# CITY OF PORTAGE LA PRAIRIE
# WATER POLLUTION CONTROL FACILITY
# 2014 ANNUAL REPORT

**The Water Pollution Control Facility is a classified as a level 4 treatment facility. Municipal wastewater is pumped from 12 different lift stations throughout the City of Portage la Prairie to the facility. Domestic strength sewage is also received from Southport and the Peony Farm. High strength industrial flow is received from the Poplar Bluff and the McMillan Industrial parks. This flow is pre-treated in large anaerobic digesters prior to reaching the WPCF secondary treatment system. These two sources are combined and pumped sequentially into four aeration basins. Each basin 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.**

## Plant Performance

In 2014, WPCF treated 6,483,000 m3 of incoming wastewater. This is compared to a flow of 5,530,000 m3 in 2013 (an increase of 17%). 3,058,000 m3 was received from municipal sources, 1,981,000 m3 was from the McMillan Industrial Park, and 1,445,000 m3 was contributed from the Poplar Bluff Industrial Park. Industrial contribution is 53% of total incoming flow.

Manitoba Conservation issues the facility an operating license that outlines the discharge limits of various parameters that the treatment facility must achieve for release of effluent into the Assiniboine River. The average total suspended solids discharged were 21.8 mg/L with a maximum peak of 383 mg/L. The average Biological Oxygen Demand was 6 mg/L with a limit of 30 mg/L. Maximum BOD was 67 mg/L. The monthly average limit for Total Coliforms is 1500 CFU/mL and 200 CFU/100 mL for fecal coliforms. WPCF operated within these limits each month with the exception of March and April. Total Coliforms was 4445 CFU in March and 7873 CFU in April. Fecal coliforms was recorded at 1370 CFU in March and 1075 CFU in April. The lowest monthly average was in May with Total Coliform reported at 3.2 CFU/100 mL and fecal coliform reported at 3.1 CFU/100 mL. The license limits for the amount of ammonia permitted to be discharged varies each month, with August having the lowest limit of 129.6 kg/day. In August, WPCF discharged an average of 7.8 kg/day. The average Ammonia load was 8.7 kg/day for all of 2014.

## Operations Issues

WPCF experienced a variety of operational issues throughout 2014. In the first few months of the year, the pre-treatment system at Poplar Bluff industrial park was discharging increasingly high loads of suspended solids to the WPCF secondary system. This was well in excess of the industrial services agreement and eventually in excess of the overall system design capacity. All efforts were made to ensure secondary treatment was maintained however, toward the end of the month of February, the incoming loads pushed the system beyond the design making treatment difficult to maintain on a daily basis. Between January and May, there were 31 Total Suspended Solids exceedances that could be attributed to the high incoming loads. This also affects the

efficiency of UV disinfection as the UV rays are unable to penetrate the bacteria through all the solids material. The results from the samples were in excess of the environmental limits. The solids inventory in the basins has also accumulated to a point that the solids removal system could not remove enough material daily to maintain proper sludge bed levels. The increased solids loading lead to an increased amount of sludge material that filled the storage tanks close to capacity. Simplot Foods, in co-operation with the City of Portage la Prairie, proposed that the solids removal system be operated on a 24 hour basis, with the thickened sludge being transported back to Simplot for storage in their onsite Bulk Volume Fermenter. In addition, polymer was added to the secondary SBR basins to promote settling of materials. This proposal was conditional on Simplot implementing measures to reduce the incoming load from their facility. This plan was implemented on March 31st and after several set- backs, was successful at removing the excess solids material and returning treatment to within allowable limits within 3 weeks.

The wastewater facility operated consistently well during the third quarter. Influent from two industries continued to exceed agreement limits however, the secondary process was able to treat the load sufficiently. The increased loadings received in the spring and early summer did prevent staff from being able to take one basin off line for inspection, maintenance, and repair. This is the second summer in a row that this has not been feasible due to incoming industrial loads

*Odour*

A reoccurring concern is the odourous gas being emitted from the onsite Industrial Pre-treatment facility, which is operated by McCain Foods Ltd. In 2013, several recommendations were made to their operations team for permanent solutions. City of Portage la Prairie staff communicates daily to weekly requests to McCain operators to check the system for displaced caps from sample ports that allow the gas to escape. They have indicated that upgrades will be made to the gas collection system however, these changes are not expected to reduce odour. Odour is a component of the City of Portage environmental license however, in order for Manitoba Conservation to enforce this portion, three written complaints- from three different sources, must be received to their department.

## Lift 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. Although there were a handful of power outages due to storms, flow was maintained with the help of back up pumps and our portable generator.

## Biosolids Land Application

Biosolids are the residual solids that accumulate throughout the treatment process. At WPCF, these solids are dewatered and then stored until they can be applied to agricultural land as a fertilizer. Samples of the biosolids material as well from the application field are taken to obtain background levels of metals and nutrients. Application rates are determined based on these results.

The application process occurs twice per year. In the spring, 327 dry tonnes of biosolids was applied and an additional 603 dry tonnes was applied in the fall. A total of 930 dry tonnes was applied for 2014. A year-end report was submitted to Manitoba Conservation 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 also receives a report.

## Facilities Classifications and Operator Certification Levels

The Province of Manitoba requires operators and lift 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 class 4. The operations foreman and two of the four Operators are unconditionally certified at level four and two operators are unconditionally certified at level three.

The Wastewater Collections system is deemed class 2. The Facility Maintenance foreman is certified at level 2. One lift station maintenance staff is certified at level 1 in collections and distribution and the second 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.

## Nutrient Removal Regulation Compliance

*Nutrient Reduction*

The Province has given notice that Portage la Prairie will have to remove nitrogen and phosphorous (nutrients) from our final effluent by January 1, 2016; however, a request for a one year extension was made and granted until January 1, 2018.

After discussion with each industry, it was decided that a centralized nutrient removal facility would be most favorable by all parties. A focus was put on finding nutrient removal processes that would reduce industrial loads as much as possible while still being respectful of the regulatory requirements to reduce the dependency on chemical addition. Further to this, it was prioritized to select technologies that had lower impact on operating costs. After evaluation of several options, two were selected for pilot scale testing. Ostara's Pearl process was chosen for Phosphorous reduction. It removes phosphorous as struvite to form a marketable product for fertilizer. Veolia's Anitamox system utilizes specialized bacteria for the reduction of nitrogen. Piloting commenced in January 2014 and was completed in July. Both systems worked favourable to reduce the nutrients as expected and also worked well in sequence. Preliminary design of the expansion proceeded with these two systems.

Several meetings were held with each industry after the completion of the piloting study to review the findings as well as the estimated costs associated with the expansion. Industrial services agreements will need to be amended to reflect these new regulation limits as well as cost sharing arrangements. These discussions will continue into 2015.

## Staff Development

Operators and maintenance staff received a variety of training in 2014. This included lockout/ tag out, thermal stress, H2S awareness, confined space entry, and SCBA. They also received respiratory fit testing.

Lab techs and operations staff continues to take a variety of workshops and correspondence courses relating to wastewater treatment.

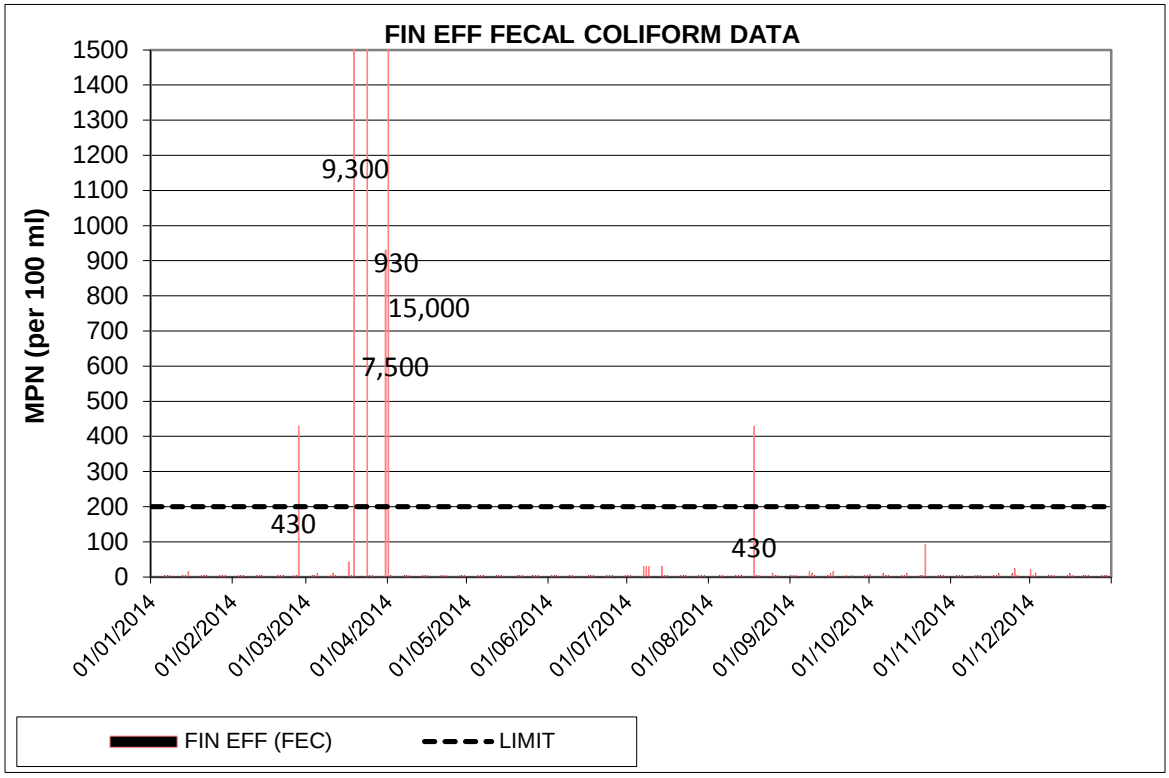
**Capital Expenditures**

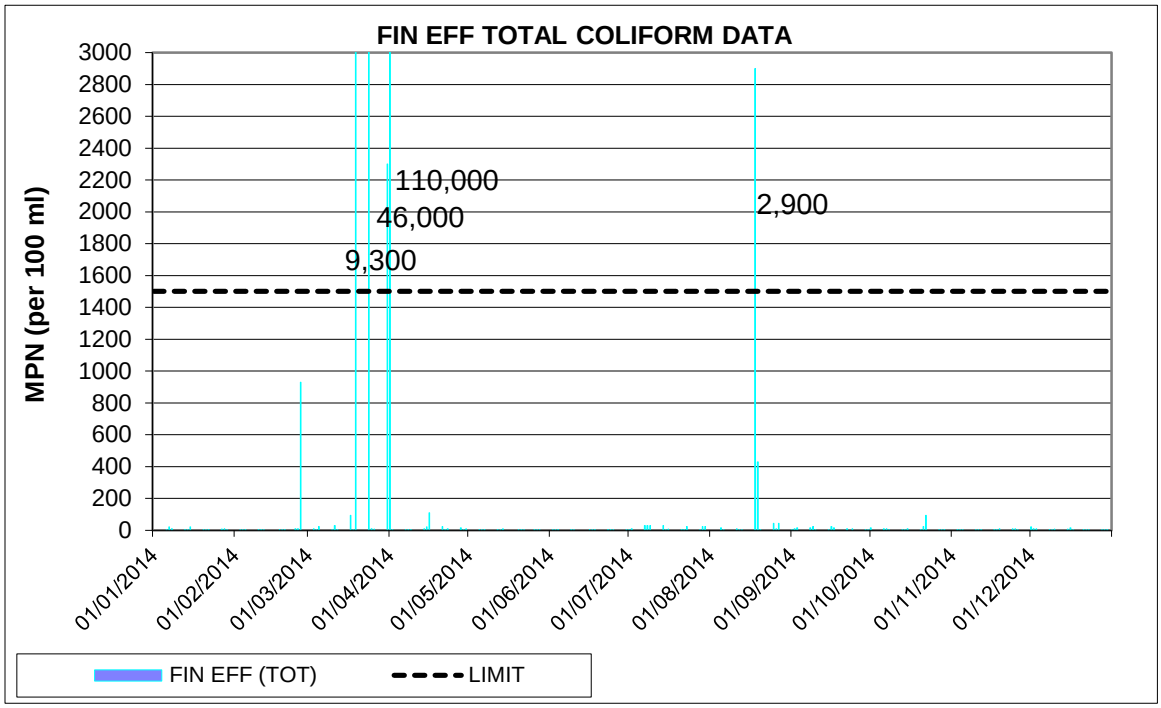
Excavation of the new SBR Pump station site began in February and after various delays, construction was completed in September. The station has been fully operation since that time with no concerns.

Process communication lines were damaged during a lightning strike in July 2013. Final repairs were made to the damage line so System A and B are both fully functional. A new SBR pump was purchased to replace an existing pump. This is part of the 10 year debt management plan where 1 of 8 pumps is scheduled to be replaced over the next 8 years.

Several building maintenance issues were addressed which saw 3 exterior doors and the vanity in the men's washroom replaced and the window blinds throughout the office areas were upgraded. Dust control was also implemented to reduce damage to electrical equipment.

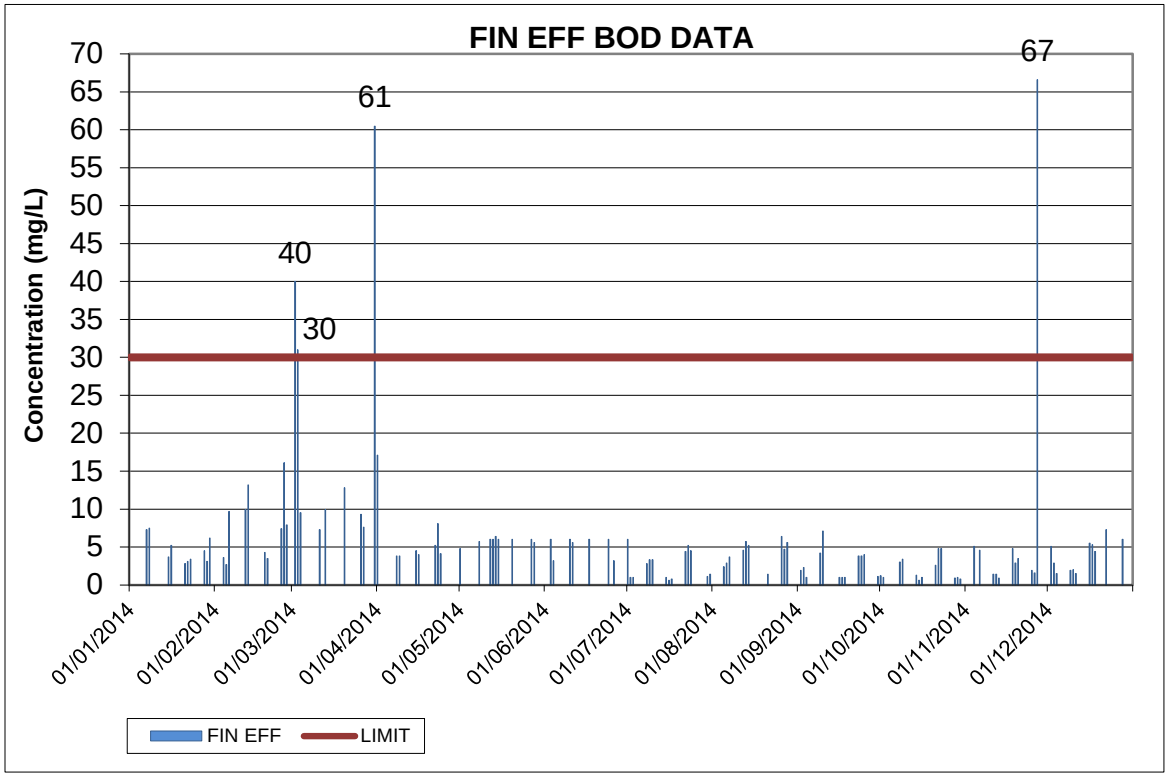
The lift station staff received a new cube van that is more reliable and better equipped for their job.

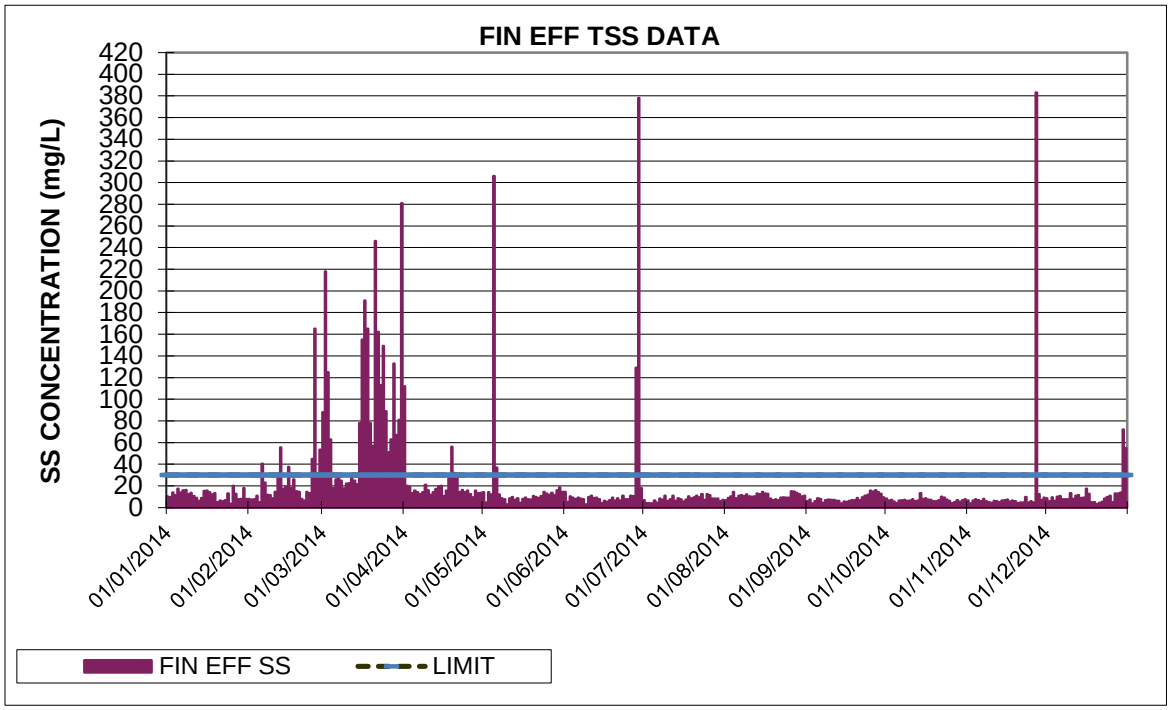



**COLIFORM YEAR TO DATE ANALYSIS**

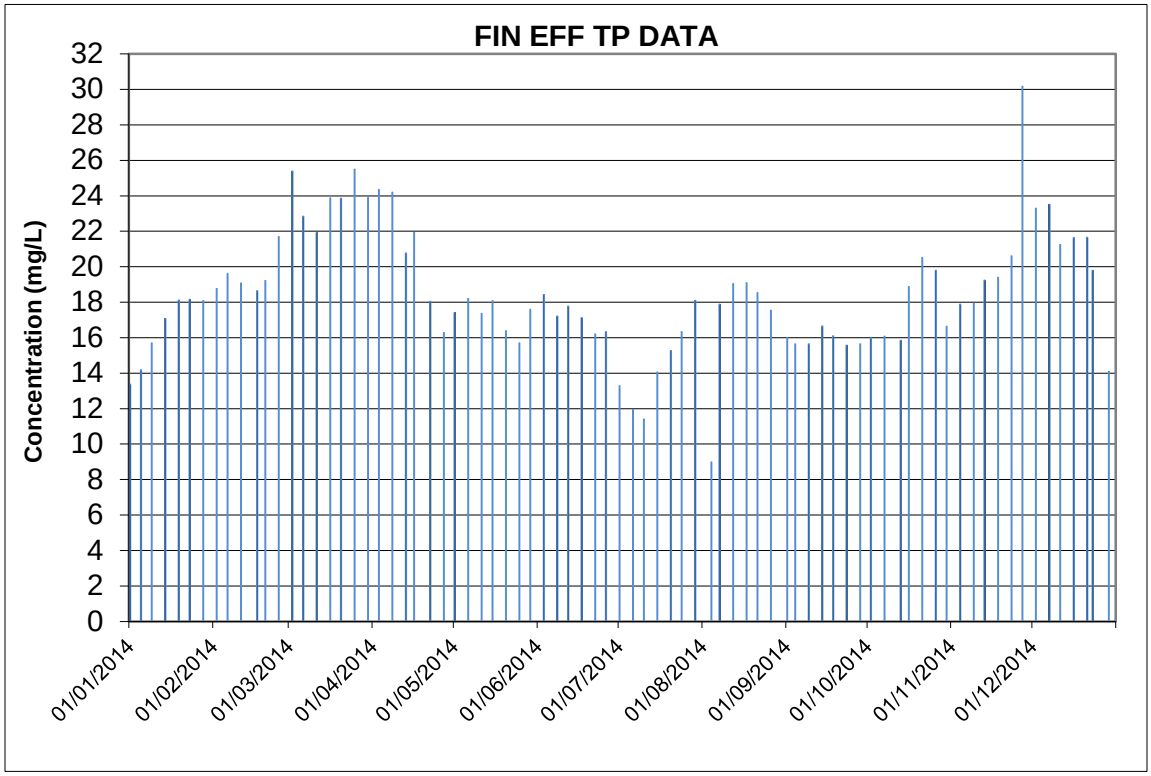
| **FECAL COLIFORM ANALYSIS (FEC)** | | **TOTAL COLIFORM ANALYSIS (TOT)** | |
|---|---|---|---|
| TOTAL ANALYZED | 153 | TOTAL ANALYZED | 153 |
| GEOMEANS | 6.3 | GEOMEANS | 11.5 |

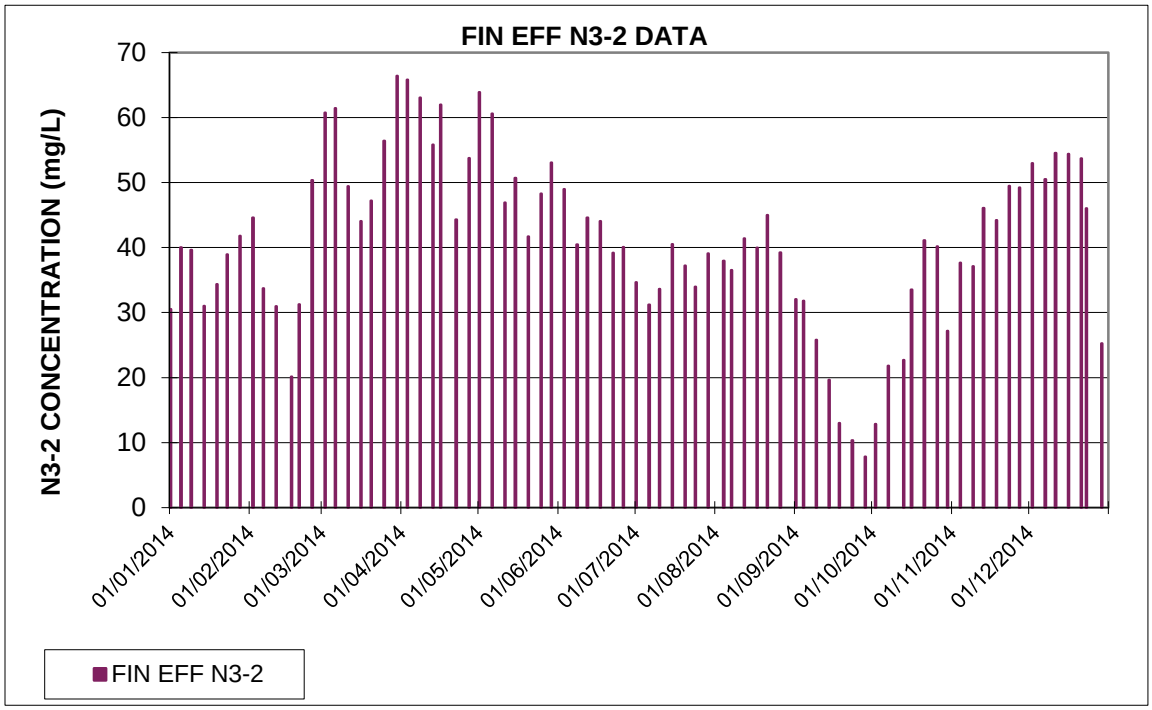



| **BOD DATA** | |
|---|---|
| TOTAL # FAILURES | 1 |
| TOTAL SAMPLES ANALYZED | 122 |
| PERCENT FAILURE | 0.82% |

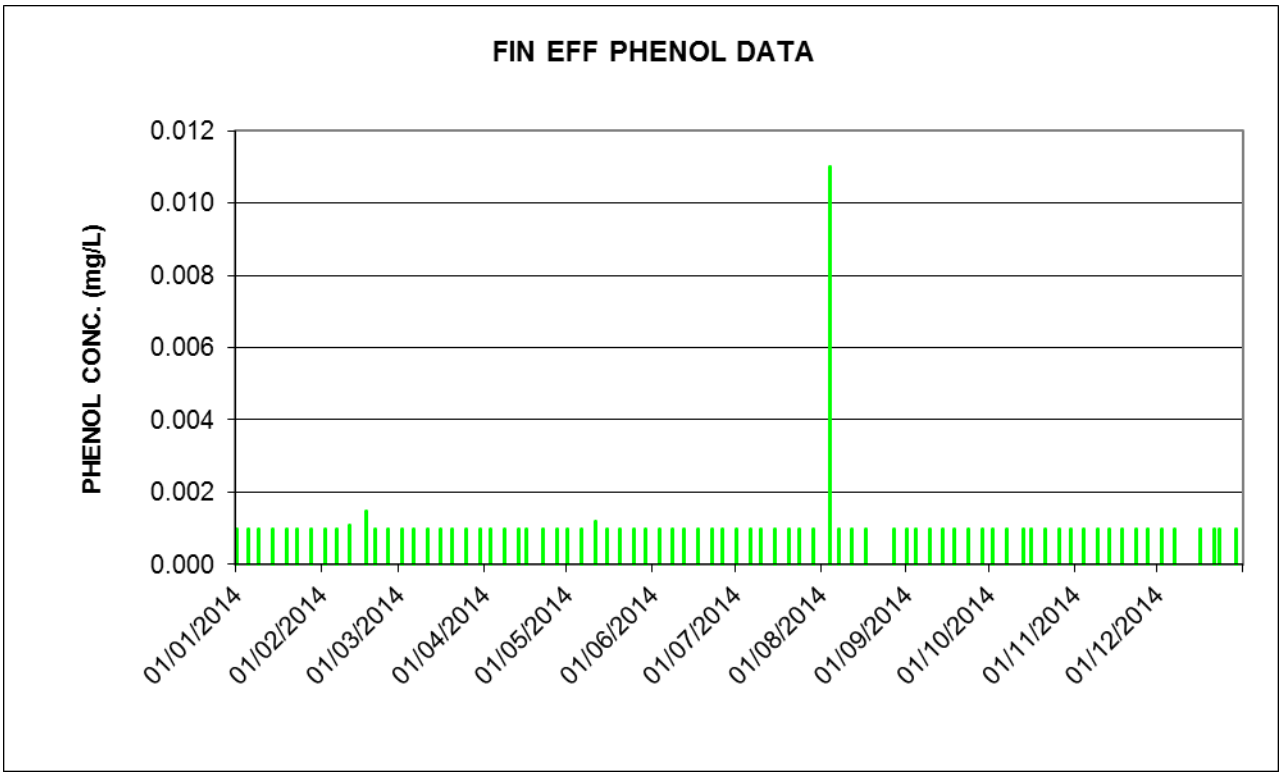
| **TSS ANALYSIS** | |
|---|---|
| TOTAL # FAILURES | 37 |
| TOTAL SAMPLES ANALYZED | 365 |
| PERCENT FAILURE | 10.14% |

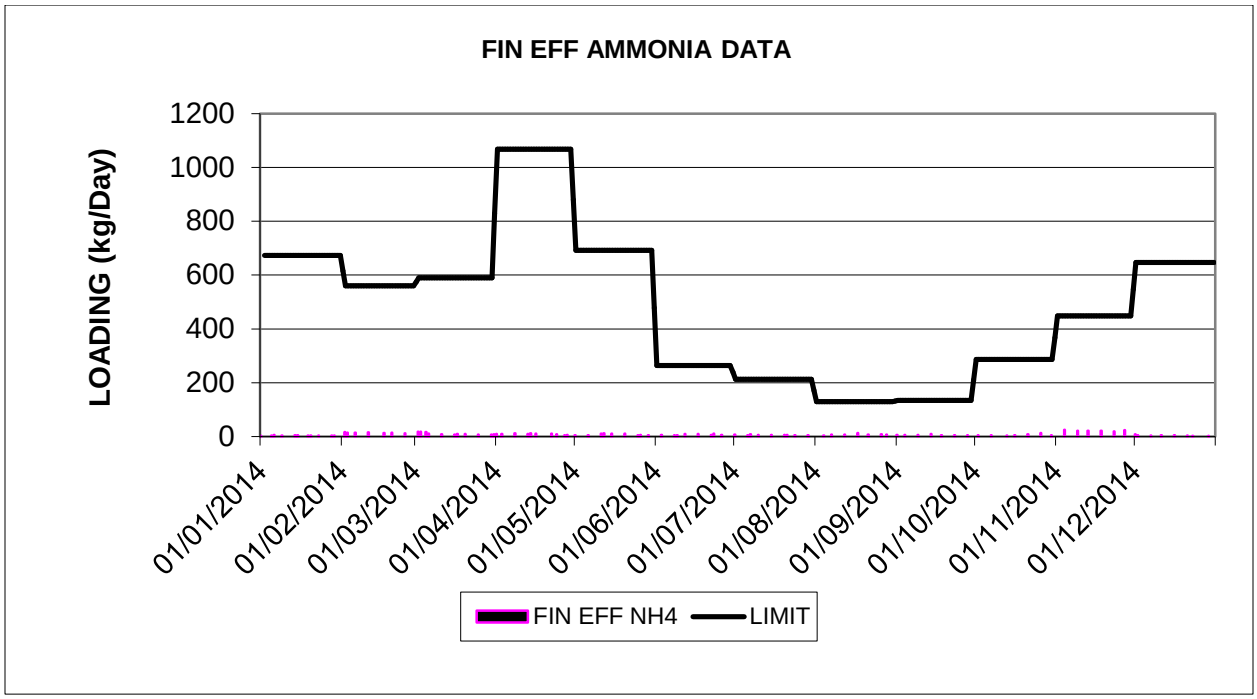



**TP DATA**
TOTAL SAMPLES ANALYZED 80

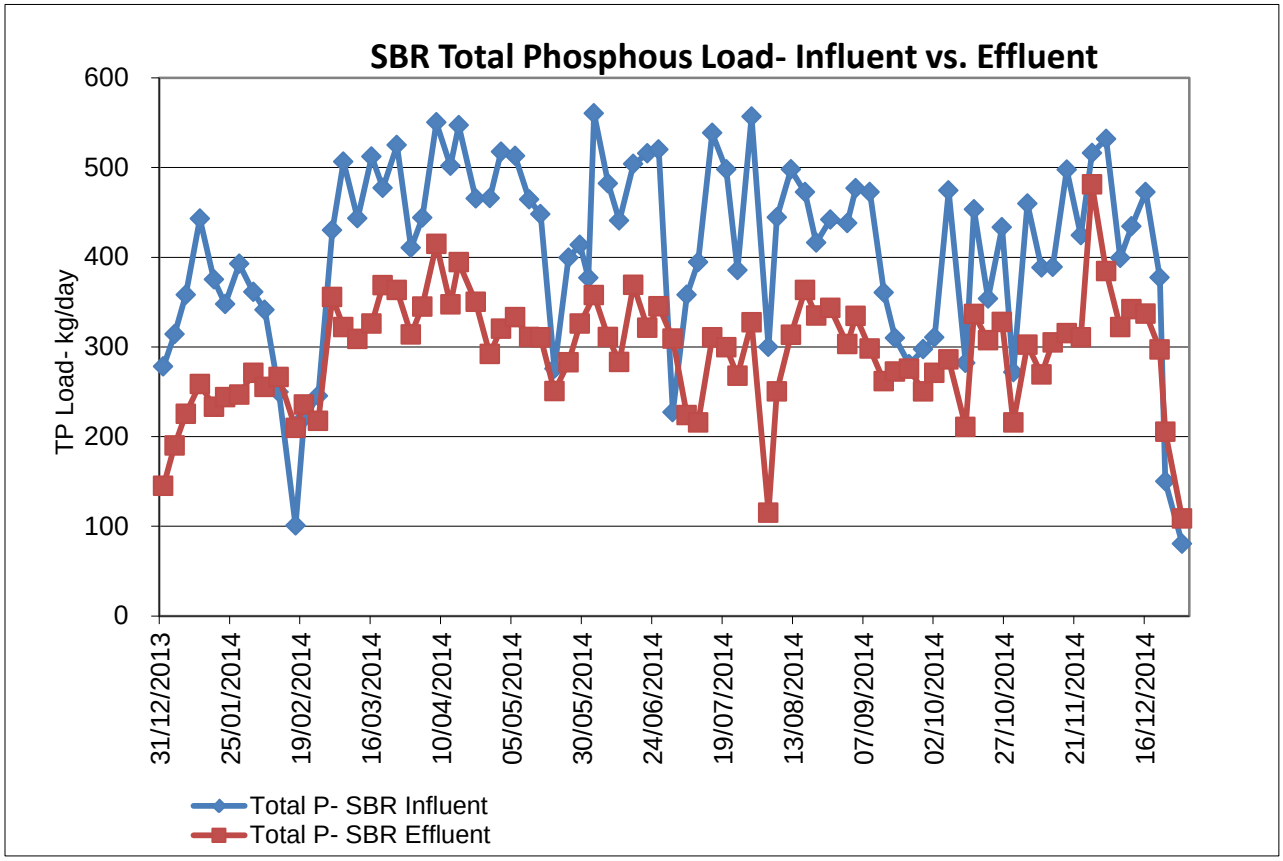
**N3-2 ANALYSIS**
TOTAL SAMPLESS ANALYZED 79

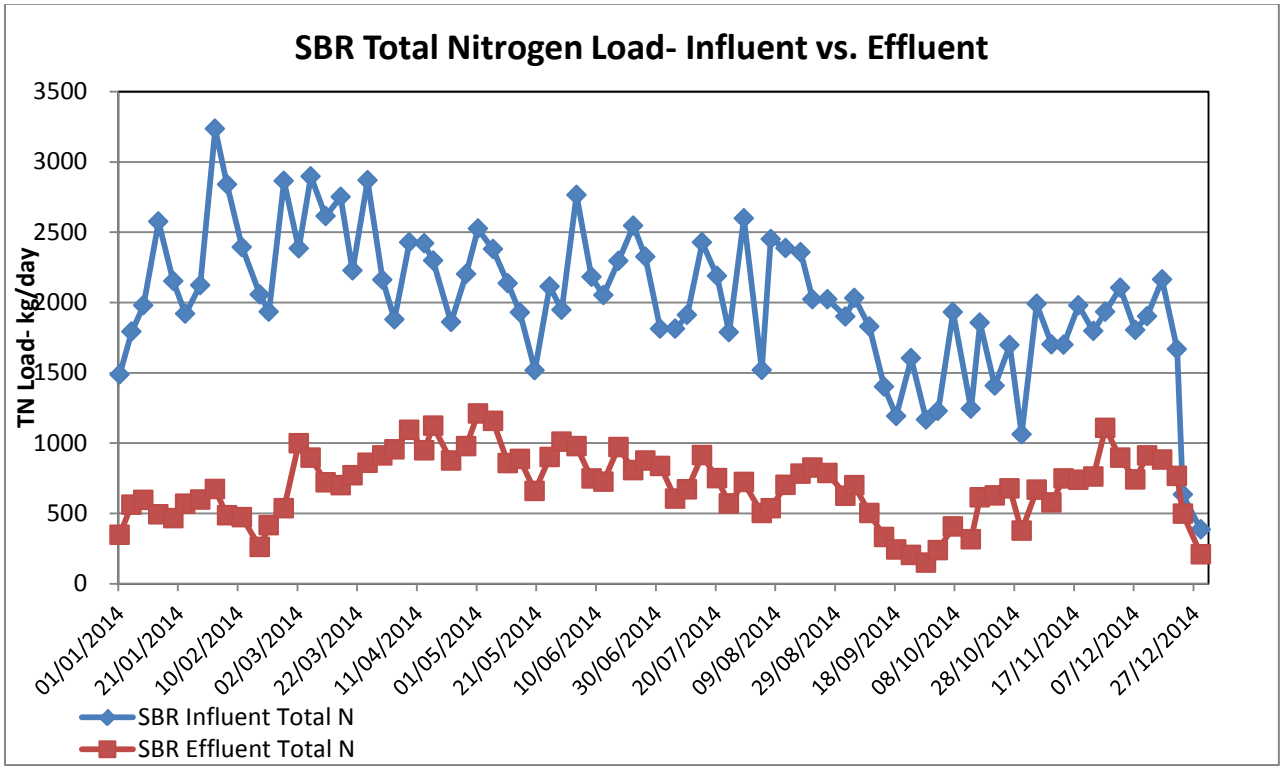


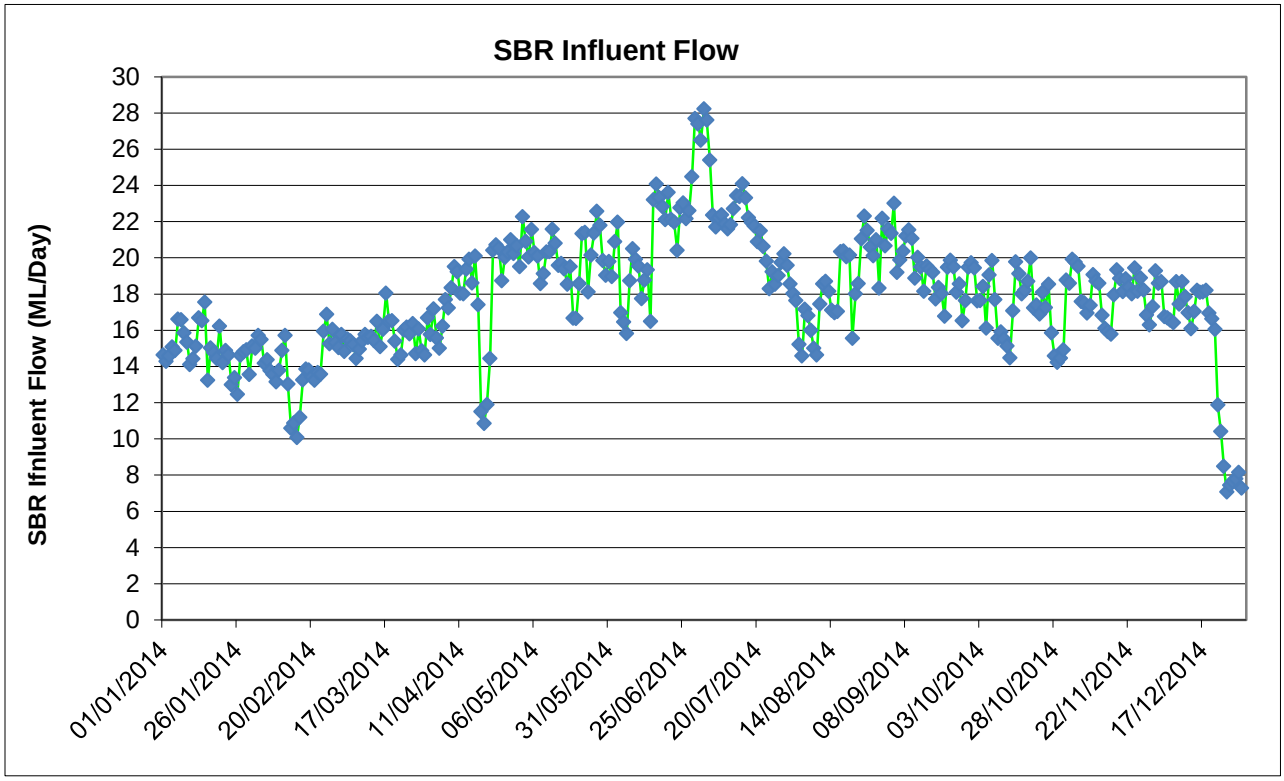




| **PHENOL ANALYSIS** | |
|---|---|
| TOTAL # FAILURES | 0 |
| TOTAL SAMPLES ANALYZED | 77 |

| **AMMONIA ANALYSIS** | |
|---|---|
| TOTAL # FAILURES | 0 |
| TOTAL SAMPLES ANALYZED | 100 |
| PERCENT FAILURE | 0.00% |


SBR Total Phosphous Load- Influent vs. Effluent
TP Load- kg/day
600
500
400
300
200
100
0
31/12/2013
25/01/2014
19/02/2014
16/03/2014
10/04/2014
05/05/2014
30/05/2014
24/06/2014
19/07/2014
13/08/2014
07/09/2014
02/10/2014
27/10/2014
21/11/2014
16/12/2014
Total P- SBR Influent
Total P- SBR Effluent


SBR Total Nitrogen Load- Influent vs. Effluent
TN Load- kg/day
3500
3000
2500
2000
1500
1000
500
0
01/01/2014
21/01/2014
10/02/2014
02/03/2014
22/03/2014
11/04/2014
01/05/2014
21/05/2014
10/06/2014
30/06/2014
20/07/2014
09/08/2014
29/08/2014
18/09/2014
08/10/2014
28/10/2014
17/11/2014
07/12/2014
27/12/2014
SBR Influent Total N
SBR Effluent Total N


SBR Influent Flow
SBR Ifnluent Flow (ML/Day)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
01/01/2014
26/01/2014
20/02/2014
17/03/2014
11/04/2014
06/05/2014
31/05/2014
25/06/2014
20/07/2014
14/08/2014
08/09/2014
03/10/2014
28/10/2014
22/11/2014
17/12/2014