Sheet is best viewed when printed on 11x17 paper.

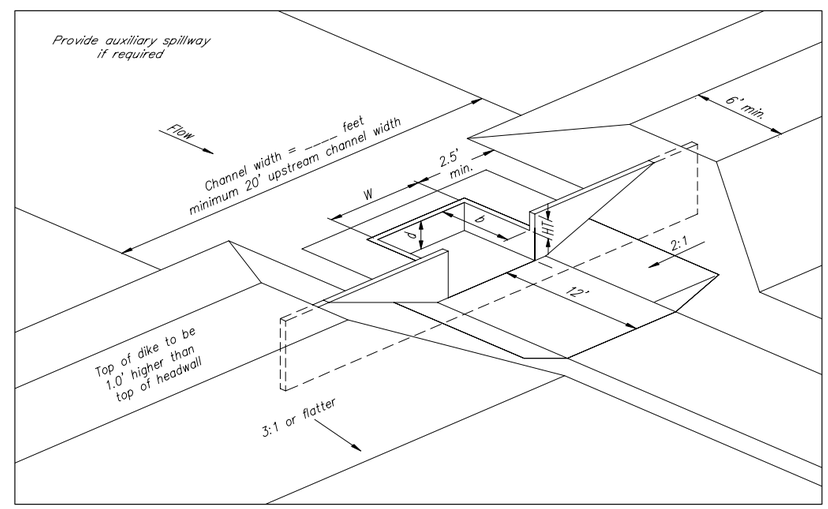
Hydraulic Capacity (Q) (cfs)	Headwall Height Above Crest (HT) (feet)	Overfall Height (d) (feet)	Box Depth (b) (feet)	Box Width (w) (feet)	Down-stream Channel Width (We) (feet)	Critical Tail-water Depth (Dc) (feet)	Required Tail-water Depth (D2) (feet)	PVC Pipe Quantities for Weep Holes: Number Of Weep-holes	PVC Pipe Quantities for Weep Holes: Length Of PVC Pipe (ln. ft.)	Drainage Quantities: Drainfill Quantity (tons)	Drainage Quantities: Geotextile Nonwoven Quantity (sq. yd.)	Inlet Protection Quantities, Option A: Concrete Quantity (cu. yd.)	Inlet Protection Quantities, Option A: Wire Fabric Quantity (sq. yd.)	Inlet Protection Quantities, Option A: Sand Bedding Quantity (tons)	Inlet Protection Quantities, Option B: Concrete Block Quantity (each)	Inlet Protection Quantities, Option B: Sand Bedding Quantity (tons)	Inlet Protection Quantities, Option B: Geotextile Nonwoven Quantity (sq. yd.)	Inlet Protection Quantities, Option C: Riprap Quantity (tons)	Inlet Protection Quantities, Option C: Geotextile Nonwoven Quantity (sq. yd.)	Outlet Protection Quantities: Outlet Protection Depth (Da) (feet)	Outlet Protection Quantities, Option A: Concrete Quantity (cu. yd.)	Outlet Protection Quantities, Option A: Wire Fabric Quantity (sq. yd.)	Outlet Protection Quantities, Option A: Sand Bedding Quantity (tons)	Outlet Protection Quantities, Option B: Concrete Block Quantity (cu. yd.)	Outlet Protection Quantities, Option B: Sand Bedding Quantity (tons)	Outlet Protection Quantities, Option B: Geotextile Nonwoven Quantity (sq. yd.)	Outlet Protection Quantities, Option C: Riprap Quantity (tons)	Outlet Protection Quantities, Option C: Geotextile Nonwoven Quantity (sq. yd.)
56	2	3	2	4	6	1.4	2.2	4.0	2.0	3.1	8.6	0.7	5.1	0.9	47	0.9	7.8	3.0	7.8	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
76	2	3	4	4	6	1.7	2.7	6.0	3.0	3.6	10.1	0.8	6.0	1.0	56	1.0	9.1	3.5	9.1	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
90	2	3	6	4	6	1.9	3.1	8.0	4.0	4.2	11.7	1.0	6.9	1.1	65	1.1	10.4	4.0	10.4	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
109	2	3	4	6	8	1.8	2.9	7.0	3.5	3.9	10.9	1.0	6.9	1.1	64	1.1	10.2	4.0	10.2	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
112	3	3	4	4	6	2.2	3.5	6.0	3.0	3.6	10.1	0.8	6.0	1.0	56	1.0	9.1	3.5	9.1	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
121	3	3	6	4	6	2.3	3.7	8.0	4.0	4.2	11.7	1.0	6.9	1.1	65	1.1	10.4	4.0	10.4	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
123	2	3	4	8	10	1.7	2.7	8.0	4.0	4.2	11.7	1.1	7.8	1.3	72	1.3	11.3	4.5	11.3	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
128	2	3	6	6	8	2.0	3.2	9.0	4.5	4.4	12.4	1.1	7.8	1.3	73	1.3	11.6	4.5	11.6	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
146	3	3	4	6	8	2.2	3.5	7.0	3.5	3.9	10.9	1.0	6.9	1.1	64	1.1	10.2	4.0	10.2	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
147	3	3	6	6	8	2.2	3.5	9.0	4.5	4.4	12.4	1.1	7.8	1.3	73	1.3	11.6	4.5	11.6	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
147	2	3	6	8	10	1.9	3.0	10.0	5.0	4.7	13.2	1.2	8.7	1.4	81	1.4	12.7	5.1	12.7	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
155	2	3	8	8	10	2.0	3.1	12.0	6.0	5.3	14.8	1.3	9.6	1.6	90	1.6	14.0	5.6	14.0	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
175	3	3	6	8	10	2.1	3.4	10.0	5.0	4.7	13.2	1.2	8.7	1.4	81	1.4	12.7	5.1	12.7	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
177	3	3	4	8	10	2.1	3.4	8.0	4.0	4.2	11.7	1.1	7.8	1.3	72	1.3	11.3	4.5	11.3	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
177	3	3	8	8	10	2.1	3.4	12.0	6.0	5.3	14.8	1.3	9.6	1.6	90	1.6	14.0	5.6	14.0	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
60	2	4	2	4	6	1.5	2.3	4.0	2.0	4.3	11.0	0.7	5.1	0.9	47	0.9	7.8	3.0	7.8	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
93	2	4	4	4	6	2.0	3.1	6.0	3.0	5.1	13.0	0.8	6.0	1.0	56	1.0	9.1	3.5	9.1	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
112	2	4	4	6	8	1.8	2.9	7.0	3.5	5.4	14.0	1.0	6.9	1.1	64	1.1	10.2	4.0	10.2	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
118	2	4	6	4	6	2.3	3.7	8.0	4.0	5.8	15.0	1.0	6.9	1.1	65	1.1	10.4	4.0	10.4	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
123	2	4	4	8	10	1.7	2.7	8.0	4.0	5.8	15.0	1.1	7.8	1.3	72	1.3	11.3	4.5	11.3	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
128	2	4	6	6	8	2.0	3.2	9.0	4.5	6.2	16.0	1.1	7.8	1.3	73	1.3	11.6	4.5	11.6	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
140	3	4	4	4	6	2.6	4.1	6.0	3.0	5.1	13.0	0.8	6.0	1.0	56	1.0	9.1	3.5	9.1	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
147	2	4	6	8	10	1.9	3.0	10.0	5.0	6.6	17.0	1.2	8.7	1.4	81	1.4	12.7	5.1	12.7	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
155	2	4	8	8	10	2.0	3.1	12.0	6.0	7.4	19.0	1.3	9.6	1.6	90	1.6	14.0	5.6	14.0	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
162	3	4	6	4	6	2.8	4.5	8.0	4.0	5.8	15.0	1.0	6.9	1.1	65	1.1	10.4	4.0	10.4	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
178	3	4	4	6	8	2.5	4.0	7.0	3.5	5.4	14.0	1.0	6.9	1.1	64	1.1	10.2	4.0	10.2	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
206	3	4	6	6	8	2.7	4.4	9.0	4.5	6.2	16.0	1.1	7.8	1.3	73	1.3	11.6	4.5	11.6	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
233	3	4	4	8	10	2.6	4.1	8.0	4.0	5.8	15.0	1.1	7.8	1.3	72	1.3	11.3	4.5	11.3	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
270	3	4	6	8	10	2.8	4.5	10.0	5.0	6.6	17.0	1.2	8.7	1.4	81	1.4	12.7	5.1	12.7	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
286	3	4	8	8	10	2.9	4.7	12.0	6.0	7.4	19.0	1.3	9.6	1.6	90	1.6	14.0	5.6	14.0	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
60	2	5	2	4	6	1.5	2.3	4.0	2.0	5.5	13.4	0.7	5.1	0.9	47	0.9	7.8	3.0	7.8	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
93	2	5	4	4	6	2.0	3.1	6.0	3.0	6.5	15.9	0.8	6.0	1.0	56	1.0	9.1	3.5	9.1	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
112	2	5	4	6	8	1.8	2.9	7.0	3.5	7.0	17.1	1.0	6.9	1.1	64	1.1	10.2	4.0	10.2	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
120	2	5	6	4	6	2.3	3.7	8.0	4.0	7.5	18.3	1.0	6.9	1.1	65	1.1	10.4	4.0	10.4	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
123	2	5	4	8	10	1.7	2.7	8.0	4.0	7.5	18.3	1.1	7.8	1.3	72	1.3	11.3	4.5	11.3	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
128	2	5	6	6	8	2.0	3.2	9.0	4.5	8.0	19.6	1.1	7.8	1.3	73	1.3	11.6	4.5	11.6	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
147	3	5	4	4	6	2.7	4.2	6.0	3.0	6.5	15.9	0.8	6.0	1.0	56	1.0	9.1	3.5	9.1	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
147	2	5	6	8	10	1.9	3.0	10.0	5.0	8.5	20.8	1.2	8.7	1.4	81	1.4	12.7	5.1	12.7	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
155	2	5	8	8	10	2.0	3.1	12.0	6.0	9.5	23.2	1.3	9.6	1.6	90	1.6	14.0	5.6	14.0	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
175	3	5	6	4	6	3.0	4.8	8.0	4.0	7.5	18.3	1.0	6.9	1.1	65	1.1	10.4	4.0	10.4	2.0	3.3	19.9	3.3	206	3.4	26.9	11.6	26.9
199	3	5	4	6	8	2.7	4.3	7.0	3.5	7.0	17.1	1.0	6.9	1.1	64	1.1	10.2	4.0	10.2	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
237	3	5	6	6	8	3.0	4.8	9.0	4.5	8.0	19.6	1.1	7.8	1.3	73	1.3	11.6	4.5	11.6	2.0	3.8	22.6	3.8	233	3.8	30.0	13.2	30.0
248	3	5	4	8	10	2.7	4.3	8.0	4.0	7.5	18.3	1.1	7.8	1.3	72	1.3	11.3	4.5	11.3	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1
295	3	5	6	8	10	3.0	4.8	10.0	5.0	8.5	20.8	1.2	8.7	1.4	81	1.4	12.7	5.1	12.7	2.0	4.2	25.3	4.2	260	4.3	33.1	14.7	33.1

NOTES: Critical tailwater depth is calculated using $Dc = (((Q / We)^2) / 32.2)^{1/3}$
Minimum required tailwater depth is calculated using D2 = Dc * 1.6

Note: Detailed instructions for design of grade stabilization structures and completion of KS-ENG-444 and KS-ENG-445 can be found in the Practice Documentation Requirement in Section IV of the electronic Field Office Technical Guide for any county in Kansas. eFOTG-Document Locator

Instructions for Completing KS-ENG-444:

1. Select structure dimensions based on design storm discharge, overfall height, and available tailwater depth. (Available tailwater depth must be greater than required tailwater depth.)
2. Transfer structure dimensions to job plan. (Use text style "TEXT" for design information blanks in .dwg file.)
3. Design auxiliary spillway (if applicable).
4. Complete title block with owner name and location information.
5. Drawing should be plotted on 11x17 paper for proper scale.
6. Calculate peak Q for the appropriate frequency storm based on eFOTG Conservation Practice Standard 410. Use EFH-2 computer program or other acceptable runoff-discharge programs.

Instructions for Completing KS-ENG-445:

1. Complete table of quantities using the above tables and desired inlet and outlet protection options. Inlet and outlet protection is required for all designs.
2. Complete the blanks for outlet channel width, Inlet channel width (20' minimum), embankment top width (6' minimum), outlet protection option, inlet protection option, distance to embankment toe (2.5' minimum), and embankment slope ratio (3:1 or flatter).
3. Complete benchmark description and elevation blanks.
4. Drawing should be plotted on 11x17 paper for proper scale.
5. The following are suggested text styles for the different parts of the .dwg file: 1. "TEXT" style for the table of quantities. 2. "TEXT2" for the channel widths, inlet protection option, and outlet protection option.