

Waste Water Pond #1 Odor Reduction Project Overview

Early in 2016 the Public Works Committee and City Council made a commitment to reducing the odor coming from the City Waste Water Treatment Pond #1. After discussing options it was decided the solution was to replace the faulty membranes on the aeration system. Before we explain the project to you below is a short summary of how the system works:

- “ The City’s wastewater treatment facility consists of six (6) lagoon cells.
- “ Cell No. 1 receives the raw municipal wastewater via forcemains. This cell utilizes a fine bubble aeration system.
- “ Wastewater flows from Cell No. 1 to Cell No. 2 by using an overflow wier. Cell No. 2 is a facultative(settling) treatment cell.
- “ Water from this cell can be pumped to Cells No. 5 and 6 via a forcemain or transferred by gravity to Cell No. 3.
- “ Once sufficient treatment has occurred, Cell No. 3 can be gravity discharged to the Red River at Outfall No. 1. Cells No. 5 and 6 can be gravity discharged to the Red River at Outfall No. 2 after sufficient treatment has occurred.

The following is a summary of information on the existing wastewater lagoon cells:

Cell No.	Year Constructed	Effective Area (size of pond)
1	1972	3.55 Acres
2	1978	21.24 Acres
3	1958	51.0 Acres
4	1958	8.5 Acres - Inactive
5	1990	47.7Acres
6	1990	29.4 Acres

As the City grew the need was identified in 2002 that a fine bubble aeration system was need to enhance the treatment capacity of Pond #1. The fine bubble aeration system incorporated a blower system that pumped air into a series of PVC pipes placed near the bottom of the pond. The PVC pipes have a rubber membrane over the PVC pipe that has tiny holes in the surface of the membrane. The air is fed from the PVC pipes and into the membrane. The air is forced out of the membrane through tiny holes and produces fine air bubble. These fine bubbles introduce air into the water column in the form of Dissolved Oxygen (DO). The DO aids in the breakdown of the waste in the water thus reducing the amount of time to treat waste water.

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Over the years the membranes wore out and were not producing enough air to keep the DO levels high enough in the pond, thus the odor issue concerns.

The solution was to replace the membranes. The project was completed with Public Works crews performing the majority of the work.

Below is a short description of the project and time line.

Pond #1 was drained the first week of August. Manure pumps were placed at strategic locations in the pond to pump out about 1.5 to 4 feet of sludge that accumulated in the bottom of the pond. It took several weeks of pushing the sludge over to the manure pumps with skid loaders with a specialized squeegee type bucket made for pushing sludge.

After the pond was cleaned of sludge crews then removed and replaced the membranes and reinstalled the diffusers. This took us a few weeks to complete. We leveled each membrane in an effort to balance the air flow to each diffuser.

On October 6th we completed the project and opened the valves to fill the pond.

To date we have enjoyed a substantial reduction in odor, most days there is no detectable odor from the pond.



Pond #1 has been drained. The white PVC pipes carry the air to the diffusers. Don Wald, Sewer Foreman, with waders on measures the depth of the sludge in the bottom of the pond.



Removing sludge around edge of pond with backhoe



Tractor and manure pumps, pumping sludge out of pond



This is a membrane diffuser it is 10 feet long. There is one at the end of each PVC pipe



Pushing sludge to the manure pumps with skid loader



Manure pumps spray water to loosen thick sludge



Rubber membrane diffuser

PVC pipe that carries air to the membrane diffuser



Overhead view of the entire pond.
There were 112 membranes that
needed replacement

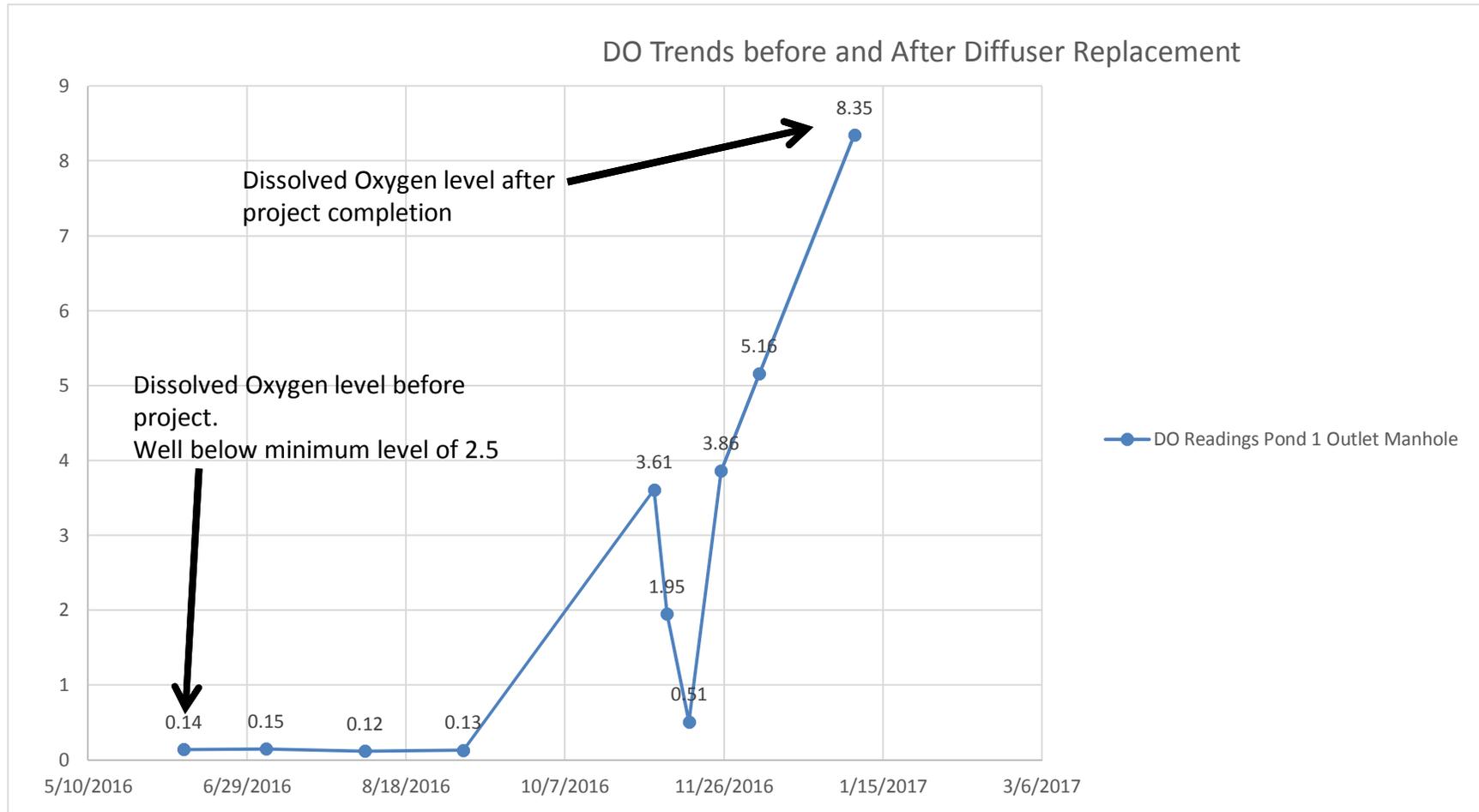


Diffusers were removed, hauled out of pond and membranes replaced on shore, hauled back into bottom of pond to be reinstalled



Replacing membranes on shore

Successful Results





Dismantling and reassemble of the diffusers was a dirty job

Let's not forget-- it was the people down in the bottom of that pond
everyday that made this a success!

THANK YOU

