CITIZENS ENVIRONMENTAL QUALITY COMMITTEE MEETING NOTES

DATE: Monday May 21, 2018

TIME: Scheduled for 10:00 am at the Wastewater Treatment Plant (WWTP)

PRESENT: Chris Meyer, Bruno Borsari, Dan Hall, Hans Madland, Fran Goodin and Lynette Power.

GUESTS: Paul Schollmeier

STAFF: Natural Resources Sustainability Coordinator John Howard, Wastewater Pre-treatment coordinator Eden Willcox, Wastewater Assistant Superintendent Jeff Schneider, Wastewater Superintendent Paul Drazkowski

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Quorum achieved at 10 am.

Before the formal tour, members of the CEQC asked various questions about the City's wastewater system, and learned that the WWTP can refuse service to customers that are non-compliant. The largest industrial users need to sample weekly, and get a yearly inspection from the City's pre-treatment coordinator. Approximately 300 businesses are reviewed by the pre-treatment coordinator.

The tour began with an overview of the waste water treatment plant (WWTP) at the main office. WWTP staff passed around a schematic of the plant processes (attached). A couple of full time staff regularly clean sewer pipes throughout the City. This is done with a cutter or by rodding the sewer line. Grease buildup is a common problem, which often is a result of poor cleaning or improper use of grease traps. Hans enquired about the funding source for wastewater activities and infrastructure, and Jeff and Eden deferred until Paul, the plant supervisor, arrived.

The sanitary sewer is not always replaced when street repairs tear up the street, but has been done in large street repairs, such as the Grand St. and Hamilton St. reconstruction. A severe problem that the sewer department occasionally encounters is when an electrical or water line is within the sewer pipe. This is found once a year or so.

The main plant was built in 1972. The previous plant was nearer to the Mississippi River. Federal and state law led to more stringent wastewater rules, and necessitated the current plant layout. Biosolids, which are the organic left overs after treatment, are given to qualified farmers as fertilizers. Typically three farmers each year get the biosolids. The City tests the biosolids for heavy metals before they are applied since heavy metals can accumulate and are not ideal for food products. Dan worked on heavy metal testing when he was an intern at the plant. Bruno asked where the heavy metals come from, and Eden said they tend to originate from the wearing away of pipes and also industrial effluent. Dan added that heavy metals were historically used as paint pigments, and that heavy metals bind to organic materials.

Lynette had a related question about how industries dispose of solvents and other toxic substances. Eden said that hazardous materials need to be disposed via hazardous waste haulers, who pick up materials at the industrial facilities – so they are not put down the sewer drain. Hans was curious if industrial users pay extra for dirtier discharges, and Eden replied that many industrial operators in town treat waste to some degree before

discharge, so cost is not born by the City WWTP. Businesses adding industrial wastewater pay more than domestic users.

The City's WWTP is operating at about half capacity or less. The plant has capacity for 15 million gallons per day, and now rarely exceeds 7.5 million gallons per day.

Bruno wondered if the relaxing of environmental regulations at the federal level was impacting how the plant operates? Eden replied that EPA standards for WWTPs have not changed. Bruno also asked how residents can support and learn about the work of the WWTP? Jeff replied that if residents have issues, they can always call the WWTP and staff would address their issue. The WWTP considered doing a bill mailer about education, but chose not to proceed. Jeff also mentioned that so-called "flushable wipes" are a specific issue that WWTPs are dealing with. Despite the name and manufacturer claims, flushable wipes clog up pipes and therefore should not be flushed. Jeff elaborated that a simple, general rule for what should come to the plant is: If it doesn't come out of a person's body, it shouldn't go down the sewer pipe.

Chris asked if the City could publicize the good work of the WWTP? John said this would be doable. Bruno suggested a radio Q & A, like what the City is doing with the Police Community Service officer. He envisions the program having a humorous atmosphere given the subject matter.

Dan asked if triclosan, which was a common anti-bacterial additive to soap, caused issues for the WWTP? City staff said that they have not encountered issues, and that it was banned by the state government in the last couple years.

Hans wondered who at the City is responsible for keeping stormwater clean? This is John's role, and John added that the City depends on resident complaints to learn about issues. If people notice something unusual in or heading toward a storm drain, such as oil, they should notify John.

Chris is hoping to get a more detailed understanding of the biodigester and microturbine, as it seems some City leaders believe the digester was a failure. Paul Drazkowski replied that the system is working well and functions without much supervision. There was an initial issue with siloxane and hydrogen sulfide, which led to increased maintenance. This has since been solved, and the microturbine is producing electricity as expected – nearly 1500 kW/day or about 1/3 of the plant's electricity. The microturbine was initially planned to send some of the methane it produced to the WWTP boilers, but this did not really work at first due to impurities in the gas. The system does yield about 225 BTU/hour, and halved the need for natural gas. A future project could potentially double the amount of energy produced for the plant, and would cost about $165,000, which is much less than the $1.2 million spent on the initial installation. The cost savings are due to only needing another turbine/powerhouse, and not the associated infrastructure. To fuel the expanded capacity, the City could accept fats, oils, and greases (FOGs) or food wastes. This would also save many of these items being sent to the landfill or composters where the decomposition gas is not used. The City uses a Unison brand system that is anaerobic and 29% efficient. Bruno shared that his hometown in Italy uses compost to generate nearly 20% of the town's energy. Paul suggested a report on the successful operation of the biodigester to clear up the misunderstanding held by some City leaders.

Hans departed at 11:03 am.

The biggest priority for the WWTP is to replace underground pipes that are in poor condition. Each spring, the amount of water entering the WWTP doubles, and this is likely due to groundwater and rainwater getting into the sewer system.

Walking Tour:

The first stop was the bar screen building where large wastes and trash (cigarette butts, tampons, etc.) are removed from the wastewater. A dump truck worth of waste is collected each week and disposed of at Miller Scrap. Adjacent to the bar screen building are the clarifier ponds where solids settle out. A squeegee ensures material is cleaned out.

The group then walked to the trickling filters where the wastewater, minus the solids, is spread over a rock medium. The rocks are coated by microbes that take in nutrients. The strong odor of the trickling filters is the hydrogen sulfide produced by the microbes. The water is spread by gravity, and rocks don't need cleaning, so a very low maintenance process.

The more common method nationwide to trickling filters is activated sludge ponds, which is the next step in the process. These ponds are smaller and aerated, and thus more controlled by operators, and therefore are a steadier tool for nutrient removal. Bacterial mats that form are sent to the biodigester.

The group then moved to the chlorine diffuser chamber. The plant disinfects the treated water before discharging to the Mississippi. The chlorine is scrubbed by sulfur dioxide so the discharge is not laden with chlorine.

Prior to chlorine disinfection, the wastewater goes to final clarifier tanks where solids settle out leaving mostly clean water.

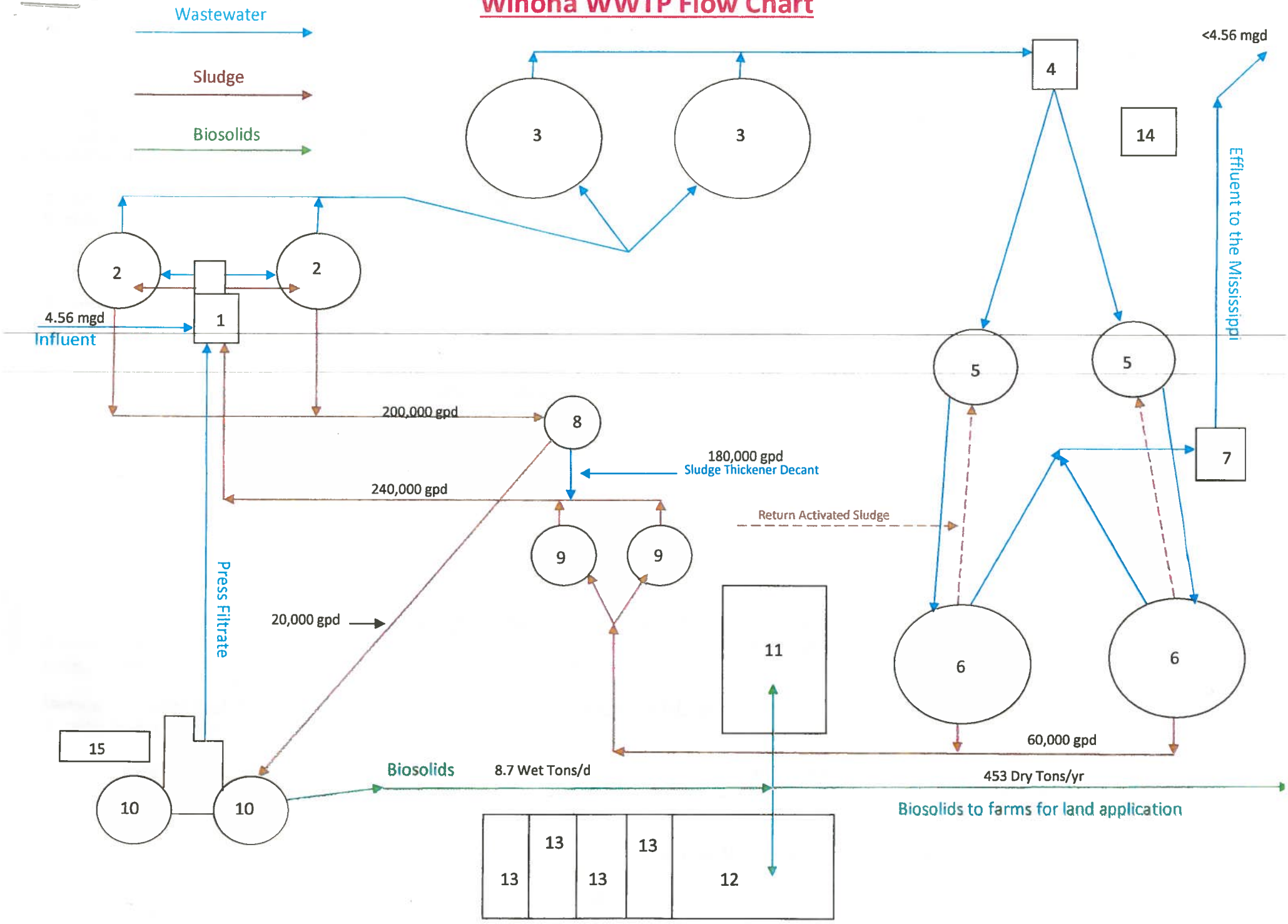
This concluded the water portion of the tour. The group walked back to the main office and along the way saw the covered storage area for biosolids, some unused drying beds ponds (one of which was being prepared to be the gravel bed tree nursery) and some sludge thickener silos.

Lynette departed at 12:23 PM.

The last building in the tour was the anaerobic digester building. Solids, or sludge, that have settled out at the different stages of the plant are routed to the large digesters, where they are heated to "digest" the sludge. The detention time of the sludge in the digesters is about 35 days. Once digested, the sludge is given a new name of biosolids since it has been treated. These biosolids are then pressed to remove water and conveyed to a truck which will relocate them to the storage shed. The natural gas that forms in the digesters goes to the microturbine, but before being burned, the gas is pressurized, moisture controlled through condensing, reheated, and filtered for siloxane. The microturbine runs 24/7 except when down for maintenance. In general, the microturbine is very low maintenance and mostly runs itself. In total, the microturbine occupies a room roughly 15 feet by 20 feet.

There being no further sites to see and no additional questions, the tour concluded at 12:36 PM and meeting was adjourned.

Winona WWTP Flow Chart



KEY TO WINONA WWTP FLOW CHART

1. The wastewater (ww) is lifted to the WWTP by Lift Stations #4 and #7 via force mains. The ww enters the (1) **bar screen building** where it passes through an automatic bar screen and also through the grit chambers north of the building. The bar screenings and the washed grit from the grit chambers is landfilled along with the rubbish generated at the WWTP. In 2016 we received about 1.24 billion gallons which is about 3.39 million gals per day.

2. After leaving the grit chambers the ww enters the (2) **primary clarifiers**. The sludge that settles on the bottom is pumped to the (8) **sludge clarifier**. The thickened sludge from the sludge clarifier is pumped to the (10) **anaerobic digesters.**

3. The ww leaves the primary clarifiers and enters the (3) **trickling filters** for biological treatment.

4. The ww is then lifted by the (4) **screw pumps**.

5. The lift station moves it to (5) **the solids contact tanks** for additional biological treatment.

6. From the solids contact tanks the ww goes to (6) **the final clarifiers**. Most of the sludge from the final clarifiers goes to the (9) **sludge thickening units**. Some of the sludge is returned to the solids contact tanks to maintain the level of mixed liquor suspended solids necessary for optimum treatment, which varies somewhat according to the nutrient load entering the WWTP.

7. From the final clarifiers the ww goes to the (7) **chlorine diffuser chamber**. In this chamber, from April 1st through October 31st, chlorine is added to the ww to disinfect the ww. 1200 feet downstream is a chamber into which sulfur dioxide is diffused into the ww to remove any residual chlorine. About 500 feet downstream from the sulfur dioxide diffuser chamber the ww enter the Mississippi River.

8. Most of the sludge that settles on the bottom of the final clarifiers goes to the (9) **gravity thickeners**. The sludge is aerated in the thickeners and then goes to the primary clarifiers where it settles out and is pumped to the sludge clarifier.

10. About 20,000 gpd of sludge enters the (10) **anaerobic digesters** every day. The detention time of the sludge in the digesters is about 35 days. The digested sludge is dewatered on a belt press using a charged polymer. The dewatered digested sludge or biosolids is stored in the (11-12) **sludge storage areas**. The press filtrate is returned to the head of the plant for full treatment.

Number (11) is the **roofed biosolids storage area** and number (12) is **an unroofed slab**. Biosolids are land applied on area farms in Spring and Fall. In between those periods it is stored in these areas.

13. (13) **Sludge drying beds** are used to dewater sludge when the belt press is off line or there is some other problem that needs to be dealt with. Filtrate from the drying beds is returned to the head of the plant for full treatment. The drying beds can be used for dewatered biosolids storage if areas (11-12) are filled.

14. A (14) **diesel powered generator** is on standby to power critical treatment units in the WWTP in case of power outage.

15. (15) **The Turbine Building** is where we clean our biogas and burn it in a turbine to generate electricity to meet part of the demand for the WWTP.