Unitywater

Serving you today, **investing in tomorrow.**

Drinking Water Quality Management Plan

ANNUAL REPORT 2018-2019


5 mL

Contents

1. Unitywater at a glance

Unitywater provides water and sewerage services to the Moreton Bay, Sunshine Coast and Noosa local authority regions.

Unitywater operates and maintains more than $3.4 billion of water and sewerage infrastructure, supplying services to residential and business customers across 5223 square kilometres.

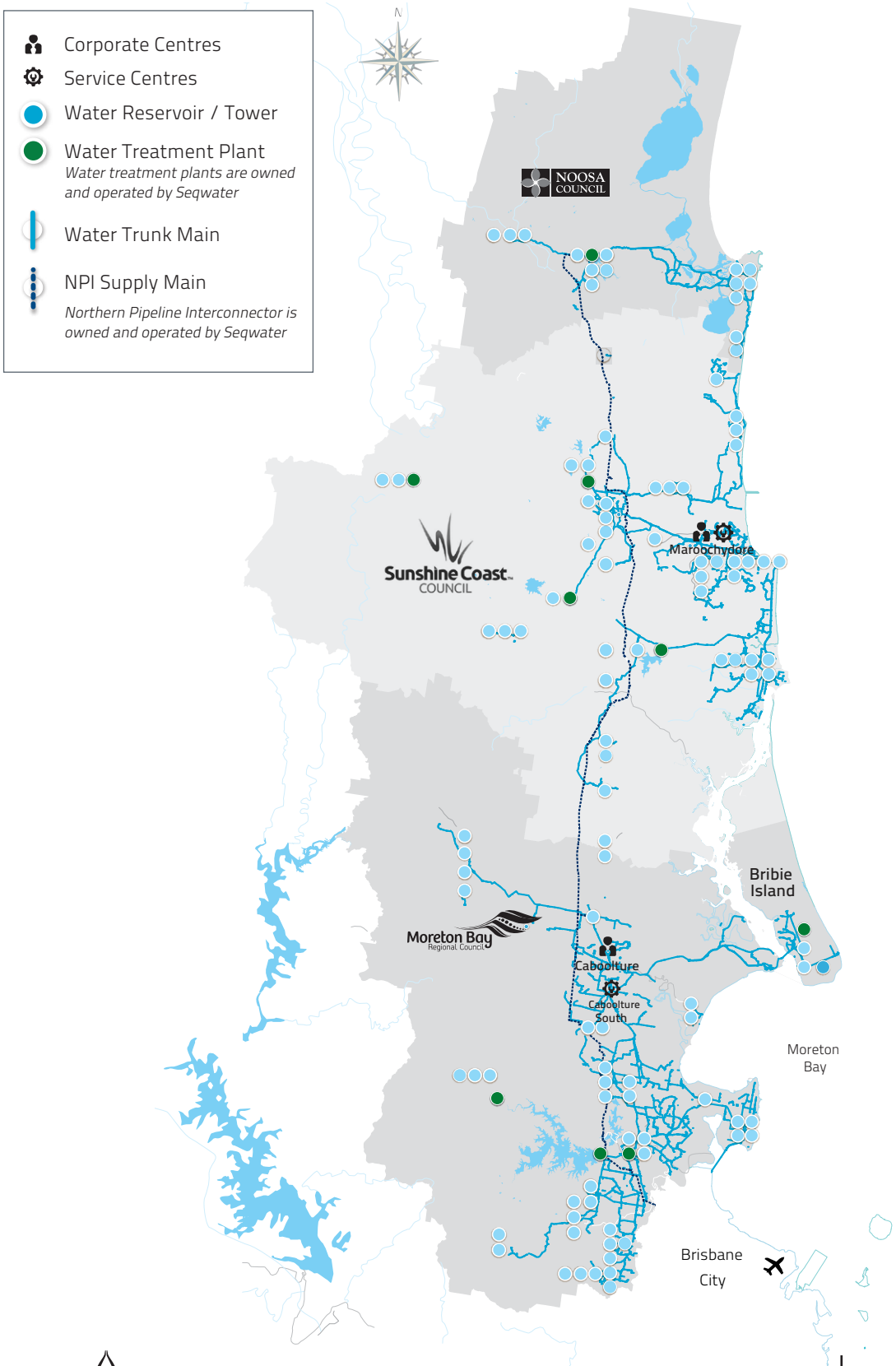
103
reservoirs

57,803 ML
of water supplied to
328,318
customers connections

Serviced customers with
6091 KM
of water mains

This report aligns with the *Water Supply (Safety and Reliability) Act 2008* requirements under Section 142(3). For further details on alignment, please see Appendix A.

2. Our supply area



3. Where we sit in the grid

The South-East Queensland water grid connects the water supplies from Noosa and the Sunshine Coast, through greater Brisbane and down to the Gold Coast.

This arrangement allows Seqwater to move treated 'bulk' drinking water from one area to another, reducing the risk of any single source being used up (i.e. during drought conditions). For more detail on the bulk water supply network, go to:
seqwater.com.au/water-supply/supply-network

Seqwater
Seqwater manage the catchments, dams and production of bulk drinking water for the SEQ region

Unitywater
Unitywater distributes water to the Noosa, Sunshine Coast and Moreton Bay council areas.

Queensland Urban Utilities
Queensland Urban Utilities distributes water to the Brisbane, Ipswich, Lockyer Valley, Scenic Rim and Somerset council areas.

City of Gold Coast

Redland City Council

Logan City Council

4. Water supply sources

Unitywater purchases bulk treated water from Seqwater. Seqwater is responsible for management of 'raw water' (the lakes and dams), the water treatment plants (WTPs) and the delivery of treated 'bulk' water to the bulk supply points, from where Unitywater is responsible for the management and delivery of this water to our consumers.

Please direct any queries on water sources or treatment to Seqwater seqwater.com.au/contacts

Treated drinking water enters the Unitywater network either directly from a WTP or via the major pipeline called the Northern Pipeline Interconnector (NPI). The NPI was built by the Queensland Government to provide long term water supply and security to the Brisbane and Sunshine Coast regions. The NPI allows water to be transferred between the Sunshine Coast, Moreton Bay and Brisbane Council, and is owned and operated by Seqwater.

The NPI flow direction is dependent on source water availability and regional demand and negotiated between Seqwater and the Distribution Retail Entities (Unitywater, Queensland Urban Utilities, Logan City Council, Redland City Council, and Gold Coast City Council).

The Unitywater service area during the 2018-19 financial year had five supply regions, which are then broken down into 14 schemes. These regions include:

- Dayboro – Dayboro
- Kenilworth – Kenilworth
- NPI North (Northern Grid) – Noosa, Maroochy North (South Maroochy River), Maroochy South, Caloundra Coastal, Caloundra Railway Towns, Maleny
- Pine Rivers North (Petrie) – Pine Rivers North
- NPI South (Southern Grid) – Caboolture, Bribie Island, Woodford, Redcliffe, Pine Rivers South.

DAYBORO

This includes the Dayboro township and surrounds that receive reticulated water.

General operation:
This area is normally supplied from the Dayboro WTP operated by Seqwater.

- The Dayboro WTP treats water extracted from bores located in the North Pine River and supplies the Dayboro region.
- Dayboro is not connected to the South East Queensland water grid. Water can be imported via water tankers if necessary.

KENILWORTH

This includes the Kenilworth township and surrounds that receive reticulated water.

General operation:
This area is normally supplied from the Kenilworth WTP operated by Seqwater.

- The Kenilworth WTP treats water extracted from bores located in the Mary River and supplies the Kenilworth region.
- Kenilworth is not connected to the South East Queensland water grid. Water can be imported via water tankers if necessary.

PINE RIVERS NORTH

This includes North Lakes, Murrumba Downs, Kallangur and surrounding suburbs that receive reticulated water.

Prior to March 2018, the Petrie WTP was the sole source of water to these areas. Throughout March and April 2018, these areas were transitioned to the new grid-connected supply. In future, this region will be grouped together with the south region for referencing purposes.

General operation:

- This area is normally supplied from the North Pine WTP, which treats water from North Pine Dam and supplies the Pine Rivers North region via the NPI.

NORTH

This includes all areas within the Sunshine Coast and Noosa councils that receive reticulated water, i.e. Caloundra, Maleny, Maroochy North, Maroochy South, Noosa and Railway Towns (excluding Kenilworth).

General operation:
This area is normally supplied from the Lake Macdonald, Image Flat and Landers Shute WTPs with supplementary supply via the NPI - Stage 2.

- The Lake Macdonald WTP treats raw water from Lake Macdonald and the Mary River to supply the Noosa area (includes Pomona and Cooroy).
- The Image Flat WTP treats raw water from Cooloolabin Dam, Wappa Dam and Poona Dam to supply the Maroochy North area. Bli Bli and Coolum zones are supplemented by the Nambour NPI - Stage 2.
- The Landers Shute WTP treats raw water from Baroon Pocket Dam and supplies the Maroochy South, Maleny, Caloundra and Railway Towns area.
- The Ewen Maddock WTP treats raw water from Ewen Maddock Dam and supplies the Caloundra area.

SOUTH

This includes all areas within the Moreton Bay Regional Council that receive reticulated water, i.e. Bribie Island, Caboolture, Redcliffe, Pine Rivers South and Woodford (excluding Dayboro).

General operation:

- North Pine WTP treats water from North Pine Dam and supplies the Redcliffe and Pine Rivers South region via the NPI. The Woodford, Caboolture and Bribie areas are supplied primarily by North Pine WTP, with supplementary feed from Landers Shute WTP via the NPI.

YOUR SUBURB AND ITS WATER SUPPLY REGION

To find out more about the water supply and quality in your area, go to this link and use your postcode to view the annual water quality results.
unitywater.com/about-us/our-business/water-quality

5. Water quality summary

In 2018-19, Unitywater collected approximately 7000 drinking water samples and performed over 75,000 water quality tests. Out of these 75,000 tests, only two results exceeded a health-based guideline value. Our detailed performance summaries, including information on the two health-based guideline value exceedances, are provided in the following sections.

5.1 Drinking Water Quality Performance Snapshot

The table below briefly summarises drinking water performance across three categories, by each supply region: microbiological, chemical (health) and chemical (aesthetic) performance in accordance with regulatory compliance requirements under the *Public Health Regulation 2018*.

Microbiological performance is said to have met the performance requirement if more than 98% of samples from the supply region over a 12-month period returned a nil result for *E. coli*.

Chemical (health) performance is said to have met the performance requirement if the 95th percentile for each chemical over a 12-month period is below the Australian Drinking Water Guidelines health value for that chemical.

Chemical (aesthetic) performance is said to have met the performance requirement if the average result for each chemical over a 12-month period is below the Australian Drinking Water Guidelines aesthetic value for that chemical.

Please see Appendix B for further detail on our drinking water quality chemical performance against health and aesthetic guideline values.

Supply region	Microbiological performance	Chemical (health) performance	Chemical (aesthetic) performance
Dayboro	✔	✔	✔
Kenilworth	✔	✔	✔
Northern Grid	✔	✔	✔
Pine Rivers North	✔	✔	✔
Southern Grid	✔	✔	✔

5.2 Microbiological performance in detail

The table below summarises our microbiological performance against the requirements of the *Public Health Regulation 2018:*

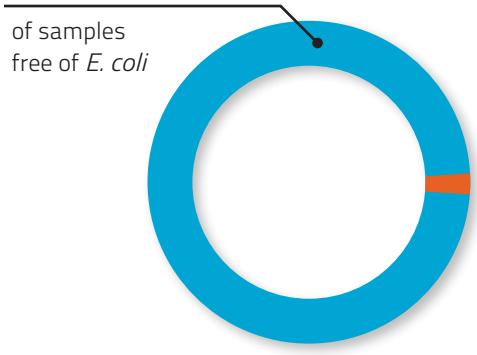
Supply region	Number of *E. coli* samples tested	Number of positive *E. coli* results	Required performance (PHR*)	Actual performance	Met PHR?
Dayboro	99	0	98%	100%	✔
Kenilworth	139	1	98%	99.28%	✔
Northern Grid	1691	0	98%	100%	✔
Pine Rivers North	401	0	98%	100%	✔
Southern Grid	1639	0	98%	100%	✔
Overall	3969	1	98%	99.97%	✔

** PHR = Public Health Regulation (2018).*

MICROBIOLOGICAL REGULATORY COMPLIANCE REQUIREMENT

>98%

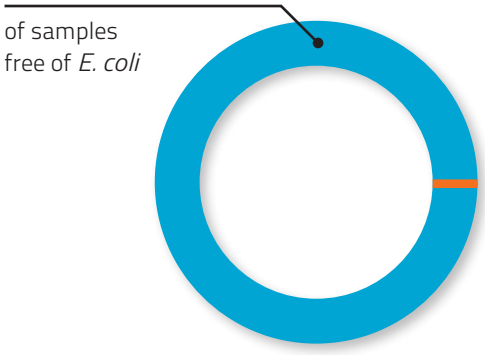
of samples free of *E. coli*



OUR 2018-19 PERFORMANCE

99.97%

of samples free of *E. coli*



Negative

Positive

5.3 Notifications to the Regulator

This year saw a reduction in the number of notifications to the Water Supply Regulator (the Regulator) in comparison to last year. Under sections 102 and 102A of the *Water Supply (Safety and Reliability) Act 2008* Unitywater is required to immediately inform the Regulator if there are any instances where the Australian Drinking Water Guidelines (ADWG) have not been met.

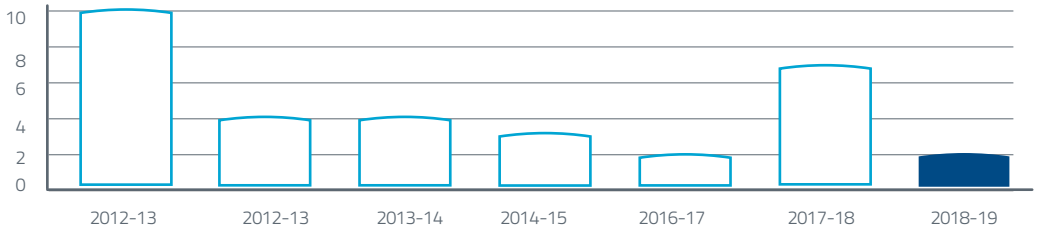
Summary of notifications

During the 2018-19 financial year there were two instances where the Regulator was notified under sections 102 or 102A of the Act.

- 1 notification involved an elevated total chlorine result
- 1 notification involved a detection of *E. coli.*

Additional detail on the individual notifications has been provided below.

TOTAL NOTIFICATIONS TO THE REGULATOR
from 2012-13 to 2018-19



Detailed description of the two notifications

On 7 November 2018, an elevated total chlorine result was detected by our Scientific Services sampling team during the routine verification monitoring program sampling run. The sample result was 5.7mg/L total chlorine, which is above the ADWG health guideline value of 5mg/L. This was located at the Bellara reservoir inlet sample tap. Our Network Engineering team was notified on 8 November, and an immediate investigation took place. It was found that no other sample tap in the area recorded an elevated result in the same time period, and there were no known issues at the Bellara reservoir. The online analyser verified the total chlorine level was 1.72mg/L. It was concluded that this elevated chlorine result was not a true reflection of water quality in the drinking water network. All analysers on site were checked and the Scientific Services team calibrated all field equipment.

On 3 January 2019, *E. coli* was detected in a routine drinking water sample located at a distribution sample tap in Kenilworth. The result was 1 MPN/100mL with a free chlorine result of 0.79 mg/L. Testing and verification of the surrounding network determined there were no other *E. coli* detected with good levels of disinfectant through the Kenilworth network. The investigation concluded it was not a systemic issue and overhanging vegetation and rain on the day of sampling attributed as a possible contributing factor to the *E. coli* detection.

6. Customer enquiries related to water quality

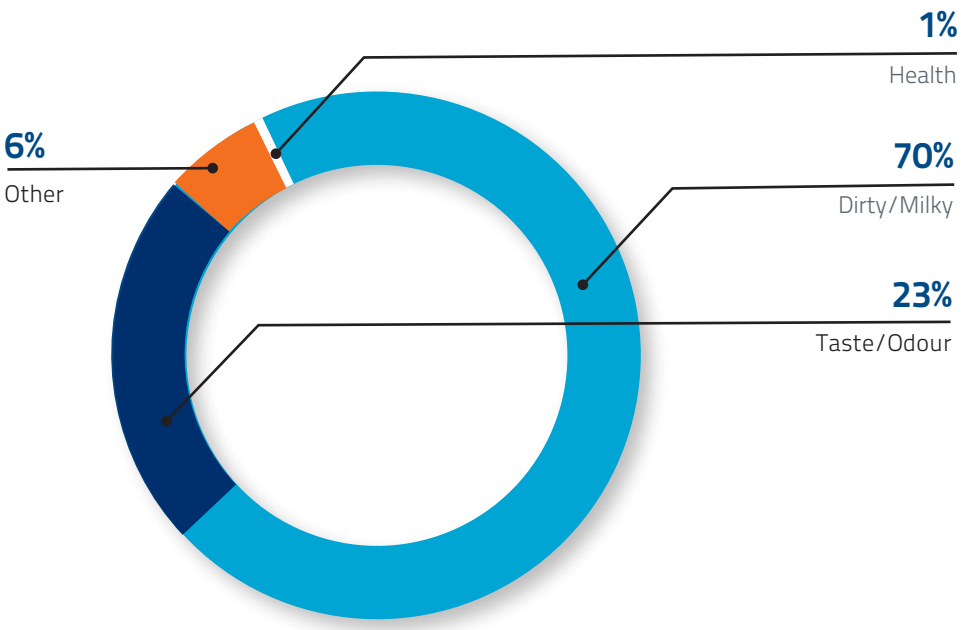
Feedback from our customers through our contact centre and social media pages is an important part of alerting us to issues in the drinking water network.

We track all water quality enquiries through our contact centre and Network Operations control room. Tracking water quality enquiries allows us to continually improve our services to our customers.

In total, 493 water quality customer enquiries were received for the financial year 2018-19. From this, 11 progressed through to a complaint. Our water quality enquiries are categorised into one of four common areas: Dirty/milky, taste and odour, health and other.

To improve our efficiencies in the field when responding to water quality customer enquiries, a water quality enquiries cluster tool has been developed. This assists our Network Operations and Control Room teams in identifying a water quality event through multiple enquiries in the same area. Appendix C contains more details on each of these water quality events which occurred in 2018-19.

WATER QUALITY ENQUIRIES



HEALTH CUSTOMER ENQUIRIES:

1% (five in total) of our water quality customer enquiries were related to health and illness. In each case, an investigation was carried out and a crew attended site to confirm water quality at the residence. The investigations concluded that the drinking water was not the cause of the health enquiry.

DIRTY/MILKY CUSTOMER ENQUIRIES

70% of our water quality customer enquiries were categorised as dirty/milky. This is where a customer may experience discoloured water which is either brown in appearance through disruption of sediment, or cloudy and white which is trapped air in the mains. Through our investigation process, it was found that network activity and maintenance work, both planned and unplanned, had caused the majority of the dirty/milky occurrences. In most instances, a crew was sent out to flush the affected area. In some cases, internal plumbing issues were the contributing factor, and Unitywater provided advice to our customers to assist them in rectifying their internal plumbing issue.

TASTE AND ODOUR CUSTOMER ENQUIRIES

23% of our water quality customer enquiries were categorised as taste and odour. This is where a customer may experience an unusual taste or smell compared with their usual experience of drinking water. Most taste and odour enquiries received in the 2018-19 financial year were attributed to either chlorine or earthy and musty characteristics. During the warmer months in 2018, the source water treated by Seqwater experiences algae blooms. These algae blooms can then affect the taste and odour of our drinking water in the Unitywater network. Seqwater has worked hard to reduce the occurrence of these algae blooms, but unfortunately sometimes this still affects our customers. Where required, flushing of the water mains was carried out by our crews to improve taste and odour.

OTHER

6% of our water quality enquiries were categorised as other. This category is used to capture enquiries which may not fit into the above categories, but are water quality in nature and require attention from our Network Operations team.

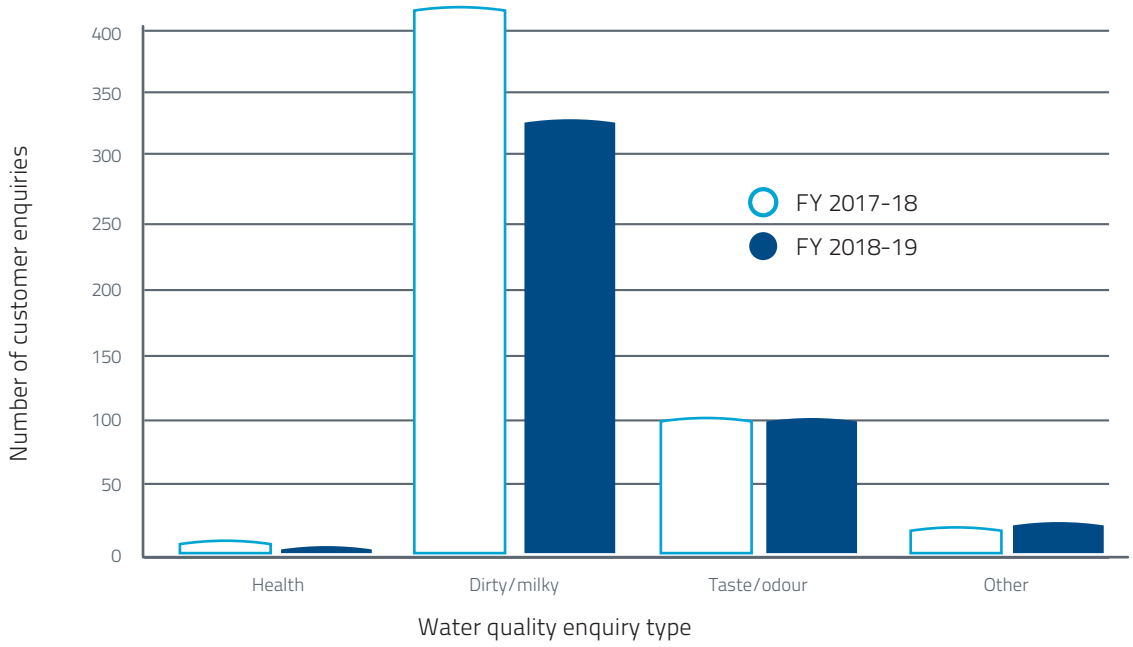
The following table shows a breakdown of the water quality customer enquiries received through the 2018-19 financial year. The number of enquiries have also been normalised against the population of each region, to give a per 1000 customers figure.

	Water quality enquiry type						
Water supply region	Health	Dirty/ milky	Taste/ odour	Other	Grand total	Connected population (estimated)*	Per 1000 customers**
NPI South	3	187	51	12	253	373,403	0.68 ↑
NPI North	2	113	51	15	181	429,047	0.42 ↓
Dayboro	0	0	0	0	0	2073	0.00 –
Kenilworth	0	0	0	0	0	762	0.00 –
Pine Rivers North (Petrie)	0	36	10	2	48	91,986	0.52 ↓
Total	5	336	112	29	482	897,271	0.54 ↓

*Connected population is based on residential and non-residential customers

**Arrow indicates performance compared to previous FY 2017-18

The following graph shows our 2018-19 performance compared to the previous year.



7. Managing safe drinking water

Our Drinking Water Management System (DWMS) is how we deliver on our commitment to providing safe and reliable drinking water. This is described in our approved DWQMP as required under the *Water Supply (Safety and Reliability) Act 2008*.

To further support achieving our commitment, our DWMS is independently certified to ISO 22000:2018 Food Safety Management Systems. By maintaining this certification, we are providing assurance to our customers, consumers and community that our drinking water is a food grade product.

7.1 Actions taken to implement the DWQMP

Implementing the DWQMP involves multiple activities under our DWMS, some of which are described in other sections of this report. Key implementation activities include:

SAFE WATER STEERING GROUP

In pursuit of continual improvement, we revised our water quality governance approach and formed the Safe Water Steering Group. The purpose of this Steering Group is to provide strategic oversight and direction in meeting Unitywater's commitment to ensuring delivery of safe drinking water to our customers, contained within Unitywater's Drinking Water Quality Policy. In support of this objective, the steering group also oversees implementation of the approved DWQMP and ISO 22000.

DWQMP UPDATES

During 2018-19, the DWQMP was updated under Section 99a of the *Water Supply (Safety and Reliability) Act 2008*. The updated DWQMP (version 9a), submitted in June 2019 included:

- infrastructure changes in the Pine North water supply scheme. In April-May 2018, the Petrie WTP was decommissioned, and the drinking water scheme transitioned from free chlorine disinfectant to a chloramine supply
- improvement outcomes from the ISO 22000 recertification audit
- improvement outcomes from the DWMS review activity.

ISO 22000 RECERTIFICATION AUDIT

We view the drinking water we provide to our consumers as a food source and, in pursuit of industry leading practice, our DWMS is independently certified to ISO22000:*2018 Food Safety Management Systems*. This year we underwent a full recertification audit by our external management system auditors to ensure continued compliance of our DWMS with the requirements of the international standard. We were assessed as maintaining a compliant system and have been successfully recertified for a further three years.

7.2 Audit and DWQMP Review Outcomes

No DWQMP audit was conducted or required during the reporting period 1July 2018 to 30 June 2019. The next regulatory audit of the DWQMP is scheduled to be completed by 5 April 2021. The next revision of our DWQMP is due to be completed by 5 April 2020.

8. Improving our drinking water quality

We're continually challenging ourselves to improve and innovate in the way we manage your drinking water. Following are some of the initiatives, projects, plans and activities we have progressed in pursuit of keeping our communities healthy through improved delivery of safe drinking water.

DRINKING WATER MANAGEMENT SYSTEM REVIEW

Our DWMS is a structured framework of policies, processes and procedures that guides management and provision of safe drinking water. A detailed internal review of the DWMS was conducted against the Australian Drinking Water Guidelines to assess alignment and effectiveness. Several opportunities for improvement were identified, with delivery of an action plan already underway.

SCIENTIFIC SERVICES LABORATORY – IMPROVED IN-HOUSE CAPABILITY

Our Scientific Services Laboratory team has been working on method development for our new Gas Chromatography with an Electron Capture Detector instrument (GC-ECD). This will give us the ability to quickly analyse samples for any suspected emerging water quality issues such as disinfection by-products like trihalomethanes (THMs). Having this in-house capability give us the edge on those rare occasions when emerging issues are identified.

INCIDENT MANAGEMENT

Various planned and the occasional unplanned drinking water supply incidents have provided us with opportunities to test and hone our incident response processes along with corrective and preventative control measures. Whether its detecting issues in our network, standing up our incident management team, deploying maintenance and construction crews, securing alternative supplies to our customers, keeping our customers informed, ensuring water quality is always maintained, and returning reliable supply as soon as possible, we're always learning from our experiences and improving our approach to providing safe and reliable drinking water.

MAINS CLEANING

This year, we continued our mains cleaning program, cleaning the mains in Caboolture, Bellmere and Beachmere. In any drinking water network, the mains can be susceptible to tiny amounts of microscopic sediment build-up. Under normal operating conditions, this does not impact the drinking water to our customers. But if there is an unexpected reversal of flow or sudden pressure decrease, the water can become discoloured. To reduce the chances of discoloured water, we have developed a mains cleaning program to periodically clean the mains. To reduce customer impact during the cleaning process, we have engaged a third-party contractor to use technology that cleans, disinfects and reinjects the flushed water back into the mains so that no water is wasted. Suburbs are prioritised for mains cleaning using a risk based approach. During 2018-19 we cleaned over 270 km of mains, with another 300km currently scheduled for 2019-20 financial year.

BWSA WATER QUALITY SERVICE STANDARDS REVISION/EXPANSION

Our relationship with Seqwater is bound by a Bulk Water Supply Agreement (BWSA) between Unitywater and Seqwater. Among other things, this instrument outlines the water quality provision standards expected of Seqwater. In collaboration with Seqwater we have fully reviewed and expanded on the service standards applicable to multiple water quality parameters across the bulk supply locations in our network. This will provide greater specification of the nature and extent of the services Unitywater receives from Seqwater for water quality. This in turn will support consistent decision-making regarding treatment plant operation and investment for Seqwater.

MANAGING RISK

Under our DWQMP, the Risk Management Improvement Program outlines actions to be undertaken to proactively manage risks to maintaining safe drinking water. We are currently on track to complete all actions by the target dates.

Current actions under the risk management improvement program include:

- identify high risk triggers for microbiological contamination to the water supply during reservoir repair works/activities
- ensure dosing stations incorporate fail safe to prevent overdosing in the event of equipment failure
- control room staff to undertake awareness training in DWQMS and consequences of poor water quality.

In late 2019 we will be undertaking a full review of our DWQMP which will include a new improvement program.

Appendix A

Regulatory annual reporting requirements summary

Sections of report that address reporting requirement under Section 142(3) of the Act:

Section ref #	Legislative requirement under Section 142(3) of the Act	Content guide	Section of this report
-	Overview of operations	Contextual information of the water supply schemes that this annual report relates to.	Section 2, 3 & 4
142(3) b	Actions taken to implement the DWQMP	Description of activities undertaken during the reporting period to implement the DWQMP: › Safe Water Steering Group › DWQMP updates › ISO 22000 certification › Improving our drinking water quality, managing risk. (Progress in implementing the Risk Management Improvement Program (RMIP))	Section 7.1 & 8
142(3) c	Outcome of the DWQMP review and how issues raised have been addressed	› DWQMP updates › Audit and DWQMP review outcomes › Improving our drinking water quality, Drinking Water Management System review	Section 7.1, 7.2 & 8
142(3) d	Findings and recommendations of the DWQMP auditor	› Regulatory audit summary of findings › Outcomes of the DWQMP review	Section 7.2 & 8
142(3) e	Notifications to the Regulator under sections 102 and 102A of the Act	› Non-compliances with the water quality criteria and corrective and preventive actions undertaken › Prescribed incidents or events reported to the Regulator and corrective and preventive actions undertaken	Section 5.3
142(3) f	Compliance with water quality criteria for drinking water	› Verification monitoring results summary for the reporting period › Commentary on water quality performance the Australian Drinking Water Guidelines, *E. coli* and fluoride standards	Section 5
142(3) g	Customer complaints related to water quality	› Summary of water quality enquiries › Summary of events and corrective action	Section 6 Appendix C

Appendix B

Water quality summary

Dayboro

CHEMICAL (HEALTH) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Arsenic	mg/L	1	<0.001	<0.001	<0.001	<0.001	0.01	✔
Bromate	mg/L	4	<0.005	<0.005	<0.005	<0.005	0.02	✔
Chlorate	mg/L	28	<0.01	0.27	0.07	0.13	a	a
Chlorine free	mg/L	127	0.1	1.5	0.86	1.30	5	✔
Chlorine total	mg/L	127	0.2	1.6	0.95	1.40	5	✔
Copper	mg/L	28	<0.01	<0.01	<0.01	<0.01	2	✔
Fluoride	mg/L	25	0.71	0.93	0.84	0.91	1.5	✔
HAAs	ug/L	1	<60	<60	<60	<60	a	a
Lead	mg/L	28	<0.01	<0.01	<0.01	<0.01	0.01	✔
Manganese	mg/L	57	<0.01	<0.01	<0.01	<0.01	0.5	✔
Nickel	mg/L	28	<0.01	<0.01	<0.01	<0.01	0.02	✔
THMs	mg/L	28	0.012	0.068	0.033	0.062	0.25	✔

a - No guideline limit

Appendix B

Water quality summary

Dayboro

CHEMICAL (AESTHETIC) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Alkalinity total	mg/L as $CaCO_3$	28	40.6	100	87.78	95.90	a	a
Aluminium	mg/L	57	<0.02	0.03	<0.02	0.02	0.2	✔
Calcium	mg/L	28	11	14	12.29	14.00	a	a
Chloride	mg/L	4	29	37	32.50	36.40	250	✔
Colour Apparent	PCU	58	<1	4.8	1.24	2.23	15	✔
Colour true	PCU	58	<1	1.3	<1	<1	15	✔
Conductivity	uS/cm	127	247	335	286	309	1000	✔
Copper	mg/L	28	<0.01	<0.01	<0.01	<0.01	1	✔
Iron	mg/L	57	<0.01	0.04	0.01	0.03	0.3	✔
Magnesium	mg/L	28	7	10	8.71	9.65	a	a
Manganese	mg/L	57	<0.01	<0.01	<0.01	<0.01	0.1	✔
pH	pH Units	127	7.1	7.9	7.4	7.8	6.5-9.2	✔
Potassium	mg/L	4	1.4	1.7	1.53	1.69	a	a
Silica as SiO2	mg/L	1	14	14	14.00	14.00	80	✔
Sodium	mg/L	4	28	31	29.5	30.9	180	✔
Sulphate	mg/L	1	6.2	6.2	6.2	6.2	250	✔
Temperature	°C	127	14.9	29.4	22.5	28.2	a	a
Total hardness	mg/L as $CaCO_3$	28	59	75	66.61	71.95	200	✔
Turbidity	NTU	124	0.09	0.65	0.19	0.30	5	✔
Zinc	mg/L	28	<0.01	<0.01	<0.01	<0.01	3	✔

a - No guideline limit

Appendix B

Water quality summary

Kenilworth

CHEMICAL (HEALTH) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Arsenic	mg/L	2	<0.001	<0.001	<0.001	<0.001	0.01	✔
Bromate	mg/L	6	<0.005	0.008	<0.005	0.007	0.02	✔
Chlorate	mg/L	36	0.06	0.26	0.13	0.25	a	a
Chlorine free	mg/L	175	0.3	1.6	1.00	1.40	5	✔
Chlorine total	mg/L	175	0.3	1.8	1.08	1.50	5	✔
Copper	mg/L	36	<0.01	0.01	<0.01	<0.01	2	✔
Fluoride	mg/L	29	<0.1	0.26	0.18	0.22	1.5	✔
HAAs	ug/L	2	<60	<60	<60	<60	a	a
Lead	mg/L	36	<0.01	<0.01	<0.01	<0.01	0.01	✔
Manganese	mg/L	48	<0.01	<0.01	<0.01	<0.01	0.5	✔
Nickel	mg/L	36	<0.01	<0.01	<0.01	<0.01	0.02	✔
THMs	mg/L	36	0.005	0.072	0.024	0.046	0.25	✔

a - No guideline limit

Appendix B

Water quality summary

Kenilworth

CHEMICAL (AESTHETIC) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Alkalinity total	mg/L as $CaCO_3$	29	42	176	148.31	173.60	a	a
Aluminium	mg/L	48	<0.02	<0.02	<0.02	<0.02	0.2	✔
Calcium	mg/L	29	15	19	16.90	18.60	a	a
Chloride	mg/L	6	34	39	37.00	39.00	250	✔
Colour apparent	PCU	48	<1	2.1	<1	1.40	15	✔
Colour true	PCU	48	<1	1.1	<1	<1	15	✔
Conductivity	uS/cm	161	326	445	403	438	1000	✔
Copper	mg/L	36	<0.01	0.01	<0.01	<0.01	1	✔
Iron	mg/L	48	<0.01	0.01	<0.01	<0.01	0.3	✔
Magnesium	mg/L	29	9	11	9.97	11.00	a	a
Manganese	mg/L	48	<0.01	<0.01	<0.01	<0.01	0.1	✔
pH	pH Units	161	7.1	7.7	7.4	7.6	6.5-9.2	✔
Potassium	mg/L	8	<1	1	<1	<1	a	a
Silica as SiO2	mg/L	2	23	24	23.50	23.95	80	✔
Sodium	mg/L	6	46	58	54.5	57.8	180	✔
Sulphate	mg/L	2	6.7	7	6.9	7.0	250	✔
Temperature	°C	175	18	30.9	23.4	29.1	a	a
Total hardness	mg/L as $CaCO_3$	29	74	91	83.69	91.00	200	✔
Turbidity	NTU	161	0.05	0.81	0.12	0.22	5	✔
Zinc	mg/L	36	<0.01	<0.01	<0.01	<0.01	3	✔

a - No guideline limit

Appendix B

Water quality summary

North

CHEMICAL (HEALTH) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Arsenic	mg/L	16	<0.001	<0.001	<0.001	<0.001	0.01	✔
Bromate	mg/L	72	<0.005	0.01	<0.005	0.009	0.02	✔
Chlorate	mg/L	462	<0.01	0.6	0.08	0.31	a	a
Chlorine free	mg/L	3,396	<0.1	2.6	0.98	1.70	5	✔
Chlorine total	mg/L	3,396	<0.1	3	1.12	1.80	5	✔
Copper	mg/L	458	<0.01	0.02	<0.01	<0.01	2	✔
Fluoride	mg/L	359	<0.1	0.96	0.81	0.90	1.5	✔
HAAs	ug/L	16	<60	75	<60	<60	a	a
Lead	mg/L	434	<0.01	0.01	<0.01	<0.01	0.01	✔
Manganese	mg/L	1,445	<0.01	0.1	<0.01	<0.01	0.5	✔
Nickel	mg/L	458	<0.01	<0.01	<0.01	<0.01	0.02	✔
THMs	µg/L	455	5	150	61	120	250	✔

a - No guideline limit

Appendix B

Water quality summary

North

CHEMICAL (AESTHETIC) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Alkalinity total	mg/L as $CaCO_3$	356	30.2	130	46.42	63.38	a	a
Aluminium	mg/L	1,445	<0.02	0.08	<0.02	0.02	0.2	✔
Calcium	mg/L	357	12	28	18.33	24.00	a	a
Chloride	mg/L	72	14	49	23.65	39.25	250	✔
Colour apparent	PCU	1,432	<1	54	1.46	3.40	15	✔
Colour true	PCU	1,432	<1	2.8	<1	1.30	15	✔
Conductivity	uS/cm	3,168	87	487	229	312	1000	✔
Copper	mg/L	458	<0.01	0.02	<0.01	<0.01	1	✔
Iron	mg/L	1,445	<0.01	0.53	0.01	0.04	0.3	✔
Magnesium	mg/L	357	2	18	5.14	9.00	a	a
Manganese	mg/L	1,445	<0.01	0.1	<0.01	<0.01	0.1	✔
pH	pH Units	3,168	7	9.2	7.5	8.1	6.5-9.2	✔
Potassium	mg/L	74	<1	2	1.52	2.00	a	a
Silica as SiO2	mg/L	16	2	13	6.88	10.00	80	✔
Sodium	mg/L	72	10	36	17.9	27.0	180	✔
Sulphate	mg/L	16	25	44	34.2	41.8	250	✔
Temperature	°C	3,373	15.7	31	22.7	27.9	a	a
Total hardness	mg/L as $CaCO_3$	357	46	139	66.95	84.40	200	✔
Turbidity	NTU	3,116	0.05	7	0.16	0.29	5	✔
Zinc	mg/L	458	<0.01	0.02	<0.01	<0.01	3	✔

a - No guideline limit

Appendix B

Water quality summary

Pine Rivers North

CHEMICAL (HEALTH) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Arsenic	mg/L	1	<0.001	<0.001	<0.001	<0.001	0.01	✔
Bromate	mg/L	6	<0.005	<0.005	<0.005	<0.005	0.02	✔
Chlorate	mg/L	42	0.02	0.38	0.09	0.14	a	a
Chlorine free	mg/L	510	<0.1	2.4	0.16	0.30	5	✔
Chlorine total	mg/L	510	<0.1	3.3	1.45	2.70	5	✔
Copper	mg/L	42	<0.01	<0.01	<0.01	<0.01	2	✔
Fluoride	mg/L	25	0.26	0.92	0.75	0.92	1.5	✔
HAAs	ug/L	1	<60	<60	<60	<60	a	a
Lead	mg/L	42	<0.01	<0.01	<0.01	<0.01	0.01	✔
Manganese	mg/L	171	<0.01	0.1	<0.01	<0.01	0.5	✔
Monochloramine NH2Cl	mg/L	487	<0.02	2.17	0.65	1.54	3	✔
Nickel	mg/L	42	<0.01	<0.01	<0.01	<0.01	0.02	✔
Nitrite as NO2	mg/L	487	<0.02	1.02	0.27	0.72	3	✔
THMs	µg/L	45	45	95	64	86	250	✔

a - No guideline limit

Appendix B

Water quality summary

Pine Rivers North

CHEMICAL (AESTHETIC) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Alkalinity total	mg/L as $CaCO_3$	30	49.6	66.3	57.60	65.07	a	a
Aluminium	mg/L	171	0.02	0.05	0.03	0.04	0.2	✔
Calcium	mg/L	30	13	17	15.47	16.55	a	a
Chloride	mg/L	6	24	28	26.67	28.00	250	✔
Colour apparent	PCU	184	<1	8	2.39	4.20	15	✔
Colour true	PCU	184	<1	2.4	<1	1.79	15	✔
Conductivity	uS/cm	498	235	461	264	279	1000	✔
Copper	mg/L	42	<0.01	<0.01	<0.01	<0.01	1	✔
Iron	mg/L	171	<0.01	0.05	<0.01	0.02	0.3	✔
Magnesium	mg/L	30	6	7	6.23	7.00	a	a
Manganese	mg/L	171	<0.01	0.1	<0.01	<0.01	0.1	✔
pH	pH Units	498	7.5	8.6	7.9	8.3	6.5-9.2	✔
Potassium	mg/L	6	2	2.4	2.10	2.35	a	a
Silica as SiO2	mg/L	1	6	6	6.00	6.00	80	✔
Sodium	mg/L	6	22	24	22.7	23.8	180	✔
Sulphate	mg/L	1	24	24	24.0	24.0	250	✔
Temperature	°C	505	16	30.3	22.9	27.8	a	a
Total hardness	mg/L as $CaCO_3$	30	58	69	64.57	68.55	200	✔
Turbidity	NTU	489	0.08	1.4	0.20	0.32	5	✔
Zinc	mg/L	42	<0.01	<0.01	<0.01	<0.01	3	✔

Appendix B

Water quality summary

South

CHEMICAL (HEALTH) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Arsenic	mg/L	13	<0.001	<0.001	<0.001	<0.001	0.01	✔
Bromate	mg/L	50	<0.005	0.008	<0.005	<0.005	0.02	✔
Chlorate	mg/L	336	<0.01	0.87	0.17	0.48	a	a
Chlorine free	mg/L	2,649	<0.1	5	0.31	1.30	5	✔
Chlorine total	mg/L	2,649	<0.1	5.7	1.20	2.90	5	✔
Copper	mg/L	332	<0.01	<0.01	<0.01	<0.01	2	✔
Fluoride	mg/L	266	0.18	1.18	0.73	0.90	1.5	✔
HAAs	µg/L	13	<60	<60	<60	<60	a	a
Lead	mg/L	332	<0.01	<0.01	<0.01	<0.01	0.01	✔
Manganese	mg/L	1,005	<0.01	0.08	<0.01	<0.01	0.5	✔
Monochloramine NH2Cl	mg/L	2,245	<0.02	2.09	0.43	1.53	3	✔
Nickel	mg/L	332	<0.01	<0.01	<0.01	<0.01	0.02	✔
Nitrite as NO2	mg/L	2,245	<0.02	1.25	0.12	0.57	3	✔
THMs	µg/L	342	22	160	75	120	250	✔

a - No guideline limit

Appendix B

Water quality summary

South

CHEMICAL (AESTHETIC) PERFORMANCE

Parameter	Units	Number of samples	Min. result	Max. result	Average result	95th percentile	ADWG guideline	Met ADWG
Alkalinity total	mg/L as $CaCO_3$	270	29.2	84.8	55.79	63.91	a	a
Aluminium	mg/L	1,005	<0.02	0.14	0.02	0.04	0.2	✔
Calcium	mg/L	271	12	24	15.91	18.00	a	a
Chloride	mg/L	50	23	38	27.50	33.55	250	✔
Colour apparent	PCU	1,051	<1	15	2.38	4.50	15	✔
Colour true	PCU	1,051	<1	3.1	<1	1.80	15	✔
Conductivity	uS/cm	2,595	131	477	267	306	1000	✔
Copper	mg/L	332	<0.01	<0.01	<0.01	<0.01	1	✔
Iron	mg/L	1,005	<0.01	0.26	0.01	0.04	0.3	✔
Magnesium	mg/L	271	4	13	6.30	7.00	a	a
Manganese	mg/L	1,005	<0.01	0.08	<0.01	<0.01	0.1	✔
pH	pH Units	2,595	7.1	8.9	7.7	8.1	6.5-9.2	✔
Potassium	mg/L	50	1.8	2.4	2.06	2.30	a	a
Silica as SiO2	mg/L	13	6	6	6.00	6.00	80	✔
Sodium	mg/L	50	20	30	22.9	26.0	180	✔
Sulphate	mg/L	13	23	26	24.3	25.4	250	✔
Temperature	°C	2,647	14.6	32.2	22.9	28.3	a	a
Total hardness	mg/L as $CaCO_3$	271	54	113	65.56	72.00	200	✔
Turbidity	NTU	2,587	0.06	3	0.18	0.29	5	✔
Zinc	mg/L	330	<0.01	0.01	<0.01	<0.01	3	✔

a - No guideline limit

Appendix C

Water quality enquiry cluster investigation summary

Event number	Event date	Trigger description	Dirty / Milky	Taste / Odour	Health	Other	Investigation commentary	Corrective action undertaken
							2 x Due to unplanned water outage - WO4037849 - water main break / repair.	Reactive flushing undertaken
1151	13/08/2018	Any WQ Enquiry: 6 in 24 hours, WQ Report	4	0	0	2	3 (LMNLL) x Unknown - no known planned or unplanned works in the area that could impact water quality, and no unusual pressure or flow trends.	Reactive flushing undertaken
							1 (MNTCK) x Unknown - isolated incident in DMA. No known planned or unplanned works that could impact water quality, and no unusual pressure trends (no flow trends available).	Reactive flushing undertaken
1152	10/09/2018	Any WQ Enquiry: 4 in 24 hours, single DMA	4	0	0	0	Due to unplanned water outage – WO4109570 - water main break / repair - WO4109570	Reactive flushing undertaken
1153	19/09/2018	Any WQ Enquiry: 4 in 24 hours, single DMA	6	0	0	0	Due to planned works - PTW39809 - boundary valve 2178459 failed to open (existing "dolly" spun instead of engaging with the valve) resulting in an unplanned outage affecting 632 properties. Pressure dropped suddenly in the DMA, followed by sudden increases in flow to restore supply, stirring up sediment / biofilm through the DMA.	Reactive flushing undertaken
1154	19/09/2018	Any WQ Enquiry: 6 in 24 hours, WQ Report	6	0	0	0	Due to planned work - PTW39809 - boundary valve 2178459 failed to open (existing "dolly" spun instead of engaging with the valve) resulting in an unplanned outage affecting 632 properties. Pressure dropped suddenly in the DMA, followed by sudden increases in flow to restore supply, stirring up sediment / biofilm through the DMA.	Reactive flushing undertaken
1155	26/10/2018	Any WQ Enquiry: 3 in 12 hours, single DMA	3	0	0	0	Due to planned works - PTW40603 - 2 x 525mm water main connections.	Reactive flushing undertaken

Appendix C

Water quality enquiry cluster investigation summary

Event number	Event date	Trigger description	Dirty / Milky	Taste / Odour	Health	Other	Investigation commentary	Corrective action undertaken
							4 x Due to planned works - PTW40603 - 2 x 525mm water main connections	Reactive flushing undertaken
1156	26/10/2018	Any WQ Enquiry: 6 in 24 hours, WQ Report	6	0	0	1	1 x Due to planned works - water meter replacement	Reactive flushing undertaken
							2 x unknown - isolated incidents in their respective DMAs with no known planned or unplanned works in the area and no unusual pressure or flow trends. In both instances, internal flushing restored water quality.	Reactive flushing undertaken
1157	26/10/2018	Any WQ Enquiry: 4 in 24 hours, single DMA	4	0	0	0	Due to planned works - PTW40603 - 2 x 525mm water main connections	Reactive flushing undertaken
1158	1/11/2018	Any WQ Enquiry: 3 in 12 hours, single DMA	2	0	0	1	Due to unplanned water outage - WO4254191 water main break / repair	Reactive flushing undertaken
1159	7/12/2018	Any WQ Enquiry: 3 in 12 hours, single DMA	4	0	0	0	Due to planned works - PTW40173 - replace section of 300mm water main	Reactive flushing undertaken
1160	7/12/2018	Any WQ Enquiry: 4 in 24 hours, single DMA	5	0	0	0	Due to planned works - PTW40173 - eplace section of 300mm water main	Reactive flushing undertaken

Appendix C

Water quality enquiry cluster investigation summary

Event number	Event date	Trigger description	Dirty / Milky	Taste / Odour	Health	Other	Investigation commentary	Corrective action undertaken
1161	7/12/2018	Any WQ Enquiry: 6 in 24 hours, WQ Report	7	0	1	0	5 x Due to planned works - PTW40173 - replace section of 300mm water main	Reactive flushing undertaken
							1 x Illness linked to water quality being compromised internally (customer was already aware of internal leak)	Field visit
							1 x Due to planned works - PTW42349 - 300mm hydrant cut in	Reactive flushing undertaken
							1 x Unknown cause; no known planned or unplanned works in the area and no unusual pressure or flow trends	No reactive work required; resolved by internal flushing
1162	3/02/2019	Any WQ Enquiry: 4 in 24 hours, single DMA	4	0	0	0	Due to unplanned water outage – WO4555758 - 250mm AC mains break / repair	Reactive flushing undertaken
1163	3/02/2019	Any WQ Enquiry: 3 in 12 hours, single DMA	3	0	0	0	Due to unplanned water outage – WO4555758 - 250mm AC mains break / repair	Reactive flushing undertaken
1164	3/02/2019	Any WQ Enquiry: 6 in 24 hours, WQ Report	7	0	0	0	Due to unplanned water outage – WO4555758 - 250mm AC mains break / repair	Reactive flushing undertaken
1165	9/02/2019	Health, Taste or Odour: 2 in 10 hours, single DMA	0	2	0	0	Due to unplanned water outage – WO4551143 – leaking valve on 375mm TWM	Reactive flushing undertaken
1166	13/02/2019	Any WQ Enquiry: 4 in 24 hours, single DMA	10	0	0	0	Due to planned works - PTW44303 - Isolation of Stage 2 TWM which resulted in a boundary valve being opened and reversal of flow	Reactive flushing undertaken
1167	13/02/2019	Any WQ Enquiry: 3 in 12 hours, single DMA	9	0	0	0	Due to planned works - PTW44303 - Isolation of Stage 2 TWM which resulted in a boundary valve being opened and reversal of flow	Reactive flushing undertaken

Appendix C

Water quality enquiry cluster investigation summary

Event number	Event date	Trigger description	Dirty / Milky	Taste / Odour	Health	Other	Investigation commentary	Corrective action undertaken
1168	13/02/2019	Any WQ Enquiry: 6 in 24 hours, WQ Report	12	0	0	0	Due to planned works - PTW44303 - Isolation of Stage 2 TWM which resulted in a boundary valve being opened anwd reversal of flow	Reactive flushing undertaken
1169	23/04/2019	Health, Taste or Odour: 2 in 10 hours, single DMA	0	2	0	0	Created in error; mapping issue that caused the all DMA zones to show as UNKNOWN	Each taste / odour customer complaint was dealt with individually and corrective actions recorded in Maximo
1170	23/04/2019	Health, Taste or Odour: 2 in 10 hours, single DMA	0	3	0	0	Created in error; mapping issue that caused the all DMA zones to show as UNKNOWN	Each taste / odour customer complaint was dealt with individually and corrective actions recorded in Maximo
1171	16/05/2019	Health, Taste or Odour: 2 in 10 hours, single DMA	0	2	0	0	Created in error; mapping issue that caused the all DMA zones to show as regional zone	Each taste / odour customer complaint was dealt with individually and corrective actions recorded in Maximo
1172	31/05/2019	Any WQ Enquiry: 4 in 24 hours, single DMA	3	1	0	0	Due to planned works - PTW46667 - Salt Water Creek, Narangba 375mm water main replacement; contributed to a combination of inadequate preventative flushing to compensate for reversal of flow through a "dead section" of water main (as demonstrated through the Deception Bay Rd Flow Meter) and works associated with the main connections (including recharging the main).	Reactive flushing undertaken
1173	2/06/2019	Any WQ Enquiry: 3 in 12 hours, single DMA	2	1	0	0	Due to planned works - PTW46667 - Salt Water Creek, Narangba 375mm water main replacement; contributed to a combination of inadequate preventative flushing to compensate for reversal of flow through a "dead section" of water main (as demonstrated through the Deception Bay Rd Flow Meter) and works associated with the main connections (including recharging the main).	Reactive flushing undertaken

Glossary of terms

<	Less than
>	Greater than
ADWG	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
CFU/100mL	Colony forming units per 100 millilitres
MPN/100mL	Most probable number per 100 millilitres
DMA	District metered area
DNRME	Department of Natural Resources, Mining, Energy (the Regulator)
DWQMP	Drinking Water Quality Management Plan
DWMS	Drinking Water Management System
E. coli	*Escherichia coli*, a bacterium which may indicate the presence of faecal contamination and therefore potential health risk
FY 2018-19	Financial year 2018-19
KM	Kilometre
M	Million
ML	Megalitres
NPI	Northern Pipeline Interconnector
NTU	Nephelometric Turbidity Units
RMIP	Risk Management Improvement Plan
SEQ	South East Queensland
the Act	*Water Supply (Safety and Reliability) Act 2008*
PCU	Platinum cobalt colour – unit measurement for true and apparent colour
uS/cm	microSiemens – unit measurement for conductivity
WQ	Water quality
WTP	Water treatment plant

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