

Colorado Department of Transportation Staff Bridge Bridge Detail Manual	Chapter: 8 Effective: June 30, 2024 Supersedes: October 11, 2023
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Bridge Hydraulic Information

8.1 Purpose

This drawing or set of drawings, is to indicate all pertinent hydraulic information necessary in the design of a structure or structures at a given location.

8.2 Responsibility

This drawing is prepared by the Hydraulic Section or a Hydraulics Consultant. The responsibility for the accuracy of the hydraulic information presented on this drawing rests with the Hydraulics Engineer.

8.3 Check Items

Listed below are items to be checked in reviewing this drawing.

- A) Net and excavated channel width and elevation.
- B) Riprap limits, size, thickness, and upper and lower riprap elevations.
- C) Design year and 500 year scour lines.
- D) Highwater surface elevations (500, 100 year flood).
- E) Centerline of channel and direction of flow.

See CDOT Drainage Design Manual (chapters 4, 9 and 10) for additional information.

8.4 Title Block

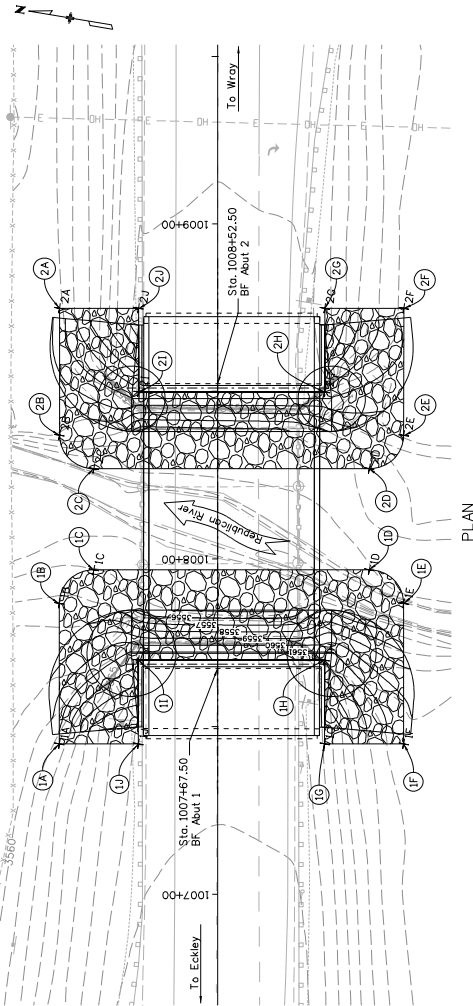
This drawing is titled "BRIDGE HYDRAULIC INFORMATION", and shall be so indicated in the title block. In addition to the above, the following information shall be placed in the proper locations of the title block:

- A) Initials of, or first initial and last name of the Designer and Detailer preparing the drawing.
- B) Structure Number or Numbers.
- C) Bridge drawing number.

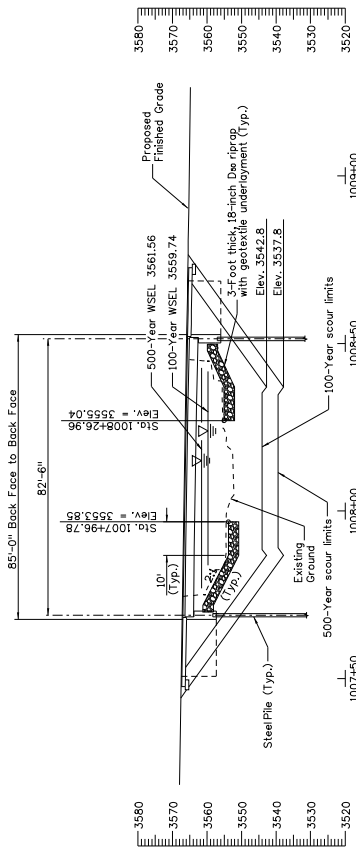
8.5 Additional Details

There may be instances when additional details are required, such as bank protection, channel changes, etc. If possible, these details should be shown on this drawing; however, if additional drawings are required, they should directly follow the "BRIDGE HYDRAULIC INFORMATION" drawing.

Position Label (X)	Northing	Easting
1A	1287033.527	3905430.614
1B	1287040.624	3905471.946
1C	1287032.460	3905483.494
1D	1286953.842	3905496.993
1E	1286942.294	3905488.829
1F	1286935.197	3905447.497
1G	1286957.757	3905443.624
1H	1286961.993	3905466.255
1I	1287015.190	3905459.121
1J	1287010.967	3905434.488
2A	1287055.523	3905556.723
2B	1287049.115	3905521.403
2C	1287037.567	3905513.239
2D	1286958.949	3905526.238
2E	1286950.785	3905538.286
2F	1286957.193	3905575.606
2G	1286979.753	3905571.733
2H	1286975.531	3905547.100
2I	1287028.690	3905537.972
2J	1287032.963	3905562.597

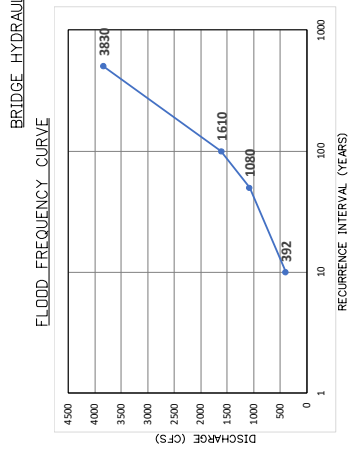
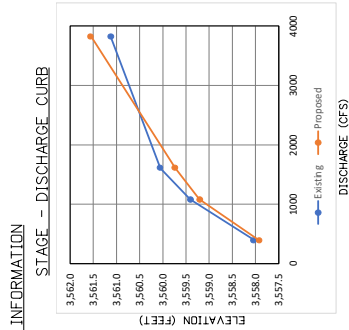
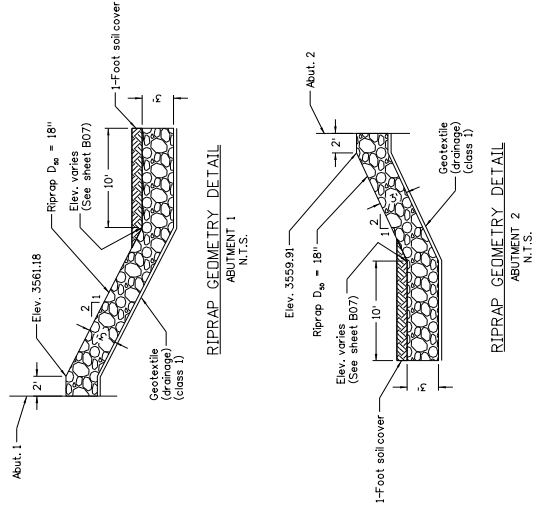


- NOTES**
- All riprap slopes are 2:1 (perpendicular to abutment).
 - The contractor is responsible for any and all cost associated with the installation of the riprap, including, but not limited to, the cost of the riprap, geotextile, and installation. This cost will not be measured or paid for separately but included in the cost of riprap.
 - See roadway plans for riprap, geotextile, and unclassified excavation quantities.



ELEVATION
 * Elevations shown at finished grade (taken at HCL US 34)

Example 8-1



COMPARISON OF HYDRAULICS DURING 500-YEAR EVENT

TYPE	VELOCITY (FPS)	FREEBORD WS ELEV. (FT)	WS ELEV. (FT)
EXISTING	5.71	1.29	3561.13
PROPOSED	5.78	0.86	3561.56

COMPARISON OF HYDRAULICS DURING 100-YEAR EVENT

TYPE	VELOCITY (FPS)	FREEBORD WS ELEV. (FT)	WS ELEV. (FT)
EXISTING	5.35	2.36	3560.06
PROPOSED	6.19	2.68	3559.74

* REQUIRED FREEBOARD = 1.22 FT
NOTE: WSEL FROM LOCATION OF MAXIMUM BACKWATER

SCOUR ANALYSIS RESULTS

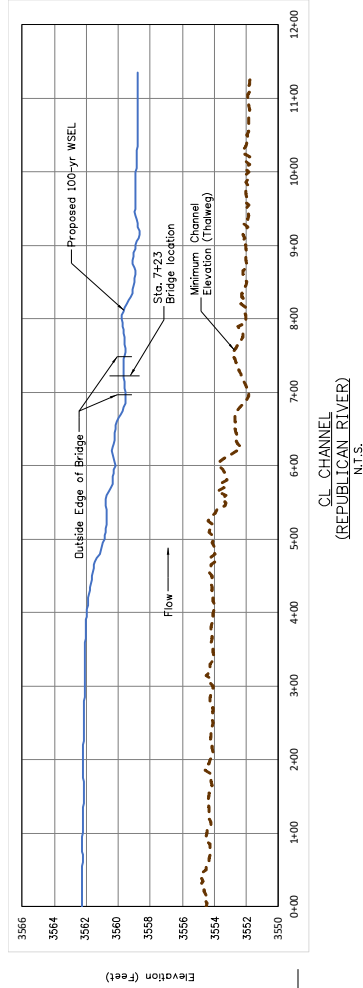
TYPE	DEPTH (FT)	
	100-YEAR	500-YEAR
CONTRACTION SCOUR	7.7	12.3
ABUTMENT SCOUR	8.9	13.9
TOTAL SCOUR	8.9	13.9
SCOUR ELEV. (NAVD=88)	3542.8	3537.8

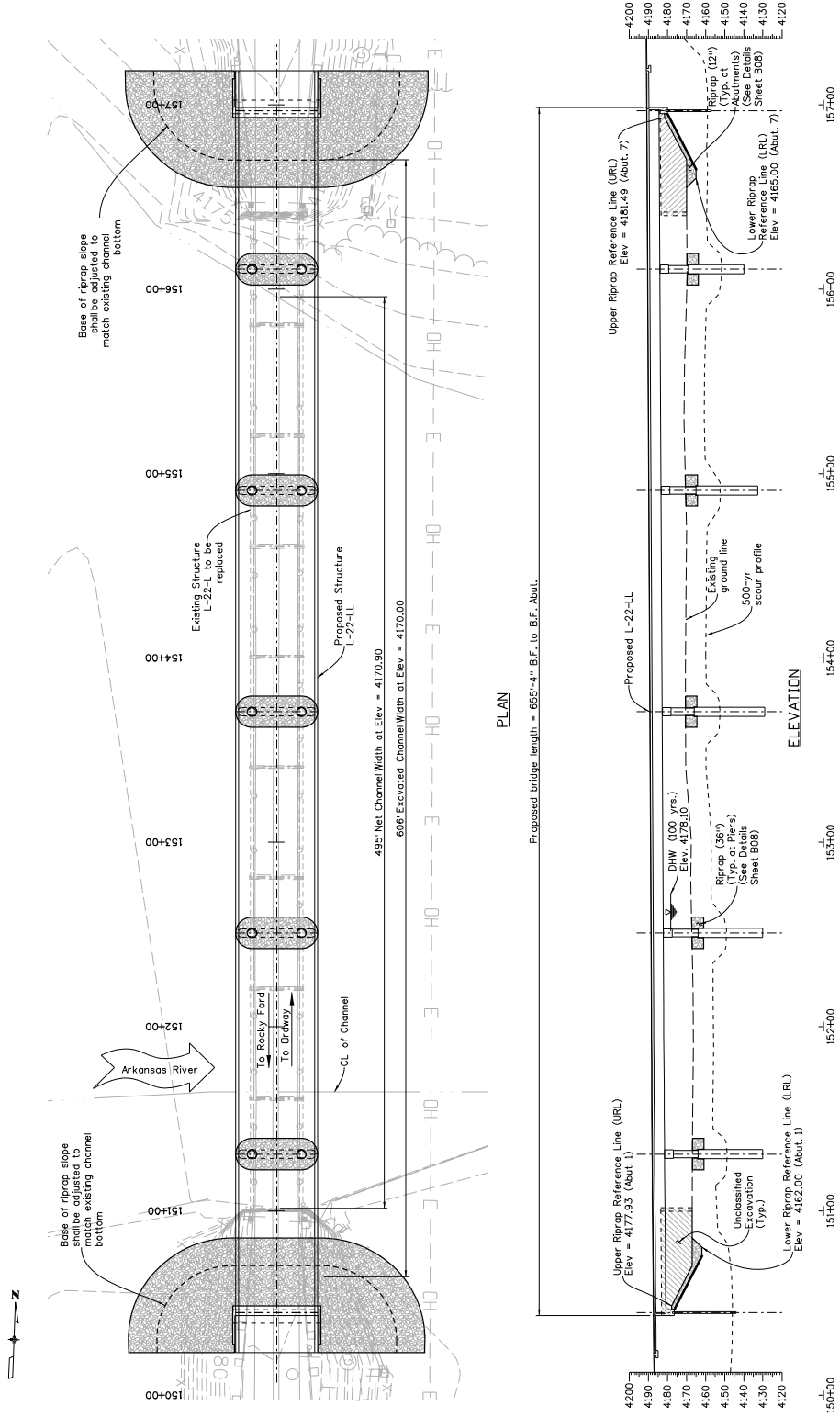
100-YEAR RECURRENCE INTERVAL

FLOW UPSTREAM OF BRIDGE: = 1610 CFS
DRAINAGE AREA: = 645 Sq Mi

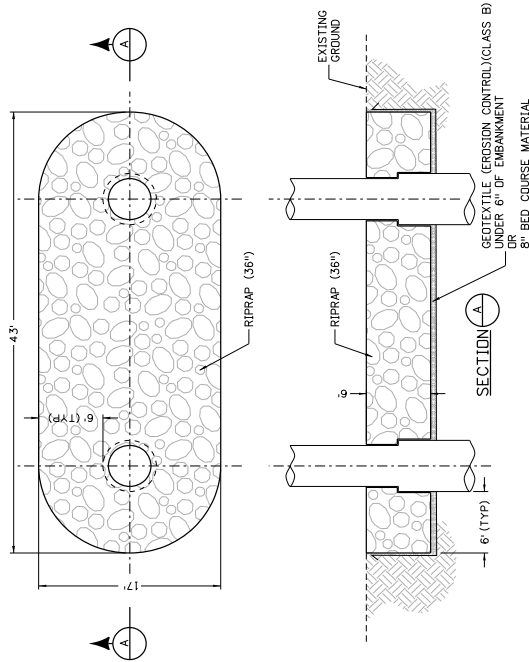
CHANNEL DESCRIPTION

BOTTOM MATERIAL SIZE: = CLAY SILT SAND GRAVEL COBBLES OTHER
 STREAM FORM: = STRAIGHT MEANDERING BRAIDED
 MANNINGS "n" FOR DESIGN: CHANNEL 0.030 OVERBANK 0.035
 DEBRIS POTENTIAL: LOW

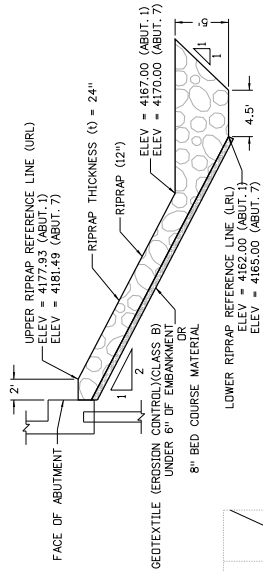




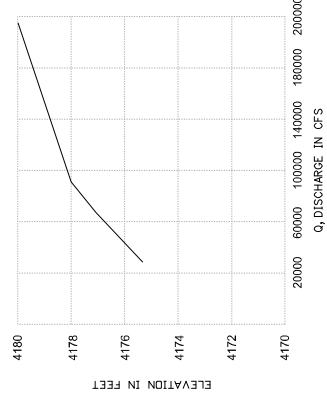
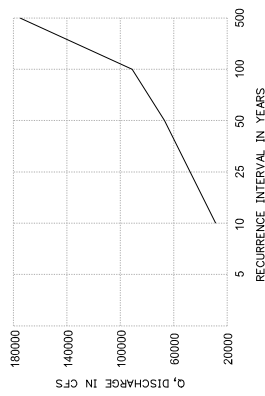
Example 8-3



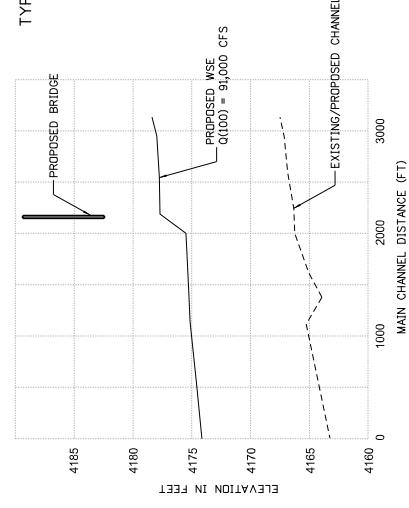
TYPICAL RIPRAP AT PIER DETAIL (NTS)



TYPICAL RIPRAP AT ABUTMENT DETAIL (NTS)



Drainage Area = 11,500 square miles
 CHANNEL DESCRIPTION
 Bottom Material - Cohesive Non Cohesive
 Bottom Material Size - Clay Silt Sand Gravel
 Debris - Brush Trees/Logs Ice Other



Example 8-4