

Long Run Diversion Well Project
Final Report



Prepared by
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2010

Project Description

What was supposed to be accomplished?

The Long Run Diversion Well Project was funded in 2006 for the construction of four diversion wells on this tributary to Clearfield Creek. These four locations were based on ease of access and preliminary water quality data collected on Long Run as part of the Clearfield Creek Watershed Assessment, completed in 2003. At the time this project was funded the major goals were:

1. Collect additional samples and determine the location of the diversion wells
2. Secure landowner agreements and increase public awareness
3. Hiring a consultant to handle the design and permitting, as well as construction oversight
4. Construction of the wells
5. Set up an operation and maintenance schedule for the wells

What was accomplished and how it differs from the original plan?

Though this project deadline was extended from June 30, 2008 to June 30, 2010 the project was completed. The CCCD became responsible for all aspects of the project instead of a consultant so that more of the funds awarded to the District could go toward the construction of the wells. This meant that the Watershed Specialist (CDWS) was responsible for the design, permitting, and construction oversight. The Pennsylvania Association of Conservation Districts Technical Assistance Program provided the design and engineering of the diversion wells.

Additional samples were collected and taken into account when determining the location of the diversion wells. During the course of the project, it was determined that only two locations were suitable for the placement of diversion wells: LR-2 adjacent to the Wildflower Road and LR-4 adjacent to Spring Valley Road. The landowner at the Wildflower Road site was very interested in being involved and signed a landowner agreement without problem. The landowner at the Spring Valley Road site was far more hesitant about the project, though they were receptive to the idea when first approached before the Growing Greener Grant was submitted. Very little progress was ever made with this landowner during the course of the project and as such, only the Wildflower Road diversion well was installed though all the materials for two wells were purchased. This problem will be further discussed in the problem section of the report.

The necessary permits were secured for the Wildflower Road site and construction both commenced and was completed in June 2010. A local contractor was hired and both the Bradford and Boggs Township Supervisor's provided assistance in the form of storage space for limestone and other materials as well as labor during the construction. The Watershed Specialist was on site for construction oversight and no unanticipated problems were encountered during construction. The Supervisor's filled the well with limestone in August and immediate water quality improvements were noted and will be discussed further in this report.

What were your successes and reasons for success?

We had four major successes during the course of this project, starting with the noted water quality improvement in Long Run following the completion of the Wildflower Road Diversion Well. Upstream of the system Long Run has an average pH of 4.2 and average conductivity of 850.

Downstream of the system, Long Run has an average pH of 5.2 and an average conductivity of 830. As we continue adjusting the level of water flow through the diversion well and amount of limestone in the well, we expect the performance of the system to be even better.

Our second success was the involvement of the Bradford and Boggs Townships Supervisors. Pre construction, the Supervisor's provided space for the diversion well materials and limestone as well as sponsorship of the necessary permits. During construction they provided valuable labor and some equipment. Additionally, they continually check on the system weekly making sure that no one attempts to destroy the system.

The third success was securing the permits. The DEP representatives present at the pre- construction meeting were helpful in explaining the necessary permits and offered guidance on their completion. Also, considering the problems encountered with the design of the diversion wells, see explanation below, receiving the approved permits in the mail was a huge morale boost to the project and was the last thing the District was waiting for to start construction of the well.

Lastly, the completion of construction itself. With the problems this project faced it was a huge success to get the construction finished by the deadline. All the necessary elements: design, permits, labor, contractor, landowner agreement, materials, limestone, weather; came together very shortly before the project neared the deadline of June 30th. All the parties involved went out of their way to make the construction happen and the contractor was very willing to spend the necessary time to get the project done on time.

What problems were encountered and how you dealt with them?

There were four major problems encountered during the course of the Long Run Diversion Well Project. First, was with the PACD Engineering services. It took a very, very long time for the design of the system to be completed. The PACD engineer initially visited the site in the fall of 2007; it was the fall of 2009 before the first draft of a design was shown to the Watershed Specialist; and early in the spring of 2010 before the plans were finalized. This made it extremely hard for the CDWS to make any headway on the project. There was no way of knowing what materials would be needed or how much and what size of limestone to purchase, it was difficult to get a contractor willing to construct a system like this without the final plans, and the permitting had to wait until the preliminary plans were given to the District. It also kept pushing the estimated construction date back until it was June of 2010, the month that the project needed to be completed, before the project actually went to construction.

The second problem encountered was landowner issues. Prior to the submission of the Growing Greener Grant in 2005, landowners of the properties where the initial four projects were to be constructed were approached and all signed landowner commitment letters for the design of the diversion wells. However, four years later, when it came time to construct the diversion wells on two of those sights, the landowner at the Spring Valley sight was hesitant to have a well on his property. He sighted the construction of their new home during those four years, the wet conditions of the site, and space limitations. This means that although all the materials were purchased, the second diversion well has not been installed yet while negotiations continue with this second landowner. Rather than having the entire project fail, the CDWS continued work on installing the Wildflower Road Diversion Well. The District felt that once the first well was completed, it would really help the landowner see what a diversion well is and what goes into building one and would possibly make them more comfortable with having one on their property. Additionally, we are investigating the suitability of

another site on Long Run for the installation of a diversion well at a location where the landowner is more willing to work with the District.

The third problem faced was site constraints. In the draft design provided by the PACD Engineer in the fall of 2009, the intake at the top of the project was placed above a hand placed dam. After meeting with the DEP representatives, this was changed to a cross vane, so the project didn't interfere with the natural movement of fish in the stream or cause a flooding hazard. In order for a diversion well to work, the intake has to be 8 feet higher than the top of the diversion well, which is at ground level. This change in design meant that the intake had to be situated about 400' upstream of the well, double the length of the anticipated project area and pipe needed to install the well. However, we just worked through the issue by purchasing the necessary length of pipe and installing the cross vane as recommended by DEP.

The final problem encountered was the hiring of a new Watershed Specialist. With the project already delayed, the District had to hire a new CDWS in March of 2009. It took time for her to become familiar with not only this project, but several others as well. By the time she was able to start moving on the Diversion Well project, it was already fall of 2009 and there was less than a year left to complete the project on time. Fortunately, she was able to secure the needed landowner agreement, get the finalized design, get the permits completed and approved, purchase all needed materials and have them delivered on time, negotiate operation and maintenance terms with the Bradford and Boggs Township Supervisors, get the support of a local contractor, and get the system built before the project deadline.

How your work contributed to the solution of the original problem?

The original problem on Long Run was depressed pH and elevated metals as the result of abandoned mine drainage pollution. As mentioned above, the pH of the stream below the diversion well has shown improvement since going on-line in August. Above the project area, the pH in Long Run averages 4.2 while a hundred yards below the system the average pH is 5.2, showing the project is having a positive effect on Long Run. However, it must be noted that the District has been monitoring the mouth of Long Run monthly since October 2009 and in that time the pH has never been more than 4.64, even after the installation of the diversion well upstream. Just a quarter mile up from the mouth, there is a severe AMD discharge emanating from the Sky Haven Coal Company, Penn State #1 Operation, impacting Long Run at this point and negates the positive effects of the diversion well. For Long Run to truly every be restored, this discharge must be remediated as well.

What else needs to be done?

The second diversion well needs to be constructed. Currently the District is continuing to negotiate with the landowner at the Spring Valley site, which is the ideal location determined early on during this project. However, the CDWS is investigating the suitability of another site further away from any houses adjacent to Long Run.

Also, the District needs to continue to monitor the water quality of Long Run and the performance of the system and determine the correct amount of water to allow through the system for optimum performance of the diversion well.

Additionally, as mentioned before the severe AMD discharge emanating from the Sky Haven Coal Penn State #1 Operation must be remediated before all of Long Run could ever be considered restored.

What are your plans for disseminating results of your work?

We have been writing project updates for the quarterly West Branch Susquehanna Restoration Coalition newsletter since the fall of 2009. The District is also planning to have an open house for the system before the spring meeting of the West Branch Susquehanna Restoration Coalition in 2011. The public will be invited to attend as well as local municipal officials and representatives from the local newspapers. Additionally, the CDWS has been monitoring Long Run since October 2009 as part of the Stream Monitoring Project funded by the PA DEP Section 205(j)/604(b) of the Federal Water Quality Act of 1987. At the completion of this project, she will complete a final report of the water quality and macroinvertebrate survey results collected during this project that will be available to the public.

How well did your spending align with your budget request?

The Clearfield County Conservation District received funding for Salary and Benefits, Contractual, and Construction and spending aligned very well with the budget request. The amount dedicated to Salary was unchanged during the project. Once the spending limit was reached, the CDWS donated her time to the project. The money dedicated to Contractual, \$5,500 to hire a contractor to do the design, permitting, and construction oversight was all transferred to construction. This increased the Construction category to \$49,500 and was spent on the construction materials, system nozzle, limestone, and construction contractor costs for installation.

Summary

The Long Run Diversion Well Project is an abandoned mine drainage treatment system that works by diverting low pH water from Long Run into a well filled with limestone. The limestone increases the pH of the water before returning to Long Run, ultimately increasing the pH of the stream itself.

Photographs and Detailed Technical Report

Photographs can be found on the attached CD and hardcopies of the approved GP permit, Erosion and Sedimentation Plan, and Diversion Well Drawings are attached to this report.

Operation, Maintenance, and Replacement Plans

The Boggs and Bradford Township Supervisors as well as the Clearfield County Senior Environment Corps and Clearfield County Conservation District are responsible for checking on the system on a bi-weekly basis. Leaves and debris are to be removed from the intake and the amount of water allowed into the system is to be adjusted accordingly so too much water is not withdrawn from Long Run. Limestone is to be put into the well on a monthly basis, depending on the amount dissolved over the course of the month. Two years worth of limestone was purchased for this project and is currently being stockpiled at the Boggs and Bradford Township Buildings for the sole purpose of being used in the diversion well. Should it be needed, the Clearfield County Conservation District and Boggs and Bradford Township Supervisors will seek funding for the repair or replacement of the diversion well. Additionally, the Clearfield County Conservation District will continue to monitor Long Run for improvement in water quality.