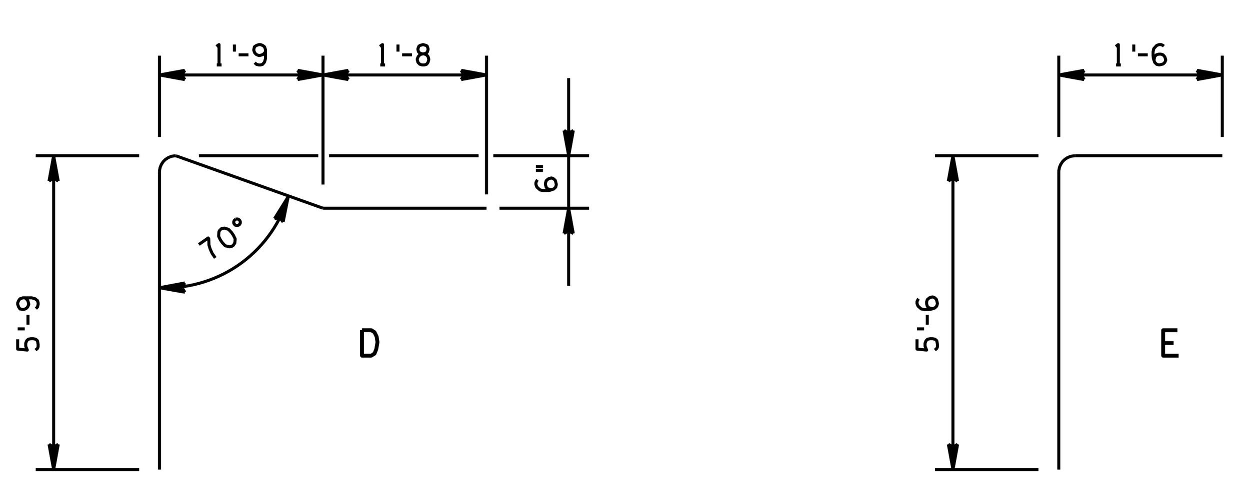
Mark	Bend	RIGHT ANGLE																			
		90" Φ		96" Φ		102" Φ		108" Φ		114" Φ		120" Φ		126" Φ		132" Φ		138" Φ		144" Φ	
		No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth
h	D	16	9'-3	17	9'-3	18	9'-3	18	9'-3	19	9'-3	20	9'-3	21	9'-3	21	9'-3	22	9'-3	23	9'-3
j	str	8	24'-0	8	25'-0	8	26'-0	8	27'-0	8	28'-0	8	29'-0	8	30'-0	8	31'-0	8	32'-0	8	33'-0
k	E	16	7'-0	17	7'-0	18	7'-0	18	7'-0	19	7'-0	20	7'-0	21	7'-0	21	7'-0	22	7'-0	23	7'-0
r1	str	9	20'-0	9	21'-0	9	21'-9	9	22'-9	9	23'-9	11	24'-9	11	25'-6	11	26'-6	11	27'-6	13	28'-6
r2	str	4	15'-0	4	15'-6	4	17'-0	4	18'-6	4	18'-6	4	20'-0	4	20'-6	4	23'-0	4	24'-0	4	23'-6
r3	str	4	9'-9	4	10'-0	4	11'-6	4	13'-0	4	13'-6	4	15'-6	4	15'-0	4	17'-6	4	18'-6	4	17'-9
r4	str	2	7'-0	2	7'-6	2	9'-0	2	10'-6	4	9'-6	2	11'-0	4	10'-0	4	12'-0	4	13'-0	4	12'-0
r5	str																	2	10'-6	2	9'-0
s	str	51	2'-0	53	2'-0	56	2'-0	58	2'-0	61	2'-0	63	2'-0	66	2'-0	68	2'-0	71	2'-0	73	2'-0
t1	str	3	8'-0	4	8'-6	4	9'-0	4	9'-6	4	10'-0	4	10'-6	4	11'-0	4	11'-6	4	12'-0	5	12'-6
t2	str	3	10'-3	3	11'-0	4	11'-6	4	12'-0	4	12'-9	4	13'-3	4	13'-9	4	14'-6	4	15'-0	4	15'-6
t3	str	3	12'-6	3	13'-3	3	14'-0	4	14'-6	4	15'-3	4	16'-0	4	16'-9	4	17'-3	4	18'-0	4	18'-6
t4	str	3	15'-0	3	15'-9	3	16'-6	3	17'-3	3	18'-0	4	18'-9	4	19'-6	4	20'-3	4	21'-0	4	21'-9
t5	str	3	17'-3	3	18'-3	3	19'-0	3	19'-9	3	20'-9	3	21'-6	4	22'-3	4	23'-3	4	24'-0	4	24'-9
t6	str	3	19'-6	3	20'-6	3	21'-6	3	22'-6	3	23'-3	3	24'-3	3	25'-3	4	26'-0	4	27'-0	4	28'-0
t7	str	3	22'-0	3	23'-0	3	24'-0	3	25'-0	3	26'-0	3	27'-0	3	28'-0	3	29'-0	4	30'-0	4	31'-0

Mark	Bend	15° SKEW																			
		90" Φ		96" Φ		102" Φ		108" Φ		114" Φ		120" Φ		126" Φ		132" Φ		138" Φ		144" Φ	
		No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth
h	D	16	9'-3	17	9'-3	17	9'-3	18	9'-3	19	9'-3	19	9'-3	20	9'-3	21	9'-3	21	9'-3	22	9'-3
j	str	8	23'-0	8	24'-0	8	25'-0	8	26'-0	8	27'-0	8	28'-0	8	29'-0	8	30'-0	8	31'-0	8	32'-0
k	E	16	7'-0	17	7'-0	17	7'-0	18	7'-0	19	7'-0	19	7'-0	20	7'-0	21	7'-0	21	7'-0	22	7'-0
r1	str	8	18'-6	9	19'-3	9	20'-3	9	21'-0	10	22'-0	10	23'-0	11	23'-9	12	24'-9	12	25'-6	13	26'-6
r2	str	2	16'-6	2	17'-0	2	18'-6	2	20'-0	2	20'-0	2	20'-6	2	22'-0	2	22'-0	2	23'-0	3	23'-0
r3	str	2	13'-6	2	14'-0	2	15'-6	2	17'-0	2	17'-6	2	18'-0	2	18'-9	2	19'-0	2	20'-0	3	18'-6
r4	str	2	10'-6	2	11'-0	2	12'-6	2	14'-0	2	14'-3	2	14'-9	2	15'-9	2	16'-0	2	17'-0	2	15'-6
r5	str	2	7'-6	2	8'-0	2	9'-6	2	11'-0	2	10'-9	2	11'-3	2	12'-6	2	13'-0	2	14'-0	2	12'-6
r6	str	2	4'-6	2	5'-0	2	6'-6	2	8'-0	2	7'-6	2	8'-0	2	9'-6	2	10'-0	2	11'-0	2	9'-6
r7	str															2	7'-0	2	8'-0	2	6'-6
r8	str	1	9'-0	1	9'-9	1	10'-6	1	11'-3	1	11'-9	1	12'-6	1	13'-3	1	14'-0	1	14'-9	1	15'-6
s	str	47	2'-0	50	2'-0	53	2'-0	56	2'-0	59	2'-0	62	2'-0	65	2'-0	68	2'-0	71	2'-0	74	2'-0
t1	str	2	8'-6	3	9'-0	2	9'-6	3	10'-0	3	10'-3	3	10'-9	3	11'-3	3	11'-9	3	12'-3	3	12'-9
t2	str	2	10'-0	2	11'-0	2	11'-0	2	12'-0	3	12'-6	3	13'-0	3	13'-6	3	14'-3	3	14'-6	3	15'-0
t3	str	2	11'-6	2	12'-6	2	12'-6	2	13'-6	2	15'-0	3	15'-3	3	16'-0	3	16'-9	3	17'-0	3	17'-3
t4	str	2	13'-0	2	14'-0	2	14'-3	2	15'-0	2	16'-9	2	17'-6	3	18'-3	3	19'-0	3	19'-3	3	19'-6
t5	str	2	14'-6	2	15'-6	2	15'-9	2	16'-6	2	18'-3	2	19'-0	2	20'-9	3	21'-6	3	21'-9	3	22'-0
t6	str	2	16'-0	2	17'-0	2	17'-3	2	18'-0	2	20'-0	2	20'-9	2	22'-3	2	23'-6	3	24'-0	3	24'-3
t7	str	2	17'-6	2	18'-6	2	18'-9	2	19'-6	2	21'-9	2	22'-3	2	23'-9	2	25'-0	2	26'-0	3	26'-6
t8	str	2	19'-0	2	20'-0	2	20'-6	2	21'-0	2	23'-3	2	24'-0	2	25'-6	2	26'-6	2	27'-6	2	28'-6
t9	str	2	21'-6	2	21'-6	2	22'-0	2	22'-6	2	25'-0	2	25'-6	2	27'-0	2	28'-0	2	29'-0	2	30'-0
t10	str					2	21'-0	2	22'-0	2	19'-0	2	21'-0	2	24'-0	2	17'-0	2	21'-0	1	23'-0
t11	str	1	21'-6	1	22'-6	1	23'-6	1	24'-6	1	25'-6	1	26'-6	1	27'-6	1	28'-6	1	29'-6	1	30'-6

Mark	Bend	30° SKEW																			
		90" Φ		96" Φ		102" Φ		108" Φ		114" Φ		120" Φ		126" Φ		132" Φ		138" Φ		144" Φ	
		No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth
h	D	19	9'-3	20	9'-3	21	9'-3	22	9'-3	23	9'-3	24	9'-3	25	9'-3	26	9'-3	27	9'-3	28	9'-3
j	str	8	30'-0	8	31'-3	8	32'-6	8	33'-9	8	35'-0	8	36'-0	8	37'-3	8	38'-6	8	39'-9	8	41'-0
k	E	19	7'-0	20	7'-0	21	7'-0	22	7'-0	23	7'-0	24	7'-0	25	7'-0	26	7'-0	27	7'-0	28	7'-0
r1	str	9	15'-6	10	16'-3	11	17'-3	11	18'-0	11	19'-0	12	19'-9	13	20'-9	13	21'-6	14	22'-3	14	23'-3
r2	str	2	14'-6	2	15'-6	2	15'-9	2	17'-0	2	18'-0	2	18'-6	2	19'-3	3	19'-6	3	20'-0	3	21'-0
r3	str	2	13'-0	2	13'-9	2	14'-3	2	15'-3	2	16'-3	2	16'-9	2	17'-6	2	17'-9	3	18'-3	3	19'-6
r4	str	2	11'-6	2	12'-3	2	12'-6	2	13'-9	2	14'-9	2	15'-3	2	15'-9	2	16'-3	2	16'-6	3	18'-0
r5	str	2	10'-0	2	10'-6	2	10'-9	2	12'-0	2	13'-0	2	13'-6	2	14'-3	2	14'-6	2	14'-9	2	15'-9
r6	str	2	9'-6	2	9'-0	2	9'-3	2	10'-3	2	11'-6	2	12'-0	2	12'-6	2	13'-0	2	12'-9	2	13'-9
r7	str	2	7'-0	2	7'-3	2	7'-6	2	8'-9	2	9'-9	2	10'-3	2	10'-9	2	11'-3	2	11'-0	2	11'-6
r8	str	2	5'-6	2	5'-9	2	6'-0	2	7'-0	2	8'-3	2	8'-9	2	9'-3	2	9'-9	2	9'-3	2	9'-6
r9	str							1	6'-3	2	6'-6	2	7'-0	2	7'-6	2	8'-0	2	7'-6	2	7'-3
s	str	48	2'-0	51	2'-0	53	2'-0	56	2'-0	59	2'-0	61	2'-0	64	2'-0	67	2'-0	69	2'-0	72	2'-0
t1	str	2	9'-3	2	9'-9	3	10'-3	3	11'-0	3	11'-6	3	12'-0	3	12'-6	3	13'-0	3	13'-9	3	14'-3
t2	str	2	11'-9	2	12'-3	2	12'-9	3	13'-9	3	14'-3	3	15'-0	3	15'-6	3	16'-3	3	17'-0	3	17'-6
t3	str	2	14'-0	2	14'-6	2	15'-3	2	16'-6	3	17'-3	3	18'-0	3	18'-9	3	19'-6	3	20'-3	3	20'-9
t4	str	2	16'-6	2	17'-0	2	17'-9	2	19'-3	2	20'-0	3	21'-0	3	21'-9	3	22'-6	3	23'-9	3	24'-0
t5	str	2	18'-9	2	19'-3	2	20'-3	2	21'-9	2	22'-9	2	24'-0	2	24'-9	3	25'-9	3	27'-0	3	27'-3
t6	str	2	21'-3	2	21'-9	2	23'-0	2	24'-6	2	25'-6	2	27'-0	2	27'-9	2	29'-0	2	30'-3	3	30'-6
t7	str	2	23'-6	2	24'-0	2	25'-6	2	27'-3	2	28'-6	2	30'-0	2	31'-0	2	32'-3	2	33'-9	2	33'-9
t8	str	1	26'-0	1	26'-6	2	28'-0	2	30'-0	2	31'-3	2	33'-0	2	34'-0	2	35'-6	2	37'-0	2	37'-0
t9	str			1	20'-0													1	24'-0	1	25'-0
t10	str	1	29'-3	1	30'-6	1	31'-9	1	33'-0	1	34'-3	1	35'-6	1	36'-9	1	38'-0	1	39'-3	1	40'-6

Mark	Bend	45° SKEW																			
		90" Φ		96" Φ		102" Φ		108" Φ		114" Φ		120" Φ		126" Φ		132" Φ		138" Φ		144" Φ	
		No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth	No	Lgth
h	D	25	9'-3	26	9'-3	27	9'-3	29	9'-3	30	9'-3	31	9'-3	32	9'-3	34	9'-3	35	9'-3	36	9'-3
j	str	8	37'-0	8	39'-0	8	41'-0	8	43'-0	8	45'-0	8	47'-0	8	49'-0	8	51'-0	8	53'-0	8	55'-0
k	E	25	7'-0	26	7'-0	27	7'-0	29	7'-0	30	7'-0	31	7'-0	32	7'-0	34	7'-0	35	7'-0	36	7'-0
r1	str	11	12'-6	12	13'-6	13	14'-6	14	15'-3	14	16'-3	15	17'-3	16	18'-3	16	19'-0	17	20'-0	17	21'-0
r2	str	3	11'-6	3	12'-3	3	13'-0	3	13'-9	3	14'-6	3	15'-6	3	16'-3	3	17'-0	3	17'-9	4	18'-6
r3	str	3	10'-0	3	10'-9	3	11'-3	3	12'-3	3	13'-0	3	14'-0	3	14'-6	3	15'-6	3	16'-3	3	16'-9
r4	str	3	8'-9	3	9'-3	3	9'-9	3	10'-9	3	11'-3	3	12'-6	3	13'-0	3	14'-0	3	14'-6	3	15'-3
r5	str	3	7'-3	3	7'-9	3	8'-0	3	9'-3	3	9'-9	3	11'-0	3	11'-3	3	12'-3	3	13'-0	3	13'-6
r6	str	3	5'-9	3	6'-0	3	6'-3	3	7'-6	3	8'-3	3	9'-3	3	9'-9	3	10'-9	3	11'-3	3	12'-0
r7	str	2	4'-6	2	5'-3	3	4'-9	3	6'-0	3	6'-9	3	7'-9	3	8'-3	3	9'-3	3	9'-9	3	10'-3
r8	str							3	4'-6	3	5'-3	2	6'-6	3	6'-6	3	7'-9	3	8'-3	3	8'-9
r9	str									2	4'-0	2	5'-6	3	4'-9	2	6'-6	3	6'-6	3	7'-0
r10	str															2	5'-6	3	5'-0	3	5'-6
s	str	47	2'-0	50	2'-0	53	2'-0	56	2'-0	59	2'-0	62	2'-0	65	2'-0	68	2'-0	71	2'-0	74	2'-0
t1	str	2	12'-0	2	12'-9	2	13'-3	2	14'-0	2	14'-9	2	15'-3	2	16'-0	3	16'-9	3	17'-3	3	18'-0
t2	str	2	16'-3	2	16'-9	2	17'-3	2	17'-9	2	18'-9	2	19'-3	2	19'-9	2	22'-0	3	23'-0	3	23'-0
t3	str	2	20'-6	2	20'-9	2	21'-6	2	21'-9	2	22'-6	2	23'-3	2	23'-6	2	26'-3	2	29'-0	3	28'-0
t4	str	2	24'-9	2	25'-0	2	25'-9	2	25'-6	2	26'-3	2	27'-0	2	27'-3	2	30'-6	2	33'-0	2	33'-0
t5	str	2	29'-0	2	29'-0	2	29'-9	2	29'-3	2	30'-3	2	31'-0	2	30'-9	2	34'-6	2	37'-0	2	38'-0
t6	str	1	33'-0	2	33'-0	2	34'-0	2	33'-3	2	34'-3	2	35'-0	2	34'-6	2	38'-9	2	41'-0	2	43'-0
t7	str			1	34'-0	1	36'-0	2	37'-0	2	38'-0	2	39'-0	2	38'-3	2	43'-0	2	45'-0	2	48'-0
t8	str											1	41'-0	2	42'-0	2	40'-0	2	39'-0	2	30'-0
t9	str	1	28'-0	1	13'-0	1	24'-0	1	24'-0	2	21'-0	2	19'-0	2	21'-0	2	19'-0	2	19'-0	2	16'-0
t10	str	1	36'-0	1	38'-0	1	40'-0	1	42'-0	1	44'-0	1	46'-0	1	48'-0	1	50'-0	1	52'-0	1	54'-0

	QUANTITIES		
	PIPE Dia.	REINF. Lbs.	CONCRETE C.Y.
RIGHT ANGLE	90"	220	3.7
	96"	235	4.3
	102"	265	4.8
	108"	285	5.5
	114"	315	5.9
	120"	370	6.6
	126"	415	7.3
	132"	450	8.1
	138"	515	8.7
	144"	560	9.1
15° SKEW	90"	185	3.9
	96"	215	4.5
	102"	250	4.9
	108"	275	5.5
	114"	320	6.0
	120"	335	6.6
	126"	385	7.4
	132"	445	8.1
	138"	465	8.6
	144"	515	9.3
30° SKEW	90"	230	5.4
	96"	290	6.1
	102"	340	6.5
	108"	375	7.3
	114"	415	7.8
	120"	465	8.5
	126"	495	9.3
	132"	545	10.0
	138"	610	10.7
	144"	660	11.5
45° SKEW	90"	350	7.3
	96"	405	8.1
	102"	440	8.9
	108"	515	9.8
	114"	555	10.6
	120"	615	11.6
	126"	675	12.7
	132"	745	13.7
	138"	815	14.8
	144"	855	15.9



BENDS

NOTE:

All reinforcing bars are #4.
The apron quantities take into consideration the cutoff walls being omitted along outlet headwalls.

NOTE:

For General Notes and additional Details, see SD 6.30 (1 of 5) and SD 6.36 (1 of 4).

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	7-12
2			
3			
4			

DESIGN APPROVED Shafi U. Hasan

APPROVED FOR DISTRIBUTION Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

PIPE CULVERT HEADWALLS
OUTLET APRON STEEL LIST
4 : 1 SLOPE

ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.36 (3 of 4)

LOCATION | SHEET NO. OF

22-JAN-2016 14:46 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.30 Series\SD636-1 to 4\sd636-3_0116.dgn