



# Sewage Treatment Plant Performance Report

1 JULY 2019 – 30 JUNE 2020



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# Foreword from the CEO

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Dear Customers

I am pleased to share Unitywater's Sewage Treatment Plant Performance Report for 2019-20 and highlight the quality sewage treatment services that we provide to Noosa, Moreton Bay and the Sunshine Coast.

We continue to invest in sewerage infrastructure vital for our growing region and in maintaining the 17 Sewage Treatment Plants within our region. Continuing to invest in the upgrade and renewal of our Sewage Treatment Plants (STP's) has enabled Unitywater to maintain our high quality of service and achieve a combined compliance result of 99.2%.

A major investment this financial year has been the upgrade of the Kawana STP is progressing. Methane from the plant's new anaerobic digester will generate 30% of the site's electricity needs. This project aligns with our 7-year energy management plan that seeks to reduce Unitywater's carbon footprint, costs and dependence on the electricity grid.

This year we further reviewed our practices to ensure the optimisation of asset performance to benefit our customers and the community. Newly endorsed asset management plans for each of our sewage treatment plants places us in an excellent position to again improve upon our operations, find new and innovative ways to maintain our infrastructure and to proactively address risks.





I trust the information in this report demonstrates our strong track record and commitment in sewage treatment.

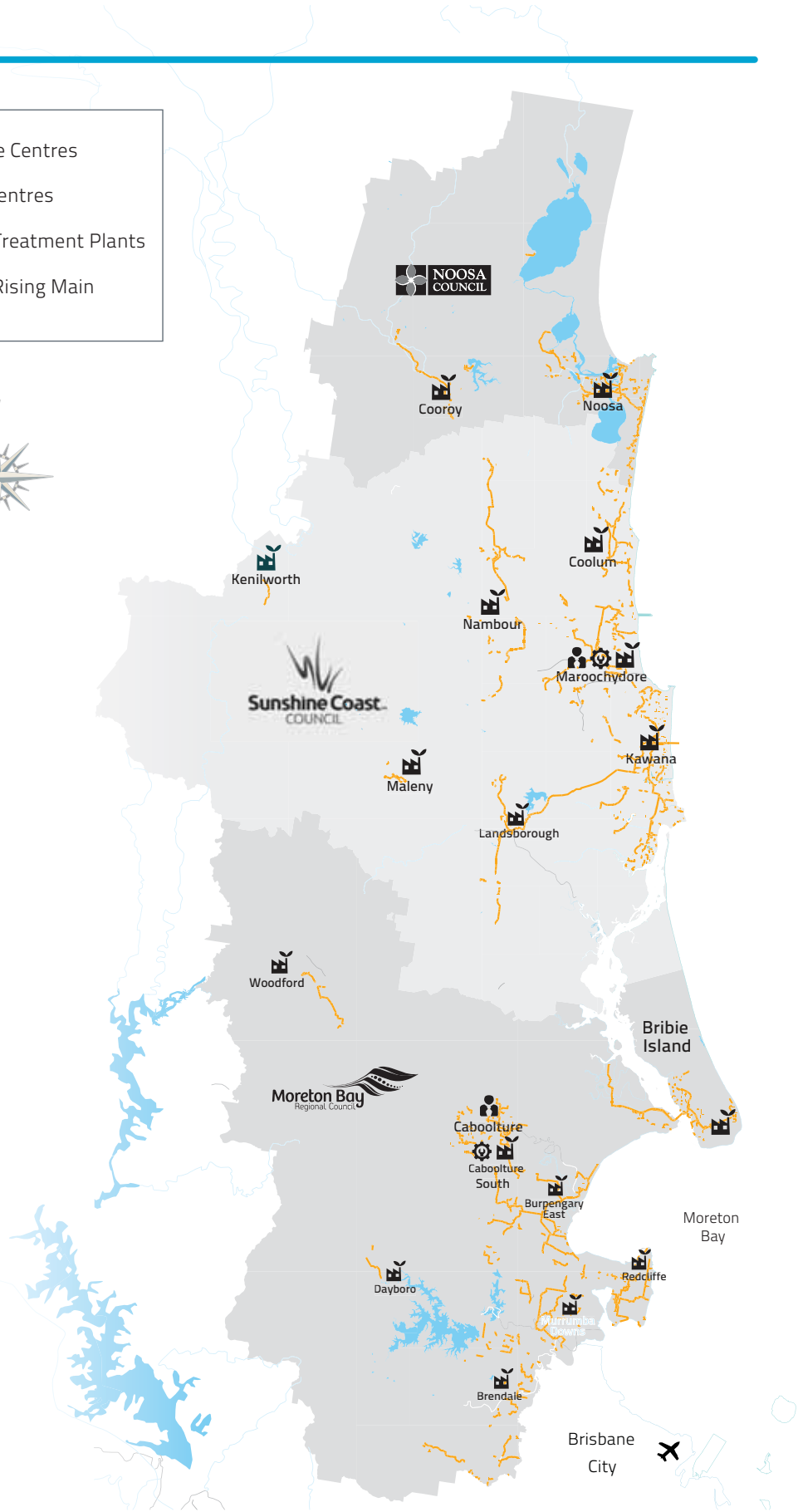


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George Theo  
Chief Executive Officer

# Our service area

-  Corporate Centres
-  Service Centres
-  Sewage Treatment Plants
-  Sewage Rising Main







# 1. Introduction

Unitywater supplies more than 791,000 people across 5,223 square kilometers with sewerage and water services.

We monitor effluent quality from each sewage treatment plant to assess compliance with conditions specified under the licence granted by the Department of Environment and Science (DES). We hold the following DES registration and approval:

- 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 we not meet our obligations as set out in the licence, penalties may apply in accordance with the *Sustainable Planning Act 2009* and *Environmental Protection Act 1994*. We report our compliance results each month to the Department of Environment and Science and provide detailed commentary as required to address specific items of note.

This report is published to provide information about effluent quality and some licence compliance statistics from our sewage treatment plants. By meeting licence conditions, we ensure high quality service, minimising impacts on waterways in our local communities.

## 1.1 Quick statistics June 2020

Number of sewerage connections	154,980
Kilometres of sewer main pipes	5,975 km
Number of sewage pump stations	797
Number of sewage treatment plants	17
Volume of sewage collected and treated	57,618 ML <sup>1</sup>

<sup>1</sup> Does not include 1354 ML diverted to Queensland Urban Utilities (QUU) via the Kedron Brook Sewerage Scheme. This sewage would be treated to meet QUU's licence requirements.

## 1.2 Mass load releases

Graphs of mass loads released from sites with load discharge limits to the environment are shown below for information purposes. All treatment plants are within their mass load limits and are licence compliant.

Figure 1 and Figure 2 show variability from year to year. Nitrogen and phosphorus mass discharge varies for several reasons, including:

- Annual rainfall (variability of mass load due to the effect of wet weather flows on treatment processes).
- Increasing plant raw sewage loads (as the community grows, influent nutrient mass load will gradually increase).
- Balancing nitrogen and phosphorus removal with the associated power and chemical consumption and their environmental impacts, through plant optimisation and improvement activities.
- The decline in the community's use of phosphate containing detergents.

Figure 1

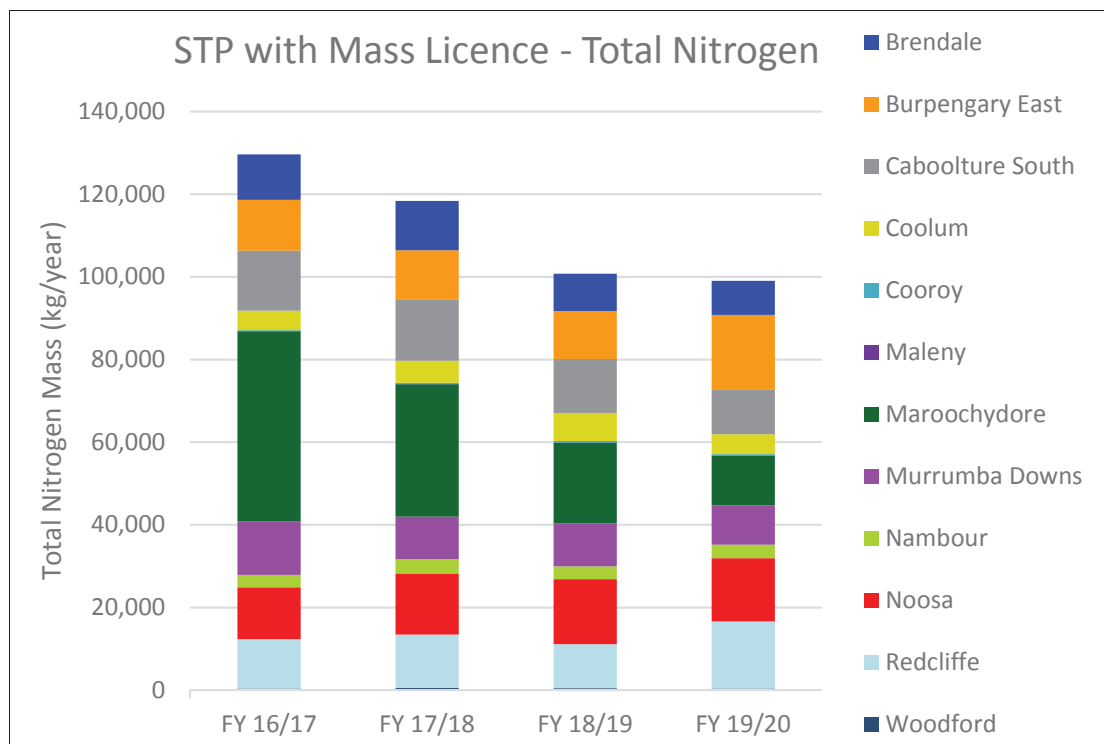
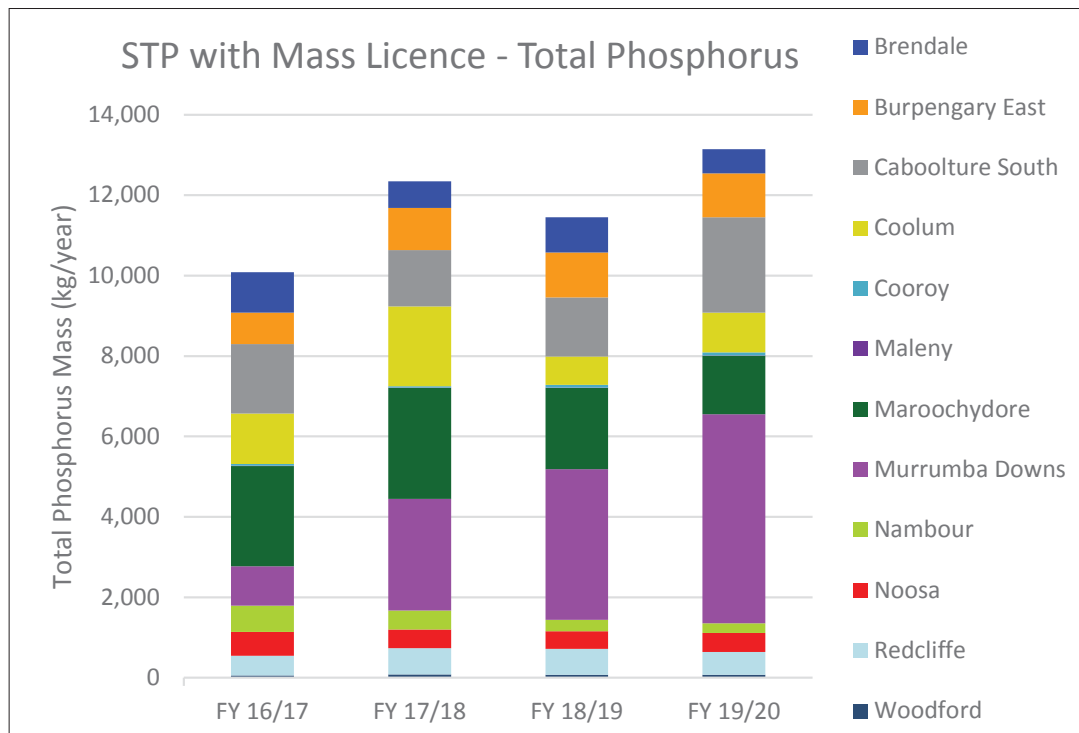


Figure 2



It is worth noting the changes in effluent quality and Unitywater’s continued optimisation, renewal or upgrade activities.

- Maroochydore STP has benefited (results can be seen in Figure 1 with a year on year nitrogen mass load reduction) from renewals of equipment to improve plant performance as well as diversion of sewage as part of the Kawana STP upgrade.
- Burpengary STP’s effluent nitrogen concentration has increased as the plant is approaching its design capacity. Therefore, planning is underway for a plant upgrade. The upgrade design is to commence in late 2020.
- South Caboolture STP has reduced its nutrient removal chemical use to near zero. This has achieved a reduced nitrogen mass load. The reliance on biological process has resulted in an increased phosphorous mass load however results remain well within licence limits. Avoiding the use of phosphorous removal chemicals, and instead relying on biological processes, results in an improved fertiliser when biosolids are beneficially reused.
- The overall treatment process has changed as part of the plant upgrade resulting in an increase in capacity, but slightly higher effluent nitrogen concentrations within the licence limits.
- Murrumba Downs STP’s effluent phosphorus concentration has been increasing slightly over the last few years (however remains well within licence limits) as the bioreactor nears its capacity limit. A second bioreactor will come online within the next few years, which is likely to result in reduced phosphorus concentrations.

## 2. Effluent Quality Summary

DES requires that all sewage treatment plants discharge effluent that meets 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 DES.

In the 2019–20 financial year, Unitywater achieved 99.2% compliance against overall effluent standards discharged from its sewage treatment plants. DES 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 2019–20 financial year.

*Table 1 – Effluent Compliance*

Sewage Treatment Plant	Catchment Equivalent Population	Treatment Process	Discharge to:			Effluent Quality Compliance
			Freshwater Body	Ocean	Irrigation, wetlands or groundwater	
Brendale	37,092	BNR <sup>1</sup>	✓			100%
Bribie Island	25,604	Biological nitrogen removal and chemical phosphorus removal			✓	99.9%
Burpengary East	54,090	BNR	✓			99.3%
Coolum	28,725	BNR	✓			99.3%
Cooroy	8,357	BNR	✓		✓	100%
Dayboro	1,031	Biological nitrogen removal			✓	99.3%
Kawana	152,533	Biological nitrogen removal	✓	✓		99.1%
Kenilworth	439	Oxidation Pond	✓		✓	98.3%
Landsborough <sup>2</sup>	11,797	BNR	✓	✓		100%
Maleny	2,450	Biological nitrogen removal and chemical phosphorus removal	✓		✓	99.6%
Maroochydore	89,501	BNR	✓			98.2%
Murrumba Downs	138,206	BNR	✓			99.2%
Nambour	46,296	BNR	✓			100%
Noosa	48,187	BNR	✓			100%
Redcliffe	62,919	BNR		✓		99.9%
South Caboolture	67,056	BNR	✓			99.4%
Woodford	2,338	Biological nitrogen removal and chemical phosphorus removal	✓			99.8%
		Overall Compliance				99.2%

- Notes: 1. Biological Nutrient Reduction (BNR) – Reduces nitrogen and phosphorus biologically.  
 2. 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.

## 3. Performance in Detail JULY 2019 – JUNE 2020

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 DES approval to operate.

### 3.1 Brendale Sewage Treatment Plant

*Table 2 – Brendale STP Release Targets*

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD	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 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	✓

## 3.2 Bribie Island Sewage Treatment Plant

Table 4 – Bribie Island STP Contaminant Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD	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	✓

\* pH was outside of the compliance range one time in the 2019–20 financial year. Please refer to the next page for further details.

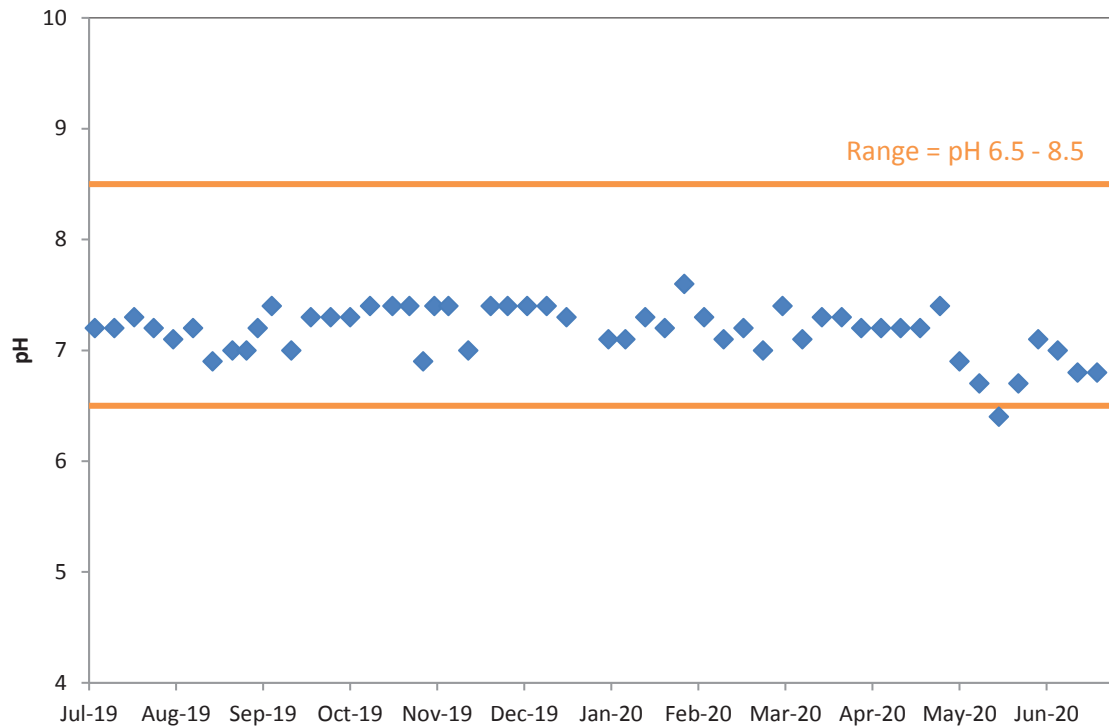
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*Exceedances*

**pH**

pH was outside the required range once in the financial year at Bribie Island Sewage Treatment Plant. STP equipment and processes were within normal ranges during this period therefore this exceedance is believed to be due to a change in the raw sewage characteristics or a sampling or analysis error. Overall 98% compliance in pH targets was achieved.

*Figure 3 – Bribie Island STP – pH – Minimum*



### 3.3 Burpengary East Sewage Treatment Plant

Table 5 – Burpengary East STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD	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 was exceeded once in the 2019-20 financial year.  
Please refer to the next page for further details.

\*\*TSS long term 80th Percentile was exceeded three time in the 2019-20 financial year.  
Please refer to the next page for further details.

Table 6 – Burpengary East 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	✓

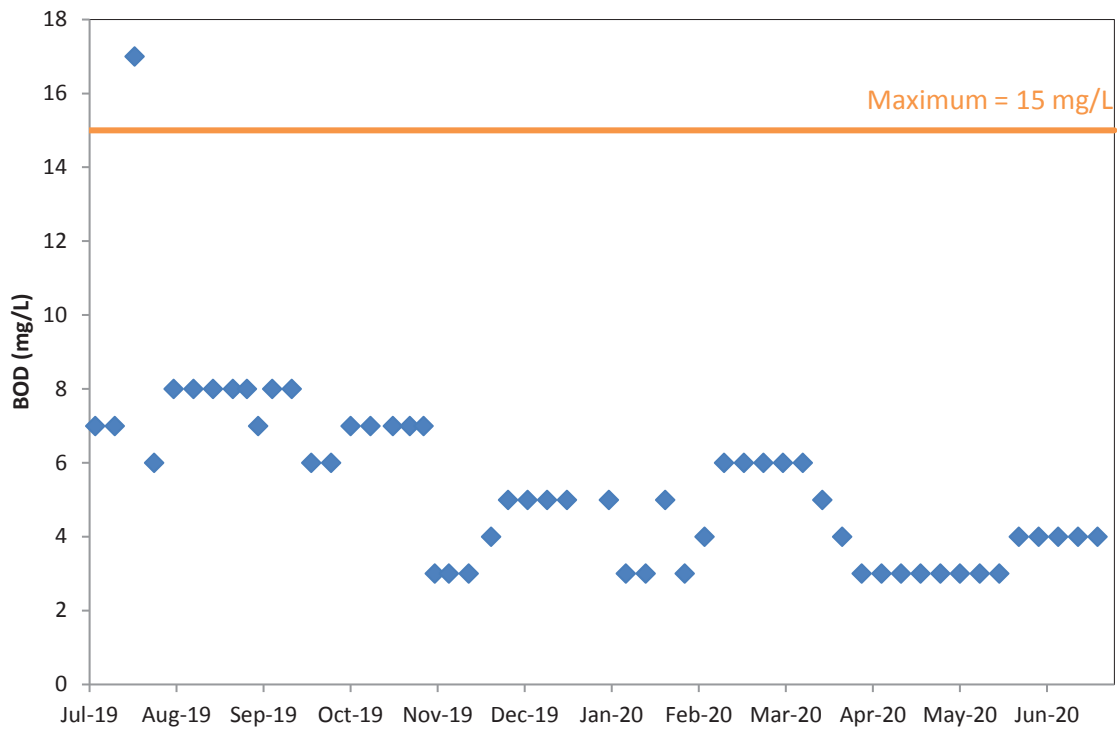


Exceedances

BOD

BOD Short Term 80th Percentile was exceeded once in the financial year at Burpengary East Sewage Treatment Plant. A sample containing elevated solids was due to sample contamination when the sample container scraped the wall of the tank, dislodging contamination. Corrective action was taken to address the issue to prevent it striking the wall of the tank. Overall 98% compliance in BOD Short Term 80th Percentile targets was achieved.

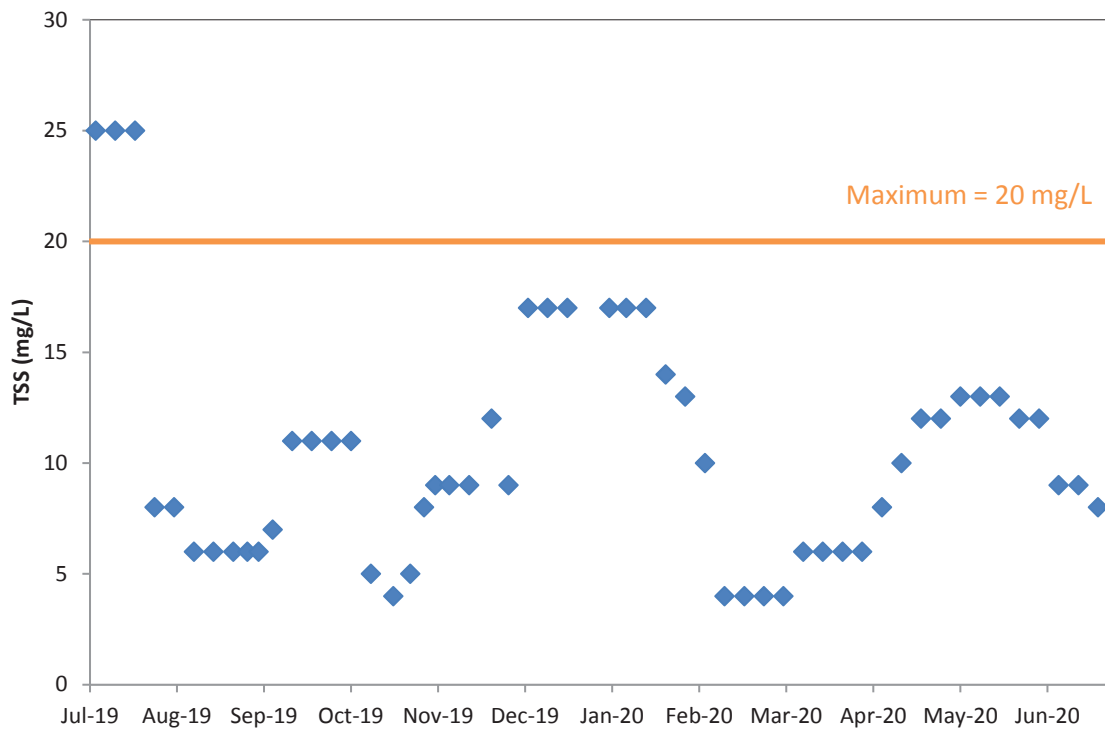
Figure 4 – Burpengary East STP – BOD Short Term 80th Percentile – Maximum



## TSS

TSS Short Term 80th Percentile was exceeded three times in the financial year at Burpengary East Sewage Treatment Plant. As discussed above, samples were contaminated and the cause has since been addressed. Overall 94% compliance in TSS Short Term 80th Percentile targets was achieved.

Figure 5 – Burpengary East STP – TSS Short Term 80th Percentile – Maximum



### 3.4 Coolum Sewage Treatment Plant

Table 7 – Coolum STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD	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 <sub>3</sub> -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	✓***

\*Ammonia Maximum was exceeded twice in the 2019-20 financial year. Please refer to the next page for further details.

\*\*Free Chlorine Residual Maximum was exceeded once in the 2019-20 financial year. Please refer to the next page for further details.

\*\*\*Faecal Coliforms Median was exceeded three times and 80th Percentile was exceeded five times in the 2019-20 financial year. Please refer to the next page for further details.

Table 8 – Coolum STP Mass Limits

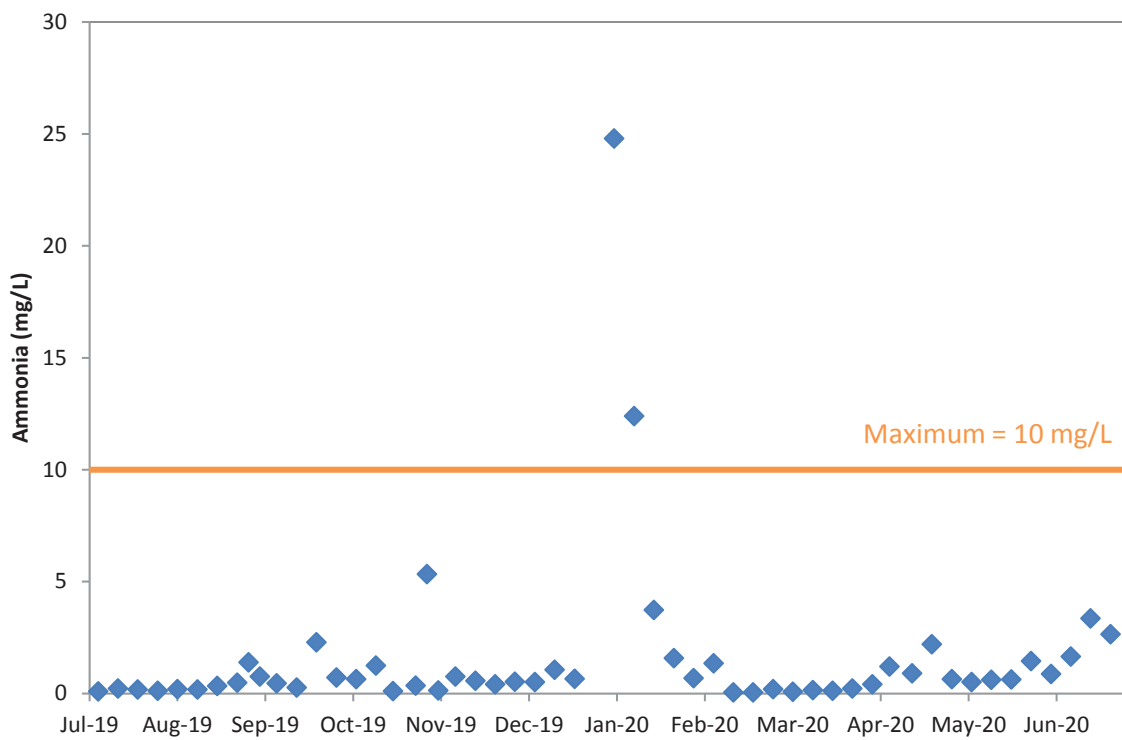
Parameter	Unit	Number of Days	Limit Type	Compliant
Average Annual Flow	ML/yr	365	maximum	✓
Nitrogen Mass Load	kg/yr	-	maximum	✓
Phosphorus Mass Load	kg/yr	-	maximum	✓

*Exceedances*

**AMMONIA**

Ammonia Maximum was exceeded twice at Coolum Sewage Treatment Plant in the financial year. These occurred during peak school holiday load. This issue will be resolved by the upgrade of the Coolum STP which is currently in the planning stage. Overall 96% compliance with the Ammonia Maximum limits were achieved.

*Figure 6 – Coolum STP – Ammonia – Maximum*





## FAECAL COLIFORMS

Median Faecal Coliforms was exceeded three times and 80th percentile Faecal Coliforms was exceeded five times at Coolum Sewage Treatment Plant in the financial year. This is due to extreme wet weather, with 510mm recorded at the site in a 10 day period. Overall 94% compliance with Faecal Coliforms Median and 90% compliance with the Faecal Coliforms 80th Percentile limits were achieved.

Figure 8 – Coolum STP – Faecal Coliform – Median

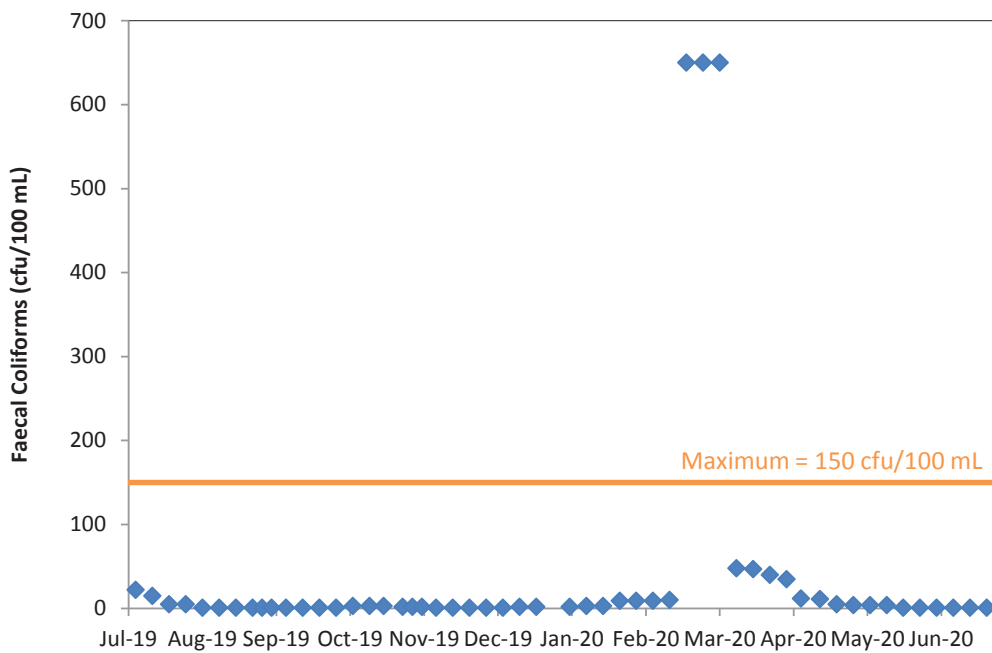
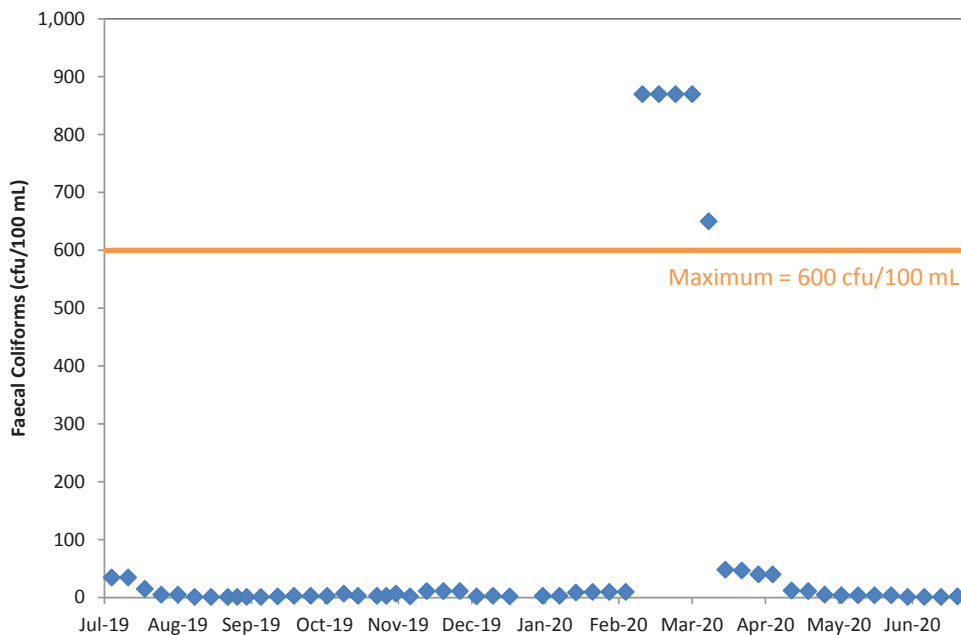


Figure 9 – Coolum STP – Faecal Coliform – 80th Percentile



### 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	53	long term 50th percentile	✓
			maximum	✓

\* Maximum Total Phosphorus was exceeded four times in the 2019-20 financial year. Please refer to further details below.

Table 10 – Cooroy STP Mass Limits

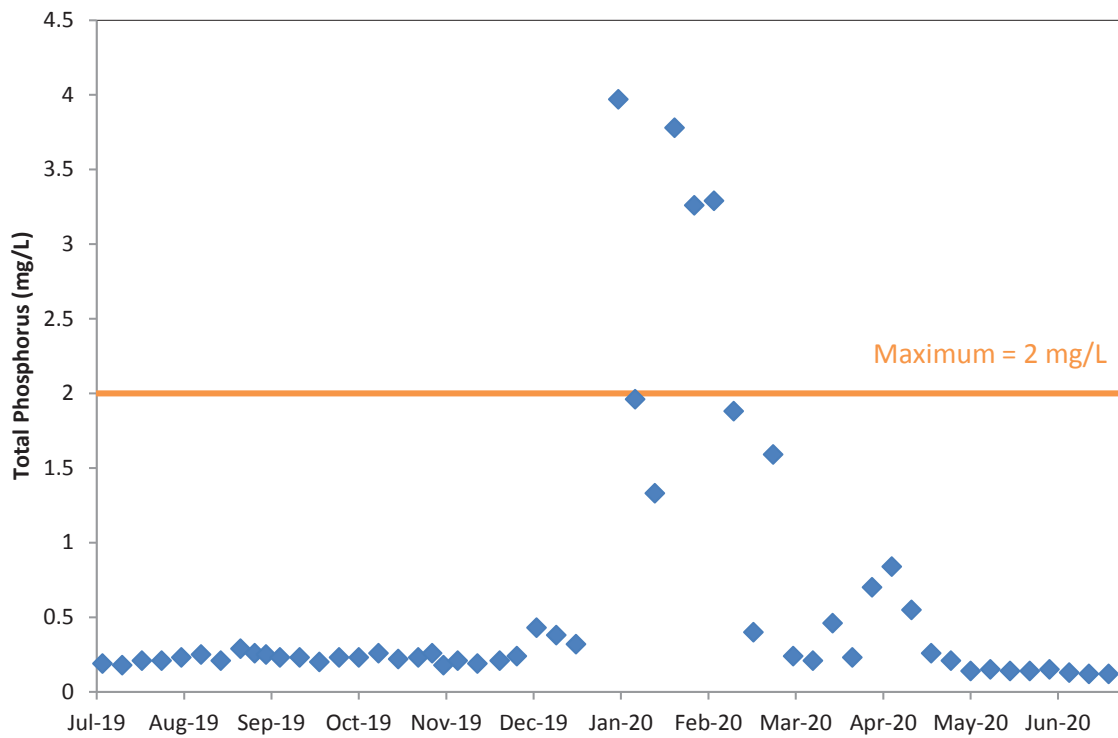
Parameter	Unit	Limit Type	Compliant
Nitrogen Mass Load	kg/yr	maximum	✓
Phosphorus Mass Load	kg/yr	maximum	✓

*Exceedances*

**TOTAL PHOSPHORUS**

Maximum Total Phosphorus was exceeded four times in the financial year. The raw sewage characteristics to the plant changed due to a reduction in the receipt of tankered waste. This resulted in the need to alter the treatment process from reliance on biological phosphorous removal to chemical phosphorous removal. Stable operation was achieved once the transition was complete. 92% compliance was achieved for the maximum limit.

*Figure 10 – Cooroy STP – Total Phosphorus – Maximum*





## 3.6 Dayboro Sewage Treatment Plant

Table 11 – Dayboro STP Contaminants Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD	mg/L	13	80th percentile	✓
			maximum	✓
TSS	mg/L	13	80th percentile	✓
			maximum	✓
pH	pH units	13	range	✓
NH <sub>3</sub> -N	mg/L	13	50th percentile	✓
			maximum	✓
E. Coli	mg/L	65	median	✗*
			80th percentile	✓

\* Median *E.Coli* was exceeded three times in the 2019-20 financial year.  
Please refer to the next page for further details.

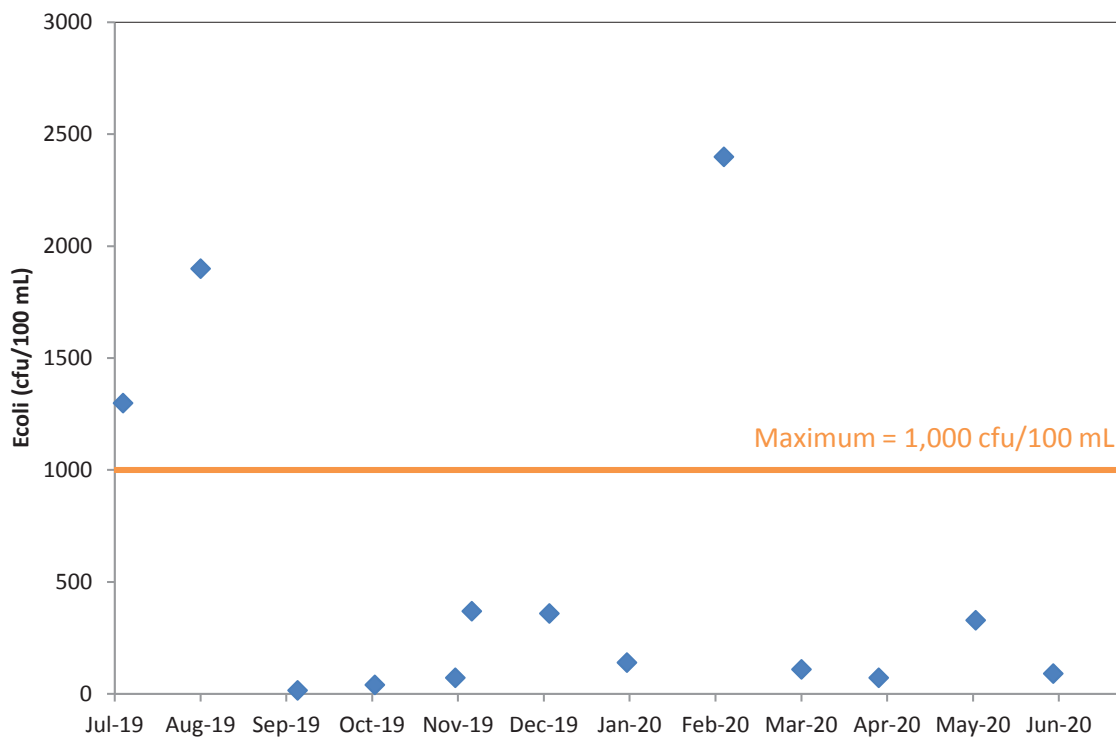
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*Exceedances*

*E.COLI*

Target Median *E.coli* was exceeded at Dayboro Sewage Treatment Plant three times in the financial year. The plant relies on sunlight to naturally disinfect the effluent prior to on-site irrigation. Hence, disinfection performance is impacted by lack of sunlight (i.e. during wet weather days) and algae present in the effluent storage dam (excessive algae prevents sunlight from penetrating the water column). Following the successful trial of Nualgi Diatomics last year, to reduce algae in the storage dam to improve UV disinfection, 77% compliance with the Faecal Coliforms median limits were achieved in the 2019-20 financial year, an improvement from 62% in the 2018-19 financial year. There is no risk to the environment nor the community due to reduced disinfection performance because effluent is disposed of via on-site land irrigation.

*Figure 11 – Dayboro STP – E.coli – Median*



## 3.7 Kawana-Landsborough Sewage Treatment Plants

Table 12 – Kawana-Landsborough STP Release Targets<sup>^</sup>

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD	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 <sub>3</sub> -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	✓**

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

\*Free Residual Chlorine Maximum was exceeded once in the in the 2019-20 financial year.  
Please refer to the next page for further details

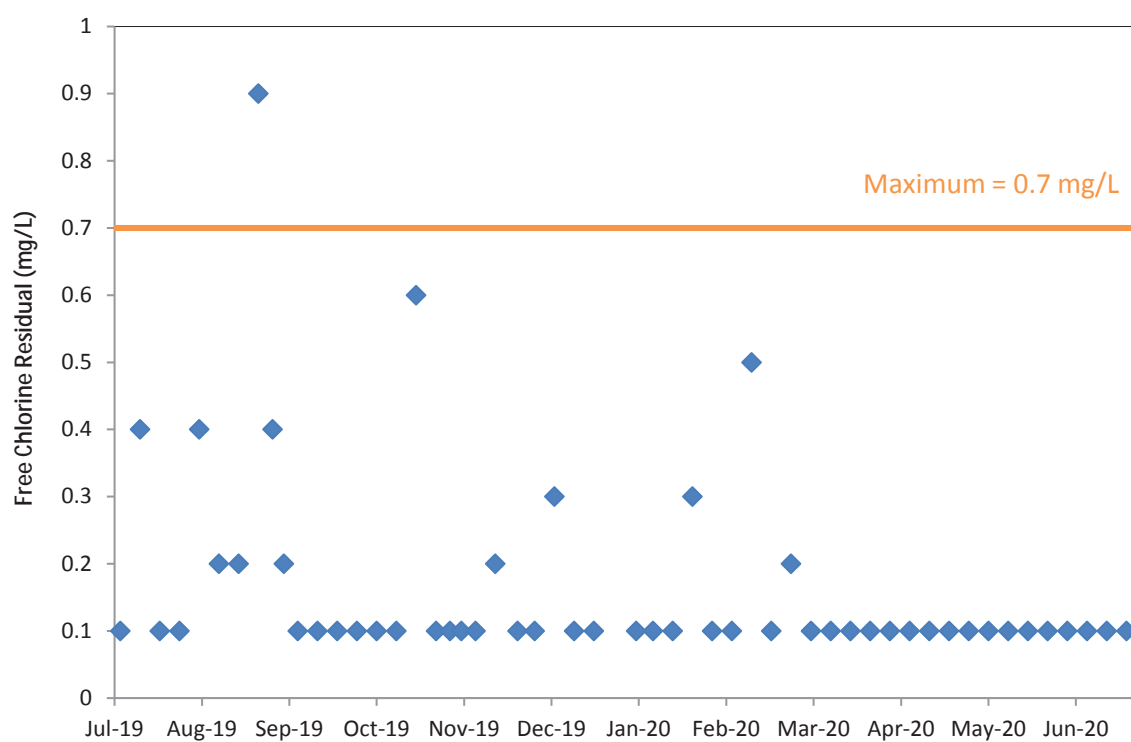
\*\*Faecal Coliforms Medium was exceeded six times and the 80th Percentile two times in the in the 2019-20 financial year.  
Please refer to the next page for further details

*Exceedances*

**FREE CHLORINE**

Free Chlorine Maximum was exceeded once at Kawana Sewage Treatment Plant in the financial year. This result did not correlate with onsite measurements and the disinfection equipment was functioning normally. Overall 98% compliance with the Free Chlorine Maximum limits were achieved.

*Figure 12 – Kawana STP – Free Chlorine Residual – Maximum*



## FAECAL COLIFORMS

Faecal Coliforms Median was exceeded six times and 80th Percentile two times at the Kawana Sewage Treatment Plant in the financial year. This was during the period of commissioning activities of the Kawana Sewage Treatment Plant upgrade. Overall 88% compliance with the Faecal Coliforms Median limits and 95% compliance with 80th Percentile limits were achieved.

Figure 13 – Kawana STP – Faecal Coliforms – Median

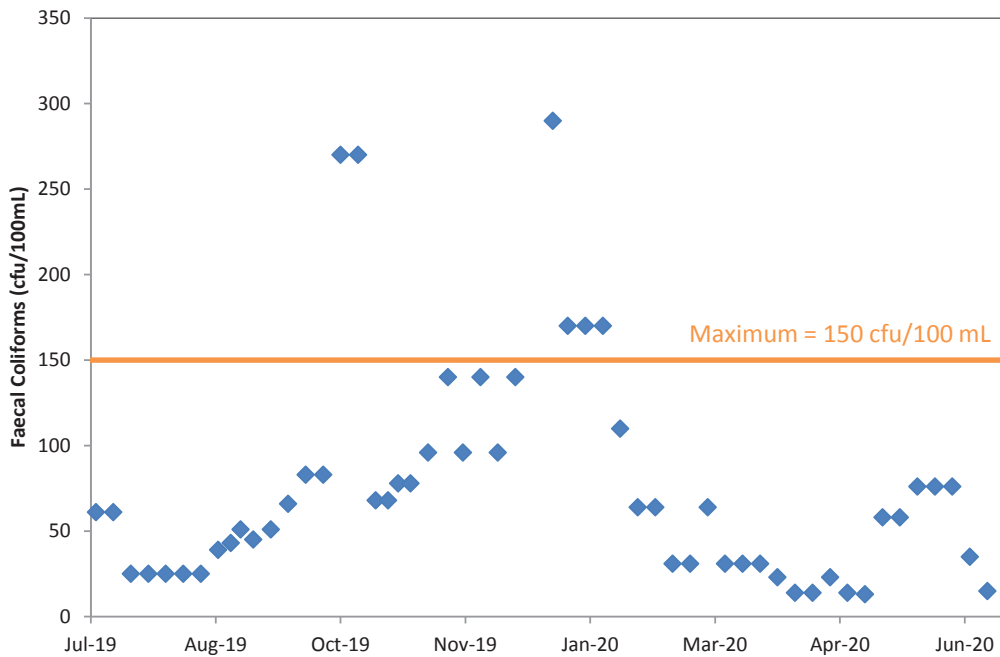
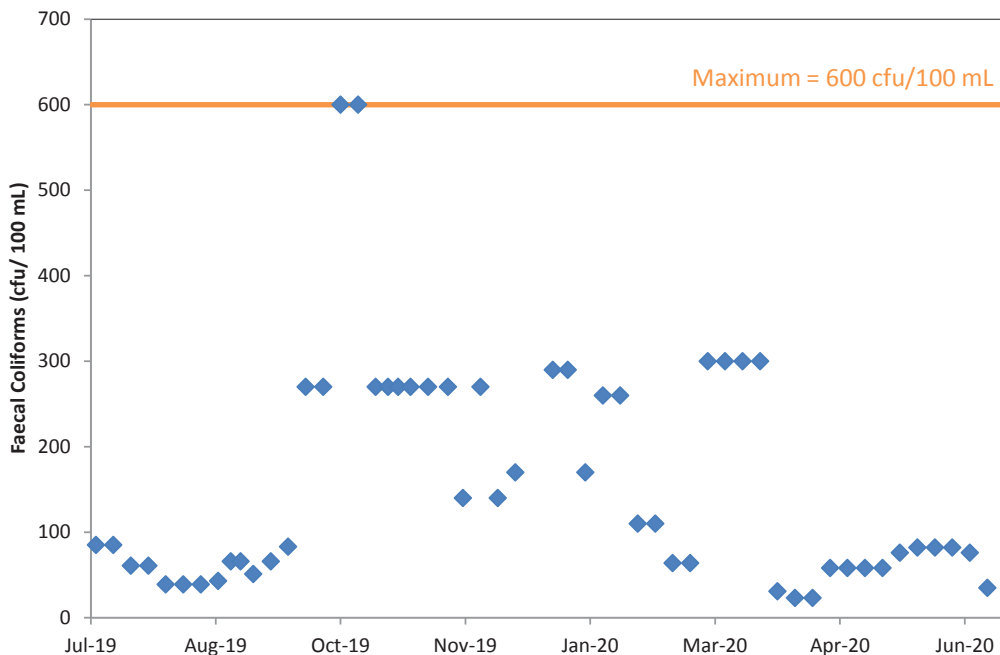


Figure 14 – Kawana STP – Faecal Coliforms – 80th Percentile



### 3.8 Kenilworth Sewage Treatment Plant

Table 13 – Kenilworth STP Release Targets<sup>^</sup>

Parameter	Unit	Number of Samples	Target Type	Compliant
<b>BOD</b>	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
<b>TSS</b>	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
<b>pH</b>	pH units	53	range	✓*
<b>DO</b>	mg/L	53	minimum	✓
<b>Conductivity</b>	µs/cm	53	long term 50th percentile	✓**
			maximum	✓
<b>Faecal Coliforms</b>	cfu/100 mL	53	median	✓
			80th percentile	✓

<sup>^</sup> 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 discharge to waters limits are not assessed and therefore 100% compliance with release to waters limits was achieved.

\* pH limits for discharge to land were exceeded nine times in the 2019-20 financial year. Please refer to the next page for further details.

\*\* Conductivity long term 50th percentile limits for discharge to land were exceeded once in the 2019-20 financial year. Please refer to the next page for further details.

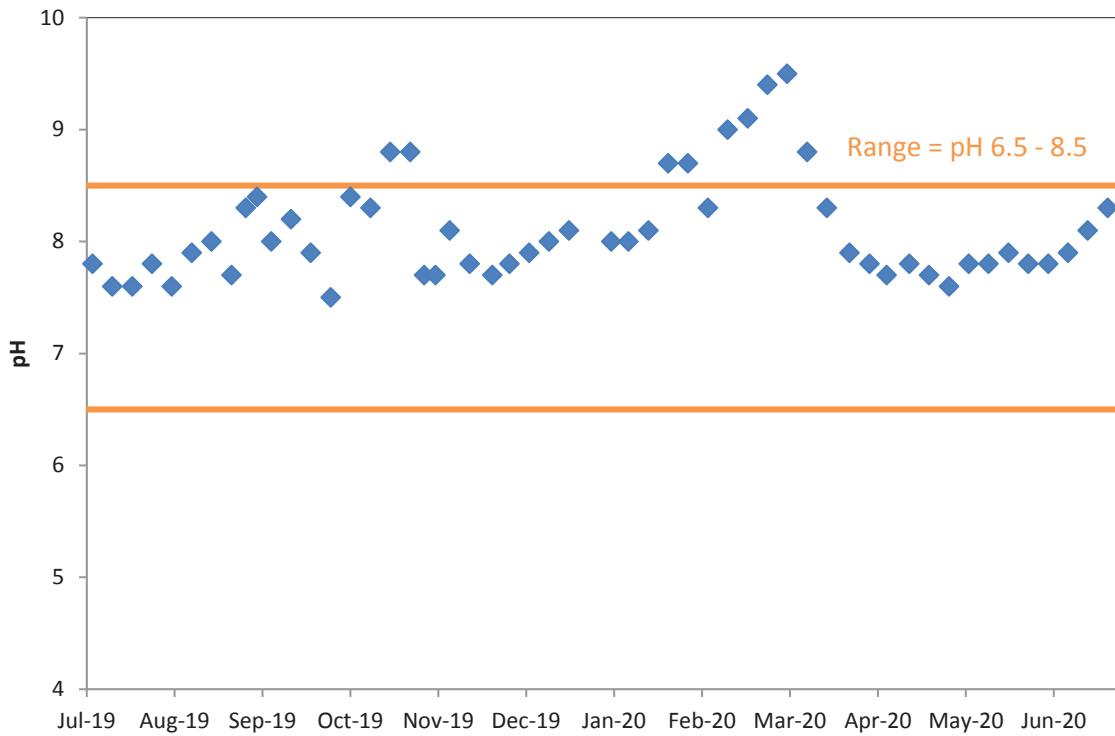
---

*Non-compliance*

**PH**

The pH limit was exceeded nine times in the financial year. pH limits were not met due to the impacts of algae in the facultative treatment lagoons. Unitywater's floating wetlands trial has so far demonstrated some pH impacts, improving pH compliance from 58% in the 2018-19 financial year to 83% in the financial year. Unitywater will continue to monitor the wetland's ability to control pH. To further enhance pH control an additional trial of Nualgi Diatomics is being investigated following the success of this technique for controlling algae in open bodies of water at other sites.

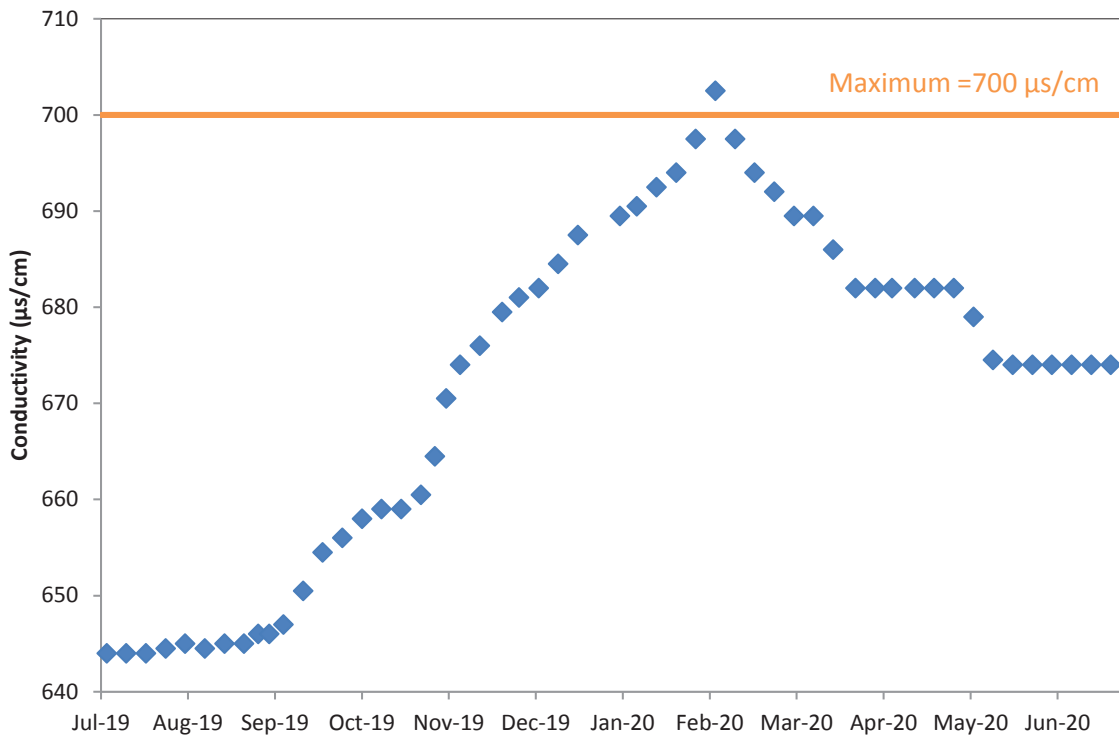
*Figure 15 – Kenilworth STP – pH*



## CONDUCTIVITY

The conductivity limit was exceeded once in the financial year. 98% compliance for conductivity was achieved in the 2019-2020 financial year. This is most likely due to reduced rainfall and following the summer rainfall the conductivity returned to compliance. A further trial of Nualgi Diatomics is being investigated following success of this technique for controlling algae in open bodies of water and may have a positive impact on the ammonia concentration that may contribute to the conductivity measurement.

Figure 16 – Kenilworth STP – Conductivity – Long term 50th Percentile





### 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	✓
<i>E. Coli</i>	cfu/100 mL	53	median	✓

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	✓
<i>E. Coli</i>	cfu/100 mL	53	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.

### 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	✓ *

\* 80th percentile Faecal Coliforms was exceeded four times in the 2019-20 financial year. Please refer to the next page for further details.

Table 17 – Maroochydore STP Mass Limits

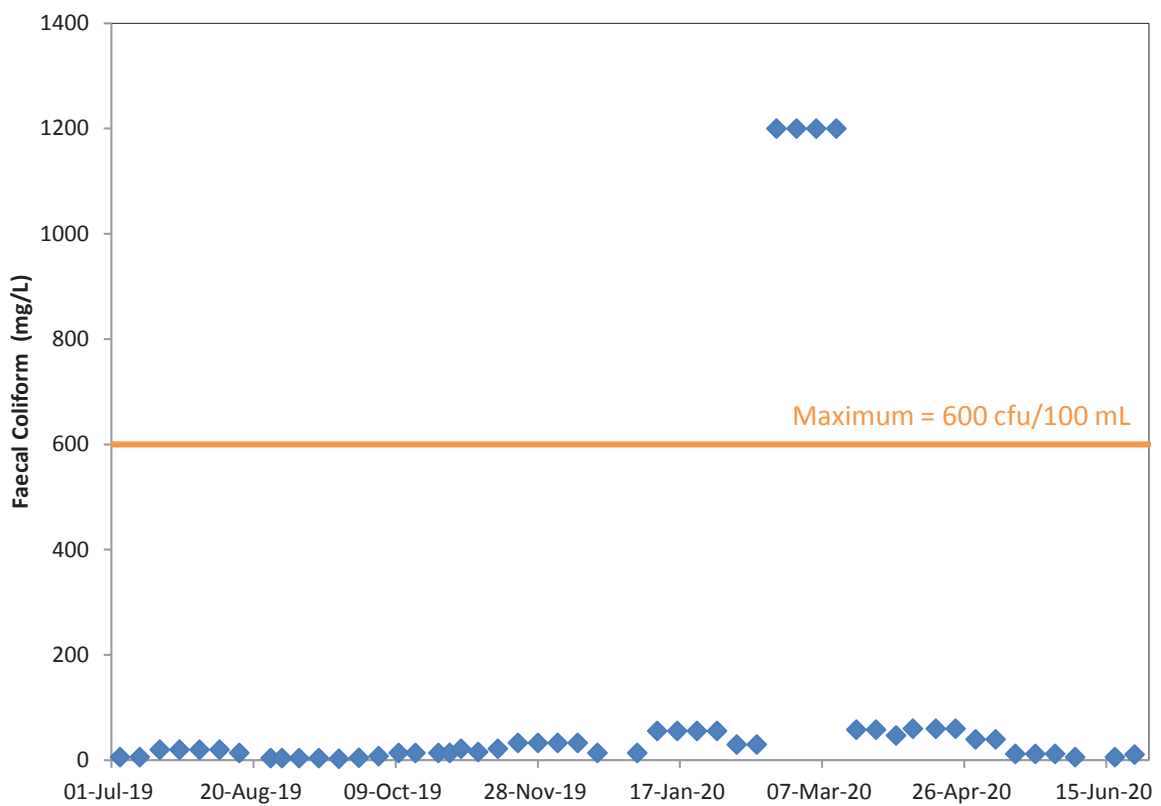
Parameter	Unit	Number of Samples	Limit Type	Compliant
Average Annual Flow	ML/yr	365	maximum	✓
Nitrogen Mass Load	kg/yr	53	maximum	✓
Phosphorus Mass Load	kg/yr	53	maximum	✓

*Non-compliance*

**FAECAL COLIFORMS**

80th percentile Faecal Coliforms was exceeded 4 times at Maroochydore Sewage Treatment Plant. This was due to wet weather impacting disinfection performance with 439mm of rainfall received over the weeks prior to and during this event. 92% compliance for 80th Percentile Faecal Coliforms was achieved.

*Figure 17 – Maroochydore STP – Faecal Coliforms – 80th Percentile*



### 3.11 Murrumba Downs Sewage Treatment Plant

Table 18 – Murrumba Downs STP Release Targets

Parameter	Unit	Number of Samples	Target Type	Compliant
BOD	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	✓
Ammonia Nitrogen	mg/L	53	maximum	✓
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	✓
Faecal Coliforms	cfu/100 mL	265	median	✓ *
			80th percentile	✓ *

\* Median Faecal Coliforms was exceeded six times and 80th percentile faecal coliforms was exceeded once in the 2019-20 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
<b>Dry Weather Flow</b>	ML/d	268	maximum	✓
			average	✓
<b>Volumetric Release</b>	ML/d	365	maximum on any one day	✓

Table 20 – Murrumba Downs STP Mass Limits

Parameter	Unit	Number of Samples	Limit Type	Compliant
<b>BOD</b>	kg/yr	53	annual load	✓
	kg/d		50th percentile load	✓
<b>TN</b>	kg/yr	53	annual load	✓
	kg/d		50th percentile load	✓
<b>TP</b>	kg/yr	53	annual load	✓
	kg/d		50th percentile load	✓

Exceedances

**FAECAL COLIFORMS**

The non-compliances are due to receiving a total of 749mm of rain during wet weather events in early 2020, brief periods of poor settling solids and a sampling error. 88% compliance was achieved for median Faecal Coliforms and 98% for 80th Percentile Faecal Coliforms.

Figure 18 – Murrumba Downs STP – Faecal Coliforms – Median

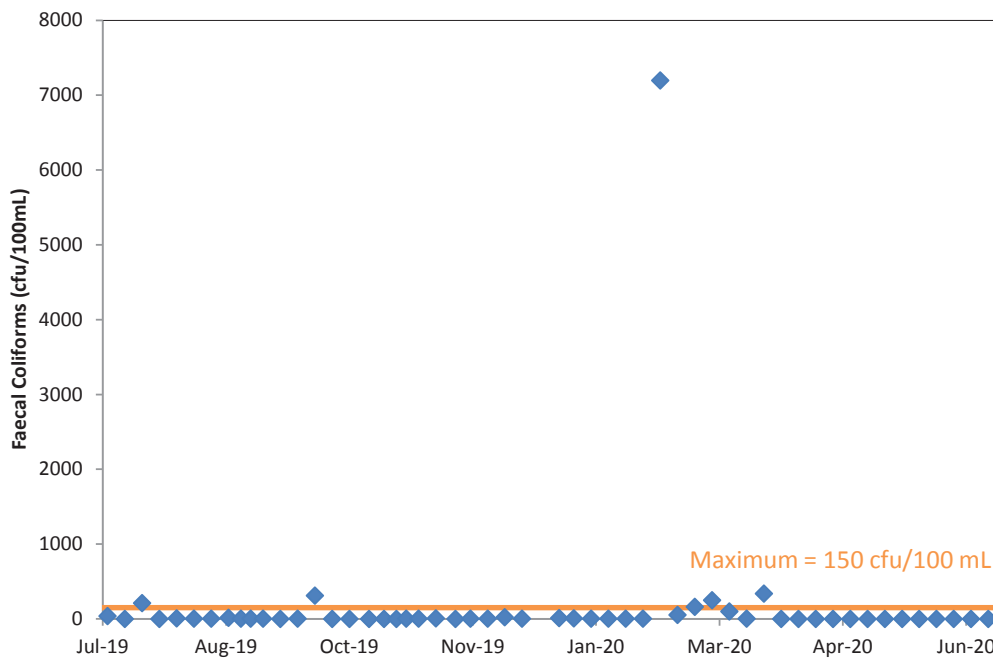
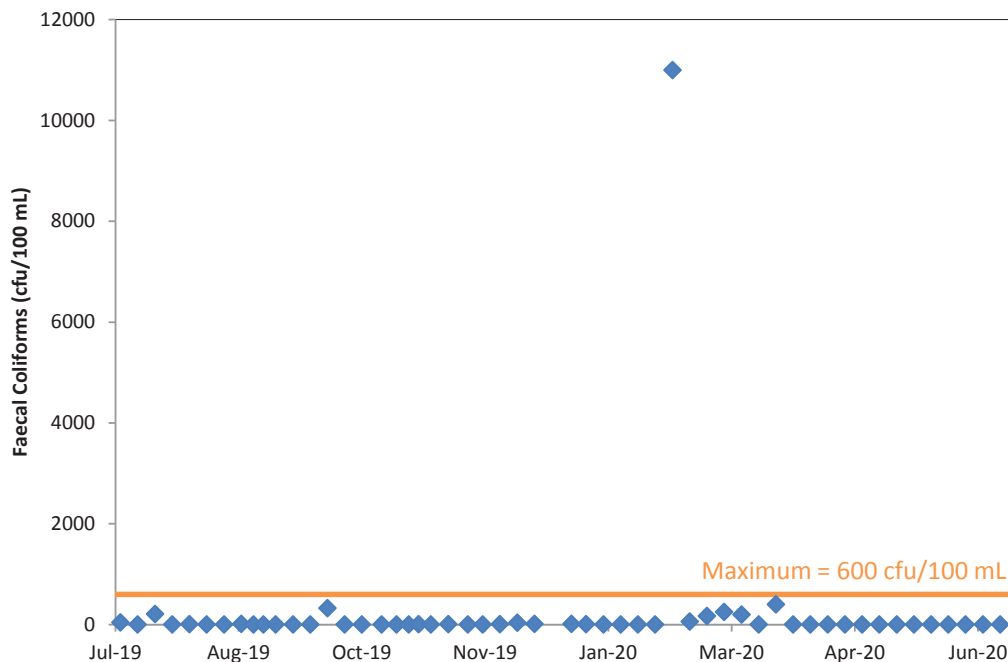


Figure 19 – Murrumba Downs STP – Faecal Coliforms – 80th Percentile



### 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 <sub>3</sub> -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	53	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	53	maximum	✓
			maximum	✓

Table 23 – Noosa STP Mass Limits

Parameter	Unit	Number of Samples	Limit Type	Compliant
Average Annual Flow	ML/yr	365	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
<b>BOD</b>	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
<b>TSS</b>	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
<b>pH</b>	pH units	53	range	✓
<b>DO</b>	mg/L	53	minimum	✓
<b>Free Chlorine Residual</b>	mg/L	53	maximum	✓
<b>Faecal Coliforms</b>	cfu/100 mL	265	median	✓*
			80th percentile	✓*

\* Median Faecal Coliforms was exceeded six times and 80th percentile Faecal Coliforms was exceeded once in the 2019-20 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
<b>Average Annual Flow</b>	ML/yr	365	maximum	✓
<b>Nitrogen Mass Load</b>	kg/yr	-	maximum	✓
<b>Phosphorus Mass Load</b>	kg/yr	-	maximum	✓

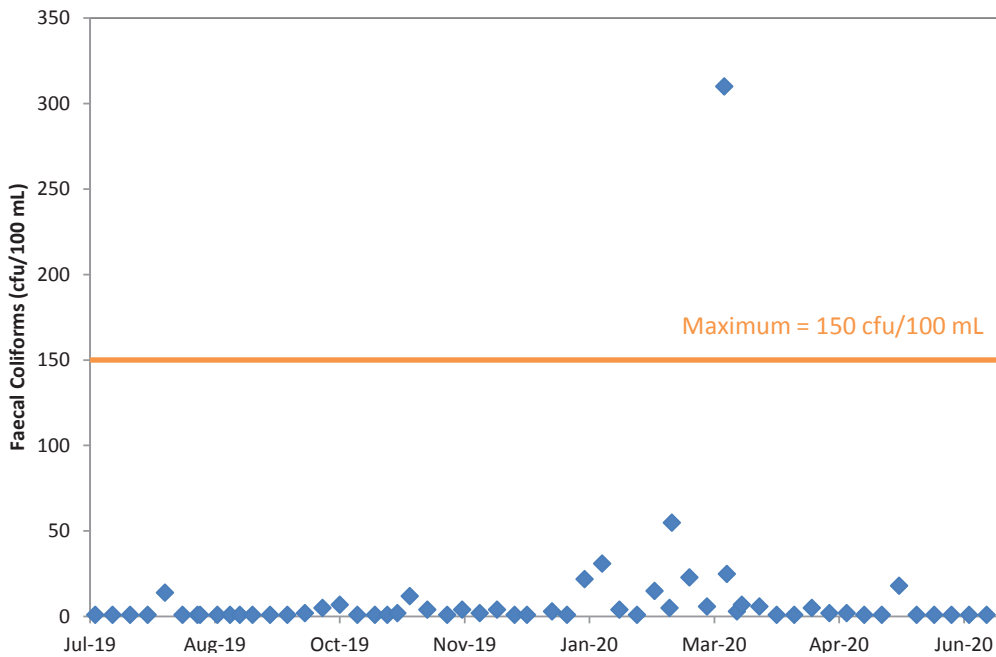


*Exceedances*

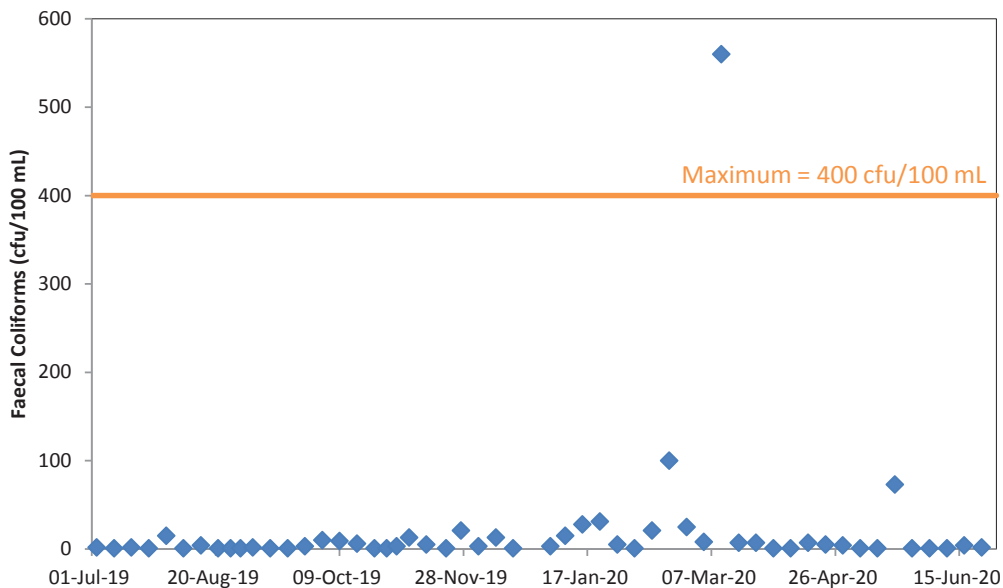
**FAECAL COLIFORMS**

The Faecal Coliform exceedances were a result of significant wet weather with 114mm in the seven days prior. Overall, 98% compliance was achieved for both median Faecal Coliforms and 80th percentile Faecal Coliforms.

*Figure 20 – Redcliffe STP – Faecal Coliforms – Median*



*Figure 21 – 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
<b>BOD</b>	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓
			maximum	✓
<b>TSS</b>	mg/L	53	long term 80th percentile	✓
			short term 80th percentile	✓*
			maximum	✓
<b>pH</b>	pH units	53	range	✓
<b>DO</b>	mg/L	53	minimum	✓
<b>Free Chlorine Residual</b>	mg/L	53	maximum	✓**
<b>Faecal Coliforms</b>	cfu/100 mL	265	median	✓***
			80th percentile	✓***

\* TSS Short Term 80th Percentile was outside of the compliance range once in the 2019-20 financial year. Please refer to the next page for further details.

\*\* Free Chlorine Maximum was outside of the compliance range once in the 2019-20 financial year. Please refer to the next page for further details.

\*\*\* Median Faecal Coliforms were exceeded three times and 80th percentile faecal coliforms were exceeded twice in the 2019-20 financial year. Please refer to the next page for further details.

Table 27 – South Caboolture STP Mass Limits

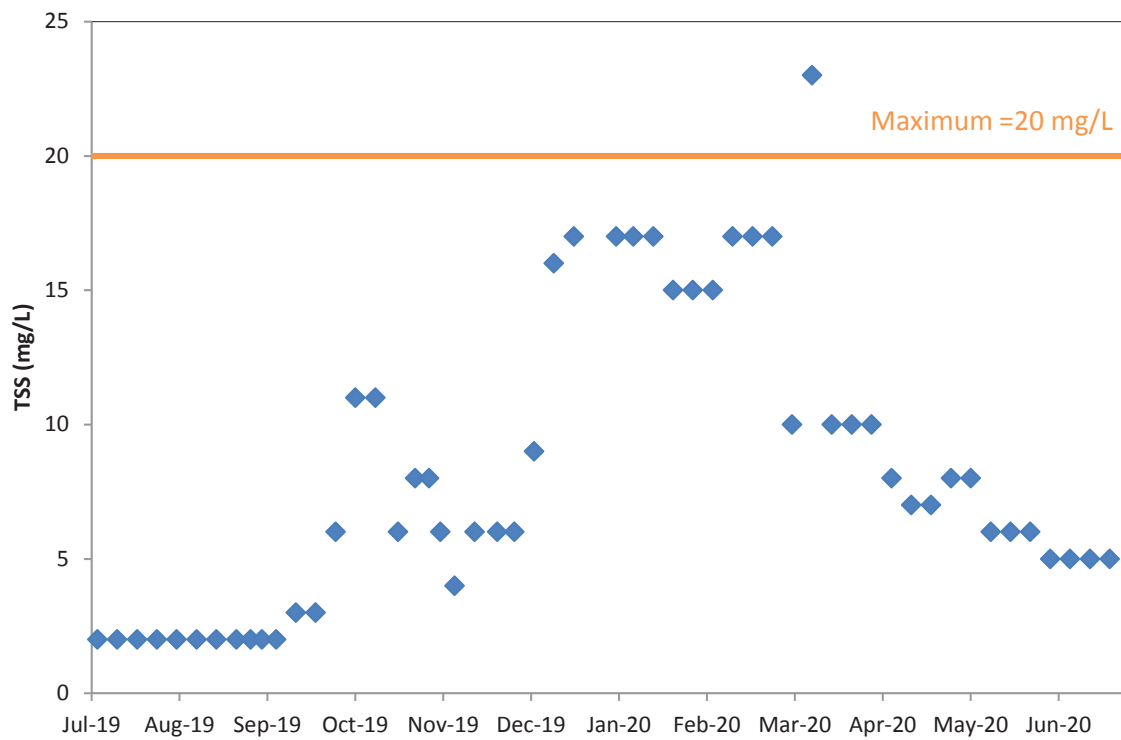
Parameter	Unit	Number of Samples	Limit Type	Compliant
<b>Average Annual Flow</b>	ML/yr	366	maximum	✓
<b>Nitrogen Mass Load</b>	kg/yr	-	maximum	✓
<b>Phosphorus Mass Load</b>	kg/yr	-	maximum	✓

Exceedances

TSS

TSS Short Term 80th Percentile was outside the compliance range once in the 2019-20 financial year at South Caboolture Sewage Treatment Plant due to a wet weather event with 115mm in the seven days prior. Overall 98% compliance with TSS Short Term 80th Percentile limits was achieved.

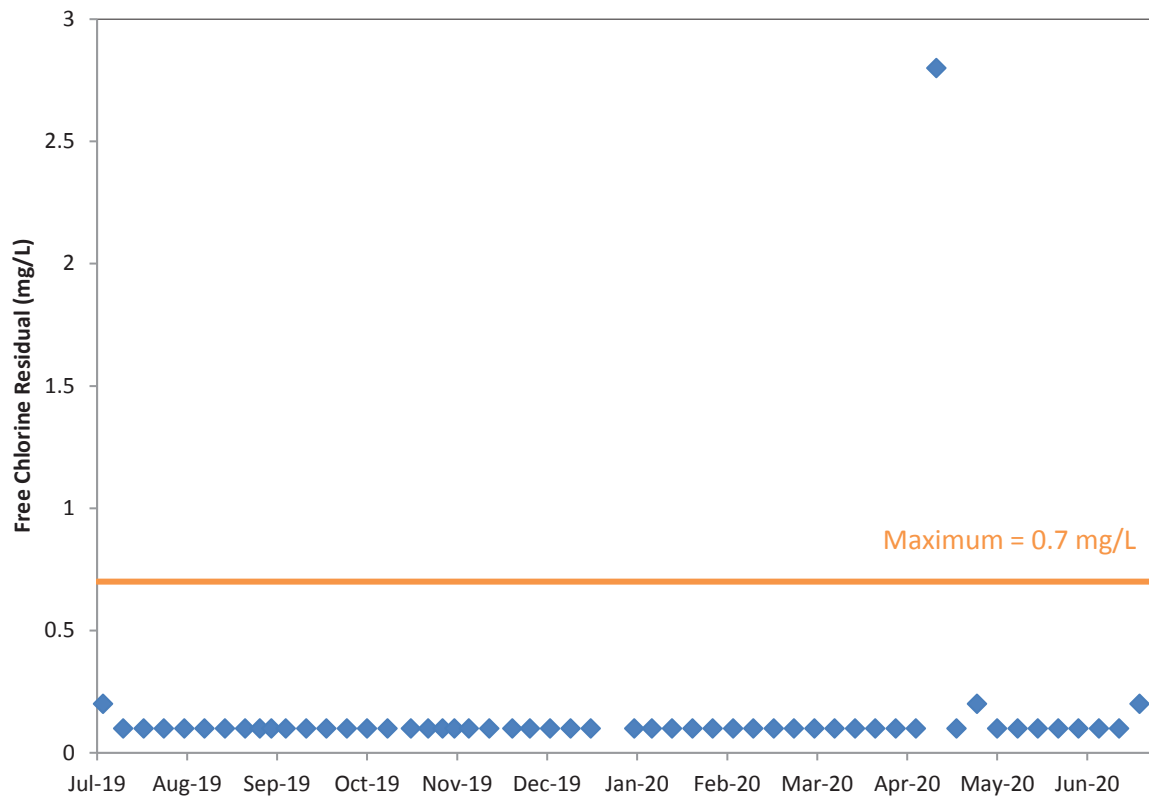
Figure 22 – South Caboolture STP – TSS – Short Term 80th Percentile



## FREE CHLORINE

Free Chlorine Maximum was outside the compliance range once in the financial year at South Caboolture Sewage Treatment Plant due to sample contamination where the result did not align with on-site readings. Overall 98% compliance with Free Chlorine Maximum limits was achieved.

Figure 23 – South Caboolture STP – Free Chlorine Residual – Maximum



## FAECAL COLIFORMS

The Faecal Coliform exceedances were a result of wet weather with events of 114.5mm prior to the two January events and 115mm in the seven days prior to the March event. Overall, 94% compliance was achieved for Median Faecal Coliforms and 96% compliance for 80th Percentile Faecal Coliforms.

Figure 24 – South Caboolture STP – Faecal Coliforms – Median

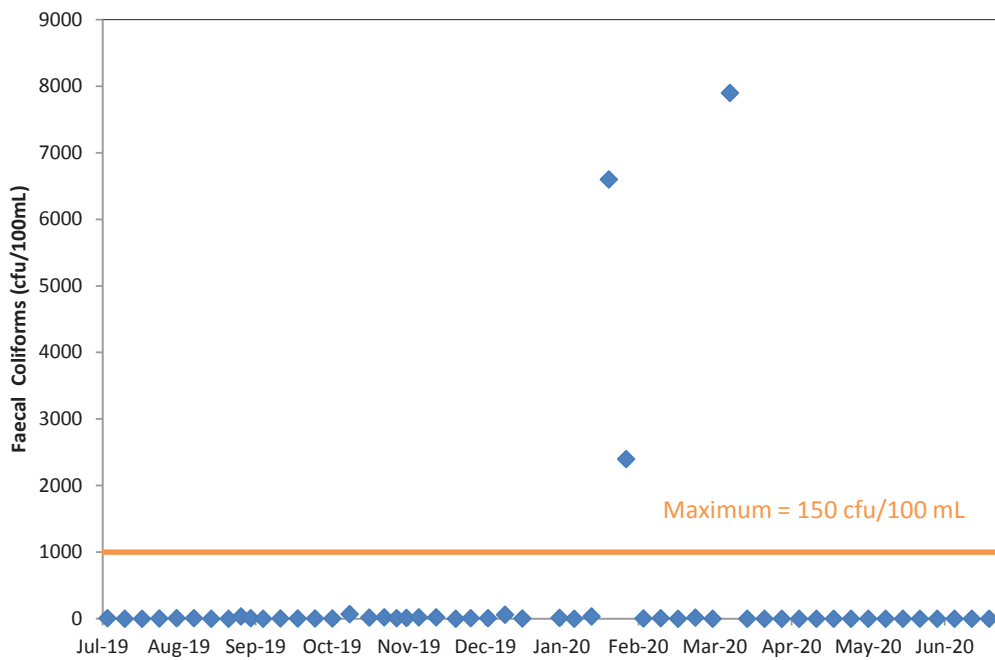
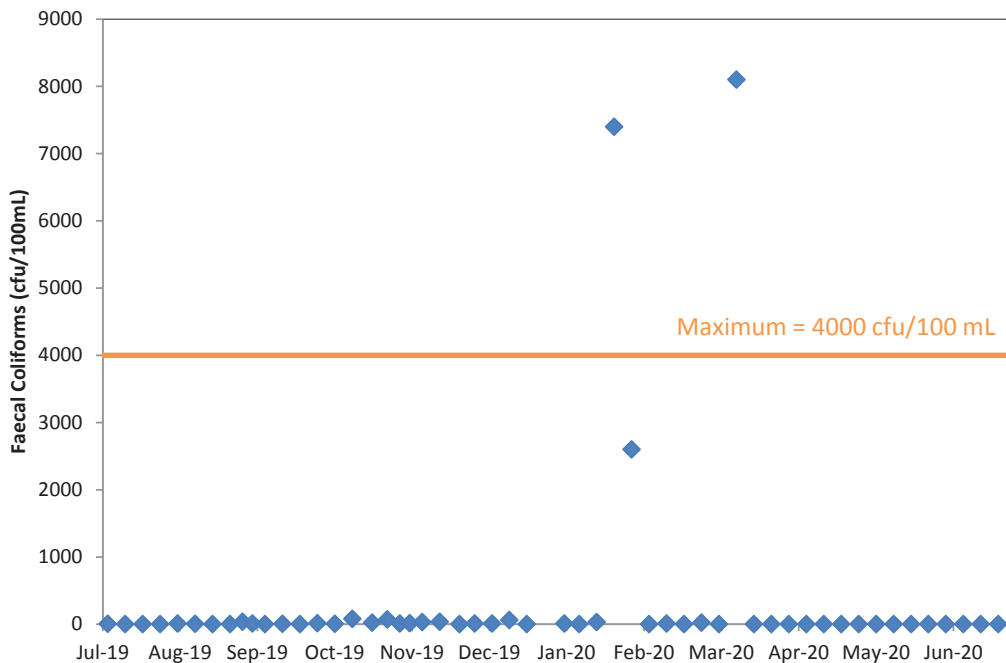


Figure 25 – South Caboolture STP – Faecal Coliforms – 80th Percentile



### 3.16 Woodford Sewage Treatment Plant

Table 28 – Woodford STP Release Targets

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

\* Free Chlorine Residual Maximum was exceeded once in the 2019-20 financial year. Please refer to the next page for further details.

\*\* Median Faecal Coliforms and 80th Percentile Faecal Coliforms were each exceeded once in the 2019-20 financial year. Please refer to the next page for further details.

Table 29 – Woodford STP Mass Limits

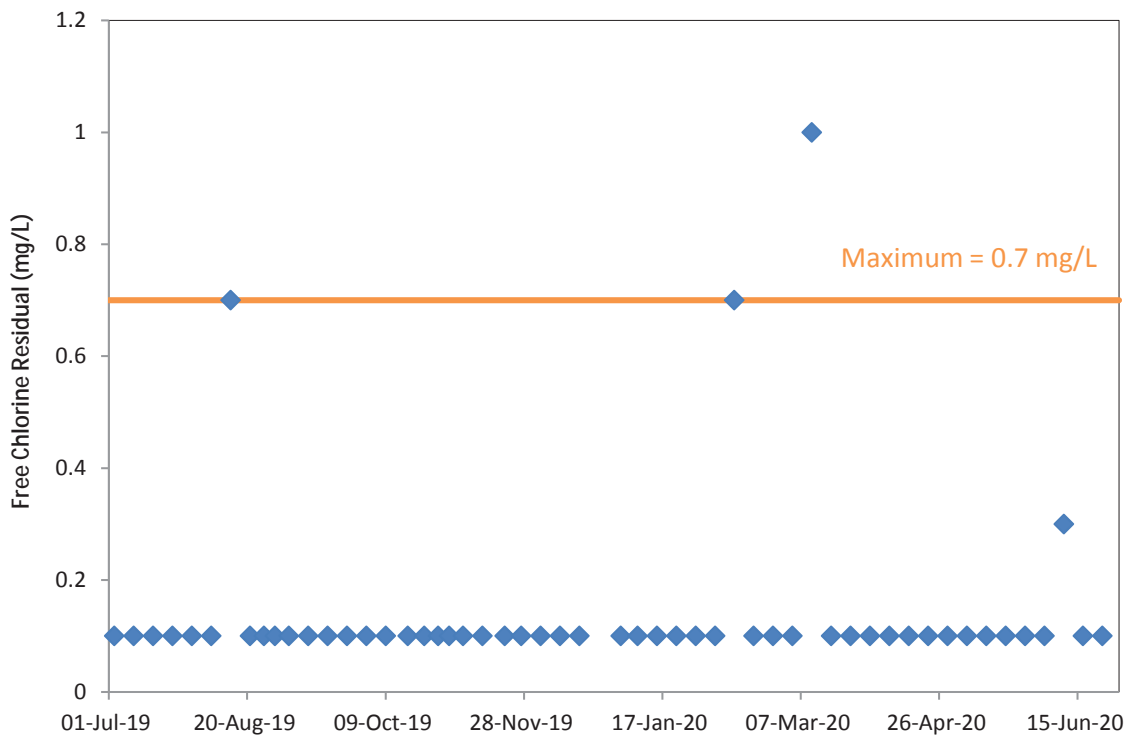
Parameter	Unit	Number of Samples	Limit Type	Compliant
<b>Average Annual Flow</b>	ML/yr	365	maximum	✓
<b>Nitrogen Mass Load</b>	kg/yr	-	maximum	✓
<b>Phosphorus Mass Load</b>	kg/yr	-	maximum	✓

*Exceedances*

**Free Chlorine**

Free Chlorine Maximum was exceeded once in the financial year at South Caboolture Sewage Treatment Plant. The short term excursion from compliance range was caused by wet weather with 103mm in the seven days prior to this event. Overall 98% compliance with Free Chlorine Maximum was achieved.

*Figure 26 – Woodford STP – TSS – Free Chlorine Residual Maximum*



## FAECAL COLIFORMS

The Faecal Coliform exceedances were caused during a short period when the disinfection system was being upgraded. 98% compliance for median and 80th Percentile Faecal Coliforms was achieved.

Figure 27 – Woodford STP – Faecal Coliforms – Median

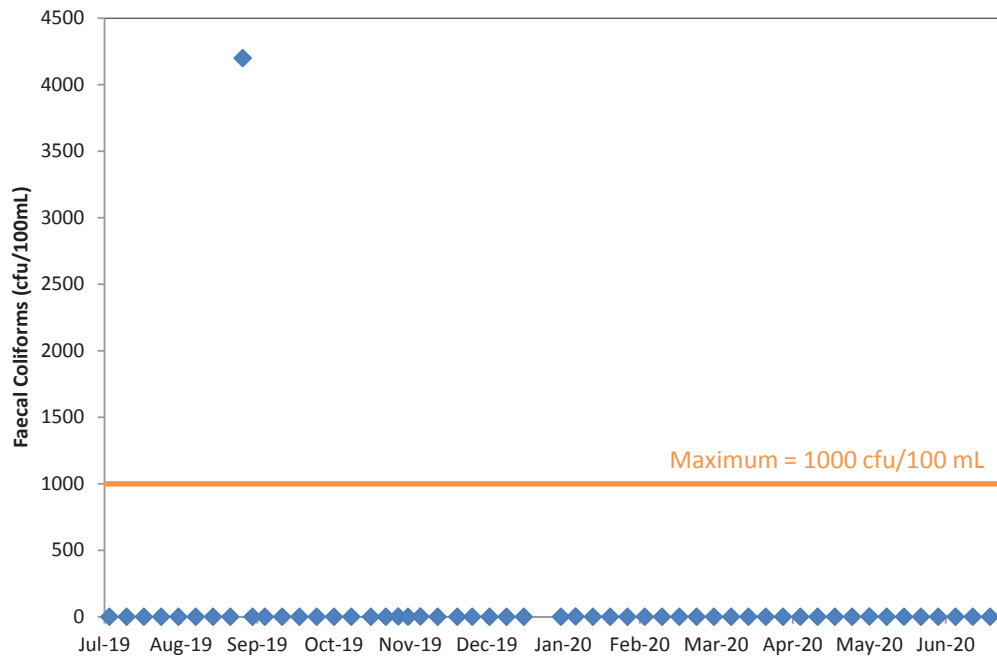
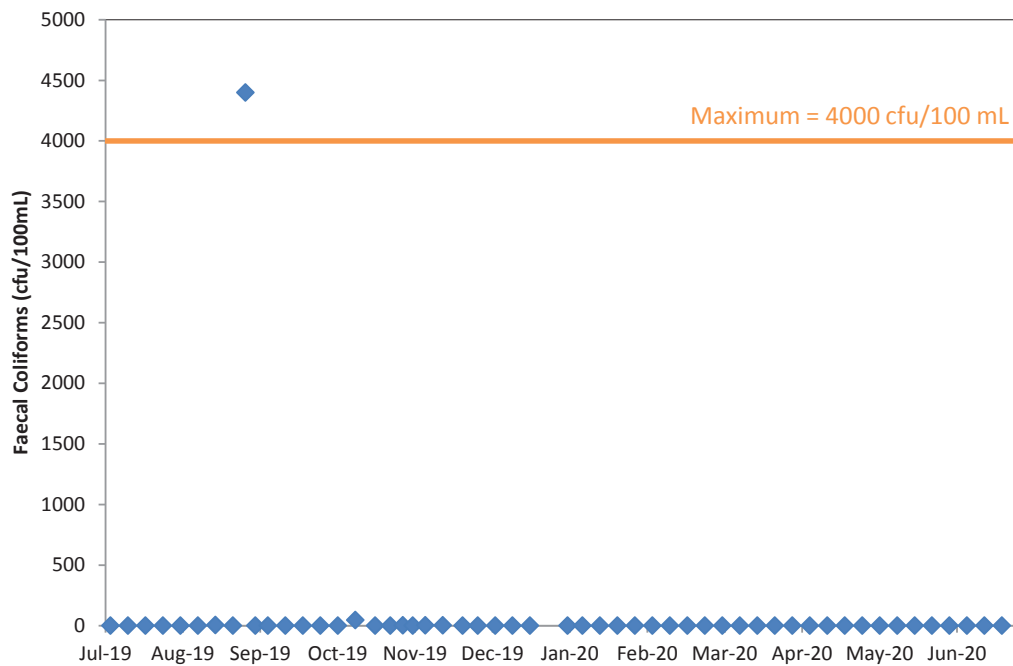


Figure 28 – Woodford STP – Faecal Coliforms – 80th Percentile





## 4. Definitions and Legend

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

Table 30 – Acronyms and Definitions

Acronym	Term	Definition
<b>BOD</b>	biochemical oxygen demand after five day test	The amount of dissolved oxygen needed by aerobic organisms to break down organic material.
<b>BNR</b>	biological nutrient removal	A biological process used for nitrogen and phosphorous removal from sewage.
<b>DES</b>	Department of Environment and Science	
<b>DO</b>	dissolved oxygen	Gaseous oxygen that is mixed in water and is available to aquatic organisms for respiration.
<i>E. coli</i>	<i>Escherichia coli</i>	Used as an indicator of pathogenic organisms that may cause diseases.
<b>IDEA</b>	intermittent decanted extended aeration	A three-stage wastewater treatment process that involves aeration, settling and decanting.
<b>NH<sub>3</sub> – N</b>	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.
<b>SBR</b>	sequential batch reactors	A draw-and-fill biological treatment process that uses aerobic microorganisms to break down and treat wastewater.
<b>TN</b>	total nitrogen	The sum of nitrate, nitrite and ammonia in water. These are removed in order to maintain the health of waterways and prevent environmental issues such as eutrophication.
<b>TP</b>	total phosphorus	The sum of phosphorus compounds. These are removed in order to maintain the health of waterways and prevent environmental issues such as eutrophication.
<b>TSS</b>	total suspended solids	Total amount of solid particles that remain suspended within the wastewater.
<b>UV</b>	ultraviolet	A technology using radiation that disinfects wastewater.
	faecal coliform	Used as an indicator of pathogenic organisms that may cause diseases.
<b>pH</b>		A figure expressing the acidity or alkalinity of the water

Table 31 – Definition of Units

Units	Definition
µs/cm	microsiemens 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 32 – Legend

Symbol	Compliance value
✓	> 90%
✓	80% - 90%
✗	< 80%



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33 King Street, Caboolture QLD 4510

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