

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 30.6 cfs

Maximum Flow: 34.39 cfs

Table 1 - Summary of Culvert Flows at Crossing: Crossing 9

Headwater Elevation (ft)	Total Discharge (cfs)	Lt. Sta. 472+40 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
420.46	0.00	0.00	0.00	1
421.27	3.44	3.44	0.00	1
421.63	6.88	6.88	0.00	1
421.95	10.32	10.32	0.00	1
422.22	13.76	13.76	0.00	1
422.46	17.20	17.20	0.00	1
422.69	20.63	20.63	0.00	1
422.92	24.07	24.07	0.00	1
423.16	27.51	27.51	0.00	1
423.40	30.60	30.60	0.00	1
423.72	34.39	34.39	0.00	1
426.00	53.94	53.94	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 9

Total Rating Curve

Crossing: Crossing 9

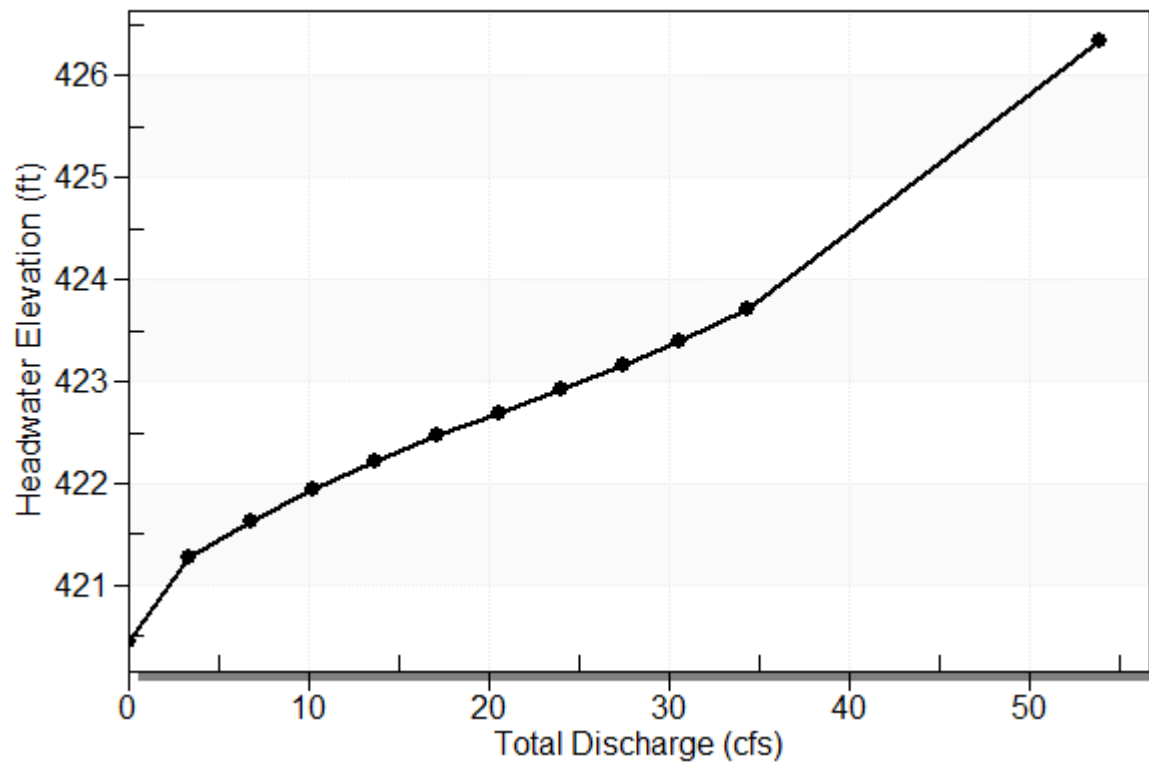


Table 2 - Culvert Summary Table: Lt. Sta. 472+40

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	420.46	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
3.44	3.44	421.27	0.811	0.0*	1-S2n	0.392	0.606	0.392	0.159	6.835	1.906
6.88	6.88	421.63	1.173	0.0*	1-S2n	0.560	0.864	0.560	0.241	8.292	2.484
10.32	10.32	421.95	1.490	0.0*	1-S2n	0.698	1.072	0.698	0.307	9.229	2.894
13.76	13.76	422.22	1.763	0.0*	1-S2n	0.806	1.248	0.822	0.364	9.754	3.219
17.20	17.20	422.46	2.004	0.0*	1-S2n	0.913	1.397	0.934	0.416	10.295	3.495
20.63	20.63	422.69	2.233	0.0*	1-S2n	1.005	1.540	1.032	0.463	10.774	3.735
24.07	24.07	422.92	2.462	0.0*	1-S2n	1.096	1.667	1.096	0.508	11.614	3.948
27.51	27.51	423.16	2.703	0.0*	5-S2n	1.184	1.786	1.198	0.549	11.840	4.141
30.60	30.60	423.40	2.938	0.0*	5-S2n	1.260	1.883	1.260	0.585	12.348	4.301
34.39	34.39	423.72	3.256	0.472	5-S2n	1.352	1.991	1.381	0.626	12.360	4.482

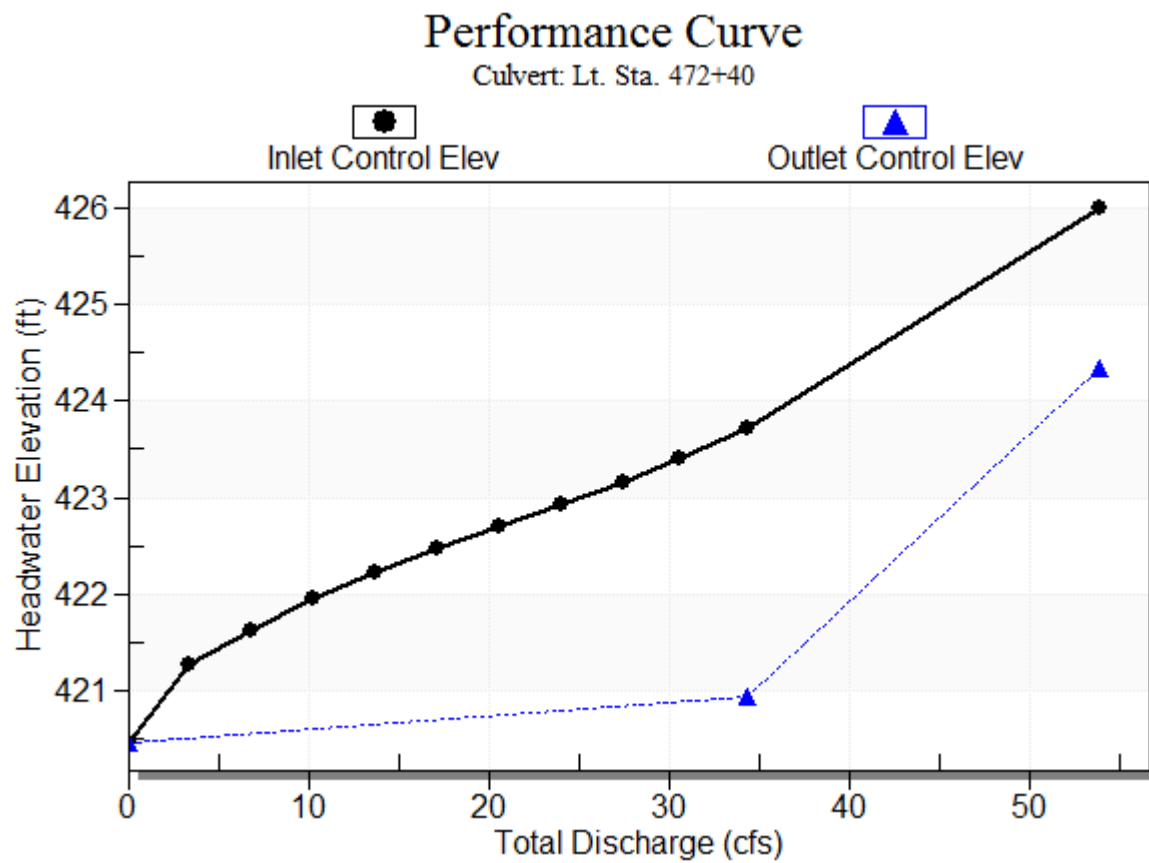
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 420.46 ft, Outlet Elevation (invert): 416.48 ft

Culvert Length: 216.95 ft, Culvert Slope: 0.0183

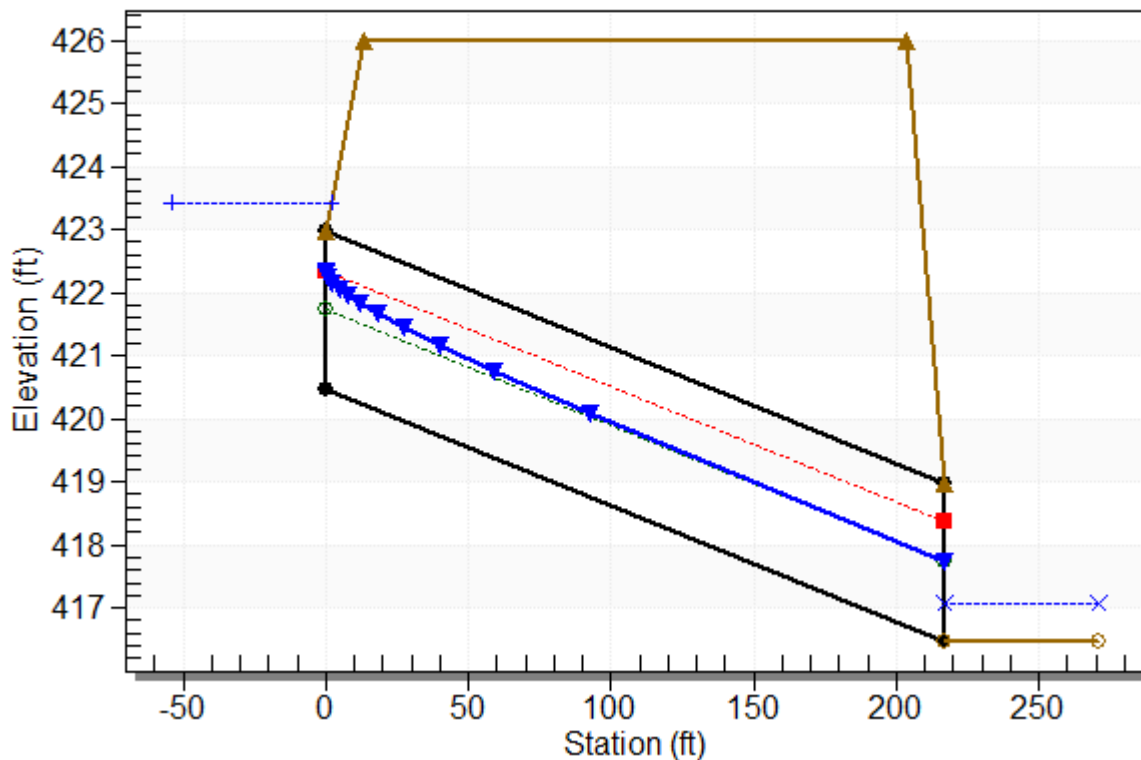
Culvert Performance Curve Plot: Lt. Sta. 472+40



Water Surface Profile Plot for Culvert: Lt. Sta. 472+40

Crossing - Crossing 9 , Design Discharge - 30.6 cfs

Culvert - Lt. Sta. 472+40, Culvert Discharge - 30.6 cfs



Site Data - Lt. Sta. 472+40

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 420.46 ft

Outlet Station: 216.91 ft

Outlet Elevation: 416.48 ft

Number of Barrels: 1

Culvert Data Summary - Lt. Sta. 472+40

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 9)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	416.48	0.00	0.00	0.00	0.00
3.44	416.64	0.16	1.91	0.28	0.85
6.88	416.72	0.24	2.48	0.42	0.91
10.32	416.79	0.31	2.89	0.54	0.94
13.76	416.84	0.36	3.22	0.64	0.97
17.20	416.90	0.42	3.50	0.73	0.99
20.63	416.94	0.46	3.74	0.81	1.00
24.07	416.99	0.51	3.95	0.89	1.02
27.51	417.03	0.55	4.14	0.96	1.03
30.60	417.06	0.58	4.30	1.02	1.04
34.39	417.11	0.63	4.48	1.09	1.05

Tailwater Channel Data - Crossing 9

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 11.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0280

Channel Manning's n: 0.0375

Channel Invert Elevation: 416.48 ft

Roadway Data for Crossing: Crossing 9

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 426.00 ft

Roadway Surface: Paved

Roadway Top Width: 190.00 ft