SEWAGE TREATMENT PLANT PERFORMANCE REPORT

2015-16

Unitywater

Serving you today,
investing in tomorrow.

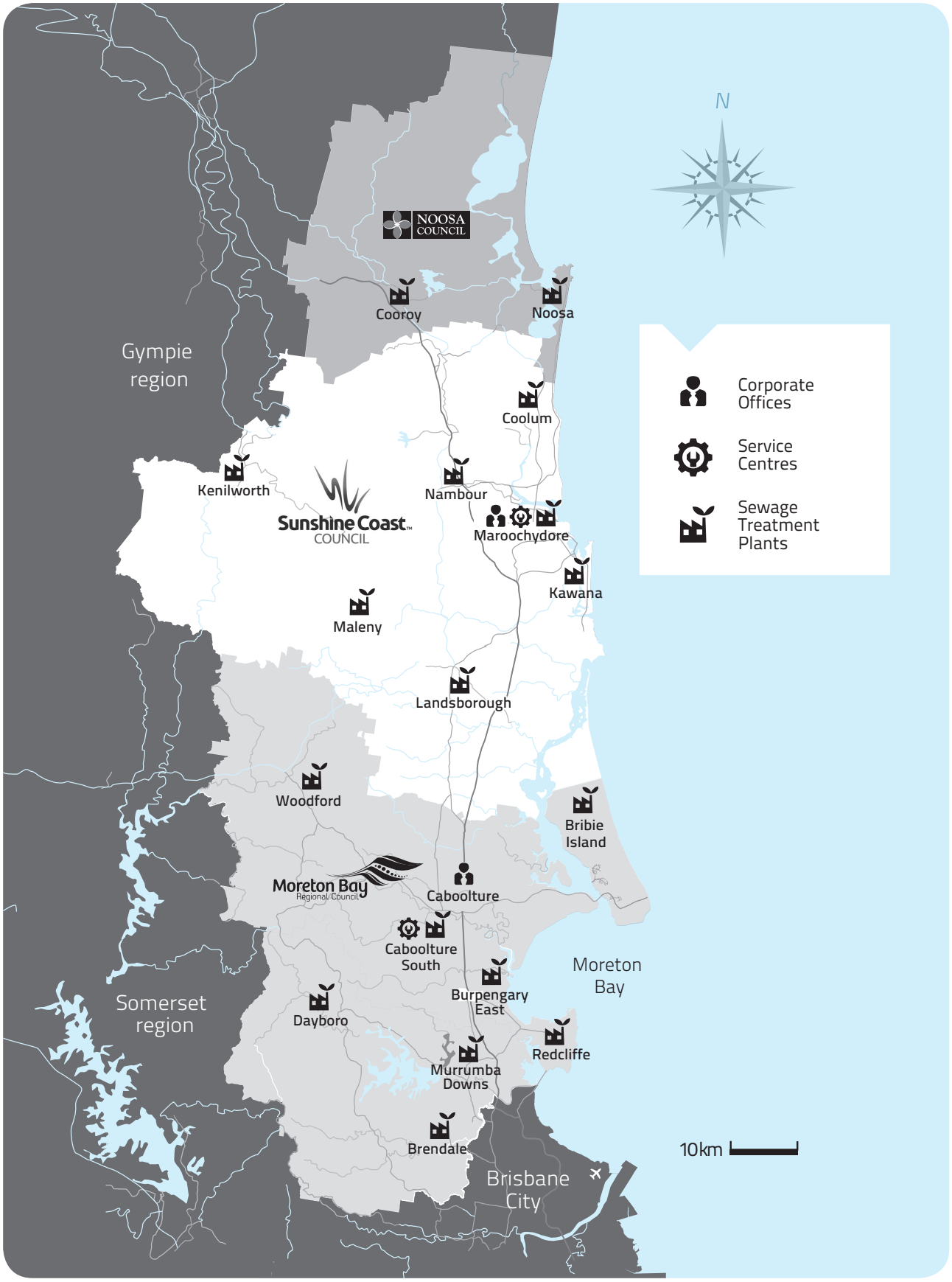
Report Details

Report Writer	Graduate Engineer Process Engineer Manager Treatment Plants
References	Environmental Authority EPPR00869113 Correspondence from DEHP dated 3 September 2014 "RE: Environmental Authority EPPR00869113 – Unitywater Sewage Treatment Plants"

Contents

List of Tables

List of Figures



 | Objective reference: A3641522

1. Introduction

Unitywater supplies more than 724,626 people across 5223 square kilometres with sewerage and water services.

Unitywater operates its activities and monitors effluent quality from each of its sewage treatment plants to assess compliance with conditions specified under its licence granted by the Department of Environment and Heritage Protection (DEHP). Unitywater is the holder of the following registration and approval, which are issued by DEHP:

A. A single Registration Certificate, authorising Unitywater to operate sewage treatment plants; and

B. A single Environmental Authority (Environmental Licence) for the following sewage treatment plants:

- Brendale
- Burpengary East
- Bribie Island
- Coolum
- Cooroy
- Dayboro
- Kawana
- Kenilworth
- Landsborough
- Maleny
- Maroochydore
- Murrumba Downs
- Nambour
- Noosa
- Redcliffe
- South Caboolture
- Suncoast *(decommissioned)*
- Woodford

Should Unitywater not meet its obligations as set out in the licence, penalties may apply in accordance with the *Sustainable Planning Act 2009 and Environmental Protection Act 1994.*

This report is published to provide Unitywater customers with transparent information about effluent quality and some licence compliance statistics from its sewage treatment plants. By meeting licence conditions, Unitywater can reassure customers with high quality service thus minimising impacts on waterways in the local community.

1.1. Quick Statistics July 2015 - June 2016

Number of sewerage connections	272,604
Kilometres of sewer main pipes	5,601 km
Number of sewage pump stations	781
Number of sewage treatment plants	17
Volume of sewage collected and treated	50,468 ML[1]

1. Does not include 2,181 ML diverted to Queensland Urban Utilities (QUU) via the Kedron Brooke Sewerage Scheme. This sewage would be treated to meet QUU's licence limits

2. Effluent Quality Summary

DEHP requires that all sewage treatment plants discharge effluent that meet quality and quantity conditions to minimise impacts on the health of waterways in Queensland.

Concentrations of contaminants such as organic matter, suspended solids, chlorine and pathogens are measured and reported. Release volumes and mass loads are also evaluated to compare with limits specified by DEHP.

In the 2015-16 financial year, Unitywater achieved over 99% compliance in overall effluent quality discharged from its sewage treatment plants (slight improvement compared to 98% achieved in 2014-15). DEHP allows fluctuations in effluent quality parameters (DEHP, 2014) and therefore the plants performed within the overall quality standards set by the Environmental Licence. The table below provides a summary of where treated effluent is discharged and overall effluent quality compliance in the 2015-16 financial year.

Table 1 – Effluent Quality Compliance

Sewage Treatment Plant	Catchment Equivalent Population	Treatment Process	Discharge to:			Effluent Quality Compliance
			Freshwater Body	Ocean	Irrigation, wetlands or groundwater	
Brendale	36,539	BNR[1]	✓			99.6%
Bribie Island	23,880	Biological nitrogen removal and chemical phosphorus removal			✓	100%
Burpengary East	45,119	BNR	✓			100%
Coolum	25,094	BNR	✓			100%
Cooroy	10,323	BNR	✓		✓	99.9%
Dayboro	695	Biological nitrogen removal			✓	95.4%[2]
Kawana	100,579	Biological nitrogen removal	✓	✓		99.8%
Kenilworth	136	Oxidation Pond	✓		✓	100%
Landsborough[3]	10,403	BNR	✓	✓		
Maleny	2,406	Biological nitrogen removal and chemical phosphorus removal	✓		✓	99.9%
Maroochydore	114,458	BNR	✓			100%
Murrumba Downs	130,199	BNR	✓			99.8%
Nambour	42,155	BNR	✓			100%
Noosa	46,640	BNR	✓			100%
Redcliffe	62,213	BNR		✓		99.9%
South Caboolture	59,098	Biological nitrogen removal and chemical phosphorus removal	✓			99.9%
Woodford	1,640	Biological nitrogen removal and chemical phosphorus removal	✓			100%
	Overall Compliance					99.9%[4]

Notes: **1.** Biological Nutrient Reduction (BNR) – Reduces nitrogen and phosphorus biologically. **2.** Because Dayboro STP discharges to restricted land (not a waterway) and therefore poses no risk to human health, the plant is licensed to disinfect by natural sunlight. The effectiveness is therefore impacted by weather conditions (i.e. disinfection is less effective on rainy days). **3.** A separate 'Performance in Detail' table is not provided for Landsborough Sewage Treatment Plant as effluent from this facility is combined with Kawana Sewage Treatment Plant effluent before being released to the outfall. **4.** Effluent quality met stringent quality standards 999 out of every 1000 times (well within the quality standards set by the Environmental Licence).

3. Performance in Detail (July 2015 – June 2016)

Note that the release parameters often differ from plant to plant (e.g. Brendale STP has mass load limits and Bribie Island STP does not). This is often due to the nature of the discharge point (e.g. waterway or land) or when the plant was issued DEHP approval to operate.

3.1. Brendale Sewage Treatment Plant

Table 2 – Brendale STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓ *
			maximum	✓
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
Free Chlorine Residual	mg/L	53	maximum	✓
Faecal Coliforms	cfu/ 100 mL	265	median	✓ **
			80th percentile	✓ **

* BOD short term 80th percentile target was exceeded three times in the 2015-16 financial year. Please refer to the next page for further details.

** Median and 80th percentile faecal coliforms target were respectively exceeded three and two times in the 2015-16 financial year. Please refer to the next page for further details.

Table 3 – Brendale STP Mass Limits

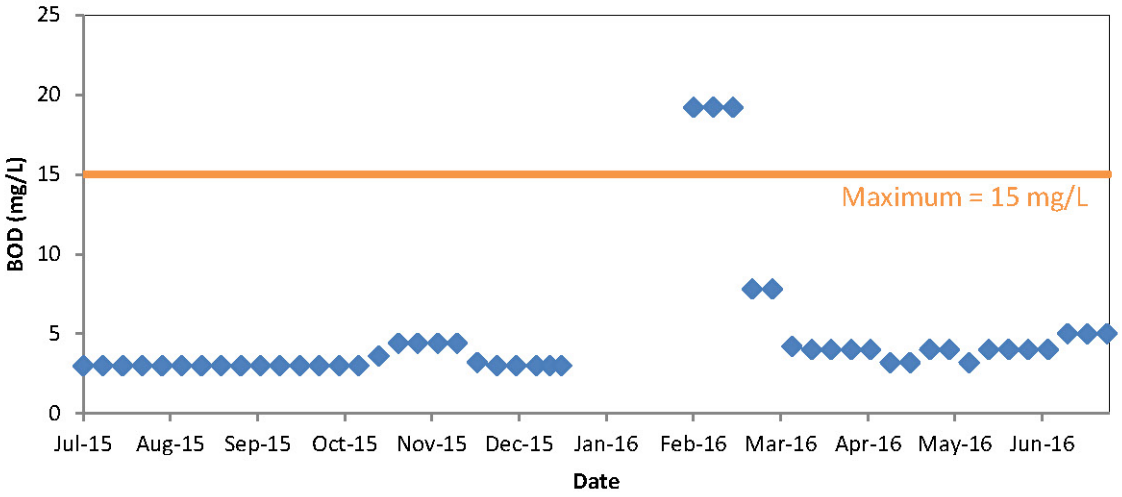
Parameter	Unit	Number of Days	Limit Type	Compliant
Average Annual Flow	ML/yr	365	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

Exceedances

BOD5

The three exceedances of the short term 80th percentile BOD_5 target in early 2016 were due to sampling techniques or sample contamination. 20 mg/L was measured in January 2016 followed by a 19 mg/L BOD_5 result recorded in February 2016, which produced subsequent high short term readings. The data appeared anomalous as full conversion of ammonia to nitrate was nearly attained (as a rule of thumb, if the process of biological nitrogen reduction occurred, it is almost certain that organic matter has been similarly reduced). Overall 94.0% compliance in the short term 80th percentile BOD_5 target was achieved in the 2015-16 financial year.

Figure 1 – Brendale STP - BOD5 – Short Term 80th Percentile



Faecal Coliforms

The target exceedances at Brendale Sewage Treatment Plant in October 2015 and June 2016 were attributed to faulty ultraviolet (UV) disinfection. Unitywater staff responded immediately to correct these issues. 96.0% and 98.0% compliances were achieved for median faecal coliforms and 80th percentile faecal coliforms respectively in the 2015-16 financial year.

Figure 2 – Brendale STP - Faecal Coliform - Median

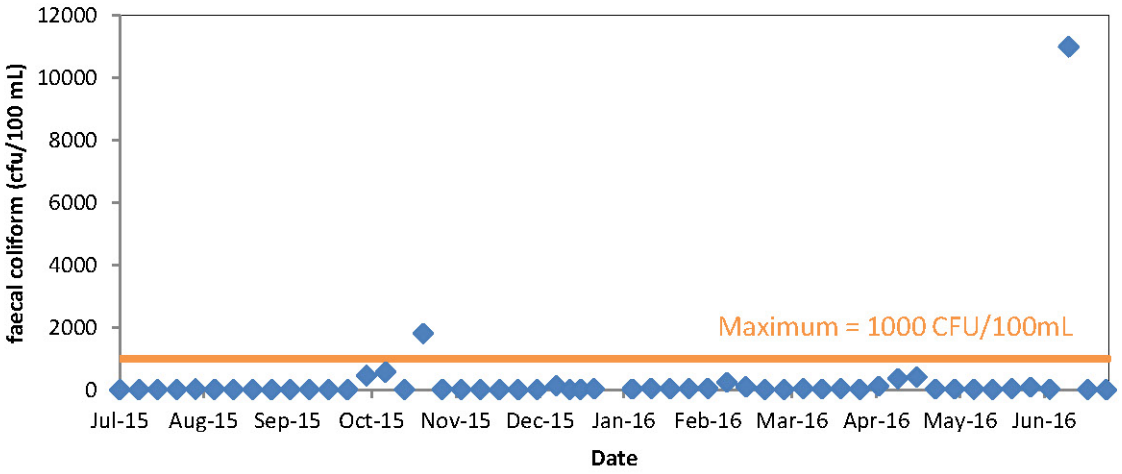
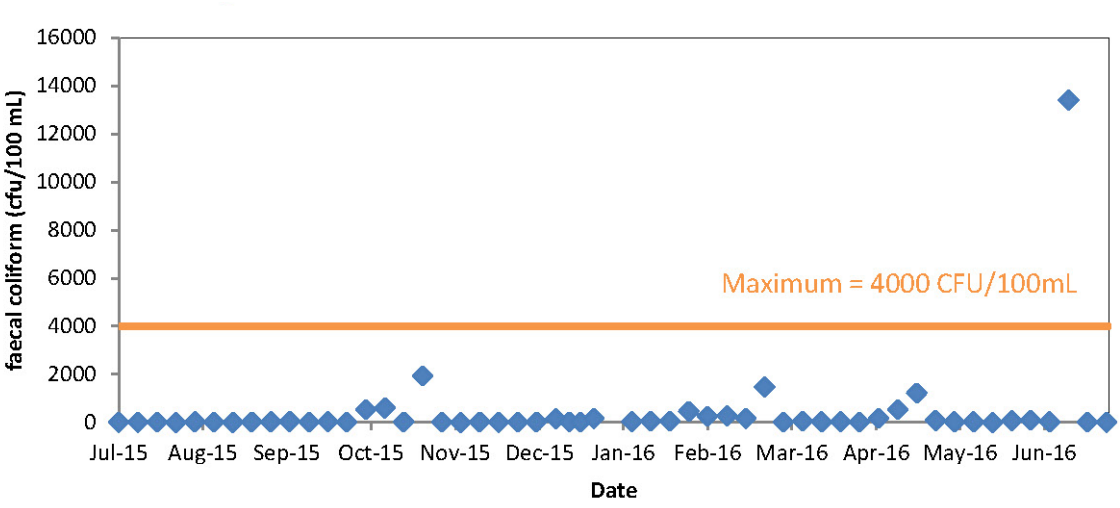


Figure 3 – Brendale STP - Faecal Coliform – 80th Percentile



3.2. Bribie Island Sewage Treatment Plant

Table 4 – Bribie Island STP Contaminant Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
TN	mg/L	53	long term 50th percentile	✓
			short term 50th percentile	✓
			maximum	✓
TP	mg/L	53	long term 50th percentile	✓
			short term 50th percentile	✓
			maximum	✓

3.3. Burpengary East Sewage Treatment Plant

Table 5 – Burpengary East STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
Free Chlorine Residual	mg/L	53	maximum	✓
Faecal Coliforms	cfu/ 100 mL	265	median	✓
			80th percentile	✓

Table 6 – Burpengary STP Mass Limits

Parameter	Unit	Number of Days	Limit Type	Compliant
Average Annual Flow	ML/yr	365	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

3.4. Coolum Sewage Treatment Plant

Table 7 – Coolum STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
NH_3-N	mg/L	53	long term 50th percentile	✓
			maximum	✓
Free Chlorine Residual	mg/L	53	maximum	✓
Faecal Coliforms	cfu/ 100 mL	53	median	✓
			80th percentile	✓

Table 8 – Coolum STP Mass Limits

Parameter	Unit	Number of Days	Limit Type	Compliant
Average Annual Flow	ML/yr	365	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

3.5. Cooroy Sewage Treatment Plant

Table 9 – Cooroy STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
TN	mg/L	53	long term 50th percentile	✓
			maximum	✓ *
TP	mg/L	53	long term 50th percentile	✓
			maximum	✓
Intestinal Enterococci	mg/L	159	long term 50th percentile	✓
			maximum	✓

* Maximum total nitrogen was exceeded once in the 2015-16 financial year. Please refer to the next page forfurther details.

Table 10 – Cooroy STP Mass Limits

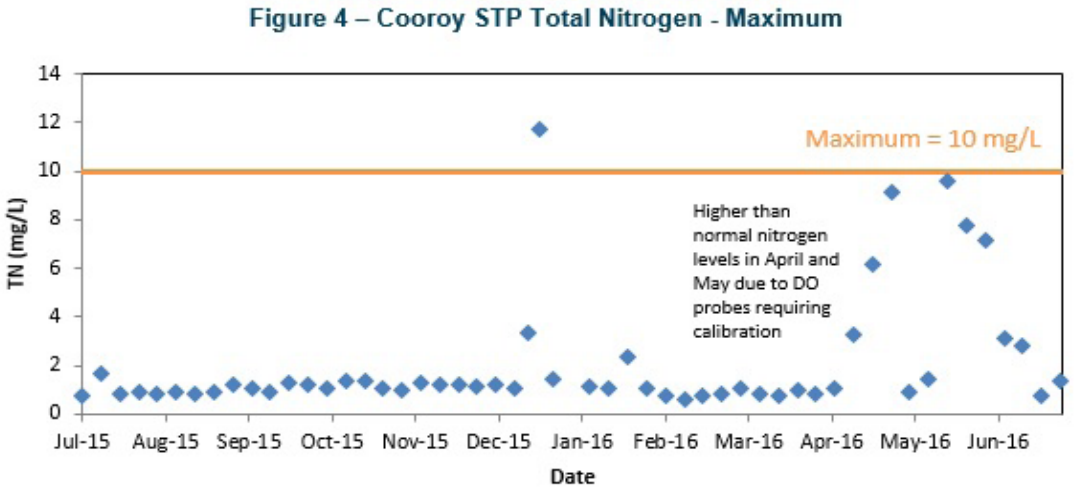
Parameter	Unit	Limit Type	Compliant
Nitrogen Mass Load	kg/yr	maximum	✓
Phosphorus Mass Load	kg/yr	maximum	✓

Exceedances

Total Nitrogen

Higher than normal total nitrogen was detected once in the year at the Cooroy Sewage Treatment Plant. The high value was caused by a control system communication error between the aerators and the dissolved oxygen probes, which was immediately corrected by Unitywater staff. 98.1% compliance in maximum total nitrogen was achieved in the 2015-16 financial year.

Figure 4 – Cooroy STP Total Nitrogen - Maximum



3.6. Dayboro Sewage Treatment Plant

Table 11 – Dayboro STP Contaminants Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	12	80th percentile	✓
			maximum	✓
TSS	mg/L	12	80th percentile	✓
			maximum	✓
pH	pH units	12	range	✓
NH_3-N	mg/L	12	50th percentile	✓ *
			maximum	✓ *
E.Coli	mg/L	60	median	✓ **
			80th percentile	✓

* 50th percentile ammonia nitrogen and maximum ammonia nitrogen targets were exceeded once each in the 2015-16 financial year. Please refer to the next page for further details.

** Median E.Coli was exceeded twice in the 2015-16 financial year. Please refer to the next page for further details.

Exceedances

Ammonia Nitrogen

50th percentile and maximum ammonia nitrogen levels were above targets on three occasions in 2015-16. The maximum and 50th percentile ammonia nitrogen target exceedance in November 2015 was due to the under performance of the bioreactor caused by a temporary breakdown of the aeration blowers, which was immediately repaired by Unitywater's maintenance team. High inflow rate after a wet weather event caused the 50th percentile ammonia nitrogen target exceedance in February 2016. 91.7% and 84.6% compliances in 50th percentile ammonia nitrogen and maximum ammonia nitrogen were respectively met within the financial year.

Figure 5 – Dayboro STP Ammonia Nitrogen – 50th Percentile

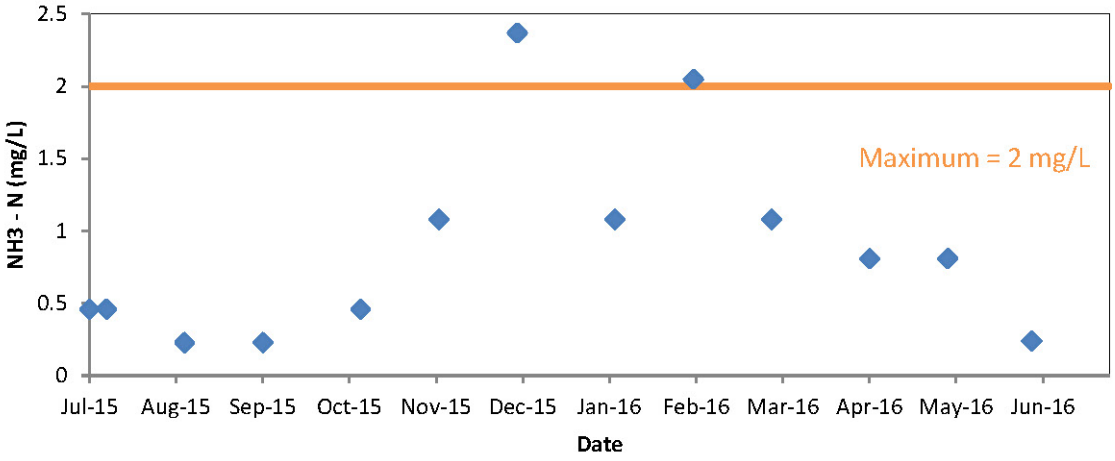
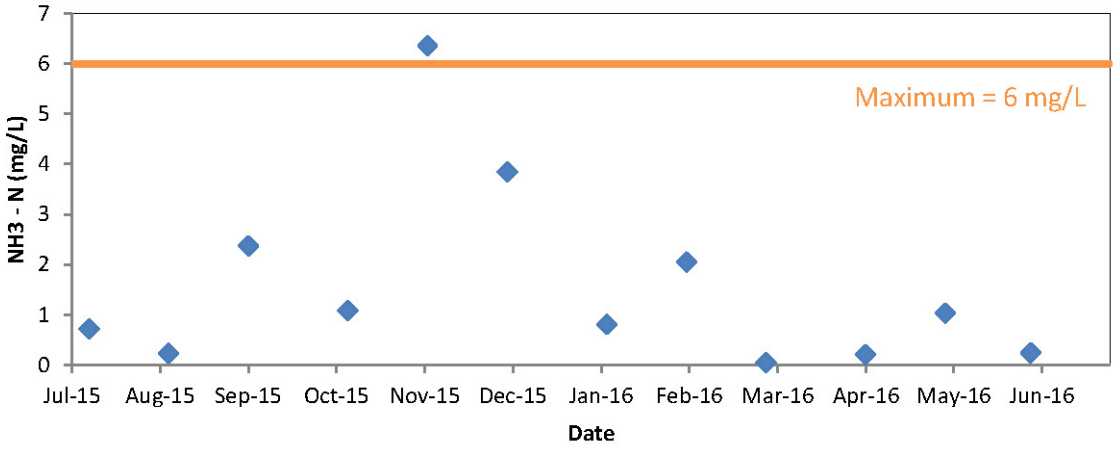


Figure 6 – Dayboro STP Ammonia Nitrogen - Maximum



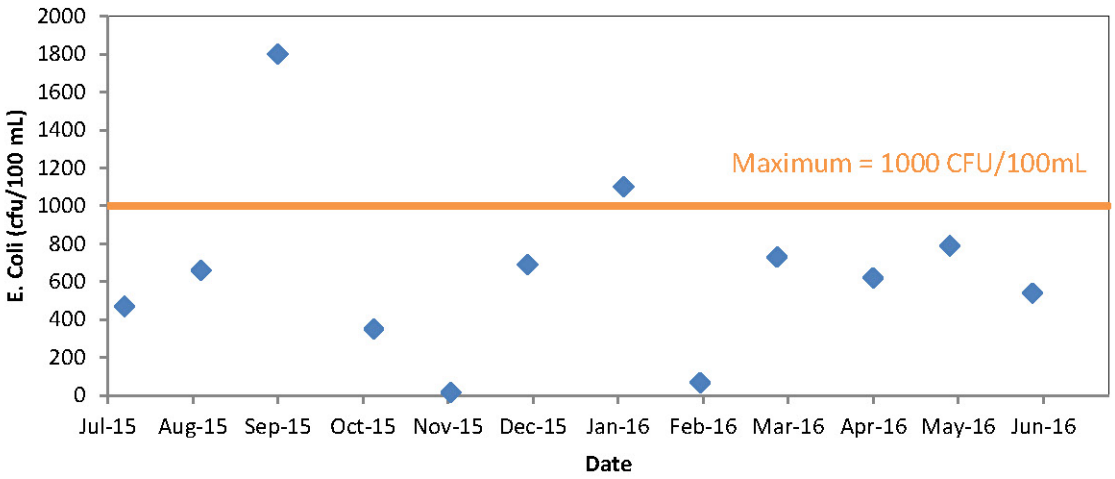
 |

E.Coli

Median E.Coli level was exceeded in September 2015 and January 2016. Dayboro is the only Unitywater plant in which sunlight is relied upon for disinfection at the site because this small plant discharges to land onsite and there is no risk to the environment and the community. The exceedence in September 2015 is likely to be directly linked to the cessation of NuAlgi dosing during trials. These dosing trials were proven successful in improving UV sunlight penetration and effluent disinfection. Permanaent NuAlgi dosing units have now been installed at Dayboro STP.

The second exceedence observed in January 2016 was due to reduced UV disinfection as a result of overcast and wet weather conditions. Overall, 83.3% compliance in maximum median E.Coli was attained in the 2015-16 financial year.

Figure 7 – Dayboro STP E.Coli - Median



3.7. Kawana-Landsborough Sewage Treatment Plants

Table 12 – Kawana-Landsborough STP Release Targets^

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	53	long term 80th percentile	✓
			maximum	✓
TSS	mg/L	53	long term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
NH_3-N	mg/L	53	long term 50th percentile	✓
			maximum	✓
Free Chlorine Residual	mg/L	53	maximum	✓ *
Faecal Coliforms	cfu/ 100 mL	53	median	✓
			80th percentile	✓

^ Note that effluent to the main outfall contains flow from both Kawana and Landsborough Sewage Treatment Plants.

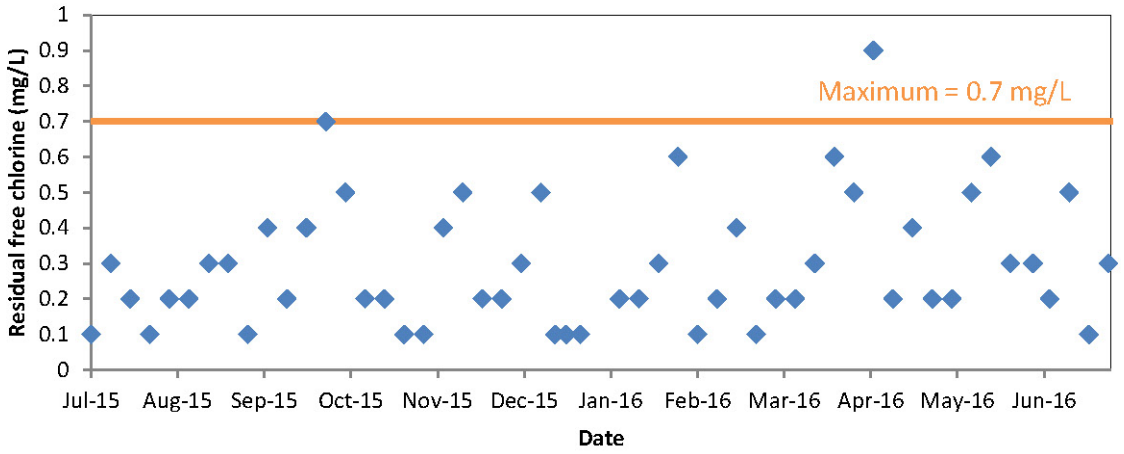
* Residual free chlorine was exceeded once in the 2015-16 financial year. Please refer to the next page for further details.

Non-Compliance

Free Chlorine

Residual free chlorine was exceeded once at the Kawana Sewage Treatment Plant in December 2015. Unitywater staff rechecked dosing and the resampled result indicated <0.7 mg/L (i.e. the second sample was fully compliant). Overall 98.1% compliance in residual free chlorine was achieved in the 2015-16 financial year.

Figure 8 – Kawana-Landsborough STP Residual Free Chlorine



3.8. Kenilworth Sewage Treatment Plant

Table 13 – Kenilworth STP Release Targets^

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	49	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
TSS	mg/L	49	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	49	range	✓
DO	mg/L	49	minimum	✓
Faecal Coliforms	cfu/ 100 mL	49	median	✓
			80th percentile	✓

^ Note that no discharge to the nearby creek was released from Kenilworth Sewage Treatment Plant (i.e.: treated effluent was released to the disposal area) thus 100% compliance was attained.

3.9. Maleny Sewage Treatment Plant

Table 14 – Maleny STP Release Targets to Constructed Wetlands

Parameter	Unit	Number of Samples ^	Target Type	Compliant
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
pH	pH units	53	range	✓ *
DO	mg/L	53	minimum	✓
TN	mg/L	53	long term 50th percentile	✓
TP	mg/L	53	long term 50th percentile	✓
E. Coli	cfu/ 100 mL	52	median	✓

* pH minimum was exceeded once in the 2015-16 financial year. Please refer to the next page for further details.

Table 15 – Maleny STP Release Targets to Forest Irrigation

Parameter	Unit	Number of Samples ^	Limit Type	Compliant
pH	pH units	53	range	✓
Electrical Conductivity	µs/cm	53	maximum	✓
TN	mg/L	53	maximum	✓
TP	mg/L	53	maximum	✓
E. Coli	cfu/ 100 mL	52	median	✓

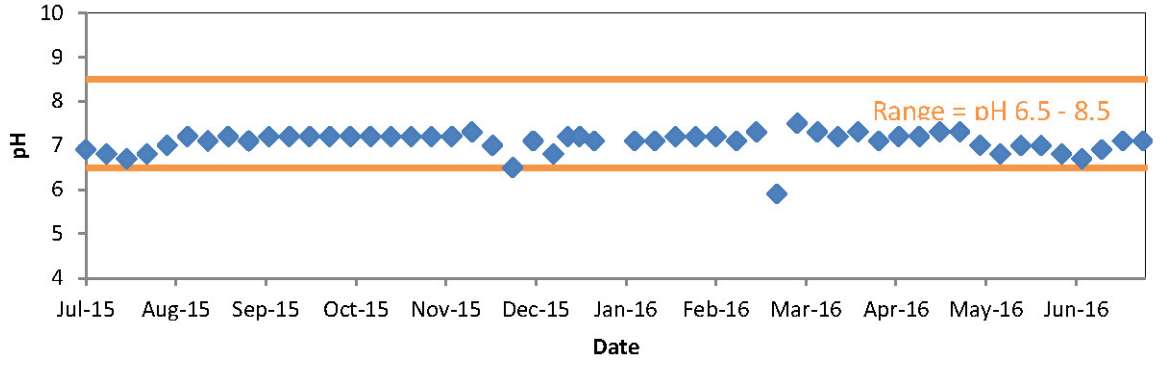
^ Total number of samples of effluent. Note that effluent released to the constructed wetlands and forest irrigation is sampled from the same location, however flow is diverted to either, but not both, outfalls on any one day.

Exceedances

pH

The one-off exceedance in the minimum pH observed in February of 2016 may have been a false reading. Nitrification performance is expected to significantly decrease with low pH, which was not observed. Overall, 94.7% compliance in pH was met.

Figure 9 – Maleny STP pH



3.10. Maroochydore Sewage Treatment Plant

Table 16 – Maroochydore STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
Faecal Coliforms	cfu/ 100 mL	53	median	✓
			80th percentile	✓

Table 17 – Maroochydore STP Mass Limits

Parameter	Unit	Number of Samples	Limit Type	Compliant
Average Annual Flow	ML/yr	366	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

3.11. Murrumba Downs Sewage Treatment Plant

Table 18 – Murrumba Downs STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	54	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
TSS	mg/L	54	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	54	range	✓
DO	mg/L	54	minimum	✓
Ammonia Nitrogen	mg/L	54	maximum	✓
TN	mg/L	54	long term 50th percentile	✓
			short term 50th percentile	✓
			maximum	✓
TP	mg/L	54	long term 50th percentile	✓
			short term 50th percentile	✓ *
			maximum	✓ *
Faecal Coliforms	cfu/ 100 mL	257	median	✓ **
			80th percentile	✓ **

* Short term 50th percentile total phosphorous was exceeded twice and the maximum total phosphorous was exceeded once in the 2015-16 financial year. Please refer to the next page for further details.

** Median faecal coliforms was exceeded three times and the 80th percentile faecal coliforms was exceeded once in the 2015-16 financial year. Please refer to the next page for further details.

Table 19 – Murrumba Downs STP Volumetric Limits

Parameter	Unit	Number of Samples	Limit Type	Compliant
Dry Weather Flow	ML/d	274	maximum	✓
			average	✓
Volumetric Release	ML/d	366	maximum on any one day	✓

Table 20 – Murrumba Downs STP Mass Limits

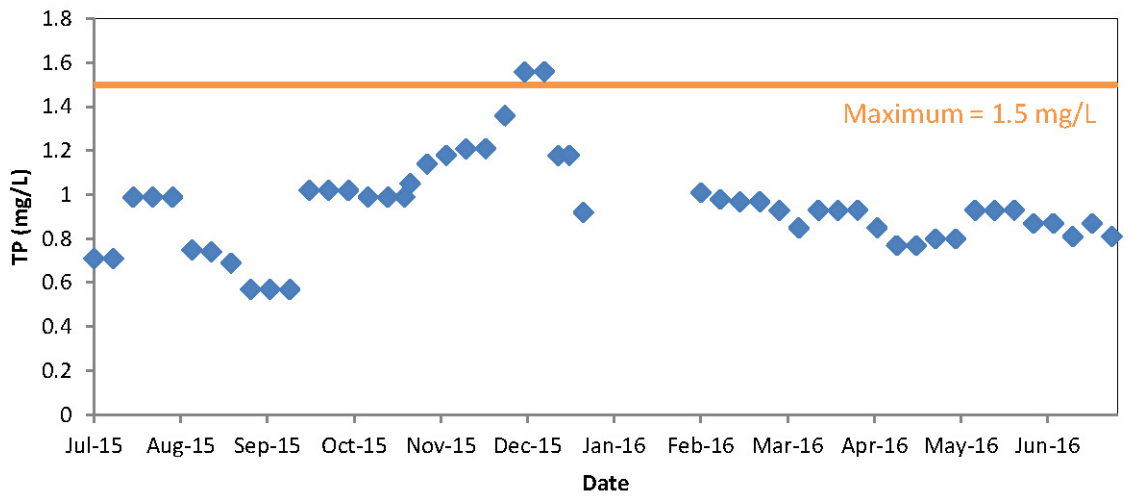
Parameter	Unit	Number of Samples	Limit Type	Compliant
BOD_5	kg/yr	54	annual load	✓
	kg/d		50th percentile load	✓
TN	kg/yr	54	annual load	✓
	kg/d		50th percentile load	✓
TP	kg/yr	54	annual load	✓
	kg/d		50th percentile load	✓

Exceedances

Total Phosphorus

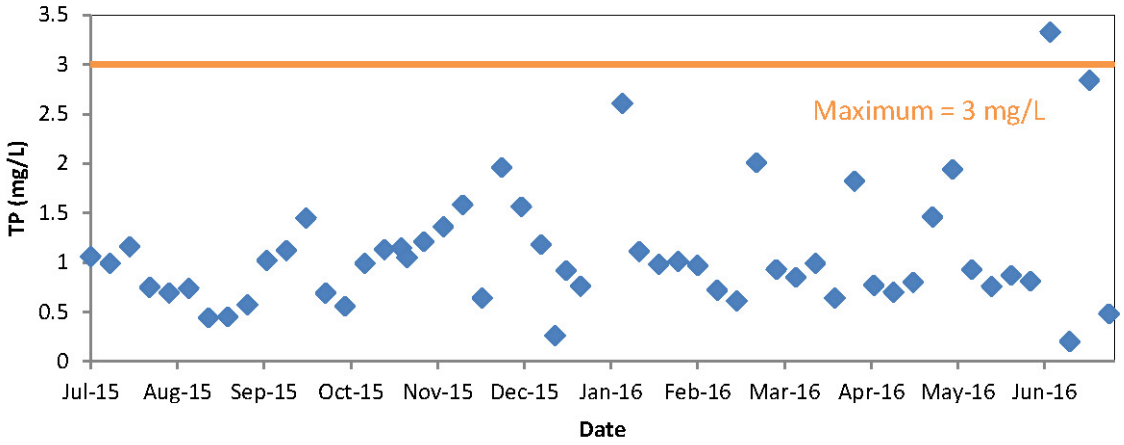
Short term 50th percentile total phosphorus targets were exceeded twice in December 2015 due to the utilisation of biological phosphorous control, which is less predictable than that of dosing chemicals. The performance of biological phosphorous control was also suboptimal in June 2016 due to wet weather flow in the preceding days, causing another exceedance. A 96.0% and 98.1% compliance were respectively achieved for short term 50th percentile total phosphorous and maximum total phosphorous in the 2015-16 financial year.

Figure 10 – Murrumba Downs STP Total Phosphorous – Short Term 50th Percentile



 |

Figure 11 – Murrumba Downs STP Total Phosphorous - Maximum



Faecal Coliforms

The small number of faecal coliform exceedances were attributed to problems related to the UV disinfection unit. These issues included failure of UV intensity sensors which were immediately repaired and other reactive maintenance works. Overall, 94.0% and 98.0% in median faecal coliforms and 80th percentile faecal coliforms were respectively attained in the 2015-16 financial year.

Figure 12 – Murrumba Downs STP Faecal Coliforms - Median

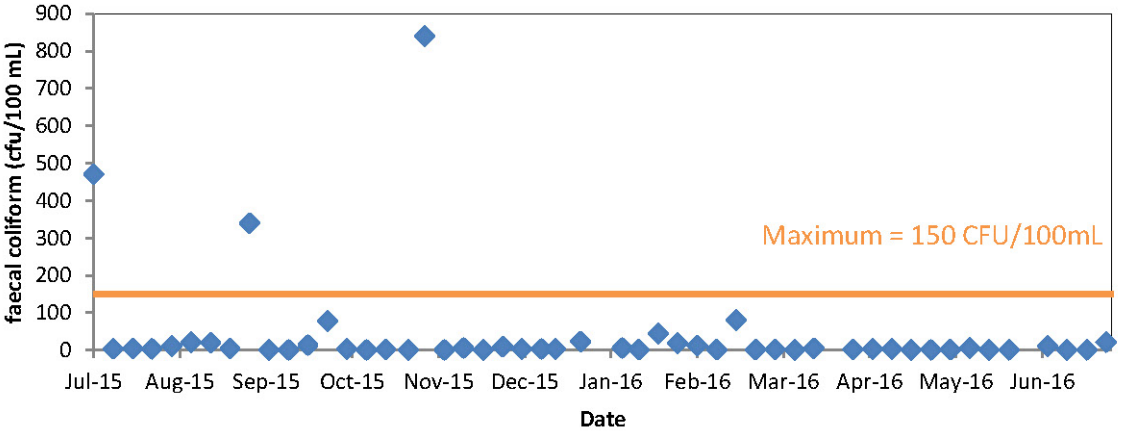
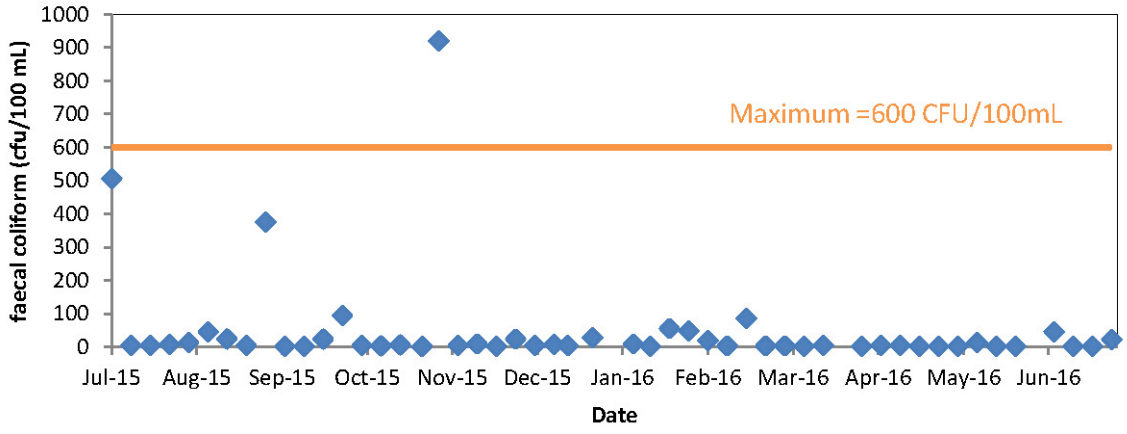


Figure 13 – Murrumba Downs STP Faecal Coliforms – 80th Percentile



 | Objective reference: A3641522

3.12. Nambour Sewage Treatment Plant

Table 21 – Nambour STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
NH_3-N	mg/L	53	long term 50th percentile	✓
			maximum	✓
TN	mg/L	53	long term 50th percentile	✓
TP	mg/L	53	long term 50th percentile	✓
Faecal Coliforms	cfu/ 100 mL	51	median	✓
			80th percentile	✓

3.13. Noosa Sewage Treatment Plant

Table 22 – Noosa STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
Faecal Coliforms	cfu/ 100 mL	78	median	✓
			80th percentile	✓

Table 23 – Noosa STP Mass Limits

Parameter	Unit	Number of Samples	Limit Type	Compliant
Average Annual Flow	ML/yr	366	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

3.14. Redcliffe Sewage Treatment Plant

Table 24 – Redcliffe STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
Free Chlorine Residual	mg/L	53	maximum	✓
Faecal Coliforms	cfu/ 100 mL	265	median	✓
			80th percentile	✓ *

* Faecal coliforms 80th percentile target was exceeded once in the 2015-16 financial year. Please refer to the next page for further details.

Table 25 – Redcliffe STP Mass Limits

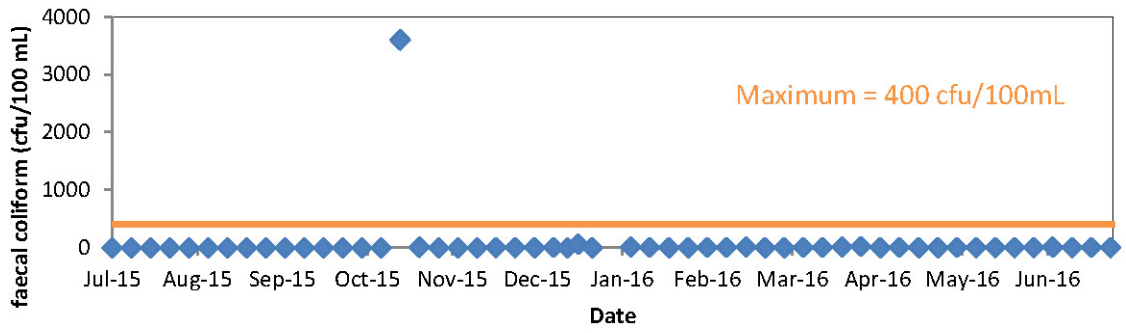
Parameter	Unit	Number of Samples	Limit Type	Compliant
Average Annual Flow	ML/yr	366	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

Exceedances

Faecal Coliforms

The rare exceedance in faecal coliforms in October 2015 was caused by high inflow rate after a wet weather event. A 99.6% compliance in 80th percentile faecal coliforms was me in the 2015-16 financial year.

Figure 14 – Redcliffe STP Faecal Coliforms – 80th Percentile



 |

3.15. South Caboolture Sewage Treatment Plant

Table 26 – South Caboolture STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
TSS	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	53	range	✓
DO	mg/L	53	minimum	✓
Free Chlorine Residual	mg/L	53	maximum	✓
Faecal Coliforms	cfu/ 100 mL	265	median	✓ *
			80th percentile	✓ *

* Median and 80th percentile faecal coliforms targets were exceeded once in the 2015-16 financial year. Please refer to the next page for further details.

Table 27 – South Caboolture STP Mass Limits

Parameter	Unit	Number of Samples	Limit Type	Compliant
Average Annual Flow	ML/yr	366	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

Exceedances

Faecal Coliforms

Median faecal coliform and 80th percentile faecal coliform targets were exceeded once in June 2016 as a result of reduced disinfection effectiveness after a wet weather event. 98.1% overall compliance in both median faecal coliform and 80th percentile faecal coliform was achieved in the 2015-16 financial year.

Figure 15 – South Caboolture STP Faecal Coliform - Median

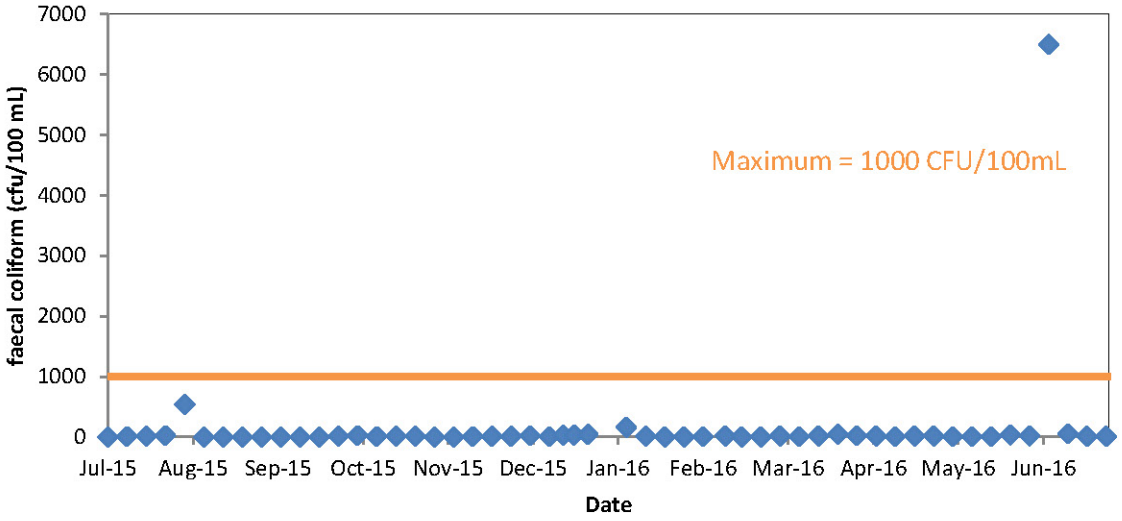
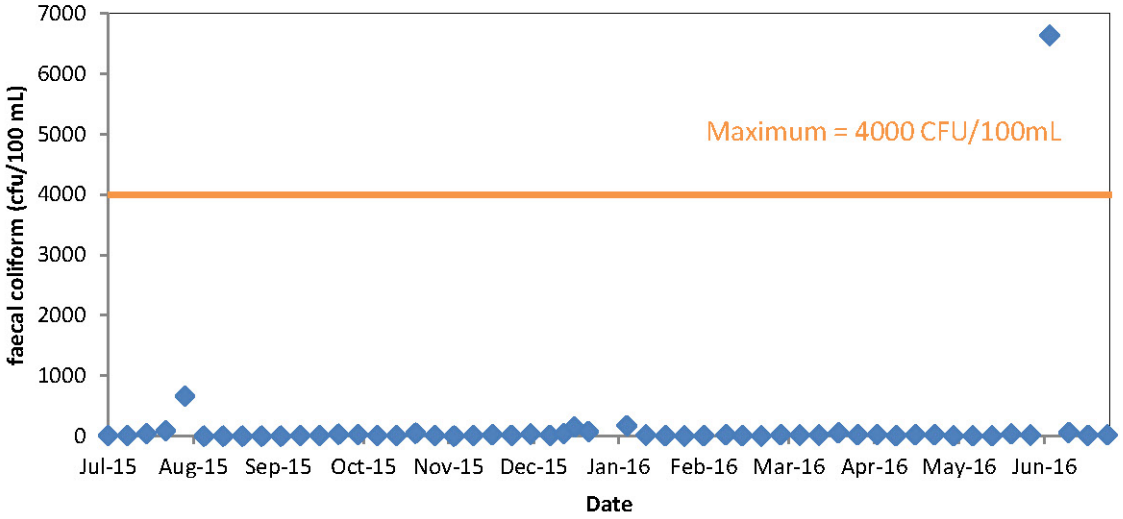


Figure 16 – South Caboolture STP Faecal Coliform – 80th Percentile



3.16. Woodford Sewage Treatment Plant

Table 28 – Woodford STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD_5	mg/L	54	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
TSS	mg/L	54	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
pH	pH units	54	range	✓
DO	mg/L	54	minimum	✓
Free Chlorine Residual	mg/L	54	maximum	✓
Faecal Coliforms	cfu/ 100 mL	260	median	✓
			80th percentile	✓

Table 29 – Woodford STP Mass Limits

Parameter	Unit	Number of Samples	Limit Type	Compliant
Average Annual Flow	ML/yr	366	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

4. Odour Nuisance

Table 30 – Odour Nuisance

STP	No major odour issues
Brendale	✓
Bribie Island	✓
Burpengary East	✓
Coolum	✓
Cooroy	✓
Dayboro	✓
Kawana	✓
Kenilworth	✓
Landsborough	✓
Maleny	✓
Maroochydore	✗
Murrumba Downs	✓
Nambour	✓
Noosa	✓
Redcliffe	✓
South Caboolture	✓
Woodford	✓

Note: Unitywater received 41 odour complaints associated with Maroochydore STP in 2015-16

In 2015-16, odour releases from Maroochydore Sewage Treatment Plant was caused by performance issues with the dewatering and anaerobic digestion units.

Unitywater is resolving this matter by performing an odour assessment, upgrading odour control equipment and improving process reliability for the benefit of surrounding residents and local businesses. Trials using Ultrawaves technology to improve digestion are also being undertaken with the aim of reducing odour releases.

All initiatives to improve the odour issues at Maroochydore STP will be complete by December 2016.

5. Definitions and Legend

Definitions of acronyms, units of measurement and legends throughout this performance report are defined below.

Table 31 – Acronyms and Definitions

Acronym	Term	Definition
BOD_5	biochemical oxygen demand after 5 day test	The amount of dissolved oxygen needed by aerobic organisms to break down organic material.
BNR	biological nutrient removal	A process used for nitrogen and phosphorous removal from sewage.
DEHP	Department of Environment and Heritage Protection	
DO	dissolved oxygen	Gaseous oxygen that is mixed in water and is available to aquatic organisms for respiration.
E.Coli	Escherichia coli	Used as an indicator of pathogenic organisms that may cause diseases.
IDEA	intermittent decanted extended aeration	A three stage wastewater treatment process that involves aeration, settling and decanting.
NH_3 – N	ammonia nitrogen	A chemical compound that is removed in order to maintain the health of waterways. High levels can cause environmental issues such as eutrophication.
SBR	sequential batch reactors	A draw-and-fill biological treatment process that uses aerobic microorganisms to break down and treat wastewater.
TN	total nitrogen	The sum of nitrate, nitrite and ammonia that is removed in order to maintain the health of waterways and prevent environmental issues such as eutrophication.
TP	total phosphorus	The sum of phosphorus compounds that is removed in order to maintain the health of waterways and prevent environmental issues such as eutrophication.
TSS	total suspended solids	Total amount of small solid particles that remain suspended within the wastewater.
UV	ultraviolet	A technology using radiation that disinfects wastewater.
	faecal coliform	Used as an indicator of pathogenic organisms that may cause diseases.
pH		A figure expressing the acidity or alkalinity of the water

Table 32 – Definition of Units

Units	Definition
µs/cm	micro-Siemens per centimetre
cfu/ 100 mL	colony forming units per 100 millilitre
kg/yr	kilogram per year
mg/L	milligrams per litre
ML	megalitres
ML/yr	megalitres per year
NTU	Nephelometric Turbidity Units

Table 33 – Legend

Symbol	Compliancy value
✓	> 90%
✓	80% - 90%
×	< 80%

