



Teeswater Formosa Sewer System and Wastewater Treatment Plant

2017 Summary Report

**Prepared by Veolia Water
For the Municipality of South Bruce**

Contents

ECA (#0279-8Q8JD6) Reporting Requirements

Plant Description

The Teeswater Wastewater Treatment Plant is a Sequencing Batch Reactor plant with a Rated Capacity of 1,350 m³/day. Treated water is discharged into the Teeswater River. The facility receives waste from households, businesses and industries in Formosa and Teeswater included but not limited to dairy waste from Gay Lea Food Co-operatives Limited and brewery waste from the Brick Brewing Ltd.

Teeswater Wastewater Treatment Plant

- **Influent Works**

One (1) 600 mm wide and 1,300 mm deep screen channel equipped with a mechanically cleaned, 3 mm diameter perforated plate debris screen rated at 110 L/s and a bypass channel with an overflow weir and manual bar screen with custom aluminum rake.

One (1) 2.0 m diameter circular vortex grit removal unit rated with a *peak flow rate* of 110 L/s equipped with a grit removal system.

One (1) screw conveyor grit classifier serving the grit removal unit.

One (1) 9,500 L capacity alum solution storage tank, together with two (2) chemical metering pumps (one standby) each rated at 0 to 12 L/h, with an alum solution feed line to grit tank outlet channel.

- **Secondary Treatment Facilities**

A 350 mm diameter inflow pipe connected to an influent splitter box designed to distribute the influent sewage evenly between two sequential batch reactors (SBR). The reactors are 29.5 m long x 10.5 m wide x 6.4 m (5.8 m top water level) deep parallel continuous inflow SBRs with a baffle wall at the upstream end of each tank to direct all influent into bottom of the tank and equipped with fine bubble aeration system.

One (1) motorized effluent decanter rated at 196 L/s peak rate for each SBR with, a fixed float scum guard, and discharging into a 26.7 m by 4 m equalization tank.

Two (2) submersible centrifugal waste activated sludge pumps for each SBR, each rated at 29 m³/h at a TDH of 8.0 m, with discharge line to the sludge digestion facility.

- **Air Blowers**

Three (3) positive displacement air blowers (one standby) serving as the compressed air supply for the SBR aeration system and sludge digestion system, each rated at 1860 m³/h at 69 kPa.

- **Effluent Filtration Systems**

Six (6) deep bed, continuous backwash effluent filters with total surface area of 27.87 m² rated at 3.3 L/m²/s for *Peak Flow Rate* of 92 L/s.

A 200 mm diameter inlet magmeter to allow supplementary flow-proportional chemical dosing to the filters;

One (1) 4,100 L chemical storage tank and two dosing pumps (one standby) to the inlet pipe to filters, each with a capacity range of 0 L/h to 12 L/h;

One (1) 2.4 m³ flocculation (mixing chamber) ahead of filters equipped with a variable speed, 5 hp mixer.

Two (2) submersible, 7.5 hp well-type pumps each rated at 5 L/s at 73.7 m TDH for effluent water reuse in the headworks.

- **Effluent Disinfection Facilities**

A 4.41 m long x 406 mm wide x 780 mm deep indoor UV disinfection channel, equipped with a UV disinfection unit with a *peak flow rate* of 152 L/s, complete with a level control serpentine weir.

- **Plant Effluent Outfall Sewer**

A 525 mm diameter outfall sewer to Teeswater River;

- **Sludge Digestion and Storage Facilities**

One (1) 550 m³ stage 1 sludge digestion tank and one (1) 245 m³ stage 2 digestion tank, complete with aeration systems and decant assemblies.

Two (2) submersible centrifugal waste activated sludge pump rated at 29 m³/h at a TDH of 14.5 m in digester 2, one for truck loading and for discharge to the sludge storage facilities.

One (1) 4,461 m³ capacity thickened sludge holding tank with cover.

One (1) 20 hp sludge mixer and an option for an additional second mixer if required.

- **Emergency Power Supply System**

One (1) 360 kW diesel engine standby power generator with integral fuel storage.

- **On-Site Wastewater Pumping Station**

An on-site wastewater pumping station equipped with two (2) 20 hp solids chopping centrifugal submersible sewage pumps (one standby) for pumping Formosa sewage, septage, filter backwash, domestic sewage and digester decant to the inlet works.

Includes a septage receiving station with manual bar screen and stainless steel custom rake.

Teeswater Sewage Collection System

- **Teeswater Main Sewage Pumping Station**

A wet well/dry well style sewage pumping station located at the northwest corner of Mill Street and Hillcrest Street East at 6 Mill Street, Teeswater that is equipped with 2 submersible pumps, a backup generator and inlet manual bar screen complete with custom stainless steel rake.

- **Teeswater Local Sewage Pumping Station A1**

Located at the intersection of Reid Street and Logan Street, a duplex E-One grinder pump station and a 50 mm diameter forcemain along Logan Street to a maintenance hole east of Wright Street.

- **Teeswater Local Sewage Pumping Station A2**

Located at the end of Riverview Terrace, a duplex E-One grinder pump station and a 50 mm diameter forcemain along Riverview Terrace to a maintenance hole on Hillcrest Street E

- **Teeswater Local Sewage Pumping Station A3**

Located at the end of Andrew Street, a duplex pump station with grinder style centrifugal sewage pumps and a 75 mm diameter forcemain along Andrew Street to a maintenance hole on Hillcrest Street W
This station is equipped with a backup diesel generator.


Formosa Sewage Collection System

- **Formosa Main Sewage Pumping Station**

A 3.0 m diameter precast concrete wet well sewage pumping station, located on the east side of Bruce Road No. 12 at 1114 Bruce Road 12 and approximately 150 m south of Council Road equipped with two (2) submersible pumps, a backup generator, flow meter, bypass piping and alarms.

- **Formosa Teeswater Sewage Transmission Line** – a 200 mm diameter sanitary forcemain along Bruce Road 12, Concession 10, Sideroad 1B and Concession Road 8 from the pumping station to a grit removal chamber which discharges to a 300 mm/250 mm diameter gravity sewer along Concession Road 8, followed by a 250 mm/200 mm diameter sag sewer along Concession Road 8, with intermediate flush chambers, followed by a 250 mm diameter gravity sewer along Concession Road 8, followed by a second 250 mm/200 mm diameter sag sewer along Concession 8 and Sideroad 10A with intermediate flush chambers, followed by a 250 mm diameter gravity sewer along Sideroad 10A and finally discharges to the on-site sewage pumping station at the wastewater treatment plant;

- **Formosa Low Pressure Sanitary Sewer System** – Low pressure Sewers Serviced with Grinder Pumps at individual service locations.

	Teeswater Wastewater Compliance Report 2017												Facility Classification: Class 3 Waste Water Treatment Rated Capacity: 1350 m3/day Peak Flow: 7949 m3/day (92 l/s) Receiving Waters: Teeswater River			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Average	Maximum	Limit
Flow																
Influent Total Flow (m3/mth)	35,177	37,053	34,787	32,555	34,466	34,010	32,806	30,479	28,091	31,043	31,303	28,933	390,703	32,559		
Influent Average Day Flow (m3/d)	1,135	1,323	1,122	1,085	1,112	1,134	1,058	983	936	1,001	1,043	933		1,072		1350
Influent Max Day Flow (m3/d)	1,425	1,638	1,459	1,461	1,339	1,456	1,673	1,139	1,186	1,229	1,329	1,198			1,673	
Biochemical O2 Demand																
Influent Average BOD (mg/L)	557	439	557	670	435	383	690	450	272	322	713	705		519.9	1,370.0	
Effluent Average CBOD (mg/L)	2	2	2	2	2	2	2	2	2	2	3	2		2.1	4.2	10
Percent Removal	99.6	99.4	99.6	99.7	99.5	99.5	99.7	99.6	99.3	99.4	99.6	99.7		99.6 %		
Suspended Solids																
Influent Average TSS (mg/L)	356	317	589	518	358	378	452	267	252	336	1,011	364		443.1	2,810.0	
Effluent Average TSS (mg/L)	8	6	7	7	7	6	3	4	5	3	6	4		5.8	12.0	10
Percent Removal	97.8	98.1	98.8	98.6	98.0	98.4	99.3	98.7	98.1	99.2	99.4	98.9		98.6 %		
Phosphorus																
Influent Average TP (mg/L)	8.87	8.66	12.76	10.78	8.43	7.95	9.59	8.55	6.06	7.70	12.95	11.45		9.55	29.30	
Effluent Average TP (mg/L)	0.074	0.052	0.083	0.080	0.070	0.097	0.055	0.048	0.073	0.038	0.038	0.028		0.061	0.170	0.15
Percent Removal	99.2	99.4	99.3	99.3	99.2	98.8	99.4	99.4	98.8	99.5	99.7	99.8		99.3 %		
Nitrogen Series																
Influent Average NH3+4 (mg/l)	16.38	14.98	21.38	22.75	25.10	20.15	23.08	18.05	12.70	14.08	18.74	18.65		18.94	36.10	
Influent Average TKN (mg/L)	56.14	50.80	67.23	64.30	49.06	48.25	58.78	49.90	39.00	43.50	74.96	64.83		55.91	164.00	
Effluent Average NH3+NH4 (mg/L)	2.78	1.22	0.07	1.50	0.20	0.08	0.20	0.04	0.06	0.05	0.14	2.82		1.01	12.10	3
Effluent Average Nitrate (mg/L)	2.73	2.08	1.41	2.83	1.16	2.54	1.43	2.92	4.13	4.08	0.50	2.33		2.37	6.94	
Effluent Average Nitrite (mg/L)	0.06	0.05	0.03	0.45	0.04	0.02	0.01	0.01	0.01	0.16	0.01	0.28		0.09	0.76	
Effluent TKN (mg/L)	8.44	4.23	1.80	3.28	2.24	2.10	1.40	1.36	1.43	1.18	1.45	5.53		2.90	19.90	
pH																
Influent Average pH	7.88	7.83	7.27	6.99	6.99	7.29	7.56	7.20	7.12	7.56	7.56	8.19		7.46	9.83	
Effluent Average pH	7.58	7.88	7.81	7.89	7.97	7.92	7.91	8.00	7.79	8.00	7.92	7.80		7.87	8.24	
UV Disinfection																
Average UV Intensity	100.00	100.00	99.21	90.28	98.43	95.24	96.60	90.93	83.53	80.48	84.12	61.89		90.0	100.0	
Disinfection																
E.Coli Geo.Mean per 100mL	1	1	1	1	1	1	1	1	1	1	1	1		1	2	100

* Note: The Effluent Ammonia limit from December 1st to April 30th is 4 mg/l
 Values exceeding Monthly Effluent limits have been highlighted

Operating Problems

- During 2017 there were no major Operating Problems, that significantly impacted the ability to meet effluent requirements. All Effluent limits were met for the entire year.

Major Maintenance and Events

Additional maintenance other than routine maintenance included:

January 19 - A seal failure occurred with one of the main Raw Sewage pumps requiring the pump to be removed and rebuilt.

May 4 - Operators replaced the bulbs for the UV Disinfection System.

October-November - Repair work had to be completed to the mixer and davit arm system for the Biosolids Holding Tank.

November 5-13 - Dealt with a major cream spill that occurred at the Gay Lea facility that impacted the Wastewater Treatment Plant. Trucks were brought in to vacuum off cream, and extra biosolids haulage took place due to the spill.

QA/QC Measures

All required regulatory and ECA analyses were performed by E3 Labs. In addition, routine in house laboratory sampling was undertaken to ensure compliance. These tests include: 30 minute Settling, Suspended Solids, Final Effluent Total Phosphorus, pH, and temperature.

Filamentous Bacteria analysis was completed by GAP Labs.

Monitoring Equipment

The following is a list of the monitoring equipment at the Teeswater WWTP:

- Hach DR 2800 – Total Phosphorus, Dissolved Phosphorous, Ammonia, Total Solids (Effluent)
- Hach HQ 40d– pH, Dissolved Oxygen (Effluent, and SBR Tanks)
- Endress Hauser online Analyzer - Dissolved Oxygen, Temperature (SBR Tanks)
- Digital Scale for MLSS and TSS (Effluent, SBR Tanks)
- Lab Oven for MLSS and TSS (Effluent, SBR Tanks)

Calibration and Service of Equipment

- April 6th – Annual inspection of all safety equipment.
- June 15th, November 17th – Calibration of gas detectors

- June 17nd - Calibration of flow monitoring equipment

Effluent Objectives

1. Dissolved Phosphorus tests were used to indicate the required Alum dosage.
2. pH measurements were taken to ensure levels were between 6.0 and 9.0 and water quality.
3. Dissolved oxygen was measured to ensure that adequate aeration is being carried out.
4. Mixed liquor suspended solids and 30 minute settling tests are used to determine adequate microbiological populations and to set the sludge wasting rates.

Although all effluent limits were met in 2017 there were several months where the Total Suspended Solids objective of 5 mg/l was not met. The winter ammonia objective of 2 mg/l was also not met in January and December of 2017. See Teeswater Compliance Report (above) for more details.

Bio Solids Volume

In 2017 approximately 6,539 m³ of Biosolids were hauled. These Bio-Solids were hauled to the McDonald (NASM#21716), McKague (NASM#22302), Parker (NASM#21712), and Batte (NASM #23122) Farms.

This is a decrease of 3869 m³ when compared to 2016.

In 2018 it is expected that a similar volume of bio-solids will be hauled.

Customer Complaints

2017 (Throughout) – Odor complaints continued to be received from Formosa residents, but complaints have continued to be far less common. Veolia and South Bruce will continue to take additional measures to further reduce odor complaints. Several sewer vent deodorizing units have been provided to customers in an effort to further reduce odor complaints.

Information for the District Manager

No additional information was known to have been requested from the District Manager.

Recommendations

1. The incoming waste strength exceeding the design capacity several times throughout 2016. In 2017 these incidents were reduced, partially due to the Formosa Brewery reducing its effluent for the majority of the year. The Municipality should continue to work with the Industrial Customers in order to either reduce the strength of the incoming waste, or make improvements to the current plant to increase the capacity of the Wastewater Treatment Plant.
2. Continue to address odor issues associated with the Formosa Collection System.
3. Improved lighting at the Wastewater Treatment Plant to improve overall safety

4. Air Relief valve for sewage force-main system to prevent potential of a pipe break.

By-Passes

There were no by-passes or spills to report for 2017.

Table 2 BYPASS AND OVERFLOW SUMMARY FOR 2017



MONTH	Primary Bypass			Secondary Bypass			Plant Overflows			Collection System Overflows		
	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (m3)
January	0			0			0			0		
February	0			0			0			0		
March	0			0			0			0		
April	0			0			0			0		
May	0			0			0			0		
June	0			0			0			0		
July	0			0			0			0		
August	0			0			0			0		
September	0			0			0			0		
October	0			0			0			0		
November	0			0			0			0		
December	0			0			0			0		
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0

Note: An 'Event' means an occurrence or occurrences of a bypass or overflow separated by a period of more than 12 hours between the occurrence(s) or the event(s) and the previous event, at each location.