

TASMANIAN WATER AND SEWERAGE STATE OF THE INDUSTRY REPORT 2015-16

MARCH 2017

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TABLE OF CONTENTS

ACRONYMS	I
FOREWORD	III
OVERVIEW	VII
1 INTRODUCTION.....	1
1.1 SCOPE OF THIS REPORT.....	1
1.2 INFORMATION SOURCES.....	2
1.3 INDUSTRY STRUCTURE.....	2
1.4 REGULATORY FRAMEWORK.....	3
1.5 INDUSTRY REGULATORS	4
1.6 OTHER REGULATORY OBLIGATIONS AND RESPONSIBILITIES.....	6
1.7 PERFORMANCE AND REGULATORY REPORTING	8
2 WATER SUPPLY	11
2.1 SOURCES OF WATER	11
2.2 WATER USAGE	11
2.3 WATER ASSETS.....	13
2.4 PERFORMANCE OF WATER INFRASTRUCTURE	16
3 SEWERAGE SERVICES.....	21
3.1 SEWAGE COLLECTED	21
3.2 RECYCLED WATER.....	22
3.3 SEWERAGE ASSETS.....	23
3.4 PERFORMANCE DATA	25
4 CUSTOMER SERVICE.....	29
4.1 COMPLAINTS.....	29
4.2 CALL CENTRE PERFORMANCE.....	30
4.3 PAYMENT MANAGEMENT	31

5	PUBLIC HEALTH.....	33
5.1	DRINKING WATER TREATMENT.....	33
5.2	BACTERIOLOGICAL COMPLIANCE OF WATER SUPPLY SYSTEMS.....	33
5.3	CHEMICAL COMPLIANCE OF WATER SUPPLY SYSTEMS.....	36
5.4	FLUORIDATION OF PUBLIC DRINKING WATER SUPPLY SYSTEMS.....	37
6	ENVIRONMENT.....	39
6.1	SEWERAGE SCHEMES.....	39
6.2	OUTFALLS TO THE ENVIRONMENT.....	40
6.3	SEWAGE TREATMENT PLANT COMPLIANCE.....	40
6.4	BIOSOLIDS REUSE.....	46
6.5	NET GREENHOUSE GAS EMISSIONS.....	48
7	PRICING AND FINANCE.....	49
7.1	PRICING.....	49
7.2	FINANCIAL PERFORMANCE.....	52
7.3	STATUS OF MAJOR PROJECTS	56
8	PRIORITIES FOR IMPROVING PERFORMANCE.....	63
8.1	ENVIRONMENT PROTECTION AUTHORITY	63
8.2	PUBLIC HEALTH	65
8.3	WATER ALLOCATIONS/LICENCES AND DAM SAFETY	66
APPENDIX 1	PERFORMANCE INDICATORS.....	A-1
APPENDIX 2	SEWAGE MANAGEMENT ISSUES.....	A-7
APPENDIX 3	DAM SAFETY.....	A-13
APPENDIX 4	STP PERFORMANCE SUMMARY	A-15
APPENDIX 5	CUSTOMER SERVICE STANDARDS.....	A-27

ACRONYMS

Term	Meaning within the context of this report
ADWF	Average dry weather flow
ADWG	Australian Drinking Water Guidelines 2011
AMT	Accepted Modern Technology
ANCOLD	Australian National Committee on Large Dams
ANZBP	Australian and New Zealand Biosolids Partnership
COAG	Council of Australian Governments
Code	Customer Service Code
CSO	Community Service Obligation
DHHS	Department of Health and Human Services (Tas)
DPIPWE	Department of Primary Industries, Parks, Water and Environment (Tas)
DSMP	Dam Safety Management Plan
DWQG	Tasmanian <i>Drinking Water Quality Guidelines 2005</i>
EBIT	Earnings Before Interest and Tax
EMPCA	<i>Environmental Management and Pollution Control Act 1994 (Tas)</i>
EPA	Environment Protection Authority (Tas)
EPN	Environment Protection Notice
ERR	Economic Rate of Return
NDTE	Net Debt to Equity
NPAT	Net Profit After Tax
NPR	National Performance Report
STP	Sewage treatment plant or wastewater treatment plant
WDRC	Written down replacement cost
WTP	Water treatment plant
WWMP	Wastewater Management Plan

Basic measures:

kL kilolitre = 1 000 litres or 1 m³ (cubic metre) and weighs 1 tonne

ML megalitre = 1 000 kL (or 1 000 m³)

GL gigalitre = 1 000 ML

TL teralitre = 1 000 GL or 1 km³ (cubic kilometre)

FOREWORD

Much has happened in the years since major reform of the Tasmanian water and sewerage industry in 2008. However, many of the issues and challenges identified in the first 'State of the Industry Report' remain today and are expected to continue to be a focus for the industry for many years to come.

As the current regulatory framework moves into its eighth year of operation, it is evident that despite significant investment in terms of both expenditure and effort, drinking water quality and environmental compliance are not at the levels expected or required for contemporary water and sewerage networks. Tasmania's water and sewerage assets are deteriorating faster than they can be replaced, and hence, remain behind their interstate counterparts in terms of both service and reliability.

The patchwork of water and sewerage prices across the State that existed nine years ago has largely been consolidated into one. However, while the vast majority of customers have transitioned to consistent industry pricing, a significant number of customers remain on tariffs that are below the target levels, and as such, represent cross-subsidies in the system.

As the second regulatory period continues, I expect the focus to remain on increasing compliance, particularly with respect to the delivery of projects that have contributed significantly to expenditure and, therefore, prices. Of particular note is TasWater's progress with its planned capital expenditure program. TasWater's capital expenditure increased by approximately \$26 million in 2015-16. However, a number of projects have experienced delays against the approved schedule due to an increasing backlog of maintenance and repairs. TasWater will need to continue to closely manage the delivery of future capital programs that have been funded as part of TasWater's approved 2015-18 price and service plan.

In what was its third year of operation as a single entity, TasWater took some significant steps forward in 2015-16, particularly in relation to building knowledge of its water and sewerage network and assets and programs to improve monitoring and control. However, operating costs continued to rise above inflation in 2015-16. This is, in part, due to the age and condition of the assets. In addition, leakage and water loss have also increased this year with water losses estimated to be around 33 per cent.

TasWater continued to receive a high number of complaints in 2015-16, with the rate of complaints equivalent to around 14 per 1 000 properties which exceeds the relevant service standard. Water quality concerns remain the largest source of complaints received by TasWater (38 per cent of complaints). Billing and accounts also continued to generate a relatively high number of complaints in 2015-16. The Ombudsman reported a small increase in the number of complaints received by its office compared to the previous year, with the number of complaints remaining within required service standard levels.

Delays in TasWater's capital works program meant that improvements to drinking water quality were not delivered as scheduled, and continued to be below expectations in 2015-16. Twenty three towns across the State were supplied with non-compliant drinking water (ie water supplies subject to a Permanent Boil Water Alert or a Do Not Consume notice). Six drinking water systems were found to contain metal concentrations above safe limits on at least one occasion.

In 2015-16, TasWater finalised its first drinking water quality management plan which identified key actions and projects to maintain and improve Tasmania's drinking water systems. It is apparent that water quality compliance activities have been prioritised, with solutions including rationalisation of supply to small townships. In August 2016, TasWater undertook to remove all permanent boil water alerts by August 2018.

During 2015-16 TasWater spent \$2.6 million on dam safety compliance activities and carried out interim measures to reduce the risk to a number of dams that are categorised as having 'high' consequences were they to fail. During the year, five dams were impacted due to flooding, resulting in non-compliance with the relevant safety standards.

Despite significant investment aimed at improving the performance of sewage treatment plants (STP) and operational practices, compliance with regulatory discharge limits for sewage effluent has worsened by around eight per cent over the past six years from 2009-10. Flow-weighted compliance during 2015-16 was 84 per cent, a small improvement after a significant period of decline. The operating performance of TasWater's 13 largest sewage treatment plants that process approximately 70 per cent of treated volume remains below expectations, at levels consistent with the state-wide compliance figure. High trade waste input also continued to impact the performance of a number of STPs, leading to poor environmental outcomes for the State.

In 2015-16, 17 Tasmanian STPs were classified as substantially non-compliant with regulatory discharge to waters limits (ie less than 75 per cent compliant) while 24 STPs reported compliance above 90 per cent. STPs with historically low compliance levels include lagoon systems where desludging works, which would lift compliance, have been postponed.

TasWater's total income rose by three per cent to \$309.3 million in 2015-16, despite a small decrease in sales revenue due to a reduction in water consumption. Operating costs increased by 6.8 per cent in 2015-16, in most part due to rising employee, maintenance and planning costs. Operating costs were around the average of comparable mainland providers. Potential cost reductions associated with TasWater's relatively lower levels of compliance are being offset by additional costs associated with its high number of assets and dispersed (and ageing) infrastructure. TasWater reported \$25 million net profit after tax (NPAT) of which \$20 million was returned to Council owners as dividends.

Average water and sewerage bills rose nominally by around four per cent in 2015-16, a trend set to continue over each year of the regulatory period ending on 30 June 2018. The vast majority of customers have completed the transition to target tariffs; customers previously paying above target have dropped to target tariffs in accordance with the price determination made on 30 April 2015.

TasWater has made some significant improvements to its systems and processes to better understand its infrastructure and operations. However, performance outcomes will need to improve markedly to achieve the required regulatory standards, particularly in relation to sewerage. Since 2015-16, TasWater has improved its engagement with customers and industry stakeholders and is developing a long term strategic plan.

A handwritten signature in black ink, appearing to read 'Joe Dimasi'.

Joe Dimasi

TASMANIAN ECONOMIC REGULATOR

OVERVIEW

The Tasmanian Water and Sewerage State of the Industry Report 2015-16 is the latest in a series of reports published by the Tasmanian Economic Regulator that provides a comprehensive, independent review of the industry's performance.

It addresses the key areas of affordability, customer service, network reliability and efficiency, financial performance, drinking water quality and environmental performance. It also outlines opportunities for improved performance, as identified by industry regulators and the State's single water and sewerage service provider, TasWater.

TasWater provided around 202 500 properties (ie 85 per cent of the State's population) with a reticulated water supply during 2015-16.

Key performance measures

	2014-15	2015-16
Water and sewerage connected properties	200 527	202 478
Total urban water supplied	54 592 ML	52 383 ML
Average residential consumption	172 kL	176 kL
Water network reliability (water main breaks/100 km of main)	28	33
Sewer network reliability (sewer breaks and chokes/100 km of main)	57	61
Average customer minutes off supply (minutes)	143	199
Average sewerage interruption (minutes)	274	277
Treated wastewater volume compliant with EPA requirements (flow-weighted)	81.4 %	84.2 %
Percentage of population receiving drinking water that complied with ADWG microbiological guidelines	98.6 %	99.2 %
Drinking water supply systems on long term boil water notices or public health alerts ¹	21 of 88	23 of 87
Customer complaints	2 324	2 892
Calls answered within 30 seconds	89 %	88 %
Total revenue	\$300.3 m	\$309.3 m
Operating costs	\$166.5 m	\$177.7 m
Capital expenditure	\$102.5 m	\$128.6 m
Net Debt to Equity ratio	23 %	27 %

¹ For 2014-15, Hamilton and Ouse were reported as two separate drinking water supply systems. For 2015-16, Hamilton-Ouse was reported as one supply owing to the single WTP servicing these towns via a pipeline.

Water supply

Sources of water

In 2015-16 the state-wide total volume of water sourced was 83 GL, an increase of 4.6 per cent on the previous year: the total volume of urban water supplied decreased by 4.0 per cent to 52 GL.

Across the State, almost 93 per cent of sourced water came from surface water in 2015-16. The remaining water was sourced from recycled water (7 per cent) and groundwater (<1 per cent).

Residential water consumption

Average annual residential water consumption increased slightly to 176 kL per property. Below average rainfall across much of the 2015-16 period may have contributed to the increase in demand.

Water network

Between 2014-15 and 2015-16, the total number of properties connected to water mains grew by just one per cent, to reach 202 478 properties. The length of water mains across Tasmania increased slightly to 6 242 km.

Water loss from the distribution system was significantly higher in 2015-16 than in previous years, with TasWater reporting an infrastructure leakage index (ILI) of three (ratio of real losses to unavoidable real losses). The volume of water unaccounted for was 24 610 ML, around 32 per cent of potable water produced.

Water supply interruptions

On average, 167 out of 1 000 properties (or 17 per cent) experienced an unplanned water supply interruption in 2015-16. The number of customers affected by unplanned interruptions has increased year on year since reporting began in 2011-12.

Customers affected by unplanned water supply interruptions were without supply for an average of 199 minutes (3 hours 19 minutes) which is a 40 per cent increase in customer minutes off water supply compared to 2014-15.

Eighty seven per cent of 'priority 1' bursts and leaks were responded to within 60 minutes which is slightly below the service standard of 90 per cent.

Sewerage services

Sewage collected and recycled

The volume of sewage collected in 2015-16 was 50 356 ML, or 283 kL per property. Thirty five of the State's 79 sewage treatment plants recycle at least some proportion of the treated sewage effluent. In 2015-16, 10.4 per cent of the sewage volume collected was reused as recycled water.

Sewerage network

As at 30 June 2016 there were 177 899 properties connected to the sewerage network. During 2015-16, the length of sewerage mains and channels contracted to 4 723 km.

Sewerage service interruptions

In 2015-16, interruptions to the sewerage service lasted, on average, 277 minutes. This represents a small increase compared to the previous years' average duration of 274 minutes.

Customer service

Call centre performance

TasWater's call centre answered 88 per cent of calls within 30 seconds in 2015-16.

Customer complaints

In 2015-16 TasWater received 2 892 complaints, up 24 per cent from 2 324 for the previous year. The largest group of complaints were in relation to water quality (38 per cent) and billing and accounts (21 per cent). Eighty nine per cent of complaints were resolved within ten days (or within an agreed timeframe).

Public health

Drinking water quality

Of the 87 Tasmanian drinking water supplies, 81 were adequately monitored for bacteriological compliance and 85 for chemical water quality.

Sixty six of the State's 87 drinking water systems achieved microbiological compliance, with the compliance of one system reported as 'unknown' due to inadequate sample numbers. Thirteen water supplies had chemical contaminants detected above the ADWG health guideline values.

Twenty five systems were operated under a temporary or permanent boil water alert while another five systems had a public health alert (do not consume) in place. Six systems reported metal concentrations above safe health limits.

Microbiological compliance was achieved for 99.2 per cent of the population serviced with water.

Environment

Sewage treatment plant compliance

In 2015-16, TasWater failed to achieve full compliance with the regulatory discharge limits in relation to all except one Level 2 STP under its control.

Overall, TasWater achieved approximately 84 per cent compliance with the regulatory discharge to waters limits (flow-weighted). Seventeen Tasmanian STPs were classified as

substantially non-compliant (ie less than 75 per cent compliant), while the number of STPs with compliance above 90 per cent increased to 24 (out of 72).

In 2015-16 TasWater reported 201 sewer overflows to the environmental regulator, the EPA. This equates to around 4.3 overflows per 100 km of sewer main which is greater than the rate of 3.5 per 100 km of sewer main reported in 2014-15.

Pricing

Typical residential bill

The typical annual bill for residential customers with average water consumption (176 kL per annum) was \$1 062 in 2015-16. The typical bill is based on \$501 for water and \$561 for sewerage. The water usage component (based on measured volume) accounts for 16 per cent of the total bill.

In 2015-16, annual residential bills rose by around four per cent nominally, which will continue each year over the second regulatory period from 1 July 2015 to 30 June 2018.

Finance

Revenue and expenditure

TasWater's total income in 2015-16 was \$309 million, up three per cent compared to the previous year. Operating costs grew by 6.8 per cent to \$178 million while capital expenditure was 25 per cent higher than the previous year, at almost \$129 million.

Financial performance

In 2015-16, TasWater's net profit after tax was just over \$25 million. TasWater returned \$20.3 million to its shareholders as dividends (not including income tax equivalents and guarantee fees) which represented over 80 per cent of its profit after tax.

TasWater reported a net debt to equity ratio of 27 per cent and an interest cover ratio of 0.61 times in 2015-16.

Major projects

In 2015-16 TasWater completed five major projects while seven projects encountered delays that will affect their respective final completion dates. Another 18 projects were still proceeding on schedule.

1 INTRODUCTION

This Report assesses the Tasmanian Water and Sewerage Corporation Pty Ltd's (trading as TasWater) performance during 2015-16 across a number of key measures. The purpose of this Report is to apply transparency and accountability to the performance of the providers of water and sewerage services in Tasmania.

The objectives of this Report are to:

- ❑ provide an overview of the performance of the water and sewerage industry; and
- ❑ identify key priorities for improved performance of the industry.

The Economic Regulator has prepared this Report in consultation with the Director of Public Health, the Director of the Environment Protection Authority (EPA) and the Secretary of the Department of Primary Industries, Parks, Water and Environment (DPIPWE).

This Report is the third to assess TasWater's performance as a single entity, following the amalgamation of the three previous regional corporations into the single corporation on 1 July 2013.

1.1 Scope of this report

The structure and content of this Report is based on the National Performance Reporting Framework¹, with some additional State-based measures. However, reporting against a number of indicators is limited due to the absence of some performance data.

This Report focuses on indicators across a number of key performance areas, including:

- ❑ water supply – water sources, infrastructure, treatment, consumption and reliability;
- ❑ sewage services – infrastructure, collection, treatment and reliability;
- ❑ customers – customer complaints, call centre performance and payment management;
- ❑ public health – water quality compliance with bacteriological, chemical and fluoridation standards;
- ❑ environment – wastewater treatment, effluent discharge, impacts on waterways, effluent and biosolids reuse; and
- ❑ pricing and finance – tariff structures, revenue and expenditure, future capital expenditure and status of major projects;

This Report does not include information on the collection and use of stormwater or the supply or use of water for irrigation purposes. These activities are excluded from the regulation of the water and sewerage industry by clause 3 of the *Water and Sewerage Industry*

¹ 2013-14 National Performance Framework; Performance Reporting Indicators and Definitions Handbook and Urban Auditing Requirements.

Declaration Order 2011 and section 3 of the *Water and Sewerage Industry Act 2008* respectively.

While services in relation to recycling or re-use of water are also excluded from the regulation of the water and sewerage industry by clause 3 of the *Water and Sewerage Industry Declaration Order 2011*, Chapter 2 of this Report provides commentary on these issues in the context of the treatment of wastewater.

1.2 Information sources

This Report is based on two principal sources of information:

- ❑ performance data provided by TasWater against key performance measures, specified by the Economic Regulator in its Reporting Guideline, and comments provided by TasWater explaining its performance; and
- ❑ performance data collected as part of regulatory reporting requirements by the Department of Health and Human Services, DPIPWE and the EPA.

Where shown, performance reported between 2009-10 and 2012-13 is for the three previous regional corporations.

The data provided by TasWater for 2015-16 has been independently audited, with some data assessed to be at a basic level. The reliability and accuracy of all data therefore, cannot be assured. Additionally, in response to the findings of a recently completed independent audit of a selection of TasWater's performance indicators, performance against some indicators has been revised to correct identified errors. In these cases, the data reported in this Report may not match the data reported in the Bureau of Meteorology's, *National Performance Report: Urban Water Utilities 2015-16* against these indicators.

Readers should consider this when interpreting the data and commentary presented in the Report.

Numerous comparisons throughout this report refer to the performance of similarly sized service providers in other Australian jurisdictions. The selection of similarly sized service providers in these comparisons has been based on the number of connections and do not account for the relatively greater number of assets (eg treatment plants, pumping stations, and dams) that TasWater is responsible for when compared to interstate service providers. Mr Miles Hampton, Chairman of the TasWater Board, recently noted that, based on two benchmarking studies that TasWater had participated in:

While TasWater services only 2 per cent to 3 per cent of the population served by those [other 18 Australian and New Zealand] authorities, ... it is responsible for 38 per cent of the drinking water systems, 37 per cent of the sewerage systems and 18 per cent of the dams. Therefore 2 per cent to 3 per cent of the population has to, in effect, fund the looking after, ongoing maintenance, upgrading and compliance of a totally disproportionate number of water treatment plants, waste water treatment plants and dams.²

² Hansard, Legislative Council Government Business Scrutiny Committee A, 6 December 2016, page 17.

Readers should therefore also consider this factor when making comparisons between TasWater's performance and the performance of mainland service providers.

1.3 Industry structure

Since 1 July 2013³ TasWater has owned, controlled and operated water supply and sewerage systems in Tasmania. TasWater manages all aspects of the water supply chain from dams and reservoirs to customer property connections. Similarly, TasWater manages its sewerage systems from customer sewer connections to wastewater treatment and disposal.

Services provided include:

- ❑ harvesting, storage and treatment of raw water supplies;
- ❑ transmission of bulk water supplies;
- ❑ the operation of the sewerage service and treatment of the majority of sewage;
- ❑ retail services; and
- ❑ trade waste.

TasWater's principal objectives⁴ are to:

- ❑ promote the efficient delivery of water supply and provision of sewerage services; and
- ❑ encourage water conservation, demand management of water and the re-use of water on an economic and commercial basis.

1.4 Regulatory framework

The key Tasmanian piece of legislation governing the water and sewerage industry is the *Water and Sewerage Industry Act 2008* (the Industry Act). The Industry Act requires any persons or entities owning and/or operating water and/or sewerage infrastructure, or supplying water and/or sewerage services to others, to be licensed, unless exempted.

The licence places a number of regulatory obligations on licensees through reference to various regulatory instruments, such as codes and guidelines, as well as requiring the preparation of management plans in relation to matters such as asset and emergency management and compliance.

Industry regulators for the sector include the Tasmanian Economic Regulator, Director, EPA, Director of Public Health, and Secretary, DPIPWE.

Compliance and regulatory obligations are imposed by legislation including the *Tasmanian Environmental Management and Pollution Control Act 1994*, *Public Health Act 1997*, *Fluoridation Act 1968* and *Water Management Act 1999*. A diagram setting out the regulatory framework for the Tasmanian water and sewerage industry is shown in Figure 1.1.

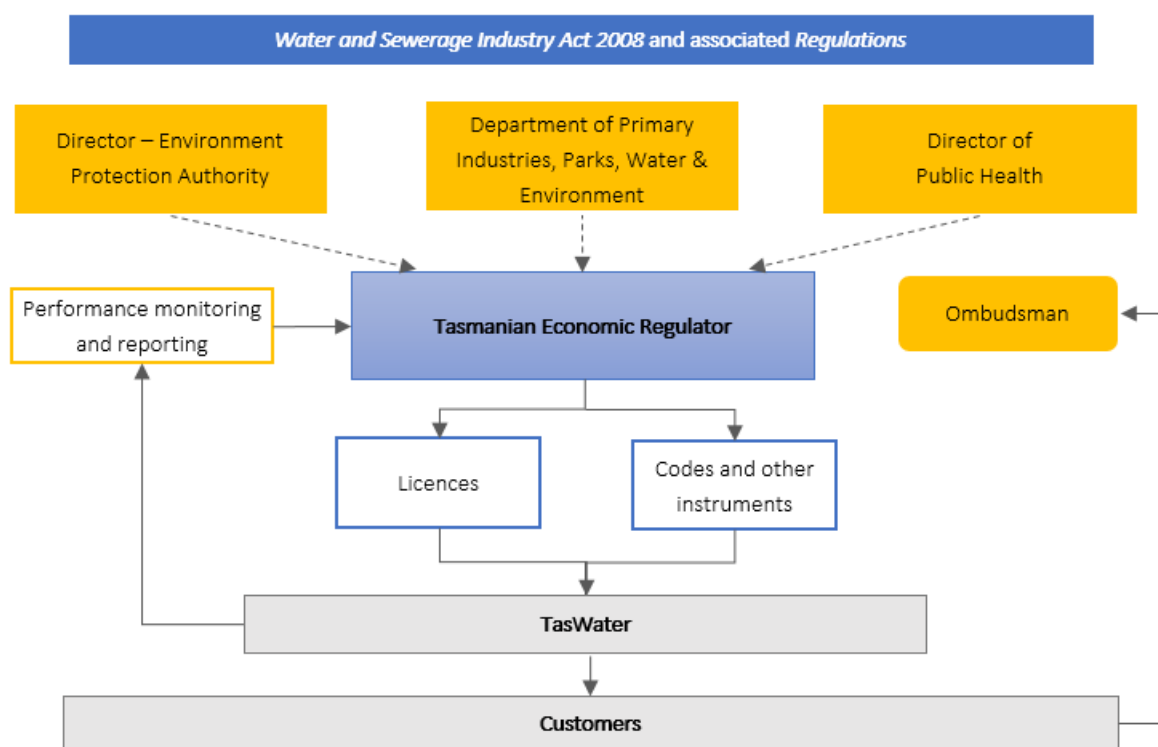
This regulatory framework does not cover:

³ Ben Lomond Water, Cradle Mountain Water, Southern Water and Onstream were amalgamated to form TasWater.

⁴ Prescribed in the *Water and Sewerage Corporation Act 2012* (Tas).

- ❑ water used for irrigation or electricity generation purposes;
- ❑ private water supplies, including drinking water supplies at premises that do not receive water from a reticulated system managed by a licensed provider - namely, private bores and tanks and small privately owned water systems; or
- ❑ on-site sewerage treatment (septic tanks) or small private sewerage treatment plants.

Figure 1.1 Tasmanian water and sewerage industry economic regulatory framework



1.5 Industry Regulators

The regulatory framework for the water and sewerage industry covers economic regulation, technical regulation, water planning and customer service.

1.5.1 Tasmanian Economic Regulator

The Tasmanian Economic Regulator's role includes industry licensing, consumer protection and retail pricing⁵.

- ❑ **Water and sewerage services prices** – the Economic Regulator's Price Determination sets out the services, revenue requirements and pricing structure for TasWater over the regulatory period.

⁵ For further details, refer to the Economic Regulator's previous State of the Industry Reports and its Price Determination Investigation Final Report (published 30 April 2015).

- ❑ **Customer service standards** – the Customer Service Code, issued by the Economic Regulator, sets out obligations for the delivery of services to customers across Tasmania including service targets and standards.
- ❑ **Performance monitoring and reporting** - a periodic state of the industry report (this Report) prepared by the Economic Regulator in consultation with the other industry regulators.

In carrying out its functions under the Industry Act, the Economic Regulator is required to promote the efficient pricing of regulated services, ensure appropriate service standards are maintained and promote efficient long-term investment in infrastructure.

1.5.2 Director of Public Health

The Director of Public Health (and the Department of Health and Human Services, DHHS) is responsible for regulating drinking water quality and ensuring safety through monitoring and enforcing compliance with drinking water guidelines and policies established under the *Public Health Act 1997* and the *Fluoridation Act 1968*. This includes monitoring and enforcing compliance with the standards and requirements prescribed by the:

- ❑ *Public Health Act 1997* (and its associated Tasmanian Drinking Water Quality Guidelines 2015);
- ❑ *Fluoridation Act 1968*;
- ❑ *Fluoridation (Interim) Regulations 2009*; and
- ❑ Australian Drinking Water Guidelines 2011 (which were updated in 2015).

The Director of Public Health is also responsible for developing and implementing strategies to protect, promote and improve public health. The Director is supported in discharging its functions and duties by the Public Health Services Division, which is a part of DHHS.

1.5.3 Director, Environment Protection Authority

The Director of the Environment Protection Authority (EPA) and the EPA Board are responsible for administering and enforcing the *Environmental Management and Pollution Control Act 1994* (EMPCA). They are supported in discharging their functions and duties by EPA Tasmania⁶, which is part of DPIPWE⁷.

The Director's responsibilities in regulating Level 2⁸ sewage treatment plants (STPs) include:

- ❑ undertaking, as a member of the EPA Board, environmental impact assessments in relation to proposals for new STPs or significant changes to existing STPs;
- ❑ imposing legally binding environmental conditions upon the operation of STPs;

⁶ The EPA Division of DPIPWE adopted the name 'EPA Tasmania' in 2016.

⁷ For further information on the EPA's functions, see www.epa.tas.gov.au.

⁸ Only Level 2 STPs, with a flow capacity of more than 100 kL per day, are regulated by the EPA. Level 1 STPs are regulated by local government (Councils).

- ❑ applying the Tasmanian State Policy on Water Quality Management 1997 as relevant to wastewater activities; and
- ❑ ensuring compliance with environmental conditions.

EPA Tasmania also provides TasWater with advice on wastewater issues including those relevant to pumping stations, wastewater reuse, trade waste, blue green algae management and biosolids reuse.

1.5.4 Department of Primary Industries, Parks, Water and the Environment

The Water Policy and Planning Branch in DPIPWE develops and coordinates policies relating to the regulation of the water and sewerage industry and supports the Minister for Primary Industries and Water in fulfilling the Minister's functions under the Industry Act.

The Water and Marine Resources Division within DPIPWE also plays an important water management, planning and regulatory role for the State's water resources, including the administration and enforcement of the *Water Management Act 1999*.

The *Water Management Act 1999* is part of Tasmania's resource management and planning system and provides for the use and management of Tasmania's freshwater resources through arrangements for licensing, water trading, water allocations and dam permits.

1.5.5 Delegate for Dam Safety Regulation

The Minister for Primary Industries and Water also has regulatory oversight of dam safety. The Water Operations Branch, of the Water and Marine Resources Division within DPIPWE, administers the *Water Management Act 1999* and the *Water Management (Safety of Dams) Regulations 2015* to ensure that owners of existing dams meet their dam safety responsibilities⁹. The key functions in this regard relate to:

- ❑ developing prescribed standards required for the design, construction, maintenance, surveillance and decommissioning of dams, and ensuring compliance with those standards (these standards are largely based on the criteria and guidelines produced by the Australian National Committee on Large Dams (ANCOLD)); and
- ❑ formulating measures to ensure the safety of dams and, in particular, plans to remove or minimise risks to persons, property or the natural environment arising from a dam safety incident.

1.5.6 Chief Officer of the Tasmania Fire Service

The Tasmanian Fire Service (TFS) is the regulatory authority responsible for fire safety in Tasmania.

TasWater's obligations under the Industry Act, with respect to fire safety, relate to:

- ❑ the installation of fire hydrants in its water infrastructure at distances and locations as are necessary for the ready supply of water to control and extinguish fires; and

⁹ For further information on dam safety, see www.dpipwe.tas.gov.au/water/dams/dam-safety.

- ❑ the need to keep its water infrastructure charged with water where that infrastructure supplies water to a fire hydrant.

The Industry Act provides that TasWater may reduce or restrict the quantity of water it supplies on days declared by the TFS to be days of total fire ban. Such restrictions include specifying how water may be used¹⁰, such as prohibiting the use of water outdoors. Limiting non-essential water use such as garden watering or lawn sprinklers on days of total fire ban can help to help to ensure that the TFS and residents who may be facing a bushfire threat have water available for firefighting and prevention.

1.5.7 Ombudsman

If a customer is dissatisfied with the outcome of a complaint made under TasWater's customer complaints process the customer may refer the complaint to the Ombudsman under the *Ombudsman Act 1978*. Under section 77 of the Industry Act, it is a condition of its licence that TasWater comply with any recommendations made by the Ombudsman.¹¹

1.6 Other regulatory obligations and responsibilities

Regulation of the water and sewerage industry is affected by national policies and obligations. These policies and regulatory obligations and responsibilities are outlined below.

1.6.1 National water initiative

In June 2005, along with the Australian Government and the other states and territories, Tasmania became a signatory to the National Water Initiative (NWI) Agreement. Under the NWI Agreement, the signatories agreed to report independently, publicly and on an annual basis, and to benchmark data on the pricing and service quality of urban water delivery agencies.

The signatories of the NWI Agreement developed a performance reporting framework for urban utilities (Urban Framework) which is reflected in a handbook of performance indicators and definitions.

1.6.2 National performance reporting framework

In accordance with Tasmania's obligations under the NWI, TasWater participates in the annual completion of performance indicators for the Bureau of Meteorology (the Bureau) in accordance with the National Performance Framework: Urban performance reporting indicators and definitions handbook, which is updated each year.

The performance data is subject to independent audit at least once every three years. Further information on the NWI Agreement and the performance reporting framework can be found on the NWC website at <http://www.nwc.gov.au/nwi> and <http://www.nwc.gov.au/publications/topic/nprs> respectively.¹²

¹⁰ See Part 2 of the *Water and Sewerage Industry (General) Regulations 2009*.

¹¹ See www.ombudsman.tas.gov.au for further information.

¹² Whilst the NWC no longer exists, the NWI is continuing and the NWC's website continues to be available.

The preparation of annual national performance reports that independently and publicly benchmark pricing and service quality, is an important commitment under the NWI. The reports align with a nationally consistent performance framework, built on reporting practices already in place in the urban water sector.

TasWater is required to submit annual performance information for the NPR, with oversight of data submission provided by the Economic Regulator.

1.6.3 Other government bodies

1.6.3.1 Department of Treasury and Finance

The Department of Treasury and Finance has responsibilities in relation to water and sewerage pricing policy, which remain a responsibility of the Treasurer under the Industry Act.¹³

1.6.3.2 Local Government

Prior to 2009-10, local government was responsible for providing most reticulated urban water and sewerage services (excluding some water and sewerage infrastructure located within private or Crown land). Local governments now own TasWater.

Local government is responsible for the regulation of small and on-site sewerage infrastructure (such as septic tanks) and private water supplies (such as private bores and tanks).

1.6.3.3 Bureau of Meteorology

In 2008, the Bureau assumed a new role in relation to water accounting, as part of the then Australian Government's Water for the Future initiative. In 2014, the Bureau also took over the administration of the Urban Framework¹⁴ for water performance reporting and production of the National Urban Performance Reports for 2013-14, 2014-15 and 2015-16.

The Bureau's water information functions are contained in the *Water Act 2007* (Cwlth), under Part 7 - Water Information. These functions are supported by the *Water Regulations 2008* (Cwlth) (the Water Regulations).

In Tasmania, the Water Regulations require a number of organisations including TasWater to submit a range of water accounting information to the Bureau.

1.7 Performance and regulatory reporting

1.7.1 Performance reporting

The Industry Act provides that the Economic Regulator is to issue guidelines to regulated entities in relation to their annual performance and information reporting requirements.

¹³ The administration of Subdivision 3 of Division 1, and Division 5 of Part 4 and sections 88 and 111 of the Industry Act are assigned to the Treasurer and the Department of Treasury and Finance.

¹⁴ The National Water Commission (NWC) was previously responsible for overseeing progress under the NWI Agreement including the performance reporting framework for urban utilities (Urban Framework).

The Economic Regulator's *Water and Sewerage Industry Performance and Information Reporting Guideline*¹⁵ (the Guideline) sets out the data and contextual information that a regulated entity must provide to the Economic Regulator, so that its performance can be measured.

The Guideline provides for a transitional compliance regime, whereby TasWater is required to achieve compliance with the full range of performance measures over time. The Economic Regulator monitors TasWater's performance in meeting those requirements.

1.7.2 Regulatory reporting

Licensed water utilities are required to carry out regular audits to assess:

- ❑ compliance with and the adequacy of management and compliance plans and
- ❑ the quality, reliability, and conformity of regulatory information, including performance information.

The audits are an important element of the regulatory framework. They ensure that all stakeholders are provided with sufficient information to properly assess the performance of licensees in meeting their regulatory obligations, and provide a reliable basis for on-going performance assessment.

The approach to regulatory reporting is set out in the Economic Regulator's regulatory reporting guideline.¹⁶

The independent appraisal of TasWater's performance indicators was carried out in three tranches over three years, between 2013-14 and 2015-16. A second round of independent appraisals is scheduled to occur between 2016-17 and 2018-19.

TasWater undertook independent reviews of its compliance and emergency management plans during 2014-15, while the independent appraisal of its asset management plan was conducted early in the 2015-16 financial year as scheduled.

1.7.3 Regulatory compliance

For 2015-16 TasWater reported:

- ❑ nine public health non-compliances relating to elevated levels of microbiological contaminants in the drinking water system;
- ❑ one instance of a serious non-compliance with environmental legislation occurred at the Longford STP and consisted of a failure to provide an 'Effluent Compliance Plan' within the set timeframe;
- ❑ 17 STPs were classified as substantially non-compliant (ie less than 75 per cent compliant) with their respective discharge to waters limits for sewage effluent;

¹⁵ Version 1.3 of the Guideline was published 28 October 2015 to reflect amendments consequential to the Economic Regulator Reforms and the abolition of the National Water Commission. The Guideline is available from the Economic Regulator's website: www.economicregulator.tas.gov.au.

¹⁶ Tasmanian Economic Regulator, *Regulatory Reporting Guideline*, (as updated from time to time).

- ❑ five instances of non-compliance with dam safety regulation as a result of the 6 June 2016 floods, with a further 26 dams receiving minor damage caused by floods but these did not meet non-compliance criterion. All issues have been pro-actively managed and mitigated. The Dam Safety regulator did not consider the reported instances to be non-compliant with the *Water Management Act 1999* but rather were treated as operational Dam Safety Incidents; and
- ❑ no instances of non-compliance with economic regulation.

2 WATER SUPPLY

2.1 Sources of water

The average annual volume of surface water runoff in Tasmania is 33 312 000 megalitres (ML)¹ and up to 2 500 000 ML of water is potentially available each year from groundwater.² The overwhelming majority of urban water supplied in Tasmania is sourced from surface water, with only minor amounts extracted from groundwater.

① Water volumes

kL kilolitres = 1 000 litres

ML megalitres = 1 000 000 litres

GL gegalitres = 1 000 000 000 litres

Total sourced water includes both freshwater and recycled water resources and supports the requirements of town water supply, irrigation and the majority of the State's electricity requirements.

Drinking water sourced from surface water and consumed by domestic, commercial and industrial customers accounts for around 15 per cent of the estimated total use of surface water in the State (including water used for irrigation and industry).

Urban use of groundwater accounts for only a very small portion of the estimated total groundwater usage and only around 0.3 per cent of reticulated drinking water.

During 2015-16 only 248 ML of groundwater was extracted for use in reticulated supplies, all of which was utilised in the northern and north-western regions of the State. The 2015-16 total was unchanged from the previous year.

Rain water tanks represent another important source of water for many Tasmanian households. Approximately 22 per cent of Tasmanian households have rain water tanks as their primary source of drinking water.³

During 2015-16 TasWater sourced 77 796 ML from surface water (99.7 per cent) and ground water (0.3 per cent) for urban use. Urban water in Tasmania was not sourced from desalination or recycled water, although TasWater did use recycled water for some non-drinking uses (see section 3.2 of this report).

2.2 Water usage

The Australian Bureau of Statistics (ABS) has published a National Water Account for 2014-15⁴ which details the water extraction and consumption for each sector in each state and territory.

¹ Tasmanian Planning Commission 2009, *State of the Environment Tasmania* 2009.

² Audit Advisory Council 2001, *National Land and Water Resources Audit 1997-2002* in Tasmanian Planning Commission 2009, *State of the Environment Tasmania* 2009.

³ ABS 4602.0.55.033, *Environmental Issues: Water Use and Conservation*, March 2013.

⁴ ABS 4610.0 *Water Account, Australia 2014-15*, November 2016.

These figures show that water use for the major sectors for Tasmania in 2014-15 was as follows:

- ❑ Agriculture 228 169 ML;
- ❑ Aquaculture⁵ 669 ML;
- ❑ Urban Water 55 310 ML;
- ❑ Commercial⁶ 38 460 ML; and
- ❑ Mining⁷ not reported.

For this Report, urban water supplied does not include irrigation water or water usage by private supply systems. It differs from the Australian Bureau of Statistics' estimated urban consumption, as total urban water supplied is TasWater's metered volume of water (both drinking water quality and non-drinking water quality) supplied to customers during 2015-16 plus estimated non-metered water supplied. The total water supplied comprises the sum of residential, commercial, municipal, industrial and other water supplied.

TasWater provided the following detailed breakdown of water supplied to residential and non-residential customers⁸ for 2015-16:

- ❑ residential customers were supplied with 31 768 ML of water; and
- ❑ commercial, municipal and industrial customers were supplied with 20 615 ML of water.

The total amount of urban water supplied in 2015-16 was 52 383 ML. This volume was delivered to around 202 500 residential and non-residential customers.

The average annual consumption per connection across the State in 2015-16 was 259 kilolitres (kL). This is five per cent lower than the average for 2014-15, which was 272 kL.

The average annual consumption per residential connection across the State increased, with consumption rising from 172 kL in 2014-15 to 176 kL in 2015-16. Despite the increase in average annual residential consumption in 2015-16, the tendency over the past six years has been for declining residential consumption, with average annual residential consumption per connection dropping from 225 kL in 2010-11 to 176 kL in 2015-16. This is a 22 per cent decline over that period.

The declining trend in average consumption per connection is likely to be due to a number of factors, including:

- ❑ variations in rainfall for the State between the years, which influences household demand for outside water usage;

⁵ The Tasmanian aquaculture industry accessed 796 753 ML but almost all of this water was used in-stream. The industry consumed only 669 ML of water during 2014-15.

⁶ Commercial is made up of self-extracted water usage figures for the manufacturing and "other" industry classifications from the *Water Account, Australia 2014-15*.

⁷ Comparable extraction and consumption figures for the mining sector are not available. ABS data includes a significant mine de-watering component which is not separately reported.

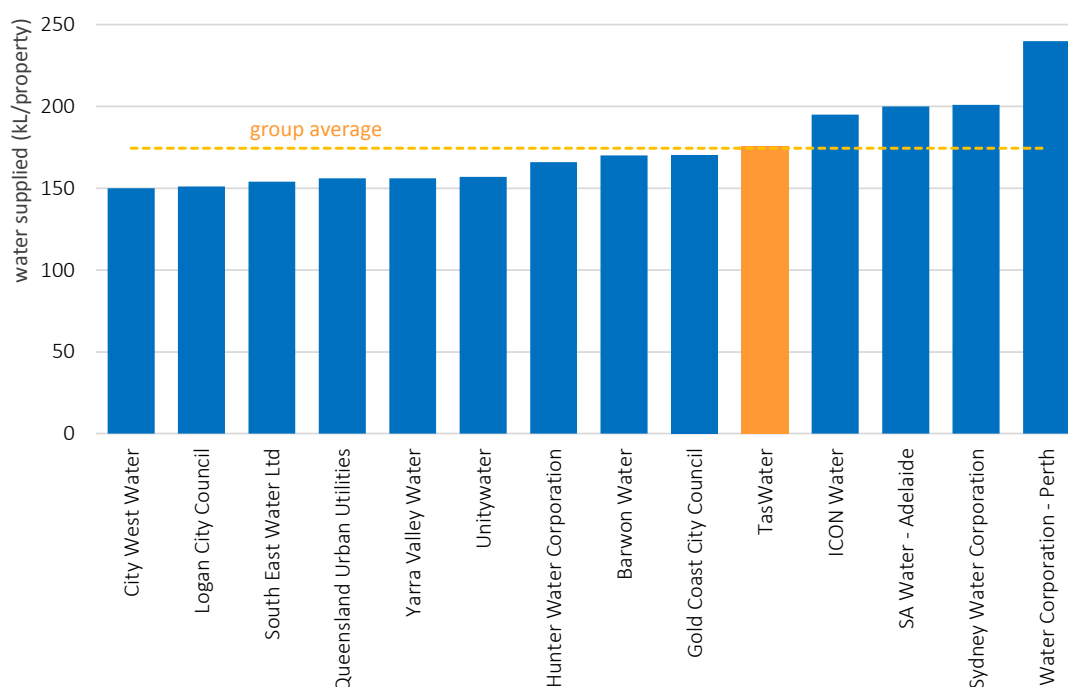
⁸ Non-residential customers include all commercial, industrial and municipal users.

- ❑ the state-wide roll-out of water meters raising consumers' awareness of their consumption levels; and
- ❑ the improvement in the quality of the data collection relating to water consumption with the state-wide introduction of water meters.

Figure 2.1 shows the average annual volumes of residential water supplied by major utilities (100 000 or more connected properties) across Australia during 2015-16 together with the average volume of water supplied by providers in this category.

TasWater's average residential consumption of 176 kL per residence was marginally above the average residential consumption for major water utilities in 2015-16, which was 173 kL.

Figure 2.1 Average annual residential water supplied (kL/property) – major utilities (large)



Source: Bureau of Meteorology, *National performance report 2015-16: urban water utilities*

2.3 Water assets

Tasmania's relatively mountainous terrain poses a unique challenge for the redistribution of its fresh water resources, which are unevenly distributed across the State. Water is relatively abundant in the lightly populated western part of the state, and less abundant in the more heavily populated south-east and east coast regions.

Transferring water from the source of supply to the point of use can be difficult. The large distances and difficult terrain mean that, in some instances, pumping water from remote sources of supply to where it is needed incurs high costs.

The water assets that enable the treatment and transmission of water to customers include water treatment plants (WTPs), storage dams, reservoirs and the reticulated system of pipes and pumps.

2.3.1 Water supply systems and treatment plants

A WTP is an individual facility receiving raw or partially treated water for treatment and ultimate delivery to customers and does not include secondary or booster disinfection plants. There may be more than one WTP at a specific location. TasWater is required to report the level and complexity of treatment provided to bring water quality to an acceptable level for the customer.

There are three broad categories of WTP:

- ❑ disinfection only – the treatment plant solely disinfects the water prior to supply to customers. This category also includes WTPs that provide fluoridation only;
- ❑ further treatment – the treatment plant provides additional processes to serve a particular purpose. It does not meet the requirements of full treatment, but may address some of those elements; and
- ❑ full treatment – a substantial structure involving multiple treatment steps to achieve high quality water. The plant includes processes that remove turbidity and/or colour via different types of filtration and varying filter types, as well as providing filtration and disinfection. Most full treatment plants also fluoridate the water. Other treatment processes can include removal of taste and/or odour, softening, pH correction and the targeted removal of elements and compounds such as iron, manganese, nitrates and pesticides.

During 2015-16 TasWater supplied water to 475 624 customers through 70 drinking water systems⁹, that were serviced by 74 water treatment plants. Table 2.1 provides details of the number and type of WTPs operated by TasWater during 2015-16.

Table 2.1 Drinking water plants in Tasmania, 2015-16

Disinfection only WTPs	Untreated	Fully treated	Total Systems
13	18	43	74

2.3.2 Storage dams

TasWater is responsible for the operation and maintenance of a large number (280) of water supply and wastewater dams throughout Tasmania.

Owners of dams have a legal obligation to maintain and operate them so as not to cause danger to the public or significant environmental harm or present a danger to the public. Each dam is assessed under Australian National Committee on Large Dams (ANCOLD) guidelines for its severity of damage and loss and potential population at risk. The consequence and risk assessment includes three major considerations:

- ❑ the potential population placed at risk in the event of a dam failure;

⁹ A water supply system is a unique system for the extraction and preparation of water for distribution via the water supply network. A system may have more than one treatment plant.

- ❑ the potential impact on community and private infrastructure, such as bridges, roads, buildings, communication, energy and water and sewerage assets; and
- ❑ the impact on the environment.

Once assessed each dam is assigned a consequence and risk category. The consequence category of each dam can be assigned to one of seven levels (Table 2.2) through a structured process provided by ANCOLD.

Table 2.2 ANCOLD Guidelines consequence category for dams

Population at Risk	Severity of damage and loss			
	Minor	Medium	Major	Catastrophic
<1	Very Low	Low	Significant	High C
≥1 to <10	Significant (Note 2)	Significant (Note 2)	High C	High B
≥11 to <100	High C	High C	High B	High A
≥100 to <1 000	(Note 1)	High B	High A	Extreme
≥1 000	(Note 1)	(Note 1)	Extreme	Extreme

Source: Table 3 of the ANCOLD Guidelines on the Consequence Categories for Dams (2012).

Note 1: With a population at risk in excess of 100, it is unlikely that damage will be minor. Similarly with a population at risk in excess of 1 000 it is unlikely damage will be classified as medium.

Note 2: Change to "High C" where there is potential of one or more lives being lost.

All dams with a consequence category of "Significant" or higher require comprehensive surveillance inspections, and for dams where there is the potential for loss of life in the event of dam failure, dam safety emergency plans are required.

These compliance requirements become more significant as the consequence category increases. TasWater owns and operates in excess of 300 water and wastewater dams, lagoons and weirs around the state. Of these 37 are identified as having a consequence category of "Significant" or higher, due to their potential downstream impact (life, business, economic, damage) in the unlikely event of a complete dam failure. The remaining dams and storages are assessed as a low or very low risk. TasWater has a five year program in place to assess the consequence category for its smaller, un-categorised dams. The consequence category for these dams is expected to range between very low and significant. For many of these dams the consequence category is expected to lie between very low and significant with most the majority lying in the being very low or very low consequence category.

Table 2.3 details TasWater's storage dams by consequence category as set out in TasWater's Dam Safety Management Plan (DSMP). The terminology used in Dam Safety Assessments is set out in Appendix 3.

Table 2.3 TasWater's storage dams by consequence category (no.)

Very low	Low	Significant	High C	High B	High A	Extreme
64	102	14	9	3	7	4

Works to decommission and remediate two high risk dams located at Queenstown (Roaring Meg and Cutten Street No. 3 dams), were completed in April 2015.

In 2015-16, TasWater progressed its plans for upgrades to other high risk dams:

- Margaret Street Detention Basin is scheduled for completion in 2016-17; and
- Conglomerate Dam upgrade is scheduled for completion in 2017-2018.

In addition, detailed design and investigation work is continuing for the Mikany and Ridgeway dams while the Pet Dam upgrade investigations are scheduled to commence in 2016-17. Decommissioning of Waratah, Grey Mountain No. 1 and No. 2, all high risk dams, is currently being considered. Lowering the risk at Tolosa Dam commenced in late 2016, with the reduction of the water level, in anticipation of the dam's decommissioning during 2017-18.

2.3.3 Other water assets

Other water assets utilised by TasWater in its water supply systems include fluoridation stations/equipment, water pumping stations, water mains and water distribution storage facilities.

Table 2.4 summarises the other water infrastructure assets in Tasmania. The total length of water mains includes all transfer, distribution, reticulation mains and recycled water distribution and reticulation mains delivering water for urban areas.

Table 2.4 Other water assets owned by TasWater as at 30 June 2016

Number of water pumping stations	Number of water distribution storage facilities	Length of water mains (km)
219	294	6 242

The length of water mains and properties serviced per kilometre of water main indicates the scale of TasWater's water mains network and the spatial density and distribution of properties served.

In 2015-16 the length of the water network increased only marginally, with an average customer density of 33 properties per kilometre of main. Compared to other large mainland water utilities TasWater's customer density is relatively low, owing to the regional nature of much of the network's service area.

2.4 Performance of water infrastructure

Water supply network reliability is measured by the frequency of interruptions, as indicated by the number of water main breaks per 100 kilometres of water main. Water loss and leakage (eg the volume of water that does not reach customers due to leaking pipes) are also used to gauge system reliability.

2.4.1 Water main breaks

A water supply interruption is an event that causes a total loss of water supply to customers. Factors affecting the frequency of interruptions include soil type, rainfall, pipe material and the age and condition of the network. Water main breaks are the primary cause of supply interruptions for the reticulated water network.

Table 2.5 shows the number of water main breaks per 100 kilometres of water main reported by TasWater. In 2015-16 the average rate of bursts and leaks across the State was 33 per

100 kilometres of water main. While this outcome is higher than 2014-15, there appears to be a downward trend in this indicator.

Table 2.5 Water main breaks

	Total number of water main breaks (breaks, bursts and leaks)	Water main breaks (per 100 km of water main)
2010-11	3 722	56
2011-12	2 196	34
2012-13	3 063	48
2013-14	2 056	35
2014-15	1 753	28
2015-16	2 051	33

For comparative purposes the average water main breaks for mainland major water utilities was around 26 per 100 kilometres of water main.¹⁰ While TasWater's performance in 2015-16 was close to the national average for this indicator, the reported rate of unplanned water supply interruptions, at 84 per 100 kilometre of water main, was above the CSC minimum standard of 71.

Depending on the location of the break or fault, one unplanned interruption may affect one or many customers. Interruptions to water supply affected a total of 33 898 customers during 2015-16. This means that around 167 in 1 000 properties (17 per cent of customers) across Tasmania experienced an unplanned interruption to their water supply in 2015-16.

Table 2.6 shows that the number of customers affected by unplanned interruptions has increased year on year (an unplanned interruption is often the result of a water main break).

Table 2.6 Unplanned water interruptions

	Number of unplanned interruptions	Number of customers affected
2011-12	5 650	22 330
2012-13	3 513	23 382
2013-14	4 451	28 286
2014-15	6 007	33 352
2015-16	5 807	33 898

In relation to the number of unplanned interruptions shown above, TasWater believes that northern region data for 2012-13 was significantly under-reported.

¹⁰ Bureau of Meteorology, *National performance report 2015-16: urban water utilities*, March 2017 (indicator A8).

2.4.2 Water losses

Water losses in the distribution system can be classified as either apparent losses (unauthorised consumption, retail metering errors) or real losses (leakage and overflows from mains, service reservoirs and service connections prior to customer meters).

Real losses per service connection per day indicate how effectively the network is being managed. This measure is influenced by water pressure, condition or age of the infrastructure, or a combination of all these factors. Real losses represent a wasted resource, reduce the effective capacity of a water supply system and may result in unnecessary operating costs.

TasWater estimates that real losses in the reticulation networks are in the order of 333 litres per service connection per day and 10.4 kL per kilometre of water main per day. This level of water loss equates to around 29 per cent of the total water sourced by TasWater, a significant proportion.

2.4.3 Water supply interruptions

A water supply interruption is any event causing a total loss of water supply to customers. Water supply interruptions may be unplanned, such as when a pipe bursts, or planned, such as scheduled repairs and maintenance. TasWater is required to notify customers of planned interruptions.

An unplanned interruption is measured from when TasWater is aware water is no longer available at a customer's first cold water tap until normal service has been restored. The average duration of unplanned interruptions is an indication of the condition of the water supply network and how effectively the network is operated and managed.

① Unplanned interruptions

An interruption is classed as unplanned when a customer has not been given at least 24 hours notification or when a planned interruption exceeds the original notified duration.

The frequency of unplanned water supply interruptions may be influenced by a number of factors including age, construction material, the condition of water mains and the type of soil in which pipes are laid.

Figure 2.2 Incidence and duration of unplanned water supply interruptions

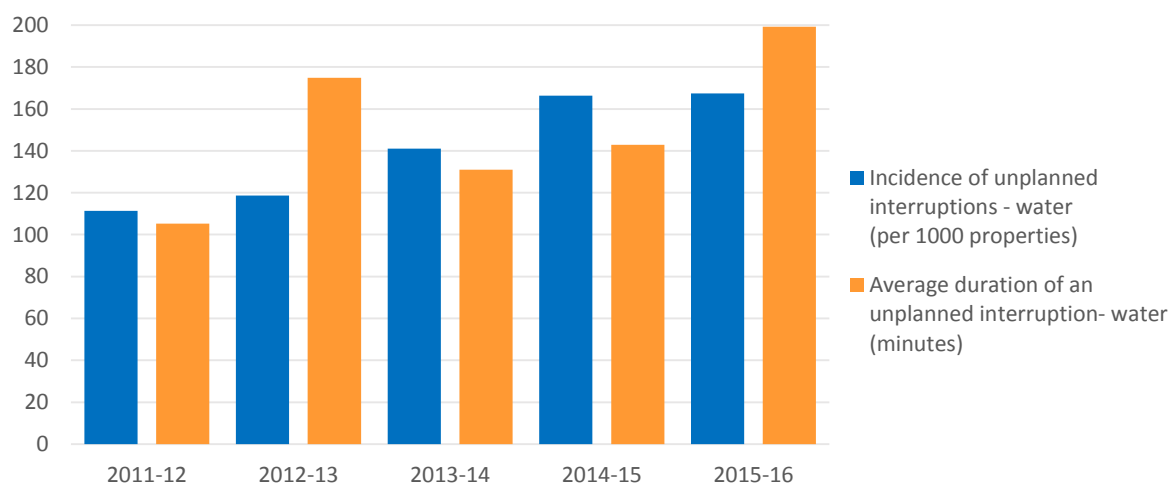


Figure 2.2 shows the average frequency and duration of unplanned water supply interruptions over the last five years. In 2015-16 TasWater reported 167 unplanned interruptions per 1 000 properties. The average rate reported by similar utilities on the mainland is typically around 134 unplanned interruptions per 1 000 properties.¹¹

In 2015-16, TasWater reported the average customer minutes off supply (duration of unplanned water supply interruptions) was 199 minutes while similar utilities on the mainland typically reported an average of around 134 customer minutes off supply during that year.

It is evident from the figure above that the duration of unplanned water interruptions has steadily increased year on year since 2013-14, despite the incidence of interruptions remaining steady between 2014-15 and 2015-16. This indicates unplanned water supply interruptions are taking longer to rectify and during 2015-16 impacted customers for an average of more than three hours. TasWater noted there was a 40 per cent increase in customer minutes off water supply as a consequence of a 17 per cent increase in water main breaks.

Table 2.7 shows the average duration of interruptions and customer minutes off supply for both planned and unplanned water interruptions, together with the minimum service standards for 2015-16.

Table 2.7 Water supply interruptions

	CSC standard ¹²	2011-12	2012-13	2013-14	2014-15	2015-16
<i>Planned interruptions</i>						
Average duration (minutes)	180	-	228	244	292	130
Average duration (% of time standard achieved)	80	-	-	-	NR	94
Average customer minutes off supply	20	-	7	11	9	2
Interruptions restored within five hours (%)	80	-	85	81	95	97
Average frequency (number)	0.1	-	0.03	0.05	0.03	0.01
<i>Unplanned interruptions</i>						
Interruptions (per 100 km of water main)	71	89	55	75	97	93
Average duration (minutes)	180	105	175	131	143	199
Average duration (% of time standard achieved)	80	-	-	-	NR	90
Average customer minutes off supply	20	-	12	21	24	34
Interruptions restored within five hours (%)	85	-	98	98	97	94
Average frequency (number)	0.1	0.11	0.12	0.14	0.17	0.17

TasWater achieved the minimum service standards in relation to planned water interruptions during 2015-16. The average duration and frequency of such outages remained low. However,

¹¹ Bureau of Meteorology, *National Performance Report: Urban Water Utilities 2015-16*.

¹² Minimum service standards for 2015-16, as per the Customer Service Code.

as highlighted in the section above, TasWater's response to unplanned interruptions generally fell short of the minimum standards, meeting two of the six benchmarks during 2015-16. The average duration of unplanned interruptions increased from the previous year, with customers experiencing, on average, 34 minutes off water supply. Response times to unplanned outages were satisfactory and have consistently met the service standards each year since 2012-13.

2.4.4 Bursts and leaks

Bursts and leaks are often attributable to failure of a pipe, hydrant, valve, fitting or joint material. A burst or leak may not necessarily result in loss of supply to the customer.

The average response time (minutes) to attend bursts and leaks, categorised by interruption priority against the minimum service standards for 2015-16, are shown in Table 2.8.

Bursts and leaks classified as priority 1 were generally attended to in 35 minutes, which was well within the applicable minimum service standard.

For priority 2 bursts and leaks the average response time was 69 minutes on average which differed little from the previous year. Priority 2 response times were also well within the minimum service target of 180 minutes.

Table 2.8 Average time taken to attend bursts and leaks (minutes)

	CSC standard ¹³	2011-12	2012-13	2013-14	2014-15	2015-16
Priority 1	60	213	47	31	36	35
Priority 2	180	217	152	95	70	69
Priority 3	4 320	1 471	2 083	1 930	673	1 861

Priority 3 bursts and leaks have less stringent attendance targets, with TasWater's performance in 2015-16 well within the minimum service standard.

① Bursts and leaks – interruption priority categories

A burst or leak that causes, or has potential to cause:

Priority 1: substantial damage or harm to customers, water quality, flow rate, property or environment.

Priority 2: minor damage or harm to customers, water quality, flow rate, property or environment

Priority 3: no discernible impact on customers, property or the environment

¹³ Customer Service Code minimum standard.

3 SEWERAGE SERVICES

In 2015-16, TasWater operated 79 Level 2 sewage treatment plants (STPs) (flow rate >100 kL/day) and 33 Level 1 STPs (flow rate <100 kL/day). In addition, Parks and Wildlife Service operated two Level 2 STPs (Ben Lomond and Lake St Clair National Parks) and the Port Arthur Historical Site Management Authority operated one Level 2 STP.

This chapter relates only to the performance of the 79 Level 2 STPs operated by TasWater.^{1,2}

3.1 Sewage collected

Sewage volumes discussed in this section are based on total inflows received by STPs.

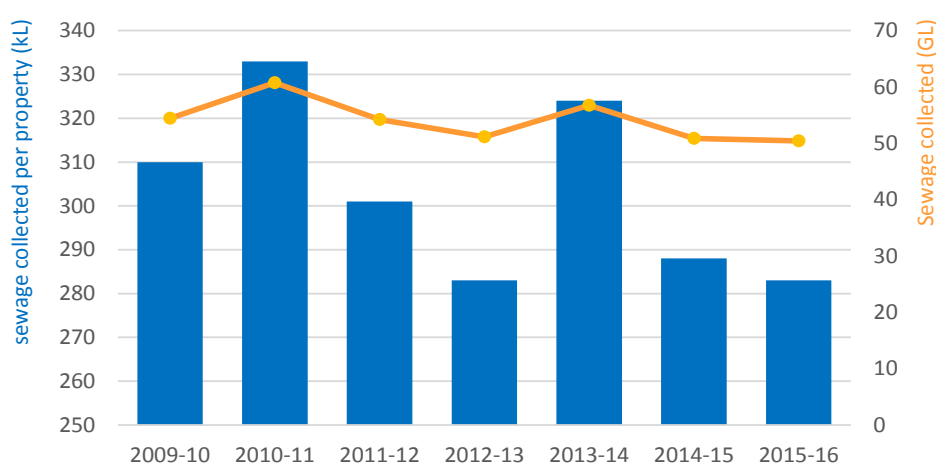
In 2015-16, the total volume of sewage collected across the State was 50 433 ML. TasWater's Level 2 STPs collected 50 356 ML of sewage in 2015-16, very similar to the volume (50 876 ML) reported in 2014-15. The average volume of sewage collected (residential and non-residential) was 283 kL per property.

Table 3.1 Volume of sewage collected

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Sewage collected (ML)	54 353	60 734	54 201	51 131	56 718	50 876	50 356
Per property (kL)	310	333	301	283	324	288	283

Figure 3.1 shows the volume of sewage received by TasWater's STPs over the past seven years.

Figure 3.1 Volume of sewage received / treated



Total annual flow volumes are generally affected to some degree by the climatic patterns. Rainfall can increase inflow and infiltration of water into the sewer system, resulting in

¹ Level 1 STPs are not regulated by the EPA and are not required to report performance information.

² Level 2 STPs operated by organisations other than TasWater are not required to submit performance information.

increased volumes being received by STPs. Spring and summer 2015-16 were characterised by dry to very dry conditions across the State, followed by very much above average rainfall across the majority of the State from April to the end of June 2016. Widespread flooding occurred in Tasmania during June 2016. Rainfall had a particularly pronounced impact on flows to Launceston's Ti-Tree Bend STP, which includes significant areas of combined catchment carrying both sewage and stormwater.

3.1.1 Comparative sewage treatment levels

Sewage treatment is divided into three categories indicating the degree to which sewage is treated.

During 2015-16 approximately 37 895 ML or 75.1 per cent of all sewage was treated to secondary standard, including the majority of effluent discharged to reuse schemes. Tertiary treatment contributed 15.3 per cent of the total effluent volume (7 692 ML) and primary treatment the remaining 9.6 per cent (4 838 ML).

As a proportion of total treated effluent discharged to the environment, effluent subject to secondary treatment clearly outweighed the other categories. State-wide proportions of discharge by treatment levels have remained fairly constant since 1 July 2009.

① Sewage treatment levels

Primary treatment involves screening the solids from the water and allowing a proportion of the suspended solids and organic matter to settle from the sewage.

Secondary treatment takes primary treated effluent and, with the aid of mechanical biological processes, breaks down a further proportion of the dissolved or suspended organic matter to a form that reduces its environmental impact if discharged. Disinfection by means of chlorination, ozonation or UV radiation is generally also considered to be part of the secondary treatment step.

With **tertiary treatment**, the secondary treated effluent is further processed using various techniques including flocculation, coagulation, clarification and filtration.

The sewage treatment levels of TasWater's STPs are discussed further in section 3.3.1 below.

3.2 Recycled water

Recycled water is water that has been extracted through the process of treating sewage. Recycled water can be used on-site at an STP or for off-site applications such as land irrigation or industrial processes.³

Thirty-six of TasWater's 79 STPs are designed to provide partial or full effluent recycling. As effluent reuse schemes in Tasmania predominantly involve land irrigation, fluctuations in the actual volume of effluent recycled are generally reflective of climatic factors driving the demand for irrigation at any given time.

Table 3.2 shows the volume of recycled water used per annum in Tasmania and the percentage of total treated effluent volume recycled each year, over the last five years.

In 2015-16 the total volume of recycled effluent generated by Level 2 STPs was 5 257 ML, equivalent to 10.4 per cent of the total effluent discharged from these STPs. The Clarence Recycled Water Scheme remains the largest reuse scheme in the State (2 354 ML recycled), followed by the Brighton/Bridgewater combined scheme (847 ML recycled). As a result of

³ These uses require treated effluent to meet 'Class B' quality standard as specified in the *Tasmanian environmental guidelines for the use of recycled water in Tasmania (DPIPWE 2002)*.

these two schemes, approximately 82 per cent of treated effluent generated at the associated STPs was diverted from the Derwent Estuary to sustainable reuse, a significant increase from the 67 per cent achieved in the previous year.

The 2015-16 financial year was characterised by an unusually dry spring season, providing ideal conditions for effluent irrigation on land. The slight increase in effluent recycling from the previous year is therefore consistent with expectations. It is not indicative of structural investment in this area to facilitate an expansion of reuse as an alternative to the continued discharge to waterways.

Table 3.2 Volume of Recycled Water and percentage of total treated effluent reused

Year	Total volume of effluent recycled (ML)	Percentage of treated effluent recycled
2010-11	3 906	6.6
2011-12	3 520	6.5
2012-13	4 147	8.5
2013-14	5 239	9.4 ⁴
2014-15	4 814	9.4
2015-16	5 257	10.4

Table A-4.3 in Appendix 4 lists the proportion of effluent reused and reuse flow per year for each Level 2 STP between 2010-11 and 2015-16 inclusive.

3.3 Sewerage assets

Sewerage assets include STPs, pumping stations⁵, sewer mains and effluent outfalls⁶. Performance indicators for these assets relate to their number, density, length and operational performance.

3.3.1 Sewage treatment plants

Nearly every major township in Tasmania has reticulated sewerage and an associated STP. STPs discharge to waterways and to effluent recycling schemes. There were 177 899 properties connected to the sewerage network across Tasmania in 2015-16.

Table 3.3 Sewerage assets operated by TasWater as at 30 June 2016

Sewage pumping stations	Length of sewerage mains (km)	Level 1 STPs	Level 2 STPs	Total number of STPs
760	4 723	33	79	112

Table 3.3 summarises the sewerage assets operated by TasWater during 2015-16.

⁴ Correction of typographical error from 2013-14 Report which erroneously stated 9.24.

⁵ Sewage pumping stations pump sewage from low points in the reticulation system to facilitate the passage of sewage to the sewage treatment plant.

⁶ An effluent outfall is the outlet of a drain or a sewer where it discharges into another body of water, usually a lake, river or the sea.

Most of the listed STPs service major urban catchments and/or accept large volumes of industrial sewage (Smithton, Ulverstone, Pardoe Downs and Wynyard). The top five STPs remain unchanged from the previous year. Ti-Tree Bend STP remains the largest sewage treatment plant by inflow volume in the State (see Table 6.1 in Chapter 6).

The number of properties serviced per kilometre of sewer main gives an indication of the scale of TasWater's sewerage network and the spatial density and distribution of properties serviced.

In 2015-16, there were on average 38 properties serviced per kilometre of sewer main. This is lower than for most major mainland utilities, which would usually service around 59 properties per kilometre of sewer main.⁷

Table 3.4 provides a breakdown of Level 2 STPs by treatment level.

As in previous years the vast majority of Level 2 STPs operated by TasWater (67 of 79) fell into the secondary treatment category. With the commissioning of the new Rosebery STP in September 2015, the number of treatment plants providing tertiary treatment rose from 10 STPs in 2014-15 to 11 STPs in 2015-16.

Table 3.4 Number of Level 2 STPs operated by TasWater (by treatment level)

Primary	Secondary	Tertiary
1	67	11

Pardoe Beach STP in Devonport continued to be the only Level 2 STP in Tasmania providing only primary treatment in 2015-16. Effluent from this STP is discharged via a long ocean outfall. Long-term ambient monitoring has not indicated any significant environmental impacts outside the mixing zone.

3.3.2 Recycled water treatment plants

Table 3.5 categorises the Level 2 STPs operated by TasWater according to whether full reuse, partial reuse or no reuse of treated effluent occurred over the last five financial years. Partial reuse schemes are further divided into those achieving less than 50 per cent, and greater than 50 per cent, recycling. Schemes are re-classified each year based on the actual recycling percentages achieved.

The table highlights that the number of STPs associated with full reuse schemes increased in 2015-16 and that the number of 'no reuse' STPs increased by the same number.

⁷ Bureau of Meteorology, *National Performance Report 2015-16: urban water utilities*, March 2017 (indicator A3).

Table 3.5 Classification of reuse schemes associated with Level 2 STPs

	Tasmanian reuse category				Recycled WTPs (More than 50% reuse)
	Full	Partial (>50% recycled)	Partial (<50% recycled)	None	
2010-11	6	12	14	47	18
2011-12	5	13	16	45	18
2012-13	8	17	12	42	25
2013-14	7	19	11	42	26
2014-15	10	18	7	43	28
2015-16	13	12	8	46	25

Discharge from the Carrick STP to a partial reuse scheme was authorised in June 2015, however there was no effluent reuse reported for this scheme for 2015-16 due to delays to the implementation the scheme. The new STP at Rosebery, where climatic conditions do not favour effluent irrigation, also contributed to the increase in STPs in the 'no reuse' category.

3.4 Performance data

The performance of the sewerage infrastructure is assessed against a range of measures relating to sewer blockages, breaks and chokes, at both the sewer main and property connection points.

3.4.1 Sewer main breaks and chokes

The number of breaks and chokes in the sewer main indicates both the level of service received by customers and the condition of the sewerage network. A break or leak is a failure of the sewer main which results in an interruption to the sewerage service. A choke is a partial or total blockage that may or may not result in a spill from the sewer system to the external environment.

Across its sewerage system in 2015-16, TasWater reported 2 895 sewer main breaks and chokes, which is more than the 2 710 breaks and chokes reported in 2014-15.

Reliability of the sewerage network is measured by the frequency of service failure, as indicated by the rate of sewer breaks and chokes per 100 kilometres of sewer main (Table 3.6). This measure does not include sewer breaks and chokes that occur within property connections.

TasWater's performance of 61 breaks and chokes per 100 kilometres in 2015-16 appears to be in line with previous years and is well below the minimum service standard of 104. However, the rate reported nationally for similarly sized utilities was around half TasWater's performance at 32 breaks and chokes per 100 kilometres of sewer main.⁸

⁸ Bureau of Meteorology, *National Performance Report 2015-16: urban water utilities*, March 2017 (indicator A14).

Table 3.6 Sewer main breaks and chokes

	Total number of breaks and chokes	Sewer mains breaks and chokes (per 100km sewer main)
2010-11	2 619	56
2011-12	2 723	57
2012-13	2 669	56
2013-14	2 244	50
2014-15	2 710	57
2015-16	2 895	61

Stormwater ingress, particularly during periods of high rainfall, is a major factor affecting the frequency and impact of sewerage system chokes and overflows.

3.4.2 Property connection sewer breaks and chokes

The property connection is a short sewer owned and operated by TasWater, which connects the sewer main and the customer's property at the inspection opening. TasWater measures and reports on breaks and chokes in property connections on a per 1 000 connected properties basis.

The rate of property connection sewer breaks and chokes reported for 2015-16 was 5.3 per 1 000 property connections. This is the same result as the previous year and is comparable to other water utilities on the mainland. The national average for similarly sized urban water utilities around Australia is around four breaks per 1 000 properties⁹.

3.4.3 Sewer overflows

An overflow occurs when untreated sewage spills or discharges from the sewerage system (ie pumping stations, pipes, maintenance holes or designed overflow structures) escape into the external environment.

The rate of sewer overflows is calculated with reference to the length of the sewer mains and channels to give the average frequency of sewer overflows for the system per 100 km of sewer main as shown in Table 3.7.

⁹ Bureau of Meteorology, *National Performance Report 2015-16: urban water utilities*, March 2017 (indicator A15)

Table 3.7 Sewer overflows

	Number of sewer overflows reported	Sewer overflows (per 100 km of sewer main)
2010-11	235	5.7
2011-12	173	3.7
2012-13	178	3.9
2013-14	645	14.3
2014-15	164	3.5
2015-16	201	4.3

In 2015-16 TasWater reported 201 sewer overflows to the environmental regulator, the EPA. This equates to around 4.3 overflows per 100 km of sewer main.

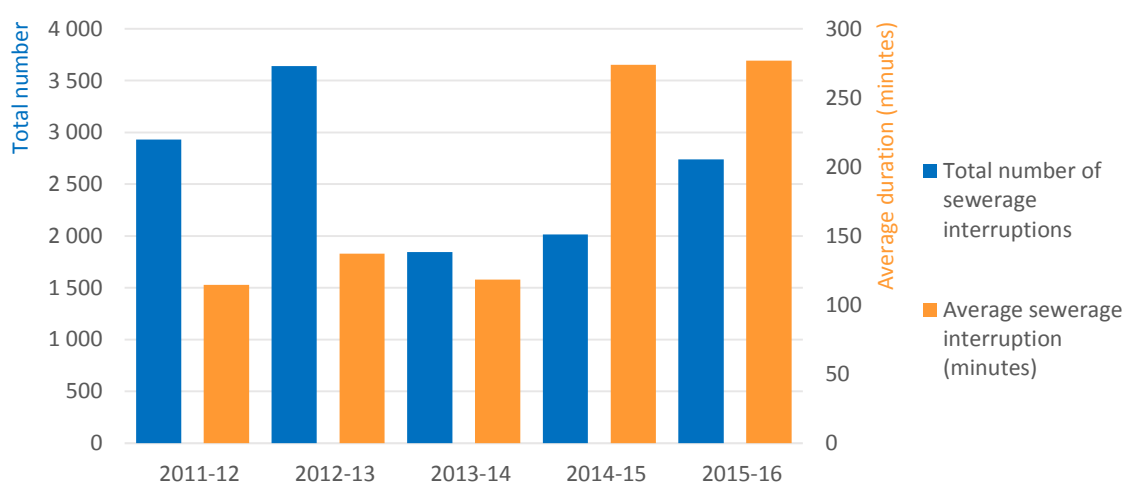
The rate of sewer overflows to the environment across Tasmania is high compared to similar sized utilities on the mainland, which historically report an average of between 0.5 and 1.0 sewer overflows per 100 kilometre of sewer main.¹⁰

3.4.4 Sewerage service interruptions

A sewerage service interruption is any planned or unplanned event causing a loss of sewerage services. An interruption starts when TasWater is made aware that sewerage services are no longer available and ends when normal service is restored.

During 2015-16, there were 2 740 sewer service interruptions, each of which lasted an average of 277 minutes (over 4.5 hours). This is significantly above the minimum service standard (180 minutes) and the typical performance level reported by similar utilities on the mainland (160 minutes). The average duration of sewerage interruptions over the past five years is shown in Figure 3.2.

Figure 3.2 Sewerage service interruptions



¹⁰ Bureau of Meteorology, *National Performance Report 2014-15: urban water utilities*, March 2016 (indicator E13).

Table 3.8 shows the average duration of interruptions and customer minutes off supply for sewerage interruptions, together with the minimum service targets which TasWater is required to meet.

Table 3.8 Sewerage service interruptions

	CSC standard ¹¹	2011-12	2012-13	2013-14	2014-15	2015-16
Average time to attend breaks and chokes (minutes)	60	-	66	61	51	55
Average time to attend breaks and chokes (% of time standard achieved)	90	-	-	-	NR	74
Average duration (minutes)	180	115	137	118	274	277
Average duration (% of time standard achieved)	80	-	-	-	-	78
Spills contained within five hours (%)	99	-	94	99	98	100

In 2015-16, TasWater exceeded the attendance time standard specified in the Code for sewerage breaks and chokes. The average duration of sewerage service interruptions was above the service standard by more than 50 per cent; failing to meet the standard for the second year in a row. All sewerage spills were contained within five hours in accordance with the service target.

¹¹ Minimum service standards for 2015-16, as per the Customer Service Code.

4 CUSTOMER SERVICE

This Chapter outlines TasWater's customer service performance with respect to the operation of its call centre and management of complaints as well as the timeliness of its responses to service complaints and interruptions.

As at 30 June 2016, approximately 202 478 properties were connected to the water and sewerage network operated by TasWater, with residential customers making up around 90 per cent of those connections.

4.1 Complaints

The numbers of, and categories of, customer complaints received by TasWater provides a general indication of overall customer satisfaction and is also a useful way of identifying issues of concern to customers.

For 2015-16, TasWater's customer service standard was nine complaints per 1 000 properties.

During 2015-16, TasWater received 2 892 complaints or 14 complaints per 1 000 properties which exceeds the service standard by almost 50 per cent. Compared to 2014-15, the total number of complaints increased by 24 per cent.

① As defined in Australian Standard ISO 2006 a complaint is an:

"...expression of dissatisfaction made to an organisation related to its products, or the complaints-handling process itself, where a response or resolution is explicitly or implicitly expected."

TasWater reported that improved complaint measurement processes across the organisation has resulted in the increase in the number of complaints recorded. However, the rate of complaints per 1 000 properties is much higher than reported for comparable utilities on the mainland (long term average of five per 1 000 properties).

Figure 4.1 Summary of complaints received by category

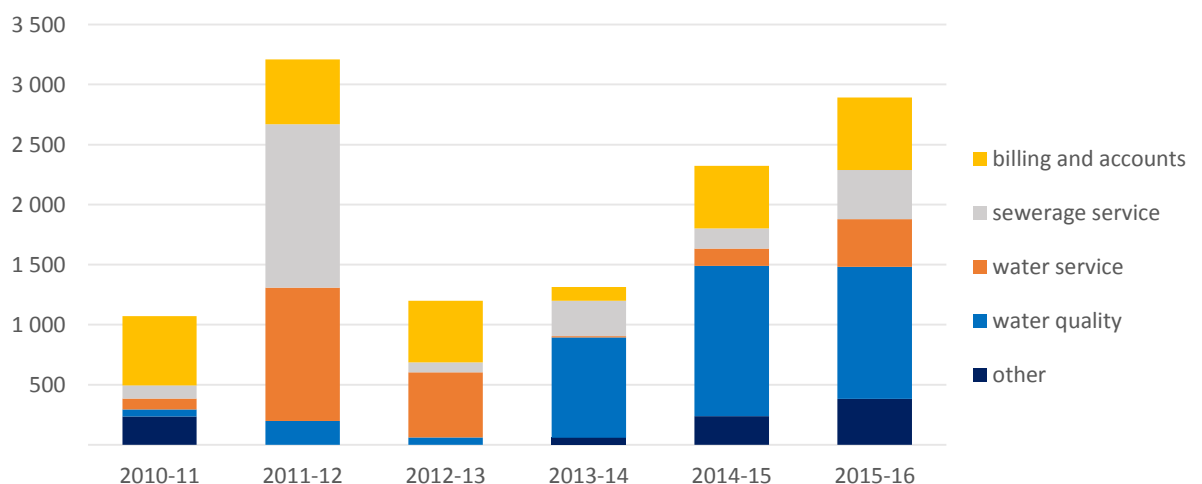


Figure 4.1 summarises the complaints received by category over the last six years. As with the previous year, the majority (38 per cent) of complaints in 2015-16 were in relation to water

quality (ie taste, colour and odour) and billing and accounts (21 per cent). The proportion of water quality related complaints is reflective of the water quality challenges facing TasWater.

The number of billing and accounts related complaints for 2015-16 was consistent with the number of complaints relating to these issues over five of the last six financial years and has shown no significant sign of improvement.

The number of water and sewerage service complaints (complaints concerning interruptions, bursts or leaks and reliability) more than doubled in 2015-16 compared to previous year. It is likely that the flood events experienced during the year had an impact on the number of complaints received on these issues.

Overall, 89 per cent of complaints were resolved within 10 business days for the year against a target of 80 per cent.

Customers whose complaints are not resolved through TasWater's customer complaints process may refer their complaint to the Ombudsman. TasWater has a target of having less than 0.5 complaints per 1 000 properties referred to the Tasmanian Ombudsman (the Ombudsman).

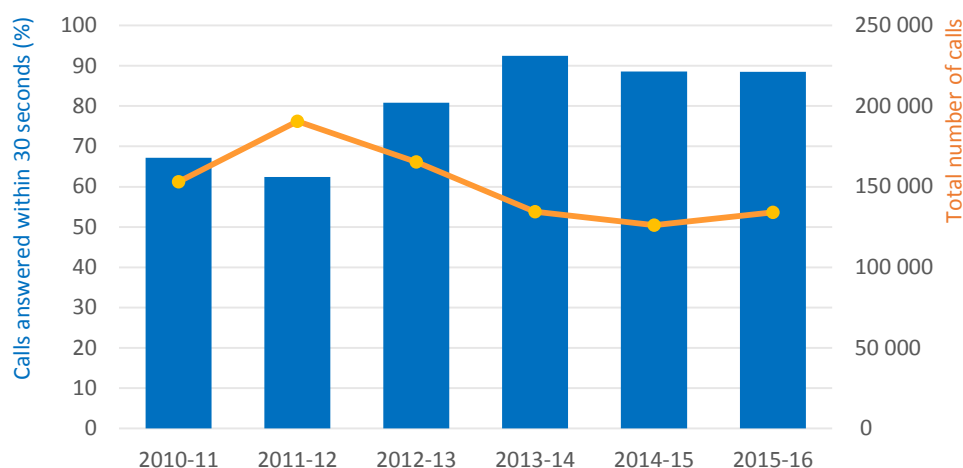
The Ombudsman received 77 complaints regarding TasWater during 2015-16 which equates to 0.38 complaints per 1 000 properties which was a slight increase from the 0.32 complaints per 1 000 properties received for 2014-15. TasWater officers also reviewed and resolved 46 preliminary enquiries while one preliminary enquiry was formally raised with, and resolved by TasWater's Chief Executive Officer.

4.2 Call centre performance

Call centres provide an important link between customers and TasWater and remains a popular way of doing business for many customers.

TasWater's call centre performance is measured in terms of the time it takes an operator to answer a customer's call. TasWater's call centre operators are required to answer 85 per cent of calls (ie where the customer has selected a relevant operator option) within 30 seconds.

Figure 4.2 Call centre performance



TasWater's call centre received 134 127 calls during 2015-16, 88 per cent of which were answered within the 30 second service target. Call volumes have remained low in 2015-16

compared to an observed high in 2011-12 (during operation of the three regional corporations).

Overall, the responsiveness of the call centre has consistently performed above the service standard over the past three years. TasWater's call centre response time was above the national average for similar sized water utilities, which averaged 80 per cent of calls answered within 30 seconds in 2015-16.¹

4.3 Payment management

TasWater is obliged, under the Code, to provide customers with flexible payment options and to offer a hardship program to customers who are experiencing difficulty paying their bill.

Table 4.1 shows data for residential customers who had difficulty paying their accounts during 2015-16. As at 30 June 2016, 858 non-residential customers were also repaying a debt.

Table 4.1 Residential customers with payment difficulties

Category	2015-16	
Residential customers repaying a debt	5 095	
Average debt for residential customers	\$1 155	
Customers on hardship program (concession customers)	82	(37)
Restrictions applied for non-payment (concession customers)	0	(0)
Restrictions removed within seven days of being applied (Concession customers)	-	-
Customers to which legal action applied for non-payment of water bill	0	

Of the 5 095 residential customers repaying a debt in 2015-16, 57 per cent owed more than \$500. The average debt of residential customers increased by 13 per cent compared to the previous year, with residential customers owing on average \$1 155, which is the equivalent of a typical annual bill for water and sewerage assuming water consumption of 550 litres per day (around 200 kL per year).

The number of customers on the hardship program has reduced to 82 as at 30 June 2016, with 37 concession customers using the program. Customers using the program have significant levels of debt, with the average around \$2 946.

In certain circumstances, TasWater may restrict or disconnect the water supply to residential customers for non-payment. Water restrictions are only applied after other arrangements such as flexible payment plans have failed to achieve the desired outcome of the customer either paying or agreeing to pay their outstanding account. Once again, no restrictions were applied to customers in 2015-16.

After all reasonable steps have been taken to allow a customer to pay an outstanding debt, TasWater may commence legal action to recover the debt in court. During 2015-16 TasWater did not pursue legal action against any customers due to non-payment.

¹ Bureau of Meteorology, *National Performance Report - urban water utilities, 2015-16* (indicator C14)

5 PUBLIC HEALTH

There were 87 monitoring zones (water supplies) across the 70 public drinking water supply systems managed by TasWater in Tasmania during 2015-16.

Sixty eight of the water supply systems are classified by a single monitoring zone (or water supply). The Greater Hobart system has ten monitoring zones and the Huon Valley system has nine monitoring zones. Compliance is assessed against each of the monitoring zones and accordingly this Chapter reports the information of the 87 water supplies only.

5.1 Drinking water treatment

Further to the three categories of water treatment discussed in section 2.3.1, some water supplies have no treatment processes prior to supply to customers.

During 2015-16, 18 water supplies supplied raw water (no treatment) with 14 of these supplies operated on a permanent boil water alert; whilst the other four operated on a public health alert (see Section 5.3.1).

Eight water supplies provided disinfection only, with a single treatment barrier such as chlorination or ultra violet light. One of these water supplies operated on a permanent boil water alert, two on a temporary boil water alert, with the other five classified as drinking water quality. However, chlorination can become ineffective if the source water becomes turbid, which commonly occurs during heavy rain events and/or drought conditions. When chlorination may become ineffective a temporary boil water alert is issued.

The remaining 61 water supplies (70 per cent) had multiple water treatment processes to address public health risks posed by the source water quality. These require effective operation and ongoing maintenance to ensure the water treatment processes are appropriate and adequate. These systems are effective against most bacteriological hazards that may be present in the source water.

Two of these water supplies operated on a permanent boil water alert and five on a temporary boil water alert at some stage during 2015-16. The remaining 54 water supplies of this category supplied water of drinking water quality throughout the period.

5.2 Bacteriological compliance of water supply systems

Bacteriological compliance monitoring is one way of measuring the effectiveness of the management of drinking water supplies. Bacteriological monitoring of the water demonstrates whether the microbiological risk associated with each component of the water supply has been adequately managed.

The determination of the bacteriological compliance of a drinking water supply depends on collecting sufficient appropriate microbiological samples. Water suppliers must sample and test drinking water from their drinking water supplies in accordance with the

① Drinking water guidelines

The Australian Drinking Water Guidelines (ADWG) and the Tasmanian Drinking Water Quality Guidelines 2015 (DWQG)

sampling requirements prescribed in the ADWG and the Tasmanian DWQG. Sufficient samples and appropriate frequency of sampling demonstrate that monitoring is representative of the water provided to consumers throughout the year.¹

In 2015-16 TasWater adequately monitored 93 per cent of its water supplies in compliance with the required sampling frequency specified in the ADWG and DWQG. The exceptions were the water supplies to Cornwall (100 people), Ellendale (187), Huon Valley Jacksons Road (61), Longford (10 327), Mathinna (179) and Maydena (301), where insufficient samples were taken. By considering the missing samples (ie the missing sample was considered to be non-compliant) it was possible to evaluate bacteriological compliance for most of these supplies. For five of these six water supplies there was sufficient data to determine that they were bacteriologically compliant, even with the worst case assumption for missing samples. Only the Maydena water supply remained of unknown compliance.

Of TasWater's 87 public drinking water supplies, 66 were considered by the DHHS to be bacteriologically compliant (76 per cent). The 20 water supplies (23 per cent) that were non-compliant were: Branxholm (430 people), Colebrook (177), Cornwall (100), Derby (274), Epping (53), Gladstone (110), Gormanston (40), Gretna (178), Herrick (31), Huon Valley – Jacksons Road (61), Judbury (266), Lady Baron (196), Mathinna (179), Mole Creek (581), Mountain River (4), Pioneer (19), Ringarooma (440), Rossarden (94), Whitemark (330) and Winnaleah (100). One water supply (Maydena (301)) was assessed as unknown compliance.

Table 5.1 compares the level of compliance, non-compliance and unknown compliance (due to insufficient sampling) from 2011-12 to 2015-16. There was an improvement in bacteriological compliance from 2011-12 to 2012-13 and 2013-14. The lower compliance in 2014-15 was in part due to classifying systems as unknown compliance due to insufficient sampling. Bacteriological compliance in 2015-16 was similar to 2012-13 and 2013-14.

Comparisons of previous years with 2015-16 should be done with caution because of the changed methodology for determining bacteriological compliance in water supplies that have not met their required sampling frequency. Previously, any water supply that was not sufficiently sampled was classified as unknown compliance. In 2015-16, by assuming that all missing samples were non-compliant (ie a worst case scenario) five such supplies could be assessed as compliant, rather than of unknown compliance.

Table 5.1 Bacteriological compliance of drinking water supplies (per cent of supplies)

Bacteriological compliance	2011-12	2012-13	2013-14	2014-15	2015-16
Compliant	68	76	76	72	76
Non-compliant	31	24	23	17	23
Unknown compliance	1	0	1	11	1

TasWater uses bacteriological compliance data to inform management of the risks associated with non-compliant water supplies. This action will be necessary until TasWater can commission the capital projects required to provide permanent improvements to the bacteriological quality of these water supplies.

¹ Information about the quality of each drinking water supply can be obtained from the DHHS Annual Drinking Water Quality Report or from water quality reports published by TasWater.

It is anticipated that in coming years, key projects such as the Ringarooma Valley, Mole Creek, King Island and Flinders Island water systems will address many of the issues with currently non-compliant water supplies and will improve the overall level of compliance within the State.

5.2.1 Incidence of boil water alerts

In accordance with the DWQG issued under the *Public Health Act 1997*, when water samples indicate non-compliance (eg *E.coli* are detected), TasWater must undertake immediate corrective actions to minimise the public health risk. Most commonly, the source of the contamination is quickly identified and the contamination removed or treated. At other times a more wide ranging investigation is required and a temporary boil water alert is issued to protect the public from the risk of water contamination in the meantime.

① Boil water alerts

When a boil water alert is issued, water should be brought to a rolling boil and then cooled to room temperature or below before drinking or use in food preparation. Boiling the water kills pathogenic bacteria, viruses and protozoa.

Permanent boil water alerts are issued for water supplies that are not able to prevent contamination from various environmental sources and where there is inadequate or no water treatment process in place. In these instances consumers need to act to protect themselves from the hazards of potentially contaminated water.

Temporary boil water alerts are used to manage well defined time-limited (usually short term) events. If the source of contamination or risk cannot be addressed within three months, the status is changed to a permanent boil water alert, and additional criteria must be met before the alert can be lifted.

The majority of Tasmanian water supplies which operate under a permanent boil water alert have no water treatment processes (such as disinfection by chlorination) in place to reliably protect the public from risks posed by any episodic contamination.

In 2015-16, 18 of TasWater's public drinking water supplies operated under a permanent boil water alert because they did not receive any water treatment or significant public health risks were identified that could not be mitigated by their respective treatment barriers. These water supplies collectively supplied water to around one per cent of the Tasmanian population receiving a reticulated supply. Of these 18 water supplies, 14 were raw water supplies where no treatment is provided, one was treated with disinfection only, and two water supplies were subject to full treatment with two or more treatment barriers.

Seven water supplies operated on a temporary boil water alert owing to varied compliance with the microbiological standards or the identification of potential risks to public health. These water supplies affected approximately 3.8 per cent of the Tasmanian population receiving a reticulated water supply. Of these seven water supplies, two received disinfection only and five were fully treated supplies. Only two of these temporary boil water alerts remained in place at the end of the reporting period.

Table 5.2 compares the number of water supplies which operated with permanent or temporary boil water alerts between 1 July 2011 and 30 June 2016. During 2015-16 there were 18 drinking water supplies with a permanent boil water alert in place. This is an increase on the number reported in 2014-15 owing to both the Scamander and Wayatinah water supplies being changed from a temporary boil water alert to a permanent boil water alert.

Table 5.2 Incidence of boil water alerts

Alert type	2011-12	2012-13	2013-14	2014-15	2015-16
Temporary boil water alerts	10	6	6	5	7
Permanent boil water alerts	22	22	19	16	18

5.2.2 Population receiving bacteriologically compliant reticulated water

Approximately 92 per cent of Tasmanians² receive their drinking water from a public drinking water supply.

In 2015-16, 0.8 per cent of the Tasmanian population serviced with reticulated water supply received drinking water that was bacteriologically non-compliant or of unknown compliance. This result remains in contrast to mainland jurisdictions where full microbiological compliance is generally achieved.

5.3 Chemical compliance of water supply systems

In 2015-16, TasWater adequately monitored 98 per cent of its water supplies for chemical contaminants. The exceptions were Lady Baron (196 people) and Whitemark (330). These two water supplies did not take the required number of chemical samples and therefore have been classified as of unknown compliance. In the samples that were taken at Lady Baron and Whitemark, contaminants did not exceed the health related guideline values.

Health based guideline values are conservative and incorporate a range of safety factors that err on the side of caution so as to protect public health. Guideline values represent the maximum allowable concentration of a chemical that would not result in any significant risk to the health of the consumer over a *lifetime* of consumption. For most parameters, intermittent exceedances of guideline limits do not result in adverse health effects.

Thirteen of TasWater's water supplies had chemical contaminants detected above the ADWG health guideline during 2015-16. For an additional two water supplies, the sampling did not meet the ADWG requirements.

Table 5.3 shows the number of water supplies that had chemical contaminants detected above the ADWG health guideline values between 1 July 2011 and 30 June 2016.

Table 5.3 Number of water supplies exhibiting chemical non-compliances

	2011-12	2012-13	2013-14	2014-15	2015-16
Chemical non-compliances	12	14	14	14	13

During 2015-16, temporarily elevated levels of lead were detected in four water supplies (Dowlings Creek (291 people), Gormanston (40), Lake Barrington (2 170) and Pioneer (19)). One water supply (Rosebery (1 017)) detected temporarily elevated levels of lead and disinfection by-products. One water supply (Avoca (245)) detected temporary elevated levels of cadmium and disinfection by-products. Seven water supplies (Colebrook (177), Coles Bay (100), Conara (166), Ellendale (187), Epping (53), Tullah (277) and Wayatinah (48))

² Connection data provided by TasWater is normalised through the estimated occupancy rate for each water supply area as sourced from the ABS website through population data.

detected temporarily elevated levels of disinfection by-products. In all cases, subsequent remedial action by TasWater and re-sampling of the water supply showed that contaminants had returned to acceptable levels.

5.3.1 Incidence of Public Health Alerts

Public health alerts are put in place when non-compliant water is detected that cannot be rendered safe by boiling. Five water supplies operated under a public health alert during 2015-16 (Avoca, Pioneer, Rossarden, Winnaleah and Whitemark). These alerts affected 0.3 per cent of the serviced population.

Table 5.4 shows the number of water supplies operating under a public health alert from 1 July 2011 to 30 June 2016. There were no new public health alerts issued during 2015-16. The increase over the years is attributable to greater compliance with monitoring programs to better identify potential public health risks. As at 30 June 2016 TasWater's actions had not resulted in improved chemical compliance of the affected water supply systems.

Table 5.4 Number of water supplies operating on a public health alert

	2011-12	2012-13	2013-14	2014-15	2015-16
Public health alerts	0	3	3	5	5

5.3.2 Population receiving chemically compliant reticulated water

In 2015-16, 98.8 per cent of the Tasmanian population serviced by a reticulated water supply received drinking water that was chemically compliant. The 1.2 per cent of the Tasmanian population receiving drinking water that was chemically non-compliant or of unknown compliance was a significant decrease from the 14.5 per cent reported in 2014-15. This was largely due to the Forth (37 480 people) and Pet River (20 295) supplies being found to be compliant during 2015-16.

5.4 Fluoridation of public drinking water supply systems

In nature fluoridation of water can occur when fluoride compounds dissolve in water as it passes through rocks and soil. Tasmania's natural water supplies are comparatively low in fluoride, so fluoridation of drinking water is carried out to adjust the level of fluoride in the water to a level considered safe and effective in preventing tooth decay.

The widespread fluoridation of water in Tasmania is conducted in accordance with the *Australian National Oral Health Plan 2015-2024* which advocates water fluoridation of public water supplies for communities across Australia with populations of 1 000 or more. In Tasmania, fluoridation of public water supplies has been achieved in all communities of greater than 1 000. Only Tasmania, the Australian Capital Territory and the Northern Territory have achieved this significant outcome.

Tasmania was the first jurisdiction to fluoridate a public drinking water supply (Beaconsfield in 1953). Under the *Fluoridation Act 1968*, the Minister for Health directs TasWater (based on recommendations from the Fluoridation Committee) to fluoridate specific public water supplies in a prescribed manner. Included in this Ministerial Direction is the need to monitor the level of fluoride in drinking water daily.

5.4.1 Fluoridation compliance

Of the Tasmanian population receiving a reticulated water supply, 98 per cent receive fluoridated water.³

Under the *Fluoridation (Interim) Regulations 2009* the fluoride concentration range required in the drinking water supply (to achieve optimum tooth decay prevention) is 0.8 to 1.2 milligrams per litre (mg/L) whilst the maximum level of fluoride allowed in the water (ie the maximum level specified in the ADWG) is 1.5 mg/L. The *Tasmanian Code of Practice for Fluoridation of Public Water Supplies (2007-10)* recommends a compliance level of 90 per cent (ie that 90 per cent of all daily readings fall within the required concentration range).

In 2015-16 there were 39 fluoridation systems in operation throughout the State servicing 51 of the 87 water supplies. All of the 39 fluoridation systems maintained an average fluoride dose within the required fluoride concentration range.⁴ This is an increase on the 38 systems operating within the required range during 2014-15.

Table 5.5 shows fluoridation compliance between 1 July 2011 and 30 June 2016. In 2015-16, 100 per cent of Tasmanians receiving a fluoridated reticulated water supply received water with an average fluoridation concentration within the prescribed range of 0.8 to 1.2 mg/L.

Table 5.5 Fluoridation compliance (per cent of serviced population)

	2011-12	2012-13	2013-14	2014-15	2015-16
Fluoridation compliance	75	99	99	97	100

Of the 39 fluoridated systems 29 achieved compliance of 90 per cent or greater in 2015-16. These systems provided fluoridated water to approximately 87 per cent of the Tasmanian population who receive reticulated water. This is an increase from 2014-15 when only 69 per cent of the serviced population receiving compliant fluoridated water.

The Hobart supply system is complex with four fluoridation systems servicing the ten water supplies. At any given time the reticulated water can comprise a mix of water from different supplies and fluoridation systems, with the mix varying in different Hobart locations. Extensive monitoring therefore occurs around the Greater Hobart reticulation network to confirm fluoridation levels being supplied to customers.

Two of the four fluoridation systems servicing Greater Hobart did not comply with the requirement of having greater than 90 per cent of samples within the 0.8 – 1.2 mg/L range. Only 861 people received this non-compliant fluoridated water while the remaining 217 718 people in Greater Hobart received a combination of fluoridated water from the other fluoridation systems which exhibited compliance exceeding 90 per cent.

³ TasWater is wholly responsible for the operation and maintenance of fluoridation systems and is obliged under the Fluoridation Act to fluoridate the drinking water when directed to do so.

⁴ All daily fluoride samples (both treated and distribution) are averaged over a 12 month period to result in a yearly fluoride average against which compliance is assessed.

6 ENVIRONMENT

6.1 Sewerage schemes

For the purposes of this Chapter, only the performance of the 79 Level 2 STPs operated by TasWater is assessed.

Key issues which can have an impact on performance of STPs are outlined in Appendix 2.

EPA Tasmania's analysis of the performance of STPs operated by TasWater during 2015-16 can be found in Appendix 4. Where flow data was incomplete, sewage volumes have been estimated.

① Sewage treatment plants (STPs)

The information in this section does not extend to Level 1 STPs, which have a design capacity of less than 100 kilolitres per day and continue to be regulated by local government (Councils) nor does it include STPs operated by bodies other than TasWater.

As shown in Table 6.1, 14 TasWater Level 2 STPs received annual inflows of more than 1 000 ML for 2015-16. Most of these service major urban catchments and/or accept large volumes of industrial sewage (ie Smithton, Ulverstone, Pardoe Downs and Wynyard). Ti-Tree Bend STP remains the largest STP by inflow volume in the State.

Table 6.1 Tasmanian STPs with annual inflows exceeding 1 000 ML/year

Premises name	Catchment area	Total flow 2014-15 ML/year	Total flow 2015-16 ML/year	Change (%)
Ti-Tree Bend	Launceston	8 007	6 158	-23
Pardoe Downs	Devonport	4 259	4 838	14
Macquarie Point	Hobart	3 791	3 780	0
Selfs Point	Hobart	3 525	3 696	5
Prince of Wales Bay	Hobart	2 942	2 963	1
Ulverstone	Ulverstone	2 184	2 631	20
Rosny	Hobart	2 203	2 192	-1
Round Hill	Burnie	2 075	2 042	-2
Cameron Bay	Hobart	1 766	1 682	-5
Blackmans Bay	Kingston	1 454	1 474	1
Wynyard	Wynyard	1 220	1 345	10
Smithton	Smithton	1 233	1 308	6
Newnham Drive	Launceston	1 051	1 122	7
Hoblers Bridge	Launceston	1 059	1 088	3

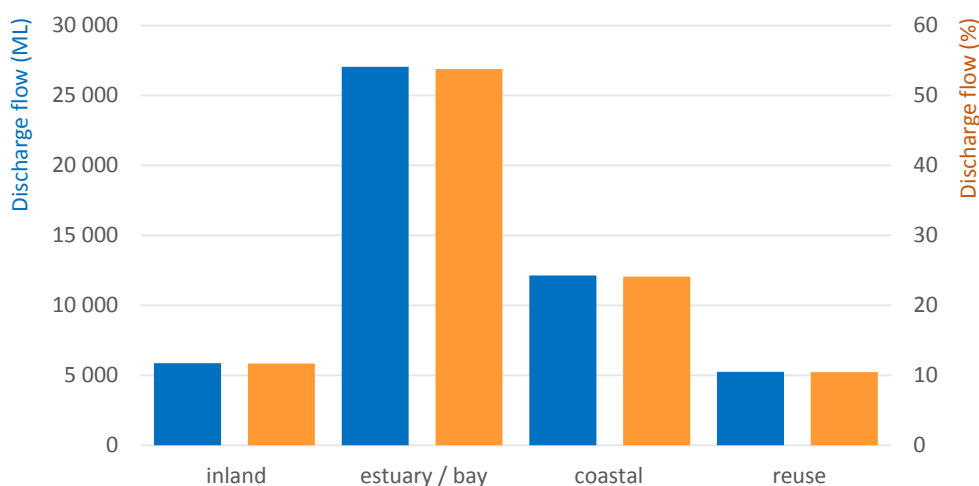
6.2 Outfalls to the environment

Sewage treatment plants discharge to inland, estuarine and marine (coastal) environments. The type of receiving environment provides an initial indication of the sensitivity of the receiving environment and its capacity to cope with pollutants.

Of the 79 Level 2 STPs operated by TasWater during 2015-16, 13 were classified as marine discharge, 31 as estuarine or bay discharge and 35 as inland waters discharge.

Figure 6.1 shows the volume and percentage of sewage discharged by Level 2 STPs during 2015-16, categorised by receiving environment. The distribution of treated effluent proportions by receiving environment has remained fairly static over the last five reporting periods.

Figure 6.1 Sewage discharge by receiving environment 2015-16 (ML/year; percentage of flow)



Of the total volume of effluent discharged to waterways, the majority was discharged to estuarine waters (27 051 ML or 53.8 per cent), followed by discharge to coastal waters (12 135 ML or 24.1 per cent) and inland waters (5 869 ML or 11.7 per cent). In addition, 5 257 ML (or 10.4 per cent) of effluent was reused.

Significant regional differences exist in relation to the receiving environment, reflecting the population settlement differences in each region. Discharges in the southern and northern regions of the State are predominantly to the Derwent and Tamar estuaries respectively, with smaller volumes to inland watercourses. In the north-western region discharges are predominantly to coastal environments.

6.3 Sewage treatment plant compliance

The level of compliance with discharge limits stipulated by the EPA for STPs is a key measure of overall environmental compliance.

In Tasmania, regulatory discharge limits for Level 2 STPs are specified in the environmental conditions issued for each facility by the Director of the Tasmanian EPA. Discharge limits vary depending on the sensitivity of the receiving environment, the volume of discharge and the date the conditions were issued.

Evaluation of STP performance against Accepted Modern Technology (AMT) limits is also undertaken. AMT limits represent a theoretical but stable benchmark. While AMT limits are not binding, the degree to which they are met is in some respects a better indicator of performance over time, as they have remained unchanged over the last five years. Determinations for upgrading regulatory limits to AMT standard will occur in the future.

Section 6.3.1 examines compliance against current regulatory limits, whilst performance against potential AMT limits is examined in section 6.3.2.

Compliance has been calculated for TasWater as a single entity since the Corporation's formation in July 2013. Previously, compliance was calculated separately for the three Regional Water Corporations. Back calculations of compliance on a state-wide level for the period prior to July 2013 provide a relevant baseline against which TasWater's compliance can be compared.

Calculations and charts in this section are based on analysis of effluent quality monitoring data maintained by EPA Tasmania.

Compliance is assessed for each parameter for which a limit is specified by determining the number of scheduled samples that complied with the specified limit as a percentage of the total number of scheduled samples analysed in the reporting period. Compliance percentages for all parameters are combined to provide one overall compliance figure for each STP. To account for STPs of varying hydraulic capacities, the flow weighted average of individual STP compliance is used as the value representing compliance.

If both land-based and water-based discharge limits exist for a STP, compliance is assessed separately against each limit provided an adequate monitoring data set is available. However, to calculate utility-based compliance, only flows directed to the respective receiving environments (ie waters vs reuse) are taken into account. This approach is used to reflect the fact that most effluent reuse schemes are operated on a seasonal basis and are reactive in terms of climatic conditions, with discharge patterns varying considerably from year to year.

6.3.1 Compliance with current discharge to waters limits

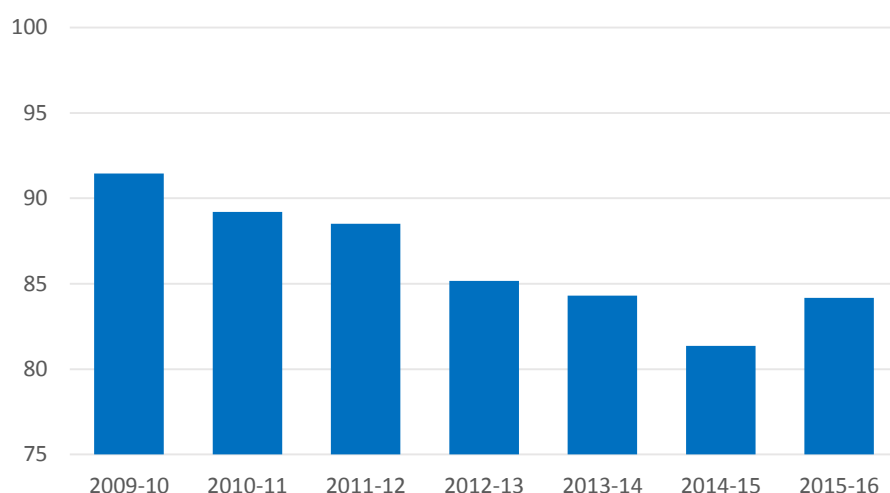
After excluding STPs without regulatory discharge to waters limits or inadequate monitoring data sets, 72 were STPs assessed under this measure (out of the total 79 Level 2 STPs).

Figure 6.2 shows compliance against discharge to waters limits over time. In 2015-16, TasWater achieved approximately 84 per cent compliance with the regulatory discharge to waters limits, a slight improvement on the result for 2014-15 but still less than the 88.4 per cent recorded for 2011-12.

① Discharge limits

EPA Tasmania issued more than 30 Environment Protection Notices (EPNs) over the course of the last five years. While the majority of these EPNs contain interim discharge limits, it is envisaged that the next phase of EPNs will introduce limits that reflect the assimilative capacity of the receiving environment and are commensurate with contemporary standards. This process will ultimately provide a more consistent and relevant benchmark for STP compliance. EPN roll-out is likely to continue for a number of years to facilitate this process.

Figure 6.2 Compliance against discharge to waters regulatory limits (per cent)



The majority of mainland utilities reporting on this indicator under the NPR framework in the past have recorded compliance levels in excess of 95 per cent. However, under the NPR classification system TasWater was compared with large utilities servicing predominantly metropolitan areas, which establishes a relatively higher benchmark. Since this indicator is no longer included in the NPR, a direct comparison with mainland utilities for 2015-16 is not possible.

Compliance levels are illustrated in Table 6.2. In 2015-16, 17 Tasmanian STPs were classified as substantially non-compliant (ie less than 75 per cent compliant), which is a slight improvement from the previous three reporting periods (20 STPs in this category for each of the 2012-13, 2013-14 and 2014-15 financial years). Comparison over the past five years highlights that there has been no tangible progress towards substantially improved compliance levels, with only around one third of STPs in the higher compliance category in 2015-16.

Only the Cygnet STP achieved 100 per cent compliance with its regulatory discharge limits and is considered fully compliant for 2015-16. However, this STP is subject to relatively dated, more lenient environmental conditions compared with contemporary conditions imposed on other plants.

Table 6.2 Number of STPs by compliance category (regulatory limits)

	2011-12	2012-13	2013-14	2014-15	2015-16
>90% compliance	29	33	25	22	24
>75 - 90% compliance	29	23	30	29	31
>50 - 75% compliance	12	11	15	15	12
<50 % compliance	5	9	5	5	5

Table 6.3 shows the five STPs which demonstrated 50 per cent or less compliance in 2015-16. This is the same number as in all previous years with the exception of 2012-13. The common characteristic between Kempton and Campania is that these are lagoon systems which have significant sludge accumulations which may be impacting on performance. Oatlands STP, which was represented in the low compliance category for a number of years, reached compliance levels of greater than 50 per cent in 2015-16 following desludging. Desludging of

the Kempton, Campania and Port Sorell STPs was not completed in 2015-16 as planned and has been postponed by one year. Low compliance levels with discharge to water limits for Kempton and Campania STPs were offset by significant effluent reuse percentages for these STPs (100 per cent and 91 per cent respectively). Ulverstone STP continued to struggle with high trade waste inputs into the system.

Table 6.3 STPs with 50 per cent or less compliance against discharge to waters limits

STP	Limit type	Number of limits assessed	Compliance (%)
Port Sorell ¹	Max	4	27.1
Campania ^{1,2}	Max	4	37.5
Kempton ^{1,2}	Max	4	39.6
Ulverstone ¹	Max	1	41.7
Bridport	Max	9	45.4

Notes: 1. Indicates consecutive years of 50 per cent or less compliance.

2. Indicates full reuse in 2015-16.

6.3.2 Performance against AMT discharge to waters limits

The limits adopted for the analysis in this section represent AMT standards contained in the *Emission Limit Guidelines for Sewage Treatment Plants* (DPIPWE, 2001). AMT limits, which differentiate between fresh water and marine receiving environment, incorporate stringent nutrient reduction standards. While AMT limits generally reflect expected performance at a tertiary treatment level, most sewage in Tasmania is currently treated to a secondary level only.

Figure 6.3 Performance against AMT discharge to waters limits (per cent)

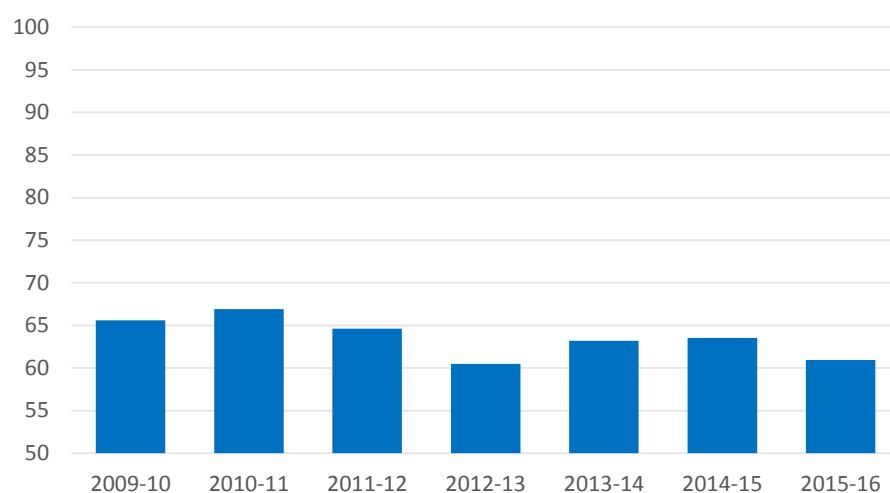


Figure 6.3 shows performance of TasWater's Level 2 STPs against AMT limits as a time series. Not surprisingly, the levels achieved are significantly lower than compliance with regulatory limits as shown in Figure 6.2.

Performance against AMT limits has remained relatively stable over the years with no consistent trend over the past five years. 2015-16 levels indicate slightly worse performance,

with 61 per cent of treated effluent volume achieving adherence to the limits compared to 63.5 per cent in the previous year.

The AMT category distribution highlights that performance has improved little over the past five reporting periods, with representation in the greater than 90 per cent category remaining around nine STPs. Table 6.4 below confirms that, in the longer term, there has been a reduction in the number of STPs in the two higher-performing categories and a recent increase of STPs represented in the less than 50 per cent category.

Table 6.4 STPs by performance category (AMT limits)

	2011-12	2012-13	2013-14	2014-15	2015-16
>90% compliance	10	7	7	9	9
>75 - 90% compliance	12	14	13	8	9
>50 - 75% compliance	33	32	38	39	33
<50 % compliance	23	25	19	17	23

6.3.3 Summary of discharge to waters limits compliance

EPA Tasmania's analysis shows that compliance with regulatory discharge to waters limits has generally declined over the last five years, with a small uplift in this reporting period. In addition, it is evident compliance levels worsened during the seven years from July 2009, when the water and sewerage reforms began and responsibility for the management of sewage infrastructure was transferred firstly to regional corporations and subsequently to TasWater.

Performance against AMT limits has decreased slightly but displays no consistent trend in the last five years.

In summary, while there have been some improvements from the low base of 2014-15 regulatory compliance levels, there is evidence of reduced performance over the longer term in relation to the indicators considered.

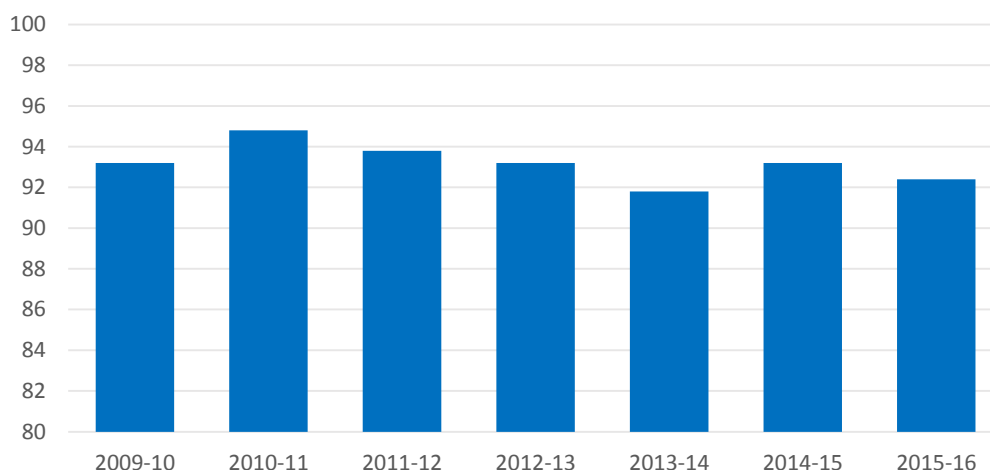
Table A4.1 and Figures A4.1 to A4.2 in Appendix 4 show compliance with regulatory limits and AMT limits for each STP.

Some STPs reported compliance with AMT limits that exceeded compliance with regulatory limits. This generally means that the regulatory limits, which are site-specific, are more stringent than AMT limits. This is the case for STPs at Cambridge/Airport, Cradle Mountain, Ranelagh, Selfs Point, Sisters Beach and St Helens. In the case of Kempton and Zeehan STPs, which also reported better compliance against AMT than regulatory limits during 2015-16, these outcomes are due to the limited number of parameters used to assess compliance against regulatory limits compared to the suite of parameters used to determine compliance against AMT limits.

6.3.5 Compliance with discharge to land limits

This section assesses the levels of compliance reported for effluent recycling schemes which utilise treated effluent generated by Level 2 STPs. Effluent recycling schemes operated during the reporting period were generally required to comply with 'Class B' quality standards (as outlined in the *Environmental Guidelines for the Use of Recycled Water in Tasmania* (DPIWE, 2002).

Figure 6.4 Compliance with 'Class B' discharge to land limits (per cent)



The chart illustrates that over the last five years, TasWater's flow-weighted compliance with 'Class B' reuse limits continued to be within an acceptable range of greater than 90 per cent, although in 2015-16 there was a slight performance decrease compared to the previous year. Review of compliance levels achieved by individual STPs indicates that some systems are clearly compromised and struggling due to overloading and/or sludge accumulation, with five STPs reporting less than 75 per cent compliance and another 17 STPs reporting less than 90 per cent compliance with the relevant limits.

6.3.6 Public disclosure of sewage treatment plant performance

TasWater is required to submit Annual Environmental Review (AER) reports to EPA Tasmania and make these publically available. TasWater provided AERs for all Level 2 STPs in 2015-16 and has therefore satisfied this requirement.

EPA Tasmania makes AERs available to the public upon request. In addition, publication of STP performance information in this report is another means of public disclosure, supporting transparency and making TasWater accountable to the community, government and regulators for its performance.

6.3.7 Compliance with the Director, Environment Protection Authority's requirements

As discussed in previous sections, TasWater failed to achieve full compliance with the regulatory discharge limits in relation to all except one Level 2 STP under its control.

Incidents with the potential to cause environmental harm at STPs or associated sewerage infrastructure can trigger an enforcement response under the provisions of the *Environmental Management and Pollution Control Act 1994*, or the associated regulations. Environmental

Infringement Notices (EINs) and formal Written Warning letters are the most commonly used enforcement provisions in relation to the release of pollutants to the environment associated with significant incidents.

Unlike the situation in previous reporting periods, TasWater did not receive any EINs or formal Written Warnings in 2015-16.

6.4 Biosolids reuse

This section reports on the level of reuse of biosolids, being the stabilised organic solids that result from sewage treatment processes.

Reuse involves managing biosolids safely and sustainably to beneficially utilise their nutrient, energy or other values. This may include biosolids beneficially used for agriculture (eg fertiliser), soil conditioning, mine rehabilitation and other applications recognised as reuse.

The reuse proportion can be calculated on the basis of:

$$\frac{\text{Total dry weight (tonnes) of biosolids reused}}{\text{Total dry weight (tonnes) of biosolids produced during the reporting period}}$$

Based on the information provided by TasWater to EPA under the EPA's regulatory annual reporting obligations, approximately 8 800 dry solid tonnes (DST) of biosolids were produced at level 2 STPs across Tasmania in 2015-16. Approximately 2 000 dry solid tonnes remained stored on site at the end of the reporting period while 12 300 DST were beneficially reused during 2015-16. A minor amount of about 20 DST of metal contaminated sludge was taken to landfill. Significant volumes of biosolids originating from 2013-14 and previously stockpiled at Ti Tree Bend STP were also utilised, resulting in a reuse percentage in excess of 100 per cent for 2015-16. Overall the proportion of the biosolids material beneficially reused was 140 per cent of the volume generated in 2015-16. Unlike previous reporting periods, landfill capping of composted biosolids did not represent a significant percentage of biosolids use in 2015-16.

TasWater undertook sludge surveys at a number of lagoon systems across the state in 2015-16, resulting in updated status information on sludge accumulation and a review of desludging priorities. Survey information confirmed significant sludge accumulations in a number of lagoon systems. Sludge volumes in excess of 60 per cent of lagoon volume were reported for lagoons at Deloraine, Margate, Port Sorell, Queenstown and Smithton. Desludging of lagoons with a high percentage of accumulated sludge is likely to enhance the treatment capacity of a lagoon system.

Sludge was removed from Brighton, Electrona, Longford, Margate, Port Sorell, Richmond, Ridgley and Stanley lagoon systems in 2015-16, in addition to the biosolids produced by mechanical STPs. An overview of the STPs generating the greatest volumes of biosolids in 2015-16 and associated reuse/management practices is provided in Table 6.5 below.

Table 6.5 Biosolids – major volumes generated and reuse percentage in 2015-16

STP Name	Biosolids generated (dry solid tonnes / year)	Biosolids beneficially reused (dry solid tonnes / year)	End use / purpose	Biosolids reused (%)	Comments
Ti-Tree Bend	~ 3 250	6 250	Ti-Tree Bend STP generates significant volumes of biosolids at the premises as well as receiving additional material from other STPs (Hoblers, Newnham, Riverside and St Helens STPs). 2000 DSTs of sewage sludge remained stockpiled at the STP premises at the end of 2015-16. The remainder was beneficially reused on agricultural land.	192%	In addition to material generated in 2015-16, 3 000 DST of a stockpile of 5 000 DST which remained on site at the end of 2014-15 was also utilised.
Selfs Point	965	965	All biosolids generated at Selfs Point STP were beneficially reused on agricultural land.	100%	
Rosny	657	657	All biosolids generated at Rosny STP were beneficially reused on agricultural land.	100%	
Prince of Wales Bay	593.2	593.2	All biosolids generated at Prince of Wales Bay STP were beneficially reused in 2015-16. 584.5 DST were directly applied to agricultural land, and 8.7 DST were composted prior to beneficial reuse.	100%	
State-wide (TasWater) total	8 784	12 330	Material removed from the treatment system but not the premises is counted as generated but not reused. Composted sewage sludge is counted as beneficially reused if the end product is used in accordance with the relevant definition in the <i>Tasmanian Biosolids Reuse Guidelines</i> (1999). Composted material used for landfill capping is not considered to be beneficially reused. Stockpile from previous reporting periods are not counted in biosolids generated.	140.4%	The biosolids reuse percentage in excess of 100% is reflective of a significant reduction in stockpiled biosolids. Another contributing factor to the increased reuse percentage is the reduction in use of composted biosolids for land fill capping. The percentage represents a further improvement on the previous year's reuse proportion (91.1%).

6.5 Net greenhouse gas emissions

This section reports on the impact of water and sewerage activities on greenhouse gas emissions. In doing so, it is important not to consider a single indicator in isolation, but rather to look at the total environmental footprint arising from water and sewerage activities. For example, increased sewage treatment levels can provide water quality benefits but will also consume additional energy, resulting in greater net greenhouse gas emissions.

In 2015-16, TasWater's total net greenhouse gas emissions were 34 919 tonnes CO₂-equivalents (CO₂e) or an average of 172 tonnes produced per 1 000 properties. Greenhouse gas emissions categorised into water and sewerage related operations are provided in Table 6.6.

As the quality and accuracy of the data reported to date is low, the only observation that can be made is that sewerage related operations produce a higher volume of CO₂e compared to water treatment operations due to the nature of STPs and the production of nitrous oxide and methane through sewage processing.

Table 6.6 Volume of greenhouse gases produced by TasWater (CO₂-equivalent)

	Water-related operations		Sewerage-related operations	
	CO ₂ e (tonnes)	CO ₂ e (per 1 000 properties)	CO ₂ e (tonnes)	CO ₂ e (per 1 000 properties)
2013-14	8 888	44.3	25 433	145.4
2014-15	9 786	48.8	21 697	123.0
2015-16	9 873	48.8	22 646	127.3

TasWater did not trigger the 50 000 tonnes CO₂-equivalent per facility reporting threshold under the *National Greenhouse and Energy Reporting Act 2007* (Cwlth).

TasWater is not required to report greenhouse gas emissions directly to the EPA under the stipulated environmental conditions for STPs.

7 PRICING AND FINANCE

This Chapter discusses water and sewerage pricing and provides an overview of TasWater's financial performance for 2015-16 including factors affecting the cost and affordability of water and sewerage services.

TasWater's prices must comply with the Economic Regulator's *Tasmanian Water and Sewerage Corporation Pty Ltd, Water and Sewerage Services Price Determination, 1 July 2015 – 30 June 2018* and the decisions outlined in the Economic Regulator's *2015 Price Determination Investigation – Regulated water and sewerage services in Tasmania – Final Report*, May 2015.

7.1 Pricing

There is state-wide pricing for water and sewerage. Residential tariffs are generally made up of:

- ❑ a fixed water service charge (based on the size of the water connection to the property);
- ❑ a variable water usage charge (based on the metered water usage); and
- ❑ a sewerage service charge (based on the number of equivalent tenements (ETs) assessed for each property).

① Equivalent tenements (ETs)

An ET is a classification used in the Water Services Association of Australia Sewer Code to measure the demand a property will place on infrastructure

In 2015-16 price regulation arrangements applied to TasWater's tariffs as customers continued to transition to regulated target tariffs. On 1 July 2015, customers who were paying above target tariffs were brought down to target fixed tariffs. Price constraints continued to apply during 2015-16 to customers transitioning up to target tariffs.

7.1.1 Average bills

Table 7.1 shows the components that make up a customer's typical residential bill based on average consumption and the applicable target tariffs.

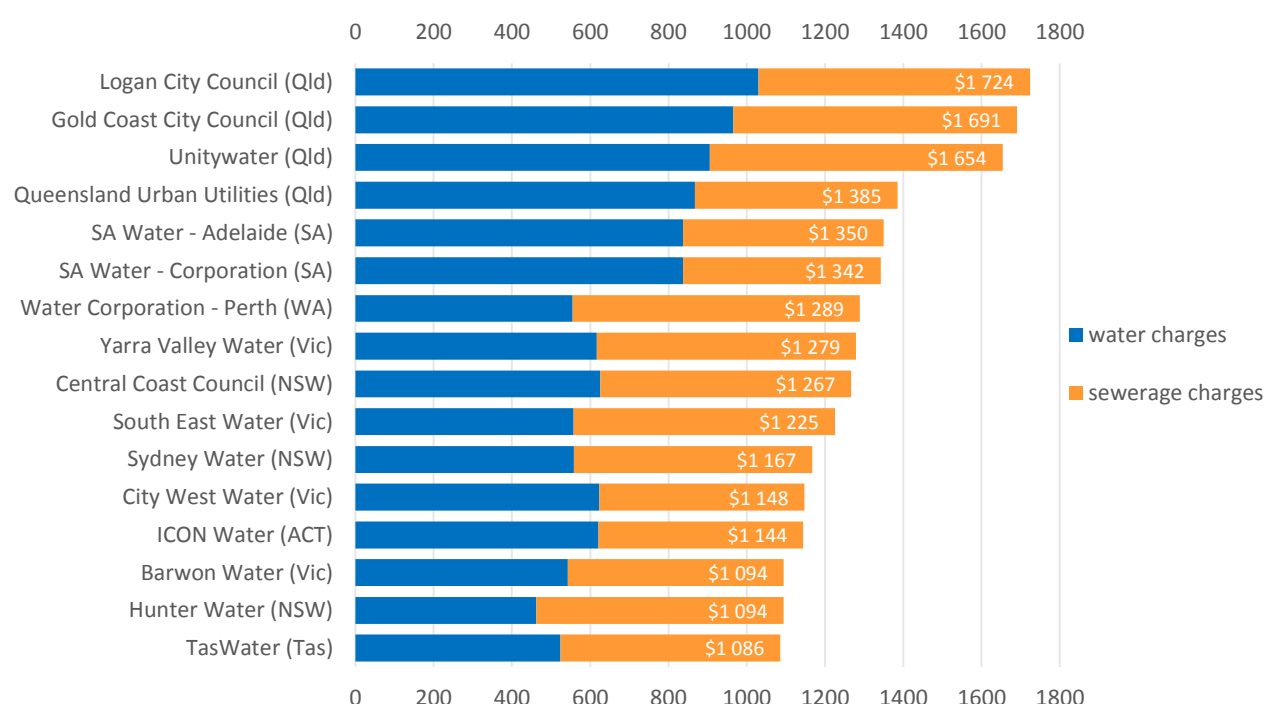
Table 7.1 Components of typical annual residential customer bill in 2015-16

Component	Charge
Water fixed charge	\$329.48
Water usage charge	97.11 c/kL
Average annual residential water use	176 kL
Typical residential bill - water	\$500.62
Sewerage fixed charge	\$561.60
Typical residential bill - water and sewerage	\$1 062.22

Annual bills for individual customers may differ from these figures depending on the price each customer is paying relative to the target tariff and the volume of water used. As at 30 June 2016, around 80 per cent of standard water customers were on the target tariff and around 75 per cent of customers were on target tariff for sewerage. Under the Industry Act, the transition of customers to target tariffs is required to be completed by 1 July 2020.

Figure 7.1 provides a comparison of water and sewerage bills for customers of major water utilities (with 100 000 or more customers) across Australia, including TasWater (target tariffs), for a hypothetical residential customer using 200 kL per annum in 2015-16.¹ The average residential bill for water and sewerage services was around \$1 300 while a TasWater customer's bill was the lowest in this group at \$1 086.

Figure 7.1 Annual bills based on 200kL/a (water & sewerage), 2015-16



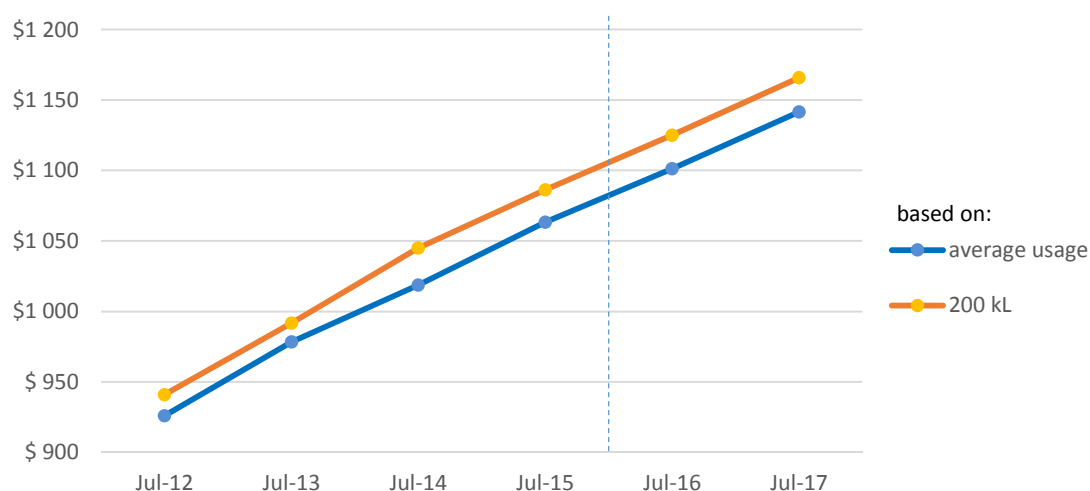
Within this group, Queensland's water utilities are the most expensive. Overall, it appears that TasWater customers are paying between \$100 and \$200 less than their interstate counterparts for water and sewerage. However, this reflects the fact that TasWater prices are transitioning to full cost recovery and have been constrained by limits on price increases.

Figure 7.2 shows the calculated annual residential bill for TasWater customers based on the target tariffs based on average usage and 200 kL per annum.

In 2015-16, annual residential bills rose by around four per cent nominally, which will continue each year over the second regulatory period from July 2015 to June 2018 (Figure 7.2).

¹ Bureau of Meteorology, *National Performance Report - urban water utilities, 2015-16* (indicator P7).

Figure 7.2 Annual residential bill (\$nominal)



Compared to other large utilities nationally, TasWater's fixed water charges are notably high, with the mainland charge averaging around \$190 per property.² However, TasWater's usage charges are significantly less than those charged by mainland utilities, whose higher usage charges (around 250 cents per kL) reflect priorities to encourage efficient water use. For example, many mainland utilities have inclining block tariff structures for water, with usage charges rising to over 300 cents per kilolitre. This difference in pricing reflects the fact that Tasmania does not typically experience water shortages with respect to supplying water for urban use.

7.1.2 Concession customers

To be eligible for a concession discount, the applicant must be legally responsible for the account and occupy the property as their principal place of residence as well as holding either a:

- ☐ Centrelink Health Care Card;
- ☐ Centrelink Pensioner Concession Card; or
- ☐ Department of Veterans' Affairs Repatriation Gold Card.

Eligible customers were entitled to an annual water and sewerage concession discount of up to \$179 (\$89.50 each for water and sewerage) in 2015-16. Year on year, the concession has generally increased in line with prices. In 2015-16, 52 286 customers received the benefit of a concession discount.

These concession arrangements are funded by the State Government and administered by TasWater. A community service obligation (CSO) payment is a subsidy provided by the State Government to allow for the provision of a good and/or service at less than total cost. In 2015-16, TasWater received a total of \$8.4 million in CSO payments to cover the cost of providing these concessions.

² Bureau of Meteorology, *National Performance Report - urban water utilities, 2015-16* (indicator P1.2)

7.2 Financial performance

This section presents TasWater's financial performance against a range of indicators. Analysis of these indicators provides a guide as to TasWater's financial efficiency, viability and longer term sustainability. Where shown, data from 2010-11 to 2012-13 is the sum of the previous regional corporations' aggregated results.

7.2.1 Revenue

Table 7.2 shows the previous regional corporations' aggregated total income and TasWater's total income together with the revenue collected from the provision of regulated water and sewerage services for the period 1 July 2011 to 30 June 2016 inclusive. It should be noted that total income includes revenue from other sources³ but does not include revenue from third parties (ie CSOs) or investments.

Table 7.2 Revenue (\$'000s, nominal)

	Previous regional corporations		TasWater		
	2011-12	2012-13	2013-14	2014-15	2015-16
Water	110 387	121 844	129 071	150 070	142 665
Sewerage	99 574	109 993	121 519	146 389	150 450
Total income	245 607	263 460	268 617	300 314	309 331

Total income in 2015-16 increased by three per cent compared to the previous year, due to underlying increases in regulated target tariffs and the continuation of arrangements to transition customers up to these tariffs. Water revenue fell by almost five per cent from 2014-15 to 2015-16, consistent with a decrease in urban water supplied and customers paying above target moving to target tariffs. Residential revenue from water usage represented around 23 per cent of water revenue in 2015-16.

7.2.2 Asset values

The written down replacement cost (WDRC) of TasWater's water and sewerage infrastructure assets (excluding plant and equipment) is shown in Table 7.3. The quantum of assets damaged or destroyed as a result of the flooding that occurred in the north and north-west of Tasmania is not reflected here and will be reported in 2016-17. TasWater is required to report on a WDRC basis rather than on the fair value basis required for its financial statements.⁴

Table 7.3 Fixed Asset values (\$'000s, nominal)

	2011-12	2012-13	2013-14	2014-15	2015-16
Water assets	1 379 749	1 441 614	1 383 105	1 378 227	1 308 099
Sewerage assets	1 357 729	1 369 638	1 307 119	1 316 010	1 320 226

³ See the 2013-14 National Performance Framework: Urban performance reporting indicators and definitions handbook for definitions.

⁴ See Note 9 of TasWater's 2015-16 Financial Statements (attachment to *TasWater 2015-16 Annual Report*).

As at 30 June 2016 TasWater held water and sewerage assets with a WDRC of just over \$2.6 billion. Over recent years, depreciation has offset the significant capital expenditure, with no consistent increase evident in asset values.

7.2.3 Operating costs

Operating costs (Opex) include any costs associated with the operation and maintenance of the infrastructure assets used to provide water and sewerage services plus the associated administration costs. Opex includes salaries and wages, chemicals and raw materials and energy costs. Table 7.4 shows TasWater's Opex and the breakdown between water and sewerage operations.

Table 7.4 Operating costs (\$'000s, nominal)

	2011-12	2012-13	2013-14	2014-15	2015-16
Water	68 706	73 181	71 061	80 655	88 951
Sewerage	73 368	80 849	82 559	85 796	88 812
Total	142 075	154 030	153 620	166 451	177 763

TasWater's Opex rose by 6.8 per cent in 2015-16 compared to the previous year due, in part, to increased wage expenses and higher costs for raw materials and consumables which rose by 8.4 and 8.5 per cent respectively. TasWater claims that this was driven by an increase in capital investment in new treatment plants and capability such as the Network Operation Centre and the Asset Management Information System.

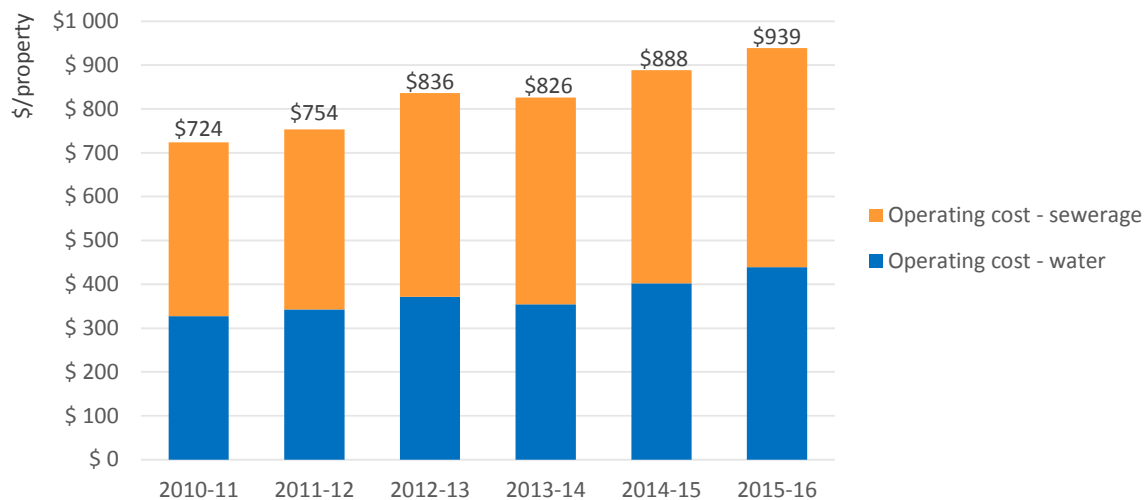
TasWater's Opex per property, shown in Figure 7.3, was around average compared to the costs reported by mainland service providers⁵ which typically range between \$660 and \$1 080 per property in 2015-16.⁶

However, it should be noted that TasWater's Opex is based on its current level of regulatory non-compliance meaning that these costs are not directly comparable to mainland providers with relatively higher levels of regulatory compliance ie increased regulatory compliance generally leads to increases in operating costs. TasWater's Opex also reflects its relatively larger number of dispersed water and sewerage assets.

⁵ Major Utilities (Large) with 100 000 or more customers.

⁶ Bureau of Meteorology, *National Performance Report - urban water utilities, 2015-16* (indicator F13).

Figure 7.3 Operating costs (\$/property)

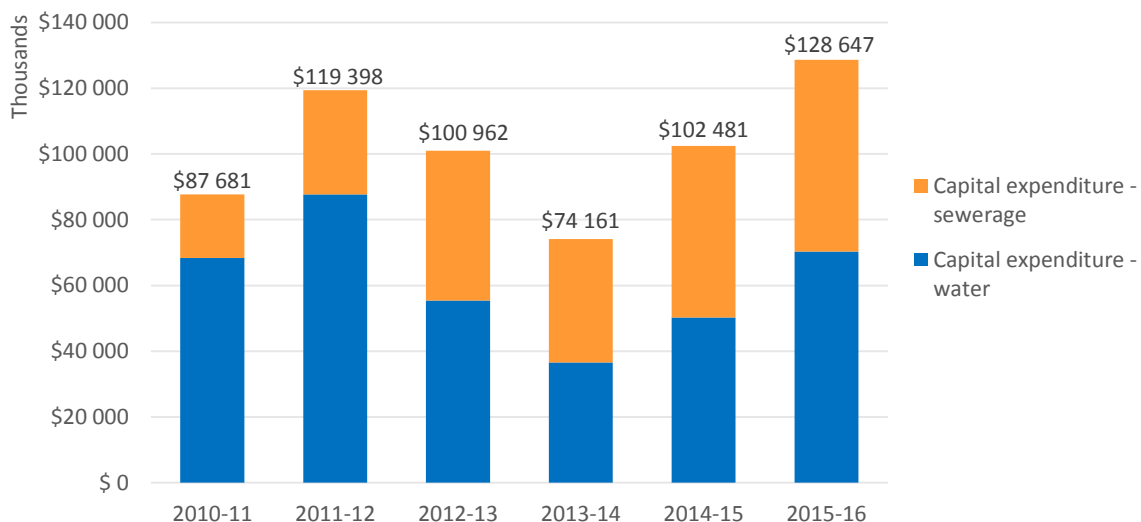


7.2.4 Capital expenditure

Capital expenditure (Capex) is investment in new assets including expenditure on new works, renewals or replacements and any other expenditure that would otherwise be referred to as capital.

Figure 7.4 Capital expenditure (\$'000s, nominal) shows TasWater's Capex for water and sewerage over the past six years, with almost \$129 million in Capex incurred during 2015-16. Note that gifted assets and developer charges have been excluded.

Figure 7.4 Capital expenditure (\$'000s, nominal)



TasWater's Capex during 2015-16 grew by 25 per cent on the previous year, with a sharp increase evident over the two year period from 2013-14 to 2015-16. Capex per property was \$347 for water and \$328 for sewerage, which is high compared to similar utilities on the mainland that reported an average of around \$156 for water and \$221 for sewerage in

2015-16.⁷ This is indicative of the scale of capex required to bring the water and sewerage network up to expected standards, including the work associated with replacing old or poor infrastructure that is currently underperforming.

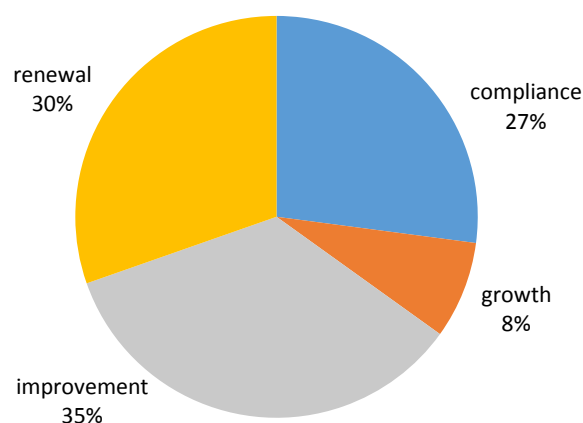
Table 7.5 shows Capex categorised between new works, renewals or replacements, gifted assets and other capital expenditure for both water and sewerage infrastructure.

Table 7.5 Water and Sewerage Capex by category (\$'000s, nominal)

	2011-12	2012-13	2013-14	2014-15	2015-16
Water:					
New works	64 935	38 881	4 798	6 399	4 764
Renewals or replacements	21 807	8 939	16 683	17 272	19 402
Other	928	7 569	15 090	26 613	46 191
Sewerage:					
New works	8 323	17 050	4 932	6 284	5 559
Renewals or replacements	19 679	20 920	17 148	16 071	20 610
Other	3 726	7 602	15 510	29 842	32 121

The key drivers for capital expenditure in 2015-16 were compliance and renewals, with expenditure on new works (growth) relatively low for both water and sewerage.

Figure 7.5 Capex by driver, 2015-16



During the year \$0.1 million was spent on unregulated assets.

The amount spent on 'other' Capex, which includes compliance and improvements, has increased significantly each year since 2011-12 for both water and sewerage. In 2015-16 Capex on 'other' water projects grew by 74 per cent compared to the previous year. Expenditure in this category includes upgrading SCADA remote monitoring and control to improve system operation and service response times; and an Asset Management Information System (AMIS) that will automate the collection of asset cost and performance information,

⁷ Bureau of Meteorology, *National Performance Report - urban water utilities, 2015-16* (indicators F28 & F29)

which will enable further improvements in productivity in asset management and services for customers.

In 2015-16 TasWater did not receive any capital works grants from State or Commonwealth governments to undertake specific capital works.

Further detail on capital projects completed or commenced during 2015-16 are outlined in section 7.3 below.

7.2.5 Other financial performance information

Below is a summary of other financial performance information used to determine how efficiently a business is using its financial resources, its financial sustainability and viability.

Table 7.6 Financial performance measures (nominal)

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Net profit after tax (\$000s)	21 982	19 557	22 439	27 236	33 155	25 310
Profit ratio (%)	9.4	8.0	8.5	10.1	11.0	8.2
Economic rate of return	-1.76	0.91	1.05	-0.20	0.65	-0.14
Dividends (\$000s)	11 122	11 041	12 640	18 647	22 120	20 332
Dividend payout ratio (%)	50.6	56.5	56.3	68.5	66.7	80.3
Net debt to equity (%)				21.0	22.8	27.2
Interest cover (times) ⁸				0.88	0.91	0.61

Key observations:

- ❑ Net profit after tax decreased by 24 per cent from 2014-15 to 2015-16.
- ❑ TasWater's economic rate of return was -0.14 and is expected to remain relatively low as it continues to work towards meeting its regulatory compliance obligations.
- ❑ TasWater's profit ratio decreased slightly compared to the previous year and was comparable to that of mainland utilities.
- ❑ TasWater returned \$20.3 million to its shareholders in 2015-16 which represented over 80 per cent of its profit after tax. TasWater's dividend payout ratio has also increased significantly compared to previous years and is much higher than dividend payout ratios of comparable mainland utilities, which are typically around 60 per cent.

⁸ For the 2013-14 and 2014-15 state of the industry reports, the Interest Cover ratio was based on information published by the Auditor-General in its annual report to Parliament on the financial performance of Local Government and TasWater. The Auditor-General's calculation of Earnings before Interest and Tax (EBIT) is based on TasWater's statutory financial statements. However, the Regulator considers it more appropriate that the reporting of this measure is based on the Urban NPR requirements. The 2013-14 Urban NPR Handbook requires TasWater to, amongst other things, deduct depreciation based on the WDRC of its assets from its revenue when calculating EBIT. This results in TasWater reporting a far lower EBIT and, consequentially, a far lower Interest Cover ratio than that reported by the Auditor-General. The Interest Cover ratio for each of the 2013-14, 2014-15 and 2015-16 financial years has therefore been reported in Table 7.6 on this basis.

- In 2015-16 TasWater reported a net debt to equity (NDTE) ratio of 27 per cent and an interest cover ratio of 0.61 times. The NDTE ratio is very low compared to the ratio for comparable mainland service providers where the ratio is typically around 70 per cent.

In August 2016 the Board of TasWater determined it will reduce and freeze annual distributions to Owner Councils at \$20 million for a period of seven years commencing 1 July 2018. Dividends will be more than halved to less than \$10 million per annum, with the balance of payments made up of loan guarantee fees and income tax equivalent payments.

7.3 Status of major projects

This section provides an overview of the major projects completed or progressed by TasWater during 2015-16. Major projects are those that are high priority and/or involve expenditure of over \$2 million.

TasWater's 2015-18 price and service plan⁹ included its proposed major capital investment projects that were to be progressed or completed during the regulatory period. Therefore, it is appropriate TasWater explain delays or changes to its project schedule, because approved funds will flow from pricing whether the expenditure is incurred or not.

A range of major projects that continued or commenced during 2015-16, including the forecast expenditure for 2015-16 and the project budget, is set out in Table 7.7 below.

In 2015-16 TasWater completed five major projects while seven projects encountered delays that will affect their respective completion dates. Another 18 projects are still proceeding on schedule.

Of the seven projects listed as delayed or deferred in 2015-16, three projects were deferred or rescheduled after being identified as low priority while two projects were rescheduled to align with an updated management plan or to allow for additional planning requirements.

⁹ TasWater's 2015-18 PSP is available at: <http://www.taswater.com.au/Your-Account/Price---Service-Plan>

Table 7.7 Major capital projects to be continued or commenced in 2015-16

Project	Driver	Project value (\$ millions)	Project description	Scheduled start date	Scheduled completion date	Status
Water						
Tolosa Dam - decommissioning and supply upgrade	Compliance	\$19	Decommissioning of the dam and construction of two reservoirs and connecting pipework to replace the Tolosa Dam.	2014-15	2017-18	On schedule
King Island Water Supply Upgrade	Compliance	\$16	Construction of a new water treatment plant and a connecting pipeline between Grassy and Currie.	2014-15	2017-18	On schedule
Ridgeway Dam – Upgrade Post Tensioned Anchors	Compliance	\$22	Replace the existing post tensioned anchors to ensure the stability of the abutment blocks in the long-term.	2014-15	June 2021	Deferred
Scottsdale – Bridport Pipeline	Growth	\$5.5	Construction of a new pipeline between Scottsdale and Bridport. Pipeline will allow for decommissioning of existing poorly performing Bridport WTP and make use of surplus capacity at Scottsdale WTP.	2017-18	Sept 2022	Deferred
Flinders Island Water Supply	Compliance	\$11	Construction of water treatment infrastructure for the towns of Whitemark and Lady Barron to remove permanent boil water alerts.	2015-16	2016-17	On schedule
Ringarooma Valley Treated Water Supply	Compliance	\$14.5	Project to provide treated water supply in accordance with ADWG for the towns of Ringarooma, Legerwood, Branxholm and Derby. The project may also incorporate construction of a pipeline to the town of Winnaleah. Note: Partially funded from PSP1.	2013-14	2017-18	On schedule
Rosebery Water Treatment Plant	Compliance	\$7.1	Construction of a new WTP for the town of Rosebery to improve compliance with ADWG.	2012-13	2016-17	On schedule
Margate Water Main – Stage 2	Growth	\$7.5	Installation of pipeline to serve fast growing areas in Kingborough.	2010-11	2017-18	On schedule
Avoca Treated Water Supply	Compliance	\$5	Capital improvement works (WTP or pipeline from Fingal) to remove the Do Not Consume notice in place at Avoca.	2014-15	2016-17	On schedule

Project	Driver	Project value (\$ millions)	Project description	Scheduled start date	Scheduled completion date	Status
Lake Mikany – Filter Buttress	Compliance	\$7.3	Upgrade to the existing Lake Mikany Dam to lower operating risk associated with the dam.	2014-15	2017-18	On schedule
Ouse Hamilton WTP	Compliance	\$4	A new WTP was constructed to supply water to Ouse with a pump station supplying Hamilton via a 14 km pipeline.	2015-16	2015-16	Completed
Mole Creek water supply	Compliance	\$4	Construction of a WTP at the top end of the existing water system including associated pipe and network upgrades.	2015-16	2017-18	On schedule
Sewerage						
Kingborough Sewerage Strategy - Treatment	Compliance	\$51	Rationalisation of existing STP's at Margate, Electrona and Blackmans Bay. The existing plants are all high on the EPA priority list.	2013-14	2019-20	On schedule
Wynyard STP – Major Plant Upgrade	Compliance	\$17	Major upgrade at Wynyard STP to achieve compliance with AMT limits and rationalisation with Somerset STP. Note: \$5M to be funded during third pricing period.	2015-16	2020-21	On schedule
Kingborough Sewerage Strategy - Network	Compliance	\$14	Construction of pipelines to allow rationalisation of existing STP's at Margate, Electrona and Blackmans Bay.	2013-14	2019-20	On schedule
Sewage pump station Electrical Switchboard Renewal	Renewal	\$12	A number of switchboards have been identified as exceeding their useful life and are failing. Project will replace a number of switchboards at SPS across the southern region. Note: Approximately \$3.5M funded in first PSP.	2015-16	2017-18	On schedule
Rosebery STP – Construction of new plant and network upgrades	Compliance	\$10	Construction of a new treatment plant for Rosebery to replace the existing arrangement with discharge into a tailings dam. Note: Approximately \$4M funded in first PSP.		2015-16	Completed on time
Ti Tree Bend Centrifuge – Biosolids Reduction	Compliance	\$8.4	Construction of a centrifuge and sludge drying facilities to improve sludge handling at the STP.	2014-15	Feb 2022	Delayed

Project	Driver	Project value (\$ millions)	Project description	Scheduled start date	Scheduled completion date	Status
Brighton STP Rationalisation	Compliance	\$9	High priority plant on EPA list, flows exceed treatment capacity.	2014-15	June 2021	Deferred
Legana STP Upgrade	Compliance	\$9	The existing plant is hydraulically overloaded due to continued growth in the system. High volumetric loading causes discharge into the Tamar River. Note: \$6M to be funded during fourth pricing period.	2014-15	TBC	Deferred
Evandale – Western Junction Major STP Upgrades	Compliance	\$20.5	The existing plants are both poorly performed and could be rationalised into a single new STP at the Evandale STP site.	2024-25		Deferred
Longford STP Process Improvements	Compliance	\$7	Upgrade to treatment process to handle high trade waste content from Swift abattoirs and relocate/upgrade existing outfall location.	2017-18		Delayed
Ulverstone, Burnie and Devonport STP sludge handling upgrades	Improvement	\$3.5	Upgrades to STP sludge handling including sludge dewatering upgrades and installation of Spriotainer sludge containers for the storage and transport of sludge for disposal.	2015-16	2015-16	Completed on time
Burnie Sewerage Network upgrades	Improvement	\$3.5	Upgrades to the network to accommodate increased flows from the new Lion cheese factory in Burnie.	2015-16	2015-16	Completed on time
Orford Quarry Point outfall remediation	Replacement	\$1	The outfall was replaced with a new pipeline that was directionally drilled to establish a discharge point approximately 180 m offshore.	2015-16	2015-16	Completed on time
Non-network						
Asset Management Information System (AMIS)	Improvement	\$13.3	Installation of commercial off the shelf, fit for purpose AMIS that integrates to all major corporate functions and interfaces. Note: Partially funded from the third pricing period.	2015-16	2016-17	On schedule
Fleet (Vehicles and Plant) Replacement Program	Renewal	\$2	\$2M annual ongoing renewal program for vehicles and fleet to maintain field services capability.		2016-17	On schedule
Statewide Asset Safety Rectification Program	Improvement	\$4	\$1M annual ongoing program to address safety risks identified throughout the business.	2015-16	2017-18	On schedule

Project	Driver	Project value (\$ millions)	Project description	Scheduled start date	Scheduled completion date	Status
Minor Plant and Equipment Program	Renewal	\$5.4	\$1.2M annual ongoing renewal program for minor plant and equipment to maintain field services capability.	2015-16	2017-18	On schedule
Statewide Miscellaneous Minor Works Program	Renewal	\$4.5	\$1M annual ongoing renewal program for unplanned minor asset renewals.	2015-16	2017-18	On schedule

7.3.1 Future capital projects

The 2016-17 capital works program includes 86 projects and 25 programs with a total budget in excess of \$105 million.

Major projects due to commence in 2016-17, including forecast expenditure are set out in Table 7.8. Continuing projects from previous years are included in Table 7.7.

Table 7.8 Major capital projects to be commenced in 2016-17

Project	Project value (\$ millions)	Project description
Winnaleah treated water supply	\$3.8	Treated water supply to Winnaleah
Gretna/Bushy Park/Glenora water supply upgrade	\$3.3	Upgrade to the Gretna scheme and supply to Glenora and Bushy Park
Cambridge wet weather emergency storage and improvements	\$4.6	Improvement of detention storage to reduce the risk of sewage spills
St Helens STP upgrades	\$1.7	Upgrades to the St Helens STP inlet works, pump station and rising main
Prince of Wales STP	\$3.5	Replacement of the digester roof and refurbishment of the primary digester.

Projects that are considered by industry regulators to be high priority for improving performance in the future are discussed further in Chapter 8.

8 PRIORITIES FOR IMPROVING PERFORMANCE

The following sections examine the processes and considerations adopted by key industry regulators in identifying priorities for improving performance across the water and sewerage sector.

8.1 Environment Protection Authority

8.1.1 Wastewater management plan update

Although there was no legislative requirement to do so, TasWater produced a 2015-18 Wastewater Management Plan (WWMP) to guide decisions regarding wastewater priorities and project funding over the second Price and Service Plan period. In addition to its strategic role, the WWMP also serves as a reference document supporting, for example, EPA Tasmania in the development of Environment Protection Notices (EPNs).

EPA Tasmania's review of the 2015-18 WWMP document concluded that, overall:

- ❑ capital expenditure proposed by TasWater should lead to increased regulatory compliance and improved environmental outcomes;
- ❑ EPA priorities relating to wastewater treatment plant upgrades had largely been incorporated into the WWMP; and
- ❑ a strategic approach was adopted to address broader wastewater management issues such as reticulation integrity, incident response and desludging.

However, the review also flagged:

- ❑ significant delays with the implementation of agreed key projects;
- ❑ capital expenditure not reaching the amount originally planned; and
- ❑ state-wide compliance for wastewater treatment plant discharges showing a downward trend over the past five years.

Significant compliance improvements will in most cases be linked to major infrastructure upgrades or maintenance works. Due to the amount of capital investment required to drive improvements in environmental discharge compliance, the Director of EPA and TasWater have continued to focus attention on areas which will return the greatest environmental benefit.

The EPA endorsed Priority 1 projects in the November 2015 version of the WWMP while additional, smaller scale projects remain subject to negotiation. Capital expenditure to progress priority 1 projects within the WWMP timeframe was estimated as in excess of \$101 million. Additional capital funding was allocated to linear infrastructure projects (ie pipes and sewage pump stations).

Major wastewater capital projects requiring capex greater than \$3 million over the life of the WWMP are the Kingborough Sewerage Strategy, Longford STP upgrade, Wynyard STP

upgrade, Ti-Tree biosolids improvements, Burnie STP upgrade to accept Lion Nathan trade waste, Bridport Improvement Program, Southern Plants Inlet Works Program, Rosebery STP completion, Launceston Sewage Improvement Program and Westbury STP upgrade and reuse investigation and implementation.

8.1.2 Environmental conditions updating

A priority project for the EPA is ensuring that all STPs are regulated under contemporary environmental conditions, particularly with regard to technical standards, monitoring practices, reporting arrangements and plant management. Modern environmental conditions are generally imposed via Environment Protection Notices (EPNs).

New EPNs incorporate a suite of standardised conditions which are designed to be consistent with the principles outlined in relevant policy documents, including:

- ❑ *State Policy on Water Quality Management* (1997);
- ❑ *Environmental guidelines for the reuse of recycled water in Tasmania* (Department of Primary Industries, Water and Environment (DPIPWE), 2001);
- ❑ *Emission limit guidelines for sewage treatment plants that discharge pollutants into fresh and marine waters* (DPIPWE, 2001); and
- ❑ *National water quality management strategy* (a suite of documents relating to wastewater management).

8.1.3 Ambient monitoring¹

EPA Tasmania has also identified the need for comprehensive ambient monitoring (the monitoring of impacts in the receiving environment) around sewage treatment plant outfalls as a key issue for environmental regulation in the wastewater sector. Properly designed ambient monitoring programs can provide important information regarding the impacts of current and past practices, and the results of such monitoring are crucial for the determination of site-relevant, cost-effective solutions consistent with the *State Policy on Water Quality Management 1997*.

Ambient monitoring programs, prioritised according to environmental considerations, have been rolled out across the State for a number of years. The EPA expects TasWater to continue progressing these commitments. Corresponding requirements are incorporated into EPNs with timeframes determined for each WWTP according to priority.

Information collected through ambient monitoring is essential to strategic decision-making for managing and upgrading STPs. Such programs primarily aim to detect and quantify impacts of current STP discharge practices, identify mixing zones associated with outfalls and assist with the determination of required improvement measures. In addition, these programs are likely to enhance the general understanding of our waterways, especially when co-ordinated with existing water quality monitoring programs.

¹ Monitoring the surrounding area or receiving environment, commonly aquatic for STPs.

During 2015-16, EPA Tasmania assessed and approved Ambient Monitoring Plans (AMPs) submitted by TasWater for a number of locations, while other ambient monitoring programs were progressed to implementation and / or analysis phase.

Noteworthy milestones were:

- ❑ Northern region – the Tamar / North Esk ambient monitoring program moved into the implementation phase, marked by the commencement of monitoring in June 2015. This program involves five STPs servicing the urban Launceston catchment. Deloraine, Prospect Vale and Fingal STP where ambient monitoring programs were implemented and data analysis completed.
- ❑ Southern region - following completion of the active monitoring phase for the Derwent Estuary STPs in May 2015, data collected for Cameron Bay, Prince of Wales Bay, Green Point, East Risdon, Macquarie Point, Selfs Point and Rosny STP outfalls was collated and outfall modelling was performed. The findings of this comprehensive program will provide crucial input into the further upgrade strategies for these STPs.
- ❑ Monitoring associated with the Geeveston STP commenced in October 2015; monitoring results and modelled outputs are expected to be submitted in early 2017.
- ❑ Northwest region – ambient monitoring of four STP outfalls (Ridgley, Zeehan, Railton and Queenstown) commenced in mid-2015 and continued throughout the financial year.
- ❑ Ongoing ambient monitoring in the Stitt River commenced following the commissioning of the Rosebery STP outfall in 2015.
- ❑ Additional ongoing or seasonal ambient monitoring which is not linked to a campaign-based program occurs in a number of other locations. For example, other monitoring programs pre-dating the AMP requirements were undertaken at Blackmans Bay, Cambridge, Cradle Valley, Electrona, Longford and Margate.

8.1.4 Biosolids management

Sustainable and cost-effective biosolids management, including regular intermittent desludging of lagoon sewage treatment systems to maintain treatment capacity, is an integral component of sewage treatment. Biosolids management incurs significant expenditure for treatment, testing and transport and forward planning is needed to make use of those times of the year when ground conditions and plant growth cycles allow land application of biosolids.

During 2015-16 TasWater finalised its state-wide biosolids management policy and strategy. Work on an associated state-wide implementation plan continued during 2015-16.

8.2 Public health

The Department of Health and Human Services (DHHS) works closely with TasWater to maintain and improve compliance with its legislative requirements.

During 2015-16 TasWater continued to work towards addressing the priority capital works list agreed with DHHS as part of the previous water corporations' respective interim operating licences. An ongoing role for DHHS is to incorporate emerging public health issues and associated risks (which have been identified with the improved monitoring of drinking water supplies) into TasWater's decision-making processes when prioritising capital works. In this

regard, DHHS issued a revised priority listing to TasWater in early 2014 and has been liaising with TasWater on an ongoing basis to assist with the development of forward capital investment for the third regulatory period.

DHHS has mandated, through legislation, an independent auditing framework for the verification and validation of TasWater's drinking water quality management plan. This has been achieved through the release of the updated *Tasmanian Drinking Water Quality Guidelines (2015)* which were issued in November 2015. TasWater has a Drinking Water Quality Management Plan for all of its public drinking water supply systems. The plans outline the identified public health risks of each drinking water supply and TasWater's corresponding systematic preventative measures to minimise and manage those risks. The plans also specify the monitoring regimes, including parameters and frequency determined by a risk assessment for each drinking water supply.

It is expected that the revised Tasmanian Code of Practice for the Fluoridation of Drinking Water Supplies will be finalised during 2016-17. However, in the interim, TasWater has agreed to implement the Code as best practice until a final version of the Code is approved and issued by the Fluoridation Committee.

DHHS has reiterated its commitment to working with TasWater to ensure that matters of public health are given due consideration in this process now that the water and sewerage sector's activities are managed by a single water corporation.

8.3 Water allocations/licences and dam safety

DPIPWE is responsible for the sustainable management and development of the State's freshwater resources through the *Water Management Act 1999*.

Before water can be taken directly from a stream or stored in a dam for supply to urban water systems, an allocation licence must be obtained from DPIPWE. The Department, along with TasWater, is continuing a review of all current urban water allocations and licences which were initially transferred to the regional corporations and now TasWater. The review has focussed on ensuring that the extraction points of water allocations endorsed on licences are correctly designated in terms of the extraction location and the specific resource from which the water is taken, and that the quantum of the allocation reflects the historical entitlement. In the context of expected and emerging future urban water demand and supply scenarios, allocations may be varied to maximise the quality and reliability of allocated water and to better reflect actual, and expected future, demand.

DPIPWE is also responsible for assessing applications for dam works (including new and significant repairs or modifications) and for the regulation of dam safety to ensure the owners of existing dams meet their statutory safety responsibilities.

TasWater's recent dam works activities have been focused mostly within the repairs and modifications area, specifically works associated with meeting its dam safety obligations.

However, TasWater has decommissioned two high risk dams at Queenstown and rehabilitated each dam site, removing public safety risks. Further progress is being made with several high risk dams (Margaret Street Detention Basin and Conglomerate Dam), where these dams will be upgraded over the coming reporting period, to lower their dam safety risk. In addition to this, detailed design and investigation work is continuing for a number of other high risk dams (Mikany, Ridgeway, Waratah, Grey Mountain No. 1 and Blackman River No. 2).

All applications to undertake dam works must include a range of information, including engineering designs, for review by departmental staff who advise the Minister or delegate.² The Minister then decides whether or not to grant approval for an application and to issue the terms and conditions of this approval. This is to ensure that all dam works are undertaken in a manner that ensures they avoid environmental harm and do not present a risk to the Tasmanian population (as required under the *Water Management Act 1999* and the *Water Management (Dam Safety) Regulations 2015*).³

DPIPWE is responsible for ensuring that owners of existing dams meet their safety responsibilities through mandatory ongoing surveillance and maintenance of dams and, where necessary, ensuring dams meet contemporary safety standards. The previous three regional corporations and, more recently, TasWater have been required to undertake a portfolio risk assessment (PRA) of all dams to ensure the risk that these dams may present are mitigated to within modern tolerable risk standards as outlined in the various Australian National Committee on Large Dams Incorporated (ANCOLD) guidelines and other acceptable risk standards and legislation. DPIPWE's role as dam safety regulator is to ensure that:

- ❑ these risk mitigation plans are developed;
- ❑ that they are to an acceptable standard as outlined by ANCOLD; and
- ❑ that they are implemented to an agreed schedule as outlined in their respective PRAs.

The Delegate for Dam Safety Regulation monitors and reviews annual management plans for dams to ensure that the required maintenance and risk mitigation tasks are being carried out in accordance with assessed PRA priorities and the identified high risk dams are being managed to reduce their risk to a tolerable level.

² As of 1 January 2016, the approval Committee (Assessment Committee for Dam Construction) requirements under the *Water Management Act 1999* have been rescinded.

³ The *Water Management (Dam Safety) Regulations 2011* were rescinded and replaced as of 1 January 2016.

APPENDIX 1 PERFORMANCE INDICATORS

Performance indicators used in this report are a subset of those defined in the *National Performance Framework: 2013-14 urban performance reporting indicators and definitions handbook*, July 2014. In relation to the performance indicators listed below, data was requested from TasWater and other regulators which was used in preparing this report.

Indicator	NPR reference
WATER RESOURCES	
Sources of Water	
Volume of water sourced from surface water (ML)	W1
Volume of water sourced from groundwater (ML)	W2
Volume of water sourced from desalination of marine water (ML)	W3.2
Volume of water sourced from recycling (ML)	W4
Volume of water received from bulk supplier (ML)	W5
Volume of bulk recycled water purchased (ML)	W6
Total sourced water (ML)	W7
Uses of Water Supplied	
Volume of water supplied - Residential (ML)	W8
Volume of water supplied - Commercial, municipal and industrial (ML)	W9
Volume of water supplied - Other (ML)	W10
Total urban water supplied (ML)	W11
Average annual residential water supplied (kL per property)	W12
Volume of water supplied - Environmental flows (ML)	W13
Volume bulk water exports (ML)	W14
Volume bulk recycled water exports (ML)	W15
Sewerage collected	
Volume of sewage collected - Residential sewage, non-residential sewage and non-trade waste (ML)	W16
Volume of sewage collected -Trade waste (ML)	W17
Total sewage collected (ML)	W18
Sewage collected per property (kL per property)	W19
Volume of recycled water supplied - Residential (ML)	W20
Volume of recycled water supplied - Commercial, municipal and industrial (ML)	W21
Volume of recycled water supplied - Agricultural (ML)	W22
Volume of recycled water supplied - Environmental (ML)	W23
Volume of recycled water supplied - On-site (ML)	W24

Indicator	NPR reference
Volume of recycled water supplied - Other (ML)	W25
Total recycled water supplied (ML)	W26
Recycled water (per cent of effluent recycled)	W27
Volume of urban stormwater supplied to other infrastructure operators (ML)	W28.1
Volume of urban stormwater used (ML)	W28.4
ASSETS	
Water treatment plants	
Number of water treatment plants providing disinfection only	
Number of water treatment plants providing further treatment	
Number of water treatment plants providing full treatment	A1
Other water assets	
Number of water pumping stations	
Length of water mains (km)	A2
Properties served per km of water main (No. per km)	A3
Number of water distribution storage facilities	
Sewerage assets	
Number of Level 1 sewage treatment plants	A4 [^]
Number of Level 2 sewage treatment plants	A4 [^]
Number of sewage pumping stations	
Length of sewerage mains and channels (km)	A5
Properties served per km of sewer main (No. per km)	A6
Recycled water assets	
Number of recycled water treatment plants	A7 [#]
Water supply	
Water main breaks (No. per 100 km of water main)	A8
Water loss	
Infrastructure leakage index (ILI)	A9
Real losses (L per service connection per day)	A10
Real losses (kL per km of water main per day)	A11
Sewer main breaks and chokes	
Sewer main breaks and chokes (No. per 100 km sewer main)	A14
Property connection sewer breaks and chokes (No. per 1 000 properties)	A15
CUSTOMERS	
Connected properties and population	
Population receiving water supply services	C1
Connected Residential properties - water supply	C2
Connected Non-residential properties - water supply	C3

Indicator	NPR reference
Total connected properties – water supply	C4
Population receiving sewage services	C5
Connected Residential properties – sewerage	C6
Connected Non-residential properties – sewerage	C7
Total connected properties – sewerage	C8
Complaints	
Water quality complaints (No. per 1 000 properties)	C9
Complaints meaningfully responded to within ten days (%)	
Water service complaints (No. per 1 000 properties)	C10
Sewerage service complaints (No. per 1 000 properties)	C11
Billing and account complaints – water and sewerage (No. per 1 000 properties)	C12
Total water and sewerage complaints (No. per 1 000 properties)	C13
Average call wait time (seconds)	
Per cent of calls answered by an operator within 30 seconds (%)	C14
Average duration of an unplanned interruption- water (minutes)	C15
Average sewerage interruption (minutes)	C16
Number of sewer spills	
Average break/choke repair time – sewerage (minutes)	
Average frequency of unplanned interruptions – water (No. per 1 000 properties)	C17
Number of restrictions applied for non-payment of water bill (No. per 1 000 properties)	C18
Number of legal actions applied for non-payment of water bill (No. per 1 000 properties)	C19
ENVIRONMENT	
Percentage of sewage treated to a primary level (%)	E1
Percentage of sewage treated to a secondary level (%)	E2
Percentage of sewage treated to a tertiary or advanced level (%)	E3
Percentage of sewage volume treated that was compliant (%)	E4 [#]
Number of sewage treatment plants compliant at all times	E5 [#]
Public disclosure of your sewage treatment plant's performance	E6 [#]
Compliance with environmental regulator – sewerage (yes/no)	E7 [#]
Percentage of biosolids reused (%)	E8
Greenhouse gas emissions - Water (tonnes CO ₂ -equivalents per 1 000 connected water properties)	E9
Greenhouse gas emissions - Sewerage (tonnes CO ₂ -equivalents per 1 000 connected sewerage properties)	E10
Total Net Greenhouse gas emissions (tonnes CO ₂ -equivalents per 1 000 connected water properties)	E12
Sewer overflows reported to environmental regulator (No. per 100 km of main)	E13

Indicator	NPR reference
FINANCE	
Total revenue – water (\$)	F1
Total revenue – sewerage (\$)	F2
Total revenue for whole of utility (\$)	F3
Residential revenue from usage charges – water (%)	F4
Revenue per property for water supply services (\$ per property)	F5
Revenue per property for sewerage services (\$ per property)	F6
Revenue per property for whole of utility (\$ per property)	F7
Revenue from Community Service Obligations (%)	F8
Nominal written down replacement cost of fixed water supply assets (\$)	F9
Nominal written down replacement cost of fixed sewerage assets (\$)	F10
Operating cost – water (\$)	F11
Operating cost – sewerage (\$)	F12
Combined operating cost - water and sewerage (\$ per property)	F13
Total water supply capital expenditure (\$)	F14
Total sewerage capital expenditure (\$)	F15
Total capital expenditure for water and sewerage (\$)	F16
Water supply capital expenditure (\$ per property)	F28
Sewerage capital expenditure (\$ per property)	F29
Economic real rate of return – water (%)	F17
Economic real rate of return – sewerage (%)	F18
Economic real rate of return – water and sewerage (%)	F19
Dividend (\$)	F20
Dividend payout ratio (%)	F21
Net debt to equity (%)	F22
Interest cover (times)	F23
Net profit after tax (NPAT)	F24
NPAT ratio (%)	F30
Community Service Obligations (\$)	F25
Capital works grants – water (\$)	F26
Capital works grants – sewerage (\$)	F27
PUBLIC HEALTH	
Water quality guidelines	H1
Number of zones where microbiological compliance was achieved	H2 [#]
% of population where microbiological compliance was achieved	H3
Number of zones where chemical compliance was achieved	H4
Risk-based drinking water management plan externally assessed (yes/no)	H5

Indicator	NPR reference
PRICING	
Water	
Tariff Structure (description) - water	P1
Free Water Allowance (kL) - water	P1.1
Fixed Charge (basis for charge) - water	P1.2
Usage Charge 1 st Step (kL range and \$)	P1.3
Special Levies (\$) - water	P1.12
Income from Special Levies Retained by Utility? (Yes/No) - water	P1.13
Annual bill based on 250kL per annum - water	P2
Average Residential Consumption - water	P2.1
Typical Residential Bill - water	P3
Sewerage	
Tariff Structure - sewerage	P4
Fixed Charge - sewerage	P4.1
Usage Charge - sewerage (kL range and \$)	P4.2
Special Levies (\$) - sewerage	P4.3
Income from Special Levies Retained by Utility? (Yes/No) - sewerage	P4.4
Annual bill based on 250kL per annum - sewerage	P5
Typical Residential Bill - sewerage	P6
Water and Sewerage	
Annual bill based on 250kL per annum (water & sewerage)	P7
Typical Residential Bill (water & sewerage)	P8

Notes: ^ These sub-indicators combine for one indicator

These indicators have been subsequently removed from the NPR performance indicator handbook

APPENDIX 2 SEWAGE MANAGEMENT ISSUES

This Appendix presents the Environment Protection Authority's (EPA) overview of some of the environmental management issues associated with Tasmania's sewage treatment systems. These issues potentially impact on system performance and may lead to impacts on Tasmania's waterways and other receiving environments.

Capacity restrictions

Several STPs across Tasmania report average inflows that significantly exceed average dry weather flow limits imposed by the EPA (Appendix 4, Table 4.4). This may be indicative of issues with hydraulic flow capacity at the STP. Operating at or over the hydraulic capacity limit restricts the ability of the system to cope with existing loads. Where seasonally fluctuating loads or trade waste inputs are an additional concern, such capacity issues are further compounded. Operating outside hydraulic capacity limits may translate to poor compliance. In addition, insufficient hydraulic capacity may also restrict potential for further residential or industrial development in a sewerage catchment.

The reticulation network delivering sewage to the treatment plants may also suffer from capacity limitations. One common concern is inflow and infiltration ie the ingress of water (either stormwater or groundwater) into the sewerage system, increases the sewage volume transported to the STP for treatment. This may result in overflows of raw or diluted sewage from points in the reticulation system (eg manholes, dedicated emergency overflow pipes and pumping stations) or at the STP itself. Alternatively, sewage may only receive partial treatment during, for example, peak wet weather flow periods. Areas with old or poorly maintained reticulation systems are particularly affected, as are those which commonly experience prolonged wet weather periods. The depth of the reticulation infrastructure which affects whether it comes into contact with groundwater, is another factor.

The impacts of sewage overflows from failed or under-capacity reticulation are potentially serious in terms of public and environmental health. Contamination of oysters by sewage or overflows in the vicinity of popular swimming areas are two scenarios which can have significant public health consequences. The health of waterways can be affected by overflows of raw sewage through a reduction in the available oxygen level and smothering by solids. Toxic impacts of sewage constituents such as ammonia can result in fish kills in extreme cases. Gross solids from overflows may result in visual pollution.

Conflict with other land or water uses

A number of Tasmanian STPs discharge effluent to waters used for domestic and industrial water supplies, recreational purposes, aquaculture or agricultural irrigation. Conflict with other water users or uses can occur depending on the quality of the effluent discharged, the dilution received at the point of discharge and any exacerbating circumstances such as the presence of harmful substances or organisms. Generally, such situations are managed by TasWater notifying affected water users, having effluent discharge management procedures in place and developing improvement options for affected STPs. In some cases, the proximity of STPs has resulted in odour impacts on adjacent residential and recreational areas.

Analysis of the environmental sensitivity of existing sewage treatment plants and associated discharges has been undertaken by the EPA and TasWater. The agreed outcome has been incorporated into subsequent versions of TasWater's Wastewater Management Plan which is a strategic document underpinning decisions regarding upgrading and investment priorities related to sewage infrastructure.

Flow monitoring and control

The reliable and accurate measurement of sewage inflows and effluent discharge flows is critical for effective operation, maintenance and continued improvement of sewerage systems. Significant investment into the roll-out of flow meters across the state has been made over past reporting periods which has resulted in significant improvements in monitoring and controlling flows in areas previously identified as a concern. Further progress is required to ensure that flow meters are regularly serviced and adequate data control processes are in place, to maintain ongoing accuracy of measurements.

Trade waste

Several sewage treatment systems in Tasmania receive major trade waste inputs from one or more trade waste generators. Often these generators, particularly in the food processing industry, contribute not only a significant hydraulic load but also a sizeable organic and nutrient load.

Important considerations related to trade waste in the sewerage system include:

- ❑ trade waste inputs into the sewerage system can cause fluctuations in sewage quality and quantity which can be difficult to deal with at the STP;
- ❑ odour issues reported in relation to some Tasmanian STPs are often associated with plants receiving major trade waste inputs; and
- ❑ plants receiving high trade waste loads generate substantial volumes of sludge which need to be managed and regularly removed to maintain system efficiency. Some trade waste has the potential to impact on biosolids quality and reuse options.

Additionally, highly saline trade waste inputs into the reticulation system can make effluent unsuitable for reuse applications, such as irrigation.

Lagoon systems

In Tasmania, sewage lagoons or systems incorporating sewage lagoons are present at almost half of the Level 2 STPs. Over 50 per cent of the Level 2 STPs in the northern region incorporate sewage lagoons. The southern region, due to a greater number of urban STPs, has a slightly lower proportion of lagoons, as does the north-west region.

Sewage lagoon systems represent a simple method of treating sewage, characterised by a low level of technical complexity and low power consumption. They are a popular treatment system in rural areas where the cost of land is not prohibitive and where the less frequent requirement for operator attendance is an advantage. Lagoons provide secondary level treatment, which can be sufficient where the receiving waterways provide sufficient dilution, or in combination with effluent reuse applications. In many cases, these lagoon systems are operated in conjunction with an effluent reuse scheme.

Issues with Tasmanian sewage lagoons which have at times had a negative impact on performance include:

- ❑ periodic growth of algae, including blue-green algae, is a common occurrence in lagoons. Apart from presenting a potential toxin risk in the case of blue-green algae blooms, prevalence of algae may impact on oxygen transfer into the system and increase the turbidity of the effluent;
- ❑ accumulation of sludge in sewage lagoons can significantly reduce treatment efficiency. In a number of lagoon systems, sludge has accumulated to such a degree that treatment capacity is significantly affected and desludging options need to be urgently progressed;
- ❑ lagoon liners should be designed and maintained to prevent leaking of sewage into the underlying groundwater. Where liners were not installed to the required specification, or subsequently damaged, groundwater contamination is a potential issue requiring consideration; and
- ❑ sewage lagoons can also be prone to flooding and sludge wash-out depending on location.

Blue-green algae blooms

Blue-green algae (BGA) blooms are a relatively common occurrence in sewage lagoons. Unlike mechanical-biological STPs, sewage lagoons provide a calm, stable water environment high in nutrients which, coupled with suitable climatic conditions, provides a perfect environment for BGA populations to increase. Blooms typically occur in summer and autumn, particularly during periods of prolonged stable weather. Under favourable conditions, blooms can persist into the winter months and, as BGA can survive over winter in spore or vegetative forms, they may seasonally disappear but re-establish once suitable conditions return.

Experience with Tasmanian sewage lagoons has shown that BGA are often present at sufficient concentrations to pose a potential risk to stock and human health if toxins are produced and the affected water is released into streams or recycled for irrigation. This emphasises the need for caution in managing affected effluent. Not all species of BGA are toxic, or toxic all the time. The production of toxins is influenced by environmental conditions as well as species composition.

The management of BGA is a complex issue and presents a challenge to all managers of sewage lagoons. Various measures can be used in conjunction and should ideally be documented in a contingency management plan specific to each lagoon system.

The majority of Tasmanian sewage lagoons (approximately 40 Level 2 STPs have a lagoon component) have been affected by BGA blooms at some point.

The publication of the *Guidelines for Managing Blue-Green Algae (Cyanobacteria) Blooms in Sewage Treatment Lagoons* in March 2011 assists with the preparation of appropriate Contingency Management Plans. The guidelines are accessible via the EPA's webpage at: <http://epa.tas.gov.au/regulation/wastewater/resources-for-wastewater-managers/wastewater-treatment-lagoons/blue-green-algae-guidelines>.

Reuse scheme management

A large degree of variability exists in relation to the management of effluent reuse schemes around the State. This is partially due to the differences in supplier – user arrangements; the type of end use (eg golf course versus agricultural application); and type of user (eg corporate body or user cooperative versus single user). Historical differences in management approaches originally adopted by different councils for reuse schemes are another factor.

The EPA assesses and reviews effluent reuse schemes associated with Level 2 STPs but does not directly regulate these schemes. Environmental regulation of these schemes is largely the domain of local government. Environmental conditions for reuse schemes typically require adherence to an approved management plan and compliance with specified discharge limits.

Prior to the July 2009 reforms, information required by the EPA for reuse schemes often remained outstanding, suggesting inadequate performance monitoring and management practices at the time. This situation is gradually being addressed by TasWater, with progressive audits and reviews of schemes and comprehensive monitoring and reporting regimes being implemented across its effluent reuse schemes.

Determining whether the rate of uptake of effluent recycling is sufficient requires closer examination of data for most Level 2 STPs. Whilst there may be valid technical or climatic reasons preventing or minimising reuse, the feasibility of effluent reuse needs to be more fully considered, consistent with the *State Policy on Water Quality Management*. Under the policy, effluent reuse needs to be pursued in order to minimise discharge to waters, unless there are valid reasons not to do so. A range of factors, including practical considerations, environmental outcomes and financial implications will be considered by TasWater to determine whether effluent reuse is viable.

Under the suite of contemporary environmental conditions which continues to be rolled out to all STPs, the preparation of an effluent reuse feasibility study is a standard requirement where it has not previously been investigated. This will ensure that effluent recycling is considered as an alternative option to discharging treated effluent into waterways.

Biosolids

Sewage sludge is a by-product of the sewage treatment process. Sludge is separated from the liquid portion of sewage as part of the treatment process and may require further treatment to address stabilisation and contamination issues. Following further testing and if all relevant guideline requirements are met, sewage sludge may be classified as biosolids and beneficially re-used, generally in agricultural applications. Issues previously identified by the EPA for sustainable management of sewage sludge include:

- ❑ management of biosolids quality through implementation of measures such as installation of inlet screening and improved controls on sewage inputs including trade wastes;
- ❑ thorough investigation of sustainable management options for existing biosolids stockpiles;
- ❑ consideration of beneficial reuse in preference to disposal methods wherever feasible;
- ❑ adequate reporting in relation to the volume of sewage sludge produced at a site and, where material is transported off site, information regarding its destination and end use; and

- scheduling and implementation of regular intermittent desludging of sewage lagoons to maintain or enhance operational capacity.

Significant progress has been made in improving biosolids management in Tasmania. Desludging of some lagoon systems identified as high priority has been progressed although timely, regular lagoon desludging continues to pose a challenge to TasWater.

The *Tasmanian Biosolids Reuse Guidelines 1999* provide the current regulatory guidance in relation to biosolids management and are accessible via the EPA's webpage at <http://epa.tas.gov.au/regulation/wastewater/resources-for-wastewater-managers/biosolids>

Since publication of the original guidelines in 1999, significant research into biosolids has been undertaken both nationally and internationally. As a result the guidelines are currently under review by the EPA.

The outcome of the review will be a contemporary guideline to ensure sustainable biosolids reuse in Tasmania and guide appropriate commitments to expenditure on biosolids management.

The EPA is a member of the Australian and New Zealand Biosolids Partnership (ANZBP), which is a collective of utilities, consultants, academics and government agencies with an interest in ensuring the sustainable reuse of biosolids. It is contributing to the research being undertaken by the ANZBP and is utilising ANZBP resources, references and tools in its review of the Biosolids Guidelines.

APPENDIX 3 DAM SAFETY

Dam safety assessment terminology

Consequence category

This refers to the classification scale that details the consequences resulting from a catastrophic dam failure. There are seven consequence categories in a graded scale ranging from “Very Low” (the consequences of a dam failure are negligible) through to “Extreme” (the consequences of a dam failure are severe in terms of loss of life and infrastructure impacts). (Refer to Table A3.1)

Consequence of Dam Failure

The result of a dam failure in terms of loss of life and damage to infrastructure, services and the environment.

Dam

An artificial barrier together with any works that is constructed for the storage, control or diversion of water and other liquids, silt, debris of liquid borne debris.

Dam Safety Management Plans

TasWater is required to develop five year dam safety works programs. These works programs are required to be submitted to, and agreed to by, the Dam Safety Regulator. The overall objective of each five year program is that all dams which have a “Significant” or higher consequence category are within the Limit of Tolerability in terms of societal risk and reduced to As Low As Reasonably Practicable, as defined in the Australian National Committee on Large Dams (ANCOLD) guidelines. Dams that do not currently meet these criteria require a program of works to bring them within acceptable criteria.

Dam Safety Emergency Plans (DSEP)

A DSEP is prepared for use in a situation where there is a dam safety emergency; it is the Department of Primary Industries, Parks, Water and Environment’s (DPIPWE’s) policy that all dams where there is the potential for loss of life in the event of dam failure, require a DSEP. As a minimum a DSEP is required to include general information about the dam, emergency contact details, flood inundation maps, dam specifications, a plan of the dam and emergency procedure information.

Comprehensive Surveillance Inspections and Reports

TasWater is required to undertake a comprehensive surveillance inspection every five years for each of its dams that have a “Significant” or higher consequence category, and report, to the Dam Safety Regulator (DPIPWE) in its annual Dam Safety Management Plan, on the condition of each dam inspected, outlining any planned remedial works required to maintain or upgrade the inspected dam.

Table A3.1 TasWater's Significant or higher consequence category dams in Tasmania, 2015-16

Dam name	Consequence category rating
Flagstaff Gully	Extreme
Knights Creek	Extreme
Limekiln Gully	Extreme
Tolosa Reservoir	Extreme
Curries Dam	High A
Lower Reservoir	High A
Meredith Reservoir	High A
Mooreville Road Reservoir	High A
Ridgeway Reservoir	High A
Upper Burnie Reservoir	High A
Upper Reservoir	High A
Lake Isandula	High B
Lake Mikany	High B
Risdon Brook	High B
Conglomerate Dam	High C
Duckhole Rivulet	High C
Girdlestones Reservoir	High C
Illabrook Dam	High C
Lower Prosser	High C
Margaret Street Detention Basin	High C
Pet Dam	High C
Westbury Dam	High C
Williams Reservoir	High C
Barwick Effluent Lagoons	Significant
Bicheno Dam	Significant
Blackmans #1	Significant
Blackmans #2	Significant
Coles Bay	Significant
Fenton	Significant
Grey Mountain No.1	Significant
Grey Mountain No.2	Significant
Guide Dam	Significant
Midway Point Sludge Lagoon	Significant
Sorell Sludge Lagoons	Significant
Stiglitz Wastewater & Reuse Dams	Significant
Waratah Dam	Significant
Georges River Weir	Significant

APPENDIX 4 SEWAGE TREATMENT PLANT (STP) PERFORMANCE SUMMARY

As outlined in Chapter 6 of this report, despite a slight uplift compared to 2014-15, TasWater's Level 2 sewage treatment plants (STPs) reported unsatisfactory compliance levels against specified emission limits imposed by the EPA during 2015-16.

Chapter 6 reports compliance results on a state-wide level. As it may also be important to understand how the performance of individual STPs contributes to corporation-wide performance, more detailed compliance information is provided in this Appendix.

Table A4.1 and Figures A4.1 to A4.2 show compliance with regulatory limits and in comparison to AMT limits for effluent discharges to water.

Table A4.2 lists the compliance reported for each recycling scheme which utilises treated effluent generated by Level 2 STPs. Compliance is measured against 'Class B' quality expectations (as outlined in the *Environmental Guidelines for the Use of Recycled Water in Tasmania, DPIWE 2002*) for each of the 2011-12 to 2015-16 financial years.

Table A4.3 lists the proportion of effluent reused and reuse flow per year for each Level 2 STP with associated effluent reuse for each of the 2011-12 to 2015-16 financial years.

Table A4.4 provides the licensed average dry weather flow limit and the actual average annual inflow in 2015-16 for each Level 2 STP.

Table A4.1 Summary of STP discharge to waters Regulatory Limits and AMT Limits compliance results, 2011-12 to 2015-16

Premises name	2015-16		2014-15		2013-14		2012-13		2011-12	
	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)
Beaconsfield	83.6	60.7 ¹	93.4	55.7 ¹	83.6	57.4 ¹	90.7	53.1 ¹	84.6	50.4
Beauty Point	88.5	48.2 ¹	93.1	64.4 ¹	91.7	63 ¹	91.7	62.0 ¹	84.1	59.6
Bicheno	89.6	68.5 ¹	89.6	68.9 ¹	68.8	57.4 ¹	83.4	59.1 ¹	80.8	59.3
Blackmans Bay	73.3	53.7 ¹	90.0	58.3 ¹	86	58.5 ¹	95	64.8 ¹	91.5	57.9
Boat Harbour	74.1	71.3 ¹	55.6	51.5 ¹	66.4	69.1 ¹	84.5	77.4 ²	78.1	76
Bothwell	75.9	69.4 ¹	85.9	74.5 ¹	88.9	75 ¹	91.4	77.1 ¹	89.6	68.9
Bridgewater	87.6	62.3 ¹	86.0	61.7 ¹	76.4	54.6 ¹	91.6	61.7 ¹	97.2	67.6
Bridport	45.4	45.4 ¹	50.8	50.8 ¹	54.5	54.5 ¹	47.7	47.7 ¹	44.9	44.9
Brighton	-	-	-	-	77.5	33.3 ¹	74	39.3 ¹	70.8	37
Cambridge/Airport	83.3	88.0 ¹	83.3	90.4 ¹	81.5	88 ¹	77.8	92.9 ¹	83.9	93.1
Cameron Bay	92.5	74.1 ¹	89.1	74.8 ¹	82.2	66.7 ¹	84.3	62.0 ¹	81.5	65.8
Campania	37.5	38.0 ¹	39.6	41.5 ¹	35.4	45.4 ¹	42	43.9 ¹	33.9	48.2
Campbell Town	80.2	50.0 ¹	80.2	56.9 ¹	86.3	54.2 ¹	89.6	56.5 ¹	87.5	57.4
Carrick	75.2	54.3 ¹	82.8	60.6 ¹	80.2	54.7 ¹	87.6	57.1 ¹	76	50.9
Cradle Mountain	98.8	99.2 ¹	98.7	99.0 ¹	94.7	96.5 ¹	99.3	99.8 ¹	99	99.5
Cressy	83.3	40.7 ¹	91.6	51.4 ¹	91.6	47.7 ¹	84.4	40.7 ¹	88.4	43.6
Currie	90.1	66.0 ¹	90.3	72.4 ¹	97.6	72.3 ¹	87.4	59.8 ¹	78.4	50.5
Cygnets	100	85.9 ¹	97.9	77.6 ¹	100	85.2 ¹	91.5	73.0 ¹	96.2	82.6
Deloraine	57.4	54.6 ¹	66	66.0 ¹	66	52.4 ¹	73.5	63.7 ¹	68.9	56.6
Dover	96.3	88.9 ¹	96.3	88.0 ¹	89.8	82.4 ¹	85.3	66.4 ¹	87.7	67
East Strahan	91.4	70.2 ¹	90.5	69.1 ²	90.1	72.5 ¹	95.1	83.2 ¹	99.1	84
Electrona	90	36.1 ¹	85.6	27.4 ¹	31.3	37 ¹	37.5	37.9 ¹	42	31.9

Premises name	2015-16		2014-15		2013-14		2012-13		2011-12	
	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)
Evandale	71.9	33.3 ¹	72.9	34.3 ¹	72.2	29.4 ¹	67.4	29.9 ¹	71.9	35.2
Exeter	80.2	32.4 ¹	87.1	36.6 ¹	93.6	51.2 ¹	95.7	41.5 ¹	93.8	38
Fingal	83.3	53.1 ¹	73.9	46.4 ¹	79.4	47.7 ¹	52.4	47.5 ²	44.7	45.8
Geeveston	73.3	67.6 ¹	74.2	73.2 ¹	83.9	77.8 ¹	91.7	84.2 ¹	97.9	84.6
George Town	83.3	63.0 ¹	83.3	62.5 ¹	88.7	74.1 ¹	94.5	82.4 ¹	91.3	65.4
Hoblers Bridge	90.2	68.8 ¹	86.2	64.6 ¹	97.5	72.2 ¹	95.9	64.8 ¹	91.7	66.7
Kempton	39.6	41.5 ¹	33.3	32.1 ¹	45.8	46.3 ¹	31.3	35.2 ¹	36.8	34.3
Latrobe	81.3	48.2 ¹	80.4	54.7 ¹	73.9	58.5 ¹	71.7	51.0 ¹	85.4	57.4
Legana	75.9	34.3 ¹	84.0	34.9 ¹	85.1	45.5 ¹	81.4	36.1 ¹	87.1	34.4
Lilydale	89.4	85.2 ¹	92.0	67.0 ¹	90.8	70.4 ¹	90.7	57.0 ¹	92.6	63
Longford	64.6	46.3 ¹	54.4	35.0 ¹	44.1	28.6 ¹	57.3	32.4 ¹	65.6	39.8
Macquarie Point	88.3	54.6 ¹	78.9	50.9 ¹	87.8	50.5 ¹	93	42.9 ¹	82.2	25.7
Margate	79.5	48.2 ¹	73.3	52.8 ¹	70.3	49.1 ¹	79.2	50.5 ¹	66.7	46.9
Midway Point	95.8	72.2 ¹	97.9	69.8 ¹	100	78.3 ¹	100	73.7 ¹	97.9	81.7
New Norfolk	91.7	56.5 ¹	85.8	57.4 ¹	85.5	56.5 ¹	89.6	53.7 ¹	85.4	41.7 ²
Newnham	71.7	50.0 ¹	85.9	58.5 ¹	84.8	56.5 ¹	95.8	61.1 ¹	97.9	60.7
Norwood	94.5	72.6 ¹	96.4	82.0 ¹	94.1	78.7 ¹	97.9	77.8 ¹	97.8	70.8
Oatlands	53.2	50.5 ¹	50.0	44.3 ¹	39.6	41.7 ¹	29.2	39.1 ¹	54.2	48
Orford	88.0	63.9 ¹	86.8	59.4 ¹	93.5	66.7 ¹	93.5	68.5 ¹	96.5	69.9
Pardoe	84.4	19.6 ¹	58.7	14.3 ¹	70	15.7 ¹	82.6	19.2 ¹	89.6	20.6 ²
Perth	73.5	35.5 ¹	76.0	35.2 ¹	84.9	35.2 ¹	76.1	27.8 ¹	83.3	31.5
Port Sorell	27.1	25.9 ¹	35.4	28.9 ¹	52.1	36.3 ¹	39.6	15.5 ²	51	16.5 ²
Prince of Wales	79.2	52.8 ¹	83.0	55.1 ¹	89.6	62 ¹	87.5	59.4 ¹	93.8	64.4
Prospect Vale	85.9	67.7 ¹	89.9	71.7 ¹	82.4	69.5 ¹	88	66.7 ¹	86.1	60.2

Premises name	2015-16		2014-15		2013-14		2012-13		2011-12	
	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)
Queenstown	91.5	68.2 ¹	70.2	72.6 ²	62.5	59.7 ²	74.5	76.2 ¹	80.0	79.0
Railton	-	-	-	-	89	65.8 ¹	91.2	68.0 ¹	94.7	69.8
Ranelagh	93.3	95.4 ¹	95.0	100.0 ¹	86	93.6 ¹	47.4	47.4 ¹	59.6	59.6
Richmond	-	44.4 ¹	-	44.3 ¹	-	42.6 ¹	-	41.7 ¹	-	46.8
Ridgley	80.2	80.0 ¹	90.9	90.7 ¹	87.7	88.1 ¹	93	85.5 ²	85.4	90.5
Risdon Vale	97.9	90.7 ¹	96.1	93.8 ¹	97.9	89.8 ¹	100	93.3 ¹	97.3	91.6
Riverside	93.5	52.8 ¹	97.0	58.4 ¹	100	63.9 ¹	91.7	57.4 ¹	80.8	51.4
Rokeby	95.3	95.3 ¹	82.2	81.4 ¹	99.1	99.1 ¹	87.4	85.2 ¹	93.3	93.6
Rosebery	79.3	79.3 ¹	-	-	-	-	-	-	-	-
Rosny	89.6	58.3 ¹	85.9	65.5 ¹	88.3	67.6 ¹	100	68.8 ¹	99.3	66.7
Round Hill	95.4	95.4 ¹	90.6	90.6 ¹	85.6	85.6 ¹	93.5	93.5 ¹	98.1	98.1
Scamander	-	64.3 ¹	-	64.7 ¹	-	69.4 ¹	-	69.6 ¹	-	67.3
Scottsdale	96.8	57.0 ¹	94.3	64.3 ¹	91.7	65.7 ¹	95.5	70.7 ¹	97.1	70.1
Selfs Point	90.3	96.2 ¹	87.4	93.8 ¹	94.2	97.8 ¹	86.4	93.6 ¹	93.9	98
Sheffield	95.4	95.4 ¹	98.0	98.0 ¹	97.2	97.2 ¹	94.3	94.3 ¹	66.7	90.7
Sisters Beach	96.3	97.2 ¹	88.0	88.0 ¹	95.7	95.7 ¹	85.9	89.4 ²	87.5	94.8
Smithton	89.7	46.0 ¹	88.2	56.8 ¹	57.6	36.62	43.7	35.1 ¹	67.8	61.1
Somerset	88.8	66.7 ¹	100.0	58.5 ¹	100	67.9 ¹	100	77.8 ²	91.7	79.2
Sorell	91.7	68.5 ¹	89.6	78.7 ¹	97.9	78.8 ¹	91.7	66.3 ¹	93.8	67.3
St Helens	96.3	100 ¹	96.0	100.0 ¹	96.2	98.1 ¹	97.2	98.1 ¹	99.1	99.1
St Marys	²	²	²	²	83.3	47.2 ¹	77	45.0 ¹	58.3	2.8 ²
Stanley	86.1	37.2 ¹	75.0	43.1 ¹	69	50.7 ¹	66.2	48.7 ¹	82.5	61.8
Stieglitz	-	-	-	-	100	73.2 ¹	100	64.5 ²	100	64.3 ²
Swansea	83.3	48.2 ¹	81.1	44.3 ¹	83.3	52.8 ¹	74.5	42.7 ¹	79.2	45

Premises name	2015-16		2014-15		2013-14		2012-13		2011-12	
	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)	Reg limits (%)	AMT limits (%)
Ti-Tree Bend	94.3	81.8 ¹	96.5	89.6 ¹	95.8	83.3 ¹	97.9	73.1 ¹	95.8	84.3
Triabunna	75.0	51.9 ¹	73.6	52.8 ¹	79.6	50.9 ¹	78.2	54.5 ¹	76.1	51.3
Tullah	87.5	65.2 ¹	93.9	68.8 ²	93.3	75.42	95.4	84.7 ¹	91.9	82.7
Turners Beach	68.5	42.6 ¹	74.0	43.3 ¹	78.4	55.7 ¹	71.2	42.3 ¹	76.9	49.1
Ulverstone	41.7	18.2 ¹	33.3	11.1 ³	– ³	– ³	12.5	12.5 ²	58.3	88.1 ²
Westbury	51.9	51.9 ¹	72.8	72.8 ¹	58.5	58.5 ¹	89.7	89.7 ¹	84	84
Wynyard	92.4	75.9 ¹	79.7	63.6 ¹	84.8	46.5 ¹	100	71.8 ²	100	73.3
Zeehan	81.6	82.6 ¹	68.2	75.3 ²	71.9	76.82	76.1	81.6 ¹	79.1	83.7

AMT dataset completeness:

– cannot be assessed (no relevant limits or no discharge to this location)

¹ essentially complete

² substantially complete (some gaps)

³ substantially incomplete (large gaps)

Figure A4.1 STP compliance with regulatory discharge to waters limits, 2015-16 (per cent)

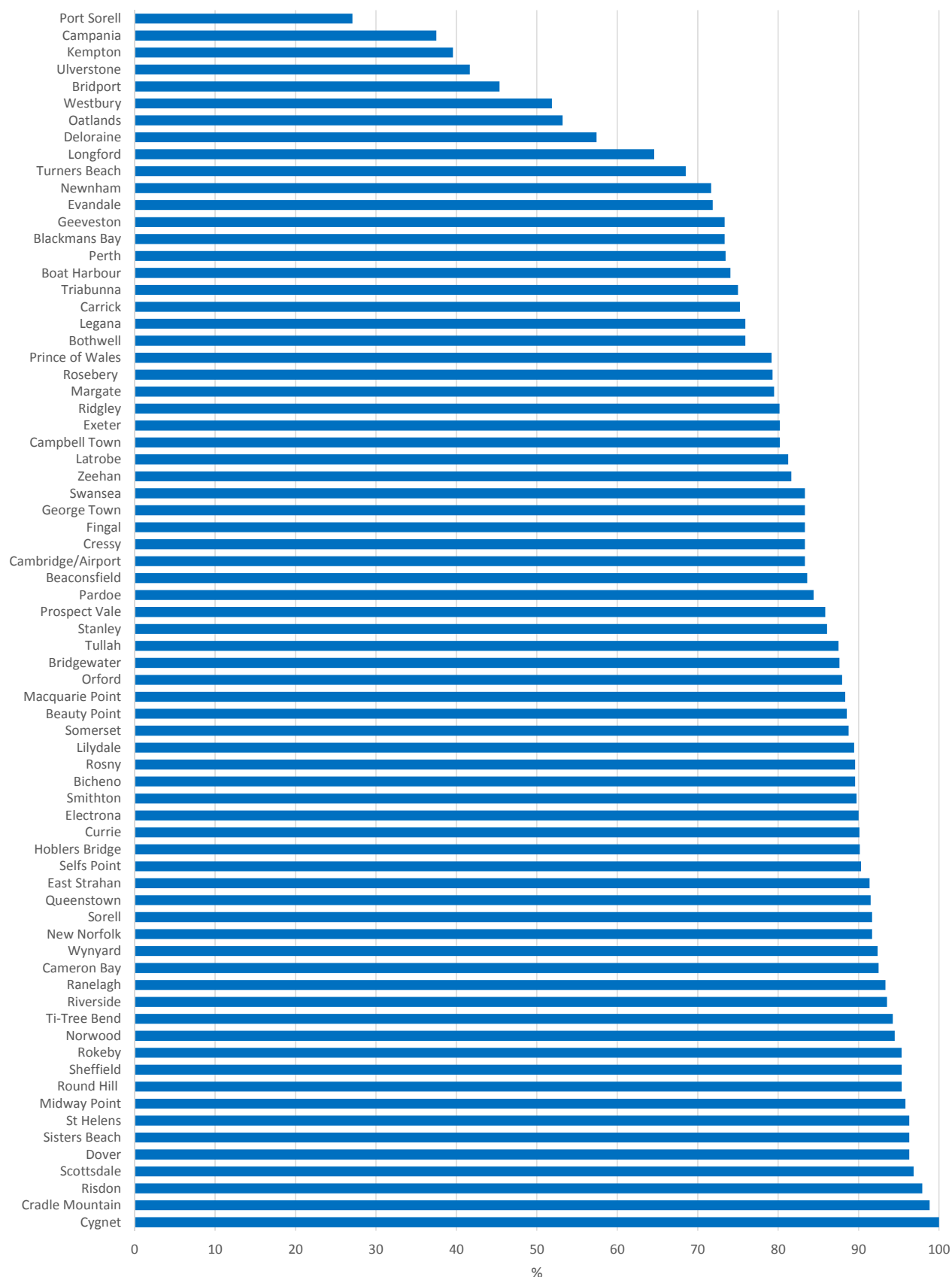


Figure A4.2 STP compliance with AMT discharge to waters limits, 2015-16 (per cent)

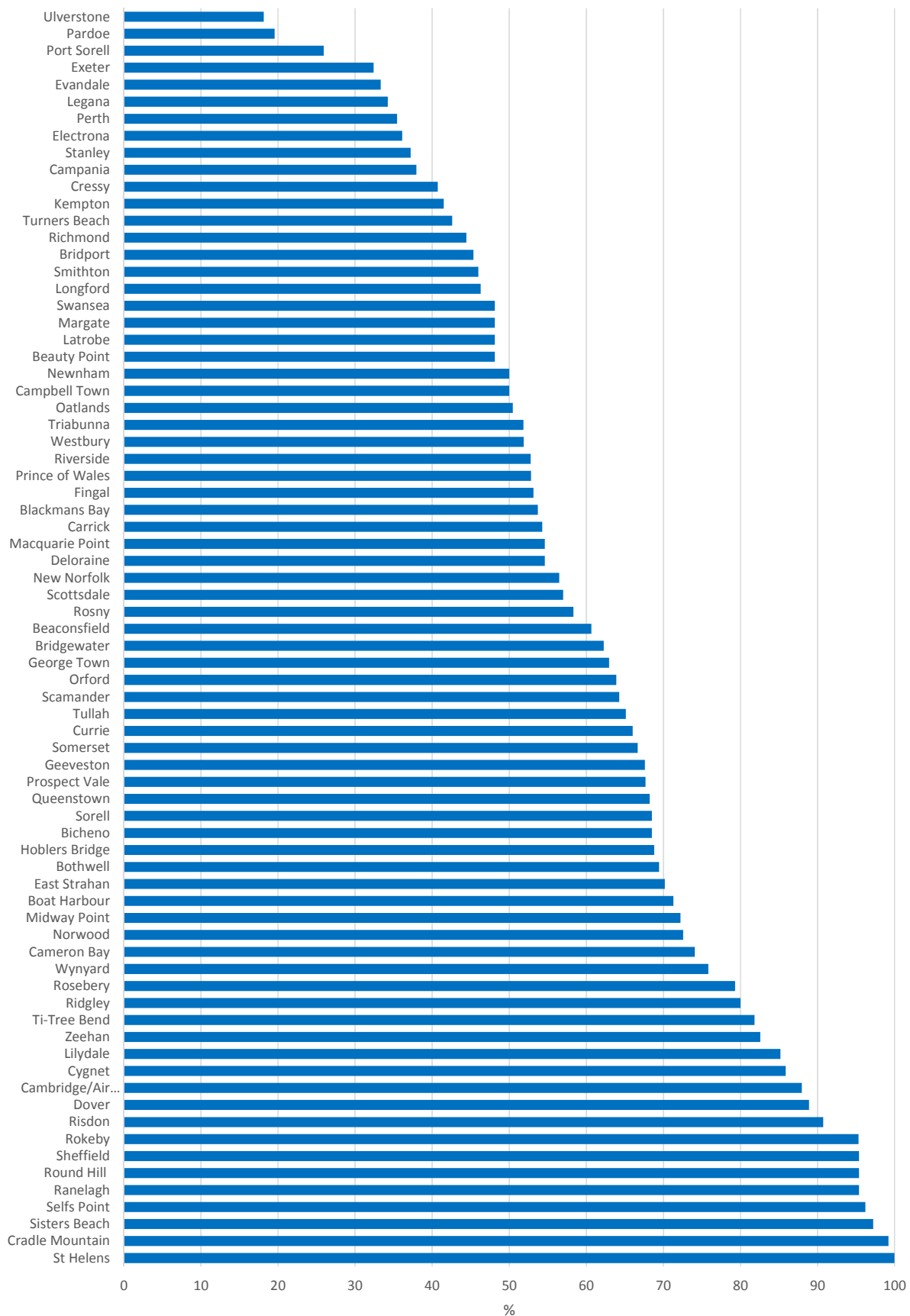


Table A4.2 STP compliance with 'Class B' reuse limits

STP	2015-16	2014-15	2013-14	2012-13	2011-12
Beaconsfield	93.3	*	*	88.9	--
Beauty Point	86.7	92.1	93.3	91.7	87.3
Bicheno	96.7	94.8	83.3	93.3	93.4
Bothwell	85.0	93.1	90	94.6	93.1
Bridgewater	98.3	96.6	75	96.7	100
Bridport	80.0	87.9	100	91.7	95.2
Brighton	79.3	86.4	83.1	81.7	86.7
Cambridge/Airport	98.3	100.0	95	100.0	99.0
Cameron Bay	98.3	98.3	98.3	100.0	96.9
Campania	90.0	77.6	80	85.5	78.6
Campbell Town	80.0	87.1	90	95.0	91.7
Carrick	-	87.3	80	91.4	89.3
Cressy	85.0	91.5	90	81.7	90.0
Evandale	68.3	61.7	59	65.0	63.3
Exeter	78.3	87.3	94.1	96.6	78.3
Kempton	53.5	51.7	71.7	61.7	63.8
Latrobe	-	87.9	75.9	65.5	76.7
Legana	80.0	88.8	89.7	93.5	96.4
Lilydale	93.6	92.9	94.3	93.3	96.7
Macquarie Point	-	98.3	89.7	94.3	100
Oatlands	77.6	79.3	81.7	75.0	94.0
Orford	-	89.7	100	96.7	96.7
Penna	90.0	95.0	91.4	85.7	91.1
Perth	83.9	86.4	87.9	80.0	76.7
Railton	73.4	81.5	78.8	88.9	86.2
Richmond	80.0	87.9	76.7	80.0	84.4
Riverside	90.0	100.0	100	100.0	96.5
Rokeby	100	98.4	100	100.0	99.0
Rosny	100	98.4	100	100.0	100
Scamander	91.9	95.0	96.7	93.3	92.1
Selfs Point	-	99.7	100	100.0	99.3
St Marys	72.4	71.4	83.3	86.0	61.1
Stieglitz	95.0	88.7	98.2	96.7	95.0
Swansea	85.0	82.8	88.3	79.0	79.7
Triabunna	75.0	77.6	85	83.9	77.1
Westbury	70.2	-	-	-	-

* Insufficient number of samples provided

Table A4.3 Reuse proportion per STP (per cent proportion and ML/year) 2011-12 to 2015-16

Premises name	2015-16		2014-15		2013-14		2012-13		2011-12	
	Reuse proportion (%)	Reuse flow ML/year	Reuse proportion (%)	Reuse flow ML/year	Reuse proportion (%)	Reuse flow ML/year	Reuse proportion (%)	Reuse flow ML/year	Reuse proportion (%)	Reuse flow ML/year
Beaconsfield	89.4	100.7	87.1	62.3	79.4	100.0	69.6	40.4	-	-
Beauty Point	74.6	120.1	67.5	107.7	62.0	124.9	73.4	85.7	55.0	82.7
Bicheno	36.5	46.0	88.3	88.5	51.9	63.7	43.3	45.8	22.9	28.2
Bothwell	100	38.6	100	42.4	76.9	33.2	100.0	41.1	58.0	26.5
Bridgewater (Green Point)	81.2	644.2	56.0	499.1	63.6	538.6	54.9	433.4	50.1	455.3
Bridport	12.9	9.0	15.9	13.0	8.5	7.6	0.5	0.5	0.0	0.0
Brighton	100	203.2	100	207.9	100.0	281.3	86.5	226.0	74.8	204.4
Cambridge (Airport)	4.3	6.2	7.2	10.2	4.9	5.9	3.9	3.7	5.2	6.0
Cameron Bay	2.7	45.1	2.4	43.1	2.7	46.5	4.3	74.8	3.2	63.7
Campania	90.7	29.1	100	16.7	100.0	30.4	100.0	29.5	100.0	29.5
Campbell Town	100	71.7	100	69.3	98.4	73.7	100.0	62.7	33.6	29.3
Carrick	-	-	23.1	39.5	13.7	28.3	36.5	70.6	9.0	16.0
Cressy	100	56.9	100	60.7	80.0	59.2	97.8	49.8	57.9	36.8
Evandale	100	75.7	99.6	93.3	64.1	58.9	88.7	59.6	60.2	42.5
Exeter	41.0	26.4	53.0	29.0	44.2	31.9	58.2	13.2	49.9	8.3
Kempton	100	22.5	100	25.5	100.0	43.6	100.0	43.0	100.0	42.5
Legana	63.1	232.1	62.5	222.3	52.6	188.2	60.7	172.5	45.2	150.1
Lilydale	86.3	31.4	86.0	33.7	63.8	20.8	41.0	8.3	60.0	19.0
Macquarie Point	-	-	-	-	2.7	102.2	5.8	225.8	3.8	160.2
Midway Point	83.1	133.0	69.9	118.9	67.5	117.4	67.4	108.4	63.0	81.9
Oatlands	100	72.9	99.8	49.9	100.0	61.5	72.0	57.8	58.0	46.6
Penna	100	270.2	100	246.1	100.0	237.7	100.0	279.9	100.0	208.0
Perth	100	198.8	84.7	175.3	74.3	143.8	72.9	143.9	55.3	130.9
Railton	100	152.2	100	148.9	43.1	112.1	43.0	73.5	82.9	141.8

Premises name	2015-16		2014-15		2013-14		2012-13		2011-12	
	Reuse proportion (%)	Reuse flow ML/year	Reuse proportion (%)	Reuse flow ML/year	Reuse proportion (%)	Reuse flow ML/year	Reuse proportion (%)	Reuse flow ML/year	Reuse proportion (%)	Reuse flow ML/year
Richmond	100	63.3	91.2	60.4	87.6	63.1	82.4	55.0	100.0	72.0
Riverside	1.5	8.5	11.1	59.2	14.1	89.9	8.1	40.0	22.2	111.4
Rokeby	100	681.5	98.5	700	98.4	620.4	65.3	393.8	44.2	298.2
Rosny	76.3	1672.8	56.3	1251.6	75.2	1684.6	52.2	1170.8	31.0	771.9
Scamander	85.1	45.7	100	43.8	100.0	50.9	100.0	17.1	81.5	87.5
Selfs Point	-	-	3.2	115.8	0.4	14.5	0.4	10.7	2.3	83.7
Sorell	81.7	165.6	76.8	157.6	65.7	134.9	68.7	169.3	64.0	104.8
St Marys	79.8	35.6	84.6	34.1	92.9	52.0	100.0	47.4	47.0	25.8
Stieglitz	100	65.7	100	65.0	100.0	81.5	100.0	19.0	100.0	74.8
Swansea	47.9	45.1	86.7	66.4	77.7	64.2	98.0	77.2	36.0	28.1
Taroona	-	-	-	-	3.7	4.5	4.9	6.3	-	-
Triabunna	93.8	60.3	99.8	60.0	98.3	62.8	65.8	56.6	35.0	59.3
Westbury	41.8	97.1	18.7	43.0	11.9	42.1	6.9	14.0	-	-

Table A4.4 2015-16 Licensed flow limit and actual average annual inflow per STP (kL/day and per cent proportion)

Catchment area	Premises name	Licensed flow limit (kL/day)	2015-16 average annual inflow (kL/day)	Actual inflow (per cent of licensed limit)
West Tamar	Beaconsfield	400	308	77
West Tamar	Beauty Point	540	441	82
Glamorgan/Spring Bay	Bicheno	450	345	77
Kingborough	Blackmans Bay	4125	4029	98
Waratah/Wynyard	Boat Harbour	170	28	17
Central Highlands	Bothwell	155	105	68
Brighton	Bridgewater	3500	2167	62
Dorset	Bridport	1400	192	14
Brighton	Brighton	650	556	85
Clarence	Cambridge/Airport	800	396	50
Glenorchy	Cameron Bay	6000	4597	77
Southern Midlands	Campania	136	87	64
Northern Midlands	Campbell Town	325	197	60
Meander Valley	Carrick	624	595	95
Kentish	Cradle Mountain	500	268	54
Northern Midlands	Cressy	240	156	65
King Island	Currie	290	348	120
Huon Valley	Cygnets	400	316	79
Meander Valley	Deloraine	850	865	102
Huon Valley	Dover	360	213	59
West Coast	East Strahan	1056	467	44
Kingborough	Electrona	450	360	80
Northern Midlands	Evandale	375	205	55
West Tamar	Exeter	150	176	117
Break O' Day	Fingal	125	66	53
Huon Valley	Geeveston	300	260	87
George Town	George Town	3600	1897	53
Launceston	Hobblers Bridge	4500	2973	66
Southern Midlands	Kempton	135	62	46
Latrobe	Latrobe	1000	1249	125
West Tamar	Legana	540	1008	187
Launceston	Lilydale	135	99	74
Northern Midlands	Longford	2700	1851	69
Hobart	Macquarie Point	18000	10328	57
Kingborough	Margate	681	464	68
Sorell	Midway Point	810	435	54
Derwent Valley	Turiff Lodge	4100	1620	40
Launceston	Newnham Drive	3920	3067	78
Launceston	Norwood	4050	2241	55
Southern Midlands	Oatlands	136	201	147

Catchment area	Premises name	Licensed flow limit (kL/day)	2015-16 average annual inflow (kL/day)	Actual inflow (per cent of licensed limit)
Glamorgan/ Spring Bay	Orford	473	207	44
Devonport	Pardoe	14000	13217	94
Sorell	Penna#	1400	738	53
Northern Midlands	Perth	450	546	121
Latrobe	Port Sorell	961	861	90
Glenorchy	Prince of Wales	9900	8096	82
Meander Valley	Prospect Vale	1720	1607	93
West Coast	Queenstown	1100	2719	247
Kentish	Railton	600	414	69
Huon Valley	Ranelagh	1200	1399	117
Clarence	Richmond	n/a	172	
Burnie	Ridgley	110	138	125
Clarence	Risdon	1000	705	70
West Tamar	Riverside	2800	1587	57
Clarence	Rokeby	4000	1864	47
West Coast	Rosebery	242	332	137
Clarence	Rosny	7500	5989	80
Burnie	Round Hill	9000	5580	62
Break O' Day	Scamander	240	149	62
Dorset	Scottsdale	3200	448	14
Hobart	Selfs Point	13000	10099	78
Kentish	Sheffield	350	465	133
Waratah/Wynyard	Sisters Beach	585	61	10
Circular Head	Smithton	5200	3573	69
Waratah/Wynyard	Somerset	1200	1090	91
Sorell	Sorell	810	553	68
Break O' Day	St Helens	1500	523	35
Break O' Day	St Marys	190	122	64
Circular Head	Stanley	276	135	49
Break O' Day	Stieglitz	110	178	162
Glamorgan/ Spring Bay	Swansea	430	257	60
Launceston	Ti-Tree Bend	25000	16825	67
Glamorgan/ Spring Bay	Triabunna	253	174	69
West Coast	Tullah	243	74	30
Central Coast	Turners Beach	600	569	95
Central Coast	Ulverstone	7500	7188	96
Meander Valley	Westbury	600	635	106
Waratah/Wynyard	Wynyard	2900	3674	127
West Coast	Zeehan	214	311	145

Source: EPA Tasmania database

The Penna STP acts as a "polishing plant" for treated effluent from the Midway Point and Sorell STPs, with effluent receiving further treatment prior to being made available for recycled water use

APPENDIX 5 CUSTOMER SERVICE STANDARDS

Table A5.1 Customer Service Code service standards, targets and performance

Indicator	CSC minimum standard ¹	2014-15	2015-16
Water:			
Unplanned water supply interruptions (per 100 km of water main)	71	<u>97</u>	<u>93</u>
Average time taken to attend bursts and leaks:			
– priority 1 (minutes/% of time standard achieved)	60/90%	36	35 / <u>87%</u>
– priority 2 (minutes/% of time standard achieved)	180/90%	70	69 / 98%
– priority 3 (minutes/% of time standard achieved)	4 320/90%	673	1 861 / 91%
Average frequency of unplanned water supply interruptions (number)	0.10	<u>0.17</u>	<u>0.17</u>
Average frequency of planned water supply interruptions (number)	0.10	0.03	0.01
Average unplanned customer minutes off water supply (minutes)	25	24	<u>34</u>
Average planned customer minutes off water supply (minutes)	20	9	2
Average duration of water supply interruptions:			
– unplanned (minutes/% of time standard achieved)	180/80%	143	<u>199</u> / 90%
– planned (minutes/% of time standard achieved)	180/80%	<u>292</u>	130 / 94%
Unplanned water supply interruptions restored within five hours (per cent)	85	97	94
Planned water supply interruptions restored within five hours (per cent)	80	95	97
Number of customers receiving more than five unplanned water interruptions a year (number/% of time standard achieved) [^]	0/90%	NR	NR
Unaccounted for water (per cent)	14	<u>22</u>	<u>33</u>
Sewerage:			
Sewer breaks and chokes (per 100 km of sewer main)	104	57	61
Average time to attend sewer spills, breaks and chokes (minutes/% of time standard achieved)	60/90%	51	55 / <u>74%</u>
Average sewerage service interruption (minutes/% of time standard achieved)	180/80%	<u>274</u>	<u>277</u> / <u>78%</u>
Sewerage spills contained within five hours (per cent)	99	<u>98</u>	100
Customers receiving more than three sewerage service interruptions per year [^]	0	NR	NR
Customers:			
Total water and sewerage complaints (per 1 000 properties)	9.00	<u>11.59</u>	<u>14.28</u>
Water and sewerage complaints to Ombudsman (per 1 000 properties)	0.50	0.32	0.38
Percentage of calls answered by an operator within 30 seconds	85	89	88

Results in **bold** and underlined indicate standard was not met for the year[^] Indicator not measurable

NR Not reported

¹ Minimum service standards for 2015-16 as per TasWater's Price and Service Plan 2015-18.

