CITY OF PORTAGE LA PRAIRIE
WATER POLLUTION CONTROL FACILITY
2016 ANNUAL REPORT

The Water Pollution Control Facility (WPCF) is a class IV wastewater treatment facility. Domestic and industrial wastewater is conveyed to the facility for treatment **via 13 pumping stations located throughout the city and industrial park areas. Industrial wastewater is pre-treated in one of two Bulk Volume Fermenters (BVF) prior to being combined with screened domestic wastewater and pumped to the WPCF secondary treatment system. The secondary system is comprised of four Sequencing Batch Reactors (SBRs). Each reactor will cycle through timed stages of fill, aeration, and settle providing the necessary treatment to remove the waste products from the water. The treated water is disinfected by Ultraviolet light and then discharged into the Assiniboine River. Solids that accumulate in the basins during the secondary treatment process are removed to prevent a buildup of solids. These solids are thickened, anaerobically digested, and stored before land application as a soil abatement.**

Plant Performance and License Compliance

The facility performed very well throughout 2016. A total flow of 6,060,283,400 L, was processed through the secondary system. Of this total, 3,021,916,700 L is from domestic sources (including Southport), 1,303,177,000 L is from Poplar Bluff Industrial Park and 1,735,189,700 L flows from McMillan Industrial Park. Industrial contribution is 49.86% of total incoming flow.

Manitoba Department of Sustainable Development has issued an operating license to the facility detailing the maximum discharge limits that the effluent wastewater must be within. There are limits for total suspended solids, biochemical oxygen demand, ammonia, and total and fecal coliforms. Any exceedance is reported to Sustainable Development within 24 hours of the limit being surpassed. A second license is issued that pertains to the application of biosolids that restrict the application rate of nutrients, solids, and metals.

There were seven exceedance events throughout the year on seven separate days. This equates to a compliance rating of 98%. It should be noted that the remainder of the year, the effluent was well below the allowable limits. Graphs demonstrating the overall performance of the facility are included at the end of this report.

Total Suspended Solids

The Environmental license permits a maximum daily discharge of 30mg/L of total suspended solids. In 2016, this was exceeded on seven occasions. The dates and reasoning are listed;

February 8- The BVF that services the McMillan Industrial Park was in "upset "conditions for several days which results in a large release of solids from the BVF into the secondary system. The total suspended solids in the final effluent increased gradually during this time. On February 7th, the value was 30 mg/L and peaked at 39 mg/L on February 8th. There was also strong winds caused turbulence in the basins and prevented properly settling of materials.

February 20-22- Decant header 2B was floating and allowed solids from the surface of the basins to flush out with the effluent. This header, as well as 2 others, were adjusted to prevent solids being removed that should not have been. Solids discharged during these three days was 32 mg/L, 425 mg/L and 33.5 mg/L.

August 16-17- The air valve in basin #4 stuck open during the night. This prevented solids from settling as required and the material washed out with the decanted water. The recorded value for suspended solids was 605 mg/L. The suspended solids on August 17 were recorded as 64 mg/L as it took time for the solids material that was captured in the equalization basin to rinse out of the system.

September 2- An over limit value of 46.3 mg/L for total suspended solids was recorded. There was a noticeable amount of scale in the sample indicating a buildup in the hose of the sample station. There was no known operation or mechanical cause.

Biological Oxygen Demand
The Environmental operating license permits a maximum daily discharge of 30mg/L. There was no exceedance of this parameter.

Ammonia
The allowable amount of ammonia that can be discharged in the effluent changes each month. There were no incidents of ammonia exceedance.

Coliforms
Total and fecal coliforms are measured three times per week. The limit for total coliforms is based as a monthly geometric mean of 1500 CFU/100mL and fecal coliform limit is 200 CFU/100mL. There were individual days were the results were reported above the limits but the monthly geometric mean limit was not exceeded. These daily events do not need to be reported.

Odour
Odour is a component of the City of Portage environmental license. Three written complaints, from three different sources must be received by Manitoba Sustainable Development in order for their department to act on odour issues. A reoccurring concern is the odourous gas being emitted from the onsite Industrial Pre-treatment facility, which is operated by McCain Foods Ltd. City of Portage la Prairie staff communicates regular requests to McCain to check the system for displaced caps from sample ports that allow the gas to escape.

Anaerobic Digester
The biosolids license requires that material must be anaerobically digested for 30 days at 20°C prior to land application. The mixing system in the anaerobic digester has not been functioning for a few years. Material continues to build up in the tank, reducing the overall capacity and reducing the retention time in the digester, meaning the 30 days cannot be obtained. As well, the boiler that supplies the heat to the digester stopped functioning early in January, 2015. A new boiler was not installed until late May. The 20°C requirement was not maintained during this time. A suspension of the clause in the license that requires the time and temperature was requested, and approved, for land application of biosolids for the 2015 Spring and Fall application programs.

Two chopper pumps were purchased to be placed in the digester to provide temporary mixing until a new digester is built during the facility upgrade. An attempt was made to install these

pumps but was unsuccessful due to a thick layer of material at the top of the digester. Another attempt will be made in the spring of 2017.

SBR Pump Station

The SBR Pump Station that was constructed in 2014-2015 had ongoing issues with the PVC liner that were identified in the fall of 2015. The installer of the liner was on-site late March to inspect the holidays that were noted during the November 2015 inspection. Holidays are indicators of leaks within the liner system. Their team replaced the pipe bands that have were already replaced once in July 2015. They were sealed in place with a plastic banding of the liner material. A large number of holidays were identified and it was thought that patching all of the holidays could potentially damage the liner further. The manufacturer and installer of the liner system returned to site on June 8th, along with the General contractor and the engineer from AECOM. After inspection, it was determined that there are improper welds that are causing holidays in the material. The City requested the installer to return to site, clean the station thoroughly, and repair all leaks according to manufacturer specifications. This work began on October 17and repairs were completed on October 18. The station was put back into service on Monday, October 24 and has been operating satisfactorily since then.

Pumping Stations

The City of Portage la Prairie operates and maintains twelve pumping stations throughout the city. These stations collect and pump wastewater to the treatment facility. A major storm on June 26 caused several power outages at various pumping stations throughout the City. Operations and maintenance staff worked diligently through the night to restore power or install stand by systems to ensure wastewater continued to flow to the treatment facility. Aside from this one incident, all stations functioned as expected the remainder of the year.

Biosolids Land Application

Biosolids are the residual solids that accumulate throughout the treatment process. The solids are thickened, anaerobically digested and then stored until land application through injection in the Spring and Fall. Samples of the biosolids material as well from the selected field are taken to obtain background levels of metals and nutrients. Application rates are determined based on these results.

A total of 814 dry tonnes was applied in 2016. In the Spring, 231 dry tonnes of biosolids was applied and an additional 583 dry tonnes was applied in the Fall. A year-end report was submitted to Manitoba Department of Sustainable Development as required, outlining the total tonnage applied. The report also includes the total amount of ammonia, phosphorous, and metals applied. The owner of the field receives a report and a copy has been posted on the City of Portage la Prairie website.

Facilities Classifications and Operator Certification Levels

The Province of Manitoba requires operators and pumping station maintenance staff to be certified according to the classification of the facility. Certification is obtained through experience, examination and continuing education credits.

The Water Pollution Control Facility is deemed as class 4 and the collection system is classified as class 2. Two of the four facility operators are unconditionally certified at level four and two

operators, as well as the facility manager, are unconditionally certified at level three. All are certified with level 2 in collections. The Facility Maintenance foreman and one pumping station maintenance staff has obtained level 2 in collections and a second pumping station maintenance staff is working towards writing the level one exam. The goal is to have all operators certified to the level of the facilities they operate.

In order to maintain or advance certification levels, operators must participate in ongoing education. In 2015, several staff worked on wastewater related courses through correspondence and one operator and the laboratory technologist attended a workshop on wastewater microbiology.

Reporting

Monthly reports are submitted to Manitoba Department of Sustainable Development. These reports detail the final effluent information as well as information on the three influent sources to the secondary system. A copy of relevant information is also sent to each industry each month.

On a quarterly basis, WPCF is required to report to the Federal Government under the Water Systems Effluent Regulation. A National Pollutant Control report is also submitted annually. WPCF must report on ammonia and total phosphorous that is released to the environment through the discharged effluent water as well as applied to land through biosolids.

Nutrient Removal Regulation Compliance

The Province of Manitoba implemented the Water Quality Standards, Objectives and Guidelines regulation that requires any wastewater facility that discharges into Lake Winnipeg to reduce nitrogen and phosphorous (nutrients) from the effluent by January 1, 2016; however, a request for an extension was made and granted until January 1, 2018. Quarterly reports are provided to Manitoba Department of Sustainable Development as to the progress of this project.

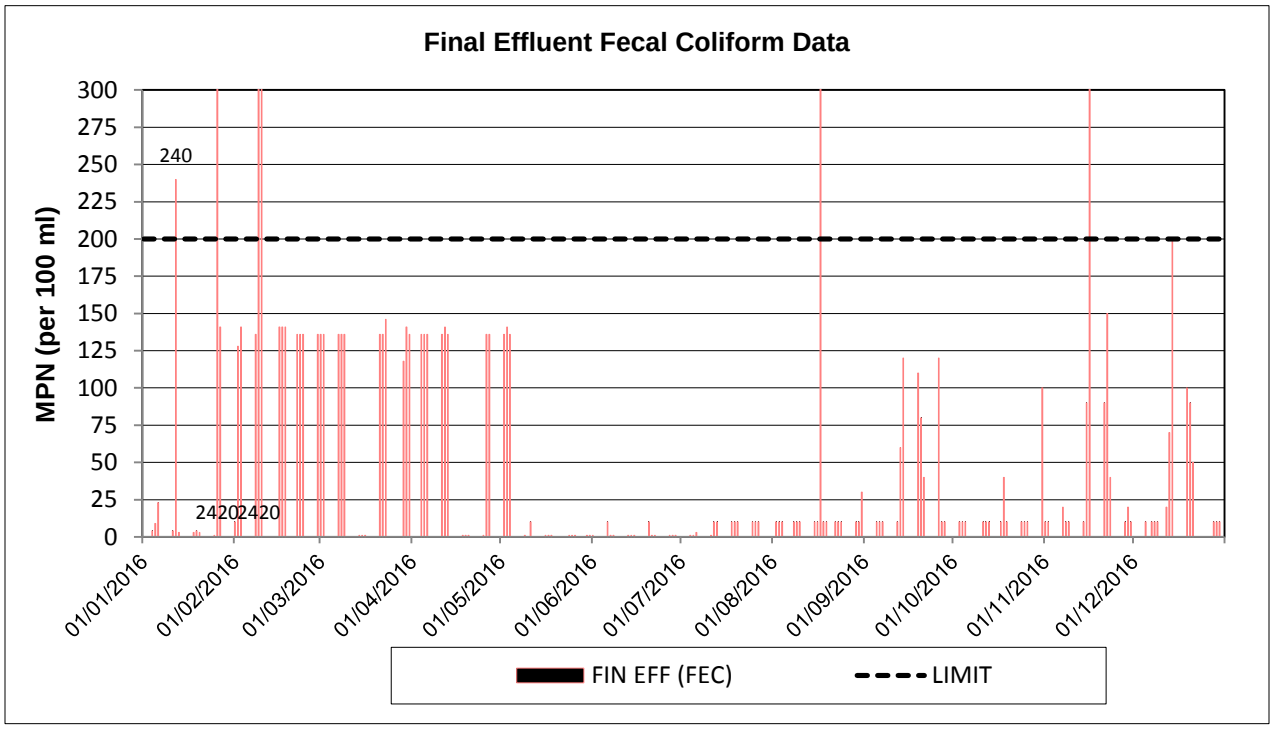
In 2015, the functional design was completed with a total capital cost is estimated at $106 M. A business case analysis was conducted in 2016 to determine if a Private-Public Partnership would be most economical to help fund this project. Ernst & Young were hired to conduct the review and the result indicated that a complete Design, Build, Finance, Operate & Maintain model through Private-Public Partnership would result in the highest Value for Money. City Council approved this recommendation. In the final quarter of 2016, a new industry, Roquette, announced it would develop a new pea processing facility in Portage la Prairie. This will add a significant amount of wastewater flow and load to WPCF. Finalization of wastewater loads from the new facility is to be completed in by April 2017 and the functional design will need to be updated to include this new information.

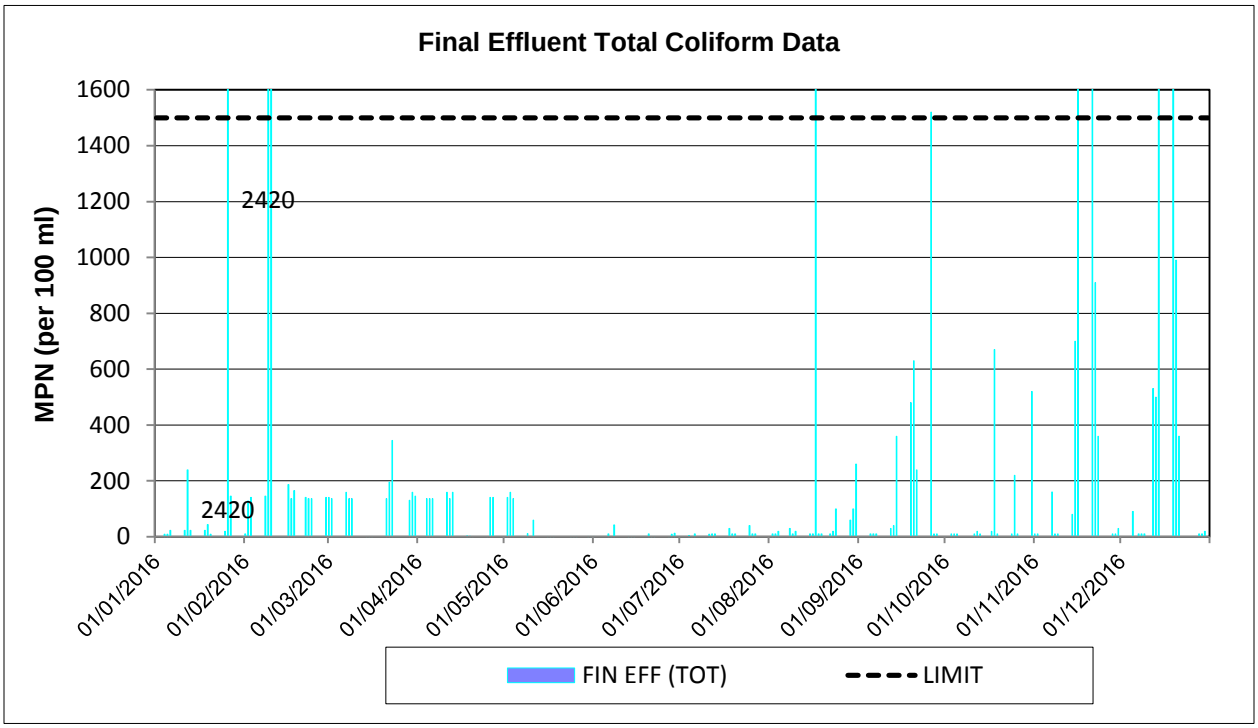
Administration continues to work on the Industrial Services Agreements. Extensive alterations to the cost participation formula, including capital and operating costs are ongoing. Several discussions have taken place with the four industrial users to keep them informed on progress on this project and estimates of capital contribution.

Capital Expenditures

The 2016 budget contained several items that were required for WPCF. Three new pumps were purchased for the following locations- SBR, Equalization Basin, and outfall. Replacement media for odour control at the Biosolids Storage Tanks was procured as was some facility doors. Level sensors and floats were also installed in the new SBR pumping station. A large storage cabinet was installed in the lab to allow for improved storage of chemicals.

Final Effluent Data

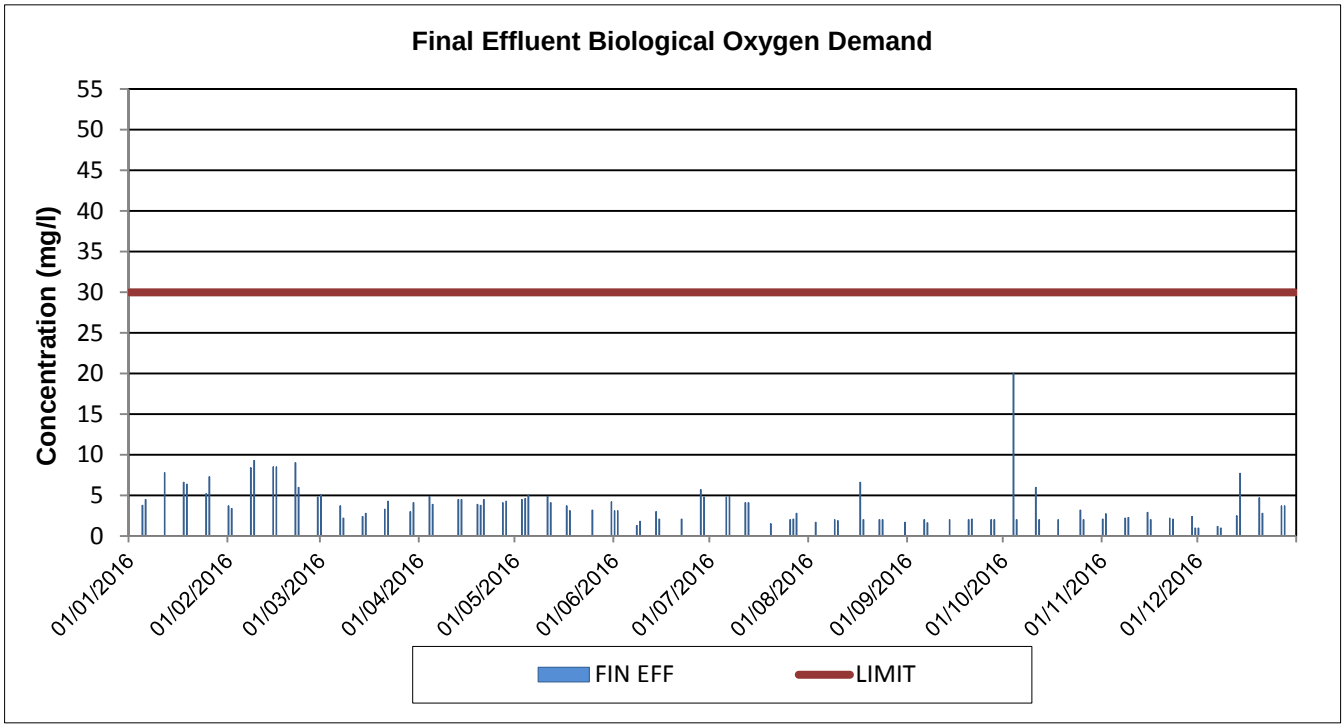


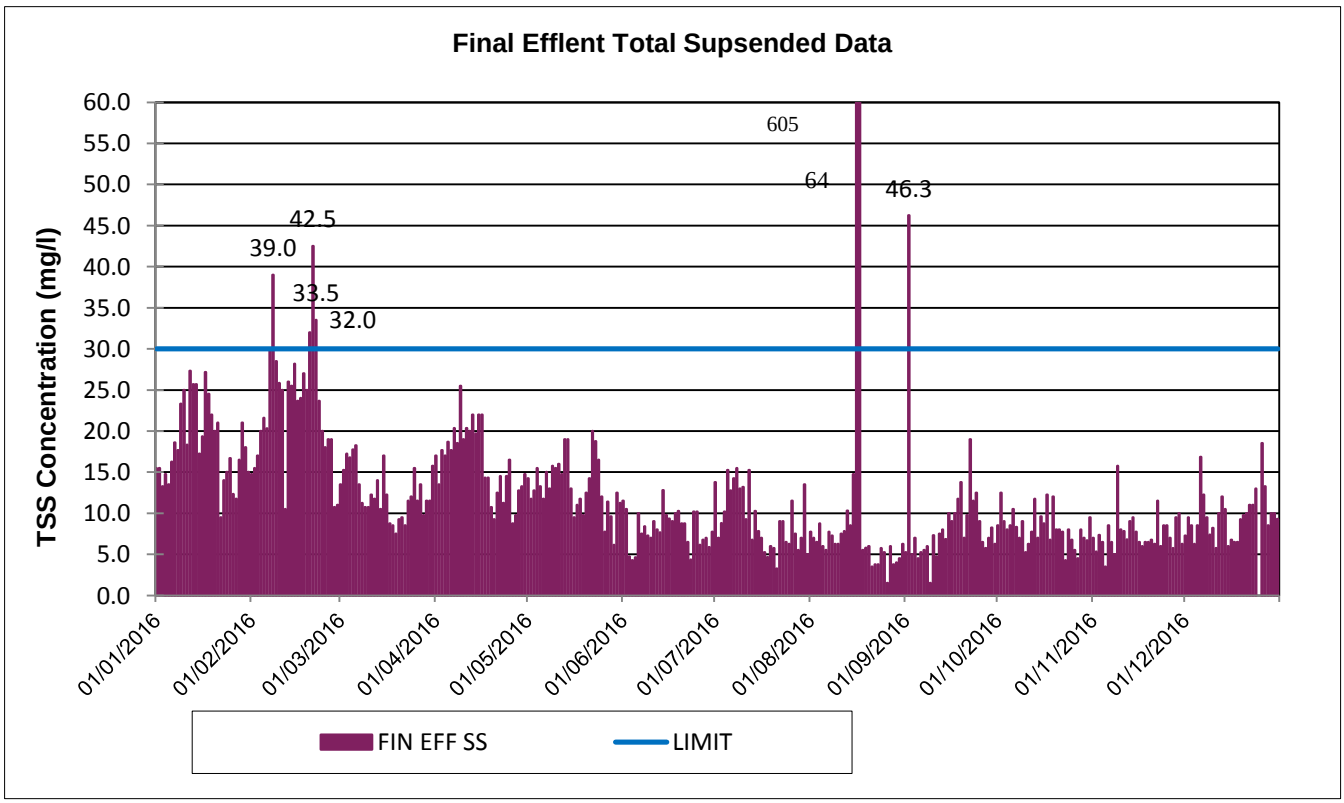


COLIFORM YEAR TO DATE ANALYSIS

FECAL COLIFORM ANALYSIS (FEC)
TOTAL ANALYZED 158
GEOMEANS 31.6

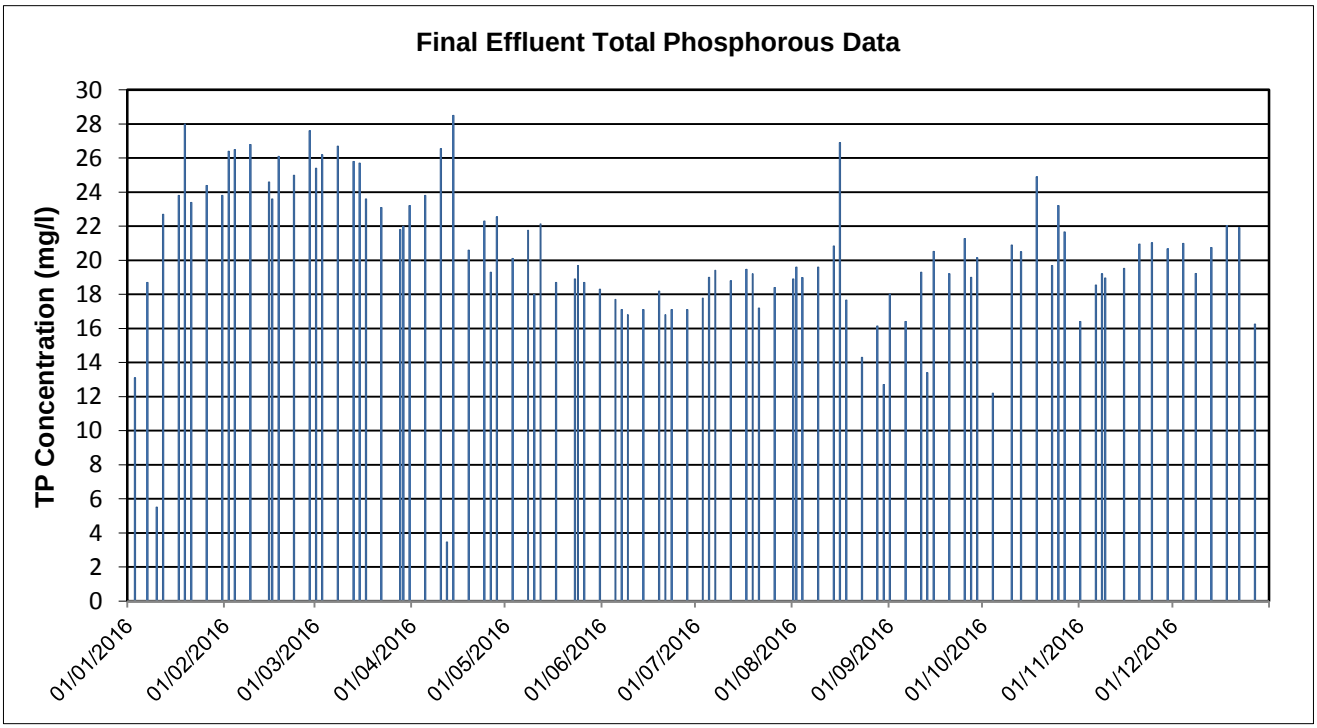
TOTAL COLIFORM ANAYLSIS (TOT)
TOTAL ANALYZED158
GEOMEANS 52.1

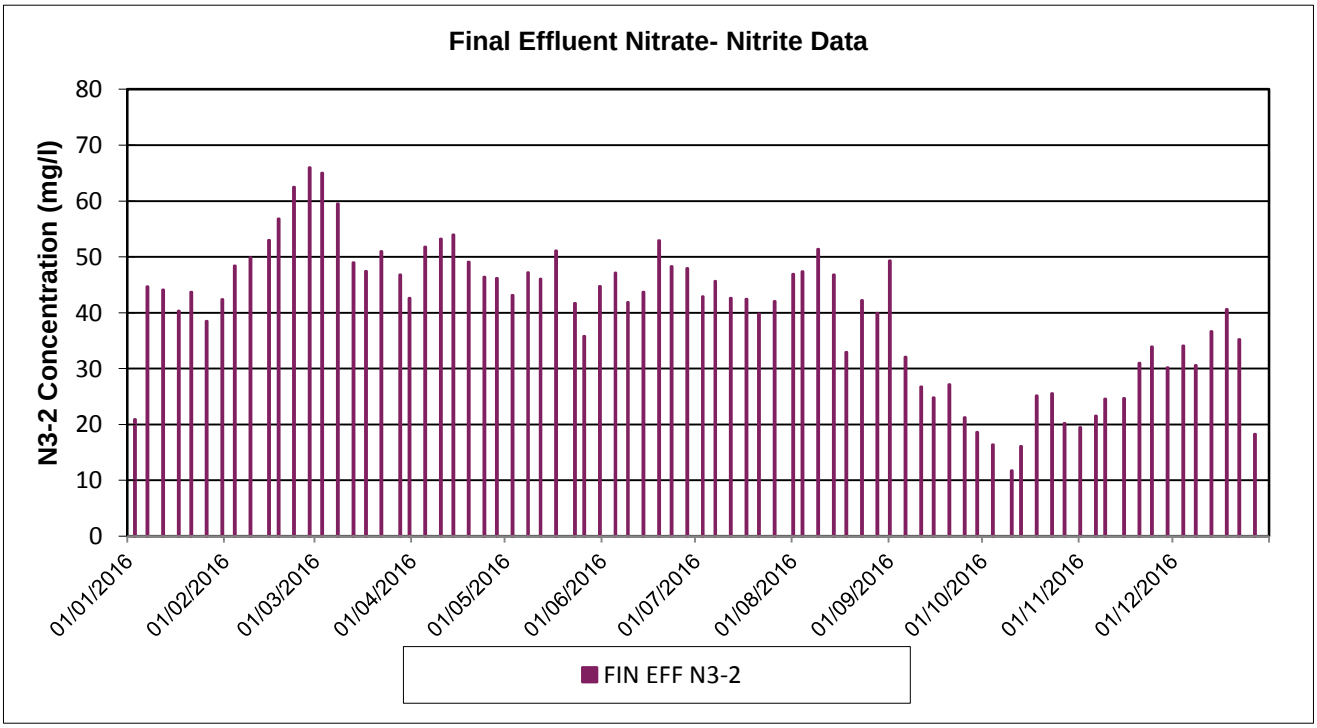




Biological Oxygen Demand
TOTAL # FAILURES 0
TOTAL SAMPLES ANALYZED 100
PERCENT FAILURE 0

Total Suspended Solids
TOTAL # FAILURES 7
TOTAL SAMPLES ANALYZED 365
PERCENT FAILURE 0.02

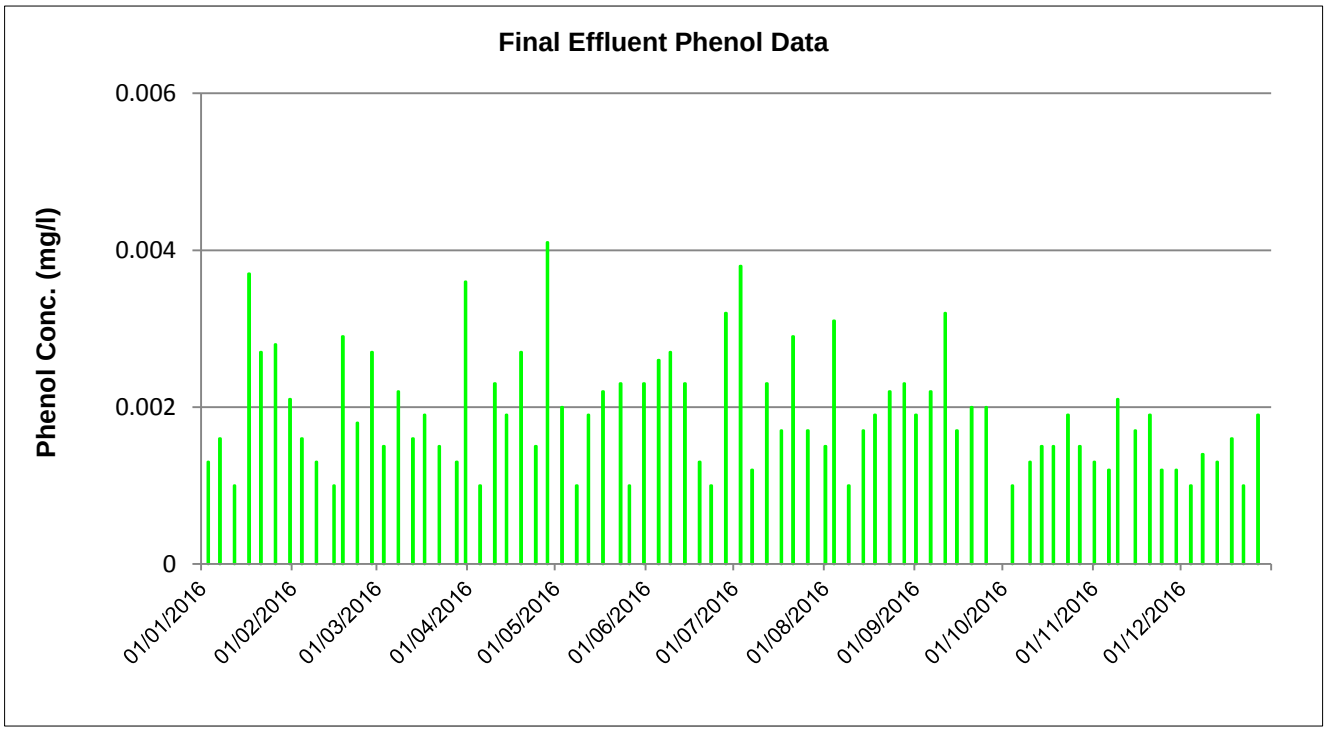


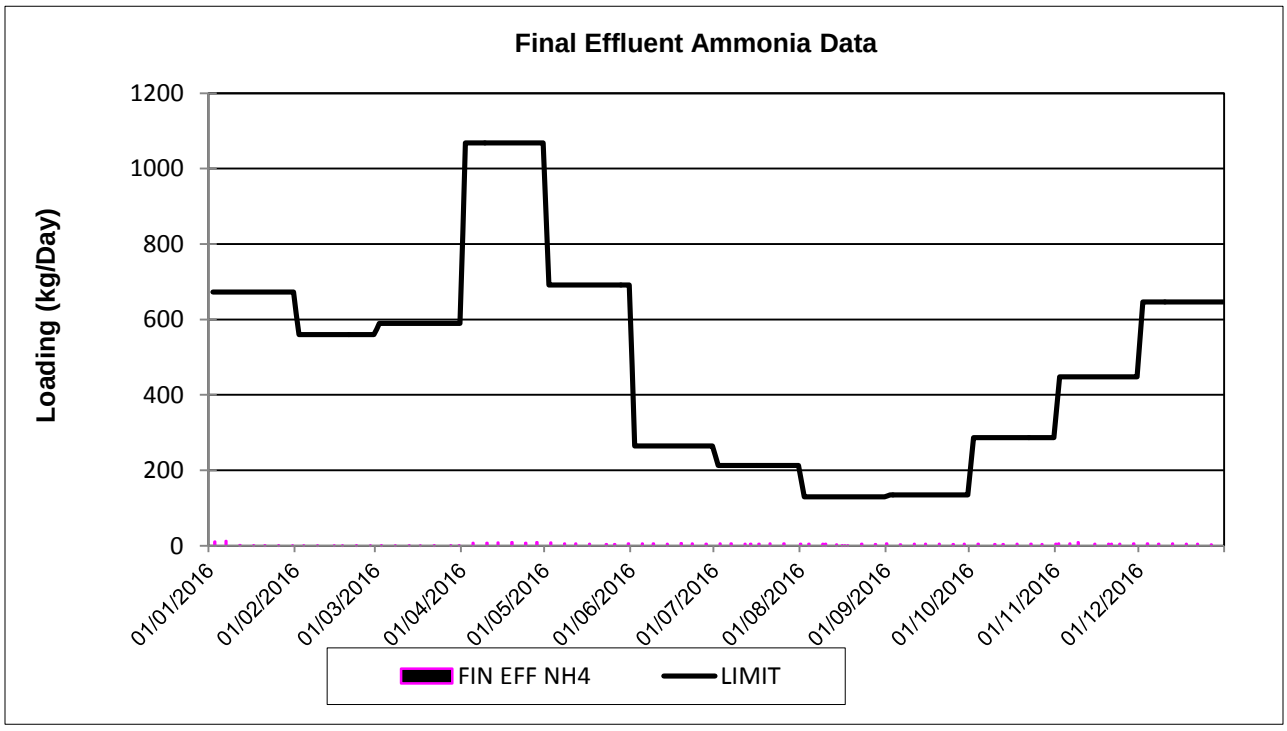


Total Phosphorous **Nitrate-Nitrite**

Total Samples Analyzed 100

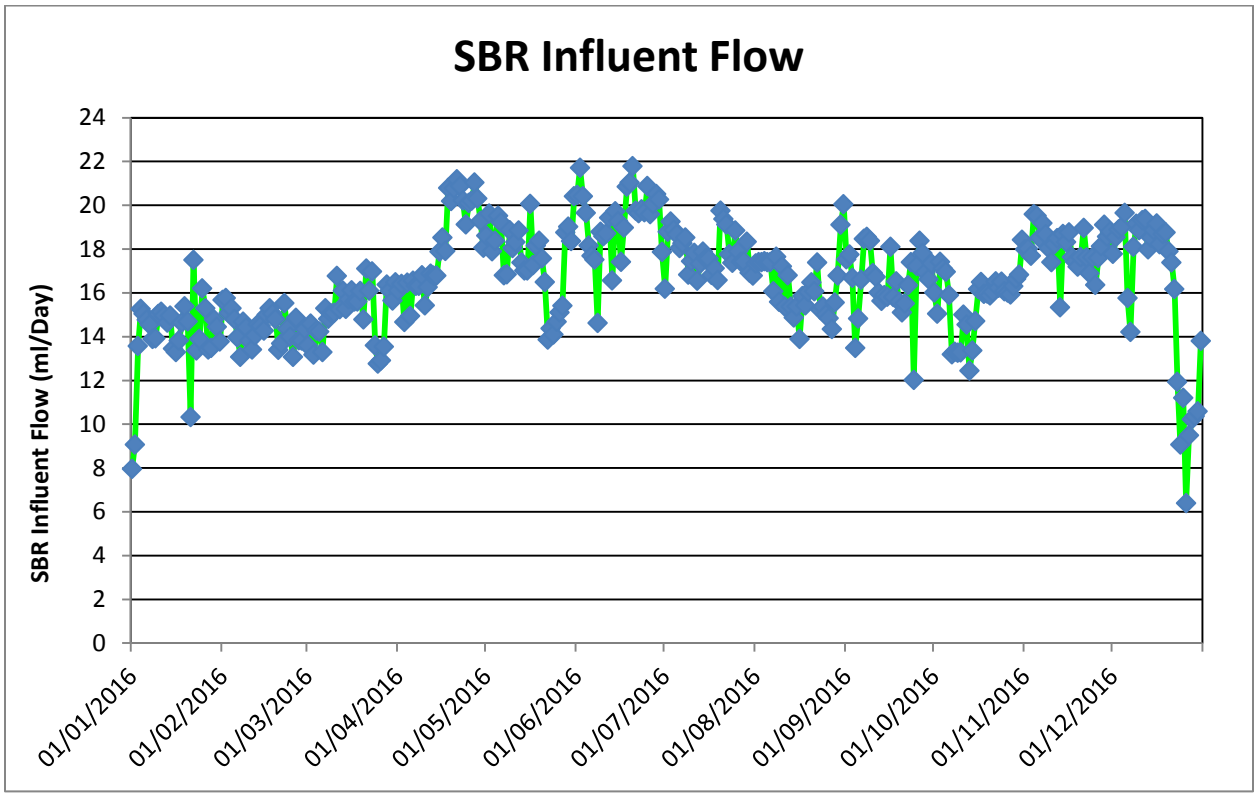
Total Samples Analyzed 80

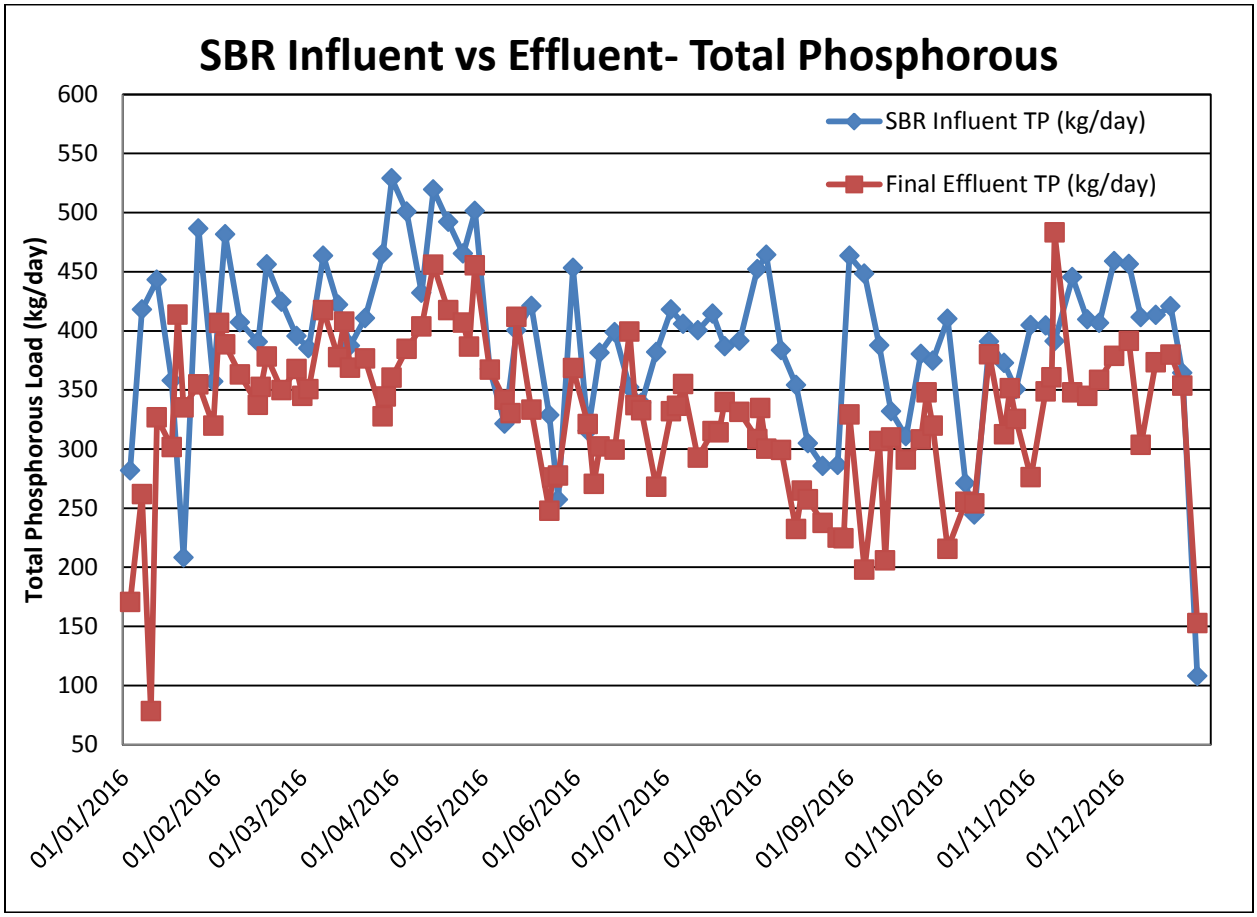


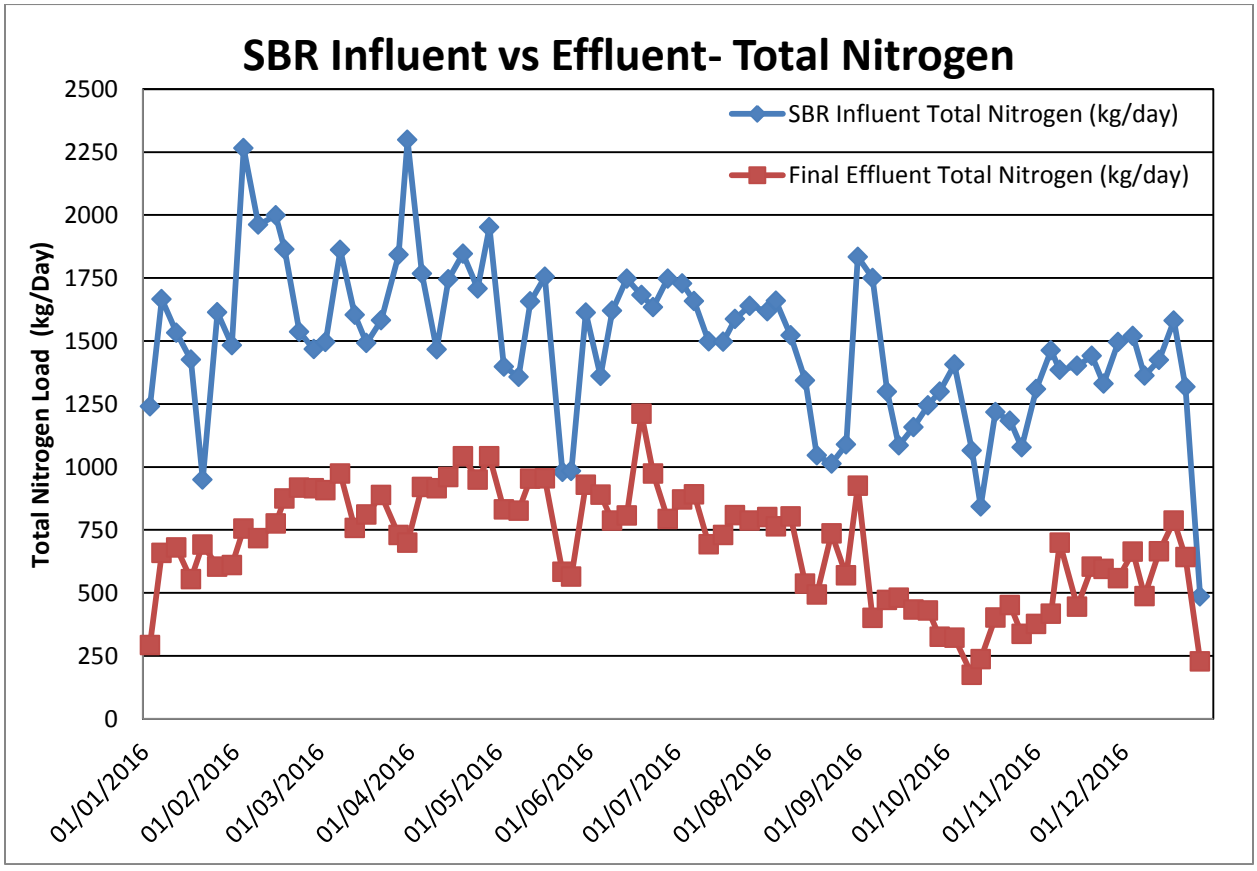


PHENOL ANALYSIS
TOTAL # FAILURES 0
TOTAL SAMPLES ANALYZED 77

AMMONIA ANALYSIS
TOTAL # FAILURES 0
TOTAL SAMPLES ANALYZED 84
PERCENT FAILURE 0




SBR Influent vs Effluent- Total Phosphorous
Total Phosphorous Load (kg/day)
600
550
500
450
400
350
300
250
200
150
100
50
SBR Influent TP (kg/day)
Final Effluent TP (kg/day)
01/01/2016
01/02/2016
01/03/2016
01/04/2016
01/05/2016
01/06/2016
01/07/2016
01/08/2016
01/09/2016
01/10/2016
01/11/2016
01/12/2016


SBR Influent vs Effluent- Total Nitrogen
Total Nitrogen Load (kg/Day)
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
SBR Influent Total Nitrogen (kg/day)
Final Effluent Total Nitrogen (kg/day)
01/01/2016
01/02/2016
01/03/2016
01/04/2016
01/05/2016
01/06/2016
01/07/2016
01/08/2016
01/09/2016
01/10/2016
01/11/2016
01/12/2016