

Technical Writing Sample

Created October 7, 2016

MEMORANDUM

TO: INSTRUCTOR KILE SIPES
FROM: LUCAS PRICE
SUBJECT: ARCATA MARSH WASTEWATER TREATMENT PLANT FIELD TRIP
DATE: OCTOBER 7, 2016
CC: PROFESSOR EILEEN CASHMAN

Purpose

The purpose of this memorandum is to offer a review of our field trip to the Arcata Marsh Wastewater Treatment Plant.

Discussion

On the afternoon of September 30, 2016 our lab section went on a field trip to the Arcata Marsh Wastewater Treatment Plant. Our trip was guided by one of the plant operators, Thea, and our lab instructor Kyle. In a time of about two hours we were guided through the treatment plant and given an explanation of the process through which the water is treated.

Upon arrival to the facility we were greeted with the smells that accompany the process of treating wastewater. Our tour started in the headworks of the facility, then moved to the primary clarifier, from the clarifier we then saw the oxidation ponds and treatment wetlands, and finished with the disinfection process. The headworks is where all of the wastewater enters the facility. We were told that the water coming into the plant has BOD of 200-250. The volume of the water varies by season from 0.9 - 1.1 million gallons per day in the summer to 7 – 9 million gallons per day in the winter. The water is elevated with the use of Archimedes Screws to allow for gravity to do the work of moving the water through the facility. Organic and inorganic solids are then separated by bar screens and grit separators. The water then moves to the primary clarifier where suspended solids are allowed to settle and are removed from the water. The organic sludge that is collected in the headworks and clarifier is sent to the digester where compost and methane is produced. Right now there is no use for the methane but the compost is dried and used in city landscaping projects. The water from the clarifier is then sent to the oxidation ponds. In the oxidation ponds the water is oxygenated by algae, allowing many microorganism to flourish. These microorganism begin to break down the sludge and pollutants in the water. The water moves very slowly through the ponds allowing for time for the biological processes to occur and allowing for further settling of the sludge. It was noted that the BOD of the water actually increases in the oxidation ponds because of the algae. After the water moves through the oxidation ponds it is then moved to the treatment wetlands. The treatment wetlands are densely vegetated and as the water moves through the wetlands it is filtered through the roots of the vegetation and organic material is further broken down by microorganisms living on the roots of the plants. This process removes the added BOD acquired in the oxidation ponds and provides further treatment of the water. After leaving the treatment wetlands the water begins its final cycle of disinfection and further treatment before being released into the bay. The water is first disinfected by chlorination, it is then dechlorinated and sent to the enhancement wetlands for further treatment then back to chlorination and dechlorination. It is a cycle because after being disinfected only some of the water is sent to the bay while the rest is sent back to the treatment wetlands to repeat the cycle. This final

process brings down the BOD of the water to below 30 which is the water quality standard for water being released into Humboldt Bay.

Because this system has been in use for decades there are some problems that have arrived over time with this facility. The main problem that was discussed on the tour is that some of the treatment wetlands are beginning to not work properly due to a buildup of sludge that has accumulated over decades of use. This is a problem that is currently being researched by engineers at HSU and methods for reducing this sludge are currently being tested. Our lab instructor, Kyle, was able to give us some information about one of the methods currently being tested. To try and reduce the amount of sludge, they have been deploying these machines they call “Blue Frogs”. He wasn’t able to tell us exactly how they remove the sludge but he said that it looks as if they are reducing the volume of the sludge.

Conclusion

This field trip gave us thorough overview of the processes that the city of Arcata uses to treat its wastewater. It is a fairly new and very unique process that is still being improved, providing research opportunities for us as students at HSU and future environmental engineers.