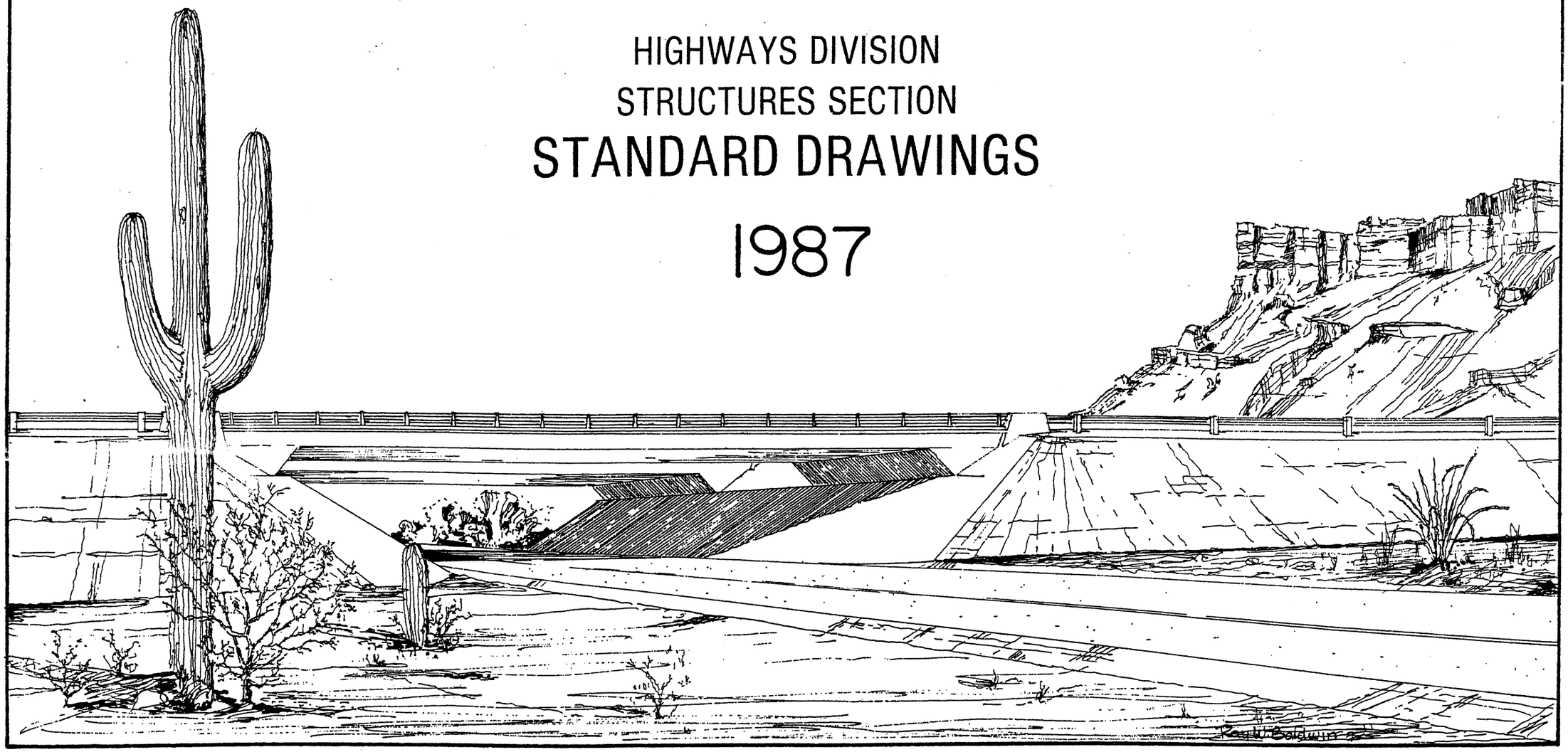
ARIZONA
DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION
STRUCTURES SECTION
STANDARD DRAWINGS

1987



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REINFORCED CONCRETE BOX CULVERTS

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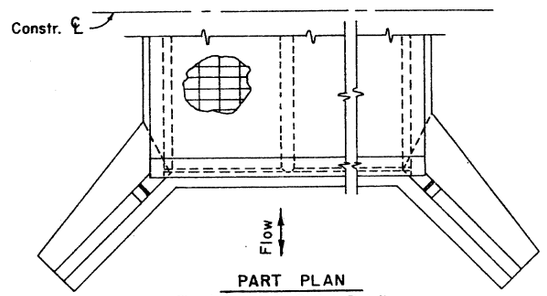
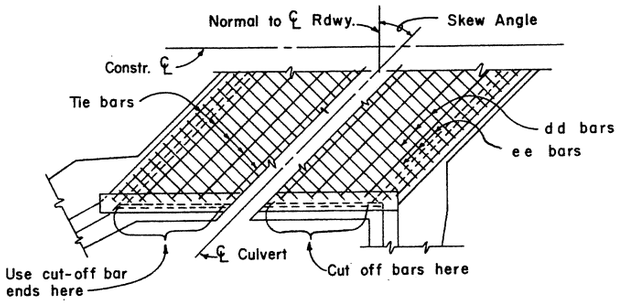
REINFORCED CONCRETE HEADWALLS FOR PIPE CULVERTS

RETAINING WALLS

MISCELLANEOUS STANDARDS



PART PLAN
Showing Inlet & Outlet Details



PART PLAN-SKEWED CULVERT
Showing Reinf. Steel Placement

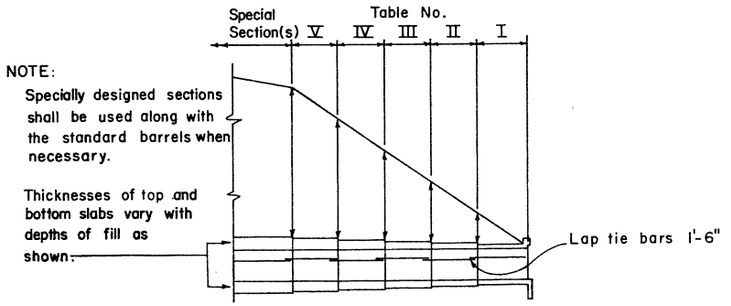
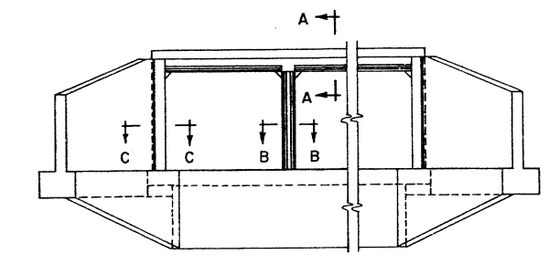
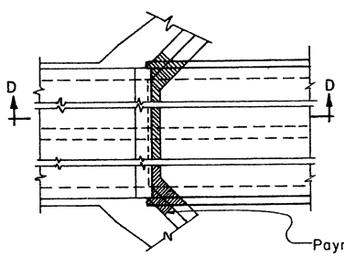


DIAGRAM SHOWING TABLES TO BE USED FOR VARIOUS FILL HEIGHTS

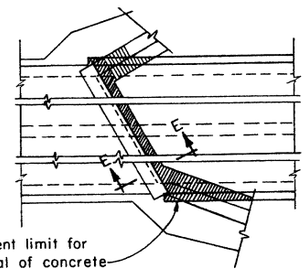
NOTE: Culvert barrels always begin and end with Table No. I.



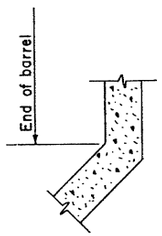
TYPICAL ELEVATION



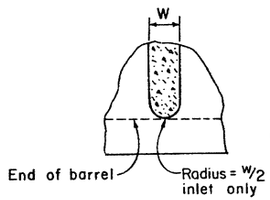
RIGHT ANGLE CULVERT



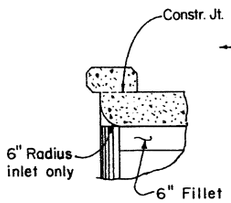
SKEWED CULVERT



SECTION C-C

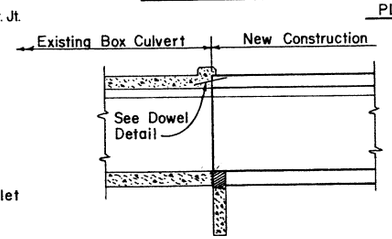


SECTION B-B

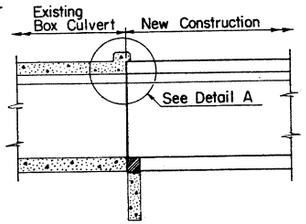


SECTION A-A

TYPICAL DETAILS



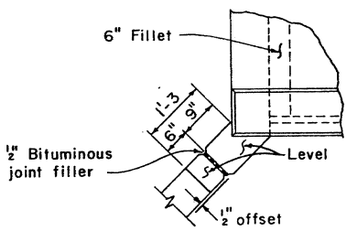
SECTION D-D



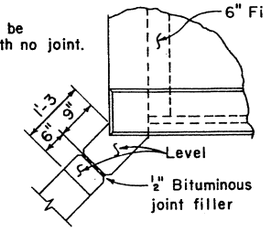
SECTION E-E

PLAN

EXTENSION OF CULVERTS

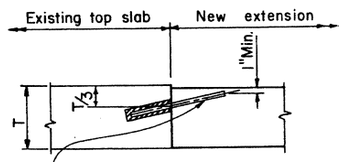


NOTE:
Footing shall be continuous with no joint.

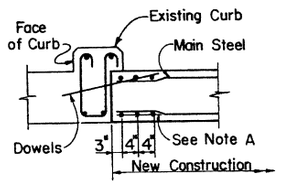


WINGWALL JOINT DETAIL
For all barrels 8 ft. and over (H ≥ 8')

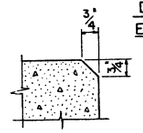
WINGWALL JOINT DETAIL
For all barrels under 8 ft. (H < 8')



DOWEL NOTE



DETAIL A
EDGE BEAM



Chamfer all exposed corners thus unless otherwise noted.
This note applicable to all culvert sheets pertaining to the project.

QUANTITY NOTE:
Total Box Culvert Quantities include Barrel Quantities and Headwall Quantities. Add Apron Quantity when apron is used.
Standard headwall quantities include wings, curb and cut-off wall.
Barrel Quantities are obtained by multiplying length of box by quantities per linear foot of box.

GENERAL NOTES:
Construction-Arizona Department of Transportation Standard Specification for Road and Bridge Construction.
Design-AASHTO Standard Specifications for Highway Bridges, 1983 Edition, and 1984 and 1985 Supplements.
Loading Class-HS 20-44 and Interstate Alternate Loading.
All Concrete shall be Class 'S', f'c = 3000 psi.
Reinforcing Steel shall conform to ASTM Specification A615.
Bar size #6 and smaller shall be designed as Grade 40 and furnished as Grade 40 or Grade 60, fs = 20,000 psi. Bar sizes #7 and larger shall be Grade 60, fs = 24,000 psi.
All bend dimensions for reinforcing steel shall be out to out of bars. All placement dimensions for reinforcing steel shall be to center of bars except as noted.
All reinforcing steel shall have 2" clear cover unless noted otherwise.

JOINT NOTE:
All structures shall have formed Constr. joints in top slab and walls (optional in floor slab) spaced not more than 38'-6" apart or as shown. Reinforcing steel shall project 1'-6" thru the joint. The joint shall be made with ¼" plywood bulkhead which shall be left in place.

CONSTRUCTION NOTE:
Remove existing headwall as required for new construction.
If concrete headwall is removed to face of curb, no dowels are needed.
Use projecting reinforcing steel for bond in new concrete.
Curb to remain unless within 1'-0" of finish grade.
Wingwalls to be removed a Min. of 1'-6" to provide steel for bond.

NOTE A:
For Straight culverts and skews up to 30° use 3 #7 bars* top and bottom of slab.
For culverts skewed over 30° to 45°, use 3 #8 bars* top and bottom of slab.
For culverts skewed over 45°, requires a special edge beam design.
*Reinforcing bar quantities have to be calculated.

DESIGN	DHY
DRAWN	FDL
CHECKED	NAB

NO.	DESCRIPTION OF REVISIONS	DATE	MADE BY
①	Edge Beam added with Note	8-72	DHY
②	Added Notes & Changed Details	9-72	FDL
③	General Notes	3-73	NAB

NO.	DESCRIPTION OF REVISIONS	DATE	MADE BY
④	General Notes	10-74	SEA
⑤		7-76	JTW
⑥		7-82	CH

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
		JEM	10-86

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
R.C. Brechler		10-86
APPROVED FOR DISTRIBUTION: E.F. Shandler	MISCELLANEOUS DETAILS FOR STANDARD BOX CULVERTS	STANDARD NO. B-01.10

R.C. Brechler

TABLE NO. I
0'-10' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Spacing	aa Length	cc ⊕ Number	ee Size	ee Spacing	ee Length	gg ⊕ Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	15"	4'-0	20	#5	5"	7'-0	22	#4	5"	4'-9	2'-3
	4'	8"	8"	15"	5'-0	24	#5	5"	7'-0	22	#4	5"	5'-3	2'-3
	5'	8"	8"	18"	6'-0	24	#6	6"	7'-0	22	#5	6"	5'-9	2'-2
	6'	8"	8"	18"	7'-0	28	#6	6"	7'-0	22	#5	6"	6'-6	2'-4
	7'	8"	8"	12"	8'-0	32	#6	6"	7'-0	22	#5	6"	7'-6	2'-10
8'	3'	8"	9"	15"	4'-0	20	#5	5"	9'-0	22	#5	5"	5'-6	2'-11
	4'	8"	9"	15"	5'-0	24	#5	5"	9'-0	22	#5	5"	5'-9	2'-8
	5'	8"	9"	18"	6'-0	24	#6	6"	9'-0	26	#5	6"	6'-3	2'-8
	6'	8½"	9"	18"	7'-0	28	#6	6"	9'-0	26	#5	6"	6'-9	2'-8
	7'	8½"	9"	18"	8'-0	32	#6	6"	9'-0	26	#5	6"	7'-3	2'-8
	8'	8½"	9"	12"	9'-0	32	#6	6"	9'-0	26	#5	6"	8'-0	2'-10
10'	3'	9"	10"	18"	4'-2	20	#7	9"	11'-3	28	#7	9"	6'-9	3'-7
	4'	9"	10"	17"	5'-2	24	#7	8½"	11'-3	28	#7	8½"	7'-3	3'-7
	5'	9"	10"	15"	6'-2	24	#8	10"	11'-3	34	#5	5"	7'-3	3'-4
	6'	9½"	10"	15"	7'-3	28	#8	10"	11'-3	34	#5	5"	7'-3	3'-0
	7'	9½"	10"	15"	8'-3	32	#8	10"	11'-3	34	#5	5"	7'-9	3'-0
	8'	10"	10"	15"	9'-3	32	#8	10"	11'-3	34	#5	5"	8'-3	3'-0
	9'	10"	10"	14"	10'-3	36	#7	7"	11'-3	36	#6	7"	9'-3	3'-2
	10'	10½"	10"	14"	11'-3	40	#7	7"	11'-3	36	#6	7"	10'-0	3'-4
12'	8'	11"	12"	18"	9'-6	32	#7	6"	13'-6	46	#6	6"	9'-6	3'-10
	9'	11½"	12"	17"	10'-6	36	#8	8½"	13'-6	46	#7	8½"	10'-6	4'-2
	10'	11½"	12"	18"	11'-6	40	#7	6"	13'-6	46	#6	6"	10'-6	4'-0
	11'	12"	12"	18"	12'-6	40	#7	6"	13'-6	46	#6	6"	11'-0	3'-9
	12'	12"	12"	12"	13'-6	44	#7	6"	13'-6	46	#7	6"	12'-0	4'-0

TABLE NO. II
10'-15' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Spacing	aa Length	cc ⊕ Number	ee Size	ee Spacing	ee Length	gg ⊕ Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	18"	4'-0	20	#5	6"	7'-0	14	#4	6"	4'-6	2'-0
	4'	8"	8"	18"	5'-0	24	#5	6"	7'-0	14	#4	6"	5'-0	2'-0
	5'	8"	8"	18"	6'-0	24	#5	6"	7'-0	14	#4	6"	5'-6	2'-0
	6'	8"	8"	18"	7'-0	28	#5	6"	7'-0	14	#4	6"	6'-0	2'-0
	7'	8"	8"	18"	8'-0	32	#5	6"	7'-0	14	#5	6"	6'-9	2'-0
8'	3'	8½"	9"	15"	4'-0	20	#5	5"	9'-0	18	#5	5"	5'-3	2'-6
	4'	8½"	9"	15"	5'-0	24	#5	5"	9'-0	18	#5	5"	5'-9	2'-6
	5'	9"	9"	18"	6'-0	24	#6	6"	9'-0	18	#5	6"	6'-0	2'-4
	6'	9"	9"	18"	7'-0	28	#6	6"	9'-0	18	#5	6"	6'-6	2'-4
	7'	9"	9"	18"	8'-0	32	#6	6"	9'-0	18	#5	6"	7'-0	2'-4
	8'	9"	9"	18"	9'-0	32	#6	6"	9'-0	18	#6	6"	8'-0	2'-6
10'	3'	10"	10"	18"	4'-3	20	#6	6"	11'-3	22	#7	6"	6'-3	3'-0
	4'	10"	10"	18"	5'-3	24	#7	6"	11'-3	22	#6	6"	6'-6	2'-11
	5'	10½"	10"	14"	6'-3	24	#7	7"	11'-3	22	#7	7"	7'-0	2'-9
	6'	11"	10"	14"	7'-3	28	#7	7"	11'-3	22	#6	7"	7'-3	2'-7
	7'	11"	10"	14"	8'-3	32	#7	7"	11'-3	22	#6	7"	7'-9	2'-7
	8'	11"	10"	14"	9'-3	32	#8	7"	11'-3	22	#7	7"	8'-9	2'-9
	9'	11"	10"	14"	10'-3	36	#8	7"	11'-3	22	#7	7"	9'-3	2'-9
	10'	11"	10"	14"	11'-3	40	#8	7"	11'-3	22	#7	7"	9'-9	2'-9
12'	8'	13"	12"	16"	9'-9	32	#9	8"	13'-6	26	#7	8"	9'-3	3'-3
	9'	13"	12"	16"	10'-9	36	#9	8"	13'-6	26	#7	8"	9'-9	3'-3
	10'	13"	12"	16"	11'-9	40	#9	8"	13'-6	26	#7	8"	10'-3	3'-3
	11'	13"	12"	16"	12'-9	40	#9	8"	13'-6	26	#7	8"	10'-9	3'-3
	12'	13½"	12"	16"	13'-9	44	#9	8"	13'-6	26	#7	8"	11'-6	3'-5

TABLE NO. III
15'-20' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Spacing	aa Length	cc ⊕ Number	ee Size	ee Spacing	ee Length	gg ⊕ Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	16½"	4'-0	20	#5	5½"	7'-0	14	#5	5½"	4'-9	2'-2
	4'	8"	8"	16½"	5'-0	24	#5	5½"	7'-0	14	#5	5½"	5'-3	2'-0
	5'	8"	8"	16½"	6'-0	24	#5	5½"	7'-0	14	#5	5½"	5'-9	2'-0
	6'	8½"	8"	16½"	7'-0	28	#5	5½"	7'-0	14	#5	5½"	6'-3	2'-0
	7'	8½"	8"	16½"	8'-0	32	#5	5½"	7'-0	14	#5	5½"	6'-9	2'-2
8'	3'	10"	9"	15"	4'-3	20	#8	10"	9'-0	18	#6	5"	5'-3	2'-3
	4'	10"	9"	15"	5'-3	24	#8	10"	9'-0	18	#5	5"	5'-6	2'-2
	5'	10½"	9"	15"	6'-3	24	#8	10"	9'-0	18	#5	5"	6'-0	2'-2
	6'	10½"	9"	15"	7'-3	28	#8	10"	9'-0	18	#5	5"	6'-6	2'-2
	7'	10½"	9"	18"	8'-3	32	#8	9"	9'-0	18	#6	6"	7'-3	2'-4
	8'	10½"	9"	18"	9'-3	32	#8	9"	9'-0	18	#6	6"	7'-9	2'-4
10'	3'	12"	10"	16½"	4'-6	20	#9	11"	11'-3	22	#7	5½"	6'-3	2'-9
	4'	12½"	10"	18"	5'-6	24	#7	6"	11'-3	22	#6	6"	6'-0	2'-5
	5'	12½"	10"	18"	6'-6	24	#7	6"	11'-3	22	#6	6"	6'-6	2'-5
	6'	12½"	10"	18"	7'-6	28	#7	6"	11'-3	22	#6	6"	7'-0	2'-5
	7'	12½"	10"	18"	8'-6	32	#9	9"	11'-3	22	#5	4½"	7'-3	2'-3
	8'	13"	10"	18"	9'-6	32	#9	9"	11'-3	22	#5	4½"	7'-9	2'-3
	9'	13"	10"	18"	10'-6	36	#9	9"	11'-3	22	#6	4½"	8'-6	2'-4
	10'	13"	10"	18"	11'-6	40	#9	9"	11'-3	22	#6	4½"	9'-3	2'-9
12'	8'	15"	12"	15"	10'-0	32	#9	7½"	13'-6	26	#7	7½"	9'-6	3'-2
	9'	15"	12"	15"	11'-0	36	#9	7½"	13'-6	26	#7	7½"	10'-0	3'-2
	10'	15½"	12"	15"	12'-0	40	#9	7½"	13'-6	26	#7	7½"	10'-6	3'-2
	11'	15½"	12"	15"	13'-0	40	#9	7½"	13'-6	26	#7	7½"	11'-0	3'-2
	12'	15½"	12"	15"	14'-0	44	#9	7½"	13'-6	26	#7	7½"	11'-6	3'-2

TABLE NO. IV
20'-25' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Spacing	aa Length	cc ⊕ Number	ee Size	ee Spacing	ee Length	gg ⊕ Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	9"	8"	18"	4'-0	20	#7	9"	7'-0	14	#5	4½"	4'-6	1'-10
	4'	9"	8"	18"	5'-0	24	#7	9"	7'-0	14	#5	4½"	5'-0	1'-10
	5'	9½"	8"	18"	6'-3	24	#7	9"	7'-0	14	#5	4½"	5'-6	1'-10
	6'	9½"	8"	18"	7'-3	28	#7	9"	7'-0	14	#5	4½"	6'-0	1'-10
	7'	9½"	8"	18"	8'-3	32	#7	9"	7'-0	14	#5	4½"	6'-9	2'-0
8'	3'	11½"	9"	15"	4'-6	20	#6	5"	9'-0	18	#6	5"	5'-6	2'-4
	4'	11½"	9"	15"	5'-6	24	#6	5"	9'-0	18	#5	5"	5'-6	2'-0
	5'	11½"	9"	15"	6'-6	24	#6	5"	9'-0	18	#5	5"	6'-0	2'-0
	6'	12"	9"	15"	7'-6	28	#6	5"	9'-0	18	#5	5"	6'-6	2'-0
	7'	12"	9"	15"	8'-6	32	#6	5"	9'-0	18	#5	5"	7'-0	2'-0
	8'	12"	9"	15"	9'-6	32	#6	5"	9'-0	18	#6	5"	8'-0	2'-3
10'	3'	14"	10"	14"	5'-0	20	#8	7"	11'-3	22	#7	7"	6'-3	2'-8
	4'	14"	10"	14"	6'-0	24	#8	7"	11'-3	22	#7	7"	6'-9	2'-8
	5'	14"	10"	18"	7'-0	24	#8	6"	11'-3	22	#6	6"	6'-9	2'-4
	6'	14½"	10"	15"	8'-0	28	#7	5"	11'-3	22	#6	5"	7'-0	2'-2
	7'	14½"	10"	15"	9'-0	32	#7	5"	11'-3	22	#6	5"	7'-6	2'-2
	8'	14½"	10"	15"	10'-0	32	#7	5"	11'-3	22	#6	5"	8'-3	2'-4
	9'	14½"	10"	18"	11'-0	36	#8	6"	11'-3	22	#7	6"	9'-3	2'-6
	10'	14½"	10"	12"	12'-0	40	#8	6"	11'-3	22	#7	6"	9'-9	2'-6
12'	8'	17"	12"	16½"	10'-3	32	#8	5½"	13'-6	26	#7	5½"	9'-0	2'-8
	9'	17½"	12"	16½"	11'-3	36	#8	5½"	13'-6	26	#6	5½"	9'-3	2'-7
	10'	17½"	12"	16½"	12'-3	40	#8	5½"	13'-6	26	#7	5½"	10'-0	3'-1
	11'	17½"	12"	15"	13'-3	40	#8	5"	13'-6	26	#7	5"	11'-0	3'-0
	12'	17½"	12"	10"	14'-3	44	#8	5"	13'-6	26	#7	5"	11'-3	3'-0

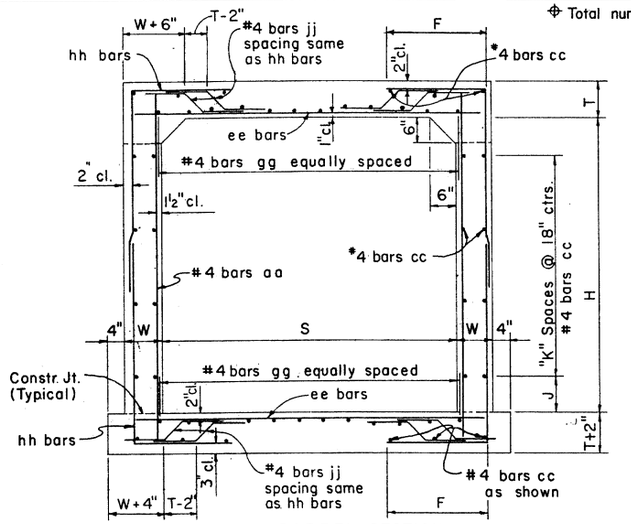
⊕ Total number of bars in the cross-section.

TABLE NO. V
25'-30' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Spacing	aa Length	cc ⊕ Number	ee Size	ee Spacing	ee Length	gg ⊕ Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	10"	8"	16"	4'-3	20	#7	8"	7'-0	14	#4	4"	4'-3	1'-7
	4'	10½"	8"	16"	5'-3	24	#7	8"	7'-0	14	#4	4"	4'-9	1'-7
	5'	10½"	8"	16"	6'-3	24	#7	8"	7'-0	14	#4	4"	5'-3	1'-7
	6'	10½"	8"	16"	7'-3	28	#7	8"	7'-0	14	#4	4"	5'-9	1'-7
	7'	10½"	8"	12"	8'-3	32	#7	8"	7'-0	14	#5	4"	6'-9	1'-9
8'	3'	13"	9"	15"	4'-9	20	#9	10"	9'-0	18	#5	5"	5'-0	2'-0
	4'	13"	9"	15"	5'-9	24	#9	10"	9'-0	18	#5	5"	5'-6	2'-0
	5'	13"	9"	15"	6'-9	24	#9	10"	9'-0	18	#5	5"	6'-0	2'-0
	6'	13"	9"	15"	7'-9	28	#9	10"	9'-0	18	#5	5"	6'-6	2'-0
	7'	13½"	9"	15"	8'-9	32	#9	10"	9'-0	18	#5	5"	7'-0	2'-0
	8'	13½"	9"	15"	9'-9	32	#9	10"	9'-0	18	#6	5"	8'-0	2'-3
10'	3'	16"	10"	18"	5'-3	20	#8	6"	11'-3	22	#7	6"	6'-0	2'-3
	4'	16"	10"	18"	6'-3	24	#8	6"	11'-3	22	#6	6"	6'-3	2'-2
	5'	16"	10"	18"	7'-3	24	#8	6"	11'-3	22	#6	6"	6'-9	2'-2
	6'	16"	10"	18"	8'-3	28	#8	6"	11'-3	22	#6	6"	7'-3	2'-2
	7'	16"	10"	18"	9'-3	32	#8	6"	11'-3	22	#6	6"	7'-9	2'-2
	8'	16"	10"	18"	10'-3	32	#8	6"	11'-3	22	#6	6"	8'-3	2'-2
	9'	16½"	10"	12"	11'-3	36	#8	6"	11'-3	22	#7	6"	9'-6	2'-6
	10'	16½"	10"	12"	12'-3	40	#8	6"	11'-3	22	#7	6"	9'-9	2'-6
12'	8'	19"	12"	18"	10'-6	32	#9	6"	13'-6	26	#7	6"	9'-0	2'-5
	9'	19½"	12"	18"	11'-6	36	#9	6"	13'-6	26	#7	6"	9'-6	2'-5
	10'	19½"	12"	15"	12'-6	40	#8	5"	13'-6	26	#6	5"	9'-9	2'-6
	11'	19½"	12"	15"	13'-6	40	#8	5"	13'-6	26	#7	5"	10'-9	2'-8
	12'	19½"	12"	10"	14'-6	44	#8	5"	13'-6	26	#7	5"	11'-9	3'-0

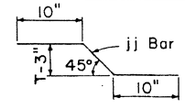
QUANTITIES PER LINEAR FT. OF BARREL

Span "S"	Height "H"	Table I Concrete C.Y.	Table I Reinf. Steel Lbs.	Table II Concrete C.Y.	Table II Reinf. Steel Lbs.	Table III Concrete C.Y.	Table III Reinf. Steel Lbs.	Table IV Concrete C.Y.	Table IV Reinf. Steel Lbs.	Table V Concrete C.Y.	Table V Reinf. Steel Lbs.
6'	3'	.586	131.0	.586	110.0	.586	133.0	.633	150.8	.680	143.5
	4'	.635	138.0	.635	116.2	.635	141.6	.682	160.0	.753	152.0
	5'	.685	156.9	.685	119.8	.685	146.2	.756	167.5	.803	157.0
	6'	.734	165.6	.734	126.0	.758	155.1	.805	181.3	.852	164.7
	7'	.783	181.0	.783	153.0	.807	164.6	.854	187.9	.902	207.1
8'	3'	.723	166.1	.754	160.9	.845	198.0	.936	208.4	1.027	191.4
	4'	.779	172.3	.810	169.6	.901	181.1	.992	189.7	1.083	200.1
	5'	.834	175.8	.896	169.3	.987	187.6	1.048	195.8	1.139	206.2
	6'	.920	184.2	.951	177.0	1.042	196.3	1.133	204.9	1.194	214.9
	7'	.976	191.9	1.007	184.7	1.098	225.1	1.189	213.7	1.280	224.5
	8'	1.031	202.6	1.062	221.6	1.153	232.0	1.245	258.8	1.336	270.5
10'	3'	.937	197.1	1.011	233.8	1.166	260.8	1.315	256.2	1.456	286.9
	4'	.999	215.2	1.073	235.8	1.258	234.1	1.369	267.1	1.517	265.7
	5'	1.061	255.5	1.172	245.6	1.320	241.0	1.431	271.4	1.579	272.6
	6'	1.159	228.2	1.271	224.4	1.382	250.6	1.530	290.7	1.641	282.1
	7'	1.221	236.9	1.332	233.3	1.443	265.1	1.592	301.7	1.703	291.7
	8'	1.320	243.8	1.394	300.4	1.523	272.5	1.653	313.5	1.764	298.6
	9'	1.382	262.3	1.456	311.2	1.585	326.8	1.715	352.9	1.863	362.1
	10'	1.480	274.0	1.517	322.1	1.647	342.4	1.777	369.9	1.925	374.3
12'	8'	1.665	316.1	1.842	329.1	2.019	349.8	2.196	404.8	2.373	415.2
	9'	1.784	316.2	1.916	333.0	2.093	360.1	2.315	368.2	2.492	428.0
	10'	1.858	338.0	1.991	348.8	2.212	371.1	2.389	431.0	2.566	413.4
	11'	1.976	342.7	2.065	355.9	2.286	378.7	2.463	483.9	2.640	484.0
	12'	2.050	416.9	2.183	368.6	2.360	389.0	2.537	505.0	2.714	505.3



TYPICAL BARREL SECTION

Height "H"	"J" Dimension	"K" Spaces
3'	9"	1
4'	3"	2
5'	12"	2
6'	9"	3
7'	3"	4
8'	12"	4
9'	9"	5
10'	3"	6
11'	12"	6
12'	9"	7



BEND

NOTE:
See B-01.10 for general notes and miscellaneous details.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Conc. quantities Table II, 6' span	J T W	7-76
②	Rev. to AASHTO 1985 Spec.	J M	10-86
③			

DESIGN	DHY	12-71
DRAWN	APJ	7-72
CHECKED	NAB	3-73

DESIGN APPROVED

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ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION 10-86

SINGLE BARREL
BOX CULVERT

STANDARD NO. B-02.10

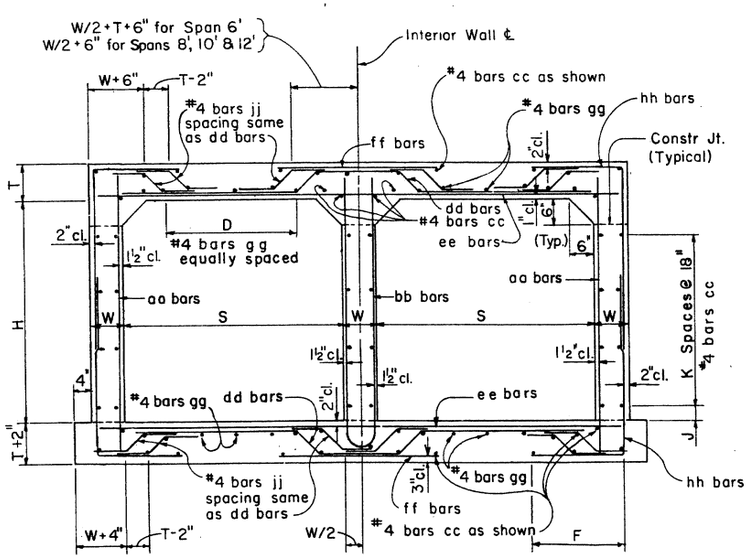
QUANTITIES PER LIN. FOOT OF BARRELS

Span "S"	Height "H"	Table I		Table II		Table III		Table IV		Table V	
		Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.
6'	3'	1.039	182.1	1.039	153.1	1.127	169.4	1.260	174.2	1.348	184.9
	4'	1.113	189.7	1.113	163.7	1.201	179.2	1.334	184.0	1.423	194.2
	5'	1.187	196.6	1.187	169.0	1.275	184.2	1.408	189.3	1.497	193.3
	6'	1.261	222.6	1.261	189.7	1.350	188.8	1.482	194.2	1.571	203.0
	7'	1.335	233.0	1.335	199.5	1.424	198.9	1.556	226.7	1.645	242.6
8'	3'	1.360	262.6	1.532	236.3	1.704	222.2	1.934	223.4	2.163	230.6
	4'	1.443	280.5	1.615	230.8	1.787	231.6	2.017	233.2	2.246	240.4
	5'	1.584	267.8	1.699	236.2	1.871	242.7	2.100	239.1	2.330	244.0
	6'	1.667	281.6	1.782	245.5	1.954	253.0	2.184	250.3	2.413	253.9
	7'	1.751	295.3	1.865	254.9	2.037	263.4	2.267	260.2	2.496	288.1
	8'	1.834	305.1	1.949	284.0	2.121	271.6	2.350	271.7	2.580	297.8
10'	3'	1.849	382.3	2.131	288.1	2.484	284.7	2.765	307.8	3.118	316.0
	4'	2.012	371.3	2.224	299.6	2.576	295.0	2.928	303.6	3.210	325.7
	5'	2.105	375.2	2.387	309.2	2.739	303.9	3.021	307.9	3.303	331.5
	6'	2.198	344.6	2.479	298.6	2.832	314.2	3.114	317.2	3.396	341.4
	7'	2.290	357.5	2.572	308.4	2.924	324.5	3.206	327.9	3.488	351.5
	8'	2.383	358.1	2.665	338.1	3.017	330.9	3.299	358.6	3.581	358.7
	9'	2.475	372.9	2.757	348.4	3.110	341.7	3.391	369.4	3.673	409.8
	10'	2.568	385.2	2.850	391.2	3.202	411.1	3.484	316.5	3.766	441.9
12'	8'	3.187	484.9	3.609	416.6	4.115	423.5	4.537	421.4	4.922	435.2
	9'	3.298	501.1	3.720	429.7	4.226	436.4	4.648	464.8	5.070	478.1
	10'	3.409	506.5	3.831	441.8	4.337	445.9	4.759	485.4	5.181	489.8
	11'	3.520	516.2	3.942	449.3	4.448	491.7	4.870	540.1	5.292	560.4
	12'	3.631	571.0	4.053	506.1	4.559	519.1	4.981	568.7	5.403	591.9

TABLE NO. I
0'-10' FILL

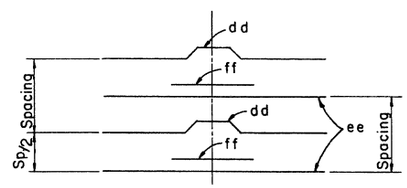
Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd						ee			ff			gg		hh			
				Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	A	B	C	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	D	Size	Spacing	Length	F
6'	3'	8"	8"	#4	11"	3'-9	#5	11"	8'-3	48	#4	11"	13'-5	5'-0	2'-3	5"	#5	11"	13'-6	#5	11"	9'-3	20	3'-6	#4	5½"	4'-9	2'-3
	4'	8"	8"	#4	11"	4'-9	#4	11"	10'-3	54	#4	11"	13'-5	5'-0	2'-3	5"	#5	11"	13'-6	#5	11"	9'-9	20	3'-6	#4	5½"	5'-3	2'-3
	5'	8"	8"	#4	11"	5'-9	#4	11"	12'-3	54	#4	11"	13'-5	5'-0	2'-3	5"	#5	11"	13'-6	#5	11"	10'-3	20	3'-6	#4	5½"	5'-9	2'-3
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-3	60	#4	11"	13'-5	5'-0	2'-3	5"	#6	11"	13'-6	#5	11"	11'-6	20	3'-6	#4	5½"	6'-3	2'-3
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-3	66	#4	11"	13'-5	5'-0	2'-3	5"	#6	11"	13'-6	#5	11"	11'-0	20	3'-6	#4	5½"	7'-0	2'-6
8'	3'	8½"	9"	#4	12"	4'-0	#4	6"	8'-6	48	#5	12"	15'-11	5'-7½	3'-4	5½"	#6	12"	17'-9	#7	12"	10'-6	24	4'-5	#5	6"	5'-9	3'-1
	4'	8½"	9"	#4	12"	5'-0	#4	6"	10'-6	54	#5	12"	16'-5	5'-10	3'-4	5½"	#6	12"	17'-9	#7	12"	11'-0	28	4'-5	#5	6"	6'-3	3'-1
	5'	9"	9"	#4	14"	6'-0	#4	7"	12'-6	54	#6	14"	16'-5	6'-0	3'-0	6"	#6	14"	17'-9	#7	14"	11'-0	28	4'-8	#5	7"	6'-6	2'-9
	6'	9"	9"	#4	14"	7'-0	#4	7"	14'-6	60	#6	14"	16'-5	6'-0	3'-0	6"	#6	14"	17'-9	#7	14"	12'-0	28	4'-8	#5	7"	7'-0	2'-9
	7'	9"	9"	#4	14"	8'-0	#4	7"	16'-6	66	#6	14"	16'-5	5'-9½	3'-4	6"	#6	14"	17'-9	#7	14"	13'-0	28	4'-4	#5	7"	7'-6	2'-9
	8'	9"	9"	#4	14"	9'-0	#4	7"	18'-6	66	#6	14"	16'-11	6'-1	3'-4	6"	#6	14"	17'-9	#7	14"	13'-0	28	4'-4	#5	7"	8'-0	2'-10
10'	3'	10"	10"	#4	11"	4'-3	#5	5½"	9'-0	48	#6	11"	19'-8	6'-11	4'-2	7"	#5	11"	21'-9	#7	11"	17'-6	32	5'-5	#6	5½"	6'-6	3'-9
	4'	10½"	10"	#4	11"	5'-3	#5	5½"	11'-0	54	#6	11"	19'-8	6'-10	4'-2	7½"	#5	11"	21'-9	#7	11"	17'-6	32	5'-4	#5	5½"	7'-0	3'-9
	5'	10½"	10"	#4	11"	6'-3	#6	11"	13'-0	54	#6	11"	20'-2	7'-1	4'-2	7½"	#5	11"	21'-9	#7	11"	18'-0	32	5'-4	#5	5½"	7'-3	3'-6
	6'	10½"	10"	#4	13"	7'-3	#5	6½"	15'-0	60	#6	13"	20'-2	7'-2	4'-0	7½"	#6	13"	21'-9	#7	13"	12'-10	32	5'-6	#5	6½"	7'-9	3'-6
	7'	10½"	10"	#4	13"	8'-3	#5	6½"	17'-0	66	#6	13"	20'-2	7'-2	4'-0	7½"	#6	13"	21'-9	#7	13"	13'-4	32	5'-6	#5	6½"	8'-0	3'-3
	8'	10½"	10"	#4	13"	9'-3	#6	13"	19'-0	66	#6	13"	20'-2	7'-2	4'-0	7½"	#6	13"	21'-9	#7	13"	13'-10	32	5'-6	#5	6½"	8'-6	3'-3
	9'	10½"	10"	#4	13"	10'-3	#6	13"	21'-0	72	#6	13"	20'-2	7'-2	4'-0	7½"	#6	13"	21'-9	#7	13	14'-10	32	5'-6	#5	6½"	9'-0	3'-3
	10'	10½"	10"	#4	13"	11'-3	#4	6½"	23'-0	78	#6	13"	20'-2	7'-2	4'-0	7½"	#6	13"	21'-9	#7	13"	16'-10	32	5'-6	#5	6½"	9'-6	3'-5
12'	8'	12½"	12"	#4	11"	9'-6	#5	5½"	20'-0	66	#6	11"	23'-8	8'-2	5'-0	9½"	#6	11"	26'-6	#7	11"	17'-3	40	6'-4	#5	5½"	9'-9	4'-3
	9'	12½"	12"	#4	11"	10'-6	#5	5½"	22'-0	72	#6	11"	24'-2	8'-5	5'-0	9½"	#6	11"	26'-6	#7	11"	17'-3	40	6'-4	#5	5½"	10'-3	4'-3
	10'	12½"	12"	#4	12"	11'-6	#5	6"	24'-0	78	#7	12"	24'-5	8'-6½	5'-0	9½"	#6	12"	26'-6	#7	12"	17'-3	40	6'-4	#5	6"	10'-9	4'-3
	11'	12½"	12"	#4	12"	12'-6	#5	6"	26'-0	78	#7	12"	24'-5	8'-6½	5'-0	9½"	#6	12"	26'-6	#7	12	17'-3	40	6'-4	#5	6"	11'-3	4'-3
	12'	12½"	12"	#4	12"	13'-6	#5	6"	28'-0	84	#7	12"	23'-11	8'-3½	5'-0	9½"	#6	12"	26'-6	#7	12"	17'-3	40	6'-4	#5	6"	11'-9	4'-3

⊕ Total number of bars in the cross-section.

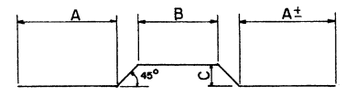


TYPICAL SECTION

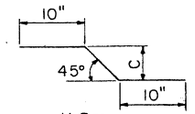
Height "H"	"J" Dim.	"K" Spaces
3'	9"	1
4'	3"	2
5'	12"	2
6'	9"	3
7'	3"	4
8'	12"	4
9'	9"	5
10'	3"	6
11'	12"	6
12'	9"	7



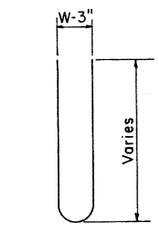
REINFORCING BAR PLACING DIAGRAM



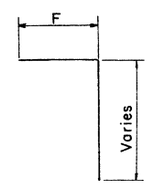
dd bar



jj Bar



bb bar



hh bar

BENDS

NOTE:

See B-02.25 for Tables No. II through V.

See B-01.10 for general notes and miscellaneous details.

All bend dimensions are out to out of bar.

DESIGN	DRAWN	CHECKED
DHY	ARJ	NAB

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Conc. quantities Table II 6' Span	J T W	7-76
2	Rev. to AASHTO 1985 Spec.	J. M.	10-86
3			

12-71	7-72	3-73

DESIGN APPROVED

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION 10-86

DOUBLE BARREL
BOX CULVERT

STANDARD NO. B-02.20

TABLE NO. II
10'-15' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd						ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number	Size	Spacing	Length	A	B	C	Size	Spacing	Length	Size	Spacing	Length	Number	D	Size	Spacing	Length	F
6'	3'	8"	8"	#4	12"	3'-9	#4	12"	8'-0	48	#5	12"	12'-5	4'-5	2'-6	5"	#4	12"	13'-6	#5	12"	4'-9	20	3'-4	#4	6"	4'-3	1'-9
	4'	8"	8"	#4	12"	4'-9	#4	12"	10'-0	54	#5	12"	12'-11	4'-8	2'-6	5"	#4	12"	13'-6	#5	12"	4'-9	20	3'-4	#4	6"	4'-9	1'-9
	5'	8"	8"	#4	12"	5'-9	#4	12"	12'-0	54	#5	12"	12'-11	4'-8	2'-6	5"	#4	12"	13'-6	#5	12"	4'-9	20	3'-4	#4	6"	5'-3	1'-9
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-0	60	#5	11"	12'-11	4'-8	2'-6	5"	#4	11"	13'-6	#5	11"	4'-9	20	3'-4	#4	5½"	5'-9	1'-9
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-0	66	#5	11"	12'-11	4'-8	2'-6	5"	#4	11"	13'-6	#5	11"	4'-9	20	3'-4	#4	5½"	6'-3	1'-9
8'	3'	10"	9"	#4	12"	4'-3	#4	12"	9'-0	48	#6	12"	16'-5	5'-10½	3'-0	7"	#5	12"	17'-9	#7	12"	6'-3	24	4'-6	#4	6"	4'-6	1'-9
	4'	10"	9"	#4	12"	5'-3	#4	12"	11'-0	54	#6	12"	16'-11	6'-1½	3'-0	7"	#5	12"	17'-9	#7	12"	6'-3	24	4'-6	#4	6"	5'-3	2'-0
	5'	10"	9"	#4	12"	6'-3	#4	12"	13'-0	54	#6	12"	16'-11	6'-1½	3'-0	7"	#5	12"	17'-9	#7	12"	6'-3	24	4'-6	#4	6"	5'-9	2'-0
	6'	10"	9"	#4	12"	7'-3	#4	12"	15'-0	60	#6	12"	16'-11	6'-1½	3'-0	7"	#5	12"	17'-9	#7	12"	6'-3	24	4'-6	#4	6"	6'-3	2'-0
	7'	10"	9"	#4	12"	8'-3	#4	12"	17'-0	66	#6	12"	16'-11	6'-1½	3'-0	7"	#5	12"	17'-9	#7	12"	6'-3	24	4'-6	#4	6"	6'-9	2'-0
	8'	10"	9"	#4	12"	9'-3	#4	12"	19'-0	66	#6	12"	16'-11	6'-1½	3'-0	7"	#5	12"	17'-9	#7	12"	6'-3	24	4'-6	#5	6"	7'-6	2'-3
10'	3'	12"	10"	#4	11"	4'-6	#4	11"	9'-6	48	#6	11"	20'-2	7'-3	3'-6	9"	#5	11"	21'-9	#7	11"	7'-6	28	5'-9	#5	5½"	5'-3	2'-3
	4'	12"	10"	#4	11"	5'-6	#4	11"	11'-6	54	#6	11"	20'-2	7'-3	3'-6	9"	#5	11"	21'-9	#7	11"	7'-6	28	5'-9	#5	5½"	5'-9	2'-3
	5'	12½"	10"	#4	11"	6'-6	#4	11"	13'-6	54	#6	11"	20'-8	7'-5	3'-6	9½"	#5	11"	21'-9	#7	11"	7'-6	28	5'-8	#5	5½"	6'-3	2'-3
	6'	12½"	10"	#4	11"	7'-6	#4	11"	15'-6	60	#6	11"	20'-8	7'-5	3'-6	9½"	#5	11"	21'-9	#7	11"	7'-6	28	5'-8	#4	5½"	6'-9	2'-3
	7'	12½"	10"	#4	11"	8'-6	#4	11"	17'-6	66	#6	11"	20'-8	7'-5	3'-6	9½"	#5	11"	21'-9	#7	11"	7'-6	28	5'-8	#4	5½"	7'-3	2'-3
	8'	12½"	10"	#4	13"	9'-6	#4	13"	19'-6	66	#7	13"	21'-2	7'-8	3'-6	9½"	#6	13"	21'-9	#7	13"	7'-6	28	5'-8	#5	6½"	7'-9	2'-3
	9'	12½"	10"	#4	13"	10'-6	#4	13"	21'-6	72	#7	13"	21'-2	7'-8	3'-6	9½"	#6	13"	21'-9	#7	13"	7'-6	28	5'-8	#5	6½"	8'-3	2'-3
	10'	12½"	10"	#4	13"	11'-6	#4	13"	23'-6	78	#7	13"	21'-2	7'-8	3'-6	9½"	#6	13"	21'-9	#7	13"	7'-6	28	5'-8	#6	6½"	9'-2	2'-8
12'	8'	15"	12"	#4	11"	10'-0	#4	11"	20'-6	66	#6	11"	24'-5	8'-6	4'-6	12"	#6	11"	26'-6	#8	11"	9'-0	32	6'-5	#5	5½"	8'-3	2'-6
	9'	15"	12"	#4	11"	11'-0	#4	11"	22'-6	72	#6	11"	24'-11	8'-9	4'-6	12"	#6	11"	26'-6	#8	11"	9'-0	32	6'-5	#5	5½"	8'-9	2'-7
	10'	15"	12"	#4	11"	12'-0	#4	11"	24'-6	78	#6	11"	24'-5	8'-6	4'-6	12"	#6	11"	26'-6	#8	11"	9'-0	32	6'-5	#5	5½"	9'-6	2'-10
	11'	15"	12"	#4	11"	13'-0	#4	11"	26'-6	78	#6	11"	24'-5	8'-6	4'-6	12"	#6	11"	26'-6	#8	11"	9'-0	32	6'-5	#5	5½"	10'-0	2'-10
	12'	15"	12"	#4	11"	14'-0	#4	11"	28'-6	84	#6	11"	24'-5	8'-6	4'-6	12"	#6	11"	26'-6	#8	11"	9'-0	32	6'-5	#6	5½"	10'-9	3'-0

TABLE NO. III
15'-20' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd						ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number	Size	Spacing	Length	A	B	C	Size	Spacing	Length	Size	Spacing	Length	Number	D	Size	Spacing	Length	F
6'	3'	9"	8"	#4	11"	4'-0	#4	11"	8'-6	48	#5	11"	12'-11	4'-6	2'-6	6"	#4	11"	13'-6	#6	11"	5'-7	16	3'-1	#4	5½"	4'-3	1'-8
	4'	9"	8"	#4	11"	5'-0	#4	11"	10'-6	54	#5	11"	12'-11	4'-6	2'-6	6"	#4	11"	13'-6	#6	11"	5'-7	16	3'-1	#4	5½"	4'-9	1'-8
	5'	9"	8"	#4	11"	6'-0	#4	11"	12'-6	54	#5	11"	12'-11	4'-6	2'-6	6"	#4	11"	13'-6	#6	11"	5'-1	16	3'-1	#4	5½"	5'-3	1'-8
	6'	9"	8"	#4	11"	7'-0	#4	11"	14'-6	60	#5	11"	12'-11	4'-6	2'-6	6"	#4	11"	13'-6	#5	11"	4'-9	16	3'-1	#4	5½"	5'-9	1'-8
	7'	9"	8"	#4	11"	8'-0	#4	11"	16'-6	66	#5	11"	12'-11	4'-6	2'-6	6"	#4	11"	13'-6	#5	11"	4'-9	16	3'-1	#4	5½"	6'-3	1'-10
8'	3'	11½"	9"	#4	12"	4'-6	#4	12"	9'-6	48	#6	12"	16'-11	5'-11½	3'-0	8½"	#5	12"	17'-9	#7	12"	6'-3	24	4'-3	#4	6"	4'-6	1'-9
	4'	11½"	9"	#4	12"	5'-6	#4	12"	11'-6	54	#6	12"	16'-11	5'-11½	3'-0	8½"	#5	12"	17'-9	#7	12"	6'-3	24	4'-3	#4	6"	5'-0	1'-9
	5'	11½"	9"	#4	13"	6'-6	#4	13"	13'-6	54	#6	13"	16'-11	5'-11½	3'-0	8½"	#5	13"	17'-9	#7	13"	6'-6	24	4'-3	#5	6½"	6'-0	2'-0
	6'	11½"	9"	#4	13"	7'-6	#4	13"	15'-6	60	#6	13"	16'-11	5'-11½	3'-0	8½"	#5	13"	17'-9	#7	13"	6'-6	24	4'-3	#5	6½"	6'-6	2'-0
	7'	11½"	9"	#4	13"	8'-6	#4	13"	17'-6	66	#6	13"	16'-11	5'-11½	3'-0	8½"	#5	13"	17'-9	#7	13"	6'-6	24	4'-3	#5	6½"	7'-0	2'-0
	8'	11½"	9"	#4	13"	9'-6	#4	13"	19'-6	66	#6	13"	16'-11	6'-2½	2'-6	8½"	#5	13"	17'-9	#7	13"	6'-6	24	4'-9	#5	6½"	7'-9	2'-4
10'	3'	14½"	10"	#4	13"	5'-0	#4	13"	10'-6	48	#6	13"	20'-8	7'-5½	3'-0	11½"	#6	13"	21'-9	#8	13"	7'-9	28	5'-10	#5	6½"	5'-3	2'-0
	4'	14½"	10"	#4	13"	6'-0	#4	13"	12'-6	54	#6	13"	20'-8	7'-5½	3'-0	11½"	#6	13"	21'-9	#8	13"	7'-9	28	5'-10	#5	6½"	5'-9	2'-0
	5'	15"	10"	#4	13"	7'-0	#4	13"	14'-6	54	#6	13"	21'-5	7'-9	3'-0	1'-0	#6	13"	21'-9	#8	13"	7'-10	28	5'-9	#5	6½"	6'-3	2'-0
	6'	15"	10"	#4	13"	8'-0	#4	13"	16'-6	60	#6	13"	21'-5	7'-9	3'-0	1'-0	#6	13"	21'-9	#8	13"	7'-10	28	5'-9	#5	6½"	6'-9	2'-0
	7'	15"	10"	#4	13"	9'-0	#4	13"	18'-6	66	#6	13"	21'-5	7'-9	3'-0	1'-0	#6	13"	21'-9	#8	13"	7'-10	28	5'-9	#5	6½"	7'-3	2'-0
	8'	15"	10"	#4	13"	10'-0	#4	13"	20'-6	66	#6	13"	21'-5	7'-9	3'-0	1'-0	#6	13"	21'-9	#8	13"	7'-10	28	5'-9	#5	6½"	7'-9	2'-0
	9'	15"	10"	#4	13"	11'-0	#4	13"	22'-6	72	#6	13"	20'-11	7'-6	3'-0	1'-0	#6	13"	21'-9	#8	13"	7'-10	28	5'-9	#5	6½"	8'-6	2'-4
	10'	15"	10"	#4	12"	12'-0	#4	12"	24'-6	78	#6	12"	20'-11	7'-6	3'-0	1'-0	#6	12"	21'-9	#8	12"	7'-9	28	5'-9	#6	6"	9'-7	2'-11
12'	8'	18"	12"	#4	12"	10'-6	#4	12"	21'-6	66	#7	12"	25'-5	8'-11	4'-0	1'-3	#6	12"	26'-6	#8	12"	9'-6	32	6'-5	#5	6"	8'-3	2'-4
	9'	18"	12"	#4	12"	11'-6	#4	12"	23'-6	72	#7	12"	25'-5	8'-11	4'-0	1'-3	#6	12"	26'-6	#8	12"	9'-6	32	6'-5	#5	6"	9'-0	2'-6
	10'	18"	12"	#4	12"	12'-6	#4	12"	25'-6	78	#7	12"	25'-5	8'-11	4'-0	1'-3	#6	12"	26'-6	#8	12"	9'-0	32	6'-5	#5	6"	9'-6	2'-6
	11'	18"	12"	#4	12"	13'-6	#4	12"	27'-6	78	#7	12"	25'-5	8'-11	4'-0	1'-3	#6	12"	26'-6	#8	12"	9'-0	32	6'-5	#6	6"	10'-10	3'-4
	12'	18"	12"	#5	12"	14'-6	#4	12"	29'-6	84	#7	12"	25'-5	8'-11	4'-0	1'-3	#6	12"	26'-6	#8	12"	9'-0	32	6'-5	#6	6"	11'-0	3'-0

TABLE NO. IV
20'-25' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd						ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number	Size	Spacing	Length	A	B	C	Size	Spacing	Length	Size	Spacing	Length	Number	D	Size	Spacing	Length	F
6'	3'	10½"	8"	#4	11"	4'-3	#4	11"	9'-0	48	#5	11"	13'-8	4'-8	2'-6	7½"	#4	11"	13'-6	#6	11"	5'-7	16	2'-10	#4	5½"	4'-3	1'-6
	4'	10½"	8"	#4	11"	5'-3	#4	11"	11'-0	54	#5	11"	13'-8	4'-8	2'-6	7½"	#4	11"	13'-6	#6	11"	5'-7	16	2'-10	#4	5½"	4'-9	1'-6
	5'	10½"	8"	#4	11"	6'-3	#4	11"	13'-0	54	#5	11"	13'-8	4'-8	2'-6	7½"	#4	11"	13'-6	#6	11"	5'-3	16	2'-10	#4	5½"	5'-3	1'-6
	6'	10½"	8"	#4	11"	7'-3	#4	11"	15'-0	60	#5	11"	13'-8	4'-8	2'-6	7½"	#4	11"	13'-6	#5	11"	4'-9	16	2'-10	#4	5½"	6'-0	1'-9
	7'	10½"	8"	#4	11"	8'-3	#4	11"	17'-0	66	#5	11"	13'-8	4'-8	2'-6	7½"	#4	11"	13'-6	#5	11"	4'-9	16	2'-10	#5	5½"	6'-9	2'-2
8'	3'	13½"	9"	#4	11"	4'-9	#4	11"	10'-0	48	#5	11"	17'-5	6'-0	3'-0	10½"	#5	11"	17'-9	#7	11"	6'-6	20	3'-11	#4	5½"	4'-6	1'-6
	4'	13½"	9"	#4	11"	5'-9	#4	11"	12'-0	54	#5	11"	17'-5	6'-0	3'-0	10½"	#5	11"	17'-9	#7	11"	6'-6	20	3'-11	#4	5½"	5'-0	1'-6
	5'	13½"	9"	#4	11"	6'-9	#4	11"	14'-0	54	#5	11"	17'-5	6'-0	3'-0	10½"	#5	11"	17'-9	#7	11"	6'-6	20	3'-11	#4	5½"	5'-6	1'-6
	6'	13½"	9"	#4	11"	7'-9	#4	11"	16'-0	60	#5	11"	17'-5	6'-0	3'-0	10½"	#5	11"	17'-9	#7	11"	6'-6	20	3'-11	#4	5½"	6'-3	1'-9
	7'	13½"	9"	#4	11"	8'-9	#4	11"	18'-0	66	#5	11"	17'-5	6'-0	3'-0	10½"	#5	11"	17'-9	#7	11"	6'-6	20	3'-11	#4	5½"	6'-9	1'-9
	8'	13½"	9"	#4	12"	9'-9	#4	12"	20'-0	66	#5	12"	17'-5	6'-0	3'-0	10½"	#5	12"	17'-9	#7	12"	6'-6	20	3'-11	#5	6"	7'-6	2'-2
10'	3'	16½"	10"	#4	12"	5'-3	#4	12"	11'-0	48	#6	12"	21'-5	7'-7½	3'-0	1'-1½	#6	12"	21'-9	#8	12"	8'-1	28	5'-6	#5	6"	5'-0	1'-9
	4'	17"	10"	#4	12"	6'-3	#4	12"	13'-0	54	#6	12"	21'-8	7'-8	3'-0	1'-2	#6	12"	21'-9	#8	12"	8'-2	28	5'-5	#4	6"	5'-6	1'-9
	5'	17"	10"	#4	12"	7'-3	#4	12"	15'-0	54	#6	12"	21'-8	7'-8	3'-0	1'-2	#6	12"	21'-9	#8	12"	8'-2	28	5'-5	#4	6"	6'-0	1'-9
	6'	17"	10"	#4	12"	8'-3	#4	12"	17'-0	60	#6	12"	21'-8	7'-8	3'-0	1'-2	#6	12"	21'-9	#8	12"	7'-9	28	5'-5	#4	6"	6'-6	1'-9
	7'	17"	10"	#4	12"	9'-3	#4	12"	19'-0	66	#6	12"	21'-8	7'-8	3'-0	1'-2	#6	12"	21'-9	#8	12"	7'-9	28	5'-5	#4	6"	7'-3	2'-0
	8'	17"	10"	#4	12"	10'-3	#4	12"	21'-0	66	#6	12"	21'-8	7'-8	3'-0	1'-2	#6	12"	21'-9	#8	12"	7'-9	28	5'-5	#5	6"	8'-0	2'-0
	9'	17"	10"	#4	12"	11'-3	#4	12"	23'-0	72	#6	12"	21'-8	7'-8	3'-0	1'-2	#6	12"	21'-9	#8	12"	7'-9	28	5'-5	#5	6"	8'-6	2'-3
	10'	17"	10"	#5	12"	12'-3	#4	12"	25'-0	78	#6	12"	21'-2	7'-5	3'-0	1'-2	#6	12"	21'-9	#8	12"	7'-9	28	5'-5	#6	6"	9'-7	2'-10
12'	8'	20½"	12"	#4	15"	11'-0	#4	15"	22'-6	66	#6	10"	25'-8	8'-9	4'-0	1'-5½	#6	10"	26'-6	#8	10"	9'-0	28	6'-0	#4	5"	8'-3	2'-2
	9'	20½"	12"	#4	15"	12'-0	#4	15"	24'-6	72	#6	10"	25'-8	8'-9	4'-0	1'-5½	#6	10"	26'-6	#8	10"	9'-0	28	6'-0	#5	5"	9'-0	2'-4
	10'	20½"	12"	#4	10"	13'-0	#4	15"	26'-6	78	#6	10"	25'-8	8'-9	4'-0	1'-5½	#6	10"	26'-6	#8	10"	9'-0	28	6'-0	#5	5"	9'-9	2'-6
	11'	20½"	12"	#4	10"	14'-0	#4	15"	28'-6	78	#6	10"	25'-2	8'-6	4'-0	1'-5½	#6	10"	26'-6	#8	10"	9'-0	28	6'-0	#6	5"	11'-4	3'-7
	12'	20½"	12"	#5	10"	15'-0	#4	15"	30'-6	84	#6	10"	25'-2	8'-6	4'-0	1'-5½	#6	10"	26'-6	#8	10"	9'-0	28	6'-0	#6	5"	11'-10	3'-7

TABLE NO. V
25'-30' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd						ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number	Size	Spacing	Length	A	B	C	Size	Spacing	Length	Size	Spacing	Length	Number	D	Size	Spacing	Length	F
6'	3'	11½"	8"	#4	15"	4'-6	#4	15"	9'-6	48	#5	10"	13'-11	4'-11	2'-0	8½"	#4	10"	13'-6	#6	10"	5'-7	16	3'-2	#4	5"	4'-3	1'-6
	4'	11½"	8"	#4	15"	5'-6	#4	15"	11'-6	54	#5	10"	13'-11	4'-11	2'-0	8½"	#4	10"	13'-6	#6	10"	5'-7	16	3'-2	#4	5"	4'-9	1'-6
	5'	11½"	8"	#4	15"	6'-6	#4	15"	13'-6	54	#5	10"	13'-11	4'-11	2'-0	8½"	#4	10"	13'-6	#5	10"	5'-3	16	3'-2	#4	5"	5'-3	1'-6
	6'	11½"	8"	#4	15"	7'-6	#4	15"	15'-6	60	#5	10"	13'-11	4'-11	2'-0	8½"	#4	10"	13'-6	#5	10"	4'-9	16	3'-2	#4	5"	6'-0	1'-9
	7'	11½"	8"	#4	10"	8'-6	#4	15"	17'-6	66	#5	10"	13'-11	4'-11	2'-0	8½"	#4	10"	13'-6	#5	10"	4'-9	16	3'-2	#5	5"	7'-0	2'-1-3
8'	3'	15½"	9"	#4	11"	5'-0	#4	11"	10'-9	48	#5	11"	17'-8	5'-10	3'-0	1'-0½	#5	11"	17'-9	#7	11"	7'-0	20	3'-7	#4	5½"	4'-9	1'-8
	4'	15½"	9"	#4	11"	6'-0	#4	11"	12'-9	54	#5	11"	17'-8	5'-10	3'-0	1'-0½	#5	11"	17'-9	#7	11"	7'-0	20	3'-7	#4	5½"	5'-3	1'-8
	5'	15½"	9"	#4	11"	7'-0	#4	11"	14'-9	54	#5	11"	17'-8	5'-10	3'-0	1'-0½	#5	11"	17'-9	#7	11"	6'-6	20	3'-7	#4	5½"	5'-9	1'-8
	6'	15½"	9"	#4	11"	8'-0	#4	11"	16'-9	60	#5	11"	17'-8	5'-10	3'-0	1'-0½	#5	11"	17'-9	#7	11"	6'-6	20	3'-7	#4	5½"	6'-3	2'-2
	7'	15½"	9"	#4	11"	9'-0	#4	11"	18'-9	66	#5	11"	17'-8	5'-10	3'-0	1'-0½	#5	11"	17'-9	#7	11"	6'-6	20	3'-7	#5	5½"	7'-0	1'-10
	8'	15½"	9"	#4	11"	10'-0	#4	11"	20'-9	66	#5	11"	17'-8	5'-10	3'-0	1'-0½	#5	11"	17'-9	#7	11"	6'-6	20	3'-7	#5	5½"	7'-9	2'-0
10'	3'	19"	10"	#4	11"	5'-9	#4	11"	11'-9	48	#6	11"	21'-8	7'-5	3'-0	1'-4	#6	11"	21'-9	#8	11"	7'-9	24	5'-1	#4	5½"	5'-0	1'-7
	4'	19"	10"	#4	11"	6'-9	#4	11"	13'-9	54	#6	11"	21'-8	7'-5	3'-0	1'-4	#6	11"	21'-9	#8	11"	7'-9	24	5'-1	#4	5½"	5'-6	1'-7
	5'	19"	10"	#4	11"	7'-9	#4	11"	15'-9	54	#6	11"	21'-8	7'-5	3'-0	1'-4	#6	11"	21'-9	#8	11"	7'-9	24	5'-1	#4	5½"	6'-0	1'-7
	6'	19"	10"	#4	11"	8'-9	#4	11"	17'-9	60	#6	11"	21'-8	7'-5	3'-0	1'-4	#6	11"	21'-9	#8	11"	7'-9	24	5'-1	#4	5½"	6'-6	1'-7
	7'	19"	10"	#4	11"	9'-9	#4	11"	19'-9	66	#6	11"	21'-8	7'-5	3'-0	1'-4	#6	11"	21'-9	#8	11"	7'-9	24	5'-1	#4	5½"	7'-0	1'-9
	8'	19"	10"	#4	13"	10'-9	#4	13"	21'-9	66	#7	13"	21'-1	7'-8	3'-0	1'-4	#6	13"	21'-9	#8	13"	7'-9	24	5'-1	#4	5½"	8'-0	2'-0
	9'	19"	10"	#5	13"	11'-9	#4	13"	23'-9	72	#7	13"	21'-1	7'-8	3'-0	1'-4	#6	13"	21'-9	#8	13"	7'-9	24	5'-1	#6	6½"	9'-6	3'-0
	10'	19"	10"	#5	11"	12'-9	#4	11"	25'-9	78	#6	11"	21'-8	7'-5	3'-0	1'-4	#6	11"	21'-9	#8	11"	7'-9	24	5'-1	#6	5½"	10'-0	3'-0
12'	8'	23"	12"	#4	10"	11'-3	#4	15"	23'-0	66	#6	10"	25'-11	8'-7	4'-0	1'-8	#6	10"	26'-6	#8	10"	10'-4	28	5'-7	#4	5"	8'-3	2'-0
	9'	23"	12"	#4	10"	12'-3	#4	15"	25'-0	72	#6	10"	25'-11	8'-7	4'-0	1'-8	#6	10"	26'-6	#8	10"	9'-0	28	5'-7	#5	5"	9'-3	2'-4
	10'	23"	12"	#4	10"	13'-3	#4	15"	27'-0	78	#6	10"	25'-11	8'-7	4'-0	1'-8	#6	10"	26'-6	#8	10"	9'-0	28	5'-7	#5	5"	9'-9	2'-4
	11'	23"	12"	#5	10"	14'-3	#4	15"	29'-0	78	#6	10"	25'-11	8'-7	4'-0	1'-8	#6	10"	26'-6	#8	10"	9'-0	28	5'-7	#6	5"	11'-4	3'-6
	12'	23"	12"	#6	10"	15'-3	#4	15"	31'-0	84	#6	10"	25'-5	8'-4	4'-0	1'-8	#6	10"	26'-6	#8	10"	9'-0	28	5'-7	#6	5"	12'-1	3'-9

Total number of bars in cross-section.

NOTE:

See B-02.20 for Table No. I, typical section, steel call outs, bend diagrams and quantities.

See B-01.10 for general notes and miscellaneous details.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Table II, 6' span, T now 8"	J.T.W	7-76
2	Rev. to AASHTO 1985 Spec.	J.M	10-86
3			

	12-71	9-72	3-73
DESIGN	DHY		
DRAWN	FDL		
CHECKED	NAB		

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STANDARD DRAWINGS

REVISION 10-86

DOUBLE BARREL
BOX CULVERT

STANDARD NO. B-02.25

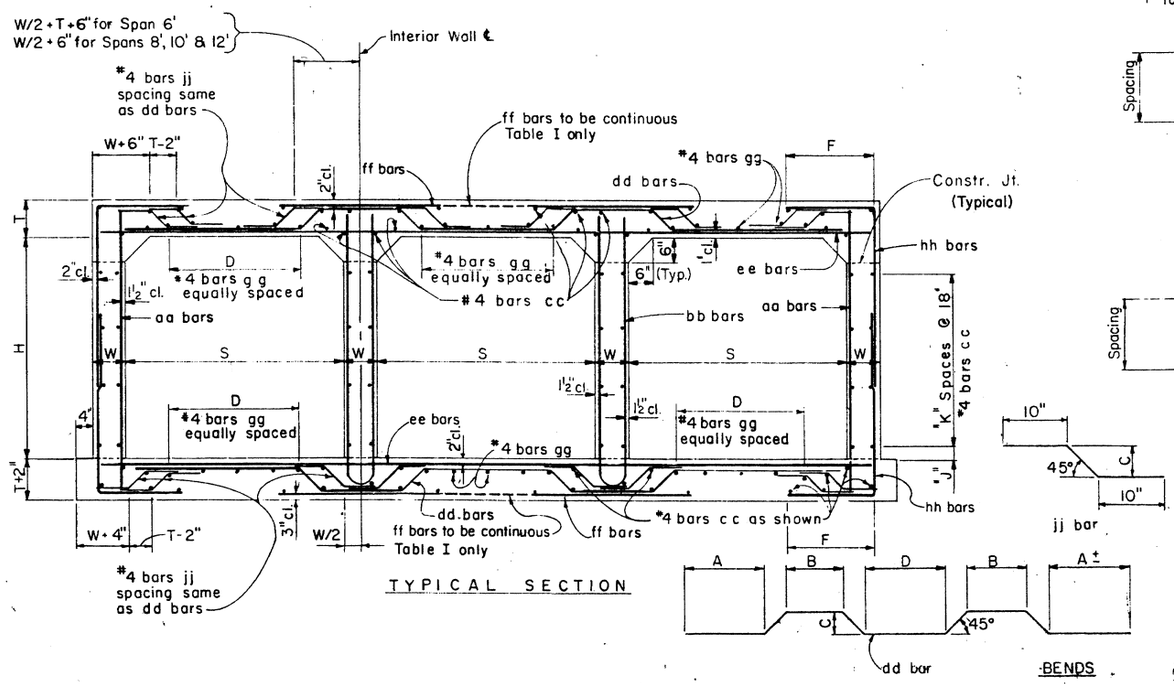
QUANTITIES PER LIN. FOOT OF BARRELS

Span "S"	Height "H"	Table I		Table II		Table III		Table IV		Table V	
		Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.
6'	3'	1.493	262.7	1.493	213.7	1.623	241.4	1.817	245.6	1.947	258.8
	4'	1.592	268.6	1.592	226.8	1.721	254.0	1.916	258.3	2.045	270.6
	5'	1.690	275.9	1.690	233.5	1.820	258.0	2.015	263.4	2.144	263.0
	6'	1.789	308.8	1.789	260.9	1.919	258.9	2.113	264.7	2.243	273.9
	7'	1.888	321.4	1.888	273.5	2.018	271.6	2.212	300.8	2.342	318.6
8'	3'	1.966	396.0	2.219	336.7	2.472	322.9	2.809	322.0	3.147	331.9
	4'	2.077	416.7	2.330	333.1	2.583	334.9	2.920	334.7	3.258	344.5
	5'	2.272	401.7	2.441	339.8	2.694	342.0	3.032	341.9	3.369	347.4
	6'	2.383	413.5	2.552	351.9	2.805	354.9	3.143	356.0	3.480	360.0
	7'	2.494	428.1	2.663	363.9	2.916	367.8	3.254	368.7	3.591	397.0
	8'	2.606	438.7	2.774	394.4	3.027	377.3	3.365	375.2	3.702	408.2
10'	3'	2.686	551.7	3.102	414.5	3.621	415.6	4.037	451.4	4.557	466.5
	4'	2.914	535.6	3.225	428.8	3.745	428.5	4.264	449.7	4.680	479.2
	5'	3.037	534.9	3.453	439.9	3.972	439.7	4.388	456.4	4.804	486.5
	6'	3.161	525.3	3.576	432.0	4.097	452.2	4.511	464.0	4.927	499.1
	7'	3.284	543.4	3.700	444.7	4.219	465.1	4.635	477.4	5.050	511.7
	8'	3.407	535.7	3.823	480.3	4.343	472.7	4.758	509.4	5.174	512.3
	9'	3.531	551.7	3.947	521.1	4.466	486.1	4.882	522.9	5.297	573.3
	10'	3.654	560.6	4.070	540.3	4.590	571.4	5.005	587.7	5.421	636.2
12'	8'	4.576	730.7	5.198	603.0	5.945	616.9	6.567	619.4	7.190	646.8
	9'	4.724	752.8	5.346	618.9	6.093	632.5	6.716	665.1	7.338	678.6
	10'	4.872	760.4	5.494	633.8	6.241	640.7	6.864	688.1	7.486	692.6
	11'	5.020	774.2	5.642	642.8	6.389	695.6	7.012	755.8	7.634	775.0
	12'	5.168	791.4	5.791	702.4	6.538	717.8	7.160	785.6	7.782	810.8

TABLE NO. I
0'-10' FILL

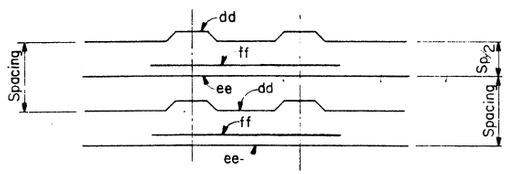
Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd						ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	A	B	C	D	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	F
6'	3'	8"	8"	#4	11"	3'-9	#5	11"	8'-3	68	#4	11"	20'-9	5'-1	2'-3	5"	3'-7	#5	11"	20'-3	#5	11"	14'-6	30	#4	5½"	6'-9	4'-2
	4'	8"	8"	#4	11"	4'-9	#4	11"	10'-3	76	#4	11"	20'-9	5'-1	2'-3	5"	3'-7	#5	11"	20'-3	#5	11"	14'-6	30	#4	5½"	7'-3	4'-2
	5'	8"	8"	#4	11"	5'-9	#4	11"	12'-3	76	#4	11"	20'-9	5'-1	2'-3	5"	3'-7	#5	11"	20'-3	#5	11"	14'-6	30	#4	5½"	7'-9	4'-2
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-3	84	#4	11"	20'-9	5'-1	2'-3	5"	3'-7	#6	11"	20'-3	#5	11"	14'-6	30	#4	5½"	8'-3	4'-2
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-3	92	#4	11"	20'-9	5'-1	2'-3	5"	3'-7	#6	11"	20'-3	#5	11"	14'-6	30	#4	5½"	8'-9	4'-2
8'	3'	8½"	9"	#4	12"	4'-0	#4	6"	8'-6	68	#5	12"	25'-3	5'-8	3'-4	5½"	4'-6	#6	12"	26'-6	#7	12"	18'-9	36	#5	6"	8'-0	5'-3
	4'	8½"	9"	#4	12"	5'-0	#4	6"	10'-6	76	#5	12"	25'-6	5'-9½	3'-4	5½"	4'-6	#6	12"	26'-6	#7	12"	18'-9	42	#5	6"	8'-6	5'-3
	5'	9"	9"	#4	14"	6'-0	#4	7"	12'-6	76	#6	14"	25'-9	6'-0	3'-0	6"	4'-9	#6	14"	26'-6	#7	14"	18'-9	42	#5	7"	9'-0	5'-3
	6'	9"	9"	#4	14"	7'-0	#4	7"	14'-6	84	#6	14"	25'-9	6'-0	3'-0	6"	4'-9	#6	14"	26'-6	#7	14"	18'-9	42	#5	7"	9'-6	5'-3
	7'	9"	9"	#4	14"	8'-0	#4	7"	16'-6	92	#6	14"	25'-9	5'-10	3'-4	6"	4'-5	#6	14"	26'-6	#7	14"	18'-9	42	#5	7"	10'-0	5'-3
	8'	9"	9"	#4	14"	9'-0	#4	7"	18'-6	92	#6	14"	26'-3	6'-1	3'-4	6"	4'-5	#6	14"	26'-6	#7	14"	18'-9	42	#5	7"	10'-6	5'-3
10'	3'	10"	10"	#4	11"	4'-3	#5	5½"	9'-0	68	#6	11"	31'-3	7'-0	4'-2	7"	5'-6	#5	11"	32'-9	#7	11"	23'-0	48	#6	5½"	9'-3	6'-6
	4'	10½"	10"	#4	11"	5'-3	#5	5½"	11'-0	76	#6	11"	31'-3	6'-11	4'-2	7½"	5'-5	#5	11"	32'-9	#7	11"	23'-0	48	#5	5½"	9'-9	6'-6
	5'	10½"	10"	#4	11"	6'-3	#6	11"	13'-0	76	#6	11"	31'-6	7'-0½	4'-2	7½"	5'-5	#5	11"	32'-9	#7	11"	23'-0	48	#5	5½"	10'-3	6'-6
	6'	10½"	10"	#4	13"	7'-3	#5	6½"	15'-0	84	#6	13"	31'-6	7'-1½	4'-0	7½"	5'-7	#6	13"	32'-9	#7	13"	23'-0	48	#5	6½"	10'-9	6'-6
	7'	10½"	10"	#4	13"	8'-3	#5	6½"	17'-0	92	#6	13"	31'-6	7'-1½	4'-0	7½"	5'-7	#6	13"	32'-9	#7	13"	23'-0	48	#5	6½"	11'-3	6'-6
	8'	10½"	10"	#4	13"	9'-3	#6	13"	19'-0	92	#6	13"	31'-6	7'-1½	4'-0	7½"	5'-7	#6	13"	32'-9	#7	13"	23'-0	48	#5	6½"	11'-9	6'-6
	9'	10½"	10"	#4	13"	10'-3	#6	13"	21'-0	100	#6	13"	31'-6	7'-1½	4'-0	7½"	5'-7	#6	13"	32'-9	#7	13"	23'-0	48	#5	6½"	12'-3	6'-6
	10'	10½"	10"	#4	13"	11'-3	#4	6½"	23'-0	108	#6	13"	31'-6	7'-1½	4'-0	7½"	5'-7	#6	13"	32'-9	#7	13"	23'-0	48	#5	6½"	12'-9	6'-6
12'	8'	12½"	12"	#4	11"	9'-6	#5	5½"	20'-0	92	#6	11"	37'-6	8'-2	5'-0	9½"	6'-5	#6	11"	39'-6	#7	11"	27'-6	60	#5	5½"	13'-3	7'-8
	9'	12½"	12"	#4	11"	10'-6	#5	5½"	22'-0	100	#6	11"	38'-0	8'-6	5'-0	9½"	6'-5	#6	11"	39'-6	#7	11"	27'-6	60	#5	5½"	13'-9	7'-8
	10'	12½"	12"	#4	12"	11'-6	#5	6"	24'-0	108	#7	12"	38'-3	8'-7½	5'-0	9½"	6'-5	#6	12"	39'-6	#7	12"	27'-6	60	#5	6"	14'-3	7'-8
	11'	12½"	12"	#4	12"	12'-6	#5	6"	26'-0	108	#7	12"	38'-3	8'-7½	5'-0	9½"	6'-5	#6	12"	39'-6	#7	12"	27'-6	60	#5	6"	14'-9	7'-8
	12'	12½"	12"	#4	12"	13'-6	#5	6"	28'-0	116	#7	12"	37'-9	8'-4	5'-0	9½"	6'-5	#6	12"	39'-6	#7	12"	27'-6	60	#5	6"	15'-3	7'-8

⊕ Total number of bars in the cross-section.

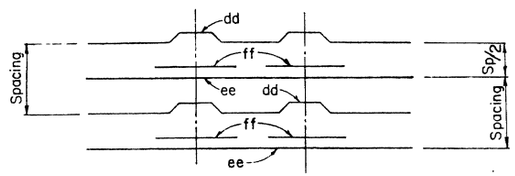


TYPICAL SECTION

BENDS



REINFORCING BAR PLACING DIAGRAM
For Table I only



REINFORCING BAR PLACING DIAGRAM
For Tables II through V

jj bar

Height "H"	"J" Dim.	"K" Spaces
3'	9"	-
4'	3"	2
5'	12"	2
6'	9"	3
7'	3"	4
8'	12"	4
9'	9	5
10'	3"	6
11'	12"	6
12'	9"	7

NOTE:
See B-02.35 for Tables II thru V.
See B-01.10 for general notes and miscellaneous details.
All bend dimensions are out to out of bar.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Table I ff bars & quantities	J.T.W.	7-76
2	Rev. to AASHTO 1985 Spec.	J.M.	10-86

DESIGN	DHY	12-71	
DRAWN	CAG	8-72	1
CHECKED	NAB	3-73	2

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REVISION 10 - 86

TRIPLE BARREL
BOX CULVERT

STANDARD NO B-02.30

TABLE NO. II
10'-15' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	#4	12"	3'-9	#4	12"	8'-0	68	#5	12"	19'-6	4'-5	2'-6	5"	3'-4	#4	12"	20'-3	#5	12"	4'-9	30	#4	6"	4'-3	1'-9
	4'	8"	8"	#4	12"	4'-9	#4	12"	10'-0	76	#5	12"	20'-0	4'-8	2'-6	5"	3'-4	#4	12"	20'-3	#5	12"	4'-9	30	#4	6"	4'-9	1'-9
	5'	8"	8"	#4	12"	5'-9	#4	12"	12'-0	76	#5	12"	20'-0	4'-8	2'-6	5"	3'-4	#4	12"	20'-3	#5	12"	4'-9	30	#4	6"	5'-3	1'-9
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-0	84	#5	11"	20'-0	4'-8	2'-6	5"	3'-4	#4	11"	20'-3	#5	11"	4'-9	30	#4	5½"	5'-9	1'-9
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-0	92	#5	11"	20'-0	4'-8	2'-6	5"	3'-4	#4	11"	20'-3	#5	11"	4'-9	30	#4	5½"	6'-3	1'-9
8'	3'	10"	9"	#4	12"	4'-3	#4	12"	9'-0	68	#6	12"	25'-9	6'-0	3'-0	7"	4'-7	#5	12"	26'-6	#7	12"	6'-3	36	#5	6"	5'-0	2'-3
	4'	10"	9"	#4	12"	5'-3	#4	12"	11'-0	76	#6	12"	26'-0	6'-1	3'-0	7"	4'-7	#5	12"	26'-6	#7	12"	6'-3	36	#4	6"	5'-3	2'-0
	5'	10"	9"	#4	12"	6'-3	#4	12"	13'-0	76	#6	12"	26'-0	6'-1	3'-0	7"	4'-7	#5	12"	26'-6	#7	12"	6'-3	36	#4	6"	5'-9	2'-0
	6'	10"	9"	#4	12"	7'-3	#4	12"	15'-0	84	#6	12"	26'-0	6'-1	3'-0	7"	4'-7	#5	12"	26'-6	#7	12"	6'-3	36	#4	6"	6'-3	2'-0
	7'	10"	9"	#4	12"	8'-3	#4	12"	17'-0	92	#6	12"	26'-0	6'-1	3'-0	7"	4'-7	#5	12"	26'-6	#7	12"	6'-3	36	#4	6"	6'-9	2'-0
	8'	10"	9"	#4	12"	9'-3	#4	12"	19'-0	92	#6	12"	26'-0	6'-1	3'-0	7"	4'-7	#5	12"	26'-6	#7	12"	6'-3	36	#5	6"	7'-6	2'-3
10'	3'	12"	10"	#4	11"	4'-6	#4	11"	9'-6	68	#6	11"	31'-6	7'-3	3'-6	9"	5'-10	#5	11"	32'-9	#7	11"	7'-6	42	#5	5½"	5'-3	2'-3
	4'	12"	10"	#4	11"	5'-6	#4	11"	11'-6	76	#6	11"	31'-6	7'-3	3'-6	9"	5'-10	#5	11"	32'-9	#7	11"	7'-6	42	#5	5½"	5'-9	2'-3
	5'	12½"	10"	#4	11"	6'-6	#4	11"	13'-6	76	#6	11"	32'-0	7'-5	3'-6	9½"	5'-9	#5	11"	32'-9	#7	11"	7'-6	42	#5	5½"	6'-3	2'-3
	6'	12½"	10"	#4	11"	7'-6	#4	11"	15'-6	84	#6	11"	32'-0	7'-5	3'-6	9½"	5'-9	#5	11"	32'-9	#7	11"	7'-6	42	#4	5½"	6'-9	2'-3
	7'	12½"	10"	#4	11"	8'-6	#4	11"	17'-6	92	#6	11"	32'-0	7'-5	3'-6	9½"	5'-9	#5	11"	32'-9	#7	11"	7'-6	42	#4	5½"	7'-3	2'-3
	8'	12½"	10"	#4	13"	9'-6	#4	13"	19'-6	92	#7	13"	32'-9	7'-9	3'-6	9½"	5'-9	#6	13"	32'-9	#7	13"	7'-6	42	#5	6½"	7'-9	2'-3
	9'	12½"	10"	#4	13"	10'-6	#4	13"	21'-6	100	#7	13"	32'-9	7'-9	3'-6	9½"	5'-9	#6	13"	32'-9	#7	13"	7'-6	42	#5	6½"	8'-6	2'-3
	10'	12½"	10"	#4	13"	11'-6	#4	13"	23'-6	108	#7	13"	32'-9	7'-9	3'-6	9½"	5'-9	#6	13"	32'-9	#7	13"	7'-6	42	#6	6½"	9'-2	2'-8
12'	8'	15"	12"	#4	11"	10'-0	#4	11"	20'-6	92	#6	11"	38'-0	8'-6	4'-6	12"	6'-6	#6	11"	39'-6	#8	11"	9'-0	48	#5	5½"	8'-3	2'-6
	9'	15"	12"	#4	11"	11'-0	#4	11"	22'-6	100	#6	11"	38'-6	8'-8	4'-6	12"	6'-6	#6	11"	39'-6	#8	11"	9'-0	48	#5	5½"	8'-9	2'-7
	10'	15"	12"	#4	11"	12'-0	#4	11"	24'-6	108	#6	11"	38'-0	8'-6	4'-6	12"	6'-6	#6	11"	39'-6	#8	11"	9'-0	48	#5	5½"	9'-6	2'-10
	11'	15"	12"	#4	11"	13'-0	#4	11"	26'-6	108	#6	11"	38'-0	8'-6	4'-6	12"	6'-6	#6	11"	39'-6	#8	11"	9'-0	48	#5	5½"	10'-0	2'-10
	12'	15"	12"	#4	11	14'-0	#4	11	28'-6	116	#6	11"	38'-0	8'-6	4'-6	12"	6'-6	#6	11"	39'-6	#8	11"	9'-0	48	#6	5½"	10'-9	3'-0

TABLE NO. III
15'-20' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	9"	8"	#4	11"	4'-0	#4	11"	8'-6	68	#5	11"	20'-0	4'-6	2'-6	6"	3'-2	#4	11"	20'-3	#6	11"	5'-7	24	#4	5½"	4'-3	1'-8
	4'	9"	8"	#4	11"	5'-0	#4	11"	10'-6	76	#5	11"	20'-0	4'-6	2'-6	6"	3'-2	#4	11"	20'-3	#6	11"	5'-7	24	#4	5½"	4'-9	1'-8
	5'	9"	8"	#4	11"	6'-0	#4	11"	12'-6	76	#5	11"	20'-0	4'-6	2'-6	6"	3'-2	#4	11"	20'-3	#6	11"	5'-1	24	#4	5½"	5'-3	1'-8
	6'	9"	8"	#4	11"	7'-0	#4	11"	14'-6	84	#5	11"	20'-0	4'-6	2'-6	6"	3'-2	#4	11"	20'-3	#5	11"	4'-9	24	#4	5½"	5'-9	1'-8
	7'	9"	8"	#4	11"	8'-0	#4	11"	16'-6	92	#5	11"	20'-0	4'-6	2'-6	6"	3'-2	#4	11"	20'-3	#5	11"	4'-9	24	#4	5½"	6'-3	1'-10
8'	3'	11½"	9"	#4	12"	4'-6	#4	12"	9'-6	68	#6	12"	26'-3	6'-0	3'-0	8½"	4'-4	#5	12"	26'-6	#7	12"	6'-3	36	#4	6"	4'-6	1'-9
	4'	11½"	9"	#4	12"	5'-6	#4	12"	11'-6	76	#6	12"	26'-3	6'-0	3'-0	8½"	4'-4	#5	12"	26'-6	#7	12"	6'-3	36	#4	6"	5'-0	1'-9
	5'	11½"	9"	#4	13"	6'-6	#4	13"	13'-6	76	#6	13"	26'-3	6'-0	3'-0	8½"	4'-4	#5	13"	26'-6	#7	13"	6'-6	36	#5	6½"	6'-0	2'-0
	6'	11½"	9"	#4	13"	7'-6	#4	13"	15'-6	84	#6	13"	26'-3	6'-0	3'-0	8½"	4'-4	#5	13"	26'-6	#7	13"	6'-6	36	#5	6½"	6'-6	2'-0
	7'	11½"	9"	#4	13"	8'-6	#4	13"	17'-6	92	#6	13"	26'-3	6'-0	3'-0	8½"	4'-4	#5	13"	26'-6	#7	13"	6'-6	36	#5	6½"	7'-0	2'-0
	8'	11½"	9"	#4	13"	9'-6	#4	13"	19'-6	92	#6	13"	26'-3	6-3	2'-6	8½"	4-10	#5	13"	26'-6	#7	13"	6'-6	36	#5	6½"	7'-9	2'-4
10'	3'	14½"	10"	#4	13"	5'-0	#4	13"	10'-6	68	#6	13"	32'-3	7'-6	3'-0	11½"	5'-11	#6	13"	32'-9	#8	13"	7'-9	42	#5	6½"	5'-3	2'-0
	4'	14½"	10"	#4	13"	6'-0	#4	13"	12'-6	76	#6	13"	32'-3	7'-6	3'-0	11½"	5'-11	#6	13"	32'-9	#8	13"	7'-9	42	#5	6½"	5'-9	2'-0
	5'	15"	10"	#4	13"	7'-0	#4	13"	14'-6	76	#6	13"	33'-0	7'-9	3'-0	1'-0	5'-10	#6	13"	32'-9	#8	13"	7'-10	42	#5	6½"	6'-3	2'-0
	6'	15"	10"	#4	13"	8'-0	#4	13"	16'-6	84	#6	13"	33'-0	7'-9	3'-0	1'-0	5'-10	#6	13"	32'-9	#8	13"	7'-10	42	#5	6½"	6'-9	2'-0
	7'	15"	10"	#4	13"	9'-0	#4	13"	18'-6	92	#6	13"	33'-0	7'-9	3'-0	1'-0	5'-10	#6	13"	32'-9	#8	13"	7'-10	42	#5	6½"	7'-3	2'-0
	8'	15"	10"	#4	13"	10'-0	#4	13"	20'-6	92	#6	13"	33'-0	7'-9	3'-0	1'-0	5'-10	#6	13"	32'-9	#8	13"	7'-10	42	#5	6½"	7'-9	2'-0
	9'	15"	10"	#4	13"	11'-0	#4	13"	22'-6	100	#6	13"	32'-6	7'-6	3'-0	1'-0	5'-10	#6	13"	32'-9	#8	13"	7'-10	42	#5	6½"	8'-6	2'-4
	10'	15"	10"	#4	12"	12'-0	#4	12"	24'-6	108	#6	12"	32'-6	7'-6	3'-0	1'-0	5'-10	#6	12"	32'-9	#8	12"	7'-9	42	#6	6"	9'-7	2'-11
12'	8'	18"	12"	#4	12"	10'-6	#4	12"	21'-6	92	#7	12"	39'-3	8'-10	4'-0	1'-3	6'-6	#6	12"	39'-6	#8	12"	9'-6	48	#5	6"	8'-3	2'-4
	9'	18"	12"	#4	12"	11'-6	#4	12"	23'-6	100	#7	12"	39'-3	8'-10	4'-0	1'-3	6'-6	#6	12"	39'-6	#8	12"	9'-6	48	#5	6"	9'-0	2'-6
	10'	18"	12"	#4	12"	12'-6	#4	12"	25'-6	108	#7	12"	39'-3	8'-10	4'-0	1'-3	6'-6	#6	12"	39'-6	#8	12"	9'-0	48	#5	6"	9'-6	2'-6
	11'	18"	12"	#4	12"	13'-6	#4	12"	27'-6	108	#7	12"	39'-3	8'-10	4'-0	1'-3	6'-6	#6	12"	39'-6	#8	12"	9'-0	48	#6	6"	10'-10	3'-4
	12'	18"	12"	#5	12"	14'-6	#4	12"	29'-6	116	#7	12"	39'-3	8'-10	4'-0	1'-3	6'-6	#6	12"	39'-6	#8	12"	9'-0	48	#6	6"	11'-0	3'-0

TABLE NO. IV
20'-25' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	10½"	8"	#4	11"	4'-3	#4	11"	9'-0	68	#5	11"	20'-9	4'-8	2'-6	7½"	2'-11	#4	11"	20'-3	#6	11"	5'-7	24	#4	5½"	4'-3	1'-6
	4'	10½"	8"	#4	11"	5'-3	#4	11"	11'-0	76	#5	11"	20'-9	4'-8	2'-6	7½"	2'-11	#4	11"	20'-3	#6	11"	5'-7	24	#4	5½"	4'-9	1'-6
	5'	10½"	8"	#4	11"	6'-3	#4	11"	13'-0	76	#5	11"	20'-9	4'-8	2'-6	7½"	2'-11	#4	11"	20'-3	#6	11"	5'-3	24	#4	5½"	5'-3	1'-6
	6'	10½"	8"	#4	11"	7'-3	#4	11"	15'-0	84	#5	11"	20'-9	4'-8	2'-6	7½"	2'-11	#4	11"	20'-3	#5	11"	4'-9	24	#4	5½"	6'-0	1'-9
	7'	10½"	8"	#4	11"	8'-3	#4	11"	17'-0	92	#5	11"	20'-9	4'-8	2'-6	7½"	2'-11	#4	11"	20'-3	#5	11"	4'-9	24	#5	5½"	6'-9	2'-2
8'	3'	13½"	9"	#4	11"	4'-9	#4	11"	10'-0	68	#5	11"	26'-9	5'-11	3'-0	10½"	4'-0	#5	11"	26'-6	#7	11"	6'-6	30	#4	5½"	4'-6	1'-6
	4'	13½"	9"	#4	11"	5'-9	#4	11"	12'-0	76	#5	11"	26'-9	5'-11	3'-0	10½"	4'-0	#5	11"	26'-6	#7	11"	6'-6	30	#4	5½"	5'-0	1'-6
	5'	13½"	9"	#4	11"	6'-9	#4	11"	14'-0	76	#5	11"	26'-9	5'-11	3'-0	10½"	4'-0	#5	11"	26'-6	#7	11"	6'-6	30	#4	5½"	5'-6	1'-6
	6'	13½"	9"	#4	11"	7'-9	#4	11"	16'-0	84	#5	11"	26'-9	5'-11	3'-0	10½"	4'-0	#5	11"	26'-6	#7	11"	6'-6	30	#4	5½"	6'-3	1'-9
	7'	13½"	9"	#4	11"	8'-9	#4	11"	18'-0	92	#5	11"	26'-9	5'-11	3'-0	10½"	4'-0	#5	11"	26'-6	#7	11"	6'-6	30	#4	5½"	6'-9	1'-9
	8'	13½"	9"	#4	12"	9'-9	#4	12"	20'-0	92	#5	12"	26'-9	5'-11	3'-0	10½"	4'-0	#5	12"	26'-6	#7	12"	6'-6	30	#5	6"	7'-6	2'-2
10'	3'	16½"	10"	#4	12"	5'-3	#4	12"	11'-0	68	#6	12"	33'-3	7'-8	3'-0	1'-1½"	5'-7	#6	12"	32'-9	#8	12"	8'-1	42	#5	6"	5'-0	1'-9
	4'	17"	10"	#4	12"	6'-3	#4	12"	13'-0	76	#6	12"	33'-3	7'-7	3'-0	1'-2	5'-6	#6	12"	32'-9	#8	12"	8'-2	42	#4	6"	5'-6	1'-9
	5'	17"	10"	#4	12"	7'-3	#4	12"	15'-0	76	#6	12"	33'-3	7'-7	3'-0	1'-2	5'-6	#6	12"	32'-9	#8	12"	8'-2	42	#4	6"	6'-0	1'-9
	6'	17"	10"	#4	12"	8'-3	#4	12"	17'-0	84	#6	12"	33'-3	7'-7	3'-0	1'-2	5'-6	#6	12"	32'-9	#8	12"	7'-9	42	#4	6"	6'-6	1'-9
	7'	17"	10"	#4	12"	9'-3	#4	12"	19'-0	92	#6	12"	33'-3	7'-7	3'-0	1'-2	5'-6	#6	12"	32'-9	#8	12"	7'-9	42	#4	6"	7'-3	2'-0
	8'	17"	10"	#4	12"	10'-3	#4	12"	21'-0	92	#6	12"	33'-3	7'-7	3'-0	1'-2	5'-6	#6	12"	32'-9	#8	12"	7'-9	42	#5	6"	8'-0	2'-0
	9'	17"	10"	#4	12"	11'-3	#4	12"	23'-0	100	#6	12"	33'-3	7'-7	3'-0	1'-2	5'-6	#6	12"	32'-9	#8	12"	7'-9	42	#5	6"	8'-6	2'-3
	10'	17"	10"	#5	12"	12'-3	#4	12"	25'-0	108	#6	12"	33'-3	7'-7	3'-0	1'-2	5'-6	#6	12"	32'-9	#8	12"	7'-9	42	#6	6"	9'-7	2'-10
12'	8'	20½"	12"	#4	15"	11'-0	#4	15"	22'-6	92	#6	10"	39'-9	8'-9	4'-0	1'-5½"	6'-1	#6	10"	39'-6	#8	10"	9'-0	42	#4	5"	8'-3	2'-2
	9'	20½"	12"	#4	15"	12'-0	#4	15"	24'-6	100	#6	10"	39'-9	8'-9	4'-0	1'-5½"	6'-1	#6	10"	39'-6	#8	10"	9'-0	42	#5	5"	9'-0	2'-4
	10'	20½"	12"	#4	10"	13'-0	#4	15"	26'-6	108	#6	10"	39'-9	8'-9	4'-0	1'-5½"	6'-1	#6	10"	39'-6	#8	10"	9'-0	42	#5	5"	9'-9	2'-6
	11'	20½"	12"	#4	10"	14'-0	#4	15"	28'-6	108	#6	10"	39'-3	8'-6	4'-0	1'-5½"	6'-1	#6	10"	39'-6	#8	10"	9'-0	42	#6	5"	11'-4	3'-7
	12'	20½"	12"	#5	10"	15'-0	#4	15"	30'-6	116	#6	10"	39'-3	8'-6	4'-0	1'-5½"	6'-1	#6	10"	39'-6	#8	10"	9'-0	42	#6	5"	11'-10	3'-7

TABLE NO. V
25'-30' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	11½"	8"	#4	15"	4'-6	#4	15"	9'-6	68	#5	10"	20'-9	4'-9	2'-0	8½"	3'-3	#4	10"	20'-3	#6	10"	5'-7	24	#4	5"	4'-3	1'-6
	4'	11½"	8"	#4	15"	5'-6	#4	15"	11'-6	76	#5	10"	20'-9	4'-9	2'-0	8½"	3'-3	#4	10"	20'-3	#6	10"	5'-7	24	#4	5"	4'-9	1'-6
	5'	11½"	8"	#4	15"	6'-6	#4	15"	13'-6	76	#5	10"	20'-9	4'-9	2'-0	8½"	3'-3	#4	10"	20'-3	#5	10"	5'-3	24	#4	5"	5'-3	1'-6
	6'	11½"	8"	#4	15"	7'-6	#4	15"	15'-6	84	#5	10"	20'-9	4'-9	2'-0	8½"	3'-3	#4	10"	20'-3	#5	10"	4'-9	24	#4	5"	6'-0	1'-9
	7'	11½"	8"	#4	10"	8'-6	#4	15"	17'-6	92	#5	10"	20'-9	4'-9	2'-0	8½"	3'-3	#4	10"	20'-3	#5	10"	4'-9	24	#5	5"	7'-0	2'-3
8'	3'	15½"	9"	#4	11"	5'-0	#4	11"	10'-9	68	#5	11"	27'-0	5'-9	3'-0	1'-0½"	3'-8	#5	11"	26'-6	#7	11"	7'-0	30	#4	5½"	4'-9	1'-8
	4'	15½"	9"	#4	11"	6'-0	#4	11"	12'-9	76	#5	11"	27'-0	5'-9	3'-0	1'-0½"	3'-8	#5	11"	26'-6	#7	11"	7'-0	30	#4	5½"	5'-3	1'-8
	5'	15½"	9"	#4	11"	7'-0	#4	11"	14'-9	76	#5	11"	27'-0	5'-9	3'-0	1'-0½"	3'-8	#5	11"	26'-6	#7	11"	6'-6	30	#4	5½"	5'-9	1'-8
	6'	15½"	9"	#4	11"	8'-0	#4	11"	16'-9	84	#5	11"	27'-0	5'-9	3'-0	1'-0½"	3'-8	#5	11"	26'-6	#7	11"	6'-6	30	#4	5½"	6'-3	2'-2
	7'	15½"	9"	#4	11"	9'-0	#4	11"	18'-9	92	#5	11"	27'-0	5'-9	3'-0	1'-0½"	3'-8	#5	11"	26'-6	#7	11"	6'-6	30	#5	5½"	7'-0	1'-10
	8'	15½"	9"	#4	11"	10'-0	#4	11"	20'-9	92	#5	11"	27'-0	5'-9	3'-0	1'-0½"	3'-8	#5	11"	26'-6	#7	11"	6'-6	30	#5	5½"	7'-9	2'-0
10'	3'	19"	10"	#4	11"	5'-9	#4	11"	11'-9	68	#6	11"	33'-6	7'-5	3'-0	1'-4	5'-2	#6	11"	32'-9	#8	11"	7'-9	36	#4	5½"	5'-0	1'-7
	4'	19"	10"	#4	11"	6'-9	#4	11"	13'-9	76	#6	11"	33'-6	7'-5	3'-0	1'-4	5'-2	#6	11"	32'-9	#8	11"	7'-9	36	#4	5½"	5'-6	1'-7
	5'	19"	10"	#4	11"	7'-9	#4	11"	15'-9	76	#6	11"	33'-6	7'-5	3'-0	1'-4	5'-2	#6	11"	32'-9	#8	11"	7'-9	36	#4	5½"	6'-0	1'-7
	6'	19"	10"	#4	11"	8'-9	#4	11"	17'-9	84	#6	11"	33'-6	7'-5	3'-0	1'-4	5'-2	#6	11"	32'-9	#8	11"	7'-9	36	#4	5½"	6'-6	1'-7
	7'	19"	10"	#4	11"	9'-9	#4	11"	19'-9	92	#6	11"	33'-6	7'-5	3'-0	1'-4	5'-2	#6	11"	32'-9	#8	11"	7'-9	36	#4	5½"	7'-0	1'-9
	8'	19"	10"	#4	13"	10'-9	#4	13"	21'-9	92	#7	13"	34'-0	7'-8	3'-0	1'-4	5'-2	#6	13"	32'-9	#8	13"	7'-9	36	#5	6½"	8'-0	2'-0
	9'	19"	10"	#5	13"	11'-9	#4	13"	23'-9	100	#7	13"	34'-0	7'-8	3'-0	1'-4	5'-2	#6	13"	32'-9	#8	13"	7'-9	36	#6	6½"	9'-6	3'-0
	10'	19"	10"	#5	11"	12'-9	#4	11"	25'-9	108	#6	11"	33'-6	7'-5	3'-0	1'-4	5'-2	#6	11"	32'-9	#8	11"	7'-9	36	#6	5½"	10'-0	3'-0
12'	8'	23"	12"	#4	10"	11'-3	#4	15"	23'-0	92	#6	10"	40'-0	8'-6	4'-0	1'-8	5'-8	#6	10"	39'-6	#8	10"	10'-4	42	#4	5"	8'-3	2'-0
	9'	23"	12"	#4	10"	12'-3	#4	15"	25'-0	100	#6	10"	40'-0	8'-6	4'-0	1'-8	5'-8	#6	10"	39'-6	#8	10"	9'-0	42	#5	5"	9'-3	2'-4
	10'	23"	12"	#4	10"	13'-3	#4	15"	27'-0	108	#6	10"	40'-0	8'-6	4'-0	1'-8	5'-8	#6	10"	39'-6	#8	10"	9'-0	42	#5	5"	9'-9	2'-4
	11'	23"	12"	#5	10"	14'-3	#4	15"	29'-0	108	#6	10"	40'-0	8'-6	4'-0	1'-8	5'-8	#6	10"	39'-6	#8	10"	9'-0	42	#6	5"	11'-4	3'-6
	12'	23"	12"	#6	10"	15'-3	#4	15"	31'-0	116	#6	10"	39'-6	8'-3	4'-0	1'-8	5'-8	#6	10"	39'-6	#8	10"	9'-0	42	#6	5"	12'-1	3'-9

⊕ Total number of bars in the cross-section.

NOTE:

See B-02.30 for Table No.I, typical section, steel call outs, bend diagrams and quantities.

See B-01.10 for general notes and miscellaneous details.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Table II, 6' span, T now 8"	J.T.W	7-76
2	Rev. to AASHTO 1995 Spec.	C.H.	10-86
3			

	DHY	12-71
DESIGN	CAG	8-72
DRAWN	NAB	3-73
CHECKED		

Registered Professional Engineer — Certificate No. 5323 — Richard C. Buechler — Dec. 31, 19... — Arizona, U.S.A.

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
R.C. Buechler		10-86
APPROVED FOR DISTRIBUTION: E.A. Hamblin	TRIPLE BARREL BOX CULVERT	STANDARD NO. B-02.35

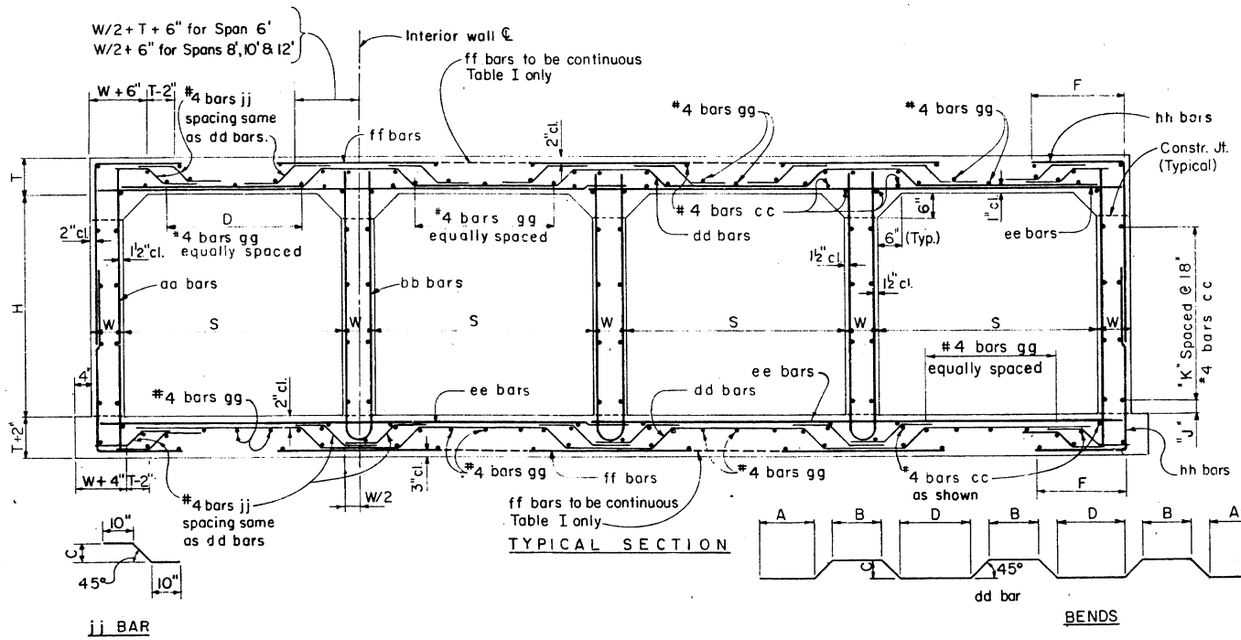
QUANTITIES PER LIN. FOOT OF BARRELS

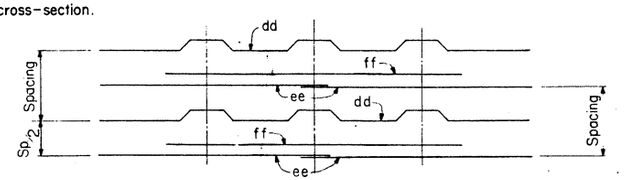
Span "S"	Height "H"	Table I		Table II		Table III		Table IV		Table V	
		Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.	Concrete C.Y.	Reinf. Steel Lbs.
6'	3'	1.946	340.4	1.946	279.5	2.117	319.3	2.373	324.2	2.544	342.8
	4'	2.070	345.7	2.070	295.3	2.240	334.7	2.497	339.6	2.669	356.9
	5'	2.193	354.4	2.193	303.3	2.364	338.5	2.620	345.1	2.791	343.5
	6'	2.317	397.9	2.317	337.9	2.487	336.4	2.743	342.8	2.914	355.5
	7'	2.440	413.3	2.440	353.3	2.611	351.8	2.867	381.8	3.038	402.6
8'	3'	2.571	518.8	2.906	446.1	3.240	433.7	3.685	431.8	4.131	445.6
	4'	2.710	546.4	3.044	446.0	3.379	448.4	3.824	447.3	4.269	461.0
	5'	2.961	527.1	3.183	454.0	3.517	450.7	3.963	456.0	4.408	463.0
	6'	3.099	541.1	3.322	468.7	3.656	466.2	4.102	472.9	4.547	478.5
	7'	3.238	559.3	3.461	483.4	3.795	481.6	4.241	488.3	4.686	518.3
	8'	3.377	572.2	3.600	515.2	3.934	492.4	4.380	488.3	4.824	530.9
10'	3'	3.523	715.5	4.073	551.1	4.759	558.1	5.309	605.3	5.996	632.3
	4'	3.815	705.4	4.227	568.1	4.914	573.6	5.600	608.8	6.150	647.7
	5'	3.969	701.8	4.519	580.7	5.205	586.1	5.755	616.8	6.304	656.5
	6'	4.124	694.4	4.673	575.7	5.360	601.6	5.909	624.8	6.459	671.9
	7'	4.278	717.7	4.827	591.1	5.514	617.1	6.063	640.8	6.613	687.3
	8'	4.432	703.6	4.982	632.1	5.668	625.8	6.218	674.2	6.767	678.3
	9'	4.587	723.7	5.136	647.6	5.823	641.8	6.372	690.4	6.921	741.8
	10'	4.741	733.2	5.290	666.3	5.977	741.3	6.525	755.8	7.076	818.9
12'	8'	5.965	960.5	6.788	799.6	7.776	820.7	8.600	830.4	9.422	868.1
	9'	6.151	988.5	6.974	819.2	7.961	839.0	8.784	878.5	9.607	893.8
	10'	6.336	991.1	7.159	836.0	8.147	847.1	8.970	903.9	9.793	910.3
	11'	6.521	1017.1	7.344	846.4	8.332	903.4	9.155	972.7	9.978	993.7
	12'	6.706	1039.6	7.529	908.8	8.517	928.3	9.340	1004.9	10.163	1031.9

TABLE NO. I
0'-10' FILL

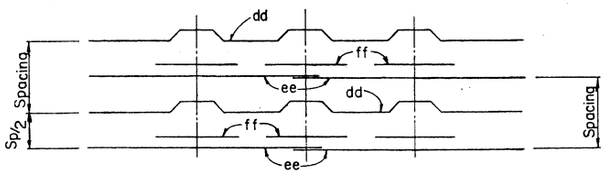
Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd							ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	A	B	C	D	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	F
6'	3'	8"	8"	#4	11"	3'-9	#5	11"	8'-3	88	#4	11"	27'-5	5'-0	2'-3	5"	3'-7	#5	11"	14'-0	#5	11"	21'-0	40	#4	5½"	6'-9	4'-2
	4'	8"	8"	#4	11"	4'-9	#4	11"	10'-3	98	#4	11"	27'-5	5'-0	2'-3	5"	3'-7	#5	11"	14'-0	#5	11"	21'-0	40	#4	5½"	7'-3	4'-2
	5'	8"	8"	#4	11"	5'-9	#4	11"	12'-3	98	#4	11"	27'-5	5'-0	2'-3	5"	3'-7	#5	11"	14'-0	#5	11"	21'-0	40	#4	5½"	7'-9	4'-2
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-3	108	#4	11"	27'-5	5'-0	2'-3	5"	3'-7	#6	11"	14'-0	#5	11"	21'-0	40	#4	5½"	8'-3	4'-2
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-3	118	#4	11"	27'-5	5'-0	2'-3	5"	3'-7	#6	11"	14'-0	#5	11"	21'-0	40	#4	5½"	8'-9	4'-2
8'	3'	8½"	9"	#4	12"	4'-0	#4	6"	8'-6	88	#5	12"	34'-2	5'-8	3'-4	5½"	4'-6	#6	12"	18'-3	#7	12"	27'-6	48	#5	6"	8'-0	5'-3
	4'	8½"	9"	#4	12"	5'-0	#4	6"	10'-6	98	#5	12"	34'-5	5'-10	3'-4	5½"	4'-6	#6	12"	18'-6	#7	12"	27'-6	56	#5	6"	8'-6	5'-3
	5'	9"	9"	#4	14"	6'-0	#4	7"	12'-6	98	#6	14"	34'-8	6'-0	3'-0	6"	4'-9	#6	14"	18'-6	#7	14"	27'-6	56	#5	7"	9'-0	5'-3
	6'	9"	9"	#4	14"	7'-0	#4	7"	14'-6	108	#6	14"	34'-8	6'-0	3'-0	6"	4'-9	#6	14"	18'-6	#7	14"	27'-6	56	#5	7"	9'-6	5'-3
	7'	9"	9"	#4	14"	8'-0	#4	7"	16'-6	118	#6	14"	34'-8	5'-10	3'-4	6"	4'-5	#6	14"	18'-6	#7	14"	27'-6	56	#5	7"	10'-0	5'-3
	8'	9"	9"	#4	14"	9'-0	#4	7"	18'-6	118	#6	14"	35'-2	6'-0	3'-4	6"	4'-5	#6	14"	18'-6	#7	14"	27'-6	56	#5	7"	10'-6	5'-3
10'	3'	10"	10"	#4	11"	4'-3	#5	5½"	9'-0	88	#6	11"	42'-2	6'-11	4'-2	7"	5'-6	#5	11"	22'-6	#7	11"	34'-0	64	#6	5½"	9'-3	6'-6
	4'	10½"	10"	#4	11"	5'-3	#5	5½"	11'-0	98	#6	11"	42'-2	6'-10	4'-2	7½"	5'-5	#5	11"	22'-6	#7	11"	34'-0	64	#5	5½"	9'-9	6'-6
	5'	10½"	10"	#4	11"	6'-3	#6	11"	13'-0	98	#6	11"	42'-8	7'-0	4'-2	7½"	5'-5	#5	11"	22'-6	#7	11"	34'-0	64	#5	5½"	10'-3	6'-6
	6'	10½"	10"	#4	13"	7'-3	#5	6½"	15'-0	108	#6	13"	42'-8	7'-2	4'-0	7½"	5'-7	#6	13"	22'-9	#7	13"	34'-0	64	#5	6½"	10'-9	6'-6
	7'	10½"	10"	#4	13"	8'-3	#5	6½"	17'-0	118	#6	13"	42'-8	7'-2	4'-0	7½"	5'-7	#6	13"	22'-9	#7	13"	34'-0	64	#5	6½"	11'-3	6'-6
	8'	10½"	10"	#4	13"	9'-3	#6	13"	19'-0	118	#6	13"	42'-8	7'-2	4'-0	7½"	5'-7	#6	13"	22'-9	#7	13"	34'-0	64	#5	6½"	11'-9	6'-6
	9'	10½"	10"	#4	13"	10'-3	#6	13"	21'-0	128	#6	13"	42'-8	7'-2	4'-0	7½"	5'-7	#6	13"	22'-9	#7	13"	34'-0	64	#5	6½"	12'-3	6'-6
	10'	10½"	10"	#4	13"	11'-3	#4	6½"	23'-0	138	#6	13"	42'-8	7'-2	4'-0	7½"	5'-7	#6	13"	22'-9	#7	13"	34'-0	64	#5	6½"	12'-9	6'-6
12'	8'	12½"	12"	#4	11"	9'-6	#5	5½"	20'-0	118	#6	11"	50'-8	8'-0	5'-0	9½"	6'-5	#6	11"	27'-0	#7	11"	40'-0	80	#5	5½"	13'-3	7'-8
	9'	12½"	12"	#4	11"	10'-6	#5	5½"	22'-0	128	#6	11"	51'-2	8'-4	5'-0	9½"	6'-5	#6	11"	27'-0	#7	11"	40'-0	80	#5	5½"	13'-9	7'-8
	10'	12½"	12"	#4	12"	11'-6	#5	6"	24'-0	138	#7	12"	51'-5	8'-6	5'-0	9½"	6'-5	#6	12"	27'-0	#7	12"	40'-0	80	#5	6"	14'-3	7'-8
	11'	12½"	12"	#4	12"	12'-6	#5	6"	26'-0	138	#7	12"	51'-5	8'-6	5'-0	9½"	6'-5	#6	12"	27'-0	#7	12"	40'-0	80	#5	6"	14'-9	7'-8
	12'	12½"	12"	#4	12"	13'-6	#5	6"	28'-0	148	#7	12"	50-11	7'-9	5'-0	9½"	6'-5	#6	12"	27'-0	#7	12"	40'-0	80	#5	6"	15'-3	7'-8

⊕ Total number of bars in the cross-section.





REINFORCING BAR PLACING DIAGRAM
For Table I only



REINFORCING BAR PLACING DIAGRAM
For Tables II through V

Height "H"	"J" Dim.	"K" Spaces
3'	9"	1
4'	3"	2
5'	12"	2
6'	9"	3
7'	3"	4
8'	12"	4
9'	9"	5
10'	3"	6
11'	12"	6
12'	9"	7

NOTE:
See B-02.45 for Tables II thru V
See B-01.10 for general notes and miscellaneous details.
All bend dimensions are out to out of bar.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Table I ff bars & quantities	J.T.W	7-76
②	Rev. to AASHTO 1985 Spec.	C.H	10-86
③			

	12-71	8-72	3-73
DWY			
DESIGN		CAG	NAB
DRAWN			
CHECKED			

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

FOUR BARREL
BOX CULVERT

REVISION 10-86

STANDARD NO. B-02.40

TABLE NO. II
10'-15' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	#4	12"	3'-9	#4	12"	8'-0	88	#5	12"	26'-6	4'-5	2'-6	5"	3'-4	#4	12"	14'-0	#5	12"	4'-9	40	#4	6"	4'-3	1'-9
	4'	8"	8"	#4	12"	4'-9	#4	12"	10'-0	98	#5	12"	27'-0	4'-8	2'-6	5"	3'-4	#4	12"	14'-0	#5	12"	4'-9	40	#4	6"	4'-9	1'-9
	5'	8"	8"	#4	12"	5'-9	#4	12"	12'-0	98	#5	12"	27'-0	4'-8	2'-6	5"	3'-4	#4	12"	14'-0	#5	12"	4'-9	40	#4	6"	5'-3	1'-9
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-0	108	#5	11"	27'-0	4'-8	2'-6	5"	3'-4	#4	11"	14'-0	#5	11"	4'-9	40	#4	5½"	5'-9	1'-9
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-0	118	#5	11"	27'-0	4'-8	2'-6	5"	3'-4	#4	11"	14'-0	#5	11"	4'-9	40	#4	5½"	6'-3	1'-9
8'	3'	10"	9"	#4	12"	4'-3	#4	12"	9'-0	88	#6	12"	35'-3	6'-0	3'-0	7"	4'-7	#5	12"	18'-6	#7	12"	6'-3	48	#5	6"	5'-0	2'-3
	4'	10"	9"	#4	12"	5'-3	#4	12"	11'-0	98	#6	12"	35'-9	6'-3	3'-0	7"	4'-7	#5	12"	18'-6	#7	12"	6'-3	48	#4	6"	5'-3	2'-0
	5'	10"	9"	#4	12"	6'-3	#4	12"	13'-0	98	#6	12"	35'-9	6'-3	3'-0	7"	4'-7	#5	12"	18'-6	#7	12"	6'-3	48	#4	6"	5'-9	2'-0
	6'	10"	9"	#4	12"	7'-3	#4	12"	15'-0	108	#6	12"	35'-9	6'-3	3'-0	7"	4'-7	#5	12"	18'-6	#7	12"	6'-3	48	#4	6"	6'-3	2'-0
	7'	10"	9"	#4	12"	8'-3	#4	12"	17'-0	118	#6	12"	35'-9	6'-3	3'-0	7"	4'-7	#5	12"	18'-6	#7	12"	6'-3	48	#4	6"	6'-9	2'-0
	8'	10"	9"	#4	12"	9'-3	#4	12"	19'-0	118	#6	12"	35'-9	6'-3	3'-0	7"	4'-7	#5	12"	18'-6	#7	12"	6'-3	48	#5	6"	7'-6	2'-3
10'	3'	12"	10"	#4	11"	4'-6	#4	11"	9'-6	88	#6	11"	43'-3	7'-4	3'-6	9"	5'-10	#5	11"	22'-6	#7	11"	7'-6	56	#5	5½"	5'-3	2'-3
	4'	12"	10"	#4	11"	5'-6	#4	11"	11'-6	98	#6	11"	43'-3	7'-4	3'-6	9"	5'-10	#5	11"	22'-6	#7	11"	7'-6	56	#5	5½"	5'-9	2'-3
	5'	12½"	10"	#4	11"	6'-6	#4	11"	13'-6	98	#6	11"	43'-9	7'-6	3'-6	9½"	5'-9	#5	11"	22'-6	#7	11"	7'-6	56	#5	5½"	6'-3	2'-3
	6'	12½"	10"	#4	11"	7'-6	#4	11"	15'-6	108	#6	11"	43'-9	7'-6	3'-6	9½"	5'-9	#5	11"	22'-6	#7	11"	7'-6	56	#4	5½"	6'-9	2'-3
	7'	12½"	10"	#4	11"	8'-6	#4	11"	17'-6	118	#6	11"	43'-9	7'-6	3'-6	9½"	5'-9	#5	11"	22'-6	#7	11"	7'-6	56	#4	5½"	7'-3	2'-3
	8'	12½"	10"	#4	13"	9'-6	#4	13"	19'-6	118	#7	13"	44'-3	7'-9	3'-6	9½"	5'-9	#6	13"	22'-9	#7	13"	7'-6	56	#5	6½"	7'-9	2'-3
	9'	12½"	10"	#4	13"	10'-6	#4	13"	21'-6	128	#7	13"	44'-3	7'-9	3'-6	9½"	5'-9	#6	13"	22'-9	#7	13"	7'-6	56	#5	6½"	8'-3	2'-3
	10'	12½"	10"	#4	13"	11'-6	#4	13"	23'-6	138	#7	13"	44'-3	7'-9	3'-6	9½"	5'-9	#6	13"	22'-9	#7	13"	7'-6	56	#6	6½"	9'-2	2'-8
12'	8'	15"	12"	#4	11"	10'-0	#4	11"	20'-6	118	#6	11"	52'-0	8'-6	4'-6	12"	6'-6	#6	11"	27'-0	#8	11"	9'-0	64	#5	5½"	8'-3	2'-6
	9'	15"	12"	#4	11"	11'-0	#4	11"	22'-6	128	#6	11"	52'-9	8'-10	4'-6	12"	6'-6	#6	11"	27'-0	#8	11"	9'-0	64	#5	5½"	8'-9	2'-7
	10'	15"	12"	#4	11"	12'-0	#4	11"	24'-6	138	#6	11"	52'-0	8'-6	4'-6	12"	6'-6	#6	11"	27'-0	#8	11"	9'-0	64	#5	5½"	9'-6	2'-10
	11'	15"	12"	#4	11"	13'-0	#4	11"	26'-6	138	#6	11"	52'-0	8'-6	4'-6	12"	6'-6	#6	11"	27'-0	#8	11"	9'-0	64	#5	5½"	10'-0	2'-10
	12'	15"	12"	#4	11"	14'-0	#4	11"	28'-6	148	#6	11"	52'-0	8'-6	4'-6	12"	6'-6	#6	11"	27'-0	#8	11"	9'-0	64	#6	5½"	10'-9	3'-0

TABLE NO. III
15'-20' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	9"	8"	#4	11"	4'-0	#4	11"	8'-6	88	#5	11"	27'-6	4'-9	2'-6	6"	3'-2	#4	11"	14'-0	#6	11"	5'-7	32	#4	5½"	4'-3	1'-8
	4'	9"	8"	#4	11"	5'-0	#4	11"	10'-6	98	#5	11"	27'-6	4'-9	2'-6	6"	3'-2	#4	11"	14'-0	#6	11"	5'-7	32	#4	5½"	4'-9	1'-8
	5'	9"	8"	#4	11"	6'-0	#4	11"	12'-6	98	#5	11"	27'-6	4'-9	2'-6	6"	3'-2	#4	11"	14'-0	#6	11"	5'-1	32	#4	5½"	5'-3	1'-8
	6'	9"	8"	#4	11"	7'-0	#4	11"	14'-6	108	#5	11"	27'-6	4'-9	2'-6	6"	3'-2	#4	11"	14'-0	#5	11"	4'-9	32	#4	5½"	5'-9	1'-8
	7'	9"	8"	#4	11"	8'-0	#4	11"	16'-6	118	#5	11"	27'-6	4'-9	2'-6	6"	3'-2	#4	11"	14'-0	#5	11"	4'-9	32	#4	5½"	6'-3	1'-10
8'	3'	11½"	9"	#4	12"	4'-6	#4	12"	9'-6	88	#6	12"	36'-0	6'-2	3'-0	8½"	4'-4	#5	12"	18'-6	#7	12"	6'-3	48	#4	6"	4'-6	1'-9
	4'	11½"	9"	#4	12"	5'-6	#4	12"	11'-6	98	#6	12"	36'-0	6'-2	3'-0	8½"	4'-4	#5	12"	18'-6	#7	12"	6'-3	48	#4	6"	5'-0	1'-9
	5'	11½"	9"	#4	13"	6'-6	#4	13"	13'-6	98	#6	13"	36'-0	6'-2	3'-0	8½"	4'-4	#5	13"	18'-6	#7	13"	6'-6	48	#5	6½"	6'-6	2'-0
	6'	11½"	9"	#4	13"	7'-6	#4	13"	15'-6	108	#6	13"	36'-0	6'-2	3'-0	8½"	4'-4	#5	13"	18'-6	#7	13"	6'-6	48	#5	6½"	6'-6	2'-0
	7'	11½"	9"	#4	13"	8'-6	#4	13"	17'-6	118	#6	13"	36'-0	6'-2	3'-0	8½"	4'-4	#5	13"	18'-6	#7	13"	6'-6	48	#5	6½"	7'-0	2'-0
	8'	11½"	9"	#4	13"	9'-6	#4	13"	19'-6	118	#6	13"	36'-0	6'-5	2'-6	8½"	4'10	#6	13"	18'-6	#7	13"	6'-6	48	#5	6½"	7'-9	2'-4
10'	3'	14½"	10"	#4	13"	5'-0	#4	13"	10'-6	88	#6	13"	44'-3	7'-8	3'-0	11½"	5'-11	#6	13"	22'-9	#8	13"	7'-9	56	#5	6½"	5'-3	2'-0
	4'	14½"	10"	#4	13"	6'-0	#4	13"	12'-6	98	#6	13"	44'-3	7'-8	3'-0	11½"	5'-11	#6	13"	22'-9	#8	13"	7'-9	56	#5	6½"	5'-9	2'-0
	5'	15"	10"	#4	13"	7'-0	#4	13"	14'-6	98	#6	13"	45'-0	7'-11	3'-0	1'-0	5'-10	#6	13"	22'-9	#8	13"	7'-10	56	#5	6½"	6'-3	2'-0
	6'	15"	10"	#4	13"	8'-0	#4	13"	16'-6	108	#6	13"	45'-0	7'-11	3'-0	1'-0	5'-10	#6	13"	22'-9	#8	13"	7'-10	56	#5	6½"	6'-9	2'-0
	7'	15"	10"	#4	13"	9'-0	#4	13"	18'-6	118	#6	13"	45'-0	7'-11	3'-0	1'-0	5'-10	#6	13"	22'-9	#8	13"	7'-10	56	#5	6½"	7'-3	2'-0
	8'	15"	10"	#4	13"	10'-0	#4	13"	20'-6	118	#6	13"	45'-0	7'-11	3'-0	1'-0	5'-10	#6	13"	22'-9	#8	13"	7'-10	56	#5	6½"	7'-9	2'-0
	9'	15"	10"	#4	13"	11'-0	#4	13"	22'-6	128	#6	13"	44'-6	7'-8	3'-0	1'-0	5'-10	#6	13"	22'-9	#8	13"	7'-10	56	#5	6½"	8'-6	2'-4
	10'	15"	10"	#4	12"	12'-0	#4	12"	24'-6	138	#6	12"	44'-6	7'-8	3'-0	1'-0	5'-10	#6	12"	22'-9	#8	12"	7'-9	56	#6	6"	9'-7	2'-11
12'	8'	18"	12"	#4	12"	10'-6	#4	12"	21'-6	118	#7	12"	53'-9	9'-0	4'-0	1'-3	6'-6	#6	12"	27'-0	#8	12"	9'-6	64	#5	6"	8'-3	2'-4
	9'	18"	12"	#4	12"	11'-6	#4	12"	23'-6	128	#7	12"	53'-9	9'-0	4'-0	1'-3	6'-6	#6	12"	27'-0	#8	12"	9'-6	64	#5	6"	9'-0	2'-6
	10'	18"	12"	#4	12"	12'-6	#4	12"	25'-6	138	#7	12"	53'-9	9'-0	4'-0	1'-3	6'-6	#6	12"	27'-0	#8	12"	9'-0	64	#6	6"	9'-6	2'-6
	11'	18"	12"	#4	12"	13'-6	#4	12"	27'-6	138	#7	12"	53'-9	9'-0	4'-0	1'-3	6'-6	#6	12"	27'-0	#8	12"	9'-0	64	#6	6"	10'-10	3'-4
	12'	18"	12"	#5	12"	14'-6	#4	12"	29'-6	148	#7	12"	53'-9	9'-0	4'-0	1'-3	6'-6	#6	12"	27'-0	#8	12"	9'-0	64	#6	6"	11'-0	3'-0

TABLE NO. IV
20'-25' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	10½"	8"	#4	11"	4'-3	#4	11"	9'-0	88	#5	11"	28'-3	4'-9	2'-6	7½"	2'-11	#4	11"	14'-0	#6	11"	5'-7	32	#4	5½"	4'-3	1'-6
	4'	10½"	8"	#4	11"	5'-3	#4	11"	11'-0	98	#5	11"	28'-3	4'-9	2'-6	7½"	2'-11	#4	11"	14'-0	#6	11"	5'-7	32	#4	5½"	4'-9	1'-6
	5'	10½"	8"	#4	11"	6'-3	#4	11"	13'-0	98	#5	11"	28'-3	4'-9	2'-6	7½"	2'-11	#4	11"	14'-0	#6	11"	5'-3	32	#4	5½"	5'-3	1'-6
	6'	10½"	8"	#4	11"	7'-3	#4	11"	15'-0	108	#5	11"	28'-3	4'-9	2'-6	7½"	2'-11	#4	11"	14'-0	#5	11"	4'-9	32	#4	5½"	6'-0	1'-9
	7'	10½"	8"	#4	11"	8'-3	#4	11"	17'-0	118	#5	11"	28'-3	4'-9	2'-6	7½"	2'-11	#4	11"	14'-0	#5	11"	4'-9	32	#5	5½"	6'-9	2'-2
8'	3'	13½"	9"	#4	11"	4'-9	#4	11"	10'-0	88	#5	11"	36'-6	6'-0	3'-0	10½"	4'-0	#5	11"	18'-6	#7	11"	6'-6	40	#4	5½"	4'-6	1'-6
	4'	13½"	9"	#4	11"	5'-9	#4	11"	12'-0	98	#5	11"	36'-6	6'-0	3'-0	10½"	4'-0	#5	11"	18'-6	#7	11"	6'-6	40	#4	5½"	5'-0	1'-6
	5'	13½"	9"	#4	11"	6'-9	#4	11"	14'-0	98	#5	11"	36'-6	6'-0	3'-0	10½"	4'-0	#5	11"	18'-6	#7	11"	6'-6	40	#4	5½"	5'-6	1'-6
	6'	13½"	9"	#4	11"	7'-9	#4	11"	16'-0	108	#5	11"	36'-6	6'-0	3'-0	10½"	4'-0	#5	11"	18'-6	#7	11"	6'-6	40	#4	5½"	6'-3	1'-9
	7'	13½"	9"	#4	11"	8'-9	#4	11"	18'-0	118	#5	11"	36'-6	6'-0	3'-0	10½"	4'-0	#5	11"	18'-6	#7	11"	6'-6	40	#4	5½"	6'-9	1'-9
	8'	13½"	9"	#4	12"	9'-9	#4	12"	20'-0	118	#5	12"	36'-6	6'-0	3'-0	10½"	4'-0	#5	12"	18'-6	#7	12"	6'-6	40	#5	6"	7'-6	2'-2
10'	3'	16½"	10"	#4	12"	5'-3	#4	12"	11'-0	88	#6	12"	45'-3	7'-9	3'-0	1'-½	5'-7	#6	12"	22'-9	#8	12"	8'-1	56	#5	6"	5'-0	1'-9
	4'	17"	10"	#4	12"	6'-3	#4	12"	13'-0	98	#6	12"	45'-6	7'-9	3'-0	1'-2	5'-6	#6	12"	22'-9	#8	12"	8'-2	56	#4	6"	5'-6	1'-9
	5'	17"	10"	#4	12"	7'-3	#4	12"	15'-0	98	#6	12"	45'-6	7'-9	3'-0	1'-2	5'-6	#6	12"	22'-9	#8	12"	8'-2	56	#4	6"	6'-0	1'-9
	6'	17"	10"	#4	12"	8'-3	#4	12"	17'-0	108	#6	12"	45'-6	7'-9	3'-0	1'-2	5'-6	#6	12"	22'-9	#8	12"	7'-9	56	#4	6"	6'-6	1'-9
	7'	17"	10"	#4	12"	9'-3	#4	12"	19'-0	118	#6	12"	45'-6	7'-9	3'-0	1'-2	5'-6	#6	12"	22'-9	#8	12"	7'-9	56	#4	6"	7'-3	2'-0
	8'	17"	10"	#4	12"	10'-3	#4	12"	21'-0	118	#6	12"	45'-6	7'-9	3'-0	1'-2	5'-6	#6	12"	22'-9	#8	12"	7'-9	56	#5	6"	8'-0	2'-0
	9'	17"	10"	#4	12"	11'-3	#4	12"	23'-0	128	#6	12"	45'-6	7'-9	3'-0	1'-2	5'-6	#6	12"	22'-9	#8	12"	7'-9	56	#5	6"	8'-6	2'-3
	10'	17"	10"	#5	12"	12'-3	#4	12"	25'-0	138	#6	12"	45'-6	7'-9	3'-0	1'-2	5'-6	#6	12"	22'-9	#8	12"	7'-9	56	#6	6"	9'-7	2'-10
12'	8'	20½"	12"	#4	15"	11'-0	#4	15"	22'-6	118	#6	10"	54'-3	8'-10	4'-0	1'-5½	6'-1	#6	10"	27'-0	#8	10"	9'-0	56	#4	5"	8'-3	2'-2
	9'	20½"	12"	#4	15"	12'-0	#4	15"	24'-6	128	#6	10"	54'-3	8'-10	4'-0	1'-5½	6'-1	#6	10"	27'-0	#8	10"	9'-0	56	#5	5"	9'-0	2'-4
	10'	20½"	12"	#4	10"	13'-0	#4	15"	26'-6	138	#6	10"	54'-3	8'-10	4'-0	1'-5½	6'-1	#6	10"	27'-0	#8	10"	9'-0	56	#5	5"	9'-9	2'-6
	11'	20½"	12"	#4	10"	14'-0	#4	15"	28'-6	138	#6	10"	53'-9	8'-6	4'-0	1'-5½	6'-1	#6	10"	27'-0	#8	10"	9'-0	56	#6	5"	11'-4	3'-7
	12'	20½"	12"	#5	10"	15'-0	#4	15"	30'-6	148	#6	10"	53'-9	8'-6	4'-0	1'-5½	6'-1	#6	10"	27'-0	#8	10"	9'-0	56	#6	5"	11'-10	3'-7

TABLE NO. V
25'-30' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	11½"	8"	#4	15"	4'-6	#4	15"	9'-6	88	#5	10"	28'-9	5'-1	2'-0	8½"	3'-3	#4	10"	14'-0	#6	10"	5'-7	32	#4	5"	4'-3	1'-6
	4'	11½"	8"	#4	15"	5'-6	#4	15"	11'-6	98	#5	10"	28'-9	5'-1	2'-0	8½"	3'-3	#4	10"	14'-0	#6	10"	5'-7	32	#4	5"	4'-9	1'-6
	5'	11½"	8"	#4	15"	6'-6	#4	15"	13'-6	98	#5	10"	28'-9	5'-1	2'-0	8½"	3'-3	#4	10"	14'-0	#5	10"	5'-3	32	#4	5"	5'-3	1'-6
	6'	11½"	8"	#4	15"	7'-6	#4	15"	15'-6	108	#5	10"	28'-9	5'-1	2'-0	8½"	3'-3	#4	10"	14'-0	#5	10"	4'-9	32	#4	5"	6'-0	1'-9
	7'	11½"	8"	#4	10"	8'-6	#4	15"	17'-6	118	#5	10"	28'-9	5'-1	2'-0	8½"	3'-3	#4	10"	14'-0	#5	10"	4'-9	32	#5	5"	7'-0	2'-3
8'	3'	15½"	9"	#4	11"	5'-0	#4	11"	10'-9	88	#5	11"	37'-0	5'-11	3'-0	1'-0½	3'-8	#5	11"	18'-6	#7	11"	7'-0	40	#4	5½"	4'-9	1'-8
	4'	15½"	9"	#4	11"	6'-0	#4	11"	12'-9	98	#5	11"	37'-0	5'-11	3'-0	1'-0½	3'-8	#5	11"	18'-6	#7	11"	7'-0	40	#4	5½"	5'-3	1'-8
	5'	15½"	9"	#4	11"	7'-0	#4	11"	14'-9	98	#5	11"	37'-0	5'-11	3'-0	1'-0½	3'-8	#5	11"	18'-6	#7	11"	6'-6	40	#4	5½"	5'-9	1'-8
	6'	15½"	9"	#4	11"	8'-0	#4	11"	16'-9	108	#5	11"	37'-0	5'-11	3'-0	1'-0½	3'-8	#5	11"	18'-6	#7	11"	6'-6	40	#4	5½"	6'-3	2'-2
	7'	15½"	9"	#4	11"	9'-0	#4	11"	18'-9	118	#5	11"	37'-0	5'-11	3'-0	1'-0½	3'-8	#5	11"	18'-6	#7	11"	6'-6	40	#5	5½"	7'-0	1'-10
	8'	15½"	9"	#4	11"	10'-0	#4	11"	20'-9	118	#5	11"	37'-0	5'-11	3'-0	1'-0½	3'-8	#5	11"	18'-6	#7	11"	6'-6	40	#5	5½"	7'-9	2'-0
10'	3'	19"	10"	#4	11"	5'-9	#4	11"	11'-9	88	#6	11"	45'-9	7'-7	3'-0	1'-4	5'-2	#6	11"	22'-9	#8	11"	7'-9	48	#4	5½"	5'-0	1'-7
	4'	19"	10"	#4	11"	6'-9	#4	11"	13'-9	98	#6	11"	45'-9	7'-7	3'-0	1'-4	5'-2	#6	11"	22'-9	#8	11"	7'-9	48	#4	5½"	5'-6	1'-7
	5'	19"	10"	#4	11"	7'-9	#4	11"	15'-9	98	#6	11"	45'-9	7'-7	3'-0	1'-4	5'-2	#6	11"	22'-9	#8	11"	7'-9	48	#4	5½"	6'-0	1'-7
	6'	19"	10"	#4	11"	8'-9	#4	11"	17'-9	108	#6	11"	45'-9	7'-7	3'-0	1'-4	5'-2	#6	11"	22'-9	#8	11"	7'-9	48	#4	5½"	6'-6	1'-7
	7'	19"	10"	#4	11"	9'-9	#4	11"	19'-9	118	#6	11"	45'-9	7'-7	3'-0	1'-4	5'-2	#6	11"	22'-9	#8	11"	7'-9	48	#4	5½"	7'-3	2'-0
	8'	19"	10"	#4	13"	10'-9	#4	13"	21'-9	118	#7	13"	46'-3	7'-9	3'-0	1'-4	5'-2	#6	13"	22'-9	#8	13"	7'-9	48	#5	6½"	8'-0	2'-0
	9'	19"	10"	#5	13"	11'-9	#4	13"	23'-9	128	#7	13"	46'-3	7'-9	3'-0	1'-4	5'-2	#6	13"	22'-9	#8	13"	7'-9	48	#6	6½"	9'-6	3'-0
	10'	19"	10"	#5	11"	12'-9	#4	11"	25'-9	138	#6	11"	45'-9	7'-6	3'-0	1'-4	5'-2	#6	11"	22'-9	#8	11"	7'-9	48	#6	5½"	10'-0	3'-0
12'	8'	23"	12"	#4	10"	11'-3	#4	15"	23'-0	118	#6	10"	54'-9	8'-8	4'-0	1'-8	5'-8	#6	10"	27'-0	#8	10"	10'-4	56	#4	5"	8'-3	2'-0
	9'	23"	12"	#4	10"	12'-3	#4	15"	25'-0	128	#6	10"	54'-9	8'-8	4'-0	1'-8	5'-8	#6	10"	27'-0	#8	10"	9'-0	56	#5	5"	9'-3	2'-4
	10'	23"	12"	#4	10"	13'-3	#4	15"	27'-0	138	#6	10"	54'-9	8'-8	4'-0	1'-8	5'-8	#6	10"	27'-0	#8	10"	9'-0	56	#5	5"	9'-9	2'-4
	11'	23"	12"	#5	10"	14'-3	#4	15"	29'-0	138	#6	10"	54'-9	8'-8	4'-0	1'-8	5'-8	#6	10"	27'-0	#8	10"	9'-0	56	#6	5"	11'-4	3'-6
	12'	23"	12"	#6	10"	15'-3	#4	15"	31'-0	148	#6	10"	54'-3	8'-4	4'-0	1'-8	5'-8	#6	10"	27'-0	#8	10"	9'-0	56	#6	5"	12'-1	3'-9

⊕ Total number of bars in the cross-section.

NOTE:

See B-02.40 for Table No. I, typical section, steel call outs, bend diagrams and quantities.

See B-01.10 for general notes and miscellaneous details.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Table II, 6' span, T now 8"	JTW	7-78
②	Rev. to AASHTO 1985 Spec.	CH	10-86

DESIGN	DHY
DRAWN	CAG
CHECKED	NAB

12-71	
8-72	
3-73	

DESIGN APPROVED R.C. Buchler

APPROVED FOR DISTRIBUTION F.B. Gerdelin

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

FOUR BARREL
BOX CULVERT

REVISION 10-86

STANDARD NO. B-02.45

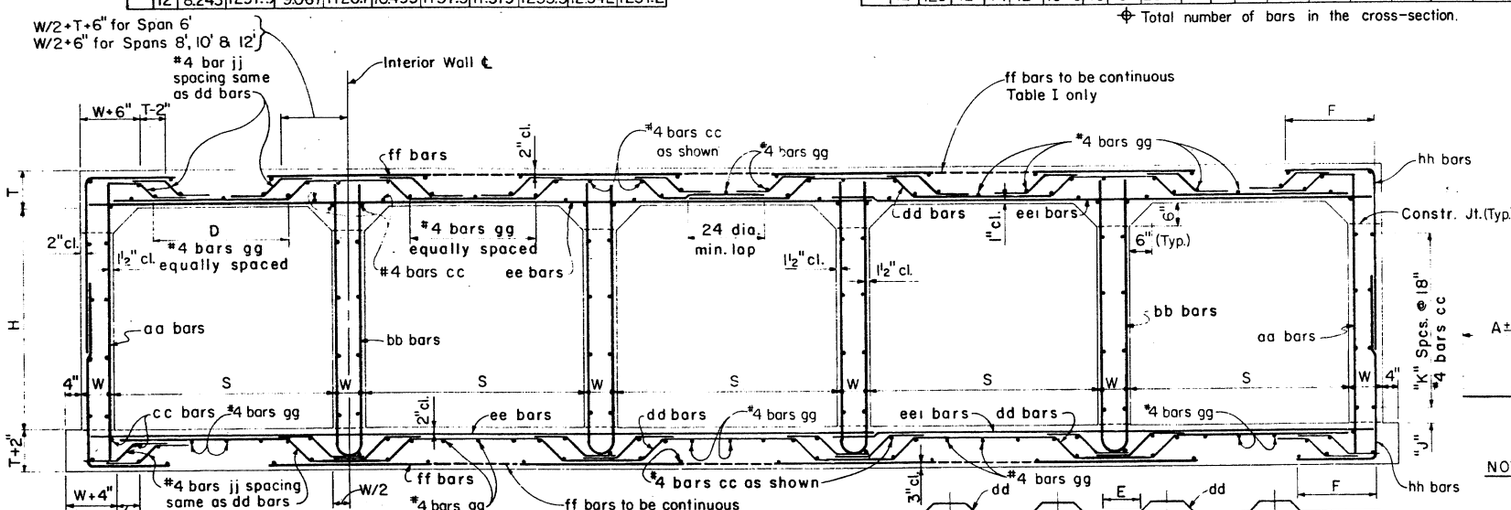
QUANTITIES PER LIN. FOOT OF BARRELS

Span "S"	Height "H"	Table I Concrete C.Y.	Table I Reinf. Steel Lbs.	Table II Concrete C.Y.	Table II Reinf. Steel Lbs.	Table III Concrete C.Y.	Table III Reinf. Steel Lbs.	Table IV Concrete C.Y.	Table IV Reinf. Steel Lbs.	Table V Concrete C.Y.	Table V Reinf. Steel Lbs.
6'	3'	2.400	418.9	2.400	347.5	2.612	397.5	2.930	403.5	3.142	426.2
	4'	2.548	423.7	2.548	365.9	2.760	415.8	3.078	421.7	3.291	442.8
	5'	2.697	433.9	2.697	375.3	2.908	419.4	3.226	427.5	3.438	423.4
	6'	2.845	487.1	2.845	417.3	3.057	414.2	3.374	421.6	3.586	436.6
	7'	2.993	505.3	2.993	435.5	3.205	432.5	3.523	463.4	3.735	496.1
8'	3'	3.177	641.1	3.592	554.6	4.007	542.6	4.561	538.2	5.114	555.6
	4'	3.344	673.1	3.759	557.1	4.174	559.9	4.727	556.5	5.281	573.8
	5'	3.649	645.9	3.926	566.5	4.341	557.6	4.894	566.7	5.448	575.1
	6'	3.815	667.8	4.092	583.8	4.507	575.6	5.061	586.3	5.614	593.3
	7'	3.982	688.4	4.259	601.2	4.674	593.7	5.227	604.6	5.781	635.9
	8'	4.149	704.9	4.426	634.4	4.841	605.6	5.394	598.2	5.946	650.0
10'	3'	4.361	881.6	5.044	656.3	5.898	697.1	6.581	757.7	7.435	791.5
	4'	4.717	878.1	5.230	676.2	6.084	715.2	6.937	763.0	7.621	809.7
	5'	4.902	870.2	5.586	724.3	6.439	728.8	7.123	772.4	7.806	819.9
	6'	5.088	860.6	5.771	722.0	6.625	746.8	7.308	780.8	7.991	838.2
	7'	5.273	889.2	5.956	738.0	6.810	764.8	7.483	799.5	8.176	856.4
	8'	5.458	868.7	6.141	783.1	6.995	774.9	7.678	834.2	8.361	841.8
	9'	5.643	892.9	6.326	801.1	7.180	793.0	7.863	853.1	8.546	907.8
	10'	5.828	903.0	6.512	853.4	7.365	905.7	8.047	921.2	8.732	995.5
12'	8'	7.354	1201.5	8.378	1001.7	9.606	1023.0	10.361	1040.4	11.654	1087.7
	9'	7.576	1226.8	8.600	1023.2	9.828	1044.0	10.852	1091.0	11.876	1107.2
	10'	7.799	1247.6	8.822	1043.7	10.051	1052.2	11.074	1147.1	12.096	1126.1
	11'	8.021	1269.8	9.044	1055.5	10.273	1109.7	11.296	1218.5	12.320	1210.6
	12'	8.243	1297.9	9.067	1120.7	10.495	1137.3	11.519	1255.3	12.542	1251.2

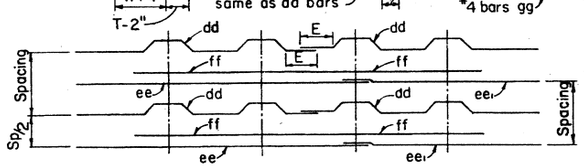
TABLE NO. I
0'-10' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc Number ⊕	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	dd E	ee & ee1 Size	ee & ee1 Spacing	ee Length	ee1 Length	ff Size	ff Spacing	ff Length	gg Number ⊕	hh Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	#4	11"	3'-9	#5	11"	8'-3	108	#4	11"	17'-9	5'-0	2'-3	5"	3'-7	2'-4	#5	11"	20'-9	14'-3	#5	11"	27'-9	50	#4	5½"	6'-9	4'-2
	4'	8"	8"	#4	11"	4'-9	#4	11"	10'-3	120	#4	11"	17'-9	5'-0	2'-3	5"	3'-7	2'-4	#5	11"	20'-9	14'-3	#5	11"	27'-9	50	#4	5½"	7'-3	4'-2
	5'	8"	8"	#4	11"	5'-9	#4	11"	12'-3	120	#4	11"	17'-9	5'-0	2'-3	5"	3'-7	2'-4	#5	11"	20'-9	14'-3	#5	11"	27'-9	50	#4	5½"	7'-9	4'-2
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-3	132	#4	11"	17'-9	5'-0	2'-3	5"	3'-7	2'-4	#6	11"	20'-9	14'-3	#5	11"	27'-9	50	#4	5½"	8'-3	4'-2
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-3	144	#4	11"	17'-9	5'-0	2'-3	5"	3'-7	2'-4	#6	11"	20'-9	14'-3	#5	11"	27'-9	50	#4	5½"	8'-9	4'-2
8'	3'	8½"	9"	#4	12"	4'-0	#4	6"	8'-6	108	#5	12"	22'-4	5'-8	3'-4	5½"	4'-6	2'-11	#6	12"	27'-0	18'-3	#7	12"	36'-3	60	#5	6"	8'-0	5'-3
	4'	8½"	9"	#4	12"	5'-0	#4	6"	10'-6	120	#5	12"	22'-7	5'-10	3'-4	5½"	4'-6	3'-0	#6	12"	27'-0	18'-3	#7	12"	36'-3	70	#5	6"	8'-6	5'-3
	5'	9"	9"	#4	14"	6'-0	#4	7"	12'-6	120	#6	14"	22'-9	6'-0	3'-0	6"	4'-9	3'-2	#6	14"	27'-0	18'-3	#7	14"	36'-3	70	#5	7"	9'-0	5'-3
	6'	9"	9"	#4	14"	7'-0	#4	7"	14'-6	132	#6	14"	22'-9	6'-0	3'-0	6"	4'-9	3'-2	#6	14"	27'-0	18'-3	#7	14"	36'-3	70	#5	7"	9'-6	5'-3
	7'	9"	9"	#4	14"	8'-0	#4	7"	16'-6	144	#6	14"	22'-6	5'-10	3'-4	6"	4'-5	3'-0	#6	14"	27'-0	18'-3	#7	14"	36'-3	70	#5	7"	10'-0	5'-3
	8'	9"	9"	#4	14"	9'-0	#4	7"	18'-6	144	#6	14"	23'-0	6'-1	3'-4	6"	4'-5	3'-0	#6	14"	27'-0	18'-3	#7	14"	36'-3	70	#5	7"	10'-6	5'-3
10'	3'	10"	10"	#4	11"	4'-3	#5	5½"	9'-0	108	#6	11"	27'-7	6'-11	4'-2	7"	5'-6	3'-6	#5	11"	33'-3	22'-6	#7	11"	44'-9	80	#6	5½"	9'-3	6'-6
	4'	10½"	10"	#4	11"	5'-3	#5	5½"	11'-0	120	#6	11"	27'-8	6'-10	4'-2	7½"	5'-5	3'-6	#5	11"	33'-3	22'-6	#7	11"	44'-9	80	#5	5½"	9'-9	6'-6
	5'	10½"	10"	#4	11"	6'-3	#6	11"	13'-0	120	#6	11"	27'-10	7'-1	4'-2	7½"	5'-5	3'-6	#5	11"	33'-3	22'-6	#7	11"	44'-9	80	#5	5½"	10'-3	6'-6
	6'	10½"	10"	#4	13"	7'-3	#5	6½"	15'-0	132	#6	13"	27'-10	7'-2	4'-0	7½"	5'-7	3'-7	#6	13"	33'-3	22'-6	#7	13"	44'-9	80	#5	6½"	10'-9	6'-6
	7'	10½"	10"	#4	13"	8'-3	#5	6½"	17'-0	144	#6	13"	27'-10	7'-2	4'-0	7½"	5'-7	3'-7	#6	13"	33'-3	22'-6	#7	13"	44'-9	80	#5	6½"	11'-3	6'-6
	8'	10½"	10"	#4	13"	9'-3	#6	13"	19'-0	144	#6	13"	27'-10	7'-2	4'-0	7½"	5'-7	3'-7	#6	13"	33'-3	22'-6	#7	13"	44'-9	80	#5	6½"	11'-9	6'-6
	9'	10½"	10"	#4	13"	10'-3	#6	13"	21'-0	156	#6	13"	27'-10	7'-2	4'-0	7½"	5'-7	3'-7	#6	13"	33'-3	22'-6	#7	13"	44'-9	80	#5	6½"	12'-3	6'-6
	10'	10½"	10"	#4	13"	11'-3	#4	6½"	23'-0	168	#6	13"	27'-10	7'-2	4'-0	7½"	5'-7	3'-7	#6	13"	33'-3	22'-6	#7	13"	44'-9	80	#5	6½"	12'-9	6'-6
12'	8'	12½"	12"	#4	11"	9'-6	#5	5½"	20'-0	144	#6	11"	33'-0	8'-1	5'-0	9½"	6'-5	4'-0	#6	11"	40'-0	27'-0	#7	11"	53'-6	100	#5	5½"	13'-3	7'-8
	9'	12½"	12"	#4	11"	10'-6	#5	5½"	22'-0	156	#6	11"	33'-4	8'-5	5'-0	9½"	6'-5	4'-0	#6	11"	40'-0	27'-0	#7	11"	53'-6	100	#5	5½"	13'-9	7'-8
	10'	12½"	12"	#4	12"	11'-6	#5	6"	24'-0	168	#7	12"	33'-7	8'-7	5'-0	9½"	6'-5	4'-1	#6	12"	40'-0	27'-0	#7	12"	53'-6	100	#5	6"	14'-3	7'-8
	11'	12½"	12"	#4	12"	12'-6	#5	6"	26'-0	168	#7	12"	33'-7	8'-7	5'-0	9½"	6'-5	4'-1	#6	12"	40'-0	27'-0	#7	12"	53'-6	100	#5	6"	14'-9	7'-8
	12'	12½"	12"	#4	12"	13'-6	#5	6"	28'-0	180	#7	12"	33'-4	8'-4	5'-0	9½"	6'-5	4'-1	#6	12"	40'-0	27'-0	#7	12"	53'-6	100	#5	6"	15'-3	7'-8

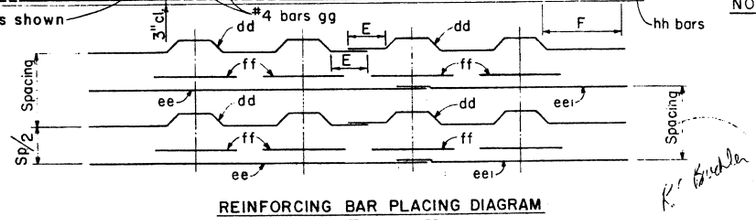
⊕ Total number of bars in the cross-section.



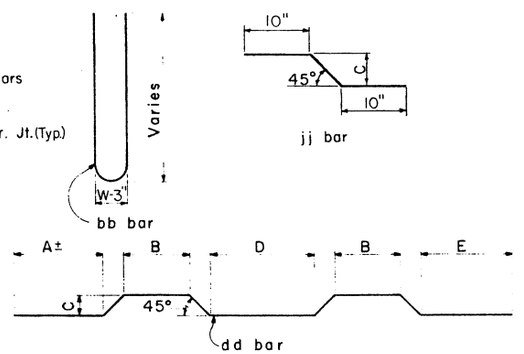
TYPICAL SECTION



REINFORCING BAR PLACING DIAGRAM
For Table I only



REINFORCING BAR PLACING DIAGRAM
For Tables II through V



BENDS

Height "H"	"J" Dim.	"K" Spaces
3'	9"	1
4'	3"	2
5'	12"	2
6'	9"	3
7'	3"	4
8'	12"	4
9'	9"	5
10'	3"	6
11'	12"	6
12'	9"	7

NOTE:
See B-02.55 for Tables II thru V.
See B-01.10 for general notes and miscellaneous details.
All bend dimensions are out to out of bar.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Table II ff bars & quantities	JTW	7-76
②	Rev. to AASHTO 1985 Spec.	JEM	10-86
③			

DESIGN	DHY	12-71	①
DRAWN	FDL	8-72	②
CHECKED	NAB	3-73	③

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION 10-86

FIVE BARREL
BOX CULVERT

STANDARD NO. B-02.50

TABLE NO. II
10'-15' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd								ee & eel				ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number	Size	Spacing	Length	A	B	C	D	E	Size	Spacing	ee Length	eel Length	Size	Spacing	Length	Number	Size	Spacing	Length	F
6'	3'	8"	8"	#4	12"	3'-9	#4	12"	8'-0	08	#5	12"	17'-6	4'-5	2'-6	5"	3'-4	2'-4	#4	12"	20'-9	14'-3	#5	12"	4'-9	50	#4	6"	4'-3	1'-9
	4'	8"	8"	#4	12"	4'-9	#4	12"	10'-0	20	#5	12"	17'-9	4'-8	2'-6	5"	3'-4	2'-4	#4	12"	20'-9	14'-3	#5	12"	4'-9	50	#4	6"	4'-9	1'-9
	5'	8"	8"	#4	12"	5'-9	#4	12"	12'-0	20	#5	12"	17'-9	4'-8	2'-6	5"	3'-4	2'-4	#4	12"	20'-9	14'-3	#5	12"	4'-9	50	#4	6"	5'-3	1'-9
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-0	32	#5	11"	17'-9	4'-8	2'-6	5"	3'-4	2'-4	#4	11"	20'-9	14'-3	#5	11"	4'-9	50	#4	5½"	5'-9	1'-9
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-0	44	#5	11"	17'-9	4'-8	2'-6	5"	3'-4	2'-4	#4	11"	20'-9	14'-3	#5	11"	4'-9	50	#4	5½"	6'-3	1'-9
8'	3'	10"	9"	#4	12"	4'-3	#4	12"	9'-0	08	#6	12"	23'-0	6'-2	3'-0	7"	4'-7	3'-0	#5	12"	27'-0	18'-3	#7	12"	6'-3	60	#5	6"	5'-0	2'-3
	4'	10"	9"	#4	12"	5'-3	#4	12"	11'-0	20	#6	12"	23'-3	6'-4	3'-0	7"	4'-7	3'-0	#5	12"	27'-0	18'-3	#7	12"	6'-3	60	#4	6"	5'-3	2'-0
	5'	10"	9"	#4	12"	6'-3	#4	12"	13'-0	20	#6	12"	23'-3	6'-4	3'-0	7"	4'-7	3'-0	#5	12"	27'-0	18'-3	#7	12"	6'-3	60	#4	6"	5'-9	2'-0
	6'	10"	9"	#4	12"	7'-3	#4	12"	15'-0	32	#6	12"	23'-3	6'-4	3'-0	7"	4'-7	3'-0	#5	12"	27'-0	18'-3	#7	12"	6'-3	60	#4	6"	6'-3	2'-0
	7'	10"	9"	#4	12"	8'-3	#4	12"	17'-0	44	#6	12"	23'-3	6'-4	3'-0	7"	4'-7	3'-0	#5	12"	27'-0	18'-3	#7	12"	6'-3	60	#4	6"	6'-9	2'-0
	8'	10"	9"	#4	12"	9'-3	#4	12"	19'-0	44	#6	12"	23'-3	6'-4	3'-0	7"	4'-7	3'-0	#5	12"	27'-0	18'-3	#7	12"	6'-3	60	#5	6"	7'-6	2'-3
10'	3'	12"	10"	#4	11"	4'-6	#4	11"	9'-6	08	#6	11"	28'-1	7'-3	3'-6	9"	5'-10	3'-9	#5	11"	33'-3	22'-6	#7	11"	7'-6	70	#5	5½"	5'-3	2'-3
	4'	12"	10"	#4	11"	5'-6	#4	11"	11'-6	20	#6	11"	28'-1	7'-3	3'-6	9"	5'-10	3'-9	#5	11"	33'-3	22'-6	#7	11"	7'-6	70	#5	5½"	5'-9	2'-3
	5'	12½"	10"	#4	11"	6'-6	#4	11"	13'-6	20	#6	11"	28'-8	7'-5	3'-6	9½"	5'-9	3'-8	#5	11"	33'-3	22'-6	#7	11"	7'-6	70	#5	5½"	6'-3	2'-3
	6'	12½"	10"	#4	11"	7'-6	#4	11"	15'-6	32	#6	11"	28'-8	7'-5	3'-6	9½"	5'-9	3'-8	#5	11"	33'-3	22'-6	#7	11"	7'-6	70	#4	5½"	6'-9	2'-3
	7'	12½"	10"	#4	11"	8'-6	#4	11"	17'-6	44	#6	11"	28'-4	7'-5	3'-6	9½"	5'-9	3'-8	#5	11"	33'-3	22'-6	#7	11"	7'-6	70	#4	5½"	7'-3	2'-3
	8'	12½"	10"	#4	13"	9'-6	#4	13"	19'-6	44	#7	13"	28'-8	7'-8	3'-6	9½"	5'-9	3'-9	#6	13"	33'-3	22'-6	#7	13"	7'-6	70	#5	6½"	7'-9	2'-3
	9'	12½"	10"	#4	13"	10'-6	#4	13"	21'-6	56	#7	13"	28'-8	7'-8	3'-6	9½"	5'-9	3'-9	#6	13"	33'-3	22'-6	#7	13"	7'-6	70	#5	6½"	8'-3	2'-3
	10'	12½"	10"	#4	13"	11'-6	#4	13"	23'-6	68	#7	13"	28'-8	7'-8	3'-6	9½"	5'-9	3'-9	#6	13"	33'-3	22'-6	#7	13"	7'-6	70	#6	6½"	9'-2	2'-8
12'	8'	15"	12"	#4	11"	10'-0	#4	11"	20'-6	44	#6	11"	34'-7	8'-6	4'-6	12"	6'-6	4'-11	#6	11"	40'-0	27'-0	#8	11"	9'-0	80	#5	5½"	8'-3	2'-6
	9'	15"	12"	#4	11"	11'-0	#4	11"	22'-6	56	#6	11"	34'-10	8'-9	4'-6	12"	6'-6	4'-11	#6	11"	40'-0	27'-0	#8	11"	9'-0	80	#5	5½"	8'-9	2'-7
	10'	15"	12"	#4	11"	12'-0	#4	11"	24'-6	68	#6	11"	34'-7	8'-6	4'-6	12"	6'-6	4'-11	#6	11"	40'-0	27'-0	#8	11"	9'-0	80	#5	5½"	9'-6	2'-10
	11'	15"	12"	#4	11"	13'-0	#4	11"	26'-6	68	#6	11"	34'-7	8'-6	4'-6	12"	6'-6	4'-11	#6	11"	40'-0	27'-0	#8	11"	9'-0	80	#5	5½"	10'-0	2'-10
	12'	15"	12"	#4	11"	14'-0	#4	11"	28'-6	80	#6	11"	34'-7	8'-6	4'-6	12"	6'-6	4'-11	#6	11"	40'-0	27'-0	#8	11"	9'-0	80	#6	5½"	10'-9	3'-0

TABLE NO. III
15'-20' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd								ee & eel				ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number	Size	Spacing	Length	A	B	C	D	E	Size	Spacing	ee Length	eel Length	Size	Spacing	Length	Number	Size	Spacing	Length	F
6'	3'	9"	8"	#4	11"	4'-0	#4	11"	8'-6	08	#5	11"	17'-10	4'-6	2'-6	6"	3'-2	2'-4	#4	11"	20'-9	14'-3	#6	11"	5'-7	40	#4	5½"	4'-3	1'-8
	4'	9"	8"	#4	11"	5'-0	#4	11"	10'-6	20	#5	11"	17'-10	4'-6	2'-6	6"	3'-2	2'-4	#4	11"	20'-9	14'-3	#6	11"	5'-7	40	#4	5½"	4'-9	1'-8
	5'	9"	8"	#4	11"	6'-0	#4	11"	12'-6	20	#5	11"	17'-10	4'-6	2'-6	6"	3'-2	2'-4	#4	11"	20'-9	14'-3	#6	11"	5'-1	40	#4	5½"	5'-3	1'-8
	6'	9"	8"	#4	11"	7'-0	#4	11"	14'-6	32	#5	11"	17'-10	4'-6	2'-6	6"	3'-2	2'-4	#4	11"	20'-9	14'-3	#5	11"	4'-9	40	#4	5½"	5'-9	1'-8
	7'	9"	8"	#4	11"	8'-0	#4	11"	16'-6	44	#5	11"	17'-10	4'-6	2'-6	6"	3'-2	2'-4	#4	11"	20'-9	14'-3	#5	11"	4'-9	40	#4	5½"	6'-3	1'-10
8'	3'	11½"	9"	#4	12"	4'-6	#4	12"	9'-6	08	#6	12"	23'-4	6'-0	3'-0	8½"	4'-4	3'-0	#5	12"	27'-0	18'-3	#7	12"	6'-3	60	#4	6"	4'-6	1'-9
	4'	11½"	9"	#4	12"	5'-6	#4	12"	11'-6	20	#6	12"	23'-4	6'-0	3'-0	8½"	4'-4	3'-0	#5	12"	27'-0	18'-3	#7	12"	6'-3	60	#4	6"	5'-0	1'-9
	5'	11½"	9"	#4	13"	6'-6	#4	13"	13'-6	20	#6	13"	23'-4	6'-0	3'-0	8½"	4'-4	3'-0	#5	13"	27'-0	18'-3	#7	13"	6'-6	60	#5	6½"	6'-0	2'-0
	6'	11½"	9"	#4	13"	7'-6	#4	13"	15'-6	32	#6	13"	23'-4	6'-0	3'-0	8½"	4'-4	3'-0	#5	13"	27'-0	18'-3	#7	13"	6'-6	60	#5	6½"	6'-6	2'-0
	7'	11½"	9"	#4	13"	8'-6	#4	13"	17'-6	44	#6	13"	23'-4	6'-0	3'-0	8½"	4'-4	3'-0	#5	13"	27'-0	18'-3	#7	13"	6'-6	60	#5	6½"	7'-0	2'-0
	8'	11½"	9"	#4	13"	9'-6	#4	13"	19'-6	44	#6	13"	23'-4	6'-4	2'-6	8½"	4'-10	3'-2	#5	13"	27'-0	18'-3	#7	13"	6'-6	60	#5	6½"	7'-9	2'-4
10'	3'	14½"	10"	#4	13"	5'-0	#4	13"	10'-6	08	#6	13"	28'-9	7'-9	3'-0	11½"	5'-11	3'-8	#6	13"	33'-3	22'-6	#8	13"	7'-9	70	#5	6½"	5'-3	2'-0
	4'	14½"	10"	#4	13"	6'-0	#4	13"	12'-6	20	#6	13"	28'-9	7'-9	3'-0	11½"	5'-11	3'-8	#6	13"	33'-3	22'-6	#8	13"	7'-9	70	#5	6½"	5'-9	2'-0
	5'	15"	10"	#4	13"	7'-0	#4	13"	14'-6	20	#6	13"	29'-0	7'-10	3'-0	1'-0	5'-10	3'-8	#6	13"	33'-3	22'-6	#8	13"	7'-10	70	#5	6½"	6'-3	2'-0
	6'	15"	10"	#4	13"	8'-0	#4	13"	16'-6	32	#6	13"	29'-0	7'-10	3'-0	1'-0	5'-10	3'-8	#6	13"	33'-3	22'-6	#8	13"	7'-10	70	#5	6½"	6'-9	2'-0
	7'	15"	10"	#4	13"	9'-0	#4	13"	18'-6	44	#6	13"	29'-0	7'-10	3'-0	1'-0	5'-10	3'-8	#6	13"	33'-3	22'-6	#8	13"	7'-10	70	#5	6½"	7'-3	2'-0
	8'	15"	10"	#4	13"	10'-0	#4	13"	20'-6	44	#6	13"	29'-0	7'-10	3'-0	1'-0	5'-10	3'-8	#6	13"	33'-3	22'-6	#8	13"	7'-10	70	#5	6½"	7'-9	2'-0
	9'	15"	10"	#4	13"	11'-0	#4	13"	22'-6	56	#6	13"	28'-8	7'-6	3'-0	1'-0	5'-10	3'-8	#6	13"	33'-3	22'-6	#8	13"	7'-10	70	#5	6½"	8'-6	2'-4
	10'	15"	10"	#4	12"	12'-0	#4	12"	24'-6	68	#6	12"	28'-8	7'-6	3'-0	1'-0	5'-10	3'-8	#6	12"	33'-3	22'-6	#8	12"	7'-9	70	#6	6"	9'-7	2'-11
12'	8'	18"	12"	#4	12"	10'-6	#4	12"	21'-6	44	#7	12"	34'-6	8'-11	4'-0	1'-3	6'-6	4'-0	#6	12"	40'-0	27'-0	#8	12"	9'-6	80	#5	6"	8'-3	2'-4
	9'	18"	12"	#4	12"	11'-6	#4	12"	23'-6	56	#7	12"	34'-6	8'-11	4'-0	1'-3	6'-6	4'-0	#6	12"	40'-0	27'-0	#8	12"	9'-6	80	#5	6"	9'-0	2'-6
	10'	18"	12"	#4	12"	12'-6	#4	12"	25'-6	68	#7	12"	34'-6	8'-11	4'-0	1'-3	6'-6	4'-0	#6	12"	40'-0	27'-0	#8	12"	9'-0	80	#5	6"	9'-6	2'-6
	11'	18"	12"	#4	12"	13'-6	#4	12"	27'-6	68	#7	12"	34'-6	8'-11	4'-0	1'-3	6'-6	4'-0	#6	12"	40'-0	27'-0	#8	12"	9'-0	80	#6	6"	10'-10	3'-4
	12'	18"	12"	#4	12"	14'-6	#4	12"	29'-6	80	#7	12"	34'-6	8'-11	4'-0	1'-3	6'-6	4'-0	#6	12"	40'-0	27'-0	#8	12"	9'-0	80	#6	6"	11'-0	3'-0

TABLE NO. IV
20'-25' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd								ee & eel				ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number	Size	Spacing	Length	A	B	C	D	E	Size	Spacing	ee Length	eel Length	Size	Spacing	Length	Number	Size	Spacing	Length	F
6'	3'	10½"	8"	#4	11"	4'-3	#4	11"	9'-0	08	#5	11"	18'-3	4'-8	2'-6	7½"	2'-11	2'-2	#4	11"	20'-9	14'-3	#6	11"	5'-7	40	#4	5½"	4'-3	1'-6
	4'	10½"	8"	#4	11"	5'-3	#4	11"	11'-0	20	#5	11"	18'-3	4'-8	2'-6	7½"	2'-11	2'-2	#4	11"	20'-9	14'-3	#6	11"	5'-7	40	#4	5½"	4'-9	1'-6
	5'	10½"	8"	#4	11"	6'-3	#4	11"	13'-0	20	#5	11"	18'-3	4'-8	2'-6	7½"	2'-11	2'-2	#4	11"	20'-9	14'-3	#6	11"	5'-3	40	#4	5½"	5'-3	1'-6
	6'	10½"	8"	#4	11"	7'-3	#4	11"	15'-0	32	#5	11"	18'-3	4'-8	2'-6	7½"	2'-11	2'-2	#4	11"	20'-9	14'-3	#5	11"	4'-9	40	#4	5½"	6'-0	1'-9
	7'	10½"	8"	#4	11"	8'-3	#4	11"	17'-0	44	#5	11"	18'-3	4'-8	2'-6	7½"	2'-11	2'-2	#4	11"	20'-9	14'-3	#5	11"	4'-9	40	#5	5½"	6'-9	2'-2
8'	3'	13½"	9"	#4	11"	4'-9	#4	11"	10'-0	08	#5	11"	23'-6	6'-0	3'-0	10½"	4'-0	2'-7	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#4	5½"	4'-6	1'-6
	4'	13½"	9"	#4	11"	5'-9	#4	11"	12'-0	20	#5	11"	23'-6	6'-0	3'-0	10½"	4'-0	2'-7	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#4	5½"	5'-0	1'-6
	5'	13½"	9"	#4	11"	6'-9	#4	11"	14'-0	20	#5	11"	23'-6	6'-0	3'-0	10½"	4'-0	2'-7	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#4	5½"	5'-6	1'-6
	6'	13½"	9"	#4	11"	7'-9	#4	11"	16'-0	32	#5	11"	23'-6	6'-0	3'-0	10½"	4'-0	2'-7	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#4	5½"	6'-3	1'-9
	7'	13½"	9"	#4	11"	8'-9	#4	11"	18'-0	44	#5	11"	23'-6	6'-0	3'-0	10½"	4'-0	2'-7	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#4	5½"	6'-9	1'-9
	8'	13½"	9"	#4	12"	9'-9	#4	12"	20'-0	44	#5	12"	23'-6	6'-0	3'-0	10½"	4'-0	2'-7	#5	12"	27'-0	18'-3	#7	12"	6'-6	50	#5	6"	7'-6	2'-2
10'	3'	16½"	10"	#4	12"	5'-3	#4	12"	11'-0	08	#6	12"	29'-3	7'-8	3'-0	1'-1½"	5'-7	3'-7	#6	12"	33'-3	22'-6	#8	12"	8'-1	70	#5	6"	5'-0	1'-9
	4'	17"	10"	#4	12"	6'-3	#4	12"	13'-0	20	#6	12"	29'-4	7'-8	3'-0	1'-2	5'-6	3'-6	#6	12"	33'-3	22'-6	#8	12"	8'-2	70	#4	6"	5'-6	1'-9
	5'	17"	10"	#4	12"	7'-3	#4	12"	15'-0	20	#6	12"	29'-4	7'-8	3'-0	1'-2	5'-6	3'-6	#6	12"	33'-3	22'-6	#8	12"	8'-2	70	#4	6"	6'-0	1'-9
	6'	17"	10"	#4	12"	8'-3	#4	12"	17'-0	32	#6	12"	29'-4	7'-8	3'-0	1'-2	5'-6	3'-6	#6	12"	33'-3	22'-6	#8	12"	7'-9	70	#4	6"	6'-6	1'-9
	7'	17"	10"	#4	12"	9'-3	#4	12"	19'-0	44	#6	12"	29'-4	7'-8	3'-0	1'-2	5'-6	3'-6	#6	12"	33'-3	22'-6	#8	12"	7'-9	70	#4	6"	7'-3	2'-0
	8'	17"	10"	#4	12"	10'-3	#4	12"	21'-0	44	#6	12"	29'-4	7'-8	3'-0	1'-2	5'-6	3'-6	#6	12"	33'-3	22'-6	#8	12"	7'-9	70	#5	6"	8'-0	2'-0
	9'	17"	10"	#4	12"	11'-3	#4	12"	23'-0	56	#6	12"	29'-4	7'-8	3'-0	1'-2	5'-6	3'-6	#6	12"	33'-3	22'-6	#8	12"	7'-9	70	#5	6"	8'-6	2'-3
	10'	17"	10"	#5	12"	12'-3	#4	12"	25'-0	68	#6	12"	29'-4	7'-8	3'-0	1'-2	5'-6	3'-6	#6	12"	33'-3	22'-6	#8	12"	7'-9	70	#6	6"	9'-7	2'-10
12'	8'	20½"	12"	#4	15"	11'-0	#4	15"	22'-6	44	#6	10"	35'-0	8'-10	4'-0	1'-5½"	6'-1	3'-10	#6	10"	40'-0	27'-0	#8	10"	9'-0	70	#4	5"	8'-3	2'-2
	9'	20½"	12"	#4	15"	12'-0	#4	15"	24'-6	56	#6	10"	35'-0	8'-10	4'-0	1'-5½"	6'-1	3'-10	#6	10"	40'-0	27'-0	#8	10"	9'-0	70	#5	5"	9'-0	2'-4
	10'	20½"	12"	#4	10"	13'-0	#4	10"	26'-6	68	#6	10"	35'-0	8'-10	4'-0	1'-5½"	6'-1	3'-10	#6	10"	40'-0	27'-0	#8	10"	9'-0	70	#5	5"	9'-9	2'-6
	11'	20½"	12"	#4	10"	14'-0	#4	10"	28'-6	68	#6	10"	34'-8	8'-6	4'-0	1'-5½"	6'-1	3'-10	#6	10"	40'-0	27'-0	#8	10"	9'-0	70	#6	5"	11'-4	3'-7
	12'	20½"	12"	#5	10"	15'-0	#4	10"	30'-6	80	#6	10"	34'-8	8'-6	4'-0	1'-5½"	6'-1	3'-10	#6	10"	40'-0	27'-0	#8	10"	9'-0	70	#6	5"	11'-10	3'-7

TABLE NO. V
25'-30' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd								ee & eel				ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number	Size	Spacing	Length	A	B	C	D	E	Size	Spacing	ee Length	eel Length	Size	Spacing	Length	Number	Size	Spacing	Length	F
6'	3'	11½"	8"	#4	15"	4'-6	#4	15"	9'-6	08	#5	10"	18'-6	4'-11	2'-0	8½"	3'-3	2'-3	#4	10"	20'-9	14'-3	#6	10"	5'-7	40	#4	5"	4'-3	1'-6
	4'	11½"	8"	#4	15"	5'-6	#4	15"	11'-6	20	#5	10"	18'-6	4'-11	2'-0	8½"	3'-3	2'-3	#4	10"	20'-9	14'-3	#6	10"	5'-7	40	#4	5"	4'-9	1'-6
	5'	11½"	8"	#4	15"	6'-6	#4	15"	13'-6	20	#5	10"	18'-6	4'-11	2'-0	8½"	3'-3	2'-3	#4	10"	20'-9	14'-3	#5	10"	5'-3	40	#4	5"	5'-3	1'-6
	6'	11½"	8"	#4	15"	7'-6	#4	15"	15'-6	32	#5	10"	18'-6	4'-11	2'-0	8½"	3'-3	2'-3	#4	10"	20'-9	14'-3	#5	10"	4'-9	40	#4	5"	6'-0	1'-9
	7'	11½"	8"	#4	10"	8'-6	#4	15"	17'-6	44	#5	10"	18'-6	4'-11	2'-0	8½"	3'-3	2'-3	#4	10"	20'-9	14'-3	#5	10"	4'-9	40	#5	5"	7'-0	2'-3
8'	3'	15½"	9"	#4	11"	5'-0	#4	11"	10'-9	08	#5	11"	23'-10	5'-10	3'-0	1'-0½"	3'-8	2'-5	#5	11"	27'-0	18'-3	#7	11"	7'-0	50	#4	5½"	4'-9	1'-8
	4'	15½"	9"	#4	11"	6'-0	#4	11"	12'-9	20	#5	11"	23'-10	5'-10	3'-0	1'-0½"	3'-8	2'-5	#5	11"	27'-0	18'-3	#7	11"	7'-0	50	#4	5½"	5'-3	1'-8
	5'	15½"	9"	#4	11"	7'-0	#4	11"	14'-9	20	#5	11"	23'-10	5'-10	3'-0	1'-0½"	3'-8	2'-5	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#4	5½"	5'-9	1'-8
	6'	15½"	9"	#4	11"	8'-0	#4	11"	16'-9	32	#5	11"	23'-10	5'-10	3'-0	1'-0½"	3'-8	2'-5	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#4	5½"	6'-3	2'-2
	7'	15½"	9"	#4	11"	9'-0	#4	11"	18'-9	44	#5	11"	23'-10	5'-10	3'-0	1'-0½"	3'-8	2'-5	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#5	5½"	7'-0	1'-10
	8'	15½"	9"	#4	11"	10'-0	#4	11"	20'-9	44	#5	11"	23'-10	5'-10	3'-0	1'-0½"	3'-8	2'-5	#5	11"	27'-0	18'-3	#7	11"	6'-6	50	#5	5½"	7'-9	2'-0
10'	3'	19"	10"	#4	11"	5'-9	#4	11"	11'-9	08	#6	11"	29'-3	7'-5	3'-0	1'-4	5'-2	3'-3	#6	11"	33'-3	22'-6	#8	11"	7'-9	60	#4	5½"	5'-0	1'-7
	4'	19"	10"	#4	11"	6'-9	#4	11"	13'-9	20	#6	11"	29'-3	7'-5	3'-0	1'-4	5'-2	3'-3	#6	11"	33'-3	22'-6	#8	11"	7'-9	60	#4	5½"	5'-6	1'-7
	5'	19"	10"	#4	11"	7'-9	#4	11"	15'-9	20	#6	11"	29'-3	7'-5	3'-0	1'-4	5'-2	3'-3	#6	11"	33'-3	22'-6	#8	11"	7'-9	60	#4	5½"	6'-0	1'-7
	6'	19"	10"	#4	11"	8'-9	#4	11"	17'-9	32	#6	11"	29'-3	7'-5	3'-0	1'-4	5'-2	3'-3	#6	11"	33'-3	22'-6	#8	11"	7'-9	60	#4	5½"	6'-6	1'-9
	7'	19"	10"	#4	11"	9'-9	#4	11"	19'-9	44	#6	11"	29'-3	7'-5	3'-0	1'-4	5'-2	3'-3	#6	11"	33'-3	22'-6	#8	11"	7'-9	60	#4	5½"	7'-0	2'-0
	8'	19"	10"	#4	13"	10'-9	#4	13"	21'-9	44	#7	13"	29'-10	7'-8	3'-0	1'-4	5'-2	3'-6	#6	13"	33'-3	22'-6	#8	13"	7'-9	60	#5	6½"	8'-0	2'-0
	9'	19"	10"	#5	13"	11'-9	#4	13"	23'-9	56	#7	13"	29'-10	7'-8	3'-0	1'-4	5'-2	3'-6	#6	13"	33'-3	22'-6	#8	13"	7'-9	60	#6	6½"	9'-6	3'-0
	10'	19"	10"	#5	11"	12'-9	#4	11"	25'-9	68	#6	11"	29'-4	7'-5	3'-0	1'-4	5'-2	3'-3	#6	11"	33'-3	22'-6	#8	11"	7'-9	60	#6	6½"	10'-0	3'-0
12'	8'	23"	12"	#4	10"	11'-3	#4	15"	23'-0	44	#6	10"	35'-3	8'-7	4'-0	1'-8	5'-8	3'-7	#6	10"	40'-0	27'-0	#8	10"	10'-4	70	#4	5"	8'-3	2'-0
	9'	23"	12"	#4	10"	12'-3	#4

QUANTITIES PER LIN. FOOT OF BARRELS

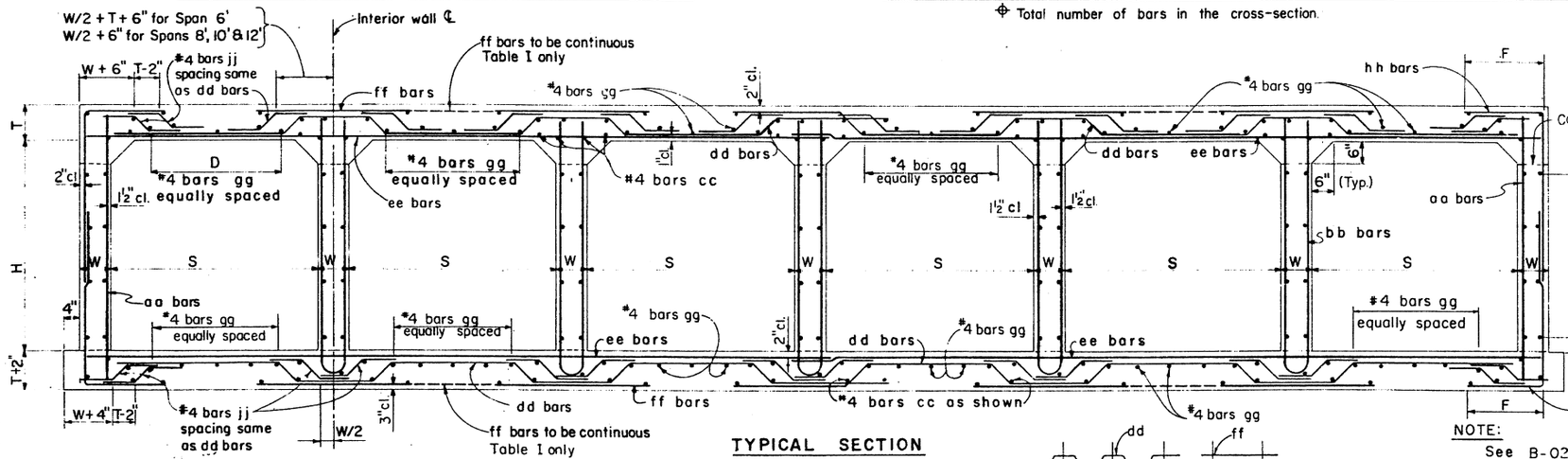
Span "S"	Height "H"	Table I Concrete C.Y.	Table I Reinf. Steel Lbs.	Table II Concrete C.Y.	Table II Reinf. Steel Lbs.	Table III Concrete C.Y.	Table III Reinf. Steel Lbs.	Table IV Concrete C.Y.	Table IV Reinf. Steel Lbs.	Table V Concrete C.Y.	Table V Reinf. Steel Lbs.
6'	3'	2.854	533.0	2.854	408.7	3.107	477.9	3.487	492.6	3.740	521.1
	4'	3.027	537.1	3.027	430.1	3.280	498.9	3.660	513.6	3.914	540.1
	5'	3.200	548.8	3.200	440.8	3.453	510.6	3.833	525.3	4.086	496.7
	6'	3.373	569.8	3.373	489.6	3.626	485.5	4.006	495.5	4.259	511.0
	7'	3.546	590.8	3.546	510.6	3.799	506.5	4.178	5400	4.431	562.9
8'	3'	3.783	786.5	4.279	685.5	4.775	675.6	5.437	646.4	6.098	662.1
	4'	3.977	801.2	4.473	691.3	4.969	695.6	5.631	665.5	6.293	681.2
	5'	4.337	784.9	4.668	702.0	5.164	672.0	5.825	675.2	6.487	682.8
	6'	4.531	801.4	4.862	722.0	5.295	691.8	6.020	696.0	6.681	706.7
	7'	4.726	836.0	5.057	742.1	5.553	711.6	6.214	720.3	6.876	728.0
	8'	4.920	853.9	5.251	776.6	5.747	723.9	6.409	757.5	7.069	767.6
10'	3'	5.198	1075.8	6.015	922.4	7.036	893.6	7.853	900.7	8.874	935.2
	4'	5.619	1077.7	6.231	943.0	7.252	912.4	8.273	905.2	9.090	954.3
	5'	5.835	1065.1	6.651	872.0	7.673	925.5	8.489	913.2	9.306	964.0
	6'	6.051	1096.8	6.868	892.6	7.889	944.4	8.706	930.6	9.522	983.1
	7'	6.267	1113.2	7.084	913.2	8.105	963.2	8.922	949.3	9.738	1008.1
	8'	6.483	1200.8	7.300	924.4	8.321	977.2	9.138	987.2	9.954	10508
	9'	6.699	1230.8	7.516	945.0	8.537	997.2	9.354	1006.5	10.171	10672
	10'	6.915	1260.7	7.732	999.9	8.753	1056.6	9.568	1075.1	10.387	11396
12'	8'	8.743	1534.3	9.967	1331.3	11.436	12680	12.661	12736	13.885	1386.3
	9'	9.002	1571.8	10.226	1356.8	11.696	1321.0	12.920	1326.6	14.144	1405.7
	10'	9.261	1607.5	10.486	1378.8	11.955	1348.5	13.179	1356.8	14.403	1470.7
	11'	9.521	1633.9	10.745	1392.1	12214	1416.4	13.438	1427.8	14.663	14893
	12'	9.780	1669.6	10.004	1460.1	12473	1435.2	13.698	1464.8	14.922	15889

TABLE NO. I
0'-10' FILL

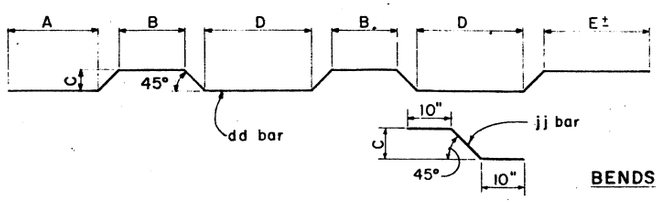
Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Size	aa Spacing	aa Length	bb Size	bb Spacing	bb Length	cc ⊕ Number	dd Size	dd Spacing	dd Length	dd A	dd B	dd C	dd D	dd E	ee Size	ee Spacing	ee Length	ff Size	ff Spacing	ff Length	gg ⊕ Number	hh Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	#4	11"	3'-9	#5	11"	8'-3	128	#5	11"	24'-9	5'-1	2'-3	5"	3'-7	5'-1	#5	11"	20'-9	#5	11"	14'-6	60	#4	5½"	6'-9	4'-2
	4'	8"	8"	#4	11"	4'-9	#4	11"	10'-3	142	#5	11"	24'-9	5'-1	2'-3	5"	3'-7	5'-1	#5	11"	20'-9	#5	11"	14'-6	60	#4	5½"	7'-3	4'-2
	5'	8"	8"	#4	11"	5'-9	#4	11"	12'-3	142	#5	11"	24'-9	5'-1	2'-3	5"	3'-7	5'-1	#5	11"	20'-9	#5	11"	14'-6	60	#4	5½"	7'-9	4'-2
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-3	156	#5	11"	24'-9	5'-1	2'-3	5"	3'-7	5'-1	#5	11"	20'-9	#5	11"	14'-6	60	#4	5½"	8'-3	4'-2
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-3	170	#5	11"	24'-9	5'-1	2'-3	5"	3'-7	5'-1	#5	11"	20'-9	#5	11"	14'-6	60	#4	5½"	8'-9	4'-2
8'	3'	8½"	9"	#4	14"	4'-0	#5	7"	8'-6	128	#7	14"	31'-5	5'-10	3'-4	5½"	4'-6	6'-8	#6	14"	27'-0	#6	14"	18'-9	72	#6	7"	8'-0	5'-3
	4'	8½"	9"	#4	14"	5'-0	#5	7"	10'-6	142	#7	14"	31'-5	5'-10	3'-4	5½"	4'-6	6'-8	#6	14"	27'-0	#6	14"	18'-9	84	#5	7"	8'-6	5'-3
	5'	9"	9"	#4	14"	6'-0	#4	7"	12'-6	142	#7	14"	31'-6	6'-0	3'-0	6"	4'-9	6'-6	#6	14"	27'-0	#6	14"	18'-9	84	#5	7"	9'-0	5'-3
	6'	9"	9"	#4	14"	7'-0	#4	7"	14'-6	156	#7	14"	31'-6	6'-0	3'-0	6"	4'-9	6'-6	#6	14"	27'-0	#6	14"	18'-9	84	#5	7"	9'-6	5'-3
	7'	9"	9"	#4	14"	8'-0	#4	7"	16'-6	170	#7	14"	31'-6	5'-10	3'-4	6"	4'-5	6'-8	#6	14"	27'-0	#6	14"	18'-9	84	#5	7"	10'-0	5'-3
	8'	9"	9"	#4	14"	9'-0	#4	7"	18'-6	170	#7	14"	31'-9	6'-1	3'-4	6"	4'-5	6'-8	#6	14"	27'-0	#6	14"	18'-9	84	#5	7"	10'-6	5'-3
10'	3'	10"	10"	#4	11"	4'-3	#5	5½"	9'-0	128	#7	11"	38'-11	7'-1	4'-2	7"	5'-6	8'-4	#5	11"	33'-6	#6	11"	23'-0	96	#6	5½"	9'-3	6'-6
	4'	10½"	10"	#4	11"	5'-3	#5	5½"	11'-0	142	#7	11"	38'-11	7'-0	4'-2	7½"	5'-5	8'-4	#5	11"	33'-6	#6	11"	23'-0	96	#5	5½"	9'-9	6'-6
	5'	10½"	10"	#4	11"	6'-3	#6	11"	13'-0	142	#7	11"	38'-11	7'-1	4'-2	7½"	5'-5	8'-3	#5	11"	33'-6	#6	11"	23'-0	96	#5	5½"	10'-3	6'-6
	6'	10½"	10"	#4	11"	7'-3	#6	11"	15'-0	156	#7	11"	38'-11	7'-2	4'-0	7½"	5'-7	8'-2	#5	11"	33'-6	#6	11"	23'-0	96	#5	5½"	10'-9	6'-6
	7'	10½"	10"	#4	11"	8'-3	#4	5½"	17'-0	170	#7	11"	38'-11	7'-2	4'-0	7½"	5'-7	8'-2	#5	11"	33'-6	#6	11"	23'-0	96	#5	5½"	11'-3	6'-6
	8'	10½"	10"	#4	11"	9'-3	#4	5½"	19'-0	170	#7	11"	38'-11	7'-2	4'-0	7½"	5'-7	8'-2	#6	11"	33'-6	#6	11"	23'-0	96	#5	5½"	11'-9	6'-6
	9'	10½"	10"	#4	11"	10'-3	#4	5½"	21'-0	184	#7	11"	38'-11	7'-2	4'-0	7½"	5'-7	8'-2	#6	11"	33'-6	#6	11"	23'-0	96	#5	5½"	12'-3	6'-6
	10'	10½"	10"	#4	11"	11'-3	#4	5½"	23'-0	198	#7	11"	38'-11	7'-2	4'-0	7½"	5'-7	8'-2	#6	11"	33'-6	#6	11"	23'-0	96	#5	5½"	12'-9	6'-6
12'	8'	12½"	12"	#4	12"	9'-6	#5	6"	20'-0	170	#8	12"	46'-7	8'-5	5'-0	9½"	6'-5	9'-9	#6	12"	40'-0	#7	12"	27'-6	120	#5	6"	13'-3	7'-8
	9'	12½"	12"	#4	12"	10'-6	#5	6"	22'-0	184	#8	12"	46'-9	8'-7	5'-0	9½"	6'-5	9'-9	#6	12"	40'-0	#7	12"	27'-6	120	#5	6"	13'-9	7'-8
	10'	12½"	12"	#4	12"	11'-6	#5	6"	24'-0	198	#8	12"	46'-9	8'-7	5'-0	9½"	6'-5	9'-9	#6	12"	40'-0	#7	12"	27'-6	120	#5	6"	14'-3	7'-8
	11'	12½"	12"	#4	12"	12'-6	#5	6"	26'-0	198	#8	12"	46'-9	8'-7	5'-0	9½"	6'-5	9'-9	#6	12"	40'-0	#7	12"	27'-6	120	#5	6"	14'-9	7'-8
	12'	12½"	12"	#4	12"	13'-6	#5	6"	28'-0	212	#8	12"	46'-7	8'-5	5'-0	9½"	6'-5	9'-9	#6	12"	40'-0	#7	12"	27'-6	120	#5	6"	15'-3	7'-8

⊕ Total number of bars in the cross-section.

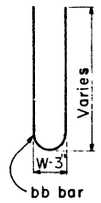
Height "H"	"J" Dim.	"K" Spaces
3'	9"	1
4'	3"	2
5'	12"	2
6'	9"	3
7'	3"	4
8'	12"	4
9'	9"	5
10'	3"	6
11'	12"	6
12'	9"	7

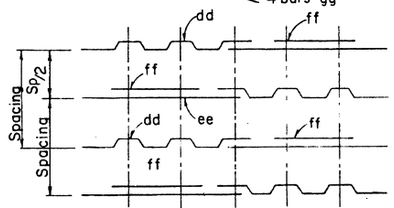


TYPICAL SECTION

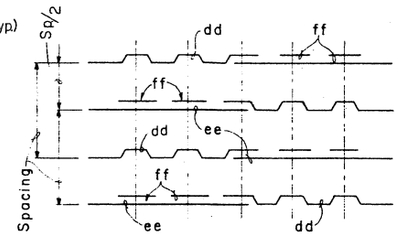


BENDS





SIX BARREL REINF. PLACING DIAGRAM
For Table I only



SIX BARREL REINF. PLACING DIAGRAM
For Tables II through V

NOTE:
See B-02.65 for Tables II thru V.
See B-01.10 for general notes and miscellaneous details.
All bend dimensions are out to out of bar.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Table I: ff bars & quantities	J.T.W.	7-76
2	Rev. to AASHTO 1985 Spec.	C.H.	10-86
3			

DESIGN	DHY 12-71
DRAWN	CAS 8-72
CHECKED	NAB 3-72

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION 10-86
APPROVED FOR DISTRIBUTION	SIX BARREL BOX CULVERT	STANDARD NO. B-02.60

TABLE NO. II
10'-15' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd							ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number ⌖	Size	Spacing	Length	A	B	C	D	E	Size	Spacing	Length	Size	Spacing	Length	Number ⌖	Size	Spacing	Length	F
6'	3'	8"	8"	#4	12"	3'-9	#4	12"	8'-0	128	#5	12"	22'-8	4'-5	2'-6	5"	3'-4	3'-8	#4	12"	20'-9	#5	12"	4'-9	60	#4	6"	4'-3	1'-9
	4'	8"	8"	#4	12"	4'-9	#4	12"	10'-0	142	#5	12"	23'-0	4'-8	2'-6	5"	3'-4	3'-8	#4	12"	20'-9	#5	12"	4'-9	60	#4	6"	4'-9	1'-9
	5'	8"	8"	#4	12"	5'-9	#4	12"	12'-0	142	#5	12"	23'-0	4'-8	2'-6	5"	3'-4	3'-8	#4	12"	20'-9	#5	12"	4'-9	60	#4	6"	5'-3	1'-9
	6'	8"	8"	#4	11"	6'-9	#4	11"	14'-0	156	#5	11"	23'-0	4'-8	2'-6	5"	3'-4	3'-8	#4	11"	20'-9	#5	11"	4'-9	60	#4	5½"	5'-9	1'-9
	7'	8"	8"	#4	11"	7'-9	#4	11"	16'-0	170	#5	11"	23'-0	4'-8	2'-6	5"	3'-4	3'-8	#4	11"	20'-9	#5	11"	4'-9	60	#4	5½"	6'-3	1'-9
8'	3'	10"	9"	#4	12"	4'-3	#4	12"	9'-0	128	#7	12"	29'-11	5'-11	3'-0	7"	4'-7	4'-8	#5	12"	27'-0	#6	12"	6'-3	72	#5	6"	5'-0	2'-3
	4'	10"	9"	#4	12"	5'-3	#4	12"	11'-0	142	#7	12"	30'-2	6'-2	3'-0	7"	4'-7	4'-8	#5	12"	27'-0	#6	12"	6'-3	72	#4	6"	5'-3	2'-0
	5'	10"	9"	#4	12"	6'-3	#4	12"	13'-0	142	#7	12"	30'-2	6'-2	3'-0	7"	4'-7	4'-8	#5	12"	27'-0	#6	12"	6'-3	72	#4	6"	5'-9	2'-0
	6'	10"	9"	#4	12"	7'-3	#4	12"	15'-0	156	#7	12"	30'-2	6'-2	3'-0	7"	4'-7	4'-8	#5	12"	27'-0	#6	12"	6'-3	72	#4	6"	6'-3	2'-0
	7'	10"	9"	#4	12"	8'-3	#4	12"	17'-0	170	#7	12"	30'-2	6'-2	3'-0	7"	4'-7	4'-8	#5	12"	27'-0	#6	12"	6'-3	72	#4	6"	6'-9	2'-0
	8'	10"	9"	#4	12"	9'-3	#4	12"	19'-0	170	#7	12"	30'-2	6'-2	3'-0	7"	4'-7	4'-8	#5	12"	27'-0	#6	12"	6'-3	72	#5	6"	7'-6	2'-3
10'	3'	12"	10"	#4	13"	4'-6	#4	13"	9'-6	128	#8	13"	37'-0	7'-6	3'-6	9"	5'-10	5'-6	#6	13"	33'-6	#7	13"	7'-6	84	#5	6½"	5'-3	2'-3
	4'	12"	10"	#4	13"	5'-6	#4	13"	11'-6	142	#8	13"	37'-0	7'-6	3'-6	9"	5'-10	5'-6	#6	13"	33'-6	#7	13"	7'-6	84	#5	6½"	5'-9	2'-3
	5'	12"	10"	#4	13"	6'-6	#4	13"	13'-6	142	#7	13"	37'-4	7'-9	3'-6	9½"	5'-9	5'-6	#6	13"	33'-6	#7	13"	7'-6	84	#5	6½"	6'-3	2'-3
	6'	12"	10"	#4	13"	7'-6	#4	13"	15'-6	156	#7	13"	37'-4	7'-9	3'-6	9½"	5'-9	5'-6	#6	13"	33'-6	#7	13"	7'-6	84	#5	6½"	6'-9	2'-3
	7'	12"	10"	#4	13"	8'-6	#4	13"	17'-6	170	#7	13"	37'-4	7'-9	3'-6	9½"	5'-9	5'-6	#6	13"	33'-6	#7	13"	7'-6	84	#5	6½"	7'-3	2'-3
	8'	12"	10"	#4	13"	9'-6	#4	13"	19'-6	170	#7	13"	37'-4	7'-9	3'-6	9½"	5'-9	5'-6	#6	13"	33'-6	#7	13"	7'-6	84	#5	6½"	8'-3	2'-3
	9'	12"	10"	#4	13"	10'-6	#4	13"	21'-6	184	#7	13"	37'-4	7'-9	3'-6	9½"	5'-9	5'-6	#6	13"	33'-6	#7	13"	7'-6	84	#5	6½"	9'-2	2'-3
	10'	12"	10"	#4	13"	11'-6	#4	13"	23'-6	198	#7	13"	37'-4	7'-9	3'-6	9½"	5'-9	5'-6	#6	13"	33'-6	#7	13"	7'-6	84	#6	6½"	9'-2	2'-8
12'	8'	15"	12"	#4	11"	10'-0	#4	11"	20'-6	170	#8	11"	44'-4	8'-7	4'-6	12"	6'-6	6'-8	#6	11"	40'-0	#7	11"	8'-9	96	#5	5½"	8'-3	2'-6
	9'	15"	12"	#4	11"	11'-0	#4	11"	22'-6	184	#8	11"	44'-7	8'-10	4'-6	12"	6'-6	6'-8	#6	11"	40'-0	#7	11"	8'-9	96	#5	5½"	8'-9	2'-7
	10'	15"	12"	#4	11"	12'-0	#4	11"	24'-6	198	#8	11"	44'-4	8'-7	4'-6	12"	6'-6	6'-8	#6	11"	40'-0	#7	11"	8'-9	96	#5	5½"	9'-6	2'-10
	11'	15"	12"	#4	11"	13'-0	#4	11"	26'-6	198	#8	11"	44'-4	8'-7	4'-6	12"	6'-6	6'-8	#6	11"	40'-0	#7	11"	8'-9	96	#5	5½"	10'-0	2'-10
	12'	15"	12"	#4	11"	14'-0	#4	11"	28'-6	212	#8	11"	44'-4	8'-7	4'-6	12"	6'-6	6'-8	#6	11"	40'-0	#7	11"	8'-9	96	#6	5½"	10'-9	3'-0

TABLE NO. III
15'-20' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd							ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number ⌖	Size	Spacing	Length	A	B	C	D	E	Size	Spacing	Length	Size	Spacing	Length	Number ⌖	Size	Spacing	Length	F
6'	3'	9"	8"	#4	11"	4'-0	#4	11"	8'-6	128	#6	11"	23'-0	4'-6	2'-6	6"	3'-2	3'-8	#4	11"	20'-9	#5	11"	4'-9	48	#4	5½"	4'-3	1'-8
	4'	9"	8"	#4	11"	5'-0	#4	11"	10'-6	142	#6	11"	23'-0	4'-6	2'-6	6"	3'-2	3'-8	#4	11"	20'-9	#5	11"	4'-9	48	#4	5½"	4'-9	1'-8
	5'	9"	8"	#4	11"	6'-0	#4	11"	12'-6	142	#6	11"	23'-0	4'-6	2'-6	6"	3'-2	3'-8	#4	11"	20'-9	#5	11"	4'-9	48	#4	5½"	5'-3	1'-8
	6'	9"	8"	#4	11"	7'-0	#4	11"	14'-6	156	#5	11"	23'-0	4'-6	2'-6	6"	3'-2	3'-8	#4	11"	20'-9	#5	11"	4'-9	48	#4	5½"	5'-9	1'-8
	7'	9"	8"	#4	11"	8'-0	#4	11"	16'-6	170	#5	11"	23'-0	4'-6	2'-6	6"	3'-2	3'-8	#4	11"	20'-9	#5	11"	4'-9	48	#4	5½"	6'-3	1'-10
8'	3'	11½"	9"	#4	12"	4'-6	#4	12"	9'-6	128	#7	12"	30'-4	6'-0	3'-0	8½"	4'-4	4'-8	#5	12"	27'-0	#6	12"	6'-3	72	#4	6"	4'-6	1'-9
	4'	11½"	9"	#4	12"	5'-6	#4	12"	11'-6	142	#7	12"	30'-4	6'-0	3'-0	8½"	4'-4	4'-8	#5	12"	27'-0	#6	12"	6'-3	72	#4	6"	5'-0	1'-9
	5'	11½"	9"	#4	14"	6'-6	#4	14"	13'-6	142	#7	14"	30'-7	6'-2	3'-0	8½"	4'-4	4'-9	#5	14"	27'-0	#7	14"	6'-6	72	#5	7"	6'-0	2'-0
	6'	11½"	9"	#4	14"	7'-6	#4	14"	15'-6	156	#7	14"	30'-7	6'-2	3'-0	8½"	4'-4	4'-9	#5	14"	27'-0	#7	14"	6'-6	72	#5	7"	6'-6	2'-0
	7'	11½"	9"	#4	14"	8'-6	#4	14"	17'-6	170	#7	14"	30'-7	6'-2	3'-0	8½"	4'-4	4'-9	#5	14"	27'-0	#7	14"	6'-6	72	#5	7"	7'-0	2'-0
	8'	11½"	9"	#4	14"	9'-6	#4	14"	19'-6	170	#7	14"	30'-7	6'-5	2'-6	8½"	4'-10	4'-6	#5	14"	27'-0	#7	14"	6'-6	72	#5	7"	7'-9	2'-4
10'	3'	14½"	10"	#4	18"	5'-0	#4	18"	10'-6	128	#7	12"	37'-7	7'-9	3'-0	11½"	5'-11	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	5'-3	2'-0
	4'	14½"	10"	#4	18"	6'-0	#4	18"	12'-6	142	#7	12"	37'-7	7'-9	3'-0	11½"	5'-11	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	5'-9	2'-0
	5'	15"	10"	#4	18"	7'-0	#4	18"	14'-6	142	#7	12"	37'-11	7'-11	3'-0	1'-0	5'-10	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	6'-3	2'-0
	6'	15"	10"	#4	18"	8'-0	#4	18"	16'-6	156	#7	12"	37'-11	7'-11	3'-0	1'-0	5'-10	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	6'-9	2'-0
	7'	15"	10"	#4	18"	9'-0	#4	18"	18'-6	170	#7	12"	37'-11	7'-11	3'-0	1'-0	5'-10	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	7'-3	2'-0
	8'	15"	10"	#4	12"	10'-0	#4	18"	20'-6	170	#7	12"	37'-11	7'-11	3'-0	1'-0	5'-10	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	7'-9	2'-0
	9'	15"	10"	#4	12"	11'-0	#4	18"	22'-6	184	#7	12"	37'-9	7'-9	3'-0	1'-0	5'-10	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	8'-6	2'-4
	10'	15"	10"	#4	12"	12'-0	#4	18"	24'-6	198	#7	12"	37'-9	7'-9	3'-0	1'-0	5'-10	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#6	6"	9'-7	2'-11
12'	8'	18"	12"	#4	15"	10'-6	#4	15"	21'-6	170	#7	10"	45'-2	8'-11	4'-0	1'-3	6'-6	6'-5	#6	10"	40'-0	#7	10"	8'-9	96	#4	5"	8'-3	2'-4
	9'	18"	12"	#4	15"	11'-6	#4	15"	23'-6	184	#7	10"	45'-2	8'-11	4'-0	1'-3	6'-6	6'-5	#6	10"	40'-0	#7	10"	8'-9	96	#5	5"	9'-0	2'-6
	10'	18"	12"	#4	10"	12'-6	#4	15"	25'-6	198	#7	10"	45'-2	8'-11	4'-0	1'-3	6'-6	6'-5	#6	10"	40'-0	#7	10"	8'-9	96	#5	5"	9'-6	2'-6
	11'	18"	12"	#4	10"	13'-6	#4	15"	27'-6	198	#7	10"	45'-2	8'-11	4'-0	1'-3	6'-6	6'-5	#6	10"	40'-0	#7	10"	8'-9	96	#6	5"	10'-0	3'-4
	12'	18"	12"	#4	10"	14'-6	#4	15"	29'-6	212	#7	10"	45'-2	8'-11	4'-0	1'-3	6'-6	6'-5	#6	10"	40'-0	#7	10"	8'-9	96	#6	5"	11'-0	3'-0

TABLE NO. IV
20'-25' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd							ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number ⌖	Size	Spacing	Length	A	B	C	D	E	Size	Spacing	Length	Size	Spacing	Length	Number ⌖	Size	Spacing	Length	F
6'	3'	10½"	8"	#4	11"	4'-3	#4	11"	9'-0	128	#6	11"	23'-10	4'-8	2'-6	7½"	2'-11	3'-11	#4	11"	20'-9	#5	11"	5'-3	48	#4	5½"	4'-3	1'-6
	4'	10½"	8"	#4	11"	5'-3	#4	11"	11'-0	142	#6	11"	23'-10	4'-8	2'-6	7½"	2'-11	3'-11	#4	11"	20'-9	#5	11"	5'-3	48	#4	5½"	4'-9	1'-6
	5'	10½"	8"	#4	11"	6'-3	#4	11"	13'-0	142	#6	11"	23'-10	4'-8	2'-6	7½"	2'-11	3'-11	#4	11"	20'-9	#5	11"	5'-3	48	#4	5½"	5'-3	1'-6
	6'	10½"	8"	#4	11"	7'-3	#4	11"	15'-0	156	#5	11"	23'-10	4'-8	2'-6	7½"	2'-11	3'-11	#4	11"	20'-9	#5	11"	4'-9	48	#4	5½"	6'-0	1'-9
	7'	10½"	8"	#4	11"	8'-3	#4	11"	17'-0	170	#5	11"	23'-10	4'-8	2'-6	7½"	2'-11	3'-11	#4	11"	20'-9	#5	11"	4'-9	48	#5	5½"	6'-9	2'-2
8'	3'	13½"	9"	#4	15"	4'-9	#4	15"	10'-0	128	#7	15"	31'-3	6'-4	3'-0	10½"	4'-0	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#5	7½"	4'-9	1'-9
	4'	13½"	9"	#4	15"	5'-9	#4	15"	12'-0	142	#7	15"	31'-3	6'-4	3'-0	10½"	4'-0	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#5	7½"	5'-3	1'-9
	5'	13½"	9"	#4	15"	6'-9	#4	15"	14'-0	142	#7	15"	31'-3	6'-4	3'-0	10½"	4'-0	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#5	7½"	5'-9	1'-9
	6'	13½"	9"	#4	15"	7'-9	#4	15"	16'-0	156	#7	15"	31'-3	6'-4	3'-0	10½"	4'-0	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#5	7½"	6'-6	2'-0
	7'	13½"	9"	#5	15"	8'-9	#4	15"	18'-0	170	#7	15"	31'-3	6'-4	3'-0	10½"	4'-0	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#5	7½"	7'-0	2'-0
	8'	13½"	9"	#5	15"	9'-9	#4	15"	20'-0	170	#7	15"	31'-3	6'-4	3'-0	10½"	4'-0	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#6	7½"	8'-0	2'-6
10'	3'	16½"	10"	#4	18"	5'-3	#4	18"	11'-0	128	#7	12"	38'-2	7'-10	3'-0	1'-11½"	5'-7	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	5'-0	1'-9
	4'	17"	10"	#4	18"	6'-3	#4	18"	13'-0	142	#7	12"	38'-4	7'-10	3'-0	1'-2	5'-6	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#4	6"	5'-6	1'-9
	5'	17"	10"	#4	18"	7'-3	#4	18"	15'-0	142	#7	12"	38'-4	7'-10	3'-0	1'-2	5'-6	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#4	6"	6'-0	1'-9
	6'	17"	10"	#4	18"	8'-3	#4	18"	17'-0	156	#7	12"	38'-4	7'-10	3'-0	1'-2	5'-6	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#4	6"	6'-6	1'-9
	7'	17"	10"	#4	18"	9'-3	#4	18"	19'-0	170	#7	12"	38'-4	7'-10	3'-0	1'-2	5'-6	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#4	6"	7'-3	2'-0
	8'	17"	10"	#4	12"	10'-3	#4	18"	21'-0	170	#7	12"	38'-4	7'-10	3'-0	1'-2	5'-6	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	8'-0	2'-0
	9'	17"	10"	#4	12"	11'-3	#4	18"	23'-0	184	#7	12"	38'-4	7'-10	3'-0	1'-2	5'-6	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#5	6"	8'-6	2'-3
	10'	17"	10"	#5	12"	12'-3	#4	18"	25'-0	198	#7	12"	38'-4	7'-10	3'-0	1'-2	5'-6	5'-3	#6	12"	33'-6	#7	12"	7'-6	84	#6	6"	9'-7	2'-10
12'	8'	20½"	12"	#4	15"	11'-0	#4	15"	22'-6	170	#7	10"	45'-9	8'-10	4'-0	1'-5½	6'-1	6'-5	#6	10"	40'-0	#7	10"	8'-9	84	#4	5"	8'-3	2'-2
	9'	20½"	12"	#4	15"	12'-0	#4	15"	24'-6	184	#7	10"	45'-9	8'-10	4'-0	1'-5½	6'-1	6'-5	#6	10"	40'-0	#7	10"	8'-9	84	#5	5"	9'-0	2'-4
	10'	20½"	12"	#4	10"	13'-0	#4	15"	26'-6	198	#7	10"	45'-9	8'-10	4'-0	1'-5½	6'-1	6'-5	#6	10"	40'-0	#7	10"	8'-9	84	#5	5"	9'-9	2'-6
	11'	20½"	12"	#4	10"	14'-0	#4	15"	28'-6	198	#7	10"	45'-7	8'-8	4'-0	1'-5½	6'-1	6'-5	#6	10"	40'-0	#7	10"	8'-9	84	#6	5"	11'-4	3'-7
	12'	20½"	12"	#5	10"	15'-0	#4	15"	30'-6	212	#7	10"	45'-7	8'-8	4'-0	1'-5½	6'-1	6'-5	#6	10"	40'-0	#7	10"	8'-9	84	#6	5"	11'-10	3'-7

TABLE NO. V
25'-30' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa			bb			cc	dd							ee			ff			gg	hh			
				Size	Spacing	Length	Size	Spacing	Length	Number ⌖	Size	Spacing	Length	A	B	C	D	E	Size	Spacing	Length	Size	Spacing	Length	Number ⌖	Size	Spacing	Length	F
6'	3'	11½"	8"	#4	15"	4'-6	#4	15"	9'-6	128	#6	10"	24'-1	4'-11	2'-0	8½"	3'-3	3'-8	#4	10"	20'-9	#5	10"	5'-3	48	#4	5"	4'-3	1'-6
	4'	11½"	8"	#4	15"	5'-6	#4	15"	11'-6	142	#6	10"	24'-1	4'-11	2'-0	8½"	3'-3	3'-8	#4	10"	20'-9	#5	10"	5'-3	48	#4	5"	4'-9	1'-6
	5'	11½"	8"	#4	15"	6'-6	#4	15"	13'-6	142	#5	10"	24'-1	4'-11	2'-0	8½"	3'-3	3'-8	#4	10"	20'-9	#5	10"	5'-3	48	#4	5"	5'-3	1'-6
	6'	11½"	8"	#4	15"	7'-6	#4	15"	15'-6	156	#5	10"	23'-10	4'-11	2'-0	8½"	3'-3	3'-5	#4	10"	20'-9	#5	10"	4'-9	48	#4	5"	6'-0	1'-9
	7'	11½"	8"	#4	10"	8'-6	#4	15"	17'-6	170	#5	10"	23'-10	4'-11	2'-0	8½"	3'-3	3'-5	#4	10"	20'-9	#5	10"	4'-9	48	#5	5"	7'-0	2'-3
8'	3'	15½"	9"	#4	15"	5'-0	#4	15"	10'-9	128	#7	15"	31'-8	6'-0	3'-0	1'-0½	3'-8	5'-0	#6	15"	27'-0	#7	15"	7'-0	60	#5	7½"	4'-9	1'-9
	4'	15½"	9"	#4	15"	6'-0	#4	15"	12'-9	142	#7	15"	31'-8	6'-0	3'-0	1'-0½	3'-8	5'-0	#6	15"	27'-0	#7	15"	7'-0	60	#5	7½"	5'-6	1'-9
	5'	15½"	9"	#4	15"	7'-0	#4	15"	14'-9	142	#7	15"	31'-5	6'-0	3'-0	1'-0½	3'-8	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#5	7½"	6'-0	1'-9
	6'	15½"	9"	#5	15"	8'-0	#4	15"	16'-9	156	#7	15"	31'-5	6'-0	3'-0	1'-0½	3'-8	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#5	7½"	6'-6	1'-9
	7'	15½"	9"	#5	15"	9'-0	#4	15"	18'-9	170	#7	15"	31'-5	6'-0	3'-0	1'-0½	3'-8	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#5	7½"	7'-3	2'-0
	8'	15½"	9"	#5	15"	10'-0	#4	15"	20'-9	170	#7	15"	31'-5	6'-0	3'-0	1'-0½	3'-8	4'-9	#6	15"	27'-0	#7	15"	6'-6	60	#6	7½"	8'-5	2'-8
10'	3'	19"	10"	#4	15"	5'-9	#4	15"	11'-9	128	#8	15"	38'-11	7'-9	3'-0	1'-4	5'-2	5'-5	#7	15"	33'-6	#8	15"	7'-9	72	#5	7½"	5'-3	1'-9
	4'	19"	10"	#4	15"	6'-9	#4	15"	13'-9	142	#8	15"	38'-11	7'-9	3'-0	1'-4	5'-2	5'-5	#7	15"	33'-6	#8	15"	7'-9	72	#5	7½"	5'-9	1'-9
	5'	19"	10"	#4	15"	7'-9	#4	15"	15'-9	142	#8	15"	38'-11	7'-9	3'-0	1'-4	5'-2	5'-5	#7	15"	33'-6	#8	15"	7'-9	72	#5	7½"	6'-3	1'-9
	6'	19"	10"	#4	15"	8'-9	#4	15"	17'-9	156	#8	15"	38'-11	7'-9	3'-0	1'-4	5'-2	5'-5	#7	15"	33'-6	#8	15"	7'-9	72	#5	7½"	6'-9	1'-9
	7'	19"	10"	#5	15"	9'-9	#4	15"	19'-9	170	#8	15"	38'-11	7'-9	3'-0	1'-4	5'-2	5'-5	#7	15"	33'-6	#8	15"	7'-9	72	#5	7½"	7'-3	2'-0
	8'	19"	10"	#5	15"	10'-9	#4	15"	21'-9	170	#8	15"	38'-11	7'-9	3'-0	1'-4	5'-2	5'-5	#7	15"	33'-6	#8	15"	7'-9	72	#6	7½"	8'-9	2'-9
	9'	19"	10"	#5	15"	11'-9	#4	15"	23'-9	184	#8	15"	38'-11	7'-9	3'-0	1'-4	5'-2	5'-5	#7	15"	33'-6	#8	15"	7'-9	72	#6	7½"	9'-3	2'-3
	10'	19"	10"	#6	15"	12'-9	#4	15"	25'-9	198	#8	15"	38'-11	7'-9	3'-0	1'-4	5'-2	5'-5	#7	15"	33'-6	#8	15"	7'-9	72	#7	7½"	10'-0	3'-0
12'	8'	23"	12"	#4	12"	11'-3	#4	18"	23'-0	170	#8	12"	46'-5	8'-10	4'-0	1'-8	5'-8	6'-6	#7	12"	40'-0	#8	12"	9'-0	84	#5	6"	8'-9	2'-2
	9'	23"	12"	#4	12"	12'-3	#4	18"	25'-0	184	#8	12"	46'-5	8'-10	4'-0	1'-8	5'-8	6'-6	#7	12"	40'-0	#8	12"	9'-0	84	#6	6"	9'-3	2'-4
	10'	23"	12"	#5	12"	13'-3	#4	18"	27'-0	198	#8	12"	46'-5	8'-10	4'-0	1'-8	5'-8	6'-6	#7	12"	40'-0	#8	12"	9'-0	84	#6	6"	9'-9	2'-6
	11'	23"	12"	#5	12"	14'-3	#4	18"	29'-0	198	#8	12"	46'-5	8'-10	4'-0	1'-8	5'-8	6'-6	#7	12"	40'-0	#8	12"	9'-0	84	#6	6"	10'-9	2'-10
	12'	23"	12"	#6	12"	15'-3	#4	18"	31'-0	212	#8	12"	46'-5	8'-10	4'-0	1'-8	5'-8	6'-6	#7	12"	40'-0	#8	12"	9'-0	84	#7	6"	12'-2	3'-9

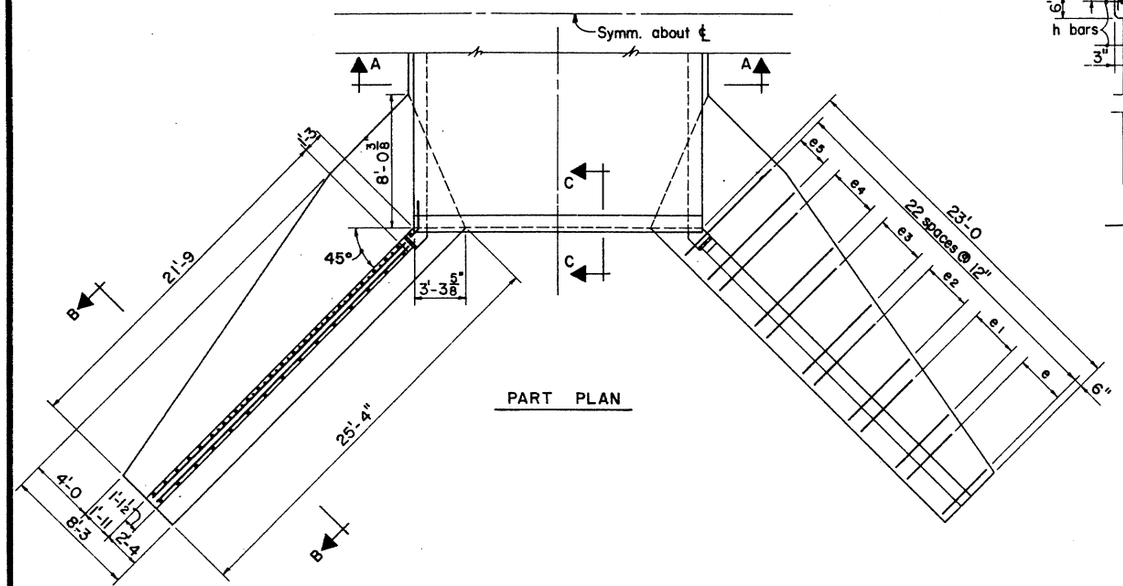
⌖ Total number of bars in the cross-section.

NOTE:

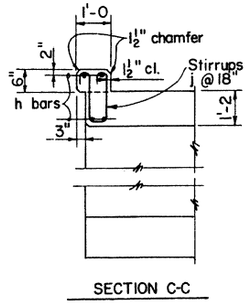
See B-02.60 for Table No.I, typical section, steel call-outs, bend diagrams and quantities.

See B-01.10 for general notes and miscellaneous details.

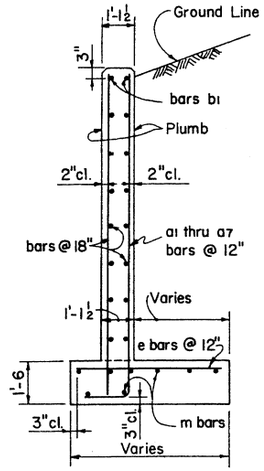
| NO. |



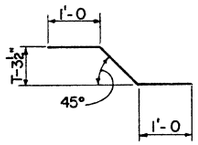
PART PLAN



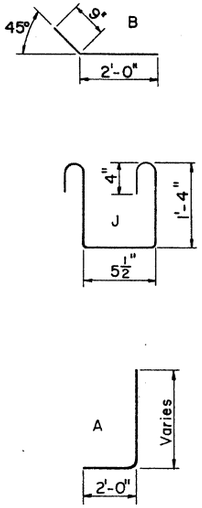
SECTION C-C



SECTION B-B



jj BAR



BENDS

STEEL LISTS

HEADWALL STEEL LIST

Mark	Bend	Size	No.	Lgth.	Mark	Bend	Size	No.	Lgth.
a	A	#5	6	10'-9	b	B	#4	20	2'-9
a1	A	#5	6	11'-9	b1	str.	#6	4	22'-9
a2	A	#5	6	12'-9	b2	str.	#4	20	21'-6
a3	A	#6	6	13'-9	b3	str.	#4	4	18'-6
a4	A	#6	6	14'-9	b4	str.	#4	4	14'-6
a5	A	#6	6	16'-0	b5	str.	#4	4	10'-6
a6	A	#6	6	17'-0	b6	str.	#4	4	6'-0
a7	A	#7	4	18'-3	e	str.	#5	8	3'-9
a8	str.	#8	16	7'-3	e1	str.	#5	8	4'-6
a9	str.	#6	16	5'-3	e2	str.	#6	8	5'-3
a10	str.	#4	6	8'-9	e3	str.	#7	8	6'-0
a11	str.	#4	6	10'-3	e4	str.	#8	8	6'-9
a12	str.	#4	6	11'-9	e5	str.	#9	6	7'-3
a13	str.	#4	6	13'-3	CURB				
a14	str.	#4	6	15'-0	h	str.	#8	4	17'-6
m	str.	#4	16	22'-6	j	J	#4	12	4'-3

HEADWALL QUANTITIES

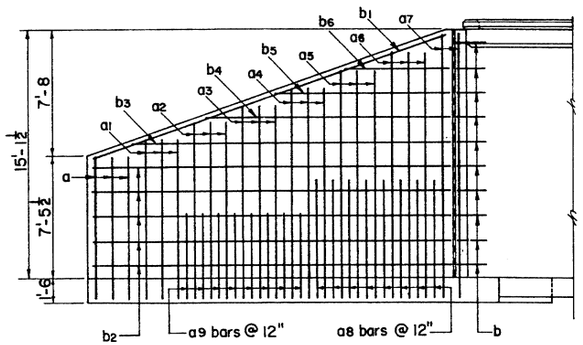
Concrete	41.50 C.Y.	Steel	3173 #

BARREL STEEL LIST

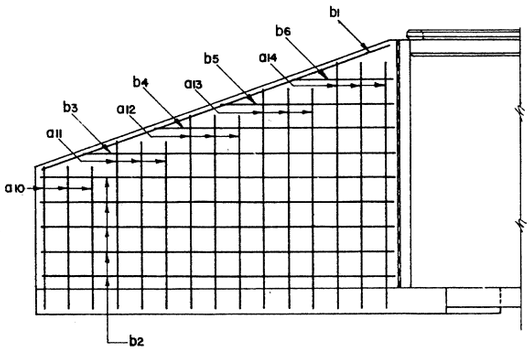
FILL	TABLE I 0 to 5'	TABLE II 5.01' to 10'	TABLE III 10.01' to 15'	TABLE IV 15.01' to 20'
Top Slab (T)	13.5"	16.5"	19.5"	21.5"
Bars aa	#4 @ 18"	#4 @ 16"	#4 @ 7½"	#4 @ 7"
Bars cc (No.)	56	56	56	56
Bars ee	#10 @ 9"	#9 @ 8"	#10 @ 7½"	#10 @ 7"
Bars ee1	#9 @ 9"	#10 @ 8"	#10 @ 7½"	#10 @ 7"
Bars gg (No.)	38	24	24	24
Bars hh	#7 @ 9"	#7 @ 8"	#7 @ 7½"	#8 @ 7"
Bars hh1	#8 @ 9"	#8 @ 8"	#9 @ 7½"	#10 @ 7"

BARREL QUANTITIES

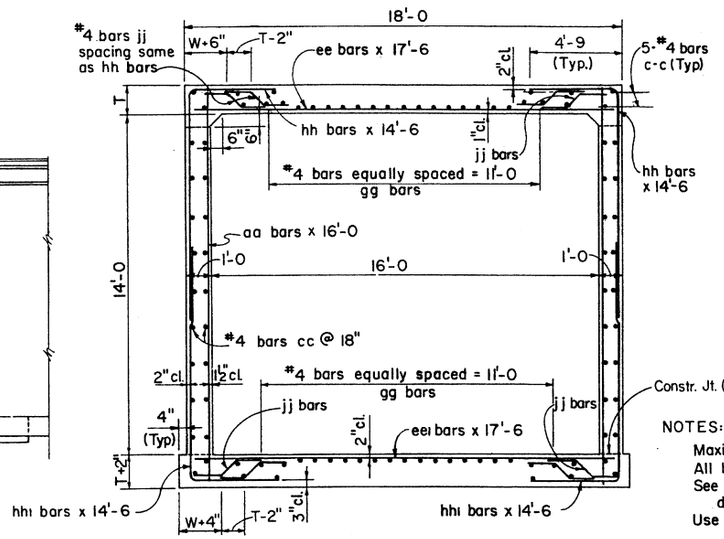
Steel #	484.7	508.0	618.1	736.5
Concrete C.Y.	2.690	3.029	3.369	3.595



WING ELEVATION
(Back Face Reinf.)



WING ELEVATION
(Front Face Reinf.)



SECTION A-A

NOTES:

Maximum Fill 5 Ft. Table I to 20 Ft. Table IV
All bend dimensions are out to out of bar.
See B-01.10 for general notes and miscellaneous details.
Use Table No. I next to headwall.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Wing thickness & curb height	J T W	7-76
2	Rev. to AASHTO 1985 Spec	J E M	10-86

	DWY	CHECKED
DESIGN	2-73	
DRAWN	ROS	2-73
CHECKED	NAB	3-73

DESIGN APPROVED
R.C. Buchli

APPROVED FOR DISTRIBUTION
E.J. Mendini

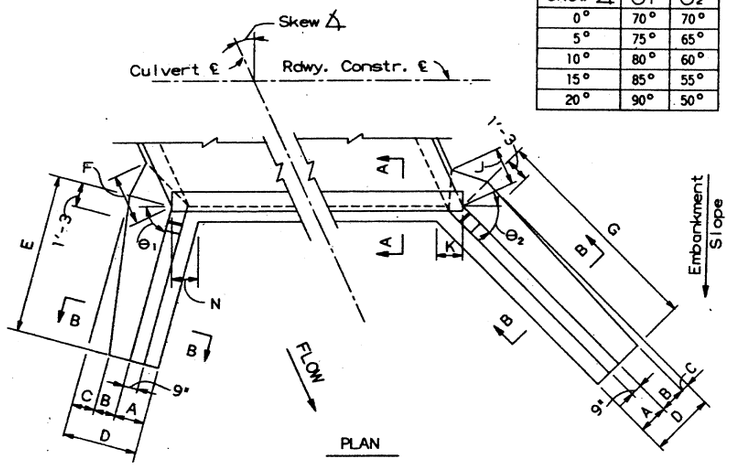
ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

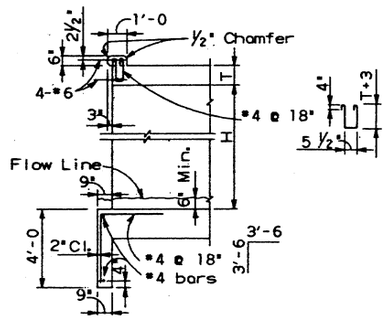
REVISION
10-86

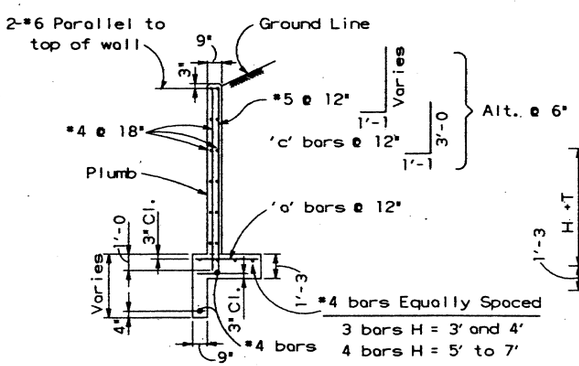
16' x 14' EQUIPMENT PASS

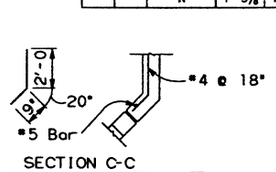
STANDARD NO.
B-03.10

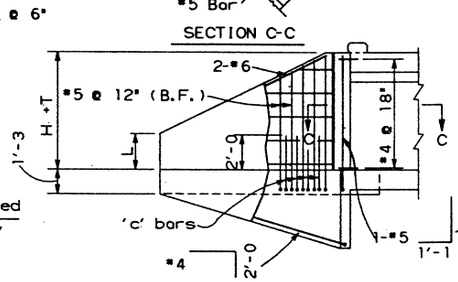
Skew Δ	θ_1	θ_2
0°	70°	70°
5°	75°	65°
10°	80°	60°
15°	85°	55°
20°	90°	50°

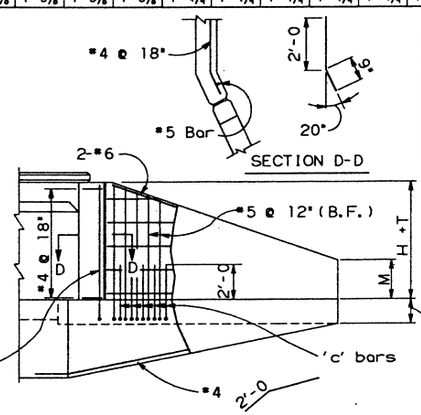












Skew Δ		0°					5°					10°					15°					20°				
Height H		3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
2 : 1 Slope Dimensions	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	7"	1'-0	1'-5	1'-10	4"	7"	1'-0	1'-5	1'-10	5"	8"	1'-1	1'-6	1'-11	5"	8"	1'-1	1'-7	2'-0	6"	9"	1'-2	1'-7	2'-1
	D	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-8	3'-2	3'-8	4'-2	4'-8	2'-8	3'-2	3'-8	4'-3	4'-9	2'-9	3'-3	3'-9	4'-3	4'-10
	E	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	7'-6	9'-0	10'-6	12'-0	6'-0	7'-6	9'-0	10'-6	12'-0
	F	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-2	1'-10	2'-6	3'-1	3'-9	1'-2	1'-10	2'-6	3'-3	3'-10	1'-3	1'-11	2'-7	3'-3	4'-0
	G	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	10'-0	11'-6	13'-0	7'-0	8'-6	10'-0	12'-0	13'-6	7'-0	9'-0	10'-6	12'-6	14'-0	7'-6	9'-6	11'-0	13'-0	14'-6
	J	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-2	1'-10	2'-6	3'-1	3'-9	1'-2	1'-10	2'-6	3'-3	3'-10	1'-3	1'-11	2'-7	3'-3	4'-0
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4	1'-4	1'-4	1'-4	1'-4
	L	1'-0	1'-4	1'-7	1'-11	2'-2	11"	1'-2	1'-6	1'-9	2'-0	10"	1'-1	1'-5	1'-8	1'-11	1'-1	1'-4	1'-7	1'-10	2'-1	1'-1	1'-4	1'-7	1'-10	2'-1
	M	1'-0	1'-4	1'-7	1'-11	2'-2	1'-1	1'-5	1'-6	1'-10	2'-2	1'-0	1'-5	1'-9	1'-10	2'-3	1'-2	1'-5	1'-9	1'-11	2'-4	1'-2	1'-5	1'-10	2'-1	2'-6
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-1¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

Skew Δ		0°					5°					10°					15°					20°				
Height H		3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
4 : 1 Slope Dimensions	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9	3"	7"	1'-0	1'-5	1'-10
	D	2'-7	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-1	3'-7	4'-1	4'-7
	E	10'-0	12'-6	15'-0	17'-6	20'-0	10'-0	12'-6	15'-0	17'-0	19'-6	10'-0	12'-6	14'-6	17'-0	19'-6	10'-0	12'-0	14'-6	17'-0	19'-6	10'-0	12'-0	14'-6	17'-0	19'-6
	F	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-9	2'-4	3'-0	3'-8
	G	10'-0	12'-6	15'-0	17'-6	20'-0	10'-6	13'-0	15'-6	18'-0	20'-6	10'-6	13'-0	16'-0	18'-6	21'-0	11'-0	13'-6	16'-0	19'-0	21'-6	11'-6	14'-0	17'-0	19'-6	22'-6
	J	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-9	2'-4	3'-0	3'-8
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4	1'-4	1'-4	1'-4	1'-4
	L	1'-9	2'-2	2'-6	2'-11	3'-4	1'-8	2'-1	2'-5	2'-11	3'-4	1'-7	2'-0	2'-6	2'-11	3'-3	1'-7	2'-1	2'-5	2'-10	3'-2	1'-7	2'-1	2'-5	2'-10	3'-2
	M	1'-9	2'-2	2'-6	2'-11	3'-4	1'-8	2'-1	2'-7	3'-0	3'-5	1'-9	2'-3	2'-7	3'-1	3'-6	1'-10	2'-4	2'-9	3'-2	3'-8	1'-10	2'-5	2'-10	3'-4	3'-9
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

Skew Δ		0°					5°					10°					15°					20°				
Height H		3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
6 : 1 Slope Dimensions	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	3"	6".	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9
	D	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6
	E	12'-6	15'-6	18'-6	21'-6	24'-6	12'-6	15'-6	18'-6	21'-6	24'-6	12'-0	15'-0	18'-0	21'-0	24'-0	12'-0	15'-0	18'-0	21'-0	24'-0	12'-0	15'-0	18'-0	21'-0	24'-0
	F	1'-0	1'-7	2'-3	2'-11	3'-5	1-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6
	G	12'-6	15'-6	18'-6	21'-6	24'-6	12'-6	16'-0	19'-0	22'-0	25'-0	13'-0	16'-0	19'-6	22'-6	25'-6	13'-6	16'-6	20'-0	23'-0	26'-6	13'-6	17'-0	20'-6	23'-6	27'-0
	J	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4	1'-4	1'-4	1'-4	1'-4
	L	2'-1	2'-8	3'-2	3'-8	4'-3	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1
	M	2'-1	2'-8	3'-2	3'-8	4'-3	2'-2	2'-8	3'-2	3'-9	4'-3	2'-2	2'-9	3'-3	3'-10	4'-5	2'-3	2'-10	3'-4	3'-11	4'-5	2'-4	2'-11	3'-5	4'-1	4'-7
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

'c' bars			
Hgt. H	Slope	Short Wing	Long Wing
		0° to 10°	0° to 20°
7'	2 : 1	3 - #5	3 - #5
	4 : 1	5 - #5	5 - #5

'a' bars			
Height H	Short Wing	Long Wing	
	0° to 20°	0° & 5°	10° to 20°
3'	#4	#4	#4
4'	#4	#4	#4
5'	#4	#4	#4
6'	#4	#4	#5
7'	#4	#4	#6

NOTE :

For General Notes and Miscellaneous Details see B-01.10.
For Headwall Quantities see B-05.10, B-05.20 and B-05.30.

DESIGN APPROVED
APPROVED FOR DISTRIBUTION
2-13-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

OUTLET WINGS
CULVERT HEIGHT 3' to 7'
SKEW 0° to 20°

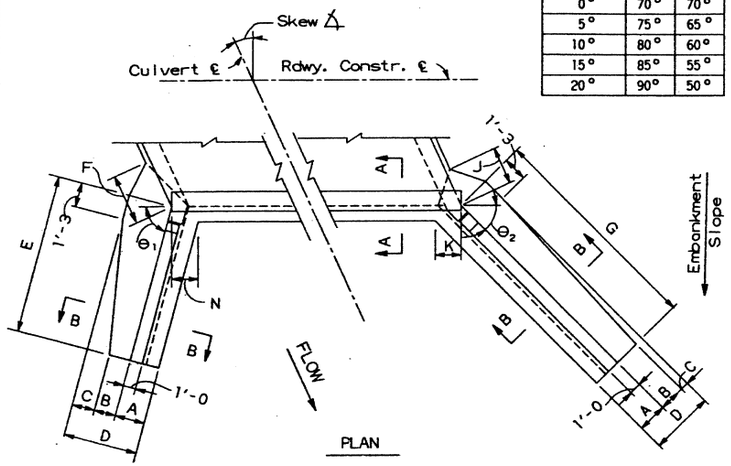
REVISION

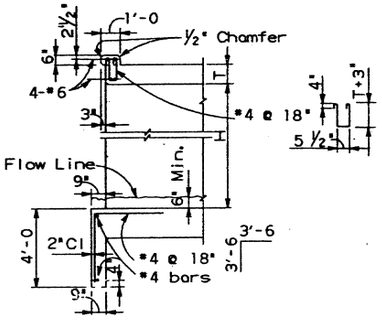
STANDARD NO.
B-04.10

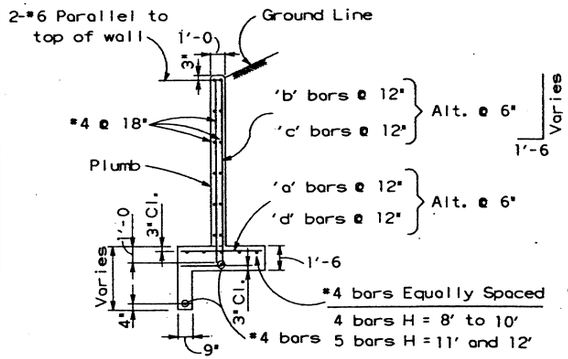
DRAWN
CHECKED

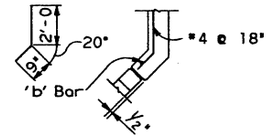
CADD FILENAME= 2FA
VIEW NAME=

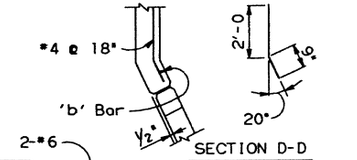
Skew Δ	Θ_1	Θ_2
0°	70°	70°
5°	75°	65°
10°	80°	60°
15°	85°	55°
20°	90°	50°

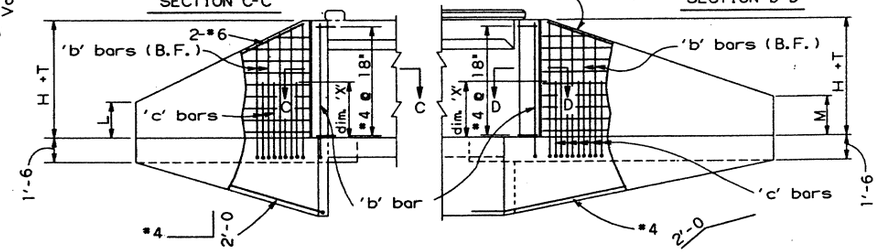












2 : 1 Slope Dimensions	Skew Δ	0°					5°					10°					15°					20°				
	Height H	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'
	A	2'0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4
	B	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8
	C	1'-10	2'-2	2'-6	3'-0	3'-8	1'-11	2'-3	2'-7	3'-2	3'-10	1'-11	2'-4	2'-8	3'-3	4'-0	2'-0	2'-5	2'-9	3'-5	4'-1	2'-1	2'-6	2'-10	3'-6	4'-3
	D	5'-2	5'-8	6'-2	6'-10	7'-8	5'-3	5'-9	6'-3	7'-0	7'-10	5'-3	5'-10	6'-4	7'-1	8'-0	5'-4	5'-11	6'-5	7'-3	8'-1	5'-5	6'-0	6'-6	7'-4	8'-3
	E	14'-6	16'-0	17'-6	19'-0	20'-6	14'-0	15'-6	17'-0	18'-6	20'-0	14'-0	15'-6	17'-0	18'-6	20'-0	13'-6	15'-0	16'-6	18'-0	19'-6	13'-6	15'-0	16'-6	18'-0	19'-6
	F	3'-9	4'-3	4'-10	5'-7	6'-6	3'-10	4'-5	4'-11	5'-9	6'-9	3'-10	4'-6	5'-0	5'-11	6'-11	4'-0	4'-7	5'-2	6'-1	7'-1	4'-1	4'-9	5'-3	6'-2	7'-3
	G	14'-6	16'-0	17'-6	19'-0	20'-6	14'-6	16'-6	18'-0	19'-6	21'-0	15'-0	17'-0	18'-6	20'-0	22'-0	15'-6	17'-6	19'-0	21'-0	22'-6	16'-6	18'-6	20'-0	22'-0	23'-6
	J	3'-9	4'-3	4'-10	5'-7	6'-6	3'-10	4'-5	4'-11	5'-9	6'-9	3'-10	4'-6	5'-0	5'-11	6'-11	4'-0	4'-7	5'-2	6'-1	7'-1	4'-1	4'-9	5'-3	6'-2	7'-3
	K	1'-10¼	1'-11⅜	2'-0⅝	2'-1½	2'-2½	1'-10¼	1'-11⅜	2'-0½	2'-1⅝	2'-2¾	1'-10½	1'-11⅝	2'-0⅞	2'-2	2'-3⅛	1'-11	2'-0¼	2'-1½	2'-2⅝	2'-3⅞	1'-11¾	2'-1⅛	2'-2⅜	2'-3¾	2'-5
	L	2'-3	2'-7	2'-10	3'-2	3'-5	2'-4	2'-7	2'-10	3'-2	3'-5	2'-2	2'-5	2'-8	2'-11	3'-3	2'-4	2'-7	2'-10	3'-1	3'-4	2'-4	2'-7	2'-10	3'-1	3'-4
	M	2'-3	2'-7	2'-10	3'-2	3'-5	2'-6	2'-7	2'-11	3'-3	3'-7	2'-7	2'-8	3'-1	3'-5	3'-6	2'-9	2'-11	3'-3	3'-6	3'-10	2'-9	3'-0	3'-5	3'-8	4'-1
	N	1'-10¼	1'-11⅜	2'-0⅝	2'-1½	2'-2½	1'-10½	1'-11½	2'-0½	2'-1½	2'-2⅝	1'-10¾	1'-11¾	2'-0⅞	2'-1⅞	2'-2⅞	1'-11¼	2'-0¼	2'-1¼	2'-2⅜	2'-3⅜	2'-0	2'-1	2'-2	2'-3	2'-4

4 : 1 Slope Dimensions	Skew Δ	0°					5°					10°					15°					20°				
	Height H	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'
	A	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4
	B	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8
	C	1'-8	2'-0	2'-4	2'-10	3'-6	1'-9	2'-1	2'-5	2'-11	3'-6	1'-9	2'-1	2'-5	2'-11	3'-7	1'-9	2'-1	2'-5	3'-0	3'-8	1'-10	2'-2	2'-6	3'-0	3'-8
	D	5'-0	5'-6	6'-0	6'-8	7'-6	5'-1	5'-7	6'-1	6'-9	7'-6	5'-1	5'-7	6'-1	6'-9	7'-7	5'-1	5'-7	6'-1	6'-10	7'-8	5'-2	5'-8	6'-2	6'-10	7'-8
	E	22'-6	25'-0	27'-6	30'-0	32'-6	22'-0	24'-6	27'-0	29'-6	32'-0	22'-0	24'-0	26'-6	29'-0	31'-6	21'-6	24'-0	26'-6	29'-0	31'-0	21'-6	24'-0	26'-6	29'-0	31'-0
	F	3'-6	4'-1	4'-7	5'-4	6'-4	3'-8	4'-2	4'-9	5'-5	6'-4	3'-8	4'-2	4'-9	5'-5	6'-5	3'-8	4'-2	4'-9	5'-7	6'-6	3'-9	4'-3	4'-10	5'-7	6'-6
	G	22'-6	25'-0	27'-6	30'-0	32'-6	23'-0	25'-6	28'-0	30'-6	33'-0	23'-6	26'-0	28'-6	31'-0	34'-0	24'-0	27'-0	29'-6	32'-0	35'-0	25'-0	28'-0	30'-6	33'-6	36'-0
	J	3'-6	4'-1	4'-7	5'-4	6'-4	3'-8	4'-2	4'-9	5'-5	6'-4	3'-8	4'-2	4'-9	5'-5	6'-5	3'-8	4'-2	4'-9	5'-7	6'-6	3'-9	4'-3	4'-10	5'-7	6'-6
	K	1'-10¼	1'-11⅜	2'-0⅝	2'-1½	2'-2½	1'-10¼	1'-11⅜	2'-0½	2'-1⅝	2'-2¾	1'-10½	1'-11⅝	2'-0⅞	2'-2	2'-3⅛	1'-11	2'-0¼	2'-1½	2'-2⅝	2'-3⅞	1'-11¾	2'-1⅛	2'-2⅜	2'-3¾	2'-5
	L	3'-9	4'-2	4'-7	5'-0	5'-5	3'-9	4'-2	4'-7	4'-11	5'-4	3'-8	4'-2	4'-6	4'-11	5'-4	3'-9	4'-1	4'-6	4'-10	5'-4	3'-8	4'-1	4'-5	4'-10	5'-4
	M	3'-9	4'-2	4'-7	5'-0	5'-5	3'-10	4'-3	4'-9	5'-2	5'-7	4'-0	4'-5	4'-11	5'-4	5'-8	4'-2	4'-6	5'-0	5'-6	5'-11	4'-3	4'-8	5'-3	5'-8	6'-2
	N	1'-10¼	1'-11⅜	2'-0⅝	2'-1½	2'-2½	1'-10½	1'-11½	2'-0½	2'-1½	2'-2⅝	1'-10¾	1'-11¾	2'-0⅞	2'-1⅞	2'-2⅞	1'-11¼	2'-0¼	2'-1¼	2'-2⅜	2'-3⅜	2'-0	2'-1	2'-2	2'-3	2'-4

6 : 1 Slope Dimensions	Skew Δ	0°	5°	10°	15°	20°
	Height H	8'	8'	8'	8'	8'
	A	2'-0	2'-0	2'-0	2'-0	2'-0
	B	1'-4	1'-4	1'-4	1'-4	1'-4
	C	1'-8	1'-8	1'-8	1'-9	1'-9
	D	5'-0	5'-0	5'-0	5'-1	5'-1
	E	28'-0	27'-6	27'-0	27'-0	27'-0
	F	3'-6	3'-6	3'-6	3'-8	3'-8
	G	28'-0	28'-0	29'-0	29'-6	30'-6
	J	3'-6	3'-6	3'-6	3'-8	3'-8
	K	1'-10¼	1'-10¼	1'-10½	1'-11	1'-11¾
	L	4'-8	4'-8	4'-8	4'-7	4'-7
	M	4'-8	4'-10	4'-11	5'-0	5'-2
	N	1'-10¼	1'-10½	1'-10¾	1'-11¼	2'-0

Height H	'c' Bars: Short Wing Skew Δ					Long Wing Skew Δ					Dim 'X'	'd' Bars: Short Wing		Long Wing
	0°	5°	10°	15°	20°	0°	5°	10°	15°	20°		0° to 10°	15° & 20°	0° to 20°
8'	2-#5	2-#5	2-#5	-	-	2-#5	2-#5	2-#5	3-#5	3-#5	2'-0	-	-	-
9'	4-#5	4-#5	4-#5	3-#5	2-#5	4-#5	4-#5	4-#5	5-#5	5-#5	3'-0	-	-	-
10'	6-#6	6-#6	5-#6	5-#6	4-#6	6-#6	7-#6	7-#6	7-#6	8-#6	4'-3	-	-	-
11'	8-#7	8-#7	7-#7	6-#7	6-#7	8-#7	9-#7	9-#7	10-#7	10-#7	6'-9	5-#6	4-#6	5-#6
12'	9-#7	8-#7	7-#7	6-#7	6-#7	9-#7	9-#7	9-#7	10-#7	10-#7	6'-9	8-#6	6-#6	8-#6
9'	6-#5	6-#5	5-#5	4-#5	3-#5	6-#5	6-#5	6-#5	7-#5	7-#5	3'-0	-	-	-
10'	10-#5	10-#5	9-#5	8-#5	7-#5	10-#5	10-#5	11-#5	11-#5	12-#5	4'-0	-	-	-
11'	14-#6	14-#6	13-#6	12-#6	12-#6	14-#6	15-#6	15-#6	16-#6	17-#6	5'-3	9-#6	8-#6	10-#6
12'	14-#7	14-#7	13-#7	12-#7	11-#7	14-#7	14-#7	15-#7	16-#7	17-#7	6'-9	13-#6	12-#6	15-#6

* 'd' bars alternate with 'a' bars at high end of wall.

Height H	'a' bars	'b' bars
8'	#5	#5
9'	#5	#5
10'	#6	#5
11'	#5	#5
12'	#6	#6

NOTE :

For General Notes and Miscellaneous Details see B-01.10.
For Headwall Quantities see B-05.10, B-05.20 and B-05.30.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED

CADD FILENAME= 2FA
VIEW NAME=

ROYD F. DANIEL DAVIS — REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 21473 — STATE OF ARIZONA

DESIGN APPROVED: J. D. Davis

APPROVED FOR DISTRIBUTION: James A. Hartley 2-15-84

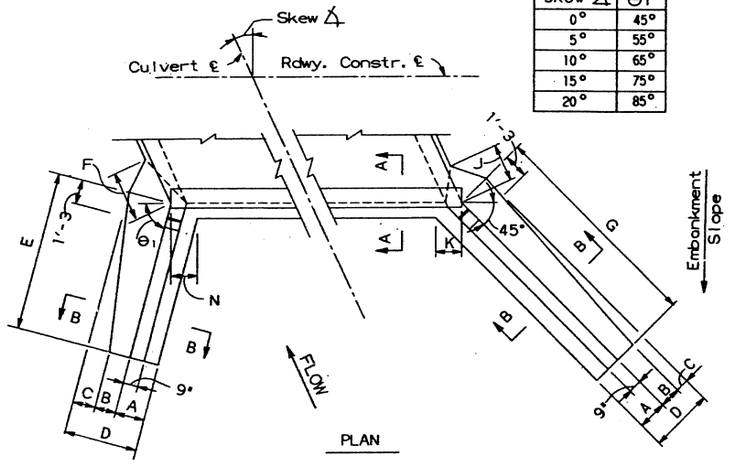
ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

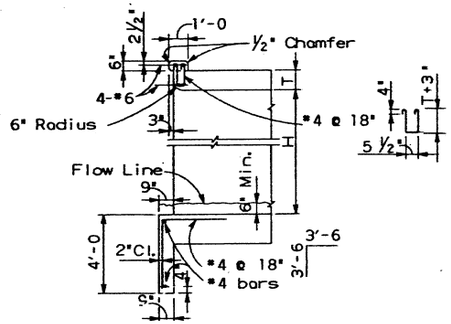
OUTLET WINGS
CULVERT HEIGHT 8' to 12'
SKEW 0° to 20°

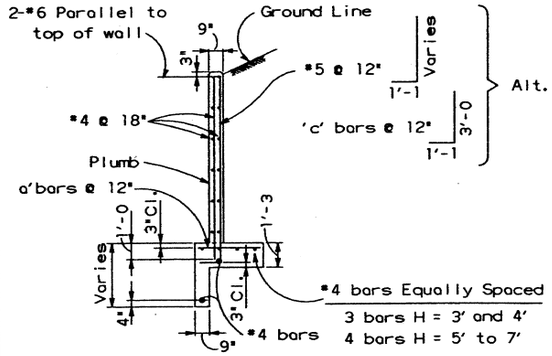
REVISION

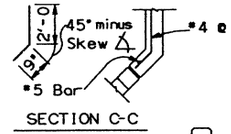
STANDARD NO. B-04.20

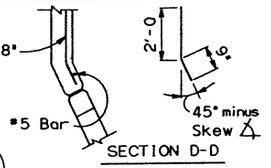
Skew Δ	θ1
0°	45°
5°	55°
10°	65°
15°	75°
20°	85°

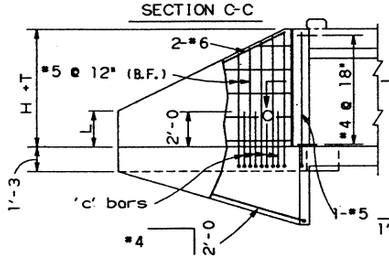


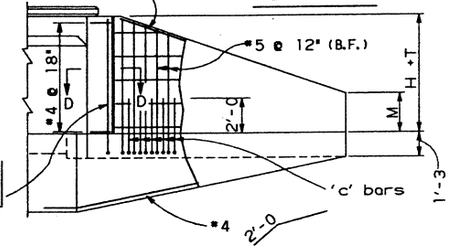












Skew Δ		0°					5°					10°					15°					20°				
2 : 1 Slope	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
Dimensions	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1
	D	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10
	E	6'-0	7'-6	8'-6	10'-0	11'-6	5'-6	7'-0	8'-6	10'-0	11'-0	5'-6	7'-0	8'-6	9'-6	11'-0	5'-6	7'-0	8'-6	10'-0	11'-0	6'-0	7'-6	8'-6	10'-0	11'-6
	F	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	2'-11	3'-8	4'-4	1'-5	2'-1	2'-11	3'-7	4'-3	1'-4	2'-0	2'-9	3'-5	4'-1
	G	6'-0	7'-6	8'-6	10'-0	11'-6	6'-0	7'-6	9'-6	10'-6	12'-0	6'-6	8'-0	9'-6	11'-0	12'-6	7'-0	8'-6	10'-0	12'-0	13'-6	7'-6	9'-0	11'-0	12'-6	14'-6
	J	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	2'-11	3'-8	4'-4	1'-5	2'-1	2'-11	3'-7	4'-3	1'-4	2'-0	2'-9	3'-5	4'-1
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	1'-11	2'-5	3'-1	3'-6	4'-0	1'-10	2'-2	2'-5	3'-0	3'-7	1'-7	1'-11	2'-3	2'-9	3'-1	1'-5	1'-8	1'-11	2'-3	2'-9	1'-1	1'-4	1'-10	2'-1	2'-4
	M	1'-11	2'-5	3'-1	3'-6	4'-0	1'-11	2'-5	2'-11	3'-4	3'-10	1'-9	2'-3	2'-8	3'-2	3'-8	1'-7	2'-1	2'-6	2'-10	3'-3	1'-5	1'-11	2'-2	2'-8	2'-11
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

Skew Δ		0°					5°					10°					15°					20°				
4 : 1 Slope	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
Dimensions	A	1'-6	1'-5	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-4	1'-8	9"	1'-0	1'-1	1'-3	1'-7	9"	1'-0	1'-1	1'-2	1'-6	9"	1'-0	1'-1	1'-2	1'-5	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	7"	1'-0	1'-3	1'-5	4"	7"	1'-0	1'-4	1'-6	4"	7"	1'-0	1'-5	1'-7	4"	7"	1'-0	1'-5	1'-8	4"	7"	1'-0	1'-5	1'-10
	D	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7
	E	8'-0	9'-6	11'-6	13'-6	15'-6	8'-0	10'-0	11'-6	13'-6	15'-6	8'-0	10'-0	12'-0	14'-0	16'-0	8'-6	10'-6	12'-6	14'-6	16'-6	9'-0	11'-0	13'-6	15'-6	17'-6
	F	1'-3	1'-11	2'-8	3'-4	4'-1	1'-3	1'-11	2'-7	3'-4	4'-0	1'-2	1'-11	2'-7	3'-3	4'-0	1'-2	1'-10	2'-6	3'-3	3'-11	1'-2	1'-10	2'-5	3'-1	3'-9
	G	8'-0	9'-6	11'-6	13'-6	15'-6	8'-6	10'-6	12'-6	14'-6	16'-6	9'-0	11'-0	13'-0	15'-6	17'-6	9'-6	12'-0	14'-6	16'-6	19'-0	10'-6	13'-0	15'-6	18'-6	21'-0
	J	1'-3	1'-11	2'-8	3'-4	4'-1	1'-3	1'-11	2'-7	3'-4	4'-0	1'-2	1'-11	2'-7	3'-3	4'-0	1'-2	1'-10	2'-6	3'-3	3'-11	1'-2	1'-10	2'-5	3'-1	3'-9
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	2'-8	3'-5	4'-0	4'-8	5'-4	2'-5	3'-0	3'-8	4'-4	4'-11	2'-3	2'-10	3'-4	3'-11	4'-5	2'-0	2'-6	3'-1	3'-7	4'-1	1'-10	2'-4	2'-8	3'-2	3'-8
	M	2'-8	3'-5	4'-0	4'-8	5'-4	2'-7	3'-2	3'-10	4'-6	5'-2	2'-6	3'-1	3'-9	4'-4	5'-0	2'-5	2'-11	3'-6	4'-2	4'-8	2'-2	2'-9	3'-4	3'-10	4'-4
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

Skew Δ		0°					5°					10°					15°					20°				
6 : 1 Slope	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
Dimensions	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-3	1'-7	2'-0	9"	1'-0	1'-2	1'-7	1'-11	9"	1'-0	1'-1	1'-6	1'-10	9"	1'-0	1'-1	1'-4	1'-8	9"	1'-0	1'-1	1'-3	1'-7
	C	3"	6"	9"	11"	1'-0	3"	6"	10"	11"	1'-1	3"	6"	11"	1'-0	1'-2	3"	6"	11"	1'-2	1'-4	3"	6"	11"	1'-3	1'-5
	D	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6
	E	8'-6	11'-0	13'-0	15'-0	17'-0	9'-0	11'-0	13'-6	15'-6	17'-6	9'-6	11'-6	14'-0	16'-6	18'-6	10'-0	12'-6	15'-0	17'-6	19'-6	11'-0	13'-6	16'-0	19'-0	21'-6
	F	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-9	2'-6	3'-2	3'-10	1'-1	1'-9	2'-5	3'-1	3'-9	1'-0	1'-8	2'-4	3'-0	3'-8
	G	8'-6	11'-0	13'-0	15'-0	17'-0	9'-6	11'-6	14'-0	16'-0	18'-6	10'-0	12'-6	15'-0	17'-6	20'-0	11'-0	14'-0	16'-6	19'-6	22'-0	12'-6	15'-6	18'-6	21'-6	24'-6
	J	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-9	2'-6	3'-2	3'-10	1'-1	1'-9	2'-5	3'-1	3'-9	1'-0	1'-8	2'-4	3'-0	3'-8
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	3'-1	3'-9	4'-6	5'-4	6'-1	2'-10	3'-7	4'-3	4'-11	5'-8	2'-8	3'-4	3'-11	4'-7	5'-3	2'-5	3'-1	3'-8	4'-3	4'-11	2'-3	2'-10	3'-5	3'-11	4'-6
	M	3'-1	3'-9	4'-6	5'-4	6'-1	2'-11	3'-8	4'-5	5'-2	5'-11	2'-11	3'-7	4'-4	5'-0	5'-8	2'-9	3'-5	4'-1	4'-9	5'-6	2'-7	3'-3	3'-11	4'-6	5'-2
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'- 5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

'c' bars			
Hgt. H	Slope	Short Wing 0° to 10°	Long Wing 0° to 20°
7'	2 : 1	3 - #5	3 - #5
	4 : 1	5 - #5	5 - #5

'a' bars			
Height H	Short Wing 0° to 10°	Short Wing 15° & 20°	Long Wing 0° to 20°
3'	#4	#4	#4
4'	#4	#4	#4
5'	#4	#4	#4
6'	#5	#4	#5
7'	#6	#4	#6

NOTE :

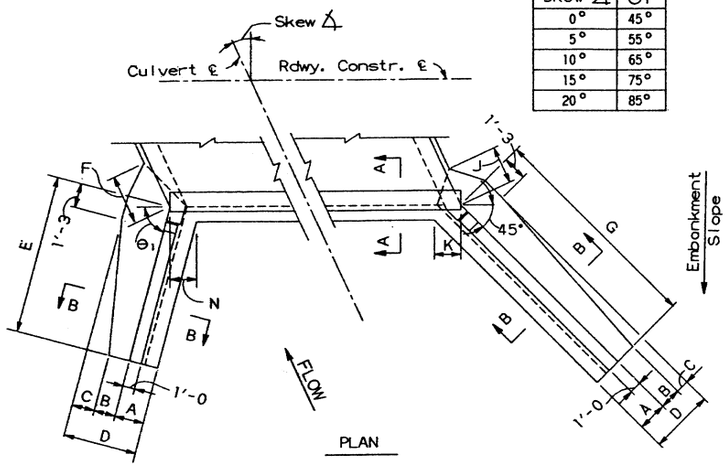
For General Notes and Miscellaneous Details see B-01.10.
For Headwall Quantities see B-05.10, B-05.20 and B-05.30.

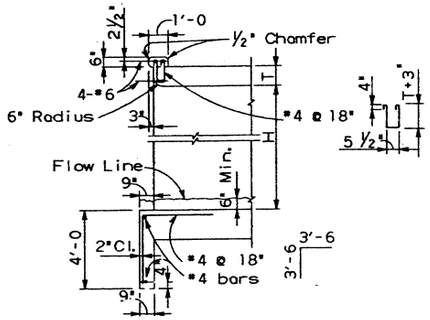
DESIGNATION	NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
DRAWN	1			
CHECKED	2			
	3			
	4			

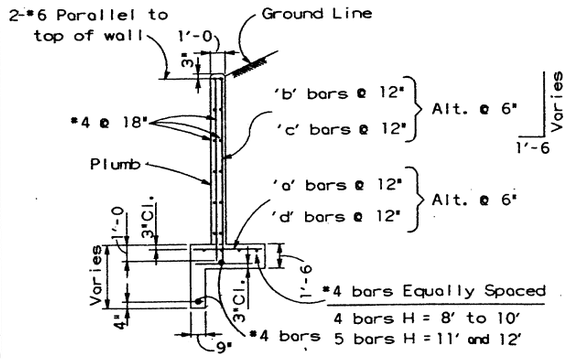
CADD FILENAME= 2FA
VIEW NAME=

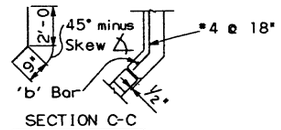
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION 2-19-87	INLET WINGS CULVERT HEIGHT 3' to 7' SKEW 0° to 20°	STANDARD NO. B-04.30

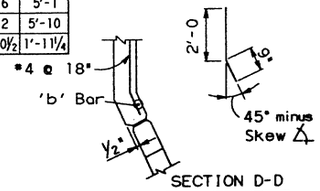
Skew Δ	Θ_1
0°	45°
5°	55°
10°	65°
15°	75°
20°	85°

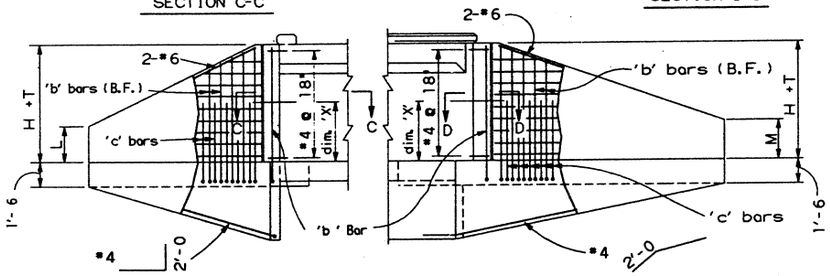












2 : 1 Slope Dimensions	Skew Δ	0°					5°					10°					15°					20°				
	Height H	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'
	A	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4
	B	1'-4	1'-5	1'-6	1'-9	1'-11	1'-4	1'-5	1'-6	1'-7	1'-9	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8
	C	2'-2	2'-7	3'-0	3'-6	4'-2	2'-2	2'-7	3'-0	3'-8	4'-4	2'-2	2'-7	3'-0	3'-8	4'-5	2'-2	2'-7	3'-0	3'-8	4'-5	2'-2	2'-7	3'-0	3'-8	4'-5
	D	5'-6	6'-1	6'-8	7'-6	8'-5	5'-6	6'-1	6'-8	7'-6	8'-5	5'-6	6'-1	6'-8	7'-6	8'-5	5'-6	6'-1	6'-8	7'-6	8'-5	5'-6	6'-1	6'-8	7'-6	8'-5
	E	13'-0	14'-6	16'-0	17'-0	18'-6	12'-6	14'-0	15'-6	16'-6	18'-0	12'-6	13'-6	15'-0	16'-6	18'-0	12'-6	14'-0	15'-0	16'-6	18'-0	13'-0	14'-6	15'-6	17'-0	18'-6
	F	4'-8	5'-4	6'-1	7'-1	8'-3	4'-7	5'-4	6'-0	7'-1	8'-3	4'-7	5'-3	5'-11	7'-0	8'-2	4'-6	5'-2	5'-10	6'-10	8'-0	4'-4	5'-0	5'-8	6'-8	7'-9
	G	13'-0	14'-6	16'-0	17'-0	18'-6	13'-6	15'-0	16'-6	18'-0	19'-6	14'-6	16'-0	17'-6	19'-0	20'-6	15'-0	17'-0	18'-6	20'-0	22'-0	16'-0	18'-0	19'-6	21'-6	23'-6
	J	4'-8	5'-4	6'-1	7'-1	8'-3	4'-7	5'-4	6'-0	7'-1	8'-3	4'-7	5'-3	5'-11	7'-0	8'-2	4'-6	5'-2	5'-10	6'-10	8'-0	4'-4	5'-0	5'-8	6'-8	7'-9
	K	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝
	L	4'-6	4'-11	5'-5	6'-1	6'-6	3'-11	4'-4	4'-9	5'-4	5'-8	3'-5	3'-11	4'-3	4'-7	4'-11	3'-0	3'-4	3'-10	4'-1	4'-4	2'-7	2'-10	3'-4	3'-7	3'-10
	M	4'-6	4'-11	5'-5	6'-1	6'-6	4'-3	4'-9	5'-3	5'-8	6'-2	3'-11	4'-5	4'-11	5'-4	5'-10	3'-9	4'-1	4'-6	5'-0	5'-3	3'-5	3'-8	4'-2	4'-6	4'-9
	N	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	1'-11	2'-0¼	2'-1½	2'-2⅝	2'-3⅞	1'-10¼	1'-11⅜	2'-0½	2'-1⅝	2'-2¾	1'-10½	1'-11½	2'-0½	2'-1½	2'-2⅝	1'-11¼	2'-0¼	2'-1¼	2'-2⅜	2'-3⅜

4 : 1 Slope Dimensions	Skew Δ	0°					5°					10°					15°					20°				
	Height H	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'
	A	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4
	B	1'-8	1'-11	2'-2	2'-5	2'-8	1'-6	1'-9	2'-0	2'-3	2'-6	1'-5	1'-8	1'-11	2'-2	2'-4	1'-4	1'-6	1'-9	1'-11	2'-2	1'-4	1'-5	1'-6	1'-8	1'-10
	C	1'-6	1'-8	1'-10	2'-3	2'-9	1'-8	1'-10	2'-0	2'-5	2'-11	1'-9	1'-11	2'-1	2'-6	3'-1	1'-10	2'-1	2'-3	2'-9	3'-3	1'-10	2'-2	2'-6	3'-0	3'-7
	D	5'-2	5'-8	6'-2	6'-11	7'-9	5'-2	5'-8	6'-2	6'-11	7'-9	5'-2	5'-8	6'-2	6'-11	7'-9	5'-2	5'-8	6'-2	6'-11	7'-9	5'-2	5'-8	6'-2	6'-11	7'-9
	E	17'-0	19'-0	21'-0	23'-0	25'-0	17'-6	19'-6	21'-0	23'-0	25'-0	18'-0	19'-6	21'-6	23'-6	25'-6	18'-6	20'-6	22'-6	24'-6	26'-6	20'-0	22'-0	24'-0	26'-6	28'-6
	F	4'-2	4'-9	5'-4	6'-3	7'-4	4'-2	4'-9	5'-4	6'-3	7'-4	4'-1	4'-8	5'-3	6'-2	7'-3	4'-0	4'-7	5'-2	6'-1	7'-1	3'-11	4'-5	5'-0	5'-11	6'-11
	G	17'-0	19'-0	21'-0	23'-0	25'-0	18'-6	20'-6	22'-6	24'-6	26'-6	19'-6	22'-0	24'-0	26'-0	28'-6	21'-6	23'-6	26'-0	28'-6	30'-6	23'-6	26'-0	28'-6	31'-0	34'-0
	J	4'-2	4'-9	5'-4	6'-3	7'-4	4'-2	4'-9	5'-4	6'-3	7'-4	4'-1	4'-8	5'-3	6'-2	7'-3	4'-0	4'-7	5'-2	6'-1	7'-1	3'-11	4'-5	5'-0	5'-11	6'-11
	K	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝
	L	6'-1	6'-8	7'-4	8'-0	8'-8	5'-6	6'-1	6'-9	7'-4	7'-11	5'-0	5'-8	6'-2	6'-9	7'-3	4'-7	5'-1	5'-8	6'-2	6'-8	4'-1	4'-7	5'-1	5'-6	6'-0
	M	6'-1	6'-8	7'-4	8'-0	8'-8	5'-10	6'-5	7'-1	7'-9	8'-5	5'-7	6'-2	6'-10	7'-6	8'-0	5'-3	5'-11	6'-6	7'-0	7'-8	4'-11	5'-6	6'-0	6'-7	7'-1
	N	2'-0⅞	2'-2⅜	2'-3¾	2'-5⅛	2'-6⅝	1'-11	2'-0¼	2'-1½	2'-2⅝	2'-3⅞	1'-10¼	1'-11⅜	2'-0½	2'-1⅝	2'-2¾	1'-10½	1'-11½	2'-0½	2'-1½	2'-2⅝	1'-11¼	2'-0¼	2'-1¼	2'-2⅜	2'-3⅜

6 : 1 Slope Dimensions	Skew Δ	0°	5°	10°	15°	20°
	Height H	8'	8'	8'	8'	8'
	A	2'-0	2'-0	2'0	2'-0	2'-0
	B	1'-11	1'-10	1'-9	1'-8	1'-6
	C	1'-2	1'-3	1'-4	1'-5	1'-7
	D	5'-1	5'-1	5'-1	5'-1	5'-1
	E	19'-6	20'-0	21'-0	22'-0	24'-0
	F	4'-1	4'-0	4'-0	3'-11	3'-9
	G	19'-6	21'-0	22'-6	24'-6	27'-6
	J	4'-1	4'-0	4'-0	3'-11	3'-9
	K	2'-0⅞	2'-0⅞	2'-0⅞	2'-0⅞	2'-0⅞
	L	6'-9	6'-4	5'-11	5'-6	5'-1
	M	6'-9	6'-7	6'-5	6'-2	5'-10
	N	2'-0⅞	1'-11	1'-10¼	1'-10½	1'-11¼

Height H	'a' bars	'b' bars
8'	#5	#5
9'	#6	#5
10'	#6	#5
11'	#6	#5
12'	#6	#6

	Height H	'c' Bars: Short Wing Skew Δ 0°	5°	10°	15°	20°	'c' Bars: Long Wing Wall	Dim 'X'	'd' Bars: Short Wing 0° to 10°	'd' Bars: Short Wing 15° & 20°	'd' Bars: Long Wing 0° to 20°
2:1 Slope	8'	3-#5	3-#5	2-#5	2-#5	-	3-#5	2'-0	-	-	-
	9'	5-#5	4-#5	3-#5	3-#5	2-#5	5-#5	3'-0	-	-	-
	10'	8-#6	7-#6	6-#6	5-#6	4-#6	8-#6	4'-3	3-#5	-	3-#5
	11'	11-#7	10-#7	9-#7	7-#7	6-#7	11-#7	6'-9	6-#5	5-#5	6-#5
	12'	11-#7	10-#7	9-#7	7-#7	6-#7	11-#7	6'-9	9-#7	7-#6	9-#7
4:1 Slope	9'	7-#5	6-#5	6-#5	5-#5	4-#5	7-#5	3'-0	-	-	-
	10'	12-#5	11-#5	10-#5	9-#5	8-#5	12-#5	4'-0	-	-	-
	11'	18-#7	17-#7	16-#7	15-#7	14-#7	18-#7	6-3	11-#5	6-#5	11-#5
	12'	18-#7	17-#7	16-#7	15-#7	14-#7	18-#7	6'-3	11-#6	11-#6	11-#6

* 'd' bars alternate with 'a' bars at high end of wall.

NOTE :

For General Notes and Miscellaneous Details see B-01.10.
For Headwall Quantities see B-05.10, B-05.20 and B-05.30.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED

CADD FILENAME= ZFA
VIEW NAME=

DESIGN APPROVED
APPROVED FOR DISTRIBUTION
2-13-87

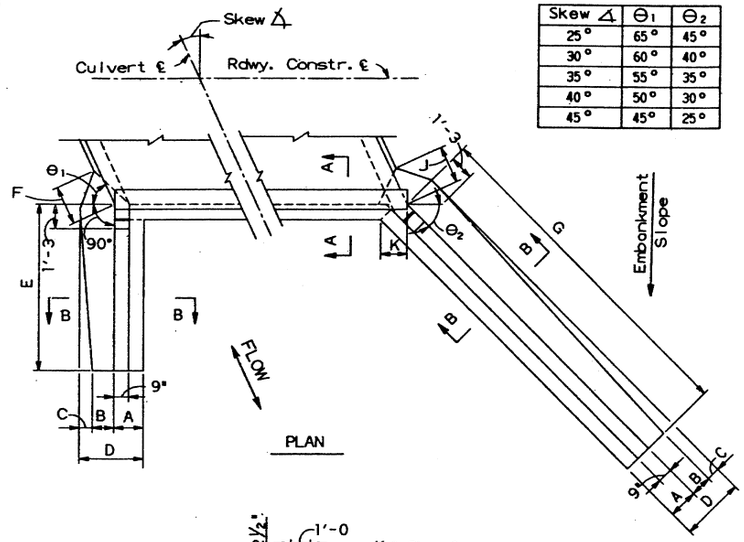
ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

INLET WINGS
CULVERT HEIGHT 8' to 12'
SKEW 0° to 20°

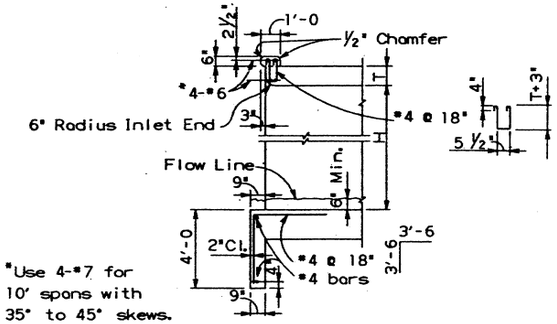
REVISION

STANDARD NO.
B-04.40

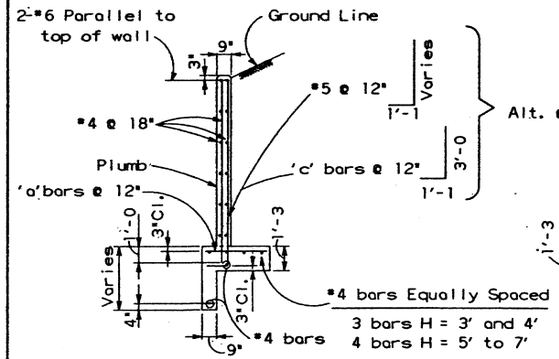
Skew Δ	θ1	θ2
25°	65°	45°
30°	60°	40°
35°	55°	35°
40°	50°	30°
45°	45°	25°



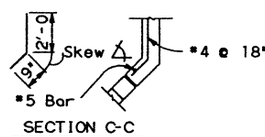
PLAN



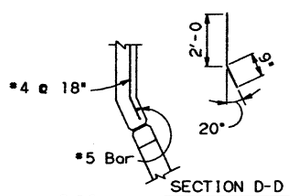
SECTION A-A



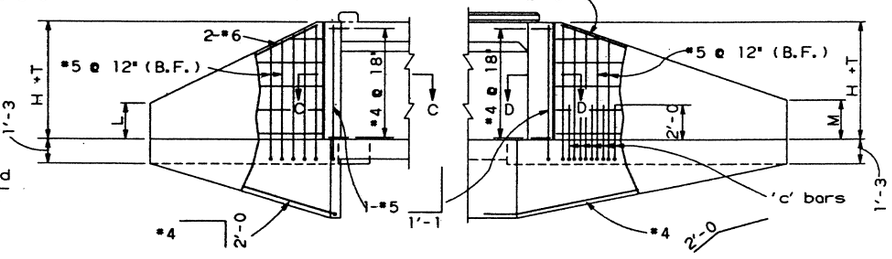
SECTION B-B



SECTION C-C



SECTION D-D



SHORT WING ELEVATION

LONG WING ELEVATION

Skew Δ	25°					30°					35°					40°					45°				
2 : 1 Slope Dimensions — Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
C	6"	9"	1'-3	1'-8	2'-1	7"	10"	1'-3	1'-9	2'-2	7"	11"	1'-4	1'-10	2'-3	8"	11"	1'-5	1'-10	2'-4	8"	1'-0	1'-6	1'-11	2'-5
D	2'-9	3'-3	3'-10	4'-4	4'-10	2'-10	3'-4	3'-10	4'-5	4'-11	2'-10	3'-5	3'-11	4'-6	5'-0	2'-11	3'-5	4'-0	4'-6	5'-1	2'-11	3'-6	4'-1	4'-7	5'-2
E	6'-0	7'-6	8'-6	10'-0	11'-6	5'-6	7'-0	8'-0	9'-6	11'-0	5'-6	6'-6	8'-0	9'-0	10'-6	5'-0	6'-6	7'-6	8'-6	10'-0	5'-0	6'-0	7'-0	8'-6	9'-6
F	1'-4	2'-0	2'-9	3'-5	4'-1	1'-6	2'-2	2'-11	3'-8	4'-4	1'-7	2'-4	3'-1	3'-10	4'-7	1'-8	2'-5	3'-3	3'-11	4'-9	1'-8	2'-6	3'-4	4'-1	4'-10
G	8'-0	10'-0	11'-6	13'-6	15'-6	8'-6	10'-6	12'-6	14'-6	16'-6	9'-0	11'-0	13'-6	15'-6	17'-6	10'-0	12'-0	14'-6	17'-0	19'-6	10'-6	13'-6	16'-0	18'-6	21'-0
J	1'-3	1'-11	2'-8	3'-4	4'-0	1'-5	2'-0	2'-8	3'-5	4'-1	1'-5	2'-2	2'-9	3'-6	4'-2	1'-6	2'-2	2'-11	3'-6	4'-3	1'-6	2'-3	3'-0	3'-8	4'-5
K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-5¾	1'-5¾	1'-5¾	1'-5¾	1'-5¾	1'-6½	1'-6½	1'-6½	1'-6½	1'-6½	1'-8⅜	1'-8⅜	1'-8⅜	1'-8⅜	1'-8⅜	1'-11¼	1'-11¼	1'-11¼	1'-11¼	1'-11¼
L	1'-1	1'-4	1'-10	-2'-1	2'-4	1'-4	1'-7	2'-1	2'-4	2'-7	1'-4	1'-10	2'-1	2'-7	2'-10	1'-7	1'-10	2'-4	2'-10	3'-1	1'-7	2'-1	2'-7	2'-10	3'-4
M	1'-3	1'-6	2'-0	2'-3	2'-7	1'-4	1'-8	2'-1	2'-5	2'-9	1'-6	1'-11	2'-2	2'-7	3'-1	1'-7	2'-1	2'-5	2'-10	3'-2	1'-10	2'-3	2'-8	3'-2	3'-8

Skew Δ	25°					30°					35°					40°					45°				
4 : 1 Slope Dimensions — Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-4	9"	1'-0	1'-1	1'-3	1'-7
C	4"	7"	1'-0	1'-5	1'-10	4"	7"	1'-0	1'-5	1'-10	4"	7"	1'-0	1'-5	1'-10	4"	7"	1'-0	1'-5	1'-9	4"	7"	1'-0	1'-5	1'-7
D	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-2	4'-8
E	9'-0	11'-0	13'-6	15'-6	17'-6	8'-6	10'-6	12'-6	14'-6	16'-6	7'-6	9'-6	11'-6	13'-6	15'-0	7'-0	9'-0	10'-6	12'-6	14'-0	7'-0	8'-6	10'-0	12'-0	13'-6
F	1'-2	1'-10	2'-5	3'-1	3'-9	1'-2	1'-10	2'-6	3'-3	3'-11	1'-2	1'-11	2'-7	3'-3	4'-0	1'-3	1'-11	2'-7	3'-4	4'-0	1'-3	1'-11	2'-8	3'-6	4'-2
G	12'-0	14'-6	17'-6	20'-6	23'-6	12'-6	15'-6	18'-6	21'-6	24'-6	13'-0	16'-0	19'-6	22'-6	25'-6	14'-0	17'-0	20'-6	24'-0	27'-6	15'-0	18'-6	22'-0	25'-6	29'-0
J	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-1	3'-9
K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-5¾	1'-5¾	1'-5¾	1'-5¾	1'-5¾	1'-6½	1'-6½	1'-6½	1'-6½	1'-6½	1'-8⅜	1'-8⅜	1'-8⅜	1'-8⅜	1'-8⅜	1-11¼	1'-11¼	1'-11¼	1'-11¼	1'-11¼
L	1'-10	2'-4	2'-8	3'-2	3'-8	1'-11	2'-5	2'-11	3'-5	3'-11	2'-2	2'-8	3'-2	3'-8	4'-4	2'-4	2'-10	3'-5	3'-11	4'-7	2'-4	2'-11	3'-7	4'-1	4'-8
M	1'-11	2'-6	3'-0	3'-5	3'-11	2'-1	2'-7	3'-1	3'-7	4'-2	2'-2	2'-9	3'-3	3'-10	4'-5	2'-4	2'-11	3'-6	4'-1	4'-8	2'-6	3'-1	3'-9	4'-4	5'-0

Skew Δ	25°					30°					35°					40°					45°				
6 : 1 Slope Dimensions — Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
B	9"	1'-0	1'-1	1'-2	1'-4	9"	1'-0	1'-1	1'-2	1'-6	9"	1'-0	1'-1	1'-3	1'-7	9"	1'-0	1'-1	1'-4	1'-8	9"	1'-0	1'-2	1'-6	1'-10
C	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-6	3"	6"	11"	1'-3	1'-5	3"	6"	11"	1'-2	1'-4	3"	6"	10"	1'-0	1'-2
D	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6
E	11'-0	13'-6	16'-0	19'-0	21'-6	10'-0	12'-6	14'-6	17'-0	19'-6	9'-0	11'-6	13'-6	15'-6	18'-0	8'-6	10'-6	12'-6	14'-6	16'-6	8'-0	10'-0	12'-0	13'-6	15'-6
F	1'-0	1'-8	2'-4	3'-0	3'-8	1'-1	1'-9	2'-5	3'-1	3'-9	1'-1	1'-9	2'-6	3'-2	3'-10	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-10	2'-6	3'-3	3'-11
G	14'-0	17'-6	21'-0	24'-6	28'-0	14'-6	18'-6	22'-0	25'-6	29'-0	15'-6	19'-0	23'-0	26'-6	30'-6	16'-0	20'-0	24'-0	28'-0	32'-0	17'-0	21'-0	25'-0	29'-6	33'-6
J	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6
K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-5¾	1'-5¾	1'-5¾	1'-5¾	1'-5¾	1'-6½	1'-6½	1'-6½	1'-6½	1'-6½	1'-8⅜	1'-8⅜	1'-8⅜	1'-8⅜	1'-8⅜	1'-11¼	1'-11¼	1'-11¼	1'-11¼	1'-11¼
L	2'-3	2'-10	3'-5	3'-11	4'-6	2'-5	3'-0	3'-8	4'-3	4'-10	2'-7	3'-2	3'-10	4'-6	5'-1	2'-8	3'-4	4'-0	4'-8	5'-4	2'-9	3'-5	4'-1	4'-10	5'-6
M	2'-5	3'-0	3'-7	4'-2	4'-9	2'-6	3'-1	3'-8	4'-4	4'-11	2'-7	3'-3	3'-10	4'-6	5'-2	2'-9	3'-5	4'-1	4'-9	5'-5	2'-10	3'-7	4'-4	5'-0	5'-8

'c' Bars Long Wingwall		
Skew Δ	2 : 1 Slope	4 : 1 Slope
H = 7' 25°	3 - *5	3 - *5
30°	3 - *5	3 - *5
35°	4 - *5	4 - *5
40°	4 - *5	4 - *5
45°	5 - *5	4 - *5

'a' Bars		
Height H	Short Wing	Long Wing
3'	*4	*4
4'	*4	*4
5'	*4	*4
6'	*4	*5
7'	*4	*6

NOTE :

For General Notes and Miscellaneous Details see B-01.10.
For Headwall Quantities see B-05.10, B-05.20 and B-05.30.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED

CADD FILENAME= 2FA
VIEW NAME=

DESIGN APPROVED

APPROVED FOR DISTRIBUTION
3-13-87

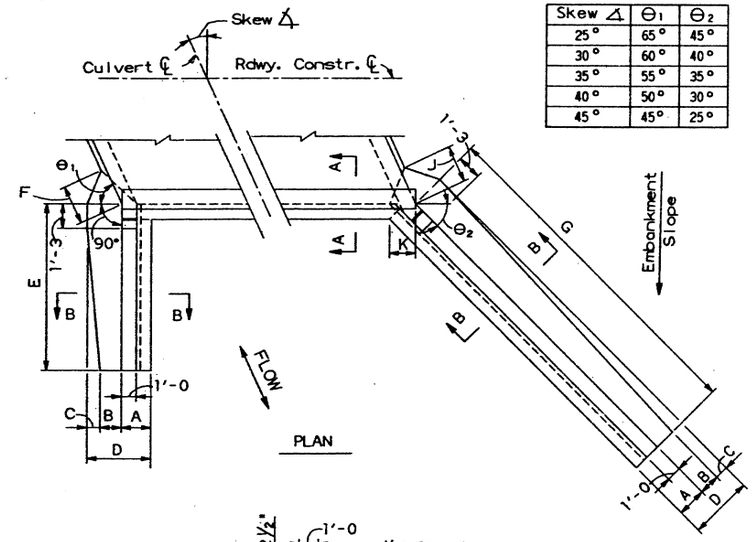
ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

INLET & OUTLET WINGS
CULVERT HEIGHT 3' to 7'
SKEW 25° to 45°

REVISION

STANDARD NO.
B-04.50

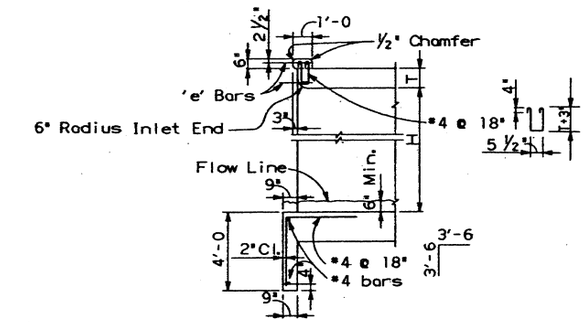
Skew ∠	Θ_1	Θ_2
25°	65°	45°
30°	60°	40°
35°	55°	35°
40°	50°	30°
45°	45°	25°



PLAN

2:1 Slope Dimensions	Skew ∠	25°					30°					35°					40°					45°				
	Height H	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'
	A	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4
	B	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-9
	C	2'-2	2'-7	3'-0	3'-8	4'-5	2'-3	2'-8	3'-1	3'-9	4'-7	2'-4	2'-9	3'-2	3'-11	4'-9	2'-5	2'-10	3'-4	4'-1	4'-11	2'-6	2'-11	3'-5	4'-2	5'-0
	D	5'-6	6'-1	6'-8	7'-6	8'-5	5'-7	6'-2	6'-9	7'-7	8'-7	5'-8	6'-3	6'-10	7'-9	8'-9	5'-9	6'-4	7'-0	7'-11	8'-11	5'-10	6'-5	7'-1	8'-0	9'-1
	E	13'-0	14'-6	15'-6	17'-0	18'-6	12'-0	13'-6	15'-0	16'-0	17'-6	11'-6	13'-0	14'-0	15'-6	16'-6	11'-0	12'-6	13'-6	15'-0	16'-0	11'-0	12'-0	13'-0	14'-6	15'-6
	F	4'-4	5'-0	5'-8	6'-8	7'-9	4'-7	5'-3	5'-11	7'-0	8'-3	4'-10	5'-6	6'-2	7'-4	8'-8	5'-0	5'-8	6'-6	7'-8	9'-0	5'-1	5'-10	6'-8	7'-10	9'-3
	G	17'-6	19'-6	21'-0	23'-0	25'-0	18'-6	20'-6	22'-6	24'-6	26'-6	20'-0	22'-0	24'-6	26'-6	28'-6	21'-6	24'-0	26'-6	29'-0	31'-0	24'-0	26'-6	29'-0	31'-6	34'-6
	J	4'-2	4'-10	5'-5	6'-5	7'-6	4'-3	4'-11	5'-7	6'-6	7'-8	4'-5	5'-0	5'-8	6'-9	7'-11	4'-6	5'-2	5'-11	6'-11	8'-2	4'-7	5'-3	6'-0	7'-1	8'-4
	K	2'-0⅞	2'-2⅝	2'-3¾	2'-5⅛	2'-6⅝	2'-2⅝	2'-4⅛	2'-5¾	2'-7¼	2'-8⅛	2'-5	2'-6¾	2'-8½	2'-10¼	3'-0	2'-8⅜	2'-10⅝	3'-0⅞	3'-2⅝	3'-4⅜	3'-1½	3'-3⅛	3'-6¼	3'-8⅝	3'-11
	L	2'-7	2'-10	3'-4	3'-7	3'-10	3'-1	3'-4	3'-7	4'-1	4'-4	3'-4	3'-7	4'-1	4'-4	4'-10	3'-7	3'-10	4'-4	4'-7	5'-1	3'-7	4'-1	4'-7	4'-10	5'-4
	M	2'-11	3'-2	3'-8	3'-11	4'-3	3'-1	3'-6	3'-10	4'-2	4'-7	3'-4	3'-9	4'-0	4'-6	4'-11	3'-8	4'-1	4'-5	4'-10	5'-4	4'-0	4'-6	4'-11	5'-5	5'-9

4:1 Slope Dimensions	Skew ∠	25°					30°					35°					40°					45°				
	Height H	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'	8'	9'	10'	11'	12'
	A	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4	2'-0	2'-1	2'-2	2'-3	2'-4
	B	1'-4	1'-5	1'-6	1'-7	1'-8	1'-4	1'-5	1'-6	1'-7	1'-9	1'-4	1'-5	1'-6	1'-9	1'-11	1'-4	1'-6	1'-9	1'-11	2'-2	1'-6	1'-9	2'-0	2'-3	2'-5
	C	1'-10	2'-2	2'-6	3'-1	3'-9	1'-10	2'-2	2'-7	3'-1	3'-8	1'-11	2'-3	2'-7	2'-11	3'-7	1'-11	2'-2	2'-4	2'-10	3'-4	1'-9	1'-11	2'-1	2'-6	3'-2
	D	5'-2	5'-8	6'-2	6'-11	7'-9	5'-2	5'-8	6'-3	6'-11	7'-9	5'-3	5'-9	6'-3	6'-11	7'-10	5'-3	5'-9	6'-3	7'-0	7'-10	5'-3	5'-9	6'-3	7'-0	7'-11
	E	20'-0	22'-0	24'-0	22'-6	28'-6	18'-6	20'-6	22'-6	24'-6	26'-6	17'-0	19'-0	20'-6	22'-6	24'-6	16'-0	17'-6	19'-6	21'-0	23'-0	15'-0	17'-0	18'-6	20'-0	22'-0
	F	3'-11	4'-5	5'-0	5'-11	6'-11	4'-0	4'-7	5'-3	6'-1	7'-1	4'-3	4'-10	5'-5	6'-2	7'-4	4'-3	4'-10	5'-5	6'-5	7'-5	4'-3	4'-10	5'-6	6'-5	7'-7
	G	26'-0	29'-0	32'-0	35'-0	37'-6	27'-6	30'-6	33'-6	36'-6	39'-6	29'-0	32'-0	35'-6	38'-6	41'-6	30'-6	34'-0	37'-6	41'-0	44'-0	33'-0	36'-6	40'-0	43'-6	47'-6
	J	3'-9	4'-3	4'-10	5'-8	6'-8	3'-9	4'-3	4'-11	5'-8	6'-8	3'-10	4'-5	4'-11	5'-8	6'-9	3'-10	4'-5	4'-11	5'-9	6'-9	3'-10	4'-5	4'-11	5'-9	6'-10
	K	2'-0⅞	2'-2⅝	2'-3¾	2'-5⅛	2'-6⅝	2'-2⅝	2'-4⅛	2'-5¾	2'-7¼	2'-8⅛	2'-5	2'-6¾	2'-8½	2'-10¼	3'-0	2'-8⅜	2'-10⅝	3'-0⅞	3'-2⅝	3'-4⅜	3'-1½	3'-3⅛	3'-6¼	3'-8⅝	3'-11
	L	4'-1	4'-7	5'-1	5'-5	5'-11	4'-5	4'-11	5'-5	5'-11	6'-5	4'-10	5'-4	5'-11	6'-5	6'-11	5'-1	5'-8	6'-2	6'-10	7'-4	5'-4	5'-10	6'-5	7'-1	7'-7
	M	4'-6	4'-11	5'-5	5'-11	6'-5	4'-8	5'-2	5'-8	6'-2	6'-9	4'-11	5'-6	6'-0	6'-7	7'-1	5'-3	5'-10	6'-5	6'-11	7'-7	5'-7	6'-2	6'-10	7'-6	8'-1



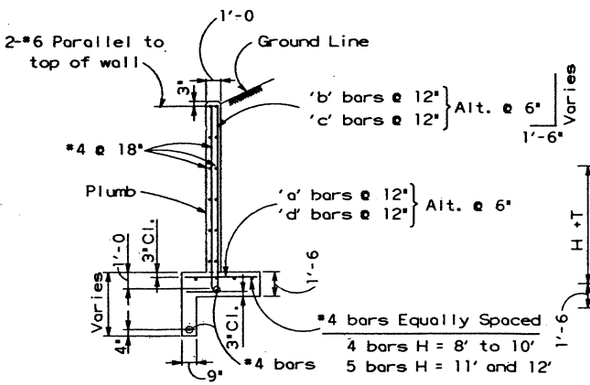
SECTION A-A

6:1 Slope Dimensions	Skew ∠	25°	30°	35°	40°	45°
	Height H	8'	8'	8'	8'	8'
	A	2'-0	2'-0	2'-0	2'-0	2'-0
	B	1'-4	1'-4	1'-6	1'-8	1'-10
	C	1'-9	1'-9	1'-7	1'-5	1'-3
	D	5'-1	5'-1	5'-1	5'-1	5'-1
	E	24'-0	22'-0	20'-0	18'-6	17'-6
	F	3'-9	3'-11	4'-0	4'-0	4'-1
	G	31'-6	32'-6	34'-0	35'-6	37'-6
	J	3'-8	3'-8	3'-8	3'-8	3'-8
	K	2'-0⅞	2'-2⅝	2'-5	2'-8⅜	3'-1½
	L	5'-1	5'-5	5'-9	6'-0	6'-2
	M	5'-4	5'-7	5'-10	6'-1	6'-5

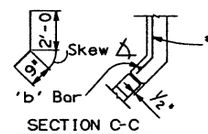
Skew ∠	'e' Bars Span 8'	10'	12'
25° to 30°	*6	*6	*7
35°	*6	*7	*8
40° & 45°	*6	*7	*9

	Height H	'c' Bars Long Wing Skew ∠ 25°	30°	35°	40°	45°	Dim. 'X'	Short Wing All Skew ∠	Short Wing Dim. 'X'	*'d' Bars Long Wing All Skew ∠	*'d' Bars Short Wing All Skew ∠
2:1 Slope	8'	4 -*5	4 -*5	5 -*5	5 -*5	6 -*5	2'-3	-	-	-	-
	9'	6 -*5	7 -*5	8 -*5	9 -*5	10 -*5	3'-3	2 -*5	2'-3	4 -*5	-
	10'	9 -*7	10 -*7	11 -*7	13 -*7	15 -*7	6'-0	4 -*5	3'-3	8 -*5	-
	11'	11 -*7	12 -*7	14 -*7	16 -*7	19 -*7	7'-0	6 -*6	4'-3	13 -*7	3 -*5
	12'	7 -*7	8 -*7	9 -*7	10 -*7	12 -*7	5'-3	6 -*6	4'-6	9 -*7	5 -*5
4:1 Slope	8'	3 -*5	4 -*5	4 -*5	5 -*5	5 -*5	2'-3	-	-	-	-
	9'	8 -*5	9 -*5	10 -*5	11 -*5	13 -*5	2'-6	4 -*5	2'-3	-	-
	10'	14 -*6	15 -*6	17 -*6	19 -*6	23 -*6	3'-9	8 -*5	3'-3	-	-
	11'	19 -*7	21 -*7	24 -*7	27 -*7	31 -*7	6'-3	12 -*6	4'-3	10 -*5	5 -*5
	12'	10 -*5	11 -*5	12 -*5	14 -*5	16 -*5	2'-9	12 -*6	4'-6	8 -*5	8 -*5

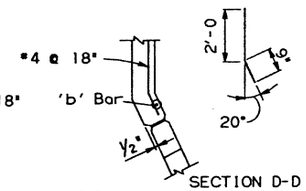
* 'd' bars alternate with 'a' bars at high end of wall



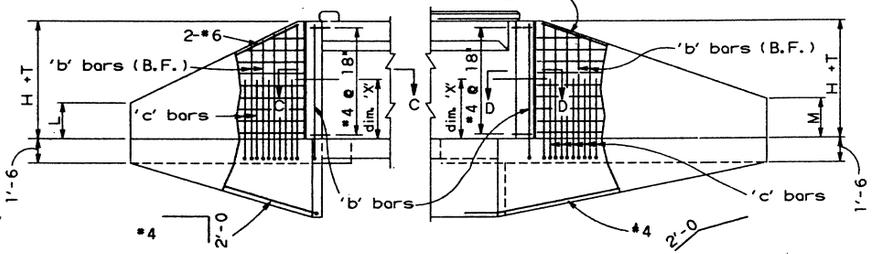
SECTION B-B



SECTION C-C



SECTION D-D



SHORT WING ELEVATION

LONG WING ELEVATION

Height H	Short Wing 'a' Bars	Short Wing 'b' Bars	Long Wing 'a' Bars	Long Wing 'b' Bars
8'	*4	*5	*6	*5
9'	*5	*5	*6	*5
10'	*6	*5	*6	*5
11'	*6	*5	*6	*5
12'	*6	*6	*7	*7

NOTE:
For General Notes and Miscellaneous Details see B-01.10.
For Headwall Quantities see B-05.10, B-05.20 and B-05.30.

NO	DESCRIPTION OF REVISIONS	BOOK BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED

CADD FILENAME= 2FA
VIEW NAME=

DESIGN APPROVED
APPROVED FOR DISTRIBUTION
2-13-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

INLET AND OUTLET WINGS
CULVERT HEIGHT 8' to 12'
SKEW 25° to 45°

REVISION

STANDARD NO.
B-04.60

INLET WINGS

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6′	3′	3.81	.86	276	80	3.66	.87	271	80	3.73	.88	281	81	3.81	.89	284	83	4.00	.92	302	85
	4′	5.18	.86	376	80	5.00	.87	357	80	5.07	.88	356	81	5.16	.89	368	83	5.38	.92	391	85
	5′	6.52	.86	452	80	6.59	.87	457	80	6.65	.88	468	81	6.75	.89	470	83	7.00	.92	487	85
	6′	8.26	.86	552	80	8.34	.87	570	80	8.28	.88	564	81	8.67	.89	570	83	8.80	.92	585	85
	7′	10.26	.86	774	80	10.18	.87	748	80	10.25	.88	763	81	10.52	.89	735	83	10.96	.92	764	85
8′	3′	4.11	1.13	318	105	3.95	1.14	311	106	4.02	1.15	322	107	4.11	1.17	332	109	4.31	1.21	352	112
	4′	5.47	1.13	397	105	5.29	1.14	380	106	5.37	1.15	381	107	5.47	1.17	400	109	5.69	1.21	423	112
	5′	6.81	1.13	477	105	6.88	1.14	482	106	6.95	1.15	493	107	7.06	1.17	499	109	7.31	1.21	520	112
	6′	8.56	1.13	604	105	8.64	1.14	620	106	8.58	1.15	617	107	8.98	1.17	633	109	9.12	1.21	649	112
	7′	10.55	1.13	791	105	10.48	1.14	773	106	10.55	1.15	788	107	10.83	1.17	767	109	11.28	1.21	798	112
	8′	15.95	1.13	892	105	15.73	1.14	909	106	16.04	1.15	922	107	16.18	1.17	935	109	16.76	1.21	948	112
10′	3′	4.41	1.40	358	130	4.25	1.41	352	131	4.33	1.43	362	132	4.42	1.45	365	135	4.63	1.49	388	139
	4′	5.77	1.40	440	130	5.59	1.41	422	131	5.68	1.43	424	132	5.78	1.45	437	135	6.01	1.49	462	139
	5′	7.11	1.40	521	130	7.18	1.41	526	131	7.26	1.43	539	132	7.37	1.45	538	135	7.64	1.49	560	139
	6′	8.86	1.40	651	130	8.94	1.41	667	131	8.88	1.43	664	132	9.29	1.45	675	135	9.44	1.49	691	139
	7′	10.86	1.40	840	130	10.78	1.41	822	131	10.86	1.43	837	132	11.14	1.45	811	135	11.60	1.49	843	139
	8′	16.25	1.40	943	130	16.04	1.41	961	131	16.35	1.43	974	132	16.50	1.45	981	135	17.10	1.49	996	139
	9′	19.48	1.40	1210	130	19.29	1.41	1182	131	19.36	1.43	1195	132	19.99	1.45	1225	135	20.60	1.49	1273	139
	10′	23.08	1.40	1412	130	22.84	1.41	1435	131	22.95	1.43	1431	132	23.30	1.45	1439	135	24.00	1.49	1497	139
12′	8′	16.59	1.69	972	156	16.36	1.69	991	157	16.71	1.71	1004	159	16.86	1.74	1007	162	17.48	1.79	1034	196
	9′	19.82	1.69	1240	156	19.63	1.69	1205	157	19.71	1.71	1226	159	20.35	1.74	1258	162	20.99	1.79	1312	196
	10′	23.42	1.69	1442	156	23.18	1.69	1465	157	23.24	1.71	1454	159	23.66	1.74	1473	162	24.38	1.79	1526	196
	11′	27.28	1.69	1828	156	27.16	1.69	1852	157	27.49	1.71	1865	159	28.02	1.74	1882	162	29.01	1.79	1938	196
	12′	32.13	1.69	2526	156	32.03	1.69	2498	157	32.41	1.71	2518	159	33.16	1.74	2480	162	34.22	1.79	2581	196

OUTLET WINGS

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6′	3′	3.70	.86	288	80	3.70	.87	288	80	3.84	.88	291	81	3.77	.89	284	83	3.94	.92	299	85
	4′	5.03	.86	366	80	5.02	.87	365	80	5.19	.88	379	81	5.23	.89	386	83	5.42	.92	400	85
	5′	6.51	.86	470	80	6.63	.87	471	80	6.72	.88	474	81	6.75	.89	482	83	6.99	.92	486	85
	6′	8.23	.86	541	80	8.35	.87	555	80	8.57	.88	577	81	8.70	.89	595	83	8.91	.92	600	85
	7′	10.15	.86	681	80	10.29	.87	682	80	10.55	.88	746	81	10.69	.89	735	83	11.01	.92	766	85
8′	3′	4.00	1.13	331	105	4.00	1.14	331	106	4.14	1.15	335	107	4.08	1.17	334	109	4.25	1.21	351	112
	4′	5.32	1.13	390	105	5.32	1.14	390	106	5.49	1.15	404	107	5.53	1.17	418	109	5.74	1.21	432	112
	5′	6.80	1.13	495	105	6.93	1.14	496	106	7.02	1.15	499	107	7.06	1.17	514	109	7.30	1.21	518	112
	6′	8.53	1.13	596	105	8.65	1.14	611	106	8.88	1.15	634	107	9.01	1.17	659	109	9.22	1.21	666	112
	7′	10.45	1.13	706	105	10.60	1.14	707	106	10.86	1.15	771	107	11.00	1.17	768	109	11.33	1.21	793	112
	8′	15.84	1.13	930	105	15.79	1.14	913	106	16.02	1.15	922	107	16.24	1.17	960	109	16.87	1.21	993	112
10′	3′	4.30	1.40	372	130	4.30	1.41	373	131	4.45	1.43	377	132	4.39	1.45	369	135	4.57	1.49	387	139
	4′	5.63	1.40	434	130	5.62	1.41	434	131	5.80	1.43	445	132	5.85	1.45	456	135	6.06	1.49	471	139
	5′	7.11	1.40	541	130	7.24	1.41	543	131	7.33	1.43	545	132	7.38	1.45	554	135	7.63	1.49	559	139
	6′	8.84	1.40	644	130	8.96	1.41	660	131	9.19	1.43	683	132	9.33	1.45	702	135	9.55	1.49	709	139
	7′	10.76	1.40	757	130	10.91	1.41	758	131	11.17	1.43	823	132	11.32	1.45	813	135	11.65	1.49	839	139
	8′	16.16	1.40	984	130	16.11	1.41	967	131	16.35	1.43	976	132	16.58	1.45	1007	135	17.21	1.49	1042	139
	9′	19.21	1.40	1131	130	19.34	1.41	1161	131	19.71	1.43	1163	132	19.98	1.45	1180	135	20.71	1.49	1216	139
	10′	22.51	1.40	1403	130	22.66	1.41	1399	131	23.09	1.43	1427	132	23.37	1.45	1438	135	24.17	1.49	1491	139
12′	8′	16.53	1.69	1000	156	16.47	1.69	997	157	16.71	1.71	1000	159	16.95	1.74	1040	162	17.59	1.79	1081	196
	9′	19.57	1.69	1162	156	19.71	1.69	1192	157	20.08	1.71	1194	159	20.35	1.74	1213	162	21.10	1.79	1255	196
	10′	22.87	1.69	1434	156	23.03	1.69	1430	157	23.46	1.71	1450	159	23.74	1.74	1473	162	24.56	1.79	1531	196
	11′	26.78	1.69	1703	156	27.08	1.69	1764	157	27.55	1.71	1766	159	28.27	1.74	1803	162	29.16	1.79	1843	196
	12′	31.26	1.69	2366	156	31.65	1.69	2348	157	32.57	1.71	2380	159	32.94	1.74	2456	162	34.10	1.79	2515	196

INLET OR OUTLET WINGS

Span	Hgt.	25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6′	3′	4.11	.95	303	88	4.23	1.00	320	93	4.44	1.05	332	98	4.71	1.13	341	105	4.97	1.22	369	113
	4′	5.61	.95	405	88	5.76	1.00	417	93	5.94	1.05	423	98	6.32	1.13	449	105	6.80	1.22	484	113
	5′	7.14	.95	503	88	7.39	1.00	523	93	7.83	1.05	550	98	8.20	1.13	574	105	8.75	1.22	597	113
	6′	9.08	.95	608	88	9.44	1.00	637	93	9.80	1.05	654	98	10.30	1.13	681	105	11.07	1.22	747	113
	7′	11.28	.95	790	88	11.67	1.00	821	93	12.11	1.05	857	98	12.88	1.13	900	105	13.61	1.22	956	113
8′	3′	4.43	1.25	356	116	4.57	1.31	367	121	4.80	1.38	386	128	5.09	1.48	398	137	5.38	1.60	429	149
	4′	5.93	1.25	438	116	6.10	1.31	444	121	6.30	1.38	458	128	6.70	1.48	485	137	7.22	1.60	523	149
	5′	7.47	1.25	532	116	7.73	1.31	551	121	8.19	1.38	586	128	8.59	1.48	611	137	9.17	1.60	635	149
	6′	9.41	1.25	674	116	9.78	1.31	698	121	10.16	1.38	723	128	10.68	1.48	753	137	11.49	1.60	823	149
	7′	11.61	1.25	824	116	12.02	1.31	849	121	12.48	1.38	893	128	13.27	1.48	937	137	14.03	1.60	995	149
	8′	17.40	1.25	1016	116	17.75	1.31	1037	121	18.60	1.38	1086	128	19.50	1.48	1150	137	21.19	1.60	1247	149
10′	3′	4.76	1.55	395	144	4.92	1.62	412	150	5.16	1.71	456	188	5.48	1.83	476	201	5.80	1.99	510	217
	4′	6.27	1.55	480	144	6.45	1.62	492	150	6.67	1.71	531	188	7.10	1.83	569	201	7.64	1.99	607	217
	5′	7.81	1.55	576	144	8.08	1.62	593	150	8.56	1.71	659	188	8.98	1.83	697	201	9.59	1.99	722	217
	6′	9.75	1.55	720	144	10.13	1.62	750	150	10.53	1.71	800	188	11.08	1.83	842	201	11.91	1.99	913	217
	7′	11.95	1.55	866	144	12.37	1.62	899	150	12.85	1.71	973	188	13.67	1.83	1029	201	14.46	1.99	1088	217
	8′	17.76	1.55	1067	144	18.12	1.62	1094	150	18.99	1.71	1169	188	19.92	1.83	1240	201	21.64	1.99	1338	217
	9′	21.30	1.55	1334	144	21.76	1.62	1371	150	22.69	1.71	1429	188	23.99	1.83	1531	201	25.67	1.99	1633	217
	10′	24.76	1.55	1641	144	25.72	1.62	1714	150	26.76	1.71	1806	188	28.34	1.83	1961	201	30.18	1.99	2070	217
12′	8′	18.15	1.86	1104	204	18.52	1.95	1130	213	19.42	2.06	1179	265	20.37	2.20	1236	334	22.13	2.38	1348	361
	9′	21.70	1.86	1362	204	22.16	1.95	1407	213	23.12	2.06	1440	265	24.45	2.20	1537	334	26.16	2.38	1643	361
	10′	25.15	1.86	1678	204	26.13	1.95	1751	213	27.18	2.06	1817	265	28.79	2.20	1968	334	30.67	2.38	2080	361
	11′	29.83	1.86	2111	204	30.66	1.95	2193	213	32.29	2.06	2334	265	34.32	2.20	2460	334	36.40	2.38	2678	361
	12′	35.14	1.86	2714	204	36.25	1.95	2828	213	37.74	2.06	2988	265	39.97	2.20	3103	334	43.12	2.38	3421	361

NOTES :

All quantities are for headwalls of barrels shown in Table No. 1 (0-10′ Fill).
Quantities are shown for single barrel culvert only.
Multi-barrel culvert headwall quantities are obtained by adding, for each additional barrel, Δs and Δc to the inlet and outlet quantities.

NOTATIONS :

Δc = inlet or outlet concrete quantity per additional barrel.

Δs = inlet or outlet steel quantity per additional barrel.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN T.J.M.C.
CHECKED

CADD FILENAME= ZFA 8050
VIEW NAME= 8050

DESIGN APPROVED
9910 F. DANIEL DAVIS
APPROVED FOR DISTRIBUTION
Z-15-89

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

HEADWALL QUANTITIES
2:1 SLOPE

REVISION

STANDARD NO.
B-05.10

INLET WINGS

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6'	3'	4.80	.86	342	80	4.84	.87	351	80	4.92	.88	357	81	5.11	.89	378	83	5.40	.92	400	85
	4'	6.38	.86	455	80	6.68	.87	475	80	6.77	.88	477	81	7.11	.89	512	83	7.46	.92	527	85
	5'	8.44	.86	593	80	8.64	.87	613	80	8.88	.88	620	81	9.41	.89	668	83	9.92	.92	706	85
	6'	10.92	.86	762	80	11.11	.87	774	80	11.47	.88	792	81	11.89	.89	814	83	12.76	.92	874	85
	7'	13.81	.86	1048	80	14.00	.87	1070	80	14.39	.88	1088	81	14.96	.89	1060	83	15.79	.92	1121	85
8'	3'	5.09	1.13	388	105	5.14	1.14	399	106	5.22	1.15	405	107	5.42	1.17	435	109	5.72	1.21	460	112
	4'	6.68	1.13	480	105	6.98	1.14	500	106	7.08	1.15	503	107	7.42	1.17	542	109	7.79	1.21	560	112
	5'	8.74	1.13	618	105	8.94	1.14	638	106	9.19	1.15	646	107	9.73	1.17	698	109	10.24	1.21	739	112
	6'	11.22	1.13	824	105	11.41	1.14	835	106	11.78	1.15	858	107	12.21	1.17	889	109	13.09	1.21	954	112
	7'	14.11	1.13	1073	105	14.31	1.14	1095	106	14.71	1.15	1114	107	15.28	1.17	1093	109	16.12	1.21	1155	112
	8'	20.89	1.13	1168	105	21.54	1.14	1231	106	22.01	1.15	1258	107	23.01	1.17	1332	109	24.55	1.21	1404	112
10'	3'	5.40	1.40	432	130	5.45	1.41	443	131	5.54	1.43	450	132	5.74	1.45	474	135	6.05	1.49	501	139
	4'	6.99	1.40	526	130	7.29	1.41	547	131	7.40	1.43	550	132	7.74	1.45	585	135	8.12	1.49	604	139
	5'	9.05	1.40	667	130	9.26	1.41	688	131	9.51	1.43	696	132	10.06	1.45	743	135	10.58	1.49	786	139
	6'	11.53	1.40	876	130	11.73	1.41	887	131	12.10	1.43	912	132	12.55	1.45	937	135	13.44	1.49	1005	139
	7'	14.43	1.40	1128	130	14.63	1.41	1151	131	15.04	1.43	1171	132	15.62	1.45	1139	135	16.47	1.49	1209	139
	8'	21.23	1.40	1225	130	21.88	1.41	1290	131	22.36	1.43	1318	132	23.37	1.45	1387	135	24.93	1.49	1462	139
	9'	25.65	1.40	1580	130	26.36	1.41	1655	131	26.92	1.43	1687	132	27.91	1.45	1756	135	29.75	1.49	1849	139
	10'	30.59	1.40	1858	130	31.03	1.41	1892	131	31.90	1.43	1948	132	33.29	1.45	2040	135	34.99	1.49	2151	139
12'	8'	21.60	1.69	1254	156	22.26	1.69	1321	157	22.75	1.71	1349	159	23.77	1.74	1413	162	25.35	1.79	1502	196
	9'	26.06	1.69	1611	156	26.74	1.69	1687	157	27.31	1.71	1710	159	28.31	1.74	1790	162	30.18	1.79	1889	196
	10'	30.96	1.69	1889	156	31.41	1.69	1923	157	32.30	1.71	1980	159	33.70	1.74	2065	162	35.43	1.79	2192	196
	11'	36.81	1.69	2573	156	37.27	1.69	2625	157	38.25	1.71	2677	159	39.97	1.74	2777	162	42.14	1.79	2894	196
	12'	43.37	1.69	3310	156	43.91	1.69	3374	157	45.07	1.71	3486	159	46.79	1.74	3583	162	49.68	1.79	3777	196

OUTLET WING

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6'	3'	5.34	.86	392	80	5.43	.87	406	80	5.43	.88	406	81	5.57	.89	410	83	5.70	.92	423	85
	4'	7.47	.86	542	80	7.58	.87	544	80	7.60	.88	545	81	7.64	.89	553	83	7.87	.92	561	85
	5'	9.88	.86	701	80	10.02	.87	715	80	10.05	.88	712	81	10.08	.89	714	83	10.49	.92	739	85
	6'	12.67	.86	851	80	12.69	.87	844	80	12.87	.88	882	81	13.05	.89	880	83	13.37	.92	907	85
	7'	15.70	.86	1055	80	15.83	.87	1074	80	16.02	.88	1141	81	16.23	.89	1162	83	16.76	.92	1197	85
8'	3'	5.64	1.13	445	105	5.73	1.14	459	106	5.74	1.15	460	107	5.88	1.17	471	109	6.02	1.21	485	112
	4'	7.78	1.13	567	105	7.89	1.14	569	106	7.91	1.15	571	107	7.95	1.17	585	109	8.20	1.21	591	112
	5'	10.19	1.13	726	105	10.34	1.14	740	106	10.36	1.15	738	107	10.40	1.17	747	109	10.82	1.21	773	112
	6'	12.98	1.13	911	105	13.00	1.14	904	106	13.19	1.15	950	107	13.38	1.17	962	109	13.71	1.21	991	112
	7'	16.02	1.13	1081	105	16.15	1.14	1100	106	16.34	1.15	1167	107	16.56	1.17	1196	109	17.10	1.21	1231	112
	8'	24.31	1.13	1423	105	24.50	1.14	1400	106	24.80	1.15	1424	107	24.92	1.17	1443	109	25.61	1.21	1472	112
10'	3'	5.95	1.40	492	130	6.05	1.41	506	131	6.06	1.43	505	132	6.21	1.45	510	135	6.36	1.49	525	139
	4'	8.10	1.40	617	130	8.21	1.41	619	131	8.23	1.43	621	132	8.29	1.45	629	135	8.54	1.49	636	139
	5'	10.51	1.40	780	130	10.66	1.41	795	131	10.69	1.43	792	132	10.73	1.45	795	135	11.17	1.49	822	139
	6'	13.31	1.40	969	130	13.33	1.41	962	131	13.53	1.43	1001	132	13.72	1.45	1014	135	14.06	1.49	1043	139
	7'	16.36	1.40	1142	130	16.49	1.41	1161	131	16.68	1.43	1229	132	16.91	1.45	1252	135	17.46	1.49	1288	139
	8'	24.68	1.40	1488	130	24.87	1.41	1465	131	25.17	1.43	1490	132	25.30	1.45	1503	135	25.99	1.49	1532	139
	9'	29.65	1.40	1754	130	29.85	1.41	1786	131	29.94	1.43	1770	132	30.52	1.45	1813	135	31.35	1.49	1861	139
	10'	35.08	1.40	2162	130	35.35	1.41	2148	131	35.41	1.43	2182	132	36.08	1.45	2215	135	36.99	1.49	2269	139
12'	8'	25.09	1.69	1500	156	25.28	1.69	1487	157	25.59	1.71	1512	159	25.72	1.74	1528	162	26.43	1.79	1563	196
	9'	30.07	1.69	1786	156	30.27	1.69	1818	157	30.36	1.71	1802	159	30.95	1.74	1849	162	31.79	1.79	1889	196
	10'	35.51	1.69	2195	156	35.78	1.69	2180	157	35.85	1.71	2215	159	36.52	1.74	2251	162	37.44	1.79	2311	196
	11'	41.81	1.69	2647	156	42.05	1.69	2680	157	42.16	1.71	2677	159	43.10	1.74	2729	162	44.23	1.79	2819	196
	12'	49.09	1.69	3777	156	49.14	1.69	3752	157	49.77	1.71	3823	159	50.52	1.74	3852	162	51.43	1.79	3939	196

INLET OR OUTLET WINGS

Span	Hgt.	25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6'	3'	5.73	.95	420	88	5.82	1.00	436	93	5.82	1.05	431	98	6.07	1.13	440	105	6.44	1.22	472	113
	4'	7.84	.95	560	88	8.06	1.00	590	93	8.06	1.05	580	98	8.34	1.13	595	105	8.77	1.22	635	113
	5'	10.47	.95	744	88	10.59	1.00	756	93	10.74	1.05	766	98	10.93	1.13	783	105	11.44	1.22	808	113
	6'	13.35	.95	915	88	13.51	1.00	931	93	13.69	1.05	949	98	14.06	1.13	964	105	14.79	1.22	1014	113
	7'	16.62	.95	1181	88	16.81	1.00	1213	93	16.86	1.05	1217	98	17.52	1.13	1257	105	18.49	1.22	1318	113
8'	3'	6.06	1.25	482	116	6.17	1.31	492	121	6.18	1.38	495	128	6.46	1.48	506	137	6.87	1.60	541	149
	4'	8.18	1.25	590	116	8.41	1.31	616	121	8.43	1.38	616	128	8.73	1.48	632	137	9.20	1.60	674	149
	5'	10.81	1.25	778	116	10.95	1.31	784	121	11.12	1.38	802	128	11.33	1.48	814	137	11.87	1.60	847	149
	6'	13.69	1.25	998	116	13.86	1.31	1008	121	14.07	1.38	1034	128	14.47	1.48	1051	137	15.22	1.60	1104	149
	7'	16.97	1.25	1206	116	17.18	1.31	1236	121	17.24	1.38	1253	128	17.93	1.48	1295	137	18.93	1.60	1358	149
	8'	25.70	1.25	1498	116	25.97	1.31	1539	121	26.47	1.38	1551	128	27.09	1.48	1618	137	28.50	1.60	1699	149
10'	3'	6.41	1.55	527	144	6.53	1.62	543	150	6.56	1.71	569	188	6.86	1.83	591	201	7.30	1.99	627	217
	4'	8.53	1.55	638	144	8.78	1.62	666	150	8.82	1.71	694	188	9.14	1.83	721	201	9.64	1.99	765	217
	5'	11.17	1.55	830	144	11.32	1.62	842	150	11.51	1.71	884	188	11.74	1.83	907	201	12.32	1.99	939	217
	6'	14.06	1.55	1054	144	14.24	1.62	1069	150	14.46	1.71	1120	188	14.88	1.83	1148	201	15.67	1.99	1202	217
	7'	17.33	1.55	1265	144	17.56	1.62	1301	150	17.64	1.71	1343	188	18.35	1.83	1395	201	19.38	1.99	1459	217
	8'	26.09	1.55	1561	144	26.38	1.62	1607	150	26.89	1.71	1644	188	27.54	1.83	1717	201	28.98	1.99	1804	217
	9'	31.21	1.55	1905	144	31.57	1.62	1965	150	32.18	1.71	2007	188	33.02	1.83	2074	201	34.98	1.99	2212	217
	10'	36.88	1.55	2292	144	37.43	1.62	2366	150	37.94	1.71	2442	188	39.43	1.83	2553	201	41.33	1.99	2670	217
12'	8'	26.54	1.86	1599	204	26.84	1.95	1645	213	27.37	2.06	1656	265	28.04	2.20	1712	334	29.53	2.38	1816	361
	9'	31.66	1.86	1944	204	32.04	1.95	2003	213	32.67	2.06	2019	265	33.53	2.20	2082	334	35.53	2.38	2210	361
	10'	37.34	1.86	2331	204	37.91	1.95	2389	213	38.44	2.06	2456	265	39.95	2.20	2562	334	41.89	2.38	2682	361
	11'	44.33	1.86	3038	204	44.50	1.95	3096	213	45.38	2.06	3194	265	47.09	2.20	3336	334	49.43	2.38	3542	361
	12'	51.55	1.86	3917	204	52.28	1.95	3987	213	53.38	2.06	4072	265	55.28	2.20	4181	334	58.56	2.38	4472	361

NOTES :

All quantities are for headwalls of barrels shown in Table No. 1 (0-10' Fill).
Quantities are shown for single barrel culvert only.
Multi-barrel culvert headwall quantities are obtained by adding, for each additional barrel, Δs and Δc to the inlet and outlet quantities.

NOTATIONS :

Δc = inlet or outlet concrete quantity per additional barrel.

Δs = inlet or outlet steel quantity per additional barrel.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN T.J.C. S.E.K.
DRAWN
CHECKED

CADD FILENAME= ZFA ITR.4380520
VIEW NAME= 805201

DESIGN APPROVED: T. D. Davis
APPROVED FOR DISTRIBUTION: James A. McGee 2-19-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

HEADWALL QUANTITIES
4:1 SLOPE

REVISION

STANDARD NO. B-05.20

INLET WINGS

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6′	3′	5.07	.86	352	80	5.35	.87	383	80	5.55	.88	397	81	5.84	.89	422	83	6.38	.92	466	85
	4′	7.25	.86	507	80	7.32	.87	518	80	7.68	.88	550	81	8.30	.89	591	83	8.91	.92	642	85
	5′	9.56	.86	657	80	9.91	.87	696	80	10.25	.88	720	81	10.94	.89	777	83	11.78	.92	834	85
	6′	12.32	.86	837	80	12.73	.87	870	80	13.46	.88	934	81	14.27	.89	973	83	15.28	.92	1039	85
	7′	15.47	.86	1131	80	16.08	.87	1198	80	16.86	.88	1252	81	17.80	.89	1233	83	19.28	.92	1344	85
8′	3′	5.37	1.13	403	105	5.65	1.14	439	106	5.86	1.15	455	107	6.16	1.17	483	109	6.70	1.21	531	112
	4′	7.56	1.13	532	105	7.63	1.14	543	106	7.99	1.15	575	107	8.62	1.17	624	109	9.24	1.21	676	112
	5′	9.87	1.13	682	105	10.22	1.14	722	106	10.57	1.15	746	107	11.26	1.17	810	109	12.12	1.21	864	112
	6′	12.63	1.13	904	105	13.04	1.14	939	106	13.78	1.15	1006	107	14.59	1.17	1057	109	15.62	1.21	1123	112
	7′	15.78	1.13	1157	105	16.40	1.14	1224	106	17.18	1.15	1278	107	18.13	1.17	1261	109	19.62	1.21	1378	112
	8′	24.25	1.13	1378	105	25.03	1.14	1407	106	26.12	1.15	1482	107	27.42	1.17	1562	109	29.61	1.21	1703	112
10′	3′	5.68	1.40	460	130	5.97	1.41	485	131	6.18	1.43	501	132	6.49	1.45	524	135	7.04	1.49	574	139
	4′	7.87	1.40	580	130	7.94	1.41	592	131	8.31	1.43	625	132	8.95	1.45	669	135	9.58	1.49	724	139
	5′	10.18	1.40	733	130	10.54	1.41	774	131	10.89	1.43	799	132	11.60	1.45	860	135	12.47	1.49	916	139
	6′	12.95	1.40	958	130	13.36	1.41	994	131	14.11	1.43	1060	132	14.94	1.45	1110	135	15.98	1.49	1179	139
	7′	16.11	1.40	1214	130	16.72	1.41	1283	131	17.52	1.43	1338	132	18.47	1.45	1317	135	19.99	1.49	1438	139
	8′	24.59	1.40	1439	130	25.38	1.41	1465	131	26.48	1.43	1546	132	27.80	1.45	1622	135	30.01	1.49	1758	139
12′	8′	24.98	1.69	1462	156	25.78	1.69	1496	157	26.89	1.71	1577	159	28.22	1.74	1657	162	30.46	1.79	1799	196

OUTLET WINGS

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6′	3′	6.56	.86	484	80	6.57	.87	485	80	6.58	.88	478	81	6.72	.89	494	83	6.75	.92	496	85
	4′	9.23	.86	667	80	9.35	.87	669	80	9.24	.88	659	81	9.40	.89	677	83	9.57	.92	683	85
	5′	12.24	.86	869	80	12.37	.87	871	80	12.40	.88	879	81	12.59	.89	884	83	12.78	.92	906	85
	6′	15.69	.86	1049	80	15.86	.87	1053	80	15.89	.88	1087	81	16.10	.89	1092	83	16.34	.92	1114	85
	7′	19.50	.86	1314	80	19.64	.87	1315	80	19.70	.88	1396	81	20.21	.89	1423	83	20.47	.92	1437	85
8′	3′	6.87	1.13	544	105	6.88	1.14	545	106	6.89	1.15	538	107	7.04	1.17	562	109	7.08	1.21	564	112
	4′	9.55	1.13	692	105	9.67	1.14	695	106	9.56	1.15	684	107	9.73	1.17	710	109	9.91	1.21	716	112
	5′	12.56	1.13	894	105	12.69	1.14	897	106	12.72	1.15	904	107	12.92	1.17	917	109	13.12	1.21	935	112
	6′	16.02	1.13	1133	105	16.19	1.14	1138	106	16.22	1.15	1172	107	16.43	1.17	1185	109	16.68	1.21	1208	112
	7′	19.83	1.13	1340	105	19.97	1.14	1341	106	20.03	1.15	1423	107	20.55	1.17	1457	109	20.82	1.21	1472	112
	8′	30.70	1.13	1748	105	30.52	1.14	1748	106	30.84	1.15	1761	107	31.30	1.17	1794	109	31.94	1.21	1843	112
10′	3′	7.19	1.40	594	130	7.20	1.41	595	131	7.22	1.43	589	132	7.37	1.45	606	135	7.42	1.49	610	139
	4′	9.88	1.40	747	130	10.00	1.41	747	131	9.89	1.43	736	132	10.07	1.45	756	135	10.26	1.49	763	139
	5′	12.90	1.40	953	130	13.03	1.41	956	131	13.07	1.43	964	132	13.27	1.45	970	135	13.48	1.49	989	139
	6′	16.36	1.40	1197	130	16.53	1.41	1202	131	16.57	1.43	1236	132	16.79	1.45	1243	135	17.05	1.49	1267	139
	7′	20.19	1.40	1408	130	20.32	1.41	1400	131	20.39	1.43	1482	132	20.91	1.45	1510	135	21.20	1.49	1526	139
	8′	31.09	1.40	1821	130	30.91	1.41	1821	131	31.23	1.43	1834	132	31.70	1.45	1861	135	32.35	1.49	1912	139
12′	8′	31.54	1.69	1853	156	31.36	1.69	1853	157	31.68	1.71	1867	159	32.16	1.74	1897	162	32.82	1.79	1942	196

INLET OR OUTLET WINGS

Span	Hgt.	25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs	1 Bbl.	Δc	1 Bbl.	Δs
6′	3′	6.72	.95	486	88	6.70	1.00	492	93	6.81	1.05	500	98	6.94	1.13	504	105	7.20	1.22	524	113
	4′	9.42	.95	678	88	9.53	1.00	690	93	9.53	1.05	681	98	9.68	1.13	692	105	9.99	1.22	712	113
	5′	12.49	.95	882	88	12.47	1.00	887	93	12.62	1.05	899	98	12.81	1.13	909	105	13.24	1.22	932	113
	6′	16.17	.95	1100	88	16.01	1.00	1101	93	16.10	1.05	1114	98	16.56	1.13	1132	105	17.12	1.22	1178	113
	7′	20.24	.95	1419	88	20.25	1.00	1425	93	20.57	1.05	1447	98	20.90	1.13	1474	105	21.52	1.22	1526	113
8′	3′	7.06	1.25	554	116	7.05	1.31	553	121	7.18	1.38	570	128	7.34	1.48	575	137	7.63	1.60	597	149
	4′	9.76	1.25	712	116	9.89	1.31	718	121	9.90	1.38	717	128	10.08	1.48	730	137	10.42	1.60	751	149
	5′	12.84	1.25	913	116	12.83	1.31	916	121	13.00	1.38	936	128	13.21	1.48	947	137	13.67	1.60	972	149
	6′	16.52	1.25	1194	116	16.38	1.31	1187	121	16.48	1.38	1199	128	16.97	1.48	1227	137	17.56	1.60	1276	149
	7′	20.60	1.25	1454	116	20.62	1.31	1453	121	20.96	1.38	1483	128	21.31	1.48	1505	137	21.97	1.60	1564	149
	8′	31.29	1.25	1836	116	31.12	1.31	1817	121	31.46	1.38	1829	128	32.05	1.48	1875	137	33.26	1.60	1947	149
10′	3′	7.41	1.55	602	144	7.42	1.62	606	150	7.56	1.71	647	188	7.74	1.83	663	201	8.07	1.99	686	217
	4′	10.12	1.55	765	144	10.26	1.62	776	150	10.30	1.71	799	188	10.50	1.83	823	201	10.87	1.99	844	217
	5′	13.21	1.55	965	144	13.21	1.62	977	150	13.40	1.71	1023	188	13.63	1.83	1045	201	14.13	1.99	1070	217
	6′	16.89	1.55	1255	144	16.77	1.62	1252	150	16.88	1.71	1289	188	17.39	1.83	1329	201	18.02	1.99	1379	217
	7′	20.98	1.55	1519	144	21.02	1.62	1524	150	21.37	1.71	1578	188	21.75	1.83	1611	201	22.43	1.99	1670	217
	8′	31.70	1.55	1897	144	31.55	1.62	1892	150	31.90	1.71	1929	188	32.51	1.83	1985	201	33.77	1.99	2058	217
12′	8′	32.18	1.86	1937	204	32.04	1.95	1930	213	32.41	2.06	1941	265	33.04	2.20	1992	334	34.33	2.38	2069	361

NOTES :

All quantities are for headwalls of barrels shown in Table No. I (0-10′ Fill).

Quantities are shown for single barrel culvert only.

Multi-barrel culvert headwall quantities are obtained by adding, for each additional barrel, Δs and Δc to the inlet and outlet quantities.

NOTATIONS :

Δc = inlet or outlet concrete quantity per additional barrel.

Δs = inlet or outlet steel quantity per additional barrel.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED

CADD FILENAME= 2FA

DESIGN APPROVED — J.D. Davis

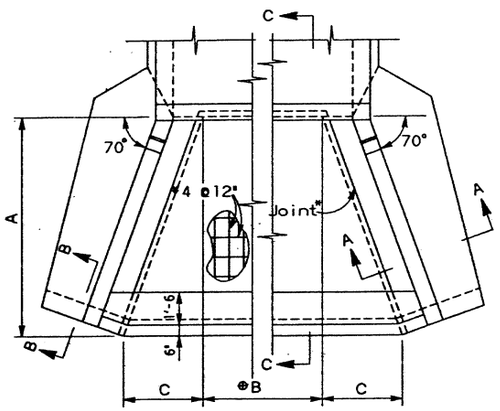
APPROVED FOR DISTRIBUTION — James A. McGee — 2-19-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

HEADWALL QUANTITIES
6:1 SLOPE

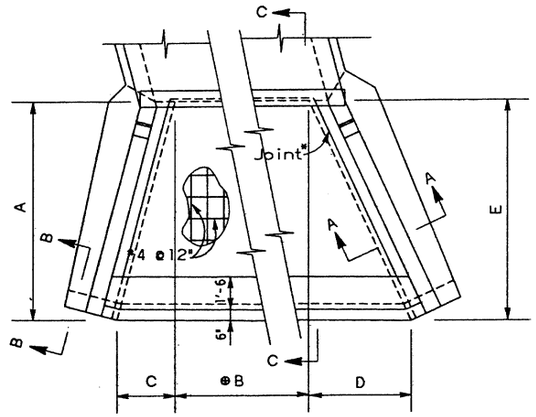
REVISION

STANDARD NO. B-05.30



PLAN

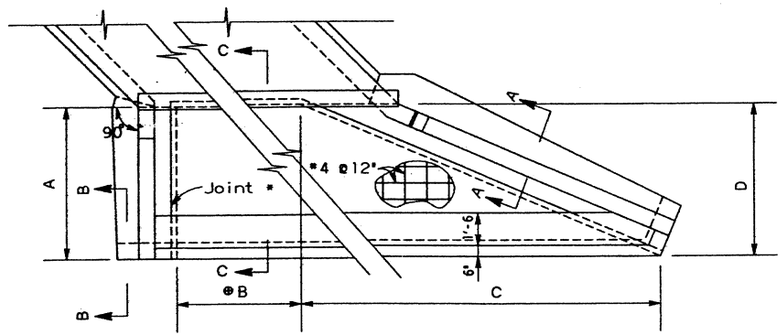
Apron for 0° skew box culvert



PLAN

Apron for 5° to 15° skew box culvert

* Optional construction joint. Apron may be poured with wingwall footings and bottom slab of barrel.

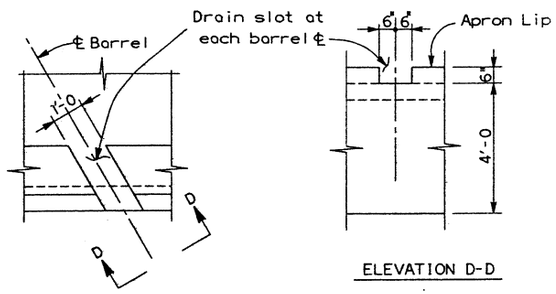


PLAN

Apron for 20° to 45° skew box culvert

Span	△ 0° Skew	5° Skew	10° Skew	15° Skew	20° Skew	25° Skew	30° Skew	35° Skew	40° Skew	45° Skew
6'	6'-8	6'-8 1/4	6'-9 1/4	6'-10 7/8	7'-1 7/8	7'-4 1/4	7'-8 3/8	8'-1 5/8	8'-8 3/8	9'-5 1/8
8'	8'-9	8'-9 3/8	8'-10 5/8	9'-0 3/4	9'-3 3/4	9'-7 7/8	10'-1 1/4	10'-8 1/8	11'-5 1/8	12'-4 1/2
10'	10'-10	10'-10 1/2	11'-0	11'-2 5/8	11'-6 7/8	11'-11 1/2	12'-6 1/8	13'-2 3/4	14'-1 3/4	15'-3 1/8
12'	13'-0	13'-0 5/8	13'-2 3/8	13'-5 1/2	13'-10	14'-4 1/8	15'-0 1/8	15'-10 1/2	16'-11 5/8	18'-4 5/8

⊕ Dimension varies with number of barrels. △ equals length to be added to dimension 'B' for each additional barrel.



ELEVATION D-D

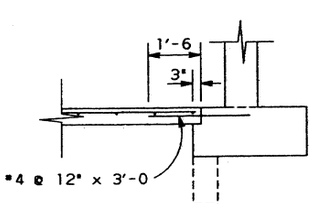
APRON DRAIN DETAIL

NOTES:

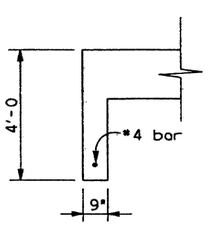
For General Notes and miscellaneous details see B-01.10.

See B-06.20, B-06.30 and B-06.40 for apron dimensions and quantities.

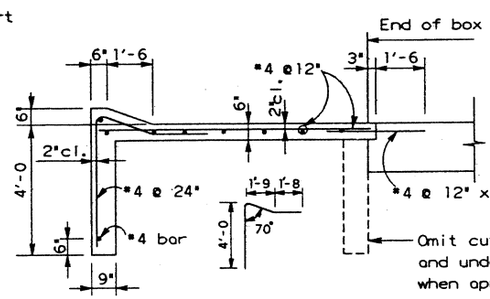
The apron quantities take into consideration the cutoff walls being omitted along outlet headwall and shall be used on new box culverts only.



SECTION A-A



SECTION B-B



SECTION C-C

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN T.J.M.C.
CHECKED

CADD FILENAME= ZFA 80510
VIEW NAME= 80510

DESIGN APPROVED

APPROVED FOR DISTRIBUTION
2-19-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION

OUTLET APRON DETAILS

STANDARD NO.
B-06.10

DIMENSIONS

Span	Hgt.	0° Skew			5° Skew					10° Skew					15° Skew					20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		A	B	C	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
6'	3'	6'-7½	4'-8¼	2'-4⅞	6'-8	4'-8½	1'-9⅜	3'-0½	6'-6¼	6'-8	4'-9⅛	1'-2⅞	3'-11¼	6'-9¼	6'-1¼	4'-10⅛	6 3/8"	4'-7⅜	6'-7⅛	6'-0	4'-11¾	5'-7½	6'-8½	6'-0	5'-2⅝	6'-8⅝	6'-8⅝	5'-6	5'- 6⅞	7'-10⅝	6'-7⅜	5'-6	5'-10⅞	9'-1½	6'-4¾	5'-0	6'-4½	10'-10⅞	6'-3⅝	5'-0	6'-11⅛	12'-5⅛	5'-9⅝
	4'	8'-0⅜	4'-8¼	2'-11⅛	8'-1⅜	4'-8½	2'-2⅜	3'-8⅛	7'-10⅝	8'-1⅝	4'-9⅛	1'-5¾	4'-8¼	8'-1⅜	7'-7¼	4'-10⅛	8"	5'-9⅛	8'-2¼	7'-6	4'-11¾	6'-11	8'-2⅛	7'-6	5'-2⅝	8'-1⅝	8'-1⅝	7'-0	5'-6⅞	9'-5	7'-10⅜	6'-6	5'-10⅞	10'-9⅛	7'-6½	6'-6	6'-4½	12'-7¼	7'-3⅝	6'-0	6'-11⅞	15'-1¾	7'-0¼
	5'	9'-5¼	4'-8¼	3'-5¼	9'-6¾	4'-8½	2'-6¼	4'-6⅛	9'-8⅜	9'-7⅜	4'-9⅛	1'-8⅜	5'-5¼	9'-4⅞	9'-1⅛	4'-10⅛	9 1/2"	6'-7½	9'-5½	9'-0	4'-11¾	7'-10½	9'-4¾	8'-6	5'-2⅝	9'-2¼	9'-2¼	8'-0	5'-6⅞	10'-11⅜	9'-2¼	8'-0	5'-10⅞	12'-9¾	8'-11⅝	7'-6	6'-4½	14'-9⅝	8'-6⅜	7'-0	6'-11⅞	17'-5	8'-1½
	6'	10'-10¼	4'-8¼	3'-11⅜	11'-0⅛	4'-8½	2'-11⅜	5'-1⅞	11'-0⅝	11'-1⅛	4'-9⅛	1'-11½	6'-5¼	11'-1¾	10'-7⅞	4'-10⅛	11 1/8"	7'-9¼	11'-1¼	10'-6	4'-11¾	9'-2	10'-11⅞	10'-0	5'-2⅝	10'-7¼	10'-7¼	9'-6	5'-6⅞	12'-5¾	10'-5⅝	9'-0	5'-10⅞	14'-5⅜	10'-1⅜	8'-6	6'-4½	16'-11⅝	9'-9⅜	8'-6	6'-11⅞	19'-8⅛	9'-2⅛
	7'	12'-3⅛	4'-8¼	4'-5½	12'-5½	4'-8½	3'-4⅛	5'-9½	12'-5	12'-6⅛	4'-9⅛	2'-2⅝	7'-2¼	12'-5¼	12'-1	4'-10⅛	1'-0⅝	8'-7⅝	12'-3⅞	12'-0	4'-11¾	10'-1½	12'-0⅞	11'-6	5'-2⅝	12'-0¼	12'-0¼	11'-0	5'-6⅞	14'-0⅛	11'-9	10'-6	5'-10⅞	16'-1⅛	11'-3¼	10'-0	6'-4½	19'-1⅝	11'-0⅝	9'-6	6'-11⅛	21'-11⅜	10'-2¾
8'	3'	6'-7½	6'-10¼	2'-4⅞	6'-8	6'-10½	1'-9⅜	3'-0½	6'-6¼	6'-8	6'-11½	1'-2⅜	3'-11¼	6'-9¼	6'-1¼	7'-1⅛	6 3/8"	4'-7⅜	6'-7⅛	6'-0	7'-3⅜	5'-7½	6'-8½	6'-0	7'-7⅜	8'-1⅝	8'-1⅝	7'-0	8'-0⅜	9'-5	7'-10⅜	6'-6	8'-6⅝	10'-9⅛	7'-6½	6'-6	9'-2⅝	12'-7¼	7'-3⅝	6'-0	9'-11⅞	15'-1¾	7'-0¼
	4'	8'-0⅜	6'-10¼	2'-11⅛	8'-1⅜	6'-10½	2'-2⅜	3'-8⅛	7'-10⅝	8'-1⅝	6'-11½	1'-5¾	4'-8¼	8'-1⅜	7'-7¼	7'-1⅛	8"	5'-9⅛	8'-2¼	7'-6	7'-3⅜	6'-11	8'-2⅛	7'-6	7'-7⅜	8'-1⅝	8'-1⅝	7'-0	8'-0⅜	9'-5	7'-10⅜	6'-6	8'-6⅝	10'-9⅛	7'-6½	6'-6	9'-2⅝	12'-7¼	7'-3⅝	6'-0	9'-11⅞	15'-1¾	7'-0¼
	5'	9'-5¼	6'-10¼	3'-5¼	9'-6¾	6'-10½	2'-6¼	4'-6⅛	9'-8⅜	9'-7⅜	6'-11½	1'-8⅜	5'-5¼	9'-4⅞	9'-1⅛	7'-1⅛	9 1/2"	6'-7½	9'-5½	9'-0	7'-3⅜	7'-10½	9'-4¾	8'-6	7'-7⅜	9'-2¼	9'-2¼	8'-0	8'-0⅜	10'-11⅜	9'-2¼	8'-0	8'-6⅝	12'-9¾	8'-11⅝	7'-6	9'-2⅝	14'-9⅝	8'-6⅜	7'-0	9'-11⅞	17'-5	8'-1½
	6'	10'-10¼	6'-10¼	3'-11⅜	11'-0⅛	6'-10½	2'-11⅜	5'-1⅞	11'-0⅝	11'-1⅛	6'-11½	1'-11½	6'-5¼	11'-1¾	10'-7⅞	7'-1⅛	11 1/8"	7'-9¼	11'-1¼	10'-6	7'-3⅜	9'-2	10'-11⅞	10'-0	7'-7⅜	10'-7¼	10'-7¼	9'-6	8'-0⅜	12'-5¾	10'-5⅝	9'-0	8'-6⅝	14'-5⅜	10'-1⅜	8'-6	9'-2⅝	16'-11⅝	9'-9⅜	8'-6	9'-11⅞	19'-8⅛	9'-2⅛
	7'	12'-3⅛	6'-10¼	4'-5½	12'-5½	6'-10½	3'-4⅛	5'-9½	12'-5	12'-6⅛	6'-11½	2'-2⅝	7'-2¼	12'-5¼	12'-1	7'-1⅛	1'-0⅝	8'-7⅝	12'-3⅞	12'-0	7'-3⅜	10'-1½	12'-0⅞	11'-6	7'-7⅜	12'-0¼	12'-0¼	11'-0	8'-0⅜	14'-0⅛	11'-9	10'-6	8'-6⅝	16'-1⅛	11'-3¼	10'-0	9'-2⅝	19'-1⅝	11'-0⅝	9'-6	9'-11⅞	21'-11⅜	10'-2¾
	8'	14'-3¾	5'-9½	5'-2½	14'-0½	5'-9¾	3'-9⅛	6'-6¼	13'-11⅞	14'-1⅝	5'-10½	2'-5⅞	8'-0⅛	13'-11⅞	13'-7½	5'-11¾	1'-2¼	9'-8⅝	13'-10⅛	13'-6	6'-1½	11'-8¼	13'-11⅞	13'-0	6'-4⅞	13'-9½	13'-9½	12'-0	6'-9	16'-0	13'-5½	11'-6	7'-2⅛	18'-8⅝	13'-1⅜	11'-0	7'-8⅜	21'-7½	12'-5¾	11'-0	8'-3¼	25'-7⅝	11'-11½
10'	3'	6'-7½	9'-0¼	2'-4⅞	6'-8	9'-0⅝	1'-9⅜	3'-0½	6'-6¼	6'-8	9'-1⅞	1'-2⅜	3'-11¼	6'-9¼	6'-1¼	9'-4	6 3/8"	4'-7⅜	6'-7⅛	6'-0	9'-7	5'-7½	6'-8½	13'-0	10'-0	6'-8⅝	6'-8⅝	5'-6	10'-6⅜	7'-10⅜	6'-7⅜	5'-6	11'-2⅜	9'-1½	6'-4¾	5'-0	12'-0⅜	10'-10⅞	6'-3⅝	5'-0	13'-0¾	12'-5⅛	5'-9⅝
	4'	8'-0⅜	9'-0¼	2'-11⅛	8'-1⅜	9'-0⅝	2'-2⅜	3'-8⅛	7'-10⅝	8'-1⅝	9'-1⅞	1'-5¾	4'-8¼	8'-1⅜	7'-7¼	9'-4	8"	5'-9⅛	8'-2¼	7'-6	9'-7	6'-11	8'-2⅛	7'-6	10'-0	8'-1⅝	8'-1⅝	7'-0	10'-6⅜	9'-5	7'-10⅜	6'-6	11'- 2⅜	10'-9⅛	7'-6½	6'-6	12'-0⅜	12'-7¼	7'-3⅝	6'-0	13'-0¾	15'-1¾	7'-0¼
	5'	9'-5¼	9'-0¼	3'-5¼	9'-6¾	9'-0⅝	2'-6¼	4'-6⅛	9'-8⅜	9'-7⅜	9'-1⅞	1'-8⅜	5'-5¼	9'-4⅞	9'-1⅛	9'-4	9 1/2"	6'-7½	9'-5½	9'-0	9'-7	7'-10½	9'-4¾	8'-6	10'-0	9'-2¼	9'-2¼	8'-0	10'-6⅜	10'-11⅜	9'-2¼	8'-0	11'- 2⅜	12'-9¾	8'-11⅝	7'-6	12'-0⅜	14'-9⅝	8'-6⅜	7'-0	13'-0¾	17'-5	8'-1½
	6'	10'-10¼	9'-0¼	3'-11⅜	11'-0⅛	9'-0⅝	2'-11⅜	5'-1⅞	11'-0⅝	11'-1⅛	9'-1⅞	1'-11½	6'-5¼	11'-1¾	10'-7⅞	9'-4	11 1/8"	7'-9¼	11'-1¼	10'-6	9'-7	9'-2	10'-11⅞	10'-0	10'-0	10'-7¼	10'-7¼	9'-6	10'-6⅜	12'-5¾	10'-5⅝	9'-0	11'-2⅜	14'-5⅜	10'-1⅜	8'-6	12'-0⅜	16'-11⅝	9'-9⅜	8'-6	13'-0¾	19'-8⅛	9'-2⅛
	7'	12'-3⅛	9'-0¼	4'-5½	12'-5½	9'-0⅝	3'-4⅛	5'-9½	12'-5	12'-6⅛	9'-1⅞	2'-2⅝	7'-2¼	12'-5¼	12'-1	9'-4	1'-0⅝	8'-7⅝	12'-3⅞	12'-0	9'-7	10'-1½	12'-0⅞	11'-6	10'-0	12'-0¼	12'-0¼	11'-0	10'-6⅜	14'-0⅛	11'-9	10'-6	11'-2⅜	16'-1⅛	11'-3¼	10'-0	12'-0⅜	19'-1⅝	11'-0⅝	9'-6	13'-0¾	21'-11⅜	10'-2¾
	8'	14'-3¾	7'-11½	5'-2½	14'-0½	7'-11¾	3'-9⅛	6'-6¼	13'-11⅞	14'-1⅝	8'-0⅛	2'-5⅞	8'-0⅛	13'-11⅞	13'-7½	8'-2⅝	1'-2¼	9'-8⅝	13'-10⅛	13'-6	8'-5¼	11'-8¼	13'-11⅞	13'-0	8'-9½	13'-9½	13'-9½	12'-0	9'-3	16'-0	13'-5½	11'-6	9'-9⅛	18'-8⅝	13'-1⅜	11'-0	10'-6⅞	21'-7½	12'-5¾	11'-0	11'-4½	25'-7⅝	11'-11½
	9'	15'-9	7'-9⅜	5'-8¾	15'-6⅛	7'-9⅝	4'-1⅞	7'-4⅝	15'-10	15'-7½	7'-10¾	2'-9	9'-1¼	15'-9⅛	15'-1½	8'-0⅝	1'-3⅛	10'-10½	15'-6⅞	15'-0	8'-2⅞	13'-0⅛	15'-6⅛	14'-6	8'-7⅛	15'-3⅛	15'-3⅛	13'-6	9'-0½	17'-7¼	14'-9¼	13'-0	9'-7⅛	20'-5½	14'-3⅛	12'-6	10'-3⅝	23'-10⅞	13'-9⅝	12'-0	11'-1⅛	28'-0¾	13'-1
	10'	17'-2¼	7'-7¼	6'-3	16'-11⅞	7'-7½	4'-6⅝	8'-0⅜	17'-2⅝	17'-1⅜	7'-8½	3'-0¼	9'-10½	17'-1¼	16'-7½	7'-10¼	1'-5½	11'-9¼	16'-9⅝	16'-5	8'-0⅝	14'-0¼	16'-6⅝	15'-6	8'-4¾	16'-4⅝	16'-4⅝	15'-0	8'-9⅛	19'-2⅝	16'-1½	14'-0	9'-4⅜	22'-7¼	15'-9⅛	13'-6	10'-0⅞	26'-2⅜	15'-1½	13'-0	10'-9¾	30'-5⅛	14'-2⅝
	8'	14'-3¾	10'-3½	5'-2½	14'-0½	10'-3⅜	3'-9⅛	6'-6¼	13'-11⅞	14'-1⅝	10'-5¼	2'-5⅞	8'-0⅛	13'-11⅞	13'-7½	10'-7⅝	1'-2¼	9'-8⅝	13'-10⅛	13'-6	10'-11	11'-8¼	13'-11⅞	13'-0	11'-4⅞	13'-9½	13'-9½	12'-0	11'-11⅞	16'-0	13'-5½	11'-6	12'-8⅛	18'-8⅝	13'-1⅜	11'-0	13'-6⅞	21'-7½	12'-5¾	11'-0	14'-8⅛	25'-7⅝	11'-11½
	9'	15'-9	10'-1	5'-8¾	15'-6⅛	10'-1¾	4'-1⅞	7'-4⅝	15'-10	15'-7½	10'-3⅛	2'-9	9'-1¼	15'-9⅛	15'-1½	10'-5⅝	1'-3⅛	10'-10½	15'-6⅞	15'-0	10'-8¾	13'-0⅛	15'-6⅛	14'-6	11'-2	15'-3⅛	15'-3⅛	13'-6	11'-8⅛	17'-7¼	14'-9¼	13'-0	12'-5⅝	20'-5½	14'-3⅛	12'-6	13'-3⅞	23'-10⅞	13'-9⅝	12'-0	14'-4¾	28'-0¾	13'-1
12'	10'	17'-2¼	9'-11¼	6'-3	16'-11⅞	9'-11⅝	4'-6⅝	8'-0⅜	17'-2⅝	17'-1⅜	10'-1	3'-0¼	9'-10½	17'-1¼	16'-7½	10'-3⅛	1'-5½	11'-9¼	16'-9⅝	16'-5	10'-6⅞	14'-0¼	16'-6⅝	15'-6	10'-11⅝	16'-4⅝	16'-4⅝	15'-0	11'-6¼	19'-2⅝	16'-1½	14'-0	12'-2⅝	22'-7¼	15'-9⅛	13'-6	13'-0⅞	26'-2⅜	15'-1½	13'-0	14'-1⅜	30'-5⅛	14'-2⅝
	11'	18'-7½	9'-9⅛	6'-9⅝	18'-5⅞	9'-9½	4'-11⅜	8'-8¼	18'-7½	18'-7⅜	9'-10¾	3'-3⅛	10'-7¾	18'-5⅞	18'-1½	10'-1	1'-7	12'-11⅜	18'-5⅞	18'-0	10'-4⅛	15'-4¼	18'-3⅝	17'-0	10'-9⅛	17'-10¼	17'-10¼	16'-0	11'-3¼	20'-9⅞	17'-5⅝	15'-6	11'-11⅞	24'-4⅛	17'-0½	15'-0	12'-9⅞	28'-5⅞	16'-5⅝	14'-6	13'-10	32'-11⅞	15'-4¼
	12'	20'-0¾	9'-7	7'-3⅝	19'-11⅛	9'-7⅞	5'-4⅛	9'-4	20'-0¼	20'-1¼	9'-8⅝	3'-6½	11'-8⅛	20'-2⅝	19'-7½	9'-10¾	1'-8⅝	13'-10⅛	19'-9¼	19'-6	10'-1¾	16'-4⅜	19'-6	18'-6	10'-6¾	19'-3⅞	19'-3⅞	17'-6	11'-1⅛	22'-5⅛	18'-9⅝	16'-6	11'-9⅛	26'-0⅛	18'-3⅛	16'-0	12'-6⅞	30'-4⅛	17'-8¼	15'-6	13'-6⅝	35'-9⅝	16'-8⅜

QUANTITIES

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s
6'	3'	1.51	1.14	87	92	1.51	1.14	86	92	1.56	1.17	91	94	1.55	1.15	88	92	1.63	1.18	93	95	1.84	1.22	99	99	2.02	1.24	106	100	2.25	1.29	117	104	2.52	1.33	128	108	2.79	1.40	139	114
	4'	1.82	1.32	112	105	1.82	1.32	112	105	1.88	1.35	117	107	1.92	1.35	118	107	2.00	1.38	124	110	2.25	1.42	131	113	2.47	1.43	140	115	2.68	1.45	148	116	3.04	1.53	165	123	3.43	1.60	182	129
	5'	2.13	1.49	140	118	2.19	1.52	145	120	2.20	1.52	145	120	2.23	1.52	146	120	2.31	1.55	151	123	2.56	1.56	156	124	2.88	1.60	172	127	3.26	1.67	191	133	3.59	1.72	205	137	4.01	1.78	224	142
	6'	2.48	1.66	170	131	2.54	1.69	175	133	2.61	1.72	180	135	2.64	1.72	181	135	2.73	1.75	187	138	3.01	1.76	193	139	3.37	1.80	211	142	3.74	1.84	228	145	4.19	1.90	249	150	4.73	2.00	275	159
	7'	2.84	1.84	201	144	2.91	1.87	207	146	2.98	1.90	212	148	3.01	1.90	213	148	3.10	1.93	219	151	3.51	1.96	233	153	3.91	2.00	253	156	4.32	2.04	271	160	4.91	2.12	303	167	5.41	2.18	323	172
8'	3'	1.88	1.50	107	120	1.88	1.50	107	121	1.95	1.54	113	124	1.92	1.51	108	121	2.01	1.55	114	125	2.23	1.61	122	129	2.42	1.62	129	131	2.67	1.69	140	137	2.96	1.75	152	142	3.25	1.84	163	150
	4'	2.25	1.73	137	137	2.25	1.73	137	138	2.32	1.77	143	141	2.35	1.77	144	141	2.45	1.81	150	144	2.71	1.87	158	149	2.93	1.88	167	151	3.16	1.91	174	153	3.54	2.01	193	162	3.95	2.10	211	169
	5'	2.62	1.95	169	154	2.69	1.99	175	157	2.69	2.00	175	158	2.72	2.00	176	158	2.82	2.04	182	161	3.06	2.05	187	162	3.39	2.10	203	166	3.81	2.20	224	174	4.15	2.25	238	179	4.59	2.33	257	186
	6'	3.02	2.18	203	171	3.09	2.22	209	174	3.17	2.26	215	177	3.20	2.26	216	177	3.30	2.30	222	181	3.58	2.31	228	182	3.96	2.36	247	186	4.33	2.41	264	190	4.80	2.49	286	197	5.39	2.63	314	208
	7'	3.44	2.41	239	188	3.52	2.45	245	191	3.60	2.49	251	194	3.63	2.49	252	194	3.73	2.53	258	198	4.14	2.57	273	201	4.56	2.62	293	205	4.99	2.67	312	210	5.60	2.78	345	219	6.12	2.86	366	226
	8'	3.94	2.80	269	213	3.87	2.77	263	210	3.96	2.81	269	213	3.99	2.81	270	213	4.18	2.88	283	219	4.66	2.93	301	223	5.07	2.94	319	224	5.65	3.03	349	231	6.23	3.12	376	238	7.14	3.32	423	253
10'	3'	2.25	1.85	128	149	2.25	1.85	128	149	2.33	1.91	134	153	2.29	1.86	129	150	2.39	1.92	136	154	2.63	1.99	144	160	2.82	2.01	151	162	3.09	2.10	163	170	3.39	2.17	175	176	3.70	2.28	188	185
	4'	2.67	2.14	162	170	2.68	2.14	162	170	2.76	2.19	168	174	2.79	2.19	169	174	2.89	2.24	176	179	3.17	2.31	185	184	3.40	2.33	194	186	3.63	2.36	201	189	4.04	2.49	222	200	4.47	2.60	241	209
	5'	3.10	2.42	199	191	3.18	2.47	205	195	3.19	2.47	205	195	3.22	2.47	206	195	3.32	2.52	212	200	3.57	2.54	217	201	3.91	2.60	234	206	4.35	2.72	256	216	4.71	2.79	271	222	5.16	2.89	291	231
	6'	3.56	2.70	237	212	3.64	2.75	243	216	3.73	2.80	250	219	3.76	2.80	251	220	3.87	2.85	257	224	4.16	2.86	263	225	4.54	2.92	282	230	4.93	2.98	300	236	5.42	3.08	324	244	6.04	3.25	353	258
	7'	4.04	2.99	277	233	4.12	3.03	284	237	4.22	3.08	290	241	4.24	3.08	291	241	4.35	3.13	297	245	4.78	3.18	313	249	5.21	3.24	334	254	5.65	3.31	353	260	6.29	3.44	388	271	6.83	3.54	410	279
	8'	4.64	3.47	313	264	4.56	3.43	306	260	4.66	3.48	313	264	4.69	3.48	313	264	4.90	3.57	328	271	5.39	3.63	346	276	5.80	3.64	364	277	6.39	3.75	395	285	7.00	3.86	423	294	7.97	4.11	473	313
	9'	5.13	3.76	352	285	5.13	3.76	353	285	5.24	3.81	360	289	5.27	3.81	360	289	5.48	3.90	375	296	6.04	3.96	395	300	6.49	3.97	416	302	7.15	4.08	450	310	7.93	4.23	490	322	8.82	4.41	533	336
	10'	5.64	4.05	393	307	5.64	4.05	393	307	5.75	4.10	400	310	5.77	4.09	400	310	6.00	4.19	415	317	6.51	4.19	431	318	7.22	4.30	471	326	7.94	4.39	509	333	8.76	4.53	551	344	9.70	4.71	661	430
12'	8'	5.39	4.17	361	316	5.30	4.11	353	312	5.40	4.17	361	317	5.43	4.17	361	317	5.66	4.28	377	325	6.17	4.35	396	331	6.58	4.37	413	332	7.20	4.50	446	343	7.83	4.63	475	353	8.85	4.93	528	376
	9'	5.94	4.51	405	342	5.94	4.51	405	342	6.06	4.57	413	347	6.09	4.57	413	346	6.32	4.68	430	355	6.89	4.75	450	360	7.35	4.76	471	362	8.03	4.90	506	372	8.84	5.08	547	386	9.77	5.29	593	403
	10'	6.51	4.86	450	368	6.51	4.86	450	368	6.63	4.92	458	372	6.66	4.91	458	372	6.90	5.02	474	381	7.41	5.03	490	381	8.15	5.16	531	391	8.88	5.26	570	400	9.74	5.44	614	413	10.72	5/65	661	430
	11'	7.10	5.21	497	394	7.10	5.20	497	394	7.22	5.26	504	398	7.36	5.31	514	402	7.61	5.42	530	410	8.18	5.43	549	411	8.86	5.48	585	416	9.78	5.66	636	429	10.84	5.88	693	446	11.90	6.10	742	463
	12'	7.70	5.55	545	419	7.71	5.55	544	419	7.94	5.66	562	428	7.97	5.66	562	427	8.22	5.76	578	436	8.98	5.82	609	440	9.72	5.88	649	445	10.56	5.99	694	453	11.68	6.21	754	470	13.07	6.50	827	493

NOTATIONS:

△c = Apron concrete quantity per additional barrel.

△s = Apron steel quantity per additional barrel.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED

CADD FILENAME= ZFA
VIEW NAME=

Registered Professional Engineer — 9410 F. DANIEL DAVIS — 7-13-87 — State of U.S.A.

DESIGN APPROVED: F. D. Davis

APPROVED FOR DISTRIBUTION: James A. McRae — 2-13-87

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

OUTLET APRON
DIMENSIONS & QUANTITIES
2 : 1 SLOPE

REVISION

STANDARD NO. B-06.20

DIMENSIONS

Span	Hgt.	0° Skew			5° Skew					10° Skew					15° Skew					20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		A	B	C	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
6'	3'	9'-10⅜	4'-8¼	3'-7¼	10'-0⅝	4'-8½	2'-8¼	4'-8¾	10'-1¾	10'-1¼	4'-9⅛	1'-9⅜	5'-8¼	9'-10⅜	10'-1⅛	4'-10⅛	10⅝*	6'-11	9'-10½	10'-0	4'-11¾	8'-2⅝	9'-9¼	9'-0	5'-2⅝	9'-6½	9'-9½	8'-6	5'-6⅜	10'-11⅜	9'-2¼	7'-6	5'-10⅞	12'-4⅞	8'-8¼	7'-0	6'-4½	14'-4½	8'-3⅝	7'-0	6'-11⅛	16'-6⅛	7'-8⅜
	4'	12'-3⅛	4'-8¼	4'-5½	12'-5½	4'-8½	3'-4⅛	5'-9½	12'-5	12'-6⅞	4'-9⅛	2'-2⅝	6'-11¼	12'-0⅛	12'-1	4'-10⅛	1'-0⅝	8'-4⅛	11'-11	12'-0	4'-11¾	9'-9¼	11'-8¼	11'-0	5'-2⅝	11'-3¾	11'-3¾	10'-6	5'-6⅜	13'-2⅞	11'-1⅜	9'-6	5'-10⅞	14'-10⅜	10'-4⅞	9'-0	6'-4½	16'-11⅝	9'-9⅝	8'-6	6'-11⅛	19'-8⅛	9'-2⅛
	5'	14'-7¼	4'-8¼	5'-3¾	14'-10½	4'-8½	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	4'-9⅛	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	4'-10⅛	1'-3¼	9'-9⅜	13'-11⅝	14'-6	4'-11¾	11'-8⅛	13'-11⅞	13'-6	5'-2⅝	13'-5¼	13'-5¼	12'-6	5'-6⅜	15'-6½	13'-0½	11'-6	5'-10⅞	17'-8⅞	12'-5	10'-6	6'-4½	20'-0	11'-6⅝	10'-0	6'-11⅛	22'-10¼	10'-7⅛
	6'	16'-11½	4'-8¼	6'-2⅛	16'-9¾	4'-8½	4'-6	7'-10⅞	16'-11⅜	17'-0	4'-9⅛	3'-0	9'-8¼	16'-9¼	17'-0¼	4'-10⅛	1'-8½	12'-11¼	18'-5⅝	17'-0	4'-11¾	13'-4⅞	15'-10⅛	15'-6	5'-2⅝	15'-6⅝	15'-6⅝	14'-6	5'-6⅜	17'-10⅛	14'-11⅝	13'-6	5'-10⅞	20'-2¼	14'-1⅝	12'-6	6'-4½	23'-0⅜	13'-3⅜	12'-0	6'-11⅛	26'-0¼	12'-1⅝
	7'	19'-3⅝	4'-8¼	7'-0⅜	19'-2¾	4'-8½	5'-1¾	8'-11½	19'-2½	19'-5⅝	4'-9⅛	3'-5⅛	10'-1¼	18'-11¼	19'-6⅝	4'-10⅛	1'-8½	12'-11¼	18'-5⅝	19'-6	4'-11¾	15'-3¼	18'-2⅝	17'-6	5'-2⅝	17'-8⅛	17'-8⅛	16'-6	5'-6⅜	20'-1⅝	16'-10¾	15'-0	5'-10⅞	22'-7¾	15'-10¼	14'-0	6'-4½	26'-0¾	15'-0⅝	13'-6	6'-11⅛	29'-2⅛	13'-7⅞
8'	3'	9'-10⅜	6'-10¼	3'-7¼	10'-0⅝	6'-10½	2'-8¼	4'-8¾	10'-1¾	10'-1¼	6'-11½	1'-9⅜	5'-8¼	9'-10⅜	10'-1⅛	7'-1⅛	10⅝*	6'-11	9'-10½	10'-0	7'-3⅜	8'-2⅝	9'-9¼	9'-0	7'-7⅜	9'-6½	9'-6½	8'-6	8'-0⅜	13'-2⅛	11'-1⅜	9'-6	8'-6⅝	14'-10⅜	10'-4⅞	9'-0	9'-2⅜	16'-11⅝	9'-9⅝	8'-6	9'-11⅞	19'-8⅛	9'-2⅛
	4'	12'-3⅛	6'-10¼	4'-5½	12'-5½	6'-10½	3'-4⅛	5'-9½	12'-5	12'-6⅞	6'-11½	2'-2⅝	6'-11¼	12'-0⅛	12'-1	7'-1⅛	1'-0⅝	8'-4⅛	11'-11	12'-0	7'-3⅜	9'-9¼	11'-8¼	11'-0	7'-7⅜	11'-3¾	11'-3¾	10'-6	8'-0⅜	13'-2⅛	11'-1⅜	9'-6	8'-6⅝	14'-10⅜	10'-4⅞	9'-0	9'-2⅜	16'-11⅝	9'-9⅝	8'-6	9'-11⅞	19'-8⅛	9'-2⅛
	5'	14'-7¼	6'-10¼	5'-3¾	14'-10½	6'-10½	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	6'-11½	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	7'-1⅛	1'-3¼	9'-9⅜	13'-11⅝	14'-6	7'-3⅜	11'-8⅛	13'-11⅞	13'-6	7'-7⅜	13'-5¼	13'-5¼	12'-6	8'-0⅜	15'-6½	13'-0½	11'-6	8'-6⅝	17'-8⅞	12'-5	10'-6	9'-2⅜	20'-0	11'-6⅝	10'-0	9'-11⅞	22'-10¼	10'-7⅛
	6'	16'-11½	6'-10¼	6'-2⅛	16'-9¾	6'-10½	4'-6	7'-10⅞	16'-11⅜	17'-0	6'-11½	3'-0	9'-8¼	16'-9¼	17'-0¼	7'-1⅛	1'-5⅞	11'-6	16'-5⅞	17'-0	7'-3⅜	13'-4⅞	15'-10⅛	15'-6	7'-7⅜	15'-6⅝	15'-6⅝	14'-6	8'-0⅜	17'-10⅛	14'-11⅝	13'-6	8'-6⅝	20'-2¼	14'-1⅝	12'-6	9'-2⅜	23'-0⅜	13'-3⅜	12'-0	9'-11⅞	26'-0¼	12'-1⅝
	7'	19'-3⅝	6'-10¼	7'-0⅜	19'-2¾	6'-10½	5'-1¾	8'-11½	19'-2½	19'-5⅝	6'-11½	3'-5⅛	10'-1¼	18'-11¼	19'-6⅝	7'-1⅛	1'-8½	12'-11¼	18'-5⅝	19'-6	7'-3⅜	15'-3¼	18'-2⅝	17'-6	7'-7⅜	17'-8⅛	17'-8⅛	16'-6	8'-0⅜	20'-1⅝	16'-10¾	15'-0	8'-6⅝	22'-7¾	15'-10¼	14'-0	9'-2⅜	26'-0¾	15'-0⅝	13'-6	9'-11⅞	29'-2⅛	13'-7⅞
	8'	21'-9⅞	6'-10¼	9'-3¼	21'-9¼	6'-10½	6'-8¾	9'-11⅜	21'-8¼	21'-9¾	6'-11½	4'-2⅝	10'-1¼	21'-8¼	21'-7⅞	7'-1⅛	2'-1⅜	14'-6⅞	20'-5⅝	21'-6	7'-3⅜	17'-1¾	20'-5¼	20'-0	7'-7⅜	19'-5⅝	19'-5⅝	18'-6	8'-0⅜	22'-1⅝	18'-10¾	17'-0	8'-6⅝	25'-2¾	17'-9¼	16'-0	9'-2⅜	29'-5⅝	16'-11¾	15'-0	9'-11⅞	32'-2⅛	15'-2⅞
10'	3'	9'-10⅜	9'-0¼	3'-7¼	10'-0⅝	9'-0⅝	2'-8¼	4'-8¾	10'-1¾	10'-1¼	9'-1⅞	1'-9⅜	5'-8¼	9'-10⅜	10'-1⅛	9'-4	10⅝*	6'-11	9'-10½	10'-0	9'-7	8'-2⅝	9'-9¼	9'-0	10'-0	9'-6½	9'-6½	8'-6	10'-6⅞	10'-11⅜	9'-2¼	7'-6	11'-2⅜	12'-4⅞	8'-8¼	7'-0	12'-0⅜	14'-4½	8'-3⅝	7'-0	13'-0¼	16'-6⅛	7'-8⅜
	4'	12'-3⅛	9'-0¼	4'-5½	12'-5½	9'-0⅝	3'-4⅛	5'-9½	12'-5	12'-6⅞	9'-1⅞	2'-2⅝	6'-11¼	12'-0⅛	12'-1	9'-4	1'-0⅝	8'-4⅛	11'-11	12'-0	9'-7	9'-9¼	11'-8¼	11'-0	10'-0	11'-3¾	11'-3¾	10'-6	10'-6⅞	13'-2⅛	11'-1⅜	9'-6	11'-2⅜	14'-10⅜	10'-4⅞	9'-0	12'-0⅜	16'-11⅝	9'-9⅝	8'-6	13'-0¼	19'-8⅛	9'-2⅛
	5'	14'-7¼	9'-0¼	5'-3¾	14'-10½	9'-0⅝	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	9'-1⅞	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	9'-4	1'-3¼	9'-9⅜	13'-11⅝	14'-6	9'-7	11'-8⅛	13'-11⅞	13'-6	10'-0	13'-5¼	13'-5¼	12'-6	10'-6⅞	15'-6½	13'-0½	11'-6	11'-2⅜	17'-8⅞	12'-5	10'-6	12'-0⅜	20'-0	11'-6⅝	10'-0	13'-0¼	22'-10¼	10'-7⅛
	6'	16'-11½	9'-0¼	6'-2⅛	16'-9¾	9'-0⅝	4'-6	7'-10⅞	16'-11⅜	17'-0	9'-1⅞	3'-0	9'-8¼	16'-9¼	17'-0¼	9'-4	1'-5⅞	11'-6	16'-5⅞	17'-0	9'-7	13'-4⅞	15'-10⅛	15'-6	10'-0	15'-6⅝	15'-6⅝	14'-6	10'-6⅞	17'-10⅛	14'-11⅝	13'-6	11'-2⅜	20'-2¼	14'-1⅝	12'-6	12'-0⅜	23'-0⅜	13'-3⅜	12'-0	13'-0¼	26'-0¼	12'-1⅝
	7'	19'-3⅝	9'-0¼	7'-0⅜	19'-2¾	9'-0⅝	5'-1¾	8'-11½	19'-2½	19'-5⅝	9'-1⅞	3'-5⅛	10'-1¼	18'-11¼	19'-6⅝	9'-4	1'-8½	12'-11¼	18'-5⅝	19'-6	9'-7	15'-3¼	18'-2⅝	17'-6	10'-0	17'-8⅛	17'-8⅛	16'-6	10'-6⅞	20'-1⅝	16'-10¾	15'-0	11'-2⅜	22'-7¾	15'-10¼	14'-0	12'-0⅜	26'-0¾	15'-0⅝	13'-6	13'-0¼	29'-2⅛	13'-7⅞
	8'	21'-9⅞	9'-0¼	9'-3¼	21'-9¼	9'-0⅝	6'-8¾	9'-11⅜	21'-8¼	21'-9¾	9'-1⅞	4'-2⅝	10'-1¼	21'-8¼	21'-7⅞	9'-4	2'-1⅜	14'-6⅞	20'-5⅝	21'-6	9'-7	17'-1¾	20'-5¼	20'-0	10'-0	19'-5⅝	19'-5⅝	18'-6	10'-6⅞	22'-1⅝	18'-10¾	17'-0	11'-2⅜	25'-2¾	17'-9¼	16'-0	12'-0⅜	29'-5⅝	16'-11¾	15'-0	13'-0¼	32'-2⅛	15'-2⅞
	9'	24'-2½	9'-0¼	10'-3⅛	24'-2½	9'-0⅝	7'-8⅝	10'-10⅞	24'-1⅝	24'-2⅛	9'-1⅞	4'-9⅛	10'-1¼	24'-1⅛	24'-0⅝	9'-4	2'-1¾	16'-3⅜	23'-3⅞	24'-0	9'-7	19'-1½	22'-9½	22'-0	10'-0	21'-11¾	21'-11¾	20'-6	10'-6⅞	25'-1¾	21'-2⅜	19'-0	11'-2⅜	28'-1⅞	20'-0¾	17'-6	12'-0⅜	32'-1⅝	18'-9⅝	17'-0	13'-0¼	35'-1⅛	17'-7¾
	10'	26'-7	9'-0¼	11'-3⅛	26'-7¾	9'-0⅝	8'-8½	11'-10⅞	26'-6⅞	26'-7⅝	9'-1⅞	5'-0⅛	10'-1¼	26'-6⅛	26'-5⅝	9'-4	2'-1⅞	16'-8⅞	23'-8¾	26'-5	9'-7	19'-7½	23'-4⅝	22'-5	10'-0	22'-4⅛	22'-4⅛	20'-6	10'-6⅞	25'-6⅛	21'-7⅜	19'-0	11'-2⅜	28'-6⅞	20'-5¾	17'-6	12'-0⅜	32'-6⅛	18'-9⅝	17'-0	13'-0¼	35'-6⅞	17'-8¼
12'	8'	21'-9⅞	10'-3½	7'-11⅜	21'-9¼	10'-3⅞	5'-10	10'-1⅜	21'-8¼	22'-0⅛	10'-5¼	3'-10⅝	12'-3⅞	21'-8¼	21'-7⅞	10'-7⅝	1'-10⅝	14'-6⅞	20'-9⅝	21'-6	10'-11	17'-1¾	20'-5¼	20'-0	11'-4⅞	19'-5⅝	19'-5⅝	18'-6	11'-11⅜	22'-10¾	19'-2½	17'-0	12'-8⅛	26'-1⅛	18'-3¼	16'-0	13'-6⅛	29'-5	16'-11¾	15'-0	14'-8⅛	33'-9½	15'-9⅛
	9'	24'-2½	10'-1	8'-9¼	24'-2½	10'-1¾	6'-5⅞	11'-2¼	23'-11⅞	24'-0	10'-3⅛	4'-2¾	13'-7¼	23'-6¾	24'-1⅛	10'-5⅜	2'-1¼	16'-3⅞	23'-3¾	24'-0	10'-8¾	19'-1½	22'-9½	22'-0	11'-2	21'-11¾	21'-11¾	20'-6	11'-8⅞	25'-3¼	21'-2⅜	19'-0	12'-2⅝	28'-7¾	20'-0¾	17'-6	13'-3⅞	32'-6⅛	18'-9⅝	17'-0	14'-4¾	37'-1½	17'-3¾
	10'	26'-7	9'-11¼	9'-8⅛	26'-7¾	9'-11⅝	7'-1⅝	12'-3½	26'-3½	26'-5¾	10'-1	4'-8	14'-10½	25'-9⅛	26'-7	10'-3⅜	2'-3⅞	17'-9½	25'-4⅞	26'-6	10'-6⅞	20'-9¼	24'-9⅛	24'-0	10'-11⅝	24'-1⅞	24'-1⅞	22'-6	11'-6¼	27'-7¾	23'-2⅜	20'-6	12'-5⅞	31'-0⅝	20'-8¼	18'-6	13'-10	35'-8⅞	20'-7½	18'-0	14'-8⅜	40'-5½	18'-0⅝
	11'	28'-11½	9'-9⅛	10'-6½	29'-0⅜	9'-9½	7'-9½	13'-4	28'-7⅛	28'-11⅞	9'-10¾	5'-1¼	16'-1¾	27'-11⅝	29'-1	10'-1	2'-6½	19'-3⅜	27'-6	29'-0	10'-4⅞	20'-9	27'-1¼	26'-6	10'-9⅛	26'-4⅝	26'-4⅝	24'-6	11'-3¼	30'-0⅝	25'-2¼	22'-6	11'-11⅞	34'-2	23'-11⅞	21'-0	13'-10	38'-10⅝	22'-5⅜	20'-0	13'-10	43'-9⅝	20'-5⅛
	12'	31'-4	9'-7	11'-4⅞	31'-6⅛	9'-7⅜	8'-5⅜	14'-4⅞	30'-10⅝	31'-5⅛	9'-8⅝	5'-6½	17'-8⅛	30'-7⅝	31'-1	9'-10¾	2'-8⅝	21'-0⅛	30'-0⅛	31'-0	10'-1¾	24'-4¾	29'-0⅞	28'-6	10'-6¾	28'-2	28'-2	26'-6	11'-1⅛	32'-6⅝	27'-2⅛	24'-6	11'-9⅛	36'-8¾	25'-8⅝	23'-0	12'-6⅛	41'-7¾	24'-0¼	22'-0	13'-6⅝	47'-7	22'-2¼

QUANTITIES

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s
6'	3'	2.19	1.55	150	102	2.25	1.58	155	124	2.26	1.58	154	124	2.33	1.61	159	127	2.41	1.64	165	130	2.62	1.62	166	128	2.88	1.63	176	130	3.07	1.61	180	129	3.39	1.65	194	132	3.80	1.74	211	139
	4'	2.81	1.84	201	144	2.87	1.87	207	146	2.88	1.87	206	146	2.90	1.87	207	146	2.99	1.90	212	149	3.25	1.88	215	147	3.64	1.91	234	150	3.87	1.89	240	149	4.25	1.94	255	153	4.71	2.00	275	159
	5'	3.47	2.13	258	165	3.54	2.16	265	167	3.56	2.16	265	167	3.57	2.16	263	168	3.74	2.22	275	172	4.07	2.19	280	171	4.46	2.19	298	171	4.83	2.20	313	172	5.17	2.20	324	173	5.69	2.26	345	178
	6'	4.21	2.42	322	187	4.22	2.42	322	187	4.30	2.45	328	189	4.40	2.48	333	191	4.50	2.51	337	194	4.91	2.47	347	191	5.37	2.47	368	192	5.80	2.48	385	193	6.29	2.50	406	195	6.90	2.57	429	200
	7'	5.02	2.71	390	208	5.03	2.71	390	208	5.12	2.74	396	210	5.22	2.76	400	213	5.42	2.82	412	217	5.83	2.75	420	212	6.36	2.75	444	213	6.74	2.72	457	211	7.41	2.76	489	214	8.10	2.83	512	220
8'	3'	2.69	2.03	180	160	2.76	2.07	186	163	2.77	2.07	186	163	2.85	2.11	191	167	2.95	2.16	197	170	3.15	2.13	198	168	3.41	2.14	208	170	3.59	2.12	211	169	3.93	2.17	225	173	4.36	2.29	244	183
	4'	3.40	2.41	239	188	3.48	2.45	245	191	3.48	2.45	245	192	3.51	2.45	245	192	3.61	2.49	251	195	3.86	2.46	253	193	4.26	2.51	272	197	4.49	2.49	277	196	4.88	2.54	293	201	5.36	2.63	314	208
	5'	4.16	2.79	303	217	4.24	2.83	310	220	4.26	2.83	310	220	4.27	2.83	308	220	4.46	2.91	322	226	4.78	2.88	325	224	5.17	2.88	343	225	5.54	2.88	358	225	5.88	2.89	368	226	6.42	2.97	390	233
	6'	5.00	3.17	373	245	5.00	3.17	373	245	5.10	3.21	380	248	5.20	3.25	386	251	5.31	3.29	390	254	5.71	3.25	399	251	6.17	3.25	420	252	6.60	3.25	437	253	7.11	3.28	458	256	7.73	3.37	481	263
	7'	5.90	3.55	449	273	5.91	3.55	449	273	6.01	3.59	454	276	6.12	3.63	460	279	6.33	3.70	473	285	6.72	3.61	479	279	7.25	3.62	503	279	7.63	3.57	515	276	8.31	3.63	547	281	9.02	3.71	571	288
	8'	6.71	4.02	499	304	6.71	4.02	499	304	6.82	4.06	505	306	6.84	4.06	503	306	7.07	4.13	516	312	7.65	4.09	533	309	8.30	4.09	566	309	8.88	4.08	593	309	9.54	4.12	619	312	10.42	4.21	657	319
10'	3'	3.20	2.51	211	198	3.27	2.56	217	202	3.28	2.57	217	202	3.38	2.62	224	206	3.48	2.67	230	211	3.68	2.63	230	208	3.94	2.66	240	210	4.12	2.62	242	209	4.46	2.69	257	215	4.93	2.83	277	226
	4'	4.00	2.99	277	233	4.08	3.03	284	237	4.09	3.04	283	237	4.12	3.04	283	237	4.23	3.09	289	242	4.47	3.05	291	239	4.88	3.11	311	244	5.10	3.08	315	243	5.51	3.15	331	249	6.01	3.25	353	258
	5'	4.85	3.46	348	268	4.94	3.50	355	272	4.96	3.50	356	272	4.97	3.51	354	272	5.18	3.60	368	280	5.49	3.56	371	277	5.89	3.57	388	278	6.26	3.57	403	279	6.60	3.57	413	280	7.16	3.67	435	289
	6'	5.78	3.93	425	303	5.79	3.93	425	303	5.89	3.97	432	307	6.00	4.02	438	311	6.12	4.07	443	315	6.51	4.02	452	311	6.98	4.02	472	312	7.41	4.03	489	313	7.92	4.07	510	317	8.56	4.17	534	326
	7'	6.78	4.40	507	338	6.79	4.40	507	338	6.90	4.45	514	342	7.02	4.49	520	346	7.25	4.58	534	353	7.62	4.47	538	345	8.15	4.48	562	346	8.51	4.42	572	342	9.21	4.49	605	348	9.94	4.59	630	357
	8'	7.71	4.98	565	376	7.71	4.98	565	376	7.83	5.03	572	379	7.85	5.03	570	379	8.09	5.12	584	386	8.67	5.07	600	383	9.31	5.06	632	383	9.89	5.05	659	382	10.56	5.10	685	387	11.46	5.21	723	396
	9'	8.77	5.46	650	411	8.77	5.46	650	411	8.78	5.45	648	411	9.03	5.55	664	418	9.29	5.63	677	425	9.84	5.53	690	417	10.58	5.52	728	417	11.24	5.52	757	417	11.96	5.54	788	419	13.15	5.72	838	433
	10'	9.89	5.93	739	447	9.89	5.93	739	447	9.90	5.93	736	447	10.17	6.02	751	453	10.44	6.11	764	460	11.09	5.99	786	452	11.91	5.99	828	451	12.63	5.95	864	449	13.64	6.04	907	456	14.72	6.15	948	465
12'	8'	8.78	5.98	637	451	8.78	5.98	637	451	8.91	6.03	644	455	8.93	6.03	642	455	9.20	6.14	658	464	9.76	6.08	672	460	10.40	6.07	705	459	10.98	6.06	730	459	11.66	6.12	757	464	12.58	6.26	796	475
	9'	9.94	6.55	730	493	9.95	6.55	729	493	9.96	6.55	728	493	10.23	6.65	744	502	10.50	6.76	759	510	11.04	6.64	770	501	11.77	6.63	807	501	12.43	6.62	836	500	13.15	6.65	866	503	14.38	6.86	919	520
	10'	11.17	7.12	826	536	11.17	7.12	826	536	11.18	7.12	823	536	11.46	7.23	840	544	11.75	7.33	854	552	12.38	7.19	873	542	13.20	7.18	915	542	13.92	7.15	950	539	14.94	7.25	993	547	16.04	7.38	1036	558
	11'	12.46	7.69	928	579	12.46	7.69	927	579	12.47	7.69	924	578	12.76	7.80	939	587	13.20	7.95	965	598	13.94	7.81	990	588	14.71	7.74	1028	583	15.54	7.70	1067	581	16.59	7.77	1116	586	17.78	7.90	1159	597
	12'	13.80	8.27	1034	621	13.80	8.27	1032	621	13.96	8.32	1041	625	14.12	8.36	1047	628	14.43	8.46	1060	636	15.27	8.32	1089	626	16.31	8.29	1146	624	17.23	8.26	1190	622	18.39	8.33	1242	628	20.01	8.54	1315	644

NOTATIONS:

△c = Apron concrete quantity per additional barrel.

△s = Apron steel quantity per additional barrel.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED

ODOT FILENAME= 2FA 151, 43B0630
VIEW NAME= HBM

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

2-13-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

OUTLET APRON
DIMENSIONS & QUANTITIES
4:1 SLOPE

REVISION

STANDARD NO.
B-06.30

DIMENSIONS

Span	Hgt.	0° Skew			5° Skew					10° Skew					15° Skew					20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		A	B	C	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
6'	3'	12'-3⅛	4'-8¼	4'-5½	12'-5½	4'-8½	3'-4⅛	5'-6⅞	11'-11½	12'-0⅛	4'-9⅛	2'-1½	6'-11¼	12'-0⅛	12'-1	4'-10⅛	1'-0⅝	8'-4⅛	11'-11	12'-0	4'-11¾	9'-5⅞	11'-3⅝	11'-0	5'-2⅝	10'-11½	10'-11½	10'-0	5'-6⅞	12'-5¾	10'-5⅝	9'-0	5'-10⅛	14'-5⅜	10'-1⅜	8'-6	6'-4½	16'-1¼	9'-3⅝	8'-0	6'-11⅛	18'-3⅛	8'-6½
	4'	15'-0⅛	4'-8¼	5'-5⅜	15'-4⅞	4'-8½	4'-1⅜	7'-0⅝	15'-1⅝	15'-0⅛	4'-9⅛	2'-7¾	8'-5¼	14'-7¼	15'-0⅛	4'-10⅛	1'-3⅜	10'-0¾	14'-4½	15'-0	4'-11¾	11'-8⅞	13'-11⅞	13'-6	5'-2⅝	13'-5¼	13'-5¼	12'-6	5'-6⅞	15'-6½	13'-0½	11'-6	5'-10⅛	17'-3⅞	12'-1½	10'-6	6'-4½	19'-6⅞	11'-3⅝	10'-0	6'-11⅞	21'-11⅜	10'-2¾
	5'	17'-10¾	4'-8¼	6'-6⅛	18'-3⅛	4'-8½	4'-10¾	8'-3⅛	17'-10¼	17'-11⅞	4'-9⅛	3'-2⅛	10'-2¼	17'-7⅝	18'-0¾	4'-10⅛	1'-7	12'-0⅞	17'-2⅛	18'-0	4'-11¾	13'-11⅞	16'-8	16'-0	5'-2⅝	15'-10⅞	15'-10⅞	14'-6	5'-6⅞	18'-2⅝	15'-3½	13'-6	5'-10⅞	20'-7⅛	14'-5	12'-6	6'-4½	23'-0⅜	13'-3⅝	12'-0	6'-11⅞	25'-6⅞	11'-11⅛
	6'	20'-8⅝	4'-8¼	7'-6½	21'-1⅞	4'-8½	5'-8	9'-7⅞	20'-6⅞	20'-1¼	4'-9⅛	3'-8⅜	11'-8¼	20'-2⅛	21'-0⅝	4'-10⅛	1'-10⅛	13'-9½	19'-8⅜	21'-0	4'-11¾	15'-11	18'-11⅝	19'-0	5'-2⅝	18'-4⅝	18'-4⅝	17'-0	5'-6⅞	20'-10⅞	17'-6½	15'-6	5'-10⅞	23'-5½	16'-5⅛	14'-6	6'-4½	26'-6	15'-3⅝	13'-6	6'-11⅞	29'-7¾	13'-9⅞
	7'	23'-6⅜	4'-8¼	8'-6¼	24'-0⅝	4'-8½	6'-5⅜	10'-10⅜	23'-3½	23'-10¼	4'-9⅛	4'-2½	13'-2¼	22'-10	24'-0½	4'-10⅛	2'-1¼	15'-5⅝	22'-6⅛	24'-0	4'-11¾	18'-2	21'-7⅞	21'-6	5'-2⅝	20'-10⅛	20'-10⅛	19'-6	5'-6⅞	23'-7	19'-9½	18'-0	5'-10⅞	26'-8⅛	18'-8⅝	16'-6	6'-4½	29'-11½	17'-3⅝	15'-6	6'-11⅞	33'-3⅜	15'-6¼
8'	3'	12'-3⅛	6'-10¼	4'-5½	12'-5½	6'-10½	3'-4⅛	5'-6⅞	11'-11½	12'-0⅛	6'-11½	2'-1½	6'-11¼	12'-0⅛	12'-1	7'-1⅞	1'-0⅝	8'-4⅛	11'-11	12'-0	7'-3⅜	9'-5⅞	11'-3⅝	11'-0	7'-7⅛	10'-11½	10'-11½	10'-0	8'-0⅜	12'-5¾	10'-5⅝	9'-0	8'-6⅝	14'-5⅜	10'-1⅜	8'-6	9'-2⅜	16'-1¼	9'-3⅝	8'-0	9'-11⅞	18'-3⅛	8'-6½
	4'	15'-0⅛	6'-10¼	5'-5¼	15'-4⅝	6'-10½	4'-1⅜	7'-0⅝	15'-1⅝	15'-0⅛	6'-11½	2'-7¾	8'-5¼	14'-7¼	15'-0⅛	7'-1⅞	1'-3⅜	10'-0¾	14'-4½	15'-0	7'-3⅜	11'-8⅞	13'-11⅞	13'-6	7'-7⅛	13'-5¼	13'-5¼	12'-6	8'-0⅜	15'-6½	13'-0½	11'-6	8'-6⅝	17'-3⅞	12'-1½	10'-6	9'-2⅜	19'-6⅞	11'-3⅝	10'-0	9'-11⅞	21'-11⅜	10'-2¾
	5'	17'-10¾	6'-10¼	6'-6⅛	18'-3⅛	6'-10½	4'-10¾	8'-3⅛	17'-10¼	17'-11⅞	6'-11½	3'-2⅛	10'-2¼	17'-7⅝	18'-0¾	7'-1⅞	1'-7	12'-0⅞	17'-2⅛	18'-0	7'-3⅜	13'-11⅞	16'-8	16'-0	7'-7⅛	15'-10⅞	15'-10⅞	14'-6	8'-0⅜	18'-2⅝	15'-3½	13'-6	8'-6⅝	20'-7⅛	14'-5	12'-6	9'-2⅜	23'-0⅜	13'-3⅝	12'-0	9'-11⅞	25'-6⅞	11'-11⅛
	6'	20'-8⅝	6'-10¼	7'-6½	21'-1⅞	6'-10½	5'-8	9'-7⅞	20'-6⅞	20'-1¼	6'-11½	3'-8⅜	11'-8¼	20'-2⅛	21'-0⅝	7'-1⅞	1'-10⅛	13'-9½	19'-8⅜	21'-0	7'-3⅜	15'-11	18'-11⅝	19'-0	7'-7⅛	18'-4⅝	18'-4⅝	17'-0	8'-0⅜	20'-10⅞	17'-6½	15'-6	8'-6⅝	23'-5½	16'-5⅛	14'-6	9'-2⅜	26'-6	15'-3⅝	13'-6	9'-11⅞	29'-7¾	13'-9⅞
	7'	23'-6⅜	6'-10¼	8'-6¼	24'-0⅝	6'-10½	6'-5⅜	10'-10⅜	23'-3½	23'-10¼	6'-11½	4'-2½	13'-2¼	22'-10	24'-0½	7'-1⅞	2'-1¼	15'-5⅝	22'-6⅛	24'-0	7'-3⅜	18'-2	21'-7⅞	21'-6	7'-7⅛	20'-10⅛	20'-10⅛	19'-6	8'-0⅜	23'-7	19'-9½	18'-0	8'-6⅝	26'-8⅛	18'-8⅝	16'-6	9'-2⅜	29'-11½	17'-3⅝	15'-6	9'-11⅞	33'-3⅜	15'-6¼
	8'	27'-0	5'-9½	9'-9⅝	27'-1	5'-9⅝	7'-3⅛	12'-2¼	26'-2⅝	26'-1¼	5'-10½	4'-9	15'-0⅞	26'-1⅜	27'-0⅛	5'-11¾	2'-4⅜	17'-8¼	25'-3¾	27'-0	6'-1½	20'-8¼	24'-7¾	24'-0	6'-4⅞	23'-8¼	23'-8¼	22'-0	6'-9	26'-8⅝	22'-5⅛	20'-0	7'-2⅛	30'-2¼	21'-1⅝	18'-6	7'-8⅜	33'-8⅞	19'-5¼	17'-6	8'-3¾	37'-10½	17'-7⅞
10'	3'	12'-3⅛	9'-0¼	4'-5½	12'-5½	9'-0⅝	3'-4⅛	5'-6⅞	11'-11½	12'-0⅛	9'-1⅞	2'-1½	6'-11¼	12'-0⅛	12'-1	9'-4	1'-0⅝	8'-4⅛	11'-11	12'-0	9'-7	9'-5⅞	11'-3⅝	11'-0	10'-0	10'-11½	10'-11½	10'-0	10'-6⅞	12'-5¾	10'-5⅝	9'-0	11'-2⅛	14'-5⅜	10'-1⅜	8'-6	12'-0⅜	16'-1¼	9'-3⅝	8'-0	13'-0¾	18'-3⅛	8'-6½
	4'	15'-0⅛	9'-0¼	5'-5⅜	15'-4⅞	9'-0⅝	4'-1⅜	7'-0⅝	15'-1⅝	15'-0⅛	9'-1⅞	2'-7¾	8'-5¼	14'-7¼	15'-0⅛	9'-4	1'-3⅜	10'-0¾	14'-4½	15'-0	9'-7	11'-8⅞	13'-11⅞	13'-6	10'-0	13'-5¼	13'-5¼	12'-6	10'-6⅞	15'-6½	13'-0½	11'-6	11'-2⅛	17'-3⅞	12'-1½	10'-6	12'-0⅜	19'-6⅞	11'-3⅝	10'-0	13'-0¾	21'-11⅜	10'-2¾
	5'	17'-10¾	9'-0¼	6'-6⅛	18'-3⅛	9'-0⅝	4'-10¾	8'-3⅛	17'-10¼	17'-11⅞	9'-1⅞	3'-2⅛	10'-2¼	17'-7⅝	18'-0¾	9'-4	1'-7	12'-0⅞	17'-2⅛	18'-0	9'-7	13'-11⅞	16'-8	16'-0	10'-0	15'-10⅞	15'-10⅞	14'-6	10'-6⅞	18'-2⅝	15'-3½	13'-6	11'-2⅛	20'-7⅛	14'-5	12'-6	12'-0⅜	23'-0⅜	13'-3⅝	12'-0	13'-0¾	25'-6⅞	11'-11⅛
	6'	20'-8⅝	9'-0¼	7'-6½	21'-1⅞	9'-0⅝	5'-8	9'-7⅞	20'-6⅞	20'-1¼	9'-1⅞	3'-8⅜	11'-8¼	20'-2⅛	21'-0⅝	9'-4	1'-10⅛	13'-9½	19'-8⅜	21'-0	9'-7	15'-11	18'-11⅝	19'-0	10'-0	18'-4⅝	18'-4⅝	17'-0	10'-6⅞	20'-10⅞	17'-6½	15'-6	11'-2⅛	23'-5½	16'-5⅛	14'-6	12'-0⅜	26'-6	15'-3⅝	13'-6	13'-0¾	29'-7¾	13'-9⅞
	7'	23'-6⅜	9'-0¼	8'-6¼	24'-0⅝	9'-0⅝	6'-5⅜	10'-10⅜	23'-3½	23'-10¼	9'-1⅞	4'-2½	13'-2¼	22'-10	24'-0	9'-4	2'-1¼	15'-5⅝	22'-6⅛	24'-0	9'-7	18'-2	21'-7⅞	21'-6	10'-0	20'-10⅛	20'-10⅛	19'-6	10'-6⅞	23'-7	19'-9½	18'-0	11'-2⅛	26'-8⅛	18'-8⅝	16'-6	12'-0⅜	29'-11½	17'-3⅝	15'-6	13'-0¾	33'-3⅜	15'-6¼
	8'	27'-0	7'-11½	9'-9⅝	27'-1	7'-11¾	7'-3⅛	12'-2¼	26'-2⅝	26'-1¼	8'-0⅞	4'-9	15'-0⅞	26'-1⅜	27'-0⅛	8'-2⅝	2'-4⅜	17'-8¼	25'-3¾	27'-0	8'-5¼	20'-8¼	24'-7¾	24'-0	8'-9½	23'-8¼	23'-8¼	22'-0	9'-3	26'-8⅝	22'-5⅛	20'-0	9'-9⅞	30'-2¼	21'-1⅝	18'-6	10'-6⅞	33'-8⅞	19'-5¼	17'-6	11'-4½	37'-10½	17'-7⅞
12'	8'	27'-0	10'-3½	9'-9⅝	27'-1	10'-3⅞	7'-3⅛	12'-2¼	26'-2⅝	26'-1¼	10'-5¼	4'-9	15'-0⅞	26'-1⅜	27'-0⅛	10'-7⅝	2'-4⅜	17'-8¼	25'-3¾	27'-0	10'-11	20'-8¼	24'-7¾	24'-0	11'-4⅜	23'-8¼	23'-8¼	22'-0	11'-11⅜	26'-8⅝	22'-5⅛	20'-0	12'-8⅛	30'-2¼	21'-1⅝	18'-6	13'-6⅞	33'-8⅛	19'-5¼	17'-6	14'-8⅛	37'-10½	17'-7⅞

QUANTITIES

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s	1 Bbl.	△c	1 Bbl.	△s
6'	3'	2.77	1.84	201	144	2.77	1.84	201	144	2.78	1.84	201	144	2.86	1.87	207	146	2.88	1.88	205	147	3.13	1.85	208	145	3.37	1.83	215	144	3.67	1.84	228	145	3.95	1.86	236	147	4.31	1.90	249	151
	4'	3.60	2.19	271	169	3.67	2.21	277	172	3.61	2.19	270	170	3.70	2.22	275	172	3.97	2.25	279	175	4.06	2.19	280	171	4.45	2.19	298	171	4.73	2.18	305	170	5.06	2.18	316	171	5.49	2.22	330	175
	5'	4.51	2.53	348	195	4.59	2.56	355	197	4.60	2.56	354	197	4.70	2.59	359	200	4.80	2.62	363	202	5.07	2.53	360	196	5.45	2.50	376	194	5.88	2.50	394	194	6.28	2.50	406	195	6.78	2.55	420	199
	6'	5.53	2.88	434	221	5.62	2.91	440	223	5.63	2.91	439	223	5.73	2.94	443	226	5.84	2.97	445	228	6.28	2.90	455	223	6.66	2.84	469	219	7.07	2.80	483	217	7.65	2.82	506	219	8.20	2.84	521	221
	7'	6.65	3.23	527	247	6.75	3.26	534	249	6.76	3.26	532	249	6.97	3.31	544	253	7.09	3.34	545	256	7.55	3.24	552	249	8.02	3.17	570	244	8.63	3.16	597	244	9.16	3.15	615	243	9.78	3.17	630	245
8'	3'	3.36	2.41	239	188	3.37	2.41	239	188	3.38	2.41	239	189	3.47	2.45	245	192	3.49	2.46	243	193	3.74	2.43	245	191	3.97	2.41	252	189	4.27	2.41	264	190	4.55	2.44	272	193	4.93	2.50	285	198
	4'	4.31	2.87	317	222	4.39	2.91	324	225	4.32	2.87	316	223	4.42	2.91	322	226	4.52	2.95	327	229	4.77	2.88	325	224	5.16	2.88	343	225	5.43	2.86	349	223	5.77	2.86	360	224	6.21	2.92	374	230
	5'	5.33	3.33	403	256	5.42	3.36	410	259	5.44	3.36	409	259	5.54	3.40	415	262	5.65	3.44	419	265	5.89	3.32	414	257	6.26	3.28	429	254	6.70	3.28	446	255	7.09	3.28	458	256	7.61	3.34	472	261
	6'	6.46	3.78	496	290	6.56	3.82	504	293	6.57	3.82	503	293	6.69	3.86	507	296	6.80	3.90	510	299	7.23	3.81	517	293	7.58	3.72	530	287	7.98	3.68	542	284	8.57	3.71	565	287	9.12	3.73	580	290
	7'	7.70	4.24	598	324	7.81	4.28	606	327	7.82	4.28	604	327	8.05	4.35	617	333	8.18	4.38	618	336	8.60	4.26	623	326	9.06	4.17	639	320	9.66	4.15	665	320	10.18	4.13	682	319	10.81	4.16	697	322
	8'	9.05	4.86	690	366	8.94	4.82	679	363	9.07	4.86	686	366	9.19	4.90	689	369	9.45	4.97	700	374	9.88	4.80	705	362	10.42	4.72	727	356	11.01	4.66	751	352	11.65	4.65	771	352	12.51	4.72	800	357
10'	3'	3.96	2.99	277	233	3.96	2.99	277	233	3.98	2.99	277	233	4.08	3.04	283	237	4.10	3.05	282	239	4.34	3.01	283	236	4.56	2.98	289	234	4.87	2.98	300	236	5.16	3.02	308	239	5.55	3.09	321	246
	4'	5.02	3.55	363	275	5.11	3.60	370	278	5.03	3.55	362	276	5.14	3.60	368	279	5.25	3.65	374	284	5.48	3.56	371	277	5.87	3.57	388	278	6.14	3.54	394	277	6.48	3.54	404	278	6.93	3.62	418	285
	5'	6.16	4.12	457	317	6.26	4.16	465	321	6.27	4.16	464	321	6.38	4.21	470	325	6.50	4.26	475	329	6.71	4.11	468	318	7.07	4.06	482	315	7.51	4.06	498	316	7.91	4.07	510	317	8.44	4.14	525	323
	6'	7.40	4.86	559	359	7.51	4.73	567	363	7.52	4.73	566	363	7.64	4.78	571	367	7.77	4.82	574	371	8.17	4.72	580	363	8.50	4.61	590	355	8.89	4.55	602	352	9.49	4.59	625	356	10.04	4.62	640	359
	7'	8.75	5.25	670	401	8.87	5.30	678	405	8.88	5.30	676	405	9.13	5.38	691	412	9.26	5.43	692	416	9.66	5.27	694	404	10.09	5.16	708	396	10.69	5.14	734	396	11.21	5.11	749	395	11.84	5.14	764	398
	8'	10.26	6.02	771	453	10.13	5.97	760	449	10.27	6.01	768	453	10.41	6.06	771	456	10.68	6.15	783	463	11.06	5.94	784	448	11.59	5.84	805	441	12.17	5.77	827	436	12.80	5.76	847	435	13.68	5.84	875	442
12'	8'	11.55	7.22	860	543	11.42	7.17	848	539	11.56	7.22	856	543	11.71	7.27	860	548	12.00	7.38	873	556	12.34	7.13	871	537	12.85	7.01	889	529	13.41	6.93	910	523	14.04	6.91	929	522	14.94	7.01	958	530

NOTATIONS:

△c = Apron concrete quantity per additional barrel.

△s = Apron steel quantity per additional barrel.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN APPROVED
F. D. Davis

APPROVED FOR DISTRIBUTION
James A. McRae
2-15-89

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

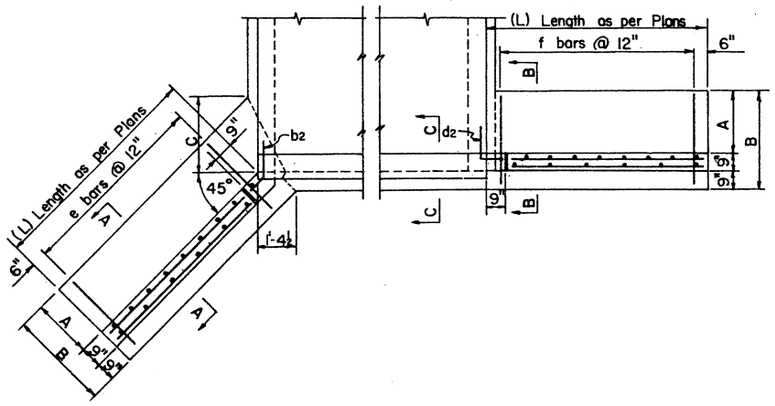
OUTLET APRON
DIMENSIONS & QUANTITIES
6:1 SLOPE

REVISION

STANDARD NO.
B-06.40

DESIGN
DRAWN
CHECKED

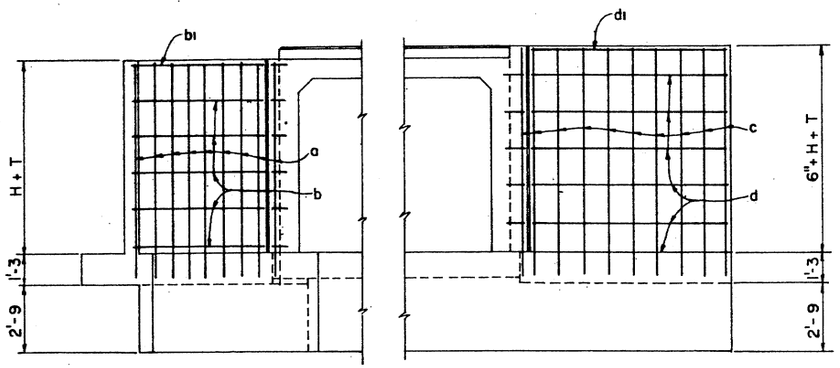
CADD FILENAME= ZFA
VIEW NAME=



TYPE A WING

TYPE B WING

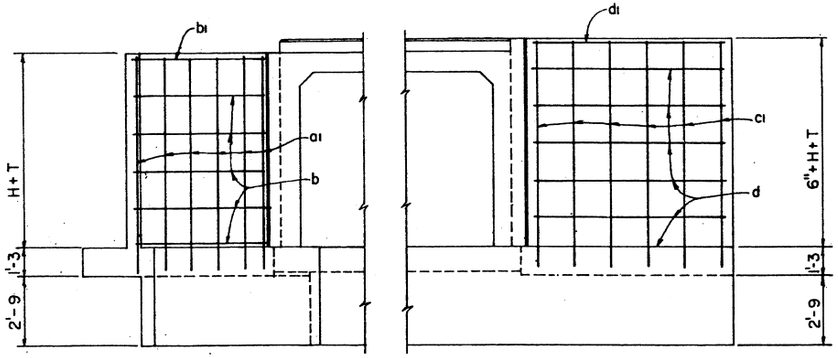
HEADWALL PLAN



TYPE A WING

TYPE B WING

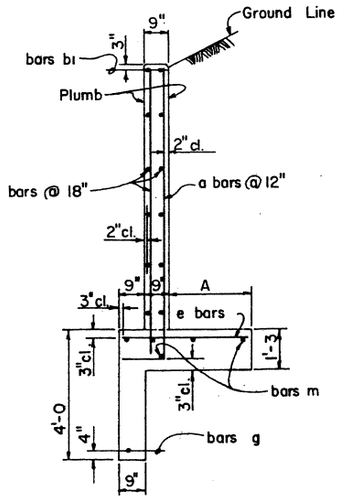
ELEVATION (Back Face Reinf.)



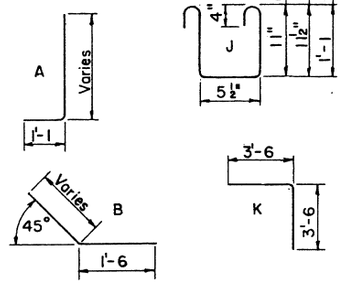
TYPE A WING

TYPE B WING

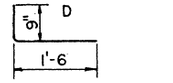
ELEVATION (Front Face Reinf.)

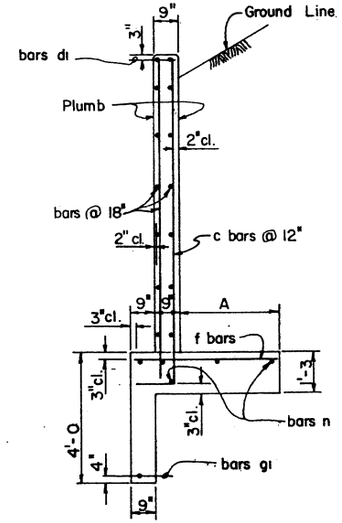


SECTION A-A

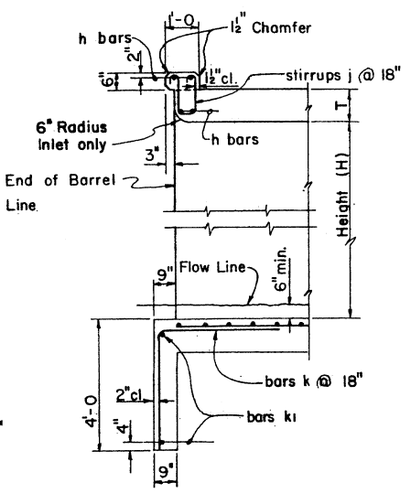


BENDS





SECTION B-B



SECTION C-C

DIMENSIONS

Height of Opening	A	B	C
3'	1'-6	3'-0	1'-9
4'	2'-0	3'-6	2'-6
5'	2'-6	4'-0	3'-2
6'	3'-0	4'-6	3'-11
7'	3'-3	4'-9	4'-3

WINGS STEEL LIST (L=H+2)

Mark	Bend	3' Height			4' Height			5' Height			6' Height			7' Height		
		No.	Size	Lgth.	No.	Size	Lgth.	No.	Size	Lgth.	No.	Size	Lgth.	No.	Size	Lgth.
TYPE A WING																
a	A	12	#5	5'-6	14	#5	6'-6	16	#5	7'-6	18	#6	8'-6	20	#7	9'-6
a1	str.	8	#4	4'-6	8	#4	5'-6	8	#4	6'-6	10	#4	7'-6	10	#4	8'-6
b	⌐	8	✓	4'-0	12	✓	5'-0	12	✓	6'-0	16	✓	7'-0	20	✓	8'-0
b1	⌐	4	#6	4'-0	4	#6	5'-0	4	#6	6'-0	4	#6	7'-0	4	#6	8'-0
b2	B	6	#4	2'-3	8	#4	2'-3	8	#4	2'-3	10	#4	2'-3	12	#4	2'-3
e	str.	12	#5	2'-6	14	#5	3'-0	16	#5	3'-6	18	#5	4'-0	20	#5	4'-3
g	B	2	#4	6'-9	2	#4	7'-9	2	#4	8'-9	2	#4	9'-9	2	#4	10'-9
m	str.	8	✓	5'-0	8	✓	6'-0	10	✓	7'-0	10	✓	8'-0	10	✓	9'-0
TYPE B WING																
c	A	12	#5	6'-0	14	#5	7'-0	16	#5	8'-0	18	#6	9'-0	20	#7	10'-0
c1	str.	8	#4	5'-0	8	#4	6'-0	8	#4	7'-0	10	#4	8'-0	10	#4	9'-0
d	⌐	8	✓	4'-0	12	✓	5'-0	12	✓	6'-0	16	✓	7'-0	20	✓	8'-0
d1	⌐	4	#6	4'-0	4	#6	5'-0	4	#6	6'-0	4	#6	7'-0	4	#6	8'-0
d2	D	6	#4	2'-3	8	#4	2'-3	8	#4	2'-3	10	#4	2'-3	12	#4	2'-3
f	str.	10	#5	2'-6	12	#5	3'-0	14	#5	3'-6	16	#5	4'-0	18	#5	4'-3
g1	⌐	2	#4	6'-3	2	#4	7'-3	2	#4	8'-3	2	#4	9'-3	2	#4	10'-3
n	⌐	8	✓	5'-0	8	✓	6'-0	10	✓	7'-0	10	✓	8'-0	10	✓	9'-0

CURB & CUT-OFF WALL STEEL LIST

Mark	Bend	Size	6' Spans				8' Spans				10' Spans			
			1 Barrel		○	◇	1 Barrel		○	◇	1 Barrel		○	◇
			No.	Lgth.	No.	Lgth.	No.	Lgth.	No.	Lgth.	No.	Lgth.	No.	Lgth.
TYPE A WING														
h	str.	#6	4	7'-0		6'-8	4	9'-0		8'-9	4	11'-3		10'-10
j	J	#4	6	3'-6	4		7	3'-6	6		8	3'-9	7	
k	K	✓	4	7'-0	4		5	7'-0	6		6	7'-0	7	
k1	str.	✓	2	4'-6		6'-8	2	6'-9		8'-9	2	9'-0		10'-10
TYPE B WING														
h	str.	#6	4	7'-0		6'-8	4	9'-0		8'-9	4	11'-3		10'-10
j	J	#4	6	3'-6	4		7	3'-6	6		9	3'-9	7	
k	K	✓	5	7'-0	4		7	7'-0	6		9	7'-0	7	
k1	str.	✓	2	7'-3		6'-8	2	9'-3		8'-9	2	11'-6		10'-10

○ Additional number of bars per each extra barrel.

◇ Additional length of bars per each extra barrel.

APPROXIMATE HEADWALL QUANTITIES *

Span	Height	Hdwl. Type A Wings				Hdwl. Type B Wings			
		For L=H+2'		Per each Add. Ft.		For L=H+2'		Per each Add. Ft.	
		Conc.	Steel	Conc.	Steel	Conc.	Steel	Conc.	Steel
6'	3'	4.18	297	.3146	19	4.32	308	.3310	20
	4'	5.52	375	.3655	23	5.60	382	.3819	23
	5'	7.07	456	.4164	25	7.07	467	.4329	26
	6'	8.86	636	.4673	33	8.75	652	.4838	34
	7'	10.58	864	.5067	41	10.43	886	.5231	43
8'	3'	4.47	319	.3157	19	4.61	336	.3322	20
	4'	5.80	397	.3666	23	5.88	409	.3831	23
	5'	7.35	477	.4176	25	7.37	494	.4340	26
	6'	9.14	658	.4685	33	9.04	679	.4849	34
	7'	10.88	886	.5090	41	10.75	913	.5255	43
10'	3'	4.81	344	.3180	19	4.94	368	.3345	20
	4'	6.13	423	.3640	23	6.21	441	.3854	23
	5'	7.66	503	.4210	25	7.69	527	.4375	26
	6'	9.46	683	.4731	33	9.39	712	.4896	34
	7'	11.19	911	.5125	41	11.09	946	.5290	43

*Includes curb and cut-off wall quantities for a single barrel.

CURB & CUT-OFF WALL QUANTITIES PER EACH ADDITIONAL BARREL

6' Spans		8' Spans		10' Spans	
Conc.	Steel	Conc.	Steel	Conc.	Steel
.859	76	1.114	103	1.370	130

NOTE:

See B-01.10 for general notes and miscellaneous details.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Curb height now 6"	J.T.W.	7-76
②			
③			

DESIGN	DHY 8-72
DRAWN	APJ 9-72
CHECKED	NAB 9-72

DESIGN APPROVED R.C. Buechler

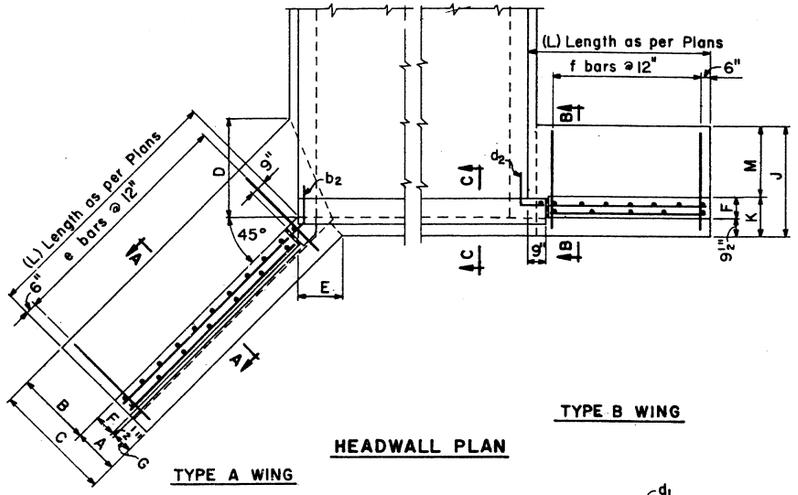
APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

INLET OR OUTLET
LEVEL WINGS,
HEIGHT 3' TO 7'

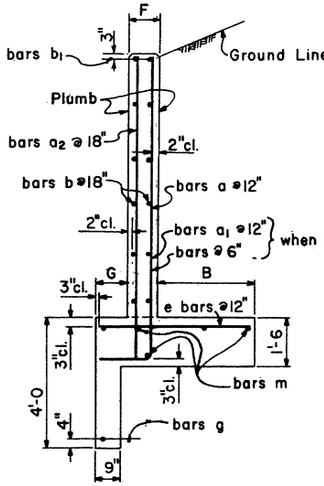
REVISION

STANDARD NO. B-08.10

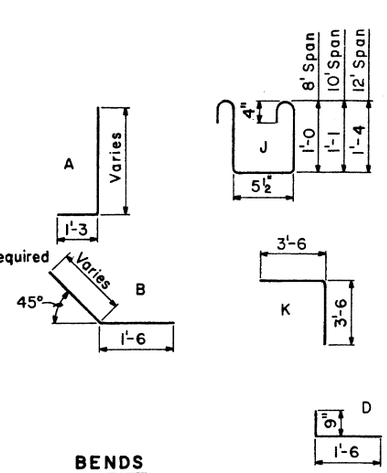


TYPE B WING

HEADWALL PLAN



SECTION A-A

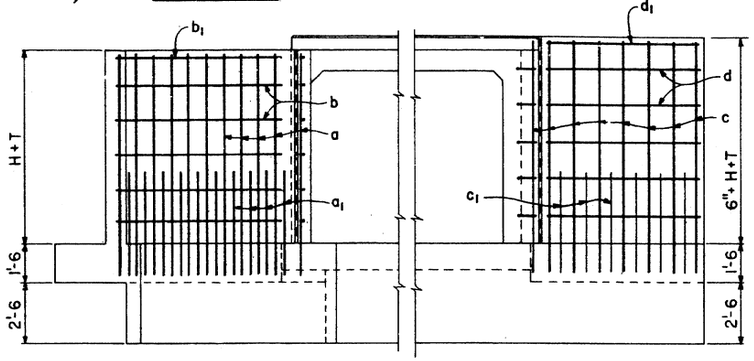


BENDS

WINGS STEEL LIST (L=H+2')

Mark	Bend	8' Height			9' Height			10' Height			11' Height			12' Height		
		No.	Size	Lgth.	No.	Size	Lgth.	No.	Size	Lgth.	No.	Size	Lgth.	No.	Size	Lgth.
TYPE A WING																
a	A	20	#7	11'-0	22	#8	12'-3	24	#6	13'-3	26	#7	14'-3	28	#7	15'-3
a_1	A							24	#6	6'-6	26	#7	6'-9	28	#7	7'-0
a_2	str.	14	#4	9'-9	14	#4	11'-0	16	#4	12'-0	18	#4	13'-0	18	#4	14'-0
b	⌐	20	#4	9'-0	24	#4	10'-0	28	#4	11'-0	28	#4	12'-0	32	#4	13'-0
b_1	⌐	4	#6	9'-0	4	#6	10'-0	4	#6	11'-0	4	#6	12'-0	4	#6	13'-0
b_2	B	12	#4	2'-3	14	#4	2'-3	16	#4	2'-3	16	#4	2'-3	18	#4	2'-3
e	str.	20	#5	5'-0	22	#6	5'-6	24	#7	6'-0	26	#7	6'-6	28	#8	6'-9
g	B	2	#4	12'-3	2	#4	13'-9	2	#4	14'-9	2	#4	16'-0	2	#4	17'-0
m	str.	10	#4	9'-6	10	#4	10'-6	10	#4	11'-6	10	#4	12'-6	10	#4	13'-6
TYPE B WING																
c	A	20	#7	11'-6	22	#8	12'-9	24	#6	13'-9	26	#7	14'-9	28	#7	15'-9
c_1	⌐							24	#6	6'-6	26	#7	6'-9	28	#7	7'-0
c_2	str.	14	#4	10'-3	14	#4	11'-6	16	#4	12'-6	18	#4	13'-6	18	#4	14'-6
d	⌐	24	#4	9'-0	28	#4	10'-0	28	#4	11'-0	32	#4	12'-0	36	#4	13'-0
d_1	⌐	4	#6	9'-0	4	#6	10'-0	4	#6	11'-0	4	#6	12'-0	4	#6	13'-0
d_2	D	14	#4	2'-3	16	#4	2'-3	16	#4	2'-3	18	#4	2'-3	20	#4	2'-3
f	str.	20	#5	5'-0	22	#6	5'-6	24	#7	6'-0	26	#7	6'-6	28	#9	7'-6
g_1	⌐	2	#4	11'-3	2	#4	12'-3	2	#4	13'-3	2	#4	14'-3	2	#4	15'-3
n	⌐	10	#4	9'-6	10	#4	10'-6	10	#4	11'-6	10	#4	12'-6	10	#4	13'-6

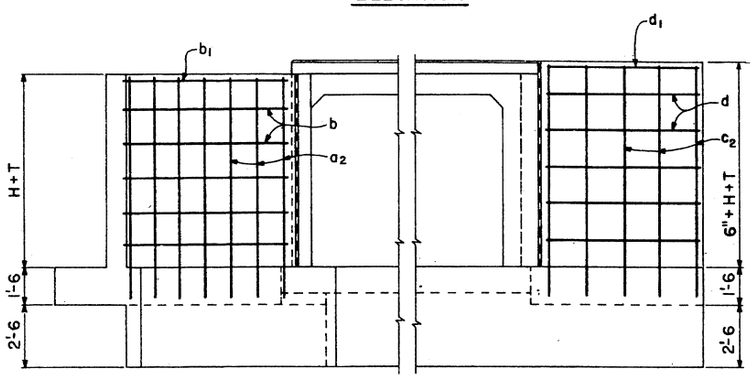
TYPE A WING



TYPE A WING
(Back Face Reinf.)

TYPE B WING
(Back Face Reinf.)

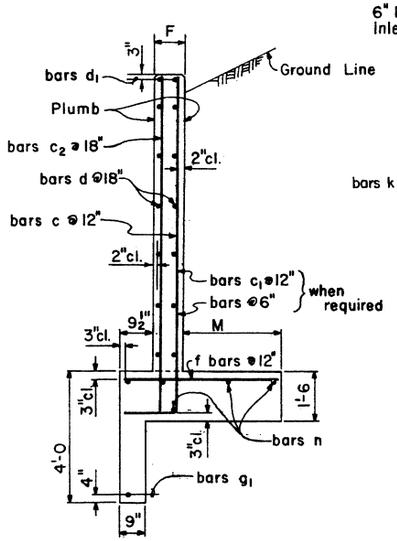
ELEVATION



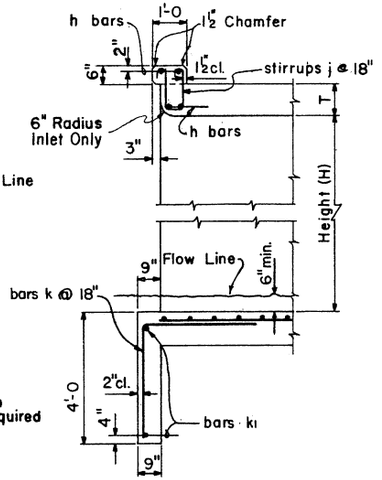
TYPE A WING
(Front Face Reinf.)

TYPE B WING
(Front Face Reinf.)

ELEVATION



SECTION B-B



SECTION C-C

CURB & CUT-OFF WALL QUANTITIES PER EACH ADDITIONAL BARREL

8' Spans		10' Spans		12' Spans	
Conc.	Steel	Conc.	Steel	Conc.	Steel
1.114	103	1.370	130	1.625	155

CURB & CUT-OFF WALL STEEL LIST

Mark	Bend	Size	8' Spans				10' Spans				12' Spans			
			I Barrel		○	◇	I Barrel		○	◇	I Barrel		○	◇
			No.	Lgth.	No.	Lgth.	No.	Lgth.	No.	Lgth.	No.	Lgth.	No.	Lgth.
TYPE A WING														
h	str.	#6	4	9'-0		8'-9	4	11'-3		10'-10	4	13'-6		13'-0
j	J	#4	7	3'-6	5		8	3'-9	7		9	4'-3	8	
k	K	⌐	4	7'-0	6		6	7'-0	7		7	7'-0	8	
k_1	str.	⌐	2	5'-9		8'-9	2	7'-6		10'-10	2	8'-3		13'-0
TYPE B WING														
h	str.	#6	4	10'-6		8'-9	4	12'-9		10'-10	4	15'-0		13'-0
j	J	#4	7	3'-6	6		9	3'-9	7		10	4'-3	8	
k	K	⌐	7	7'-0	6		9	7'-0	7		10	7'-0	8	
k_1	str.	⌐	2	9'-6		8'-9	2	11'-6		10'-10	2	13'-6		13'-0

○ Additional number of bars per. ea. extra barrel.
◇ Additional length of bars per. ea. extra barrel.

APPROXIMATE HEADWALL QUANTITIES *

Span	Height	Hdwl. Type A Wings				Hdwl. Type B Wings			
		For L= H+2'		Per each Add. Ft.		For L= H+2'		Per each Add. Ft.	
		Conc.	Steel	Conc.	Steel	Conc.	Steel	Conc.	Steel
8'	8'	15.07	1017	.682	46	15.05	1095	.703	49
10'	8'	15.44	1045	.690	46	15.41	1128	.707	49
	9'	18.30	1462	.753	61	18.18	1556	.771	63
	10'	21.49	1655	.817	64	21.20	1708	.835	65
12'	8'	15.78	1071	.696	46	15.80	1155	.714	49
	9'	18.67	1488	.759	61	18.59	1582	.777	63
	10'	21.86	1680	.822	64	21.61	1734	.840	65
	11'	25.95	2197	.663	78	25.61	2295	.922	81
	12'	30.03	2596	1.015	87	30.86	2908	1.035	98

* Includes curb and cut-off wall quantities for a single barrel.

DIMENSIONS

Height of Opening	A	B	C	D	E	F	G	J	K	M
8'	1'-9	3'-9	5'-6	5'-0	1'-8¾	11½	0'-9	5'-6	1'-9	3'-9
9'	2'-0	4'-0	6'-0	5'-4	2'-1	11½	1'-0	6'-0	1'-9	4'-3
10'	2'-0	4'-6	6'-6	6'-0	2'-1	11½	1'-0	6'-6	1'-9	4'-9
11'	2'-4	4'-8	7'-0	6'-3	2'-6⅝	1'-0½	1'-3	7'-0	1'-10	5'-2
12'	2'-6	4'-9	7'-3	6'-5	2'-9⅜	1'-1½	1'-4	8'-0	1'-11	6'-1

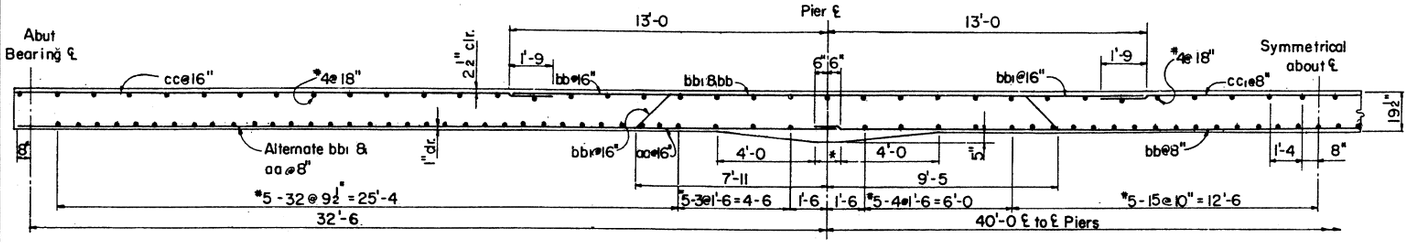
NOTE:
See B-01.10 for general notes and miscellaneous details.

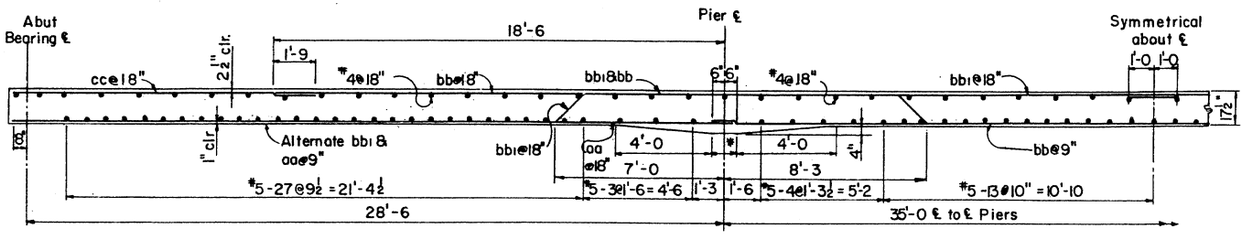
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Wing thickness & curb height	J.T.W.	7-76
②			
③			

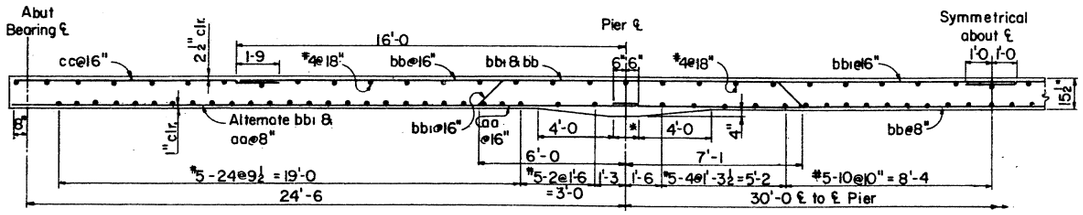
	WT., DHY.	KDM, ARV	NAB, ARV
DESIGN	8-72		
DRAWN	8-72		
CHECKED	3-73		

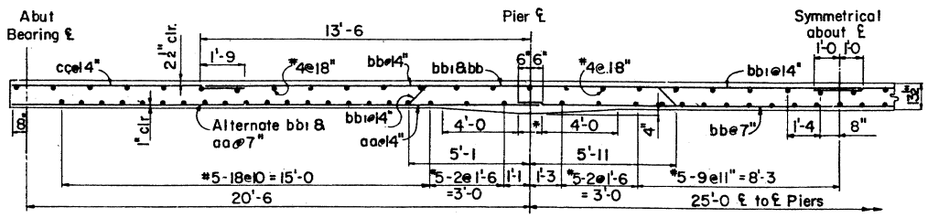
Registered Professional Engineer (Civil) CERTIFICATE EXPIRES Dec. 31, 19 ARIZONA, U.S.A.

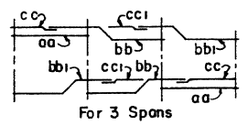
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET OR OUTLET LEVEL WINGS, HEIGHT 8' TO 12'	STANDARD NO. B-08.20



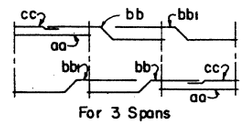




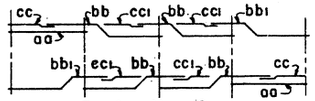




For 3 Spans



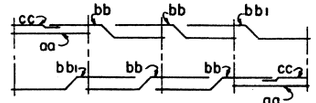
For 3 Spans



For 4 or More Spans

SLAB STEEL PLACING DIAGRAM

For 32½-40 Span Length



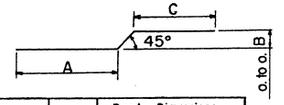
For 4 or More Spans

SLAB STEEL PLACING DIAGRAM

For 28½-35, 24½-30 & 20½-25 Span Lengths

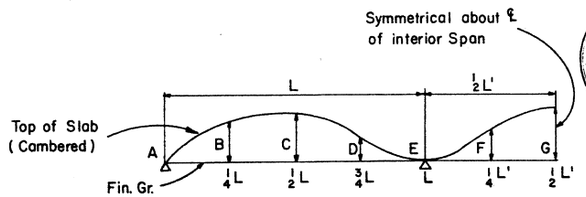
STEEL LIST

Span Lgths	Mark	Size	Bend	Lgth	Bend Dimensions A	B	C
32'-6, 40'-0	aa	10	str	33'-9			
	bb	10		54'-0	31'-1	1'-4	21'-2
	bb1	10		46'-9	25'-3	1'-4	19'-8
	cc	6	str	22'-0			
	cc1	4	str	17'-6			
28'-6, 35'-0	aa	10	str	29'-9			
	bb	10		54'-6	27'-3	1'-2	25'-8
	bb1	10		48'-3	22'-2	1'-2	24'-5
	cc	6	str	12'-6			
24'-6, 30'-0	aa	9	str	25'-9			
	bb	9		47'-0	23'-5	1'-0	22'-2
	bb1	9		41'-6	19'-2	1'-0	21'-1
	cc	6	str	11'-0			
20'-6, 25'-0	aa	8	str	21'-9			
	bb	8		39'-6	19'-7	10"	18'-8
	bb1	8		35'-0	16'-1	10"	17'-10
	cc	6	str	9'-6			



DEAD LOAD CAMBER

L	L'	A	B	C	D	E	F	G
32'-6	40'-0	0"	1/4"	9/32"	1/8"	0"	1/8"	9/32"
28'-6	35'-0	0"	3/16"	7/32"	3/32"	0"	3/32"	5/32"
24'-6	30'-0	0"	1/8"	5/32"	1/16"	0"	3/32"	5/32"
20'-6	25'-0	0"	3/32"	3/32"	1/32"	0"	1/32"	3/32"



DEAD LOAD CAMBER DIAGRAM

NO SCALE

GENERAL NOTES:

See Project Drawings for cross section of deck slab, roadway width, curbs, railings, and foundations.

Minimum length of bridge shall be 3 spans. For additional length intermediate spans equal to the center span shall be added.

Construction - Standard Specifications Ariz. Dept. of Transportation Edition of 1982, revised to date.

Design - A.A.S.H.O. Specifications for Highway Bridges 1973.

Dead Load - Dead Load includes allowance of 25 pounds per square foot for future wearing surface.

Loading Class - HS20 - 44

Load Distribution - E = 4.0 + .06S (S taken as effective end span length)

Stresses -

Class S concrete $f'_c = 4{,}500$ psi; $f_c = 1{,}400$ psi

Reinforcing steel shall conform to ASTM Spec. A615.

Bar sizes #6 and smaller shall be Gr. 40 or Gr. 60; $f_s = 20000$ psi

Bar sizes #7 and larger shall be Grade 60; $f_s = 24000$ psi

Curbs and/or sidewalk shall be poured to grade after falsework has been struck.

Dimensions shall not be scaled from drawings.

Haunch dimension normal to centerline of bent.

Forms shall be cambered for dead load deflection, vertical curvature, form deflection and falsework settlement. Camber figures given in plans are for dead load only.

*Dimension varies. See Project Drawings for dimension and Special Pier Details.

NO.	DESCRIPTION OF REVISIONS	DATE	MADE BY
1	Added haunch dimension note	7-76	JTW
2	Change notes & clearances	2-82	WEB
3	Change Reinf. Note	10-86	CH

DESIGN	JEM	9-72
DRAWN	CAG	11-72
CHECKED	JEM, HW	12-72

DESIGN APPROVED R.C. Buchli

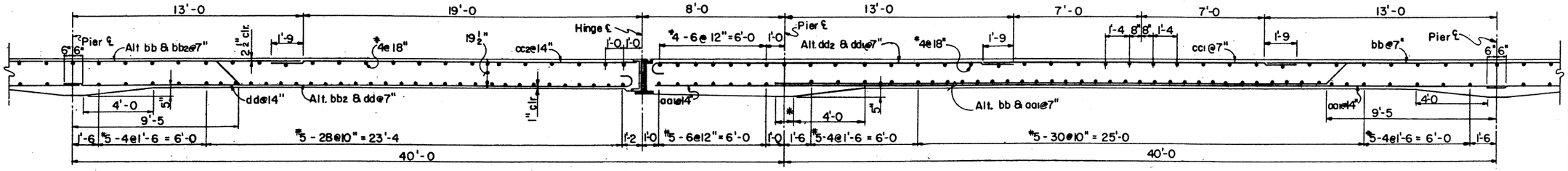
APPROVED FOR DISTRIBUTION

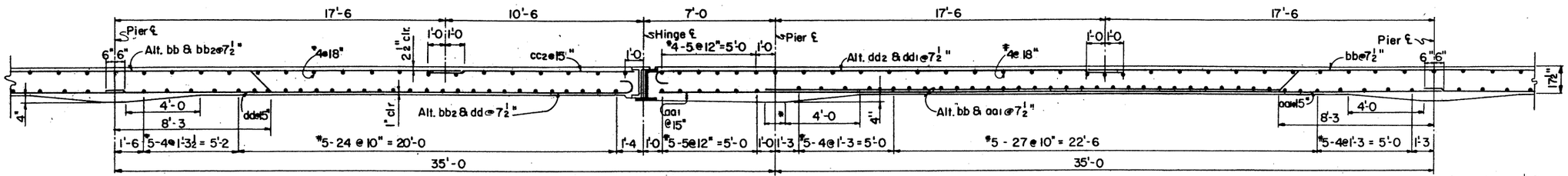
ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS

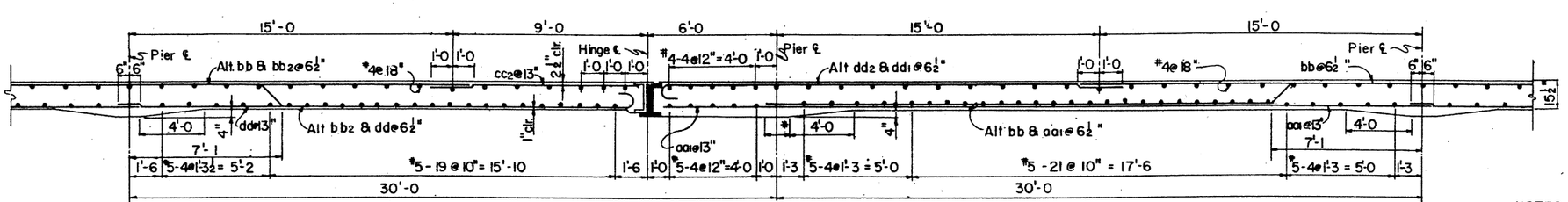
REVISION 10-86

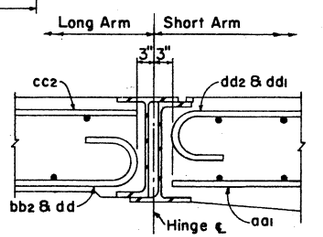
CONTINUOUS SPAN SLAB HS20-44 LOADING

STANDARD NO. B-09.10

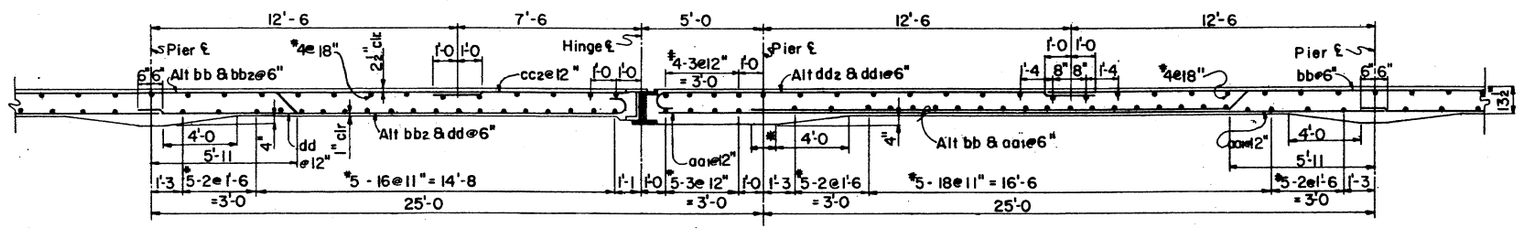








SECTION THROUGH JOINT



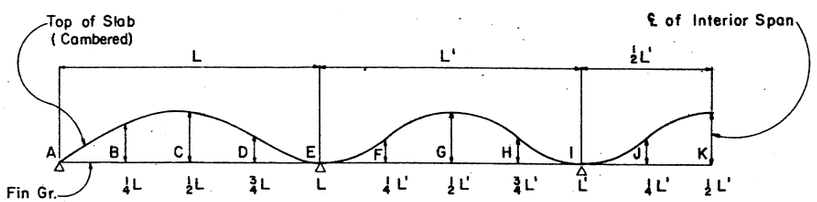
NOTES:

Refer to B-09.10 and Project Drawings for General Notes.

Refer to B-10.10 for steel list, bar placing diagrams and hinge details.

NOTE

The contractor shall excercise caution when installing hinge assembly. Reversed hinge installation will not provide required structural support for suspended arm.



DEAD LOAD CAMBER DIAGRAM

NO SCALE

DEAD LOAD CAMBER

L	L'	A	B	C	D	E	F	G	H	I	J	K
32'-6	40'-0	0"	¼"	9/32"	⅛"	0"	⅛"	9/32"	⅛"	0"	⅛"	9/32"
28'-6	35'-0	0"	13/64"	7/32"	3/32"	0"	3/32"	13/64"	3/32"	0"	3/32"	13/64"
24'-6	30'-0	0"	⅛"	5/32"	1/16"	0"	3/32"	5/32"	3/32"	0"	3/32"	5/32"
20'-6	25'-0	0"	5/64"	3/32"	1/32"	0"	3/32"	3/32"	3/32"	0"	3/32"	3/32"

Camber hinge span as per interior spans.

*Dimension varies. See Project Drawings for dimension and Special Pier Details.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Changed haunch dimension	JTW	7-76
②	Changed hinge	JEM	2-85

	J.E.M.	10-72
DESIGN	CAG	11-72
DRAWN	JEM, HW	12-72
CHECKED		

DESIGN APPROVED: R.C. Brechler

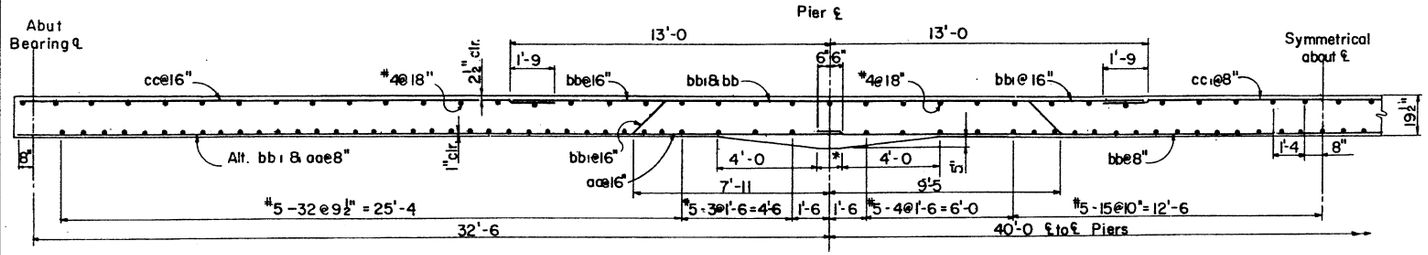
APPROVED FOR DISTRIBUTION: E.D. Jendali

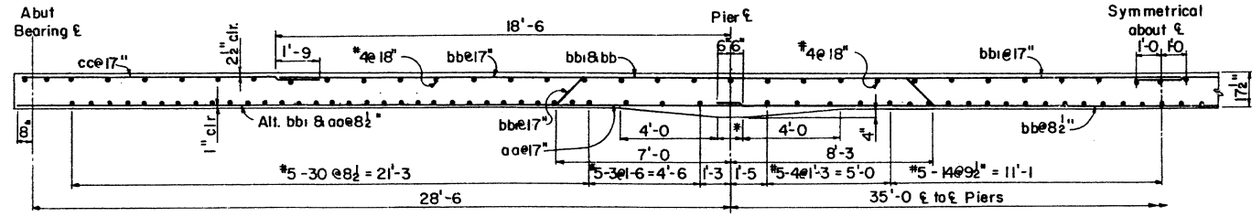
ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

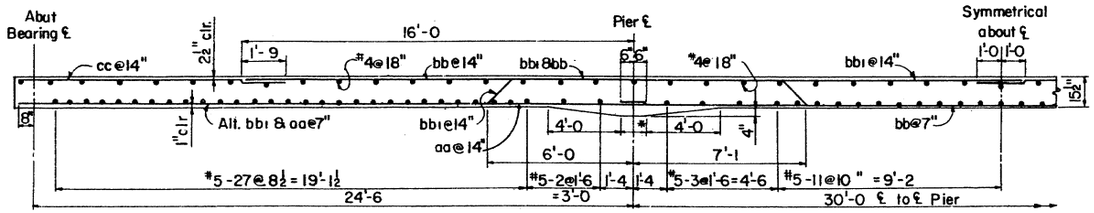
CONTINUOUS SPAN SLAB WITH HINGE HS20-44 LOADING

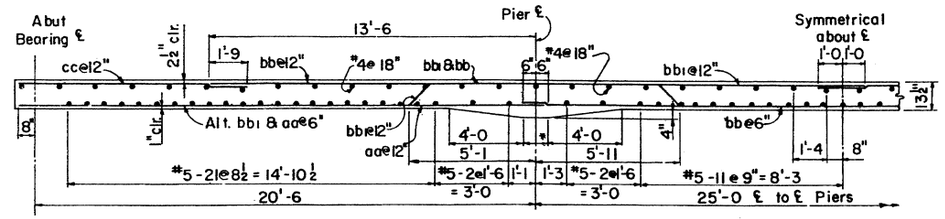
REVISION 18/85

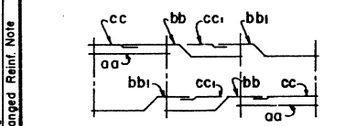
STANDARD NO. B-09.20



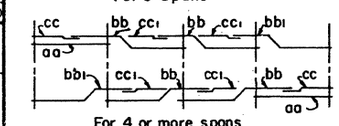








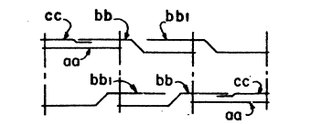
For 3 Spans



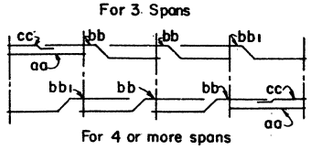
For 4 or more spans

SLAB STEEL PLACING DIAGRAM

For $32\frac{1}{2}$ - 40 Span Length



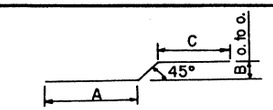
For 3 Spans



For 4 or more spans

SLAB STEEL PLACING DIAGRAM

For $28\frac{1}{2}$ -35, $24\frac{1}{2}$ -30, $20\frac{1}{2}$ -25 Span Lengths

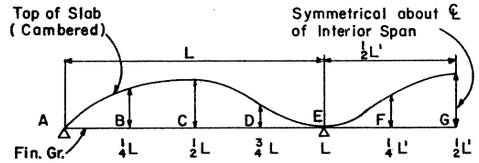


STEEL LIST

Span Lgths	Mark	Size	Bend	Lgth	Bend Dimensions A	B	C
32'-6, 40'-0	aa	10	str	33'-9			
	bb	10	⌒	54'-0	31'-1	1'-4	21'-2
	bb1	10	⌒	46'-9	25'-3	1'-4	19'-8
	cc	6	str	22'-0			
	cc1	4	str	17'-6			
28'-6, 35'-0	aa	10	str	29'-9			
	bb	10	⌒	54'-6	27'-3	1'-2	25'-8
	bb1	10	⌒	48'-3	22'-2	1'-2	24'-5
	cc	6	str	12'-6			
24'-6, 30'-0	aa	9	str	25'-9			
	bb	9	⌒	47'-0	23'-5	1'-0	22'-2
	bb1	9	⌒	41'-6	19'-2	1'-0	21'-1
	cc	6	str	11'-0			
20'-6, 25'-0	aa	8	str	21'-9			
	bb	8	⌒	39'-6	19'-7	10"	18'-8
	bb1	8	⌒	35'-0	16'-1	10"	17'-10
	cc	6	str	9'-6			

DEAD LOAD CAMBER

L	L'	A	B	C	D	E	F	G
32'-6	40'-0	0"	¼"	9/32"	⅛"	0"	⅛"	9/32"
28'-6	35'-0	0"	3/16"	7/32"	3/32"	0"	3/32"	5/32"
24'-6	30'-0	0"	⅛"	5/32"	1/16"	0"	5/32"	5/32"
20'-6	25'-0	0"	3/32"	3/32"	1/32"	0"	1/32"	3/32"



DEAD LOAD CAMBER DIAGRAM

NO SCALE

GENERAL NOTES:

See Project Drawings for cross section of deck slab, roadway width, curbs, railings, and foundations.
Minimum length of bridge shall be 3 spans. For additional length intermediate spans equal to the center span shall be added.
Construction - Standard Specifications Arizona Department of Transportation Edition of 1982, revised to date.
Design - A.A.S.H.O. Specifications for Highway Bridges 1973.

Dead Load - Dead Load includes allowance of 25 pounds per square foot for future wearing surface.
Loading Class - HS20-44 and/or Interstate Alternate Loading.
Load Distribution - E = 4.0 + .06S (S taken as effective end span length)
Stresses-
Class S concrete f'c = 4,500psi; fc = 1,400 psi
Reinforcing steel shall conform to ASTM Spec. A615.
Bar sizes #6 and smaller shall be Gr. 40 or Gr. 60; f_s = 20000psi
Bar sizes #7 and larger shall be Grade 60; f_s = 24000psi

Curbs and/or sidewalk shall be poured to grade after falsework has been struck.
Dimensions shall not be scaled from drawings.
Haunch dimension normal to centerline of bent.
Forms shall be cambered for dead load deflection, vertical curvature, form deflection and falsework settlement. Camber figures given in plans are for dead load only.

* Dimension varies. See Project Drawings for dimension and Special Pier Details.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
⑦	Added haunch dimension note	J.T.W	7-76
⑧	Chg. steel note & bar dim.	WEB	2-82
⑨	Changed Reinf. Note	CH	10-86

DESIGN	JEM	9-72	
DRAWN	CAG	11-72	
CHECKED	JEM, HW	12-72	

DESIGN APPROVED R.C. Brechler

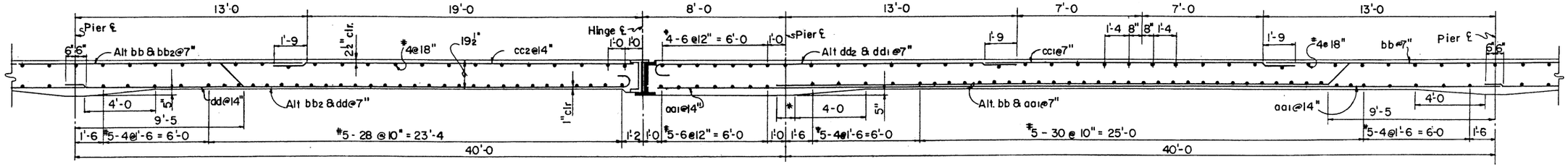
APPROVED, FOR DISTRIBUTION F. H. Scheidler

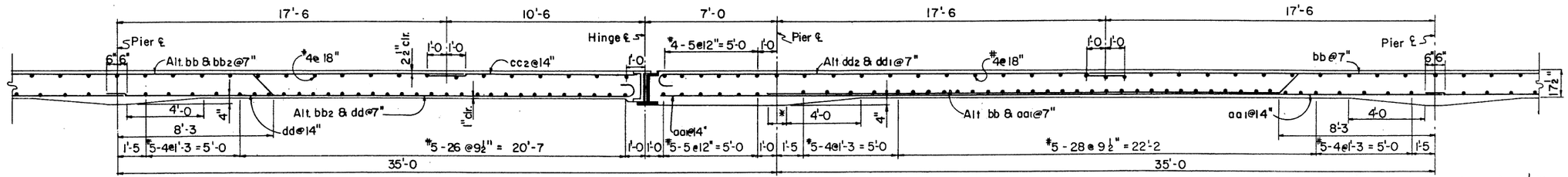
ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

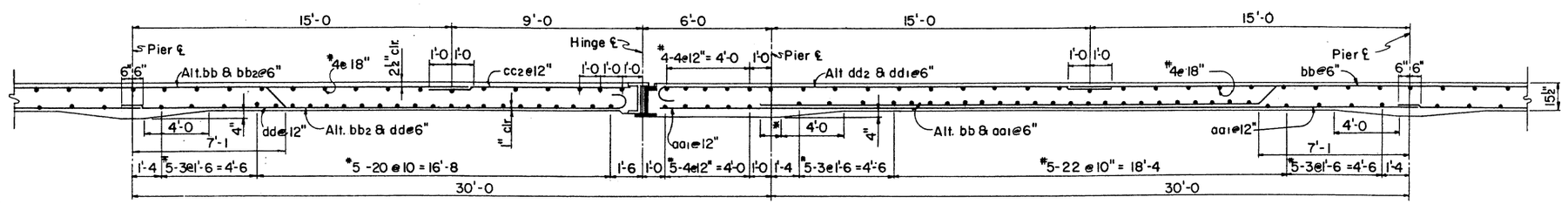
CONTINUOUS SPAN SLAB
INTERSTATE LOADING

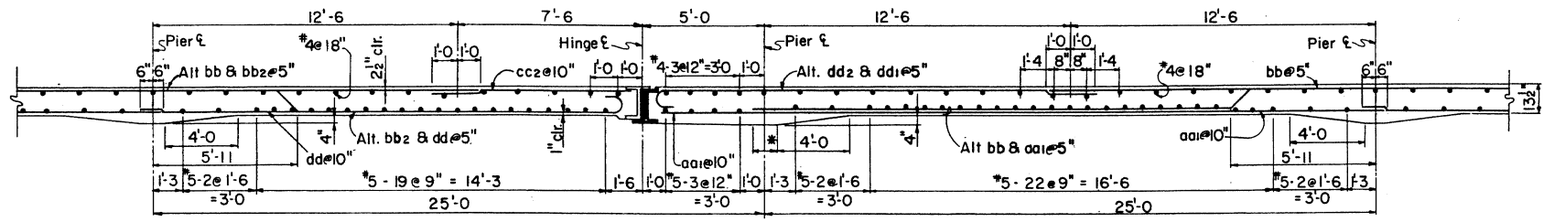
REVISION 10-86

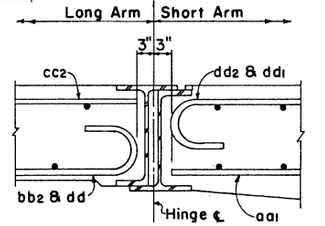
STANDARD NO. B-09.30









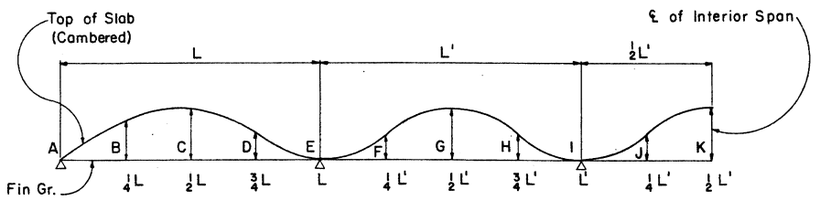


SECTION THROUGH JOINT

NOTES:

Refer to B-09.30 and Project Drawings for General Notes.
Refer to B-10.10 for steel list, bar placing diagram and hinge details.

NOTE
The contractor shall excercise caution when installing hinge assembly. Reversed hinge installation will not provide required structural support for suspended arm.



DEAD LOAD CAMBER DIAGRAM
NO SCALE

DEAD LOAD CAMBER

L	L'	A	B	C	D	E	F	G	H	I	J	K
32'-6	40'-0	0"	¼"	9/32"	⅛"	0"	⅛"	9/32"	⅛"	0"	⅛"	9/32"
28'-6	35'-0	0"	3/16"	7/32"	3/32"	0"	3/32"	3/16"	3/32"	0"	3/32"	3/16"
24'-6	30'-0	0"	⅛"	5/32"	1/16"	0"	3/32"	1/32"	3/32"	0"	3/32"	1/32"
20'-6	25'-0	0"	1/32"	3/32"	1/32"	0"	3/32"	1/32"	3/32"	0"	3/32"	1/32"

Camber hinge span as per interior spans

* Dimension varies. See Project Drawings for dimension and Special Pier Details.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Changed haunch dimension	JTW	7-78
②	Changed hinges	JEM	2-85
③			

DESIGN	JEM
DRAWN	CAG
CHECKED	JEM, HW
10-72	
11-72	
12-72	

DESIGN APPROVED: R.C. Brechle

APPROVED FOR DISTRIBUTION: E.J. Hamilton

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION 8/85

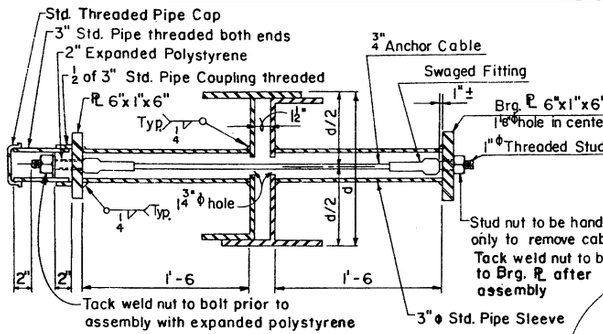
CONTINUOUS SPAN SLAB
WITH HINGE,
INTERSTATE LOADING

STANDARD NO. B-09.40

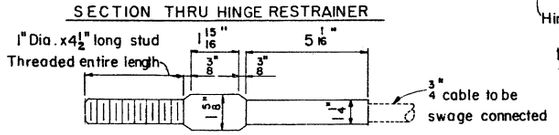
INTERSTATE OR HS20-44*

Span Lgth	Mark	Size	Bend	Lgth	Bend Dimensions A	B	C	D	E
40'-0	aa1	10	str	48'-3					
	bb	10	2	54'-0	31'-1	1'-4	21'-2		
	bb2	10	1	46'-4	22'-4	1'-4	21'-2	1'-0¾"	11½"
	cc1	4	str	17'-6					
	cc2	6	str	20'-6					
	dd	10	3	33'-4	32'-3	9"	9½"		
	dd1	10	3	21'-11	20'-9	9"	9½"		
	dd2	10	3	21'-11	20'-9	9"	9½"		
35'-0	aa1	10	str	42'-3					
	bb	10	2	54'-6	27'-3	1'-2	25'-8		
	bb2	10	1	47'-10	19'-6	1'-2	25'-8	1'-0¾"	11½"
	cc2	6	str	11'-3					
	dd	10	3	29'-4	28'-3	9"	9½"		
	dd1	10	3	32'-8	31'-7	9"	9½"		
	dd2	10	3	26'-5	25'-3	9"	9½"		
30'-0	aa1	9	str	36'-3					
	bb	9	2	47'-0	23'-5	1'-0	22'-2		
	bb2	9	1	41'-1	16'-8	1'-0	22'-2	11½"	10"
	cc2	6	str	9'-9					
	dd	9	3	25'-4	24'-3	8"	8½"		
	dd1	9	3	27'-8	26'-7	8"	8½"		
	dd2	9	3	22'-8	21'-9	8"	8½"		
25'-0	aa1	8	str	30'-3					
	bb	8	2	39'-6	19'-7	10"	18'-8		
	bb2	8	1	34'-7	13'-10	10"	18'-8	8"	8"
	cc2	6	str	8'-3					
	dd	8	3	21'-1	20-3	7"	7½"		
	dd1	8	3	22'-5	21'-7	7"	7½"		
	dd2	8	3	19'-2	18'-3	7"	7½"		

* Bar sizes and bend dimensions are the same for both Interstate and HS20-44 slabs. Bar spacing varies for the two cases. See B-09.20 and B-09.40 for details.



SECTION THRU HINGE RESTRAINER



SWAGED FITTING AND STUD DETAIL

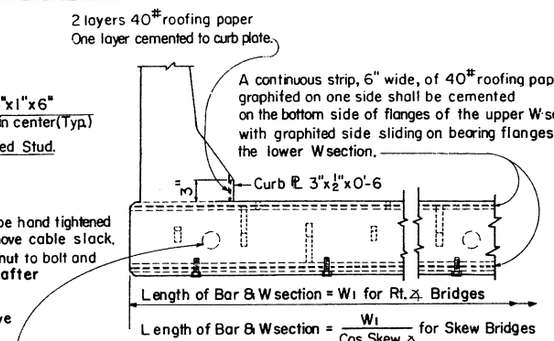
NOTE:

Anchor cable shall be 6x19 classification, galvanized, with a minimum breaking strength of 21.4 tons.

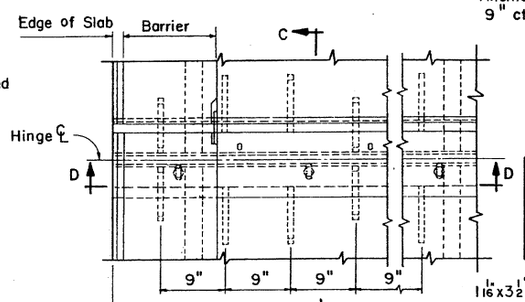
Swaged fitting and stud assembly shall conform to the requirements of American Iron and Steel Institute 1035 and shall develop the breaking strength of the cable.

Expanded polystyrene shall be shipped loose and assembled after hinge joint is erected.

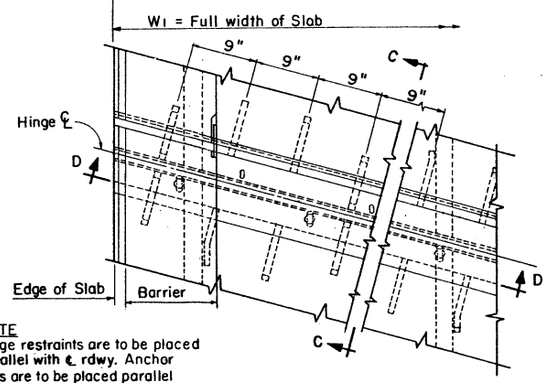
HINGE RESTRAINER DETAILS



SECTION D-D

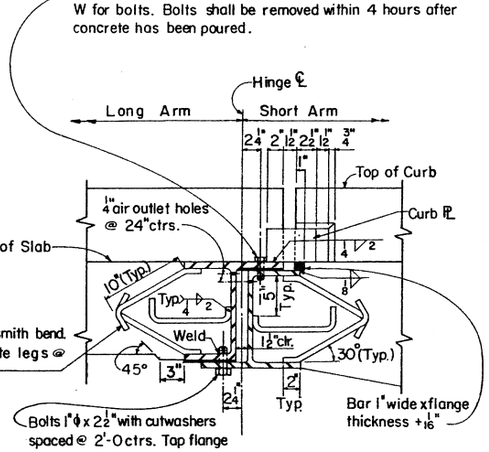


PLAN
Right Angle Bridge



NOTE
Hinge restraints are to be placed parallel with ℄ rdwy. Anchor bars are to be placed parallel with ℄ rdwy. for skews in excess of 10°

PLAN
Skew Bridge



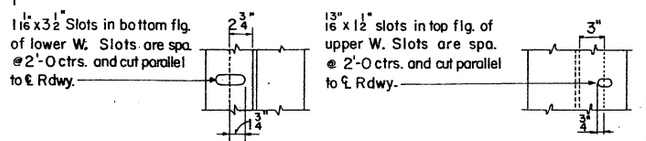
SECTION C-C

NOTES: W sections see table below

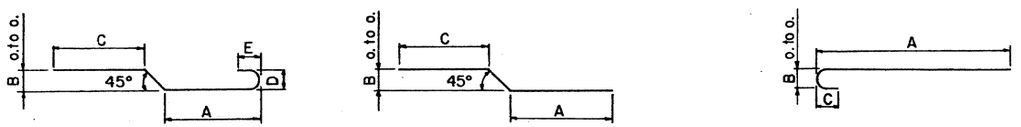
Burn off one half flange of each section flush with web face.

Bearing faces of flanges shall be ground smooth after drilling and tapping.

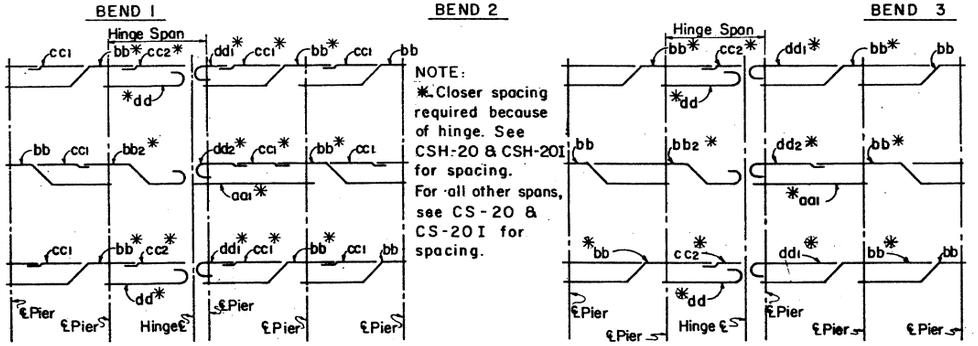
W sections shall have parallel flange faces.



FLANGE SLOT DETAILS



BEND 1 BEND 2 BEND 3



NOTE:
* Closer spacing required because of hinge. See CSH-20 & CSH-201 for spacing.
For all other spans, see CS-20 & CS-201 for spacing.

For 40' Span Lengths For 35', 30' & 25' Span Lengths

STEEL PLACING DIAGRAM FOR HINGE SPAN & ADJACENT SPANS

NOTES:

Structural steel shall conform to ASTM Spec. A36.

Paint and painting shall conform to Standard Specifications. Contact surfaces shall not be painted.

Slab Hinge Joint shall be shop assembled, shipped and erected as a unit. Unit shall be shop fabricated to conform to the roadway section as noted on deck details.

Joint shall be continuous for lengths 40 feet or less. For lengths over 40 feet the joint may be two pieces butted together, without welded splicing, at the roadway crown or construction centerline.

Butted ends shall meet smoothly on the roadway surface after installation or they shall be ground smooth.

Reinforcing steel shall conform to ASTM Spec. A615

Bar sizes #6 and smaller shall be Gr. 40 or Gr. 60; f_s=20000psi

Bar sizes #7 and larger shall be Grade 60; f_s=24000psi

TABLE OF W SECTIONS FOR VARIOUS SLAB THICKNESSES

Slab Thickness	W Section
19½"	W 21x111
17½"	W 18x97
15½"	W 16x77
13½"	W 14x90

REGISTERED PROFESSIONAL ENGINEER R.C. Buehler DEC. 31, 19 ARIZONA, U.S.A.

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
R.C. Buehler		10-86
APPROVED FOR DISTRIBUTION	SLAB HINGE JOINT AND HINGE SPAN REINFORCING DETAILS	STANDARD NO. B-10.10

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
④	Change notes & bar dim.	WEB	8-82
⑤	Changed hinge sect., hinge restrainer & bar lgths.	JEM	2-85
⑥	Revised Paint Note.	CH	10-86

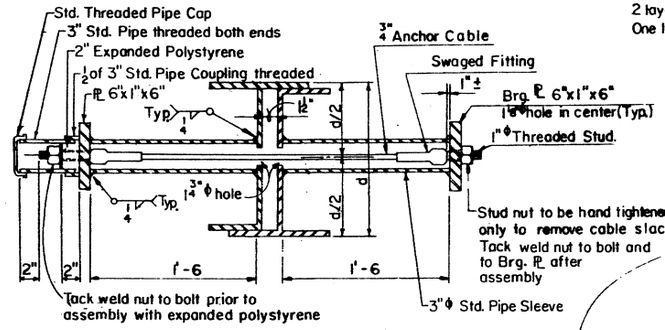
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Joint note added	SEA	11-74
②	Reinf. Note changed & W Shapes.	C.H.	8-80
③	Change W18X97 to W14X99	WB	5-81

DESIGN	JEM	10-72
DRAWN	CAG	11-72
CHECKED	JEM, HW	12-72

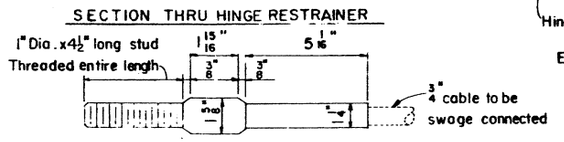
INTERSTATE OR HS20 - 44*

Span Lgth	Mark	Size	Bend	Lgth	Bend Dimensions A	B	C	D	E
40'-0	aa1	10	str	48'-3					
	bb	10	2	54'-0	31'-1	1'-4	21'-2		
	bb2	10	1	46'-4	22'-4	1'-4	21'-2	1'-0¾	11½"
	cc1	4	str	17'-6					
	cc2	6	str	20'-6					
	dd	10	3	33'-4	32'-3	9"	9½"		
	dd1	10	3	21'-11	20'-9	9"	9½"		
	dd2	10	3	21'-11	20'-9	9"	9½"		
35'-0	aa1	10	str	42'-3					
	bb	10	2	54'-6	27'-3	1'-2	25'-8		
	bb2	10	1	47'-10	19'-6	1'-2	25'-8	1'-0¾	11½"
	cc2	6	str	11'-3					
	dd	10	3	29'-4	28'-3	9"	9½"		
	dd1	10	3	32'-8	31'-7	9"	9½"		
	dd2	10	3	26'-5	25'-3	9"	9½"		
30'-0	aa1	9	str	36'-3					
	bb	9	2	47'-0	23'-5	1'-0	22'-2		
	bb2	9	1	41'-1	16'-8	1'-0	22'-2	11½"	10"
	cc2	6	str	9'-9					
	dd	9	3	25'-4	24'-3	8"	8½"		
	dd1	9	3	27'-8	26'-7	8"	8½"		
	dd2	9	3	22'-8	21'-9	8"	8½"		
25'-0	aa1	8	str	30'-3					
	bb	8	2	39'-6	19'-7	10"	18'-8		
	bb2	8	1	34'-7	13'-10	10"	18'-8	8"	8"
	cc2	6	str	8'-3					
	dd	8	3	21'-1	20'-3	7"	7½"		
	dd1	8	3	22'-5	21'-7	7"	7½"		
	dd2	8	3	19'-2	18'-3	7"	7½"		

* Bar sizes and bend dimensions are the same for both Interstate and HS20-44 slabs. Bar spacing varies for the two cases. See B-09.20 and B-09.40 for details.



SECTION THRU HINGE RESTRAINER



SWAGED FITTING AND STUD DETAIL

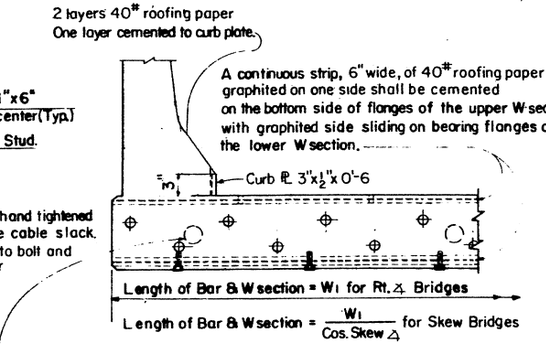
NOTE:

Anchor cable shall be 6 x 19 classification, galvanized, with a minimum breaking strength of 21.4 tons.

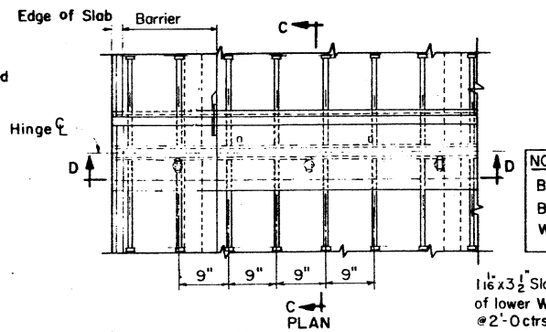
Swaged fitting and stud assembly shall conform to the requirements of American Iron and Steel Institute 1035 and shall develop the breaking strength of the cable.

Expanded polystyrene shall be shipped loose and assembled after hinge joint is erected.

HINGE RESTRAINER DETAILS

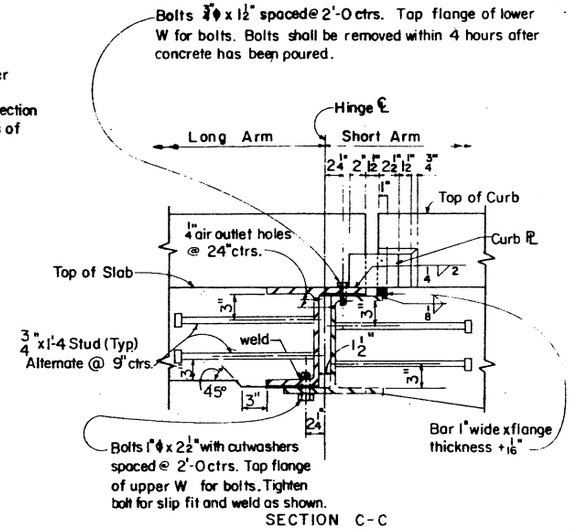


SECTION D-D



PLAN

Right Angle Bridge



SECTION C-C

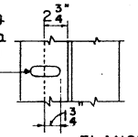
NOTES: W sections see table below

Burn off one half flange of each section flush with web face.

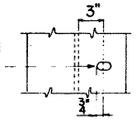
Bearing faces of flanges shall be ground smooth after drilling and tapping.

W sections shall have parallel flange faces.

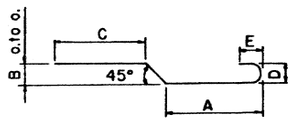
1/16" x 3½" Slots in bottom flg. of lower W. Slots are spa. @ 2'-0 ctrs. and cut parallel to ℄ Rdwy.



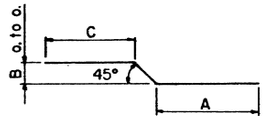
13/16" x 1½" slots in top flg. of upper W. Slots are spa. @ 2'-0 ctrs. and cut parallel to ℄ Rdwy.



FLANGE SLOT DETAILS



BEND 1



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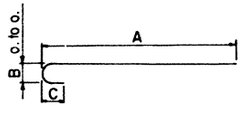
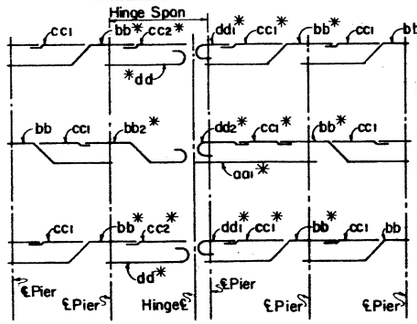
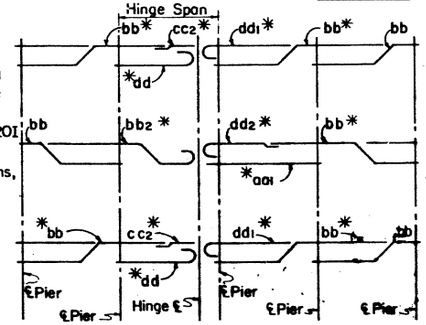


BEND 3



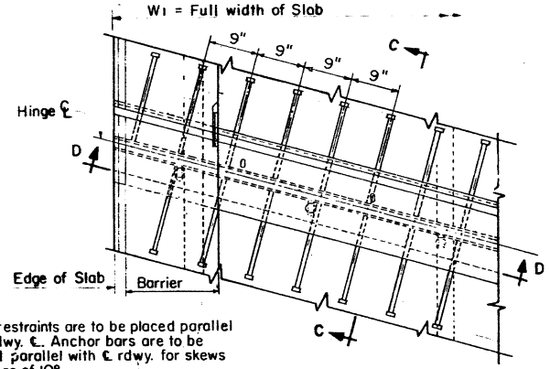
For 40' Span Lengths

NOTE:
* Closer spacing required because of hinge. See CSH-20 & CSH-201 for spacing. For all other spans, see CS-20 & CS-201 for spacing.



For 35', 30' & 25' Span Lengths

STEEL PLACING DIAGRAM FOR HINGE SPAN & ADJACENT SPANS



PLAN

Skew Bridge

NOTE

Hinge restraints are to be placed parallel with rdwy. ℄. Anchor bars are to be placed parallel with ℄ rdwy. for skews in excess of 10°.

NOTES:

Structural steel shall conform to ASTM Spec. A36.

Paint and painting shall conform to Standard Specifications. Contact surfaces shall not be painted.

Slab Hinge Joint shall be shop assembled, shipped and erected as a unit. Unit shall be shop fabricated to conform to the roadway section as noted on deck details.

Joint shall be continuous for lengths 40 feet or less. For lengths over 40 feet the joint may be two pieces butted together, without welded splicing, at the roadway crown or construction centerline.

Butted ends shall meet smoothly on the roadway surface after installation or they shall be ground smooth.

Reinforcing steel shall conform to ASTM Spec. A615

Bar sizes #6 and smaller shall be Gr 40 or Gr. 60; f_s = 20000psi

Bar sizes #7 and larger shall be Grade 60; f_s = 24000psi

TABLE OF W SECTIONS FOR VARIOUS SLAB THICKNESSES

Slab Thickness	W Section
19½"	W 21x111
17½"	W18x97
15½"	W16x77
13½"	W14x90

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Changed hinge seat, hinge restrainer & bar lgths	JEM	2-85
2	Revised Point Note	CH	10-86
3			

DESIGN
DRAWN WEB 12-82
CHECKED 1-82

DESIGN APPROVED K. Bueche

APPROVED FOR DISTRIBUTION E. Hamblin

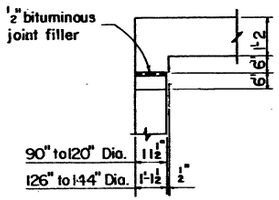
ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

SLAB HINGE JOINT AND HINGE SPAN REINFORCING DETAILS

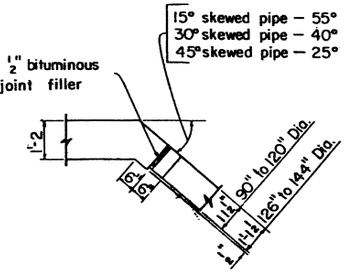
REVISION 10-86

STANDARD NO B-10.11

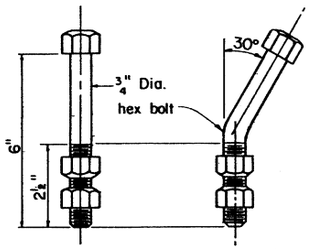
NOTE:
When straight anchor bolt will not fit in headwall use alternate anchor bolt.



DETAIL B

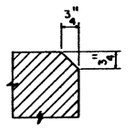


DETAIL C



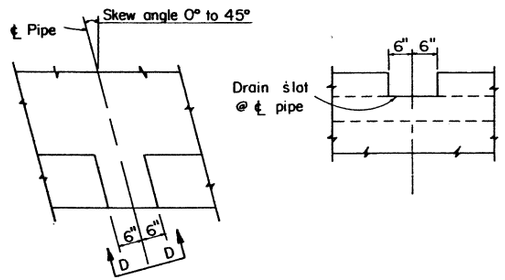
ANCHOR BOLT DETAIL

ALTERNATE ANCHOR BOLT DETAIL



Chamfer all exposed corners as shown unless otherwise noted. This note applicable to all sheets.

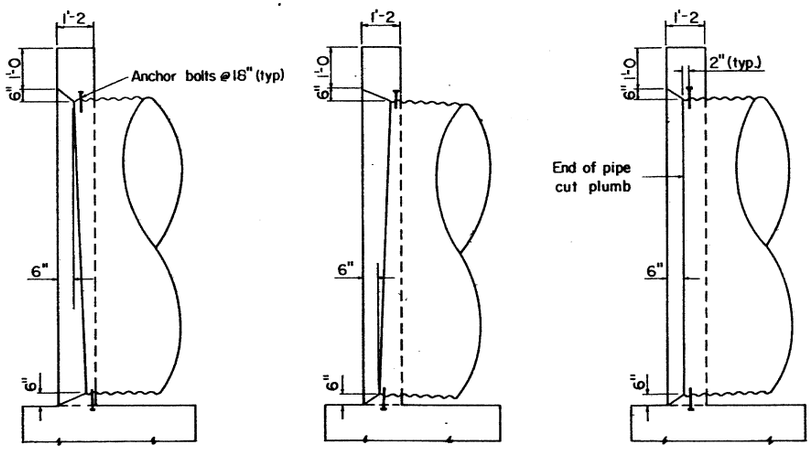
CHAMFER DETAIL



PLAN

ELEVATION D-D

APRON DRAIN DETAIL



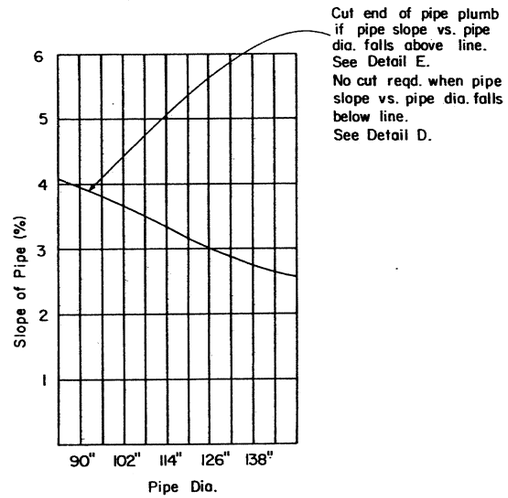
Outlet End

Inlet End

Outlet or Inlet End

DETAIL D

DETAIL E



CHART

(Use to determine treatment at end of pipe)

GENERAL NOTES

Design – AASHTO Std. Spec's for Highway Bridges 1977.

Construction – Std. Spec's. Ariz. Dept. of Transportation Edition of 1982 revised to date.

All Concrete shall be Class 'S', f'_c = 3000 psi.

Reinforcing steel shall conform to ASTM Spec's. A615.
Bar sizes #6 and smaller shall be Gr. 40 or Gr. 60; f_s = 20000psi
Bar sizes #7 and larger shall be Grade 60; f_s = 24,000psi

All bend dimensions for reinforcing steel shall be out to out of bars.

All reinforcing steel shall have 2" clear cover unless noted otherwise.

Dimensions shall not be scaled from drawings.

Bolt material shall conform to ASTM Spec's A 307.

Bolts shall be galvanized to conform to ASTM Spec's A153.

When end of pipe is cut to fit skew or slope, disturbed area of pipe shall be treated in accordance with requirements of the Standard Spec's.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Added Alt. Bolt Detail	WBK:sel	2-11-76
②	Wall Thicknesses	G.H.	7-14-76
③	Changes Notes	W.F.B.	12-82
④	Changed Reinf. Note	C.H.	10-86

DESIGN	K.W.	9-72
DRAWN	L.A.M.	9-72
CHECKED	R.L.C.	9-72

DESIGN APPROVED

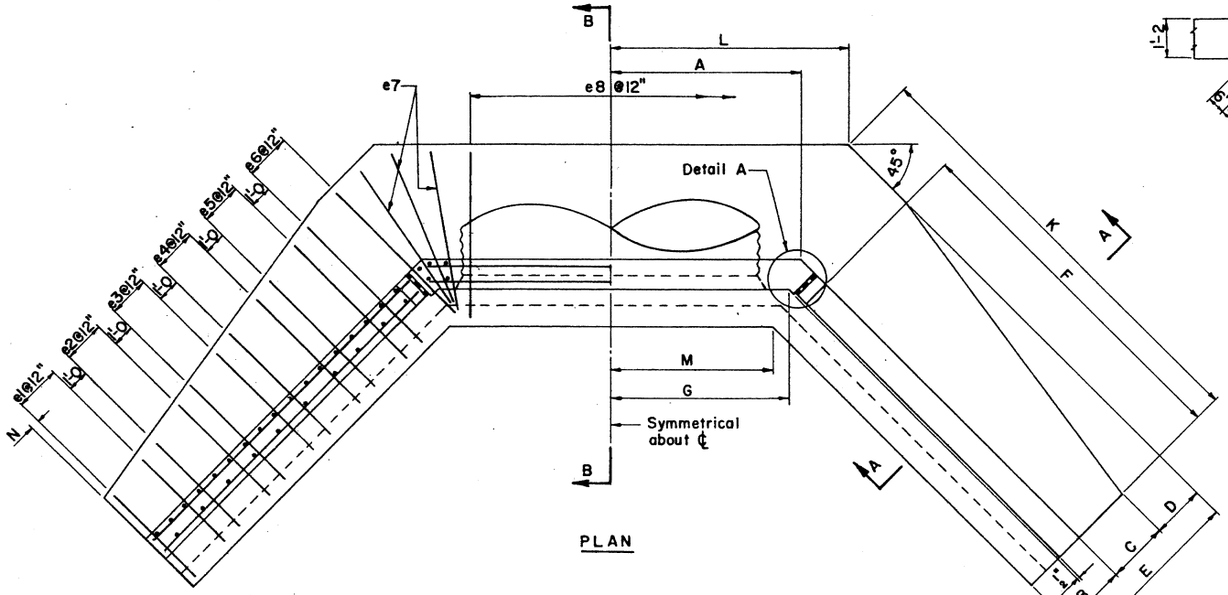
APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

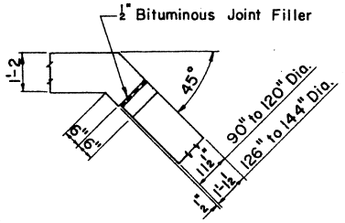
PIPE CULVERT HEADWALLS
MISCELLANEOUS DETAILS

REVISION 10-86

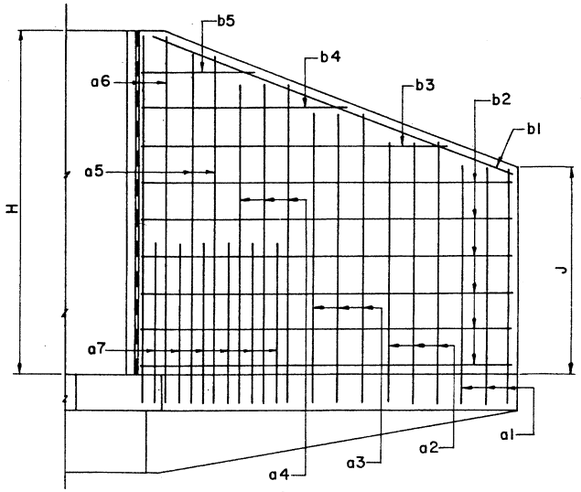
STANDARD NO. B-11.10



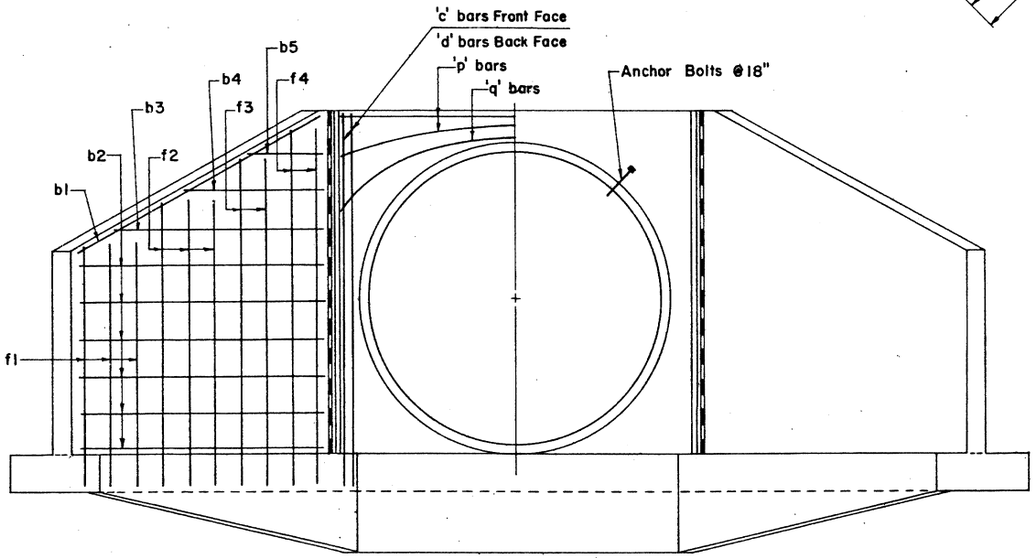
PLAN



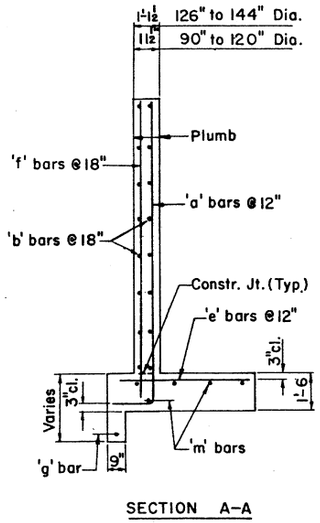
DETAIL A



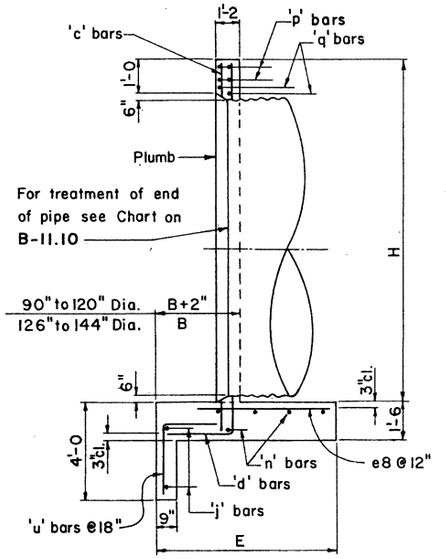
Back Face
WING ELEVATION



ELEVATION



SECTION A–A

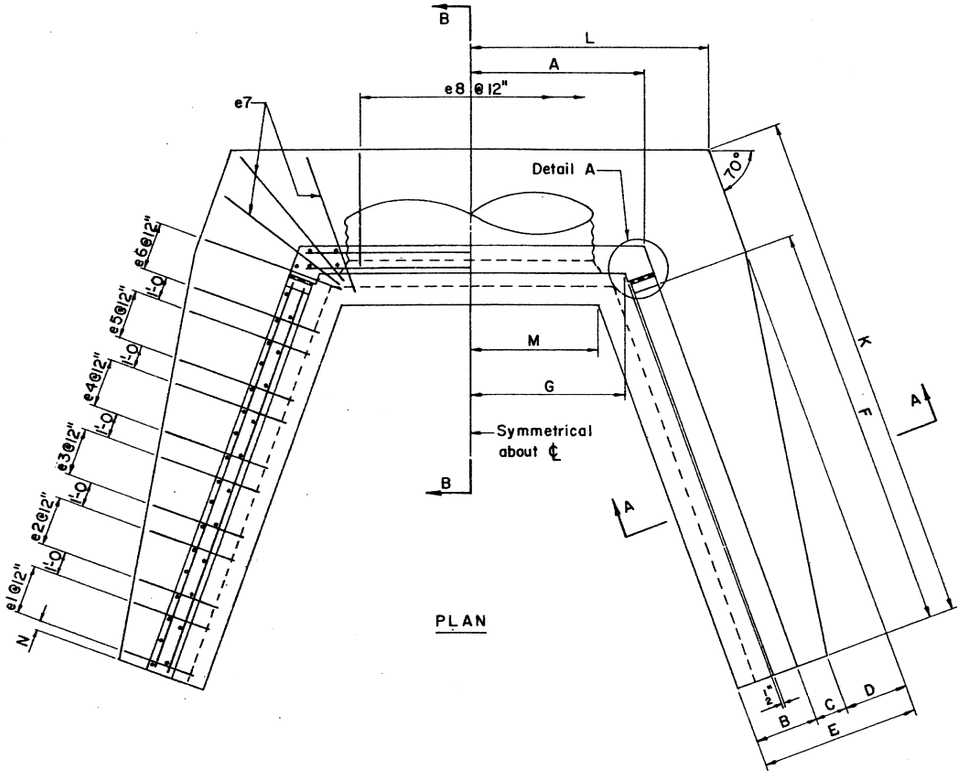


SECTION B-B

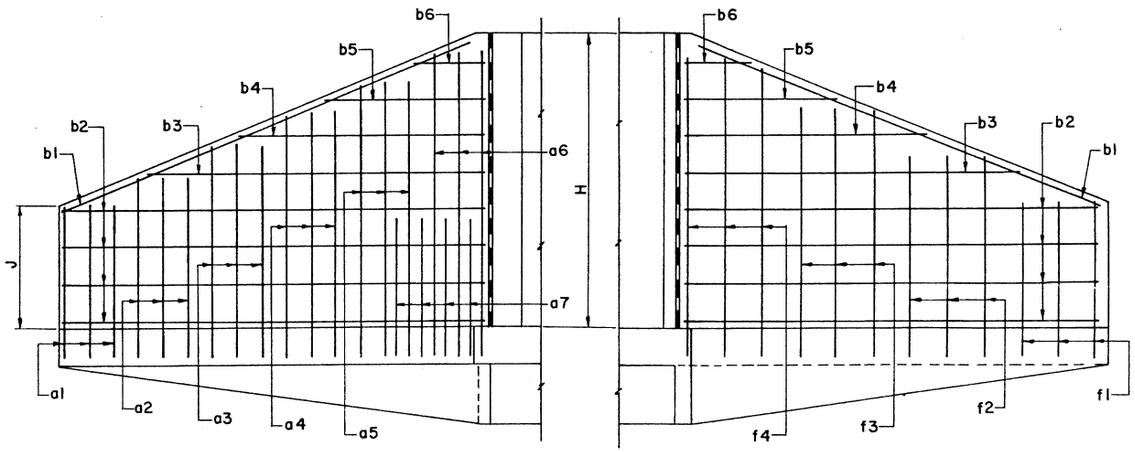
Notes: For General Notes and Misc. Details see B-11.10.
For steel list and bend diagrams see B-12.30, B-12.40 or B-12.50.

DESIGN	K.W.	9-72	NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
DRAWN	G.H.	9-72	①	Wall Thicknesses	G.H.	7-14-76
CHECKED	R.L.C.	9-72	②			
			③			

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
R.C. Buehler		
APPROVED FOR DISTRIBUTION	INLET HEADWALL RIGHT ANGLE PIPE CULVERT	STANDARD NO. B-12.10



PLAN

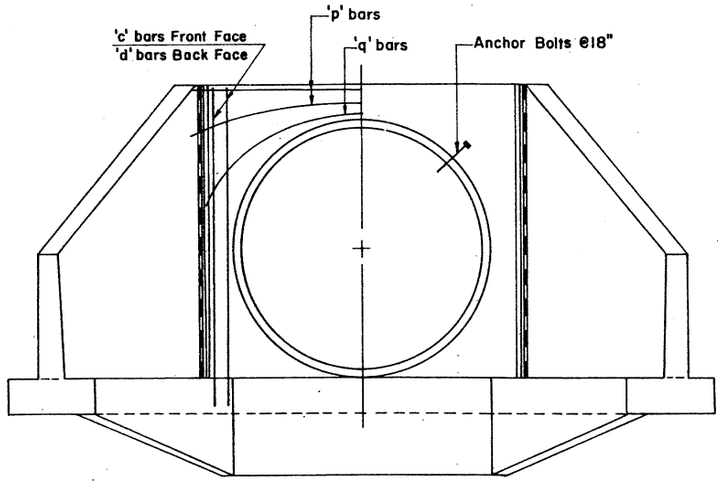


Back Face

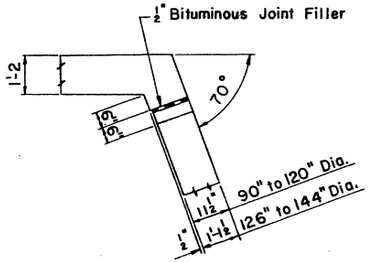
WING ELEVATION

Front Face

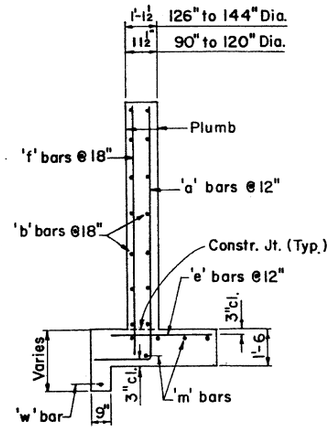
WING ELEVATION



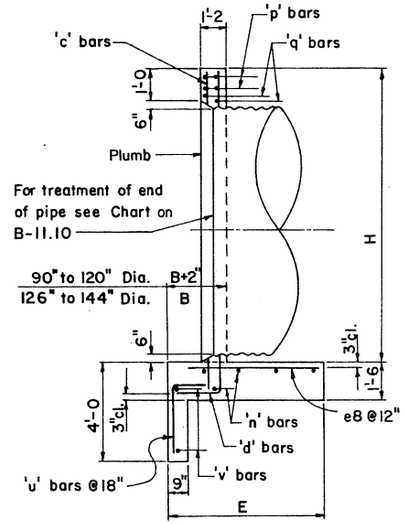
ELEVATION



DETAIL A



SECTION A-A



SECTION B-B

Notes: For General Notes and Misc. Details see B-11.10.
For steel list and bend diagrams see B-12.30, B-12.40 or B-12.50.

DESIGN	K.W.	9-72	NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
DRAWN	G.H.	9-72	①	Wall Thicknesses	G.H.	7-14-76
CHECKED	R.L.C.	9-72	②			
			③			

DESIGN APPROVED
K.C. Buehler

APPROVED FOR DISTRIBUTION
E.T. Beadle

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION

OUTLET HEADWALL
RIGHT ANGLE PIPE CULVERT

STANDARD NO.
B-12.20

STEEL LIST - INLET END

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	6	#5	8-6	6	#5	9-0	6	#5	9-3	6	#5	9-6	6	#5	10-0	6	#5	10-3	6	#6	10-6	6	#6	10-9	6	#6	11-3	6	#6	11-6
a2	A	6	#5	9-6	6	#5	10-0	6	#5	10-3	6	#5	10-6	6	#6	11-0	6	#6	11-3	6	#6	11-6	6	#7	11-9	6	#7	12-6	6	#7	12-6
a3	A	6	#5	10-6	6	#6	11-0	6	#6	11-3	6	#6	11-6	6	#6	12-0	6	#7	12-3	6	#7	12-9	6	#7	13-0	6	#8	13-6	6	#8	13-9
a4	A	6	#6	11-9	6	#6	12-0	4	#7	12-3	6	#7	12-6	6	#7	13-0	6	#7	13-3	6	#8	13-9	6	#8	14-0	6	#8	14-6	6	#8	14-9
a5	A							4	#7	13-0	4	#8	13-6	4	#8	14-0	6	#8	14-3	6	#8	14-9	4	#8	15-0	4	#8	15-6	6	#8	15-9
a6	A																						4	#8	15-9	4	#8	16-3	4	#8	17-0
a7	A																						8	#4	5-0	8	#4	5-6	10	#4	6-0
b1	str	4	#4	11-6	4	#4	12-0	4	#4	12-6	4	#4	13-3	4	#4	14-0	4	#4	14-6	4	#4	15-0	4	#4	15-9	4	#4	16-3	4	#4	16-9
b2	str	16	#4	11-0	16	#4	11-6	16	#4	12-0	20	#4	12-9	20	#4	13-6	20	#4	14-0	20	#4	14-6	20	#4	15-0	24	#4	15-6	24	#4	16-0
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b4	str	4	#4	4-0	4	#4	6-3	4	#4	7-3	4	#4	4-9	4	#4	6-0	4	#4	7-6	4	#4	8-9	4	#4	10-3	4	#4	7-3	4	#4	8-9
b5	str				4	#4	2-0	4	#4	3-9				4	#4	2-0	4	#4	3-9	4	#4	5-0	4	#4	6-6	4	#4	3-9	4	#4	5-0
c	str	4	#4	10-6	4	#4	11-0	4	#4	11-6	4	#4	12-0	4	#4	12-6	4	#4	13-0	4	#4	13-6	4	#4	14-0	4	#4	14-6	4	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#8	13-9	6	#8	14-6	6	#8	15-0	6	#8	15-6	6	#8	16-0	6	#8	16-6	6	#8	17-0
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e5	str							4	#5	4-9	4	#6	5-0	6	#6	5-3	6	#6	5-6	6	#7	5-9	8	#7	6-0	6	#8	6-0	6	#8	6-3
e6	str																									4	#8	6-3	4	#8	6-9
e7	str	4	#5	4-6	4	#5	4-9	4	#5	4-9	4	#6	5-0	4	#6	5-3	6	#6	5-6	6	#7	6-0	6	#7	6-0	6	#8	6-3	6	#8	6-9
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f1	str	6	#4	6-9	6	#4	7-3	6	#4	7-6	6	#4	7-9	6	#4	8-0	6	#4	8-3	6	#4	8-6	6	#4	9-0	6	#4	9-3	6	#4	9-6
f2	str	6	#4	8-6	6	#4	8-9	6	#4	9-0	6	#4	9-6	6	#4	9-6	6	#4	10-0	6	#4	10-0	6	#4	10-6	6	#4	10-9	6	#4	11-0
f3	str	4	#4	10-0	4	#4	10-3	6	#4	10-6	6	#4	11-0	4	#4	11-0	4	#4	11-6	6	#4	11-6	6	#4	12-0	6	#4	12-6	6	#4	12-6
f4	str													4	#4	12-3	4	#4	12-6	4	#4	13-3	4	#4	13-9	4	#4	14-0	6	#4	14-3
g	str	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-0	2	#4	14-6	2	#4	15-0	2	#4	15-6	2	#4	16-0
u	B	7	#4	4-6	7	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	5-0	9	#4	5-0	9	#4	5-0	9	#4	5-0	10	#4	5-0
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m	str	8	#4	11-9	8	#4	12-6	8	#4	13-0	8	#4	13-6	10	#4	14-6	10	#4	15-3	10	#4	16-0	10	#4	16-6	10	#4	17-0	10	#4	17-9
n	str	5	#4	11-6	5	#4	11-6	5	#4	12-0	5	#4	13-0	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0	5	#4	16-0
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q	str	2	#6	12-0	2	#6	12-6	2	#6	13-0	2	#6	13-6	2	#6	14-0	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6

STEEL LIST - OUTLET END

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	6	#4	7-0	6	#4	7-3	6	#4	7-3	6	#4	7-6	6	#4	8-0	6	#4	8-0	6	#4	8-3	6	#4	8-6	6	#4	8-9	6	#5	9-3
a2	A	6	#4	8-6	6	#4	8-6	6	#4	8-9	6	#4	8-9	6	#5	9-6	6	#5	9-6	6	#5	9-9	6	#5	10-0	6	#5	10-3	6	#6	10-9
a3	A	6	#5	9-9	6	#5	10-0	6	#5	10-3	6	#5	10-3	6	#6	10-9	6	#6	11-0	6	#6	11-3	6	#6	11-6	6	#6	11-9	6	#7	12-0
a4	A	6	#6	11-3	4	#6	11-6	6	#6	11-9	6	#6	11-9	6	#7	12-3	6	#7	12-3	6	#7	12-6	6	#7	12-9	6	#7	13-0	6	#8	13-6
a5	A				4	#7	12-6	4	#7	13-0	4	#7	13-3	6	#8	13-9	4	#8	13-6	4	#8	14-0	6	#8	14-0	6	#8	14-6	6	#8	15-0
a6	A																			4	#8	14-6	4	#8	15-0	4	#8	15-6	4	#8	16-6
a7	A																						4	#4	4-6	6	#4	5-0	10	#4	5-6	12	#4	6-0
b1	str.	4	#4	12-6	4	#4	13-0	4	#4	14-0	4	#4	14-9	4	#4	15-6	4	#4	16-6	4	#4	16-9	4	#4	17-6	4	#4	18-0	4	#4	18-6
b2	str.	12	#4	11-6	12	#4	12-0	16	#4	12-9	12	#4	13-6	16	#4	14-3	16	#4	15-0	16	#4	15-6	16	#4	16-0	16	#4	16-6	20	#4	17-0
b3	str.	4	#4	10-3	4	#4	11-3	4	#4	9-0	4	#4	13-3	4	#4	11-6	4	#4	12-3	4	#4	13-6	4	#4	14-6	4	#4	15-6	4	#4	13-6
b4	str.	4	#4	7-0	4	#4	8-0	4	#4	6-0	4	#4	10-3	4	#4	8-3	4	#4	9-3	4	#4	10-3	4	#4	11-3	4	#4	12-3	4	#4	10-3
b5	str.	4	#4	3-9	4	#4	4-9	4	#4	2-9	4	#4	7-0	4	#4	5-0	4	#4	6-0	4	#4	7-0	4	#4	8-3	4	#4	9-0	4	#4	7-0
b6	str.										4	#4	3-9				4	#4	2-6	4	#4	3-9	4	#4	5-0	4	#4	6-0	4	#4	3-9
c	str.	4	#4	10-6	4	#4	11-0	4	#4	11-6	4	#4	12-0	4	#4	12-6	4	#4	13-0	4	#4	13-6	4	#4	14-0	4	#4	14-6	4	#4	15-0
d	A	6	#6	12-3	6	#7	12-9	6	#7	13-3	6	#7	13-9	6	#8	14-6	6	#8	15-0	6	#8	15-6	6	#8	16-0	6	#8	16-6	6	#8	17-0
e1	str.	6	#4	1-9	6	#4	2-0	6	#4	2-0	6	#4	2-0	6	#4	2-3	6	#4	2-3	6	#4	2-6	6	#4	2-6	6	#4	2-6	6	#4	2-9
e2	str.	6	#4	2-6	6	#4	2-6	6	#4	2-9	6	#4	2-9	6	#4	2-9	6	#4	3-0	6	#4	3-0	6	#4	3-3	6	#4	3-3	6	#4	3-6
e3	str.	6	#4	3-3	6	#4	3-3	6	#4	3-3	6	#4	3-6	6	#4	3-6	6	#4	3-9	6	#5	3-9	6	#5	4-0	6	#5	4-0	6	#5	4-3
e4	str.	4	#4	3-9	4	#4	4-0	6	#5	4-0	6	#5	4-3	6	#5	4-3	6	#5	4-3	6	#6	4-6	6	#6	4-9	6	#6	4-9	6	#6	4-9
e5	str.	4	#4	4-3	4	#5	4-6	4	#5	4-9	6	#6	4-9	6	#6	5-0	4	#6	5-0	6	#7	5-0	6	#7	5-3	6	#7	5-3	6	#7	5-6
e6	str.																			4	#7	5-6	4	#7	5-9	4	#7	6-0	6	#8	6-0	6	#8	6-3
e7	str.	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#6	4-9	6	#6	5-0	6	#7	5-6	6	#7	5-9	6	#7	6-0	6	#8	6-0	6	#8	6-3
e8	str.	8	#4	4-3	8	#5	4-6	9	#5	4-9	9	#6	4-9	10	#6	5-0	10	#7	5-6	10	#7	5-9	10	#7	6-0	11	#8	6-0	12	#8	6-3
f1	str.	6	#4	5-6	6	#4	5-6	6	#4	6-0	6	#4	5-9	6	#4	6-3	6	#4	6-3	6	#4	6-6	6	#4	6-9	6	#4	7-0	6	#4	7-3
f2	str.	6	#4	7-6	6	#4	7-9	6	#4	8-0	6	#4	8-0	6	#4	8-3	6	#4	8-3	6	#4	8-9	6	#4	9-0	6	#4	9-0	6	#4	9-6
f3	str.	6	#4	9-6	6	#4	9-9	6	#4	10-3	4	#4	10-0	4	#4	10-6	6	#4	10-6	6	#4	10-9	6	#4	11-3	6	#4	11-6	6	#4	11-6
f4	str.										4	#4	11-6	4	#4	11-9	4	#4	12-6	4	#4	13-0	4	#4	13-3	6	#4	13-3	6	#4	13-9
u	B	6	#4	4-6	6	#4	4-9	7	#4	4-9	7	#4	4-9	7	#4	4-9	8	#4	5-0	8	#4	5-0	8	#4	5-0	8	#4	5-0	9	#4	5-0
m	str.	8	#4	14-6	8	#4	14-9	8	#4	15-9	8	#4	16-6	8	#4	17-3	8	#4	18-3	8	#4	18-9	10	#4	19-6	10	#4	20-6	10	#4	21-6
n	str.	5	#4	12-6	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0	5	#4	16-0	5	#4	17-0	5	#4	18-0	5	#4	17-0	5	#4	18-0
p	str.	4	#5	10-0	4	#5	10-6	4	#5	11-0	4	#5	11-6	4	#5	12-0	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6
q	str.	2	#6	12-0	2	#6	12-6	2	#6	13-0	2	#6	13-6	2	#6	14-0	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6	2	#6	16-6
v	str.	2	#4	8-6	2	#4	9-0	2	#4	9-3	2	#4	9-9	2	#4	10-3	2	#4	10-3	2	#4	10-9	2	#4	11-3	2	#4	11-9	2	#4	12-0	2	#4	12-6
w	str.	2	#4	12-0	2	#4	12-6	2	#4	13-3	2	#4	13-9	2	#4	14-6	2	#4	15-3	2	#4	15-9	2	#4	16-3	2	#4	16-9	2	#4	17-3

DIMENSIONS INLET END

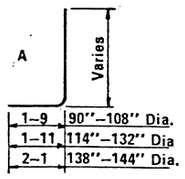
Pipe Dia	A	B	C	D	E	F	G	H	J	K	L	M	N
90"	5-2	2-1	1-7	1-5	5-1	11-0	4-11	9-6	5-8	13-7 7/8	6-6 7/8	4-5 5/8	0-3
96"	5-5	2-2	1-8	1-6	5-4	11-6	5-2	10-0	6-0	14-2 3/4	6-10 3/4	4-8 1/4	0-6
102"	5-8	2-2	1-10	1-7	5-7	12-0	5-5	10-6	6-3	14-10	7-3	4-11 1/4	0-3
108"	5-11	2-3	1-11	1-8	5-10	12-9	5-8	11-0	6-7	15-7 3/4	7-6 7/8	5-1 3/4	0-11/2
114"	6-2	2-3	2-1	1-9	6-1	13-6	5-11	11-6	6-10	16-6	7-11	5-4 3/4	0-6
120"	6-5	2-4	2-2	1-10	6-4	14-0	6-2	12-0	7-1	17-0 7/8	8-2 7/8	5-7 3/8	0-3
126"	6-10 3/4	2-6	2-2	1-11	6-7	14-6	6-5	12-6	7-5	17-8	8-7 1/8	5-10 3/8	0-6
132"	7-1 3/4	2-7	2-3	2-0	6-10	15-0	6-8	13-0	7-9	18-2 7/8	8-10 7/8	6-1	0-3
138"	7-4 3/4	2-7	2-5	2-1	7-1	15-6	6-11	13-6	8-0	18-10 1/4	9-3 1/8	6-4	0-6
144"	7-7 3/4	2-8	2-6	2-2	7-4	16-0	7-2	14-0	8-4	19-5	9-7	6-6 1/2	0-3

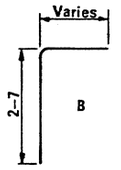
DIMENSIONS OUTLET END

Pipe Dia	A	B	C	D	E	F	G	H	J	K	L	M	N
90"	5-6 5/8	2-1	0-11	2-1	5-1	11-6	4-11	9-6	4-2	15-3 5/8	7-8 5/8	4-11 7/8	0-6
96"	5-9 5/8	2-2	0-11	2-3	5-4	12-0	5-2	10-0	4-4	15-11	8-1	4-4 1/4	0-3
102"	6-0 5/8	2-2	1-0	2-5	5-7	12-9	5-5	10-6	4-6	16-10 1/8	8-6 1/8	4-7 1/4	0-11/2
108"	6-3 5/8	2-3	1-1	2-6	5-10	13-6	5-8	11-0	4-8	17-8 1/2	8-10 1/2	4-9 1/2	0-6
114"	6-6 5/8	2-3	1-2	2-8	6-1	14-3	5-11	11-6	4-10	18-7 5/8	9-3 5/8	5-0 1/2	0-4 1/2
120"	6-9 5/8	2-4	1-3	2-9	6-4	15-0	6-2	12-0	5-0	19-6	9-8	5-2 3/4	0-3
126"	7-2 3/4	2-6	1-3	2-10	6-7	15-6	6-5	12-6	5-3	10-2 1/8	10-1 1/8	5-5 3/4	0-6
132"	7-5 3/4	2-6	1-4	3-0	6-10	16-0	6-8	13-0	5-6	20-10 1/4	10-6 1/4	5-8 3/4	0-3
138"	7-8 3/4	2-7	1-5	3-1	7-1	16-6	6-11	13-6	5-9	21-5 5/8	10-10 5/8	5-11 1/8	0-6
144"	7-11 3/4	2-8	1-6	3-2	7-4	17-0	7-2	14-0	6-0	22-1	11-3	6-1 3/8	0-3

QUANTITIES

Pipe Dia.	Inlet		Outlet	
	Reinf. (lbs)	Conc. (CY)	Reinf. (lbs)	Conc. (CY)
90"	1050	19.44	995	19.74
96"	1160	21.19	1175	21.36
102"	1375	23.00	1295	23.42
108"	1645	25.19	1415	25.54
114"	1815	27.49	1770	27.79
120"	2020	29.50	2010	30.10
126"	2330	34.35	2165	34.87
132"	2590	36.74	2365	37.27
138"	2870	39.22	2580	39.72
144"	3120	41.75	2955	42.23





BENDS

NOTE:

Quantities and steel list shown are for one headwall

DESIGN	KW	9-72
DRAWN	LAM	9-72
CHECKED	RLC	9-72

DESIGN APPROVED

RC Buechler

APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

INLET AND OUTLET HEADWALLS
RIGHT ANGLE PIPE CULVERT
2:1 SLOPE

REVISION

STANDARD NO.

B-12.30

STEEL LIST - INLET END

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	8	#5	10-0	6	#5	11-3	8	#5	10-9	8	#6	11-0	8	#6	11-6	6	#6	12-0	8	#6	12-3	8	#7	12-9	8	#7	13-3	8	#8	13-9
a2	A	8	#5	10-9	6	#5	11-0	6	#6	11-6	6	#6	11-9	8	#6	12-3	6	#6	12-6	6	#7	13-0	6	#7	13-6	8	#8	14-0	8	#8	14-6
a3	A	6	#6	11-6	6	#6	11-6	6	#6	12-0	6	#7	12-3	6	#7	13-0	6	#7	13-0	6	#7	13-6	6	#8	14-0	6	#8	14-9	8	#8	15-0
a4	A	6	#6	12-0	6	#6	12-0	6	#7	12-6	6	#7	13-0	6	#8	13-9	6	#8	13-9	6	#8	14-3	6	#8	14-6	6	#8	15-3	6	#8	15-9
a5	A				6	#7	12-6	6	#7	13-0	6	#8	13-6	6	#8	14-3	6	#8	14-3	6	#8	14-9	6	#8	15-3	6	#8	15-9	6	#8	16-3
a6	A																6	#8	14-9	6	#8	15-3	6	#8	15-9	6	#8	16-3	6	#8	16-9
a7	A																			6	#4	4-6	12	#4	5-0	18	#4	5-6	26	#4	6-0
b1	str	4	#4	13-6	4	#4	14-3	4	#4	15-0	4	#4	15-9	4	#4	16-6	4	#4	17-3	4	#4	18-0	4	#4	18-9	4	#4	19-6	4	#4	20-3
b2	str	20	#4	13-3	20	#4	14-0	24	#4	14-9	24	#4	15-6	24	#4	16-3	24	#4	17-0	28	#4	17-9	28	#4	18-6	28	#4	19-3	28	#4	20-0
b3	str	4	#4	9-0	4	#4	11-0	4	#4	6-3	4	#4	9-0	4	#4	11-9	4	#4	14-9	4	#4	8-9	4	#4	3-6	4	#4	14-9	4	#4	17-6
b4	str				4	#4	3-0							4	#4	3-6	4	#4	6-0							4	#4	6-0	4	#4	9-0
b5	str																														
c	str	4	#4	10-6	4	#4	11-0	4	#4	11-6	4	#4	12-0	4	#4	12-6	4	#4	13-0	4	#4	13-6	4	#4	14-0	4	#4	14-6	4	#4	15-0
d	A	6	#6	12-3	6	#7	12-9	6	#7	13-3	6	#8	13-9	6	#8	14-6	6	#8	15-0	6	#8	15-6	6	#8	16-0	6	#8	16-6	6	#8	17-0
e1	str	8	#4	3-9	6	#4	4-0	8	#4	4-0	8	#4	4-3	8	#4	4-6	6	#5	4-6	8	#5	4-9	8	#5	5-0	8	#5	5-3	8	#5	5-6
e2	str	8	#4	4-0	6	#4	4-3	6	#4	4-3	6	#4	4-6	8	#5	4-9	6	#5	4-9	6	#5	5-0	6	#5	5-3	8	#6	5-6	8	#6	5-9
e3	str	6	#4	4-3	12	#4	4-6	6	#4	4-6	6	#5	4-9	6	#5	5-0	6	#5	5-0	6	#5	5-3	6	#6	5-6	6	#6	5-9	8	#7	6-0
e4	str	6	#4	4-6	6	#5	4-9	6	#5	4-9	6	#5	5-0	6	#5	5-3	6	#5	5-3	6	#6	5-6	6	#6	5-9	6	#7	6-0	6	#7	6-3
e5	str							6	#5	5-0	6	#5	5-3	6	#6	5-6	6	#6	5-6	6	#6	5-9	6	#7	6-0	6	#7	6-3	6	#7	6-6
e6	str																6	#6	5-9	6	#7	6-0	6	#7	6-3	6	#7	6-6	6	#8	6-9
e7	str	4	#4	4-6	4	#5	4-9	4	#5	5-0	4	#5	5-3	6	#6	5-6	6	#6	5-9	6	#7	6-0	6	#7	6-3	6	#7	6-6	6	#8	6-9
e8	str	10	#4	4-6	10	#5	4-9	11	#5	5-0	11	#5	5-3	12	#6	5-6	12	#6	5-9	13	#7	6-0	13	#7	6-3	13	#7	6-6	14	#8	6-9
f1	str	8	#4	8-3	8	#4	8-6	8	#4	9-0	8	#4	9-3	6	#4	9-9	6	#4	10-0	8	#4	10-6	8	#4	10-9	8	#4	11-3	8	#4	11-6
f2	str	6	#4	9-3	6	#4	9-6	8	#4	10-0	8	#4	10-6	6	#4	10-6	6	#4	11-0	6	#4	11-6	6	#4	12-0	8	#4	12-3	8	#4	12-9
f3	str	6	#4	10-3	6	#4	10-6	6	#4	11-3	6	#4	11-6	6	#4	11-3	6	#4	11-9	6	#4	12-3	6	#4	12-9	6	#4	13-3	6	#4	13-6
f4	str													6	#4	12-0	6	#4	12-6	6	#4	13-0	6	#4	13-6	6	#4	14-0	6	#4	14-6
g	str	2	#4	12-6	2	#4	13-6	2	#4	14-0	2	#4	14-6	2	#4	15-3	2	#4	16-0	2	#4	16-9	2	#4	17-3	2	#4	18-0	2	#4	18-6
u	B	7	#4	4-6	7	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	5-0	9	#4	5-0	9	#4	5-0	9	#4	5-0	10	#4	5-0
j	str	2	#4	9-3	2	#4	9-6	2	#4	10-0	2	#4	10-6	2	#4	11-0	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6
m	str	8	#4	16-0	8	#4	16-6	8	#4	17-6	8	#4	18-6	8	#4	19-0	8	#4	20-0	8	#4	21-0	10	#4	21-9	10	#4	22-6	10	#4	23-6
n	str	5	#4	12-9	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-3	5	#4	16-0	5	#4	16-6	5	#4	17-3	5	#4	18-0	5	#4	18-9
p	str	4	#5	10-0	4	#5	10-6	4	#5	11-0	4	#5	11-6	4	#5	12-0	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6
q	str	2	#6	12-0	2	#6	12-6	2	#6	13-0	2	#6	13-6	2	#6	14-0	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6

STEEL LIST - OUTLET END

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	8	#4	9-0	6	#4	9-6	6	#5	9-9	8	#5	10-0	8	#5	10-6	8	#6	11-0	6	#6	11-3	8	#6	11-6	8	#6	12-3	8	#7	12-6
a2	A	8	#5	10-3	6	#5	10-3	6	#5	10-6	6	#6	11-3	8	#6	11-6	8	#6	12-0	6	#6	12-0	6	#7	12-6	6	#7	13-3	8	#8	13-6
a3	A	6	#6	11-3	6	#6	11-0	6	#6	11-6	6	#6	12-0	6	#6	12-0	6	#7	13-0	6	#7	13-0	6	#7	13-3	6	#7	13-9	6	#8	14-0
a4	A	6	#6	12-0	6	#6	11-9	6	#6	12-3	6	#7	12-9	6	#7	13-3	6	#8	13-9	6	#8	13-6	6	#8	14-0	6	#8	14-9	6	#8	15-3
a5	A				4	#7	12-6	6	#7	13-0	6	#7	13-3	6	#8	14-0	6	#8	14-6	6	#8	14-3	6	#8	15-0	6	#8	15-6	6	#8	16-0
a6	A																			6	#8	15-0	6	#8	15-6	6	#8	16-3	6	#8	16-9
a7	A																			6	#4	4-6	10	#4	5-0	12	#4	5-6	18	#4	6-0
b1	str	4	#4	13-3	4	#4	13-9	4	#4	14-9	4	#4	15-6	4	#4	16-3	4	#4	17-0	4	#4	17-9	4	#4	18-3	4	#4	19-0	4	#4	19-6
b2	str	20	#4	13-0	20	#4	13-6	20	#4	14-3	20	#4	15-0	20	#4	15-9	24	#4	16-6	24	#4	17-3	24	#4	17-9	24	#4	18-6	28	#4	19-0
b3	str	4	#4	6-9	4	#4	8-9	4	#4	10-9	4	#4	13-0	4	#4	15-0	4	#4	15-0	4	#4	11-0	4	#4	13-3	4	#4	15-0	4	#4	13-3
b4	str				4	#4	3-0	4	#4	5-0	4	#4	7-0	4	#4	9-0	4	#4	5-0	4	#4	7-0	4	#4	9-0	4	#4	11-0	4	#4	7-3
b5	str													4	#4	3-0							4	#4	3-0	4	#4	5-0			
b6	str																														
c	str	4	#4	10-6	4	#4	11-0	4	#4	11-6	4	#4	12-0	4	#4	12-6	4	#4	13-0	4	#4	13-6	4	#4	14-0	4	#4	14-6	4	#4	15-0
d	A	6	#6	12-3	6	#7	12-9	6	#7	13-3	6	#8	13-9	6	#8	14-6	6	#8	15-0	6	#8	15-6	6	#8	16-0	6	#8	16-6	6	#8	17-0
e1	str	8	#4	3-3	8	#4	3-3	8	#4	3-6	8	#4	3-6	10	#4	3-6	8	#4	3-6	8	#4	3-9	8	#4	3-9	8	#4	4-0	8	#5	4-0
e2	str	8	#4	3-6	8	#4	3-6	8	#4	3-9	8	#4	3-9	8	#4	4-0	8	#4	4-0	8	#5	4-3	8	#5	4-3	8	#5	4-6	8	#5	4-6
e3	str	6	#4	3-9	8	#4	4-0	8	#5	4-0	8	#5	4-3	8	#5	4-6	8	#5	4-3	8	#5	4-9	8	#6	4-9	8	#6	5-0	8	#6	5-0
e4	str	6	#4	4-0	6	#5	4-3	6	#5	4-6	8	#5	4-9	8	#6	5-0	6	#6	4-9	6	#6	5-3	8	#6	5-3	8	#7	5-6	8	#7	5-6
e5	str																6	#6	5-3	6	#7	5-9	6	#7	5-9	8	#7	6-0	8	#8	6-3
e6	str																														
e7	str	4	#4	4-0	4	#5	4-3	4	#5	4-6	4	#5	4-9	6	#6	5-0	6	#6	5-3	6	#7	5-9	6	#7	6-0	8	#7	6-3	8	#8	6-6
e8	str	9	#4	4-0	10	#5	4-3	11	#5	4-6	11	#5	4-9	12	#6	5-0	12	#6	5-3	13	#7	5-9	13	#7	6-0	13	#7	6-3	14	#8	6-6
f1	str	6	#4	7-6	8	#4	8-0	8	#4	8-3	8	#4	8-3	8	#4	8-9	6	#4	9-3	6	#4	9-6	8	#4	9-9	8	#4	10-0	8	#4	10-6
f2	str	6	#4	8-9	6	#4	9-0	6	#4	9-9	8	#4	10-0	8	#4	10-3	6	#4	10-3	6	#4	10-6	6	#4	11-3	6	#4	11-6	6	#4	12-0
f3	str	6	#4	9-9	6	#4	10-3	6	#4	10-9	6	#4	11-3	6	#4	11-9	6	#4	11-9	6	#4	11-3	6	#4	11-9	6	#4	12-3	6	#4	12-6
f4	str																6	#4	12-3	6	#4	12-9	6	#4	13-6	6	#4	13-9	6	#4	14-3
u	B	6	#4	4-6	6	#4	4-9	7	#4	4-9	7	#4	4-9	7	#4	4-9	8	#4	5-0	8	#4	5-0	8	#4	5-0	8	#4	5-0	9	#4	5-0
m	str	8	#4	16-6	8	#4	17-3	8	#4	18-0	8	#4	19-0	8	#4	19-9	8	#4	20-9	8	#4	21-9	10	#4	22-3	10	#4	23-3	10	#4	23-9
n	str	5	#4	12-6	5	#4	13-3	5	#4	14-0	5	#4	14-6	5	#4	15-3	5	#4	16-0	5	#4	16-9	5	#4	16-9	5	#4	17-3	5	#4	18-0
p	str	4	#5	10-0	4	#5	10-6	4	#5	11-0	4	#5	11-6	4	#5	12-0	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6
q	str	2	#6	12-0	2	#6	12-6	2	#6	13-0	2	#6	13-6	2	#6	14-0	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6
v	str	2	#4	8-6	2	#4	9-0	2	#4	9-3	2	#4	9-9	2	#4	10-3	2	#4	10-9	2	#4	11-3	2	#4	11-9	2	#4	12-0	2	#4	12-6
w	str	2	#4	13-6	2	#4	14-0	2	#4	14-9	2	#4	15-3	2	#4	16-0	2	#4	16-9	2	#4	17-6	2	#4	18-0	2	#4	18-9	2	#4	19-3

DIMENSIONS INLET END

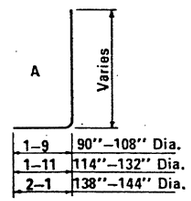
Pipe Dia	A	B	C	D	E	F	G	H	J	K	L	M	N
90"	5-2	2-0	2-4	0-9	5-1	13-3	4-11	9-6	7-3	15-11 1/4	6-7 1/4	4-6	0-4 1/2
96"	5-5	2-2	2-5	0-9	5-4	14-0	5-2	10-0	7-6	16-8 3/4	6-10 3/4	4-8 1/4	0-3
102"	5-8	2-2	2-6	0-11	5-7	14-9	5-5	10-6	7-11	17-7	7-3	4-11 1/4	0-1 1/2
108"	5-11	2-2	2-8	1-0	5-10	15-6	5-8	11-0	8-3	18-5 1/4	7-7 1/4	5-2 1/4	0-6
114"	6-2	2-3	2-9	1-1	6-1	16-3	5-11	11-6	8-7	19-3	7-11	5-4 3/4	0-4 1/2
120"	6-5	2-4	2-10	1-2	6-4	17-0	6-2	12-0	9-0	20-0 7/8	8-2 7/8	5-7 3/8	0-3
126"	6-10 3/4	2-6	2-10	1-3	6-7	17-9	6-5	12-6	9-4	20-11 1/8	8-7 1/8	5-10 3/8	0-1 1/2
132"	7-1 3/4	2-6	3-0	1-4	6-10	18-6	6-8	13-0	9-9	21-9 3/8	8-11 3/8	6-1 3/8	0-6
138"	7-4 3/4	2-7	3-1	1-5	7-1	19-3	6-11	13-6	10-1	22-7 1/8	9-3 1/8	6-4	0-4 1/2
144"	7-7 3/4	2-8	3-2	1-6	7-4	20-0	7-2	14-0	10-6	23-5	9-7	6-6 1/2	0-3

DIMENSIONS OUTLET END

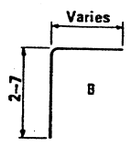
Pipe Dia	A	B	C	D	E	F	G	H	J	K	L	M	N
90"	5-6 5/8	2-1	2-0	1-0	5-1	13-0	4-11	9-6	6-3	16-9 5/8	7-8 5/8	4-17/8	0-3
96"	5-9 5/8	2-2	2-1	1-1	5-4	13-6	5-2	10-0	6-7	17-5	8-1	4-4 1/4	0-6
102"	6-0 5/8	2-2	2-2	1-3	5-7	14-3	5-5	10-6	6-11	18-4 1/8	8-6 1/8	4-7 1/4	0-4 1/2
108"	6-3 5/8	2-3	2-3	1-4	5-10	15-0	5-8	11-0	7-3	19-2 1/2	8-10 1/2	4-9 1/2	0-3
114"	6-6 5/8	2-3	2-5	1-5	6-1	15-9	5-11	11-6	7-7	20-1 5/8	9-3 5/8	5-0 1/2	0-1 1/2
120"	6-9 5/8	2-4	2-6	1-6	6-4	16-6	6-2	12-0	7-11	21-0	9-8	5-2 3/4	0-6
126"	7-2 3/4	2-6	2-6	1-7	6-7	17-3	6-5	12-6	8-3	21-11 1/8	10-1 1/8	5-5 3/4	0-4 1/2
132"	7-5 3/4	2-6	2-7	1-9	6-10	17-9	6-8	13-0	8-7	22-7 1/4	10-6 1/4	5-8 3/4	0-1 1/2
138"	7-8 3/4	2-7	2-8	1-10	7-1	18-6	6-11	13-6	8-11	23-5 5/8	10-10 5/8	5-11 1/8	0-6
144"	7-11 3/4	2-8	2-9	1-11	7-4	19-0	7-2	14-0	9-4	24-1	11-3	6-1 3/8	0-3

QUANTITIES

Pipe Dia.	Inlet Reinf. (lbs)	Inlet Conc. (CY)	Outlet Reinf. (lbs)	Outlet Conc. (CY)
90"	1255	23.17	1225	22.98
96"	1510	25.37	1440	24.89
102"	1725	27.71	1610	27.21
108"	1995	30.18	1850	29.60
114"	2310	32.68	2155	32.18
120"	2595	35.33	2395	34.79
126"	2935	41.39	2755	40.65
132"	3235	44.57	3040	43.28
138"	3625	47.72	3325	46.43
144"	4125	51.07	3790	49.27



BENDS



NOTE:

Quantities and steel list shown are for one headwall.

DESIGN	KW	9-72	DRAWN	LAM	9-72	CHECKED	RLC	9-72

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

INLET AND OUTLET HEADWALLS
RIGHT ANGLE PIPE CULVERT
4:1 SLOPE

REVISION

STANDARD NO.
B-12.40

STEEL LIST - INLET END

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	8	#5	10-6	10	#6	11-0	8	#6	11-3	8	#6	11-9	10	#6	12-3	10	#7	12-9	10	#7	13-3	10	#7	13-6	12	#8	14-3	10	#8	14-6
a2	A	6	#6	11-0	6	#6	11-9	6	#6	11-9	6	#6	12-3	6	#7	13-0	6	#7	13-6	8	#7	13-9	8	#8	14-3	8	#8	14-9	8	#8	15-3
a3	A	6	#6	11-6	6	#6	12-3	6	#6	12-3	6	#7	12-6	6	#7	13-3	6	#7	13-9	6	#8	14-3	8	#8	14-9	8	#8	15-3	8	#8	15-9
a4	A	6	#6	11-9	6	#7	12-6	6	#6	12-6	6	#7	13-0	6	#7	13-9	6	#8	14-0	6	#8	14-6	6	#8	15-0	6	#8	15-9	8	#8	16-0
a5	A	6	#6	12-3	6	#7	13-0	6	#7	13-0	6	#7	13-3	6	#8	14-0	6	#8	14-6	6	#8	15-0	6	#8	15-6	6	#8	16-3	6	#8	16-6
a6	A							4	#7	13-3	6	#7	13-9	6	#8	14-3	6	#8	14-9	6	#8	15-3	6	#8	15-9	6	#8	16-6	6	#8	17-0
a7	A																			6	#4	9-0	18	#4	9-6	26	#4	10-3	36	#4	10-9
b1	str	4	#4	15-3	4	#4	16-0	4	#4	17-0	4	#4	18-0	4	#4	19-0	4	#4	19-6	4	#4	20-6	4	#4	21-3	4	#4	22-0	4	#4	22-9
b2	str	20	#4	15-3	24	#4	16-0	24	#4	17-0	24	#4	18-0	28	#4	18-9	28	#4	19-6	28	#4	20-3	24	#4	21-0	32	#4	21-9	32	#4	22-6
b3	str	4	#4	14-0	4	#4	5-0	4	#4	10-0	4	#4	14-6	4	#4	6-0	4	#4	10-3	4	#4	14-3	4	#4	19-0	4	#4	10-3	4	#4	15-3
b4	str																						4	#4	8-3				4	#4	2-6
b5	str																														
c	str	4	#4	10-6	4	#4	11-0	4	#4	11-6	4	#4	12-0	4	#4	12-6	4	#4	13-0	4	#4	13-6	4	#4	14-0	4	#4	14-6	4	#4	15-0
d	A	6	#6	12-3	6	#7	12-9	6	#7	13-3	6	#7	13-9	6	#8	14-3	6	#8	14-9	6	#8	15-3	6	#8	15-9	6	#8	16-3	6	#8	16-9
e1	str	12	#4	3-6	10	#4	3-9	10	#4	3-9	10	#4	4-0	10	#5	4-3	12	#5	4-6	12	#5	4-9	12	#6	5-0	12	#6	5-0	12	#6	5-3
e2	str	10	#4	3-9	8	#4	4-0	10	#4	4-0	10	#5	4-3	10	#5	4-6	10	#5	4-9	10	#6	5-0	12	#6	5-3	12	#6	5-3	12	#7	5-6
e3	str	10	#4	4-0	8	#5	4-3	8	#5	4-6	10	#5	4-6	10	#5	4-9	10	#6	5-0	10	#6	5-3	10	#6	5-6	12	#7	5-9	12	#7	6-0
e4	str				8	#5	4-6	8	#5	4-9	8	#5	4-9	10	#6	5-0	10	#6	5-3	10	#7	5-6	10	#7	5-9	12	#7	6-0	12	#8	6-3
e5	str																														
e6	str																														
e7	str	4	#4	4-0	4	#5	4-6	4	#5	4-9	4	#5	4-9	4	#6	5-0	4	#6	5-3	6	#7	5-6	6	#7	5-9	8	#7	6-0	8	#8	6-3
e8	str	10	#4	4-0	10	#5	4-6	11	#5	4-9	11	#5	4-9	12	#6	5-0	12	#6	5-3	13	#7	5-6	13	#7	5-9	14	#7	6-0	14	#8	6-3
f1	str	8	#4	8-9	8	#4	9-3	8	#4	9-6	8	#4	10-0	8	#4	10-6	8	#4	10-9	8	#4	11-3	8	#4	11-9	8	#4	12-0	8	#4	12-6
f2	str	8	#4	9-6	8	#4	10-3	8	#4	10-3	6	#4	10-9	6	#4	11-3	8	#4	11-6	8	#4	12-0	8	#4	12-6	8	#4	12-9	8	#4	13-3
f3	str	6	#4	10-3	6	#4	11-0	8	#4	11-0	6	#4	11-3	6	#4	11-9	6	#4	12-3	6	#4	12-9	8	#4	13-0	8	#4	13-6	8	#4	14-0
f4	str										6	#4	11-9	6	#4	12-3	6	#4	12-9	6	#4	13-3	6	#4	13-9	6	#4	14-3	8	#4	14-6
g	str	2	#4	15-3	2	#4	16-0	2	#4	17-0	2	#4	18-0	2	#4	18-9	2	#4	19-6	2	#4	20-3	2	#4	21-0	2	#4	21-9	2	#4	22-6
u	B	7	#4	4-6	7	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	5-0	9	#4	5-0	9	#4	5-0	9	#4	5-0	10	#4	5-0
j	str	2	#4	9-3	2	#4	9-6	2	#4	10-0	2	#4	10-6	2	#4	11-0	2	#4	11-3	2	#4	11-9	2	#4	12-3	2	#4	12-9	2	#4	13-3
m	str	8	#4	18-0	8	#4	18-9	8	#4	19-9	8	#4	21-0	10	#4	21-9	10	#4	22-6	10	#4	23-6	10	#4	24-3	10	#4	25-3	10	#4	26-0
n	str	5	#4	12-9	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-3	5	#4	16-0	5	#4	16-6	5	#4	17-3	5	#4	18-0	5	#4	18-9
p	str	4	#5	10-0	4	#5	10-6	4	#5	11-0	4	#5	11-6	4	#5	12-0	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6
q	str	2	#6	12-0	2	#6	12-6	2	#6	13-0	2	#6	13-6	2	#6	14-0	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6

STEEL LIST - OUTLET END

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	8	#5	10-3	8	#5	10-9	8	#5	11-0	8	#6	11-3	8	#6	11-9	8	#6	12-0	8	#7	12-6	8	#7	13-0	10	#7	13-9	10	#8	14-0
a2	A	8	#5	11-0	8	#6	11-6	8	#6	11-9	8	#6	12-0	8	#6	12-6	8	#7	12-9	8	#7	13-3	8	#8	13-9	8	#8	14-6	10	#8	15-0
a3	A	8	#6	11-9	8	#6	12-0	6	#6	12-3	6	#7	12-6	8	#7	13-0	8	#7	13-6	8	#8	13-9	8	#8	14-3	8	#8	15-0	8	#8	15-9
a4	A	6	#6	12-3	8	#6	12-6	6	#7	12-9	6	#7	13-0	6	#7	13-6	8	#8	14-0	8	#8	14-6	8	#8	15-0	8	#8	15-9	8	#8	16-6
a5	A							6	#7	13-0	6	#7	13-6	6	#8	14-0	6	#8	14-6	8	#8	15-0	8	#8	15-6	8	#8	16-3	8	#8	17-0
a6	A																													
a7	A																													
b1	str	4	#4	14-3	4	#4	15-3	4	#4	16-0	4	#4	16-9	4	#4	17-6	4	#4	18-3	8	#4	9-0	16	#4	9-6	20	#4	10-3	24	#4	10-9
b2	str	20	#4	14-3	20	#4	15-0	24	#4	15-9	24	#4	16-6	24	#4	17-3	24	#4	18-0	4	#4	19-0	4	#4	19-9	4	#4	20-6	4	#4	21-3
b3	str	4	#4	8-6	4	#4	13-6	4	#4	6-3	4	#4	10-9	4	#4	13-3	4	#4	16-9	28	#4	18-9	28	#4	19-6	28	#4	20-3	28	#4	21-0
b4	str				4	#4	4-3							4	#4	4-3	4	#4	7-6	4	#4	10-9	4	#4	14-0	4	#4	16-6	4	#4	20-6
b5	str																						4	#4	4-3	4	#4	7-3	4	#4	10-9
b6	str																														
c	str	4	#4	10-6	4	#4	11-0	4	#4	11-6	4	#4	12-0	4	#4	12-6	4	#4	13-0	4	#4	13-6	4	#4	14-0	4	#4	14-6	4	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#8	14-6	6	#8	15-0	6	#8	15-6	6	#8	16-0	6	#8	16-6	6	#8	17-0
e1	str	8	#4	3-6	8	#4	3-9	8	#4	3-9	8	#4	3-9	8	#4	4-0	8	#5	4-3	8	#5	4-6	10	#5	4-6	10	#5	4-6	10	#6	4-6
e2	str	8	#4	3-9	8	#4	4-0	8	#4	4-0	8	#4	4-0	8	#5	4-3	8	#5	4-6	8	#5	4-6	8	#6	4-9	8	#6	5-0	10	#6	5-0
e3	str	8	#4	4-0	8	#4	4-3	6	#4	4-3	8	#5	4-3	8	#5	4-6	8	#5	4-9	8	#6	4-9	8	#6	5-3	8	#6	5-3	8	#7	5-3
e4	str	6	#4	4-3	8	#5	4-6	6	#5	4-3	6	#5	4-6	6	#5	4-9	8	#6	5-0	8	#6	5-3	8	#6	5-6	8	#7	5-6	8	#7	5-9
e5	str							6	#5	4-6	6	#5	4-9	6	#6	5-0	6	#6	5-3	8	#7	5-6	8	#7	5-9	8	#7	6-0	8	#8	6-3
e6	str																														
e7	str	4	#4	4-3	4	#5	4-6	4	#5	4-6	4	#5	4-9	6	#6	5-0	6	#6	5-3	6	#7	5-6	6	#7	5-9	8	#7	6-0	8	#8	6-3
e8	str	10	#4	4-3	10	#5	4-6	11	#5	4-9	12	#6	5-0	12	#6	5-3	13	#7	5-6	13	#7	5-9	14	#7	6-0	14	#8	6-3			
f1	str	8	#4	8-6	8	#4	9-0	8	#4	9-3	6	#4	9-6	6	#4	10-0	8	#4	10-3	8	#4	10-9	8	#4	11-0	8	#4	11-6	8	#4	12-0
f2	str	6	#4	9-3	8	#4	9-9	8	#4	10-3	6	#4	10-3	6	#4	10-6	6	#4	11-3	6	#4	11-9	8	#4	12-0	8	#4	12-6	8	#4	12-9
f3	str	6	#4	10-0	6	#4	10-9	6	#4	11-0	6	#4	11-6	6	#4	11-3	6	#4	12-0	6	#4	12-6	6	#4	13-0	6	#4	13-3	8	#4	13-9
f4	str										6	#4	11-6	6	#4	12-0	6	#4	12-9	6	#4	13-0	6	#4	13-9	6	#4	14-0	6	#4	14-6
u	B	6	#4	4-6	6	#4	4-9	7	#4	4-9	7	#4	4-9	7	#4	4-9	8	#4	5-0	8	#4	5-0	8	#4	5-0	8	#4	5-0	9	#4	5-0
m	str	8	#4	17-9	8	#4	18-9	8	#4	19-9	8	#4	20-6	8	#4	21-6	10	#4	22-3	10	#4	23-3	10	#4	24-3	10	#4	25-0	10	#4	25-9
n	str	5	#4	14-5	5	#4	15-9	5	#4	16-6	5	#4	17-3	5	#4	18-0	5	#4	18-9	5	#4	19-6	5	#4	20-3	5	#4	21-0	5	#4	21-9
p	str	4	#5	10-0	4	#5	10-6	4	#5	11-0	4	#5	11-6	4	#5	12-0	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6
q	str	2	#6	12-0	2	#6	12-6	2	#6	13-0	2	#6	13-6	2	#6	14-0	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6
v	str	2	#4	8-6	2	#4	9-0	2	#4	9-3	2	#4	9-9	2	#4	10-3	2	#4	10-9	2	#4	11-3	2	#4	11-9	2	#4	12-0	2	#4	12-6
w	str	2	#4	14-9	2	#4	15-6	2	#4	16-3	2	#4	16-9	2	#4	17-6	2	#4	18-3	2	#4	19-0	2	#4	19-9	2	#4	20-6	2	#4	21-3

DIMENSIONS INLET END

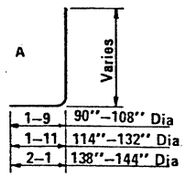
Pipe Dia	A	B	C	D	E	F	G	H	J	K	L	M	N
90"	5-2	2-0	2-6	0-7	5-1	15-3	4-11	9-6	7-8	17-11 1/4	6-7 1/4	4-6	0-4 1/2
96"	5-5	2-2	2-7	0-7	5-4	16-0	5-2	10-0	8-1	18-8 3/4	6-10 3/4	4-8 1/4	0-3
102"	5-8	2-2	2-8	0-9	5-7	17-0	5-5	10-6	8-6	19-10	7-3	4-11 1/4	0-3
108"	5-11	2-2	2-11	0-9	5-10	18-0	5-8	11-0	8-11	20-11 1/8	7-7 1/4	5-2 1/4	0-3
114"	6-2	2-3	2-11	0-11	6-1	18-9	5-11	11-6	9-4	21-9	7-11	5-4 3/4	0-11 1/2
120"	6-5	2-4	3-1	0-11	6-4	19-6	6-2	12-0	9-9	22-6 7/8	8-2 7/8	5-7 3/8	0-6
126"	6-10 3/4	2-6	3-1	1-0	6-7	20-3	6-5	12-6	10-2	23-5	8-7 1/8	5-10 3/8	0-4 1/2
132"	7-1 3/4	2-6	3-4	1-0	6-10	21-0	6-8	13-0	10-7	24-3 3/8	8-11 3/8	6-1 3/8	0-3
138"	7-4 3/4	2-7	3-5	1-1	7-1	21-9	6-11	13-6	11-0	25-1 1/4	9-3 1/8	6-4	0-11/2
144"	7-7 3/4	2-8	3-7	1-1	7-4	22-6	7-2	14-0	11-5	25-11	9-7	6-6 1/2	0-6

DIMENSIONS OUTLET END

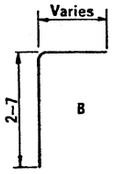
Pipe Dia	A	B	C	D	E	F	G	H	J	K	L	M	N
90"	5-6 5/8	2-1	2-6	0-6	5-1	14-3	4-11	9-6	7-3	18-0 5/8	7-8 5/8	4-11 7/8	0-4 1/2
96"	5-9 5/8	2-2	2-7	0-7	5-4	15-0	5-2	10-0	7-8	18-11	8-1	4-4 1/4	0-3
102"	6-0 5-8	2-2	2-8	0-9	5-7	15-9	5-5	10-6	8-0	19-10 1/8	8-6 1/8	4-7 1/4	0-11 1/2
108"	6-3 5/8	2-3	2-9	0-10	5-10	16-6	5-8	11-0	8-5	20-8 1/2	8-10 1/2	4-9 1/2	0-6
114"	6-6 5/8	2-3	2-10	1-0	6-1	17-3	5-11	11-6	8-9	21-7 5/8	9-3 5/8	5-0 1/2	0-4 1/2
120"	6-9 5/8	2-4	3-0	1-0	6-4	18-0	6-2	12-0	9-2	22-6	9-8	5-2 3/4	0-3
126"	7-2 3/4	2-6	2-11	1-2	6-7	18-9	6-5	12-6	9-7	23-5 1/8	10-1 1/8	5-5 3/4	0-11 1/2
132"	7-5 3/4	2-6	3-0	1-4	6-10	19-6	6-8	13-0	10-0	24-4 1/4	10-6 1/4	5-8 3/4	0-6
138"	7-8 3/4	2-7	3-2	1-4	7-1	20-3	6-11	13-6	10-4	25-2 5/8	10-10 5/8	5-11 1/8	0-4 1/2
144"	7-11 3/4	2/8	3-4	1-4	7-4	21-0	7-2	14-0	10-9	26-1	11-3	6-1 3/8	0-3

QUANTITIES

Pipe Dia.	Inlet Reinf. (lbs)	Inlet Conc. (CY)	Outlet Reinf. (lbs)	Outlet Conc. (CY)
90"	1455	25.92	1365	25.26
96"	1810	28.34	1590	27.68
102"	1935	31.13	1840	30.05
108"	2215	34.21	2050	32.63
114"	2705	36.84	2395	35.27
120"	2990	39.76	2785	38.12
126"	3395	46.47	3275	44.48
132"	3835	49.94	3700	47.74
138"	4335	53.37	3850	51.13
144"	4760	57.01	4460	54.70



BENDS

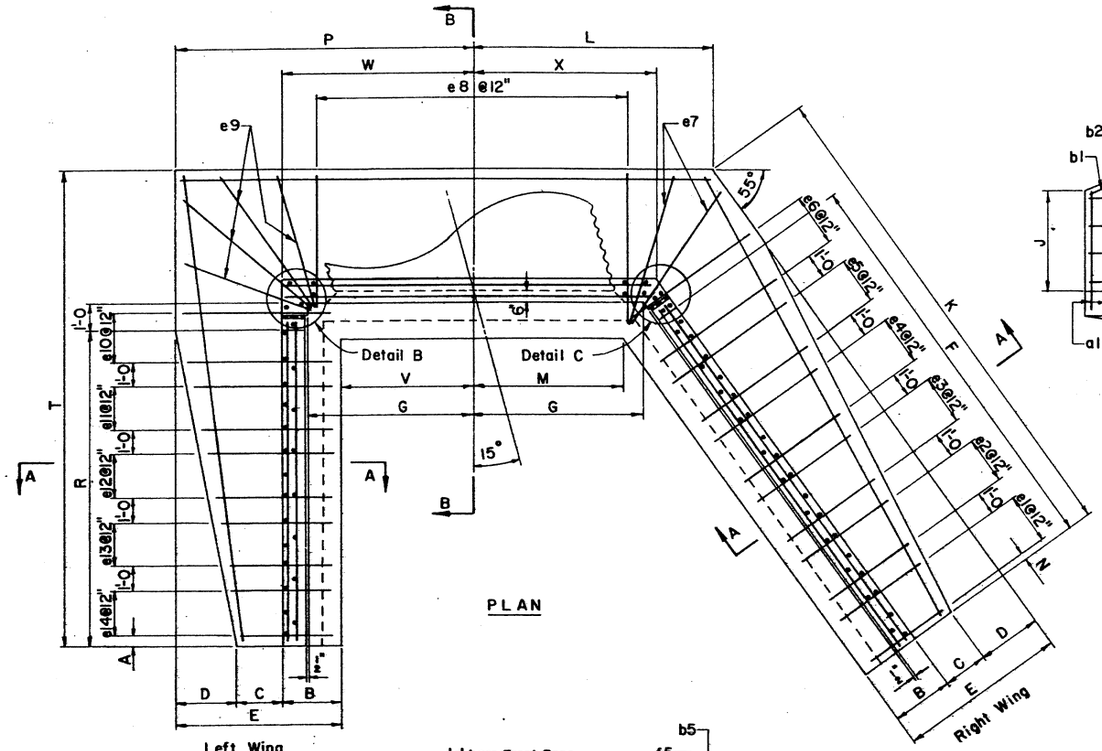


NOTE:

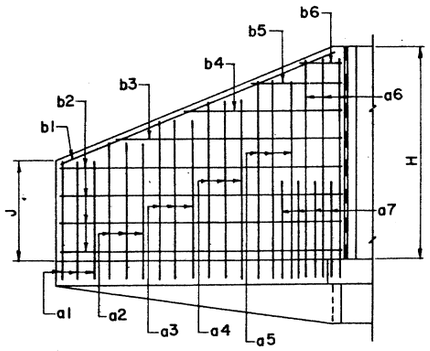
Quantities and steel list shown are for one headwall.

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS RIGHT ANGLE PIPE CULVERT 6:1 SLOPE	STANDARD NO. B-12.50

DESIGN	DRAWN	CHECKED
K W 9-72	LAM 9-72	RLC 9-72

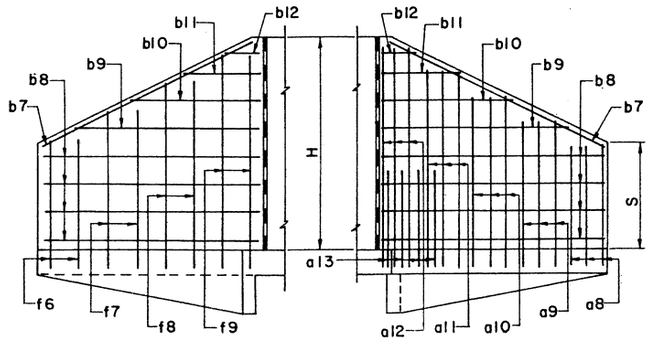


PLAN



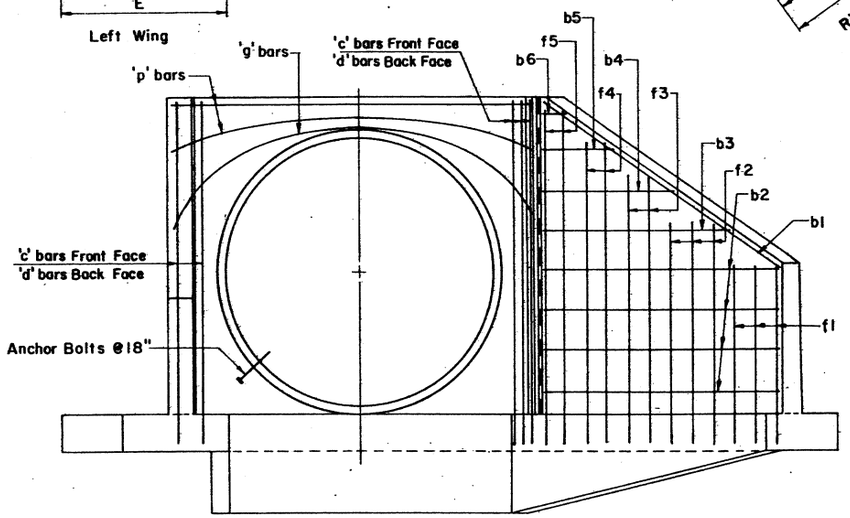
Back Face

RIGHT WING ELEVATION

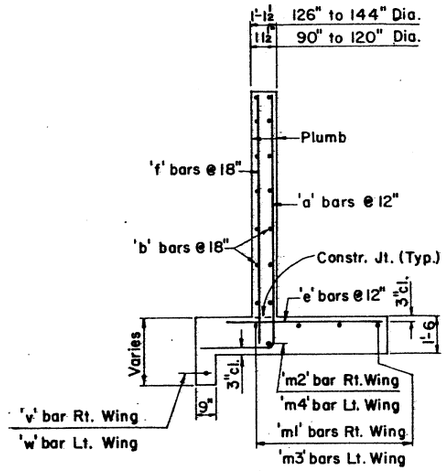


Front Face Back Face

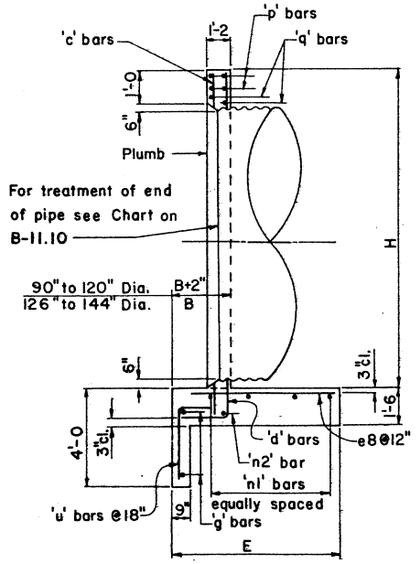
LEFT WING ELEVATION



ELEVATION



SECTION A-A



SECTION B-B

Notes: For General Notes and Misc. Details see B-11.10.
For steel list and bend diagrams see B-13.20, B-13.30 or B-13.40.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Revised % of pipe.	WBK/GHS	2-11-75
2	Wall Thicknesses	G.H.	7-14-76

DESIGN	K.W.	9-72
DRAWN	G.H.	9-72
CHECKED	R.L.C.	9-72

DESIGN APPROVED R.C. Buchler

APPROVED FOR DISTRIBUTION E.T. Stradling

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

INLET & OUTLET HEADWALLS
15° SKEW PIPE CULVERT

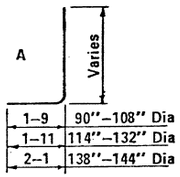
REVISION

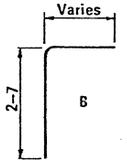
STANDARD NO. B-13.10

STEEL LIST

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	3	#4	7-6	3	#4	7-9	3	#4	8-0	3	#4	8-3	3	#4	8-6	3	#4	9-0	3	#4	9-3	3	#4	9-6	3	#5	9-9	4	#5	10-0
a2	A	3	#4	8-9	3	#4	9-0	3	#4	9-3	3	#5	9-6	3	#5	9-9	3	#5	10-3	3	#5	10-6	3	#5	10-9	3	#6	11-0	3	#6	11-9
a3	A	3	#5	10-0	3	#5	10-3	3	#5	10-6	3	#6	10-9	3	#6	11-3	3	#6	11-6	3	#6	11-9	3	#6	12-0	3	#7	12-3	3	#7	13-0
a4	A	2	#5	11-3	2	#6	11-3	3	#6	11-9	3	#7	12-0	2	#7	12-3	3	#7	12-9	3	#7	12-9	3	#7	13-0	3	#8	13-6	3	#8	14-3
a5	A	2	#6	12-0	2	#7	12-6	2	#7	13-0	3	#8	13-3	2	#7	13-3	2	#8	13-9	3	#8	14-0	3	#8	14-3	3	#8	14-9	3	#8	15-6
a6	A													2	#8	14-3	2	#8	14-9	2	#8	15-3	2	#8	15-6	3	#8	16-0	3	#8	16-9
a7	A																			2	#4	6-0	3	#4	7-0	5	#4	7-0	3	#4	7-0
a8	A	3	#4	7-9	3	#4	8-0	3	#4	8-3	3	#4	8-6	3	#4	9-0	3	#4	9-3	3	#4	9-6	3	#5	9-9	3	#5	10-0	5	#5	10-3
a9	A	3	#5	9-3	3	#5	9-6	3	#5	9-9	3	#5	10-0	3	#5	10-6	3	#6	10-9	3	#6	11-0	3	#6	11-3	3	#6	11-6	3	#6	11-9
a10	A	2	#6	10-9	3	#6	11-0	3	#6	11-3	3	#6	11-6	2	#6	12-0	3	#7	12-3	3	#7	12-6	3	#7	12-9	3	#7	13-0	3	#8	13-3
a11	A	2	#6	11-9	2	#7	12-3	2	#7	12-9	3	#7	13-0	2	#7	13-3	2	#7	13-6	2	#7	13-9	3	#8	14-3	3	#8	14-9	3	#8	15-0
a12	A													2	#7	14-3	2	#7	14-9	2	#7	15-3	2	#8	15-6	2	#8	16-0	3	#8	16-6
a13	A													3	#4	6-0	4	#4	6-0	4	#4	6-0	4	#4	7-0	4	#4	7-0	8	#4	7-0
b1	str	2	#4	12-6	2	#4	13-0	2	#4	14-0	2	#4	14-6	2	#4	15-0	2	#4	16-0	2	#4	16-9	2	#4	17-3	2	#4	18-0	2	#4	18-9
b2	str	6	#4	12-0	8	#4	12-6	8	#4	13-6	8	#4	14-0	8	#4	14-9	8	#4	15-3	8	#4	16-0	8	#4	16-9	10	#4	17-6	10	#4	18-0
b3	str	2	#4	11-6	2	#4	9-3	2	#4	10-6	2	#4	11-6	2	#4	12-9	2	#4	14-0	2	#4	15-6	2	#4	16-6	2	#4	14-0	2	#4	15-3
b4	str	2	#4	8-0	2	#4	5-6	2	#4	6-9	2	#4	7-9	2	#4	9-0	2	#4	10-3	2	#4	11-6	2	#4	12-6	2	#4	10-6	2	#4	11-6
b5	str	2	#4	4-3	2	#4	2-0	2	#4	3-0	2	#4	4-3	2	#4	5-3	2	#4	6-6	2	#4	7-9	2	#4	9-0	2	#4	6-9	2	#4	7-9
b6	str																2	#4	3-0	2	#4	4-3	2	#4	5-3	2	#4	3-0	2	#4	4-3
b7	str	2	#4	10-3	2	#4	10-9	2	#4	11-3	2	#4	11-9	2	#4	12-3	2	#4	12-9	2	#4	13-3	2	#4	14-0	2	#4	14-6	2	#4	15-0
b8	str	8	#4	9-6	8	#4	10-0	8	#4	10-6	8	#4	11-0	8	#4	11-6	8	#4	12-0	10	#4	12-6	10	#4	13-0	10	#4	13-6	10	#4	14-0
b9	str	2	#4	6-6	2	#4	7-6	2	#4	8-6	2	#4	9-6	2	#4	10-6	2	#4	11-6	2	#4	9-6	2	#4	10-6	2	#4	11-3	2	#4	12-3
b10	str	2	#4	3-6	2	#4	4-6	2	#4	5-6	2	#4	6-6	2	#4	7-6	2	#4	8-6	2	#4	6-6	2	#4	7-6	2	#4	8-3	2	#4	9-3
b11	str				2	#4	1-6	2	#4	2-6	2	#4	3-6	2	#4	4-6	2	#4	5-6	2	#4	3-3	2	#4	4-6	2	#4	5-3	2	#4	6-6
b12	str													2	#4	1-6	2	#4	2-3				2	#4	1-3	2	#4	2-3	2	#4	3-6
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-6	6	#7	17-0
e1	str	3	#4	2-3	3	#4	2-3	3	#4	2-6	3	#4	2-9	3	#4	2-9	3	#4	2-9	3	#4	2-9	3	#4	2-9	3	#4	3-0	4	#4	3-0
e2	str	3	#4	2-9	3	#4	2-9	3	#4	3-0	3	#4	3-0	3	#4	3-3	3	#4	3-3	3	#4	3-3	3	#5	3-6	3	#5	3-6	3	#5	3-9
e3	str	3	#4	3-3	3	#4	3-3	3	#5	3-6	3	#5	3-6	3	#5	3-9	3	#5	3-9	3	#5	4-0	3	#5	4-0	3	#6	4-0	3	#6	4-3
e4	str	2	#5	3-6	3	#5	3-9	3	#6	3-9	3	#6	4-0	3	#6	4-3	3	#6	4-3	3	#6	4-6	3	#6	4-6	3	#7	4-6	3	#7	4-9
e5	str	2	#5	3-9	2	#6	4-0	2	#6	4-3	3	#7	4-6	2	#7	4-6	2	#7	4-9	3	#7	5-0	3	#7	5-0	3	#7	5-0	3	#8	5-3
e6	str													2	#7	5-0	2	#7	5-3	2	#8	5-6	3	#8	5-6	3	#8	5-9	3	#8	5-9
e7	str	2	#5	4-3	2	#6	4-6	2	#6	4-9	2	#7	5-3	2	#7	5-6	2	#7	5-9	2	#8	6-0	2	#8	6-3	2	#8	6-6	2	#8	6-6
e8	str	10	#5	4-3	11	#6	4-6	11	#6	4-9	12	#7	5-3	12	#7	5-6	13	#7	5-9	13	#8	6-0	14	#8	6-3	14	#8	6-6	15	#8	6-6
e9	str	4	#5	4-3	4	#6	4-6	4	#6	4-9	4	#7	5-3	4	#7	5-6	4	#7	5-9	4	#8	6-0	4	#8	6-3	4	#8	6-6	4	#8	6-6
e10	str	2	#4	4-3	2	#5	4-6	3	#5	4-9	3	#5	4-6	2	#6	5-3	2	#6	5-6	2	#7	5-9	2	#7	6-0	3	#7	6-3	3	#8	6-6
e11	str	3	#4	3-6	3	#4	3-9	3	#4	4-0	3	#5	4-0	2	#5	4-9	2	#6	5-0	3	#6	5-0	3	#6	5-3	3	#7	5-6	3	#7	5-9
e12	str	3	#4	3-0	3	#4	3-0	3	#4	3-3	3	#4	3-3	3	#5	4-0	3	#5	4-3	3	#5	4-3	3	#5	4-6	3	#5	4-6	3	#6	4-9
e13	str	3	#4	2-3	3	#4	2-3	3	#4	2-6	3	#4	2-9	3	#4	3-3	3	#4	3-6	3	#4	3-6	3	#4	3-9	3	#4	3-9	3	#5	4-0
e14	str													3	#4	2-6	3	#4	2-9	3	#4	2-9	3	#4	3-0	3	#4	3-0	3	#4	3-6
f1	str	3	#4	5-9	3	#4	6-0	3	#4	6-3	3	#4	6-6	3	#4	6-9	3	#4	7-0	3	#4	7-0	3	#4	7-3	3	#4	7-6	4	#4	7-9
f2	str	2	#4	7-9	2	#4	8-0	3	#4	8-0	3	#4	8-6	3	#4	8-6	3	#4	9-0	3	#4	9-0	3	#4	9-3	3	#4	9-9	3	#4	10-3
f3	str	2	#4	9-0	2	#4	9-3	2	#4	10-0	2	#4	10-3	3	#4	10-3	3	#4	10-9	3	#4	10-9	3	#4	11-3	3	#4	11-6	3	#4	12-3
f4	str	2	#4	10-0	2	#4	10-6	2	#4	11-3	2	#4	11-6	2	#4	12-3	2	#4	12-6	3	#4	12-6	3	#4	13-0	3	#4	13-3	3	#4	14-0
f5	str																														
f6	str	3	#4	6-0	3	#4	6-3	3	#4	6-6	3	#4	6-9	3	#4	7-0	3	#4	7-3	3	#4	7-6	3	#4	7-9	3	#4	8-0	3	#4	8-3
f7	str	2	#4	8-3	3	#4	8-6	3	#4	8-9	3	#4	9-3	2	#4	9-3	2	#4	9-6	2	#4	10-0	3	#4	10-0	3	#4	10-3	3	#4	10-9
f8	str	2	#4	10-0	2	#4	10-9	2	#4	11-0	2	#4	11-6	2	#4	10-9	2	#4	11-0	2	#4	11-6	2	#4	12-3	2	#4	12-6	2	#4	13-0
f9	str													2	#4	12-3	2	#4	12-6	2	#4	13-0	2	#4	13-9	2	#4	14-0	2	#4	14-6
m1	str	3	#4	14-9	3	#4	15-6	3	#4	16-6	3	#4	17-0	4	#4	18-0	4	#4	18-9	4	#4	19-6	4	#4	20-3	4	#4	21-0	4	#4	21-9
m2	str	1	#4	14-9	1	#4	15-6	1	#4	16-6	1	#4	17-0	1	#4	18-0	1	#4	18-9	1	#4	19-6	1	#4	20-3	1	#4	21-0	1	#4	21-9
m3	str	3	#4	14-0	3	#4	14-9	3	#4	15-6	3	#4	16-3	4	#4	17-0	4	#4	17-6	4	#4	18-3	4	#4	19-0	4	#4	19-9	4	#4	20-6
m4	str	1	#4	14-0	1	#4	14-9	1	#4	15-6	1	#4	16-3	1	#4	17-0	1	#4	17-6	1	#4	18-3	1	#4	19-0	1	#4	19-9	1	#4	20-6
n1	str	3	#4	16-0	3	#4	16-9	3	#4	17-6	3	#4	18-3	4	#4	19-0	4	#4	19-9	4	#4	20-6	4	#4	21-3	4	#4	22-3	4	#4	23-3
n2	str	1	#4	16-0	1	#4	16-9	1	#4	17-6	1	#4	18-3	1	#4	19-0	1	#4	19-9	1	#4	20-6	1	#4	21-3	1	#4	22-3	1	#4	23-3
p	str	4	#5	11-0	4	#5	11-6	4	#5	12-0	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6	4	#5	15-0	4	#5	15-6
q	str	2	#6	13-0	2	#6	13-6	2	#6	14-0	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6	2	#6	17-0	2	#6	17-6
g	str	2	#4	9-0	2	#4	9-3	2	#4	9-9	2	#4	10-3	2	#4	10-9	2	#4	11-0	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	13-0
u	B	7	#4	4-6	7	#4	4-6	7	#4	4-6	8	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	4-9	9	#4	5-0	9	#4	5-0	9	#4	5-0
v	str	1	#4	12-9	1	#4	13-6	1	#4	14-3	1	#4	14-9	1	#4	15-6	1	#4	16-0	1	#4	16-9	1	#4	17-3	1	#4	18-0	1	#4	18-6
w	str	1	#4	9-6	1	#4	9-9	1	#4	10-3	1	#4	10-9	1	#4	11-3	1	#4	11-9	1	#4	12-3	1	#4	12-9	1	#4	13-3	1	#4	13-6

Pipe Dia	DIMENSIONS																			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-6	2-1	1-2	1-10	5-1	12-0	5-1	9-6	4-7	15-1	7-2	4-6 1/4	0-3	9-1	9-6	4-9	14-6	4-0	6-1	5-5 7/8
96"	0-3	2-2	1-3	1-11	5-4	12-8	5-4	10-0	4-10	15-10	7-6	4-8 3/4	0-7	9-6	10-0	5-0	15-2	4-2	6-4	5-8 7/8
102"	0-6	2-2	1-4	2-1	5-7	13-4	5-7	10-6	5-1	16-7 5/8	7-10 5/8	4-11 3/4	0-5	10-0	10-6	5-3	15-11	4-5	6-7	5-11 7/8
108"	0-3	2-3	1-5	2-2	5-10	14-0	5-10	11-0	5-3	17-4 5/8	8-2 5/8	5-2	0-3	10-5	11-0	5-6	16-7	4-7	6-10	6-2 7/8
114"	0-6	2-3	1-7	2-3	6-1	14-8	6-1	11-6	5-6	18-2 1/4	8-7 1/4	5-5 1/4	0-7	10-11	11-6	5-9	17-4	4-10	7-1	6-5 7/8
120"	0-3	2-4	1-8	2-4	6-4	15-4	6-4	12-0	5-9	18-11 1/4	8-11 1/4	5-7 5/8	0-5	11-4	12-0	6-0	18-0	5-0	7-4	6-8 7/8
126"	0-6	2-6	1-7	2-6	6-7	16-0	6-7	12-6	6-0	19-8 3/4	9-3 7/8	5-10 5/8	0-3	11-10	12-6	6-3	18-9	5-3	7-9	7-2 1/4
132"	0-3	2-7	1-8	2-7	6-10	16-8	6-10	13-0	6-2	20-5 7/8	9-7 7/8	6-1 1/8	0-7	12-3	13-0	6-6	19-5	5-5	8-0	7-5 1/4
138"	0-6	2-7	1-10	2-8	7-1	17-4	7-1	13-6	6-5	21-3 3/8	10-0 3/8	6-4 1/8	0-5	12-9	13-6	6-9	20-2	5-8	8-3	7-8 1/4
144"	0-3	2-8	1-11	2-9	7-4	18-0	7-5	14-0	6-8	22-0 1/2	10-5 1/2	6-7 5/8	0-3	13-3	14-0	7-0	20-10	5-11	8-7	8-0 1/4





BENDS

QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1025	20.02
96"	1180	21.86
102"	1330	23.83
108"	1595	25.79
114"	1760	27.99
120"	1955	30.15
126"	2180	34.27
132"	2395	36.72
138"	2645	39.37
144"	2920	42.20

NOTE:

Quantities and steel list shown are for one headwall.

Registered Professional Engineer (Civil) — Certificate Expires — Field Grade — DEC. 31, 19 — ARIZONA, U.S.A.

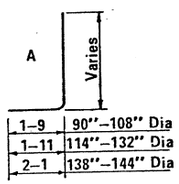
DESIGN	KW	9-72
DRAWN	LAM	9-72
CHECKED	RLC	9-72

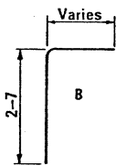
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS 15° SKEW PIPE CULVERT 2:1 SLOPE	STANDARD NO. B-13.20

STEEL LIST

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	4	#5	9-9	3	#5	10-3	4	#5	10-6	4	#5	10-9	4	#6	11-3	4	#6	11-9	4	#6	12-0	4	#6	12-6	4	#7	12-9	5	#7	13-3
a2	A	4	#5	10-9	3	#5	10-9	3	#6	11-3	4	#6	11-6	4	#6	12-0	4	#7	12-6	4	#7	12-9	4	#7	13-3	4	#8	13-9	4	#8	14-3
a3	A	3	#6	11-6	3	#6	11-3	3	#6	12-0	3	#6	12-3	3	#7	12-9	4	#7	13-3	4	#8	13-6	4	#8	14-0	4	#8	14-6	4	#8	15-0
a4	A	3	#6	12-3	3	#6	12-0	3	#7	12-6	3	#7	13-0	3	#7	13-6	3	#8	14-0	4	#8	14-6	4	#8	14-9	4	#8	15-3	4	#8	15-9
a5	A				3	#7	12-6	3	#7	13-0	2	#7	13-6	3	#8	14-0	3	#8	14-6	3	#8	15-0	3	#8	15-6	4	#8	16-0	4	#8	16-6
a6	A																														
a7	A																			3	#4	7-3	6	#4	7-9	8	#4	8-3	11	#4	8-6
a8	A	3	#4	9-0	3	#4	9-6	4	#5	9-9	4	#5	10-3	4	#6	10-9	4	#6	11-0	4	#6	11-3	4	#6	11-9	4	#6	12-0	4	#7	12-6
a9	A	3	#4	9-9	3	#5	10-3	3	#5	10-9	4	#6	11-3	4	#6	11-9	4	#6	12-0	4	#7	12-3	4	#7	12-6	4	#7	13-0	4	#7	13-6
a10	A	3	#5	10-6	3	#6	11-0	3	#6	11-6	3	#7	12-0	3	#7	12-6	4	#7	13-0	4	#8	13-3	4	#8	13-6	4	#8	14-0	4	#8	14-6
a11	A	3	#6	11-3	3	#6	11-9	3	#7	12-3	3	#7	12-9	3	#7	13-6	3	#8	14-0	3	#8	14-3	4	#8	14-6	4	#8	15-0	4	#8	15-6
a12	A	2	#6	12-0	3	#7	12-3	3	#7	12-9	2	#7	13-3	3	#8	14-0	2	#8	14-6	3	#8	15-0	3	#8	15-6	3	#8	16-0	4	#8	16-6
a13	A																			2	#4	7-0	6	#4	7-0	6	#4	7-3	7	#4	7-9
b1	str	2	#4	13-6	2	#4	14-3	2	#4	15-0	2	#4	15-9	2	#4	16-6	2	#4	17-3	2	#4	18-0	2	#4	18-9	2	#4	19-6	2	#4	20-3
b2	str	10	#4	13-3	10	#4	14-0	10	#4	14-9	12	#4	15-6	12	#4	16-3	12	#4	17-0	12	#4	17-9	14	#4	18-6	14	#4	19-3	14	#4	20-0
b3	str	2	#4	8-0	2	#4	10-9	2	#4	13-0	2	#4	8-0	2	#4	10-6	2	#4	12-9	2	#4	15-3	2	#4	10-9	2	#4	12-9	2	#4	15-3
b4	str				2	#4	3-0	2	#4	5-9				2	#4	3-3	2	#4	5-6	2	#4	8-0	2	#4	3-3	2	#4	5-6	2	#4	7-9
b5	str																														
b6	str																														
b7	str	2	#4	13-6	2	#4	14-0	2	#4	14-9	2	#4	15-6	2	#4	16-0	2	#4	16-6	2	#4	17-3	2	#4	18-0	2	#4	18-6	2	#4	19-0
b8	str	8	#4	13-6	10	#4	14-0	10	#4	14-9	10	#4	15-6	10	#4	16-0	12	#4	16-6	12	#4	17-3	12	#4	18-0	12	#4	18-6	12	#4	19-0
b9	str	2	#4	12-9	2	#4	8-9	2	#4	10-9	2	#4	12-9	2	#4	14-6	2	#4	10-9	2	#4	12-6	2	#4	14-6	2	#4	16-6	2	#4	18-6
b10	str	2	#4	6-9	2	#4	2-9	2	#4	4-9	2	#4	6-9	2	#4	8-6	2	#4	4-9	2	#4	6-6	2	#4	8-9	2	#4	10-9	2	#4	12-6
b11	str													2	#4	2-9							2	#4	2-6	2	#4	4-6	2	#4	6-6
b12	str																														
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-6	6	#7	17-0
e1	str	4	#4	3-0	3	#4	3-0	4	#4	3-3	4	#4	3-6	4	#4	3-9	4	#4	4-0	4	#4	4-0	4	#4	4-3	4	#4	4-6	5	#5	4-6
e2	str	4	#4	3-6	3	#4	3-6	3	#4	3-6	4	#4	3-9	4	#4	4-0	4	#4	4-3	4	#5	4-3	4	#5	4-6	4	#5	4-9	4	#6	5-0
e3	str	3	#4	3-9	3	#4	3-9	3	#4	4-0	3	#4	4-0	3	#5	4-3	4	#5	4-6	4	#5	4-9	4	#6	4-9	4	#6	5-0	4	#6	5-3
e4	str	3	#4	4-0	3	#4	4-0	3	#4	4-3	3	#5	4-6	3	#5	4-6	3	#6	4-9	4	#6	5-0	4	#6	5-3	4	#7	5-6	4	#7	5-9
e5	str				3	#5	4-3	3	#5	4-6	3	#5	4-9	3	#6	4-9	3	#6	5-0	3	#7	5-3	4	#7	5-6	4	#7	5-9	4	#8	6-0
e6	str																														
e7	str	2	#4	4-3	2	#5	4-6	2	#5	4-9	2	#5	5-0	2	#6	5-0	2	#6	5-3	2	#7	5-6	2	#7	5-9	2	#7	6-0	2	#8	6-3
e8	str	10	#4	4-3	11	#5	4-6	11	#5	4-9	12	#5	5-0	12	#6	5-0	13	#6	5-3	13	#7	5-6	14	#7	5-9	14	#7	6-0	15	#8	6-3
e9	str	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	5-0	4	#6	5-0	4	#6	5-3	4	#7	5-6	4	#7	5-9	4	#7	6-0	4	#8	6-3
e10	str	3	#4	4-0	3	#5	4-3	4	#5	4-6	3	#5	4-9	3	#6	4-9	3	#6	5-0	3	#7	5-3	3	#7	5-6	4	#7	5-9	4	#8	6-0
e11	str	3	#4	3-9	3	#4	4-0	4	#4	4-0	3	#5	4-6	3	#5	4-6	3	#6	4-9	3	#6	5-0	4	#6	5-3	4	#7	5-6	4	#7	5-9
e12	str	3	#4	3-6	3	#4	3-9	4	#4	3-9	3	#4	4-0	3	#4	4-3	4	#5	4-6	4	#5	4-9	4	#6	4-9	4	#6	5-0	4	#6	5-3
e13	str	3	#4	3-3	3	#4	3-6	4	#4	3-3	4	#4	3-9	4	#4	4-0	4	#4	4-3	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	5-0
e14	str	3	#4	3-0	3	#4	3-0				4	#4	3-6	4	#4	3-9	4	#4	4-0	4	#4	4-0	4	#4	4-3	4	#4	4-6	4	#4	4-6
f1	str	4	#4	7-9	4	#4	8-6	4	#4	8-9	4	#4	9-0	3	#4	9-3	3	#4	9-9	4	#4	10-0	4	#4	10-6	4	#4	10-9	4	#4	11-0
f2	str	3	#4	9-3	3	#4	9-9	4	#4	10-0	4	#4	10-3	3	#4	10-3	3	#4	10-9	3	#4	11-3	3	#4	11-9	4	#4	12-0	4	#4	12-3
f3	str	3	#4	10-0	3	#4	10-6	3	#4	11-0	3	#4	11-6	3	#4	11-3	3	#4	11-6	3	#4	12-3	3	#4	12-9	3	#4	13-3	3	#4	13-6
f4	str													3	#4	12-0	3	#4	12-6	3	#4	13-0	3	#4	13-6	3	#4	14-0	3	#4	14-6
f5	str																														
f6	str	4	#4	7-3	4	#4	7-9	4	#4	8-0	4	#4	8-6	3	#4	8-9	3	#4	9-0	3	#4	9-6	4	#4	9-9	4	#4	10-0	4	#4	10-6
f7	str	3	#4	8-9	3	#4	9-3	4	#4	9-6	4	#4	10-0	3	#4	9-9	3	#4	10-3	3	#4	10-6	3	#4	11-3	3	#4	11-6	4	#4	12-0
f8	str	3	#4	10-0	3	#4	10-6	3	#4	11-0	3	#4	11-6	3	#4	10-9	3	#4	11-3	3	#4	11-9	3	#4	12-3	3	#4	12-9	3	#4	13-6
f9	str													3	#4	12-0	3	#4	12-6	3	#4	12-9	3	#4	13-6	3	#4	13-9	3	#4	14-6
m1	str	3	#4	16-0	3	#4	16-9	3	#4	17-9	3	#4	18-6	3	#4	19-3	3	#4	20-3	3	#4	21-0	4	#4	22-0	4	#4	22-9	4	#4	23-9
m2	str	1	#4	16-0	1	#4	16-9	1	#4	17-9	1	#4	18-6	1	#4	19-3	1	#4	20-3	1	#4	21-0	1	#4	22-0	1	#4	22-9	1	#4	23-9
m3	str	3	#4	18-3	3	#4	18-9	3	#4	19-9	3	#4	20-9	3	#4	21-6	3	#4	22-3	3	#4	23-3	4	#4	24-0	4	#4	24-9	4	#4	25-6
m4	str	1	#4	18-3	1	#4	18-9	1	#4	19-9	1	#4	20-9	1	#4	21-6	1	#4	22-3	1	#4	23-3	1	#4	24-0	1	#4	24-9	1	#4	25-6
n1	str	3	#4	14-9	3	#4	15-6	3	#4	16-3	3	#4	17-0	3	#4	17-6	3	#4	18-3	3	#4	19-0	4	#4	19-9	4	#4	20-6	4	#4	21-3
n2	str	1	#4	14-9	1	#4	15-6	1	#4	16-3	1	#4	17-0	1	#4	17-6	1	#4	18-3	1	#4	19-0	1	#4	19-9	1	#4	20-6	1	#4	21-3
p	str	4	#5	11-0	4	#5	11-6	4	#5	12-0	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6	4	#5	15-0	4	#5	15-6
q	str	2	#6	13-0	2	#6	13-6	2	#6	15-0	2	#6	15-6	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6	2	#6	17-0	2	#6	17-6
r	str	2	#4	9-3	2	#4	9-9	2	#4	10-0	2	#4	10-6	2	#4	11-0	2	#4	11-3	2	#4	11-9	2	#4	12-3	2	#4	12-9	2	#4	13-3
u	B	7	#4	4-6	7	#4	4-6	7	#4	4-6	8	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	4-9	9	#4	5-0	9	#4	5-0	9	#4	5-0
v	str	1	#4	14-0	1	#4	14-9	1	#4	15-6	1	#4	16-3	1	#4	17-0	1	#4	17-9	1	#4	18-6	1	#4	19-3	1	#4	20-0	1	#4	20-9
w	str	1	#4	13-6	1	#4	14-0	1	#4	14-6	1	#4	15-3	1	#4	15-9	1	#4	16-3	1	#4	17-0	1	#4	17-6	1	#4	18-0	1	#4	18-6

Pipe Dia	DIMENSIONS																			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-6	2-1	2-0	1-0	5-1	13-3	5-1	9-6	6-9	16-4	7-2	4-6 1/4	0-4	9-1	13-6	6-2	18-6	4-0	6-1	5-5 7/8
96"	0-3	2-2	2-1	1-1	5-4	14-0	5-4	10-0	7-2	17-2	7-6	4-8 3/4	0-3	9-6	14-0	6-6	19-2	4-2	6-4	5-8 7/8
102"	0-1 1/2	2-2	2-3	1-2	5-7	14-9	5-7	10-6	7-6	18-0 5/8	7-10 5/8	4-11 3/4	0-2	10-0	14-9	6-10	20-2	4-5	6-7	5-11 7/8
108"	0-6	2-2	2-5	1-3	5-10	15-6	5-10	11-0	7-10	18-11 1/8	8-3 1/8	5-2 3/4	0-6	10-6	15-6	7-2	21-2	4-8	6-10	6-2 7/8
114"	0-3	2-3	2-6	1-4	6-1	16-3	6-1	11-6	8-2	19-9 1/4	8-7 1/4	5-5 1/4	0-4	10-11	16-0	7-6	21-10	4-10	7-1	6-5 7/8
120"	0-6	2-4	2-8	1-4	6-4	17-0	6-4	12-0	8-6	20-7 1/4	8-11 1/4	5-7 5/8	0-3	11-4	16-6	7-10	22-6	5-0	7-4	6-8 7/8
126"	0-4 1/2	2-6	2-8	1-5	6-7	17-9	6-7	12-6	8-10	21-5 3/4	9-3 7/8	5-10 5/8	0-2	11-10	17-3	8-2	23-6	5-3	7-9	7-2 1/4
132"	0-3	2-7	2-9	1-6	6-10	18-6	6-10	13-0	9-3	22-3 7/8	9-7 7/8	6-1 1/8	0-6	12-3	18-0	8-6	24-5	5-5	8-0	7-5 1/4
138"	0-6	2-7	2-11	1-7	7-1	19-3	7-1	13-6	9-7	23-2 3/8	10-0 3/8	6-4 1/8	0-4	12-9	18-6	8-10	25-2	5-8	8-3	7-8 1/4
144"	0-3	2-8	3-0	1-8	7-4	20-0	7-5	14-0	9-11	24-0 1/2	10-5 1/2	6-7 5/8	0-3	13-3	19-0	9-3	25-10	5-11	8-7	8-0 1/4





BENDS

QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1235	24.21
96"	1460	26.36
102"	1690	28.83
108"	1805	31.40
114"	2140	33.82
120"	2360	36.39
126"	2745	41.74
132"	3040	44.85
138"	3320	47.94
144"	3720	51.22

NOTE:

Quantities and steel list shown are for one headwall.

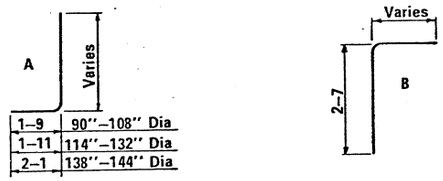
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS 15° SKEW PIPE CULVERT 4:1 SLOPE	STANDARD NO. B-13.30

DESIGN	K W	9-72
DRAWN	LAM	9-72
CHECKED	R L C	9-72

STEEL LIST

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	5	#5	10-0	5	#5	10-6	5	#6	11-0	4	#6	11-6	5	#6	12-0	5	#6	12-3	5	#7	12-6	5	#7	12-9	5	#8	13-3	6	#8	13-9
a2	A	4	#6	10-9	5	#6	11-3	5	#6	11-9	4	#6	12-0	4	#7	12-6	5	#7	13-0	5	#7	13-3	5	#8	13-9	5	#8	14-0	5	#8	14-6
a3	A	4	#6	11-6	4	#6	12-0	5	#7	12-3	4	#7	12-6	4	#7	13-3	4	#8	13-9	5	#8	14-0	5	#8	14-3	5	#8	14-9	5	#8	15-3
a4	A	4	#6	12-0	4	#7	12-6	4	#7	13-0	4	#7	13-0	4	#8	13-9	4	#8	14-3	4	#8	14-9	5	#8	15-0	5	#8	15-6	5	#8	16-0
a5	A										4	#8	13-6	4	#8	14-3	4	#8	14-9	4	#8	15-3	4	#8	15-9	5	#8	16-3	5	#8	16-9
a6	A																														
a7	A																			3	#4	6-3	8	#4	7-0	14	#4	7-6	19	#4	8-3
a8	A	4	#4	10-0	5	#4	10-6	5	#5	10-9	5	#5	11-0	5	#5	11-9	4	#6	12-0	5	#6	12-6	5	#7	12-9	5	#7	13-3	5	#7	13-9
a9	A	4	#5	10-6	4	#5	11-0	5	#5	11-6	5	#6	11-9	5	#6	12-6	4	#6	12-6	4	#7	13-0	4	#7	13-6	5	#7	14-0	5	#7	14-6
a10	A	4	#5	11-3	4	#6	11-9	4	#6	12-3	4	#7	12-9	5	#7	13-3	4	#7	13-3	4	#7	13-9	4	#7	14-3	4	#8	14-9	5	#8	15-3
a11	A	4	#6	12-0	4	#7	12-6	3	#7	13-0	4	#7	13-3	4	#7	14-0	4	#7	14-0	4	#8	14-6	4	#8	15-0	4	#8	15-6	4	#8	16-0
a12	A																4	#8	14-6	3	#8	15-0	4	#8	15-6	4	#8	16-3	4	#8	16-9
a13	A																									3	#4	8-0	7	#4	8-9
b1	str	2	#4	16-3	2	#4	17-3	2	#4	18-3	2	#4	19-3	2	#4	20-3	2	#4	21-3	2	#4	22-3	2	#4	23-3	2	#4	24-3	2	#4	25-3
b2	str	10	#4	16-0	10	#4	17-0	12	#4	18-0	12	#4	19-0	12	#4	20-0	12	#4	21-0	14	#4	22-0	14	#4	23-0	14	#4	24-0	14	#4	25-0
b3	str	2	#4	12-0	2	#4	16-9	2	#4	8-9	2	#4	12-9	2	#4	17-0	2	#4	19-3	2	#4	11-9	2	#4	15-0	2	#4	18-9	2	#4	23-0
b4	str				2	#4	4-9							2	#4	5-3	2	#4	8-0				2	#4	4-3	2	#4	9-3	2	#4	11-3
b5	str																														
b6	str																														
b7	str	2	#4	15-3	2	#4	16-0	2	#4	16-9	2	#4	17-6	2	#4	18-3	2	#4	19-0	2	#4	19-9	2	#4	20-6	2	#4	21-3	2	#4	22-0
b8	str	10	#4	15-0	10	#4	15-9	10	#4	16-6	12	#4	17-3	12	#4	18-0	12	#4	18-9	14	#4	19-6	14	#4	20-3	14	#4	21-0	14	#4	21-9
b9	str	2	#4	10-0	2	#4	13-0	2	#4	15-9	2	#4	9-9	2	#4	12-9	2	#4	16-0	2	#4	10-0	2	#4	12-9	2	#4	15-9	2	#4	19-0
b10	str				2	#4	3-9	2	#4	6-9				2	#4	4-0	2	#4	7-0				2	#4	3-6	2	#4	6-9	2	#4	9-9
b11	str																														
b12	str																														
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-6	6	#7	17-0
e1	str	5	#4	3-6	5	#4	3-6	5	#4	3-9	4	#4	3-9	5	#4	4-0	5	#5	4-0	5	#5	4-3	5	#5	4-3	5	#6	4-6	6	#6	4-9
e2	str	4	#4	3-9	5	#4	3-9	5	#4	4-0	4	#4	4-0	4	#5	4-3	5	#5	4-3	5	#5	4-6	5	#6	4-9	5	#6	5-0	5	#6	5-3
e3	str	4	#4	4-0	4	#4	4-0	5	#5	4-3	4	#5	4-3	4	#5	4-6	4	#5	4-9	5	#6	4-9	5	#6	5-0	5	#6	5-3	5	#7	5-6
e4	str	4	#4	4-3	4	#5	4-3	4	#5	4-6	4	#5	4-6	4	#5	4-9	4	#6	5-0	4	#6	5-3	5	#6	5-6	5	#7	5-9	5	#7	6-0
e5	str										4	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	5	#7	6-0	5	#8	6-3
e6	str																														
e7	str	2	#4	4-3	2	#5	4-6	2	#5	4-9	2	#5	5-0	2	#6	5-3	2	#6	5-6	2	#6	5-9	2	#7	6-0	2	#7	6-3	2	#8	6-6
e8	str	10	#4	4-3	11	#5	4-6	11	#5	4-9	12	#5	5-0	12	#6	5-3	13	#6	5-6	13	#6	5-9	14	#7	6-0	14	#7	6-3	14	#8	6-6
e9	str	3	#4	4-3	3	#5	4-6	3	#5	4-9	3	#5	5-0	4	#6	5-3	4	#6	5-6	4	#6	5-9	4	#7	6-0	4	#7	6-3	4	#8	6-6
e10	str	4	#4	4-3	4	#5	4-3	4	#5	4-6	4	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0	4	#8	6-3
e11	str	4	#4	4-0	4	#5	4-0	4	#5	4-3	4	#5	4-6	5	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0
e12	str	4	#4	3-9	4	#4	3-9	5	#4	4-0	5	#4	4-3	5	#5	4-6	4	#5	4-9	4	#6	4-9	4	#6	5-0	4	#6	5-3	5	#7	5-6
e13	str	4	#4	3-6	5	#4	3-6	5	#4	3-9	5	#4	3-9	5	#4	4-0	4	#5	4-3	4	#5	4-6	4	#5	4-9	5	#6	5-0	5	#6	5-3
e14	str																4	#5	4-0	5	#5	4-3	5	#5	4-3	5	#6	4-6	5	#6	4-9
f1	str	3	#4	8-6	3	#4	9-0	4	#4	9-3	4	#4	9-9	4	#4	10-0	4	#4	10-3	4	#4	10-6	4	#4	10-9	4	#4	11-3	4	#4	11-9
f2	str	3	#4	9-0	3	#4	9-6	3	#4	10-0	4	#4	10-6	4	#4	10-9	4	#4	11-0	4	#4	11-6	4	#4	11-9	4	#4	12-3	4	#4	12-6
f3	str	3	#4	9-9	3	#4	10-0	3	#4	10-9	3	#4	11-3	3	#4	11-9	4	#4	11-9	4	#4	12-0	4	#4	12-6	3	#4	13-0	4	#4	13-3
f4	str	3	#4	10-3	3	#4	10-9	3	#4	11-3	3	#4	11-9	3	#4	12-3	3	#4	12-9	4	#4	13-0	4	#4	13-6	3	#4	13-9	3	#4	14-3
f5	str																									3	#4	14-3	3	#4	14-9
f6	str	4	#4	8-3	4	#4	8-6	4	#4	9-0	4	#4	9-3	4	#4	9-9	4	#4	10-3	4	#4	10-6	4	#4	10-9	4	#4	11-3	4	#4	11-9
f7	str	4	#4	9-3	4	#4	9-6	4	#4	9-9	4	#4	10-3	3	#4	10-6	3	#4	11-0	4	#4	11-6	4	#4	11-9	4	#4	12-3	4	#4	12-6
f8	str	3	#4	10-3	3	#4	10-6	4	#4	10-9	4	#4	11-3	3	#4	11-3	3	#4	12-0	3	#4	12-6	3	#4	12-9	4	#4	13-3	4	#4	13-6
f9	str													3	#4	12-3	3	#4	12-6	3	#4	13-3	3	#4	13-6	3	#4	14-3	3	#4	14-6
m1	str	3	#4	18-9	3	#4	19-9	3	#4	21-3	3	#4	22-0	4	#4	23-3	4	#4	24-6	4	#4	25-6	4	#4	26-6	4	#4	27-9	4	#4	28-6
m2	str	1	#4	18-9	1	#4	19-9	1	#4	21-3	1	#4	22-0	1	#4	23-3	1	#4	24-6	1	#4	25-6	1	#4	26-6	1	#4	27-9	1	#4	28-6
m3	str	3	#4	19-6	3	#4	20-6	3	#4	21-6	3	#4	22-6	4	#4	23-3	4	#4	24-3	4	#4	25-3	4	#4	26-3	4	#4	27-3	4	#4	28-3
m4	str	1	#4	19-6	1	#4	20-6	1	#4	21-6	1	#4	22-6	1	#4	23-3	1	#4	24-3	1	#4	25-3	1	#4	26-3	1	#4	27-3	1	#4	28-3
n1	str	3	#4	16-0	3	#4	16-9	3	#4	17-6	3	#4	18-3	4	#4	19-0	4	#4	19-9	4	#4	20-6	4	#4	21-3	4	#4	22-3	4	#4	23-3
n2	str	1	#4	16-0	1	#4	16-9	1	#4	17-6	1	#4	18-3	1	#4	19-0	1	#4	19-9	1	#4	20-6	1	#4	21-3	1	#4	22-3	1	#4	23-3
p	str	4	#5	11-0	4	#5	11-6	4	#5	12-0	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6	4	#5	15-0	4	#5	15-6
q	str	2	#6	13-0	2	#6	13-6	2	#6	14-0	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-0	2	#6	16-6	2	#6	17-0	2	#6	17-6
g	str	2	#4	9-6	2	#4	9-9	2	#4	10-3	2	#4	10-9	2	#4	11-0	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6
u	B	7	#4	4-6	7	#4	4-6	7	#4	4-6	8	#4	4-9	8	#4	4-9	8	#4	4-9	8	#4	4-9	9	#4	5-0	9	#4	5-0	9	#4	5-0
v	str	1	#4	16-3	1	#4	17-3	1	#4	18-3	1	#4	19-3	1	#4	20-3	1	#4	21-3	1	#4	22-3	1	#4	23-3	1	#4	24-3	1	#4	25-3
w	str	1	#4	15-3	1	#4	15-9	1	#4	16-6	1	#4	17-3	1	#4	17-9	1	#4	18-6	1	#4	19-3	1	#4	20-3	1	#4	20-9	1	#4	21-6

Pipe Dia	DIMENSIONS																			
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-3	2-1	2-3	0-9	5-1	16-0	5-1	9-6	7-4	19-1	7-2	4-6 1/4	0-3	9-1	15-0	7-0	20-0	4-0	6-1	5-5 7/8
96"	0-1 1/2	2-2	2-4	0-10	5-4	17-0	5-4	10-0	7-9	20-2	7-6	4-8 3/4	0-3	9-6	15-9	7-5	20-11	4-2	6-4	5-8 7/8
102"	0-6	2-2	2-6	0-11	5-7	18-0	5-7	10-6	8-2	21-3 5/8	7-10 5/8	4-11 3/4	0-3	10-0	16-6	7-9	21-11	4-5	6-7	5-11 7/8
108"	0-4 1/2	2-3	2-8	0-11	5-10	19-0	5-10	11-0	8-7	22-4 5/8	8-2 5/8	5-2	0-3	10-5	17-3	8-1	22-10	4-7	6-10	6-2 7/8
114"	0-3	2-4	2-10	0-11	6-1	20-0	6-1	11-6	9-0	23-5 5/8	8-6 5/8	5-4 5/8	0-3	10-10	18-0	8-6	23-9	4-9	7-1	6-5 7/8
120"	0-1 1/2	2-4	2-11	1-1	6-4	21-0	6-4	12-0	9-2	24-7 1/4	8-11 1/4	5-7 5/8	0-3	11-4	18-9	8-11	24-9	5-0	7-4	6-8 7/8
126"	0-6	2-6	2-10	1-3	6-7	22-0	6-7	12-6	9-6	25-8 3/4	9-3 3/4	5-10 5/8	0-3	11-10	19-6	9-3	25-9	5-3	7-9	7-2 1/4
132"	0-4 1/2	2-7	3-0	1-3	6-10	23-0	6-10	13-0	9-10	26-9 7/8	9-7 7/8	6-1 1/8	0-3	12-3	20-3	9-7	26-8	5-5	8-0	7-5 1/4
138"	0-3	2-7	3-1	1-5	7-1	24-0	7-1	13-6	10-3	27-11 3/8	10-0 3/8	6-4 1/8	0-3	12-9	21-0	10-0	27-8	5-8	8-3	7-8 1/4
144"	0-1 1/2	2-8	3-3	1-5	7-4	25-0	7-5	14-0	10-7	29-0 1/2	10-5 1/2	6-7 5/8	0-3	13-3	21-9	10-5	28-7	5-11	8-7	8-0 1/4



BENDS

QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1435	27.29
96"	1680	29.93
102"	1915	32.73
108"	2180	35.65
114"	2560	38.73
120"	2890	41.76
126"	3180	47.88
132"	3610	51.49
138"	4060	55.22
144"	4530	59.31

NOTE:
Quantities and steel list shown are for one headwall.

DESIGN	K W	9-72
DRAWN	LAM	9-72
CHECKED	RLC	9-72

DESIGN APPROVED

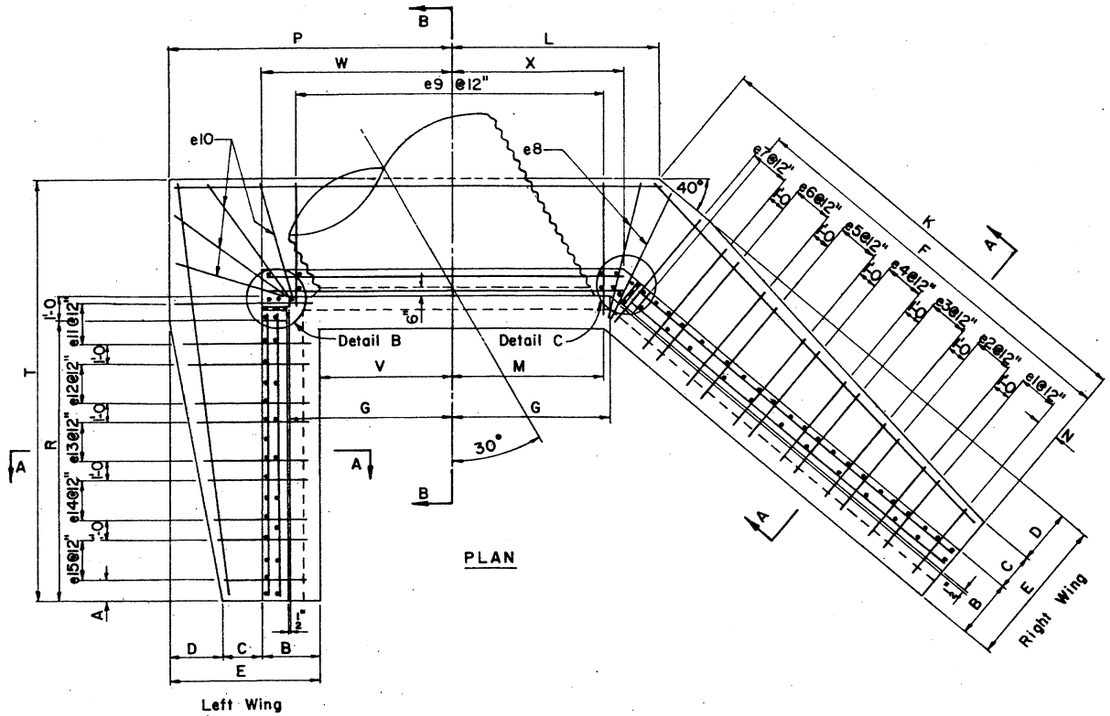
APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

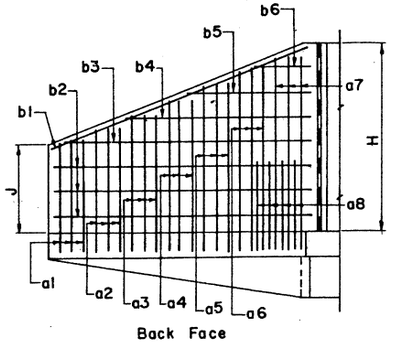
INLET AND OUTLET HEADWALLS
15° SKEW PIPE CULVERT
6:1 SLOPE

REVISION

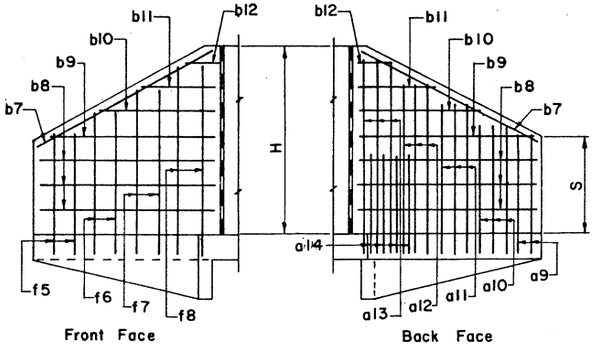
STANDARD NO.
B-13.40



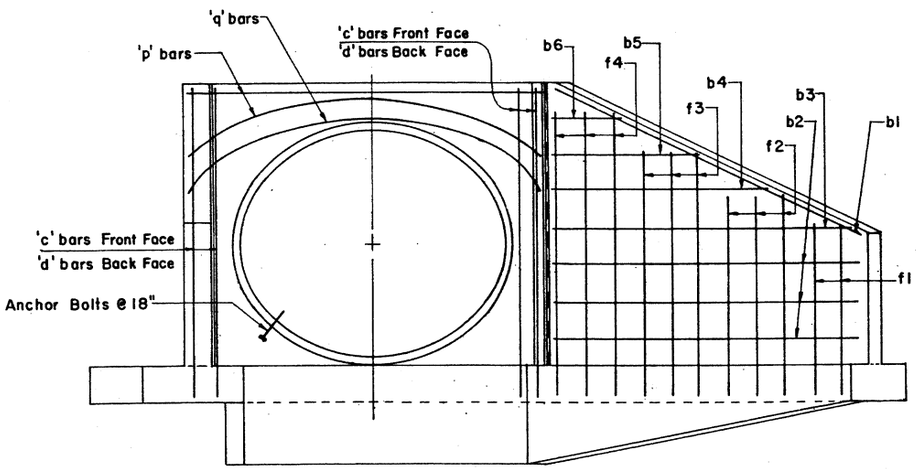
PLAN



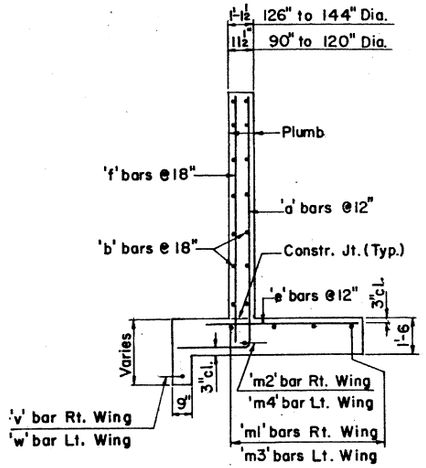
RIGHT WING ELEVATION



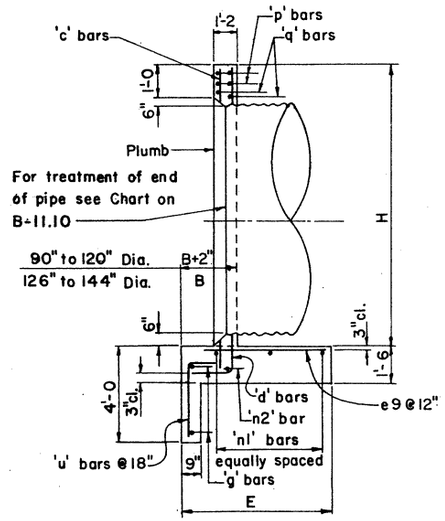
LEFT WING ELEVATION



ELEVATION



SECTION A-A



SECTION B-B

Notes: For General Notes and Misc. Details see B-11.10.
For steel list and bend diagrams see B-14.20, B-14.30 or B-14.40.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Revised ℄ of pipe.	WBR/sss	2-11-75
2	Wall Thicknesses	G.H.	7-14-76
3			

DESIGN	K.W.	9-72
DRAWN	G.H.	9-72
CHECKED	R.L.C.	9-72

DESIGN APPROVED R.C. Buchler

APPROVED FOR DISTRIBUTION E.A. Sandin

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

INLET & OUTLET HEADWALLS
30° SKEW PIPE CULVERT

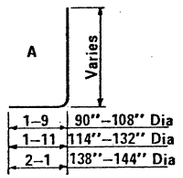
REVISION

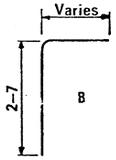
STANDARD NO. B-14.10

STEEL LIST

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	3	#4	8-3	3	#4	8-6	3	#4	8-9	3	#4	9-0	3	#4	9-3	3	#4	9-6	3	#5	9-9	3	#5	10-0	3	#5	10-3	4	#5	10-9
a2	A	3	#4	9-3	3	#5	9-6	3	#5	9-9	3	#5	9-9	3	#5	10-3	3	#5	10-6	3	#5	10-9	3	#6	11-0	3	#6	11-3	3	#6	12-0
a3	A	3	#5	10-3	3	#5	10-6	3	#5	10-9	3	#5	10-9	3	#6	11-3	3	#6	11-6	3	#6	11-9	3	#7	12-0	3	#7	12-3	3	#7	12-9
a4	A	3	#6	11-3	3	#6	11-6	3	#6	11-6	3	#6	11-9	3	#7	12-3	3	#7	12-3	3	#7	12-9	3	#8	13-0	3	#8	13-3	3	#8	13-9
a5	A	2	#6	12-0	3	#7	12-6	2	#7	12-6	2	#7	12-9	3	#7	13-3	2	#8	13-3	3	#8	13-9	3	#8	14-0	3	#8	14-3	3	#8	14-9
a6	A							2	#7	13-3	2	#8	13-9	2	#8	14-3	2	#8	14-0	2	#8	14-6	3	#8	14-9	3	#8	15-3	3	#8	15-9
a7	A																2	#8	14-9	2	#8	15-3	2	#8	15-9	3	#8	16-3	2	#8	16-9
a8	A																3	#4	6-3	3	#4	6-9	7	#4	7-6	8	#4	8-0	7	#4	8-3
a9	A	3	#4	7-9	3	#4	8-0	3	#4	8-3	3	#4	8-6	3	#4	9-0	3	#4	9-3	3	#4	9-6	3	#5	9-9	3	#5	10-0	3	#5	10-3
a10	A	3	#5	9-0	3	#5	9-6	3	#5	9-9	3	#5	10-0	3	#5	10-3	3	#6	10-9	3	#6	11-0	3	#6	11-3	3	#6	11-6	3	#6	11-9
a11	A	2	#6	10-6	3	#6	11-0	3	#6	11-3	3	#6	11-6	2	#6	11-9	3	#7	12-3	3	#7	12-6	3	#7	12-9	3	#7	13-0	3	#8	13-3
a12	A	2	#6	11-6	2	#7	12-0	2	#7	12-6	3	#7	13-0	2	#7	13-0	2	#7	13-6	2	#7	13-9	3	#8	14-3	3	#8	14-6	3	#8	15-0
a13	A													2	#7	14-0	2	#7	14-9	2	#7	15-3	2	#8	15-9	2	#8	16-0	3	#8	16-6
a14	A													3	#4	6-0	4	#4	6-0	4	#4	6-0	4	#4	7-0	4	#4	7-0	8	#4	7-0
b1	str	2	#4	13-6	2	#4	14-3	2	#4	15-0	2	#4	15-9	2	#4	16-9	2	#4	17-9	2	#4	18-6	2	#4	19-3	2	#4	20-3	2	#4	21-0
b2	str	8	#4	13-3	8	#4	14-0	8	#4	14-9	8	#4	15-6	10	#4	16-6	10	#4	17-6	10	#4	18-3	10	#4	19-0	10	#4	19-9	10	#4	20-6
b3	str	2	#4	10-0	2	#4	11-6	2	#4	13-3	2	#4	14-9	2	#4	11-9	2	#4	13-3	2	#4	14-9	2	#4	16-3	2	#4	17-6	2	#4	19-6
b4	str	2	#4	5-6	2	#4	6-9	2	#4	8-6	2	#4	10-0	2	#4	7-0	2	#4	8-6	2	#4	10-3	2	#4	11-9	2	#4	13-0	2	#4	14-9
b5	str							2	#4	3-3	2	#4	5-6	2	#4	2-0	2	#4	3-9	2	#4	5-3	2	#4	7-0	2	#4	8-6	2	#4	10-3
b6	str																									2	#4	4-0	2	#4	5-6
b7	str	2	#4	10-3	2	#4	10-9	2	#4	11-3	2	#4	11-9	2	#4	12-3	2	#4	12-9	2	#4	13-3	2	#4	14-0	2	#4	14-6	2	#4	15-0
b8	str	8	#4	9-6	8	#4	10-0	8	#4	10-6	8	#4	11-0	8	#4	11-6	8	#4	12-0	10	#4	12-6	10	#4	13-0	10	#4	13-6	10	#4	14-0
b9	str	2	#4	6-6	2	#4	7-6	2	#4	8-6	2	#4	9-6	2	#4	10-6	2	#4	11-6	2	#4	9-6	2	#4	10-6	2	#4	11-3	2	#4	12-3
b10	str	2	#4	3-6	2	#4	4-6	2	#4	5-6	2	#4	6-6	2	#4	7-6	2	#4	8-6	2	#4	6-6	2	#4	7-6	2	#4	8-3	2	#4	9-3
b11	str				2	#4	1-6	2	#4	2-6	2	#4	3-6	2	#4	4-6	2	#4	5-6	2	#4	3-3	2	#4	4-6	2	#4	5-3	2	#4	6-6
b12	str													2	#4	1-6	2	#4	2-6				2	#4	1-3	2	#4	2-3	2	#4	3-3
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-6	6	#7	17-0
e1	str	3	#4	2-3	3	#4	2-3	3	#4	2-6	3	#4	2-6	3	#4	2-6	3	#4	2-9	3	#4	2-9	3	#4	3-0	3	#4	3-0	4	#4	3-6
e2	str	3	#4	2-9	3	#4	2-9	3	#4	3-0	3	#4	3-0	3	#4	3-0	3	#4	3-3	3	#4	3-3	3	#4	3-6	3	#4	3-6	3	#4	3-9
e3	str	3	#4	3-3	3	#4	3-6	3	#4	3-3	3	#4	3-6	3	#4	3-6	3	#4	3-9	3	#4	3-9	3	#4	4-0	3	#5	4-0	3	#5	4-3
e4	str	3	#4	3-9	3	#4	4-0	3	#4	3-9	3	#4	4-0	3	#5	4-3	3	#5	4-3	3	#5	4-3	3	#5	4-6	3	#5	4-6	3	#6	4-9
e5	str	2	#4	4-3	3	#5	4-6	2	#5	4-3	3	#5	4-6	3	#5	4-9	3	#5	4-6	3	#6	4-9	3	#6	5-0	3	#6	5-0	3	#6	5-3
e6	str							2	#5	4-9	2	#5	5-0	3	#6	5-3	2	#6	5-0	2	#6	5-3	2	#7	5-6	3	#7	5-9	3	#7	6-0
e7	str																2	#6	5-6	2	#7	5-9	2	#7	6-0	3	#7	6-3	3	#8	6-6
e8	str	2	#4	4-3	2	#5	4-6	2	#5	4-9	2	#5	5-0	2	#6	5-3	2	#6	5-6	2	#7	5-9	2	#7	6-0	2	#7	6-3	2	#8	6-6
e9	str	11	#4	4-3	11	#5	4-6	12	#5	4-9	12	#5	5-0	13	#6	5-3	13	#6	5-6	14	#7	5-9	14	#7	6-0	15	#7	6-3	16	#8	6-6
e10	str	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0	4	#7	6-3	4	#8	6-6
e11	str	2	#4	4-3	2	#5	4-6	3	#5	4-9	3	#5	4-6	2	#6	5-3	2	#6	5-6	2	#7	5-9	2	#7	6-0	3	#7	6-3	3	#8	6-6
e12	str	3	#4	3-6	3	#4	3-9	3	#4	4-0	3	#5	4-0	2	#5	4-9	2	#6	5-0	3	#6	5-0	3	#6	5-3	3	#7	5-6	3	#7	5-9
e13	str	3	#4	3-0	3	#4	3-0	3	#4	3-3	3	#4	3-3	3	#5	4-0	3	#5	4-3	3	#5	4-3	3	#5	4-6	3	#5	4-6	3	#6	4-9
e14	str	3	#4	2-3	3	#4	2-3	3	#4	2-6	3	#4	2-9	3	#4	3-3	3	#4	3-6	3	#4	3-6	3	#4	3-9	3	#4	3-9	3	#5	4-0
e15	str													3	#4	2-6	3	#4	2-9	3	#4	2-9	3	#4	3-0	3	#4	3-0	3	#4	3-6
f1	str	3	#4	6-6	3	#4	6-9	3	#4	7-0	3	#4	7-3	3	#4	7-6	4	#4	7-6	4	#4	7-9	4	#4	8-0	4	#4	8-3	4	#4	8-9
f2	str	3	#4	8-0	3	#4	8-3	3	#4	8-6	3	#4	8-9	3	#4	9-0	3	#4	9-6	3	#4	9-9	4	#4	10-0	4	#4	10-3	4	#4	10-6
f3	str	2	#4	9-3	2	#4	9-9	3	#4	10-0	3	#4	10-3	3	#4	10-6	3	#4	10-9	3	#4	11-3	3	#4	12-0	3	#4	12-3	3	#4	12-6
f4	str	2	#4	10-6	2	#4	10-9	2	#4	11-0	2	#4	11-6	3	#4	11-9	3	#4	12-3	3	#4	12-9	3	#4	13-3	3	#4	13-9	3	#4	14-0
f5	str	3	#4	6-0	3	#4	6-0	3	#4	6-6	3	#4	6-9	3	#4	7-0	3	#4	7-3	3	#4	7-6	3	#4	7-9	3	#4	8-0	3	#4	8-3
f6	str	2	#4	8-3	3	#4	8-3	3	#4	8-9	3	#4	9-0	2	#4	9-3	2	#4	9-6	2	#4	9-9	3	#4	9-9	3	#4	10-3	3	#4	10-6
f7	str	2	#4	9-9	2	#4	10-6	2	#4	11-0	2	#4	11-3	2	#4	10-9	2	#4	11-0	2	#4	11-3	2	#4	12-0	2	#4	12-6	2	#4	12-9
f8	str													2	#4	12-3	2	#4	12-6	2	#4	12-9	2	#4	13-9	2	#4	14-0	2	#4	14-3
m1	str	3	#4	15-6	3	#4	16-0	3	#4	17-0	3	#4	18-0	4	#4	19-0	4	#4	20-0	4	#4	20-9	4	#4	21-6	4	#4	22-6	4	#4	23-3
m2	str	1	#4	15-6	1	#4	16-0	1	#4	17-0	1	#4	18-0	1	#4	19-0	1	#4	20-0	1	#4	20-9	1	#4	21-6	1	#4	22-6	1	#4	23-3
m3	str	3	#4	14-0	3	#4	14-9	3	#4	15-6	3	#4	16-3	4	#4	17-0	4	#4	17-6	4	#4	18-3	4	#4	19-0	4	#4	19-9	4	#4	20-6
m4	str	1	#4	14-0	1	#4	14-9	1	#4	15-6	1	#4	16-3	1	#4	17-0	1	#4	17-6	1	#4	18-3	1	#4	19-0	1	#4	19-9	1	#4	20-6
n1	str	3	#4	15-9	3	#4	16-9	3	#4	17-9	3	#4	18-9	4	#4	19-6	4	#4	20-3	4	#4	21-3	4	#4	22-0	4	#4	23-0	4	#4	23-6
n2	str	1	#4	15-9	1	#4	16-9	1	#4	17-9	1	#4	18-9	1	#4	19-6	1	#4	20-3	1	#4	21-3	1	#4	22-0	1	#4	23-0	1	#4	23-6
p	str	4	#5	11-9	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-3	4	#5	14-6	4	#5	15-6	4	#5	16-0	4	#5	16-6	4	#5	17-0
q	str	2	#6	13-9	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-3	2	#6	16-6	2	#6	17-6	2	#6	18-0	2	#6	18-6	2	#6	19-0
g	str	2	#4	10-0	2	#4	10-6	2	#4	11-3	2	#4	11-9	2	#4	12-3	2	#4	12-9	2	#4	13-3	2	#4	13-9	2	#4	14-3	2	#4	14-9
u	B	7	#4	4-6	8	#4	4-6	8	#4	4-6	8	#4	4-9	9	#4	4-9	9	#4	4-9	9	#4	4-9	10	#4	5-0	10	#4	5-0	10	#4	5-0
v	str	1	#4	14-3	1	#4	15-0	1	#4	15-9	1	#4	16-6	1	#4	17-3	1	#4	18-3	1	#4	19-0	1	#4	20-0	1	#4	20-9	1	#4	21-3
w	str	1	#4	9-6	1	#4	9-9	1	#4	10-3	1	#4	10-9	1	#4	11-3	1	#4	11-9	1	#4	12-3	1	#4	12-9	1	#4	13-3	1	#4	13-6

Pipe Dia	DIMENSIONS																		
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-6	2-1	1-4	1-8	5-1	13-3	5-5	9-6	5-3	15-8 1/2	6-10 3/8	5-0 1/4	0-4	9-5	9-6	4-9	14-6	4-4	6-5	5-7
96"	0-3	2-2	1-5	1-9	5-4	14-0	5-9	10-0	5-6	16-6 1/4	7-3 1/4	5-3 7/8	0-3	9-11	10-0	5-0	15-2	4-7	6-9	5-11
102"	0-6	2-2	1-6	1-11	5-7	14-9	6-1	10-6	5-9	17-4 1/4	7-8 1/4	5-7 7/8	0-2	10-6	10-6	5-3	15-11	4-11	7-1	6-3
108"	0-3	2-2	1-8	2-0	5-10	15-6	6-4	11-0	6-0	18-2 3/8	8-0 3/8	5-10 7/8	0-6	11-0	11-0	5-6	16-8	5-2	7-4	6-6
114"	0-6	2-3	1-8	2-2	6-1	16-6	6-8	11-6	6-3	19-3 1/8	8-5 1/8	6-2 1/2	0-6	11-6	11-6	5-9	17-4	5-5	7-8	6-10
120"	0-3	2-4	1-10	2-2	6-4	17-6	6-11	12-0	6-5	20-3 7/8	8-8 7/8	6-5 1/8	0-6	11-11	12-0	6-0	18-0	5-7	7-11	7-1
126"	0-6	2-6	1-8	2-5	6-7	18-3	7-3	12-6	6-8	21-1 7/8	9-1 7/8	6-9 1/8	0-4	12-6	12-6	6-3	18-9	5-11	8-5	7-8 1/8
132"	0-3	2-6	1-10	2-6	6-10	19-0	7-6	13-0	6-11	22-0	9-6	7-0 1/8	0-3	13-0	13-0	6-6	19-6	6-2	8-8	7-11 1/8
138"	0-6	2-7	2-0	2-6	7-1	19-9	7-10	13-6	7-2	22-9 3/4	9-10 3/4	7-3 7/8	0-2	13-6	13-6	6-9	20-2	6-5	9-0	8-3 1/8
144"	0-3	2-8	2-2	2-6	7-4	20-6	8-1	14-0	7-6	23-7 1/2	10-2 1/2	7-6 1/2	0-6	13-11	14-0	7-0	20-10	6-7	9-3	8-6 1/8





QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1065	21.88
96"	1240	23.04
102"	1395	25.20
108"	1505	27.38
114"	1800	29.79
120"	2025	32.22
126"	2250	36.76
132"	2585	39.45
138"	2775	42.38
144"	3075	45.27

BENDS

NOTE:
Quantities and steel list shown are for one headwall.

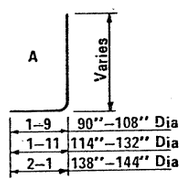
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS 30° SKEW PIPE CULVERT 2:1 SLOPE	STANDARD NO. B-14.20

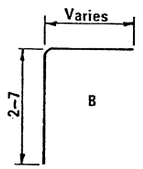
DESIGN K W 9-72 | DRAWN LAM 9-72 | CHECKED RLC 9-72

STEEL LIST

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	4	#5	10-0	4	#5	10-6	4	#5	10-9	4	#6	11-3	4	#6	11-9	4	#6	12-3	4	#7	12-6	5	#7	13-0	5	#7	13-3	5	#8	13-9
a2	A	3	#5	10-6	4	#6	11-0	4	#6	11-3	4	#6	11-9	4	#6	12-3	4	#7	12-9	4	#7	13-0	4	#8	13-9	5	#8	14-3	5	#8	14-9
a3	A	3	#6	11-0	3	#6	11-9	3	#6	12-0	4	#7	12-6	4	#7	13-0	4	#7	13-3	4	#8	13-9	4	#8	14-3	4	#8	15-0	4	#8	15-6
a4	A	3	#6	11-9	3	#6	12-3	3	#7	12-6	3	#7	13-0	4	#7	13-9	4	#8	14-0	4	#8	14-6	4	#8	15-0	4	#8	15-6	4	#8	16-0
a5	A	3	#6	12-0	2	#7	12-6	3	#7	13-0	3	#7	13-6	3	#8	14-3	3	#8	14-6	4	#8	15-0	4	#8	15-6	3	#8	16-3	4	#8	16-9
a6	A																														
a7	A																														
a8	A																			3	#4	8-0	7	#4	8-3	10	#4	8-9	11	#4	8-3
a9	A	3	#4	9-0	3	#4	9-6	4	#5	9-9	4	#5	10-0	4	#6	10-9	4	#6	11-0	4	#6	11-3	4	#6	11-9	4	#6	12-0	4	#7	12-6
a10	A	3	#4	9-9	3	#5	10-3	3	#5	10-9	4	#6	11-0	4	#6	11-6	4	#6	12-0	4	#7	12-3	4	#7	12-6	4	#7	13-0	4	#7	13-6
a11	A	3	#5	10-6	3	#6	11-0	3	#6	11-6	3	#7	12-0	3	#7	12-6	4	#7	13-0	4	#8	13-3	4	#8	13-6	4	#8	14-0	4	#8	14-6
a12	A	3	#6	11-3	3	#6	11-9	3	#7	12-3	3	#7	12-9	3	#7	13-3	3	#8	14-0	3	#8	14-3	4	#8	14-6	4	#8	15-0	4	#8	15-6
a13	A	2	#6	11-9	3	#7	12-3	3	#7	12-9	2	#7	13-6	3	#8	14-0	2	#8	14-9	3	#8	15-0	3	#8	15-6	3	#8	16-0	4	#8	16-6
a14	A																			2	#4	7-0	6	#4	6-6	6	#4	7-3	7	#4	7-9
b1	str	2	#4	15-0	2	#4	15-9	2	#4	16-6	2	#4	17-3	2	#4	18-0	2	#4	18-9	2	#4	19-6	2	#4	20-0	2	#4	20-9	2	#4	21-3
b2	str	10	#4	14-9	10	#4	15-6	12	#4	16-3	12	#4	17-0	12	#4	17-9	12	#4	18-6	14	#4	19-3	14	#4	19-9	14	#4	20-6	14	#4	21-0
b3	str	2	#4	9-9	2	#4	13-6	2	#4	7-9	2	#4	10-6	2	#4	13-6	2	#4	16-9	2	#4	10-6	2	#4	13-6	2	#4	16-3	2	#4	19-3
b4	str				2	#4	4-6							2	#4	4-0	2	#4	7-3				2	#4	4-3	2	#4	7-0	2	#4	10-0
b5	str																														
b6	str	2	#4	13-6	2	#4	14-0	2	#4	14-9	2	#4	15-6	2	#4	16-0	2	#4	16-6	2	#4	17-3	2	#4	18-0	2	#4	18-6	2	#4	19-0
b7	str	8	#4	13-6	10	#4	14-0	10	#4	14-9	10	#4	15-6	10	#4	16-0	12	#4	16-6	12	#4	17-3	12	#4	18-0	12	#4	18-6	12	#4	19-0
b8	str	2	#4	12-9	2	#4	8-9	2	#4	10-9	2	#4	12-9	2	#4	14-6	2	#4	10-9	2	#4	12-6	2	#4	14-6	2	#4	16-6	2	#4	18-6
b9	str	2	#4	6-9	2	#4	2-9	2	#4	4-9	2	#4	6-9	2	#4	8-6	2	#4	4-9	2	#4	6-6	2	#4	8-9	2	#4	10-9	2	#4	12-6
b10	str													2	#4	2-9							2	#4	2-6	2	#4	4-6	2	#4	6-9
b11	str																														
b12	str																														
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-6	6	#7	17-0
e1	str	4	#4	3-0	4	#4	3-3	4	#4	3-3	4	#4	3-6	4	#4	3-9	4	#4	4-0	4	#5	4-3	5	#5	4-3	5	#5	4-6	5	#5	4-9
e2	str	3	#4	3-3	4	#4	3-6	4	#4	3-6	4	#4	3-9	4	#5	4-3	4	#5	4-3	4	#5	4-6	4	#6	4-6	5	#6	4-9	5	#6	5-0
e3	str	3	#4	3-6	3	#4	3-9	3	#4	3-9	4	#5	4-3	4	#5	4-6	4	#5	4-6	4	#6	4-9	4	#6	5-0	4	#6	5-0	4	#7	5-3
e4	str	3	#4	3-9	3	#4	4-0	3	#5	4-3	3	#5	4-6	4	#5	4-9	4	#6	4-9	4	#6	5-0	4	#7	5-3	4	#7	5-6	4	#7	5-9
e5	str	3	#4	4-0	3	#5	4-3	3	#5	4-6	3	#5	4-9	3	#6	5-0	4	#6	5-0	4	#7	5-3	4	#7	5-6	4	#7	5-9	4	#8	6-0
e6	str																														
e7	str																														
e8	str	2	#4	4-3	2	#5	4-6	2	#5	4-9	2	#5	5-0	2	#6	5-0	2	#6	5-3	2	#7	5-6	2	#7	5-9	2	#7	6-0	2	#8	6-3
e9	str	10	#4	4-3	11	#5	4-6	11	#5	4-9	12	#5	5-0	12	#6	5-0	13	#6	5-3	13	#7	5-6	14	#7	5-9	14	#7	6-0	15	#8	6-3
e10	str	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	5-0	4	#6	5-0	4	#6	5-3	4	#7	5-6	4	#7	5-9	4	#7	6-0	4	#8	6-3
e11	str	3	#4	4-0	3	#5	4-3	4	#5	4-6	3	#5	4-9	3	#6	4-9	3	#6	5-0	3	#7	5-3	3	#7	5-6	4	#7	5-9	4	#8	6-0
e12	str	3	#4	3-9	3	#4	4-0	4	#4	4-0	3	#5	4-6	3	#5	4-6	3	#6	4-9	3	#6	5-0	4	#6	5-3	4	#7	5-6	4	#7	5-9
e13	str	3	#4	3-6	3	#4	3-9	4	#4	3-9	3	#4	4-0	3	#4	4-3	4	#5	4-6	4	#5	4-9	4	#6	4-9	4	#6	5-0	4	#6	5-3
e14	str	3	#4	3-3	3	#4	3-6	4	#4	3-3	4	#4	3-9	4	#4	4-0	4	#4	4-3	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	5-0
e15	str	3	#4	3-0	3	#4	3-0				4	#4	3-6	4	#4	3-9	4	#4	4-0	4	#4	4-0	4	#4	4-3	4	#4	4-6	4	#4	4-6
f1	str	4	#4	8-3	4	#4	8-9	3	#4	9-0	3	#4	9-6	4	#4	9-9	4	#4	10-3	4	#4	10-6	4	#4	11-0	4	#4	11-3	4	#4	11-9
f2	str	4	#4	9-3	4	#4	9-9	3	#4	9-9	3	#4	10-3	3	#4	10-9	3	#4	11-3	4	#4	11-6	4	#4	12-0	4	#4	12-3	4	#4	12-9
f3	str	3	#4	10-3	3	#4	10-9	3	#4	10-6	3	#4	11-0	3	#4	11-6	3	#4	12-0	3	#4	12-6	3	#4	13-0	4	#4	13-3	4	#4	13-9
f4	str							3	#4	11-3	3	#4	11-9	3	#4	12-3	3	#4	12-6	3	#4	13-3	3	#4	13-9	3	#4	14-3	3	#4	14-9
f5	str	4	#4	7-3	4	#4	7-9	4	#4	8-0	4	#4	8-6	3	#4	8-9	3	#4	9-0	3	#4	9-6	4	#4	9-9	4	#4	10-0	4	#4	10-6
f6	str	3	#4	8-9	3	#4	9-3	4	#4	9-6	4	#4	10-0	3	#4	9-9	3	#4	10-3	3	#4	10-6	3	#4	11-3	3	#4	11-6	4	#4	12-0
f7	str	3	#4	10-0	3	#4	10-3	3	#4	11-0	3	#4	11-6	3	#4	10-9	3	#4	11-3	3	#4	11-9	3	#4	12-3	3	#4	12-9	3	#4	13-6
f8	str													3	#4	12-0	3	#4	12-6	3	#4	12-9	3	#4	13-6	3	#4	13-9	3	#4	14-6
m1	str	3	#4	17-0	3	#4	17-9	3	#4	18-6	3	#4	19-6	3	#4	20-3	3	#4	21-0	3	#4	21-9	4	#4	22-6	4	#4	23-3	4	#4	23-9
m2	str	1	#4	17-0	1	#4	17-9	1	#4	18-6	1	#4	19-6	1	#4	20-3	1	#4	21-0	1	#4	21-9	1	#4	22-6	1	#4	23-3	1	#4	23-9
m3	str	3	#4	18-3	3	#4	18-9	3	#4	19-9	3	#4	20-9	3	#4	21-6	3	#4	22-3	3	#4	23-3	4	#4	24-0	4	#4	24-9	4	#4	25-6
m4	str	1	#4	18-3	1	#4	18-9	1	#4	19-9	1	#4	20-9	1	#4	21-6	1	#4	22-3	1	#4	23-3	1	#4	24-0	1	#4	24-9	1	#4	25-6
n1	str	3	#4	15-6	3	#4	16-6	3	#4	17-6	3	#4	18-6	3	#4	19-3	3	#4	20-0	3	#4	21-0	4	#4	21-9	4	#4	22-9	4	#4	23-3
n2	str	1	#4	15-6	1	#4	16-6	1	#4	17-6	1	#4	18-6	1	#4	19-3	1	#4	20-0	1	#4	21-0	1	#4	21-9	1	#4	22-9	1	#4	23-3
p	str	4	#5	11-9	4	#5	12-3	4	#5	13-0	4	#5	13-6	4	#5	14-0	4	#5	14-6	4	#5	15-3	4	#5	15-9	4	#5	16-6	4	#5	17-0
q	str	2	#6	12-9	2	#6	13-3	2	#6	14-0	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-3	2	#6	16-9	2	#6	17-6	2	#6	18-0
g	str	2	#4	9-6	2	#4	10-0	2	#4	10-9	2	#4	11-3	2	#4	11-9	2	#4	12-0	2	#4	12-9	2	#4	13-3	2	#4	14-0	2	#4	14-3
u	B	7	#4	4-0	8	#4	4-0	8	#4	4-0	8	#4	4-0	9	#4	4-3	9	#4	4-3	9	#4	4-3	10	#4	4-3	10	#4	4-6	10	#4	4-6
v	str	1	#4	15-9	1	#4	16-3	1	#4	17-3	1	#4	17-9	1	#4	18-6	1	#4	19-3	1	#4	20-3	1	#4	20-6	1	#4	21-3	1	#4	21-9
w	str	1	#4	14-0	1	#4	14-6	1	#4	15-0	1	#4	15-9	1	#4	16-3	1	#4	16-9	1	#4	17-6	1	#4	17-9	1	#4	18-6	1	#4	19-0

Pipe Dia	DIMENSIONS																		
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-6	2-1	2-2	0-10	5-1	14-9	5-5	9-6	7-2	17-2 1/2	6-10 1/4	5-0 1/4	0-2	9-5	13-6	6-2	18-6	4-4	6-5	5-7
96"	0-3	2-2	2-4	0-10	5-4	15-6	5-9	10-0	7-6	18-0 1/4	7-3 1/4	5-3 7/8	0-6	9-11	14-0	6-6	19-2	4-7	6-9	5-11
102"	0-1 1/2	2-2	2-6	0-11	5-7	15-3	6-1	10-6	7-11	18-10 1/4	7-8 1/4	5-7 7/8	0-4	10-6	14-9	6-10	20-2	4-11	7-1	6-3
108"	0-6	2-3	2-7	1-0	5-10	17-0	6-4	11-0	8-3	19-8 3/8	8-0 3/8	5-10 7/8	0-3	11-0	15-6	7-2	21-2	5-2	7-4	6-6
114"	0-3	2-3	2-8	1-2	6-1	17-9	6-8	11-6	8-8	20-6 1/8	8-5 1/8	6-2 1/2	0-2	11-6	16-0	7-6	21-10	5-5	7-8	6-10
120"	0-6	2-4	2-10	1-2	6-4	18-6	6-10	12-0	9-1	21-3 7/8	8-7 7/8	6-4 1/8	0-6	11-10	16-6	7-10	22-6	5-6	7-10	7-0
126"	0-4 1/2	2-6	2-10	1-3	6-7	19-3	7-3	12-6	9-5	22-1 7/8	9-1 7/8	6-9 1/8	0-4	12-6	17-3	8-2	23-6	5-11	8-5	7-8 1/8
132"	0-3	2-6	3-0	1-4	6-10	19-9	7-6	13-0	9-10	22-9	9-6	7-0 1/8	0-2	13-0	18-0	8-6	24-6	6-2	8-8	7-11 1/8
138"	0-6	2-7	3-1	1-5	7-1	20-6	7-10	13-6	10-2	23-6 3/4	9-10 3/4	7-3 7/8	0-6	13-6	18-6	8-10	25-2	6-5	9-0	8-3 1/8
144"	0-3	2-8	3-2	1-6	7-4	21-0	8-1	14-0	10-7	24-1 1/2	10-2 1/2	7-6 1/2	0-3	13-11	19-0	9-3	25-10	6-7	9-3	8-6 1/8





BENDS

QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1305	25.47
96"	1520	27.84
102"	1755	30.49
108"	1950	33.10
114"	2245	35.65
120"	2470	38.14
126"	2895	43.91
132"	3270	46.95
138"	3455	50.13
144"	3900	53.09

NOTE:
Quantities and steel list shown are for one headwall.

Registered Professional Engineer — CERTIFICATE EXPIRES — DEC. 31, 19 — ARIZONA, U.S.A.

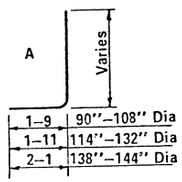
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS 30° SKEW PIPE CULVERT 4:1 SLOPE	STANDARD NO. B-14.30

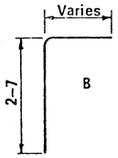
DESIGN K W 9-72 | DRAWN LAM 9-72 | CHECKED R L C 9-72

STEEL LIST

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	5	#5	10-6	4	#5	11-0	5	#6	11-3	5	#6	11-9	5	#6	12-3	5	#7	12-9	5	#7	13-0	5	#7	13-6	5	#8	14-0	6	#8	14-6
a2	A	5	#5	11-0	4	#6	11-3	4	#6	11-9	5	#6	12-3	5	#7	12-9	5	#7	13-3	5	#7	13-6	5	#8	14-0	5	#8	14-6	5	#8	15-0
a3	A	5	#6	11-6	4	#6	11-9	4	#6	12-3	4	#7	12-9	4	#7	13-3	5	#7	13-9	5	#8	14-3	5	#8	14-6	5	#8	15-0	5	#8	15-6
a4	A	4	#6	12-0	4	#6	12-3	4	#7	12-6	4	#7	13-3	4	#7	13-9	4	#8	14-3	5	#8	14-9	5	#8	15-0	5	#8	15-6	5	#8	16-0
a5	A				4	#7	12-9	4	#7	13-3	3	#7	13-9	4	#8	14-3	4	#8	14-9	4	#8	15-3	4	#8	15-6	5	#8	16-0	5	#8	16-6
a6	A																														
a7	A																														
a8	A																			3	#4	7-0	8	#4	8-3	14	#4	7-0	19	#4	8-3
a9	A	4	#4	10-0	5	#4	10-6	5	#5	10-9	5	#5	11-0	5	#5	11-9	4	#6	12-0	5	#6	12-6	5	#7	12-9	5	#7	13-3	5	#7	13-9
a10	A	4	#5	10-6	4	#5	11-0	5	#5	11-6	5	#6	11-9	5	#6	12-6	4	#6	12-6	4	#7	13-0	4	#7	13-6	5	#7	14-3	5	#7	14-6
a11	A	4	#5	11-3	4	#6	11-9	4	#6	12-3	4	#7	12-9	5	#7	13-3	4	#7	13-3	4	#7	13-9	4	#7	14-3	4	#8	15-0	5	#8	15-3
a12	A	4	#6	12-0	4	#7	12-6	3	#7	13-0	4	#7	13-3	4	#7	14-0	4	#7	14-0	4	#8	14-6	4	#8	15-0	4	#8	15-6	4	#8	16-0
a13	A																4	#8	14-6	3	#8	15-0	4	#8	15-6	4	#8	16-3	4	#8	16-9
a14	A																									3	#4	8-0	7	#4	8-9
b1	str	2	#4	18-6	2	#4	19-3	2	#4	20-0	2	#4	20-9	2	#4	21-6	2	#4	22-3	2	#4	23-0	2	#4	23-9	2	#4	24-6	2	#4	25-3
b2	str	10	#4	18-3	12	#4	19-0	12	#4	19-9	12	#4	20-6	12	#4	21-3	14	#4	22-0	14	#4	22-9	14	#4	23-6	16	#4	24-3	16	#4	25-0
b3	str	2	#4	15-0	2	#4	5-9	2	#4	9-9	2	#4	15-0	2	#4	19-6	2	#4	10-0	2	#4	14-6	2	#4	19-9	2	#4	10-0	2	#4	15-0
b4	str													2	#4	5-9							2	#4	5-9						
b5	str																														
b6	str																														
b7	str	2	#4	15-3	2	#4	16-0	2	#4	16-9	2	#4	17-6	2	#4	18-3	2	#4	19-0	2	#4	19-9	2	#4	20-6	2	#4	21-3	2	#4	22-0
b8	str	10	#4	15-0	10	#4	15-9	10	#4	16-6	12	#4	17-3	12	#4	18-0	12	#4	18-9	14	#4	19-6	14	#4	20-3	14	#4	21-0	14	#4	21-9
b9	str	2	#4	10-0	2	#4	13-0	2	#4	15-9	2	#4	9-9	2	#4	12-9	2	#4	16-0	2	#4	10-0	2	#4	12-9	2	#4	15-9	2	#4	19-0
b10	str				2	#4	3-9	2	#4	6-9				2	#4	4-0	2	#4	7-0				2	#4	3-6	2	#4	6-9	2	#4	9-9
b11	str																														
b12	str																														
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-6	6	#7	17-0
e1	str	5	#4	3-3	4	#4	3-6	5	#4	4-0	5	#4	4-3	5	#5	4-6	5	#5	4-6	5	#5	4-9	5	#6	4-9	5	#6	5-3	5	#6	5-6
e2	str	5	#4	3-6	4	#4	3-9	4	#4	4-0	5	#4	4-3	5	#5	4-6	5	#5	4-6	5	#5	4-9	5	#6	4-9	5	#6	5-3	5	#6	5-6
e3	str	5	#4	3-9	4	#4	4-0	4	#4	4-3	4	#5	4-6	4	#5	4-9	5	#5	4-9	5	#6	5-0	5	#6	5-0	5	#6	5-6	5	#7	5-9
e4	str	4	#4	4-0	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	5-0	4	#6	5-3	5	#6	5-6	5	#7	5-6	5	#7	6-0	5	#7	6-3
e5	str				4	#5	1-6	4	#5	4-9	4	#5	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	5	#7	6-0	5	#7	6-3	5	#8	6-6
e6	str																														
e7	str																														
e8	str	2	#4	4-3	2	#5	4-6	2	#5	4-9	2	#5	5-0	2	#6	5-3	2	#6	5-6	2	#7	5-9	2	#7	6-0	2	#7	6-3	2	#8	6-6
e9	str	11	#4	4-3	12	#5	4-6	12	#5	4-9	13	#5	5-0	13	#6	5-3	14	#6	5-6	14	#7	5-9	15	#7	6-0	16	#7	6-3	16	#8	6-6
e10	str	3	#4	4-3	3	#5	4-6	3	#5	4-9	3	#5	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0	4	#7	6-3	4	#8	6-6
e11	str	4	#4	4-0	4	#5	4-3	4	#5	4-6	4	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0	4	#8	6-3
e12	str	4	#4	3-9	4	#5	4-0	4	#5	4-3	4	#5	4-6	5	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0
e13	str	4	#4	3-6	4	#4	3-9	5	#4	4-0	5	#4	4-3	5	#5	4-6	4	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6	5	#7	5-9
e14	str	4	#4	3-3	5	#4	3-6	5	#4	3-9	5	#4	4-0	5	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	4-9	5	#6	5-0	5	#6	5-3
e15	str																4	#5	4-3	5	#5	4-6	5	#5	4-6	5	#6	4-9	5	#6	5-0
f1	str	4	#4	8-9	4	#4	9-3	4	#4	9-6	4	#4	10-0	4	#4	10-6	4	#4	10-9	4	#4	11-3	5	#4	11-9	5	#4	12-0	5	#4	12-6
f2	str	3	#4	9-3	4	#4	9-9	4	#4	10-0	4	#4	10-6	4	#4	11-0	4	#4	11-3	4	#4	11-9	4	#4	12-3	4	#4	12-9	5	#4	13-3
f3	str	3	#4	9-9	3	#4	10-3	3	#4	10-9	4	#4	11-0	4	#4	11-6	4	#4	12-0	4	#4	12-6	4	#4	13-0	4	#4	13-6	4	#4	14-0
f4	str	3	#4	10-3	3	#4	10-9	3	#4	11-3	3	#4	11-9	3	#4	12-3	4	#4	12-6	4	#4	13-0	4	#4	13-9	4	#4	14-0	4	#4	14-6
f5	str	4	#4	8-3	4	#4	8-6	4	#4	9-0	4	#4	9-3	4	#4	9-9	4	#4	10-3	4	#4	10-6	4	#4	10-9	4	#4	11-3	4	#4	11-9
f6	str	4	#4	9-3	4	#4	9-6	4	#4	9-9	4	#4	10-3	3	#4	10-6	3	#4	11-0	4	#4	11-6	4	#4	11-9	4	#4	12-3	4	#4	12-6
f7	str	3	#4	10-3	3	#4	10-6	4	#4	10-9	4	#4	11-3	3	#4	11-3	3	#4	12-0	3	#4	12-6	3	#4	12-9	4	#4	13-3	4	#4	13-6
f8	str													3	#4	12-6	3	#4	12-3	3	#4	13-3	3	#4	13-6	3	#4	14-3	3	#4	14-6
m1	str	3	#4	20-6	3	#4	21-6	3	#4	22-3	3	#4	23-0	4	#4	24-0	4	#4	25-9	4	#4	26-6	4	#4	27-3	4	#4	28-3	4	#4	29-0
m2	str	1	#4	20-6	1	#4	21-6	1	#4	22-3	1	#4	23-0	1	#4	24-0	1	#4	25-9	1	#4	26-6	1	#4	27-3	1	#4	28-3	1	#4	29-0
m3	str	3	#4	19-6	3	#4	20-6	3	#4	21-6	3	#4	22-6	4	#4	23-3	4	#4	24-3	4	#4	25-3	4	#4	26-3	4	#4	27-3	4	#4	28-3
m4	str	1	#4	19-6	1	#4	20-6	1	#4	21-6	1	#4	22-6	1	#4	23-3	1	#4	24-3	1	#4	25-3	1	#4	26-3	1	#4	27-3	1	#4	28-3
n1	str	3	#4	15-9	3	#4	16-9	3	#4	17-6	3	#4	18-6	4	#4	19-6	4	#4	20-3	4	#4	21-0	4	#4	21-9	4	#4	22-9	4	#4	23-6
n2	str	1	#4	15-9	1	#4	16-9	1	#4	17-6	1	#4	18-6	1	#4	19-6	1	#4	20-3	1	#4	21-0	1	#4	21-9	1	#4	22-9	1	#4	23-6
p	str	4	#5	11-9	4	#5	12-6	4	#5	13-0	4	#5	13-6	4	#5	14-3	4	#5	14-6	4	#5	15-6	4	#5	16-0	4	#5	16-6	4	#5	17-0
q	str	2	#6	13-9	2	#6	14-6	2	#6	15-0	2	#6	15-6	2	#6	16-3	2	#6	16-6	2	#6	17-6	2	#6	18-0	2	#6	18-6	2	#6	19-0
g	str	2	#4	9-9	2	#4	10-3	2	#4	10-9	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13 6	2	#4	14-0	2	#4	14-6
u	B	7	#4	4-6	8	#4	4-6	8	#4	4-6	8	#4	4-9	9	#4	4-9	9	#4	4-9	9	#4	4-9	10	#4	5-0	10	#4	5-0	10	#4	5-0
v	str	1	#4	18-6	1	#4	19-9	1	#4	20-3	1	#4	21-3	1	#4	22-0	1	#4	22-6	1	#4	23-3	1	#4	24-9	1	#4	24-9	1	#4	25-6
w	str	1	#4	15-0	1	#4	15-9	1	#4	16-3	1	#4	17-3	1	#4	17-9	1	#4	18-6	1	#4	19-3	1	#4	20-9	1	#4	20-9	1	#4	21-6

Pipe Dia	DIMENSIONS																					
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-3	2-1	2-4	0-8	5-1	18-3	5-6	9-6	7-6	20-8 1/2	6-11 1/2	5-1 1/4	0-4	9-6	15-0	7-0	20-0	4-5	6-6	5-8
96"	0-11/2	2-2	2-6	0-8	5-4	19-0	5-9	10-0	8-0	21-6 1/4	7-3 1/4	5-3 7/8	0-3	9-11	15-9	7-5	20-11	4-7	6-9	5-11
102"	0-6	2-3	2-8	0-8	5-7	19-9	6-1	10-6	8-4	22-3 7/8	7-7 7/8	5-7 1/2	0-2	10-5	16-6	7-9	21-10	4-10	7-1	6-3
108"	0-4 1/2	2-2	2-10	0-10	5-10	20-6	6-4	11-0	8-10	23-2 3/8	8-0 3/8	5-10 7/8	0-6	11-0	17-3	8-1	22-11	5-2	7-4	6-6
114"	0-3	2-3	3-0	0-10	6-1	21-3	6-8	11-6	9-3	24-0 1/8	8-5 1/8	6-2 1/2	0-4	11-6	18-0	8-6	23-10	5-5	7-8	6-10
120"	0-11/2	2-4	3-0	1-0	6-4	22-0	6-11	12-0	9-8	24-9 7/8	8-8 7/8	6-5 1/8	0-3	11-11	18-9	8-11	24-9	5-7	7-11	7-1
126"	0-6	2-7	3-0	1-0	6-7	22-9	7-3	12-6	10-0	25-7 5/8	9-1 5/8	6-8 3/4	0-2	12-5	19-6	9-3	25-8	5-10	8-5	7-8 1/8
132"	0-4 1/2	2-8	3-2	1-0	6-10	23-6	7-6	13-0	10-6	26-5 1/4	9-5 1/4	6-11 1/2	0-6	12-10	20-3	9-7	26-7	6-0	8-8	7-11 1/8
138"	0-3	2-8	3-5	1-0	7-1	24-3	7-10	13-6	10-11	27-3 3/8	9-10 3/8	7-3 1/2	0-4	13-5	21-0	10-0	27-7	6-4	9-0	8-3 1/8
144"	0-11/2	2-8	3-8	1-0	7-4	25-0	8-1	14-0	11-4	28-11 1/2	10-2 1/2	7-6 1/2	0-3	13-11	21-9	10-5	28-7	6-7	9-3	8-6 1/8





BENDS

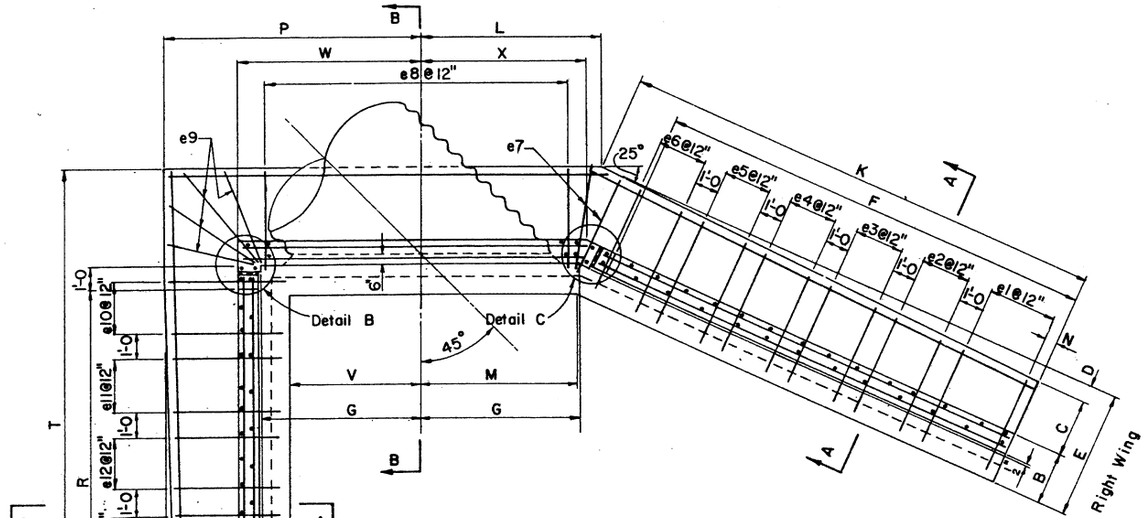
QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1430	28.92
96"	1780	31.55
102"	1995	34.33
108"	2220	37.18
114"	2615	40.26
120"	2985	43.12
126"	3370	49.49
132"	3720	52.99
138"	4150	56.89
144"	4600	60.74

NOTE:
Quantities and steel list shown are for one headwall.

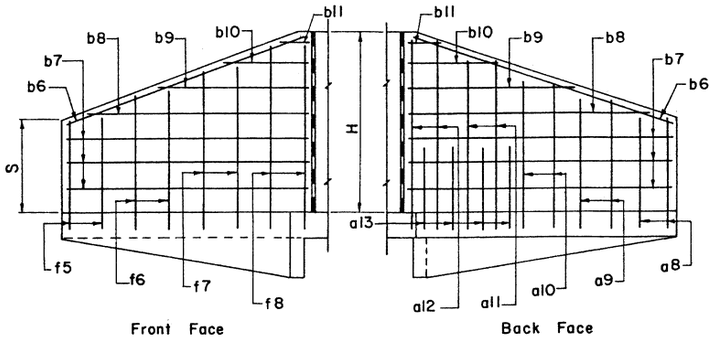
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS 30° SKEW PIPE CULVERT 6:1 SLOPE	STANDARD NO. B-14.40

DESIGN	K W	9-72
DRAWN	LAM	9-72
CHECKED	RLC	9-72



PLAN

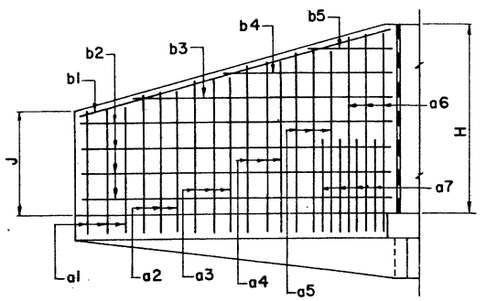
Left Wing



Front Face

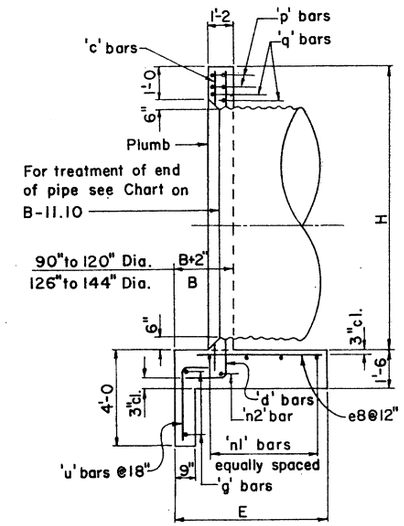
Back Face

LEFT WING ELEVATION

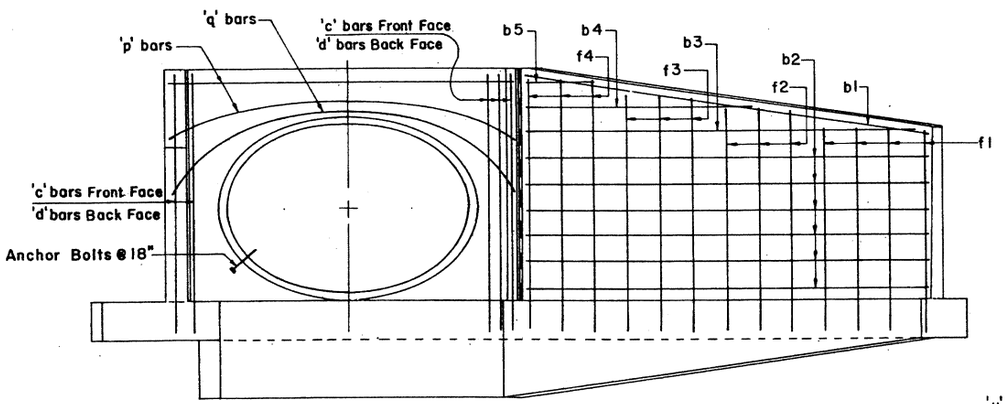


Back Face

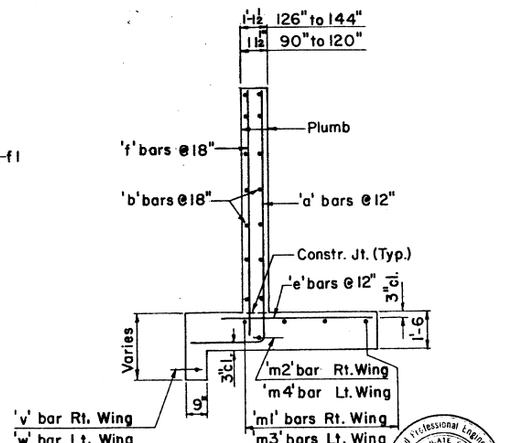
RIGHT WING ELEVATION



SECTION B-B



ELEVATION



SECTION A-A

Notes: For General Notes and Misc. Details see B-11.10.
For steel list and bend diagrams see B-15.20, B-15.30 or B-15.40.

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET & OUTLET HEADWALLS 45° SKEW PIPE CULVERT	STANDARD NO. B-15.10

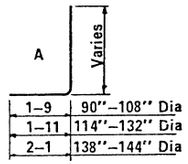
		NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
DESIGN	K. W.	9-72	1 Revised ℄ of pipe.	WSK:wes	2-11-76
DRAWN	G. H.	9-72	2 Wall Thicknesses	G.H.	7-14-76
CHECKED	R.L.C.	9-72	3		

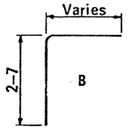
STEEL LIST

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	4	#4	9-3	4	#5	9-6	4	#5	9-9	4	#5	10-3	4	#5	10-9	4	#6	11-0	4	#6	11-3	4	#7	11-9	4	#7	12-0	4	#7	12-3
a2	A	4	#5	10-0	4	#5	10-3	4	#6	10-6	4	#6	11-0	4	#6	11-6	4	#7	11-9	4	#7	12-0	4	#7	12-6	4	#8	13-0	4	#8	13-3
a3	A	4	#6	10-9	3	#6	11-0	4	#7	11-6	4	#7	11-9	4	#7	12-3	4	#7	12-9	4	#7	13-0	4	#8	13-3	4	#8	13-9	4	#8	14-0
a4	A	4	#7	11-9	3	#7	11-9	3	#7	12-3	4	#7	12-6	4	#7	13-0	3	#7	13-6	4	#7	13-9	4	#8	14-3	4	#8	14-9	4	#8	15-0
a5	A				3	#7	12-6	3	#7	13-0	3	#7	13-6	4	#7	13-9	3	#7	14-0	3	#7	14-6	3	#8	15-0	4	#8	15-6	4	#8	15-9
a6	A																2	#7	14-6	2	#7	15-3	3	#8	15-6	3	#8	16-3	4	#8	16-9
a7	A										3	#4	6-0	7	#5	6-0	11	#5	6-0	12	#6	6-0	9	#5	7-0	10	#5	7-0	15	#6	7-0
a8	A	3	#4	7-9	3	#4	8-0	3	#4	8-3	3	#4	8-6	3	#4	9-0	3	#4	9-3	3	#4	9-6	3	#5	9-9	3	#5	10-0	3	#5	10-3
a9	A	3	#5	9-3	3	#5	9-6	3	#5	9-9	3	#5	10-0	3	#5	10-6	3	#6	10-9	3	#6	11-0	3	#6	11-3	3	#6	11-6	3	#6	11-9
a10	A	2	#6	10-9	3	#6	11-0	3	#6	11-3	3	#6	11-6	2	#6	12-0	3	#7	12-3	3	#7	12-6	3	#7	12-9	3	#7	13-0	3	#8	13-3
a11	A	2	#6	11-6	2	#7	12-6	2	#7	12-9	3	#7	13-0	2	#7	13-3	2	#7	13-6	2	#7	13-9	3	#8	14-3	3	#8	14-9	3	#8	14-9
a12	A													2	#7	14-3	2	#7	14-9	2	#7	15-3	2	#8	15-9	2	#8	16-0	3	#8	16-3
a13	A													3	#4	6-0	4	#4	6-0	4	#4	6-0	4	#4	7-0	4	#4	7-0	8	#4	7-0
b1	str	2	#4	15-9	2	#4	16-9	2	#4	17-6	2	#4	18-3	2	#4	19-3	2	#4	20-0	2	#4	20-9	2	#4	21-9	2	#4	22-6	2	#4	23-3
b2	str	8	#4	15-6	10	#4	16-6	10	#4	17-3	10	#4	18-0	10	#4	19-0	12	#4	19-9	12	#4	20-6	12	#4	21-6	12	#4	22-3	12	#4	23-0
b3	str	2	#4	15-3	2	#4	10-0	2	#4	12-3	2	#4	15-3	2	#4	17-3	2	#4	12-9	2	#4	14-6	2	#4	17-6	2	#4	20-0	2	#4	22-0
b4	str	2	#4	8-3	2	#4	3-3	2	#4	5-3	2	#4	8-0	2	#4	10-3	2	#4	5-6	2	#4	7-9	2	#4	10-3	2	#4	12-9	2	#4	15-0
b5	str													2	#4	3-0							2	#4	3-0	2	#4	5-6	2	#4	8-0
b6	str	2	#4	10-3	2	#4	10-9	2	#4	11-3	2	#4	11-9	2	#4	12-3	2	#4	12-9	2	#4	13-3	2	#4	14-0	2	#4	14-6	2	#4	15-0
b7	str	8	#4	9-6	8	#4	10-0	8	#4	10-6	8	#4	11-0	8	#4	11-6	8	#4	12-0	10	#4	12-6	10	#4	13-0	10	#4	13-6	10	#4	14-0
b8	str	2	#4	6-6	2	#4	7-6	2	#4	8-6	2	#4	9-6	2	#4	10-6	2	#4	11-6	2	#4	9-6	2	#4	10-6	2	#4	11-3	2	#4	12-3
b9	str	2	#4	3-6	2	#4	4-6	2	#4	5-6	2	#4	6-6	2	#4	7-6	2	#4	8-6	2	#4	6-6	2	#4	7-6	2	#4	8-3	2	#4	9-3
b10	str				2	#4	1-6	2	#4	2-6	2	#4	3-6	2	#4	4-6	2	#4	5-6	2	#4	3-3	2	#4	4-6	2	#4	5-3	2	#4	6-6
b11	str													2	#4	1-6	2	#4	2-6				2	#4	1-3	2	#4	2-3	2	#4	3-3
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-6	6	#7	17-0
e1	str	4	#4	3-0	4	#4	3-0	4	#4	3-3	4	#4	3-3	4	#4	3-6	4	#4	3-6	4	#4	3-6	4	#4	3-9	4	#4	3-9	4	#5	4-0
e2	str	4	#4	3-3	4	#4	3-3	4	#4	3-6	4	#4	3-6	4	#4	3-9	4	#4	3-9	4	#4	4-0	4	#5	4-0	4	#5	4-0	4	#5	4-6
e3	str	3	#4	3-6	3	#4	3-9	4	#4	3-9	4	#5	4-0	4	#5	4-0	4	#5	4-3	4	#5	4-3	4	#5	4-6	4	#6	4-6	4	#6	4-9
e4	str	3	#4	3-9	3	#4	4-0	3	#5	4-3	4	#5	4-6	4	#5	4-3	3	#5	4-6	4	#6	4-6	4	#6	5-0	4	#6	5-0	4	#7	5-0
e5	str	3	#4	4-0	3	#5	4-3	3	#5	4-6	3	#5	4-9	4	#6	4-9	3	#6	4-9	3	#6	5-0	3	#7	5-3	4	#7	5-6	4	#7	5-6
e6	str																3	#6	5-0	3	#7	5-6	3	#7	5-6	3	#7	5-9	4	#8	6-0
e7	str	2	#4	4-3	2	#5	4-6	2	#5	4-9	2	#5	5-0	2	#6	5-3	2	#6	5-6	2	#7	5-9	2	#7	6-0	2	#7	6-3	2	#8	6-6
e8	str	14	#4	4-3	14	#5	4-6	15	#5	4-9	15	#5	5-0	16	#6	5-3	16	#6	5-6	17	#7	5-9	17	#7	6-0	18	#7	6-3	19	#8	6-6
e9	str	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0	4	#7	6-3	4	#8	6-6
e10	str	2	#4	4-3	2	#5	4-6	3	#5	4-9	3	#5	4-9	2	#6	5-3	2	#6	5-6	2	#7	5-9	2	#7	6-0	3	#7	6-3	3	#8	6-6
e11	str	3	#4	3-9	3	#4	4-0	3	#4	4-3	3	#5	4-3	2	#5	4-9	2	#6	5-0	3	#6	5-0	3	#6	5-3	3	#7	5-6	3	#7	5-9
e12	str	3	#4	3-3	3	#4	3-6	3	#4	3-9	3	#4	3-9	3	#5	4-3	3	#5	4-6	3	#5	4-6	3	#5	4-9	3	#5	5-0	3	#6	5-3
e13	str	3	#4	3-0	3	#4	3-0	3	#4	3-3	3	#4	3-3	3	#4	4-0	3	#4	4-0	3	#4	4-0	3	#4	4-3	3	#4	4-3	3	#5	4-6
e14	str													3	#4	3-6	3	#4	3-6	3	#4	3-6	3	#4	3-9	3	#4	3-9	3	#4	4-0
f1	str	4	#4	7-6	4	#4	7-9	4	#4	8-3	4	#4	8-6	4	#4	8-9	4	#4	9-0	4	#4	9-6	4	#4	9-9	4	#4	10-0	4	#4	10-6
f2	str	4	#4	8-9	4	#4	9-0	4	#4	9-6	3	#4	9-6	4	#4	9-9	4	#4	10-3	4	#4	10-6	4	#4	11-0	4	#4	11-3	4	#4	11-9
f3	str	3	#4	10-0	4	#4	10-3	4	#4	11-3	3	#4	10-6	3	#4	11-0	3	#4	11-6	4	#4	11-9	4	#4	12-3	4	#4	12-6	4	#4	13-3
f4	str										3	#4	11-6	3	#4	11-9	3	#4	12-6	3	#4	13-0	3	#4	13-6	4	#4	13-9	4	#4	14-6
f5	str	3	#4	6-0	3	#4	6-3	3	#4	6-6	3	#4	6-9	3	#4	7-0	3	#4	7-3	3	#4	7-6	3	#4	7-9	3	#4	8-0	3	#4	8-3
f6	str	2	#4	8-0	3	#4	8-6	3	#4	8-9	3	#4	9-3	2	#4	9-0	2	#4	9-6	2	#4	10-0	3	#4	10-0	3	#4	10-3	3	#4	10-9
f7	str	2	#4	10-0	2	#4	10-9	2	#4	11-0	2	#4	11-6	2	#4	10-9	2	#4	11-0	2	#4	11-6	2	#4	12-3	2	#4	12-6	2	#4	13-0
f8	str													2	#4	12-3	2	#4	12-6	2	#4	13-0	2	#4	13-9	2	#4	14-0	2	#4	14-6
m1	str	3	#4	17-0	3	#4	18-0	3	#4	18-9	3	#4	19-9	4	#4	20-9	4	#4	21-6	4	#4	22-6	4	#4	23-3	4	#4	24-0	4	#4	25-0
m2	str	1	#4	17-0	1	#4	18-0	1	#4	18-9	1	#4	19-9	1	#4	20-9	1	#4	21-6	1	#4	22-6	1	#4	23-3	1	#4	24-0	1	#4	25-0
m3	str	3	#4	14-0	3	#4	14-9	3	#4	15-6	3	#4	16-3	4	#4	17-0	4	#4	17-6	4	#4	18-3	4	#4	19-0	4	#4	19-9	4	#4	20-6
m4	str	1	#4	14-0	1	#4	14-9	1	#4	15-6	1	#4	16-3	1	#4	17-0	1	#4	17-6	1	#4	18-3	1	#4	19-0	1	#4	19-9	1	#4	20-6
n1	str	3	#4	17-6	3	#4	18-6	3	#4	19-6	3	#4	20-3	4	#4	21-6	4	#4	22-3	4	#4	23-3	4	#4	24-3	4	#4	25-3	4	#4	26-3
n2	str	1	#4	17-6	1	#4	18-6	1	#4	19-6	1	#4	20-3	1	#4	21-6	1	#4	22-3	1	#4	23-3	1	#4	24-3	1	#4	25-3	1	#4	26-3
p	str	4	#5	13-0	4	#5	13-9	4	#5	14-3	4	#5	15-0	4	#5	15-9	4	#5	16-6	4	#5	17-3	4	#5	17-9	4	#5	18-9	4	#5	19-3
q	str	2	#6	15-0	2	#6	15-9	2	#6	16-3	2	#6	17-0	2	#6	17-9	2	#6	18-6	2	#6	19-3	2	#6	19-9	2	#6	20-9	2	#6	21-3
g	str	2	#4	12-3	2	#4	12-9	2	#4	13-6	2	#4	14-0	2	#4	14-9	2	#4	15-6	2	#4	16-0	2	#4	16-9	2	#4	17-6	2	#4	18-0
u	B	9	#4	4-6	9	#4	4-6	10	#4	4-6	10	#4	4-9	10	#4	4-9	11	#4	4-9	11	#4	4-9	12	#4	5-0	12	#4	5-0	13	#4	5-0
v	str	1	#4	16-9	1	#4	17-6	1	#4	18-3	1	#4	19-0	1	#4	19-9	1	#4	20-6	1	#4	21-9	1	#4	22-6	1	#4	23-3	1	#4	24-0
w	str	1	#4	9-6	1	#4	9-9	1	#4	10-3	1	#4	10-9	1	#4	11-3	1	#4	11-9	1	#4	12-6	1	#4	13-0	1	#4	13-3	1	#4	14-0

DIMENSIONS

Pipe Dia	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-6	2-1	2-2	0-10	5-1	15-6	6-6	9-6	6-3	17-4 5/8	7-4 5/8	6-3 1/8	0-6	10-6	9-6	4-9	14-6	5-5	7-6	6-4 3/8
96"	0-3	2-2	2-2	1-0	5-4	16-4	6-10	10-0	6-7	18-3 1/8	7-9 1/8	6-6 7/8	0-5	11-0	10-0	5-0	15-2	5-8	7-10	6-8 3/8
102"	0-6	2-2	2-4	1-1	5-7	17-2	7-2	10-6	6-11	19-1 3/4	8-1 3/4	6-10 7/8	0-4	11-7	10-6	5-3	15-11	6-0	8-2	7-0 3/8
108"	0-3	2-3	2-3	1-4	5-10	18-0	7-6	11-0	7-3	20-0 1/4	8-6 1/4	7-2 5/8	0-3	12-1	11-0	5-6	16-7	6-3	8-6	7-4 3/8
114"	0-6	2-3	2-4	1-6	6-1	18-10	7-11	11-6	7-6	20-10 7/8	8-11 7/8	7-7 5/8	0-2	12-9	11-6	5-9	17-4	6-8	8-11	7-9 3/8
120"	0-3	2-4	2-5	1-7	6-4	19-8	8-3	12-0	7-10	21-9 1/4	9-4 1/4	7-11 1/2	0-7	13-3	12-0	6-0	18-0	6-11	9-3	8-1 3/8
126"	0-6	2-6	2-4	1-9	6-7	20-6	8-7	12-6	8-2	22-8	9-9	8-3 1/2	0-6	13-10	12-6	6-3	18-9	7-3	9-9	8-10 1/8
132"	0-3	2-7	2-6	1-9	6-10	21-4	8-11	13-0	8-6	23-6 3/8	10-1 1/2	8-7 1/4	0-5	14-4	13-0	6-6	19-5	7-6	10-1	9-2 1/8
138"	0-6	2-7	2-7	1-11	7-1	22-2	9-4	13-6	8-10	24-5	10-7 1/8	9-0 1/4	0-4	15-0	13-6	6-9	20-2	7-11	10-6	9-7 1/8
144"	0-3	2-8	2-8	2-0	7-4	23-0	9-8	14-0	9-2	25-3 1/2	10-11 1/2	9-4	0-3	15-6	14-0	7-0	20-10	8-2	10-10	9-11 1/8





BENDS

QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1215	23.99
96"	1415	26.13
102"	1605	28.52
108"	1765	30.78
114"	2080	33.40
120"	2305	35.99
126"	2585	41.02
132"	2945	44.05
138"	3210	47.29
144"	3705	50.47

NOTE:

Quantities and steel list shown are for one headwall.

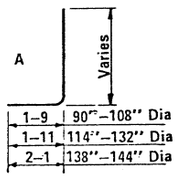
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS 45° SKEW PIPE CULVERT 2:1 SLOPE	STANDARD NO. B-15.20

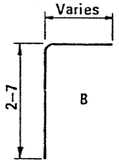
DESIGN	K W	9-72
DRAWN	L A M	9-72
CHECKED	R L C	9-72

STEEL LIST

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	4	#5	10-6	4	#5	11-0	4	#6	11-6	4	#6	12-0	4	#6	12-6	5	#7	13-0	5	#7	13-3	5	#8	13-9	5	#8	14-3	5	#8	14-9
a2	A	4	#5	11-0	4	#6	11-6	4	#6	12-0	4	#6	12-6	4	#7	13-0	4	#7	13-6	5	#8	13-9	5	#8	14-3	5	#8	14-9	5	#8	15-3
a3	A	3	#6	11-6	4	#6	11-9	4	#6	12-3	4	#7	12-9	4	#7	13-3	4	#7	13-9	4	#8	14-3	4	#8	14-9	5	#8	15-3	5	#8	15-9
a4	A	3	#6	11-9	3	#6	12-3	4	#7	12-9	4	#7	13-3	4	#7	13-9	4	#8	14-3	4	#8	14-9	4	#8	15-3	5	#8	15-9	5	#8	16-3
a5	A	3	#6	12-3	3	#7	12-6	3	#7	13-3	3	#7	13-6	4	#8	14-0	4	#8	14-6	4	#8	15-3	4	#8	15-9	4	#8	16-3	4	#8	16-9
a6	A																														
a7	A																			3	#4	7-0	12	#4	6-6	13	#4	8-3	18	#4	8-9
a8	A	3	#4	9-0	3	#4	9-6	4	#5	9-9	4	#5	10-0	4	#6	10-9	4	#6	11-0	4	#6	11-3	4	#6	11-9	4	#6	12-0	4	#7	12-6
a9	A	3	#4	9-9	3	#5	10-3	3	#5	10-9	4	#6	11-0	4	#6	11-6	4	#6	11-9	4	#7	12-3	4	#7	12-6	4	#7	13-0	4	#7	13-6
a10	A	3	#5	10-6	3	#6	11-0	3	#6	11-6	3	#7	12-0	3	#7	12-6	4	#7	13-0	4	#8	13-3	4	#8	13-6	4	#8	14-0	4	#8	14-6
a11	A	3	#6	11-3	3	#6	11-9	3	#7	12-3	3	#7	12-9	3	#7	13-6	3	#8	14-0	3	#8	14-3	4	#8	14-6	4	#8	15-0	4	#8	15-6
a12	A	2	#6	11-9	3	#7	12-3	3	#7	12-9	2	#7	13-3	3	#8	14-0	2	#8	14-6	3	#8	15-3	3	#8	15-6	3	#8	16-0	4	#8	16-6
a13	A																			2	#4	7-0	6	#4	6-6	6	#4	7-3	7	#4	7-9
b1	str	2	#4	16-6	2	#4	17-3	2	#4	18-0	2	#4	18-9	2	#4	19-6	2	#4	20-3	2	#4	21-3	2	#4	22-0	2	#4	23-0	2	#4	23-9
b2	str	10	#4	16-3	12	#4	17-0	12	#4	17-9	12	#4	18-6	14	#4	19-3	14	#4	20-0	14	#4	21-0	14	#4	21-9	16	#4	22-9	16	#4	23-6
b3	str	2	#4	15-3	2	#4	6-6	2	#4	10-6	2	#4	15-6	2	#4	5-6	2	#4	10-6	2	#4	15-0	2	#4	19-6	2	#4	10-6	2	#4	15-0
b4	str																						2	#4	5-9						
b5	str																														
b6	str	2	#4	13-6	2	#4	14-0	2	#4	14-9	2	#4	15-6	2	#4	16-0	2	#4	16-6	2	#4	17-3	2	#4	18-0	2	#4	18-6	2	#4	19-0
b7	str	8	#4	13-6	10	#4	14-0	10	#4	14-9	10	#4	15-6	10	#4	16-0	12	#4	16-6	12	#4	17-3	12	#4	18-0	12	#4	18-6	12	#4	19-0
b8	str	2	#4	12-9	2	#4	8-9	2	#4	10-9	2	#4	12-9	2	#4	14-6	2	#4	10-9	2	#4	12-6	2	#4	14-6	2	#4	16-6	2	#4	18-6
b9	str	2	#4	6-9	2	#4	2-9	2	#4	4-9	2	#4	8-9	2	#4	8-6	2	#4	4-9	2	#4	6-6	2	#4	8-9	2	#4	10-9	2	#4	12-6
b10	str													2	#4	2-6							2	#4	2-6	2	#4	4-6	2	#4	6-9
b11	str																														
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-3	6	#6	12-9	6	#7	13-3	6	#7	13-9	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-6	6	#7	17-0
e1	str	5	#4	3-3	4	#4	3-6	5	#4	3-6	5	#4	3-9	5	#5	4-0	5	#5	4-0	5	#5	4-3	5	#5	4-3	5	#6	4-9	5	#6	5-0
e2	str	4	#4	3-6	5	#4	3-9	5	#4	3-9	5	#5	4-0	5	#5	4-3	4	#5	4-3	5	#5	4-6	5	#6	4-6	5	#6	5-0	5	#6	5-3
e3	str	4	#4	3-9	5	#4	4-0	5	#5	4-0	5	#5	4-3	5	#5	4-6	4	#5	4-6	4	#6	4-9	5	#6	5-0	5	#7	5-3	5	#7	5-6
e4	str	4	#4	4-0	4	#5	4-3	4	#5	4-3	5	#5	4-6	5	#6	4-9	4	#6	4-9	4	#6	5-0	4	#7	5-3	5	#7	5-6	5	#7	5-9
e5	str																4	#6	5-0	4	#7	5-3	4	#7	5-6	4	#7	5-9	5	#8	6-0
e6	str																														
e7	str	2	#4	4-3	2	#5	4-6	2	#5	4-9	2	#5	5-0	2	#6	5-0	2	#6	5-3	2	#7	5-6	2	#7	5-9	2	#7	6-0	2	#8	6-3
e8	str	13	#4	4-3	14	#5	4-6	15	#5	4-9	15	#5	5-0	16	#6	5-0	17	#6	5-3	17	#7	5-6	18	#7	5-9	19	#7	6-0	20	#8	6-3
e9	str	4	#4	4-3	4	#5	4-6	4	#5	4-9	4	#5	5-0	4	#6	5-0	4	#6	5-3	4	#7	5-6	4	#7	5-9	4	#7	6-0	4	#8	6-3
e10	str	5	#4	4-0	5	#5	4-3	5	#5	4-6	5	#5	4-9	4	#6	4-9	3	#6	5-3	3	#7	5-3	3	#7	5-6	4	#7	5-9	4	#8	6-0
e11	str	5	#4	3-9	5	#4	3-9	5	#4	4-3	4	#5	4-6	4	#5	4-6	3	#6	5-0	3	#6	5-0	4	#6	5-3	4	#7	5-6	4	#7	5-9
e12	str	5	#4	3-3	5	#4	3-6	6	#4	3-9	4	#4	4-3	4	#4	4-3	4	#5	4-9	4	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6
e13	str										4	#4	3-9	5	#4	4-0	4	#4	4-6	4	#4	4-6	4	#5	4-9	4	#5	5-0	4	#5	5-3
e14	str																4	#4	4-3	4	#4	4-3	4	#4	4-6	4	#4	4-9	4	#4	5-0
f1	str	4	#4	8-9	4	#4	9-3	4	#4	9-9	4	#4	10-3	4	#4	10-6	4	#4	11-0	4	#4	11-3	4	#4	11-9	4	#4	12-3	5	#4	12-6
f2	str	4	#4	9-6	4	#4	10-0	3	#4	10-6	3	#4	10-9	4	#4	11-3	4	#4	11-9	4	#4	12-0	4	#4	12-6	4	#4	12-9	4	#4	13-3
f3	str	4	#4	10-3	4	#4	10-9	3	#4	11-0	3	#4	11-3	3	#4	11-9	3	#4	12-3	4	#4	12-9	4	#4	13-3	4	#4	13-6	4	#4	14-0
f4	str							3	#4	11-3	3	#4	11-9	3	#4	12-3	3	#4	12-9	3	#4	13-3	3	#4	13-9	4	#4	14-3	4	#4	14-9
f5	str	4	#4	7-3	4	#4	7-9	4	#4	8-0	4	#4	8-6	3	#4	8-9	3	#4	9-0	3	#4	9-6	4	#4	9-9	4	#4	10-0	4	#4	10-6
f6	str	3	#4	8-9	3	#4	9-3	4	#4	9-6	4	#4	10-0	3	#4	9-9	3	#4	10-3	3	#4	10-6	3	#4	11-3	3	#4	11-6	4	#4	12-0
f7	str	3	#4	10-0	3	#4	10-9	3	#4	11-0	3	#4	11-6	3	#4	10-9	3	#4	11-3	3	#4	11-9	3	#4	12-3	3	#4	12-9	3	#4	13-6
f8	str													3	#4	12-0	3	#4	12-6	3	#4	12-9	3	#4	13-6	3	#4	13-9	3	#4	14-6
m1	str	3	#4	17-9	3	#4	18-6	3	#4	19-3	3	#4	20-3	3	#4	21-0	3	#4	21-9	3	#4	22-9	4	#4	23-9	4	#4	24-9	4	#4	25-6
m2	str	1	#4	17-9	1	#4	18-6	1	#4	19-3	1	#4	20-3	1	#4	21-0	1	#4	21-9	1	#4	22-9	1	#4	23-9	1	#4	24-9	1	#4	25-6
m3	str	3	#4	18-3	3	#4	18-9	3	#4	19-9	3	#4	20-9	3	#4	21-6	3	#4	22-3	3	#4	23-3	4	#4	24-0	4	#4	24-9	4	#4	26-6
m4	str	1	#4	18-3	1	#4	18-9	1	#4	19-9	1	#4	20-9	1	#4	21-6	1	#4	22-3	1	#4	23-3	1	#4	24-0	1	#4	24-9	1	#4	26-6
n1	str	3	#4	17-9	3	#4	18-6	3	#4	19-6	3	#4	20-6	3	#4	21-6	3	#4	22-3	3	#4	23-3	4	#4	24-0	4	#4	25-0	4	#4	26-0
n2	str	1	#4	17-9	1	#4	18-6	1	#4	19-6	1	#4	20-6	1	#4	21-6	1	#4	22-3	1	#4	23-3	1	#4	24-0	1	#4	25-0	1	#4	26-0
p	str	4	#5	13-9	4	#5	14-6	4	#5	15-3	4	#5	15-9	4	#5	16-6	4	#5	17-3	4	#5	18-0	4	#5	18-9	4	#5	19-6	4	#5	20-3
q	str	2	#6	14-9	2	#6	15-6	2	#6	16-3	2	#6	16-9	2	#6	17-6	2	#6	18-3	2	#6	19-0	2	#6	19-9	2	#6	20-6	2	#6	21-3
g	str	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-6	2	#4	15-3	2	#4	15-9	2	#4	16-3	2	#4	17-3	2	#4	17-9
u	B	9	#4	4-0	9	#4	4-0	10	#4	4-0	10	#4	4-0	10	#4	4-3	11	#4	4-3	11	#4	4-3	12	#4	4-3	12	#4	4-6	13	#4	4-6
v	str	1	#4	17-0	1	#4	17-9	1	#4	18-9	1	#4	19-6	1	#4	20-0	1	#4	20-9	1	#4	21-9	1	#4	22-6	1	#4	23-6	1	#4	24-3
w	str	1	#4	14-0	1	#4	14-6	1	#4	15-0	1	#4	15-6	1	#4	16-3	1	#4	16-9	1	#4	17-6	1	#4	17-9	1	#4	18-6	1	#4	19-0

Pipe Dia	DIMENSIONS																		
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-6	2-1	2-4	0-8	5-1	16-3	6-6	9-6	7-9	18-1 5/8	7-4 5/8	6-3 1/8	0-4	10-6	13-6	6-2	18-6	5-5	7-6	6-4 3/8
96"	0-3	2-2	2-6	0-8	5-4	17-0	6-10	10-0	8-2	18-11 1/8	7-9 1/8	6-6 7/8	0-3	11-0	14-0	6-6	19-2	5-8	7-10	6-8 3/8
102"	0-1 1/2	2-2	2-8	0-9	5-7	17-9	7-2	10-6	8-8	19-8 3/4	8-1 3/4	6-10 7/8	0-2	11-7	14-9	6-10	20-2	6-0	8-2	7-0 3/8
108"	0-6	2-3	2-10	0-9	5-10	18-6	7-6	11-0	9-1	20-6 1/4	8-6 1/4	7-2 5/8	0-6	12-1	15-6	7-2	21-1	6-3	8-6	7-4 3/8
114"	0-3	2-3	3-0	0-10	6-1	19-3	7-11	11-6	9-6	21-3 7/8	8-11 7/8	7-7 5/8	0-4	12-9	16-0	7-6	21-10	6-8	8-11	7-9 3/8
120"	0-6	2-4	3-2	0-10	6-4	20-0	8-3	12-0	9-11	22-1 1/4	9-4 1/4	7-11 1/2	0-3	13-3	16-6	7-10	22-6	6-11	9-3	8-1 3/8
126"	0-4 1/2	2-6	3-2	0-11	6-7	21-0	8-7	12-6	10-3	23-2	9-9	8-3 1/2	0-3	13-10	17-3	8-2	23-6	7-3	9-9	8-10 1/8
132"	0-3	2-7	3-4	0-11	6-10	21-9	8-11	13-0	10-8	23-11 3/8	10-1 3/8	8-7 1/4	0-2	14-4	18-0	8-6	24-5	7-6	10-1	9-2 1/8
138"	0-6	2-7	3-6	1-0	7-1	22-9	9-4	13-6	11-1	25-0 1/8	10-7 1/8	9-0 1/4	0-2	15-0	18-6	8-10	25-2	7-11	10-6	9-7 1/8
144"	0-3	2-8	3-8	1-0	7-4	23-6	9-8	14-0	11-6	25-9 1/2	10-11 1/2	9-4	0-6	15-6	19-0	9-3	25-10	8-2	10-10	9-11 1/8





BENDS

QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1395	27.51
96"	1655	29.95
102"	1920	32.67
108"	2090	35.47
114"	2460	38.38
120"	2700	41.24
126"	3155	47.41
132"	3580	50.91
138"	3880	54.69
144"	4315	58.23

NOTE:

Quantities and steel list shown are for one headwall.

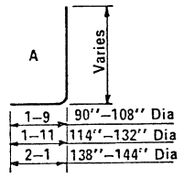
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS 45° SKEW PIPE CULVERT 4:1 SLOPE	STANDARD NO. B-15.30

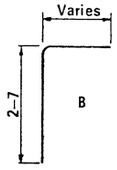
DESIGN	K W	9-72
DRAWN	L A M	9-72
CHECKED	R L C	9-72

STEEL LIST

Mark	Bend	90" Dia			96" Dia.			102" Dia.			108" Dia.			114" Dia			120" Dia.			126" Dia			132" Dia.			138" Dia			144" Dia.		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
a1	A	5	#5	11-3	5	#6	11-9	5	#6	12-3	5	#6	12-6	5	#7	13-0	5	#7	13-6	5	#7	13-9	5	#8	14-3	6	#8	15-0	6	#8	15-6
a2	A	5	#6	11-6	5	#6	12-0	4	#6	12-6	5	#7	12-9	5	#7	13-6	5	#7	14-0	5	#8	14-3	5	#8	14-9	5	#8	15-6	6	#8	16-0
a3	A	5	#6	11-9	5	#6	12-3	4	#7	12-9	4	#7	13-0	5	#7	13-9	5	#8	14-3	5	#8	14-9	5	#8	15-0	5	#8	15-9	5	#8	16-3
a4	A	4	#6	12-3	5	#7	12-9	4	#7	13-0	4	#7	13-6	4	#8	14-0	4	#8	14-6	5	#8	15-0	5	#8	15-6	5	#8	16-0	5	#8	16-6
a5	A							4	#7	13-3	3	#7	13-9	3	#8	14-3	4	#8	14-9	4	#8	15-3	5	#8	15-9	5	#8	16-6	5	#8	17-0
a6	A																														
a7	A																			3	#4	7-3	14	#4	7-6	19	#4	7-9	26	#4	8-6
a8	A	4	#4	10-0	5	#4	10-6	5	#5	10-9	5	#5	11-0	5	#5	11-9	4	#6	12-0	5	#6	12-6	5	#7	12-9	5	#7	13-3	5	#7	13-9
a9	A	4	#5	10-6	4	#5	11-0	5	#5	11-6	5	#6	11-9	5	#6	12-6	4	#6	12-6	4	#7	13-0	4	#7	13-6	5	#7	14-0	5	#7	14-6
a10	A	4	#5	11-3	4	#6	11-9	4	#6	12-3	4	#7	12-9	5	#7	13-3	4	#7	13-3	4	#7	13-9	4	#7	14-3	4	#8	14-9	5	#8	15-3
a11	A	4	#6	12-0	4	#7	12-6	3	#7	13-0	4	#7	13-3	4	#7	14-0	4	#7	14-0	4	#8	14-6	4	#8	15-0	4	#8	15-6	4	#8	16-0
a12	A																4	#8	14-6	3	#8	15-0	4	#8	15-6	4	#8	16-3	4	#8	16-9
a13	A																									3	#4	8-0	7	#4	8-9
b1	str	2	#4	18-3	2	#4	19-0	2	#4	20-0	2	#4	20-9	2	#4	21-9	2	#4	22-6	2	#4	23-6	2	#4	24-6	2	#4	25-3	2	#4	26-3
b2	str	12	#4	18-0	12	#4	18-9	12	#4	19-9	14	#4	20-6	14	#4	21-6	14	#4	22-3	16	#4	23-3	16	#4	24-3	16	#4	25-0	16	#4	26-0
b3	str				2	#4	8-0	2	#4	15-3				2	#4	8-0	2	#4	14-6				2	#4	8-9	2	#4	14-9	2	#4	21-6
b4	str																														
b5	str																														
b6	str	2	#4	15-3	2	#4	16-0	2	#4	16-9	2	#4	17-6	2	#4	18-3	2	#4	19-0	2	#4	19-9	2	#4	20-6	2	#4	21-3	2	#4	22-0
b7	str	10	#4	15-0	10	#4	15-9	10	#4	16-6	12	#4	17-3	12	#4	18-0	12	#4	18-9	14	#4	19-6	14	#4	20-3	14	#4	21-0	14	#4	21-9
b8	str	2	#4	10-0	2	#4	13-0	2	#4	15-9	2	#4	9-9	2	#4	12-9	2	#4	16-0	2	#4	10-0	2	#4	12-9	2	#4	15-9	2	#4	19-0
b9	str				2	#4	3-9	2	#4	6-9				2	#4	4-0	2	#4	7-0				2	#4	3-6	2	#4	6-9	2	#4	9-9
b10	str																														
b11	str																														
c	str	5	#4	10-6	5	#4	11-0	5	#4	11-6	5	#4	12-0	5	#4	12-6	5	#4	13-0	5	#4	13-6	5	#4	14-0	5	#4	14-6	5	#4	15-0
d	A	6	#6	12-6	6	#6	13-0	6	#6	13-6	6	#7	14-0	6	#7	14-6	6	#7	15-0	6	#7	15-6	6	#7	16-0	6	#7	16-9	6	#7	17-3
e1	str	5	#4	3-3	5	#4	3-6	5	#4	3-9	6	#5	4-0	5	#5	4-3	5	#5	4-6	5	#6	4-6	5	#6	4-9	6	#6	5-0	6	#7	5-3
e2	str	5	#4	3-6	5	#4	3-9	4	#4	4-0	6	#5	4-3	5	#5	4-6	5	#5	4-9	5	#6	4-9	5	#6	5-0	5	#6	5-3	6	#7	5-6
e3	str	5	#4	3-9	5	#4	4-0	4	#5	4-0	5	#5	4-6	5	#5	4-9	5	#6	4-9	5	#6	5-0	5	#6	5-3	5	#7	5-6	5	#7	5-9
e4	str	4	#4	4-0	5	#5	4-3	4	#5	4-3	5	#5	4-9	4	#6	4-9	4	#6	5-0	5	#6	5-3	5	#7	5-6	5	#7	5-9	5	#7	6-0
e5	str							4	#5	4-6				4	#6	5-0	4	#6	5-3	4	#7	5-6	5	#7	5-9	5	#7	6-0	5	#8	6-3
e6	str																														
e7	str	2	#4	4-0	2	#5	4-3	2	#5	4-6	2	#5	4-9	2	#6	5-0	2	#6	5-3	2	#7	5-6	2	#7	5-9	2	#7	6-0	2	#8	6-3
e8	str	14	#4	4-0	14	#5	4-3	15	#5	4-6	15	#5	4-9	16	#6	5-0	16	#6	5-3	17	#7	5-6	17	#7	5-9	18	#7	6-0	19	#8	6-3
e9	str	3	#4	4-0	3	#5	4-3	3	#5	4-6	3	#5	4-9	4	#6	5-0	4	#6	5-3	4	#7	5-6	4	#7	5-9	4	#7	6-0	4	#8	6-3
e10	str	4	#4	4-0	4	#5	4-3	4	#5	4-6	4	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0	4	#8	6-3
e11	str	4	#4	3-9	4	#5	4-0	4	#5	4-3	4	#5	4-6	5	#5	4-9	4	#6	5-0	4	#6	5-3	4	#6	5-6	4	#7	5-9	4	#7	6-0
e12	str	4	#4	3-6	4	#4	3-9	5	#4	4-0	5	#4	4-3	5	#5	4-6	4	#5	5-0	4	#6	5-0	4	#6	5-3	4	#6	5-6	5	#7	5-9
e13	str	4	#4	3-3	5	#4	3-6	5	#4	3-9	5	#4	4-0	5	#4	4-3	4	#5	4-9	4	#5	4-9	4	#5	5-0	5	#6	5-3	5	#6	5-6
e14	str																4	#5	4-6	5	#5	4-6	5	#5	4-9	5	#6	5-0	5	#6	5-3
f1	str	5	#4	9-6	5	#4	9-9	5	#4	10-3	5	#4	10-6	5	#4	11-0	4	#4	11-6	4	#4	12-0	5	#4	12-6	5	#4	12-9	5	#4	13-3
f2	str	4	#4	9-9	4	#4	10-3	5	#4	10-9	5	#4	11-3	5	#4	11-9	4	#4	12-0	4	#4	12-6	4	#4	13-0	5	#4	13-3	5	#4	13-9
f3	str	4	#4	10-3	4	#4	10-9	4	#4	11-3	5	#4	11-9	5	#4	12-3	4	#4	12-3	4	#4	12-9	4	#4	13-3	4	#4	13-9	4	#4	14-3
f4	str																4	#4	12-9	4	#4	13-3	4	#4	13-9	4	#4	14-3	4	#4	14-9
f5	str	4	#4	8-3	4	#4	8-6	4	#4	9-0	4	#4	9-3	4	#4	9-9	4	#4	10-3	4	#4	10-6	4	#4	10-9	4	#4	11-3	4	#4	11-9
f6	str	4	#4	9-3	4	#4	9-6	4	#4	9-9	4	#4	10-3	3	#4	10-6	3	#4	11-0	4	#4	11-6	4	#4	11-9	4	#4	12-3	4	#4	12-6
f7	str	3	#4	10-3	3	#4	10-6	4	#4	10-9	4	#4	11-3	3	#4	11-3	3	#4	12-0	3	#4	12-6	3	#4	12-9	4	#4	13-3	4	#4	13-6
f8	str													3	#4	12-3	3	#4	12-6	3	#4	13-3	3	#4	13-6	3	#4	14-3	3	#4	14-6
m1	str	3	#4	19-9	3	#4	20-6	3	#4	21-6	3	#4	22-3	3	#4	23-3	3	#4	24-3	3	#4	25-3	4	#4	26-3	4	#4	27-0	4	#4	28-0
m2	str	1	#4	19-9	1	#4	20-6	1	#4	21-6	1	#4	22-3	1	#4	23-3	1	#4	24-3	1	#4	25-3	1	#4	26-3	1	#4	27-0	1	#4	28-0
m3	str	3	#4	19-6	3	#4	20-6	3	#4	21-6	3	#4	22-6	3	#4	23-3	3	#4	24-3	3	#4	25-3	4	#4	26-3	4	#4	27-3	4	#4	28-0
m4	str	1	#4	19-6	1	#4	20-6	1	#4	21-6	1	#4	22-6	1	#4	23-3	1	#4	24-3	1	#4	25-3	1	#4	26-3	1	#4	27-3	1	#4	28-0
n1	str	3	#4	17-0	3	#4	17-9	3	#4	18-9	3	#4	19-6	3	#4	20-6	3	#4	21-6	3	#4	22-3	4	#4	23-3	4	#4	24-3	4	#4	25-0
n2	str	1	#4	17-0	1	#4	17-9	1	#4	18-9	1	#4	19-6	1	#4	20-6	1	#4	21-6	1	#4	22-3	1	#4	23-3	1	#4	24-3	1	#4	25-0
p	str	4	#5	13-0	4	#5	13-9	4	#5	14-3	4	#5	15-0	4	#5	15-9	4	#5	16-6	4	#5	17-3	4	#5	17-9	4	#5	18-9	4	#5	19-3
q	str	2	#6	15-0	2	#6	15-9	2	#6	16-3	2	#6	17-0	2	#6	17-9	2	#6	18-6	2	#6	19-3	2	#6	19-9	2	#6	20-9	2	#6	21-3
g	str	2	#4	12-0	2	#4	12-9	2	#4	13-6	2	#4	14-3	2	#4	14-9	2	#4	15-6	2	#4	16-0	2	#4	16-9	2	#4	17-3	2	#4	18-0
u	B	9	#4	4-6	9	#4	4-6	10	#4	4-6	10	#4	4-9	10	#4	4-9	11	#4	4-9	11	#4	4-9	12	#4	5-0	12	#4	5-0	13	#4	5-0
v	str	1	#4	19-0	1	#4	19-9	1	#4	20-6	1	#4	21-6	1	#4	22-3	1	#4	23-3	1	#4	24-0	1	#4	25-0	1	#4	25-9	1	#4	26-9
w	str	1	#4	15-0	1	#4	15-9	1	#4	16-6	1	#4	17-3	1	#4	17-9	1	#4	18-6	1	#4	19-3	1	#4	20-0	1	#4	20-9	1	#4	21-3

Pipe Dia.	DIMENSIONS																		
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	W	X
90"	0-3	2-2	2-6	0-5	5-1	18-0	6-6	9-6	8-3	19-10 1/2	7-4 1/2	6-2 7/8	0-3	10-5	15-0	7-0	19-11	5-4	7-6	6-4 3/8
96"	0-11/2	2-2	2-9	0-5	5-4	18-9	6-10	10-0	8-8	20-8 1/8	7-9 1/8	6-6 7/8	0-2	11-0	15-9	7-5	20-11	5-8	7-10	6-8 3/8
102"	0-6	2-2	2-11	0-6	5-7	19-9	7-2	10-6	9-2	21-8 3/4	8-1 3/4	6-10 7/8	0-2	11-7	16-6	7-9	21-11	6-0	8-2	7-0 3/8
108"	0-4 1/2	2-3	3-0	0-7	5-10	20-6	7-6	11-0	9-6	22-6 1/4	8-6 1/4	7-2 5/8	0-6	12-1	17-3	8-1	22-10	6-3	8-6	7-4 3/8
114"	0-3	2-4	3-2	0-7	6-1	21-6	7-11	11-6	10-0	23-6 5/8	8-11 5/8	7-7 1/2	0-6	12-8	18-0	8-6	23-9	6-7	8-11	7-9 3/8
120"	0-11/2	2-4	3-5	0-7	6-4	22-3	8-3	12-0	10-5	24-4 1/4	9-4 1/4	7-11 1/2	0-4	13-3	18-9	8-11	24-9	6-11	9-3	8-1 3/8
126"	0-6	2-7	3-4	0-8	6-7	23-3	8-7	12-6	10-10	25-4 3/4	9-8 3/4	8-3 1/4	0-4	13-9	19-6	9-3	25-8	7-2	9-9	8-10 1/8
132"	0-4 1/2	2-7	3-7	0-8	6-10	24-3	8-11	13-0	11-4	26-5 3/8	10-1 3/8	8-7 1/4	0-4	14-4	20-3	9-7	26-8	7-6	10-1	9-2 1/8
138"	0-3	2-8	3-9	0-8	7-1	25-0	9-4	13-6	11-9	27-2 7/8	10-6 7/8	9-0	0-3	14-11	21-0	10-0	27-7	7-10	10-6	9-7 1/8
144"	0-11/2	2-8	4-0	0-8	7-4	26-0	9-8	14-0	12-2	28-3 1/4	10-11 1/4	9-3 3/4	0-3	15-5	21-9	10-5	28-6	8-1	10-10	9-11 1/8





BENDS

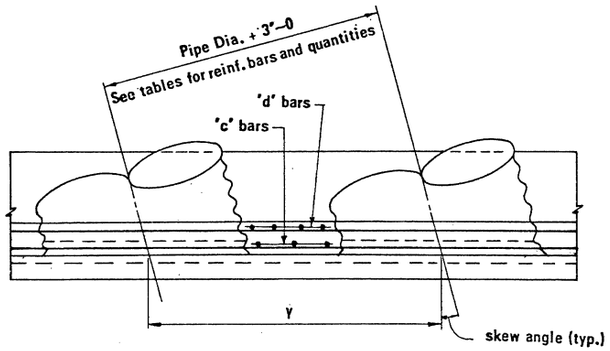
QUANTITIES

Pipe Dia.	Reinf. (lbs)	Conc. (CY)
90"	1560	29.98
96"	1840	32.78
102"	2050	35.80
108"	2325	38.64
114"	2720	42.08
120"	3075	45.38
126"	3490	52.07
132"	3960	56.09
138"	4370	60.09
144"	4910	64.31

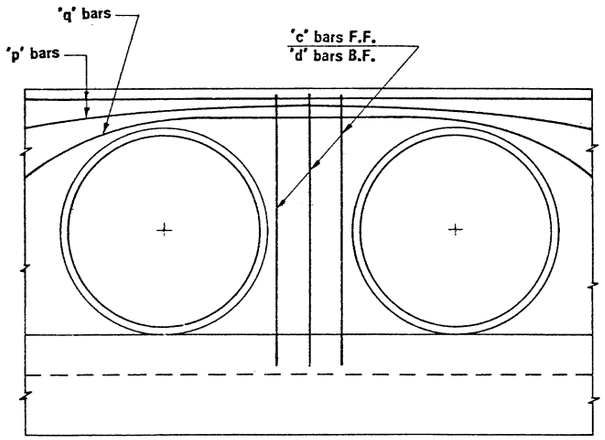
NOTE:
Quantities and steel list shown are for one headwall.

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	INLET AND OUTLET HEADWALLS 45° SKEW PIPE CULVERT 6:1 SLOPE	STANDARD NO. B-15.40

DESIGN	K W	9-72
DRAWN	L A M	9-72
CHECKED	R L C	9-72

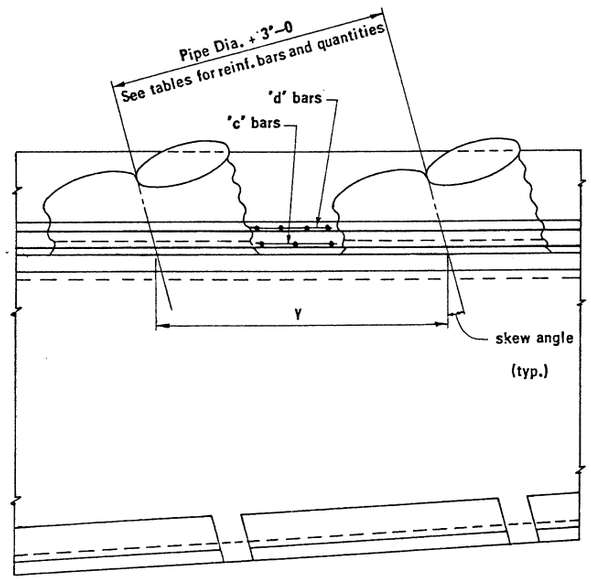


PLAN – INLET OR OUTLET END WITHOUT APRON



ELEVATION WITHOUT APRON

Note: Outlet end with apron similar.



PLAN – OUTLET END WITH APRON

DIMENSION Y (FT)

SKEW	PIPE DIA (INCHES)									
	90"	96"	102"	108"	114"	120"	126"	132"	138"	144"
Rt ∢	10-6	11-0	11-6	12-0	12-6	13-0	13-6	14-0	14-6	15-0
15°	10-10 1/2	11-4 5/8	11-10 7/8	12-5 1/8	12-11 3/8	13-5 1/2	13-11 3/4	14-6	15-0 1/4	15-6 3/8
30°	12-1 1/2	12-8 3/8	13-3 1/4	13-10 1/4	14-5 1/8	15-0 1/8	15-7	16-1 7/8	16-8 7/8	17-3 7/8
45°	14-10 1/4	15-6 5/8	16-3 1/8	16-11 5/8	17-8	18-4 1/2	19-1 1/8	19-9 5/8	20-6	21-2 1/2

NO. OF ADDITIONAL BARS REQD. PER ADDITIONAL PIPE**

SKEW	MARK	PIPE DIA. (inches)									
		90"	96"	102"	108"	114"	120"	126"	132"	138"	144"
Rt ∢	c	3	3	3	3	3	3	3	3	3	3
	d	4	4	4	4	4	4	5	5	5	5
	e8, r1, s	10	10	11	11	12	12	13	13	14	14
	h, u	6	7	7	7	8	8	8	9	9	10
15°	c	3	3	3	3	3	3	3	3	3	3
	d	4	4	4	4	5	5	6	6	6	6
	e8, r1, s	10	11	11	12	12	13	13	14	14	15
	h, u	7	7	7	8	8	8	9	9	10	10
30°	c	3	3	3	3	3	3	3	3	3	3
	d	4	4	4	4	5	5	7	7	7	7
	e8, r1, s	11	12	13	13	14	14	15	15	16	17
	h, u	8	8	8	9	9	10	10	10	11	11
45°	c	4	4	4	4	4	4	4	4	4	4
	d	5	5	5	5	6	6	9	9	9	9
	e8, r1, s	14	15	16	16	17	18	18	19	20	20
	h, u	10	10	10	11	11	12	12	13	13	14

**For inlet and outlet without apron omit bars "r1," "s" and "h."
For outlet with apron omit "u" bar.

INLET OR OUTLET QUANTITIES PER ADDITIONAL PIPE WITHOUT APRON

Pipe Dia.	Conc. (CY)				Reinforcing (lbs)														
	Rt ∢	15°	30°	45°	Rt ∢ Inlet			Rt ∢ Outlet			15°			30°			45°		
					2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1
90"	6.02	6.23	6.95	8.51	280	270	265	260	265	265	280	265	265	280	280	280	350	350	350
96"	6.52	6.76	7.54	9.22	320	335	325	320	330	300	320	300	300	320	320	320	400	395	395
102"	7.05	7.30	8.13	9.96	335	345	345	335	340	340	365	340	340	370	365	370	460	455	420
108"	7.58	7.89	8.75	10.73	420	395	355	370	390	355	430	365	365	385	380	385	480	475	480
114"	8.15	8.44	9.34	11.51	450	455	440	445	445	445	485	435	445	485	465	485	590	570	575
120"	8.72	9.03	10.07	12.34	465	470	460	500	460	460	515	460	470	500	485	500	620	600	605
126"	9.32	9.65	10.75	13.18	580	580	565	575	575	565	620	550	525	640	620	640	795	770	775
132"	9.93	10.30	11.46	14.05	595	605	585	595	595	590	660	590	600	665	655	665	840	825	830
138"	10.57	10.95	12.20	14.94	685	635	620	675	630	620	680	610	620	705	690	705	885	870	880
144"	11.22	11.62	12.95	15.86	720	715	700	700	710	700	715	705	715	810	795	810	1000	980	990

CONC. QUANTITIES PER ADDITIONAL PIPE (C.Y.) OUTLET END WITH APRON

Pipe Dia.	Rt ∢			15°			30°			45°		
	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1
90"	8.69	8.96	9.20	8.75	9.32	9.69	9.66	10.31	10.71	11.63	12.47	12.81
96"	9.41	9.71	9.99	9.50	10.11	10.53	10.49	11.19	11.63	12.62	13.50	13.90
102"	10.21	10.55	10.83	10.26	10.93	11.40	11.32	12.08	12.57	13.64	14.58	15.04
108"	11.03	11.36	11.67	11.05	11.78	12.30	12.21	13.00	13.55	14.71	15.69	16.23
114"	11.90	12.25	12.56	11.89	12.67	13.24	13.05	13.90	14.52	15.80	16.83	17.43
120"	12.79	13.15	13.46	12.73	13.57	14.20	14.07	14.98	15.64	16.95	18.04	18.71
126"	13.67	14.08	14.44	13.61	14.51	15.20	15.04	16.00	16.72	18.12	19.26	20.01
132"	14.55	15.00	15.44	14.53	15.49	16.24	16.04	17.06	17.84	19.36	20.54	21.38
138"	15.47	16.00	16.41	15.47	16.49	17.31	17.09	18.17	19.01	20.60	21.83	22.76
144"	16.42	16.99	17.46	16.42	17.51	18.40	18.17	19.30	20.21	21.89	23.18	24.19

REINF. BAR QUANTITIES PER ADDITIONAL PIPE (lbs) OUTLET END WITH APRON

Pipe Dia.	Rt ∢			15°			30°			45°		
	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1	2:1	4:1	6:1
90"	430	445	460	440	465	495	450	495	525	550	620	640
96"	500	510	505	495	515	545	505	565	590	615	690	705
102"	540	560	575	550	580	615	570	630	665	685	770	765
108"	595	630	615	640	630	665	605	665	705	730	820	855
114"	680	705	730	705	710	760	720	770	835	840	945	975
120"	755	735	775	760	765	820	760	805	855	920	990	1040
126"	855	875	910	870	875	895	915	965	1040	1095	1170	1225
132"	905	920	955	935	940	1000	955	1020	1085	1185	1280	1335
138"	1005	990	1020	965	970	1040	1015	1080	1155	1145	1355	1410
144"	1040	1085	1120	1030	1030	1170	1140	1210	1275	1380	1480	1550

BAR LENGTH ADJUSTMENT PER ADDITIONAL PIPE (FT.)

SKEW	MARK*	PIPE DIA (inches)									
		90"	96"	102"	108"	114"	120"	126"	132"	138"	144"
Rt ∢	j, n, p q, v and t1 to t7	10-6	11-0	11-6	12-0	12-6	13-0	13-6	14-0	14-6	15-0
15°	g,j,n1,n2,p,q and t1 to t11	10-9	11-3	12-0	12-6	13-0	13-6	14-0	14-6	15-0	15-6
30°	g,j,n1,n2,p,q and t1 to t10	12-0	12-9	13-3	13-9	14-6	15-0	15-6	16-3	16-9	17-3
45°	g,j,n1,n2,p,q and t1 to t10	14-9	15-6	16-3	17-0	17-9	18-3	19-0	19-9	20-6	21-3

*Increase bar lengths for single pipes by dimensions in table for each additional pipe.

NOTES: Multipipe culvert headwall quantities are obtained by multiplying quantity shown in tables by the number of additional pipes and adding to single pipe headwall quantity.
Number of bars and quantities shown in tables are for one headwall.

Professional Engineer (Civil) CERTIFICATE EXPIRES DEC. 31, 19 ARIZONA, U.S.A.

DESIGN	KW	9-72
DRAWN	LAM	9-72
CHECKED	RLC	9-72

DESIGN APPROVED

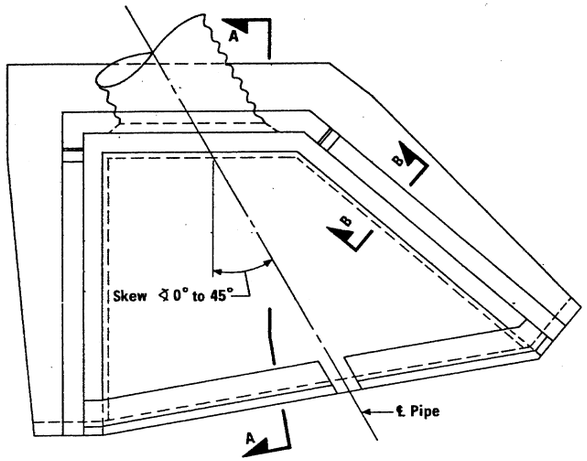
APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

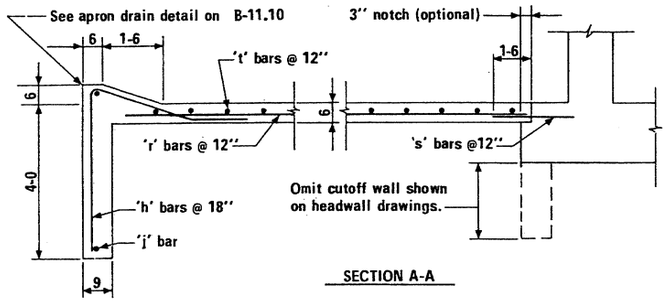
MULTIPLE HEADWALLS

REVISION

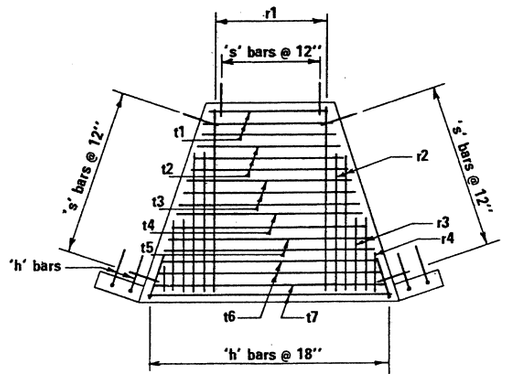
STANDARD NO.
B-16.10



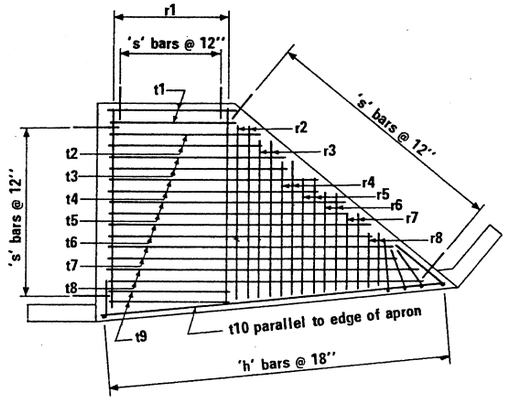
TYPICAL PLAN – HEADWALL WITH APRON



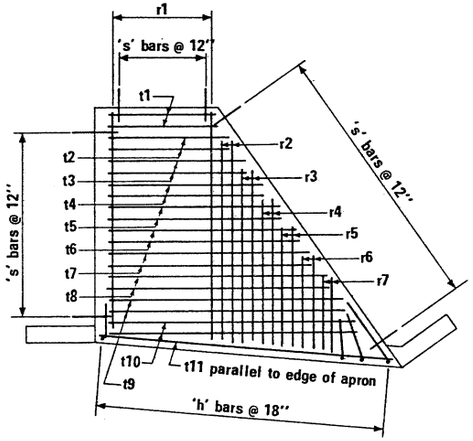
SECTION A-A



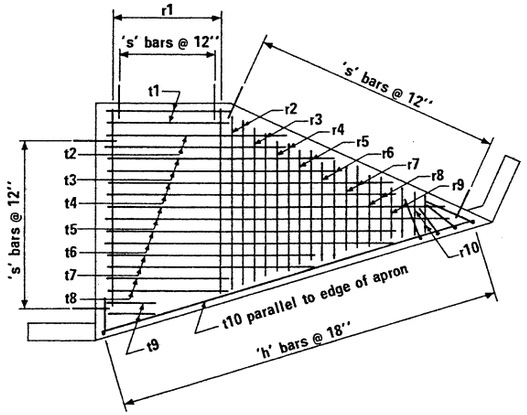
RIGHT ANGLE



30° SKEW



15° SKEW



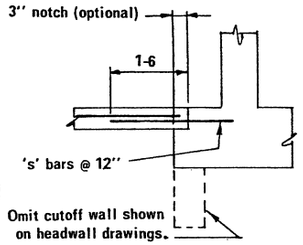
45° SKEW

OUTLET APRON QUANTITIES*

SKEW	RT ∢						15°						30°						45°					
SLOPE	2:1		4:1		6:1		2:1		4:1		6:1		2:1		4:1		6:1		2:1		4:1		6:1	
PIPE DIA.	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)	REINF. (lbs)	CONC. (CY)
90"	190	3.70	235	4.38	265	4.88	205	3.38	250	4.21	325	4.91	245	4.17	305	5.28	400	6.36	275	5.42	380	6.54	430	7.31
96"	215	3.96	255	4.66	285	5.27	215	3.64	280	4.52	350	5.33	255	4.52	335	5.70	440	6.82	285	5.81	395	7.00	475	7.91
102"	240	4.35	270	5.07	315	5.71	235	3.95	305	4.93	385	5.83	280	4.92	365	6.22	465	7.34	305	6.28	430	7.57	515	8.58
108"	265	4.73	300	5.48	345	6.14	250	4.23	330	5.36	420	6.29	315	5.32	400	6.72	495	7.93	335	6.68	475	8.12	555	9.15
114"	290	5.15	340	5.95	370	6.61	270	4.58	355	5.71	440	6.78	330	5.75	425	7.15	545	8.50	360	7.21	500	8.70	595	9.88
120"	310	5.56	350	6.38	410	7.09	295	4.88	385	6.08	495	7.33	365	6.18	455	7.52	580	8.99	400	7.67	535	9.22	650	10.57
126"	330	5.85	385	6.79	425	7.50	315	5.23	415	6.56	530	7.88	390	6.63	485	8.18	620	9.60	425	8.18	565	9.94	690	11.28
132"	360	6.23	400	7.19	450	8.03	340	5.56	440	6.99	570	8.43	425	7.09	520	8.69	665	10.17	465	8.69	615	10.56	735	12.08
138"	380	6.59	430	7.68	500	8.56	355	5.96	470	7.44	605	9.03	455	7.56	555	9.20	680	10.8	485	9.29	660	11.30	775	12.83
144"	405	6.92	460	8.04	530	9.08	395	6.36	495	7.93	655	9.70	470	7.99	570	9.59	720	11.54	530	9.81	695	11.88	825	13.62

*The apron quantities take into consideration the cutoff walls being omitted along outlet headwall.

REINFORCING STEEL LAYOUT



SECTION B-B

NOTES:
For General Notes and Misc. Details see B-11.10
For steel list and bend diagrams see B-17.20, B-17.30 or B-17.40

Registered Professional Engineer (Civil) CERTIFICATE EXPIRES RICHARD CLANCY DEC. 31, 19 ARIZONA, U.S.A.

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	OUTLET APRONS	STANDARD NO. B-17.10

DESIGN	K W	9-72
DRAWN	LAM	9-72
CHECKED	RLC	9-72

RIGHT ANGLE

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	12	#4	7-3	15	#4	7-3	15	#4	7-3	16	#4	7-3	17	#4	7-3	17	#4	7-3	18	#4	7-3	19	#4	7-3	20	#4	7-3	20	#4	7-3
j	str	1	#4	21-9	1	#4	22-6	1	#4	24-0	1	#4	25-3	1	#4	26-3	1	#4	27-6	1	#4	28-6	1	#4	29-9	1	#4	30-6	1	#4	31-6
r1	str	9	#4	10-6	9	#4	11-0	10	#4	11-6	10	#4	12-3	11	#4	12-9	11	#4	13-6	12	#4	14-0	12	#4	14-6	13	#4	15-0	13	#4	15-3
r2	str	4	#4	5-6	4	#4	6-6	4	#4	7-0	4	#4	7-9	4	#4	8-0	4	#4	8-9	4	#4	8-9	4	#4	9-6	4	#4	9-6	4	#4	10-0
r3	str	2	#4	2-9	2	#4	3-6	2	#4	3-6	2	#4	5-0	2	#4	5-0	4	#4	3-6	4	#4	3-0	4	#4	4-0	4	#4	3-6	4	#4	4-6
r4	str																														
s	str	31	#4	2-0	32	#4	2-0	33	#4	2-0	33	#4	2-6	36	#4	2-6	38	#4	2-6	40	#4	2-6	40	#4	3-0	41	#4	3-0	43	#4	3-0
t1	str	3	#4	8-3	3	#4	9-0	3	#4	9-6	3	#4	9-9	3	#4	10-3	3	#4	10-6	3	#4	11-0	3	#4	11-6	3	#4	12-3	3	#4	12-6
t2	str	3	#4	10-6	3	#4	11-0	3	#4	11-6	3	#4	11-9	3	#4	12-3	3	#4	12-6	3	#4	13-6	3	#4	13-9	3	#4	14-0	3	#4	14-6
t3	str	3	#4	13-0	3	#4	13-3	3	#4	14-0	3	#4	14-3	3	#4	14-6	3	#4	14-9	3	#4	15-9	3	#4	16-0	3	#4	16-3	3	#4	16-9
t4	str	2	#4	15-0	2	#4	15-6	3	#4	16-0	2	#4	16-6	2	#4	17-0	3	#4	17-3	3	#4	18-0	3	#4	18-0	3	#4	18-6	3	#4	19-0
t5	str										2	#4	18-0	2	#4	18-6	2	#4	19-6	2	#4	20-0	3	#4	20-0	3	#4	21-0	2	#4	21-0
t6	str																												2	#4	22-6
t7	str																														

30° SKEW

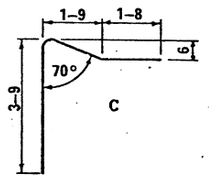
Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	14	#4	7-3	15	#4	7-3	16	#4	7-3	17	#4	7-3	17	#4	7-3	18	#4	7-3	19	#4	7-3	20	#4	7-3	21	#4	7-3	22	#4	7-3
j	str	1	#4	25-6	1	#4	27-0	1	#4	28-6	1	#4	30-0	1	#4	31-0	1	#4	33-0	1	#4	34-6	1	#4	36-0	1	#4	37-6	1	#4	39-0
r1	str	10	#4	8-0	10	#4	7-9	10	#4	8-3	11	#4	8-9	12	#4	9-3	12	#4	9-9	13	#4	10-3	13	#4	10-6	14	#4	11-0	14	#4	11-6
r2	str	2	#4	6-9	2	#4	6-9	2	#4	7-9	2	#4	7-6	2	#4	8-0	2	#4	8-9	2	#4	9-3	2	#4	9-9	2	#4	10-0	2	#4	10-6
r3	str	2	#4	5-3	2	#4	5-0	2	#4	6-3	2	#4	6-0	2	#4	6-6	2	#4	7-0	2	#4	7-6	2	#4	8-0	2	#4	8-6	2	#4	9-0
r4	str	2	#4	3-9	2	#4	3-6	2	#4	4-6	2	#4	4-3	2	#4	4-6	2	#4	5-6	2	#4	5-9	2	#4	6-6	2	#4	7-0	2	#4	7-6
r5	str							2	#4	3-6	1	#4	3-6	1	#4	3-9	2	#4	3-9	2	#4	4-6	2	#4	5-0	2	#4	5-6	2	#4	6-0
r6	str																						2	#4	4-0	3	#4	3-0	3	#4	4-3
r7	str																														
r8	str																														
s	str	30	#4	3-0	30	#4	3-0	32	#4	3-0	34	#4	3-0	35	#4	3-0	37	#4	3-0	38	#4	3-0	41	#4	3-0	42	#4	3-0	44	#4	3-0
t1	str	2	#4	9-6	2	#4	10-3	2	#4	11-0	2	#4	11-6	2	#4	12-0	2	#4	12-0	2	#4	13-0	2	#4	13-6	2	#4	14-0	2	#4	14-9
t2	str	2	#4	12-0	2	#4	12-6	2	#4	13-3	2	#4	13-9	2	#4	14-0	2	#4	14-6	2	#4	15-6	2	#4	15-9	2	#4	16-3	2	#4	17-3
t3	str	2	#4	14-6	2	#4	15-0	2	#4	15-9	2	#4	16-3	2	#4	16-6	2	#4	17-0	2	#4	17-9	2	#4	18-0	2	#4	18-9	2	#4	19-6
t4	str	2	#4	17-0	2	#4	17-3	2	#4	18-0	2	#4	18-6	2	#4	18-9	2	#4	19-3	2	#4	20-0	2	#4	20-6	2	#4	21-0	2	#4	21-9
t5	str				1	#4	19-6	1	#4	20-0	2	#4	20-9	2	#4	21-0	2	#4	21-6	2	#4	22-6	2	#4	23-0	2	#4	23-3	2	#4	24-3
t6	str																1	#4	24-0	1	#4	25-0	2	#4	25-0	2	#4	25-9	2	#4	26-6
t7	str																														
t8	str																														
t9	str																														
t10	str	1	#4	19-3	1	#4	20-3	1	#4	21-6	1	#4	22-9	1	#4	24-0	1	#4	25-0	1	#4	26-3	1	#4	27-6	1	#4	28-6	1	#4	29-6

15° SKEW

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	12	#4	7-3	12	#4	7-3	13	#4	7-3	13	#4	7-3	14	#4	7-3	14	#4	7-3	15	#4	7-3	16	#4	7-3	16	#4	7-3	17	#4	7-3
j	str	1	#4	21-0	1	#4	22-0	1	#4	23-3	1	#4	24-3	1	#4	25-6	1	#4	26-6	1	#4	27-6	1	#4	28-6	1	#4	29-9	1	#4	31-0
r1	str	9	#4	8-3	9	#4	8-6	10	#4	9-3	10	#4	9-9	11	#4	10-3	11	#4	10-9	12	#4	11-3	12	#4	11-6	12	#4	12-0	12	#4	12-6
r2	str	2	#4	6-0	2	#4	7-0	2	#4	7-0	2	#4	7-9	2	#4	7-9	2	#4	8-9	2	#4	8-6	2	#4	9-0	2	#4	10-3	2	#4	11-3
r3	str	1	#4	4-6	2	#4	4-6	2	#4	4-3	2	#4	5-3	2	#4	5-0	2	#4	6-0	2	#4	6-0	2	#4	6-6	2	#4	7-6	2	#4	8-9
r4	str																1	#4	4-9	1	#4	5-0	1	#4	5-0	2	#4	5-0	2	#4	6-0
r5	str																														
r6	str																														
r7	str																														
s	str	26	#4	3-0	26	#4	3-0	28	#4	3-0	29	#4	3-0	31	#4	3-0	33	#4	3-0	33	#4	3-0	34	#4	3-0	36	#4	3-0	38	#4	3-0
t1	str	2	#4	8-6	2	#4	9-0	2	#4	9-3	2	#4	9-9	2	#4	10-3	2	#4	10-6	2	#4	11-0	2	#4	11-6	2	#4	12-0	2	#4	12-6
t2	str	2	#4	10-3	2	#4	10-6	2	#4	11-0	2	#4	11-3	2	#4	11-9	2	#4	12-0	2	#4	12-6	2	#4	12-9	2	#4	13-3	2	#4	13-9
t3	str	2	#4	11-3	2	#4	12-0	2	#4	12-3	2	#4	12-9	2	#4	13-0	2	#4	13-6	2	#4	14-0	2	#4	14-6	2	#4	15-0	2	#4	15-3
t4	str	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-0	2	#4	14-6	2	#4	14-9	2	#4	15-3	2	#4	15-9	2	#4	16-3	2	#4	17-0
t5	str	1	#4	14-0	1	#4	14-6	1	#4	15-0	2	#4	15-6	2	#4	16-0	2	#4	16-0	2	#4	16-9	2	#4	17-0	2	#4	17-6	2	#4	18-3
t6	str																1	#4	17-6	1	#4	18-0	2	#4	18-6	2	#4	19-0	2	#4	19-6
t7	str																												1	#4	21-0
t8	str																														
t9	str																														
t10	str																														
t11	str	1	#4	15-0	1	#4	15-6	1	#4	16-6	1	#4	17-6	1	#4	18-3	1	#4	19-0	1	#4	20-0	1	#4	20-6	1	#4	21-6	1	#4	22-6

45° SKEW

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	c	18	#4	7-3	19	#4	7-3	20	#4	7-3	21	#4	7-3	22	#4	7-3	23	#4	7-3	24	#4	7-3	25	#4	7-3	26	#4	7-3	27	#4	7-3
j	str	1	#4	33-3	1	#4	34-9	1	#4	36-6	1	#4	38-0	1	#4	39-9	1	#4	41-6	1	#4	43-3	1	#4	44-9	1	#4	46-6	1	#4	48-3
r1	str	12	#4	6-9	13	#4	7-0	13	#4	7-6	14	#4	7-9	15	#4	8-0	15	#4	8-9	16	#4	9-3	17	#4	9-9	17	#4	10-3	18	#4	11-0
r2	str	3	#4	5-0	3	#4	5-3	3	#4	5-9	3	#4	6-0	3	#4	6-3	3	#4	7-3	3	#4	7-6	3	#4	8-0	3	#4	8-6	3	#4	8-6
r3	str	3	#4	4-0	3	#4	3-9	2	#4	4-0	2	#4	4-3	3	#4	4-9	3	#4	5-6	3	#4	6-0	3	#4	6-0	3	#4	6-6	3	#4	6-9
r4	str							2	#4	3-0	2	#4	3-3	2	#4	3-6	3	#4	4-0	3	#4	4-3	3	#4	5-0	3	#4	4-9	3	#4	5-3
r5	str																									2	#4	4-0	3	#4	4-0
r6	str																														
r7	str																														
r8	str																														
r9	str																														
r10	str																														
s	str	32	#4	3-0	33	#4	3-0	34	#4	3-0	37	#4	3-0	39	#4	3-0	41	#4	3-0	43	#4	3-0	46	#4	3-0	46	#4	3-0	49	#4	3-0
t1	str	3	#4	12-6	3	#4	13-0	3	#4	13-0	3	#4	14-3	3	#4	15-0	3	#4	15-6	3	#4	16-0	3	#4	16-6	3	#4	17-6	3	#4	18-0
t2	str	3	#4	18-9	3	#4	19-0	3	#4	19-9	3	#4	20-6	3	#4	21-3	3	#4	21-6	3	#4	22-3	3	#4	23-0	3	#4	23-6	3	#4	24-3
t3	str							1	#4	23-0	1	#4	24-0	1	#4	27-0	2	#4	27-0	2	#4	28-0	3	#4	29-0	3	#4	30-0	3	#4	30-6
t4	str	2	#4	12-0	2	#4	11-6	1	#4	11-0	2	#4	11-6	2	#4	14-0	2	#4	14-0	2	#4	15-0	2	#4	13-0	2	#4	16-0	2	#4	21-0
t5	str																														
t6	str																														
t7	str																														
t8	str																														
t9	str																														
t10	str	1	#4	25-6	1	#4	26-6	1	#4	28-0	1	#4	29-0	1	#4	31-0	1	#4	32-0	1	#4	33-6	1	#4	35-0	1	#4	36-6	1	#4	38-0



BEND

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	OUTLET APRON STEEL LIST 2:1 SLOPE	STANDARD NO. B-17.20

DESIGN	KW	9-72
DRAWN		
CHECKED	RLC	9-72
LAM		9-72

RIGHT ANGLE

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	16	#4	7-3	17	#4	7-3	17	#4	7-3	18	#4	7-3	18	#4	7-3	19	#4	7-3	20	#4	7-3	20	#4	7-3	21	#4	7-3	21	#4	7-3
j	str	1	#4	25-3	1	#4	26-3	1	#4	27-3	1	#4	28-6	1	#4	29-6	1	#4	30-6	1	#4	32-0	1	#4	33-0	1	#4	34-0	1	#4	35-3
r1	str	9	#4	11-0	9	#4	11-6	10	#4	12-3	10	#4	13-9	11	#4	13-6	11	#4	14-3	12	#4	15-0	12	#4	15-6	12	#4	16-0	13	#4	16-6
r2	str	4	#4	7-3	4	#4	8-0	4	#4	8-3	4	#4	8-0	4	#4	10-3	4	#4	10-0	4	#4	10-3	4	#4	11-3	4	#4	12-6	4	#4	12-0
r3	str	2	#4	4-6	2	#4	5-3	2	#4	5-0	2	#4	6-3	4	#4	5-3	4	#4	5-0	4	#4	6-3	4	#4	6-0	4	#4	7-0	4	#4	5-9
r4	str																														
s	str	33	#4	3-0	35	#4	3-0	36	#4	3-0	38	#4	3-0	39	#4	3-0	41	#4	3-0	42	#4	3-0	44	#4	3-0	46	#4	3-0	48	#4	3-0
t1	str	3	#4	8-6	3	#4	8-9	3	#4	9-3	3	#4	9-6	3	#4	10-0	3	#4	10-6	3	#4	11-0	3	#4	11-6	3	#4	12-0	3	#4	12-3
t2	str	3	#4	11-0	3	#4	11-0	3	#4	11-6	3	#4	12-0	3	#4	12-3	3	#4	12-9	3	#4	13-3	3	#4	13-9	3	#4	14-3	3	#4	14-6
t3	str	3	#4	13-0	3	#4	13-3	3	#4	13-9	3	#4	14-3	3	#4	14-6	3	#4	15-3	3	#4	15-6	3	#4	16-0	3	#4	16-6	3	#4	16-6
t4	str	3	#4	15-6	2	#4	15-3	2	#4	15-9	3	#4	16-6	3	#4	16-9	3	#4	17-6	3	#4	17-6	3	#4	18-0	3	#4	18-9	3	#4	18-9
t5	str				2	#4	17-0	2	#4	17-6	2	#4	18-6	3	#4	19-0	3	#4	19-6	2	#4	19-9	2	#4	20-3	3	#4	21-0	3	#4	21-0
t6	str																			2	#4	21-6	2	#4	22-0	2	#4	23-0	3	#4	23-0
t7	str																														

30° SKEW

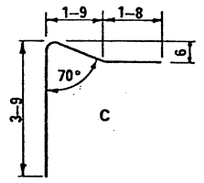
Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	14	#4	7-3	15	#4	7-3	16	#4	7-3	17	#4	7-3	17	#4	7-3	18	#4	7-3	18	#4	7-3	19	#4	7-3	20	#4	7-3	20	#4	7-3
j	str	1	#4	28-0	1	#4	29-3	1	#4	31-0	1	#4	32-6	1	#4	34-3	1	#4	35-0	1	#4	37-0	1	#4	39-0	1	#4	40-0	1	#4	42-0
r1	str	9	#4	11-0	10	#4	11-6	11	#4	12-3	11	#4	12-9	12	#4	13-0	12	#4	13-6	13	#4	14-0	13	#4	14-6	14	#4	15-0	14	#4	15-6
r2	str	2	#4	9-3	2	#4	9-3	2	#4	9-6	2	#4	10-6	2	#4	10-6	2	#4	11-3	2	#4	11-6	2	#4	12-6	2	#4	12-6	2	#4	13-3
r3	str	2	#4	7-3	2	#4	7-3	2	#4	7-6	2	#4	8-6	2	#4	8-6	2	#4	9-3	2	#4	9-6	2	#4	10-6	2	#4	10-6	2	#4	11-0
r4	str	2	#4	5-3	2	#4	5-3	2	#4	5-6	2	#4	6-6	2	#4	6-6	2	#4	7-3	2	#4	7-6	2	#4	8-6	2	#4	8-6	2	#4	9-0
r5	str	2	#4	3-3	2	#4	3-3	2	#4	3-6	2	#4	4-6	2	#4	4-6	2	#4	5-3	2	#4	5-3	2	#4	6-6	2	#4	6-6	2	#4	7-0
r6	str										1	#4	3-6	1	#4	3-6	2	#4	3-6	2	#4	3-6	2	#4	4-0	2	#4	4-6	2	#4	5-3
r7	str																						1	#4	3-6	1	#4	3-6	2	#4	3-6
r8	str																														
s	str	34	#4	3-0	35	#4	3-0	37	#4	3-0	39	#4	3-0	41	#4	3-0	43	#4	3-0	44	#4	3-0	47	#4	3-0	48	#4	3-0	50	#4	3-0
t1	str	2	#4	9-6	2	#4	10-0	2	#4	10-6	2	#4	11-0	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-0
t2	str	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-0	2	#4	14-6	2	#4	15-0	2	#4	15-6	2	#4	16-0	2	#4	16-6
t3	str	2	#4	14-6	2	#4	15-0	2	#4	15-6	2	#4	16-0	2	#4	16-6	2	#4	17-0	2	#4	17-6	2	#4	18-0	2	#4	18-6	2	#4	19-0
t4	str	2	#4	16-9	2	#4	17-6	2	#4	18-0	2	#4	18-6	2	#4	19-0	2	#4	19-6	2	#4	20-0	2	#4	20-6	2	#4	21-0	2	#4	21-6
t5	str	1	#4	19-0	2	#4	19-9	2	#4	20-6	2	#4	21-0	2	#4	21-6	2	#4	22-0	2	#4	22-6	2	#4	23-0	2	#4	23-6	2	#4	24-0
t6	str										1	#4	22-6	1	#4	24-0	2	#4	24-6	2	#4	25-0	2	#4	25-0	2	#4	25-6	2	#4	26-6
t7	str																						1	#4	25-6	1	#4	27-6	1	#4	29-0
t8	str	2	#4	12-0	2	#4	9-0	2	#4	14-0	2	#4	11-0	2	#4	14-9	2	#4	11-9	2	#4	15-9	2	#4	14-0	2	#4	17-0	2	#4	18-3
t9	str																														
t10	str	1	#4	20-0	1	#4	21-3	1	#4	22-3	1	#4	23-6	1	#4	24-6	1	#4	26-0	1	#4	27-0	1	#4	28-3	1	#4	29-3	1	#4	30-3

15° SKEW

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	11	#4	7-3	12	#4	7-3	12	#4	7-3	13	#4	7-3	13	#4	7-3	14	#4	7-3	14	#4	7-3	15	#4	7-3	15	#4	7-3	16	#4	7-3
j	str	1	#4	23-9	1	#4	25-0	1	#4	26-0	1	#4	27-3	1	#4	28-6	1	#4	30-0	1	#4	31-0	1	#4	32-3	1	#4	33-3	1	#4	34-9
r1	str	8	#4	11-3	9	#4	11-9	9	#4	12-6	10	#4	13-0	11	#4	13-6	11	#4	14-0	11	#4	14-9	12	#4	15-6	12	#4	16-0	13	#4	16-3
r2	str	2	#4	9-3	2	#4	9-3	2	#4	10-9	2	#4	10-9	2	#4	10-6	2	#4	11-3	2	#4	12-9	2	#4	12-6	2	#4	13-9	2	#4	13-6
r3	str	2	#4	6-3	2	#4	6-6	2	#4	7-9	2	#4	7-6	2	#4	7-6	2	#4	8-6	2	#4	10-0	2	#4	9-6	2	#4	10-9	2	#4	10-6
r4	str	1	#4	4-9	1	#4	4-9	2	#4	4-9	2	#4	4-6	2	#4	4-6	2	#4	5-6	2	#4	7-0	2	#4	6-6	2	#4	7-9	2	#4	7-9
r5	str																			1	#4	5-6	1	#4	5-3	2	#4	5-0	2	#4	4-9
r6	str																														
r7	str																														
s	str	30	#4	3-0	33	#4	3-0	35	#4	3-0	36	#4	3-0	38	#4	3-0	39	#4	3-0	42	#4	3-0	43	#4	3-0	44	#4	3-0	46	#4	3-0
t1	str	2	#4	8-3	2	#4	9-0	2	#4	9-6	2	#4	9-9	2	#4	10-0	2	#4	10-6	2	#4	11-0	2	#4	11-3	2	#4	11-9	2	#4	12-3
t2	str	2	#4	9-9	2	#4	10-3	2	#4	10-6	2	#4	11-0	2	#4	11-6	2	#4	12-0	2	#4	12-3	2	#4	12-9	2	#4	13-3	2	#4	13-9
t3	str	2	#4	11-3	2	#4	11-9	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	13-9	2	#4	14-3	2	#4	14-6	2	#4	15-3
t4	str	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-0	2	#4	14-6	2	#4	14-9	2	#4	15-3	2	#4	15-9	2	#4	16-0	2	#4	16-9
t5	str	2	#4	14-3	2	#4	14-6	2	#4	15-0	2	#4	15-6	2	#4	16-0	2	#4	16-3	2	#4	16-9	2	#4	17-3	2	#4	17-6	2	#4	18-3
t6	str							1	#4	16-3	2	#4	16-9	2	#4	17-3	2	#4	17-9	2	#4	18-3	2	#4	18-9	2	#4	19-0	2	#4	19-9
t7	str																1	#4	19-3	2	#4	19-9	2	#4	20-3	2	#4	20-6	2	#4	21-3
t8	str	2	#4	9-3	2	#4	11-3	2	#4	8-9	2	#4	9-9	2	#4	14-3	2	#4	9-9	2	#4	9-0	2	#4	9-6	2	#4	15-6	2	#4	17-9
t9	str																														
t10	str																														
t11	str	1	#4	16-0	1	#4	16-9	1	#4	17-9	1	#4	18-6	1	#4	19-6	1	#4	20-3	1	#4	21-0	1	#4	22-0	1	#4	22-9	1	#4	24-0

45° SKEW

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	18	#4	7-3	19	#4	7-3	20	#4	7-3	21	#4	7-3	22	#4	7-3	22	#4	7-3	23	#4	7-3	24	#4	7-3	25	#4	7-3	26	#4	7-3
j	str	1	#4	36-6	1	#4	33-3	1	#4	38-9	1	#4	40-9	1	#4	42-6	1	#4	44-0	1	#4	46-3	1	#4	48-0	1	#4	50-3	1	#4	51-9
r1	str	12	#4	10-3	12	#4	10-9	13	#4	11-3	13	#4	11-9	14	#4	12-3	15	#4	12-6	16	#4	13-0	16	#4	13-9	17	#4	14-0	17	#4	14-6
r2	str	3	#4	7-6	3	#4	8-3	3	#4	8-6	3	#4	9-6	3	#4	10-0	3	#4	9-9	3	#4	10-6	3	#4	11-0	3	#4	11-9	3	#4	12-3
r3	str	3	#4	5-6	3	#4	6-3	3	#4	7-9	3	#4	7-9	3	#4	8-6	3	#4	7-9	3	#4	8-6	3	#4	9-0	3	#4	9-9	3	#4	10-3
r4	str	3	#4	3-6	2	#4	4-0	2	#4	4-6	3	#4	5-6	3	#4	5-9	3	#4	6-0	3	#4	6-6	3	#4	7-0	3	#4	7-9	3	#4	8-9
r5	str				2	#4	3-0	2	#4	3-6	2	#4	4-0	3	#4	4-0	3	#4	4-0	2	#4	4-0	2	#4	5-0	3	#4	5-9	3	#4	6-3
r6	str																			2	#4	3-0	2	#4	4-0	3	#4	3-9	3	#4	4-3
r7	str																														
r8	str																														
r9	str																														
r10	str																														
s	str	39	#4	3-0	40	#4	3-0	42	#4	3-0	45	#4	3-0	47	#4	3-0	48	#4	3-0	50	#4	3-0	52	#4	3-0	54	#4	3-0	56	#4	3-0
t1	str	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-6	2	#4	15-0	2	#4	15-6	2	#4	16-0	2	#4	16-9	2	#4	17-6
t2	str	2	#4	16-3	2	#4	16-9	2	#4	17-3	2	#4	17-9	2	#4	18-9	2	#4	19-3	2	#4	19-9	2	#4	20-0	2	#4	21-0	2	#4	22-0
t3	str	2	#4	20-6	2	#4	21-0	2	#4	21-6	2	#4	22-0	2	#4	23-0	2	#4	23-6	2	#4	24-0	2	#4	24-3	2	#4	25-6	2	#4	26-3
t4	str	2	#4	23-3	2	#4	24-0	2	#4	24-9	2	#4	26-0	2	#4	27-0	2	#4	27-9	2	#4	28-6	2	#4	28-6	2	#4	29-9	2	#4	30-6
t5	str	2	#4	12-0	2	#4	16-0	2	#4	17-0	2	#4	21-0	2	#4	21-0	2	#4	26-0	2	#4	27-6	2	#4	32-0	2	#4	33-0	2	#4	34-0
t6	str	2	#4	6-0	2	#4	7-0	2	#4	8-6	2	#4	12-6	2	#4	14-0	2	#4	17-3	2	#4	19-0	2	#4	23-0	2	#4	26-9	2	#4	30-0
t7	str										1	#4	7-6	2	#4	7-6	2	#4	9-0	2	#4	10-6	2	#4	14-0	2	#4	17-6	2	#4	19-6
t8	str																						1	#4	10-0	2	#4	9-0	2	#4	11-0
t9	str																														
t10	str	1	#4	26-0	1	#4	27-6	1	#4	28-9	1	#4	30-0	1	#4	31-6	1	#4	32-9	1	#4	34-6	1	#4	35-9	1	#4	37-6	1	#4	38-9



BEND

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	OUTLET APRON STEEL LIST 4:1 SLOPE	STANDARD NO. B-17.30

DESIGN	K W	9-72
DRAWN	LAM	9-72
CHECKED	RLC	9-72

RIGHT ANGLE

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	17	#4	7-3	18	#4	7-3	18	#4	7-3	19	#4	7-3	20	#4	7-3	20	#4	7-3	20	#4	7-3	21	#4	7-3	22	#4	7-3	22	#4	7-3
j	str	1	#4	26-6	1	#4	28-0	1	#4	29-0	1	#4	30-3	1	#4	31-6	1	#4	32-9	1	#4	33-9	1	#4	35-0	1	#4	36-3	1	#4	37-6
r1	str	9	#4	12-6	9	#4	13-3	10	#4	14-0	10	#4	14-9	11	#4	15-6	11	#4	16-3	11	#4	17-0	12	#4	17-9	12	#4	18-6	13	#4	19-3
r2	str	4	#4	7-6	4	#4	8-9	4	#4	8-9	4	#4	10-0	4	#4	10-9	4	#4	12-0	4	#4	12-0	4	#4	12-0	4	#4	13-6	4	#4	13-3
r3	str	2	#4	5-0	2	#4	6-0	2	#4	6-0	4	#4	4-6	4	#4	4-3	4	#4	6-9	4	#4	6-9	4	#4	6-9	4	#4	8-0	4	#4	7-9
r4	str																									2	#4	5-3	2	#4	4-9
s	str	34	#4	2-0	36	#4	2-0	39	#4	2-0	41	#4	2-6	42	#4	2-6	44	#4	2-6	47	#4	2-6	47	#4	3-0	48	#4	3-0	50	#4	3-0
t1	str	3	#4	8-0	3	#4	8-9	3	#4	9-3	3	#4	9-6	3	#4	10-0	3	#4	10-0	3	#4	10-9	3	#4	11-3	3	#4	11-9	3	#4	12-0
t2	str	3	#4	10-6	3	#4	11-0	3	#4	11-9	3	#4	11-9	3	#4	12-3	3	#4	13-0	3	#4	13-0	3	#4	13-6	3	#4	14-0	3	#4	14-6
t3	str	3	#4	12-9	3	#4	13-0	3	#4	13-9	3	#4	14-0	3	#4	14-6	3	#4	15-3	3	#4	15-3	3	#4	15-9	3	#4	16-6	3	#4	17-0
t4	str	3	#4	15-0	3	#4	15-6	3	#4	16-0	3	#4	16-3	3	#4	16-6	3	#4	17-6	3	#4	17-9	3	#4	18-0	3	#4	18-6	3	#4	19-0
t5	str	2	#4	17-0	2	#4	17-6	3	#4	18-0	2	#4	18-6	2	#4	19-0	3	#4	19-6	3	#4	20-0	3	#4	20-0	3	#4	20-6	3	#4	20-9
t6	str										2	#4	20-0	2	#4	20-6	2	#4	21-6	3	#4	22-0	3	#4	22-3	2	#4	22-9	3	#4	23-0
t7	str																									2	#4	24-3	2	#4	25-0

30° SKEW

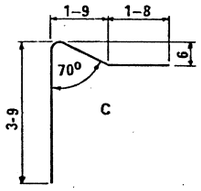
Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	17	#4	7-3	18	#4	7-3	18	#4	7-3	19	#4	7-3	20	#4	7-3	20	#4	7-3	21	#4	7-3	22	#4	7-3	22	#4	7-3	23	#4	7-3
j	str	1	#4	32-0	1	#4	33-6	1	#4	34-0	1	#4	36-6	1	#4	38-0	1	#4	39-0	1	#4	40-0	1	#4	41-0	1	#4	42-0	1	#4	43-0
r1	str	10	#4	12-9	11	#4	13-3	11	#4	14-0	12	#4	14-9	12	#4	15-6	12	#4	16-0	13	#4	16-6	13	#4	17-6	14	#4	18-0	14	#4	18-3
r2	str	2	#4	11-3	2	#4	11-6	2	#4	12-3	2	#4	13-0	2	#4	14-0	2	#4	14-9	2	#4	14-9	2	#4	14-9	2	#4	16-0	2	#4	16-0
r3	str	2	#4	9-6	2	#4	9-6	2	#4	10-3	2	#4	11-0	2	#4	12-0	2	#4	12-9	2	#4	13-0	2	#4	14-0	2	#4	14-0	2	#4	15-3
r4	str	2	#4	7-0	2	#4	7-9	2	#4	8-6	2	#4	9-0	2	#4	10-3	2	#4	10-9	2	#4	11-0	2	#4	12-0	2	#4	12-0	2	#4	13-3
r5	str	2	#4	5-3	2	#4	6-0	2	#4	6-6	2	#4	7-3	2	#4	8-3	2	#4	9-0	2	#4	9-0	2	#4	10-0	2	#4	10-0	2	#4	11-3
r6	str	1	#4	4-9	2	#4	4-0	2	#4	4-9	2	#4	5-3	2	#4	6-3	2	#4	7-0	2	#4	7-0	2	#4	8-0	2	#4	8-0	2	#4	9-3
r7	str										1	#4	4-3	2	#4	4-6	2	#4	5-0	2	#4	5-0	2	#4	6-3	2	#4	6-0	2	#4	7-6
r8	str																1	#4	4-0				2	#4	4-3	2	#4	4-0	2	#4	5-6
s	str	40	#4	3-0	42	#4	3-0	44	#4	3-0	45	#4	3-0	47	#4	3-0	49	#4	3-0	51	#4	3-0	52	#4	3-0	54	#4	3-0	56	#4	3-0
t1	str	2	#4	9-6	2	#4	10-0	2	#4	10-6	2	#4	11-0	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-0	2	#4	14-0
t2	str	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-0	2	#4	14-6	2	#4	15-0	2	#4	15-6	2	#4	15-6	2	#4	16-6
t3	str	2	#4	14-6	2	#4	15-0	2	#4	15-6	2	#4	16-0	2	#4	16-6	2	#4	17-0	2	#4	17-6	2	#4	18-0	2	#4	18-0	2	#4	19-0
t4	str	2	#4	17-0	2	#4	17-6	2	#4	18-0	2	#4	18-6	2	#4	19-0	2	#4	19-6	2	#4	20-0	2	#4	20-6	2	#4	20-6	2	#4	21-6
t5	str	2	#4	19-6	2	#4	20-0	2	#4	20-0	2	#4	21-0	2	#4	21-6	2	#4	22-0	2	#4	22-6	2	#4	22-9	2	#4	22-9	2	#4	23-0
t6	str	1	#4	22-0	2	#4	22-0	2	#4	23-0	2	#4	23-0	2	#4	24-0	2	#4	24-6	2	#4	25-0	2	#4	25-0	2	#4	25-0	2	#4	25-6
t7	str										1	#4	26-0	2	#4	26-0	2	#4	26-6	2	#4	27-0	2	#4	27-6	2	#4	27-6	2	#4	28-0
t8	str																			1	#4	28-6	2	#4	27-0	2	#4	30-0	2	#4	30-6
t9	str	2	#4	12-0	2	#4	12-0	2	#4	14-3	2	#4	12-6	2	#4	12-9	2	#4	15-0	2	#4	13-3	2	#4	13-0	2	#4	14-0	2	#4	20-6
t10	str	1	#4	23-9	1	#4	24-0	1	#4	25-9	1	#4	26-9	1	#4	28-0	1	#4	29-0	1	#4	30-0	1	#4	31-0	1	#4	32-0	1	#4	33-0

15° SKEW

Mark	Bend	90" Dia			96" Dia			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia			132" Dia			138" Dia			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	13	#4	7-3	13	#4	7-3	14	#4	7-3	15	#4	7-3	15	#4	7-3	16	#4	7-3	16	#4	7-3	17	#4	7-3	18	#4	7-3	19	#4	7-3
j	str	1	#4	25-9	1	#4	27-0	1	#4	28-3	1	#4	29-9	1	#4	31-0	1	#4	32-3	1	#4	33-6	1	#4	34-6	1	#4	36-3	1	#4	37-9
r1	str	9	#4	13-3	9	#4	14-0	10	#4	14-9	10	#4	15-6	11	#4	16-0	11	#4	16-9	12	#4	17-6	12	#4	18-3	12	#4	19-0	13	#4	19-9
r2	str	2	#4	11-0	2	#4	12-0	2	#4	11-6	2	#4	13-0	2	#4	12-9	2	#4	14-0	2	#4	14-6	2	#4	15-6	2	#4	17-0	2	#4	17-0
r3	str	2	#4	7-6	2	#4	9-0	2	#4	8-6	2	#4	10-0	2	#4	10-0	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	14-0	2	#4	14-0
r4	str	2	#4	5-0	2	#4	6-0	2	#4	6-0	2	#4	7-6	2	#4	7-0	2	#4	8-6	2	#4	8-6	2	#4	9-6	2	#4	11-6	2	#4	11-6
r5	str				2	#4	4-0	1	#4	4-6	2	#4	5-0	2	#4	4-0	2	#4	6-0	2	#4	5-0	2	#4	7-0	2	#4	8-6	2	#4	8-6
r6	str																						1	#4	5-0	2	#4	5-6	2	#4	5-6
r7	str																												1	#4	4-0
s	str	36	#4	3-0	38	#4	3-0	41	#4	3-0	42	#4	3-0	44	#4	3-0	47	#4	3-0	49	#4	3-0	51	#4	3-0	53	#4	3-0	55	#4	3-0
t1	str	2	#4	8-6	2	#4	9-0	2	#4	9-3	2	#4	9-6	2	#4	9-9	2	#4	10-3	2	#4	11-0	2	#4	11-3	2	#4	11-9	2	#4	12-3
t2	str	2	#4	10-0	2	#4	10-6	2	#4	11-0	2	#4	11-3	2	#4	11-6	2	#4	12-0	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-0
t3	str	2	#4	11-3	2	#4	11-9	2	#4	12-3	2	#4	12-6	2	#4	13-0	2	#4	13-6	2	#4	14-0	2	#4	14-6	2	#4	15-0	2	#4	15-3
t4	str	2	#4	13-0	2	#4	13-6	2	#4	13-6	2	#4	14-3	2	#4	14-6	2	#4	15-0	2	#4	15-6	2	#4	16-0	2	#4	16-6	2	#4	16-9
t5	str	2	#4	14-3	2	#4	14-6	2	#4	15-0	2	#4	15-9	2	#4	16-0	2	#4	16-6	2	#4	17-0	2	#4	17-6	2	#4	18-0	2	#4	18-3
t6	str	2	#4	15-6	2	#4	16-0	2	#4	16-6	2	#4	17-0	2	#4	17-6	2	#4	18-0	2	#4	18-3	2	#4	18-9	2	#4	19-3	2	#4	19-9
t7	str	1	#4	17-0	2	#4	17-6	2	#4	18-0	2	#4	18-6	2	#4	19-0	2	#4	19-0	2	#4	19-6	2	#4	20-0	2	#4	20-6	2	#4	21-3
t8	str	1	#4	9-0				1	#4	15-6	1	#4	20-0	2	#4	20-0	2	#4	20-6	2	#4	21-0	2	#4	21-6	2	#4	22-6	2	#4	22-6
t9	str										1	#4	14-0				1	#4	22-0	2	#4	22-6	2	#4	22-6	2	#4	23-6	2	#4	24-0
t10	str																						1	#4	24-0	1	#4	25-0	2	#4	25-6
t11	str	1	#4	17-3	1	#4	18-3	1	#4	19-3	1	#4	20-6	1	#4	21-6	1	#4	22-3	1	#4	23-0	1	#4	24-3	1	#4	25-3	1	#4	26-6

45° SKEW

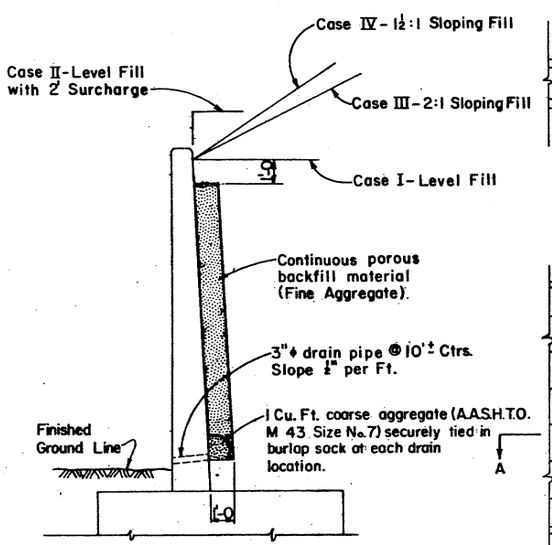
Mark	Bend	90" Dia.			96" Dia.			102" Dia			108" Dia			114" Dia			120" Dia			126" Dia.			132" Dia.			138" Dia.			144" Dia		
		No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth	No	Size	Lgth
h	C	20	#4	7-3	21	#4	7-3	22	#4	7-3	23	#4	7-3	24	#4	7-3	25	#4	7-3	26	#4	7-3	27	#4	7-3	28	#4	7-3	29	#4	7-3
j	str	1	#4	39-0	1	#4	41-0	1	#4	43-0	1	#4	45-0	1	#4	47-0	1	#4	49-0	1	#4	51-0	1	#4	53-0	1	#4	55-0	1	#4	57-0
r1	str	12	#4	11-6	13	#4	11-9	13	#4	12-9	14	#4	13-6	15	#4	14-0	15	#4	14-9	16	#4	15-3	16	#4	16-0	17	#4	16-6	17	#4	17-0
r2	str	2	#4	9-9	2	#4	10-6	2	#4	11-6	2	#4	11-9	2	#4	12-0	2	#4	13-0	2	#4	13-6	2	#4	14-3	2	#4	14-6	2	#4	15-3
r3	str	2	#4	8-6	2	#4	9-0	2	#4	10-0	2	#4	10-3	2	#4	10-6	2	#4	11-6	2	#4	12-0	2	#4	13-0	2	#4	13-3	2	#4	14-0
r4	str	2	#4	7-3	2	#4	7-6	2	#4	8-9	2	#4	9-0	2	#4	9-3	2	#4	10-3	2	#4	10-6	2	#4	11-6	2	#4	11-9	2	#4	12-6
r5	str	2	#4	6-0	2	#4	6-3	2	#4	7-3	2	#4	7-6	2	#4	7-9	2	#4	9-0	2	#4	9-3	2	#4	10-3	2	#4	10-6	2	#4	11-0
r6	str	2	#4	4-6	2	#4	4-9	2	#4	6-0	2	#4	6-0	2	#4	6-6	2	#4	7-6	2	#4	7-9	2	#4	8-6	2	#4	9-0	2	#4	9-9
r7	str				1	#4	4-0	2	#4	4-6	2	#4	4-6	2	#4	5-0	2	#4	6-0	2	#4	6-3	2	#4	7-3	2	#4	7-6	2	#4	8-3
r8	str													2	#4	3-6	2	#4	4-6	2	#4	5-0	2	#4	6-0	2	#4	6-3	2	#4	6-9
r9	str																1	#4	4-0	1	#4	4-3	2	#4	4-6	2	#4	4-9	2	#4	5-6
r10	str																									1	#4	4-0	2	#4	4-0
s	str	41	#4	3-0	43	#4	3-0	45	#4	3-0	47	#4	3-0	49	#4	3-0	52	#4	3-0	54	#4	3-0	56	#4	3-0	58	#4	3-0	60	#4	3-0
t1	str	2	#4	12-0	2	#4	12-6	2	#4	13-6	2	#4	14-0	2	#4	14-9	2	#4	15-3	2	#4	15-9	2	#4	16-3	2	#4	17-0	2	#4	17-3
t2	str	2	#4	16-3	2	#4	16-9	2	#4	17-6	2	#4	18-3	2	#4	19-0	2	#4	19-6	2	#4	20-0	2	#4	20-6	2	#4	21-3	2	#4	21-9
t3	str	2	#4	20-6	2	#4	21-0	2	#4	21-9	2	#4	22-6	2	#4	23-6	2	#4	23-9	2	#4	24-3	2	#4	24-6	2	#4	25-6	2	#4	26-3
t4	str	2	#4	25-0	2	#4	25-9	2	#4	26-0	2	#4	26-9	2	#4	27-9	2	#4	28-0	2	#4	28-6	2	#4	29-0	2	#4	29-9	2	#4	30-6
t5	str	2	#4	17-6	2	#4	22-6	2	#4	28-0	2	#4	31-0	2	#4	32-6	2	#4	32-9	2	#4	33-6	2	#4	33-6	2	#4	34-6	2	#4	35-0
t6	str	2	#4	10-6	2	#4	14-6	2	#4	16-6	2	#4	20-0	2	#4	21-0	2	#4	25-3	2	#4	26-0	2	#4	31-9	2	#4	33-0	2	#4	38-0
t7	str	1	#4	7-0	1	#4	10-0	2	#4	9-6	2	#4	11-6	2	#4	13-0	2	#4	17-3	2	#4	18-6	2	#4	23-3	2	#4	24-0	2	#4	28-0
t8	str										1	#4	7-6	1	#4	8-6	2	#4	9-3	2	#4	10-0	2	#4	15-6	2	#4	15-6	2	#4	20-0
t9	str																						1	#4	11-6	1	#4	11-0	2	#4	12-6
t10	str	1	#4	28-6	1	#4	30-0	1	#4	31-6	1	#4	33-0	1	#4	34-6	1	#4	36-0	1	#4	37-6	1	#4	39-0	1	#4	40-0	1	#4	42-0



BEND

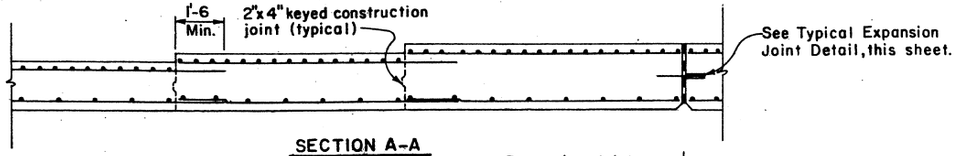
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	OUTLET APRON STEEL LIST 6:1 SLOPE	STANDARD NO. B-17.40

DESIGN	KW	9-72
DRAWN	LAM	9-72
CHECKED	RLC	9-72

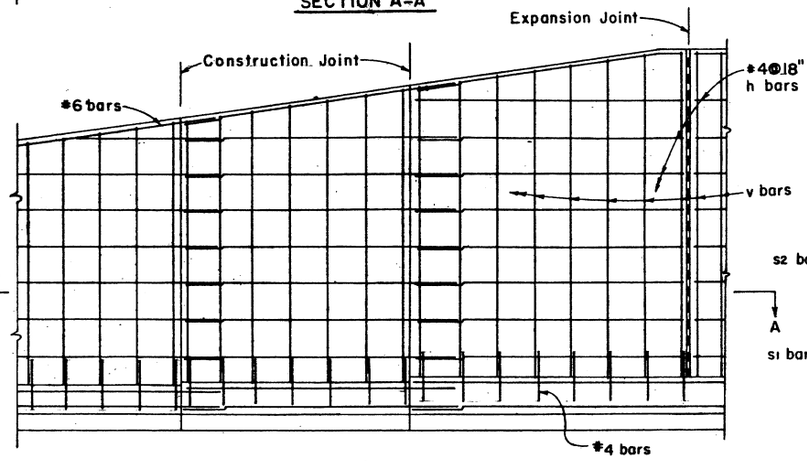


TYPICAL SECTION

Showing Design Cases & Drainage

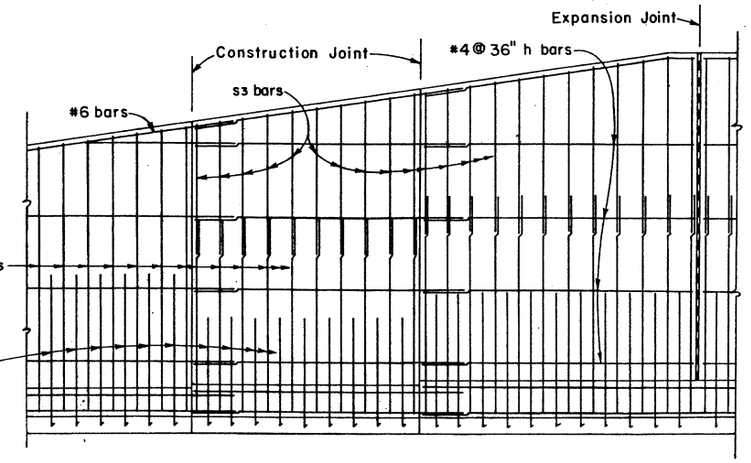


SECTION A-A



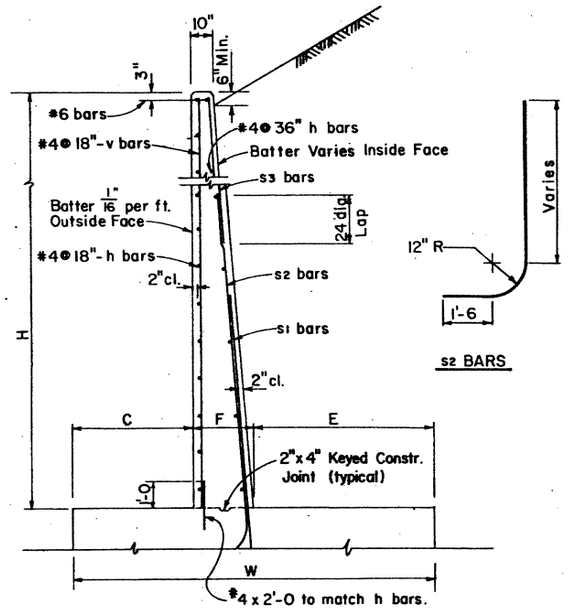
TYPICAL ELEVATION

Outside Face Reinforcing

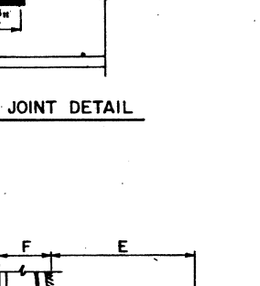


TYPICAL ELEVATION

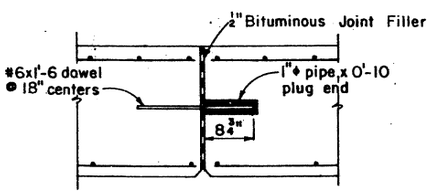
Inside Face Reinforcing



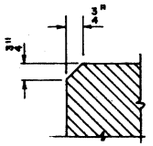
TYPICAL STEM DETAIL



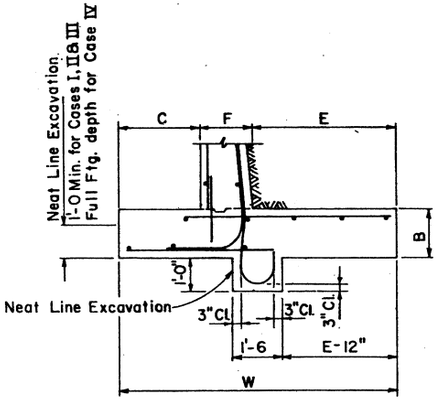
s2 BARS



TYPICAL EXPANSION JOINT DETAIL

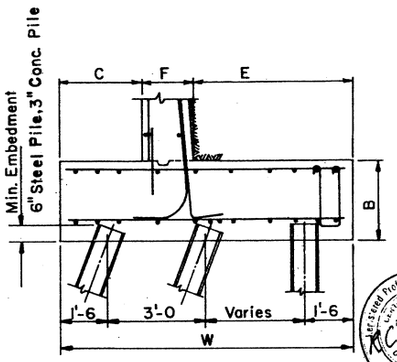


Chamfer all exposed corners thus unless otherwise noted.



SPREAD FOOTING DETAIL

See Footing Steel Detail on B-18.20



PILE FOOTING DETAIL

See Footing Steel Detail on B-18.30 or B-18.40

GENERAL NOTES

Construction - Std. Specs. Arizona Department of Transportation Edition of 1982, revised to date.

Design - AASHTO Std. Specs. for Highway Bridges 1977.

Dead Load - Weight of backfill = 120 P.C.F.
Equivalent Fluid Pressure = 35 P.C.F.

Stresses - Class S Concrete f'_c = 3000 P.S.I.

All Concrete shall be Class S.

Reinforcing Steel shall conform to A.S.T.M. Spec. A-615

Bar sizes #6 and smaller shall be Gr. 40 or Gr. 60; f_s = 20,000 P.S.I.

Bar sizes #7 and larger shall be Grade 60, f_s = 24,000 P.S.I.

All Reinforcing Steel shall have 2" clear cover unless noted otherwise.

JOINT NOTE

All Retaining Walls shall have Construction Joints spaced at not more than 30'-0 apart or as shown. Reinforcing Steel shall project through the joint.

Expansion Joints shall be provided at intervals not exceeding 90'-0.

Footings may be continuous with no joint.

BATTERED PILE NOTE

Batter Piles 3:12 for Cases I & II, 4:12 for Cases III & IV.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Change Notes & Sheet	MEB	12-82
②	Add bar in F.F.	CH	5-85
③	Changed Reinf. Note	CH	10-86

	DHY	9-72
DESIGN		
DRAWN	GFB	8-73
CHECKED	NAB	3-73

DESIGN APPROVED R.C. Brechler

APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION 10-86

CANTILEVER RETAINING WALL DETAILS

STANDARD NO. B-18.10

CASE I - LEVEL FILL

Dimensions						Steel List																				Quantities		Max. Toe Press. Lbs. / Sq. Ft.
						s1			s2			s3			h	v	b			f1	t			f2			
H	W	B	C	F	E	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	Number ⊕	Concrete Cu. Yds. / Lin. Ft.	Steel Lbs. / Lin. Ft.	
4'	2'-9	1'-3	0'-9	1'-0	1'-0	#5	12"	6'-6							3	3'-9	#5	12"	2'-0	2	#5	12"	2'-3	3	.319	21.23	980
5'	3'-0	1'-3	1'-0	1'-0	1'-0	#5	12"	7'-6							4	4'-9	#5	12"	2'-3	2	#5	12"	2'-3	3	.364	23.65	1190
6'	3'-3	1'-3	1'-1	1'-0	1'-2	#5	12"	8'-6							5	5'-9	#5	12"	2'-6	2	#5	12"	2'-6	3	.410	26.32	1510
7'	3'-9	1'-3	1'-3	1'-0	1'-6	#5	12"	9'-6							6	6'-9	#5	12"	2'-6	2	#5	12"	2'-9	3	.467	28.74	1650
8'	4'-3	1'-3	1'-5	1'-0	1'-10	#5	12"	10'-6							7	7'-9	#5	12"	2'-9	3	#5	12"	3'-3	3	.524	32.35	1790
9'	4'-9	1'-3	1'-7	1'-0	2'-2	#5	12"	11'-6							8	8'-9	#5	12"	3'-0	3	#5	12"	3'-6	3	.581	35.02	1930
10'	5'-3	1'-3	1'-9	1'-0	2'-6	#6	12"	12'-6							9	9'-9	#5	12"	3'-0	3	#5	12"	3'-9	3	.638	43.19	2070
11'	5'-9	1'-3	1'-11	1'-0	2'-10	#5	13"	6'-6	#5	13"	13'-9				10	10'-9	#5	13"	3'-3	3	#6	13"	4'-3	4	.695	47.66	2210
12'	6'-3	1'-3	2'-1	1'-0	3'-2	#6	12"	7'-6	#5	12"	14'-9				11	11'-9	#5	12"	3'-6	3	#5	6"	4'-6	4	.752	59.95	2350
13'	6'-9	1'-3	2'-3	1'-0	3'-6	#7	11"	8'-6	#5	11"	15'-9				12	12'-9	#5	11"	3'-6	3	#7	11"	5'-3	4	.809	73.94	2490
14'	7'-0	1'-3	2'-4	1'-1	3'-7	#8	14"	9'-0	#6	14"	16'-9				13	13'-9	#6	14"	3'-9	3	#6	7"	5'-0	4	.877	82.35	2810
15'	7'-6	1'-3	2'-6	1'-2	3'-10	#8	12"	9'-6	#6	12"	17'-9				14	14'-9	#6	12"	4'-0	3	#6	6"	5'-3	4	.958	97.41	2950
16'	8'-0	1'-3	2'-8	1'-3	4'-1	#8	12"	9'-3	#7	12"	11'-3	#5	12"	8'-9	15	15'-9	#5	6"	4'-3	3	#7	6"	5'-9	4	1.043	113.90	3090
17'	8'-6	1'-4	2'-10	1'-4	4'-4	#8	11"	9'-9	#7	11"	12'-0	#5	11"	9'-3	16	16'-9	#5	5½"	4'-6	3	#7	5½"	6'-0	4	1.157	128.50	3240
18'	9'-0	1'-5	3'-0	1'-5	4'-7	#9	11"	10'-9	#7	11"	13'-0	#5	11"	9'-3	17	17'-9	#5	5½"	4'-9	4	#7	5½"	6'-3	5	1.278	146.35	3480
19'	9'-6	1'-6	3'-2	1'-7	4'-9	#10	14"	11'-9	#8	14"	13'-3	#6	14"	10'-3	18	18'-9	#6	7"	5'-0	4	#8	7"	7'-3	6	1.434	163.04	3680
20'	10'-0	1'-7	3'-4	1'-8	5'-0	#10	13"	12'-0	#8	13"	14'-0	#6	13"	10'-9	19	19'-9	#6	6½"	5'-3	4	#8	6½"	7'-3	6	1.568	178.52	3880

CASE II - LEVEL FILL WITH 2' SURCHARGE

Dimensions						Steel List																				Quantities		Max. Toe Press. Lbs. / Sq. Ft.
						s1			s2			s3			h	v	b			f1	t			f2			
H	W	B	C	F	E	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	Number ⊕	Concrete Cu. Yds. / Lin. Ft.	Steel Lbs. / Lin. Ft.	
4'	3'-3	1'-3	1'-1	1'-0	1'-2	#5	12"	6'-6							3	3'-9	#5	12"	2'-6	2	#5	12"	2'-6	3	.342	22.01	1180
5'	3'-6	1'-3	1'-2	1'-0	1'-4	#5	12"	7'-6							4	4'-9	#5	12"	2'-6	2	#5	12"	2'-9	3	.387	24.43	1530
6'	4'-0	1'-3	1'-4	1'-0	1'-8	#5	12"	8'-6							5	5'-9	#5	12"	2'-9	2	#5	12"	3'-0	3	.444	27.10	1700
7'	4'-6	1'-3	1'-6	1'-0	2'-0	#5	12"	9'-6							6	6'-9	#5	12"	2'-9	3	#5	12"	3'-3	3	.502	30.19	1860
8'	5'-0	1'-3	1'-8	1'-0	2'-4	#5	9"	10'-6							7	7'-9	#5	12"	3'-0	3	#5	12"	3'-9	3	.559	36.78	2020
9'	5'-6	1'-3	1'-10	1'-0	2'-8	#5	14"	6'-0	#5	14"	11'-9				8	8'-9	#5	14"	3'-3	3	#6	14"	4'-0	4	.616	40.89	2170
10'	6'-0	1'-3	2'-0	1'-0	3'-0	#5	11"	6'-6	#5	11"	12'-9				9	9'-9	#5	11"	3'-3	3	#6	11"	4'-3	4	.673	50.60	2330
11'	6'-6	1'-3	2'-2	1'-0	3'-4	#7	12"	8'-3	#5	12"	13'-9				10	10'-9	#5	12"	3'-6	3	#6	9"	4'-9	4	.730	63.50	2480
12'	7'-0	1'-3	2'-4	1'-1	3'-7	#8	14"	8'-9	#6	14"	14'-9				11	11'-9	#6	14"	3'-9	3	#6	7"	5'-0	4	.806	76.98	2630
13'	7'-6	1'-3	2'-6	1'-2	3'-10	#8	12"	9'-0	#6	12"	15'-9				12	12'-9	#6	12"	4'-0	3	#6	6"	5'-3	4	.884	90.84	2780
14'	8'-0	1'-3	2'-8	1'-3	4'-1	#8	13"	9'-3	#7	13"	11'-0	#5	13"	7'-0	13	13'-9	#5	6½"	4'-3	3	#7	6½"	5'-9	4	.966	102.66	2940
15'	8'-6	1'-3	2'-10	1'-4	4'-4	#8	11"	9'-3	#7	11"	11'-3	#5	11"	7'-9	14	14'-9	#5	5½"	4'-6	3	#7	5½"	6'-0	4	1.051	121.44	3090
16'	9'-0	1'-5	3'-0	1'-5	4'-7	#9	11"	10'-9	#7	11"	12'-6	#5	11"	7'-9	15	15'-9	#5	5½"	4'-9	4	#7	5½"	6'-3	5	1.195	141.30	3340
17'	9'-6	1'-6	3'-2	1'-6	4'-10	#9	10"	10'-9	#7	10"	13'-0	#5	10"	8'-3	16	16'-9	#5	5"	5'-0	4	#7	5"	6'-9	5	1.318	158.86	3540
18'	10'-0	1'-7	3'-4	1'-8	5'-0	#9	12"	11'-3	#8	12"	13'-6	#6	12"	9'-3	17	17'-9	#6	6"	5'-3	4	#8	6"	7'-3	6	1.475	171.61	3750
19'	10'-6	1'-8	3'-6	1'-9	5'-3	#10	12"	12'-6	#8	12"	14'-6	#6	12"	9'-3	18	18'-9	#6	6"	5'-6	4	#8	6"	7'-6	6	1.613	193.01	3950
20'	11'-0	1'-9	3'-8	1'-10	5'-6	#10	11"	13'-0	#8	11"	15'-0	#6	11"	9'-9	19	19'-9	#6	5½"	5'-9	4	#8	5½"	7'-9	6	1.756	215.85	4150

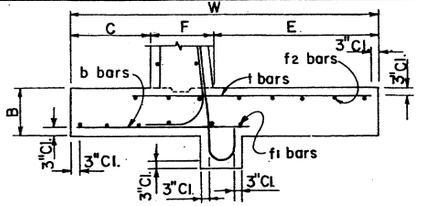
CASE III - 2:1 SLOPING FILL

Dimensions						Steel List																				Quantities		Max. Toe Press. Lbs. / Sq. Ft.
						s1			s2			s3			h	v	b			f1	t			f2			
H	W	B	C	F	E	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	Number ⊕	Concrete Cu. Yds. / Lin. Ft.	Steel Lbs. / Lin. Ft.	
4'	2'-6	1'-3	0'-9	1'-0	0'-9	#5	12"	6'-6							3	3'-9	#5	12"	2'-0	2	#5	12"	2'-0	3	.307	20.97	1290
5'	3'-0	1'-3	0'-11	1'-0	1'-1	#5	12"	7'-6							4	4'-9	#5	12"	2'-3	2	#5	12"	2'-6	3	.364	23.91	1520
6'	3'-6	1'-3	1'-1	1'-0	1'-5	#5	12"	8'-6							5	5'-9	#5	12"	2'-6	2	#5	12"	2'-9	3	.421	26.58	1740
7'	4'-0	1'-3	1'-3	1'-0	1'-9	#5	12"	9'-6							6	6'-9	#5	12"	2'-6	2	#5	12"	3'-0	3	.478	29.00	1960
8'	4'-6	1'-3	1'-6	1'-0	2'-0	#5	12"	10'-6							7	7'-9	#5	12"	2'-9	3	#5	12"	3'-3	3	.536	32.35	2120
9'	5'-0	1'-3	1'-8	1'-0	2'-4	#5	9"	11'-6							8	8'-9	#5	12"	3'-0	3	#5	12"	3'-9	3	.593	39.28	2340
10'	5'-6	1'-3	1'-10	1'-0	2'-8	#5	14"	6'-6	#5	14"	12'-9				9	9'-9	#5	14"	3'-3	3	#6	14"	4'-0	4	.650	43.30	2560
11'	6'-0	1'-3	2'-0	1'-0	3'-0	#6	12"	7'-0	#5	12"	13'-9				10	10'-9	#5	12"	3'-3	3	#5	6"	4'-3	4	.707	56.26	2780
12'	6'-6	1'-3	2'-2	1'-0	3'-4	#7	11"	7'-9	#5	11"	14'-9				11	11'-9	#5	11"	3'-6	3	#5	5½"	4'-9	4	.764	69.12	3000
13'	7'-3	1'-3	2'-5	1'-1	3'-9	#8	14"	9'-0	#6	14"	15'-9				12	12'-9	#5	7"	3'-9	3	#7	7"	5'-6	4	.853	88.23	3030
14'	7'-9	1'-3	2'-7	1'-2	4'-0	#8	12"	9'-0	#6	12"	16'-9				13	13'-9	#5	6"	4'-0	3	#7	6"	5'-9	4	.933	103.52	3250
15'	8'-3	1'-5	2'-9	1'-3	4'-3	#8	12"	9'-3	#7	12"	11'-0	#5	12"	8'-3	14	14'-9	#5	6"	4'-3	3	#7	6"	6'-0	4	1.067	112.78	3590
16'	8'-9	1'-6	2'-11	1'-5	4'-5	#8	11"	9'-6	#7	11"	11'-6	#5	11"	8'-9	15	15'-9	#5	5½"	4'-9	3	#7	5½"	6'-3	5	1.208	127.33	3880
17'	9'-3	1'-7	3'-1	1'-6	4'-8	#9	13"	10'-6	#8	13"	12'-6	#6	13"	9'-3	16	16'-9	#6	6½"	5'-0	4	#8	6½"	7'-0	5	1.333	152.10	4160
18'	10'-0	1'-9	3'-4	1'-7	5'-1	#10	13"	11'-9	#8	13"	13'-0	#6	13"	9'-9	17	17'-9	#6	6½"	5'-3	4	#8	6½"	7'-6	6	1.509	172.70	4320
19'	10'-6	1'-11	3'-6	1'-9	5'-3	#10	12"	12'-3	#8	12"	13'-9	#6	12"	10'-3	18	18'-9	#6	6"	5'-6	4	#8	6"	7'-6	6	1.710	191.44	4670
20'	11'-3	2'-0	3'-9	1'-10	5'-8	#10	11"	12'-9	#8	11"	14'-3	#6	11"	10'-9	19	19'-9	#6	5½"	6'-0	4	#8	5½"	8'-0	6	1.877	216.42	4760

CASE IV - 1½:1 SLOPING FILL

Dimensions						Steel List																				Quantities		Max. Toe Press. Lbs. / Sq. Ft.
						s1			s2			s3			h	v	b			f1	t			f2			
H	W	B	C	F	E	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Length	Number ⊕	Size	Spacing	Length	Number ⊕	Concrete Cu. Yds. / Lin. Ft.	Steel Lbs. / Lin. Ft.	
4'	3'-0	1'-3	1'-0	1'-0	1'-0	#5	12"	6'-6							3	3'-9	#5	12"	2'-3	2	#5	12"	2'-3	3	.330	21.49	1520
5'	3'-9	1'-3	1'-3	1'-0	1'-6	#5	12"	7'-6							4	4'-9	#5	12"	2'-6	2	#5	12"	2'-9	3	.399	24.43	1720
6'	4'-6	1'-3	1'-6	1'-0	2'-0	#5	12"	8'-6							5	5'-9	#5	12"	2'-9	3	#5	12"	3'-3	3	.468	28.03	1920
7'	5'-0	1'-3	1'-8	1'-0	2'-4	#5	11"	9'-6							6	6'-9	#5	11"	3'-0	3	#5	11"	3'-6	3	.525	32.23	2290
8'	5'-9	1'-3	1'-11	1'-0	2'-10	#6	10½"	10'-6							7	7'-9	#5	10½"	3'-3	3	#5	10½"	4'-0	4	.593	42.48	2490
9'	6'-6	1'-3	2'-2	1'-0	3'-4	#6	11"	6'-6	#5	11"	11'-9				8	8'-9	#5	11"	3'-6	3	#6	11"	4'-6	4	.662	52.30	2680
10'	7'-3	1'-4	2'-5	1'-0	3'-10	#7	11"	7'-9	#5	11"	13'-0				9	9'-9	#6	11"	3'-9	3	#6	11"	5'-3	4	.753	64.85	2950
11'	8'-0	1'-5	2'-8	1'-1	4'-3	#8	12"	8'-3	#6	12"	14'-0				10	10'-9	#6	9"	4'-0	3	#6	9"	5'-6	4	.866	81.22	3220
12'	8'-9	1'-6	2'-11	1'-3	4'-7	#8	12"	8'-0	#7	12"	9'-6	#5	12"	6'-9	11	11'-9	#7	12"	4'-6	3	#7	9"	6'-3	5	1.005	94.98	3500
13'	9'-6	1'-7	3'-2	1'-4	5'-0	#9	12"	9'-3	#7	12"	10'-9	#5	12"	6'-9	12	12'-9	#7	9"	4'-9	4	#6	6"	6'-3	5	1.134	114.88	3770
14'	10'-3	1'-8	3'-5	1'-6	5'-4	#9	11"	10'-0	#7	11"	11'-3	#5	11"	7'-3	13	13'-9	#8	11"	5'-3	4	#6	5½"	6'-9	5	1.293	131.67	4040
15'	11'-0	1'-9	3'-8	1'-8	5'-8	#9	12"	10'-3	#8	12"	11'-6	#6	12"	8'-3	14	14'-9	#9	12"	5'-9	4	#7	6"	7'-6	6	1.463	153.76	4310
16'	11'-9	1'-10	3'-11	1'-9	6'-1	#10	12"	11'-6	#8	12"	12'-9	#6	12"	8'-3	15	15'-9	#7	6"	6'-0	4	#8	6"	8'-3	6	1.619	191.22	4590
17'	12'-6	2'-0	4'-2	1'-11	6'-5	#10	11"	11'-9	#8	11"	13'-3	#6	11"	8'-9	16	16'-9	#7	5½"	6'-6	4	#8	5½"	8'-6	6	1.847	214.43	4930
18'	13'-3	2'-1	4'-5	2'-1	6'-9	#10	10"	12'-3	#8	10"	14'-0	#6	10"	9'-3	17	17'-9	#7	5"	6'-9	4	#8	5"	9'-0	6	2.050	244.51	5200
19'	14'-0	2'-2	4'-8	2'-3	7'-1	#11	10"	13'-0	#8	10"	15'-0	#6	10"	9'-3	18	18'-9	#9	7½"	7'-3	5	#8	5"	9'-6	7	2.264	279.31	5480
20'	14'-9	2'-3	4'-11	2'-5	7'-5	#11	10"	13'-3	#9	10"	16'-0	#6	10"	9'-3	19	19'-9	#8	5"	7'-9	5	#8	5"	10'-0	7	2.488	312.67	5750

⊕ Total number of bars in cross-section



FOOTING STEEL DETAIL

NOTES:

See B-18.10 for General Notes and all other Details.

All h, v, f1 and f2 bars shall be #4 bars spaced as shown.

DESIGN	DHY	10-72	NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
DRAWN	GFB	3-73	① ② ③	Si. bars	W.E.B.	12-82
CHECKED	NAB	3-73				

DESIGN APPROVED: R.C. Beckler

APPROVED, FOR DISTRIBUTION:

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

CANTILEVER RETAINING WALLS ON SPREAD FOOTINGS

REVISION

STANDARD NO. B-18.20

CASE I – LEVEL FILL

DIMENSIONS						PILE PATTERN			STEEL LIST																				QUANTITIES	
									s1			s2			s3			h	v	b		t		p1	p2	p3	f3			
H	W	B	C	F	E	Type	Sp 1	Sp 2	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Size	Spacing	Size	Size	Size	Number ⊕	Concrete C.Y./Lin.Ft.	Reinforcing Steel Lbs./Lin.Ft.
4'	4'-0	2'-3	1'-3	1'-0	1'-9	1	8'-0		#5	12"	5'-6							3	3'-9	#5	12"	#5	12"				#6		.469	36.9
5'	4'-3	2'-3	1'-6	1'-0	1'-9	1	8'-0		#5	12"	6'-6							4	4'-9	#5	12"	#5	12"	#6*			#6		.524	44.1
6'	4'-6	2'-3	1'-6	1'-0	2'-0	1	8'-0		#5	12"	7'-6							5	5'-9	#5	12"	#5	12"	#6*			#6		.579	46.8
7'	4'-9	2'-3	1'-9	1'-0	2'-0	1	8'-0		#5	12"	8'-6							6	6'-9	#5	12"	#5	12"	#6*			#6		.634	49.5
8'	5'-0	2'-3	1'-9	1'-0	2'-3	1	8'-0		#5	12"	9'-6							7	7'-9	#5	12"	#5	12"	#6*			#6		.688	52.1
9'	5'-6	2'-3	2'-0	1'-0	2'-6	1	8'-0		#5	12"	10'-6							8	8'-9	#5	12"	#5	12"	#7			#6		.764	63.1
10'	5'-9	2'-3	2'-0	1'-0	2'-9	1	8'-0		#6	12"	11'-6							9	9'-9	#5	12"	#5	12"	#8			#6		.819	74.8
11'	6'-0	2'-3	2'-0	1'-0	3'-0	1	8'-0		#5	13"	5'-6	#5	13"	14'-6				10	10'-9	#5	13"	#5	13"	#8			#6	2	.874	78.9
12'	6'-6	2'-3	2'-3	1'-0	3'-3	1	7'-6		#6	12"	6'-6	#5	12"	15'-6				11	11'-9	#5	12"	#5	12"	#8			#6	2	.949	88.7
13'	6'-9	2'-3	2'-3	1'-0	3'-6	1	6'-6		#7	11"	7'-3	#5	11"	16'-6				12	12'-9	#5	11"	#5	11"	#8			#6	2	1.004	100.9
14'	7'-0	2'-3	2'-6	1'-1	3'-5	1	6'-0		#8	14"	7'-9	#6	14"	17'-6				13	13'-9	#5	7"	#6	14"	#8			#6	2	1.080	113.4
15'	7'-3	2'-3	2'-6	1'-2	3'-7	2	8'-0	16'-0	#8	12"	7'-9	#6	12"	18'-6				14	14'-9	#5	12"	#5	9"	#6			#6	2	1.160	110.3
16'	7'-6	2'-3	2'-6	1'-3	3'-9	2	8'-0	16'-0	#8	12"	7'-9	#7	12"	12'-0	#5	12"	8'-9	15	15'-9	#5	12"	#5	8"	#6			#6	4	1.242	120.4
17'	8'-0	2'-3	2'-9	1'-4	3'-11	2	8'-0	16'-0	#8	11"	8'-0	#7	11"	12'-6	#5	11"	9'-3	16	16'-9	#5	5½"	#5	5½"	#6			#6	4	1.349	144.8
18'	8'-9	2'-3	3'-0	1'-5	4'-4	2	8'-0	16'-0	#9	11"	10'-6	#7	11"	13'-6	#5	11"	9'-3	17	17'-9	#5	5½"	#6	5½"	#6			#6	4	1.479	175.5
19'	9'-3	2'-3	3'-3	1'-7	4'-5	2	7'-0	16'-0	#10	14"	11'-0	#8	14"	13'-9	#6	14"	10'-3	18	18'-9	#6	7"	#6	7"	#5			#6	6	1.621	180.1
20'	9'-6	2'-3	3'-3	1'-8	4'-7	2	6'-6	16'-0	#10	13"	11'-3	#8	13"	14'-3	#6	13"	10'-9	19	19'-9	#6	6½"	#6	6½"	#5			#6	6	1.718	195.5

CASE II – LEVEL FILL WITH 2' SURCHARGE

DIMENSIONS						PILE PATTERN			STEEL LIST																				QUANTITIES	
									s1			s2			s3			h	v	b		t		p1	p2	p3	f3			
H	W	B	C	F	E	Type	Sp 1	Sp 2	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Size	Spacing	Size	Size	Size	Number ⊕	Concrete C.Y./Lin.Ft.	Reinforcing Steel Lbs./Lin.Ft.
4'	4'-0	2'-3	1'-6	1'-0	1'-6	1	8'-0		#5	12"	5'-6							3	3'-9	#5	12"	#5	12"				#6		.469	36.9
5'	4'-6	2'-3	1'-6	1'-0	2'-0	1	8'-0		#5	12"	6'-6							4	4'-9	#5	12"	#5	12"	#6*			#6		.545	44.6
6'	4'-9	2'-3	1'-9	1'-0	2'-0	1	8'-0		#5	12"	7'-6							5	5'-9	#5	12"	#5	12"	#6*			#6		.600	47.3
7'	5'-0	2'-3	1'-9	1'-0	2'-3	1	8'-0		#5	12"	8'-6							6	6'-9	#5	12"	#5	12"	#6*			#6		.654	50.0
8'	5'-6	2'-3	2'-0	1'-0	2'-6	1	8'-0		#5	9"	9'-6							7	7'-9	#5	12"	#5	12"	#7			#6		.730	64.2
9'	5'-9	2'-3	2'-0	1'-0	2'-9	1	8'-0		#5	14"	5'-0	#5	14"	12'-6				8	8'-9	#5	12"	#5	12"	#8			#6		.785	72.1
10'	6'-3	2'-3	2'-3	1'-0	3'-0	1	8'-0		#5	11"	5'-6	#5	11"	13'-6				9	9'-9	#5	12"	#5	12"	#8			#6	2	.860	81.5
11'	6'-6	2'-3	2'-3	1'-0	3'-3	1	7'-0		#7	12"	7'-0	#5	12"	14'-6				10	10'-9	#5	12"	#5	12"	#8			#6	2	.915	91.3
12'	7'-3	2'-3	2'-6	1'-1	3'-8	1	6'-6		#8	14"	7'-3	#6	14"	15'-6				11	11'-9	#5	7"	#6	14"	#8			#6	2	1.030	108.0
13'	7'-6	2'-3	2'-6	1'-2	3'-10	1	5'-6		#8	12"	7'-9	#6	12"	16'-6				12	12'-9	#5	6"	#5	8"	#8			#6	4	1.107	124.6
14'	8'-0	2'-3	2'-9	1'-3	4'-0	2	8'-0	16'-0	#8	13"	8'-0	#7	13"	11'-9	#5	13"	7'-0	13	13'-9	#6	13"	#5	6½"	#6			#6	4	1.207	119.1
15'	8'-6	2'-3	3'-0	1'-4	4'-2	2	8'-0	16'-0	#8	11"	8'-0	#7	11"	12'-0	#5	11"	7'-9	14	14'-9	#6	11"	#5	5½"	#6			#6	4	1.310	136.9
16'	8'-9	2'-3	3'-0	1'-5	4'-4	2	8'-0	16'-0	#9	12"	10'-6	#7	12"	13'-3	#5	12"	7'-6	15	15'-9	#6	9"	#6	6"	#6			#6	4	1.396	159.8
17'	9'-0	2'-3	3'-0	1'-6	4'-6	2	7'-3	16'-0	#9	11"	11'-0	#7	11"	14'-0	#5	11"	7'-9	16	16'-9	#7	11"	#6	5½"	#5			#6	4	1.485	173.8
18'	9'-3	2'-3	3'-3	1'-8	4'-4	2	6'-3	16'-0	#9	12"	11'-0	#8	12"	13'-9	#6	12"	9'-3	17	17'-9	#7	9"	#7	9"	#5			#6	6	1.604	184.4
19'	9'-9	2'-3	3'-4	1'-9	4'-8	2	5'-9	16'-0	#10	12"	12'-0	#8	12"	14'-9	#6	12"	9'-3	18	18'-9	#7	8"	#7	8"	#5			#6	6	1.721	211.4
20'	10'-0	2'-3	3'-6	1'-10	4'-8	2	5'-3	16'-0	#10	11"	12'-3	#8	11"	15'-3	#6	11"	9'-9	19	19'-9	#7	5½"	#6	5½"	#5			#6	6	1.821	242.3

CASE III – 2:1 SLOPING FILL

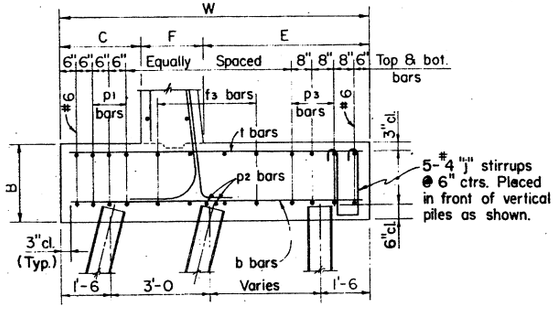
DIMENSIONS						PILE PATTERN			STEEL LIST																				QUANTITIES	
									s1			s2			s3			h	v	b		t		p1	p2	p3	f3			
H	W	B	C	F	E	Type	Sp 1	Sp 2	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Size	Spacing	Size	Size	Size	Number ⊕	Concrete C.Y./Lin.Ft.	Reinforcing Steel Lbs./Lin.Ft.
4'	4'-0	2'-3	1'-3	1'-0	1'-9	1	8'-0		#5	12"	5'-6							3	3'-9	#5	12"	#5	12"				#6		.469	36.9
5'	4'-3	2'-3	1'-6	1'-0	1'-9	1	8'-0		#5	12"	6'-6							4	4'-9	#5	12"	#5	12"	#6*			#6		.524	44.1
6'	4'-6	2'-3	1'-6	1'-0	2'-0	1	8'-0		#5	12"	7'-6							5	5'-9	#5	12"	#5	12"	#6*			#6		.579	46.8
7'	4'-9	2'-3	1'-9	1'-0	2'-0	1	8'-0		#5	12"	8'-6							6	6'-9	#5	12"	#5	12"	#6*			#6		.634	49.5
8'	5'-0	2'-3	1'-9	1'-0	2'-3	1	8'-0		#5	12"	9'-6							7	7'-9	#5	12"	#5	12"	#7			#6		.688	53.8
9'	5'-6	2'-3	2'-0	1'-0	2'-6	1	8'-0		#5	9"	10'-6							8	8'-9	#5	12"	#5	12"	#8			#6		.764	70.5
10'	5'-9	2'-3	2'-0	1'-0	2'-9	1	7'-0		#5	14"	5'-6	#5	14"	13'-6				9	9'-9	#5	12"	#5	12"	#8			#6		.819	74.8
11'	6'-0	2'-3	2'-0	1'-0	3'-0	1	6'-0		#6	12"	6'-0	#5	12"	14'-6				10	10'-9	#5	12"	#5	12"	#8			#6		.874	84.0
12'	6'-6	2'-3	2'-3	1'-0	3'-3	2	8'-0	16'-0	#7	11"	6'-6	#5	11"	15'-6				11	11'-9	#5	11"	#5	11"	#6			#7	2	.949	91.1
13'	6'-9	2'-3	2'-3	1'-1	3'-5	2	8'-0	16'-0	#8	14"	7'-6	#6	14"	16'-6				12	12'-9	#6	14"	#5	7"	#6			#7	2	1.024	104.0
14'	7'-0	2'-3	2'-6	1'-2	3'-4	2	8'-0	16'-0	#8	12"	7'-9	#6	12"	17'-6				13	13'-9	#6	12"	#6	12"	#6			#7	2	1.102	114.0
15'	7'-3	2'-3	2'-6	1'-3	3'-6	2	7'-6	16'-0	#8	12"	8'-0	#7	12"	11'-6	#5	12"	8'-3	14	14'-9	#6	12"	#6	9"	#6			#6	2	1.183	122.5
16'	7'-6	2'-3	2'-6	1'-5	3'-7	2	6'-9	16'-0	#8	11"	8'-3	#7	11"	12'-0	#5	11"	8'-9	15	15'-9	#6	11"	#7	11"	#6			#6	4	1.292	135.7
17'	8'-0	2'-3	2'-9	1'-6	3'-9	2	6'-0	16'-0	#9	13"	9'-9	#8	13"	12'-9	#6	13"	9'-3	16	16'-9	#6	8"	#6	8"	#6			#6	4	1.401	157.6
18'	9'-0	2'-3	3'-0	1'-7	4'-5	3	7'-6	16'-0	#10	13"	10'-9	#8	13"	13'-3	#6	13"	9'-9	17	17'-9	#6	8"	#7	8"	#6	#5	#6	4	1.556	186.2
19'	9'-3	2'-3	3'-3	1'-9	4'-3	3	7'-0	16'-0	#10	12"	11'-3	#8	12"	13'-9	#6	12"	10'-3	18	18'-9	#6	6"	#7	8"	#6	#5	#5	6	1.680	205.5
20'	9'-6	2'-3	3'-3	1'-10	4'-5	3	6'-0	16'-0	#10	11"	11'-9	#8	11"	14'-3	#6	11"	10'-9	19	19'-9	#6	5½"	#7	5½"	#6	#5	#5	6	1.779	236.9

* Top p1 bars Omitted

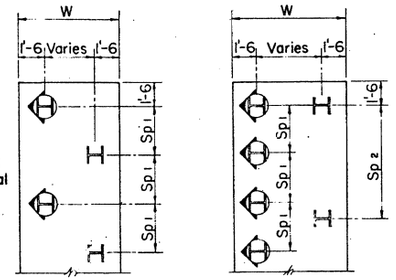
CASE IV – 1½:1 SLOPING FILL

DIMENSIONS						PILE PATTERN			STEEL LIST																				QUANTITIES	
									s1			s2			s3			h	v	b		t		p1	p2	p3	f3			
H	W	B	C	F	E	Type	Sp 1	Sp 2	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Size	Spacing	Size	Size	Size	Number ⊕	Concrete C.Y./Lin.Ft.	Reinforcing Steel Lbs./Lin.Ft.
4'	4'-0	2'-3	1'-6	1'-0	1'-6	1	8'-0		#5	12"	5'-6							3	3'-9	#5	12"	#5	12"				#7		.469	40.2
5'	4'-6	2'-3	1'-6	1'-0	2'-0	1	8'-0		#5	12"	6'-6							4	4'-9	#5	12"	#5	12"	#6*			#7		.545	47.9
6'	5'-0	2'-3	1'-9	1'-0	2'-3	1	8'-0		#5	12"	7'-6							5	5'-9	#5	12"	#5	12"	#7*			#7		.620	52.7
7'	5'-6	2'-3	2'-0	1'-0	2'-6	1	7'-6		#5	11"	8'-6							6	6'-9	#5	12"	#5	12"	#8			#7		.696	66.8
8'	6'-0	2'-3	2'-0	1'-0	3'-0	1	6'-0		#6	10"	9'-6							7	7'-9	#5	12"	#5	12"	#8			#7		.772	76.9
9'	6'-3	2'-3	2'-3	1'-0	3'-3	2	8'-0	16'-0	#6	11"	5'-6	#5	11"	12'-6				8	8'-9	#5	11"	#5	11"	#6			#7	2	.826	78.3
10'	6'-6	2'-3	2'-3	1'-0	3'-3	2	7'-6	16'-0	#7	11"	6'-6	#5	11"	13'-6				9	9'-9	#5	11"	#6	11"	#6			#7	2	.881	89.6
11'	6'-9	2'-3	2'-3	1'-1	3'-5	2	6'-0	16'-0	#8	12"	6'-9	#6	12"	14'-6				10	10'-9	#5	12"	#6	9"	#5			#7	2	.953	100.3
12'	7'-6	2'-3	2'-6	1'-3	3'-9	2	5'-0	16'-0	#8	12"	6'-6	#7	12"	10'-0	#5	12"	6'-9	11	11'-9	#6	12"	#6	8"	#5			#7	4	1.088	115.0
13'	8'-3	2'-3	2'-9	1'-4	4'-2	2	4'-6	16'-0	#9	12"	9'-0	#7	12"	11'-0	#5	12"	6'-9	12	12'-9	#6	9"	#6	6"	#5			#8	4	1.209	147.7
14'	8'-6	2'-3	2'-9	1'-6	4'-3	2	3'-6	16'-0	#9	11"	9'-6	#7	11"	11'-6	#5	11"	7'-3	13	13'-9	#5	5½"	#6	5½"	#5			#8	4	1.313	163.4
15'	9'-0	2'-3	3'-0	1'-8	4'-4	3	5'-0	16'-0	#9	12"	9'-9	#8	12"	11'-9	#6	12"	8'-3	14	14'-9	#7	9"	#8	9"	#5	#5	#6	4	1.445	176.4
16'	9'-6	2'-3	3'-3	1'-9	4'-6	3	4'-3	16'-0	#10	12"	10'-9	#8	12"	12'-9	#6	12"	8'-3	15	15'-9	#6	6"	#7	6"	#5	#5	#6	6	1.557	205.0
17'	10'-0	2'-3	3'-6	1'-11	4'-7	3	4'-0	16'-0	#10	11"	11'-0	#8	11"	13'-3	#6	11"	8'-9	16	16'-9	#6	5½"	#7	5½"	#5	#5	#6	6	1.699	227.7
18'	10'-6	2'-4	3'-6	2'-1	4'-11	3	3'-3	16'-0	#10	10"	11'-3	#8	10"	13'-9	#6	10"	9'-3	17	17'-9	#6	5"	#7	5"	#5	#5	#6	6	1.880	254.7
19'	10'-9	2'-6	3'-9	2'-3	4'-9	3	3'-0	15'-0	#11	10"	12'-0	#8	10"	15'-0	#6	10"	9'-3	18	18'-9	#7	5"	#7	5"	#5	#5	#5	8	2.080	292.3
20'	11'-6	2'-6	4'-0	2'-5	5'-1	3	3'-0	9'-0	#11	10"	12'-6	#9	10"	16'-0	#6	10"	9'-3	19	19'-9	#7	5"	#9	7½"	#5	#5	#5	8	2.269	327.8

⊕ Total number of bars in the cross-section

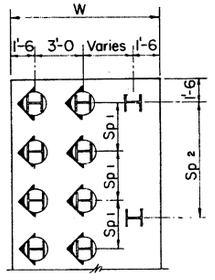


FOOTING STEEL DETAIL



TYPE 1

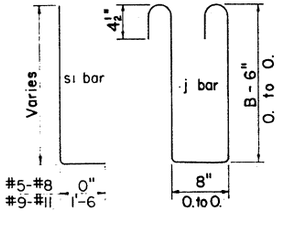
TYPE 2



TYPE 3

H Vertical Pile

Battered Pile



BENDS

NOTES:

All Piles shall be HP10x42 and Material shall conform to ASTM A36. Piling shall be driven to a minimum bearing of 55 tons.
Maximum shear resistance of each pile is assumed to be 20 kips. If the soil immediately below the pile cap is unstable or poorly consolidated, The pile pattern shall be checked.
All h, v, and f3 bars shall be #4 spaced as shown.
See B-18.10 for General Notes and all other Details.
If pile splice is required, see B-19.10 for Details.

DESIGN	DHY	L-73
DRAWN	GFB	L-73
CHECKED	NAB	3-73

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Sl. bars	WCB	12-82
②			
③			

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION

CANTILEVER
RETAINING WALLS
ON STEEL PILES

STANDARD NO.
B-18.30

CASE I – LEVEL FILL

DIMENSIONS						PILE PATTERN			STEEL LIST																			QUANTITIES	
									s1			s2			s3			h	v	b		t		p1	p2	p3	f3		
H	W	B	C	F	E	Type	Sp 1	Sp 2	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Size	Spacing	Size	Size	Size	Number ⊕	Concrete CY./Lin.Ft.	Reinforcing Steel Lbs./Lin.Ft.
4'	4'-0	2'-0	1'-3	1'-0	1'-9	1	8'-0		#5	12"	5'-6							3	3'-9	#5	12"	#5	12"			#6		.432	34.7
5'	4'-3	2'-0	1'-6	1'-0	1'-9	1	8'-0		#5	12"	6'-6							4	4'-9	#5	12"	#5	12"	#6*		#6		.485	41.9
6'	4'-6	2'-0	1'-6	1'-0	2'-0	1	8'-0		#5	12"	7'-6							5	5'-9	#5	12"	#5	12"	#6*		#6		.537	44.6
7'	4'-9	2'-0	1'-9	1'-0	2'-0	1	8'-0		#5	12"	8'-6							6	6'-9	#5	12"	#5	12"	#6*		#6		.590	47.3
8'	5'-0	2'-0	1'-9	1'-0	2'-3	1	8'-0		#5	12"	9'-6							7	7'-9	#5	12"	#5	12"	#6*		#6		.642	50.0
9'	5'-6	2'-0	2'-0	1'-0	2'-6	1	8'-0		#5	12"	10'-6							8	8'-9	#5	12"	#5	12"	#7		#6		.713	60.9
10'	5'-9	2'-0	2'-0	1'-0	2'-9	1	8'-0		#6	12"	11'-6							9	9'-9	#5	12"	#5	12"	#7		#6		.765	68.9
11'	6'-0	2'-0	2'-0	1'-0	3'-0	1	7'-0		#5	13"	5'-6	#5	13"	14'-6				10	10'-9	#5	13"	#5	13"	#7		#6	2	.818	72.9
12'	6'-6	2'-0	2'-3	1'-0	3'-3	1	6'-6		#6	12"	6'-6	#5	12"	15'-6				11	11'-9	#5	12"	#5	12"	#7		#6	2	.890	82.7
13'	6'-9	2'-0	2'-3	1'-0	3'-6	1	5'-6		#7	11"	7'-3	#5	11"	16'-6				12	12'-9	#6	11"	#6	11"	#6		#6	2	.941	97.5
14'	7'-0	2'-0	2'-6	1'-1	3'-5	1	5'-3		#8	14"	7'-9	#6	14"	17'-6				13	13'-9	#5	7"	#6	14"	#6		#6	2	1.015	103.4
15'	7'-3	2'-0	2'-6	1'-2	3'-7	2	8'-0	16'-0	#8	12"	7'-9	#6	12"	18'-6				14	14'-9	#5	12"	#6	12"	#5		#6	2	1.093	107.2
16'	7'-6	2'-0	2'-6	1'-3	3'-9	2	8'-0	16'-0	#8	12"	7'-9	#7	12"	12'-0	#5	12"	8'-9	15	15'-9	#5	9"	#6	9"	#5		#6	4	1.173	122.1
17'	8'-0	2'-0	2'-9	1'-4	3'-11	2	6'-9	16'-0	#8	11"	8'-0	#7	11"	12'-6	#5	11"	9'-3	16	16'-9	#6	11"	#7	11"	#5		#6	4	1.275	135.8
18'	8'-9	2'-0	3'-0	1'-5	4'-4	2	6'-0	16'-0	#9	11"	10'-6	#7	11"	13'-6	#5	11"	9'-3	17	17'-9	#5	5½"	#6	5½"	#5		#6	4	1.398	171.6
19'	9'-3	2'-0	3'-0	1'-7	4'-8	2	5'-3	16'-0	#10	14"	11'-0	#8	14"	13'-9	#6	14"	10'-3	18	18'-9	#6	7"	#7	7"	#5		#6	6	1.536	187.1
20'	9'-6	2'-0	3'-0	1'-8	4'-10	2	4'-9	16'-0	#10	13"	11'-3	#8	13"	14'-3	#6	13"	10'-9	19	19'-9	#6	6½"	#7	6½"	#5		#6	6	1.630	203.4

CASE II – LEVEL FILL WITH 2' SURCHARGE

DIMENSIONS						PILE PATTERN			STEEL LIST																			QUANTITIES	
									s1			s2			s3			h	v	b		t		p1	p2	p3	f3		
H	W	B	C	F	E	Type	Sp 1	Sp 2	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Size	Spacing	Size	Size	Size	Number ⊕	Concrete CY./Lin.Ft.	Reinforcing Steel Lbs./Lin.Ft.
4'	4'-0	2'-0	1'-6	1'-0	1-6	1	8'-0		#5	12"	5'-6							3	3'-9	#5	12"	#5	12*			#6		.432	34.7
5'	4'-6	2'-0	1'-6	1'-0	2'-0	1	8'-0		#5	12"	6'-6							4	4'-9	#5	12"	#5	12"	#6*		#6		.503	42.4
6'	4'-9	2'-0	1'-9	1'-0	2'-0	1	8'-0		#5	12"	7'-6							5	5'-9	#5	12"	#5	12"	#6*		#6		.556	45.1
7'	5'-0	2'-0	1'-9	1'-0	2'-3	1	8'-0		#5	12"	8'-6							6	6'-9	#5	12"	#5	12"	#6*		#6		.608	47.8
8'	5'-6	2'-0	2'-0	1'-0	2'-6	1	8'-0		#5	9"	9'-6							7	7'-9	#5	12"	#5	12"	#7		#6		.679	62.1
9'	5'-9	2'-0	2'-0	1'-0	2'-9	1	7'-6		#5	14"	5'-0	#5	14"	12'-6				8	8'-9	#5	12"	#5	12"	#7		#6		.732	66.1
10'	6'-3	2'-0	2'-3	1'-0	3'-0	1	7'-0		#5	11"	5'-6	#5	11"	13'-6				9	9'-9	#5	11"	#5	11"	#7		#6	2	.803	76.7
11'	6'-6	2'-0	2'-3	1'-0	3'-3	1	6'-0		#7	12"	7'-0	#5	12"	14'-6				10	10'-9	#5	9"	#5	9"	#7		#6	2	.855	89.2
12'	7'-3	2'-0	2'-6	1'-1	3'-8	1	5'-3		#8	14"	7'-3	#6	14"	15'-6				11	11'-9	#5	7"	#5	7"	#6		#6	2	.963	101.6
13'	7'-6	2'-0	2'-6	1'-2	3'-10	1	4'-6		#8	12"	7'-9	#6	12"	16'-6				12	12'-9	#5	6"	#6	9"	#6		#6	4	1.037	117.5
14'	8'-0	2'-0	2'-9	1'-3	4'-0	2	8'-0	16'-0	#8	13"	8'-0	#7	13"	11'-9	#5	13"	7'-0	13	13'-9	#6	13"	#6	6½"	#5		#6	4	1.133	121.6
15'	8'-6	2'-0	2'-0	2'-9	1'-4	2	7'-0	16'-0	#8	11"	8'-0	#7	11"	12'-0	#5	11"	7'-9	14	14'-9	#6	11"	#6	5½"	#5		#6	4	1.232	141.1
16'	8'-9	2'-0	3'-0	1'-5	4'-4	2	6'-0	16'-0	#9	12"	10'-6	#7	12"	13'-3	#5	12"	7'-6	15	15'-9	#6	9"	#7	9"	#5		#6	4	1.315	153.6
17'	9'-0	2'-0	3'-0	1'-6	4'-6	2	5'-6	16'-0	#9	11"	11'-0	#7	11"	14'-0	#5	11"	7'-9	16	16'-9	#7	11"	#8	11"	#5		#6	4	1.401	169.6
18'	9'-3	2'-0	3'-3	1'-8	4'-4	2	5'-0	16'-0	#9	12"	11'-0	#8	12"	13'-9	#6	12"	9'-3	17	17'-9	#7	8"	#7	8"	#5		#6	6	1.519	189.2
19'	9'-6	2'-0	3'-3	1'-9	4'-6	2	4'-6	16'-0	#10	12"	12'-0	#8	12"	14'-9	#6	12"	9'-3	18	18'-9	#7	8"	#8	9"	#5		#6	6	1.613	212.5
20'	10'-0	2'-0	3'-6	1'-10	4'-8	2	4'-3	16'-0	#10	11"	12'-3	#8	11"	15'-3	#6	11"	9'-9	19	19'-9	#7	5½"	#7	5½"	#5		#6	6	1.728	252.4

CASE III – 2:1 SLOPING FILL

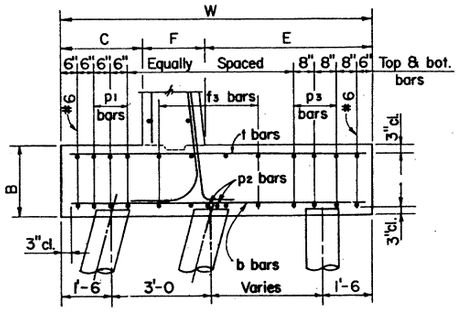
DIMENSIONS						PILE PATTERN			STEEL LIST																			QUANTITIES	
									s1			s2			s3			h	v	b		t		p1	p2	p3	f3		
H	W	B	C	F	E	Type	Sp 1	Sp 2	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Size	Spacing	Size	Size	Size	Number ⊕	Concrete CY./Lin.Ft.	Reinforcing Steel Lbs./Lin.Ft.
4'	4'-0	2'-0	1'-3	1'-0	1'-9	1	8'-0		#5	12"	5'-6							3	3'-9	#5	12"	#5	12"			#6		.432	34.7
5'	4'-3	2'-0	1'-6	1'-0	1'-9	1	8'-0		#5	12"	6'-6							4	4'-9	#5	12"	#5	12"	#6*		#6		.485	41.9
6'	4'-6	2'-0	1'-6	1'-0	2'-0	1	8'-0		#5	12"	7'-6							5	5'-9	#5	12"	#5	12"	#6*		#6		.537	44.6
7'	4'-9	2'-0	1'-9	1'-0	2'-0	1	8'-0		#5	12"	8'-6							6	6'-9	#5	12"	#5	12"	#6*		#6		.590	47.3
8'	5'-0	2'-0	1'-9	1'-0	2'-3	1	8'-0		#5	12"	9'-6							7	7'-9	#5	12"	#5	12"	#7		#6		.642	51.6
9'	5'-6	2'-0	2'-0	1'-0	2'-6	1	7'-6		#5	9"	10'-6							8	8'-9	#5	12"	#5	12"	#7		#6		.713	64.6
10'	5'-9	2'-0	2'-0	1'-0	2'-9	1	6'-0		#5	14"	5'-6	#5	14"	13'-6				9	9'-9	#5	12"	#5	12"	#7		#6		.765	68.6
11'	6'-0	2'-0	2'-0	1'-0	3'-0	1	5'-0		#6	12"	6'-0	#5	12"	14'-6				10	10'-9	#5	12"	#5	12"	#6		#6		.818	74.1
12'	6'-6	2'-0	2'-3	1'-0	3'-3	2	8'-0	16'-0	#7	11"	6'-6	#5	11"	15'-6				11	11'-9	#5	11"	#6	11"	#6		#7	2	.890	93.0
13'	6'-9	2'-0	2'-3	1'-1	3'-5	2	8'-0	16'-0	#8	14"	7'-6	#6	14"	16'-6				12	12'-9	#6	14"	#5	7"	#6		#7	2	.961	102.9
14'	7'-0	2'-0	2'-6	1'-2	3'-4	2	7'-6	16'-0	#8	12"	7'-9	#6	12"	17'-6				13	13'-9	#6	12"	#5	6"	#6		#7	2	1.037	116.7
15'	7'-3	2'-0	2'-6	1'-3	3'-6	2	6'-3	16'-0	#8	12"	8'-0	#7	12"	11'-6	#5	12"	8'-3	14	14'-9	#6	12"	#5	6"	#5		#6	2	1.116	119.2
16'	7'-6	2'-0	2'-6	1'-5	3'-7	2	5'-3	16'-0	#8	11"	8'-3	#7	11"	12'-0	#5	11"	8'-9	15	15'-9	#6	11"	#7	11"	#5		#6	4	1.222	131.8
17'	8'-0	2'-0	2'-9	1'-6	3'-9	2	4'-6	16'-0	#9	13"	9'-9	#8	13"	12'-9	#6	13"	9'-3	16	16'-9	#7	10"	#7	10"	#5		#6	4	1.327	156.7
18'	9'-0	2'-0	3'-0	1'-7	4'-5	3	6'-0	16'-0	#10	13"	10'-9	#8	13"	13'-3	#6	13"	9'-9	17	17'-9	#6	6½"	#7	6½"	#5	#5	#6	4	1.472	192.8
19'	9'-3	2'-0	3'-3	1'-9	4'-3	3	6'-0	16'-0	#10	12"	11'-3	#8	12"	13'-9	#6	12"	10'-3	18	18'-9	#6	6"	#7	6"	#5	#5	#6	6	1.594	213.3
20'	10'-0	2'-0	3'-6	1'-10	4'-8	3	5'-9	16'-0	#10	11"	11'-9	#8	11"	14'-3	#6	11"	10'-9	19	19'-9	#6	5½"	#7	5½"	#5	#5	#6	6	1.728	239.6

* Top p1 bars Omitted

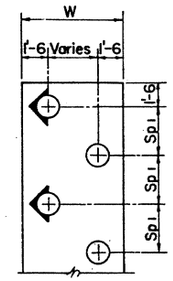
CASE IV – 1½:1 SLOPING FILL

DIMENSIONS						PILE PATTERN			STEEL LIST																			QUANTITIES	
									s1			s2			s3			h	v	b		t		p1	p2	p3	f3		
H	W	B	C	F	E	Type	Sp 1	Sp 2	Size	Spacing	Length	Size	Spacing	Length	Size	Spacing	Length	Number ⊕	Length	Size	Spacing	Size	Spacing	Size	Size	Size	Number ⊕	Concrete CY./Lin.Ft.	Reinforcing Steel Lbs./Lin.Ft.
4'	4'-0	2'-0	1'-6	1'-0	1'-6	1	8'-0		#5	12"	5'-6							3	3'-9	#5	12"	#5	12"			#6		.432	34.7
5'	4'-6	2'-0	1'-6	1'-0	2'-0	1	8'-0		#5	12"	6'-6							4	4'-9	#5	12"	#5	12"	#6*		#7		.503	45.7
6'	5'-0	2'-0	1'-9	1'-0	2'-3	1	8'-0		#5	12"	7'-6							5	5'-9	#5	12"	#5	12"	#6*		#7		.574	48.9
7'	5'-6	2'-0	2'-0	1'-0	2'-6	1	6'-0		#5	11"	8'-6							6	6'-9	#5	12"	#5	12"	#6		#6		.645	54.2
8'	6'-0	2'-0	2'-0	1'-0	3'-0	1	4'-9		#6	10"	9'-6							7	7'-9	#5	12"	#5	12"	#6		#6		.716	63.8
9'	6'-3	2'-0	2'-0	1'-0	3'-3	2	7'-0	16'-0	#6	11"	5'-6	#5	11"	12'-6				8	8'-9	#5	11"	#5	11"	#5		#7	2	.769	74.4
10'	6'-6	2'-0	2'-3	1'-0	3'-3	2	5'-9	16'-0	#7	11"	6'-6	#5	11"	13'-6				9	9'-9	#5	11"	#6	11"	#5		#7	2	.821	85.7
11'	7'-0	2'-0	2'-6	1'-1	3'-5	2	4'-9	16'-0	#8	12"	6'-9	#6	12"	14'-6				10	10'-9	#5	9"	#6	9"	#5		#7	2	.909	102.2
12'	7'-6	2'-0	2'-6	1'-3	3'-9	2	4'-0	16'-0	#8	12"	6'-6	#7	12"	10'-0	#5	12"	6'-9	11	11'-9	#6	9"	#7	9"	#5		#8	4	1.019	124.5
13'	8'-3	2'-0	2'-6	1'-4	4'-5	2	3'-3	16'-0	#9	12"	9'-0	#7	12"	11'-0	#5	12"	6'-9	12	12'-9	#6	9"	#8	9"	#5		#8	4	1.133	150.9
14'	8'-6	2'-0	2'-9	1'-6	4'-3	2	3'-0	6'-0	#9	11"	9'-6	#7	11"	11'-6	#5	11"	7'-3	13	13'-9	#7	9"	#8	9"	#5		#6	4	1.235	161.2
15'	9'-0	2'-0	3'-0	1'-8	4'-4	3	3'-9	16'-0	#9	12"	9'-9	#8	12"	11'-9	#6	12"	8'-3	14	14'-9	#7	9"	#7	6"	#5	#5	#6	4	1.361	179.8
16'	9'-3	2'-0	3'-3	1'-9	4'-3	3	3'-6	16'-0	#10	12"	10'-9	#8	12"	12'-9	#6	12"	8'-3	15	15'-9	#8	9"	#7	6"	#5	#5	#6	6	1.451	207.0
17'	9'-9	2'-0	3'-3	1'-11	4'-7	3	3'-0	16'-0	#10	11"	11'-0	#8	11"	13'-3	#6	11"	8'-9	16	16'-9	#8	8"	#9	8"	#5	#5	#6	6	1.588	237.3
18'	10'-3	2'-1	3'-6	2'-1	4'-8	3	3'-0	7'-0	#10	10"	11'-3	#8	10"	13'-9	#6	10"	9'-3	17	17'-9	#8	6"	#8	6"	#5	#5	#5	6	1.763	269.8

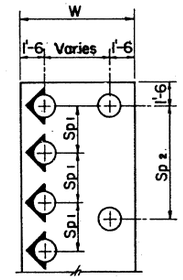
⊕ Total number of bars in the cross-section.



FOOTING STEEL DETAIL



TYPE 1



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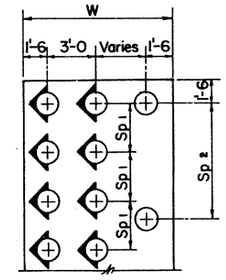

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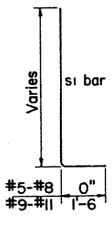


BEND

⊕ Vertical Pile

⊕ Battered Pile

NOTES:

All Piles shall be 14"⊕ Cast-in-place or Precast Concrete, see B-20.10. Piling shall be driven to a minimum bearing of 45 tons.

Maximum shear resistance of each pile is assumed to be 15 kips. If the soil immediately below the pile cap is unstable or poorly consolidated, The pile pattern shall be checked.

All h, v, and f3 bars shall be #4 spaced as shown.

See B-18.10 for General Notes and all other Details.

NO.	DESCRIPTION OF REVISIONS	DATE	MADE BY
①			
②			
③			

DESIGN —
DRAWN RDS 1-73
CHECKED NAB 2-73
DHY 3-73

DESIGN APPROVED K.C. Brechler

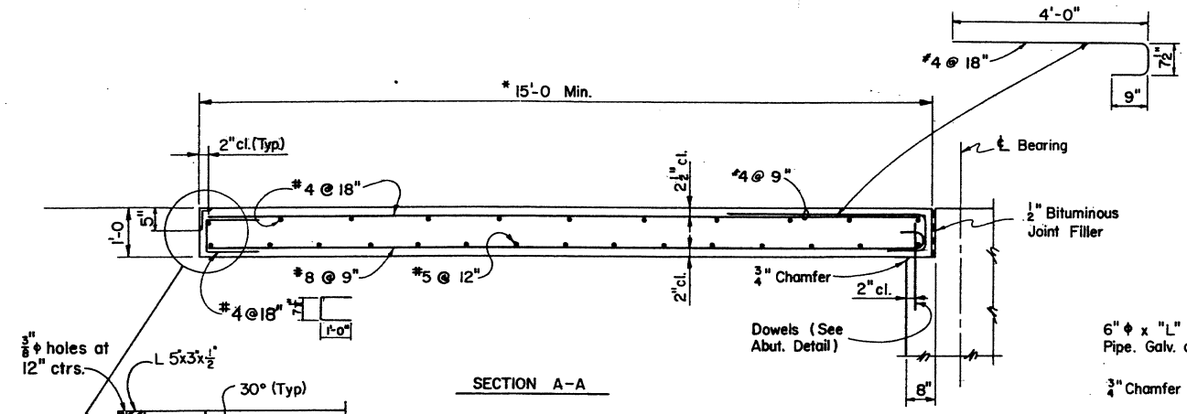
APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS

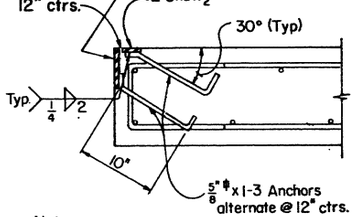
CANTILEVER RETAINING WALLS ON CONCRETE PILES

REVISION

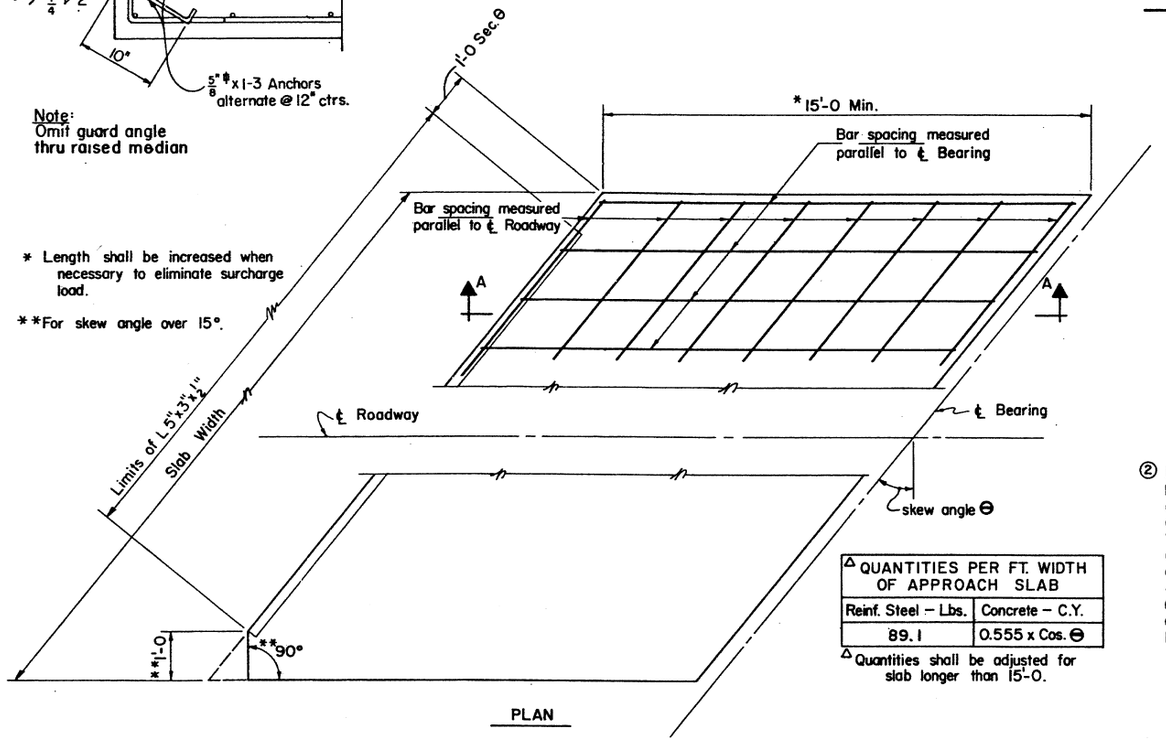
STANDARD NO. B-18.40



SECTION A-A



Note:
Omit guard angle thru raised median



PLAN

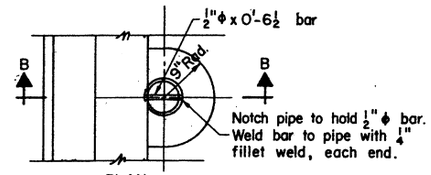
* Length shall be increased when necessary to eliminate surcharge load.

** For skew angle over 15°.

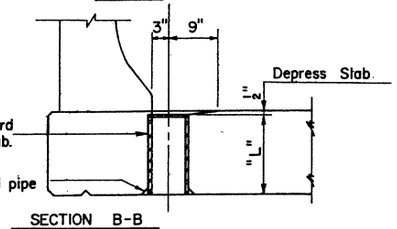
△ QUANTITIES PER FT. WIDTH OF APPROACH SLAB	
Reinf. Steel – Lbs.	Concrete – C.Y.
89.1	0.555 x Cos. θ

△ Quantities shall be adjusted for slab longer than 15'-0.

APPROACH SLAB

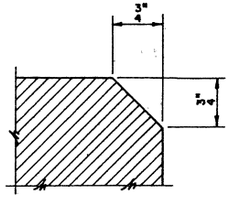


PLAN



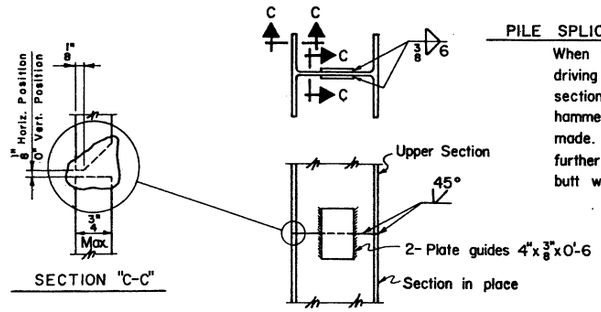
SECTION B-B

ROADWAY DRAIN DETAIL



Chamfer all exposed corners thus unless otherwise noted. This note applicable to all sheets pertaining to the structure.

CHAMFER DETAIL



SECTION "C-C"

PILE SPLICE DETAIL

PILE SPLICE NOTE

When piling is to be spliced for further driving, upper section shall be lowered on section in place and tapped lightly with hammer to full bearing before butt welds are made. When piling is to be extended without further driving, omit guide plates and make butt welds continuous across web.

② PILE POINT NOTE – (only when required).
Manufactured pile points shall be attached by means of a single bevel groove weld across the full width of each exterior face of the flanges of the pile.
The flanges of the pile shall be prepared by flame cutting a 45 degree bevel at the bottom edge of each exterior face of flanges. —
45 degree bevel size shall be ½ the flange thickness. Groove welds shall be $\frac{5}{16}$" for all HP piles 8" thru 14", except HP 13 X 100 and HP 14 X 102 shall be ⅜" and HP 14 X 117 shall be $\frac{7}{16}$".

GENERAL NOTES

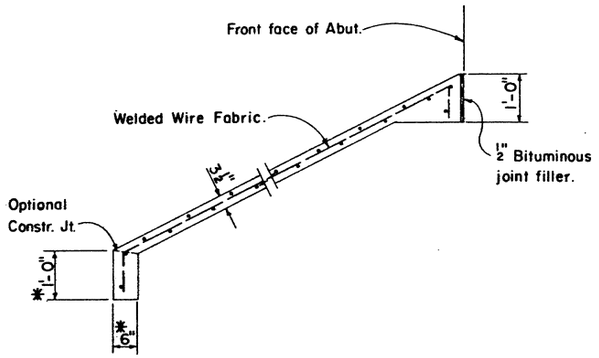
Concrete shall be class "S" f'_c = 3000 psi
Reinforcing steel shall conform to ASTM Spec. A615.
Bar sizes #6 and smaller shall be Gr. 40 or Gr. 60; f_s=20000 psi
Bar sizes #7 and larger shall be Grade 60; f_s=24000 psi
Welding shall conform to American Welding Society Specifications For Structural Welding, latest edition.
Roadway drains shall conform to A.S.T.M. Specifications A53, type S, grade "B". Galvanize after fabrication in accordance with A.S.T.M. Specifications A123.

① NOTES
Structural steel shall conform to ASTM Specification A36.
Paint and painting shall conform to Std. Specifications. Contact surfaces shall not be painted. Structural steel - Shop - 1 coat paint #1, #2 and #3. No field paint required.

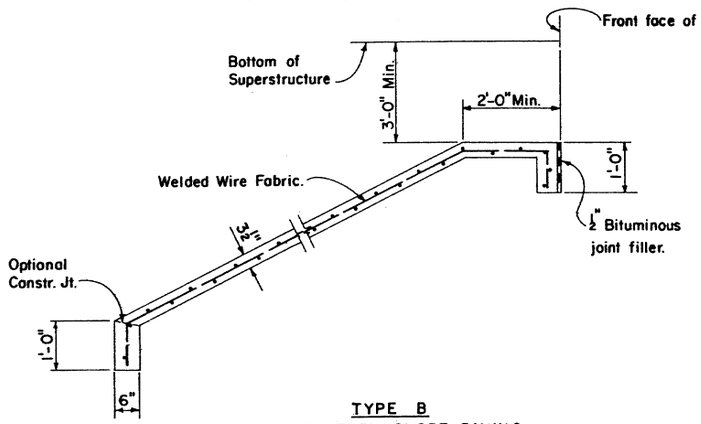
DESIGN	JBS	2-73
DRAWN	RDS	3-73
CHECKED	NAB, DHY	3-73

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Added Struct. steel & painting note	J.T.W	7-76
②	Added Pile Point Note	WEB	2-81
③	Stud alternate added & chg. steel not	WEB	2-82
④	Stud alt. removed & sheared slab angle	JEM	2-85
⑤	Section C-C Reinf. Qc.	JEM	10-86
⑥			

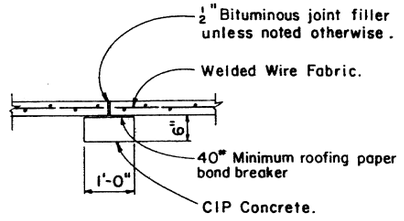
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION 10-86
APPROVED FOR DISTRIBUTION	MISCELLANEOUS DETAILS FOR BRIDGES	STANDARD NO. B-19.10



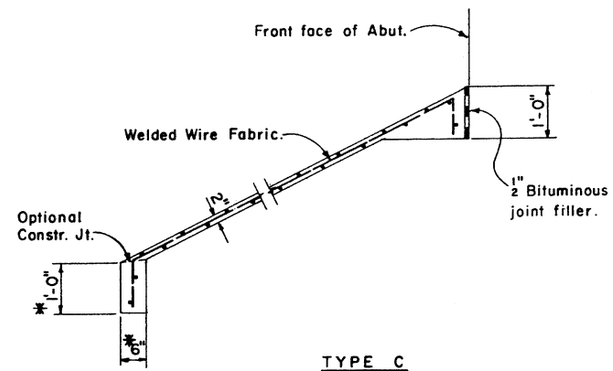
TYPE A
SECTION THRU SLOPE PAVING
Scale: ¾" = 1'-0"



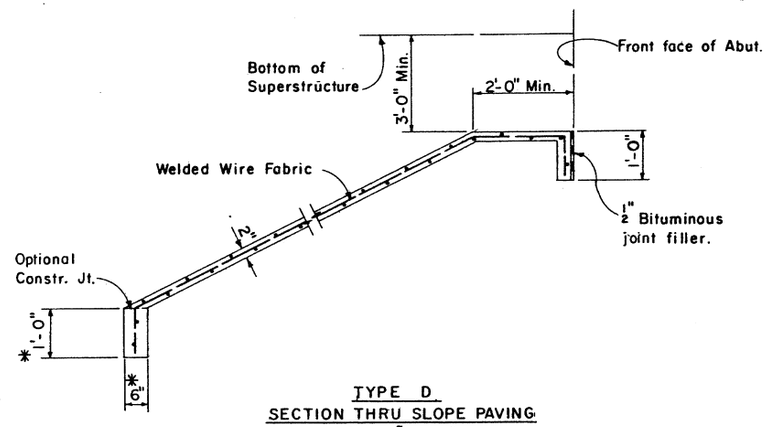
TYPE B
SECTION THRU SLOPE PAVING
Scale: ¾" = 1'-0"



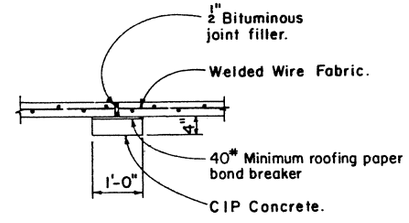
TYPE A & B
TYPICAL CONSTRUCTION JOINT
Scale: ¾" = 1'-0"



TYPE C
SECTION THRU SLOPE PAVING
Scale: ¾" = 1'-0"



TYPE D
SECTION THRU SLOPE PAVING
Scale: ¾" = 1'-0"



TYPE C & D
TYPICAL CONSTRUCTION JOINT
Scale: ¾" = 1'-0"

GENERAL NOTES

All slopes shall be paved as shown on the Location Plan.
Construction Joints thru paving shall be located at intervals of 20'-0" maximum or as directed by the Engineer.

TYPE A and TYPE B
Concrete for slopes shall be Class 'B', with 6x6 - W1.4 x W1.4 welded wire fabric reinforcing. Maximum size of coarse agregate shall be ¾".

TYPE C and TYPE D
Paving shall be 2" shotcrete, wet mix process, With 6x6 - W1.4 x W1.4 welded wire fabric.

* Dimensions shown are minimum. Cutoff wall depth and thickness may be increased, as shown on plans, to accommodate conditions and terrain.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Roofing paper callout	J.E.M.	10-86
②			
③			

DESIGN	W.E.B.	12-82
DRAWN	W.E.B.	12-82
CHECKED	N.A.B.	

6567 CHARLES DENNIS GREGG Registered ARIZONA U.S.A.

DESIGN APPROVED

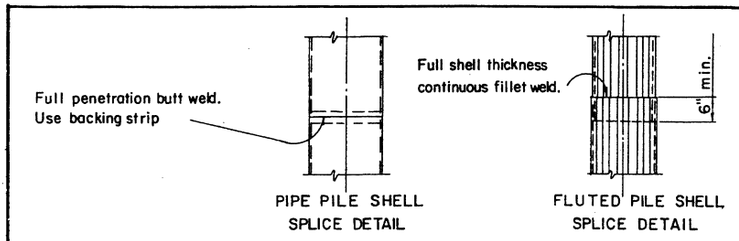
APPROVED FOR DISTRIBUTION

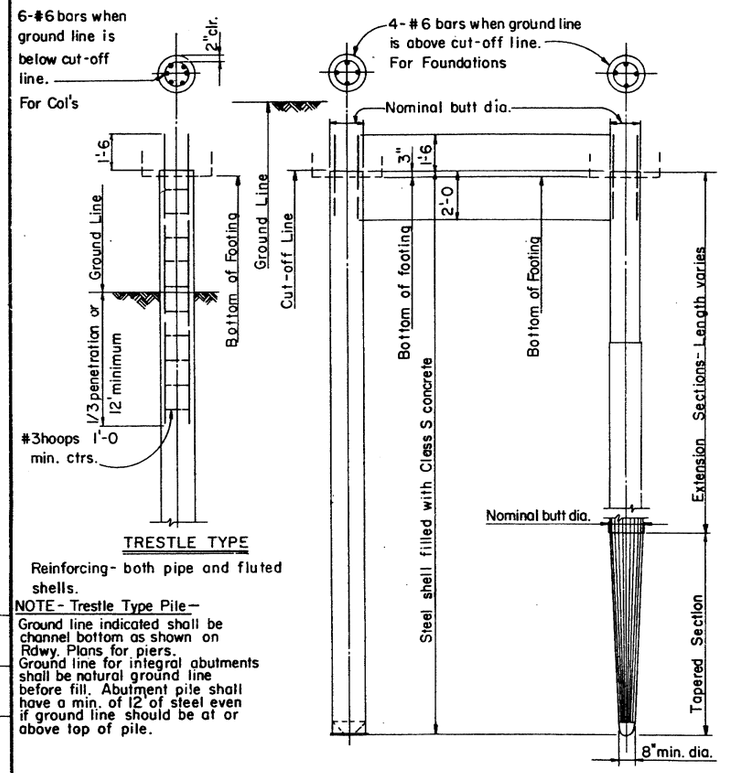
ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

SLOPE PAVING
DETAILS

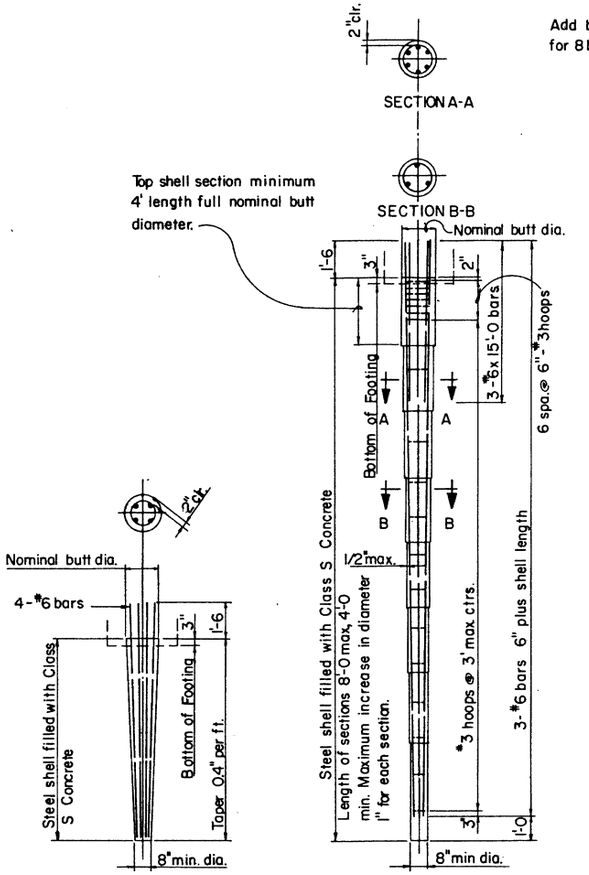
REVISION 10-86

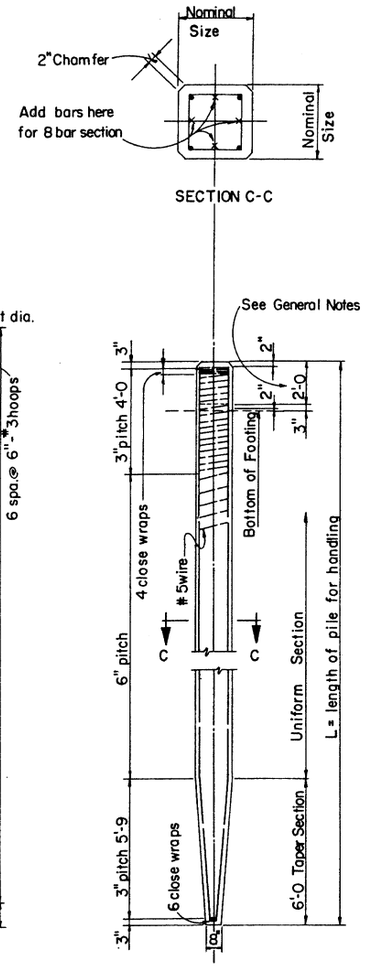
STANDARD NO. B-19.20





NOTE - Trestle Type Pile —
Ground line indicated shall be channel bottom as shown on Rdwy. Plans for piers. Ground line for integral abutments shall be natural ground line before fill. Abutment pile shall have a min. of 12" of steel even if ground line should be at or above top of pile.





GENERAL NOTES

PRECAST AND CAST-IN-PLACE PILES

Design - AASHTO Standard Specifications for Highway Bridges 1977.

Construction - Arizona Departament of Transportation Standard Specification 1982, revised to date.

Reinforcing Steel shall conform to ASTM Spec. A 615.
Bar sizes #6 and smaller shall be Grade 40, f_s = 20 000psi.
Bar sizes #7 and larger shall be Grade 60, f_s = 24 000 psi.
Spiral reinforcing shall be cold drawn wire conforming to ASTM Spec. A82.

PRECAST PILES

Precast piles shall be cast 2'-0 longer than net required length, or approved driving head provided. After driving to a depth satisfactory to the Engineer, the excess length shall be trimmed off to 3" above the bottom of the footing and the pile edges beveled. Vertical reinforcement shall be cut off to provide 1'-6 embedment. If extended pile is to be driven further, the longitudinal steel shall be lapped 40 diameters for the splice. Concrete for precast piles shall be Class S, internally vibrated.

CAST-IN-PLACE PILES

Contractor shall be responsible for furnishing shells and waterproof end closure of sufficient strength to drive without distortion, damage or leakage. Type of end closure shall be chosen by contractor to suit driving conditions, and shall not exceed shell diameter plus 1/2". Shells shall be driven only with manufacturer's standard driving head and, if necessary, with a driving mandrel.

Mill inspection of all shells shall conform to current Standard Specifications.

All shells shall be filled to cut off elevation with Class S concrete internally vibrated. (f'_c = 3000 psi)

Trestle bent piles shall have a minimum butt diameter of 14".

All pile material shall be new or unused.

PRECAST PILE PICK-UP NOTE: Pick-up points shall be plainly marked on all piles after removal of forms unless special lifting devices are attached for pick-up and all lifting shall be done at these points.

The use of special embedded or attached lifting devices, the employment of other pick-up points or any other method of pick-up shall be subject to approval by the Engineer.

CAST - IN - PLACE CONCRETE PILES

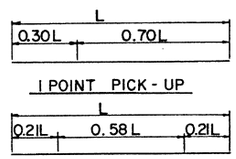
CAST - IN - PLACE CONCRETE PILES

Type of shell	Min. shell thickness	Pile Shell Specifications
Pipe	.164 in.	ASTM A252 - 50,000 psi min. Ult.
Fluted	9 guage	SAE 1010 or 1015 - 50,000 psi min. Ult.
Mandrel Driven	18 guage	Manufacturer's standard sheet steel.

PRECAST CONCRETE PILES

PRECAST CONCRETE PILES

Pile Size	No. of Bars & Size	Approx. Wt. per Lin. Ft.	Area of nominal cross-sect	Max. Length L for 1 point pick-up	Max. Length L for 2 point pick-up
14"	4 - #8	205#	196 #"	44'	66'
16"	4 - #9	265	256	46	70
18"	8 - #7	335	324	49	74



NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Chg. conc. class	WEB	2-82

DESIGN	CAG	1-73
DRAWN	WO	3-73
CHECKED		

DESIGN APPROVED R.C. Brechler

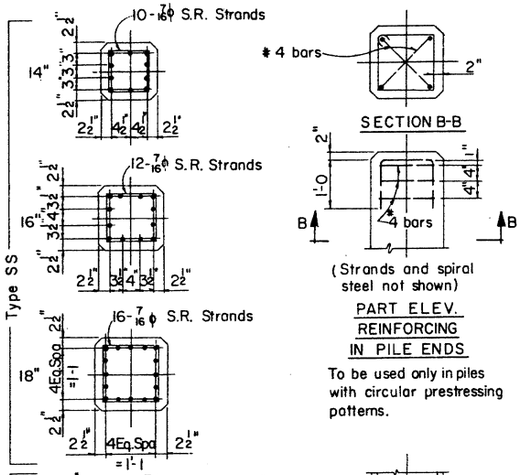
APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS

PRECAST AND CAST-IN-PLACE CONCRETE PILES

REVISION

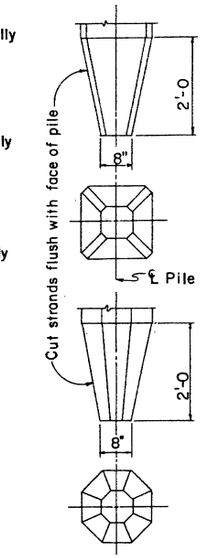
STANDARD NO. B-20.10



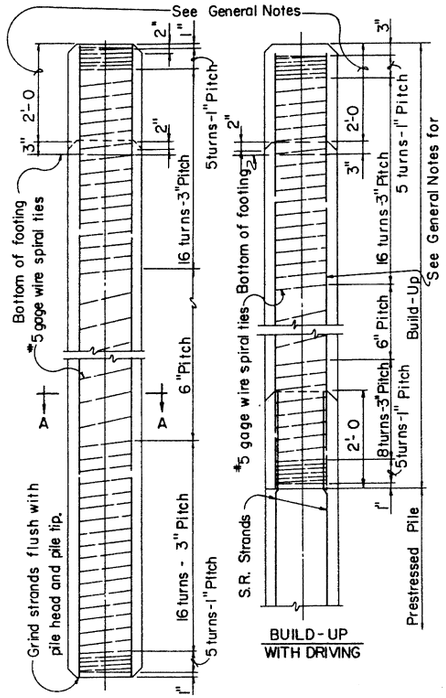
SECTIONS A-A

PART ELEV.
REINFORCING
IN PILE ENDS

To be used only in piles with circular prestressing patterns.

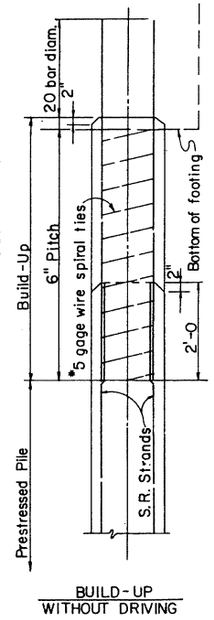


ALTERNATE PILE TIPS



ELEVATION

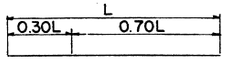
BUILD-UP WITH DRIVING



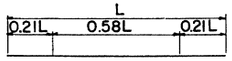
BUILD-UP WITHOUT DRIVING

PILE PICK-UP NOTE: Pick-up points shall be plainly marked on all piles after removal of the forms unless special lifting devices are attached for pick-up and all lifting shall be done at these points.

The use of special embedded or attached lifting devices, the employment of other pick-up points or any other method of pick-up shall be subject to approval by the Engineer.



1 POINT PICK-UP



2 POINT PICK-UP

GENERAL NOTES

DESIGN -AASHTO Standard Specifications For Highway Bridges 1977.

CONSTRUCTION- Standard Specifications of the Ariz. Dept. of Transportation Edition 1982. All construction Specifications for precast concrete piling shall apply except as otherwise noted here.

CONCRETE- Concrete in the prestressed pile shall be Class S and shall have a minimum compressive cylinder strength (f'c) of 5000 psi at 28 days. Compressive cylinder strength at transfer of prestressing force shall be not less than 4000 psi. Piles may be removed from casting bed to nearby storage anytime after transfer of stress. Shipment from plant site or driving will not be permitted until full compressive cylinder strength is reached. Concrete in Build-Ups shall be Class 'S' internally vibrated having a minimum compressive cylinder strength (f'c) of 2800 psi at 28 days. Build-Ups with driving shall have reached full compressive cylinder strength before driving starts.

MILD STEEL REINFORCING- Spiral reinforcement shall be cold drawn wire conforming to ASTM, A-82. All other mild reinforcement shall be in accordance with ASTM, A-615 Grade 40.

PRESTRESSING REINFORCING - Seven-wire stress relieved strand conforming to the requirements of ASTM, A-416 shall be used. In general the unit prestress after losses shall not exceed 0.2 f'c. Initial tension in strands before release shall be as follows:

3/8"φ Strands – 14,000#
7/16"φ Strands – 18,900#
1/2"φ Strands – 25,200#

The unit prestress after losses shall be not less than 700 psi.

TOLERANCES- Pile ends shall be plane surfaces and perpendicular to axis of pile. The maximum sweep (deviation from straightness measured along two perpendicular faces of the pile, while not subject to bending forces) shall not exceed 1/8" in any 10' of its length, 3/8" in any 40' or 3/16"x (total length in ft.) ÷ 20 feet.

BUILD-UPS- Build-ups as detailed may be used only if specified or authorized by the Engineer. Attachment of the build-up to the pile shall be by the same methods given for pile heads except that edges need not be beveled. If the joint is subject to conditions which would cause deterioration, suitable steps satisfactory to the Engineer shall be taken to protect the joint. The minimum area of vertical reinforcing steel shall be 1-1/2 % of the gross cross-section of concrete. Bars shall be placed in a symmetrical pattern of not less than four bars.

PILE HEADS- Prestressed piles shall be cast 2'-0 longer than net required length. After driving to a depth satisfactory to the Engineer the excess length shall be cut off on a plane normal to the axis of the pile and the pile edges beveled. Prestressing strands shall be cut off to provide 2'-0 embedment into cap, footing or build-up. Any concrete at the pile head damaged below cut off elevation in driving shall be removed to solid material and built-up to cut off elevation. If the pile head is a built-up section, it shall be trimmed same as a pre-stressed section and the vertical bars cut off to provide 20 diameters embedment into the cap or footing.

FORMS- The use of steel forms on concrete founded casting beds is required unless otherwise approved in advance by the Engineer. Outer forms shall enclose all except top horizontal surface. The side forms may have a maximum draft on each side not exceeding 1/4" per foot. All corners shall be chamfered to 1-1/2" or rounded to 2" radius. Forms for piles shall be such as to avoid the formation of fins at intersection of surfaces. Top of concrete casting shall be given a uniformly smooth finish to match the finish surface of the formed sides.

SQUARE PILE PROPERTIES

Pile Size	No. and size of S.R. Strands		Unit Prestress after losses		Approx. Wt per Lin. Ft.	Area of nominal cross-section	Section modulus of cross-section	Max. Lgth "L" * 1 Point Pick-Up		Max Lgth "L" * 2 Point Pick-Up	
	Square Pattern	Circular Pattern	Square Pattern	Circular Pattern				Square Pattern	Circular Pattern	Square Pattern	Circular Pattern
14	10-7/16φ	10-7/16φ	771psi	771psi	205*	196 in²	457 in³	57'	57'	82'	82'
16	12-7/16φ	12-7/16φ	709	709	265	256	683	60	60	85	85
18	16-7/16φ	15-7/16φ	747	700	335	324	972	64	63	92	90

*The length "L" is the distance end to end of pile including alternate pile tip used. Tabulated lengths may be used for minimum pick-up lengths when the concrete has attained a compressive cylinder strength of 5,000 psi. If piles are picked up when the concrete strength is less than 5,000 psi, the maximum pick-up length shall be the tabulated length reduced by 3%.

OCTAGON PILE PROPERTIES

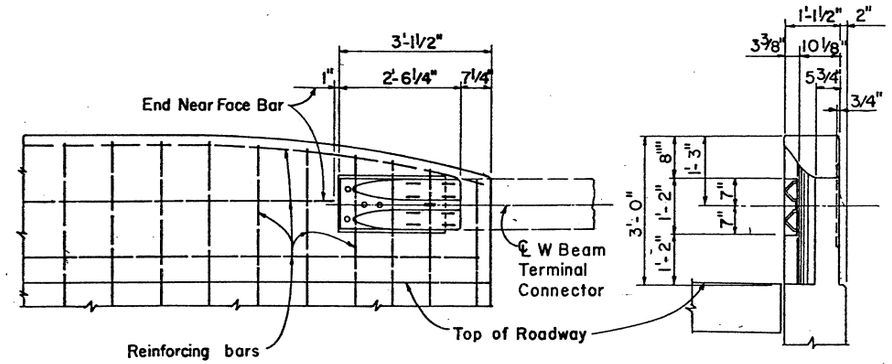
Pile Size	No. & size of S.R. Strands	Unit Pre-stress after losses	Approx. Wt. per Lin. Ft.	Area of nominal cross sect.	Section modulus of cross sect.	Max. lgth "L" * 1 point pick-up	Max. lgth "L" * 2 point pick-up
14	8-7/16φ	747 psi	170*	162 in²	301 in³	50'	72'
16	11-7/16φ	785	220	212	449	55	78
18	13-7/16φ	733	280	268	639	57	81

R.C. Brechler

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
APPROVED FOR DISTRIBUTION	PRESTRESSED CONCRETE PILES	STANDARD NO. B-20.20

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Changed Notes	WCB.	12-82
②			
③			
④			

DESIGN
DRAWN CAG 1-73
CHECKED WO 3-73

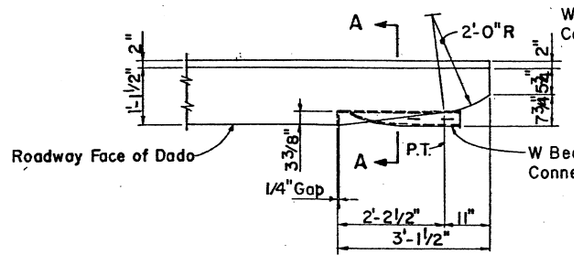


ROADWAY ELEVATION

Showing W Beam Terminal Connector
Scale: 3/4"= 1'- 0"

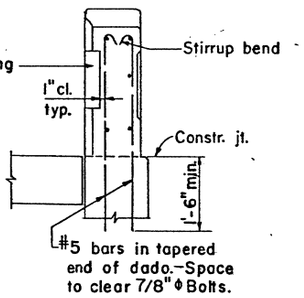
END ELEVATION OF DADO

Scale: 3/4"= 1'- 0"



PLAN OF DADO

Showing W Beam Terminal Connector
Scale: 3/4"= 1'- 0"



SECTION A-A

Scale: 3/4"= 1'-0"

GENERAL NOTES.

All dadoes shall be provided with Guard Rail connections for structures carrying two way traffic.

Only dadoes at the approach end shall be provided with Guard Rail connections for structures carrying one way traffic.

For dadoes without Guard Rail connections the inside face of dado shall be similar to the outside face.

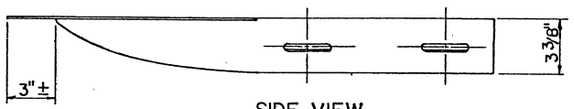
Connect W Beam Terminal Connector to dado with 7/8"℄ high strength bolts set in internally threaded tubular expansion anchors having an externally slit expansion element and a single cone expander. Tensile proof test load in 2500psi concrete shall be 6500 Lbs. or more.

The W Beam Terminal Connector shall be 10 gage steel and galvanized after fabrication in accordance with A.S.T.M. Spec's A123.

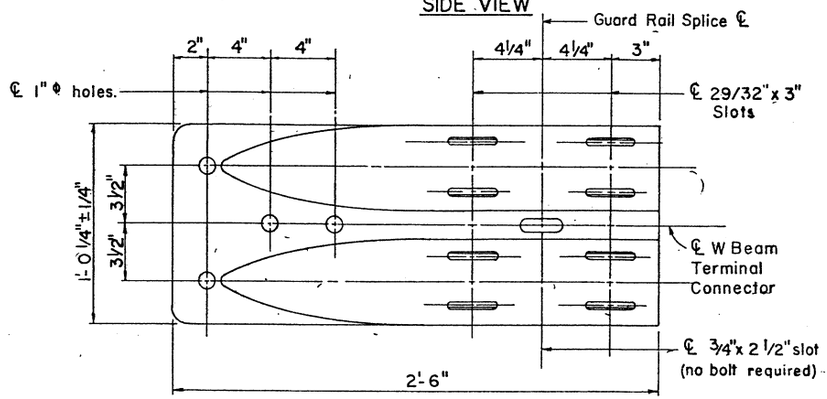
For all other dado details, see Abutment Sheets.

The W Beam Terminal Connector shall be furnished and installed with roadway approach guardrail.

The 7/8"℄ high strength bolts shall be galvanized in accordance with A.S.T.M. Spec's A153.



SIDE VIEW



PLAN
W BEAM TERMINAL CONNECTOR

Scale: 3"= 1'- 0"

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Changed End Shoe to Term. Conn.	JEM	2-85

DESIGN	M.A.H.	11-69
DRAWN		
CHECKED		

DESIGN APPROVED
R.C. Buchler

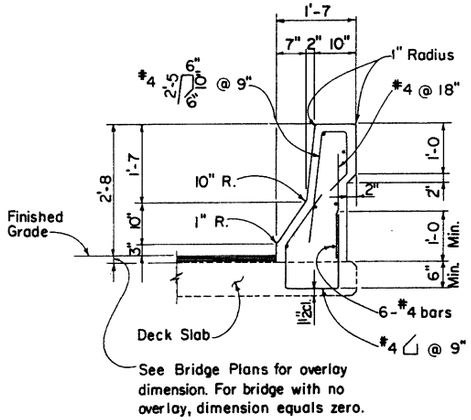
APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

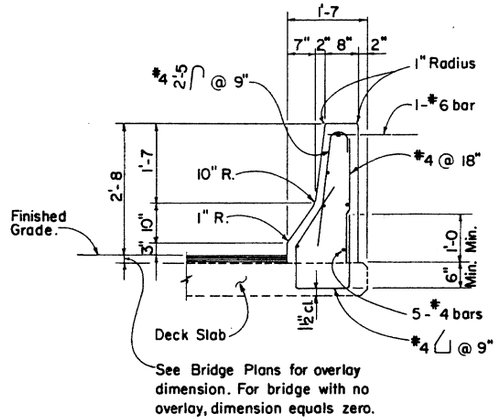
W BEAM TERMINAL CONNECTOR
DADO CONNECTION

REVISION 6/85

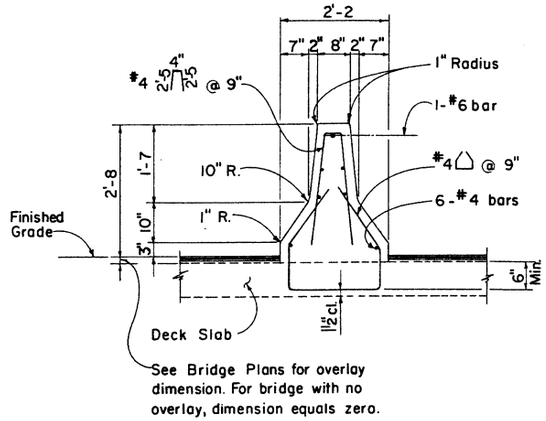
STANDARD NO. B-21.10



TYPE A



TYPE B



TYPE C

GENERAL NOTES:

Construction - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Edition of 1982, revised to date.

Design - AASHTO Standard Specification for Highway Bridges, 1983, revised to date.

Loading - Class HS20-44

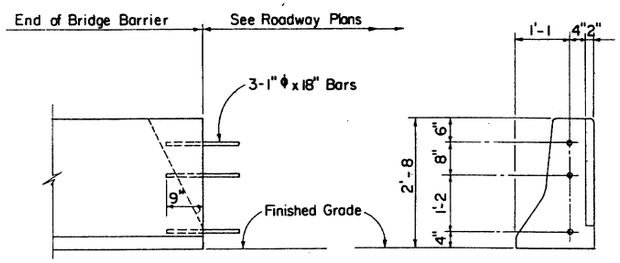
All concrete shall be Class "S" f'_c = 3000 psi.

Reinforcing steel shall conform to ASTM Specification A 615. Bar sizes are designed as Grade 40 and furnished as Grade 40 or Grade 60, f_s = 20,000 psi.

All dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

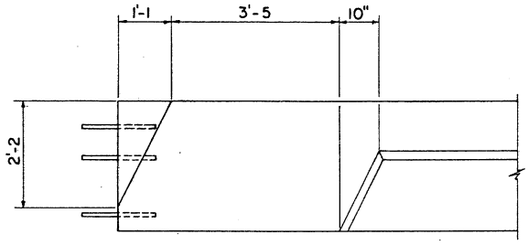
All reinforcing steel shall have 2" clear cover unless noted otherwise.

Dimensions shall not be scaled from drawing.



ROADWAY ELEVATION

END VIEW



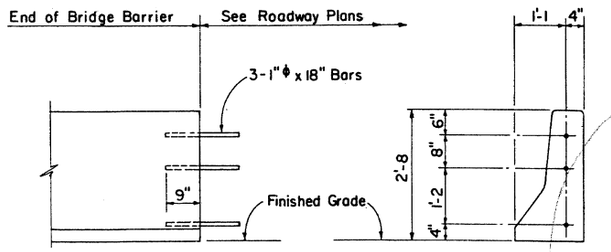
FASCIA ELEVATION

DETAIL A
(Use with Barrier Detail Type A)

NOTE:
Details A, B and C show end treatment of concrete barriers and are to be used unless other end treatment is called for on plans.

APPROXIMATE QUANTITIES		
Barrier Type	Class "S" Conc. f'_c = 3000 psi C.Y.	Reinf. Steel Lbs.
A	0.0985	8.995
B	0.0918	8.758
C	0.1178	10.312

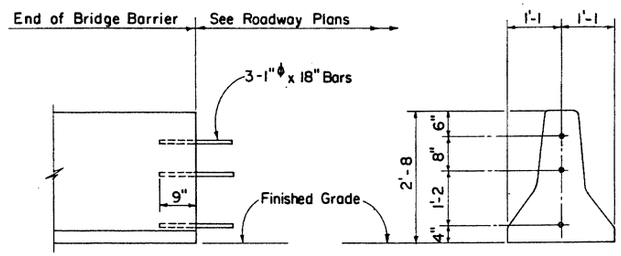
NOTE:
Quantities are per lineal foot with no overlay. Reinforcing bars embedded in deck slab are not included in Reinforcing Steel Quantity.



ELEVATION

END VIEW

DETAIL B
(Use with Barrier Detail Type B)



ELEVATION

END VIEW

DETAIL C
(Use with Barrier Detail Type C)

No.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①			
②			
③			

DESIGN
DRAWN
CHECKED

DESIGN APPROVED

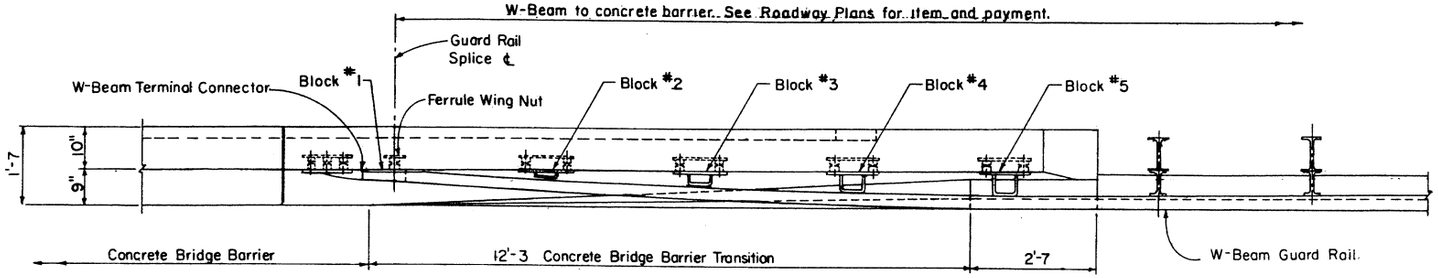
APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

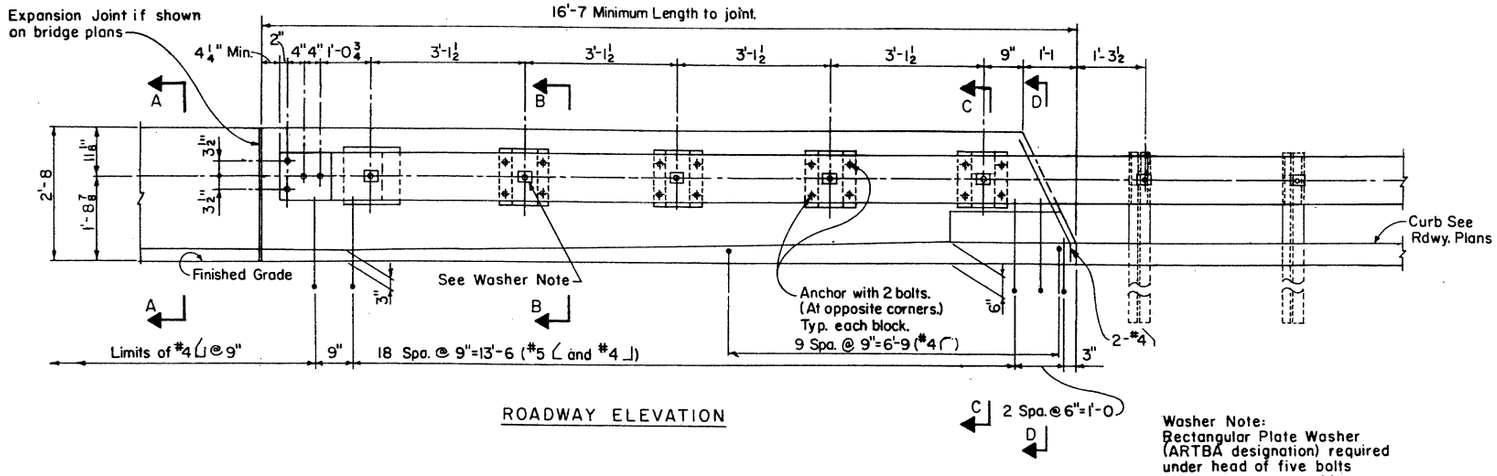
BRIDGE CONCRETE BARRIER DETAILS

REVISION 8/85

STANDARD NO. B-21.18

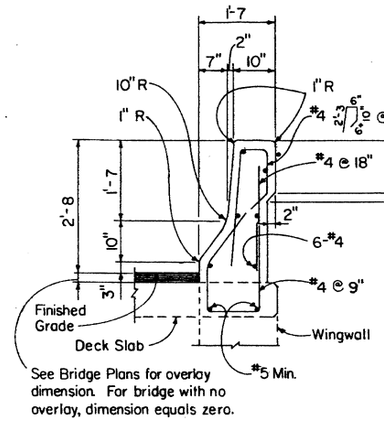


PLAN

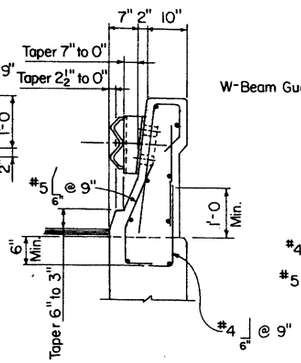


ROADWAY ELEVATION

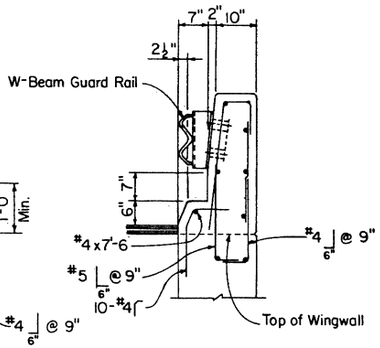
Washer Note:
Rectangular Plate Washer (ARTBA designation) required under head of five bolts along concrete transition.



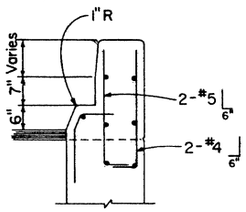
SECTION A-A



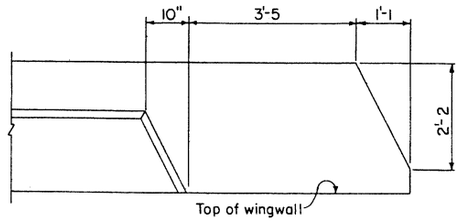
SECTION B-B



SECTION C-C



SECTION D-D



FASCIA ELEVATION
Showing treatment at end of barrier

GENERAL NOTES

Construction-Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Edition of 1982, revised to date.
Design-AASHTO Standard Specifications for Highway Bridges, 1983, revised to date.
All concrete shall be Class S, f'_c = 3000 psi.
Reinforcing Steel shall conform to ASTM Specification A 615. Bar size #6 and smaller are designed as grade 40 and furnished as Grade 40 or Grade 60, fs = 20,000 psi.
All dimensions for reinforcing steel shall be to center of bars unless noted otherwise.
All reinforcing steel shall have 2" clear cover unless noted otherwise.
Structural Steel shall conform to ASTM Specification A36 unless noted otherwise.
The terminal connectors and blocks shall be galvanized after fabrication in accordance with ASTM Spec. A123.
Bolts and washers shall be galvanized or, at the contractors option, stainless steel bolts and washers may be used as an alternate for the $\frac{7}{8}$"ϕ x 2¾" galvanized bolts and washers. They shall conform to or exceed the mechanical requirements of ASTM A307.
Terminal connectors, blocks and hardware shall be furnished and installed with roadway approach guard rail.
Insert assemblies shall be placed in new construction.
Ferrules shall be made from steel meeting the requirements of ASTM A108, grade 12 L14.
Wire struts shown in the insert assembly shall have a minimum tensile strength of 100,000 psi.
The insert assembly shall be assembled in the shop. Bolt threads may be re-cut as necessary to insure fit.
The Bridge Quantities include all concrete and reinforcing steel for barrier transitions.
The cost of the insert assembly will consist of the insert assembly, bolts and washers complete in place and shall be included in the unit price bid for barrier concrete.
See Std. TB-1A for Terminal Connector Anchor Assembly, Ferrule Wing Nut and Block Details.
Dimensions shall not be scaled from drawings.

APPROXIMATE QUANTITIES	
Class 'S' Concrete	1.593 C.Y.
Reinforcing Steel	146 lbs.

Note: Quantities are for one transition 16'-7 in length with no overlay. Reinf. bars embedded in deck slab or wingwall are not included in Reinf. Steel Quantity.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Add Block #1, Washers, etc.	JDM	10-86
2			
3			

DESIGN JEM
DRAWN 3-85
CHECKED

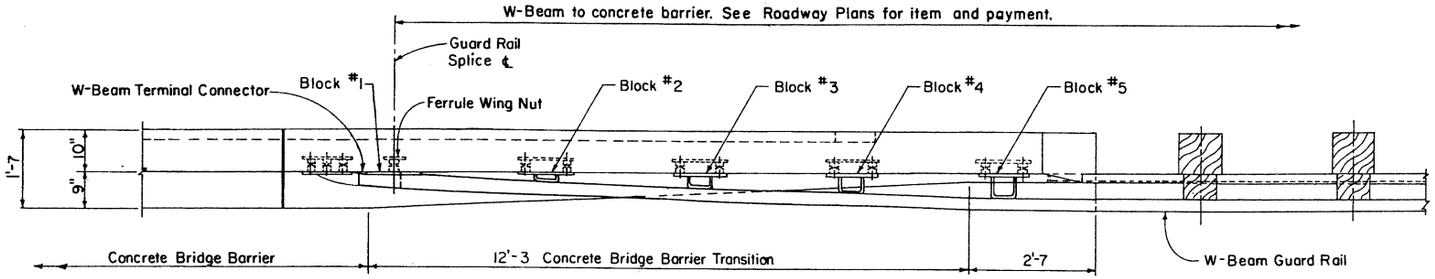
DESIGN APPROVED
APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

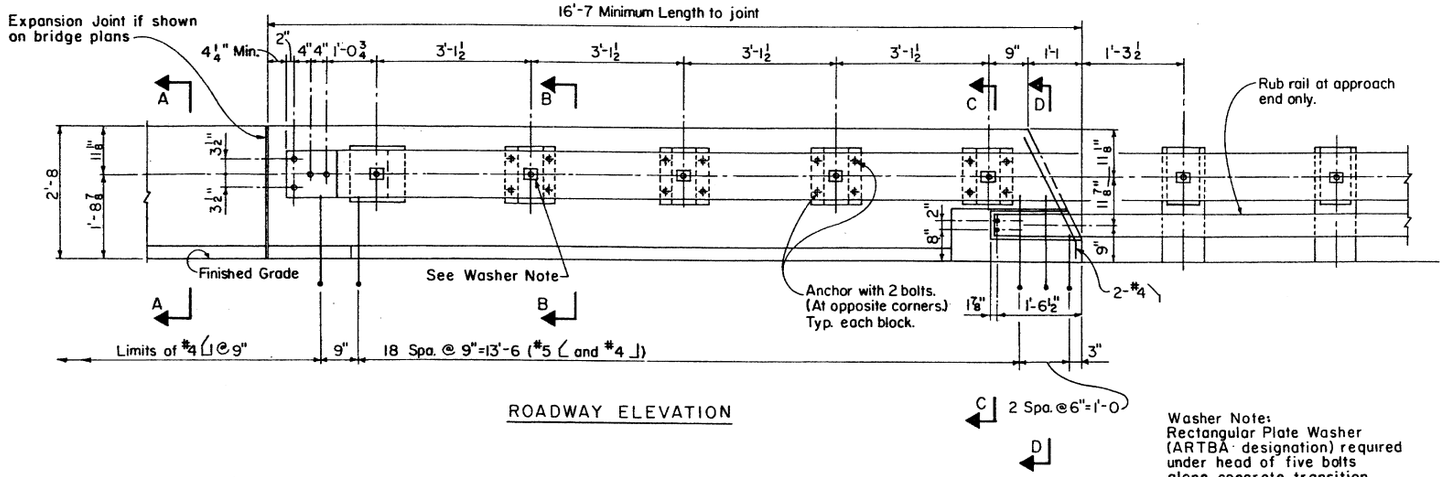
BRIDGE
CONCRETE BARRIER TRANSITION
WITH CURB

REVISION 10-86

STANDARD NO. B-21.19

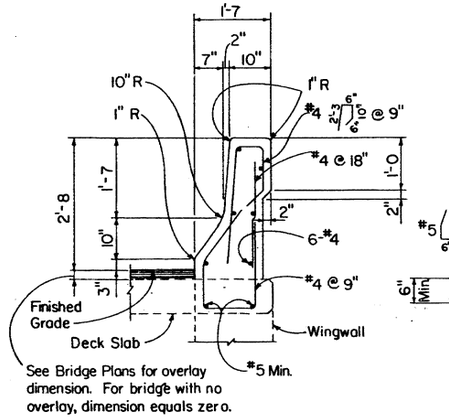


PLAN

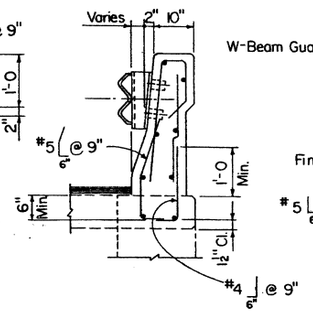


ROADWAY ELEVATION

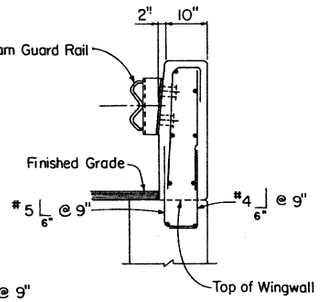
Washer Note:
Rectangular Plate Washer (ARTBA designation) required under head of five bolts along concrete transition.



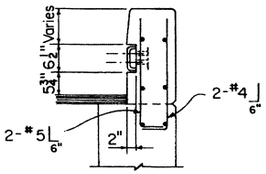
SECTION A-A



SECTION B-B



SECTION C-C



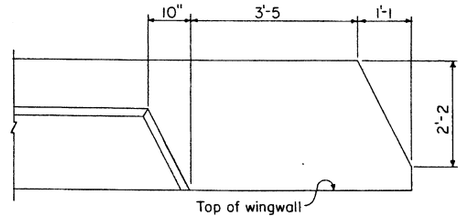
SECTION D-D

GENERAL NOTES

Construction-Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Edition of 1982, revised to date.
Design-AASHTO Standard Specifications for Highway Bridges, 1983, revised to date.
All concrete shall be Class S, f'_c = 3000 psi.
Reinforcing Steel shall conform to ASTM Specification A 615. Bar size #6 and smaller are designed as grade 40 and furnished as Grade 40 or Grade 60, fs= 20,000 psi.
All dimensions for reinforcing steel shall be to center of bars unless noted otherwise.
All reinforcing steel shall have 2" clear cover unless noted otherwise.
Structural Steel shall conform to ASTM Specification A36 unless noted otherwise.
The terminal connectors and blocks shall be galvanized after fabrication in accordance with ASTM Spec. A123.
Bolts and washers shall be galvanized or, at the contractors option, stainless steel bolts and washers may be used as an alternate for the ⅞"ϕ x 2¾" galvanized bolts and washers. They shall conform to or exceed the mechanical requirements of ASTM A307.
Terminal connectors, blocks and hardware shall be furnished and installed with roadway approach guard rail.
Insert assemblies shall be placed in new construction.
Ferrules shall be made from steel meeting the requirements of ASTM A108, grade 12 L14
Wire struts shown in the insert assembly shall have a minimum tensile strength of 100,000 psi.
The insert assembly shall be assembled in the shop. Bolt threads may be re-cut as necessary to insure fit.
The Bridge Quantities include all concrete and reinforcing steel for barrier transition.
The cost of the insert assembly will consist of the insert assembly, bolts and washers complete in place and shall be included in the unit price bid for barrier concrete.
See Std. TB-1A for Terminal Connector Anchor Assembly, Ferrule Wing Nut and Block Details.
Dimensions shall not be scaled from drawings.

APPROXIMATE QUANTITIES	
Class 'S' Concrete	1.516 C.Y.
Reinforcing Steel	141 lbs.

Note: Quantities are for one transition 16'-7 in length with no overlay. Reinf. bars embedded in deck slab or wingwall are not included in Reinf. Steel Quantity.

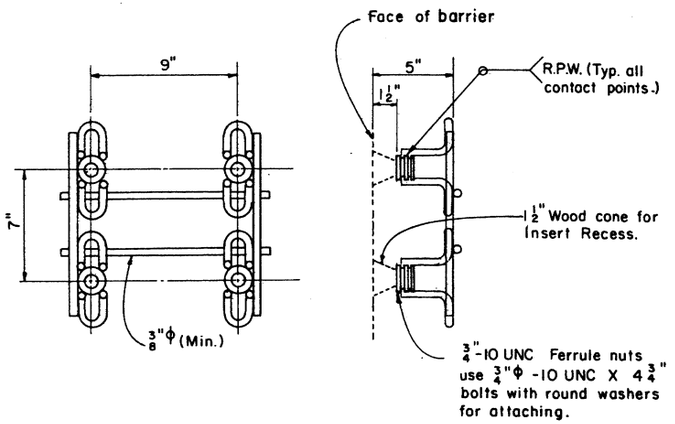


FASCIA ELEVATION
Showing treatment at end of barrier.

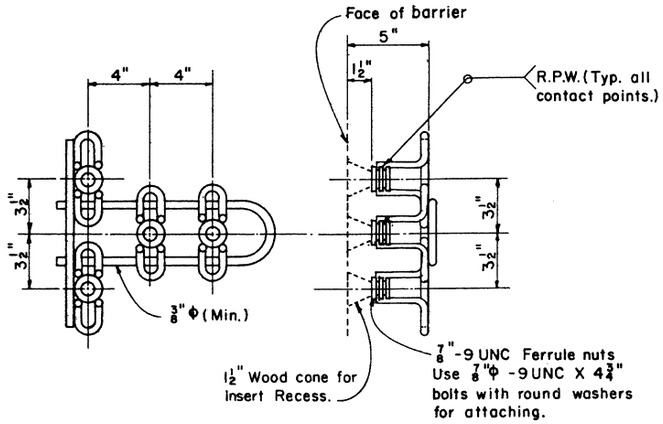
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Add-Block #1, Washer, etc.	JEM	10-86
2			
3			

DESIGN	JEM	3-85
DRAWN	KW	3-85
CHECKED		

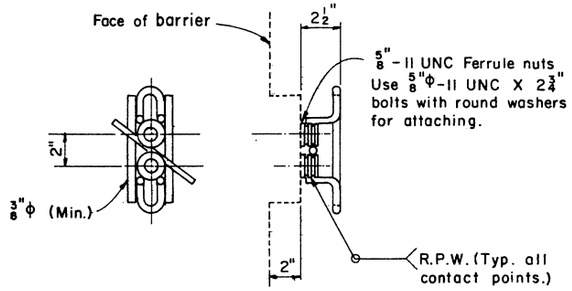
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION 10-86
APPROVED FOR DISTRIBUTION	BRIDGE CONCRETE BARRIER TRANSITION	STANDARD NO. B-21.20



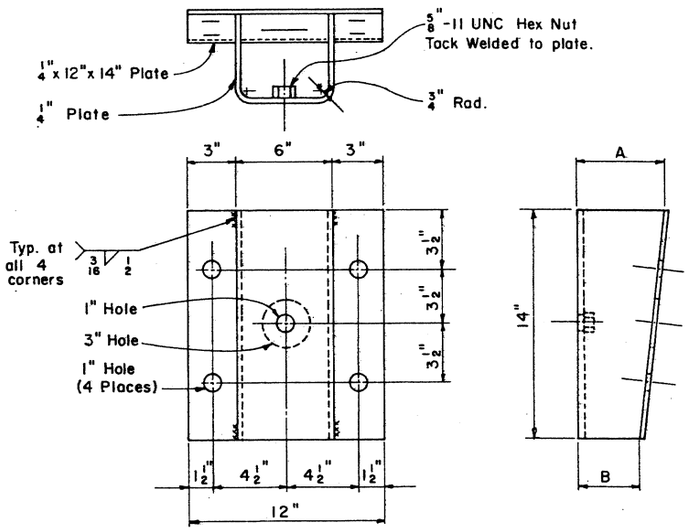
BLOCK ANCHOR ASSEMBLY



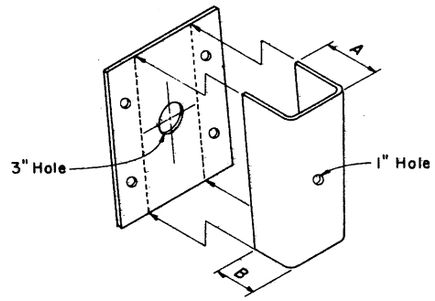
TERMINAL CONNECTOR ANCHOR ASSEMBLY



RUB RAIL
TERMINAL ANCHOR

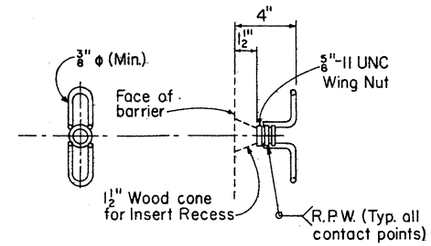


BLOCK DETAILS



DIMENSIONS		
Block #	A	B
2	1¼"	⅞"
3	2½"	1¾"
4	3 11/16"	2⅝"
5	4 15/16"	3 7/16"

Note: Block #1 is a PL 12" x ¼" x 14"



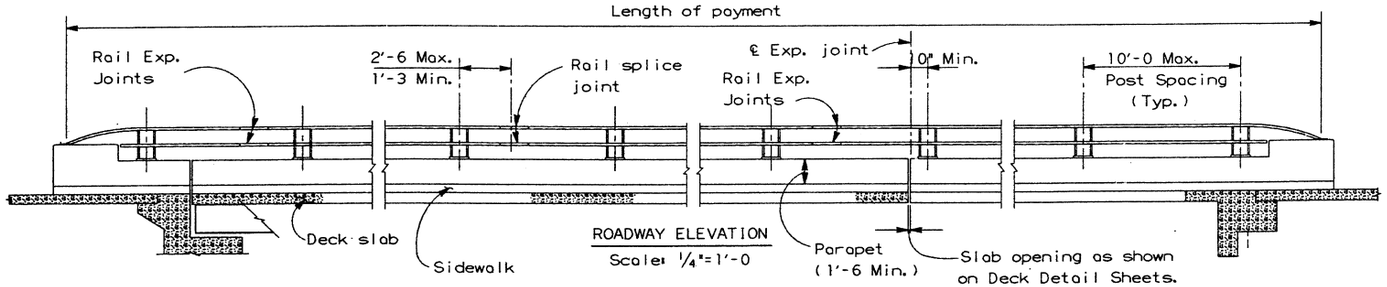
FERRULE WING NUT DETAIL

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Changed BL Dim. & add Wing Nut Dim.	JEM	2-89
2	Revised Block Dimensions	JEM	10-86
3			

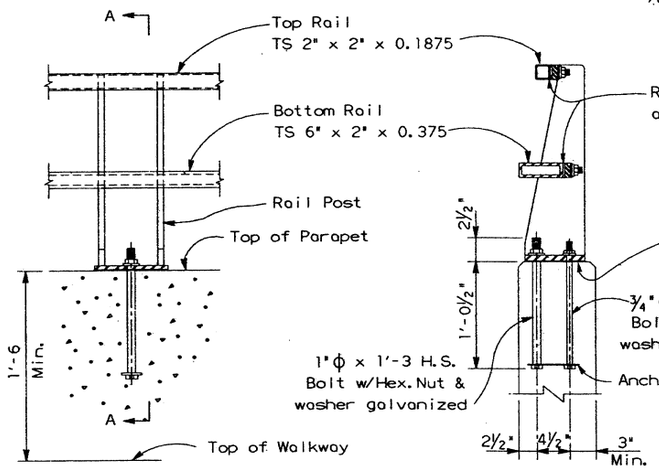
DESIGN	W.E.B.	12-82
DRAWN	W.E.B.	12-82
CHECKED	W.A.B.	12-82

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 6567 CHARLES DENNIS GRIGG

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION 10-86
APPROVED FOR DISTRIBUTION	BLOCK AND TERMINAL CONNECTOR ASSEMBLY DETAILS	STANDARD NO. B-21.21

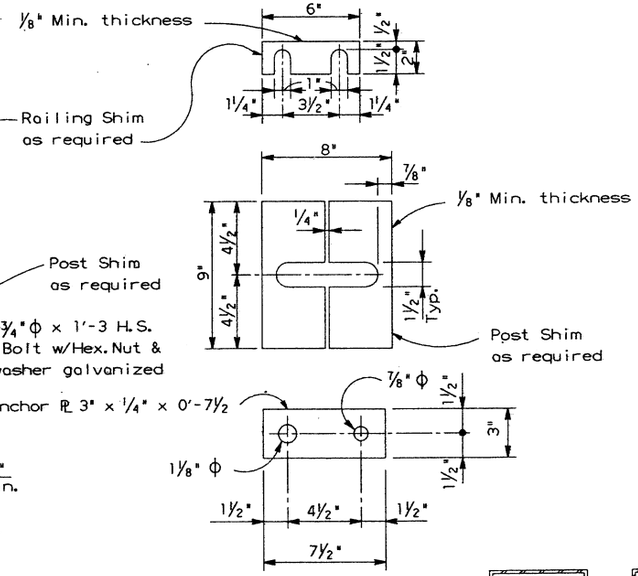


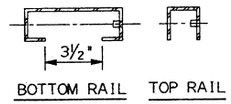
ROADWAY ELEVATION
Scale: 1/4"=1'-0



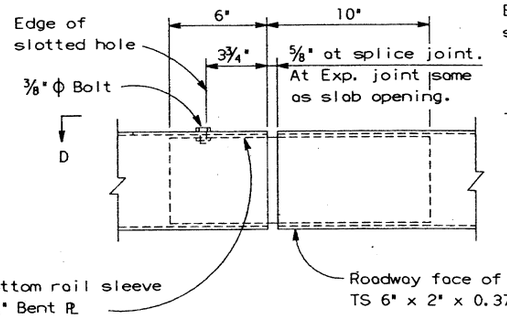
BRIDGE RAIL ELEVATION
Scale: 1½" =1'-0

SECTION A-A
Scale: 1½" =1'-0

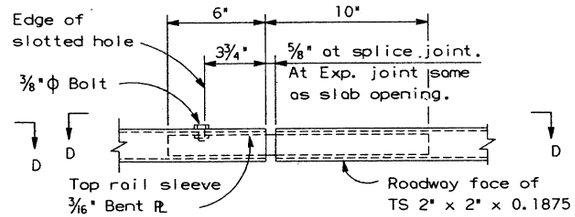




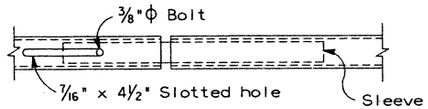
BOTTOM RAIL TOP RAIL



BOTTOM RAIL PLAN

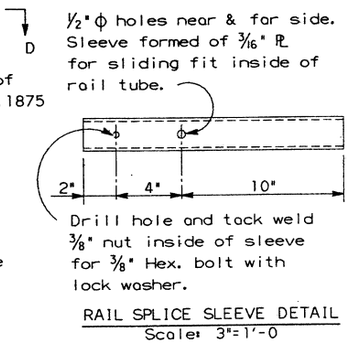


TOP RAIL PLAN



VIEW D-D

RAIL SPLICE DETAIL
Scale: 3" = 1'-0



RAIL SPLICE SLEEVE DETAIL
Scale: 3"=1'-0

MATERIAL

Materials for metal bridge rail shall be as follows:
Steel: All anchor plates, post construction and steel tubing shall be AASHTO M183 (ASTM A36) and shall be galvanized after fabrication in accordance with AASHTO M11 (ASTM A123).
Bolts: Anchor bolts, studs, nuts and woshers shall be AASHTO M164 (ASTM A325). All exposed portions of assembly shall be galvanized in accordance with AASHTO M1 (ASTM A123).

GENERAL

Construction - Arizona Deportment of Trasportation Standard Specification for Road and Bridge Construction, Edition of 1982 and 1985 Supplement.
Design - AASHTO Standard Specification for Highway Bridges, Edition of 1983, and 1984 and 1985 Supplements.
All posts shall be normal to parapet.
Panel lengths of rail shall be continuous and attached to a minimum of two posts.
Rail splices shall be located at barrier rail joints, deck expansion joints and abutment expansion joints and shall be constructed as detailed.
Torque rail to post nuts to 175 ft. Lbs. (Exception - TS 2x2 Tube is wrench tight).
For spacing of rail posts, conctete dimensions and reinforcing steel, see Project Plans.
Dimensions shall not be scaled from drawings.
This Standard shall only be used in conjunction with a sidewalk and barrier curb or traffic barrier.

WELDING NOTE

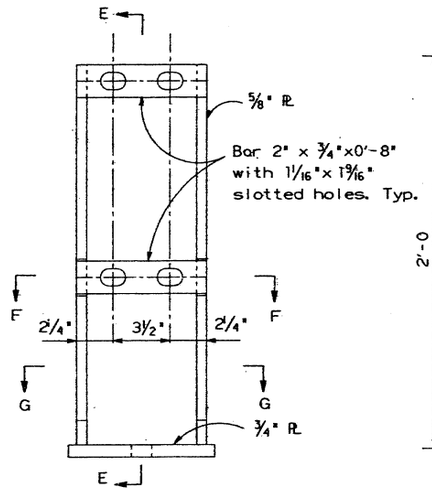
All welding shall conform to the requirements of the American Welding Society, Structural Welding code, D1.1, 1980, revised to date, and as modified by the AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges, 1981, revised to date.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

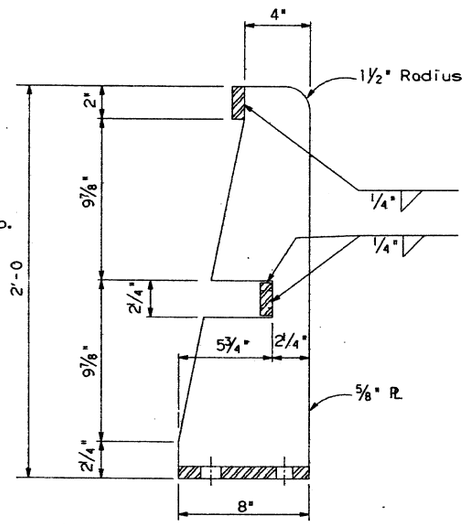
DESIGN
DRAWN
CHECKED

CADD FILENAME: 2FA
VIEW NAME:

	DESIGN APPROVED J. D. Dorn	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
	APPROVED FOR DISTRIBUTION James P. Mc Lee 2-15-87	TRAFFIC & PEDESTRIAN RAIL	STANDARD NO. B-22.40

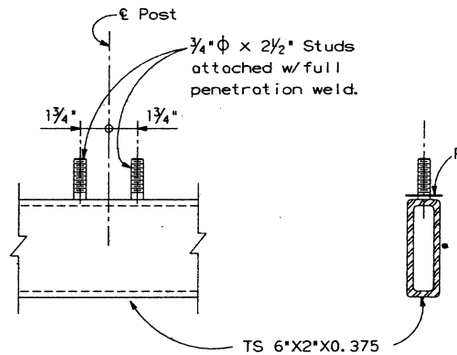


ELEVATION

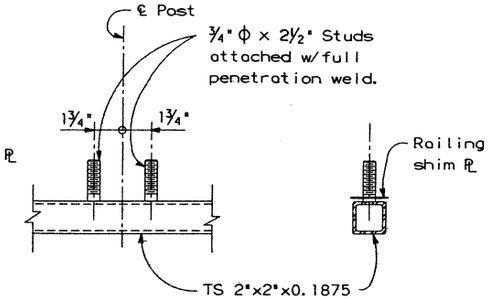


SECTION E-E

RAIL POST DETAILS
Scale: 3"=1'-0

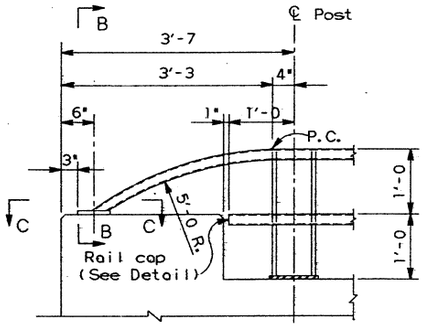


BOTTOM RAIL PLAN

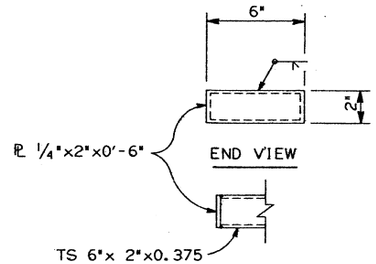


TOP RAIL PLAN

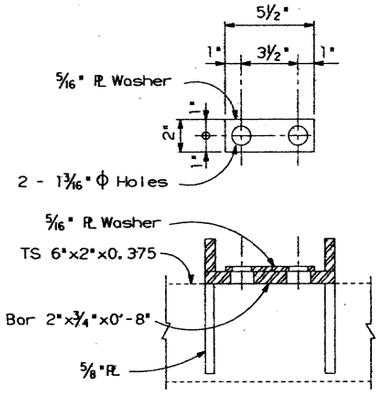
STUD BOLT DETAILS
Scale: 3"=1'-0



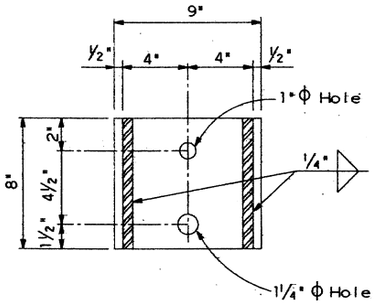
BRIDGE RAIL TERMINATION ELEVATION
Scale: 1"=1'-0



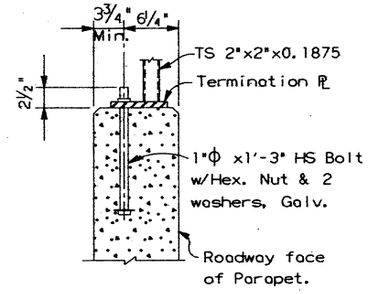
RAIL CAP
Scale: 3"=1'-0



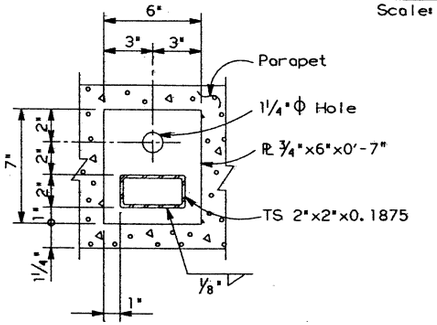
SECTION F-F
Scale: 3"=1'-0



SECTION G-G
Scale: 3"=1'-0



SECTION B-B
Scale = 1 1/2"=1'-0



SECTION C-C
Scale: 3"=1'-0

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED

CADD FILENAME= 2FA
VIEW NAME=

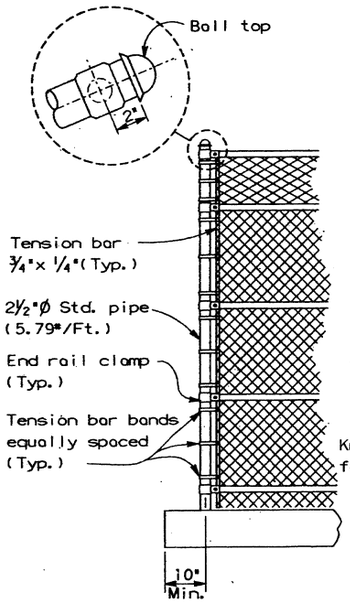
DESIGN APPROVED
J. D. Davis
APPROVED FOR DISTRIBUTION
James A. Barker
2-19-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

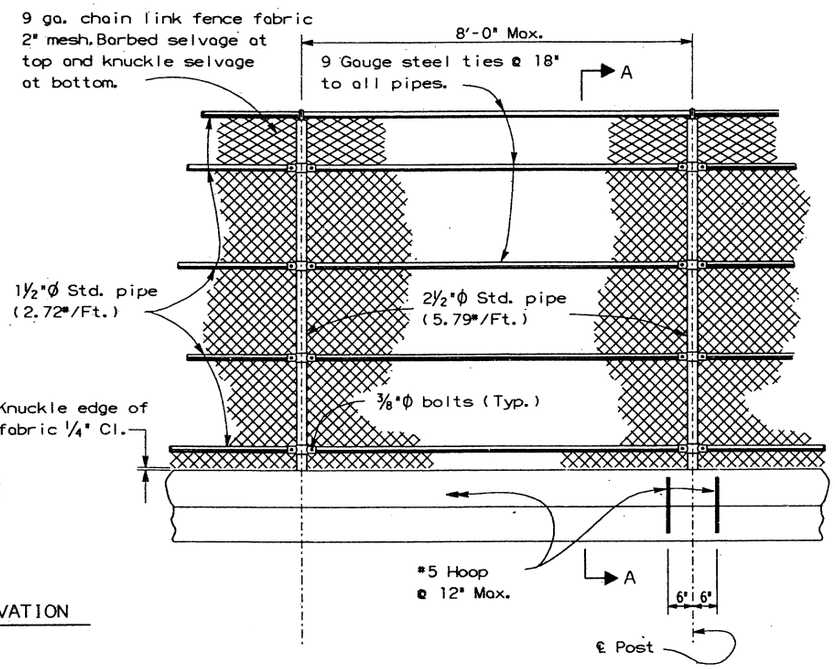
TRAFFIC & PEDESTRIAN RAIL

REVISION

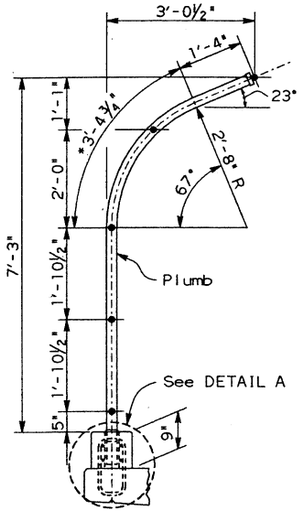
STANDARD NO.
B-22.41



TYPICAL END POST ELEVATION

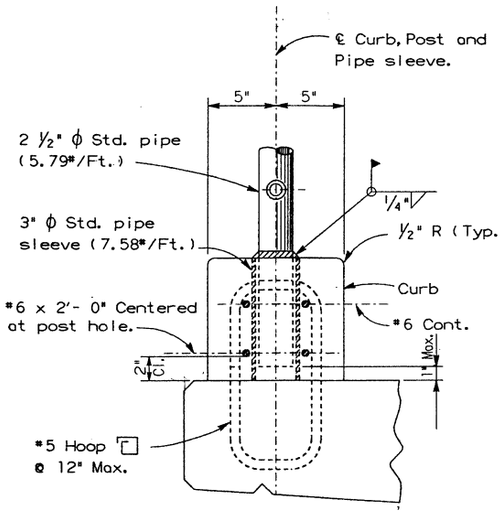


TYPICAL PANEL ELEVATION

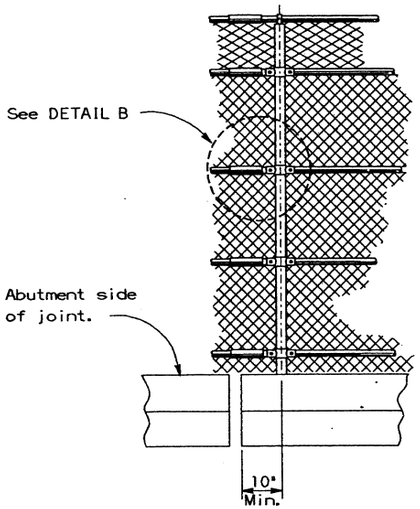


SECTION A-A
(Typical interior post)

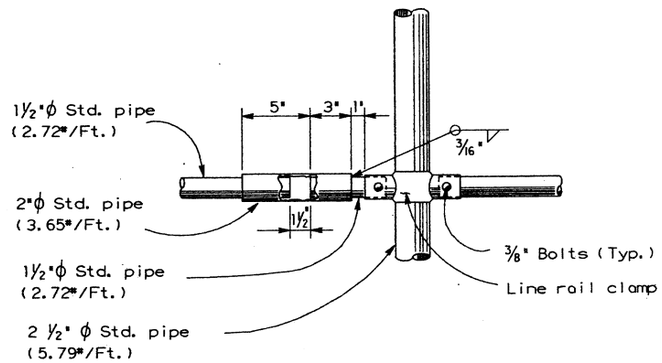
* Dimensions for fencing



DETAIL A



DETAIL AT EXPANSION JOINT



DETAIL B

GENERAL NOTES:

Chain link fence fabric, posts, fittings and hardware shall conform to AASHTO M181 - Type I or Type II. For Type I, the wire fabric coating shall be Class A.

All galvanizing that has been damaged in handling, transporting or welding shall be repaired by the application of a paste compound of an approved zinc powder and flux.

All exposed edges shall be smooth.

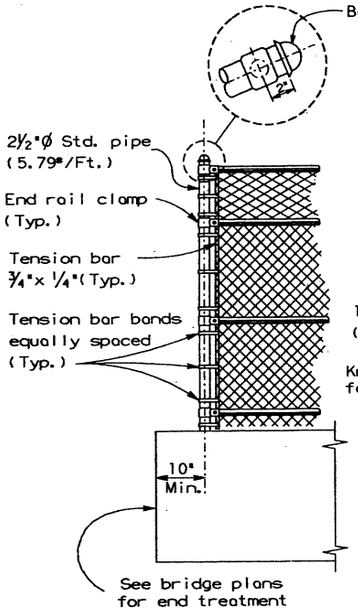
All bolt heads shall be to the inside.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

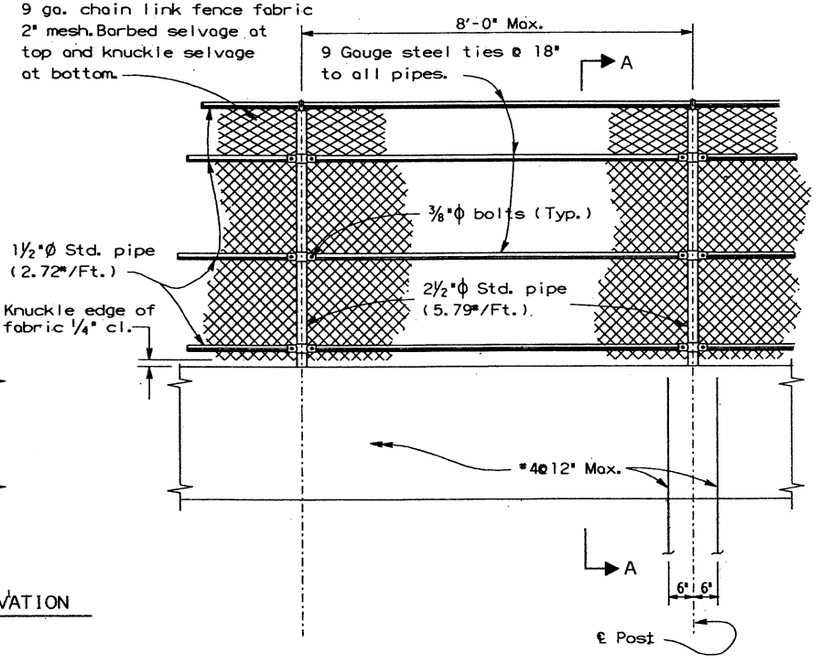
DESIGN
DRAWN
CHECKED

CADD FILENAME= ZFA
VIEW NAME=

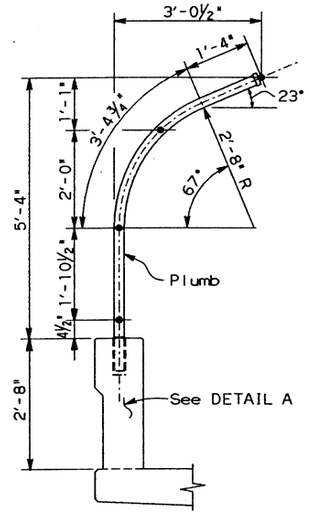
	DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
	APPROVED FOR DISTRIBUTION 2-13-89	PEDESTRIAN FENCE DETAILS WITH CURB	STANDARD NO. B-22.50



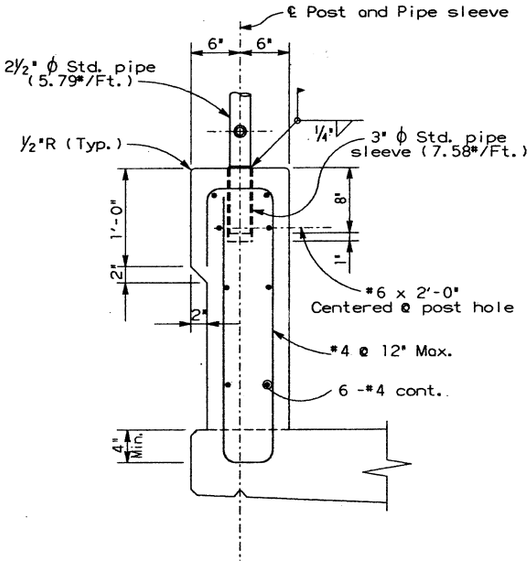
TYPICAL END POST ELEVATION



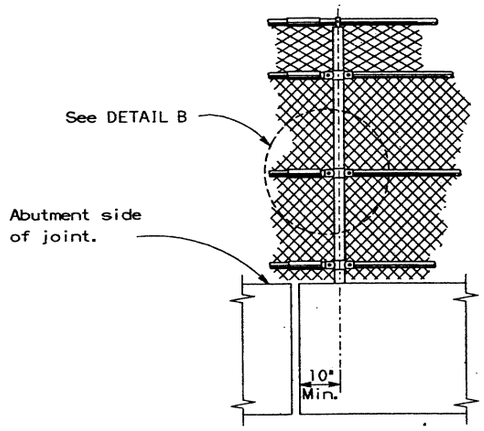
TYPICAL PANEL ELEVATION



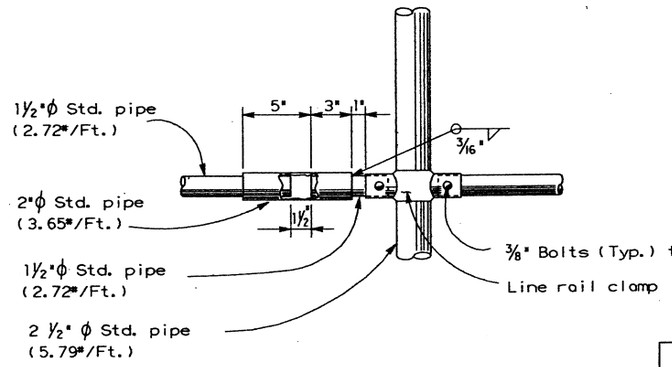
SECTION A-A
(Typical interior post)



DETAIL A



DETAIL AT EXPANSION JOINT



DETAIL B

GENERAL NOTES:

Chain link fence fabric, posts, fittings and hardware shall conform to AASHTO M 181 - Type I or Type II. For Type I, the wire fabric coating shall be Class A.

All galvanizing that has been damaged in handling, transportation or welding shall be repaired by the application of a paste compound of an approved zinc powder and flux.

All exposed edges shall be smooth.

All bolt heads shall be to the inside.

DESIGN	DRAWN	CHECKED

NO.	REVISION OR ISSUANCE	BY	DATE
1			
2			
4			

CADD FILENAME= ZFA
VIEW NAME=

DESIGN APPROVED
J. D. Davis

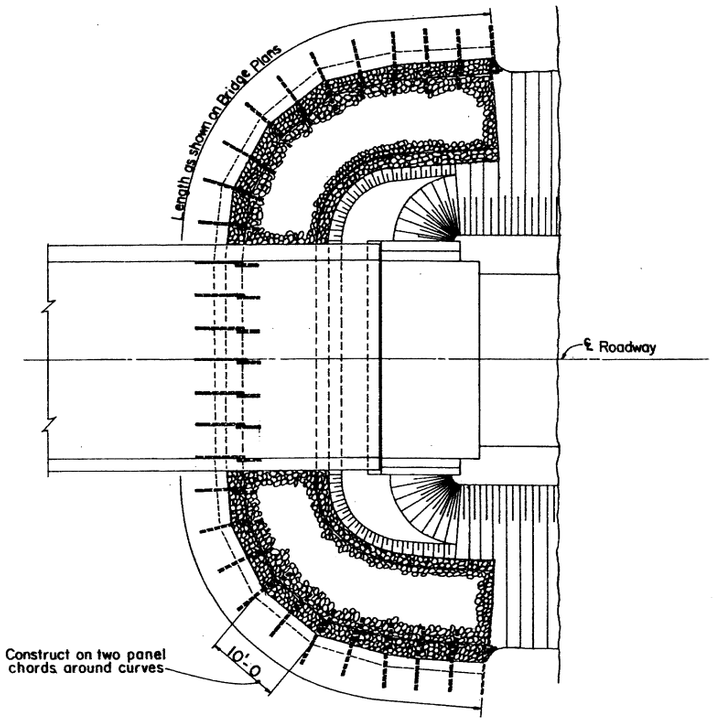
APPROVED FOR DISTRIBUTION
James A. McGee
2-13-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

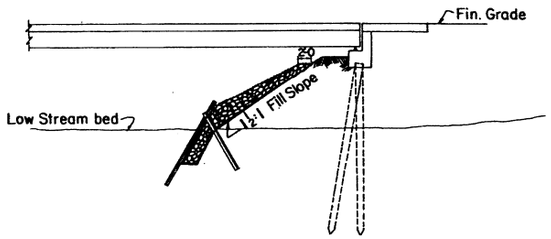
PEDESTRIAN FENCE DETAILS WITH PARAPET

REVISION

STANDARD NO.
B-22.60

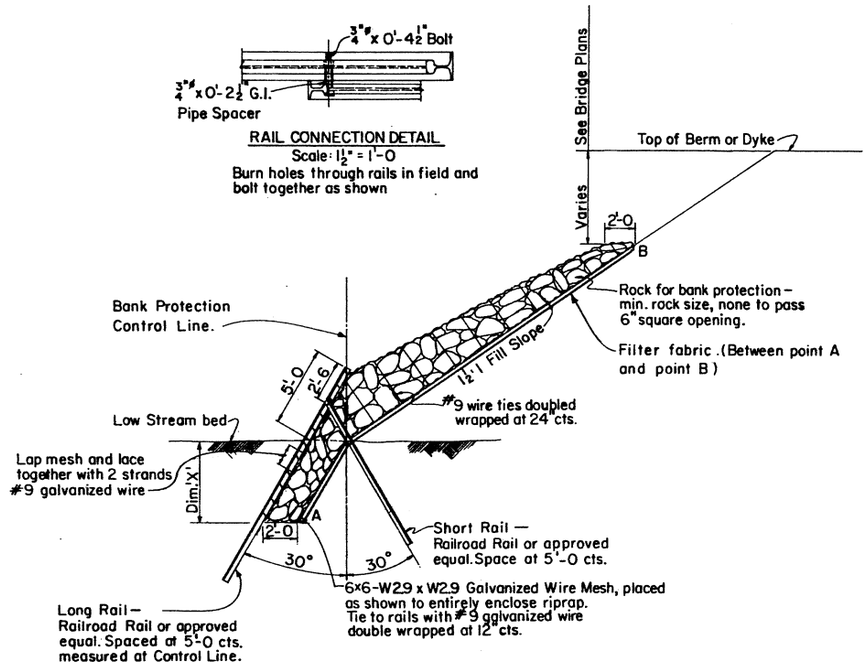


PLAN OF BANK PROTECTION AT ABUTMENT
Scale: 1"= 10'



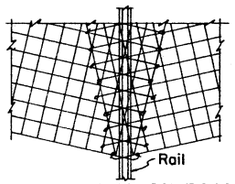
SECTION ON ℄ ROADWAY

RAIL CONNECTION DETAIL
Scale: 1½" = 1'-0
Burn holes through rails in field and bolt together as shown

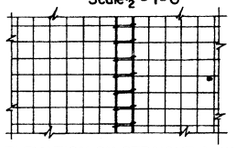


TYPICAL SECTION
Scale: ¼"= 1'-0

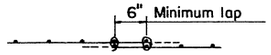
Type	Dim. 'X'	Min. Rail Length	
		Long Rail	Short Rail
A	5'-0	22'	10'
B	7'-6	25'	13'
C	10'-0	28'	16'



ELEVATION AT CHORD POINT ON CURVE
Scale: ½"= 1'-0



ELEVATION ON STRAIGHT A-WAY
Scale: ½"= 1'-0



SECTION
Scale: 1"= 1'-0

WIRE MESH SPLICE DETAILS

GENERAL NOTES

Construction – Std. Spec's. Ariz. Dept. of Transportation Edition of 1982, revised to date.

Rails may be either new or used. If used rails are furnished they shall be free from severe corrosion and equal to 95% of original section. Rails shall have a minimum weight per yard of 50 pounds.

All wire mesh, bolts, pipe spacers and tie wire shall be galvanized.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Removed 2:1 Rock Slope note	J.T.W.	7-76
②	Add Filter fabric.	C.H.	8-82
③	Changed R.R. Rail Description	J.E.M.	3-85
④	Removed Detail B, Add Table	J.E.M.	10-86
⑤			
⑥			

DESIGN		
DRAWN	K.S.T.	2-73
CHECKED	J.R.M.	3-73

DESIGN APPROVED R.C. Buchler

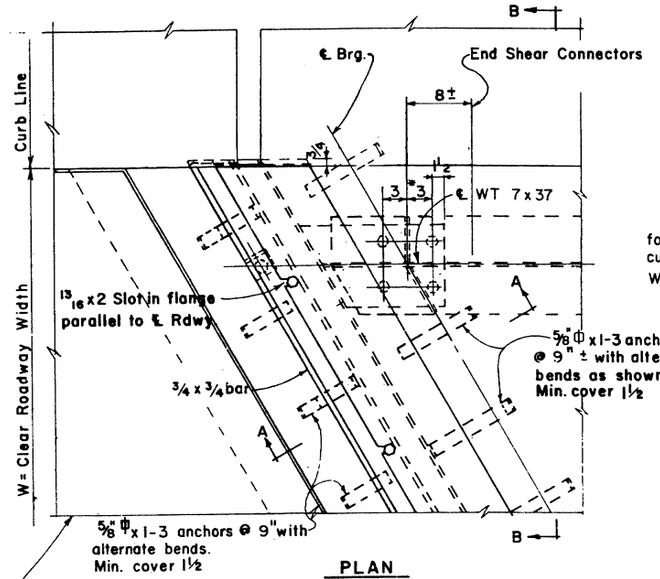
APPROVED FOR DISTRIBUTION

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

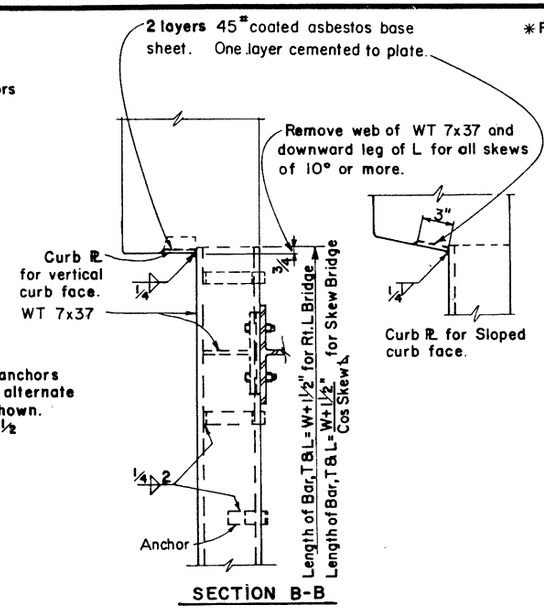
REVISION 10-86

RAIL BANK PROTECTION FOR BRIDGES

STANDARD NO. B-23.10

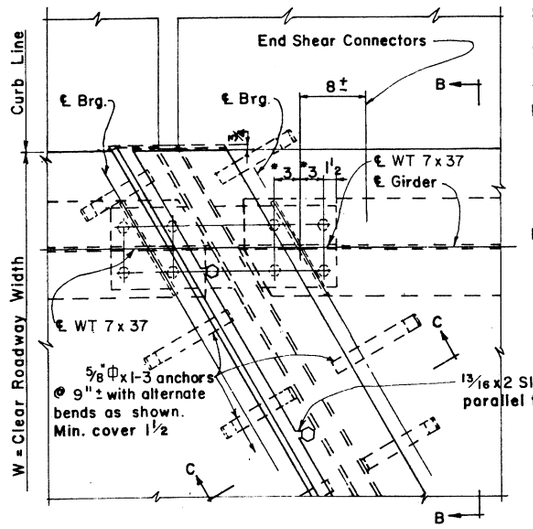


PLAN
SKEW BRIDGE



SECTION B-B

* Revise to clear bearing stiffeners if necessary.



PLAN
SKEW BRIDGE

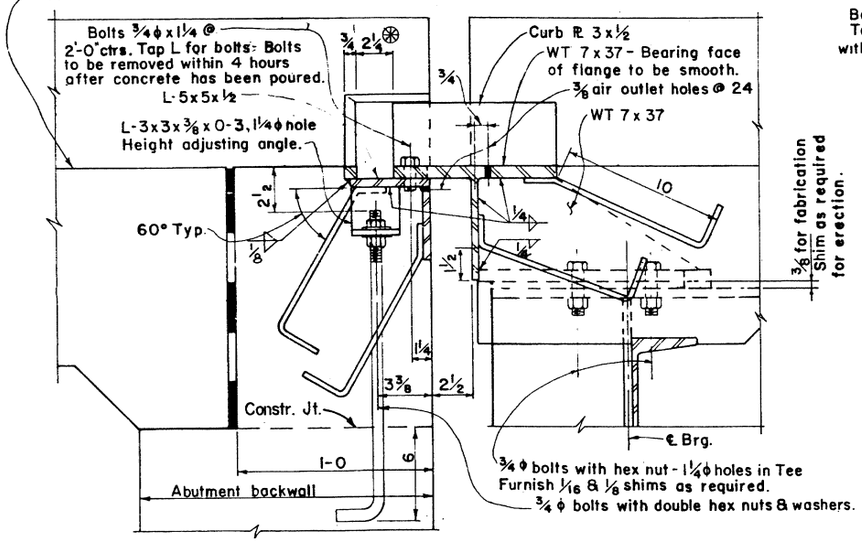
GENERAL NOTES :

Structural steel shall conform to A.S.T.M. Specification A-36.

Welding shall conform to American Welding Society Specifications for Welded Highway and Railway Bridges.

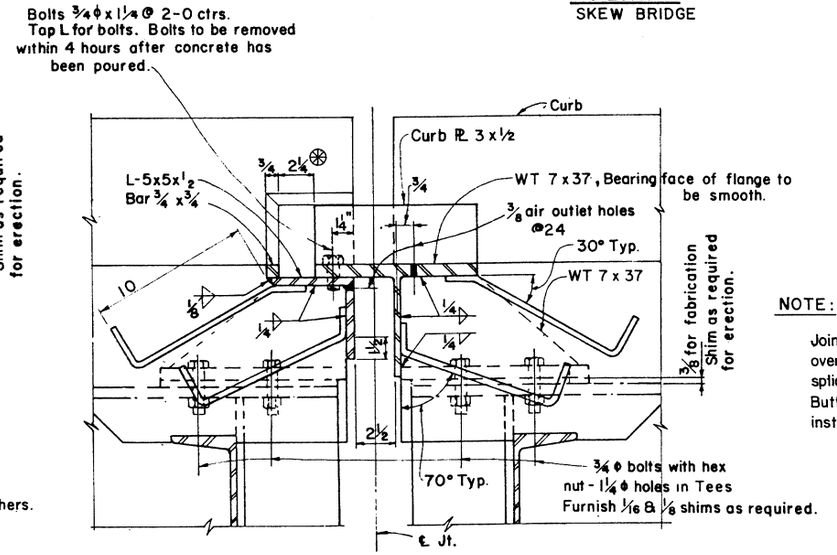
Paint and painting shall conform to Standard Specifications of Arizona Dept. of Transp. current edition.
Contact surfaces shall not be painted.

Roadway Joint shall be shop assembled, shipped and erected as a unit.
Units shall be contoured to conform to the roadway section.



SECTION A-A
AT ABUTMENTS

⊛ 2 1/4" max. at 70° F



SECTION C-C
AT PIERS & HINGED SPANS

NOTE:

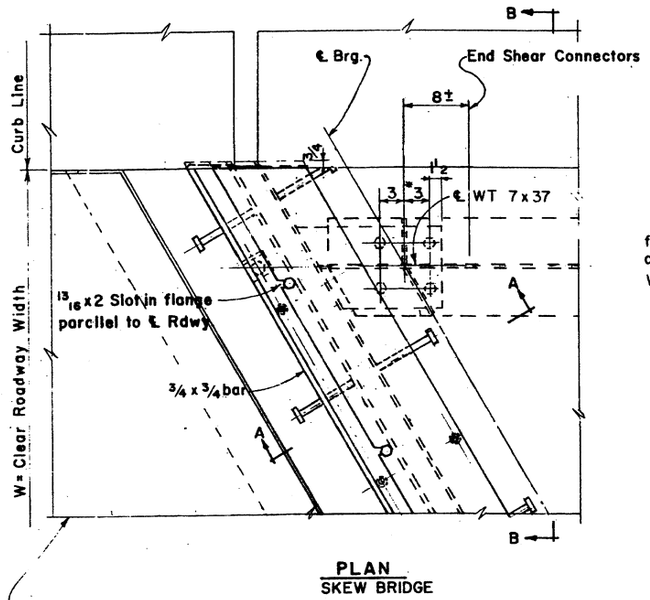
Joint shall be continuous for lengths 40 feet or less. For lengths over 40 feet the joint may be two pieces butted together, without splicing, at the roadway crown or construction centerline.
Butted ends shall meet smoothly on the roadway surface after installation or they shall be ground smooth.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Joint note added	SEA	11-74
②	Change Notes & A & bar spacing	WEB	12-82
③	Revised Paint Note	CH	10-86

DESIGN	RJR	6-82
DRAWN	CW	8-82
CHECKED	RJR	10-82

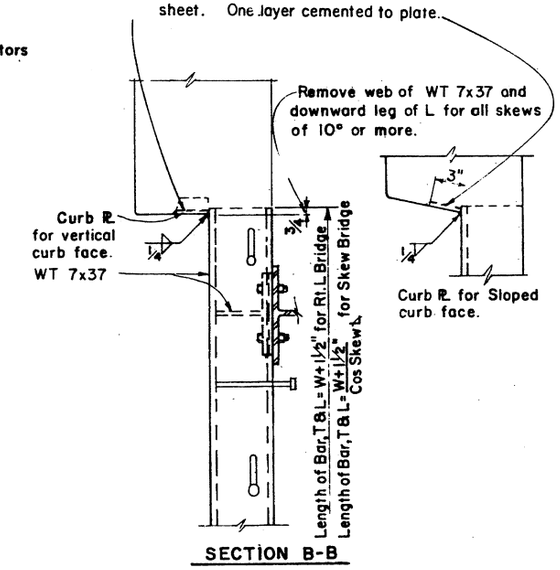
Registered Professional Engineer — Certificate Expires Dec 31, 19 — Arizona, U.S.A.

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION
R.C. Brechler		10-86
APPROVED FOR DISTRIBUTION	ROADWAY JOINT-STEEL	STANDARD NO. B-24.10



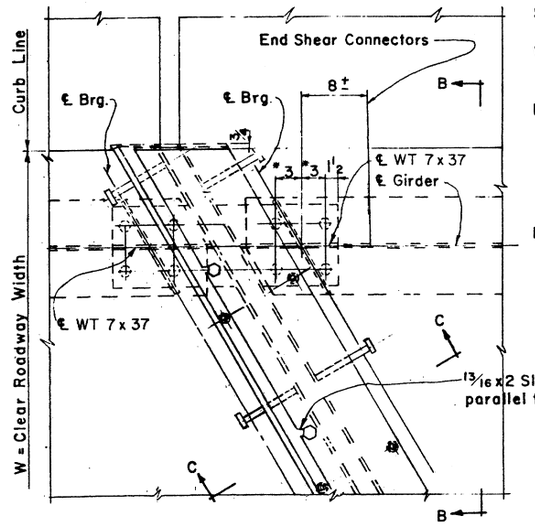
PLAN
SKEW BRIDGE

2 layers 45# coated asbestos base sheet. One layer cemented to plate.



SECTION B-B

*Revise to clear bearing stiffeners if necessary.



PLAN
SKEW BRIDGE

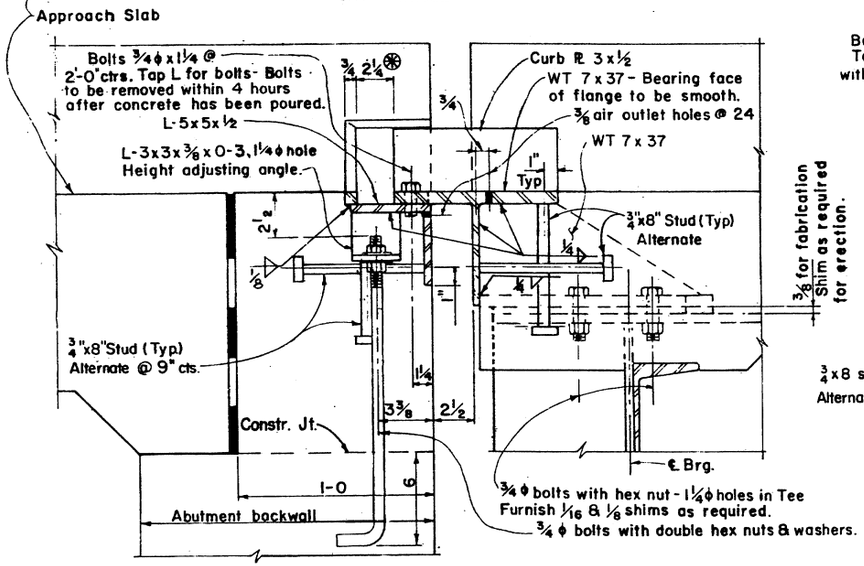
GENERAL NOTES :

Structural steel shall conform to A.S.T.M. Specification A-36.

Welding shall conform to American Welding Society Specifications for Welded Highway and Railway Bridges.

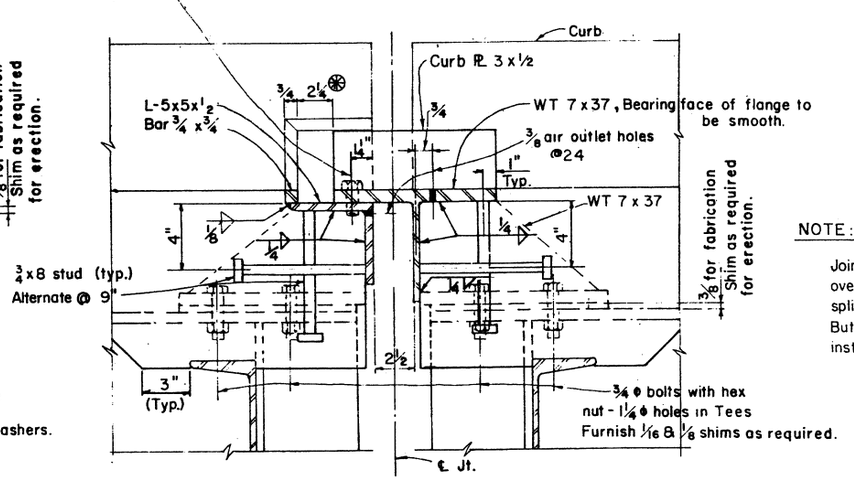
Paint and painting shall conform to Standard Specifications of Arizona Dept. of Transp. current edition.
Contact surfaces shall not be painted.

Roadway Joint shall be shop assembled, shipped and erected as a unit.
Units shall be contoured to conform to the roadway section.



SECTION A-A
AT ABUTMENTS

✻ 2¼" max. at 70° F.



SECTION C-C
AT PIERS & HINGED SPANS

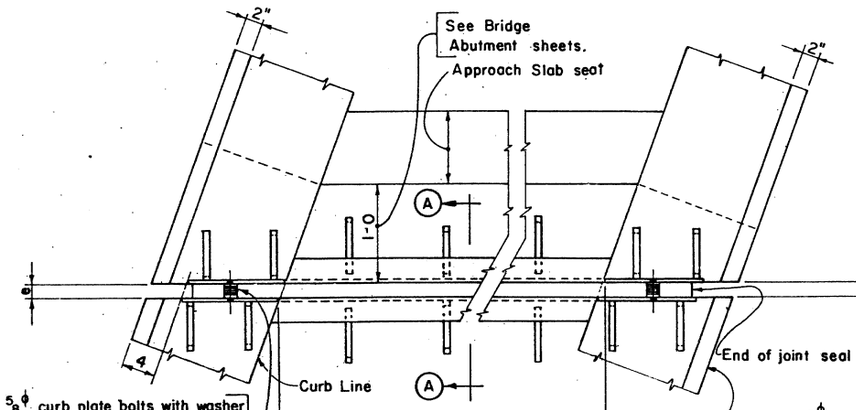
NOTE:

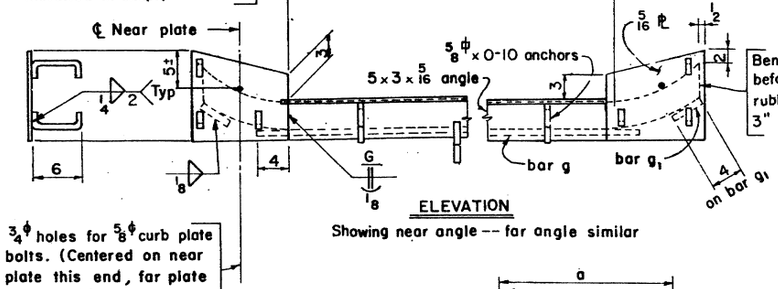
Joint shall be continuous for lengths 40 feet or less. For lengths over 40 feet the joint may be two pieces butted together, without splicing, at the roadway crown or construction centerline.
Butted ends shall meet smoothly on the roadway surface after installation or they shall be ground smooth.

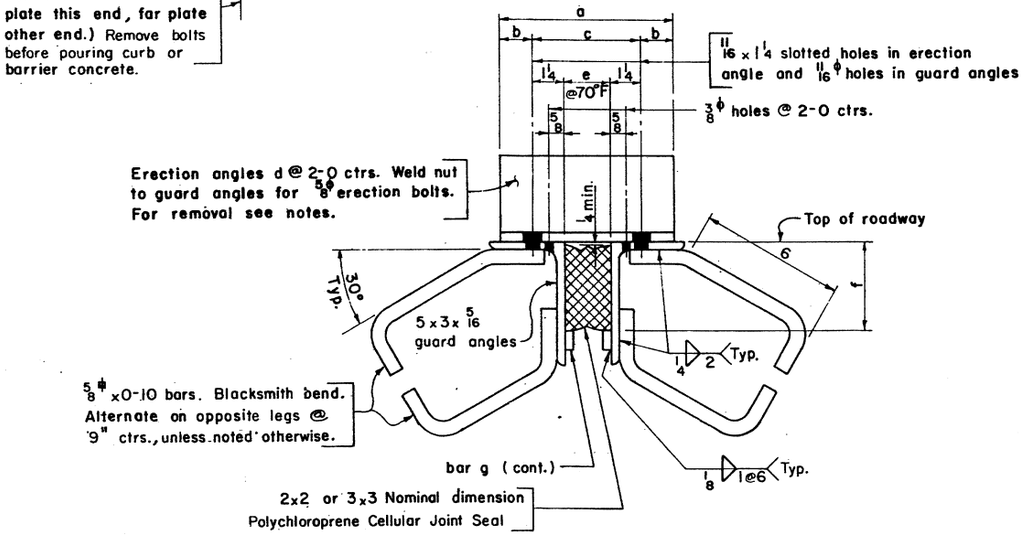
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	Revised Point Note	CH	10-86
②			
③			

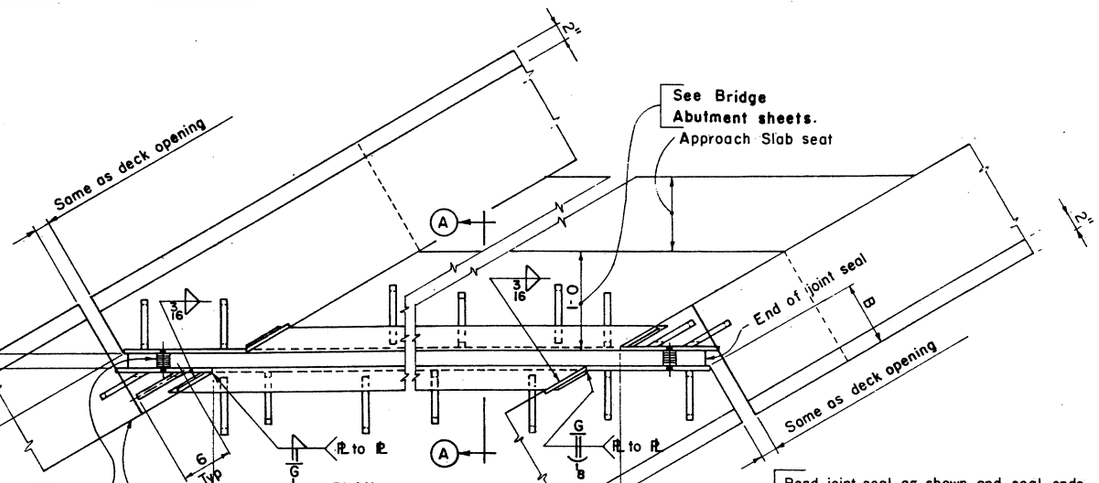
DESIGN	
DRAWN	WLB 12-82
CHECKED	

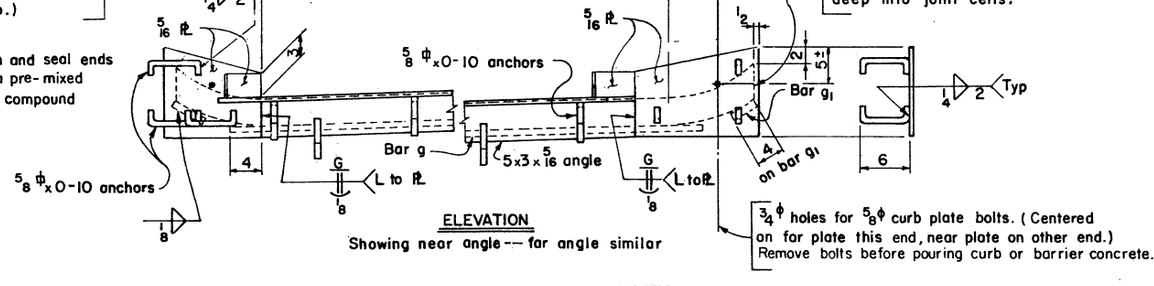
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION 10-86
APPROVED FOR DISTRIBUTION	ROADWAY JOINT-STEEL	STANDARD NO B-24.11











Skew Angle (Deg)	Dimension B(in.)
21° thru 33°	4
34° thru 36°	4½
37° thru 40°	5
41° thru 43°	5½
44° thru 47°	6
48° thru 51°	6½
52° thru 54°	7
55° thru 57°	7½
58° thru 60°	8

	2×2 Nominal Dim. Polychloroprene Cellular Joint Seal	3×3 Nominal Dim. Polychloroprene Cellular Joint Seal
a	6½	7
b	1⅜	1 5/16
c	3¾	4⅜
d	2×2×¼×0-6½ angles	3×3×⅜×0-7 angles
e	1¼ @ 70°F	1⅞ @ 70°F
f	2½	3⅝
g or g1	¼ × ¾ bar	⅜ × ¾ bar

NOTES:

Guard angles and cellular seal shall be one piece, without splices, for lengths 60 feet or less. For over 60 feet guard angles and cellular seal may be two pieces butted together, without splicing, at the crown or another location away from drainage.

Paint and painting shall conform to Std. Specs. of ADOT, current edition.

Paint- 3 coats of paint on surfaces of 5×3×5/16 guard angles, bar g, bar g1, and 5/16 plates not in contact with joint seal or concrete. One prime coat on joint seal face of guard angles, bar g, bar g1, and 5/16 plates.

Joint opening e shall be adjusted in the field for any variation of temperature above or below 70°F., for temperature correction refer to Bridge sheets.

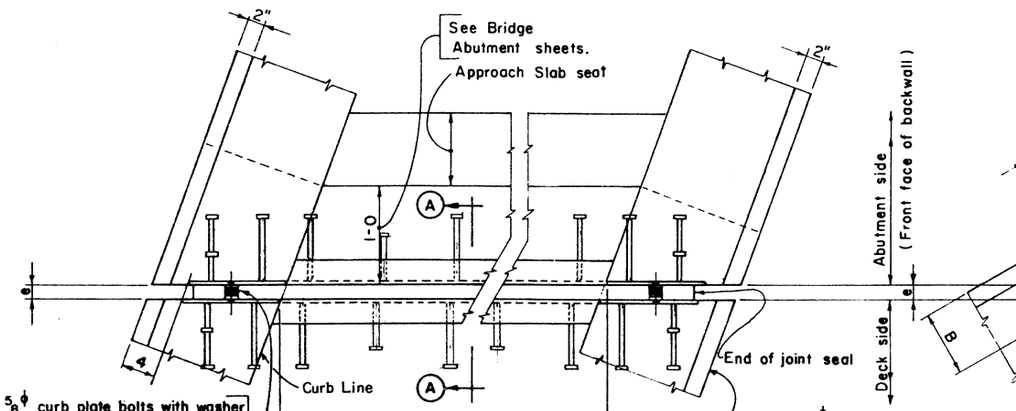
Material -- Structural Steel - A.S.T.M. - A36.

Erection angles and curb plate bolts shall not be removed until joint is fully encased in concrete (except curbs) and such concrete has attained its initial set.

Holes for curb plate bolts shall be plugged before placing curb concrete.

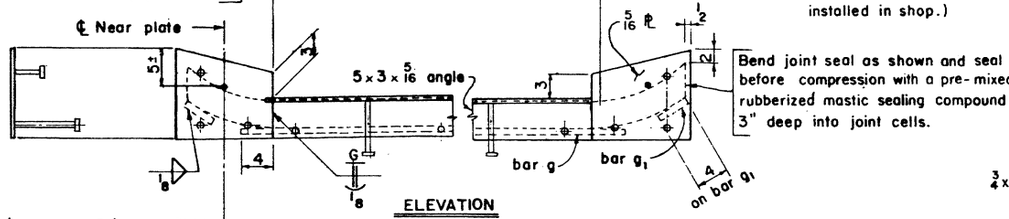
DESIGN	J.R.M.	11-70	(1)	Joint note added	SEA	11-74
DRAWN	W.H.D.	8-71	(2)	Changed Notes & ¾ϕ bar spacing	W.E.B.	12-82
CHECKED	R.R.	8-71	(3)	Revised Point Note	J.E.M.	10-86

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION 10-86
APPROVED FOR DISTRIBUTION	ROADWAY JOINT POLYCHLOROPRENE	STANDARD NO. B-24.20



PLAN
For skews 0° thru 20°

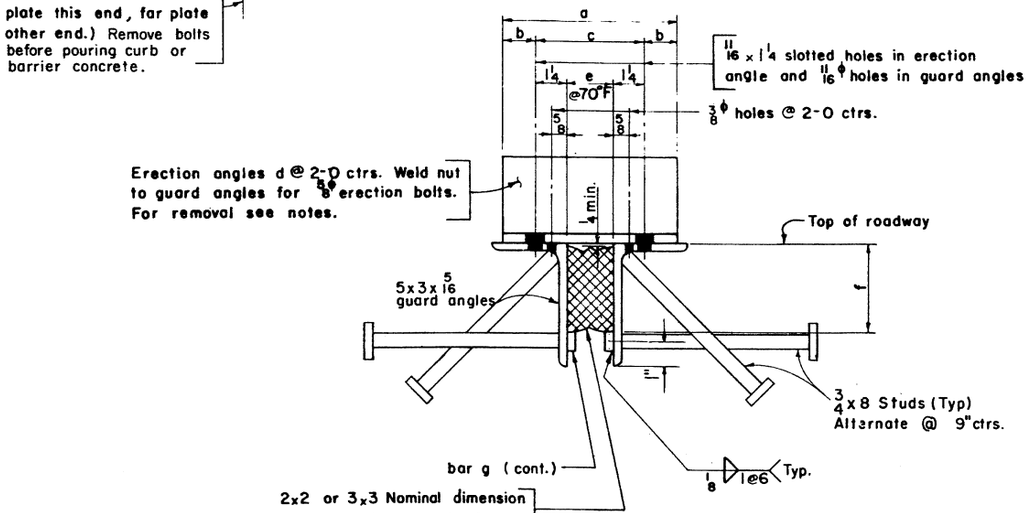
$\frac{5}{8}\phi$ curb plate bolts with washer spacers. (Washer spacers not required when joint seal is installed in shop.)



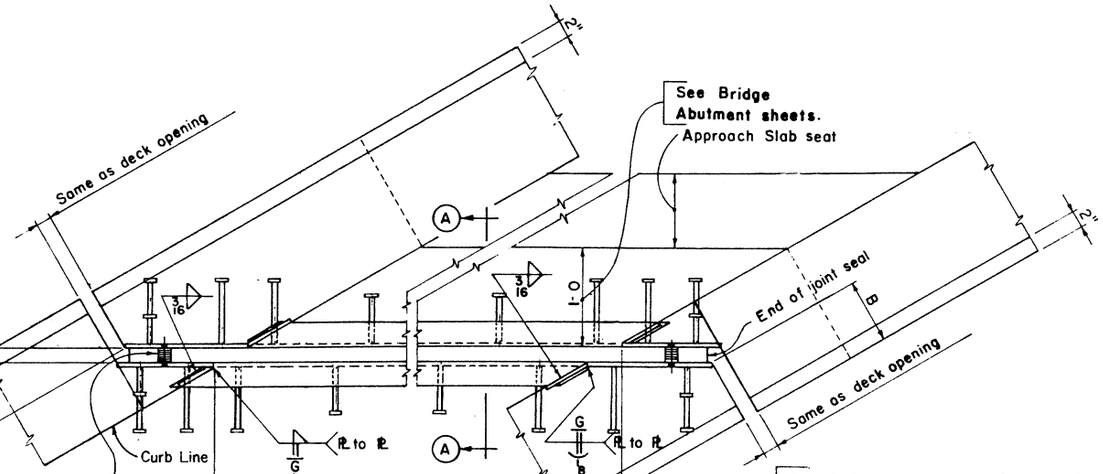
ELEVATION
Showing near angle -- far angle similar

Bend joint seal as shown and seal ends before compression with a pre-mixed rubberized mastic sealing compound 3" deep into joint cells.

$\frac{3}{4}\phi$ holes for $\frac{5}{8}\phi$ curb plate bolts. (Centered on near plate this end, far plate other end.) Remove bolts before pouring curb or barrier concrete.

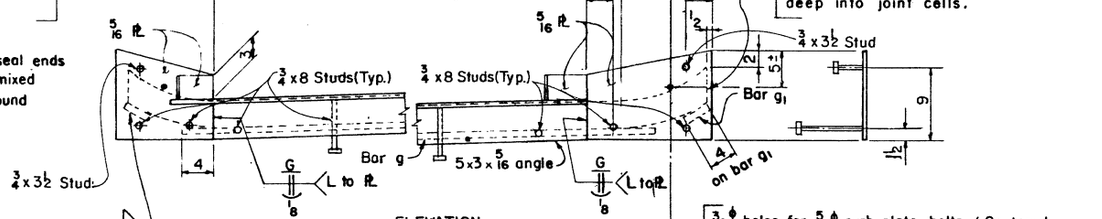


SECTION A-A



PLAN
For skews 21° thru 60°

$\frac{5}{8}\phi$ curb plate bolts with washer spacers. (Washer spacers not required when joint seal is installed in shop.)



ELEVATION
Showing near angle -- far angle similar

Bend joint seal as shown and seal ends before compression with a pre-mixed rubberized mastic sealing compound 3" deep into joint cells.

$\frac{3}{4}\phi$ holes for $\frac{5}{8}\phi$ curb plate bolts. (Centered on far plate this end, near plate on other end.) Remove bolts before pouring curb or barrier concrete.

Skew Angle (Deg)	Dimension B(in.)
21° thru 33°	4
34° thru 36°	4 1/2
37° thru 40°	5
41° thru 43°	5 1/2
44° thru 47°	6
48° thru 51°	6 1/2
52° thru 54°	7
55° thru 57°	7 1/2
58° thru 60°	8

	2x2 Nominal Dim. Polychloroprene Cellular Joint Seal	3x3 Nominal Dim. Polychloroprene Cellular Joint Seal
a	6 1/2	7
b	1 3/8	1 15/16
c	3 3/4	4 3/8
d	2x2 x 1/4 x 0-6 1/2 angles	3x3x3/8 x 0-7 angles
e	1 1/4 @ 70°F	1 7/8 @ 70°F
f	2 1/2	3 5/8
g or g1	1/4 x 3/4 bar	3/8 x 3/4 bar

NOTES:

Guard angles and cellular seal shall be one piece, without splices, for lengths 60 feet or less. For over 60 feet guard angles and cellular seal may be two pieces butted together, without splicing, at the crown or another location away from drainage.

Paint and painting shall conform to Std. Specs. of ADOT, current edition.

Paint - 3 coats of paint on surfaces of 5x3x5/16 guard angles, bar g, bar g1, and 5/16 plates not in contact with joint seal or concrete.

One prime coat on joint seal face of guard angles, bar g, bar g1, and 5/16 plates.

Joint opening e shall be adjusted in the field for any variation of temperature above or below 70°F., for temperature correction refer to Bridge sheets.

Material -- Structural Steel - A.S.T.M. - A36.

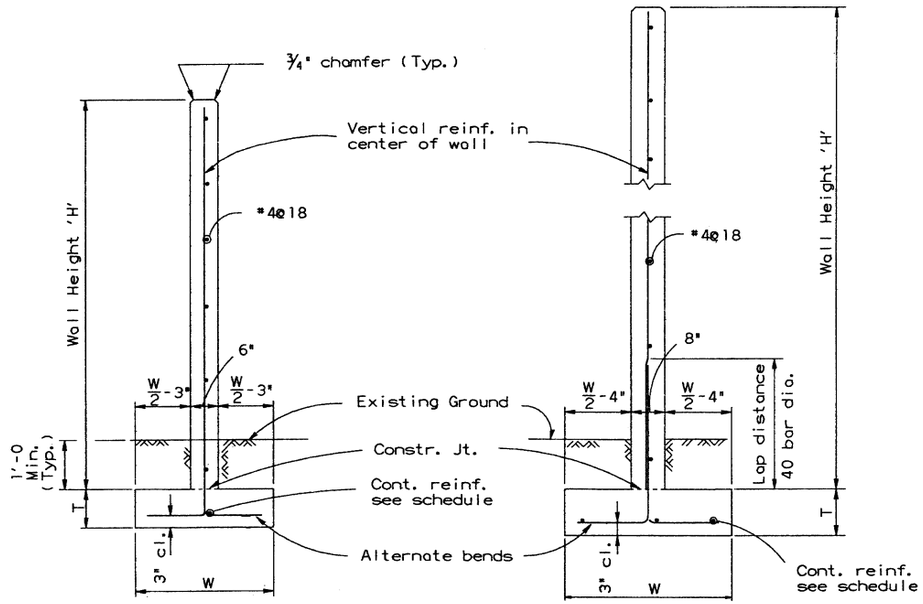
Erection angles and curb plate bolts shall not be removed until joint is fully encased in concrete (except curbs) and such concrete has attained its initial set.

Holes for curb plate bolts shall be plugged before placing curb concrete.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Revised Paint Note	JEM	10-86
3			
5			

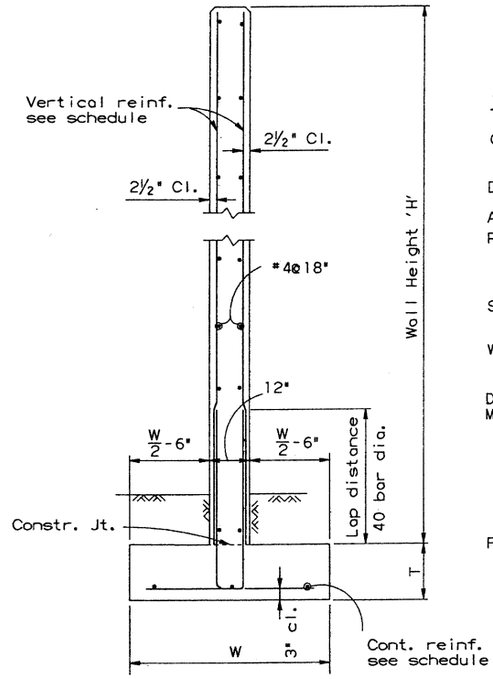
DESIGN	WEB	12-92
DRAWN		
CHECKED	NAB	12-92

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DRAWINGS	REVISION 10-86
APPROVED FOR DISTRIBUTION	ROADWAY JOINT POLYCHLOROPRENE	STANDARD NO. B-24.21



H <= 7'-0

H > 7'-0 & H <= 12'-0



H > 12'-0

TYPICAL WALL SECTIONS

GENERAL NOTES

Construction - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Edition of 1982 and 1985 Supplemental.

Design - AASHTO Standard Specifications for Highway Bridges. 1983 Edition and 1984 and 1985 Supplements.

All concrete shall be class 'S' unless noted otherwise.

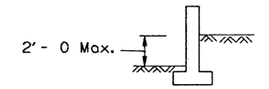
Reinforcing Steel shall conform to ASTM Specification A615. Bar sizes #6 and smaller shall be designed as Grade 40 and furnished as Grade 40 or Grade 60.

Bar sizes #7 and larger shall be Grade 60.

Stresses Concrete ---------- f'c = 2,500 psi.
Grade 40 Reinforcing Steel ------ fs = 20,000 psi.
Grade 60 Reinforcing Steel ------ fs = 24,000 psi.

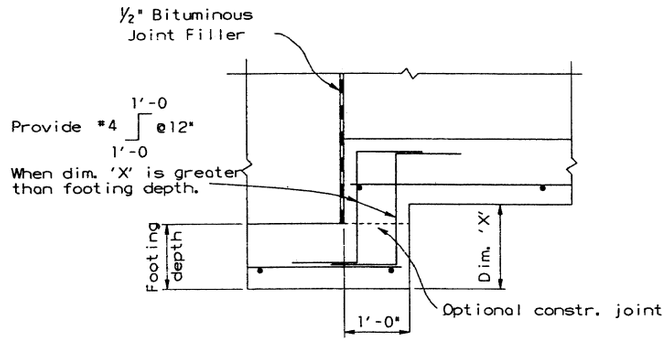
Wind Load as per 1985 Uniform Building Code. Wind Velocity 80 MPH. Wind Pressure 18.4 psf for heights <= 12'-0 and 24.5 psf for heights > 12'-0.

Design requires a minimum allowable Soil Pressure of 1,500 psf.
Maximum allowable backfill variation shall be shown as below:

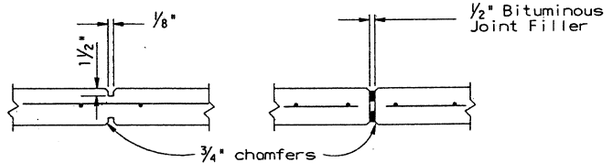


For wall treatment see Project Plans. Increase thickness of wall for any treatment with a depth greater than ½".

WALL SCHEDULE				
Wall Height 'H'	Ftg. Depth 'T'	Ftg. Width 'W'	Reinforcing	
			Wall & Dowel	Cont. Ftg.
4'	10"	1'-10	#4@9"	1-#7
5'	10"	2'-0	#4@9"	1-#7
6'	10"	2'-2	#4@9"	1-#7
7'	10"	2'-4	#4@9"	1-#7
8'	10"	2'-8	#4@12"	3-#4
9'	10"	2'-10	#4@12"	3-#4
10'	1'-0	3'-0	#5@12"	3-#5
11'	1'-0	3'-4	#5@12"	3-#5
12'	1'-0	3'-6	#5@12"	3-#6
13'	1'-2	4'-2	#5@12"	3-#6
14'	1'-4	4'-6	#5@12"	3-#7



FOOTING STEP DETAIL



Weakened Planes
Max. Spacing 30'

Expansion Joint
Max. Spacing 90'

TYPICAL JOINT DETAILS
Detail drawn for 8" thick wall

DESIGN	NW
DRAWN	VL
CHECKED	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

CADD FILENAME= ZFA 1:(51, 1)B3010.DGN
VIEW NAME= B300

DESIGN APPROVED
J. D. Davis

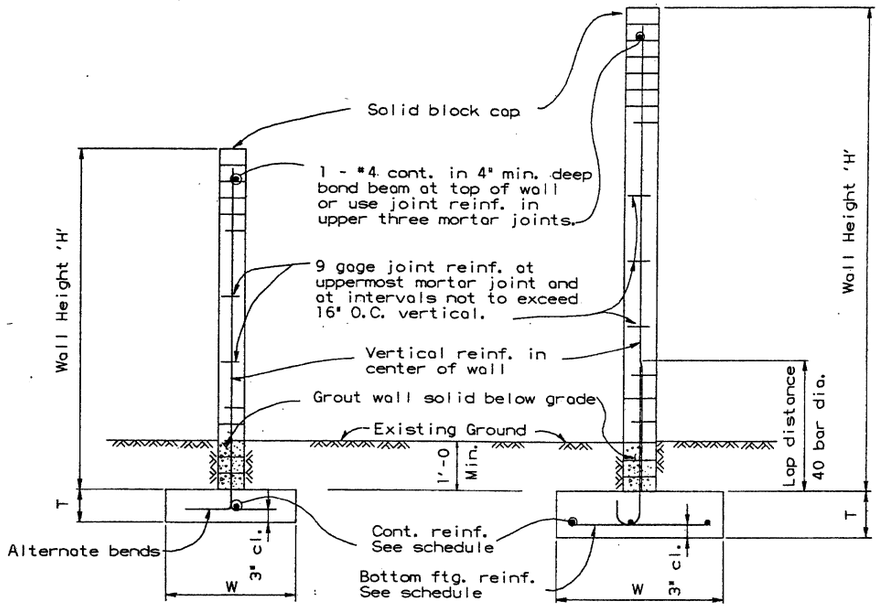
APPROVED FOR DISTRIBUTION
James A. McGee
7-15-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

CONCRETE SOUND BARRIER WALLS

REVISION

STANDARD NO.
B-30.10



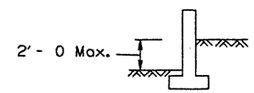
TYPICAL WALL SECTION

WALL SCHEDULE						
Wall Height 'H'	Wall Thick*	Ftg. Depth 'T'	Ftg. Width 'W'	Reinforcing		
				Wall & Dowel	Bottom Ftg.	Cont. Ftg.
4'	6"	10"	1'-10	#5@32"	———	1-#6
5'	6"	10"	2'-0	#5@32"	———	1-#6
6'	6"	10"	2'-2	#5@32"	———	1-#6
7'	6"	1'-0	2'-4	#6@40"	———	1-#6
8'	8"	1'-0	2'-8	#6@40"	#5@40"	3-#4
9'	8"	1'-0	2'-10	#6@32"	#5@32"	3-#4
10'	8"	1'-0	3'-0	#6@24"	#5@24"	3-#5
11'	8"	1'-6	3'-4	#7@40"	#6@40"	3-#5
12'	8"	1'-6	3'-6	#7@24"	#6@32"	3-#6
13'	12"	1'-6	4'-2	#7@40"	#6@40"	3-#6
14'	12"	1'-6	4'-6	#7@24"	#6@32"	3-#7

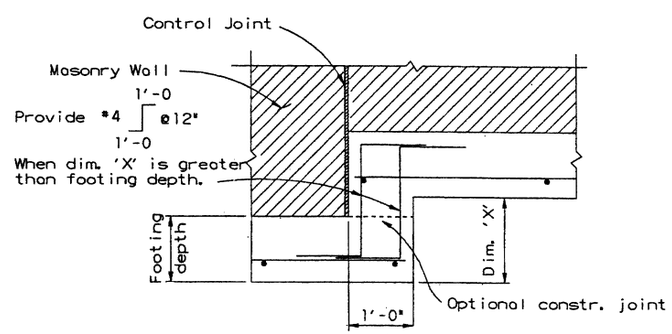
* Nominal Dimension

GENERAL NOTES

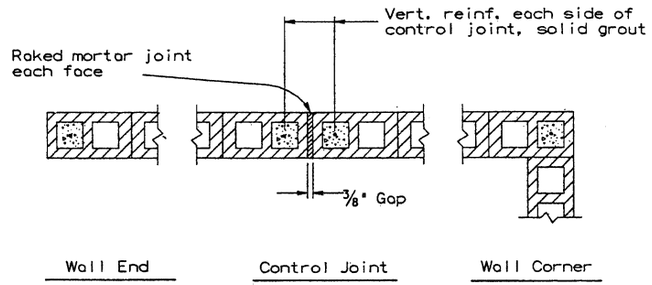
Construction - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Edition of 1982 and 1985 Supplemental.
Design - AASHTO Standard Specifications for Highway Bridges, 1983 Edition and 1984 and 1985 Supplements.
All concrete shall be class 'S' unless noted otherwise.
Reinforcing Steel shall conform to ASTM Specification A615.
Bar sizes #6 and smaller shall be designed as Grade 40 and furnished as Grade 40 or Grade 60.
Bar sizes #7 and larger shall be Grade 60.
9 Gage joint Reinforcing : Standard weight, Fy = 33,000 psi.
Masonry block, mortar, grout and wind load as per 1985 Uniform Building Code.
Stresses - Concrete ---------- f'c = 2,500 psi.
Masonry ---------- f'm = 1,350 psi.
Grade 40 Reinforcing Steel ------ fs = 20,000 psi.
Grade 60 Reinforcing Steel ------ fs = 24,000 psi.
Wind Load - Wind Velocity 80 MPH. Wind Pressure 18.4 psf for heights <= 12'-0 and 24.5 psf for heights > 12'-0.
Design requires a minimum allowable Soil Pressure of 1,500 psf.
Control joints shall occur at intervals not to exceed 24'-0.
Maximum allowable backfill variation shall be shown as below:



For wall treatment and type of block see Project Plans.
This drawing compatible with block types shown on Arizona Masonry Guide Standard #1080-80, #1090-80, #2000-80 and #2010-80.



FOOTING STEP DETAIL



TYPICAL WALL DETAILS

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

DESIGN
DRAWN
CHECKED
ENG.
VIL.

CADD FILENAME= ZFA 1=(51, 1)B3020.DGN
VIEW NAME= B3020

DESIGN APPROVED
J. D. Davis

APPROVED FOR DISTRIBUTION
James A. McRae
2-19-87

ARIZONA
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DRAWINGS

REVISION

MASONRY SOUND BARRIER WALLS

STANDARD NO.
B-30.20