April 12th, 2019

Craig Godbout
Colorado Water Conservation Board
1313 Sherman St, Rm. 712
Denver, CO 80203

Re: POGG1,PDAA,201900002389, Tornay Highline Diversion Improvement Project Report

Dear Mr. Godbout

We have recently completed the Torney Highline Diversion Improvement Project. Please review the following project summary.

We receive the official notice to proceed on October 26th of 2018. Shortly after receiving that notification, project partners reached out to excavation contractors in the Gunnison Valley to consider bids and evaluate a variety of ideas for project implementation. All Weather Earth Works was the most qualified contractor that expressed interest in the job and was selected to complete the work. Initially, the work was planned for November 2018, but construction was delayed due to subzero temperatures and the early onset of winter. Project partners agreed the most practical option was to begin construction during the spring of 2019 prior to run-off.

All Weather Earthworks began staging equipment at the site on March 26th and finished the job on April 11th.

Task 1: Remove existing diversion:

First, All Weather Earth Works graded the banks of the channel and cleaned up debris around the diversion so laborers and equipment could safely access and work around the site. A coffer dam and bypass channel were constructed prior to excavating the existing diversion. Once the site was dry the old structure was carefully excavated exposing the original division apron and wing walls. A demo saw was used to remove a portion of the wing wall on the north bank to attain the desired width. The rest of a wall was left in place to aid in bank stability and reduce the risk of water out flanking the diversion structure. The existing apron was also left in place because it provided a solid base and support for the new structure. Logs and other material used to shore up the diversion during the last 70 years were removed and disposed of.

Total cost to remove the existing diversion and prep the site was $2,000

Task 2: New Diversion Construction

The elevation of the new diversion stem wall was set 1 foot higher than the old diversion. This will allow water to reach the ditch inlet during a wider range of flows and reduce the duration panels must be used to block the stream. The stem wall was constructed with a 2-foot-wide by 8-inch-deep notch. Rocks were wet-set in the apron downstream of the notch. This portion of

the new diversion is intended to break up velocities, provide pooling and allow for improved passage for trout. The notch may also help reduce the amount of sediment deposition upstream of the diversion.

Once the new stem wall and apron were formed up re-bar was drilled into the existing apron and wing walls and suspending within the forms in the area where new concrete was poured. Concrete was poured in one slab and re-bar was also placed vertically to tie the buttress blocks to the apron. Once the concrete had cured 2x2x6 blocks were transported to the site and placed on the outer 2 feet of the apron. Holes in the bottom of the blocks aligned with the vertical re-bar extending from the apron.

The blocks were placed on geogrid fabric and tied together with metal strapping to further reduce the likelihood of movement.

Once the blocks were set, the walkway (see task 3) was transported to the site and placed to span the channel between the buttresses. Metal straps and anchor bolts where used to secure the walk way to the buttresses.

Metal strapping on blocks (below)

Once the on-site fabrication was completed and the walk way was secured, the coffer dam was removed. The bypass channel was filled with native cobble material and compacted. This area was sloped to a 5-1 grade and covered with 1-3 ft rock rip-rap. The finished elevation on the right bank, opposite the ditch inlet, is the same as the top of the ditch inlet pipe. This is the inside of the meander and will serve as a spillway during extremely high flows. The spill way on the right bank and the blocks on the left bank are reinforced with angular rock rip-rap.

Rock was also placed in the channel downstream of the apron and spillway to reduce scour and provide refuge for trout during high and low flows.

Total cost of the new diversion construction was $19,895

Looking up stream (above)
Looking down stream (below)

Task 3: Walkway and panel construction

The walkway, panels, and structure to support the panels were fabricated off site. The walkway is constructed from 6-inch I-beams, metal lattice, 4-inch angle iron, plate, and tubing. A hand rail is located on the upstream side of the walkway. The hand rail will improve operator safety and serve to support a wench used to raise/lower panels and raise/lower the panel support pipe. The 6-inch panel support pipe will be lowered into position prior to placing panels. It will provide support for the top of the panels and the bottom of the panel will rest on the stem wall under water. This pipe will be raised and chained in the "up" position during the winter and spring to reduce issues with ice dams and high flows.

The panels are a ¼ inch thick metal that resembles sheet piling. Each panel is 30 inches wide and 4 feet tall. Rather than flat stock these panels have a "V" every 6 inches. This type of panel was chosen for three reasons: 1) Rigidity 2) When in place, the panels will overlap, and the "V" will lock each panel to the next 3) When lowering a panel, the overlapping V will serve to guide it into position.

Total cost of the walkway and panel construction was $10,050

Panel (below)

Panel Support in up position

Panel Support in down Position

Task 4: Project Management

Jesse Kruthaupt with Trout unlimited provide 87 hours of in-kind labor coordinating with contractors meeting with project partners at the diversion site, on site labor during construction, and reporting. The total in-kind labor contributions from Trout Unlimited are $3,915.

Sincerely,
Diane Martin