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## INTEROFFICE MEMORANDUM

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**TO:** PROFESSOR ARCHABALD

**FROM:** AIDAN WILSON, STUDENT

**SUBJECT:** LAB 06, ARCATA WWTP TRIP MEMO

**DATE:** OCTOBER 10, 2019

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### PURPOSE

The purpose of this memo is to discuss what I learned during our trip to the Arcata waste water treatment plant. I will talk about what I learned, what we were shown during the tour, and what I found interesting about the trip.

### DISCUSSION

On October 4<sup>th</sup>, 2019 we took a trip to the Arcata waste water treatment plant (AWWTP). During this trip we were shown around the plant, told about the processes the waste goes through, and some history about the plant. We were told about the variation of effluent that comes into the plant, modifications that are in the planning stage, how they deal with sludge, information about the wetlands, and BOD<sub>5</sub> coming into and leaving the plant. Variation in effluent is affected mainly by rain and the population of people, which is much higher during Fall and Spring terms of Humboldt State University, the flow rate also changes during the night time when less people are using water. The headworks at the AWWTP has two pumps, each of which can pump 2.5 million gallons a day (MGD). The normal flow rate during the school season is 2.3 to 2.4 MGD, but during a strong rain storm though flow rates can increase up to 14 MGD. In these cases, there are pumps that bypass the headworks and put the extra waste water into one of the treatment ponds. Most waste water plants were rebuilt around the 1970s and 1980s due to the Clean Water Act. Since then not many upgrades have been done. The plant is becoming decrepit and there are many renovations planned. We were told that renovations would include an activated sludge process to bring down ammonia and nitrate levels, better aerators to deal with sludge, a rehabilitation of the treatment ponds, a switch from chlorination to ultra violet (UV) treatment, and maybe find a use for the methane that they currently burn. The most recent modification was solar panels that were placed on top of the sludge drying ponds to offset the amount of power they will need for UV treatment. The sludge that we saw drying will be turned into compost. The compost is kept in house by the city as to avoid any complications and is used in the local parks. Going back to the treatment process, after the waste water leaves the headworks it eventually is placed in the wetlands. In the first pond bacteria is introduced to take care of the solids and algae is grown to increase dissolved oxygen (DO), as the water moves on to the second pond the bacteria begins to

starve. The second pond starves the bacteria by not having the solids they feed on and by having plants that take their resources such as DO and shade the pond from the sun. When effluent first comes into the plant it is devoid of DO, as it moves into primary treatment it is aerated and put into the ponds where algae is grown to increase DO levels. Bacteria is then added, which uses the DO and creates BOD<sub>5</sub>. When the BOD<sub>5</sub> leaves the plant, it has to be below 30 mg/L which is accomplished when the water goes through the second treatment pond. The AWWTP has to report tests on the effluent such as the BOD<sub>5</sub> levels, chlorine levels, total suspended solids, and pH levels to make sure the government quality standards are met. This shows that the plant has done its job.

#### CONCLUSION

The Arcata waste water treatment plant is a good example of a WWTP trying to treat waste water by using wetlands. We were shown through the plant, told about how most things worked, and told why they treat and process things the way they do. It was interesting to learn about how they managed their system and how they planned to restore and renovate it.