

Shadow Lake Dam - New Alternative Results

3 messages

Strike, Thomas

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Hi Ben. Based on our conversations during our meeting on Shadow Lake Dam on September 4, we ran an additional hydraulic improvement alternative through our model. This alternative included permanently lowering Shadow Lake by 1-foot from its historic normal pool elevation of El. 1394.6 ft. to El. 1393.6 ft. while maintaining the existing spillway configuration (included as Alternative 2A in the tables below). Our model indicates that Alternative 2A would provide 0.6-foot of freeboard with a peak discharge of 284.5 cfs during the 1,000-year storm event.

Shadow Lake Dam Preliminary Alternatives Analysis

1,000-year Storm Event Results

Scenario	Description	Starting WSE (ft-NAVD88)	Peak Discharge (cfs)	Peak WSE (ft-NAVD88)	Freeboard (ft)
Existing	Existing	1394.6	351	1400.0	-0.1
Alt 1	Armor existing for overtopping <i>Change from Existing</i>	1394.6 0	351 0	1400.0 0.0	-0.1 0.0
Alt 2	Lower existing P/S inlet invert 2.6 ft <i>Change from Existing</i>	1392.0 -2.6	179.6 -171.4	1398.3 -1.7	1.6 1.7
Alt 2A	Lower existing P/S inlet invert 1 ft <i>Change from Existing</i>	1393.6 -1	284.5 -66.5	1399.3 -0.7	0.6 0.7
Alt 3	Lower inlet invert 2 ft and upsize to 4-ft wide by 5-ft tall box culvert <i>Change from Existing</i>	1392.6 -2	294.2 -56.8	1398.3 -1.7	1.6 1.7
Alt 3A	Lower inlet invert 1 ft and upsize to 7-ft wide by 5-ft tall box culvert <i>Change from Existing</i>	1393.6 -1	428.3 77.3	1398.8 -1.2	1.1 1.2
Alt 3B	Upsize to 45-ft wide by 5-ft tall box culvert <i>Change from Existing</i>	1394.6 0	1184.4 833.4	1398.4 -1.6	1.5 1.6
Alt 4A	24-hr drawdown using 48-in LLO <i>Change from Existing</i>	1393.5 -1.1	273.1 -77.9	1399.3 -0.7	0.6 0.7
Alt 4B	48-hr drawdown using 48-in LLO <i>Change from Existing</i>	1392.6 -2	213.3 -137.7	1398.7 -1.3	1.2 1.3
Alt 5	Dam removal <i>Change from Existing</i>	1386.3 -8.3	1225.6 874.6	1390.4 -9.6	9.5 9.6

We also evaluated peak discharge changes downstream for all alternatives during the 100-year storm event. The results are summarized in the table below. Only Alternatives 3A, 3B, and 5 would increase peak discharges.

Shadow Lake Dam Preliminary Alternatives Analysis

100-year Storm Event Results

Scenario	Description	Starting WSE (ft-NAVD88)	Peak Discharge (cfs)	Peak WSE (ft-NAVD88)	Freeboard (ft)
Existing	Existing	1394.6	167.9	1398.3	1.6
Alt 1	Armor existing for overtopping <i>Change from Existing</i>	1394.6 0	167.9 0	1398.3 0.0	1.6 0.0
Alt 2	Lower existing P/S inlet invert 2.6 ft <i>Change from Existing</i>	1392.0 -2.6	49.5 -118.4	1396.3 -2.0	3.6 2.0
Alt 2A	Lower existing P/S inlet invert 1 ft <i>Change from Existing</i>	1393.6 -1	116.0 -51.9	1397.5 -0.8	2.4 0.8
Alt 3	Lower inlet invert 2 ft and upsize to 4-ft wide by 5-ft tall box culvert <i>Change from Existing</i>	1392.6 -2	111.4 -56.5	1396.6 -1.7	3.3 1.7
Alt 3A	Lower inlet invert 1 ft and upsize to 7-ft wide by 5-ft tall box culvert <i>Change from Existing</i>	1393.6 -1	193.6 25.7	1397.2 -1.1	2.7 1.1
Alt 3B	Upsize to 45-ft wide by 5-ft tall box culvert <i>Change from Existing</i>	1394.6 0	622.1 454.2	1397.1 -1.2	2.8 1.2
Alt 4A	24-hr drawdown using 48-in LLO <i>Change from Existing</i>	1393.5 -1.1	103.9 -64	1397.5 -0.8	2.4 0.8
Alt 4B	48-hr drawdown using 48-in LLO <i>Change from Existing</i>	1392.6 -2	60.7 -107.2	1396.9 -1.4	3.0 1.4
Alt 5	Dam removal <i>Change from Existing</i>	1386.3 -8.3	654.6 486.7	1389.1 -9.2	10.8 9.2

Please let us know DSPs opinion on our results of Alternative 2A and whether providing 0.6-foot of freeboard might be acceptable pending results of a wave runup analysis and providing overtopping protection in rehabilitation design/construction. We would be happy to setup and join a meeting if needed.

At this point, we have exhausted potential viable alternatives to evaluate so that regulatory requirements are met and that the lake level could be maintained at or close to historic levels. After DSP's review and opinion of the new results, we need to collectively come to an agreement on a preferred alternative that considers the Town's best interest. Once this alternative is selected, we can complete our HEC-RAS model of this alternative and share the results with VT DSP so that they can review and preliminarily accept the hydraulic improvement alternative as permissible through their program.

Thanks.

Thomas J. Strike, PE

TEAM LEADER