



Attachment 6

Capital expenditure

30 June 2017

2018–23 Water and Sewerage Price Proposal



Quality
drinking water



Reliable
supply



Affordable
pricing



Customer
service



Environmental
sustainability

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Table of contents

1	Summary	1
1.2	Customer engagement.....	3
2	Historical capex 2013–18	5
2.1	Overview	5
2.2	Delivery of 2013–18 capital program	10
2.3	Cost drivers for capital investment in 2013–18.....	11
3	Forecast capex 2018–23	23
3.1	Overview	23
3.2	Forecasting method	25
3.3	Forecast capex by driver.....	30
Appendix 1	Top twenty project cost estimates	44
Appendix 2	Selected twenty project cost estimates	45
Appendix 3	Project cost estimates: Icon Water capital contribution scheme	46

List of tables

Table 2-1:	Icon Water's 2013–18 capex against the Industry Panel 2015 decision (\$million, 2017–18)	6
Table 2-2:	Renewals capex – water (\$million, 2017–18)	12
Table 2-3:	Key water renewal projects delivered over 2013–18	12
Table 2-4:	Renewals capex – sewerage (\$million, 2017–18)	13
Table 2-5:	Key sewerage renewal projects delivered over 2013–18	14
Table 2-6:	Growth capex – water (\$million, 2017–18)	15
Table 2-7:	Key water growth projects delivered over 2013–18	15
Table 2-8:	Growth capex – sewerage (\$million, 2017–18).....	16
Table 2-9:	Key sewerage growth projects delivered over 2013–18	16
Table 2-10:	Improvement capex – water (\$million, 2017–18)	17
Table 2-11:	Key water improvement projects delivered over 2013–18	17
Table 2-12:	Improvement – sewerage (\$million, 2017–18).....	18
Table 2-13:	Key sewerage improvement projects delivered over 2013–18	18
Table 2-14:	Non-system assets (\$million, 2017–18)	19
Table 2-15:	Key non-system projects delivered over 2013–18	22
Table 3-1:	Summary of forecast capex, 2018–23 (\$million, 2017–18).....	24
Table 3-2:	Real implicit price deflators for engineering capex for the ACT (%)	29
Table 3-3:	Forecast renewal capex (\$million, 2017–18)	30
Table 3-4:	Key projects - renewal of water assets	31
Table 3-5:	Key projects - renewal of sewerage assets	32
Table 3-6:	Key projects - renewal of non-system assets	32
Table 3-7:	Forecast growth capex (\$million, 2017–18)	35
Table 3-8:	Key projects - water assets for growth	35
Table 3-9:	Key projects - sewerage assets for growth	36
Table 3-10:	Forecast regulation driven capex (\$million, 2017–18)	37
Table 3-11:	Key projects – regulation driven capex - water assets.....	38
Table 3-12:	Key projects – regulation driven capex - sewerage assets.....	38
Table 3-13:	Key projects – regulation driven capex - non-system assets.....	39
Table 3-14:	Forecast efficiency capex (\$million, 2017–18)	40
Table 3-15:	Key projects – efficiency capex - non-system assets	41
Table 3-16:	Non-system capex (\$million, 2017–18).....	42
Table 3-17:	Capital contributions (\$ million, 2017–18).....	43

List of figures

Figure 1-1:	Icon Water's capex actual and forecast 2013–14 to 2022–23 (\$million, 2017–18)	2
Figure 1-2:	Indicative long-term capex profile (\$million, 2017–18).....	2
Figure 1-3:	Examples of how Icon Water's capital program contributes to achieving its customer priorities.....	3
Figure 2-1:	Annual capex for water and sewerage, 2013–18 (\$million, 2017–18).....	7
Figure 2-2:	LMWQCC program actual expenditure against Industry Panel final decision (\$million, nominal).....	8
Figure 2-3:	Drivers of variance between Industry Panel final decision and actual capex 2013–18 (\$million, nominal)	11
Figure 2-4:	Renewals capex – water (\$million, 2017–18)	11
Figure 2-5:	Renewals capex – sewerage (\$million, 2017–18)	13
Figure 2-6:	Growth capex – water (\$million, 2017–18)	14
Figure 2-7:	Growth capex – sewerage (\$million, 2017–18).....	15
Figure 2-8:	Improvement capex – water (\$million, 2017–18).....	17
Figure 2-9:	Improvement – sewerage (\$million, 2017–18).....	18
Figure 2-10:	Non-system assets (\$million, 2017–18).....	19
Figure 3-1:	Forecast capex 2018–23 by driver (\$million, 2017–18).....	23
Figure 3-2:	2018-23 forecast capex by asset category (\$million, 2017–18)	24
Figure 3-3:	Forecasting methodology steps for capex	26

List of boxes

Box 1-1:	Key points	1
Box 2-1:	Summary of capex 2013–18.....	5
Box 2-2:	LMWQCC program	8
Box 3-1:	2018–23 program delivery approach.....	24

1 Summary

This attachment details Icon Water's capital expenditure (capex) program delivered over the 2013–18 regulatory period against the forecast used by the Industry Panel in making its final 2015 decision, and the investment program planned for the 2018–23 regulatory period.

Box 1-1: Key points

- Actual prudent capex investment by Icon Water in water and sewerage assets during the 2013–18 regulatory period will amount to \$416.0 million (\$2017–18), including \$170.7 million on water services and \$245.4 million on sewerage services. This includes \$77.9 million investment in non-system assets¹ which is allocated between water and sewerage services. This is \$57.4 million or 12.1 per cent below the forecast allowed by the Industry Panel which is the result of prudent deferrals of renewal and growth projects, successful negotiations with the environmental regulator allowing more efficient options to meet environmental standards, and project efficiencies identified as projects were refined.
- Icon Water's forecast gross capex over the 2018–23 regulatory period is \$437.6 million or \$405.9 million net of capital contributions, including \$176.9 million for investment in water service assets and \$260.7 million for sewerage service assets. This includes \$67.7 million investment in non-system assets.
- This program reflects a typical 'baseline' investment program for Icon Water over a five-year regulatory period and has been designed to renew infrastructure to maintain service standards, expand the network to support growth in the Australian Capital Territory (ACT), improve assets to generate efficiencies and renew a number of operating systems including Icon Water's works management system.
- Icon Water has made significant improvements in its planning and delivery of projects over the 2013–18 regulatory period to meet industry best practice asset management and has been recognised for this by the Water Services Association of Australia and industry peers. Icon Water will continue to drive improvements in asset management and governance practices as outlined in [Attachment 5: Asset management and governance](#).

Over the 2013–18 regulatory period, Icon Water has focused on improving and developing its planning and service delivery capabilities in response to changes in its operating environment and future demands. Business transformation over the period has commenced without compromising delivery of services to the community. The improved overall approach to asset management will continue to enable more informed and prudent investment decisions.

The 2018–23 regulatory period will see Icon Water continue to focus on the renewal of critical infrastructure in response to the outcomes of condition assessments on its existing ageing assets. This will ensure Icon Water can maintain service standards for consumers and support growth in the region. The business transformation program (BTP) will also continue as the business undertakes a major program of information and communication technology (ICT) system renewal which will allow the business to respond to identified opportunities to drive efficiencies.²

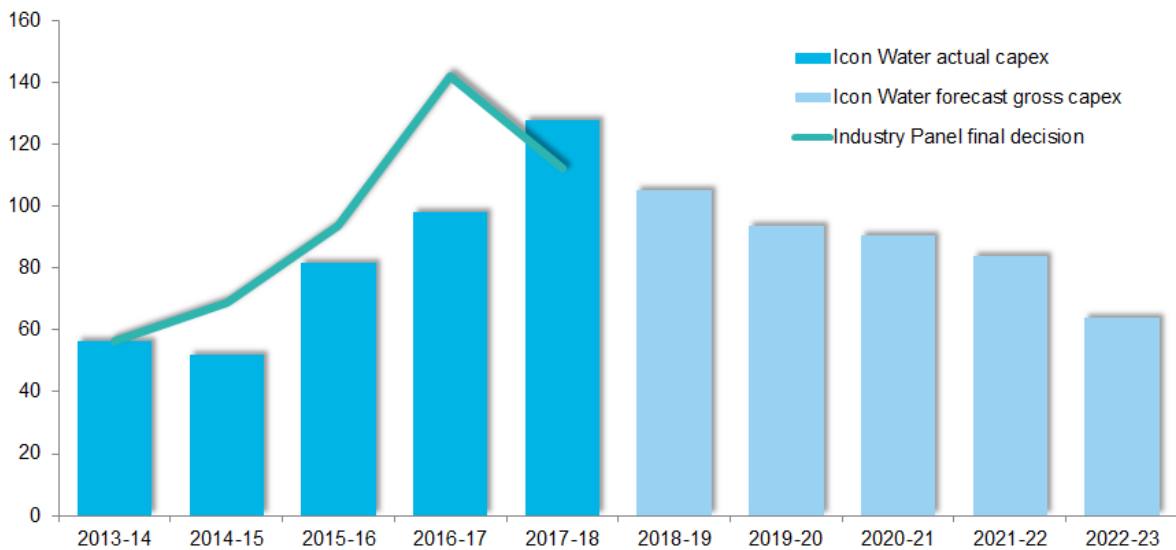
Figure 1-1 illustrates Icon Water's actual and forecast capex against the Industry Panel's 2015 decision over the 2013–18 regulatory period, together with its proposed forecast for the 2018–23 regulatory

¹ Icon Water's non-system assets include information and communication technology (ICT), fleet and equipment, land and buildings and other assets not directly part of the water or sewerage networks.

² Icon Water's ICT systems asset class is comprised of Operational Technology (OT) assets and Information Technology (IT) assets.

period. The gross forecast for 2018–23 is 5.2 per cent higher than the program in the 2013–18 regulatory period in real terms (\$2017–18). When forecast capital contributions are deducted, the program is 2.4 per cent lower.

Figure 1-1: Icon Water’s capex actual and forecast 2013–14 to 2022–23 (\$million, 2017–18)

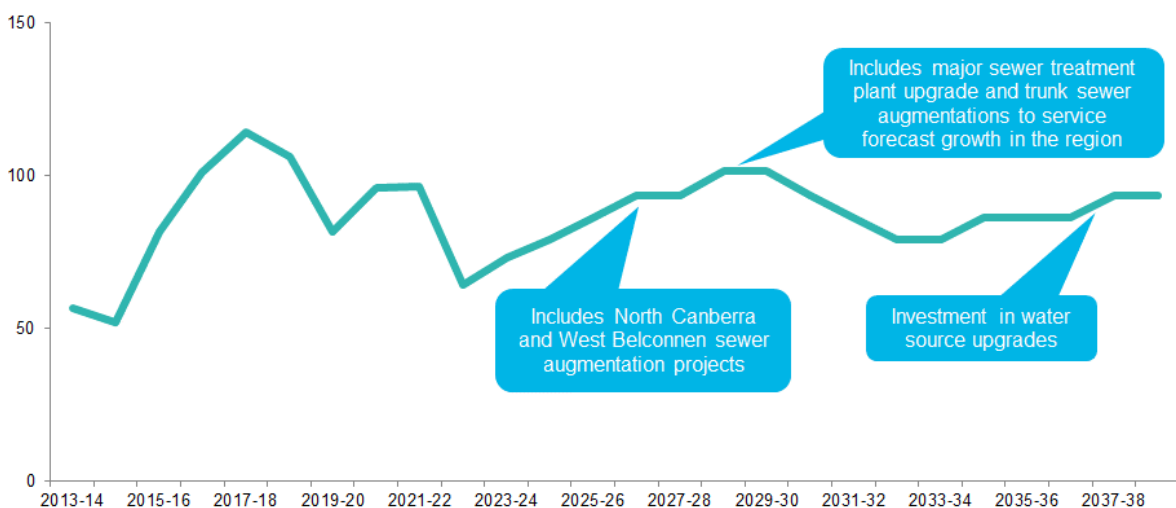


Source: Icon Water.

1.1.1 Long term capex forecast

Icon Water’s capex forecast for the 2018–23 regulatory period is in line with its indicative long-term capex profile as shown in Figure 1-2 below. As explained in [Attachment 5: Asset management governance](#) Icon Water undertakes long-term asset management planning to develop indicative forecasts of capital works required based on the age profile of its asset base, and assumptions about asset condition and growth in demand for services. At this stage, Icon Water’s indicative long-term capex is forecast to grow at a slower rate than the region’s population, which suggests that these costs will be spread over a larger customer base.

Figure 1-2: Indicative long-term capex profile (\$million, 2017–18)



Source: Icon Water.



1.2 Customer engagement

In planning its capital investment, Icon Water takes into account the preferences of its customers. Icon Water’s approach to customer engagement for this review together with the feedback received from customers on service level preferences is detailed in [Attachment 3: Service standards](#).

Icon Water has identified five customer priorities that underpin the way it operates. These priorities and how Icon Water’s capex programs for the 2013–18 and 2018–23 regulatory periods contribute to the achievement of these is provided below.

Figure 1-3: Examples of how Icon Water’s capital program contributes to achieving its customer priorities

	2013–18 program	2018–23 program
 <p>Quality drinking water</p>	<p>The investment Icon Water has made in previous periods has meant that the region enjoys a secure supply of high quality drinking water. Infrastructure investment over the 2013–18 period has included the construction of a new reservoir to service new homes and businesses in the Molonglo Valley.</p>	<p>Investment in water treatment infrastructure during the 2018–23 period will include reservoir roof replacements and renewal of the clarifier system at Googong water treatment plant (WTP).</p> <p>This will help to maintain water supply quality for customers serviced by these assets</p>
 <p>Reliable supply</p>	<p>Icon Water’s water and sewer mains renewal programs are replacing aged assets at risk of failure to maintain the reliability of water and sewerage services to customers.</p> <p>Investment in upgrades at Googong WTP has been undertaken to ensure the reliability of water supply for those serviced by this facility.</p>	<p>Investment in renewal of core systems such as the Asset Management and Maintenance Solution (AMMS) will ensure Icon Water can continue to manage its assets effectively to ensure the reliability of services is maintained.</p>
 <p>Affordable pricing</p>	<p>Icon Water is continuously looking for opportunities to reduce customer bills and only undertakes capital projects when necessary to do so or where a project can drive efficiency in the business over time. During the 2013–18 period Icon Water has prudently deferred a number of high value projects because of changes in land release programs, successful negotiations with the environmental regulator and scope refinement.</p>	<p>Icon Water’s capital governance and prioritisation process applied in the development of the 2018–23 capex program subjects all investment to a rigorous planning and execution processes to ensure prudent and efficient project delivery. This means that customers only pay for necessary water and sewerage infrastructure in their bills.</p> <p>Icon Water will also invest in technology that will drive operating efficiency in the business to reduce costs to customers over the long term, such as the renewable energy program.</p>

	2013–18 program	2018–23 program
 <p>Customer service</p>	<p>In the delivery of projects, Icon Water plans its projects with regard to customer service performance targets and customer preferences to ensure acceptable levels of service are maintained while works are carried out where possible, or interruptions are minimised.</p> <p>Delivery of the meter replacement program during the period will ensure accurate consumption data as input into customer billing.</p>	<p>Icon Water has engaged with customers to identify priorities and willingness to pay for services, and has taken the feedback from this engagement into consideration in developing the 2018–23 capex program. An example of this is revising the scope of water mains renewal expenditure to target high risk areas but not moderate risk areas based on feedback from Icon Water’s willingness to pay study.</p>
 <p>Environmental sustainability</p>	<p>Icon Water’s capex program is planned to ensure ongoing compliance with its environmental obligations and promote environmental sustainability. This is achieved through a long-term sustainability assessment which forms part of the planning approvals process for all projects.</p> <p>Investment in solar photovoltaic (PV) panels at Icon Water sites to generate renewable energy will reduce Icon Water’s reliance on alternative energy sources.</p>	<p>The 2018–23 capex program includes significant investment in renewable energy generation including completion of the solar PV panel project and hydroelectric generation technology at several sites to reduce Icon Water’s operating costs and greenhouse gas emissions.</p>

Source: Icon Water.

2 Historical capex 2013–18

Box 2-1: Summary of capex 2013–18

- Actual prudent capex by Icon Water in water and sewerage assets during 2013–18 will amount to \$416.0 million (\$2017–18), including \$170.7 million on water services and \$245.4 million on sewerage services. This includes \$77.9 million investment in non-system assets which is allocated between water and sewerage services.
- This is \$57.4 million or 12.1 per cent below the forecast allowed by the Industry Panel which is the result of:
 - prudent deferrals of renewal and growth projects based on revised condition and risk assessments and changes in the ACT Government’s land release program;
 - successful negotiations with the Environmental Protection Authority (EPA) allowing more efficient options to meet environmental standards following consideration of Icon Water’s assessment of potential overflows and proposed management approach;
 - agreement reached with developers to have assets in the program gifted; and
 - project efficiencies achieved by identifying innovative solutions as projects were refined.
- During the period Icon Water has initiated a major ICT system renewal to replace aged and unsupported systems and drive business efficiencies over the long term.
- Icon Water has made significant improvements in its planning and delivery of projects over the 2013–18 regulatory period to meet industry best practice asset management.

2.1 Overview

The Industry Panel’s 2015 final decision allowed for capex of \$473.5 million (\$2017–18) during the 2013–18 regulatory period. This decision was based on Icon Water’s forecast capex at the time of its decision, with a \$10 million (nominal) reduction in the final two years of the period.

Icon Water’s actual forecast capex is \$416.0 million. The breakdown of this between water and sewerage investment and by year is shown in Table 2-1.

Table 2-1: Icon Water’s 2013–18 capex against the Industry Panel 2015 decision (\$million, 2017–18)

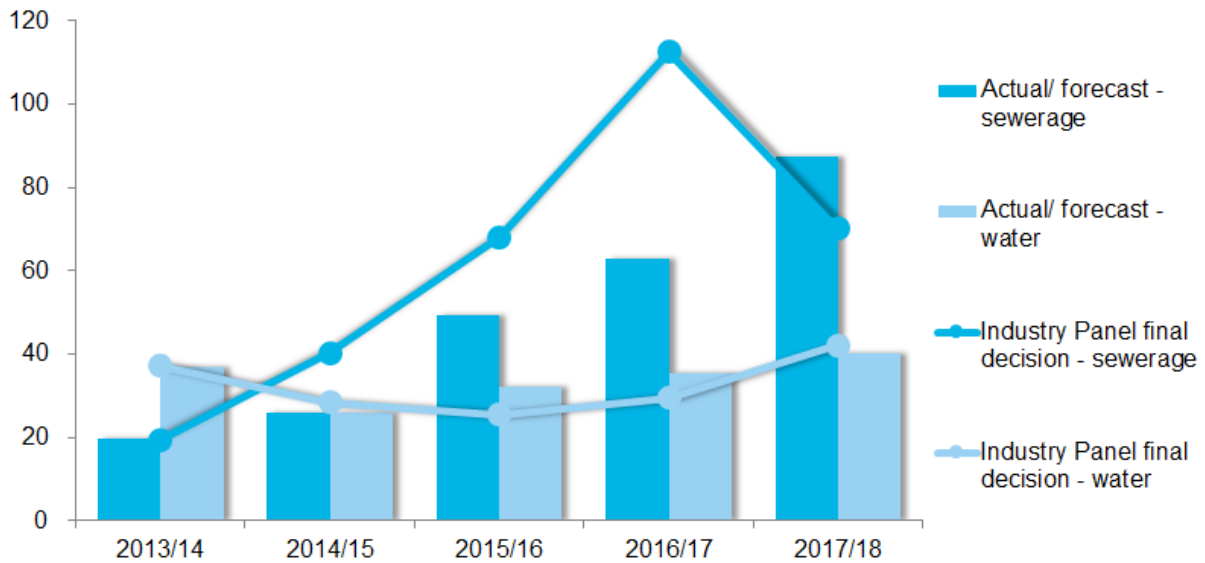
	2013–14	2014–15	2015–16	2016–17 forecast	2017–18 forecast	Total
Water						
Industry Panel 2015 decision	37.1	28.5	25.4	29.6	42.2	162.8
Actual/ forecast	36.8	25.9	32.2	35.5	40.2	170.7
Variance	-0.3	-2.6	6.8	5.9	-2.0	7.9
% variance	-1%	-9%	27%	20%	-5%	5%
Sewerage						
Industry Panel 2015 decision	19.4	40.3	68.2	112.6	70.2	310.7
Actual/ forecast	19.6	26.1	49.4	62.8	87.5	245.4
Variance	0.2	-14.2	-18.8	-49.8	17.3	-65.3
% variance	1%	-35%	-28%	-44%	25%	-21%
Combined total						
Industry Panel 2015 decision	56.6	68.7	93.6	142.2	112.4	473.5
Actual/ forecast	56.5	52.0	81.6	98.3	127.7	416.0
Variance	-0.1	-16.8	-12.0	-43.9	15.3	-57.4
% variance	0%	-24%	-13%	-31%	14%	-12%

Source: Icon Water.

Icon Water’s capital program over the 2013–18 regulatory period has focussed largely on maintaining safe and reliable services to customers through investment in water, sewerage and non-system asset replacement and improvement. This follows a period of significant investment in the region’s water security over the 2008–13 regulatory period and into the first year of the 2013–18 period. Icon Water has also delivered water and sewerage projects to meet the region’s growing needs in new urban developments and initial investment in both critical information and communication technology (ICT) and operational technology (OT) that will continue into the 2018–23 regulatory period to replace aged and unsupported systems and enable future efficiencies.

Figure 2-1 shows Icon Water’s water and sewerage capex spend against the Industry Panel’s decision in each year of the 2013–18 regulatory period.

Figure 2-1: Annual capex for water and sewerage, 2013–18 (\$million, 2017–18)



Source: Icon Water.

Icon Water’s biggest investment over the 2013–18 regulatory period has been a major program of works at the Lower Molonglo Water Quality Control Centre (LMWQCC) to replace aged assets at risk of failure and meet environmental regulations. This has included renewal of the aeration system, and upgrades to solids handling assets and the furnace and exhaust system.

Icon Water has also undertaken an extensive sewer mains replacement program, with in the order of 80 kilometres (km) of sewer mains replaced over the 2013–18 period as these assets approach the end of their useful life and have been identified as being at risk of failure.

Icon Water’s major investment in water assets over the period included completion of the Enlarged Cotter Dam project, water main renewals, a proactive water meter and property service connection replacement program, upgrades to Googong WTP and infrastructure to support population growth in the Molonglo Valley.

The 2013–18 regulatory period has, and will continue to see Icon Water embark on a significant BTP, which includes the renewal of critical ICT systems as its existing systems reach the end of their useful life. This program will extend into the beginning of the 2018–23 period and deliver efficiencies thereafter which have been incorporated into Icon Water’s capex and operational expenditure (opex) plans.

Box 2-2: LMWQCC program

The LMWQCC is the main sewage treatment facility for Canberra and is the largest inland treatment facility in Australia, treating up to 90 megalitres (ML) of sewage each day to a tertiary standard.

LMWQCC was built in 1978 and by the 2013–18 regulatory period the condition of much of the facility was deteriorating. Due to population growth and other factors the plant is also now operating at close to its process capacity.

To respond to these issues, Icon Water is undertaking an extensive renewal and expansion program of works at the facility to ensure LMWQCC can continue to serve its critical role in the region’s sewerage network. This program will spread across both the 2013–18 and 2018–23 regulatory periods and needs to be carried out around a working plant.

During the 2013–18 regulatory period, investment at LMWQCC has totalled \$126 million; 10 per cent higher than the \$115 million that was included in the forecast for the period. This represents over a quarter of Icon Water’s total capex investment for the period.

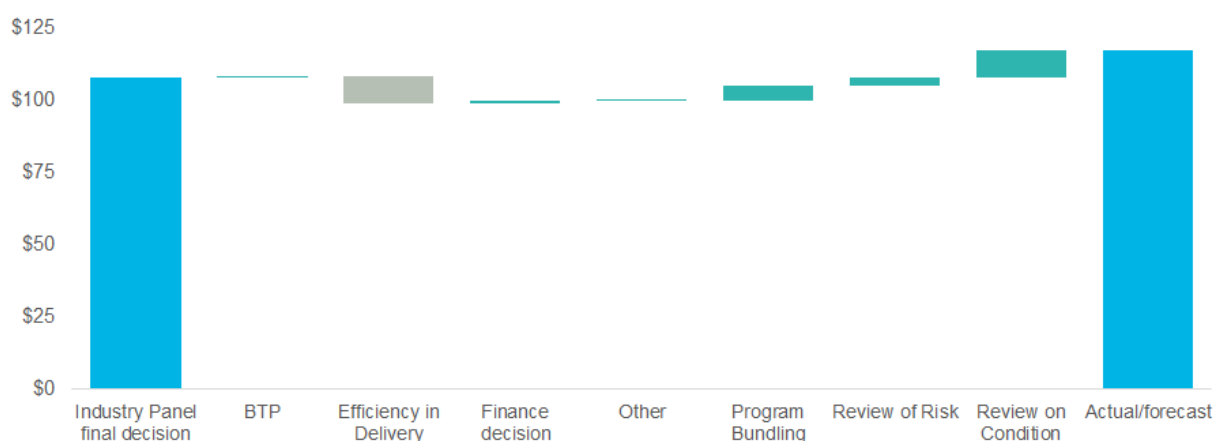
Since preparing the forecast for this period, Icon Water has undertaken detailed planning and options analysis for projects at LMWQCC, which has resulted in changes in the delivery of the program, including:

- re-evaluating the driver classification for some projects;
- splitting one major project (CX10534 LMWQCC tertiary system upgrade and associated works) into a number of smaller projects to address project management complexities and risks associated with working in a live process environment;
- prudently deferring the delivery of some projects into the 2018–23 period to accommodate system dependencies and maintain services to customers;
- efficiencies achieved following detailed options analysis of the renewal of the aeration system resulting in the identification of an alternative solution which will deliver significant cost savings; and
- bundling of building and facility renewal projects to achieve delivery efficiencies arising from economies of scale.

Figure 2-2 shows the drivers of the variance between the Industry Panel’s final decision and Icon Water’s actual and forecast expenditure on the LMWQCC program during the 2013–18 regulatory period.

Source: Icon Water.

Figure 2-2 LMWQCC program actual expenditure against Industry Panel final decision (\$million, nominal)



Source: Icon Water.

2.1.1 Forecast capex in the final two years of the current regulatory period

Icon Water's reported capex during the 2013–18 regulatory period includes actual expenditure up to the end of March 2017 and forecast expenditure for the remainder of the period.

Icon Water's forecast for the final year of the regulatory period is \$127.7 million, 14 per cent higher than the Industry Panel 2015 decision forecast. This is the highest annual spend for the period, and is mainly driven by Icon Water's investment in the renewal of core business systems, water and sewer main renewal programs and the continuation of major upgrades to sewerage treatment systems.

Icon Water has taken steps to prepare for this spike in the program. For the delivery of ICT and OT system projects, Icon Water has established the Strategic Projects and Technology division to ensure strategic focus for the BTP, which is discussed further in section 2.3.4.1.

For the delivery of major sewerage system upgrade projects, Icon Water is utilising a strategic alliance agreement with Downer. This alliance has enabled Icon Water to achieve efficiencies and reduce program risk through the engagement of short term resources with specialised project management and delivery capabilities.

In addition, Icon Water set up a design panel in early 2016 that is comprised of twelve pre-qualified, multi-skilled engineering design organisations. This has enabled an expedited procurement process for design services in addition to increasing consistency, quality and performance.

2.1.2 Ex post review

The Industry Panel's 2015 substitute price direction³ requires the Independent Competition and Regulatory Commission (ICRC) to undertake an ex-post review of the prudence and efficiency of the amount Icon Water spent on capex in the 2013–18 regulatory period as part of this price determination.

The outcome of this review will determine the level of capex to be rolled into the regulatory asset base (RAB) in order to calculate the opening value of the RAB as of 1 July 2018. Ex post review must be exercised with caution. Water and sewerage networks require long-lived investments in market-specific assets. Businesses have an incentive to make these investments only in an environment where there is little or no risk of governments disallowing the recovery of costs from consumers after the investment has been sunk. One of the primary roles of independent regulation is to generate that environment (Goldberg 1976, Levy and Spiller 1994, Crocker and Masten 1996) and this is reflected in the overarching objective for this review, which requires the ICRC "to promote efficient investment in... regulated services" (ICRC Act, s19L).

In its issues paper (ICRC 2017), the ICRC raised the issue of a situation where actual capex is materially less than the forecast allowed expenditure. In its view, if there was a material underspend of allowed capex, Icon Water would in effect receive a financing benefit, including a return on capital and a return of capital component. The ICRC raised a question of whether the value of the financing benefit should be determined and deducted from the allowed revenue or the RAB in the next regulatory period.⁴

Icon Water strongly opposes such an adjustment because it would be counter to the ICRC's objective of promoting efficient investment. The *ex ante* prospect of a financing benefit is the very source of incentives for cost efficiency that have been intentionally built into the framework of periodic price reviews applied in Australia and the United Kingdom. The regulatory arrangements established in the Industry Panel price direction did not foreshadow such an adjustment and Icon Water is not aware of a regulatory precedent that would support the adjustment. Changing the regulatory arrangements retrospectively would undermine confidence in and integrity of the established approach to incentive arrangements. This undermining of incentives would increase regulatory risk and result in higher costs

³ Industry Panel, 2015:13

⁴ ICRC, 2017: 20.

and prices over time than would otherwise be the case. Even if the adjustment were to be applied only prospectively, it would remove the incentive to outperform capex forecasts and customers would not receive the long-term benefits of lower prices that would otherwise have resulted from outperformance in future regulatory periods.

Icon Water supports a continuation of the Industry Panel arrangements, which facilitate a sharing between Icon Water and its customers of the benefits of cost efficiencies. Icon Water applies the planning and governance framework detailed in [Attachment 5: Asset management and governance](#) in making decisions about capex to ensure all investment reflects prudent and efficient expenditure. While Icon Water receives a benefit during a regulatory period for any underspend (thus providing an incentive for Icon Water to reduce its expenditure), consumers benefit at the end of the period and over the long term when the RAB is updated to include lower capex compared to a situation in which Icon Water had spent the full amount of the capex forecast. This leads to lower prices in the future. Conversely, if Icon Water needed to overspend on capex during the period, it would receive a penalty by not earning the returns on the overspend until the next regulatory period when prudent and efficient expenditure is rolled into the RAB.

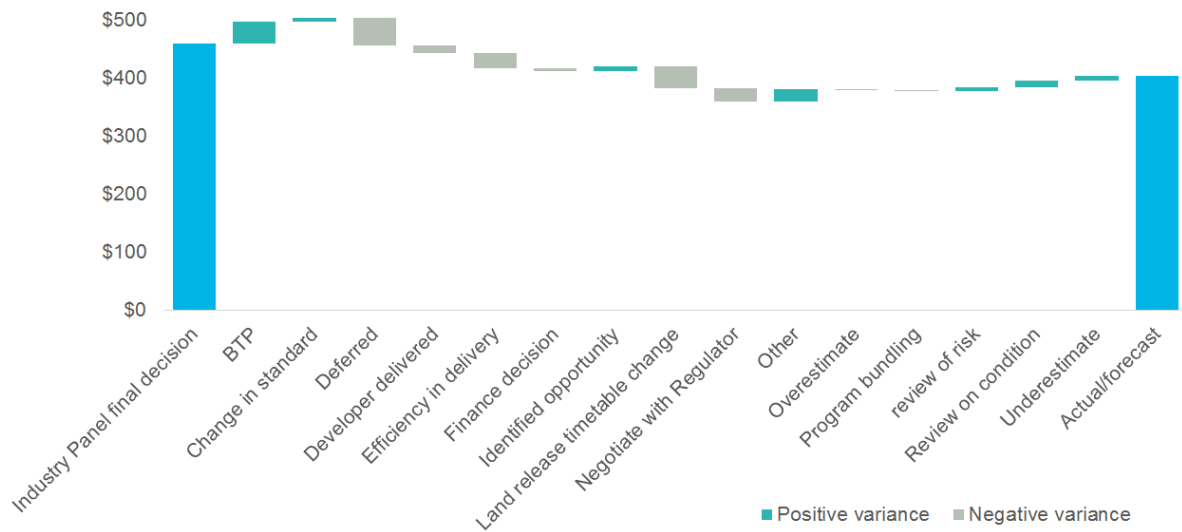
2.2 Delivery of 2013–18 capital program

Icon Water expects to spend five per cent more than the Industry Panel's 2015 decision forecast on water assets and 21 per cent less than the forecast on sewerage assets during the 2013–18 regulatory period, amounting to 12 per cent less than the total forecast. A number of factors underpinned by Icon Water's proactive risk-based asset management approach have contributed to this variance, including:

- realised efficiencies in project delivery;
- prudent reprioritisation of projects to either bring delivery forward based on revised risk assessments or growth forecasts or defer project delivery to achieve savings during the period;
- rescheduling of projects to accommodate sequencing and system constraints to achieve efficient delivery and meet operational requirements to maintain services;
- scope refinements identified at the detailed design planning stage;
- additional projects required to meet ACT Government priorities;
- identification of additional projects (predominately ICT) to achieve business efficiency opportunities; and
- changes in business practices resulting in changes to allocation of project costs between opex and capex.

Figure 2-3 shows a bridge between the Industry Panel's final decision capex program and Icon Water's actual program by the drivers of the variance. Details of the variance at a cost driver level are provided in section 2.3 below.

Figure 2-3 Drivers of variance between Industry Panel final decision and actual capex 2013–18 (\$million, nominal)



Source: Icon Water.

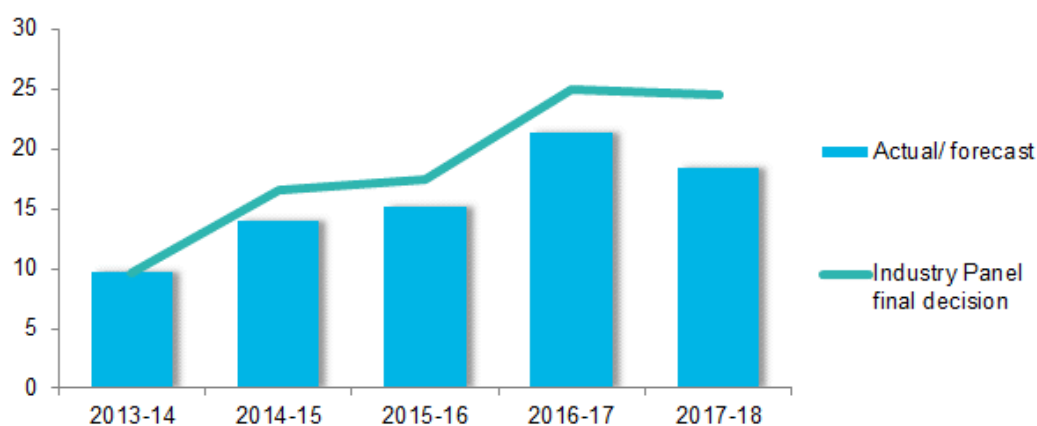
2.3 Cost drivers for capital investment in 2013–18

2.3.1 Renewals

Water

Over the current period Icon Water will invest \$78.6 million in renewing and replacing water mains, water meters and property service connections, undertaking upgrades at WTPs and water pumping stations, so that clean drinking water can continue to be supplied to customers at service standards they expect in terms of quality, reliability, pressure and taste.

Figure 2-4: Renewals capex – water (\$million, 2017–18)



Source: Icon Water.

Table 2-2: Renewals capex – water (\$million, 2017–18)

	2013–14	2014–15	2015–16	2016–17 forecast	2017–18 forecast	Total
Industry Panel 2015 decision	9.7	16.6	17.5	25.0	24.5	93.2
Actual/ forecast	9.7	14.0	15.1	21.3	18.5	78.6
Variance	0.0	-2.6	-2.4	-3.6	-6.0	-14.6

Source: Icon Water.

The lower than forecast expenditure is mainly driven by the prudent deferral of several key projects due to reprioritisation based on revised condition assessments. This includes a program of reservoir roof repairs and several planned upgrades to Googong WTP. These deferrals have been partially offset by the addition of a number of minor projects to address identified risks, refinement of scope of projects during the detailed design and bringing forward projects including the Stromlo mini hydro generator replacement in the face of energy price increases.

Key water renewals projects completed during the 2013–18 regulatory period are outlined in Table 2-3 below.

Table 2-3: Key water renewal projects delivered over 2013–18

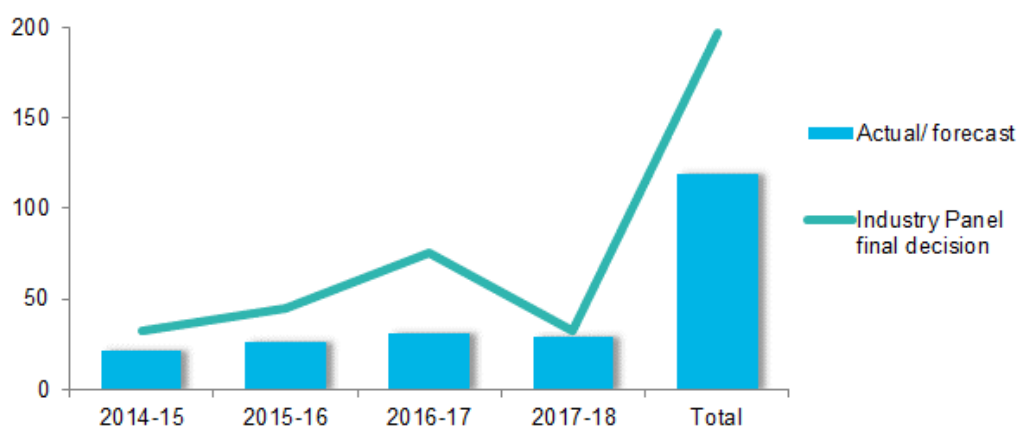
Project/ program	Project overview and benefits
Proactive 20mm water meter and property service connection replacement	<p>Water meters help ensure accurate consumption data as input to the billing system and water loss report (Water Balance), which is essential for Icon Water’s business. Upgrading malfunctioning assets or those at the end of their service life will enable the billing system to continue to function reliably.</p> <p>The program is in response to testing of in-service meters and a condition assessment of Icon Water’s current fleet and will see 6,300 meters replaced and service connections upgraded to ensure regulatory requirements are met and customers are billed accurately.</p>
Googong WTP fluoride system upgrade	<p>This project addresses issues identified with the fluoride and powdered activated carbon dosing systems and power supply capacity through the construction of a new building housing the systems and power supply infrastructure. This will improve reliability of the WTP and ensure the quality of drinking water coming from the plant.</p>
Water mains renewals	<p>The replacement of aged water mains (the oldest dating back to 1915) ensures Icon Water can meet fire flow requirements and improves the quality of water previously being supplied by unlined cast iron mains.</p>

Source: Icon Water.

Sewerage

Icon Water is investing \$119.0 million across the 2013–18 regulatory period to ensure it can maintain sewerage services at required health, environment and community standards through the renewal and replacement of sewer mains, upgrades to LMWQCC, and sewer pumping stations.

Figure 2-5: Renewals capex – sewerage (\$million, 2017–18)



Source: Icon Water.

Table 2-4: Renewals capex – sewerage (\$million, 2017–18)

	2013–14	2014–15	2015–16	2016–17 forecast	2017–18 forecast	Total
Industry Panel 2015 decision	11.7	32.7	44.6	75.1	32.8	197.0
Actual/ forecast	11.7	21.1	26.3	31.1	28.8	119.0
Variance	0.0	-11.6	-18.4	-44.0	-4.0	-78.1

Source: Icon Water.

Lower than forecast sewerage renewal expenditure is the result of:

- efficiencies achieved following detailed options analysis of the renewal of the LMWQCC aeration system resulting in the identification of an alternative solution which will deliver significant cost savings;
- efficiencies in delivery and procurement methods for the sewer mains replacement program which have delivered around 25 per cent more sewer mains than originally planned for around five per cent less than originally forecast;
- identification of a more efficient and innovative design solution at detailed design stage for the Molonglo Valley interceptor sewer and Fred Reardon bypass relining which has seen a rehabilitation rather than replacement solution being adopted at a significantly lower cost than forecast;
- prudent deferral of some components of the LMWQCC renewal program into the 2018–23 regulatory period; and
- prudent deferral of the Fyshwick sewage treatment plant based on a revised condition assessment at the plant, change in business objectives for the plant and the need to retain short-term flexibility until a decision about ‘Best for Region’ planning is reached.

Table 2-5: Key sewerage renewal projects delivered over 2013–18

Project/ program	Project overview and benefits
LMWQCC renewal and upgrade program	<p>The LMWQCC program over the period included projects to renew aged assets and those at risk of failure. This included renewal of the aeration system renewal, electrical, instrumentation, monitoring and control (EIM&C), chemical system and upgrades to the tertiary system backwash storage tank, filters, and disinfection system.</p> <p>The program will ensure LMWQCC can continue to serve its critical role in the region’s sewerage network and Icon Water can meet its environmental and service standard obligations.</p> <p>See also Box 2-2 for more information on the LMWQCC program.</p>
Sewer mains rehabilitation program	<p>Replacement of aged sewer mains will ensure Icon Water can meet regulatory and service delivery requirements and appropriately manage the risks associated with sewer overflows, breaks and chokes.</p>

Source: Icon Water.

2.3.2 Growth

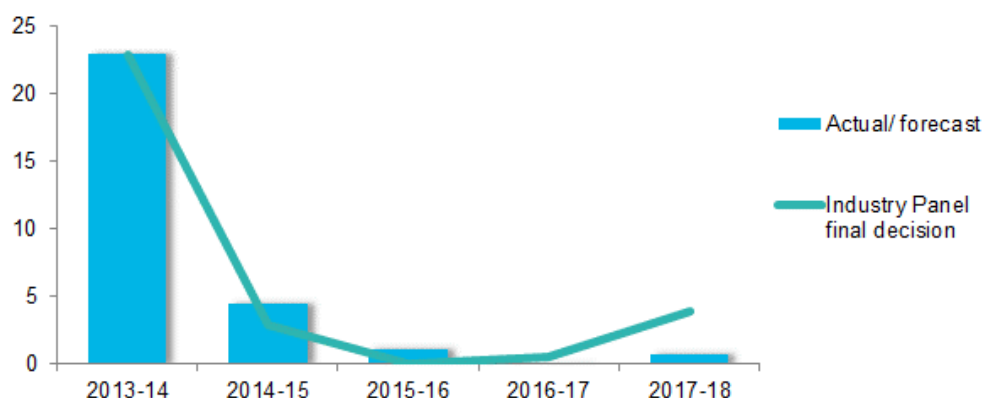
Icon Water’s estimates of growth capex rely on projections of population growth by district and the ACT Government’s four-year forward Indicative Land Release Program managed by the Land Development Agency (LDA). Icon Water makes prudent decisions about investment in expansion of the water and sewerage systems to accommodate population growth needs through ongoing consultation with the LDA and developers. Actual growth capex over the period has been driven by actual population growth and land release outcomes, which have shifted towards market-driven releases. This has resulted in some growth projects being prudently deferred and others brought forward into the period.

The 2013–18 period has seen population growth in the ACT of around 1.5 per cent per annum (ACT Government 2014, 2017) with land releases across the region in Molonglo, West Belconnen and Gungahlin. There has also been considerable urban renewal or ‘brownfield’ development during this time.

Water

Icon Water will have invested \$29.0 million over the 2013–18 period to deliver new water services infrastructure to service growth within greenfield and infill developments, as well as to complete remaining works required on the major water security project undertaken in the previous regulatory period.

Figure 2-6: Growth capex – water (\$million, 2017–18)



Source: Icon Water.

Table 2-6: Growth capex – water (\$million, 2017–18)

	2013–14	2014–15	2015–16	2016–17 forecast	2017–18 forecast	Total
Industry Panel 2015 decision	22.9	3.0	0.1	0.6	3.9	30.4
Actual/ forecast	22.9	4.5	1.1	-0.2	0.7	29.0
Variance	0.0	1.5	1.1	-0.8	-3.2	-1.3

Source: Icon Water.

Actual expenditure on water projects driven by growth compared to the Industry Panel 2015 decision is five per cent lower, which is driven by a combination of higher than forecast expenditure on completion of the Enlarged Cotter Dam and other projects, offset by the prudent deferral of projects due to changes in land release programs.

Table 2-7: Key water growth projects delivered over 2013–18

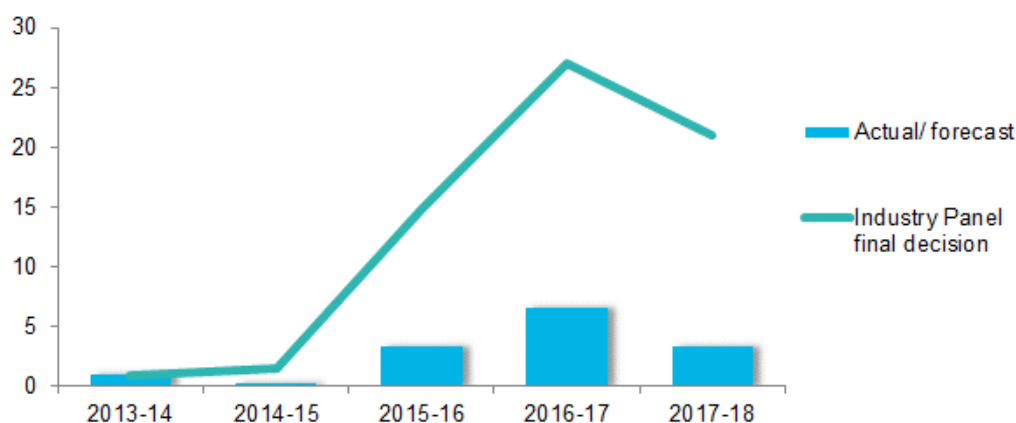
Project/ program	Project overview and benefits
Enlarged Cotter Dam	Expenditure on the Enlarged Cotter Dam in the first two years of the 2013–18 regulatory period was for the final stages of this major water security investment.
Molonglo Valley bulk mains and reservoir	These projects were delivered to provide water supply services to customers in the Molonglo Valley urban growth area.

Source: Icon Water.

Sewerage

Icon Water’s investment of \$14.4 million on sewerage infrastructure over the period will ensure the region’s growth requirements are met with sewerage services that adhere to health, environmental and community standards.

Figure 2-7: Growth capex – sewerage (\$million, 2017–18)



Source: Icon Water.

Table 2-8: Growth capex – sewerage (\$million, 2017–18)

	2013–14	2014–15	2015–16	2016–17 forecast	2017–18 forecast	Total
Industry Panel 2015 decision	0.9	1.5	14.9	27.0	21.1	65.3
Actual/ forecast	0.9	0.3	3.3	6.6	3.3	14.4
Variance	0.0	-1.2	-11.6	-20.4	-17.7	-50.9

Source: Icon Water.

The lower than forecast expenditure is mainly due to the prudent deferral of several major projects including the Belconnen trunk sewer augmentation and Molonglo Valley interceptor sewer north odour control system due to changes in land release programs and revised project risk assessments. Stage one of the Constitution Avenue trunk sewer augmentation was delivered but Icon Water successfully negotiated for this to be fully funded by the developer. The Belconnen trunk sewer main augmentation and stage two of the Constitution Avenue trunk sewer augmentation projects are forecast to be delivered in the 2018–23 regulatory period and are subject to Icon Water’s proposed water and sewerage capital contributions (WSSC) as detailed in section 3.3.6.

These deferrals were partially offset by higher than forecast expenditure due to increases in scope identified at the detailed project planning stage on the two projects outlined in Table 2-9.

Table 2-9: Key sewerage growth projects delivered over 2013–18

Project/ program	Project overview and benefits
North Weston odour and ventilation improvements	This project will upgrade the existing sewer ventilation system to address odour issues and accommodate growth in the area serviced by the system.
Liquid waste receival facility	This project is for the construction of a new liquid waste receival facility to accommodate land developments around the existing facility at Copping’s Crossing, which is to be decommissioned. This facility will provide secure and controlled receivals and protect LMWQCC from non-compliant or contaminated waste and so maintain regulatory obligations.

Source: Icon Water.

2.3.3 Improvement

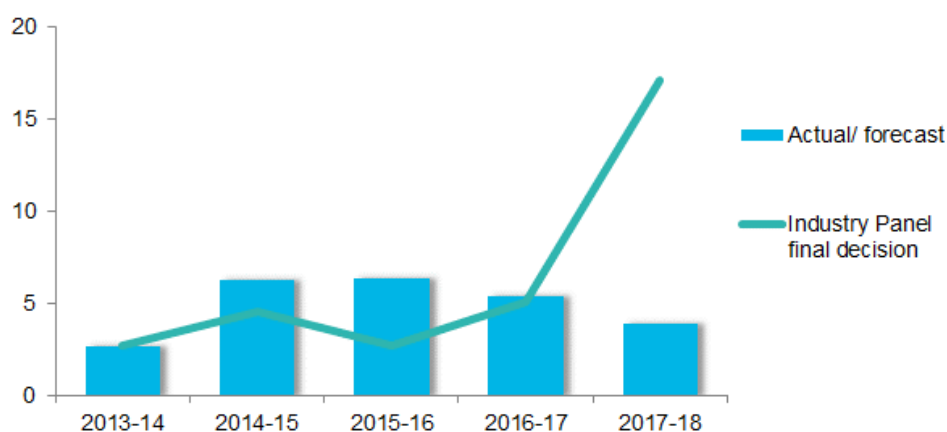
For Icon Water’s historical capex, efficiency and regulation are combined into one category – ‘improvement’ - to ensure consistency with its 2013–18 regulatory proposal and the Industry Panel’s 2015 decision; however, for forecast capex Icon Water has used both categories to better reflect the drivers of the capital program.

The 2013–18 regulatory period saw the establishment of the ACT Utilities Technical Regulator (UTR) under the *Utilities (Technical Regulation) Act 2014*. The UTR provides technical regulation of licensed utility services and a range of unlicensed regulated utility services. This includes the drafting of technical codes under the Act for which Icon Water is a key stakeholder.

Water

Over the 2013–18 regulatory period Icon Water expects to spend \$24.7 million on improvement projects to deliver cost savings, ensure compliance with regulated licence conditions, environmental standards, or deliver improved safety and risk reduction.

Figure 2-8: Improvement capex – water (\$million, 2017–18)



Source: Icon Water.

Table 2-10: Improvement capex – water (\$million, 2017–18)

	2013–14	2014–15	2015–16	2016–17 forecast	2017–18 forecast	Total
Industry Panel 2015 decision	2.7	4.6	2.8	5.1	17.1	32.2
Actual/ forecast	2.7	6.3	6.4	5.4	3.9	24.7
Variance	0.0	1.7	3.6	0.4	-13.2	-7.6

Source: Icon Water.

The lower than forecast expenditure is driven by the deferral of several major projects including stage one of the outlet valves and mains relocation at Corin Dam, which have been offset by scope refinement at the detailed design planning stage for other projects.

Table 2-11: Key water improvement projects delivered over 2013–18

Project/ program	Project overview and benefits
Googong WTP dewatering system upgrade	This project was to resolve identified issues with the dewatering and sludge systems at Googong WTP through the construction of a new dewatering building and access road to house new treatment systems. This was delivered to improve drinking water quality and supply reliability and minimise the risk of licence breaches.
Large meter renewals	This project is for the replacement of large meters to ensure Icon Water meets its regulatory requirements with respect to meter accuracy and customers with large meters are billed correctly.

Source: Icon Water.

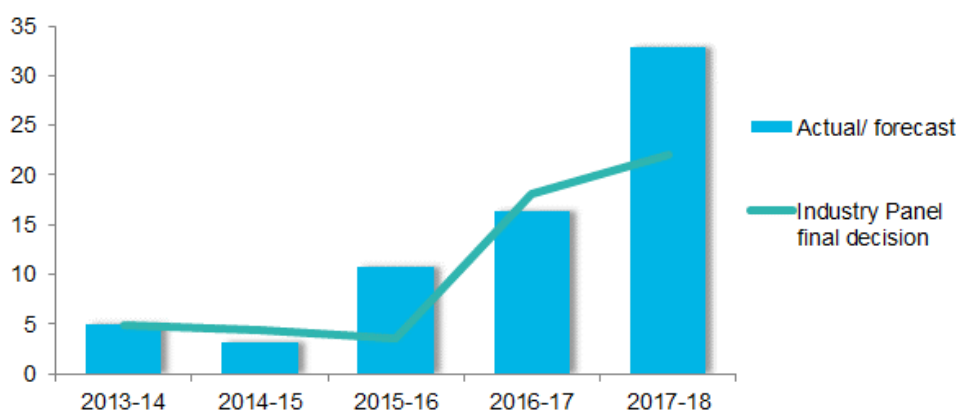
Sewerage

Expenditure on sewerage improvement projects is forecast to be \$68.0 million and has mainly been to as part of the major program of works at LMWQCC to meet new regulatory obligations. This represents expenditure \$15 million higher than the Industry Panel 2015 decision.

This is mainly the result of splitting one large LMWQCC renewal and upgrade project into a number of smaller projects, some of which were reclassified as regulation driven rather than renewals projects as

explained in Box 2-2. This has been partly offset by the deferral of three major upgrades to sewage pumping stations near lakes following clarification and negotiation with the ACT EPA and acceptance of an alternative opex (Environmental Management Plan) solution.

Figure 2-9: Improvement – sewerage (\$million, 2017–18)



Source: Icon Water.

Table 2-12: Improvement – sewerage (\$million, 2017–18)

	2013–14	2014–15	2015–16	2016–17 forecast	2017–18 forecast	Total
Industry Panel 2015 decision	4.9	4.3	3.6	18.1	22.1	53.0
Actual/ forecast	4.9	3.2	10.7	16.4	32.8	68.0
Variance	0.0	-1.2	7.1	-1.7	10.8	15.0

Source: Icon Water.

Table 2-13: Key sewerage improvement projects delivered over 2013–18

Project/ program	Project overview and benefits
LMWQCC solids handling upgrades	<p>These projects are regulation driven upgrades to solids handling facilities at LMWQCC, including the sludge holding tank, screens, grit handling, ventilation, and furnace and exhaust system, are to ensure Icon Water can meet environmental regulatory requirements and reduce Environmental Authorisation breaches.</p> <p>These upgrades will also support handling of forecast growth in load to be treated at the facility.</p>

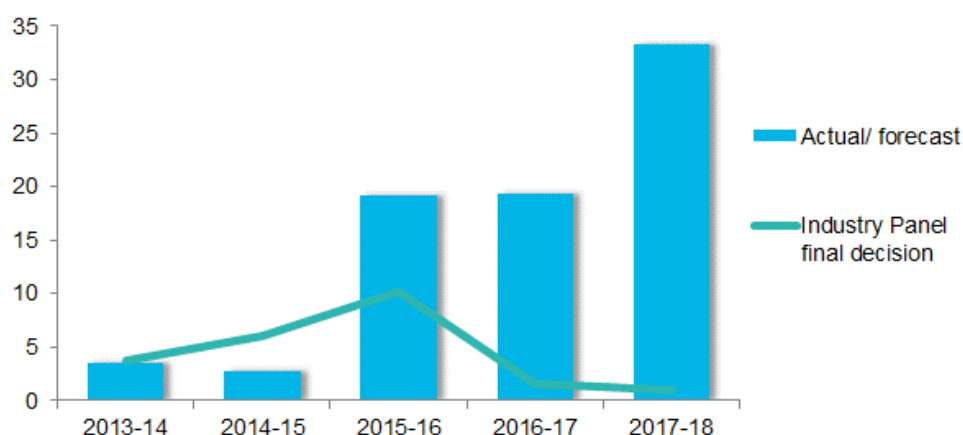
Source: Icon Water.

2.3.4 Non-system assets

Non-system assets include ICT, buildings, vehicles and other investment which is not directly part of the water or sewerage network. Icon Water’s investment in non-system assets during the 2013–18 regulatory period is forecast to total \$77.9 million which will be allocated between water and sewerage; this is \$55.4 million higher than the Industry Panel’s 2015 decision. This variance is driven primarily by the increased investment in ICT to renew core operational systems. Scope refinement for the working at heights and critical infrastructure programs has also contributed to higher than forecast expenditure.

At the time of developing its proposal for the 2013–18 regulatory period, Icon Water envisaged being able to leverage a larger portion of ActewAGL’s proposed investment in ICT through its corporate services agreement, and so only included minor ICT expenditure in its capex forecast for the period. Icon Water was able to fully leverage the ActewAGL investment in core IT systems including, finance, human resources, risk and compliance management. However, due to increasing divergence between energy and water operational requirements, Icon Water was unable to utilise ActewAGL’s ICT initiatives relating to operational systems replacement. As a consequence, Icon Water initiated a review of operational requirements and established the Business Transformation Program (BTP) containing initiatives to replace obsolete operational systems. This represents a foundational investment which will enable the business to deliver its strategic priorities and achieve efficiencies over the long term. This investment will occur in the final two years of the 2013–18 regulatory period and into the first half of the 2018-23 regulatory period.

Figure 2-10: Non-system assets (\$million, 2017–18)



Source: Icon Water.

Table 2-14: Non-system assets (\$million, 2017–18)

	2013–14	2014–15	2015–16	2016–17 forecast	2017–18 forecast	Total
Industry Panel 2015 decision	3.8	6.1	10.2	1.6	0.9	22.5
Actual/ forecast	3.5	2.8	19.1	19.3	33.3	77.9
Variance	-0.3	-3.3	8.9	17.8	32.4	55.4
Allocation						
Water	1.6	1.3	8.6	8.7	15.0	35.1
Wastewater	1.9	1.5	10.5	10.6	18.3	42.9

Source: Icon Water

2.3.4.1 Business transformation program

Icon Water has established seven key strategies to deliver its strategic objectives. Each of the seven key strategies establishes a need to implement a range of business improvements across Icon Water. However, there are two strategies that identify a level of change that extends beyond what could be achieved through continuous improvement activities. The Enterprise Asset Management Strategy (EAM

Strategy) and ICT Strategy seek to re-define operating practices and implement new methodologies and technologies.

The BTP was established to deliver the change in people, process and technology identified in the target outcomes of the EAM and ICT strategies. The BTP seeks to manage the critical dependencies that exist between initiatives and leverage the capability provided by new technology to support the targeted change in business processes and resource competencies.

The objectives of the BTP are driven by the target outcomes of the EAM and ICT strategies – implement a revised asset management framework, and renew the end of life operational technology systems. These strategies are described below.

Enterprise asset management

The EAM strategy recognises Icon Water's need to further enhance asset management practices across the organisation. It seeks to re-define business processes and embed an asset management culture through the development of a revised asset management system that will ensure holistic and efficient life-cycle asset management in accordance with the recent International Organisation for Standardisation (ISO) 55000 series of international standards for the management of infrastructure assets (ISO2014) and the Institute of Asset Management's (IAM) Asset Management Maturity Framework (2015) as discussed in section 2 of [Attachment 5: Asset management and governance](#).

Alignment of the Icon Water asset management framework with these international standards will provide a mechanism to drive efficient work practices and improve customer-centric investment decision making through increased granularity of data. The insights provided by the improved data will allow Icon Water to make targeted refinements to investment proposals, which will optimise benefits to customers.

ICT strategy and OT reset

Icon Water's ICT systems asset class is comprised of OT assets and IT assets.

Icon Water defines OT assets as the ICT assets used in the maintenance, operation, reporting, planning, design and augmentation of the Icon Water distribution network, and IT assets as the ICT assets used to support Icon Water's business operations (for example finance, human resources, and reporting functionality).

The systems that are part of the OT environment define works practices and are critical to the safe, secure and efficient management of the water and sewer network. A catastrophic system failure in the OT environment can result in significant costs due to field resource down time and/or the loss of automated workflows.

The majority of Icon Water's OT systems are at the end of their useful life. That is, they are either no longer supported by the vendor, do not have a vendor supported product development roadmap, or are based on aged technologies that are not well used in the current technology environment. Investment in addressing the issues that exist with the OT systems has been deferred for at least six years due to the complexity of the change that is required, the timing of renewal of shared corporate IT systems being implemented by ActewAGL, and the readiness of Icon Water to manage the required change.

Icon Water has positioned itself to address the complex changes required in the OT environment by:

- deferring Icon Water's OT renewal program until the completion of the ActewAGL Core Systems Replacement Program (CSRP);
- deferring the OT reset until the completion of the ActewAGL CSRP enabled increased certainty as to the level of integration to the OT environment enabled by the IT systems; and
- establishing the Strategic Projects and Technology group and the BTP and engaging experienced resources who have managed and delivered change in OT environments in Australian utilities.

In delivering the BTP, Icon Water will renew legacy systems and hardware and establish a flexible modular OT platform that will provide a long-term solution to support the upgrade, enhancement and renewal of OT (and IT) systems for the next 10+ years. The implementation of a flexible modular environment will reduce the high costs that currently exist to make changes within the OT environment due to the complexity of the environment.

The AMMS project is a strategic project within the BTP and a foundational component of business transformation. It will replace the following existing works management systems:

- Works Assets Scheduling People (WASP), for scheduled maintenance work and emergency maintenance work at treatment plants.
- Water Works, for emergency corrective work in the network.

These systems are at end-of-life, lacking in integration and will have limited ongoing support. In addition, Icon Water's engineering asset register is split across WASP, Water Works, GIS and Oracle systems. This fragmentation of key data does not support the realisation of Icon Water's strategic objectives.

Alignment of the OT reset with delivery of the EAM Strategy initiatives (including the implementation of systems to capture data at a sufficient granularity to support enhanced data driven decision making) will enable Icon Water to leverage investment in commercial off the shelf products as it re-designs business processes. The selection of OT products that support an *AS ISO 55001:2014 Asset Management – Management system – Requirements* aligned operating environment, will encourage the adoption of off the shelf processes which do not require customisation.

The AMMS project will benefit customers by providing the business with tools to strengthen and support customer-centric decision making using the enhanced, more granular data on costs and an enhanced capability for centralised planning and scheduling of works.

Several of the BTP capex projects will extend into the 2018–23 regulatory period. Capex projects included in the BTP are listed in the Table 2-15 below.

Table 2-15: Key non-system projects delivered over 2013–18

Project/ program	Project overview and benefits
Business transformation program	<p>The following non-system capex projects are included the BTP:</p> <ul style="list-style-type: none"> • AMMS • Geo-centric asset repository • Asset planning application suite • Case management system • Maintenance requirements application • Process management application • Time series repository • Finance system enhancement. <p>The program is detailed in the section above.</p>
Mitchell building extension and refurbishment	<p>This project has seen the extension and refurbishment of Icon Water’s office accommodation, much of which was at the end of its useful life, was non-compliant with building code requirements, and no longer met the business needs of Icon Water.</p> <p>This project has provided a more flexible, efficient and constructive working environment for the organisation. It also aligns with the organisation’s strategy to retain the Mitchell site with a long-term view of becoming the official headquarters for Icon Water.</p>
Working at heights program	<p>This is a rolling program designed to reduce safety at heights hazards at multiple sites and has been delivered based on a site priority list. The scope of this program has increased over the period as more sites have been identified for inclusion as a result of risk assessments at these sites.</p> <p>These upgrades are required to ensure compliance with working at heights and work health safety requirements.</p>
Critical infrastructure stage 2 program	<p>This risk-based security upgrade program will reduce the risks of unauthorised access, terrorism and vandalism incidences at Icon Water’s sites.</p> <p>This program is to protect Icon Water’s critical assets and minimise risks to those assets as well as staff, contractors, visitors and the general public.</p>

Source: Icon Water.

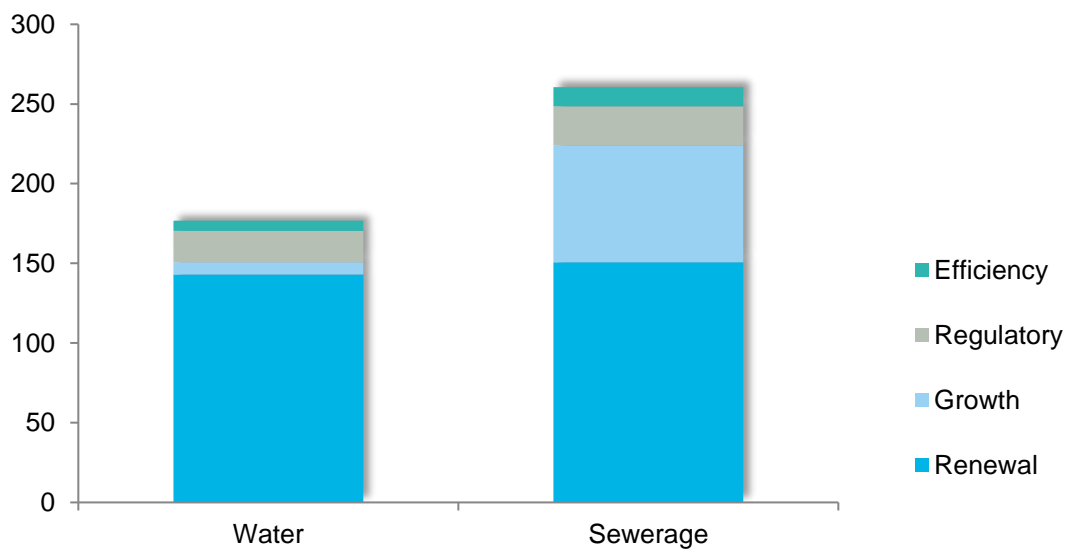
3 Forecast capex 2018–23

3.1 Overview

Icon Water’s expenditure forecast for its planned capital program over the 2018–23 regulatory period is \$437.6 million (\$2017–18) including \$176.9 million for investment in water services assets and \$260.7 million for investment in sewerage services assets. This includes \$67.7 million investment in non-system assets which is allocated between water and sewerage services.

This program includes sewerage projects which Icon Water has proposed to be co-funded by developers. Forecast capex net of these capital contributions is \$405.9 million.

Figure 3-1: Forecast capex 2018–23 by driver (\$million, 2017–18)



Source: Icon Water.

This program will continue to renew aging critical system and non-system infrastructure in response to condition and risk profile information to ensure Icon Water can maintain levels of service for customers, with 67 per cent of forecast capex spend being for renewal projects. Icon Water will also make significant investment in the upgrade and expansion of the network to support growth in the ACT, accounting for 19 per cent of the program. The remaining 14 per cent of the program spend will be to improve assets to ensure regulatory obligations are met and respond to opportunities to generate operating efficiencies. Table 3-1 summarises Icon Water’s capex forecast by driver over the 2018–23 regulatory period.

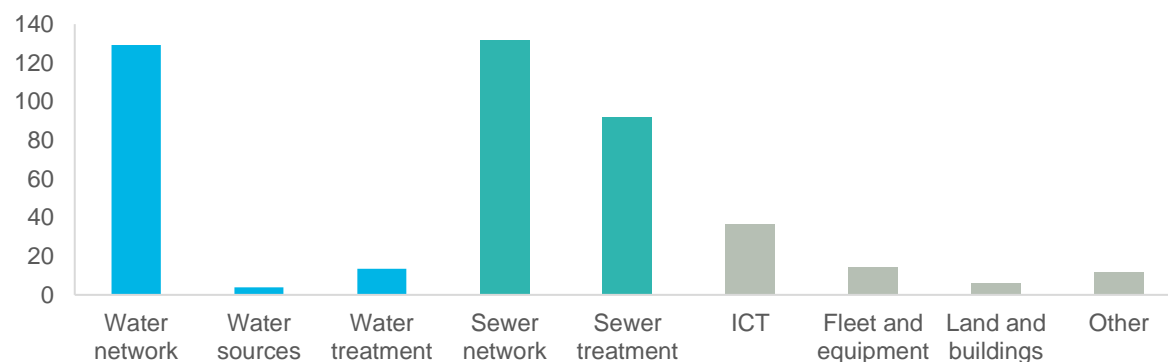
Table 3-1: Summary of forecast capex, 2018–23 (\$million, 2017–18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water						
Asset renewal	27.2	33.8	29.4	29.7	22.8	143.0
Growth	2.8	3.3	1.6	0.0	0.0	7.7
Regulatory	4.5	3.7	7.7	3.3	0.4	19.7
Efficiency	3.0	0.7	0.7	0.4	1.8	6.6
Total capex water	37.4	41.6	39.4	33.4	25.0	176.9
Sewerage						
Asset renewal	47.2	32.5	27.8	22.9	20.2	150.6
Growth	4.6	14.5	16.6	23.6	14.0	73.4
Regulatory	9.0	3.5	5.8	3.7	2.6	24.6
Efficiency	7.0	1.4	1.1	0.5	2.2	12.1
Total gross sewerage capex	67.8	51.9	51.2	50.7	39.0	260.7
Less capital contributions	1.7	7.0	7.6	10.1	5.1	31.6
Total net capex, sewerage	66.1	44.9	43.6	40.7	33.8	229.0
Total gross capex	105.3	93.6	90.7	84.1	64.0	437.6
Total net capex	103.5	86.5	83.0	74.0	58.8	405.9

Source: Icon Water.

The total forecast capex program for the 2018-23 regulatory period by asset category is shown in Figure 3-2 below.

Figure 3-2 2018-23 forecast capex by asset category (\$million, 2017–18)



Source: Icon Water.

Box 3-1: 2018–23 program delivery approach

Almost a quarter of the five-year program is forecast to be delivered in 2018–19, which will see the continuation of projects currently in progress, including major upgrades at LMWQCC, core system upgrades and water and sewer main replacement programs.

Projects currently being delivered via the Downer Program Alliance will continue through to completion (estimated at up to \$37 million during the 2013–18 regulatory period). Alternative delivery mechanisms to augment Icon Water project delivery capability into the next regulatory period are currently being evaluated to ensure prudent and efficient delivery of the program.

Included in the 2018–23 capital program is \$25 million of growth projects which will be funded by Icon Water but delivered by other parties under the WSCC detailed in section 3.3.6, as well as a \$68 million non-system expenditure program. Also included in non-system expenditure is \$14 million of fleet expenditure which has previously been expensed. These investments account for 21 per cent of the gross capex program.

Source: Icon Water.

3.2 Forecasting method

Figure 3-3 illustrates the forecasting methodology used to prepare Icon Water’s capex forecast for the 2018–23 regulatory period, with details on each of these steps provided in the section that follows. Detailed explanation of Icon Water’s project identification, prioritisation and governance processes are provided in [Attachment 5: Asset management and governance](#).

Figure 3-3: Forecasting methodology steps for capex



3.2.1 Project based evaluation

Icon Water adopted a bottom-up approach to forecasting capex. This employs Icon Water's investment planning and development (IPaD) process as detailed in [Attachment 5: Asset management and governance](#).

This approach means Icon Water's capex program is constantly evolving as each stage of a project's lifecycle is subjected to prudence and efficiency testing. For the development of Icon Water's capex forecast for the 2018–23 regulatory period for this submission, Icon Water undertook a detailed review of its program, which involved identifying, costing, reviewing and prioritising ongoing and future capital requirements at a detailed project level, then applying escalation factors to calculate total forecast costs at a moment in time.

3.2.2 Project identification

Icon Water started by identifying a current or potential gap in services using its risk-based approach and assessing whether its ability to meet service levels or other obligations is, or may be, compromised. Icon Water took into account any potential impacts on service levels which may occur and where possible, the value to customers of addressing the service gap. Where possible and cost effective to do so, Icon Water attempts to close these gaps through alterations or improvements to operational procedures and practices. Icon Water's project options analysis includes a 'do-nothing' option. The preferred solution is derived by balancing risk, cost and performance objectives. This process is explained further in section 3.5.7 of [Attachment 5: Asset management and governance](#).

Capital projects for the 2018–23 regulatory period were identified based on ongoing and future capital requirements. Ongoing capital requirements included renewal or replacement of existing assets, and are identified according to asset condition and risk assessments, obligation assessments and service performance requirements. Future capital requirements include the expansion of the existing network arising from growth in the region and future regulatory obligations, as well as opportunities to work more efficiently.

3.2.3 Project base forecast

Once the need for a capital project had been established, Icon Water undertakes several steps to forecast base capital costs at a project level.

All projects above \$250,000 require a concept development statement (CDS), and a short form CDS is required for projects below \$250,000. These outline the requirements, assumptions and capex forecast. A CDS is raised once the asset is included in the *Strategic Asset Management Plan* (SAMP). A technical report is then prepared for all capex projects that have been approved by the Investment Review Committee (IRC). Each technical report includes an option analysis, financial analysis (including detailed cost forecasts) and preferred solution to the identified requirement.

Once a technical report is endorsed a development stage proposal (DSP) is then prepared which outlines the design and tender preparation for the capital project, and tenders are received from suppliers.

3.2.4 Review project forecasts

WT Partnership Australia (WT Partnership) was engaged by Icon Water to prepare independent estimates for the 20 high value projects. Two of these projects were amalgamated by Icon Water during estimates preparation. The total value of the 19 projects as estimated is \$414 million, some of which will be incurred beyond the 2018-23 regulatory period.

WT Partnership prepared independent estimates for a further 20 projects selected as representative of the rest of the engineering projects in the capex program. The total value of the 20 representative projects as estimated is \$46 million, which also includes some expenditure beyond the 2018-23 regulatory period.

WT Partnership was also engaged to prepare independent estimates for the seven proposed capital contribution projects.

Some differences between the estimates prepared by WT Partnership and Icon Water's project forecasts exist as these project estimates were based on information available as at February 2017 and there has subsequently been additional engineering design on these projects.

While some of these projects have since been prudently deferred or amalgamated for efficient project delivery, these project estimates represent a high proportion of independently prepared estimates for the total capital program. WT Partnership conducted the following review procedures for the 2018–23 regulatory period project estimates:

- Reviewed documentation and commented on adequacy of scope and costing for each project.
- For each of the 19 largest projects, facilitated workshops where key personnel and stakeholders determined and provided a risk adjusted profile.
- Utilised Palisade@Risk software to generate a profile of the probability of constructing the project within a range of budgeted values for the 19 largest projects based on the risk adjusted profile of each project. This software meets industry standards and is well accepted in the water and other infrastructure industries. It is used to incorporate a broad range of specified risk events which may affect project budget and completion.

WT Partnership's cost forecasts followed a robust, bottom-up approach, and improved on the accuracy of Icon Water's internal forecasts. WT Partnership adopts a first principles approach which builds up cost components of the construction phase, basing cost estimates on quoted market rates or on similar projects completed in the ACT or in Australia more broadly.

Other project costs including design, management and establishment and demobilisation are estimated by applying a percentage rate to the core construction costs built up from first principles. These percentages are considered to reflect the costs of Icon Water's capital works program as a whole, and are in line with costs Icon Water has incurred on similar projects in the past.

In addition, the percentage rate applied for design costs is varied in line with project complexity – from 3 to 5 per cent for relatively simple civil works programs, up to a maximum of 12.5 per cent, reflective of costs involved in more complex mechanical and electrical projects.

WT Partnership's estimates of the risk of the project were developed by identifying and classifying risks through a series of facilitated workshops with key personnel. A Monte Carlo simulation was then used to model the distribution of cost estimates before the P50 (median) estimate was used.

Icon Water has used WT Partnership's forecasts as the base forecast costs for those projects independently reviewed, taking the P50 level (median) cost from the risk adjusted profile as the base forecast for the 19 high value projects.

WT Partnership's confidential reports on cost estimates for the top projects, 20 selected projects, and capital contributions scheme projects are provided as appendices 1-3 of this attachment. For those smaller projects not independently reviewed, either Cardno or Icon Water prepared project estimates as part of developing short form CDSs for the engineering projects.

Icon Water engaged Ernst and Young to prepare short form CDSs including estimates for 18 ICT projects.

The estimates prepared by WT Partnership and EY were at a point in time and based on a particular set of assumptions. These estimates have been further refined by testing and challenging those assumptions and in the case of some significant projects doing some engineering design.

S-curves were applied to these estimates to develop project annual cashflows across the 2018–23 regulatory period.

3.2.5 Prioritise projects

After forecasting base costs for each project, Icon Water undertook a project prioritisation process. This process involved reviewing and ranking each project based on risks to Icon Water and the community. Those projects assigned a higher risk were given priority while those with lower risks were reduced in scope or identified for prudent deferral and excluded from the capex program for the 2018–23 regulatory period, but will continue to be monitored during the five-year period.

3.2.6 Program investment scenario modelling

Projects with a forecast spend of over \$2.5 million per annum across all asset classes and expenditure types are analysed through Icon Water’s program of works balance model. This model develops optimised cost-benefit scenarios at a minimum impact to risk or key performance indicators. These scenarios are assessed to determine the appropriate investment that balances cost, risk and performance against Icon Water’s entire asset portfolio.

3.2.7 Evaluate program deliverability

Once individual projects were given a priority ranking and deemed to be included or excluded from the capex program, Icon Water evaluated the deliverability of the program with regards to any system constraints and capacity requirements (for example if two assets cannot be offline at the same time), staging of projects and smoothing of cashflow. Where necessary, project timing was revised to ensure efficient delivery of the program and reduced risk to the reliability or quality of services.

3.2.8 Escalation factors

The final step to finalise Icon Water’s capex forecast for the 2018–23 regulatory period was to apply escalation assumptions to project base cost forecasts. An independent consultant, BIS Oxford Economics (formerly BIS Shrapnel), was engaged to assist in developing appropriate ACT-specific escalation factors for engineering construction costs and labour cost escalators, provided in Table 3-2. Icon Water has applied these to engineering construction capex projects for the forecast. For ICT projects, Icon Water has applied the Electricity, Gas, Water and Waste Services Wage price indices also estimated by BIS Oxford Economics to the labour component of these projects, and CPI to remaining components. BIS Oxford Economics’ methodology and assumptions are detailed in its report (see Appendix 1 to [Attachment 7: Operating costs](#)).

Icon Water intends to update the escalators following the draft decision to provide as recent a forecast as possible in the revised proposal ahead of the final ICRC decision in 2018.

Table 3-2: Real implicit price deflators for engineering capex for the ACT (%)

	2018–19	2019–20	2020–21	2021–22	2022–23	Average
Water & sewerage implicit price deflator	-0.1	-0.2	0.7	1.9	1.3	0.7

Source: Icon Water.

3.2.9 Assumptions and project estimates accuracy

The assumptions on which cost estimates are based were specific to each project identified and are detailed in Icon Water’s project documentation. Estimates were generally based on costs of previous, similar projects or works. Quotations from suppliers were also obtained for some specialist equipment.

Accuracy of project estimates is dependent on the how well developed the project scope is. For short form CDSs the estimate accuracy is expected to be in the range of +/- 75 per cent. For projects already in construction, the estimate is expected to be within +/- 10 per cent.

3.3 Forecast capex by driver

3.3.1 Renewal capex

Asset renewal is the primary driver of capex for the 2018–23 regulatory period, accounting for 67 per cent of the total capex program. The renewal program will include \$120.9 million for water assets, \$123.7 million for sewerage assets, and \$49.0 million for non-system assets.

This expenditure ensures that Icon Water can continue to safely and reliably deliver essential services to its customers and is driven by asset condition and compliance requirements relating to safety, levels of service and asset protection. In planning its renewals program Icon Water has also taken into account the feedback received from engagement with consumers regarding water and sewer mains renewal, as detailed in [Attachment 3: Service standards](#).

Asset replacement is prioritised using a risk based approach and are generally renewed either as a result of equipment failure or deteriorating condition indicating imminent failure, rather than by direct reference to age and are assessed using sophisticated Failure Mode Effect Analysis (FMEA). Replacements of critical assets are planned to avoid failure as this could impact levels of service for customers and result in Icon Water not meeting service standards and regulatory obligations.

Detailed asset renewal requirements are provided at an asset class level in Icon Water’s asset management plans, as discussed in [Attachment 5: Asset management and governance](#).

Forecast renewal capex for the 2018–23 regulatory period is set out in Table 3-3.

Table 3-3: Forecast renewal capex (\$million, 2017–18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water						
Water network	16.7	24.2	22.1	25.6	19.6	108.2
Water sources	0.5	0.2	0.0	0.0	0.0	0.7
Water treatment	3.3	4.7	3.1	0.8	0.1	12.0
Total renewal capex, water	20.6	29.2	25.2	26.3	19.7	120.9
Sewerage						
Sewer network	9.6	13.0	13.5	9.6	9.2	54.9
Sewer treatment	29.5	13.8	9.1	9.3	7.1	68.8
Total renewal capex, sewerage	39.1	26.8	22.6	18.9	16.3	123.7
Non-system						
ICT	11.7	7.1	5.5	2.4	2.3	29.1
Fleet and equipment	2.8	2.8	2.8	2.8	2.9	14.1
Land and buildings	0.0	0.4	1.0	2.1	1.8	5.3
Other	0.3	0.2	0.0	0.0	0.0	0.5
Total non-system capex, renewal	14.8	10.4	9.4	7.4	7.0	49.0
Total renewal capex	74.4	66.4	57.2	52.6	43.0	293.6

Source: Icon Water.

Table 3-4: Key projects - renewal of water assets

Project/ program	Project overview and benefits
Mugga reservoir roof replacement and floor joint sealing	<p>Constructed in 1967, Mugga Reservoir has the dual role of feeding a reticulation zone and also serving as a balancing tank for supplies for the Woden area and beyond when the Googong WTP is in operation. It provides storage to cater for variations in demand and for emergency conditions. The reservoir has a design capacity of approximately 45 ML.</p> <p>Replacement of the roof will address safety risks resulting from the current condition of the asset. This project will also ensure water contamination and subsequent loss of service is prevented and safe drinking water quality requirements are met.</p> <p>Failure to replace the floor joint seal will result in leakage if required to operate above about half full, which would saturate the embankments surrounding the reservoir and endanger the stability of these embankments, which could lead to a serious damage to the foundation of the structure and a significant safety incident.</p> <p>Failure to replace the roof could result in a structural failure, which could result in water contamination and a serious safety incident.</p>
Water meter renewal program	<p>Water meters help ensure accurate consumption data as input to the billing system and water loss report (Water Balance), which is essential for Icon Water's business to present accurate bills to customers and collect the revenue owed. Upgrading malfunctioning assets or those at the end of their service life will enable the billing system to continue to function reliably.</p> <p>Installation of new water meters and the maintenance of existing meters is an ongoing need and required to maintain the accurate measurement of water use and remain compliant with <i>ACT Water Metering Code (December 2000)</i> and <i>NMI R 49-1</i>.</p>
Water network EIM&C	<p>Site condition assessments in recent years have identified the need to renew the EIM&C assets at 93 sites due to equipment coming to end of service life, being unsupported and/or in poor condition. The benefits of replacing these assets are improved safety, functionality, and standardisation, maintained levels of service, operability and maintenance effectiveness.</p>
O'Connor reservoir roof replacement	<p>Replacement of the roof will address safety risks resulting from the current condition of the asset. This project will also ensure water contamination and subsequent loss of service is prevented and safe drinking water quality requirements are met.</p>
Water main renewals (structural failures)	<p>This project will address structural failures of water mains, which is an ongoing issue for Icon Water and leads to supply disruption for customers, as well as loss of treated water and an escalation in reactive maintenance opex.</p> <p>The purpose of the project is to identify 'hot spots' due to structural failures and replace water mains that are failing frequently and impacting the same group of customers. This is a more efficient and effective approach to maintaining a high level of service to customers than an age based replacement strategy.</p> <p>This project will involve the replacement of 5.5 km of mains per year (27.5 km over the 2018–23 regulatory period).</p>

Project/ program	Project overview and benefits
	<p>This program takes into account the findings from Icon Water’s willingness to pay research that customers are not willing to pay for increased spending on proactive investment in the water network, and so this program reflects a measured reduction in expenditure relative to the amount required to maintain current performance. This is discussed further in Attachment 3: Service standards.</p>

Source: Icon Water.

Table 3-5: Key projects - renewal of sewerage assets

Project/ program	Project overview and benefits
Sewer mains renewal program	<p>This program will address issues with network performance due to sewer main breaks/chokes, which lead to sewer overflows on customer and public properties. Icon Water currently has a high frequency of such events relative to similar sized Australian water utilities.</p> <p>This is an ongoing program that uses conditional assessment to analyse and predict sewer mains failures to allow repair and replacement of defective lengths of sewers.</p> <p>The program will see the replacement of 16 km per year (80 km over the 2018–23 regulatory period), which will deliver considerable improvements to the service provided to customers.</p> <p>This program takes into account the findings from Icon Water’s willingness to pay research that customers are not willing to pay for increased spending on proactive investment in the sewer network, and so this program maintains a similar level of expenditure on proactive sewer renewals. This is discussed further in Attachment 3: Service standards.</p>
LMWQCC tertiary filters and disinfection system upgrade	<p>This package of works will replace aged assets and provide LMWQCC with reliable tertiary filter operation by partially rebuilding the existing filters and reduce the frequency of storage dam by-pass events by increasing the tertiary filter capacity.</p> <p>It will also reduce the risk of breaches to the current environmental authorisation.</p>
LMWQCC high voltage asset renewal	<p>This project is the renewal of a high voltage electrical feed into the sewage treatment plant. The plant currently has no redundancy and the consequence of failure is high due to the criticality of the asset. The assets are at end of life and in poor condition.</p>

Source: Icon Water.

Table 3-6: Key projects - renewal of non-system assets

Project/ program	Project overview and benefits
Vehicle lease renewals for maintenance vehicles	<p>A new Australian Accounting Standard, <i>AASB 16 Leases</i> has been issued and requires Icon Water to recognise the building and motor vehicle operating leases on the balance sheet through a ‘right-of-use asset’ and ‘lease liability’ from 1 July 2019. The right-of-use asset will be depreciated over the life of the lease and the lease liability which is recognised at the present value of future lease payments is reduced over time by the lease payments. This</p>

Project/ program	Project overview and benefits
	change in accounting treatment will prompt Icon Water to start treating vehicle lease expenses as capex.
AMMS (Axle)	<p>The AMMS is a strategic project within the BTP and a foundational component of business transformation.</p> <p>It will replace existing works management systems:</p> <ul style="list-style-type: none"> • WASP for scheduled maintenance work and emergency maintenance work at treatment plants. • Waterworks, for emergency corrective work in the network. <p>These systems are at end of life, lacking in integration and will have limited ongoing support. In addition, Icon Water’s engineering asset register is split across WASP, Waterworks, GIS and Oracle systems. This fragmentation of key data does not support the realisation of Icon Water’s strategic objectives.</p> <p>Investment in renewal of core systems such as the AMMS will benefit consumers through Icon Water being equipped to continue to manage its assets effectively to ensure the reliability of services is maintained.</p>
Enterprise warehouse and analytics	Icon Water manages and collects large amounts of data from numerous sources. The enterprise data warehouse will store both current and historical data in a single location and serve as a single source of truth for data to be used for analytics and reporting requirements. This replaces the current data warehouse, which is a non-integrated, editable solution.
LMWQCC administration building renewal	<p>The administration building, constructed in the 1970s, does not comply with the current <i>National Construction Code</i> and still contains asbestos containing materials.</p> <p>To facilitate the efficient use of space and contribute to a safe working environment and productive workforce, a major refurbishment has been planned for this building, during which the asbestos containing material is to be removed.</p>

Source: Icon Water.

3.3.2 Growth capex

Icon Water’s forecast for growth capex over the 2018–23 regulatory period is \$81.1 million, \$72.2 million of which is for sewerage assets, \$6.7 million for water, and \$2.2 million for non-system. This is an increase of 87 per cent compared to the 2013–18 regulatory period which is due to the deferral of major sewer augmentation projects from the 2013–18 period that are now to be delivered in the 2018–23 period.

Growth projects create new assets or upgrade or improve existing assets beyond their original capacity or performance. This is in response to changes in usage, customer expectations, or anticipated future need, to ensure Icon Water can provide safe and reliable services to the growing population of Canberra and its surrounds.

Planning for the growth of water supply and sewerage services is governed by the ACT Government’s land use planning framework. This framework identifies the forward planning direction for the territory, areas currently under the government’s scope of planning and future investigation areas, and develops long-term (≥ 20-year) land release strategies. This framework has seen a shift from a centralised

planning model (where a specific amount of land is released on a specific date) to market-driven releases.

In identifying the need for growth projects and planning these projects, Icon Water consults with ACT Government agencies and developers.

Projects are identified by analysing service strategies for new urban developments and through modelling of the system to identify areas where expansion is necessary to maintain service levels. In addition, the capacity of the treatment plants is also analysed based on projected demand.

The process for determining forecast growth capex takes account of:

- utilisation of the existing systems (network, treatment and reservoirs);
- modelling of water security to ensure compliance with standards (for example time in water restrictions);
- major future public and private development;
- assessed capacity and performance of the distribution network assets and impacts of asset failures on network supply;
- discharge to the environment conditions;
- reliability risks and capacity priorities;
- compliance with technical standards and requirements of the UTR;
- maintenance of service standard performance; and
- health, safety and environmental issues.

The ACT Government's current land release program is for around 18,000 dwelling sites across the ACT between 2016–17 and 2019–20. This would be an increase of over 10 per cent in dwelling numbers that will require water and sewerage services.

Growth driven projects proposed after 2020 are based on the ACT Government's land release program, and the type of development proposed. Icon Water produces high-level, long-term infrastructure plans which are refined in consultation with the ACT Government and developers as more detail is known about land releases and growth requirements.

Icon Water has proposed funding arrangement for some growth projects, as explained in section 0.

The forecast water and sewerage growth capex is set out in Table 3-7 below.

Table 3-7: Forecast growth capex (\$million, 2017–18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water						
Water network	2.8	3.1	0.9	0.0	0.0	6.7
Water sources	0.0	0.0	0.0	0.0	0.0	0.0
Water treatment	0.0	0.0	0.0	0.0	0.0	0.0
Total growth capex, water	2.8	3.1	0.9	0.0	0.0	6.7
Sewerage						
Sewer network	4.6	14.2	15.6	23.3	12.0	69.7
Sewer treatment	0.0	0.0	0.1	0.3	2.1	2.5
Total gross growth capex, sewerage	4.6	14.2	15.7	23.6	14.0	72.2
Less capital contributions	<i>1.7</i>	<i>7.0</i>	<i>7.6</i>	<i>10.1</i>	<i>5.1</i>	31.6
Net growth capex, sewerage	2.9	7.1	8.0	13.6	8.9	40.5
Non-system						
ICT	0.0	0.0	1.7	0.0	0.0	1.7
Fleet and equipment	0.0	0.0	0.0	0.0	0.0	0.0
Land and buildings	0.0	0.5	0.0	0.0	0.0	0.5
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total growth capex, non-system	0.0	0.5	1.7	0.0	0.0	2.2
Total gross growth capex	7.4	17.8	18.2	23.6	14.0	81.1
Total net growth capex	5.7	10.8	10.5	13.6	8.9	49.5

Source: Icon Water.

Table 3-8: Key projects - water assets for growth

Project/ program	Project overview and benefits
Taylor water supply	<p>This project will provide a water supply for the new development area of Taylor in accordance with Icon Water’s supply standards in relation to reliability of supply, drinking water quality and firefighting flows.</p> <p>Icon Water has included the full cost of this project in the 2018-23 program however funding arrangements are being negotiated with the ACT Government.</p>

Table 3-9: Key projects - sewerage assets for growth

Project/ program	Project overview and benefits
<p>Belconnen trunk sewer augmentation (WSCC co-funded)</p>	<p>This project will remedy inadequacy of the trunk sewer which transports sewage from the Lake Ginninderra catchment area through to Macgregor. Its capacity does not currently satisfy Icon Water internal standards which state hydraulic capacity should be adequate to only surcharge during events larger than the 1 in 10 year event. As Gungahlin’s size and population continues to grow overflow events will be more frequent.</p> <p>This project will ensure Icon Water can comply with environmental regulations and reduce overflow events for customers.</p>
<p>North Canberra sewer augmentation stage 1 (WSCC co-funded)</p>	<p>This project is stage 1 of a number of sewerage system augmentation projects in the North Canberra region to accommodate growth related to the City to the Lake development project and the Northbourne Avenue redevelopment project associated with Capital Metro.</p>
<p>Fyshwick sewage pumping station augmentation (WSCC co-funded)</p>	<p>This project is to accommodate growth in the catchment, mainly related to Eastlake and development encroachment on the sewage pumping station resulting in potential odour nuisance issues.</p>
<p>Constitution Avenue sewer augmentation stage 2 (WSCC co-funded)</p>	<p>This project is for the next stage of the sewer augmentation, following completion of stage one in 2016. This is in response to City to the Lake development in its catchment.</p>
<p>LMWQCC secondary treatment bioreactors capacity upgrade</p>	<p>Due to population growth and similar increases in the nutrient loading in the LMWQCC inflow, the plant is now operating at close to its process capacity for Ammonia. Ammonia is the main form of nitrogen present in raw sewage and is of particular environmental concern as untreated it can have toxic effects on aquatic fauna and flora. Additionally, related secondary process aeration assets including the bioreactor diffusers and the aeration header are approaching the end of their useful life and will require renewal. This addresses the risk that effluent from LMWQCC will not be able to meet the requirements of the LMWQCC environmental authorisation.</p> <p>The initial stages of this project are planned to commence during the 2018–23 regulatory period but project delivery will extend into the following 2023–28 regulatory period.</p>

Source: Icon Water.

3.3.3 Regulation driven capex

Regulation driven capex of \$44.2 million accounts for 10 per cent of Icon Water’s capex program and includes \$18.5 million on water assets, \$23.2 million on sewerage assets, and \$2.5 million on non-system assets.

These projects are identified through Icon Water’s monitoring new legislation and standards; condition reports from system operators; network planning and risk assessment reviews; close monitoring of asset performance in relation to existing standards, legislation, licence conditions and codes. The timing of the regulation driven projects is based on cost effectiveness and compliance with the different obligations.

The process for determining forecast regulation driven capex takes account of:

- the performance of existing assets in relation to legislation and standard levels;
- compliance with technical standards and requirements of the UTR;
- reliability risks and capacity priorities;
- asset performance, procedures and condition of assets;
- meeting service standard performance; and
- health, safety and environmental issues.

Forecasts for regulatory driven capex are based on known or anticipated changes in regulatory requirements at the time of preparing this proposal and project requirements to meet these changes. For example, the UTR is currently reviewing the technical codes under the *Utilities (Technical Regulation) Act 2014* with input from Icon Water. Icon Water is likely to adopt Water Services Association of Australia (WSAA) *Water Industry Standards* for the network. ACT Health has flagged potential changes to the drinking water guidelines to move to health-based targets.

Table 3-10: Forecast regulation driven capex (\$million, 2017–18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water						
Water network	1.2	1.8	7.2	3.3	0.4	14.0
Water sources	2.4	0.7	0.0	0.0	0.0	3.1
Water treatment	0.9	0.5	0.0	0.0	0.0	1.5
Total regulatory driven capex, water	4.5	3.1	7.2	3.3	0.4	18.5
Sewerage						
Sewer network	1.8	1.7	1.6	0.9	0.2	6.2
Sewer treatment	7.1	1.1	3.6	2.9	2.4	17.0
Total regulatory driven capex, sewerage	9.0	2.8	5.2	3.7	2.6	23.2
Non-system						
ICT	0.0	1.4	1.0	0.0	0.0	2.5
Fleet and equipment	0.0	0.0	0.0	0.0	0.0	0.0
Land and buildings	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total regulatory driven capex, non-system	0.0	1.4	1.0	0.0	0.0	2.5
Total regulatory driven capex	13.5	7.3	13.5	7.1	3.0	44.2

Source: Icon Water.

Table 3-11: Key projects – regulation driven capex - water assets

Project/ program	Project overview and benefits
Water renewals (hydraulic failures)	<p>Icon Water has identified hydraulic capacity deficiencies in its older unlined cast iron water mains due to corrosion build-up. This prevents the water pressure being at the required 'firefighting flow' rate.</p> <p>This program will identify and replace corroded cast iron water mains resulting in hydraulic failure. The UTR expects that Icon Water should have all of its unlined water mains meeting the current standards and will involve the replacement of up to 3 km per year (14 km over the regulatory period).</p>

Source: Icon Water.

Table 3-12: Key projects – regulation driven capex - sewerage assets

Project/ program	Project overview and benefits
Sewer network safety upgrades	<p>This is a rolling program to address safety issues identified at a number of sites relating to site access and working at heights requirements.</p> <p>Implementation of this project will mitigate the logistical and safety issues currently experienced by personnel and ensure Icon Water continues to meet its work health safety obligations.</p>
LMWQCC non-potable water system upgrade	<p>These works are required to retain compliance with the relevant regulation associated with the operation of the non-potable supply. The key Acts that regulate Icon Water's provision of recycled water are namely the <i>Utilities Act 2000 (ACT)</i> and the <i>Environmental Protection Act 1997 (ACT)</i>.</p> <p>Upgrade of the non-potable water supply at LMWQCC will provide a reliable source of non-potable water for the daily operation and emergency protection (firefighting flows) at the plant now and for future expansion.</p> <p>The non-potable network also needs upgrading to improve operation and maintenance and to reduce the risk of operational downtime of LMWQCC.</p> <p>Upgrading the non-potable water supply system will improve the reliability, redundancy and efficiency within the plant. The upgrade also allows the system to support and supply future plant expansion. Addressing these issues will assist in maintaining plant operation and reduce the risk of processes within the plant being offline or bypassed.</p>

Source: Icon Water.

Table 3-13: Key projects – regulation driven capex - non-system assets

Project/ program	Project overview and benefits
Geodetic datum upgrade	This initiative will update several Icon Water systems that rely on geospatial data. It is required to transition coordinates in these systems to the new national geodetic datum, Geocentric Datum of Australia 2020, which is anticipated to be a future mandate from the ACT Government. This work will bring Icon Water’s national latitude and longitude coordinates in line with GPS systems and enable smartphones and other technologies such as GIS to accurately locate features marked on maps.

Source: Icon Water.

3.3.4 Efficiency capex

Icon Water’s efficiency capex projects are works that will reduce costs or improve the performance of an existing infrastructure asset. Icon Water’s forecast for investment in efficiency projects over the 2018–23 regulatory period is \$18.7 million, including \$0.2 million for water assets, \$4.4 million for sewerage assets, and \$14.1 million for non-system assets.

The process for determining forecast efficient capex takes account of:

- reliability risks and capacity priorities;
- asset performance, procedures and condition of assets;
- meeting service standard performance;
- potential opex efficiencies; and
- environmental issues.

Table 3-14: Forecast efficiency capex (\$million, 2017–18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water						
Water network	0.2	0.0	0.0	0.0	0.0	0.2
Water sources	0.0	0.0	0.0	0.0	0.0	0.0
Water treatment	0.0	0.0	0.0	0.0	0.0	0.0
Total efficiency capex, water	0.2	0.0	0.0	0.0	0.0	0.2
Sewerage						
Sewer network	0.8	0.1	0.0	0.0	0.0	0.9
Sewer treatment	2.8	0.5	0.2	0.0	0.0	3.5
Total efficiency capex, sewerage	3.6	0.6	0.2	0.0	0.0	4.4
Non-system						
ICT	0.0	1.6	1.6	0.0	0.0	3.1
Fleet and equipment	0.0	0.0	0.0	0.0	0.0	0.0
Land and buildings	0.0	0.0	0.0	0.0	0.0	0.0
Other	6.1	0.0	0.1	0.8	3.9	10.9
Total efficiency capex, non-system	6.1	1.6	1.6	0.8	3.9	14.1
Total efficiency capex	9.9	2.1	1.8	0.8	3.9	18.7

Source: Icon Water.

Table 3-15: Key projects – efficiency capex - non-system assets

Project/ program	Project overview and benefits
Renewable energy program	<p>Icon Water’s operations require significant electricity consumption. In 2015–16 consumption was 33 gigawatt-hours costing \$3.8 million. Forecast trends in electricity market conditions are expected to result in significant increases in Icon Water’s electricity costs over the regulatory period and uncertainty remains beyond this time.</p> <p>These cost increases would be compounded if the ACT region experienced drought conditions due to the need to source water elsewhere which would require additional pumping and energy intensive treatment.</p> <p>To address this risk, Icon Water will continue to invest in a renewable energy program which involves solar PV panel installation at a number of sites as well as hydro-electric installations including new generation, modification of existing hydros and pump-storage hydro.</p> <p>The solar PV program will take advantage of unused rooftops and land under Icon Water’s management to generate electricity using solar PV technology in a cost effective manner.</p> <p>The hydro-electric program intends to take advantage of unutilised hydro energy resources and improve energy security (for example peak demands and blackouts). Timing of the program is designed to align with other capital works to provide synergy and drive the project costs down. Icon Water will also aim to utilise available grants, funding and incentive schemes. The program involves sites at LMWQCC, Cotter Dam, Stromlo, Googong, pipeline, pumping stations and urban reservoirs.</p> <p>Icon Water has the opportunity to generate electricity by utilising the current asset base with minor (compatibility) modifications. This will decrease greenhouse gas emissions and operating costs for water and sewerage services in the long term. Icon Water has included a negative step change in its opex proposal to reflect the forecast energy savings generated by the renewable energy program.</p>
APAS phase 2	<p>Phase 2 of the asset planning application suite (APAS) will provide enhancements to deliver new reporting and analytical capabilities that align with new business models. APAS phase 2 will make processes more efficient and automated and will enhance asset planning decisions.</p>

Source: Icon Water.

3.3.5 Non-system capex

For the 2018–23 regulatory period, forecast non-system capex and its allocation between water and sewerage expenditure has been provided at a driver level above, but is set out below together to provide a whole of non-system capex view.

Forecast non-system capex is for projects that are not directly within the operational networks, such as ICT expenditure and corporate facilities.

Non-system capex forecasts take into account:

- business requirements;

- data requirements for operational, regulatory and financial purposes;
- data security;
- condition of existing buildings and ICT systems;
- risk management review and prioritisation;
- the need to be able to respond to business needs and external regulatory compliance requirements; and
- consideration of efficiency improvements.

Table 3-16: Non-system capex (\$million, 2017–18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
ICT	11.8	10.1	9.8	2.4	2.3	36.4
Fleet and equipment	2.8	2.8	2.8	2.8	2.9	14.1
Land and buildings	0.0	0.9	1.0	2.1	1.8	5.8
Other	6.4	0.2	0.1	0.8	3.9	11.4
Total non-system capex	20.9	13.9	13.7	8.2	10.9	67.7

Source: Icon Water.

3.3.6 Capital contributions

Urban growth in the ACT has traditionally been through the building of new ‘greenfield’ suburbs on the urban fringes. Housing development in the ACT’s new suburbs is being complemented by urban infill in already developed suburbs (‘brownfields’). This expected increase in density will create pressure on existing water and sewerage infrastructure across the capital. In some areas this infrastructure is close to capacity. The current infrastructure funding arrangements were intended for development consisting primarily of greenfield suburbs. These arrangements are no longer suitable with the shift in focus to urban renewal and brownfield developments. With the aim of establishing long-term servicing strategies and arrangements for the future to address the funding of water and sewerage infrastructure associated with the growth of Canberra, Icon Water has proposed a Water and Sewerage Capital Contribution (WSCC) Code under Part 4 of the *Utilities Act 2000*, which is currently under consideration by the ICRC.

Icon Water considers its proposed WSCC to be a fairer way of determining funding arrangements for water and sewerage infrastructure upgrades that are triggered by development projects in brownfield sites. At present, if a developer triggers a water and sewerage infrastructure upgrade they will be asked to pay for the full cost of new water and sewerage infrastructure. This rule applies no matter the development size. Developers who build before or after an upgrade do not pay any contribution.

The new arrangements will involve sharing of upfront costs relating to infrastructure upgrades required to service new developments in brownfield areas between developers and Icon Water. The new arrangement will support an easier, clearer and fairer process for developers and broader community.

The new funding arrangements are expected to be introduced as a Utility Code in the ACT under the *Utilities Act 2000*. Charges under a code are separate to standard water and sewerage bills that households receive on a regular basis. The Code will maintain existing practises, such as the current greenfield scheme for the construction and gifting of assets to Icon Water.

Forecast capital contributions based on the proposed WSCC are provided in Table 3-17 below. These amounts have been netted off the gross capex forecast for the purpose of forecasting Icon Water’s

revenue requirement on the assumption that these arrangements will be approved by the ICRC. Some inconsistencies between the forecasts provided with Icon Water’s WSCC proposal to the ICRC and the forecast presented below are due to variations in project cashflow timing assumptions.

Project costs for projects included in Icon Water’s proposed WSCC scheme are provided in the confidential WT Partnership report provided as Appendix 3 to this attachment.

Table 3-17: Capital contributions (\$ million, 2017–18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water	0.0	0.0	0.0	0.0	0.0	0.0
Sewerage	1.7	7.0	7.6	10.1	5.1	31.6
Total capital contributions	1.7	7.0	7.6	10.1	5.1	31.6

Source: Icon Water.

3.3.7 Contingent projects

Icon Water has identified a contingent project and has proposed a contingent project pass-through event for the ‘Best for Region’ sewage treatment plant as detailed in section 7.1.4 of [Attachment 2: Form of regulation](#). This project has not been included in Icon Water’s capex forecast for the period at this time.

Icon Water notes that if the Best for Region sewage treatment plant proceeds, there may be some modifications to the Fyshwick sewage pumping station project (CX10846) relating to storage volume and pumping arrangements, however it is expected that the general project scope will continue to be required.

Appendix 1 Top twenty project cost estimates

This appendix contains the confidential report prepared by WT Partnership on Icon Water's top twenty capex project estimates.

Appendix 2 Selected twenty project cost estimates

This appendix contains the confidential report prepared by WT Partnership on capex project cost estimates for a selection of twenty of Icon Water's capex projects.

Appendix 3 Project cost estimates: Icon Water capital contribution scheme

This appendix contains the confidential report prepared by WT Partnership on capex project cost estimates for those projects included in Icon Water's proposed capital contributions scheme.

Abbreviations and acronyms

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AMMS	asset management and maintenance solution
AMP	asset management plan
APAS	asset planning application suite
BOM	Bureau of Meteorology
BTP	business transformation program
CDS	concept development statement
DSP	development stage proposal
EIM&C	electrical, instrumentation, monitoring and control
EPA	ACT Environment Protection Authority
FMEA	failure mode effect analysis
GIS	geographical information system
GL	gigalitre (one thousand megalitres)
ICRC	Independent Competition and Regulatory Commission
ICRC Act	Independent Competition and Regulatory Commission Act 1997
ICT	Information and communication technology (including information technology and operational technology)
IPaD	investment planning and development
IT	information technology
IRC	Investment Review Committee
kL	kilolitre (one thousand litres)
LDA	Land Development Agency
LMWQCC	Lower Molonglo Water Quality Control Centre
ML	megalitre (one thousand kilolitres)
OT	operational technology
RAB	regulatory asset base
SAMP	<i>Strategic Asset Management Plan</i>

SCI	Statement of Corporate Intent
STP	sewage treatment plant
TOC	Territory-owned Corporations Act 1990 (ACT)
UTR	ACT Utilities Technical Regulator
WSCC	Water and Sewerage Capital Contributions
WSMP	water security management projects
WTP	water treatment plant

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