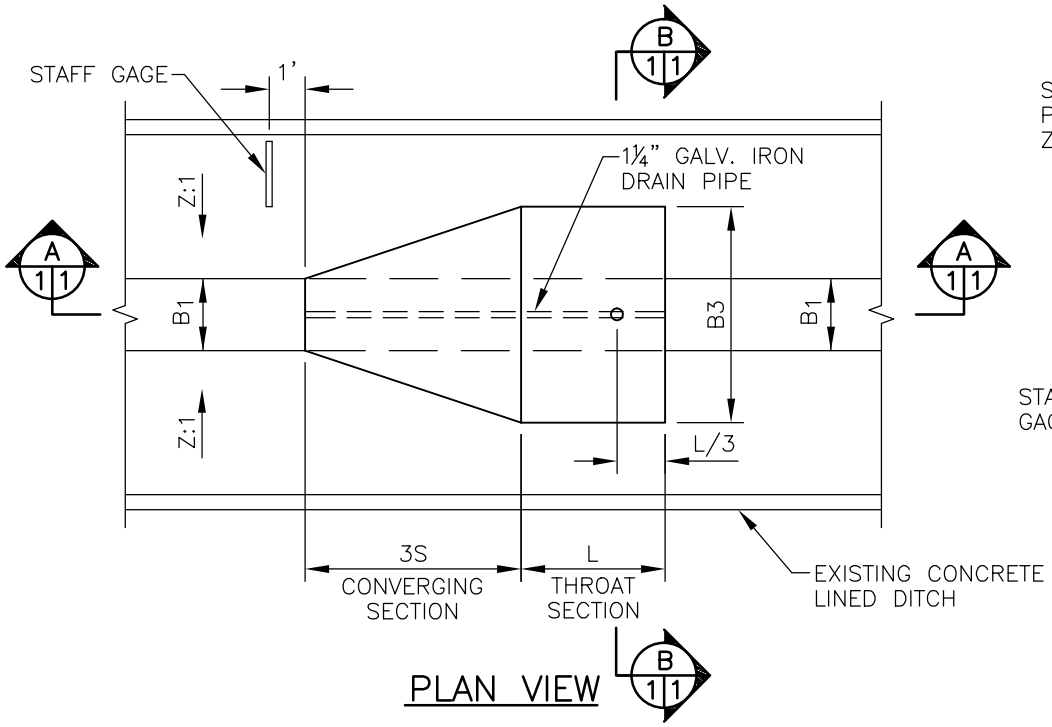
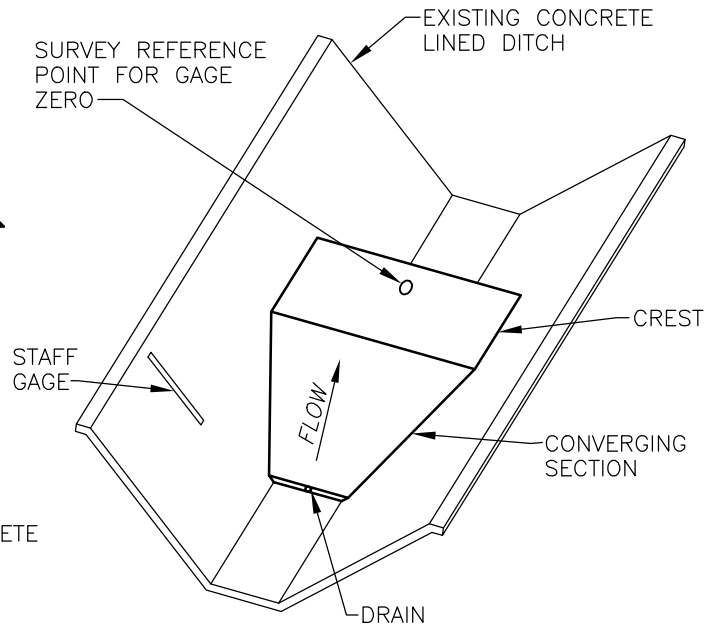
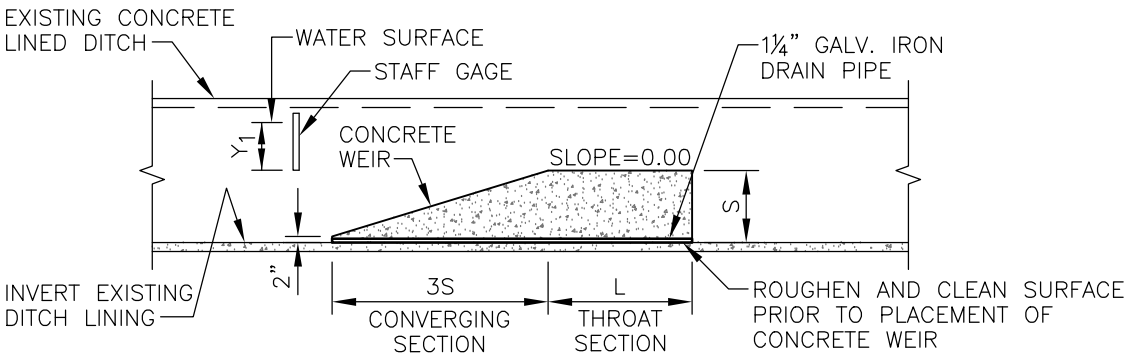


PLAN VIEW



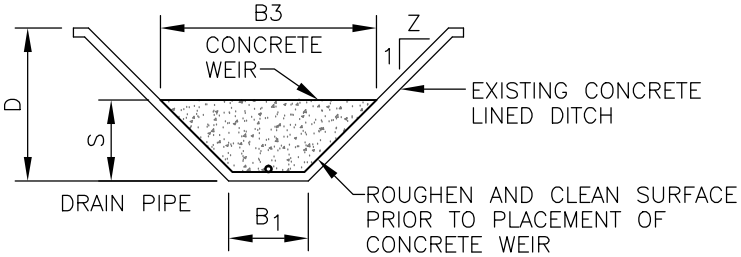
ISOMETRIC VIEW
NOT TO SCALE



SECTION A 1 1

NOTES:

1. STADARDIZED DESIGNS – MUST BE ADAPTED TO THE SPECIFIC SITE.
2. STRUCTURE SHALL BE INSTALLED IN ACCORDANCE WITH N.R.C.S. ENGINEERING STANDARD AND SPECIFICATIONS NO. COLO. – 587 "STRUCTURE FOR WATER CONTROL."



SECTION B 1 1

STATION	Qm C.F.S.	D	B_1	S	3S	L	Z	CU. YD.

File Name

Drawing Name CO-SSP-67

Sheet 1 of 4

		Date
Designed	J.R.	02-78
Drawn	DDD	05-12
Checked		
Approved	J.E. ANDREWS S.C.E.	05-12

TRAPEZOIDAL BROAD CRESTED WEIR

(REVISED LAST ON 05-12)

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

BROAD CRESTED WEIR

VERTICAL DEPTH, Y_1

FLOW = Qm (C.F.S.)	B_1 = 1' Z = 1:1			B_1 = 2' Z = 1:1			B_1 = 2' Z = 1.25:1		
	L=2.0 S=0.50	L=2.5 S=0.75	L=2.0 S=1.00	L=3.0 S=1.00	L=2.0 S=1.25	L=2.0 S=1.50	L=3.0 S=1.25	L=3.0 S=1.50	L=2.5 S=1.75
0.5	0.18	0.16	0.14						
0.6	0.20	0.18	0.16						
0.7	0.22	0.20	0.18						
0.8	0.24	0.22	0.19						
0.9	0.26	0.23	0.21						
1.0	0.28	0.24	0.22						
1.2	0.30	0.27	0.25						
1.4	0.34	0.30	0.27						
1.5	0.35	0.31	0.28						
1.6	0.36	0.33	0.29						
1.8	0.39	0.35	0.32						
2.0	0.41	0.37	0.34	0.29	0.27	0.25	0.25	0.23	0.22
2.5	0.47	0.43	0.39	0.33	0.31	0.29	0.28	0.27	0.25
3.0	0.52	0.47	0.43	0.37	0.35	0.33	0.32	0.30	0.28
3.5	0.57	0.52	0.48	0.41	0.38	0.36	0.36	0.33	0.31
4.0	0.61	0.56	0.51	0.45	0.42	0.39	0.39	0.36	0.34
4.5	0.65	0.60	0.55	0.48	0.45	0.42	0.42	0.39	0.37
5.0	0.69	0.64	0.59	0.51	0.48	0.45	0.44	0.41	0.39
6.0	0.76	0.70	0.65	0.57	0.53	0.51	0.49	0.46	0.44
7.0	0.83	0.77	0.71	0.62	0.59	0.56	0.54	0.51	0.48
8.0	0.89	0.83	0.77	0.68	0.64	0.60	0.59	0.55	0.52
9.0	0.95	0.88	0.82	0.72	0.68	0.65	0.63	0.59	0.56
10.0	1.00	0.93	0.87	0.77	0.73	0.69	0.67	0.63	0.60
11.0	1.05	0.98	0.93	0.81	0.77	0.73	0.71	0.67	0.64
12.0	1.10	1.03	0.97	0.86	0.81	0.77	0.75	0.71	0.67
13.0	1.13	1.08		0.90	0.85	0.81	0.78	0.74	0.70
14.0	1.19	1.12		0.93	0.89	0.84	0.82	0.78	0.74
15.0	1.23	1.16		0.97	0.92	0.88	0.85	0.81	0.77
16.0	1.27	1.20		1.01	0.96	0.91	0.88	0.84	0.80
17.0	1.32	1.24		1.04	0.99	0.95	0.91	0.87	0.83
18.0	1.35	1.28		1.08	1.03	0.98	0.95	0.90	0.85
19.0	1.39	1.31		1.11	1.06	1.01	0.97	0.93	0.88
20.0	1.42	1.35		1.14	1.09	1.04	1.00	0.96	0.91
21.0	1.46	1.38		1.17	1.12	1.07	1.03	0.98	0.94
22.0	1.49	1.41		1.20	1.15	1.10	1.06	1.01	0.96
23.0	1.53	1.45		1.23	1.18	1.13	1.09	1.04	0.99
24.0	1.56	1.48		1.25	1.21	1.16	1.11	1.06	1.01
25.0	1.59			1.29	1.24	1.18	1.14	1.09	1.04
26.0	1.62			1.32	1.26	1.21	1.16	1.11	1.06
27.0	1.65			1.35	1.29	1.24	1.19	1.14	1.08
28.0	1.68			1.38	1.32	1.26	1.21	1.16	1.11
29.0	1.71			1.40	1.34	1.29	1.24	1.18	1.13
30.0	1.74			1.43	1.37	1.31	1.26	1.21	1.15
31.0	1.76			1.45	1.39	1.34	1.28	1.23	1.17
32.0	1.79			1.48	1.42	1.36	1.31	1.25	1.20
33.0	1.82			1.50	1.44	1.39	1.33	1.27	1.22
34.0	1.84			1.53	1.47	1.41	1.35	1.29	1.24
35.0	1.87			1.55	1.49	1.43	1.37	1.31	1.26

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

TRAPEZOIDAL
BROAD CRESTED WEIR

(REVISED LAST ON 05–12)

		Date
Designed	J.R.	02–78
Drawn	DDD	05–12
Checked		
Approved	J.E. ANDREWS S.C.E.	05–12

File Name

Drawing Name CO–SSP–67

Sheet 2 of 4

BROAD–CRESTED WEIR DESIGN AND SELECTION:

LOCATION: BERRY PATCH ACRES, COLORADO

HOW WERE Q_m AND d_m DETERMINED?

CONCRETE DITCH DATA:

1. TOTAL DEPTH – d = 2 FT. = 24 IN.
2. BOTTOM WIDTH – B1 = 1 FT. = 12 IN.
3. SIDE SLOPES – Z = 1:1

FLOW DATA FOR CONCRETE DITCH WITHOUT WEIR IN PLACE:

4. MAXIMUM DISCHARGE RATE, Q_m = 9 C.F.S.
5. FLOW DEPTH FOR Q_m ___, d_m = 1.42 FT. 17 IN.
6. FREEBOARD (LINE 1–5) f_b = 0.58 FT. 7 IN.

WEIR SELECTION USING TABLES:

		TRIAL 1	TRIAL 2	TRIAL 3	
7. TRIAL WEIR IDENTIFICATION:		T = 1.0	T = 0.50	T = 0.50	
8. BOTTOM WIDTH, B1 (MATCHES LINE 2)	B1 =	1.0	1.0	1.0	FT.
9. SILL WIDTH, B3	B3 =	3.0	2.5	2.0	FT.
10. SIDE SLOPES, Z (MATCHES LINE 3)	Z =	1.0	1.0	1.0	
11. TRIAL WEIR SILL HEIGHT, S	S =	1.0	0.75	0.5	FT.
12. CRITICAL SECTION (SILL) LENGTH, L	L =	1.0	1.50	2.0	FT.

SUBMERGENCE – FREEFLOW CHECK, WEIR IN PLACE:

13. SILL–REFERENCED FLOW DEPTH FOR Q_m (TABLES)	Y1 =	0.82	0.88	0.95	FT.
14. UPSTREAM CANAL DEPTH (LINE 11 PLUS LINE 13)	D1 =	1.82	1.63	1.45	FT.
15. INCREASE IN CANAL DEPTH: (LINE 14 MINUS LINE 5)	ΔY1 =	0.40	0.21	0.03	FT.
16. NECESSARY INCREASE IN CANAL DEPTH: ΔY1=15%x(LINE 13)	=	0.12	0.13	0.14	FT.
17. LINE 15–LINE 16: (IF NEGATIVE TRY HIGHER SILL) (IF POSITIVE, CONSIDER LOWER SILL.) (REPEAT 7–17)	=	0.28	0.08	–0.11	FT.
*18. FREEBOARD CHECK: (LINE 1 MINUS LINE 14) (IF FREEBOARD IS TOO SMALL, TRY NEXT LOWER WEIR) (REPEAT LINES 7–18)	f_b =	0.18	0.37	–	FT.

* ADDITIONAL FREEBOARD MAY NECESSITATE RAISING THE WALLS OF AN EXISTING CONCRETE DITCH UPSTREAM FROM THE WEIR.

FARMER: JOHN Q. IRRIGATOR

TRAPEZOIDAL
BROAD CRESTED WEIR

DESIGN CALCULATIONS

File Name

Drawing Name CO–SSP–67

Sheet 3 of 4

Designed J.R. Date 02–78

Drawn DDD 05–12

Checked

Approved J.E. ANDREWS S.C.E. 05–12

TRAPEZOIDAL
BROAD CRESTED WEIR

(REVISED LAST ON 05–12)

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

BROAD–CRESTED WEIR DESIGN AND SELECTION:

LOCATION: _____

HOW WERE Q_m AND d_m DETERMINED?

_____

CONCRETE DITCH DATA:

1. TOTAL DEPTH – d = ___FT. = ___IN.
2. BOTTOM WIDTH – B1 = ___FT. = ___IN.
3. SIDE SLOPES – Z = ___

FLOW DATA FOR CONCRETE DITCH WITHOUT WEIR IN PLACE:

4. MAXIMUM DISCHARGE RATE, Q_m = ___C.F.S.
5. FLOW DEPTH FOR Q_m ___, d_m = ___FT. ___IN.
6. FREEBOARD (LINE 1–5)f_b = ___FT. ___IN.

WEIR SELECTION USING TABLES:

		TRIAL 1	TRIAL 2	TRIAL 3	
7. TRIAL WEIR IDENTIFICATION: _____					
8. BOTTOM WIDTH, B1 (MATCHES LINE 2) _____	B1 =				FT.
9. SILL WIDTH, B3 _____	B3 =				FT.
10. SIDE SLOPES, Z (MATCHES LINE 3) _____	Z =				
11. TRIAL WEIR SILL HEIGHT, S _____	S =				FT.
12. CRITICAL SECTION (SILL) LENGTH, L _____	L =				FT.

SUBMERGENCE – FREEFLOW CHECK, WEIR IN PLACE:

13. SILL–REFERENCED FLOW DEPTH FOR Q_m (TABLES)_____	Y1 =				FT.
14. UPSTREAM CANAL DEPTH (LINE 11 PLUS LINE 13)_____	D1 =				FT.
15. INCREASE IN CANAL DEPTH: (LINE 14 MINUS LINE 5)_____	ΔY1 =				FT.
16. NECESSARY INCREASE IN CANAL DEPTH: ΔY1=15%x(LINE 13)	=				FT.
17. LINE 15–LINE 16: (IF NEGATIVE TRY HIGHER SILL)_____ (IF POSITIVE, CONSIDER LOWER SILL.) (REPEAT 7–17)	=				FT.
*18. FREEBOARD CHECK: (LINE 1 MINUS LINE 14)_____ (IF FREEBOARD IS TOO SMALL, TRY NEXT LOWER WEIR) (REPEAT LINES 7–18)	f_b =				FT.

* ADDITIONAL FREEBOARD MAY NECESSITATE RAISING THE WALLS OF AN EXISTING CONCRETE DITCH UPSTREAM FROM THE WEIR.

FARMER: _____

TRAPEZOIDAL
BROAD CRESTED WEIR

_____

DESIGN CALCULATIONS

File Name

Drawing Name CO–SSP–67

Sheet 4 of 4

Designed J.R. Date 02–78

Drawn DDD 05–12

Checked

Approved J.E. ANDREWS 05–12
S.C.E.

TRAPEZOIDAL
BROAD CRESTED WEIR

(REVISED LAST ON 05–12)

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