

Juniata Maximum Flow Estimate

City of Grand Junction, Colorado

- Ref.: 0) Rules and Regulations, accessed online from <https://dnrweblink.state.co.us/dwr/ElectronicFile.aspx?docid=3552784&dbid=0>
1) Drawing Set C-661B, North Fork Diversion Pipeline and Juniata Outlet Works Modifications, HDR, October 1986.
2) Drawing Set C-661A, Juniata Reservoir, Armstrong Engineers, January 1978.

Use FHWA culvert routine HY-8 to compute inlet losses, pipe friction losses, bend losses, and friction losses.

Outlet Hydraulics

Per Section 7.8.2.1 of Ref 0, can outlet pipes drawdown reservoir five feet in five days?

Per Ref 1, Sheet 9:

Elevation ft USGS	Capacity Acre-Feet
5750	6803
5749	6659
5748	6515
5747	6373
5746	6232
5745	6093
5744	5956

OK, per reviewer (typ. all blue text)

Release =	710 acre feet
Elapsed =	5 days
Flowrate =	72 cfs

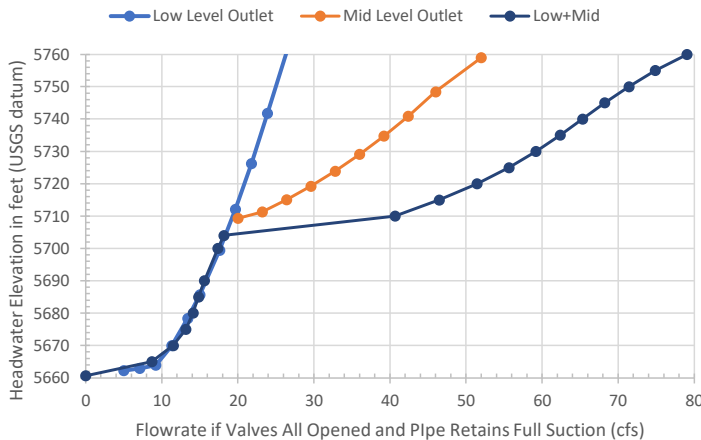
OK

Per Ref 1, Sheet 10 and Ref 2, Sheet 5:

	Low	Mid		
Pipe ID =	14.7	18.7	inches	OK
	1.23	1.56	feet	OK
Material =	HDPE	HDPE		OK
Kentr =	0.5	0.5	square edged (thick valve)	OK
Kexit =	1.0	1		OK
Kbend =	0.0	0.2		OK
Invert =	5660.7	5704.0		OK
HW =	5747.5	5747.5	(average of drawdown head)	OK
TW =	5652.1	5652.1	(four feet of water in outlet box)	OK
ΔH =	95.4	95.4	feet	OK

Use FHWA's HY-8 Culvert Analysis:

Culvert Type: Straight Double Broken Back OK



HY-8 Low Level		HY-8 Mid Level	
HW feet	cfs	HW feet	cfs
5662.2	5.0	5709.3	20.0
5662.9	7.1	5711.3	23.2
5663.9	9.2	5715.0	26.4
5670.0	11.3	5719.2	29.6
5678.4	13.4	5723.9	32.8
5685.7	15.0	5729.1	36.0
5699.4	17.6	5734.7	39.2
5712.1	19.7	5740.9	42.4
5726.2	21.8	5748.4	46.0
5741.8	23.9	5759.0	52.0
5780.0	29.0		

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Summary:

HW	Low Level	Mid Level	Low+Mid
feet	cfs	cfs	cfs
5760.0	26.3	52.7	79.0
5755.0	25.3	49.5	74.9
5750.0	24.6	46.8	71.4
5745.0	24.0	44.3	68.2
5740.0	23.5	41.8	65.3
5735.0	23.0	39.4	62.4
5730.0	22.5	36.7	59.2
5725.0	22.0	33.7	55.6
5720.0	21.2	30.2	51.5
5715.0	20.3	26.1	46.5
5710.0	19.4	21.3	40.7
5704.0	18.2	0.0	18.2
5700.0	17.4	0.0	17.4
5690.0	15.6	0.0	15.6
5685.0	14.8	0.0	14.8
5680.0	14.1	0.0	14.1
5675.0	13.2	0.0	13.2
5670.0	11.5	0.0	11.5
5665.0	8.7	0.0	8.7
5660.7	0.0	0.0	0.0