Upper Irrigation Dam Repair Project

February/March 2025

In August 2024, another in a series of large floods, came down the Mill Creek stream channel. This flood seriously impacted the operation of the company's upper dam. This dam feeds water into our Ditch 3 pipeline.

The flood topped the dirt bank on the south side of the dam and began cutting down the dirt bank. By the next morning the flood water had cut away a major portion of the bank and the creek water was now flowing around the irrigation dam headgate.

The flood had also torn out the culvert that went from the headgate to the sand box at the start of the Ditch 3 pipeline.

We still had two months left in the irrigation season so we placed a bunch of sand bags to direct water into a temporary pipe to feed water into the D3 sand box.

We also rerouted a well output pipe to feed water into the D3 pipe. This supplied enough water for the rest of the year.

We contacted an engineering firm to get an idea on how to put this dam back into full function. They determined the best thing was to build a high cement wall from the dam headgate structure and tie it into the hill side. The

estimated cost was $450,000.00. They said they would help us to try and secure some grant money, but that usually takes about two years to get funding, if at all.

The dam structure itself was still in working order. It was only the hillside that needed to be rebuilt in some way. It had to be done in a way that if a future flood also topped the structure, it would not just cut down the hillside again.

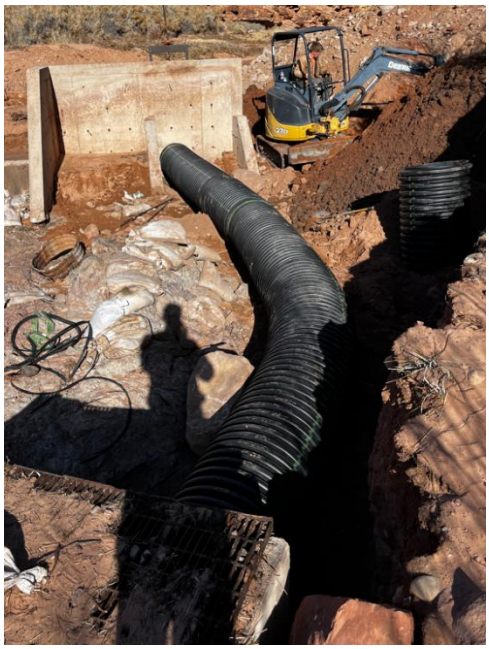
After looking at several options, we felt that the best thing to do was to build a strong gabion wall as a center hard point and then replace the hillside on each side with gravel and hard rock. The gabion wall was to be 6' wide, 12' high, and 24' long and anchored into bedrock and the headgate wall.

We estimated that the cost to build this gabion wall, replace the culvert connection to the sand box, build a small retaining wall to hold material on the downhill side, and replacing the hillside would cost in the neighborhood of $70-80 thousand.

Permits were applied for. You have to have a permit from the County and from the Corp of Engineers. This takes diagrams and an impact study on the effect the construction will have on the flow of water in Mill Creek. The permits were finally approved by the beginning of February, 2025.

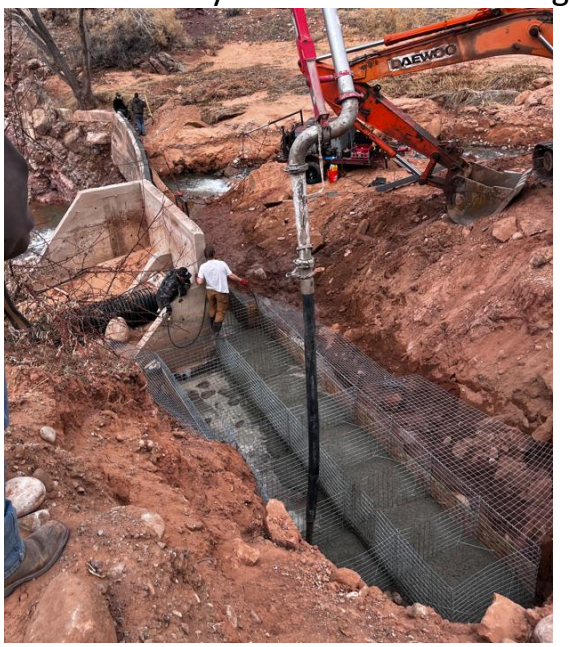
The first step of the project was to gain access to the creek bottom and divert the flow of water away from the construction area. The flood had left a 15' high bank edge along this area. We were able to get gravel fill material just back down the road at an old gravel pit. Because of the threat a future flood could have to the Power Dam Road, the county offered some assistance to haul material the short distance to build the ramp access.

Years ago, when this dam was constructed, a culvert was built into the bottom portion of the dam's cement wall so that water still had a route down the creek while the dam was built. This culvert bypass was still useable. Once access was obtained to the creek bottom, we opened up a passage to this culvert bypass location and all the creek water then flowed through the bottom of the dam. This left our work area clear of water. Or so we thought.



The first item on the repair list was to replace the 24" culvert that ran between the headgate wall and the sand box. It was a metal culvert that was destroyed, but we replaced it with a heavy plastic black culvert. A mini-ex was needed to do this. We knew that once we put in the gabion wall, we would not have access to this section again with large equipment.

We then cleaned out the area south of the headgate structure to install the gabion boxes. We wanted to be down to bedrock. As we dug down to bedrock, we found that there was a steady water flow along the bedrock layer that kept the area wet and the soil muddy. This made it challenging trying to get it cleaned out.



The first layer of gabion boxes was finally placed in the dug-out area. There would eventually be three layers of gabion boxes. Each layer had four boxes in it. To make sure this gabion wall was going to hold in place, we poured ten yards of cement into all the bottom boxes. This created a 6' wide, 24' feet long, one-foot-high block of cement to hold them in place.

Cobble rock was then obtained from a nearby cobble rock pile and placed in the

boxes. Once the first layer was done, the second layer was built and then the third layer. This took us about a week to do. It was a lot of hand work and hard labor crawling in and over and around the gabion boxes.

We had also hired a cement contractor to build a 30' long 3'-5' high cement wall between the headgate structure and the sand box. This was placed there so that fill material would not just wash away easily if water topped the headgate structure. The contractor worked quickly to get this wall built for us.

Also, while this was going on, we hired a welder to install a ½" thick 6" angle iron plate across the top of the dam. Over the last several years, the top of the dam's cement wall was starting to show damage from flood debris hitting the top of the wall. This angle iron would provide long term protection to the dam top. With the water out of way, this was a good time to do this extra bit of work on the dam.

Finally, it was time to bring in more fill material and rebuild the bank in this area. Grand County Road Department helped us again for a

few hours to do this. The bank was reshaped and actually made bigger than it was previously.

Then to help keep everything in place, limestone rock was brought in from Green River to provide a top protection layer to the bank. This is the same rock that Moab City has been using to provide protection to bridges in Moab. It is very heavy angular rock that holds well in place.

The old culvert hole in the dam was then replugged and water backed up in the dam and flowed back into Ditch 3 like it used to do. Total cost of the project came in at $81,476.00.

The board appreciated all the help we received from a variety of people to get this project completed and system functional again by the start of the mid-March water season.

Before and after aerial view of the site.