Ditch 3 Upper Line Replacement
March 2020

The irrigation line between the dam and the splitter box had become restricted. Years ago when it was constructed the gaskets were installed backwards in this portion of the line. This caused them to become partially dislodged when the pipes were inserted together. This resulted in small leaks at the joints. Vegetation found these leaks and sent roots into the inside of the pipe which has caused blockages inside the pipe. Several large root blockages were removed in previous years, but sections of the line still had issues resulting in a restricted water flow. In 2019 the long period of high water from spring runoff resulted in a lot of sand entering the system which collected at these root blockages. What water flow we were getting (which wasn't a lot) was cut in half.

This year the opportunity presented itself to replace this portion of the line. High quality HDPE pipe was obtained from the Hoodoo Motel construction. Also one of the land owners was wanted to sleeve the pipe on his property. We were also having a problem with a rock area that was threatening to seriously damage the plastic line.

One of the first things we did was to install an air vent at the top of the line. The line always had trouble with air in the line because it wouldn't vent properly. An inspection showed that the first 125' of the 15" line was still in good shape but after that it had problems. The line had not been bedded in properly years ago and the pipe itself was "flat" on the top from the dirt pressing down. It's surprising that the plastic pipe had not just split in half. We had to back up to a fitting that was a stronger point , but as it was, we still had to deal with an egg shaped end that had to be squeezed together to get it round enough to press on the gasket reducer.

At this point we reduced the line down to 12" and then we put in another air vent. We then flanged the plastic PIP pipe so that we could run HDPE from this point on. We dug another 100' feet of trench to a point where we had a wide spot on the bench above Mill Creek where the line is installed. We needed a wide spot for dealing with the HDPE pipe.

Next we had to installed the culvert section. The land owner had purchased 200' of 18" culvert so that we could sleeve our line. By doing this, it made for more real estate available to him on top for

his properly. In the future if the line for some reason sprung a serious leak in this area, it could be pulled out of the sleeve, repaired, and reinserted.

The culvert installation took several days. This area use to be the site of the old Moab Powerplant. The powerplant use to take water from Mill Creek to generate electricity for the town. Remnants of this powerplant can still be found. We tried to install this 200' of culvert in a fairly straight line, but in maintaining grade we dug into a massive cement box buried in the ground that blocked our path. This meant we had to back up and reroute the culvert. We could not put sharp bends in the culvert as it would restrict the insertion of the HDPE pipe. It also meant we would now have to cut through the small water lines that Tom Johnson had installed in the area.

At times we also had to dig right though the old 15" line. We found that this line never was on a proper grade. The pipe went up and down which resulted in air pockets and low points of water. This all affects flow rates.

Once the culvert was installed, another 200' of trench was dug to the splitter box. Because of the terrain, we could not make a straight line, so the trench had somewhat of an "S" shape to it. The trench is two to three feet deep in most places. Finally it was time to install the HDPE pipe.

HDPE pipe is not glued or gasketed together. Instead it is "heat welded". A special machine is needed to do this. One was rented from Core & Main Co. in Grand Junction. It was a nifty track powered machine. Managing the heavy 20' sections of the HDPE pipe was challenging though in the tight area that we were working.

The machine was set up on a wide spot on the bench just before the culvert starts. This HDPE pipe has a little flex to it, and even more so when it was warm. We found it was a lot easier to deal with the pipe in the afternoons after it had warmed up. A rounded cap was welded onto the first piece of pipe so that it would slide though the culvert easier. The backhoe and mini-ex was used to pull the line into the culvert as it was constructed. The process went well. The only issue was that it took 45 minutes for each weld to be completed. First you clamp down the two ends of the pipe in the machine. Then a cutter shaves off the end of each pipe end so that you have perfectly clean and

matched up ends. Then a heater plate is inserted for about 10 minutes to heat both ends of the pipe. Then the heat plate is removed and the two ends are hydraulically pressed together. The softened plastic melts together and allowed to cool and harden to complete the joint. It's an interesting process, but it does take time. So it was about an hour for each 20' joint from welding to inserting. We had 32 joints to install and could only do about seven a day. One day it was too cold and rainy to work as the pipe was just too stiff to deal with.

Finally though the pipe was pushed all the way through the 200' of culvert. We were not sure if we would have to move the machine or whether we could continue to push the pipe down the trench or not. We found out though that we could continue to push it. A few boards had to be used to help the pipe end navigate through the curves in the trench. Finally the pipe was at the end point.

We now had to reverse the machine and weld on a few more lengths in the other direction to get back to the PIP pipe flange. This was a little challenging in the tight area we were working. To connect the PIP pipe to the HDPE pipe, flanges are used to bolt the pipe together.

Once the HDPE pipe was constructed that portion of the line could be buried. The next step was the removal of the old Splitter box. This cement box was built years ago to divide the water between the company, Janie Walker, and the house by the box. The crew found it quite challenging to break the box free from the buried portion that led to the Walker line. They tried to break it apart, but in the end it was easier to cut it free from the lower box and remove it whole.

The final end point of the line was built with 12" PIP pipe as it is much easier to deal with PIP pipe when installing valves and tees, etc. Just past the splitter box the line goes into a metered drop section of pipe. We connected into that with an air vent and installed the 12" valve and then a Tee to the Walker line.

This was pretty straight forward construction. Mechanical couplers had to also be installed on each end of the HDPE to allow proper mating of the flanges. We kept the lower cement box portion that led to Walker's pipeline. Part of that had been a sand trap and it was mostly full

of dirt. The Walker line also got a small “raccoon” water line, because that is how Janie uses water for the most part. She just needed a small line for that.

From this point on it was a matter of filling in the trenches and rehab work. This was a fairly large project and took a few days to complete all the end work. The three small lines that Tom Johnson had installed to carry spring water for landscaping purposes had to be replaced in the area of the culverts. Years ago the company had signed an agreement with him that required the company to restore the area to what it was before construction began.

Originally it was hoped this would be a two week project. It turned out to take 4 weeks.

The water flow on Ditch 3 was down to about 1.0 cfs last summer. After this replacement the cfs is now up to 2.5 if you really open up the line. That amounts to basically 1100 gallons per minute flowing through the line.

Thank you to Drew Cozzens and his crew of Leon and Ponce for all the work they did on this project.