Aylesworth Creek Acid Mine Drainage Project
SRI O&M TAG Project #4 Request #1
OSM PTS ID: PA-130

Requesting Organization:	Lackawanna County Conservation District
Receiving Stream:	Aylesworth Creek
Watershed	Lackawanna River
Municipality/County:	Archbald Borough, Lackawanna County
Latitude/ Longitude:	41°31'12"N / 75°31'28"W

This report is an update to and should replace the report completed in June 2015 under O&M TAG 1.

Stream Restoration Inc. (SRI) was contacted on 8/1/11 by Cheryl Nolan, Watershed Specialist, Lackawanna County Conservation District (LCCD), regarding a problem with the Aylesworth Creek Acid Mine Drainage Project. She explained that a cyclone screen was used to prevent clogging of the treatment system intake and that the screen had stopped turning, resulting in plugging of the intake pipe, which caused untreated water to bypass the treatment system. Cliff Denholm of SRI conducted a site investigation on 9/20/11, where he was met on site by Cheryl Nolan and Jerry Stiles, District Manager, LCCD.

Originally, a different treatment system was in place that included a concrete intake and siphon vault. Once the siphon triggered, the water was flushed into a group of water-wheels as part of a limestone doser system. These water-wheels, however, resulted in significant maintenance and were a target for vandals. The system was then retrofitted with an Oxic Limestone Drain utilizing the existing intake structure and siphon vault. Unfortunately, the intake structure became plugged with leaves and debris. Because of this, a cyclone screen from Process Wastewater Technologies Inc. was installed at the inlet. The cyclone screen also became plugged by the accumulation of leaves and debris and was not spinning, causing untreated water to bypass the system through the overflow. Following SRI's initial site investigation, a meeting was held with Montgomery Watson, a local engineering company that had been involved in the project, which provided insight and helpful background information regarding the revolving screen.

On 6/10/13, Bryan Page and Ryan Mahony of BMI inspected the Aylesworth treatment system and conducted an initial field investigation to identify possible issues restricting rotation of the cyclone screen. An imbalance in the fan structure was observed, which caused the stationary support beam to interfere with the rotation of the fan blades. This issue could have been the result of weight or pressure being placed on the cyclone screen after installation. To correct the problem, adjustments were made to the support beam. New bearings were also lubricated and installed to eliminate another possible source of cyclone rotation issues. While this action helped to improve the functionality of the screen, the problem was not completely resolved as the screen was still not spinning freely.

After additional research and communications with the manufacturer, there was the realization that at least part of the problem with the screen was caused by the siphon system. The screen required a certain flow rate as well as head difference (water level) for the screen to turn. With the siphon

engaged, the water level within the box would be too high for the screen to rotate causing the screen to plug with debris. This problem could potentially be amended by increasing the flow rate of the siphons, restricting flow to the cyclone, removing the siphons, or disengaging the siphons and utilizing the much larger drain pipes within the siphon box. The last option was considered the easiest approach as the siphon system was no longer needed due to the previous installation of the Oxic Limestone Drain. Another option considered placing the cyclone screen at a higher elevation and raising the water level in the forebay; however, further evaluation of this option is necessary.

Another issue identified as a potential problem was the excess amount of leaves and other organic material which had accumulated in the forebay. The organic material not only reduces the capacity of the forebay, but also reduces the ability of the cyclone screen to spin. This issue could be remediated by removing material currently in the forebay, as well as developing a plan for future scheduled removal. One option would be to flush the organics downstream using the emergency spillway that discharges to a lower settling pond, from which the organic matter could easily be removed by excavation or other means. Another alternative would be to pump the organic material to an existing settling pond above the treatment system, or dredge the material.

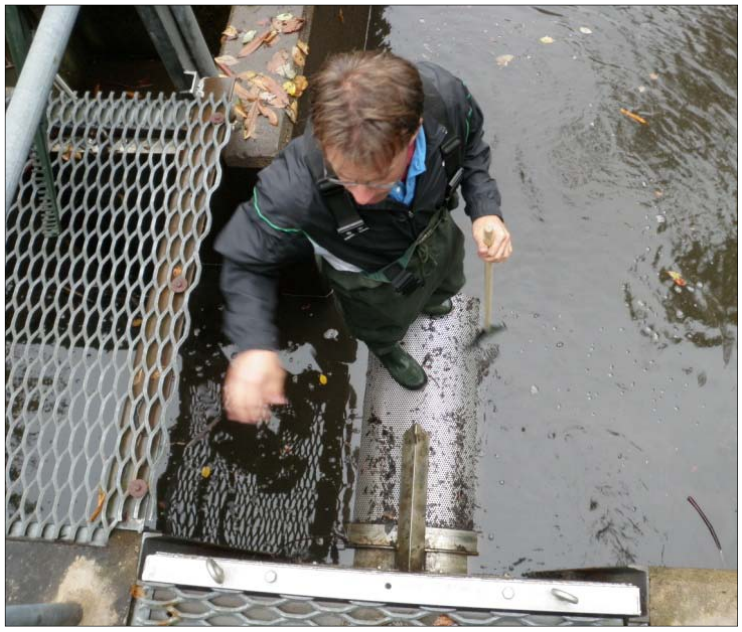
On 6/17/15, Daniel Guy and Ryan Mahony of BMI returned to the site to re-assess and address the outstanding issues relating to the cyclone screen. As described above, it had previously been determined that the best option to allow flow through the system was disengaging the siphon, which was accomplished by removing the drain plug to allow the entire system to flow through the siphon drain pipes. Organic material was also removed from the area surrounding the cyclone and moved through the forebay flush valve (not identified on plans) to allow for proper operation.

Daniel and Ryan met with Lackawanna County Parks staff and discussed work to be performed on site. After discussing the site characteristics and potential maintenance tasks, a decision was made for maintenance personnel from Lackawanna County Parks to continue future maintenance of the system. It was discussed that through the O&M TAG grant, SRI could provide future technical assistance to the park personnel on an as needed basis.

The project team thanks the Lackawanna County Conservation District, Lackawanna County Parks and Recreation Department, Montgomery Watson, Process Wastewater Technologies Inc, and the US Army Corp of Engineers for all of their efforts including support, assistance, and willingness to help with future maintenance. Funding for technical assistance and maintenance was provided by the PA DEP's Growing Greener and the Foundation for Pennsylvania Watersheds grant programs and in-kind services by project partners.

Additional Recommendations & Considerations:

- At this time, the siphons are not a necessary component for the OLD passive system to function correctly. While the siphons have been disengaged, they should be left in place and should not be removed unless absolutely necessary as they may be utilized in future retrofitting of the system.
- As the cyclone screen will continue to clog with organic material, removal of leaf litter within the forebay should be considered as a regular maintenance item. If possible, the Lackawanna County Parks maintenance staff should flush the forebay each fall.
- Ideally, the leaf litter currently in the forebay could be removed using an excavator or similar piece of equipment.
- Do not stand on the screen as it may damage the fan structure, bearings, etc., that could prevent the screen from rotating.
- An annual or semi-annual volunteer opportunity exists to remove leaf litter from the forebay using hand tools.
- Removing material that has settled in the forebay since it was constructed will help to extend system life and reduce the need for future maintenance.



Top Left & Right: The cyclone screen being cleaned to allow flow to the Oxic Limestone Drain.
Bottom Left: The siphons which may be disabled as needed to allow the cyclone to function properly.
Bottom Right: The bearings for the cyclone screen were replaced.

Top Left: Flushing the forebay using a pump to direct organic matter to the flush pipe.
Top Right: Removing organic matter by hand.
Bottom Left: The siphon vault was washed.
Bottom Right: The siphons were disabled by removing a plug to allow the cyclone to function properly.