



Melbourne Water Price Submission 2021

1 July 2021 to 30 June 2026

Aboriginal Acknowledgement

Melbourne Water respectfully acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Owners and custodians of the land and water on which all Australians rely. We pay our respects to Wurundjeri Woi wurrung, Bunurong and Wadawurrung, their Elders past, present and future, as Traditional Owners and the custodians of the land and water on which we rely and operate.

We acknowledge and respect the continued cultural, social, economic and spiritual connections of all Aboriginal Victorians. We also acknowledge the broader Aboriginal and Torres Strait Islander community and their connections with lands and waters, and recognise and value their inherent responsibility to care for and protect them for thousands of generations.

Melbourne Water acknowledges Aboriginal Victorians as Traditional Owners and, in the spirit of reconciliation, we remain committed to developing partnerships with Traditional Owners to ensure meaningful, ongoing contributions to the future of land and water management.

9 November 2020

Ms Kate Symons

Essential Services Commission
Level 37
2 Lonsdale Street
Melbourne Victoria 3000

Dear Ms Symons,

On behalf of the Board of Directors we are pleased to present Melbourne Water's *Price Submission 2021*. This submission represents our best offer, and is the result of a focused, disciplined and whole-of-organisation effort to deliver value for our customers.

Our household, business and retail water company customers, and Waterways and Drainage Customer Council, have been integral to the development of the proposals contained within this submission and we thank them for their considerable investment of time and expertise.

We will deliver the outcomes our customers value

Our submission is built around the six outcomes our customers told us they value.

1. *Access to safe and reliable water and sewerage services* – a stand-out priority for our customers, we will maintain our current high-quality services while delivering for new Melburnians, including planning collaboratively for future supply augmentations.
2. *Melbourne's environment, rivers, creeks and bays are protected and Melbourne Water's greenhouse gas emissions are minimised* – we will continue to protect Melbourne's environment, and play our part in addressing climate change.
3. *Melbourne remains liveable as it deals with the impacts of climate change and population growth* – we will increase community access to Melbourne Water land and continue to reduce flood risks.
4. *Melburnians are empowered to support the design and delivery of service outcomes* – we will empower others to deliver more, particularly for our waterways, than we could on our own.
5. *Easy, respectful, responsive and transparent customer service* – we will reach new standards in customer service for each of our major services.
6. *Bills kept as low as possible* – we have kept our bills as low as possible through the application of strong internal discipline and robust Board oversight.

1. We will be more accountable than ever

We commit to our customers that we will retain the outward focus we applied during our engagement journey throughout the regulatory period via:

- a renewed emphasis on transparency in the form of annual performance reporting directly to a representative customer forum (we will also publish results on our website)
- the introduction, for the first time by Melbourne Water, of guaranteed service levels to emphasise our commitment to delivering on our promises to our customers.

We have applied strong internal discipline *and* listened to our customers

We have taken action to keep our bills as low as possible *and* deliver greater customer value (values shown are five-year revenue requirement aggregates) by:

- increasing our capitalisation of Victorian Desalination Plant security payments – a \$217 million reduction
- accepting more risk on behalf of customers in the management of our capital program and deferring \$498 million in capital projects – an \$85.8 million¹ reduction
- smoothing our capital program to accept some delivery risk associated with the peak in years one and two – a \$42.9 million reduction
- keeping our base opex flat while supporting a growing population – based on forecast population growth of 1.95 per cent per annum, this represents a 2 per cent per annum efficiency outcome
- accepting our customers' strong desire for an uplift in waterways and drainage service levels via additional investment in high value-add services – a \$43.8 million addition.

We remain focused on affordability

- In annual average dollar-per-customer terms (households and businesses) our bulk water and sewerage charges will drop for City West Water (2.12 per cent), South East Water (1.43 per cent) and Yarra Valley Water (1.24 per cent). *Combined these three retail water companies account for 98.7 per cent of our revenue requirement.*
- Regionally, our bulk water charges (in dollar-per-customer terms) will decline in annual average terms for Barwon Water (0.79 per cent), Westernport Water (0.64 per cent) and Gippsland Water (3.41 per cent), while for Western Water and South Gippsland Water the average dollar-per-customer will rise 0.14 per cent and 1.50 per cent respectively.
- We will deliver the service uplift our waterways and drainage customers told us they wanted, and were willing to pay for, and keep price rises to a minimum. Residential, non-residential and rural charges will increase 1 per cent per annum across the period from bases of \$104.32, \$156.72 and \$57.28 per annum respectively.

Delivering will be challenging but we are up to the task

The COVID-19 pandemic, population growth (past and expected) and climate change are key challenges that we must and will address across the regulatory period. Our responses to each are considered, proportionate and designed to deliver the outcomes our customers value at a price that fairly balances the service delivery risks.

We are proud of the way we have gone about the task of preparing this submission and are confident it demonstrates our commitment to diligently, carefully, openly and honestly serving the needs of the people who benefit from our services.

Yours sincerely,

Michael Wandmaker
Managing Director

John Thwaites
Chair, on behalf of Board

¹ Estimate calculated using a rule of thumb based on a November 2019 capital expenditure forecast.

Board attestation statement

The directors of Melbourne Water, having made such reasonable inquiries of management as we considered necessary, attest that, to the best of our knowledge and for the purpose of proposing prices for the Essential Services Commission's 2021 Melbourne Water Price Review:

1. information and documentation provided in the Price Submission and relied upon to support Melbourne Water's Price Submission is reasonably based, complete and accurate in all material respects
2. financial and demand forecasts are Melbourne Water's best estimates, and supporting information is available to justify the assumptions and methodologies used
3. the Price Submission satisfies the requirements of the 2021 Melbourne Water Price Review Guidance paper issued by the Essential Services Commission in all material respects.

Michael Wandmaker
Managing Director

John Thwaites
Chair, on behalf of Board

The directors of Melbourne Water note that the COVID-19 pandemic represents an atypical level of uncertainty for a price submission.

Responding to the COVID-19 pandemic, and aligned with the ESC's revised guidance note, Melbourne Water has undertaken additional engagement and analysis to ensure that the submission remains founded on suitable "best estimates" of financial and demand forecasts, noting the high degree of uncertainty surrounding COVID-19. Importantly we have taken "best estimates" to mean estimates that are founded on robust and reasonable point-in-time information and analysis and that do not seek to push COVID-19 risks onto our customers.

How to read this document

This is a price submission document prepared solely for the purposes of meeting our obligations as a regulated water business, including the Essential Services Commission's *Melbourne Water's 2021 water price review: Guidance paper* (the Guidance Paper).

We have prepared our submission in two interrelated parts. The first part, our **Price Submission**, represents a concise, stand-alone description of our proposals and commitments across the regulatory period. It sets out the context within which we prepared this submission and how we have addressed the COVID-19 pandemic. It also describes our engagement approach, customer outcomes and commitments, demand forecasts, how our Board and Leadership team have approached the management of risk and investment, and our prices. It also contains our self-assessment under the PREMO (performance, risk, engagement, management and outcomes) model.

The **Price Submission** should be read in conjunction with the **Price Submission Supplement** – the second part of our submission. The Price Submission Supplement contains a more detailed account of each element of our regulatory proposal and has been written to directly address the requirements of the Guidance Paper.

All values presented in the Price Submission and Price Submission Supplement are in \$real 2020-21 unless otherwise stated.

Other key references

While the Price Submission Supplement provides a detailed account of our proposal against Guidance Paper requirements, in many instances we have prepared supporting documents to provide comprehensive accounts of specific aspects of our proposal and its development. These documents support the Price Submission, are referenced throughout and are available to the Commission on request. Key documents include the PS21 Engagement Supplement, Demand Supplement, Risk Strategy and Waterways and Drainage Investment Plan.

Relationship to the Waterways and Drainage Investment Plan

This submission is a companion document to the Waterways and Drainage Investment Plan (WDIP), which sets out Melbourne Water's responsibilities, goals, levels of service and programs of work for waterway management, flood management and drainage. The preparation of a WDIP is a key requirement of Melbourne Water's Statement of Obligations, which are issued in accordance with the Water Industry Act 1994. The WDIP defines the things we will do, and what it will cost, to deliver on our responsibilities and proposed levels of service for the period 2021-22 to 2025-26.



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Price Submission

Melbourne Water

1 A submission with a difference

This is a price submission with a difference. It is different in a number of ways that are central to the story of our *Price Submission 2021* (PS21) – and not just because it was prepared during a declared pandemic.

It is different because it will be our first experience with the new PREMO framework. It is also different in the ambition we have set for ourselves and the submission. It's different because of the rigour we have imposed on ourselves to ensure customers are not paying for costs we can avoid or risks we can manage. It's different because we have gone to significant lengths to understand the outcomes our customers care about most and ensure we deliver these outcomes. We will be reporting back to them to prove our commitment to meeting their expectations.

Pricing submissions are a part of the rhythm of life for a regulated water utility. Whether the intervening regulatory period is three years, five years or something else there is a degree of familiarity with the drive to outline plans and prices for the coming period. Our customers remain the households, businesses and retail water companies who enjoy the same (albeit continually evolving) high-quality water, sewerage, and waterways and drainage services we have always provided. Our regulatory task continues to be to plan and act prudently and efficiently as we deliver the services and outcomes our customers value.

We have always been driven by the needs of our unique and diverse customer base. We have not always been good at sharing this part of our story. Conscious of this, over the

past five years we have driven ourselves to become a more customer-centric organisation, prioritising genuine two-way dialogue, and embedding engagement and customer insights into how we do business.

Our *2018-2023 Customer and Community Strategy* formalises our recommitment to continuous improvement and a customer-centric way of doing business. It does this via a number of key implementation priorities:

- > Customer centricity: seeking and understanding our customers' perspectives to strengthen relationships, enhance customer experience and improve service outcomes.
- > Our community: engaging our diverse customer base on decisions that involve and impact them, while lifting awareness of our role and services.
- > Our services: continually evolving and improving our services in a way that delivers the outcomes our customers value.
- > Customer and community capability: empowering all levels of our organisation to deliver improved services, relationships and experiences to customers and community.
- > Disciplined delivery: applying strong governance and oversight, leading to better customer and community outcomes.

Our ambition then, through this submission, is to not only ensure we continue to deliver highly valued essential services to Melburnians and our customers in the wider Port Phillip and Westernport regions, but to do this in a more transparent and accessible way that places the customer at the heart of the process.

We are confident our submission achieves this and have self-assessed as "advanced" under the PREMO framework, reflecting the significant value this submission represents for our customers.

2 Melbourne's challenges are our challenges

Melbourne Water plays a unique role in the life of Melburnians and those living in the Port Phillip and Westernport regions. Part essential service provider and part steward of key aspects of the liveability of our region, we provide bulk water and sewerage services, oversee the way that drainage is managed to reduce the impacts of flooding on people and the environment, care for our waterways, creeks and the natural ecosystems which rely on them, and help to create outstanding community spaces.

This role requires us to tackle a number of fundamental challenges facing the region, including catering for an ever-growing population, acting to address climate change and, in 2020, managing the risks associated with the COVID-19 pandemic.

This submission was already being developed as the COVID-19 pandemic emerged in early 2020. The pandemic represents significant uncertainty as governments and the community deal with ongoing restrictions and the corresponding impact on businesses and the economy. The immediate challenges of the COVID-19 pandemic are discussed in **Section 2.1**; however, the submission also sets out the way in which we propose to tackle the big long-term challenges (**Section 2.2**) that will still be there when the pandemic passes.

2.1 The COVID-19 challenge

The following summary outlines how we have sought to deal with the uncertainties and challenges that the pandemic poses to our forecasts and this submission. To do this it touches on some of the key commitments that are fully introduced later in the submission. We have carefully considered the implications of COVID-19 on our submission and acted to **ensure our**

customers are not paying for any additional uncertainty caused by the pandemic.

Based on a review of available commentary and an international border which is closed to foreign citizens, it is likely that COVID-19 presents some level of downside risk to our demand forecasts, which are underpinned by forecast growth in net overseas migration.

In early September 2020 Australia's borders were closed, with only Australian citizens, residents and immediate family members able to travel or enter the country without obtaining an individual exemption.²

It is uncertain, however, exactly what level of impact this will have (lower foreign citizen migration may be offset to some degree by repatriation of Australian residents in the near term) and over what period (when current border restrictions will be lifted is unknown as is the impact of any change on net overseas migration).

We have carefully considered the pandemic and the impact it may have on future demand and customer preferences (particularly where this impacts near-term affordability) in order to consider the possible implications for our demand and expenditure forecasts, as well as our revenue and prices.

² Department of Home Affairs website advisory accessed 3 September 2020
<https://covid19.homeaffairs.gov.au/travel-restrictions-0>

To do this we considered two key questions:

- 1) What additional steps can we take to make sure we are delivering fair prices for our customers across the regulatory period, noting the current constrained economic context?
We define “fair” in this context as prices that minimise one-off year-to-year changes and that reflect underlying expenditure.
- 2) How is COVID-19 affecting the growth outlook and what are the possible implications for our submission of a revised growth outlook?

We have carefully considered these questions in relation to our expenditure and prices, noting their heavily interrelated nature.

Additional engagement and ongoing monitoring

For question one we added an additional stage to our engagement program. Noting that the closing stages of our engagement program ran concurrently with the emergence of the COVID-19 pandemic and the first stage of social restrictions, this stage sought to test and refine draft proposals on how we might:

- a) ease bill impacts in the community (for example, delay price and service increases for Koo Wee Rup–Longwarry Flood Protection District direct service customers)
- b) monitor and respond to the impacts of COVID-19 across the regulatory period (for example exploring a framework and mechanism via which Melbourne Water might provide proportionate financial relief depending on the nature of the emerging issue)

In September 2020 a deliberative forum (using the same panel engaged to consider our final customer outcomes) considered key questions relating to affordability and appropriate measures we might take to ensure our prices remain fair across the regulatory period. The panel was highly

supportive of our proposed approaches to the management of the waterways and drainage charge, and longer-term COVID-19 monitoring and response across the regulatory period. *These additional measures are outlined in the “proposed response” section below.*

Our COVID-19 engagement activities are detailed in **Attachment 1**.

We also supplemented our engagement program with a scan of a range of data sources to understand how COVID-19 is impacting customer affordability.

- > From April 2020, we have included a series of COVID-19 tracking questions to our community perceptions survey to add to our knowledge of customer impacts. On a fortnightly basis we are surveying a representative sample of the community with a series of questions focused on perceptions and confidence in ability to pay water bills.
- > Retail water company insights into end-use customer financial stress and take up of hardship programs and other COVID-19-related support packages.
- > Ongoing industry research and data collection on community financial stress and ability to pay for utilities (for example Water Services Association of Australia (WSAA) and Essential Services Commission (ESC) data collection).

This scan tells us there has been an increase in households and businesses who are struggling to pay essential bills.

This monitoring work is ongoing and provides insight into the current and evolving community sentiment about the impacts of COVID-19 and perceptions of ability to pay bills as the pandemic progresses. These insights reinforce the emphasis our price submission places on balancing affordability considerations with service levels and quality, and the importance of our affordability-related customer outcome: *‘Bills kept as low as possible’* (see **Section 3.2**).

Growth outlook and its implications

For question two, we focused on what a COVID-19-adjusted demand profile might look like and then considered its implications for our capex and opex forecasts.

COVID-19 adjusted growth outlook

Our original demand forecasts for the regulatory period are ultimately founded upon *Victoria in Future 2019* (VIF2019), *Population and Household Projections* (July 2019)³ data series forecasts, which were released prior to the emergence of the pandemic. We engaged property advisory and market research consultancy Macroplan to provide an independent, expert opinion on how VIF2019 population level forecasts might be adjusted to take into account known or likely impacts of COVID-19. In summary, compared with the VIF2019 projections, its findings (detailed in **Attachment 1**) suggest:

- > an expected drop in growth for the 2020-21 year – with some 86,000 less people residing in the greater Melbourne region than forecast by VIF2019
- > a rapid return to prior growth paths from 2021-22
- > a 2021-22 to 2025-26 forecast growth rate of 1.93 per cent that is largely aligned with the VIF2019 growth rate (1.95 per cent) for the same period.

Implications of a COVID-19-adjusted growth outlook

Our revenue requirement and prices are founded on our estimates of prudent and efficient opex and capex, which are in turn influenced by the size of our asset base, recent growth and growth forecast to occur across the regulatory period. The difference in the growth rate (0.02 per cent) has a \$1 million effect on meeting the 2 per cent efficiency calculation over five years.

Having finalised our original demand forecasts during the first half of 2020 – when the COVID-19 pandemic was in its early stages – we considered two management responses to Macroplan's COVID-19-adjusted forecasts for the purposes of this submission:

Scenario 1 – Assumes the acceptance of the COVID-19-adjusted demands (and expenditures) as our “revised best estimates”. Under this scenario demand forecasts are adjusted for COVID-19, with actual demand in line with adjusted forecasts.

Scenario 2 – Assumes the retention of pre-COVID-19 demands (and expenditures) – our “original best estimates”. Under this scenario demand forecasts are unadjusted for COVID-19, with actual demand (that is post submission) lower than submission forecasts and in line with the Macroplan forecasts.

The implications of COVID-19-adjusted demand forecasts on our expenditure forecasts are considered in **Attachment 1**, along with key modelling outputs and assumptions used to draw the following insights.

Modelling of the two scenarios outlined above shows that:

- > revised demand forecasts have a negligible impact on our proposed expenditure
 - all capital projects with a growth driver have been proposed on a “just-in-time” basis to deal with recent growth that has occurred during *Price Submission 2016* (PS16)
 - chemicals and energy costs would be \$1.3 million lower under the modelled COVID-19-adjusted growth outlook

³ Victoria in Future (VIF) projections are an estimate of the future size, distribution and composition of the population in Melbourne. They are developed using mathematical models and expert knowledge, relying on trend analysis and assumptions about future change. They were made prior to the early 2020 emergence of the COVID-19 pandemic.

- > revised demand forecasts have a negligible impact on our overall revenue requirement
 - the waterways and drainage revenue requirement is unchanged across the two scenarios
 - the water and sewerage revenue requirement would be \$1.3 million lower (in aggregate across PS21) under Scenario 1 – on a revenue requirement aggregate of \$6,731.6 million
- > prices would be higher under Scenario 1 than Scenario 2 – on average across the period:
 - waterways and drainage charge prices would be \$1.30 higher for residential, \$1.90 higher for non-residential (on minimum) and \$0.70 higher for rural customers
 - water variable tariff prices would be \$264.40 per megalitre under Scenario 1, compared to \$263.10 per megalitre under Scenario 2
 - sewerage fixed tariff prices would be \$440.4 million per annum under Scenario 1, compared to \$440.3 million under Scenario 2
- > the risk profiles of the two scenarios are different, with Scenario 2 representing a \$16.6 million revenue (net of avoided opex) risk to Melbourne Water, compared to Scenario 1 where the risk is effectively re-balanced via higher customer prices.
- > the reduction in the growth rate from 1.95 to 1.93 per cent represents about \$1 million variance to the 2 per cent efficiency target over the five-year regulatory period.

This analysis demonstrates that, on balance under Scenario 2 the risk lies with Melbourne Water, not our customers. *The revenue risk is greater than the cost risk.*

Proposed response to COVID-19

Our response to the COVID-19 pandemic seeks to balance the uncertain nature of its impact in the short, medium and long term, with the longer-term nature of the outcomes and services our customers have told us they value. In light of the challenges posed by the pandemic, we have amended our submission to ensure our customers are not bearing an unfair burden from the risks they expect us to manage.

Shouldering greater risk on behalf of customers

- > We are mitigating any capital delivery risk by “smoothing” the profile of our capital program – effectively taking the years one to three expenditure peaks and pushing these into the final year of our program⁴. This reduces the amount customers will pay for our capital program by \$42.9 million over the regulatory period.
- > We have elected to base our submission on our “original best estimates” of forecast demand and expenditures (Scenario 2 above), bearing the revenue risk should actual (post-submission) demand be lower than our forecasts.
 - This decision enables us to keep prices lower than they otherwise would be under the “revised best estimate” scenario modelled above.
 - It is in line with customer feedback, particularly from the retail water companies, who were strongly of the view that we should seek to minimise any upward price pressures arising from COVID-19. Our customers expect us to accept higher revenue risk, rather than pass that risk on to them via revised forecasts and higher prices.
 - We offer to review the forecasts between the ESC’s draft decision and final decision to take account of a better understanding of COVID-19 impacts.

⁴ We have achieved this via the regulatory depreciation override within the ESC’s financial template.

Prices

- > We are replacing what was a proposed one-off, year one (2021-22) price increase for our waterways and drainage charge with a gradual increase across the five-year regulatory period.
 - This applies to our residential, non-residential (minimum fee) and rural charges. For example, this means that the annual residential charges in 2021-22 will be \$105.36 rather than \$107.47 we were originally considering (up from a base of \$104.32).
 - We recognise this change is modest, but we also know that at times like this every dollar counts for many of our customers.

Ongoing monitoring and customer engagement

- > We will continue to monitor the emerging situation, including via engagement with the retail water companies and monitoring related industry research to understand how COVID-19 impacts customer affordability as the economic effects of the pandemic evolve. This will include continuing to survey household and business customers at regular intervals (currently fortnightly), with a series of questions focused on service affordability, to aid our understanding of the social, health and financial pressures arising from the pandemic.
- > We will use the insights we gather to actively monitor the case for setting our prices to a fair level (lower than the regulatory price cap) in any given year. In our engagement with the deliberative panel we outlined options such as temporary pauses in scheduled price rises (waterways and drainage charge), multi-year adjustments of price paths and/or a revisiting of customer-derived levels of service, as possible responses to ensure our prices remain as “fair” as possible across the period.
- > We will do this by adding a COVID-19 *discovery, reporting and response* element to the customer forum(s) we will establish under our performance management framework (**Section 3.3**).
 - *Discovery* – Coinciding with their establishment we will work collaboratively with the customer forum(s) to develop specific reporting metrics and response structures, including clear “trigger” levels to guide appropriate responses by Melbourne Water. This element would be concluded within the first six months of the regulatory period.
 - *Reporting* – Each meeting of the customer forum(s) would include a clear update on:
 - general community affordability metrics (using both Melbourne Water captured insights and available public information) relevant to customer hardship, unemployment levels and related measures
 - our delivery against our investment plans – we will expand the reporting against the outputs associated with the “*Bills kept as low as possible*” outcome (**Section 3.3**) to include meaningful references as to how we are tracking against our aggregate (5-year) expenditure plans.
 - *Response* – Where our reporting shows we are approaching or exceeding pre-agreed “trigger levels” Melbourne Water would outline its proposed response and how this aligns with the suite of possible responses identified in the discovery phase.
 - The overarching objective of any proposed response will be to ensure that customers continue to pay a “fair” price for their services across the period.
- > As a last resort we will engage the ESC about its unforeseen events mechanism.

2.2 Key themes – population, climate and assets

Over the past three years we have worked with the community and Melbourne's retail water companies to deliver (and refresh) landmark strategies that identify the challenges Melbourne's water, sewerage, and waterways and drainage services face today and into the future. Recent growth has been an important driver of expenditure and will remain so once COVID-19 passes.

We have drawn on these strategies, our day-to-day operational experience and our engagement with customers to identify the key challenges we are addressing as part of PS21.

A growing population

- > Population growth places pressure on water supply, and sewage transfer and treatment capacity, and increases the number of people who want to access waterways for recreation and to receive the health benefits of being in nature. It tends to bring more hard surfaces such as roads, roofs and pavements, which increase stormwater runoff, impacting waterway health and the risk of flooding. Population growth also contributes to a reduction in the extent of native vegetation cover and biodiversity along waterways and in catchments.
- > Despite the effects of the pandemic, Melbourne will still have half a million more residents in 2021 than in 2016 (**Table 1**). Another half a million more are expected to be living in Melbourne by the end of the PS21 period.



Table 1 VIFSA¹ (July 2019) – population growth projection

Population forecast	2016	2021	2026
Melbourne	4,683,972	5,270,871	5,803,337
Compound annual growth rate (CAGR)	<div> <div>2.39%</div> <div>1.94%</div> </div>		
Western Treatment Plant (WTP) catchment	2,302,383	2,616,022	2,882,274
CAGR	<div> <div>2.59%</div> <div>1.96%</div> </div>		
Eastern Treatment Plant (ETP) catchment	1,706,229	1,826,989	1,951,942
CAGR	<div> <div>1.38%</div> <div>1.33%</div> </div>		

Note 1: VIFSA refers to the Victoria In Future Small Area (2019) projections. Note also that these projections were developed for sewage forecasting purposes and use small areas specific to the three metropolitan retail water companies. The overall population values for 2026 are therefore lower than shown in the COVID-19 analysis in Attachment 1 and yield different CAGR values (1.94% compared to the 1.95% for Greater Melbourne).

- > A disproportionate amount of this growth has (and is expected to) occur within the catchment of our WTP, creating a special challenge for this vital piece of treatment infrastructure.

A changing climate

- > We are living in a changing climate. While overall rainfall is reducing and impacting water security (as the region continues to grow), when storms do happen, they are more intense with greater rainfall in a shorter time. Urbanisation increases hard surfaces and reduces the opportunity for rainfall to soak into the ground and support baseflow in local creeks in drier periods. Rapid runoff from hard surfaces produces unnaturally high peak flows which damage waterways and degrade their ecosystems. More water will also enter the sewerage network more quickly, filling networks to capacity and increasing the risk of spills to the environment. These risks are relevant to the way in which we manage our major services.

Existing assets that need to be maintained and renewed

We rely on a wide array of different assets to deliver our services. Each of these need to be maintained and, periodically, renewed, contributing to our maintenance (opex) and renewal (capex) expenditure.

- > Our bulk water and sewerage services are delivered via an extensive asset base, which includes 11 water storage reservoirs, over 1,600 kilometres of aqueducts, water mains and sewer mains, 41 service reservoirs, 14 earthen basins, 14 water treatment plants, eight sewage pumping stations and the ETP and WTP.
- > Our waterways and drainage services rely on both natural and engineered assets including nearly 1,500 kilometres of underground drains, 171 urban lakes, 459 wetlands, and over 25,000 kilometres of rivers and creeks.

Each of these themes has informed our investment planning to ensure we are able to deliver the outcomes our customers are seeking from our services, now and over the long term. In relation to Melbourne's growing population in particular, PS21's growth-driven capex program seeks to address not only forecast growth, but more importantly growth that has occurred over the past five years. Our "just-in-time" capex approach (**Section S6.2** of the *PS21 Supplement*) means that the half a million people who were added to our service area over the past five years have effectively consumed available capacity in critical water and sewerage assets – this is particularly evident in the catchment of the WTP, where the bulk of this growth has occurred.

Further discussion of the key challenges and our responses is provided against each customer outcome in **Section S3.1** of the *PS21 Supplement*.

3 Delivering our customer ambition

This chapter outlines how we have taken into account the priorities identified by our customers within our submission.

It describes:

- > our engagement story and how we evolved our engagement approach from PS16
- > what we heard from our customers and how we responded
- > how we expect our service base will grow across the period
- > the focus and discipline that we have applied to the development of PS21
- > what this all means for customer prices and how we are delivering against the affordability challenge we, and our customers, have set for PS21.

3.1 Early, deeply, broadly – our engagement story

We have adapted our engagement approach from the prior regulatory period, embracing the new PREMO regulatory model through a deeper engagement form (towards *collaboration*), with broader content (towards *performance stewardship*) and earlier timing (towards an *ongoing conversation*). These changes reflect our desire to continue to develop our understanding of our customers and their preferences, enabling us to improve the alignment between these and the services we deliver.

Our engagement program was purposeful about matching the engagement aims and approaches to PREMO and our customers' expectations. **Figure 1** shows how the form, timing and content of our PS21 engagement approach has built on what we did for PS16.

Customers were provided with opportunities to shape both the engagement program

itself, and key aspects of the submission, via a three-stage engagement process delivered over an 18-month period. We did this using a variety of channels and forums to engage with households and businesses, retail water companies, direct service customers, local government, industry associations and community organisations and direct service customers (**Figure 2**).

Our household and business research program adopted representative sampling and engagement approaches to ensure views expressed could be considered representative of the broader community. Participants were selected to ensure representation across different age cohorts, gender, location, level of education, household size and ownership, and work status. We also targeted harder to reach groups including people on lower incomes, people who spoke another language at home or with parents, and people with a chronic illness or disability who might otherwise find it hard to participate. We did this to ensure our submission was representative of the views of our diverse customer base.

We established two dedicated customer forums – a Water and Sewerage Customer Council (WSCC) and a Waterways and Drainage Customer Council (WDCC) – as strategic engagement channels via which Melbourne Water sought insight into customer preferences, appropriate forms of engagement and other strategic matters as they arose. The WSCC comprised representatives of our retail water company customers, while the WDCC comprised direct service (diverter) and waterways and drainage charge customers, as well as engaged community groups (for example Werribee and Yarra River Keeper associations), the State Emergency Service, the Victorian Planning Authority and Urban Development Institute of Australia, and local government.

Figure 1 Customer engagement approach – what we have done differently

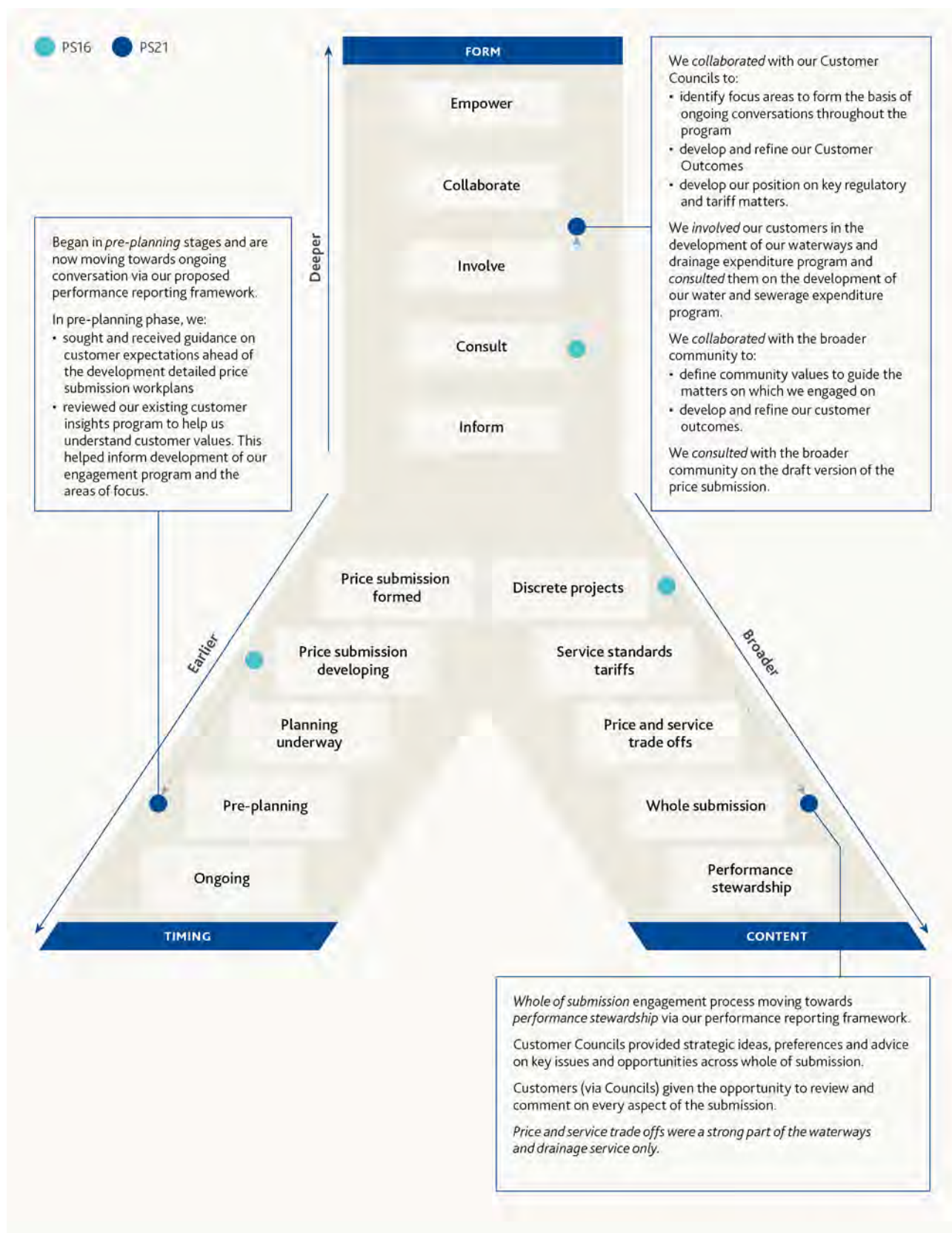
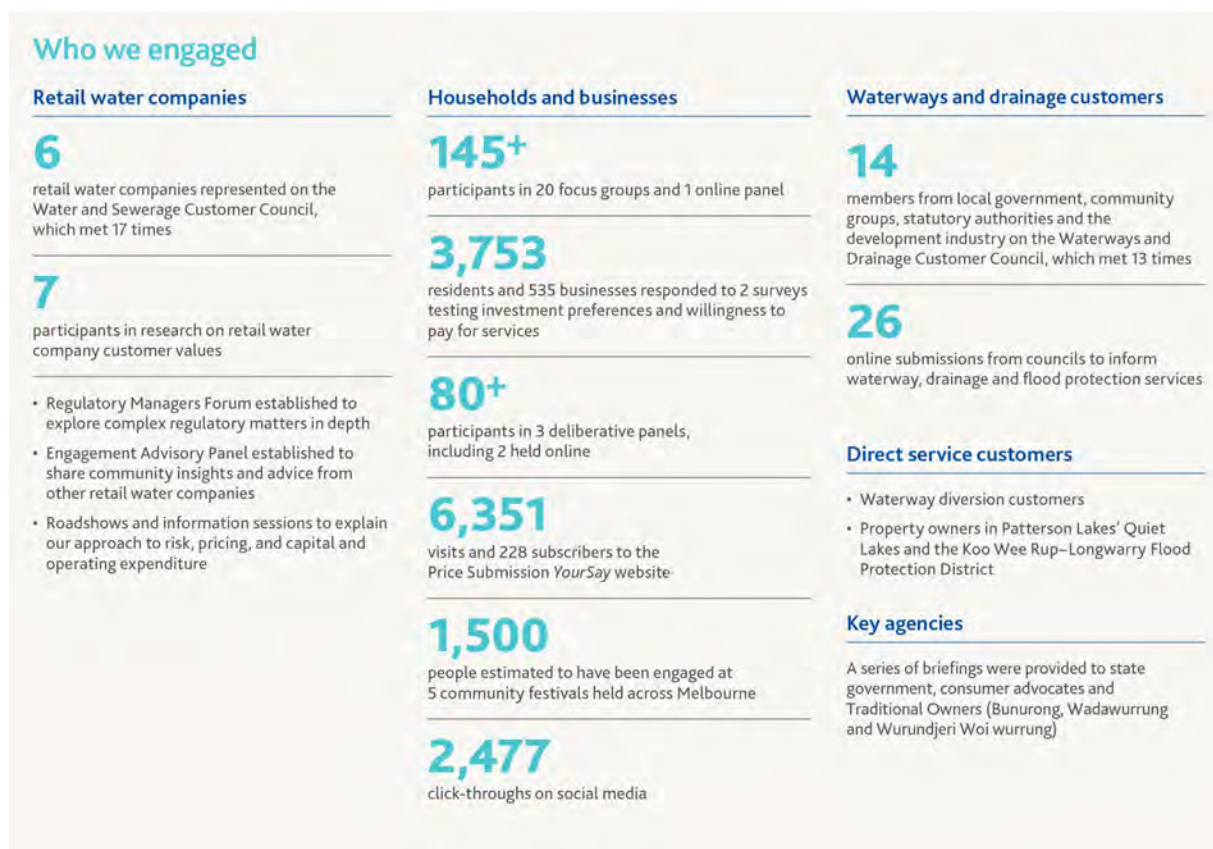


Figure 2 Engagement snapshot



These two forums worked collaboratively with us to help shape and refine both our engagement activities and our response to key service and regulatory matters. Our best offer has been heavily influenced by the work we undertook with these councils and we would like to acknowledge the time, energy and expertise they added to the development of this submission.

In *Stage 1 – values and focus areas* we set the scope of the engagement program and customer involvement. This stage shaped our understanding of customer values and areas of interest to be further explored through the engagement program. Insights drawn from this stage helped us to develop a preliminary set of customer outcome statements.

Stage 2 – preferences and performance sharpened the focus to customer preferences in relation to overall expectations of our performance (and the submission) as well as price-service trade-

offs. During this stage we refined our customer outcomes, defined related outputs and measures, and explored customer preferences and willingness to pay for selected services.

In *Stage 3 – validation* our customers endorsed the proposed customer outcomes. We committed to the introduction of guaranteed service levels (GSLs) for our bulk water and sewerage services, and we finalised the investment programs needed to deliver on our customer outcomes.

3.2 Outcomes our customers value

We heard

Our engagement journey provided strong insight into customer preferences and what it is that they value and expect from our services. Our customers told us they:

- > highly value our core services – in *Stage 1* our community assessment of services
- > highlighted the criticality of water to life, and in ensuring Melbourne can continue to thrive in the face of population growth and climate change
- > want to see positive environmental and community outcomes from the services we provide and underpin
- > don't want us to lose sight of the ongoing affordability challenge
- > expect services to be sustainable and in partnership with community
- > expect us to take a forward view and be innovative
- > want us to directly address climate change, including links to what Melbourne Water is doing to manage bushfire and drought risk, and address liveability and amenity
- > want transparency in relation to what we do and how we do it, including future expenditure challenges.

We responded

To establish a strong link between our proposed actions and expenditure, and the preferences of our customers via customer outcomes, we enlisted the support of our customers and customer councils.

Over a three-stage process (separate to, but embedded within, the overarching engagement process outlined in **Section 3.1** we:

Stage 1 – took early customer insights and developed **seven** draft customer outcomes

Stage 2 – refined seven outcomes to **six** via workshops with our customer councils

Stage 3 – tested the **six** draft final outcomes (and associated outputs and target metrics) via a deliberative panel using a representative sample of 43 households and businesses – *the customers that we ultimately serve*.

The insights we gained from this stage contributed to our understanding of the

relative value our customers place on each outcome and were used to refine the wording of the final outcomes. Our customers (retail water companies, and households and businesses) were highly supportive of the six final outcomes, and their associated outputs, presented on **Figure 3** and **Figure 4**.

Our community deliberative panel explored the draft customer outcomes and provided both endorsement and insight into the priority they would assign each outcome. Specific insights from the deliberative panel phase included a need to focus on customer-friendly over technical language (for example 'population growth' made more sense to panel members than 'urbanisation') and the benefits of keeping outcomes simple and with a direct link to Melbourne to encourage connection with the outcome.

We engaged expert reviewers (such as KPMG) who encouraged us to simplify the language and ensure it reflects what customers will receive rather than what Melbourne Water will do, leaving any technical elements to the narrative or outputs.

We will deliver against the five service-oriented outcomes while ensuring (via our sixth outcome) we remain focused on household affordability now and into the future.

We also asked our customers (deliberative panel) what they thought of our output measures. While commenting that some were somewhat technical in nature, they were generally highly supportive of the measures we propose and the clarity with which we have presented them.

For 14 of our 15 output measures we received strong endorsement (between 60 per cent and 89 per cent of respondents indicated they “agreed” or “strongly agreed” with the statement that they support Melbourne Water using the proposed output to measure performance against the aligned outcome) of the proposed measure. Responses to a question about clarity of each output measure received similar levels of support. Output-specific customer ratings are presented in **Section S3** of the *PS21 Supplement*.

The other measures, relating to reduced flooding risk received 48 per cent support on the same basis with a further 40 per cent responding via a “neutral” rating. Given the somewhat technical nature of our flood mitigation work we intend to use the proposed measure for PS21; however, we will use our performance reporting customer forum(s) to test and refine alternative measures over the course of the regulatory period.

Figure 3 Customer outcomes summary (1 of 2)

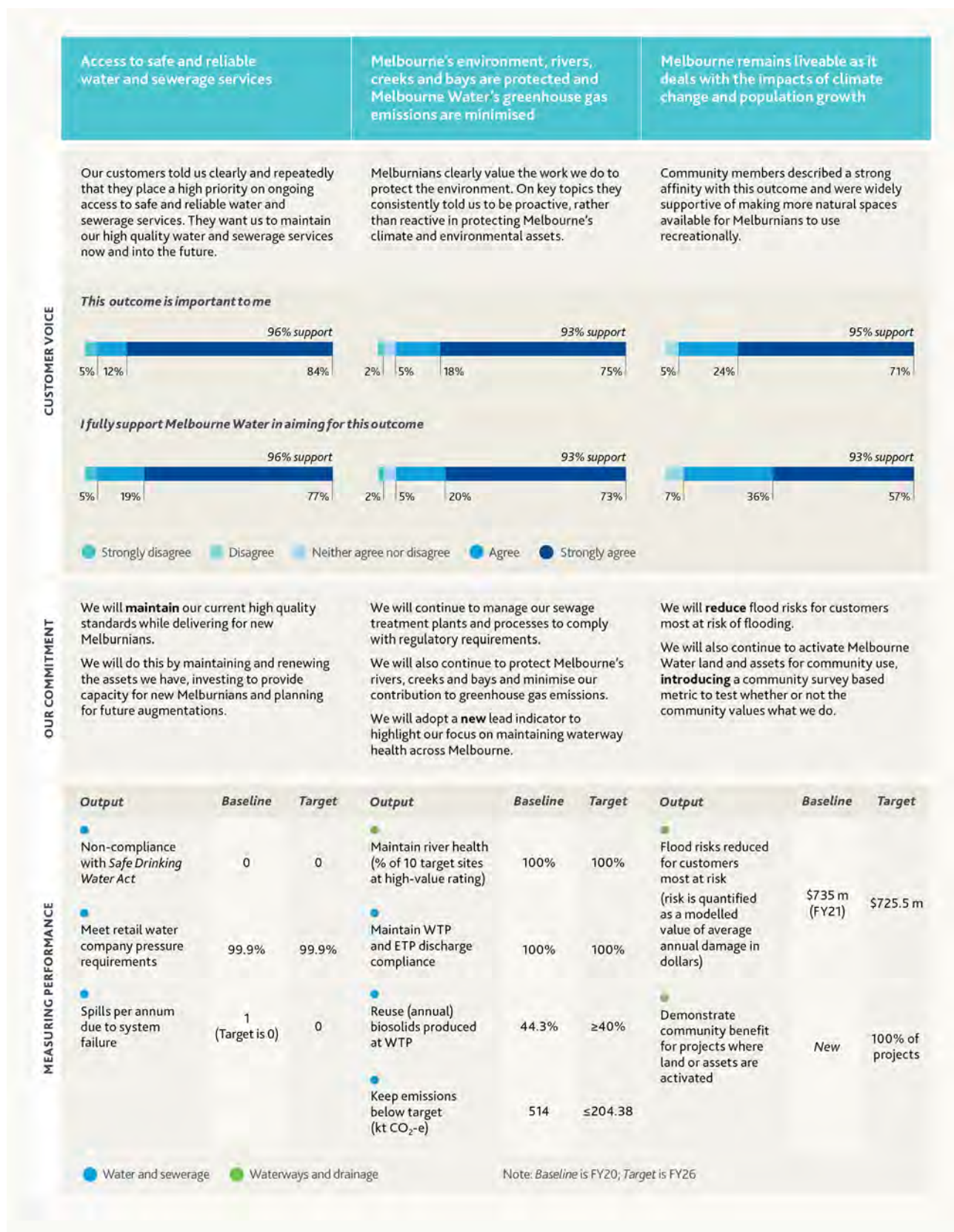


Figure 4 Customer outcomes summary (2 of 2)



3.3 Other customer-centric commitments

Our customers shared their preferences in relation to a number of other matters. What we heard and how we responded is outlined below.

We heard

Outcomes performance reporting

- > Our retail water company and household and business customers were unified in their desire for transparent reporting and clear accountability for performance – a strong customer-centric focus was evident in their responses to the question of how Melbourne Water should manage performance reporting and changing customer preferences.
- > Supplementing these views, the WDCC supported the concept of an ongoing customer council-style body. It felt that a customer-centric approach to reporting and performance was important.

WSCC accountability and transparency preferences

- > Throughout our 18-month collaboration with the WSCC we heard and responded to many requests for information and greater clarity around our service delivery challenges and proposals. While the majority of these responses were managed along the way, the WSCC also challenged us to commit to greater accountability and transparency, in particular via the introduction of GSLs and a comprehensive review of our tariff structures.

Victorian Desalination Plant – capitalisation of security payments

- > The WSCC told us they support the principle of intergenerational equity and stated that the status quo did not represent an equitable approach. In line with their desire to deliver flat prices over time, they encouraged us to explore alternative capitalisation profiles and

timings (including a stepped approach) that support this pricing outcome.

We responded

PS21 represents a step change to the way in which Melbourne Water views its commitments made via a price submission and the impact this has on its customers. The following key customer-centred initiatives have been developed in direct response to what we heard from our customers.

1. We acknowledge the strong desire of our customers for transparent and accountable delivery against our PS21 commitments. We will act via a customer-centric approach to **outcomes performance reporting and management**.

We intend that this will take the form of an ongoing customer council-style forum (or forums) meeting at least once a year. Ideally comprising representatives of our household, business and retail water company customer segments, the forum(s) will enable us to understand and test customer preferences as they relate to the services we provide. We intend to use this ongoing conversation to:

- > facilitate transparent reporting of performance against our outcomes directly to our customers (we will also publish an annual performance report on our website and communicate this via social media)
- > engage with our customers over an appropriate Melbourne Water response to underperformance (or over-performance) in relation to customer outcomes – this may include consideration of additional (non-customer-funded) expenditure to rectify an underperformance against our customer outcomes, and/or consideration of the circumstances under which it would be appropriate for Melbourne Water to make repayments to customers (for example, chronic underperformance against outcomes)

- > ensure our priorities continue to be aligned with customer preferences, and help us identify the most appropriate strategies to respond to emerging or unexpected issues
- > prepare for our next price submission in 2025 – with the expectation that as we move into pre-planning for *Price Submission 2026* (PS26) we would meet more regularly with the forum(s).

2. We will **introduce GSLs** for the first time for our bulk water and sewerage services. The introduction of GSLs (emerging concept outline in **Table 2**) represents a step change to the way in which we manage customer interests in delivering our vital services. They represent a new approach for the way we manage our services and our relationship with retail water companies.

Key features of the emerging GSL concept include metrics that:

- > have a clear link to our services and their contribution to the household and business customer experience
- > align with what we heard from retail water companies during our engagement phase
- > align with existing retail water company GSLs (including payment amount levels)
- > use existing processes to identify and pay affected household and business customers (Melbourne Water to reimburse retail water companies).

Demonstrating the sincerity of our offer to deepen our service commitment to our customers in this way, we worked with our retail water company customers to define appropriate GSLs via a considered and highly collaborative process.

Table 2 GSLs under consideration - bulk water and sewerage

GSL	Customer impact	Indicative payment
Planned event – breach of minimum notice period (for example, change of water source)	Household or business impact – unexpected loss of amenity (for example, change in taste, odour of water supply)	Match retail water company payment – in order of \$50 to household or business customer
	Retail water companies' impact – additional management of customer calls/complaints	\$5,000 per incident per affected retail water company
Unplanned water or sewerage service disruption/event⁵	Household or business impact – unexpected loss of service or amenity	Match retail water company payment – in order of \$50 to \$200 to household or business customer
Pressure deviations above tolerances	Damage to retail water company infrastructure	Actual cost >\$10,000 per incident to retailer
Sewage spill (caused by system failure)	Household or business premises or local environment	Match retailer payment to end customer in order of \$1,000-\$3,000

⁵ Events such as the boil water notice that followed a power outage at Silvan Reservoir in September 2020 would be considered an unplanned water service event. The payment amount for such widespread incidents would be determined on a case-by-case basis.

We spent time in June and July 2020 working collaboratively with metropolitan retail water companies to explore what is possible/practicable, leading to the development of a concept and prototype process in August 2020. We will continue to develop the details of the GSL concept and plan for implementation on 1 July 2021. We will provide further detail during the ESC's review stage.

3. We will initiate a comprehensive review of our tariff structures.

Responding directly to a request from the WSCC, Melbourne Water is also committing to the conduct of a review of our tariffs, to conclude not later than October 2022. This timeline is proposed with the express support of our retail water company customers, with the intent that it provides the opportunity to align the implementation of any changes with the commencement of their next regulatory period in 2023.

While individual retail water companies presented mixed views on perceived issues with the existing tariff structure, the review is intended to explore opportunities to reform our existing tariffs to better deliver on the principles contained within the *Water Industry Regulatory Order*.

In relation to the introduction of GSLs and the conduct of the tariff structure review we propose to report on progress on these matters via the proposed customer forum(s). Ultimately, we accept that failure to deliver against these commitments will detract from our "performance" assessment as part of our next price submission.

4. We will deliver **a more equitable customer treatment** of the Victorian Desalination Plant security payments in line with the feedback we received from the WSCC.

Through the combination of lease repayments and capitalisation introduced in PS16, Melbourne Water has already begun the journey to a more equitable customer repayment profile.

We propose to significantly increase the amount we capitalise in PS21, aligning the amount we capitalise each year with the annual amounts assumed as capital (principal) payments for tax purposes. This approach represents a far more equitable customer repayment profile over the life of the asset and aligns with the WSCC's stated support for intergenerational equity. We will capitalise \$399 million over the regulatory period, an increase of \$235 million from PS16, delivering a reduction in our required revenue of \$217 million.

Melburnians today will benefit via lower Victorian Desalination Plant charges. Future Melburnians will contribute a more equitable share of the asset cost after the expiry of the current lease – reflecting the ongoing benefits the plant will provide to them.

3.4 Robust and collaborative demand forecasts

We undertook a robust demand forecasting approach for PS21 that was tailored to each of our three major service areas. Growth forecasts for each service are either underpinned by, or aligned with, the VIF2019 data series. We also engaged KPMG to conduct a multistage review to test and challenge the demand forecasting process and underlying assumptions. Material improvements to the transparency and quality of supporting data were made following these reviews and a number of key assumptions were either revisited or amended.

Our demand forecasting approach and final demand forecasts are detailed in **Section S5** of the PS21 Supplement, along with key reference documents that are available upon request.

As outlined in **Section 2.1** our submission adopts our “original best estimate” demand and expenditure forecasts. We will absorb the net loss of revenue in the event these forecasts overestimate actual demand growth.

Waterways and drainage

- > Recognising the challenges associated with applying a one-size-fits-all forecast to property growth, we adapted our property forecasting methodology in PS21 to take into account more data points and the need for residential, non-residential and rural-specific assumptions. We examined a range of data sources in the development of final property growth forecasts, ultimately applying projections provided by expert property development forecaster BIS Oxford Economics on the basis that they represent the best local area view of growth and are in line with the VIF2019 and retail water company forecasts.

Water

- > As a wholesaler we rely on our retail water company customers to develop our demand forecasts. Our PS21 water

forecasts represent an aggregation of recent forecasts developed by the retail water companies. We request and examine key underlying assumptions made by each retail water company, applying a materiality test to the question of whether or not further refinement or clarification of assumptions is required. This is a continuation of the methodology we applied in developing our PS16 forecasts.

- > Our water forecasts are described in detail in **Section S5.3** of the *PS21 Supplement*. They show that the megalitres of water sold will grow on average 0.83 per cent per annum from the 2018-19 base year to the end of the PS21 regulatory period. We are comfortable that the underlying assumptions are reasonable and reflect the underlying trends of more water connections, with a declining consumption per connection. This latter trend is due to a combination of retail water company end use model assumptions around new properties being (on average) smaller, with less outdoor water usage, and the overall stock of water-using appliances becoming more efficient over time.

Sewage

- > Demand forecasting for sewage is inherently more uncertain than demand forecasting for water or property as a result of a number of factors, including five parameters requiring measurement (rather than one), great number and diversity of sources of sewage (over 1 million household and commercial connections plus industrial connections), and the absence of comprehensive property-level metering. Unlike water, where every connection is metered, measurement of sewage flows and loads occurs at a limited number of locations.
- > Applying our continuous improvement ethos, and responding to the sewage forecasting challenge outlined above, we applied a new, and highly collaborative methodology to the development of our forecasts for PS21. This methodology is outlined in detail in **Section S5.4** of the

PS21 Supplement and moves our forecasts from the aggregation of individual methodology outputs (PS16) to the application of a common methodology with agreed assumptions underpinning retail water company forecasts.

- > Our sewage forecasts show growth in the megalitres of sewage treated of, on average, 0.51 per cent per annum (ETP) and 1.03 per cent per annum (WTP) from the 2018-19 base year to the end of the PS21 regulatory period. Treatable load parameters – which are a more material driver of treatment plant costs – are also forecast to grow:
 - total suspended solids (TSS) growth is forecast to be 1.29 per cent per annum at ETP and 1.94 per cent per annum at WTP
 - biological oxygen demand (BOD) growth is forecast to be 0.99 per cent per annum at ETP and 1.46 per cent per annum at WTP
 - total Kjeldahl nitrogen⁶ (TKN) growth is forecast to be 1.11 per cent per annum at ETP and 1.90 per cent per annum at WTP.

3.5 Focused and disciplined governance

Delivering on the customer outcomes requires us to deliver a mixture of asset and non-asset-based activities. These activities form the basis for our expenditure forecasts, which in turn form the basis (along with our regulatory asset base (RAB)) for the prices we ultimately charge for our services.

Ensuring our proposal and expenditure forecasts are prudent and balanced in terms of risk requires consideration of a range of factors including asset condition, service and regulatory standards, and demand for our services – both in terms of current and future customers.

Strong internal discipline

Our Board and Leadership Team were central to the planning and delivery of this submission, challenging every part of the organisation to put forward a “best offer” that puts our customers first.

Our Board, and in particular the Customer and Service Delivery Committee (CSDC) and Audit, Risk and Finance Committee (ARFC), were actively involved in the development, review and approval of this submission.

Through a comprehensive briefing program which commenced in the early phases of submission development, the Board was both abreast of, and able to shape, key aspects of the submission including our approach to customer engagement, the alignment of expenditure proposals to customer outcomes, regulatory matters such as length of regulatory period, and the appropriate treatment of Victorian Desalination Plant payments.

The Board’s involvement in developing and reviewing the submission spanned a period of over 30 months, with the frequency and depth of involvement increasing significantly in the final stages of document completion.

In addition to regular briefings the Board members took an active interest in our engagement activities with customers. This included some Board members observing our final waterways and drainage community deliberative panel on Saturday 18 April 2020, and our final customer outcomes community deliberative forum held from 22-29 April 2020. Both of these were conducted online as a result of COVID-19 restrictions.

These actions, and the whole-of-organisation response to the Board and Leadership Team’s guidance, means PS21 sets a new benchmark for Melbourne Water price submissions in terms of rigour and oversight (internal and Board).

⁶ Total Kjeldahl nitrogen (TKN) is the sum of organic nitrogen and ammonia – it is a commonly measured sewage parameter which captures the treatable fractions of nitrogen in sewage.

Robust governance and assurance

The PREMO framework demands a more conspicuous and considered management and Board involvement around quality and accuracy of submission. Our assurance activities included a combination of internal and independent reviews from KPMG and other independent advisors, allowing for iterative review and approval of input information.

We worked closely with KPMG via its specialist regulated utilities team for well over 18 months to design and deliver a robust submission. KPMG provided staged guidance and then review of the planning, design, development and finalisation of our pricing submission and supporting documents, challenging key aspects of the development of our customer outcomes, demand, capex and opex forecasts, and supporting the overarching assurance process.

Our Internal Audit function oversaw responses to KPMG recommendations, ensuring that improvement actions were delivered as instructed by the Board and Leadership Team.

We also developed and applied a robust governance and assurance framework that set out purposeful and timely internal review and assurance activities, including:

- > leadership involvement and accountability through a steering committee chaired by our Managing Director and meeting quarterly in 2019 and monthly in 2020
- > defined roles and accountabilities, with a dedicated program director, program manager, workstream leads and a working group comprising senior leaders with overarching responsibility for water, sewerage, and waterways and drainage service-related outcomes
- > monthly assurance reports developed to provide status updates against attestation requirements for core submission components
- > iterative Leadership Team expenditure review and challenge processes
- > steering committee review of the emerging draft submission and key proposals
- > iterative Internal Audit Team review against each of the ESC guideline requirements
- > review of the accuracy of financials, including consistency between the pricing submission and the supporting financial templates
- > a comprehensive attestation process undertaken with the Board reviewing and challenging the suite of internal and external activities undertaken to facilitate attestation.

The significant focus on developing and implementing a robust assurance framework and process provided the Board and Leadership Team with high levels of confidence that all reasonable steps had been taken to meet each of the three attestation conditions.

What our commitment to strong internal discipline means for customers

Oversight by the Leadership Team and Board has directly shaped our expenditure programs with a robust challenge process running from November 2019 to August 2020, helping to refine the scope, scale and timing of our capital program and opex forecasts. As a result of the internal discipline we applied to our expenditure forecasts we have reduced our capital program by **\$498 million** since November 2019, predominantly via a series of scope reductions and deferrals (for example, the Bunyip River Diversion Project and ETP Sludge Drying Capacity Augmentation – \$104 million deferred to the next regulatory period).

A prudent and efficient investment program

We will invest prudently and efficiently (both capex and opex) to deliver the outcomes our customers have told us they value. **Table 3** shows our proposed capex program along with a comparison to our PS16 forecast.

> The uplift in capex from PS16 to PS21 is one obvious way in which we are responding to the challenges outlined in **Section 2.2**.

- We are delivering for a growing population. While taking into account forecast growth over the next five years and beyond, our growth capex is primarily a response to strong population growth over the past five years. A number of critical assets

(particularly at the WTP) have absorbed the additional demand generated by the half a million people who have been added to Melbourne's population since 2016 and now require augmentation. These assets (see **Table 13** and **Table 14** in **Attachment 1**) are currently at or exceeding critical design and compliance limits and require augmentation now.

Table 3 PS16 to PS21 comparison of capex by major service by driver

	PS16 ¹	PS21	Percentage change
Water and sewerage (excl. Corporate)²			
Growth	\$306.7m	\$824.4m	169%
Renewals	\$820.6m	\$1,017.3m	24%
Improvement/Compliance	\$463.0m	\$480.2m	4%
Totals	\$1,590.3m	\$2,321.9m	46%
Waterways and drainage (excl. Corporate)³			
Growth	\$591.7m	\$701.2m	19%
Renewals	\$105.1m	\$119.5m	14%
Improvement/Compliance	\$265.1m	\$399.1m	51%
Totals	\$961.9m	\$1,219.8m	27%
Combined totals	\$2,552.2m	\$3,541.7m	39%

Note 1: PS16 numbers include actuals and forecast and therefore do not reconcile with the ESC's financial template, which includes determination values for the 2020-21 year, rather than forecast.

Note 2: Includes one project (\$0.093 million) that is allocated to the recycled water service.

Note 3: Includes one project (\$2.14 million) that is allocated to the diversions service.

- We are investing to keep the assets we already have fit-for-purpose as they age and deal with the challenges presented by climate change (for example, accelerated corrosion). Our renewals capex growth is driven in part by a large atypical sewer main renewal project (Hobsons Bay Main Yarra Crossing Duplication) which is \$100 million larger than the next largest renewals project. It is also driven by our ongoing focus on prudently managing the assets we have. For example, over the past five years an increased focus on condition monitoring has shown that our concrete sewers are deteriorating

faster than anticipated. This insight, along with failure incidents (for example, a Maribyrnong River Main event in late 2017), has led to a recalibration of how we plan sewer transfer renewals on a large portfolio of aging assets. This means increasing our focus on early intervention, such as relining small sewers and increasing ventilation in large sewers, in order to defer or avoid far more costly whole-of-asset replacements.

We are investing to deliver the levels of service our customers have told us they desire and are willing to pay for. This is evident in the waterways and drainage “improvement” category, where the majority of the capex uplift is the result of customer-led uplifts in stormwater quality management. Customer support for higher levels of service is outlined in **Section 3.6** (and detailed in **Section S2.3.3** of the *PS21 Supplement*).

- > Our capital program is underpinned by robust business cases, and the use of risk-adjusted nominal estimates followed by Monte Carlo simulation to generate P50 estimates, which form the basis for the values shown in **Table 3**.
- > To keep customer bills as low as possible, and reflecting our ongoing commitment to continuous improvement, we are committing to achieving a base controllable opex forecast that is declining at **0.05 per cent per annum** across the period while supporting a growing population (**Table 4**).

- > Our opex will also grow to incorporate the new assets we have built in PS16 and will build in PS21, along with meeting new obligations. **Table 4** presents both our five-year opex forecast as well as the derivation of our efficient controllable base year at a whole of Melbourne Water level. Similar views, by service, are presented in **Section S6.1.4** and **Section S6.1.5** of the *PS21 Supplement*.

Figure 5 shows the impacts of our opex forecasts on the typical customer using a dollar-per-customer metric. **Figure 6** shows an underlying RAB-per-customer metric which forms the basis for our depreciation and return-to-capital allowances – *this figure does not show direct customer price impacts*. These two figures show that our opex per customer will decline across the period, while our RAB per customer will grow modestly to be 3.9 per cent above 2019-20 levels by 2025-26.

Figure 5 Opex per customer – 2015-16 to the end of PS21

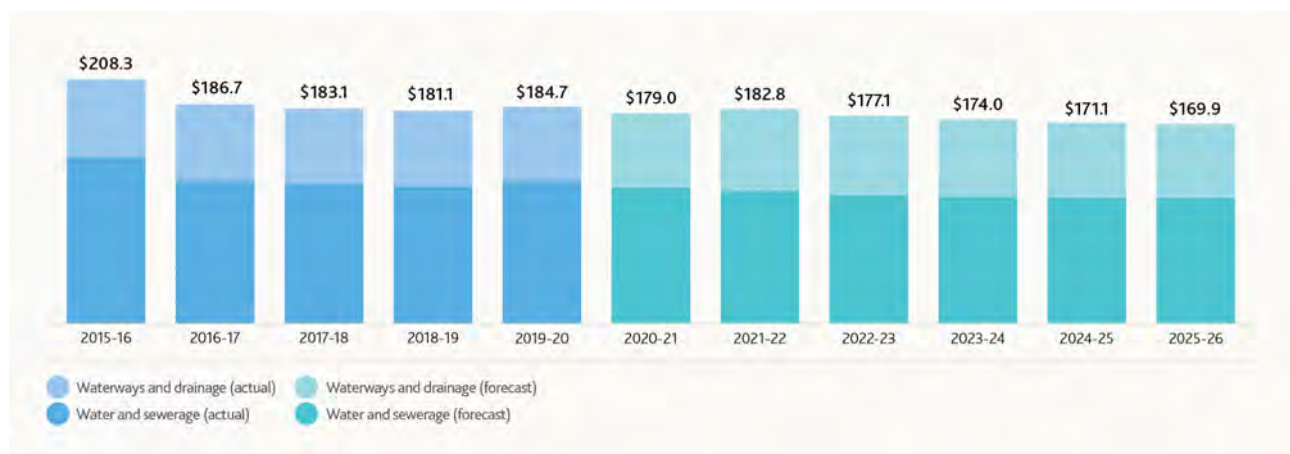


Figure 6 Closing RAB per customer – 2015-16 to the end of PS21



Per customer values shown are based on City West Water, South East Water, Yarra Valley Water and Western Water customer data.

Table 4 PS21 opex forecast and efficient base year (\$ million)

Numbers may not add due to rounding		Base	Current	PS21 Regulatory Period					PS Total	CAGR 2019-20 to 2025-26	
		2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26			
Overall forecast	Total base year opex	\$1,008.6									
Post capitalisation	Victorian Desalination Plant security payments (A)	\$587.4	\$544.5	\$493.1	\$485.2	\$473.0	\$457.0	\$443.9	\$2,352.2	(4.6%)	
Uncontrollable opex	Water and sewerage										
	Land tax, licence fees	\$24.9	\$22.6	\$21.9	\$21.9	\$21.9	\$21.9	\$21.9			
	Waterways and drainage										
	Land tax, licence fees, environmental contribution levy	\$9.0	\$8.0	\$8.7	\$8.6	\$8.6	\$8.6	\$8.6			
	Total uncontrollable opex (B)	\$33.9	\$30.6	\$30.6	\$30.6	\$30.5	\$30.5	\$30.5	\$152.7	(1.7%)	
Controllable opex	Efficient base derivation	2019-20 baseline (gross)	\$387.3								
		(less) electricity	(\$44.8)	(\$46.3)	(\$43.5)	(\$39.7)	(\$42.8)	(\$44.3)	(\$50.7)		
		add base year adjustments	\$4.1								
		2019-20 baseline (net)	\$346.6								
		Efficiency factor		(2.00%)	(2.00%)	(2.00%)	(2.00%)	(2.00%)	(2.00%)		
		Growth factor		1.80%	1.95%	1.95%	1.95%	1.95%	1.95%		
		Efficient base year (target)		\$345.9	\$345.7	\$345.5	\$345.3	\$345.2	\$345.0	\$1,726.7	
		Efficient base year forecast			\$345.7	\$345.5	\$345.3	\$345.2	\$345.0	\$1,726.7	
		Benchmark electricity allowance	\$26.3 ^a		\$28.3	\$28.1	\$28.1	\$29.8	\$33.0	\$147.3	
		Water and sewerage									
		Additions to efficient base year			\$4.9	\$3.0	\$4.3	\$7.6	\$8.3		
		Waterways and drainage									
		Additions to efficient base year			\$0.9	\$0.9	\$0.9	\$0.6	\$0.6		
		Willingness to pay			\$7.8	\$8.0	\$8.3	\$9.5	\$9.9		
		Total controllable opex (C)	\$372.9 ^a		\$387.5	\$385.5	\$387.0	\$392.6	\$396.8	\$1,949.4	1.0%
Total regulatory opex = (A) + (B) + (C)		\$994.2 ^a		\$911.2	\$901.3	\$890.5	\$880.2	\$871.2	\$4,454.4	(2.2%)	

Note a: These values are shown to enable calculation of the CAGR rate shown at far right. Total controllable opex differs from ESC template as it is calculated on the regulatory allowance, while the template shows actual electricity expenditure for 2019-20.

Careful balancing of risk

Melbourne Water undertook a robust process to identify and assess material uncertainties relating to the provision of our services for PS21. This included consideration of management/ mitigation options and who bears the residual risks post mitigation.

We started the consideration of risks for PS21 with reference to Melbourne Water's risk management processes guided by our Risk Management Team. We engaged with senior managers across the business, including representatives from our Operational, Capital Planning and Delivery, Customer and Strategy and Finance functions.

Our senior leaders, Leadership Team and customers (via the WSCC) have been central to the consideration and shaping of our response to the risks presented below.

Our Board and Leadership Team were unambiguously focused on ensuring that our expenditure decisions do not ask our customers to fund costs associated with highly uncertain events or activities.

We have also carefully considered the implications of COVID-19 on our submission (**Section 2.1**) and acted to **ensure our customers are not paying for any additional uncertainty caused by the pandemic**.

PS21 materially increases the risk that we are absorbing on behalf of customers compared to our prior regulatory submissions, including via:

- > "smoothing" the capex profile. We have taken this decision to acknowledge that there is increased delivery risk associated with our larger capital program (compared to PS16) and that this may be exacerbated by COVID-19 in the near term. The effect of this decision is to "shift" \$271.3 million from years one and two, into years three (\$9.3 million), four (\$45.3 million) and five (\$216.6 million) – reducing our aggregate revenue requirement by **\$42.9 million**

- > compared to prior price submissions, PS21 transfers considerable risk from our customers back to Melbourne Water in our opex forecasts in order to deliver a declining year-on-year base controllable opex, including via:

- application of a 3 per cent labour vacancy rate in the build-up of our labour opex (that is we have removed labour costs for the 3 per cent of positions we assume will be vacant (on average) across the period).
- not applying any risk allowance to the forecast energy we will generate and use on site. This 'behind the meter' energy (for example, solar power production that is consumed on site) represents a reduction in the energy we need to purchase from AGL. We are forecasting energy savings of **\$35.2 million** from these sources. In the event that our self-generation is unable to produce the forecast volumes of energy (for example, delay in commissioning of the ETP Solar Power Station) we will need to purchase it from AGL at our own expense.
- not passing on the full expected increases in insurance costs.

We are also not asking our customers to bear any risk associated with uncertain capital and operating expenditures arising from the Victorian Desalination Plant.

- > In the event of a bring forward of any augmentation of the Victorian Desalination Plant we propose to roll over the expenditure (capex) or apply the uncertain events mechanism (opex) – *we have not included allowances for an augmentation in our proposal.*
- > We are also proposing to amend the existing Victorian Desalination Plant water order pass-through mechanism to incorporate a provision for costs associated with pumping water out of Cardinia Reservoir into Silvan Reservoir.

Annual cost estimates associated with this activity can be upwards of \$3.5 million. Applying the pass through helps to keep bills as low as possible, negating the need for an uncertain allowance to recover these costs.

3.6 Keeping bills as low as possible

Reminder that all dollar values presented are in \$real 2020-21 unless otherwise stated.

In developing a best offer that balances service needs and desires (as defined by the customer outcomes and performance metrics introduced in **Section 3.2**) with impact on price, Melbourne Water has considered the feedback we have received from our customer councils and our customer research participants. We have also considered the prudent investments required to deliver on the service outcomes.

Price-service trade-off feedback we received from households and businesses consistently indicated a willingness to pay a little more for higher levels of service. This was most evident in our engagement on our waterways and drainage services where there was a clear desire for an uplift in existing service levels, but was also apparent in our engagement on water and sewerage services. However, we hear and acknowledge the voices of the households and businesses who preferred flat or declining prices, even if that meant a decline in the standard of service. We also acknowledge the impact the COVID-19 pandemic is having on a rising proportion of households and business finances and the flow-on impact this has on our retail water company customers.

Overall, the proposed price paths (and nature of the investment underpinning them) allows Melbourne Water to propose a prudent uplift in investment across both major service areas, confident that we can deliver efficiently, while balancing the risk we are asking customers to bear, and delivering on our commitment to keep our bills as low as possible.

We are leveraging our scale to deliver more services to more people without a commensurate increase in the amount we draw from household and business wallets. Through a combination of proactive management decisions (such as additional capitalisation of the Victorian Desalination Plant) and good timing (a cost of debt that is materially lower for PS21 compared to PS16), Melbourne Water is able to deliver on its commitments while delivering metropolitan (City West Water, South East Water and Yarra Valley Water) water and sewerage customers a declining bill in per-connection and per-megalitre terms.

Our waterways and drainage customers will receive the uplift in service levels they told us they desired at a price that is consistent with high levels of customer support.

Waterways and drainage tariffs

Table 5 shows the proposed price path for our waterways and drainage charge over the regulatory period. It demonstrates how we have adapted our price path to account for the near-term impact of COVID-19 on household and business affordability.

Table 5 Waterways and drainage – what is the tariff and how is it changing?

		Approved	Regulatory period 2021-26				
		2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Residential (\$ per annum)	<i>Pre-COVID-19</i>	104.32	<i>107.47</i>	<i>107.47</i>	<i>107.47</i>	<i>107.47</i>	<i>107.47</i>
	Proposed		105.36	106.42	107.48	108.56	109.64
How is it changing?			1.00%	1.00%	1.00%	1.00%	1.00%
Non-residential minimum fee (\$ per annum)	<i>Pre-COVID-19</i>	156.72	<i>161.45</i>	<i>161.45</i>	<i>161.45</i>	<i>161.45</i>	<i>161.45</i>
	<i>Proposed</i>		158.29	159.87	161.47	163.08	164.71
How is it changing?			1.00%	1.00%	1.00%	1.00%	1.00%
Non-residential rate in \$NAV (net asset value) (cents per annum)	Proposed	0.4447	0.4171	0.3704	0.3104	0.2446	0.1805
	How is it changing?		(6.20%)	(11.20%)	(16.20%)	(21.20%)	(26.20%)
Rural charge (\$ per annum)	<i>Pre-COVID-19</i>	57.28	<i>59.01</i>	<i>59.01</i>	<i>59.01</i>	<i>59.01</i>	<i>59.01</i>
	Proposed		57.85	58.43	59.02	59.61	60.20
How is it changing?			1.00%	1.00%	1.00%	1.00%	1.00%

Water and sewerage tariffs

Customer impact – combined bulk water and sewerage service

Our water and sewerage tariffs are paid directly by retail water companies, but ultimately by the households and businesses of Melbourne. **Table 6** sets out the change in average impact we will place on households and businesses served by City West Water, South East Water and Yarra Valley Water over the next regulatory period. These three retail water companies are the only companies we serve with our sewerage service.

Customer impact is calculated in real dollar terms, on the basis of total revenue requirement per total customers (using the ESC definition of customer) and total revenue requirement per megalitre of water supplied. For City West Water, South East Water and Yarra Valley Water both metrics show that our average impact on household and business budgets is declining.

Table 6 shows the average customer impact of our charges. The impact on individual households and businesses will vary according to their consumption patterns and their retail water company's tariff structures.

Table 6 What is the impact of our new water and sewerage prices?

Note that we have used the ESC definition of customer for the analysis presented here	Current	Regulatory period 2021-26					
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	CAGR
City West Water							
Revenue requirement	\$335.2m	\$329.8m	\$333.1m	\$337.3m	\$340.0m	\$344.5m	0.55%
\$/customer	\$668.1	\$639.0	\$627.6	\$618.7	\$607.6	\$600.2	(2.12%)
YoY % change		(4.4%)	(1.8%)	(1.4%)	(1.8%)	(1.2%)	
\$/ML water supplied	\$2,913.2	\$2,850.2	\$2,859.5	\$2,872.0	\$2,877.4	\$2,899.6	(0.09%)
YoY % change		(2.2%)	0.3%	0.4%	0.2%	0.8%	
South East Water							
Revenue requirement	\$492.9m	\$475.9m	\$481.4m	\$488.4m	\$493.6m	\$501.8m	0.36%
\$/customer	\$628.1	\$595.2	\$591.2	\$589.2	\$585.1	\$584.4	(1.43%)
YoY % change		(5.2%)	(0.7%)	(0.3%)	(0.7%)	(0.1%)	
\$/ML water supplied	\$3,027.6	\$2,901.3	\$2,904.5	\$2,919.6	\$2,922.2	\$2,937.7	(0.60%)
YoY % change		(4.2%)	0.1%	0.5%	0.1%	0.5%	
Yarra Valley Water							
Revenue requirement	\$500.2m	\$489.1m	\$494.4m	\$501.1m	\$505.7m	\$513.2m	0.51%
\$/customer	\$585.6	\$562.4	\$558.6	\$556.2	\$551.6	\$550.2	(1.24%)
YoY % change		(4.0%)	(0.7%)	(0.4%)	(0.8%)	(0.3%)	
\$/ML water supplied	\$3,013.1	\$2,928.6	\$2,934.1	\$2,956.2	\$2,974.4	\$3,001.1	(0.08%)
YoY % change		(2.8%)	0.2%	0.8%	0.6%	0.9%	

Customer impact – bulk water service only

We provide bulk water services to Western Water, Barwon Water, South Gippsland Water, Westernport Water and Gippsland Water. **Table 7** sets out the change in average impact (in real dollar terms) we will place on households and businesses served by these retail water companies over the next regulatory period. For these retail water companies, our share of their bulk water supplies is a minority one and for this reason we have focused on the price-per-customer impact.

Note that as a result of the bulk entitlement pricing reforms (introduced in PS16) Barwon Water, South Gippsland Water and Westernport Water have, for the past three

years, been paying five-thirds of their annual revenue requirement. This means that the 2020-21 revenue (as billed) is materially higher than the underlying annual revenue requirement. For these retail water companies we show a comparison with the “as billed” amounts and the “underlying” amounts. Per-customer impacts use the underlying 2020-21 revenue requirement as a baseline for year-on-year and CAGR calculations.

Factors influencing different price per customer and price-per-megalitre outcomes shown in **Table 6** and **Table 7** include:

- > allocation of water headworks costs on the basis of fixed bulk entitlements supporting Department of Environment, Land, Water and Planning (DELWP)-led policy reforms implemented in PS16

Table 7 What is the impact of our new water prices?

	Current	Regulatory period 2021-26					
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	CAGR
Western Water							
Revenue requirement	\$10.1m	\$9.6m	\$10.5m	\$11.3m	\$12.2m	\$12.6m	4.55%
\$/customer	\$130.3	\$117.9	\$123.8	\$127.9	\$133.3	\$131.2	0.14%
YoY % change		(9.6%)	5.0%	3.4%	4.2%	(1.6%)	
Barwon Water							
Revenue (as billed)	\$10.3m	\$5.5m	\$5.7m	\$6.0m	\$6.5m	\$6.9m	(7.82%)
Revenue (underlying)	\$6.4m						1.36%
\$/customer (underlying)	\$37.8	\$31.8	\$32.0	\$33.3	\$35.2	\$36.4	(0.79%)
YoY % change		(16.0%)	0.7%	3.9%	5.7%	3.4%	
South Gippsland Water							
Revenue (as billed)	\$810.2k	\$527.5k	\$543.1k	\$567.2k	\$587.0k	\$661.6k	(3.97%)
Revenue (underlying)	\$565.9k						3.18%
\$/customer (underlying)	\$26.7	\$24.5	\$24.8	\$25.5	\$26.0	\$28.8	1.50%
YoY % change		(8.3%)	1.3%	2.7%	1.8%	10.9% ^a	
Westernport Water							
Revenue (as billed)	\$759.4k	\$477.7k	\$492.3k	\$514.4k	\$532.8k	\$550.3k	(6.24%)
Revenue (underlying)	\$515.0k						1.34%
\$/customer	\$29.4	\$26.6	\$26.9	\$27.6	\$28.1	\$28.4	(0.64%)
YoY % change		(9.3%)	1.1%	2.5%	1.6%	1.3%	
Gippsland Water							
Revenue requirement	\$50.9k	\$40.1k	\$41.5k	\$43.5k	\$45.3k	\$46.9k	(1.62%)
\$/customer	\$3.2	\$2.5	\$2.5	\$2.6	\$2.7	\$2.7	(3.41%)
YoY % change		(22.6%)	1.6%	2.9%	2.1%	1.8%	

Note a: The magnitude of this year-to-year increase is driven primarily by a 25 per cent increase in water ordered from 800 megalitres to 1,000 megalitres.

- > the relative expenditures between the ETP and WTP and the level of demand each retail water company places on each plant – for example, 100 per cent of City West Water's sewage is transferred to the WTP, while South East Water and Yarra Valley Water transfer to both ETP and WTP
- > differences in per-customer demand (megalitres per customer) impact the cost allocation for sewerage and the price-per-megalitre view for water.

Table 8 and **Table 9** outline our bulk water and bulk sewerage tariffs, setting out who pays which tariffs and describing how our prices will change for each over the coming period.

Gippsland Water's water tariffs relate to specific entitlements to, and use of, the Tarago Reservoir. These are unique to Gippsland Water and are provided in detail in **Section S7.2.2** of the *PS21 Supplement*. They have not been reproduced in **Table 8**.

Price increases for bulk sewerage services

Customers have told us that they value the ongoing provision of safe and reliable services. To meet this expectation our sewerage service requires major investment to maintain the resilience of transfer pipelines and treatment plants and to build additional capacity to keep pace with recent rapid population growth.

We recognise that this affects bulk sewerage charges to retail water companies. Some fixed prices will increase by more than 10 per cent.

A number of variable sewerage load charges, mainly at Western Treatment Plant, have also increased significantly. These charges are calculated using Long Run Marginal Cost (LRMC) which converts some of the fixed charge payable by retailers to variable using forecast demand. It provides an incentive to retailers to make savings on total revenue payable by reducing load (increases in variable prices are offset by decreasing the fixed charge). Reducing demand also defers the timing of future capacity upgrades with savings benefits to customers.

In order to keep bill increases as low as possible this submission details a number of initiatives designed to defer non-essential expenditure, maintain a high level of efficiency and limit the amount of revenue required to deliver services. This includes:

- > deferring uncertain capital program to accept some delivery risk (reduction of \$42.9 million)
- > smoothing our capital program to accept some delivery risk (a reduction of \$42.9 million)
- > adopting a 2 per cent per annum efficiency outcome
- > increasing capitalisation of Victorian Desalination Plant security payments (\$217 million) to reduce the cost of water services.

- > continuing to use modern and sophisticated asset management tools and technology to ensure that not only is the system safe and secure, but capital programs are only implemented when asset condition and end of life dictates the need.

The sewerage capital expenditure program was subjected to an intensive internal and external (KPMG) assurance process. This review has established that the program meets the tests of prudence and efficiency.

We engaged with our retail water company customers to share the drivers of the sewerage expenditure program and provided indicative pricing for consideration consistent with PREMO principles.

Based on the actions outlined above we are confident that sufficient steps have been taken to prepare a prudent, efficient sewerage expenditure program that delivers safe and reliable services while keeping prices as low as they can be.

Table 8 Overview of proposed bulk water prices

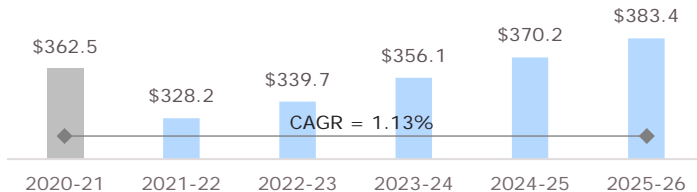

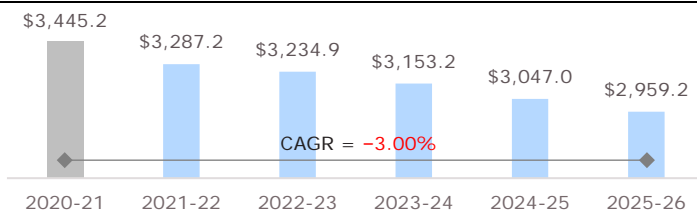

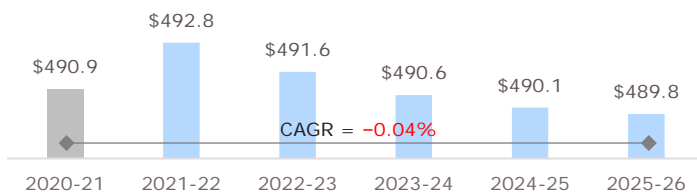

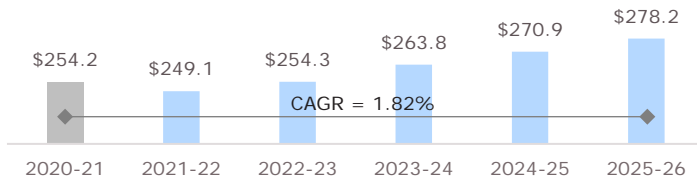




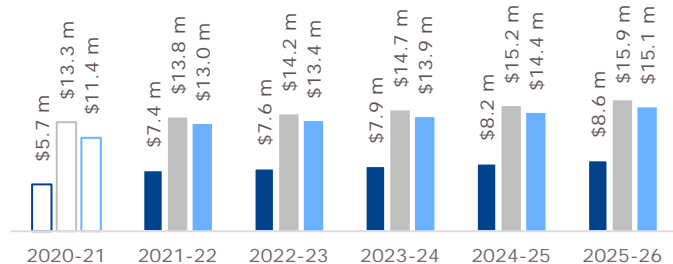

Tariff and basis of charging							Price path 2020-21 to 2025-26 (all prices shown in \$/ML terms)	% water revenue	
CWW	SEW	YVW	WW	BW	SGW	WPW			
1.1 Bulk water charge – Greater Yarra System (\$/entitlement ML) This tariff is based on regulatory building blocks applied to entitlement MLs								 26.4%	
Entitlements (ML)									
152,797	206,281	219,776	18,250	16,000	1,000	1,000			
1.2 Bulk water headworks charges – Victorian Desalination Plant This is a pass-through tariff applied to entitlement MLs. The amount passed through is adjusted downward by the amount Melbourne Water capitalises.								 54.2%	
Entitlements (ML)									
39,595	53,454	56,951	No current entitlements						
1.3 Victorian Desalination Plant Water Order charge This is a pass-through tariff applied to the ML ordered linked to entitlements							Fee schedule (not reproduced here) is provided by DELWP and includes a price path for each available order size. Water order prices may change throughout the regulatory period.		
Charges based on order volume and fee schedule			No current entitlements						
1.4 Bulk water headworks charges – North South Pipeline This tariff is based on regulatory building blocks applied to entitlement MLs								 4.3%	
Entitlements (ML)									
25,000	25,000	25,000	No current entitlements						
1.5 Bulk water usage charges – Transfer This tariff is based on regulatory building blocks applied to supplied MLs								 15.1%	
Supplied volume (ML) – 2021-22 forecasts shown for context									
115,725	164,028	167,000	14,367	1,100	800	600			

Table 9 Overview of proposed bulk sewerage prices

System		Tariff and basis of charging			Price path 2020-21 to 2025-26			% sewerage revenue		
		CWW	SEW	YVW						
1.7 Bulk sewerage usage charge – Treatment (\$/ML) – Based on long-run marginal cost calculations										
Treated volume (ML) – 2021-22 forecasts shown for context					PS16 (\$/ML)	PS21 (\$/ML)	Δ%			
Eastern	Not applicable		81,619	48,052	\$78.8	\$50.8	(35.5%)			
Western	90,391		26,906	78,481	\$293.3	\$74.1	(74.7%)			
1.8 Bulk sewerage usage charge – Transfer (\$/ML) – Based on short-run marginal cost calculations										
Transferred volume (ML) – 2021-22 forecasts shown for context					PS16 (\$/ML)	PS21 (\$/ML)	Δ%			
Eastern	Not applicable		81,619	48,052	\$5.7	\$5.6	(2.7%)			
Western	90,391		26,906	78,481	\$40.1	\$39.1	(2.7%)			
1.9 Bulk sewerage usage charge – Load (\$/per tonne) – Based on long-run marginal cost calculations (with the exception of iTDS)										
These charges apply to measured industrial and commercial loads.					PS16 (\$/tonne)	PS21 (\$/tonne)	Δ%			
2021-22 forecasts for Category A non-residential customers shown for context.										
Eastern	TSS	Not applicable	3,178	582	\$603.7	\$733.4	21.5%			
	BOD		8,176	1,496	\$367.7	\$318.9	(13.3%)			
	TKN		396	34	\$210.3	\$95.5	(54.6%)			
Western	TSS	3,426	183	3,601	\$113.4	\$670.9	491.6%			
	BOD	11,642	1,421	9,370	\$195.2	\$398.6	104.2%			
	TKN	996	48	267	\$269.6	\$1,364.3	406.1%			
	iTDS	27,731	227	7,538	\$32.0	\$32.0	0%			
1.10 Bulk sewerage service charge – (\$/per month) – Calculated using cost allocation percentages (below) applied to total sewerage revenue requirement less calculated variable charges (above)										
Total	23.1% 22.6% in PS16	39.0% 40.4% in PS16	37.9% 37.0% in PS16							
Eastern	Not applicable	86.3% 87.0% in PS16	55.4% 61.5% in PS16							
Western	100% 100% in PS16	13.7% 13.0% in PS16	44.6% 38.5% in PS16							
<div><div><div>City West Water - approved</div><div>City West Water - forecast</div></div><div><div>South East Water - approved</div><div>South East Water - forecast</div></div><div><div>Yarra Valley Water - approved</div><div>Yarra Valley Water - forecast</div></div></div> <td colspan="5"></td> <td colspan="2"></td>										

4 PREMO assessment

Reflecting our ambition for this price submission and for our customers, we have pushed ourselves harder than ever before so that we could deliver a high-quality proposal that puts the needs of customers first.

We believe we have achieved this and prepared a submission that aligns with the ESC's "advanced" level of ambition as shown on **Figure 7**. KPMG has independently assessed the submission as "advanced". Our rating of each element, and our rationale for the element rating is described below.

PREMO – Risk

We have assessed our ambition against the "Risk" element of PREMO and have assigned an advanced rating. Our Board and Leadership Team challenged themselves to take a critical look at the way we balance risk between ourselves and our customers. The result is a more active and critical consideration of uncertainty and the way it impacts our revenue building blocks. The key features of our approach and offer that support this rating include:

- > Risks relating to the operations and management of our business, and how those risks impact customers, were comprehensively identified and evaluated with clarity provided around the nature, management and quantification of each risk.
- > We demonstrate throughout our submission (and supplement) both the process and the end result of our near 30-month journey to ensure all parts of the organisation give clear consideration to the assumptions that underpin our key proposals, and that we effectively and fairly allocate risk between Melbourne Water and customers.
- > Melbourne Water has consciously accepted more risk via opex forecasts which reduce the amount of uncertainty we are asking customers to fund. This includes Melbourne Water bearing the risk of non-delivery or downtime associated with our large renewable energy self-generation forecast.
- > We have elected to "smooth" the capital program. We have taken this decision to acknowledge that there is increased delivery risk associated with our larger capital program (compared to PS16) and that this may be exacerbated by COVID-19 in the near term. The effect of this decision is to "push" \$271.3 million from years one and two, into years three (\$9.3 million), four (\$45.3 million) and five (\$216.6 million) – reducing our aggregate revenue requirement by \$42.9 million.
- > We have also accepted more risk on behalf of customers in the base capital program, deferring (via strong internal discipline) \$498 million in capital projects which equates to customer savings of \$85.8 million⁷ over the regulatory period.

⁷ Estimate calculated using a rule of thumb based on a November 2019 capital expenditure forecast.

Figure 7 An “advanced” submission



- > We have completed a robust consideration of COVID-19-related risks to the price submission and detailed our responses, including proactively adjusting the timing of the proposed waterways and drainage charge uplift. We also propose to bear the revenue risk associated with lower-than-forecast levels of demand.
- > Our proposed performance management approach (including the introduction of GSLs for the first time) emphasises transparency in relation to performance and our possible responses to underperformance, which may include consideration of additional funding and/or consideration of appropriate repayments to customers (for example, chronic underperformance).
- > We are proposing pass-through and uncertain and unforeseen events mechanisms for highly uncertain or significant events such as water order placement, pumping costs associated with water orders and any future augmentation of the Victorian Desalination Plant, rather than building these costs into our regulated revenue allowance.
- > Melbourne Water regularly has its financial position reviewed by independent credit ratings agencies. We remain confident that we are in a sound financial position.
- > We were consciously customer-centric in the way we delivered our price submission. We moved to a deeper engagement form (towards collaboration), with broader content (towards performance stewardship) and earlier timing (towards an ongoing conversation). Our engagement program was purposeful about matching the engagement aims and approaches to PREMO and our customers' expectations.
- > Our extensive and detailed customer and community engagement program engaged retail water companies (six), households and businesses (145+ participants in 20 focus groups and one online panel; 3,753 household residents and 535 businesses responded to two surveys testing investment preferences), and local government, industry associations and community groups.
- > We enabled effective collaboration through the provision of timely, fit-for-purpose instruction and information. The WSCC acknowledged the “genuine effort by Melbourne Water to engage the council during this process and commends their efforts”.
- > We provided opportunities throughout our engagement process for our customers and customer councils to tell us if we were falling short of expectations, and we listened and responded, acting to meet expectations where we could, and setting out our reasoning where we could not.
- > Our price submission demonstrates a high level of customer influence on our proposals – from our household and business, and retail water company customer segments, with customer preferences supporting or encouraging an

PREMO – Engagement

We have assessed our ambition against the “Engagement” element of PREMO and have assigned an advanced rating. The key features of our approach and offer that support this rating include:

uplift in key waterways and drainage services, a significant change to the way in which we capitalise Victorian Desalination Plant payments, the introduction of GSLs and a comprehensive tariff structure review commitment.

- > There is a clear and strong alignment between our proposals and customer preferences that is particularly evident in our customer outcomes.

PREMO – Management

We have assessed our ambition against the “Management” element of PREMO and have assigned an advanced rating. Key features of our approach and offer that support this rating include:

- > Our Board and Leadership Team have demonstrated ownership of, and commitment to, the submission and its outcomes via their guidance, review and challenge over the past 30 months. Our Managing Director chaired a PS21 steering committee comprising the Chief Financial Officer and general managers of Customer and Strategy, Service Delivery and Integrated Planning to oversee the development of the submission.
- > Robust review and challenge sessions have enabled us to:
 - defer \$498 million in capital projects with a strong case for inclusion on prudence grounds
 - keep our base opex flat while supporting a growing population – based on forecast population growth of 1.95 per cent per annum, this represents a 2 per cent per annum efficiency outcome.
- > We propose to capitalise a total of \$399 million of Victorian Desalination Plant security payments (water service only) – an increase of \$235 million compared to PS16 – to deliver a more equitable customer share of the asset costs over the life of the asset. This decision benefits our current customers by reducing our PS21 revenue requirement by \$217 million.
- > We propose a dedicated output (associated with the “Bills kept as low as possible” outcome) that firmly commits us to new efficiencies, on top of those already embedded within our opex forecast (to be realised in either the coming or subsequent regulatory period).
- > We also commit to increasing the transparency we apply to our expenditure within regulatory periods by publishing annual updates of opex and regulatory asset base closing balance – to be presented on a per-connected-property basis.
- > We continue to drive material capital efficiencies in the way in which we deliver our capital program. During PS16 we have introduced major framework agreements delivering in the order of a quarter of the total program (annually). Incentive-based clauses in the agreements are delivering savings in the order of \$6.5 million per annum (assuming a \$200 million annual program through the framework agreements). Over the course of PS21 these agreements will continue to drive improvements, including delivering greater self-performance of works, reducing the reliance on (and cost of) subcontractors.
- > We engaged experienced and highly skilled consultants to assist in the development of our submission and provide assurance about the quality of the submission, including the quality of supporting information relating to forecast costs or projects:
 - Newgate Australia and Where to help design and deliver an industry-leading customer and community engagement process
 - KPMG to help guide and review the submission to ensure that the information requirements in the ESC’s Guidance Paper were met
 - KPMG to ensure that our business case information supports the proposed capital expenditure for major capital projects.
- > We implemented a rigorous assurance process to ensure the credibility, accuracy and consistency of our submission and supporting information, involving both

internal (internal audit, submission project team) and external (KPMG) review elements.

- > Cumulatively the management (and risk) decisions we have taken deliver a \$303.1 million (real) reduction in our overall revenue requirement compared to the PS16 determination, while supporting a growing population.

PREMO – Outcomes

We have assessed our ambition against the “Outcomes” element of PREMO and have assigned an advanced rating. The key features of our approach and offer that support this rating include:

- > Our focus is on what our customers tell us they value. This is reflected in expenditure that aligns clearly with our outcomes and the relative priority our customers have assigned each outcome. By way of example, 32.3 per cent of our expenditure forecast for PS21 aligns with “access to safe and reliable water and sewerage services” – the unanimous number one priority for our retail water company and household and business customers.
- > We are increasing customer value in both water and sewerage, and waterways and drainage services, by providing greater public access to assets we need to deliver our core services, and increasing our waterways and drainage investment in line with expressed customer priorities and willingness to pay.
- > We are proposing a more transparent and ambitious approach to the way in which we deliver our services, reflected in a commitment to materially improve baseline customer satisfaction scores across each of our major service lines (water, sewage, waterways and drainage) – corresponding to “easy, respectful, responsive and transparent customer service”.
- > Our customer outcomes are articulated from the customer perspective.
- > Across each of the other outcomes we are proposing first time measures, reflecting a new level of accountability for Melbourne Water in the delivery of our services. This includes putting ourselves in the hands of our customers to demonstrate we have achieved community benefits for our liveability outcome.
- > We are holding ourselves accountable via the introduction of GSLs for the first time, and a commitment to a customer-centric performance management approach that will emphasise transparency in relation to performance and our possible responses to underperformance.
- > We will report directly, via a representative customer forum, and broadly, via our website and social media channels.

Attachment 1 – COVID-19 considerations

Our COVID-19 engagement activities are detailed in this section along with adjusted demand forecasts used to develop modelling outputs and assumptions to draw insights on our expenditure forecasts.

Additional engagement activities

As part of our response to the COVID-19 pandemic we added an additional stage to our engagement program. Noting that the final stage of our engagement program ran concurrently with the emergence of the pandemic and the first stage of social restrictions, this additional consultation sought to test and refine draft proposals on how we might ease bill impacts in the community in the immediate (year 1) and medium term across the regulatory period.

Household, business and direct service customers

We engaged with household and business customers via a representative customer panel (the same panel we used for customer outcomes engagement), and with direct services customers where a service/price increase is proposed. We also advised consumer advocate groups, DELWP and our WSCC of the proposals.

Matters we consulted on

Participants in the Community Deliberative Forum were reminded where we had landed with our final six customer outcomes, prices and service levels. We then asked the panel to deliberate on three proposals we might consider to “keep bills as low as possible”, including price smoothing, hardship assistance and related initiatives, and price reductions accompanied by, or following, expenditure pauses/deferrals.

For Patterson Lakes Quiet Lakes and the Koo Wee Rup–Longwarry Flood Protection District direct service customers, we proposed to delay the price increase and associated increase in service level for 2021-22 (continue with current levels of service and charge), with the intention to revisit our approach in 2022-23, subject to further community engagement at that time.

Table 10 summarises the customers we engaged through this additional stage of consultation, the methods used and the key insights we gained.

We also engaged with customer advocacy bodies such as the Consumer Action Law Centre (CALC) to gain a further independent perspective on our proposals. The CALC supported the proposals and provided a range of other suggestions including a boost to the utility relief grant, ensuring we capitalise as much of the security payments for the desalination plant as possible, and ensuring the lowest possible setting of the cost of capital. No other feedback was received from the other consumer groups we reached out to.

Retail water companies

Retail water companies were engaged to understand their preferences in terms of appropriate management responses to any COVID-19-adjusted growth forecasts and the revenue and cost risks that adjusted demand forecasts entail.

Retail water companies were strongly of the view that Melbourne Water should seek to minimise any upward price pressures arising from COVID-19. Where possible their preference was for Melbourne Water to accept higher revenue risk, rather than pass that risk on to customers via revised demand forecasts and higher prices.

Table 10 Summary of COVID-19 specific engagement activities and insights

Form of engagement	Key insights
Household and business customers	
<ul style="list-style-type: none"> > Community Deliberative Forum – a representative sample of 39 people from across Melbourne participated via an online forum over four days (10-13 September 2020). > Same participants who deliberated on our final customer outcomes to ensure continuity through the final engagement stages. 	<ul style="list-style-type: none"> > Seventy-four (74) per cent of participants had either been negatively financially impacted or expected to be financially impacted by COVID-19 in the coming months. > Fifty-nine (59) per cent were either concerned or very concerned about paying their bills and believe they will struggle to pay their bills because of COVID impacts, while 41 per cent were not concerned at all about their ability to manage their bills because of COVID-19. > Reinforced support for our six customer outcomes, despite financial impacts of COVID-19, with slightly more emphasis on Outcome 6 (bills kept as low as possible). > Confirmed the acceptability of our proposed price changes. > Endorsed proposal for smoothing of waterways and drainage charge price increases across five years rather than a single year-one uplift. > Endorsed proposal to identify opportunities to work with the retail water companies to assist in looking after vulnerable customers. > Endorsed proposal to collaborate with ongoing customer forum to monitor customer affordability metrics which may lead to a pause, deferral of projects and/or one-off or multi-year reduction of charges for larger-scale interruptions to project delivery. <p><i>I'm really pleased to hear that MW is considering the serious impacts that COVID-19 has had on customers and the community. Almost all businesses have had to adapt and will feel the pain of COVID so I would expect MW to do the same. The thing that stood out the most was the consideration of what the customer has been saying and listening. I'm pleased with that.</i></p>
Patterson Lakes Quiet Lakes community	
<ul style="list-style-type: none"> > Telephone survey of 30 randomly selected residents representing a sample of around 12 per cent of the 251 affected properties affected. 	<ul style="list-style-type: none"> > Of the 30 properties surveyed, the majority (24 participants) did not support the proposed delay of the service/price increase and wanted it to go ahead irrespective of COVID-19 (3 supported the proposed delay and 3 did not know/didn't have a view). This view was also held by the president of the Residents Association. > A majority of respondent (20) were not concerned about the financial impacts of COVID-19 and had not been personally financially impacted, with no concerns about paying their bills (23).
Koo Wee Rup–Longwarry Flood Protection District	
<ul style="list-style-type: none"> > District Advisory Committee members and property owners contacted via email to outline proposed approach and invite feedback. > Responses received from 24 people, representing a very small proportion of about 0.65 per cent of the approximately 3,700 affected properties (a similar response rate to previous surveying of this community). 	<ul style="list-style-type: none"> > Of the 24 people who responded to the email, 18 people supported the proposed delay (4 did not support the delay and 1 did not know). > A majority of respondents (18) were very concerned about the financial impacts of COVID-19 and about a third (8) were personally financially impacted. A little over half were either very concerned (6) or slightly concerned (7) about being able to pay their bills.

Additional demand analysis

We also added an additional stage to our demand analysis that included engagement of Macroplan, a property advisory consultancy with a strong research, economics and forecasting capability to prepare a COVID-19-adjusted growth outlook for Melbourne. Their brief included provision of a comparison to the VIF2019 forecasts, which underpin the detailed bottom-up forecasts prepared by retail water companies and BIS Oxford Economics for our waterways and drainage, water and sewage demand forecasts.

Table 11 shows the Macroplan forecasts and compares them to VIF2019 from a

2019-20 base year. Note that the two series are only 477 persons apart from their starting year of 2018-19.

It shows that Macroplan is forecasting growth across the 2019-20 to 2020-21 period will be less than half of the VIF2019 growth projection for the same period. Over the six-year period modelled Macroplan's annualised growth rate is 0.22 percentage points lower than VIF2019, largely as a result of this first year of lower growth.

The bottom half of **Table 11** provides a worked example of how we have used Macroplan's forecasts to model a lower growth forecast. We have applied the same methodology to waterways and drainage and water forecasts to deliver the scenario analysis presented below.

Table 11 Comparison of VIF2019 and COVID-19 adjusted population forecasts

	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	CAGR ^a
VIF2019 (Melbourne)	5,193,281	5,306,133	5,416,527	5,525,539	5,632,346	5,737,980	5,843,344	1.99%
Δ year-on-year (yoy)	Note b	2.17%	2.08%	2.01%	1.93%	1.88%	1.84%	
Δ from 2019-20 base (A)		2.17%	4.30%	6.40%	8.45%	10.49%	12.52%	
Macroplan	5,169,680	5,219,990	5,325,880	5,431,021	5,535,868	5,639,754	5,742,578	1.77%
Δ yoy	Note b	0.97%	2.03%	1.97%	1.93%	1.88%	1.82%	
Δ from 2019-20 base (B)		0.97%	3.02%	5.06%	7.08%	9.09%	11.08%	
Absolute difference	(23,601)	(86,143)	(90,647)	(94,518)	(96,478)	(98,226)	(100,766)	
Adjustment factor (C) = (B) / (A)		44.8%	70.3%	79.0%	83.8%	86.7%	88.5%	
Worked example – how we have applied the Macroplan COVID-19-adjusted growth forecasts for modelling purposes								
Base sewage forecast (D)	320,738	322,537	325,449	328,361	331,092	333,741	336,339	0.79%
Base growth yoy (E)		1,800	4,712	7,624	10,355	13,003	15,602	
Adjusted growth (F) = (E) x (C)		806	3,312	6,024	8,675	11,273	13,813	
Adjusted sewage forecast (G) = (D) + (F)	320,738	321,543	324,049	326,761	329,412	332,011	334,550	0.71%

Note a: CAGR values are shown from the period from 2019-20 to 2025-26.
Note that these values are 1.95% and 1.93% respectively when 2020-21 is used as a base year, consistent with the analysis presented in later sections.

Note b: Percentage changes for this year are not shown. Melbourne Water has actual demand data for this year. For the purposes of the analysis we have only considered the relative difference between VIF2019 and Macroplan from this year onwards.

Consideration of expenditure implications of demand analysis

The following analysis considers potential changes to our expenditure forecasts under Macroplan's COVID-19-adjusted growth outlook. Note that commentary and analysis conservatively considered much more significant slow-downs in growth.

In terms of capex, this is relevant to the projects with a growth driver. This includes both forecast growth, but also the strong growth in population that has occurred throughout the current regulatory period.

For opex, this primarily manifests in consumable expenditures such as chemicals and energy, but is also linked to the number and nature of growth-driven assets we propose to build and maintain.

Capex

Figure 8 highlights the aggregate capital that is funded by our customers. It also shows the split between growth and other (renewals, improvements and compliance) drivers.

COVID-19 risks to the growth driver for major projects are addressed in **Table 12**, **Table 13**, and **Table 14**.

Commentary presented in these tables is based on consideration of reduced growth forecast scenarios, where growth is assumed to be flat for up to two years (2020-21 to 2022-23) or throughout the PS21 regulatory period (from 2020-21 to 2025-26). The consistent theme in our commentary is that our projects with a "growth" driver are needed now (within PS21) in order to address recent rather than forecast growth and prudently manage service (to customers and the environment), financial and operational risks.

Capital delivery risk

This submission outlines an uplift in our capital program to respond and align with customer preferences, and tackle a number of key challenges. Prolonged restrictions to construction activity (should they eventuate) would represent a risk to the delivery of the capital program.

Figure 8 Capex breakdown – highlighting growth capex by major service



Table 12 COVID-19 risks to prudence of major growth projects – waterways and drainage

Project - growth driver	PS21 capex	% growth capex by service	Commentary
Land development (net)	\$84.7m	100%	<p>The net land development program expenditure is a function of forecast capital expenditure (\$701.2 million) and developer services revenue (\$616.5 million – <i>capital component only</i>).</p> <p>From a waterways and drainage charge perspective our customers fund the net position with the developer services revenue taken off our regulated asset base (RAB), reducing the amount of growth capex that customers fund via the waterways and drainage charge to \$84.7 million.</p> <p>Melbourne Water bears the bulk of any downside growth risk for this category. While developers may be able to defer their developments (and payments to us) we typically have less scope for deferral as we are supporting recent or immediate land development activity.</p>
Total	\$84.7m	100%	

Table 13 COVID-19 risks to prudence of major growth projects – water

Project – growth driver	PS21 capex	% growth capex by service	Commentary
Yan Yean to Bald Hill Pipeline	\$95.7m	48%	Required now as the current transfer system to Bald Hill area is under sized. This system is considered high risk due to single supply (that is it has no redundancy). The primary driver is the location of recent growth, rather than forecast growth.
Mt Atkinson Reservoir Inlet Pipeline	\$31.5m	16%	Required now as it is needed to provide a physical connection to that area. The primary driver is the location of recent growth, rather than forecast growth.
Cement Creek Diversion Works	\$27.6m	14%	While allocated a “growth” driver, the Cement Creek Diversion Works project is primarily driven by a retail water company-supported desire to address long-term water security (in 2019 water storages dropped below 50 per cent of capacity).
Yan Yean Pumping Station	\$21.1m	11%	Required under low growth scenarios as it provides material efficiencies via the potential to operate with less pumps/different operating sequence.
Mt Atkinson Service Reservoir	\$11.8m	6%	Required now as it is needed to provide a physical connection to that area. The primary driver is the location of recent growth, rather than forecast growth.
Other	\$10.7m	5%	<p>Inclusive of the following projects:</p> <p><i>Bald Hill Service Reservoir</i>: Transfer system is currently reaching its limit and the service reservoir would still be required under all reduced growth scenarios.</p> <p><i>Preston Pump Station Surge Mitigation</i>: Project could be delayed; however, other operational issues may reduce capacity to defer these works beyond a few years. For system resilience, this should be built in the next 12 months.</p>
Total	\$198.3m^a	100%	

Note a: Numbers do not add due to rounding.

Table 14 COVID-19 risks to prudence of major growth projects – sewerage

Project–growth driver	PS21 capex	% growth capex by service	Commentary
WTP Primary Treatment Capacity Augmentation	\$315.3m	50%	<p>The WTP anaerobic pots combine primary treatment and anaerobic digestion, converting chemical oxygen demand (COD) to biogas for renewable power generation.</p> <p>COD loading to the anaerobic pots is currently well in excess of the sustainable treatment capacity (~450 tonnes per day).</p> <p>This project is needed at this time to reduce high-frequency and high-cost cover removal and replacement (due to lost capacity from accumulated sludge and damage by accumulated scum) activities. It will also reduce WTP opex as the current poor process performance shifts COD load to the downstream secondary treatment process where it requires increased aeration, which increases energy costs.</p> <p>On this basis the need for this project is considered immediate.</p>
WTP 55E ASP Upgrade	\$211.4m	34%	<p>The WTP's three activated sludge plants (ASPs) remove nitrogen. The WTP has breached the total nitrogen discharge load limit set out in the Port Phillip Bay Environmental Management Plan for the past two financial years. This is due to demand exceeding nitrogen removal capacity for a number of successive years.</p> <p>Future demand growth will exacerbate this disparity.</p> <p>Delivering the project as scheduled provides a time-limited opportunity to realise circa \$40 million in savings, by temporarily shutting down the existing 55E ASP during the upgrade so that its existing clarifiers can be reused by the new plant. This opportunity and the associated saving would be foregone should the project be deferred.</p> <p>Based on recent and forecast capacity exceedances, and the opportunity for significant capital cost savings, the risks of project delay are considered to outweigh the risk of zero demand growth for the scenarios considered.</p>
ETP Digester Auxiliary Systems Upgrade	\$30.2m	5%	<p>The ETP anaerobic sludge digestion system is currently at capacity and requires augmentation. This upgrade to digester auxiliary systems represents Stage 2 of a multi-staged approach to addressing this capacity constraint. Stage 1 of the project is underway with a design and construct contract awarded in November 2019.</p> <p>Only under a zero growth until 2025-26 scenario could a delay be considered; however, this would come with the following risks:</p> <ul style="list-style-type: none"> – materially higher aeration energy consumption and Scope 2 emissions generation – materially higher risk of process failure, with consequent service and financial risks (months-long odour incident impacting general public and likely financial penalty (EPA sanction)). <p>Under the COVID-19-adjusted growth outlook provided by Macroplan this project would be required as planned. There is no potential for delay.</p>
WTP 125W Sludge Drying Pans	\$16.8m	3%	<p>There are currently 130,000 dry tonnes of solids accumulated in the WTP lagoons, impacting treatment process performance and capacity. This project provides additional capacity required to remove these solids. Consequently, a cessation in raw sewage flow/load growth (two years or to the end of PS21) would not change project timing.</p> <p>Construction contract awarded first quarter 2020-21.</p>
ETP Sludge Drying Capacity Augmentation	\$15.7m	3%	<p>An upgrade to the ETP's sludge drying capacity is needed to cater for growth as the existing sludge drying pans (SDPs) are at capacity. Melbourne Water has developed a concept for a large-scale drying facility (\$121.1 million); however, it has deferred most of this cost into the following regulatory period, on the assumption that some additional drying capacity can be provided at lower cost by optimising the existing SDPs (funded from the \$15.7 million allowance retained in PS21).</p>

Project–growth driver	PS21 capex	% growth capex by service	Commentary
			Deferring these optimisation works would impose a capacity risk, particularly as plant performance is highly weather-dependent, with wet years (such as 2019-20) significantly reducing sludge drying capacity.
ETP Biogas Handling System Upgrade	\$14.5m	2%	Key elements of the biogas handling system (compressors and waste gas burners) are capacity constrained at current raw sewage loads. Consequently, a cessation in raw sewage flow/load growth (two years or to the end of PS21) would not change project timing.
Other	\$22.3m	4%	The “other” category comprises three ETP projects scheduled for completion in the first three years of the regulatory period and circa \$0.6 million in corporate allocations.
Total	\$626.1m^a	100%	

Note a: Numbers do not add due to rounding

Opex

Key factors relevant to COVID-19 risks to our opex forecasts include:

- > Our opex forecasts have a proportional link to volumetric and load-based demand through the chemicals and energy required to treat and move the water consumed and sewage generated by our customers. It is important to note that operational decisions to manage water security (such as the recommissioning of the Yan Yean treatment plant) have a far greater impact on both chemicals and energy growth than the forecast growth in megalitres of water supplied or sewage treated.
- > The reduction in the forecast growth rate from 1.95 to 1.93 per cent represents about \$1 million variance to the 2 per cent efficiency target over the five -year regulatory period.
- > For the majority of other expenditure categories, the link to volumetric and load-based demand is less direct, with the size and nature of our asset base far more predictive.
- > Applying the demand adjustment methodology outlined above we developed COVID-19-adjusted forecasts for energy and chemicals for the water and sewerage services shown in **Table 15**.

Scenario analysis – alternative growth outlooks

Having finalised our original demand forecasts during the first half of 2020 – when the COVID-19 pandemic was in its early stages – we considered two management responses to Macroplan’s COVID-19-adjusted forecasts for the purposes of this submission:

Scenario 1 – Assumes the acceptance of the COVID-19-adjusted demands (and expenditures) as our revised “best estimates”). Under this scenario demand forecasts are adjusted for COVID-19, with actual demand in line with adjusted forecasts.

Scenario 2 – Assumes the retention of pre-COVID-19 demands (“original” estimates of demand and expenditure). Under this scenario demand forecasts are unadjusted for COVID-19, with actual demand (that is post submission) lower than submission forecasts and in line with the Macroplan forecasts.

Modelling results

The scenarios we considered to finalise our demand and expenditure forecasts are shown in **Table 16** and Table 17, taking into account the engagement, demand and expenditure analysis outlined in the preceding sections.

Table 16 shows that adopting the COVID-19-adjusted demand forecasts (Scenario 1) for our waterways and drainage service would reduce Melbourne Water's revenue risk profile by \$16.2 million, compared to Scenario 2. This is achieved by increasing customer prices by \$1.3 per customer for residential customers, \$1.90 per customer for non-residential customers (on minimum) and \$0.70 per customer for rural customers.

Table 17 shows that adopting the COVID-19-adjusted demand forecasts (Scenario 1) for our water and sewerage service would reduce Melbourne Water's revenue risk profile by a further \$0.4 million, compared to Scenario 2.

Table 15 COVID-19 opex adjustments to chemicals and energy categories

		Water	Sewerage	Total
Chemicals	Base	\$34.6m	\$16.7m	\$51.3m
	Adjusted	\$34.4m	\$16.6m	\$51.0m
	Adjustment	(\$0.2m)	(\$0.1m)	(\$0.3m)
Energy (contract)	Base	\$34.2m	\$158.7m	\$192.9m
	Adjusted	\$34.0m	\$157.9m	\$191.9m
	Adjustment	(\$0.2m)	(\$0.8m)	(\$1.0m)
Total	Adjustment	(\$0.4m)	(0.9m)	(\$1.3m)

Table 16 Implications of COVID-19 adjusted growth outlook – waterways and drainage charge

Element		Scenario 1	Scenario 2	ΔS2 to S1
Submission forecasts				
Expenditure		Unchanged across scenarios modelled		
Revenue requirement	Aggregate	\$1,429.3m		\$0m
From waterways and drainage charge	Aggregate	\$1,360.1m		\$0m
From other sources	Aggregate	\$69.2m (not included in analysis below)		\$0m
Waterways and drainage charge customers				
Residential	Average	2,066,572	2,093,268	+30,541
Non-residential on minimum	Average	149,330	151,060	+1,934
Rural	Average	117,841	119,363	+1,741
Total	Average	2,333,743	2,363,691	+34,216
Price				
Residential	Average	\$108.8	\$107.5	(\$1.3)
Non-residential on minimum	Average	\$163.4	\$161.5	(\$1.9)
Rural	Average	\$59.7	\$59.0	(\$0.7)
Post submission actuals (scenarios 1 and 2 assume COVID-19 adjusted forecasts become actuals)				
Actual total (average) customers	Average	2,333,743	2,333,743	Nil
Revenue earned – waterways and drainage charge	Aggregate	\$1,360.1m	\$1,343.9m	(\$16.2m)
Net position - Scenario 2 compared to Scenario 1				
Melbourne Water	Aggregate		(\$16.2m)	
Customers (aggregate cumulative) ^a	Aggregate		+\$14.9m ^a	

Note a: Aggregate annual customer benefit is calculated by multiplying the average price difference (per customer type) by the average number of actual customers. The final aggregate cumulative amount takes the aggregate annual amount and multiplies it by the five years of the regulatory period. The difference in benefit compared to Melbourne Water's position goes to customers who do not become customers over the period.

Table 17 Implications of COVID-19 adjusted growth outlook – water and sewerage services

Element		Scenario 1	Scenario 2	ΔS2 to S1
Water service				
Submission forecasts				
Demand				
Forecast water supplied (ML)	Average	469,215	471,798	+2,583
Expenditure				
Controllable opex	Aggregate	\$473.2m	\$473.6m	+\$0.4m
Capex	Aggregate	Unchanged across scenarios		
Revenue requirement				
Revenue requirement – variable charge	Aggregate	\$620.7m	\$621.1m	+\$0.4m
Prices				
Variable tariff (\$/ML supplied)	Average	\$264.4	\$263.1	(\$1.3)
Post submission actuals (Scenarios 1 and 2 assume COVID-19 adjusted forecasts become actuals)				
Actual water supplied (ML)	Average	469,215	469,215	Nil
Controllable opex avoided	Aggregate	Nil	(\$0.4m)	(\$0.4m)
Revenue earned – variable charge	Aggregate	\$620.7m	\$617.7m	(\$3.0m)
Revenue not earned	Aggregate	nil	(\$3.4m)	(\$3.4m)
Net position – Scenario 2 compared to Scenario 1				
Melbourne Water	Aggregate		(\$3.0m)	
Customers (aggregate)	Aggregate		+\$3.4m	
Sewerage service				
Submission forecasts				
Demand				
Forecast sewage treated (ML)	Average	329,357	330,997	
Expenditure				
Controllable opex	Aggregate	\$696.1m	\$697.0m	(\$0.9m)
Capex	Aggregate	Unchanged across scenarios		
Revenue requirement by tariff category				
Revenue requirement – variable charges	Aggregate	\$262.1m	\$263.4m	+\$1.3m
Revenue requirement – fixed charge	Aggregate	\$2,202.0m	\$2,201.5m	(\$0.4m)
Total revenue requirement (A)		\$2,464.1m	\$2,465.0m	+\$0.9m
Post submission actuals (scenarios 1 and 2 assume COVID-19 adjusted forecasts become actuals)				
Actual sewage treated (ML)	Average	329,357	329,357	Nil
Controllable opex avoided (B)	Aggregate	nil	+\$0.9m	
Revenue earned – variable charges	Aggregate	\$262.1m	\$262.1m	Nil
Revenue earned – fixed charges	Aggregate	\$2,202.0m	\$2,201.5m	(\$0.4m)
Total revenue earned (C)	Aggregate	\$2,464.1m	\$2,463.7m	(\$0.4m)
Revenue not earned (D)	Aggregate	nil	(\$1.3m)	
Net position – Scenario 2 compared to Scenario 1				
Melbourne Water (E) = (B) + (C) + (D)	Aggregate		(\$0.4m)	
Customer (aggregate) net position compared to base case (F) = (A) – (C)	Aggregate	N/A	+\$1.3m	
Combined services price movement expressed as a P0		(0.59%)	(0.63%)	(0.04%) Prices lower under Scenario 2

Key assumptions underpinning scenario modelling

Key assumptions relevant to each major service are set out in **Table 18**.

Table 18 Key assumptions by major service and revenue building block

<i>Element</i>	Waterways and drainage	Water and sewerage
<i>Opex</i>	<ul style="list-style-type: none"> > Forecast growth in opex is driven by customer-derived increases in levels of service and other obligations. > Opex forecast is unchanged for COVID-19-adjusted growth scenario. 	<ul style="list-style-type: none"> > Victorian Desalination Plant related opex (both security payments and water order payments) have been excluded from this analysis. The water order payments are a direct pass through and do not affect the revenue requirement. > Controllable opex adjustments are limited to energy and chemicals expenditure as outlined in Table 15.
<i>Capex</i>	<ul style="list-style-type: none"> > Forecast growth in capex is driven by land development activities. As outlined above this is offset (largely) by developer contributions in the final revenue requirement. > Under the COVID-19-adjusted growth scenario considered the net impact to waterways and drainage charge funded capex is expected to be negligible. > Capex forecast is unchanged for COVID-19-adjusted growth scenario. > Capital (return on and return of) revenue requirement is unchanged for COVID-19-adjusted growth scenario. 	<ul style="list-style-type: none"> > As outlined in Table 13 and Table 14 the capex projects with a "growth" driver are all needed now to restore capacity that has been consumed by recent growth across the PS16 period. > Under the COVID-19-adjusted growth scenario considered the capex forecast remains unchanged. > Capital (return on and return of) revenue requirement is unchanged for COVID-19-adjusted growth scenario. > That is, they already incorporate capital smoothing changes described in Section 2.1.
<i>Tax allowance</i>	<ul style="list-style-type: none"> > Assumed constant due to the scale of expenditure changes proposed. > Allocation across services also unchanged. 	



Melbourne Water Price Submission 2021

Supplement



S1. Context

Melbourne Water plays a unique role in the life of Melburnians. We are part essential service provider and part environmental steward. We harvest, treat and supply the water Melburnians drink, we manage and treat the sewage they produce, and we also manage waterways and major drainage systems in the Port Phillip and Westernport region, provide integrated drainage and flood management services, and help to create outstanding community spaces.

We are proud of the role we play in making Melbourne one of the world's most liveable cities, and recognise that we deliver our services for and on behalf of the households and businesses of Melbourne.

This submission represents our best offer to our customers. It sets out how we propose to deliver services and service outcomes they value while addressing known, emerging and future challenges. Our offer seeks to preserve what we already have, improve what we can and ensure we are well placed to be able to deliver for the long term.

S1.1 Our customers

Our customers include the retail water companies (both metropolitan and adjacent regional businesses), land developers and businesses that divert river water. The 2.2 million (2019-20 forecast) households and businesses across greater Melbourne are the ultimate consumers of our waterways and drainage, and water and sewerage services.

Delivering high quality and valued water, sewerage, and waterways and drainage services for our customers requires us to work in partnership with a range of other stakeholder groups. Groups such as local government, engaged community groups,

the State Government and industry (or peak) bodies contribute in a myriad of ways to the design and delivery of our essential services. Each of these groups is important to us and the valued services we provide to Melburnians.

S1.2 Melbourne's challenges are our challenges

Key challenges facing our region and our services are introduced in **Section 2.2** of the Price Submission, highlighting population growth (recent past and projected), climate change and our large and aging asset base as matters we must address in PS21. These key thematic challenges are addressed throughout the PS21 Supplement.

The PS21 Supplement also addresses the challenges of affordability, risk management and customer engagement which are introduced below.

Melburnians expect affordable services and many household budgets are under severe strain

- > Pressures on affordability are increasing in a context where some wages are stagnant, and people's vulnerability is high. Paying utility bills can have a significant impact on people's ability to live and thrive.

"Despite living in a wealthy state in a wealthy country, many Victorians live in poverty. Poverty means not having enough available income to afford life's necessities."

"In 2015-16, the overall poverty rate in Victoria was 13.2%. The poverty rate was 12.6% in Greater Melbourne and 15.1% in the rest of the state."

Quotes taken from *Every suburb Every town Poverty in Victoria* (Tanton, Peel, Vidyattama 2018), a National Centre for Social and Economic Modelling and Victorian Council of Social Services publication

Risk management and effective customer engagement are more critical than ever

The challenges introduced above are both opposing and amplifying, increasing the importance of effective risk management and customer engagement as we design and deliver appropriate service responses.

- > When urbanisation is combined with increasing storm intensity, the changed urban environment pushes more stormwater into Melbourne's drains and sewers, impacting their effectiveness, and the health of our rivers and creeks. These factors also combine to exacerbate and increase flooding risks, whether through waterways, drains or sewers, or via coastal storm surges.
- > More people and changed runoff patterns also exacerbate known risks to the water and sewerage services we rely on today. As we continue to deepen our understanding of these risks it drives the need to consider new ways to protect the quality of these services.
- > In an unconstrained world we could address all of these challenges, but Melburnians clearly also expect us to minimise our impact on their budgetary challenges. **This means our overarching challenge in PS21 is to continue to balance our ability to deliver valued services with the cost of doing so.**

*The specific challenges posed by COVID-19 are addressed in **Section 2.1** of the Price Submission.*

S1.3 How we have approached this submission

We recognise that we are on a journey to continually put ourselves in our customers' shoes and focus on what they value.

In responding to the challenges outlined above, and the ESC's new PREMO framework, we have increased our focus on our customers and the outcomes they value from the services we deliver. We have also sought to increase the transparency in the way we manage and deal with the risks that are inherent in a five-year forecast.

Section S2 of this document demonstrates that we have gone further and deeper than ever in our efforts to understand our customers and what they value. The fruit of our engagement program is evident in not only the customer outcomes, but also in the expenditure plans that support them and a number of other commitments we are making to our customers.

Section S3 presents our offer to our customers. Through our customer outcomes, developed with and endorsed by our customers, we are shifting from a service to an outcome-oriented view of the work we do to. This shift represents a natural progression from the PS16 as we continue our journey from an asset-focused engineering organisation to an outcome-focused provider of essential services.

In **Section S4** we outline the way in which we have planned for and delivered this submission, including how we have approached uncertainty. We have actively sought to ensure we are not asking customers to pay more than they should for things which we know are uncertain.

Sections S5 and **S6** outline the robust and rigorous approach we have taken to develop our expenditure forecasts, built on our "original" best estimates (for pricing purposes) of future service demands.

Section S7 summarises the revenue requirements and tariffs for each of our major services.

Section S8 covers price adjustment matters.

S2. Our engagement journey

Key references relating to this chapter:

A comprehensive description of our engagement program is provided in the *PS21 Engagement Report*

The engagement journey outlined below builds on the summary provided in **Section 3** of the Price Submission. It should also be read in conjunction with **Section 2.1** and **Attachment 1** of the Price Submission. These sections outline the additional engagement activities we undertook in response to the emergence of the COVID-19 pandemic and how we responded to what we heard.

S2.1 Engagement framework

In deriving the customer outcomes, and expenditure proposals that follow, we have engaged deeply with our customers across each of our major service areas. Our engagement program was designed early in the pre-planning phases of PS21 to deepen, strengthen and enhance our relationships with our customers and community. We not only sought to ensure the submission delivered meaningful service outcomes for our customers but also enhanced our understanding of our customers and their preferences.

Through both broad and targeted initiatives, tailored to each of Melbourne Water's services and associated customer segments, we engaged early and throughout the development of this submission. **Figure 9** illustrates the relationship between our strategic direction, customer and community strategy, our services, our customers and our approach to engagement for PS21.

The following sections describe the key features of our engagement approach: the customers we engaged with; how we engaged; and on what matters. We also outline how we balanced the different, and sometimes competing, preferences of our various customers to shape the development of our 'best offer'.

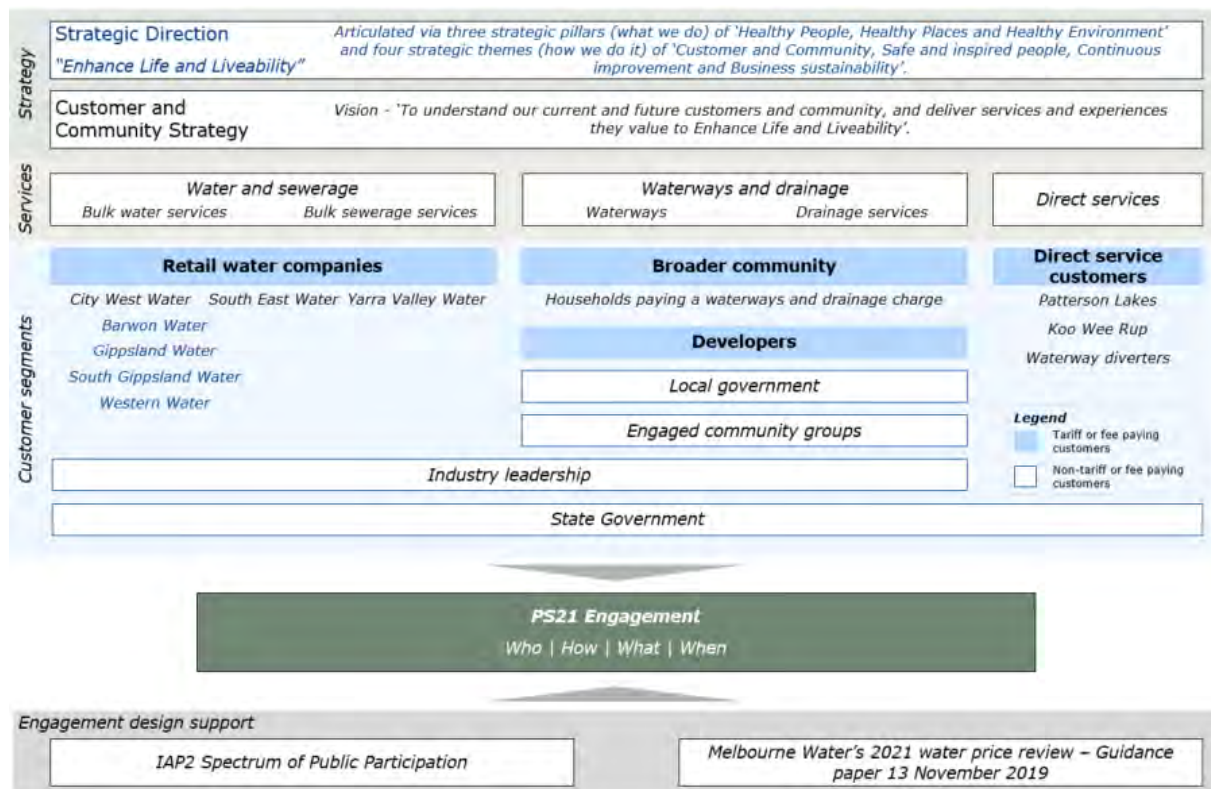
S2.2 Key features of our approach

S2.2.1 How we approached engagement for PS21

PS16 represented a step change in the way in which we engaged with our waterways and drainage service customers, and a greater recognition of the importance of seeking and responding to customer preferences for water and sewerage services. For waterways and drainage this was evident in the extensive program of social research we undertook, culminating in the use of deliberative forums and a price-service trade-off modelling exercise.

Figure 1 (Section 3.1 of the Price Submission) shows how we adapted the form, timing and content of our PS16 approach for PS21. The call-outs on each arm of the figure attest to the fact that across our entire submission we have moved to a deeper engagement form (towards *collaboration*), with broader content (towards *performance stewardship*) and earlier timing (towards an *ongoing conversation*). Our engagement program was purposeful about matching the engagement aims and approaches to PREMO and our customers' expectations. These changes reflect our desire to better understand our customers and their preferences, enabling us to improve the alignment between these and the services we deliver.

Figure 9 PS21 Engagement Framework



Engagement for PS21 followed a three-stage process, providing customers with multiple opportunities to shape the engagement program itself, as well as development of key aspects of the Price Submission. Broadly, stage one sought to understand customer preferences, stage two focused on our response to those preferences, and stage three sought to validate the outputs of the first two stages – as outlined in **Figure 10**.

S2.2.2 With whom did we engage?

As shown in **Figure 9**, the customer groups for each of our services are distinct and include some segments that (while interested parties) do not pay the tariffs and fees that are the primary subject of this submission.

In order to balance these distinct interests (while aligning with our strategic direction and customer strategy), we adopted a service-based approach to the question of "who" we engaged with as shown in **Table 19**. Opportunities for review were also afforded to our shareholder (the State Government) via briefings to the Department of Environment, Land, Water and Planning (DEWLP) and the Office of the Minister for Water. Consumer advocate groups were provided with briefings, and the opportunity to provide feedback, prior to the finalisation of PS21.

Figure 10 Engagement stages

Stage	Purpose of stage	Key elements of the stage	Key outputs and how they were used
Stage 1 <i>Values and focus areas</i>	<ul style="list-style-type: none"> > Set the scope of the engagement program and customer involvement. > Understand customer values and areas of interest to be addressed through the engagement program and to inform the initial drafting of customer outcomes. 	<ul style="list-style-type: none"> > Review of existing knowledge and insights about customer and community values to inform the development of a customised engagement program and early identification of values and focus areas. > Establish our primary advisory bodies – the WSCC and WDCC. > Engage with customer councils and broader community to define issues/matters for further engagement and customer values and preferences. 	<ul style="list-style-type: none"> > Customer and community value statements – helped us refine the engagement program. > Focus areas – key areas of interest and focus to be addressed through the engagement program and to inform initial drafting of customer outcomes. > Customer outcomes – preliminary draft of customer outcome statements.
Stage 2 <i>Preferences and performance</i>	<ul style="list-style-type: none"> > Identify customer preferences for investment and expectations of Melbourne Water's performance. 	<ul style="list-style-type: none"> > Information sharing and collaborative exploration of issues (identified in Stage 1) with our customer councils. > Broader community research activities focused on defining service levels and performance measures, and testing investment proposals with customers and the community. Stage 2 presented scenarios aligned to the key areas of focus identified in the first stage, to seek feedback on potential increases in service via willingness-to-pay surveys. 	<ul style="list-style-type: none"> > Customer outcomes and performance measures – continued to refine our customer outcomes and develop outputs and measures. > Service preferences and prioritisation – understanding customer preferences and willingness to pay for selected services. Used to help inform levels of service and investment priorities, and price and service trade-offs.
Stage 3 <i>Validation</i>	<ul style="list-style-type: none"> > Validate the proposed customer outcomes, performance measures and investments in the draft Price Submission. 	<ul style="list-style-type: none"> > Customer council review of a draft Price Submission with a focus on proposed customer outcomes, performance measures and investments. > Community deliberative panel review and prioritisation of customer outcomes and feedback on measures and performance reporting. > Final stage of public consultation providing opportunity for final questions and comments prior to lodgement with the ESC. 	<ul style="list-style-type: none"> > Customer-endorsed/supported customer outcomes, outputs and performance reporting framework. > Revised investment program. > Final draft Price Submission.

For more detail on how our customers helped to shape our customer outcomes please refer to **Section S2.3.1**.

Table 19 Focus of our engagement efforts – who

Service	Who consumes our services?	With whom did we engage?
Water and sewerage <i>Encompassing bulk water and bulk sewerage services</i>	<ul style="list-style-type: none"> > Retail water companies are our direct customers. They purchase our bulk services and on-sell these to their direct customers. > Households and businesses are our indirect customers. They fall within our “broader community” customer segment and are the group who ultimately consume the water we produce and supply the sewage we manage and treat. 	<ol style="list-style-type: none"> 1. Retail water companies. 2. Households and businesses.
Waterways and drainage <i>Encompassing waterways and drainage services</i>	<ul style="list-style-type: none"> > Households and businesses are our direct customers. They ultimately consume the waterways and drainage services we provide across greater Melbourne. > Local government, other government agencies and engaged community groups partner with us in the delivery of our services. > Developers also fund/deliver drainage infrastructure in greenfield areas. 	<ol style="list-style-type: none"> 1. Households and businesses. 2. Developers. 3. Local government. 4. Engaged community groups.
Direct services <i>Encompassing the communities of Patterson Lakes and Koo Wee Rup, and Diversers</i>	<ul style="list-style-type: none"> > Owners of property in the Tidal Waterways and Quiet Lakes at Patterson Lakes pay a special service charge – in addition to the waterways and drainage charge – for works and services specific to their properties. > The Koo Wee Rup–Longwarry Flood Protection District is prone to significant flooding risks. Property owners in this district pay an exclusive charge to cover maintenance services for the extensive network of channels that drain the area and mitigate flood risks. > Waterway diversers hold licences to extract water from rivers, streams, dams and stormwater pipes for a variety of purposes, including domestic and stock watering, agricultural irrigation, stormwater harvesting, power generation and industrial cooling. Melbourne Water manages these licences in accordance with the <i>Water Act 1989</i>. 	<ol style="list-style-type: none"> 1. Patterson Lakes residents. 2. Koo Wee Rup–Longwarry residents. 3. Diversers.

S2.2.3 How did we engage and on what matters?

Having adopted a service-based approach to “who” we engaged with, it was appropriate that the “how” and “what” of the engagement program also followed a service-based approach. The key features of the way we engaged are outlined in **Figure 11**.

Two dedicated customer forums – a WSCC and a WDCC – were established as strategic engagement channels via which Melbourne Water sought insight into customer preferences, appropriate forms of engagement and other strategic matters as they arose. These two forums worked collaboratively with Melbourne Water for over 12 months to help shape and refine both our engagement activities and our response to key service and regulatory matters. Our best offer has been heavily influenced by the work we undertook with these councils and we would like to acknowledge the time and energy they put into this submission.

The service-based approach to how we engaged and on what matters is described below.

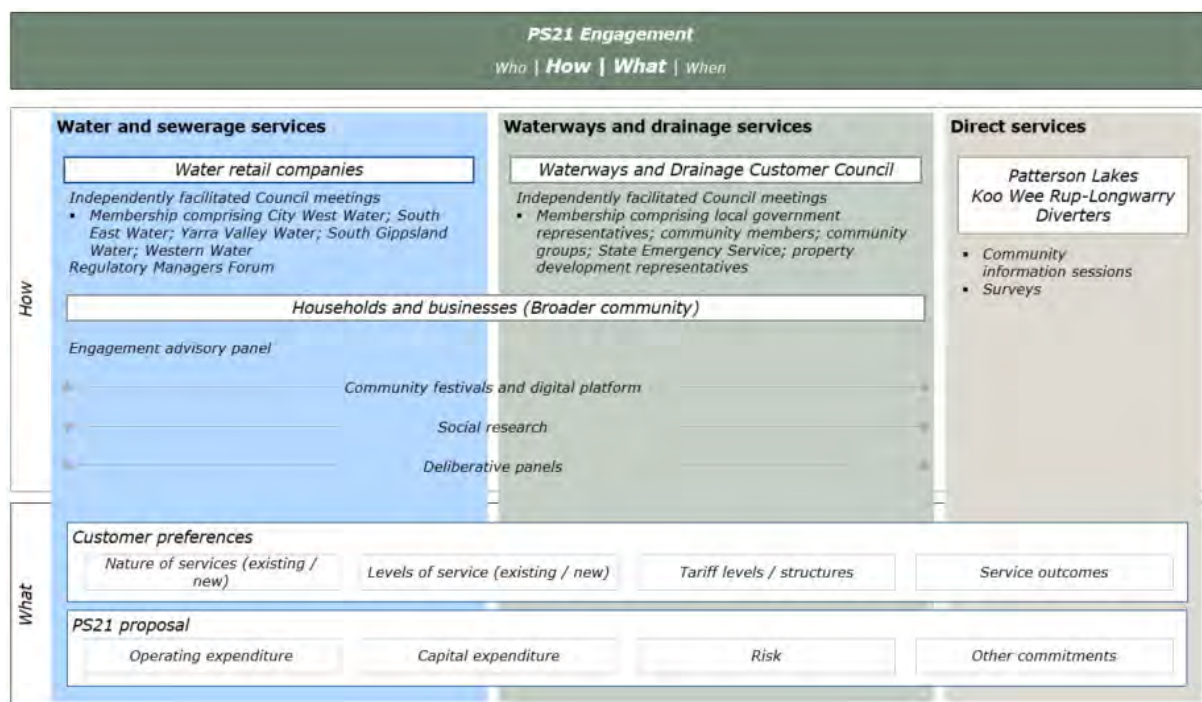
Water and sewerage

Water and Sewerage Customer Council

The WSCC served as our primary engagement channel for bulk water and sewerage services. Recognising its strong direct connection with the households and businesses who ultimately consume our services, the WSCC comprised senior leaders from our customer retail water companies and was established in February 2019.

The WSCC provided a dedicated customer forum to test strategic ideas, seek preferences and provide advice on key issues, opportunities and focus areas to support PS21. With the WSCC (and via the customer retail water company pricing submissions) we explored customer preferences in relation to the nature and the level of service we provide via our bulk water and sewerage services.

Figure 11 PS21 Engagement – the “how” and the “what”



Specific matters we explored collaboratively with the WSCC included:

- > the customer outcome statements that are presented in **Section S3**
- > the manner in which we pass through the operating expenses (including the security payment and any water order costs) we receive from the Victorian Desalination Plant
- > the principles and practice behind our proposals on regulatory period, form of price control and tariff structures.

Other ways in which we engaged with our retail water company customer included:

- > *Regulatory Managers Forum* – Established in mid-2019 to support the WSCC in the consideration of matters with a regulatory focus. It covered key regulatory topics such as the appropriate length of the PS21 regulatory period and form of price control, as well as the design of bulk water and sewerage tariffs, and appropriate risk-based treatment of the Victorian Desalination Plant water order. The forum's report helped to inform the WSCC's December communique to Melbourne Water.
- > *Engagement Advisory Panel* – Comprising engagement practitioners from the retail water companies, this group was formed to support our engagement program and to leverage the experience of retail water companies' own price submission engagement programs. The panel provided a forum for review of our engagement activities and sharing of community insights and findings openly, worked to ensure clarity and coordination of communications to the community, and identified opportunities for joint efforts and alignment of engagement activities across the sector.

- > Demand forecasting – Water and sewerage planning teams were engaged to develop appropriate demand forecasts. **Section S5** outlines the process followed and the demand forecasts that underpin this submission.

*Consideration of COVID-19 impacts on demand and how we engaged with retail water companies to consider its implications is outlined in **Section 2.1** of the Price Submission.*

Households and businesses

We also embarked upon a fit-for-purpose engagement program with households and businesses. This included the use of outbound (survey – qualitative and quantitative, community festivals, deliberative panels) and inbound (*YourSay* online engagement hub) engagement to increase awareness about PS21 and elicit customer preferences and feedback on proposals.

Our research program adopted representative sampling and engagement approaches to ensure views expressed could be considered representative of the broader community. Participants were carefully selected to ensure representation across different age cohorts, gender, location, level of education, household size and ownership, and work status. We also specifically targeted harder to reach disadvantaged groups including people on lower incomes, people who spoke another language at home or with parents and people with a chronic illness or disability who might otherwise find it hard to participate.

Key topics relevant to water and sewerage services on which the views of end-use customer were sought are outlined in **Table 20**.

Table 20 End-customer research topics – water and sewerage

Topic category	Nature of topic
<i>Validate and refine retail water company insights into affordability and price-service trade-offs</i>	Degree to which customers support building greater resilience into the sewerage system.
	Maintain or expand current levels of customer-funded recycled water availability.
	Pursue new stormwater harvesting supply (and associated non-supply benefits) above least cost supply level.
	Explore alternative options to manage water orders and their impact on bill certainty.
	Appropriate levels of investment in water cycle education and awareness.
<i>Environmental stewardship</i>	Appropriate level of customer-funded biosolids re-use.
	Preferred nature and timing of purchase of carbon offsets.
<i>Liveability</i>	Ecotourism investment at the WTP.
	Appropriate levels of customer-funded access to open space and reservoir recreation opportunities.

These topics were selected for their ability to support or supplement our existing understanding of customer preferences on both core and emerging service areas. Topics both validated and refined retail water company insights on key core services, and explored household and business views relating to Melbourne Water's role in protecting Melbourne's environment and liveability.

What we heard from our engagement with households and businesses, and how we used that insight in developing our final offer, is outlined in **Section S2.3** and **Section S3**.

Waterways and drainage

Waterways and Drainage Customer Council

The WDCC was established in March 2019 to support the development of the WDIP. The WDCC provided strategic advice on the nature and level of waterways and drainage services to be delivered by Melbourne Water via the WDIP and PS21, with the goal of helping us optimise the value our services are able to deliver to our customers and the environment.

Members of the WDCC included representatives from engaged community groups (representatives from the Friends of Steele Creek, Port Phillip EcoCentre and Baykeeper, Werribee and Yarra River Keeper associations), key stakeholders from the State Emergency Service, the Victorian Planning Authority and Urban Development Institute of Australia, local government (Brimbank, Wyndham, Yarra Ranges, Maroondah, Moorabool and Port Phillip), one community member (broader community) and a direct service charge customer (diverter). The WDCC helped shape the engagement approach we took with our broader customers, and contributed to our understanding of, and response to, what our customers value in the delivery of our waterways and drainage services. It also played a central role, together with the WSCC, in developing the customer outcome statements presented in **Section S3**.

Households, businesses and other customer segments

We also embarked upon a fit-for-purpose engagement program with households and businesses, developers and local government. This included the use of outbound (qualitative and quantitative surveys, community forums, community festivals and deliberative panels) and inbound (*YourSay* online engagement hub) engagement techniques.

The social research program included a strong focus on the willingness of customers to pay for different levels of service for key elements of the waterways and drainage service. Key topics relevant to waterways and drainage services on which the views of end-use customer were sought are introduced in **Table 21**.

These topics were selected on the basis that they were funded by the waterways and drainage charge, but with levels of service that are driven by customer preference rather than legislative or regulatory obligation. Topics also needed to offer a real choice for customers, with material differences in levels of service possible when funding is altered.

We also sought customer views on the relative merits of changing the basis on which the waterways and drainage charge is levied, from a per-property basis to one linked to the size of a property's impervious (hard surfaces) area. The feedback received to this question and Melbourne Water's proposed response is outlined in **Section S2.3.4**.

Participants in the research program were asked to select a level of expenditure that best matched their preferred service level. For a number of services, population growth and climate change impacts meant that maintenance of existing funding levels would result in a degradation of service quality.

Table 21 End-customer research topics – waterways and drainage

<i>Service area</i>	<i>Nature of topic</i>	<i>Source of insights¹</i>
Cultural values	Facilitate involvement of Traditional Owners in waterway management.	<i>Q</i>
Healthy waterways	Manage vegetation along rivers and creeks for wildlife, cleaner water and erosion protection (vegetation for environment).	<i>Q, S, D</i>
	Manage and protect natural wetlands.	<i>Q, S, D</i>
	Estuary management for environmental benefits and community recreation.	<i>Q, S, D</i>
Stormwater	Manage litter in our rivers, wetlands and estuaries.	<i>Q, S, D</i>
	Clean-up polluted stormwater caused by new urban developments to protect rivers, creeks and bays.	<i>Q, S</i>
	Collect stormwater to protect rivers, creeks and bays and provide water for re-use.	<i>Q, S, D</i>
Community access, involvement and recreation	Manage vegetation around urban rivers and creeks to improve appearance, provide shade and enable community enjoyment and wellbeing (vegetation for amenity).	<i>Q, S</i>
	Open up (and activate) Melbourne Water land for community use (retarding basins and waterway corridors).	<i>Q, S</i>
	Create ramps and launch sites for recreational boating and kayaking.	<i>Q, S</i>
	Creek and open space reinvigoration for community use.	<i>Q, S</i>
	Community education programs about major rivers and creeks across the region (including citizen science initiatives).	<i>Q, S</i>
Flood risk management	Minimise the damage caused by flooding.	<i>Q, S, D</i>
	Prepare the community for flooding to minimise damage and loss.	<i>Q, S, D</i>
Emergency and pollution	Waterway emergency response to events such as pollution and flooding – reducing safety risks and damage; clean-up and repair).	<i>Q</i>

Note 1: Q = Qualitative survey; S = SIMALTO (simultaneous multi-attribute level trade-off analysis – a form of quantitative survey); D = deliberative forum.

Direct services

Direct service customers were engaged via a multi-step process. We first engaged with a representative group (Koo Wee Rup-Longwarry and Diverters) or individual (a Residents Association of Patterson Lakes representative) to identify issues that the residents would most like to explore around current and possible levels of service. Step 1 included consideration of opportunities to propose a lower level of service, which was not endorsed.

For each direct service customer group, the outcome of Step 1 was the development of a direct engagement approach (Step 2 – via postal survey) where customers were asked to express their willingness to pay for higher levels of service than their current baseline. The outcomes of Step 2 were then analysed and fed into the design of a proposal for PS21.

S2.3 How our customers shaped this proposal

Across each of the three stages of our engagement program, we captured insights around customer preferences, either directly or indirectly. These helped to shape not only our emerging proposals but also how, what and when we engaged more deeply with either our direct customers or other groups, such as the households and businesses who underpin our bulk water and sewerage services, and interested parties such as local government, developers and engaged community groups. We also provided briefings on our draft proposals to DELWP, the Office of the Minister for Water, the Energy and Water Ombudsman of Victoria and consumer advocate groups, including the CALC and the Brotherhood of St Laurence.

A comprehensive view of our engagement program and how it shaped not only this proposal but also the engagement program itself, is presented in the *PS21 Engagement Report*.

The following sections focus on how our customers helped us to shape the central elements of our Pricing Submission and expenditure plans, namely:

1. Our customer outcomes.
2. Our response to outcomes performance reporting and management.
3. Our expenditure priorities and levels.
4. Other matters of interest to our customers (for example, tariff structure and term of regulatory period).

Both the WSCC and WDCC provided advice on an ongoing basis via discussion and meeting minutes. The WSCC also provided an interim communique (5 December 2019), and final submission response (August 2020). The WDCC provided preliminary strategic advice (January 2020) and participated in a final facilitated review session (June 2020). We have provided final formal responses to each customer council addressing the key items raised and highlighting where and why we were not able to meet their expectations.

S2.3.1 Developing and prioritising customer outcomes

In order to help establish a strong link between our proposed actions and expenditure, and the preferences of our customers via customer outcomes, Melbourne Water enlisted the support of the two customer councils. These two councils were used as the primary vehicles for the collection and collation of customer preferences in relation to outcomes development during the first two stages of the three-stage process set out in **Table 22**. During the third stage we also tested customer outcomes with the households and businesses that we ultimately serve. Their insights contributed to our understanding of the relative value our customers place on each outcome and were used to refine the wording of the final outcomes.

Our final customer outcomes statements are introduced in **Section S3**.

Table 22 Developing customer outcomes – high-level process

Stage	What we did (key activities)	What we heard/found	How we responded/used these insights
Stage 1 <i>Gathering the fibres</i>	<p>During this phase we gathered an evidence base from which to shape our understanding of customer preferences. We drew from a wide range of relevant sources including:</p> <ul style="list-style-type: none"> > retail water company price submissions – 2018 Price Review > direct community engagement (e.g. Assessment of Services, Customer Values Workshop, Community Panel – Vision and Values) > Melbourne Water's <i>Strategic Direction</i> and <i>Statement of Obligations</i>. 	<p>Key themes from this phase included:</p> <ul style="list-style-type: none"> > core services are highly valued – don't lose focus (e.g. Community Assessment of Services highlighted the criticality of water to life, and in ensuring Melbourne can continue to thrive in the face of population growth and climate change) > desire to see positive environmental and community outcomes from the services we provide and underpin > do not lose sight of the ongoing affordability challenge > desire for services to be sustainable and in partnership with community > expectation that we are taking a forward view and being innovative. 	<p>The key deliverable from this phase of the process was the development of a set of seven draft outcomes and workshop pre-reading material.</p> <p>Four outcomes focused on the provision of high quality, reliable water, sewerage, and waterways and drainage services.</p> <p>Three outcomes focused on how customers experience these services, looking at our use of partnership, impact on customer bills and customer service.</p> <p>Commitment to always seeking to deliver our services (and customer service) in ways that are forward-looking and that embrace innovation.</p>
Stage 2 <i>Weaving the thread</i>	<p>We turned identified customer preference insights into a set of draft outcome statements, engaged with our two customer councils and developed draft final outcomes complete with outputs, target metrics and activities. We tested these against:</p> <ul style="list-style-type: none"> > workshops with each council to explore draft outcomes > WSCC and WDCC interim reports > ongoing customer engagement activities and outputs (e.g. social research, <i>Your Say</i> page insights). 	<p>Via workshops, councils expressed a desire to (selected insights only):</p> <ul style="list-style-type: none"> > ensure the future remains front of mind > increase clarity around sustainability and environment > expand on community resilience and more directly address climate change, including links to what Melbourne Water is doing to manage bushfire and drought risk, and address liveability and amenity > emphasise transparency in relation to future expenditure challenges. 	<p>Six (reduced from seven) Draft Final Outcomes were established.</p> <p>Detailed outputs and target metrics were developed for each proposed outcome.</p>

Stage	What we did (key activities)	What we heard/found	How we responded/used these insights
Stage 3 <i>The final garment</i>	<p>We then engaged with our end consumers (households and businesses) via a community deliberative panel to test:</p> <ul style="list-style-type: none"> > how our customers would prioritise the six customer outcomes > the alignment of our proposed outputs and metrics to the six customer outcomes > customer preferences in relation to how we manage performance reporting and response. <p>We also shared a draft version of our complete submission with the two councils to validate and refine the final customer outcome statements.</p> <p>We then collated the views of our households and businesses with the views of our retail water companies.</p> <p>We also collated expert reviews from KPMG and others with close working knowledge of the PREMO framework to help refine our final wording.</p>	<ul style="list-style-type: none"> > Our customers (retail water companies and household and businesses) were highly supportive of the six outcomes. > Our community deliberative panel explored the draft customer outcomes and provided both endorsement and insight into the priority they would assign each outcome. Specific insights from the deliberative panel phase included a need to focus on customer-friendly over technical language (for example 'population growth' made more sense to panel members than 'urbanisation') and the benefits of keeping outcomes simple and with a direct link to Melbourne to encourage connection with the outcome. > Our expert reviewers encouraged us to simplify the language and ensure it reflects what customers will receive rather than what Melbourne Water will do, leaving any technical elements to the narrative or outputs. 	<p>We made minor wording amendments to each outcome.</p> <p>We developed a structured order in which to present and discuss our customer outcomes, highlighting the priority views of our customers – households and businesses, and retail water companies.</p> <p>We reviewed and refined our outputs and target metrics, and finalised our performance reporting and management proposal.</p>

S2.3.2 Outcomes performance reporting and management

Melbourne Water is committed to being responsive and transparent in the way we deliver our services. This extends to the way in which we assess our performance against the commitments made in this document.

Melbourne Water developed a reporting and performance matrix (**Figure 12**) to frame options to cover reporting, accountability and ongoing engagement with our diverse customer base. Using this matrix we asked our customers (both councils and the community deliberative panel) how they would like Melbourne Water to approach reporting and performance management during the regulatory period.

What we heard through engagement

The **retail water companies** (via the WSCC) indicated a preference for reporting via Melbourne Water's website and an individual annual performance overview via principal representatives responsible for governing the bulk supply agreements. They also expressed a desire for some form of GSL scheme (or other performance incentive mechanism) to address underperformance.

Our **household and business customers** (via the community deliberative forum) placed great focus on transparency. In relation to reporting, it was clearly important that information on our performance be made available, with water bills seen by most as an optimal means of reaching the community. There was also a desire for our website to provide information in a manner that catered for varying customer appetites for detail.

Figure 12 Reporting and performance matrix

"P"REMO Challenge	Melbourne Water will, at minimum, commit to...	A customer focused response will build on the minimum	A customer centric response will go further
Reporting on performance against outcomes to customers	<p>Publish annually on Melbourne Water's website</p> <p>Note that this is an existing WDIP commitment as it relates to WDIP performance measures</p>	<p>Annual presentation of performance to representatives of retail water companies</p> <p>Explore publication of annual performance scorecard via retailer bill inserts</p>	<p>Reporting to a customer forum(s)</p> <p>Meets bi-annually – one meeting dedicated to performance reporting and discussing / co-designing any response to underperformance (or over-performance); second meeting to consider emerging customer preference insights (see item 3)</p>
Responding to under performance (over-performance)	<p>Explanation of contributing factors and actions Melbourne Water will take to address</p> <p>Address as part of preparation for PS26</p>	<p>Melbourne Water to identify, propose and implement mitigation actions, which may include actions such as monitoring (wait and see); placement of revenue "at risk"; temporary bill rebates; supplementary expenditure funded by Melbourne Water</p>	<p>Customer forum(s) engaged to consider nature and scale of underperformance and consider appropriate responses with Melbourne Water</p> <p>For waterways and drainage related performance matters customer group identified in Item 3 may be engaged to support / guide this process</p>
Adaptation of outcomes to respond to changing customer preferences – informing business priorities throughout next regulatory period	<p>Address as part of planning and engagement for PS26</p>	<p>Annual questionnaire based survey of waterways and drainage customers</p> <p>Annual questionnaire based survey of water corporation customers – survey to be designed to capture feedback across critical functional interfaces between Melbourne Water and its retail water corporation customers (e.g. planning, operations, invoice to cash)</p>	<p>Ongoing conversation with waterways and drainage customers (e.g. via core group of permanent representatives supplemented periodically by samples of engaged customers)</p> <p>Ongoing conversation with retail water companies (e.g. possibly aligned to existing engagement forums)</p> <p>Opportunities for customers to inform business priorities identified and published as part of reporting</p>

Supplementing these views, the **WDCC** supported the concept of an ongoing customer council-style body to continue discussions with an educated and informed customer-based group. It felt that a customer-centric approach to reporting and performance was important.

Our proposed response

Responding to these insights, Melbourne Water proposes to adopt a customer-centric approach to reporting and performance management. We will seek to maintain an ongoing conversation with our customers. We intend that this will take the form of an ongoing customer council-style forum (or forums) meeting at least once a year. Ideally comprising representatives of our household, business and retail water company customer segments the forum(s) will enable us to understand and test customer preferences as they relate to the services we provide. This ongoing conversation will be used to:

- > facilitate performance reporting between us and our customers. In addition to reporting to the customer forum we will:
 - publish an annual performance customer outcomes report on Melbourne Water’s website
 - provide an annual overview of performance against customer outcomes and GSLs to retail water company representatives via bulk water agreement principal representatives
- > engage with our customers over an appropriate Melbourne Water response to underperformance (or overperformance) in relation to customer outcomes – this may include consideration of additional funding to rectify an underperformance, and/or consideration of the circumstances under which it would be appropriate for Melbourne Water to make repayments to customers (for example, chronic underperformance)
- > ensure our priorities continue to be well aligned with customer preferences.

We also propose to introduce GSLs for our bulk water and sewerage services. Matters subject to GSLs, and our approach to managing performance against these, is outlined in **Section S2.3**.

*Additional COVID-19-related commitments to performance reporting and management are introduced in **Section 2.1** of the Price Submission.*

S2.3.3 Price and service trade-offs

Our customers were directly involved in our consideration of price and service trade-offs.

Water and sewerage

For our water and sewerage services, the WSCC, and our household and business customers provided insights into customer preferences that were used in a top-down sense to help us respond to each of the customer outcomes and land at a final position which effectively balanced competing service and affordability challenges.

Waterways and drainage services with customer-derived levels of service

Melbourne Water’s obligations in relation to waterways and drainage services are clearly set out in the WDIP. Some of these services have a high degree of accountability and oversight, and the level of service that we must provide is established through existing standards and agreements. For example, land development and emergency pollution and response have clear requirements – we cannot ignore a requirement to provide land-use planning advice or a diesel spill into a creek. We also provide fee-for-service activities, such as lake flushing, where we have service level agreements with specific customers and collect additional fees.

For other services, while the obligation to provide the service is clear, the required level of service (for example, how much, where, and by when) is not clearly defined. In these cases, the levels of service are guided by the preferences of our customers and community, defined through our engagement for WDIP.

Services with a 'customer-derived' level of service include flood risk management; healthy waterways; community access, involvement and recreation; and stormwater.

These service areas formed the basis for our engagement with our household and business customers on the matter of price-service trade-offs. The process we undertook is presented in detail in the WDIP and included ongoing input and support from the WDCC as well as:

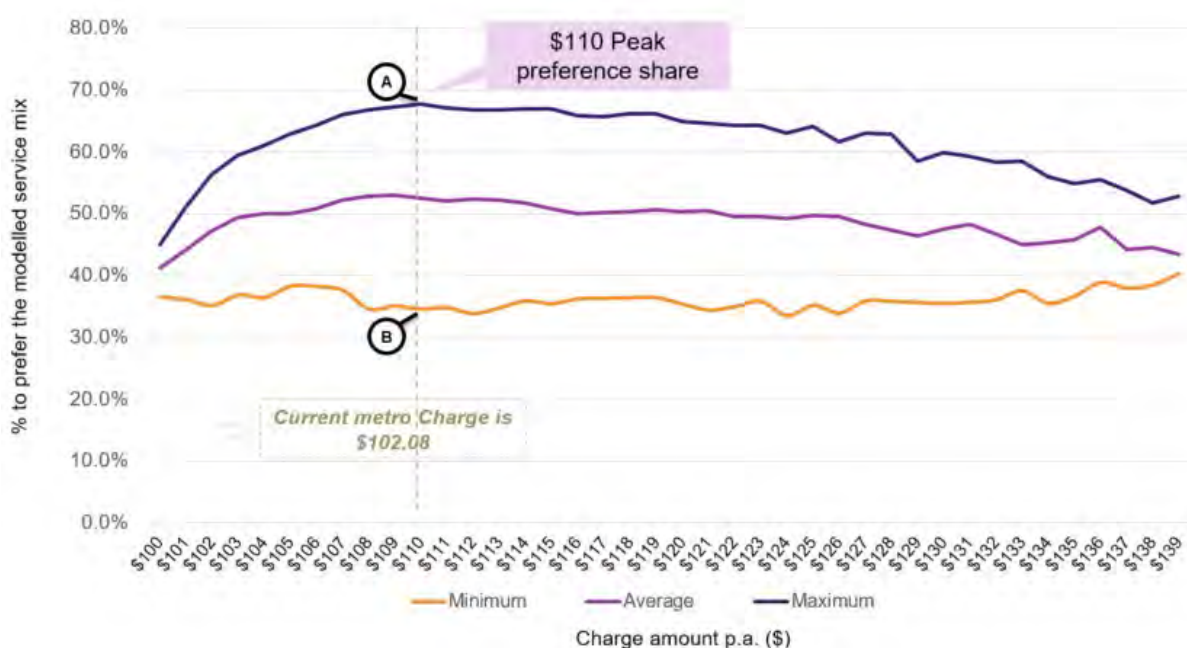
- > **Qualitative research** – Eight geographically and demographically-diverse customer focus groups provided insights to inform quantitative survey development. This provided a better understanding of any service gaps, customer perceptions of services, how to more clearly communicate services, and where customers might desire differing levels of service - to test in the quantitative survey.

- > **Quantitative research** – Statistically representative customer preference and trade-off survey of 1,069 residential (metropolitan), 135 residential (rural), and 150 non-residential (business) customers. Participants were given points proportional to indicative costs, which they could spend on service areas, programs, and service levels to indicate their preferences. Participants were able to revise their point allocation across services over three rounds (SIMALTO). This resulted in a mix of services and service levels that a majority of customers preferred and were willing to pay for.

- The results of the SIMALTO exercise were presented visually in the form of preference share charts, with separate charts produced for the residential (metropolitan), non-residential (business) and residential (rural) customer groups.

- **Figure 13** reproduces the residential (metropolitan) chart to illustrate that the price customers are willing to pay is highly dependent upon the mixture of services underpinning the chosen price point.

Figure 13 SIMALTO preference shares – residential (metropolitan) customers



- Points “A” and “B” on the chart represent different mixes of services and/or levels of service at a common \$110 per annum price point. The service mix represented by point A has 68 per cent customer support at this price point, however the level of support drops to 34 per cent when a different service mix is applied for the same price.
 - The chart also shows that there are a wide range of service mixes which enjoy greater than 50 per cent customer support for an increase in current price levels (up to \$139 per annum).
 - Similar insights can be drawn from the comparative non-residential and rural charts.
 - *As we balanced our proposed levels of service and final waterways and drainage prices we were mindful of these insights and the activity-level preferences of our customers.*
- > **Deliberative panel** – The panel represented diverse customer interests and provided insight into community priorities, values, drivers and select topics as an extension of customer research data. It supported our consideration and interpretation of SIMALTO results to help us refine the focus of our final investment plans.

Table 23 describes the baseline levels of service by activity that were presented to household and business customers during the quantitative research phase. It also introduces the proposed PS21 levels of service for each activity.

To demonstrate that we have maintained an appropriate balance between activity-level preferences of our customers and the final price they pay we re-ran the SIMALTO model (**Figure 14**) to place our final price-service proposal on the preference share charts. Proposed prices (introduced in **Section 3.6** of the Price Submission) have been adjusted to \$real 2019-20 to enable comparison with the SIMALTO results. The charts show that our proposal delivers customers the services and service levels they desire at a price they are willing to pay.

The modelled preference share (green triangle) shows that for residential and rural customers the service mix we propose aligns with the peak preference shares, at a price point that is materially higher than our proposed 2025-26 prices. This figure suggests that our proposed prices and the services they are funding are supported by well over 65 per cent of customers in these two segments.

In the non-residential category we note that the modelled result again shows a high peak preference share, but at a price point that is lower than our proposed price range. The proposed price range being to the right of the modelled price point is a function of the approved 5.5 per cent price rise in the non-residential (minimum) charge for 2020-21 (as part of a price path transition). We note also that some 25 per cent of non-residential (2019-20 customer numbers) are on the non-residential (above minimum) tariff and will benefit from price reductions across the period as they transition to the minimum tariff.

We are confident that our proposed prices and the services they are funding are strongly supported by our customers, with majority support in each of the major tariff categories.

Link to customer outcomes

Further discussion of what we heard from our customers in relation to price and service-related outcomes and how we balanced these challenges in developing our best offer is presented in **Section S3**.

S2.3.4 Other matters of interest to our customers

Our customers identified a range of other matters of interest to them that are relevant to our final offer. These matters, and our responses, are provided in **Table 24**. These matters were identified by our two customer councils.

Table 23 Customer-derived level of service – by activity

	Activity <i>Activity description</i>	Current level of service – as described to SIMALTO participants		Proposed change to current level of service	
Stormwater	Litter <i>Activities specific to managing litter in our rivers, wetlands and estuaries</i>	L1	<ul style="list-style-type: none"> > Conduct only critical litter collection activities (e.g. outlets to beaches, along major rivers) > Likely to increase litter in rivers and creeks 	L3 ↑↑	<ul style="list-style-type: none"> > Maintain current litter levels via cleaning up litter in and around drains, creeks, rivers and wetlands > Conduct research and community education, including a litter investigation in one creek with serious litter problems to understand what is causing the problem, and address it.
	Stormwater quality <i>Cleaning up polluted stormwater caused by new urban developments, to protect rivers, creeks and bays – includes litter chemicals, mud and other pollution from runoff</i>	L1	<ul style="list-style-type: none"> > No additional action to remove stormwater pollution > Would result in damage to creeks, rivers and bays 	L2 ↑	<ul style="list-style-type: none"> > Remove 10% of the stormwater pollution.
	Stormwater harvesting <i>Collecting stormwater in areas with a lot of urban development to protect rivers and creeks from damage, and to provide water for reuse</i>	L1	<ul style="list-style-type: none"> > Minimal collection and reuse of stormwater > Would mean a decline in creek and river condition 	L2 ↑	<ul style="list-style-type: none"> > Collect and reuse stormwater in 33% in areas with a lot of urban development to: <ul style="list-style-type: none"> – Protect rivers and creeks from damage – Provide water for reuse.
Waterway condition	Vegetation for environment <i>Managing vegetation along rivers and creeks for wildlife, cleaner water and protection against erosion</i>	L3	<ul style="list-style-type: none"> > Manage vegetation along 14% of rivers and creeks (about 3,400 kilometres) 	L3	<i>Unchanged.</i>
	Natural wetlands <i>Natural wetlands protection and management</i>	L2	<ul style="list-style-type: none"> > Manage the 20 highest priority natural wetlands > Current level (600 hectares of natural wetlands) 	L3 ↑	<ul style="list-style-type: none"> > Manage the 63 highest priority natural wetlands > Improved condition and extent of natural wetlands (1,900 hectares).
	Estuaries <i>Estuary management for environmental benefits and community recreation</i>	L1	<ul style="list-style-type: none"> > Minimal management of estuaries > Only addressing major problems that happen 	L3 ↑↑	<ul style="list-style-type: none"> > Actively manage 13 high priority estuaries.

	Activity Activity description	Current level of service – as described to SIMALTO participants		Proposed change to current level of service	
Community access, involvement and recreation	Vegetation for amenity <i>Manage vegetation around the 2,200 kilometres of urban rivers and creeks to improve appearance; provide green, shady, cool areas; enable community enjoyment and wellbeing</i>	L3	> Manage vegetation along 25% of urban rivers and creeks (550 kilometres)	L3	Unchanged.
	Land access <i>Opening up Melbourne Water land for community use where it is safe to do so</i>	L1	> No additional land opened for community use	L3 ↑↑	> Opening 4 new pieces of land (7 hectares).
	On-water access <i>More launches/ramps along major rivers for recreational boating and kayaking</i>	L1	> Melbourne Water doesn't contribute towards the construction of new access sites	L2 ↑	> Melbourne Water contributes 50% towards construction of five new access sites.
	Waterway restoration <i>Reinvigorating creeks and improving community access to green spaces</i>	L3	> Planting and minor landscaping improvements on 3 small -scale projects	L4 ↑	> Change drains back to natural creeks, plant urban forests, and improve open space and community access on 4 medium-scale projects.
	Community involvement <i>Community education programs about major rivers and creeks across the region (for example, Yarra, Maribyrnong, Werribee)</i>	L1	> Basic information about major creeks and rivers (for example signage, brochures, website info, community education resources)	L2 ↑	> Information about major creeks and rivers, including signage, storytelling and community events and campaigns > Citizen science and education for 6,000+ people.
Flood	Flood preparedness <i>Preparing the community for floods to minimise damage and loss</i>	L2	> Monitor flood levels in some areas at risk and warn affected residents of potential flooding > Provide flood information to the general community > A social media campaign to raise flood risk awareness across all flood affected areas in Melbourne > Flood information and warnings to 20,000 high-risk properties > Would save \$1.4 million per year in repair bills	L3 ↑	> Monitor flood levels in some areas at risk and warn affected residents of potential flooding > Provide flood information to the general community > A social media campaign to raise flood risk awareness across all flood affected areas in Melbourne > Flood information and warnings to another 30,000 high-risk properties (50,000 total) > Would save \$2.3 million per year in repair bills.
	Flood mitigation <i>Minimising the damage caused by flooding</i>	L2	> Flood risks reduced for up to 200 high-risk properties > Would save \$3.0 million in repair bills	L3 ↑	> Flood risks reduced for up to 250 high-risk properties > Would save \$3.6 million in repair bills.

Figure 14 Impact of proposed price-service levels on SIMALTO preference shares

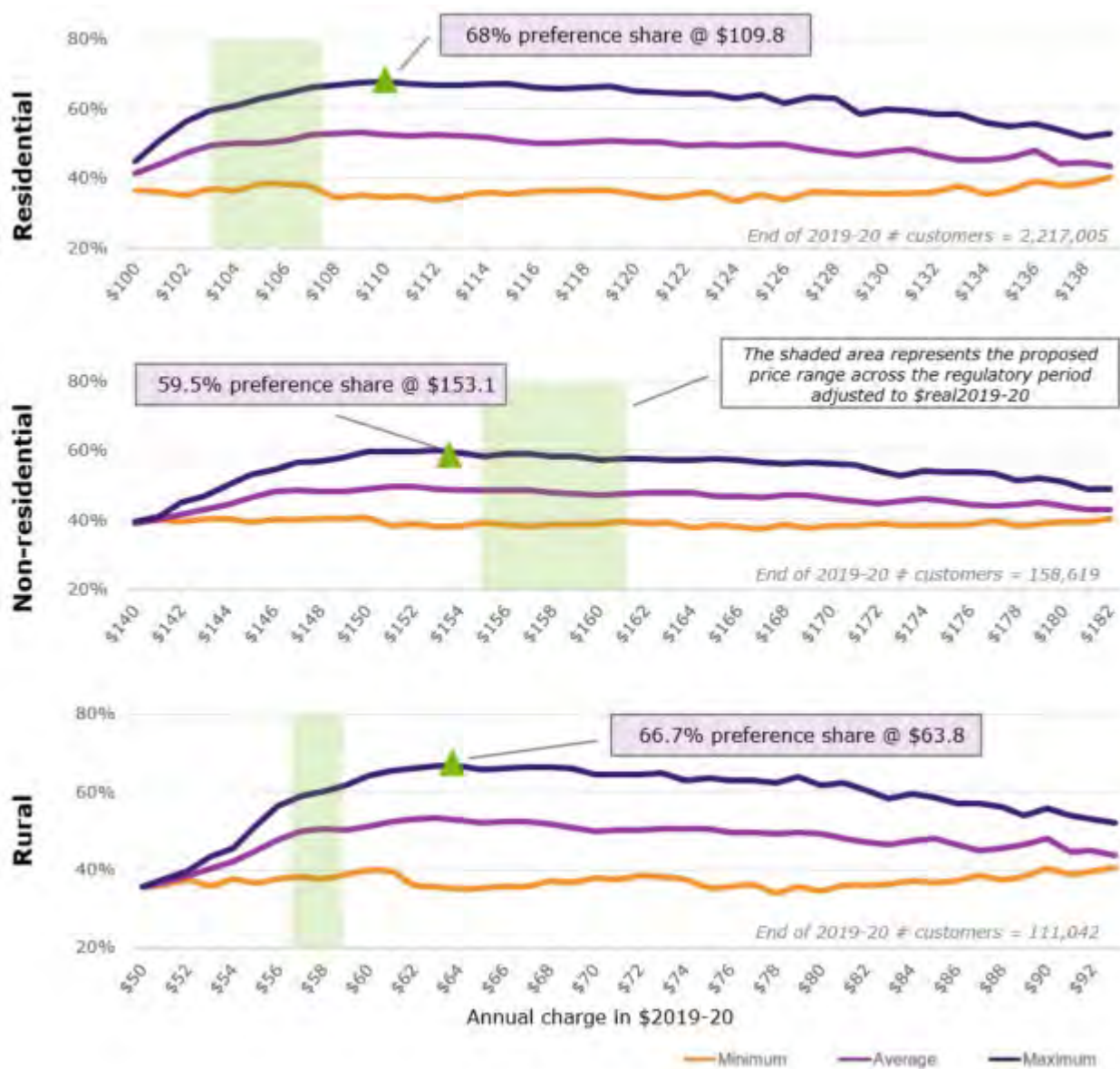


Table 24 Other matters

Matter	What we heard/found	How we responded/used these insights
Length of regulatory period	<ul style="list-style-type: none"> > The WSCC, via the Regulatory Managers Forum, considered this matter in some depth. Shorter (two and four years) and longer (six and seven years) regulatory periods were considered and the pros and cons of each defined. > Each customer retail water company was then asked to nominate a preferred option, including rationale. > Barwon Water, City West Water, South East Water and Yarra Valley Water selected a five-year regulatory period. South Gippsland Water and Western Water did not provide any comment. > Members of the WDCC also considered this question, with some expressing the view that a three-year period may provide a better balance between flexibility and certainty, and reduce the complexity of engagement of a five-year period. 	<ul style="list-style-type: none"> > Melbourne Water proposes a five-year regulatory period for PS21. This is reiterated in Section S4.4.1. > This proposal aligns with the views of the majority of our customer retail water companies. > We note the desire for an appropriate balance of flexibility and certainty behind the feedback from members of the WDCC who favoured a three-year period. We are comfortable that we have a reasonable balance of these factors for PS21 and note that the length of regulatory period will be reviewed again in the lead up to PS26. > <i>Our proposed COVID-19 analysis in Section 2.1 of the Price Submission demonstrates the major revenue-cost risks lay with Melbourne Water. We therefore remain comfortable that a 5-year regulatory period does not place undue risk on our customers in light of the pandemic's emergence.</i>
Form of price control	<ul style="list-style-type: none"> > The WSCC, via the Regulatory Managers Forum, considered this matter in some depth. Price cap, revenue cap and tariff basket forms of control were considered and the pros and cons of each defined. > Each customer retail water company was then asked to nominate a preferred option, including rationale. > Barwon Water and City West Water selected a price cap as their preferred form of price control on the basis of its contribution to price stability and their customers' stated preferences. > Yarra Valley Water selected a revenue cap, again reflecting what it had heard from its customers around questions of fairness and price shocks. > South East Water preferred that a proposal on tariff structures be finalised prior to selecting a preferred form of price control. > South Gippsland Water and Western Water did not provide any comment. 	<ul style="list-style-type: none"> > Melbourne Water proposes to continue with a price cap form of price control. This is reiterated in Section S4.4.2. > We believe this best balances the views we heard from our customers, especially when considered in conjunction with our commitment (Section S3.2.1) to conduct a tariff review post submission of PS21. > The price cap form of control represents the status quo and most commonly applied form of price control. It therefore does not lead to any change to the current sharing of risk between customers and Melbourne Water. > Melbourne Water retains the ability to price below the price cap where actual demands are significantly above forecast – passing through savings to customers/end consumers. > Following the conclusion of the tariff review, and leading into the development of PS26, Melbourne Water will revisit this matter with its customer retail water companies.

Matter	What we heard/found	How we responded/used these insights
Treatment of desalination water orders	<ul style="list-style-type: none"> > The WSCC, via the Regulatory Managers Forum, considered the treatment of annual Victorian Desalination Plant water order costs. > Via its 5 December 2019 communique, the WSCC asked that Melbourne Water include “a forecast desalination order with mechanisms to vary prices should the water order differ from the forecast”. > The WSCC indicated it was supportive of the cost recovery principles behind Melbourne Water’s proposed inclusion of costs associated with any pumping activities necessary to accommodate desalination water within the water supply system. <p><i>Social research</i></p> <ul style="list-style-type: none"> > Quantitative survey results (Community Research by Where^{to}, February 2020) showed that half of Melburnians (48-51%) would prefer to maintain current billing arrangements for desalinated water orders. > This preference was against an alternative of including an assumed water order amount (and associated charge) with a mechanism to adjust up or down based on actual orders. 	<ul style="list-style-type: none"> > Melbourne Water proposes to include a forecast for expected water order volumes to provide better visibility to retail water companies of likely costs. > Neither retail water companies nor households and businesses support the concept of creating a permanent baseline charge that would be levied regardless of order size. > The full detail of our proposal relating to this matter is presented in Section S4.2.
Tariff structure(s) – water and sewerage	<ul style="list-style-type: none"> > The WSCC, via the Regulatory Managers Forum, considered the design (cost allocation) and structure (fixed and variable components) of Melbourne Water’s major water and sewerage tariffs in some depth. > Customer water corporations differed in their views on the appropriateness of Melbourne Water’s current approach to the design and structure of its tariffs. > In general, Yarra Valley Water was in favour of an alternate approach to the design and structure of bulk water tariffs, while City West Water and South East Water either favoured the status quo (headworks tariffs) or felt further customer impact analysis was required to evaluate alternatives (transfer tariffs – South East Water). > The WSCC, reflecting on these differing views, requested in a 5 December 2019 communique that Melbourne Water “make a commitment to fully investigate tariff structures that better meet the Water Industry Regulatory Order (WIRO) tariff principles, within two years”. 	<ul style="list-style-type: none"> > Melbourne Water believes its current tariffs support the WIRO tariff principles and represent a reasonable balancing of the need to recover its revenue requirement (while balancing demand risk), support for policy directions (e.g. DELWP’s 2014 bulk entitlement reforms) and stated customer preferences (divided). > Particularly relevant to this decision is Melbourne Water’s view that the 2014 reforms are in their relative infancy and DELWP is known to be actively considering further reforms in this area. > Noting this work by DELWP, and the WSCC request for a review of our tariff structures, Melbourne Water proposes to conduct a review post submission of PS21. > Melbourne Water’s tariff structure review commitment is detailed against Customer Outcome – <i>Bills kept as low as possible</i> (Section S3.2.1).

Matter	What we heard/found	How we responded/used these insights
Tariff structure(s) – waterways and drainage charge	<p><i>Context</i></p> <ul style="list-style-type: none"> > During the current regulatory period, and consistent with the ESC's <i>Melbourne Water Price Review 2016 Final Decision (June 2016)</i> Melbourne Water commenced the 10-year transition of all non-residential customers on a property-based tariff (net annual value) to a flat minimum tariff. > Our final proposal indicated that ahead of PS21 we would consider whether to shift remaining customers to the flat minimum tariff, or move to an alternative cost reflective tariff arrangement. <p><i>Investigating the introduction of an impervious surface-based tariff</i></p> <ul style="list-style-type: none"> > Melbourne Water commissioned specialist economic consultancy Aither to help frame alternative tariff options for the charge. > Options considered included a single uniform charge for all customers (no distinction between residential, rural and non-residential customers), a charge varied on customer type (current state), a common rate charge on the basis of either total property size or impervious area, or a charge tailored to individual customer impact. > Options were evaluated against principles of efficiency, equity, revenue adequacy and certainty, and administrative burden. > The evaluation did not demonstrate a clear stand out option, with options performing well against economic efficiency (common rate charge based on impervious surface area of tailored to individual customers) aligning poorly on equity (transparency and customer impact), revenue adequacy and certainty, and administrative burden principles. The inverse applied to the single uniform charge for all customers, a charge varied on customer type, and a common rate charge on total property size. <p><i>Social Research</i></p> <ul style="list-style-type: none"> > In the quantitative survey, participants were presented information about the current costs for both residential housing and businesses in managing stormwater runoff. Participants were shown two payment options – the current fixed flat charge model and an alternative 'user pays' approach. > More than half (56%) indicated a preference for continued application of the current flat charge model. 	<ul style="list-style-type: none"> > Having considered the results of the Aither review, customer feedback and our proposed program of work we propose to: <ul style="list-style-type: none"> – continue to transition non-residential tariffs to a flat rate charge via the process commenced in the prior regulatory period; – address the underlying problems associated with growth in impervious surface areas via targeted investment in stormwater and water quality outcomes and the use of environmental performance indicators to measure improvements in impervious surface run-off impacts. > The proposed approach reflects the option with the most balanced assessment according to the Aither review. It also reflects our view that: <ul style="list-style-type: none"> – Potential behavioural change or problem-solving benefits are not well established and are exacerbated by the fact that the charge would only apply to a small proportion of land with impervious surface area – as well as not applying to residential customers it would not cover managers of significant land areas such as Vic Roads who are not subject to the waterways and drainage charge. – Implementation costs and ongoing administrative burden required to encourage behavioural change would be material – there is currently no methodology available to reasonably estimate or verify impervious surfaces on a property. Without this ability the economic efficiency of such a charge diminishes.

S3. Our customer outcomes

Key references relating to this chapter:

A comprehensive description of our engagement program, including outcomes development, is provided in the *PS21 Engagement Report*.

Our customer outcomes (introduced in **Section 3.2** of the Price Submission) are forward-looking and describe the outcomes our customers are looking to us to deliver over the next five years and beyond.

Our best offer includes a balancing of five service-oriented outcomes with a single affordability outcome. Through these outcomes we are seeking to improve the visibility of the alignment between the actions we take, and the services and outcomes our customers value. In the following sections we explore:

- > what each of these outcomes means to our customers and how they are valued by our major customer segments
- > the challenges we are addressing as we deliver these outcomes
- > what we will do over the coming regulatory period to deliver these outcomes
- > the measures we will use to hold ourselves accountable to our customers via the reporting and management approach outlined in **Section S2.3.1**.

S3.1 Outcomes our customers value

S3.1.1 Access to safe and reliable water and sewerage services

Customer outcome

Access to safe and reliable water and sewerage services

77% of community ranked this **#1**

#1 priority for retail water companies

The work we do to harvest, store, manufacture and transfer water to retail water company networks for distribution to households and businesses will enable us to deliver this outcome. So too will the work we do to transfer sewage from retail distribution networks to our two treatment plants, managing odour, inflow and infiltration and spill risks along the way.

For the purposes of this submission only, Melbourne Water has aligned all bulk sewage treatment-related work and expenditure with the outcome *Melbourne's environment, rivers, creeks and bays are protected and Melbourne Water's greenhouse gas emissions are minimised* – this is described in **Section S3.1.2**.

Customer endorsement of the outcome

Our review of the pricing submissions of our customer retail water companies identified a clear desire for continued, and long term, provision of safe, reliable services. This was reinforced throughout our engagement with the WSCC. The draft outcome received strong endorsement from both customer councils and via the community deliberative forum.

Our major customer segments – the retail water companies (via the WSCC) and the community (77 per cent rated this as their number one priority) – agreed that this outcome is a clear number one priority for Melbourne Water. Feedback from the community included:

“This is the fundamental purpose for Melbourne Water to exist. If every other outcome fails, it’s not really a big problem. If this one fails then there are significant consequences.”

“This is Melbourne Water’s core business. This is what I most expect from them and it is the most important.”

Challenges facing the delivery of this outcome

What we knew already

Key challenges facing the delivery of safe and reliable water services include:

- > **Managing risks to human health** (safe) – we continue to develop and refine our understanding of risks to human health arising from the management of our water supply catchments. Risk assessments finalised in 2019 that were undertaken as part of implementation of Melbourne Water’s *Drinking Water Quality Strategy* identified changes to the level and nature of risks associated with more people in and around our catchments, and climatic changes impacting the nature and frequency of bushfires (among others).
- > **Ensuring we have enough water to meet future demand** (reliable) – the confluence of rising demand and weakening supply reliability means our overall water security position is declining. Catchment rainfall and streamflow entering Melbourne’s water storages has declined, to the point that in recent years the demand on the supply system for the Melbourne region has exceeded the water available from rivers and reservoirs. Total demand on the water supply system is currently growing at around 10 gegalitres per year, despite relatively static per capita consumption rates.
- > **Getting water to where it is needed** (reliable) – around 30 per cent of Melbourne’s population growth is expected to occur in outer greenfield growth areas (*Victoria in Future*, 2019), in areas of Melbourne (north and west) that are generally distant from the major water sources in the east. Having been shaped by the city’s previous trend to grow in the eastern and south-eastern suburbs, Melbourne’s bulk water transfer network now needs to cater for growth in these new areas.

Key challenges facing the delivery of safe and reliable sewerage services include:

- > **Managing risks to the environment** – the growth trends outlined above are mirrored in the sewerage network. More people means more sewage. Climatic change also means larger and more frequent wet weather inflows, increasing the risk of spills to the environment as network capacities reach design limits.
- > **... and human health and amenity** – as more people move into Melbourne they are increasingly living in close proximity to sewerage assets. This increases risks to human health associated with environmental spills, but also odour management issues (also amplified by climate change), and our ability to manage and renew assets near households and businesses.
- > **Declining system resilience** – the above factors work in concert to reduce the system’s (transfer network and treatment) ability and flexibility to reliably meet agreed levels of service, and withstand and recover from external shocks. Declining system resilience limits our ability to cost-effectively carry out necessary maintenance, renewal and augmentation works in the transfer network.

Both services also face the challenge of maintaining large existing asset bases.

- > **Renewing older assets** – an ongoing challenge and focus for Melbourne Water is to monitor and review the condition of its assets to ensure that critical assets are managed so that service objectives are not impacted when they reach their end of life.
 - We manage an extensive water supply asset base, which includes 10 storage reservoirs, 221 kilometres of aqueducts, 1,070 kilometres of water mains, 41 service reservoirs, 14 earthen basins, and 14 water treatment plants across a significant geographical area.
 - We also manage over 400 kilometres of sewer mains, 8 pumping stations, 14 air treatment facilities and the ETP and WTP, which together treat over 80% of Melbourne's sewage. For sewerage in particular, climate driven increases in wet weather inflows (both size and frequency), and temperature, have the potential to accelerate corrosion and exacerbate our ongoing renewal challenge.

What we heard through engagement

Preferences expressed by the WSCC in relation to the safe and reliable water services started from the premise that "water security is a high priority for our customers". The WSCC requested clarity around Melbourne Water's approach to long-term water security. It was also highly supportive of prudent investments to "preserve the opportunity" in areas such as stormwater harvesting or recycled water reuse where pilot or small-scale initiatives now may help to deliver prudent, large scale investments in the medium to longer term.

We also asked households and businesses about their preferences in relation to Melbourne Water pursuing changes to specific aspects of the bulk water service relating to current levels of recycled water and harvested stormwater, and their ability to help ensure we have enough water to meet demand.

Community views included:

- > broad support for the idea that Melbourne could and should **recycle** more sewage (74 per cent net agree), framing it as a combination of responsible use of a waste stream and contribution to improved water security. There was a reluctance to fund this, with qualitative survey participants preferring a user pays approach, and 41-44 per cent of quantitative survey respondents selecting the status quo rather than funding an increase in distribution and greater re-use of recycled water from the ETP.
- > support across all group discussions for increased investment, and focus on **stormwater recovery** and recycling for a combination of resource utilisation and water security rationales. This translated into >75 per cent support for additional investment in stormwater harvesting to support drinking water supplies **and** deliver environmental outcomes.

Similarly, for the bulk sewerage service we asked households and businesses for their views on additional investments in system resilience and odour management across the integrated (both transfer and treatment) sewerage service. For simplicity, discussions included here are not repeated when treatment is discussed in the following section. Community views included:

- > broad support for the idea that Melbourne should have a sewerage system that is resilient and well positioned to cope with future challenges. Overall, 72-76 per cent of participants in the quantitative survey were willing to fund increased investment to improve system resilience.
- > odour management was tested via qualitative survey only, with the issue generating robust discussion and diverse opinions. Despite some who were unwilling to accept odour as an issue requiring Melbourne Water intervention, in group discussions most indicated a willingness to fund additional odour management activities.

What we will do to deliver safe and reliable water services

> Ensuring we have the water we need

– The *Melbourne Water System Strategy* (2017) establishes three key pillars to ongoing water security. Our proposal includes investments and activities against each of these pillars:

1. *Manage demand* – we continue to work closely with retail water companies and government to implement the Target 155 water saving initiative to optimise per capita demands.
2. *Optimise what we have* – this includes continued use of the Victorian Desalination Plant (a 125 gegalitre order has been placed for 2020-21), returning the Yan Yean Water Treatment Plant to active service, and other operational activities such as moving water within the system to ensure we get full value from desalination water orders.
3. *Add new supply* – in the current regulatory period the major project under this pillar is the Cement Creek Diversion which will add an estimated 8-10 gegalitres per annum in incremental yield to the system (range represents median historic climate scenarios). Beyond the PS21 period we will continue to monitor the supply-demand balance and are actively working with DELWP on the optimal timing and location of Melbourne's next major supply augmentation (expected to be a desalination-based supply).
 - Under the scenarios presented in the *Melbourne Water System Strategy*, the water supply system is expected to be able to reliably meet water demands until 2028, at which time supply from the next major augmentation may be required.

- Balancing customer desire to “do more” with recycled water and stormwater, with mixed support to pay more for this use, and strong feedback that we “keep bills low”, our strategy for PS21 remains focused on delivery of least cost augmentation options. Over the next five years our priorities will be:

- Support greater beneficial use of recycled water, particularly from the ETP (where there is ample Class A recycled water available at high pressure) via a fixed price supply agreement with South East Water. South East Water advised Melbourne Water in March 2020 that it is progressing a business case for the Dingley recycled water scheme. If implemented this would see additional high-quality recycled water going to beneficial re-use without requiring additional Melbourne Water investment.
- Explore opportunities to develop a viable pathway (including via local government or retail water company partners) for the development of stormwater-based water supplies (whether to potable standard or via third pipe networks as is done for recycled water). There are a number of stormwater harvesting projects proposed for PS21 in support of the environmental outcome presented in **Section S3.1.2** (and funded by the waterways and drainage charge). Melbourne Water's investment in these projects, such as A10418 Sunbury Stormwater Harvesting Infrastructure 2021-26, is driven by waterway health benefits.

Our involvement includes a desire to test and develop through practice, important governance (for example, asset ownership and bulk entitlements questions), policy (level of desired and permitted use in homes) and financial (sources of funding) aspects relating to the development of stormwater resources. Our investments in these projects, via the waterways and drainage charge, “preserve the opportunity” to develop or co-develop future stormwater-based water supplies. For example, the Sunbury project has the potential to add 3-4 gegalitres of treated stormwater per annum to Western Water’s existing supply mix. This may offset or complement any additional supply needed from traditional rainfall-based or future desalination-based supplies.

> **Getting water to where it is needed –**

To service growing demand in the north, west and south-east, a range of augmentation options were developed and assessed with retail water companies, and the preferred solutions consist of ‘just-in-time’ transfer and network storage augmentations. Demand growth forecasts in these areas exceed forecasts at the time of PS16, and a step change in transfer and storage augmentation projects are planned for PS21 to service this demand. These include the Yan Yean to Bald Hill Pipeline, Mt Atkinson Reservoir Inlet Pipeline, Yan Yean Pump Station and Mt Atkinson Service Reservoir.

> **Making sure it is safe –** Keeping our water supplies safe in the face of the challenges identified above requires new investments for PS21. These include: measures to control human access to drinking water supply catchments; bushfire risk reduction activities and deer control programs; commencement of the Cardinia Reservoir Catch Drain System Capacity Upgrade and the Coranderrk-Maroonah Pipeline; and delivery of the Winneke Water Treatment Plant ultraviolet disinfection system. In some cases, managing these risks now through lower cost options, such as controlling human access, enables us to defer (or avoid the need for) more expensive interventions such as the introduction of an ultraviolet disinfection system at the Silvan Water Treatment Plant.

> **Renewing existing assets –** Renew assets where age and condition profiles show that they are no longer fit-for-purpose.

What we will do to deliver safe and reliable sewerage (transfer) services

We will deliver safe and reliable sewerage services that address the challenges outlined above via two key investment pillars:

- > **Maintaining what we have –** we are significantly increasing the size of our renewal program for PS21 with a large portion of that increase accounted for by a single project – the Hobsons Bay Main Yarra crossing duplication (\$135.8 million) which will address the risk of failure for an aging, critical asset that carries considerable sewage flows.
 - Over the past five years an increased focus on condition monitoring, has shown that our concrete sewers are deteriorating faster than anticipated. This insight, along with failure incidents (for example a Maribyrnong River Main event in late 2017), has led to a recalibration of how we plan sewer transfer renewals on a large portfolio of aging assets. This means increasing our focus on early intervention, such as relining small sewers and increasing ventilation in large sewers, in order to defer or avoid far more costly whole of asset replacements.
 - To support decision-making, we are also investing in collecting more data (for example via a state-of-the-art long-range sewer monitoring boat to conduct radar wall thickness measurements in large concrete sewers) and research projects to better understand the root cause of the increased corrosion rates.
- > **Expanding capacity where it is needed –** investments to ensure the network has capacity to meet the challenges of a growing population will also increase, albeit more modestly. Projects such as the Maribyrnong Main Sewer Augmentation will increase capacity to cope with increasing flows from population growth and mitigate the risk of service level failures.

In addition to the capital projects above, our proposed operating expenditure will enable us to continue to transfer raw sewage, monitor, inspect and maintain sewers and associated assets such as air treatment facilities, and plan for long-term resilience in the sewerage system.

On odour and corrosion-related matters, our focus will remain on prudent management of these matters in accordance with our obligations.

Likewise, in balancing the overall investment program and customer outcome “*Bills kept as low as possible*”, we are relying on specific projects within the investment program (across transfer and treatment) to deliver some uplift in system resilience. For example, the ETP lamella thickener recommissioning project, will free up capacity in some constrained process units.

Water service and sewerage transfer service expenditure (excluding corporate expenditure) supporting the achievement of this outcome is summarised below.

Expenditure	PS16 determination	PS21 expenditure	Impact on prices
Opex	Annual average \$111m (\$557m in aggregate)	Annual average \$102m (\$510m in aggregate)	Average impact per customer will decrease from \$66.7 per customer in 2020-21 to \$64.6 per customer at the end of 2025-26 – an annualised decrease of -0.6 per cent <i>Water order impacts are not included in this analysis.</i>
Capex	Annual average \$166m	Annual average \$269m	

Tracking performance

We propose two output measures (Table 25) to demonstrate our commitment to delivering the safe and reliable water supply outcome. The first focuses on the safety of our water supply, while the second focuses on availability, as measured by retail water company pressure requirements. A third output is proposed for the safety and reliability of the sewage transfer system. Each of these measures received high support and clarity ratings from our deliberative panel.

S3.1.2 Melbourne’s environment is protected

Customer outcome

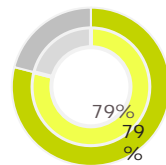
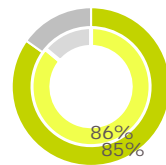
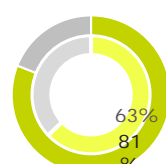
Melbourne’s environment, rivers, creeks and bays are protected and Melbourne Water’s greenhouse gas emissions are minimised

38% of community ranked this **#1 or 2**

#4 priority for retail water companies

We will deliver this outcome through the work we do (funded by our waterways and drainage charge) to manage stormwater quality, protect and enhance our waterways, manage our land assets, manage litter, and respond to emergency and pollution events. Melbourne Water also has a role to play in reducing greenhouse gas emissions – helping to protect the environment at both the local (Melbourne) and global level. Other aspects of what we do, such as supporting urban development and coastal management, also contribute to the achievement of this outcome; however, we have chosen to align these with the “*Melbourne remains liveable as it deals with the impacts of climate change and population growth*” outcome.

Table 25 Measuring success – “Access to safe and reliable water and sewerage”

Measuring success		Suitability of measure					Customer view			
Output 1 Number of <i>Safe Drinking Water Act</i> non-compliances (water sampling and audit) (#)		The <i>Safe Drinking Water Act 2003</i> and associated <i>Safe Drinking Water Regulations 2015</i> provide the legislative basis on which Melbourne Water must manage the safety of the water it supplies to retail water companies. They also set out the risk management, drinking water quality standards and reporting requirements which Melbourne Water must meet.								
Output 2 Compliance with retail water company pressure requirements (%)		Pressure is a critical measure of the ability of end users (and retailers) to be able to use water. When pressure is too low, end users experience either no supply or very low flow rates, impacting some appliances and adding time to simple tasks such as filling a sink. Pressure is a critical element of the Bulk Water Supply Agreements between Melbourne Water and the retail water companies.								
Output 3 Number of sewage transfer system spills per annum due to system failure (#)		Containment of sewage within the sewerage system is a comprehensive measure of transfer network performance and reliability, encompassing hydraulic capacity, level of service (e.g. sewer pump availability) and operational strategy.								
■ Agree or strongly agree with statement “I fully support Melbourne Water measuring their performance through this” ■ Agree or strongly agree with statement “This measure is clear to me”										
Output	Past performance				Expected	Target for PS21				
Year	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Output 1	0	0	0	0	0	0	0	0	0	0
Output 2	>99.9%	>99.9%	>99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Output 3	0	0	2	1	0	0	0	0	0	0

Our sewerage service also plays a strong role in the protection of Melbourne's environment. For simplicity, we have chosen to focus on the sewage treatment function's role in delivering this outcome. In reality, the transfer network (**Section S3.1.1**) also plays a critical role. *Customer endorsement of the outcome*

This outcome is strongly supported by our customers – both our retail water companies and the community indicated a strong desire to continue to protect and enhance Melbourne's environmental assets. Feedback from the community included:

“This is definitely an outcome I do agree that Melbourne Water should be aiming to achieve. To be honest, in reading all of this, I'm impressed by how they are trying to achieve this outcome.”

“It is actually reassuring to see that they are also looking after so much of our habitat and are so environmentally aware.”

Challenges facing the achievement of this outcome

What we already knew

The *Healthy Waterways Strategy* (2018) provides a roadmap for a shared approach to the maintenance and improvement of Melbourne's waterways. It articulates both the challenges associated with a growing population and changing climate as well as the opportunities for better waterway management. It highlights that in a number of areas if we do not act now, we will set our region on a path whereby many of the effects will be increasingly expensive to manage later, and others will be irreversible.

One of the central challenges facing Melbourne Water in this pricing period is to ensure that we deliver targeted and

measured actions to deliver on the *Healthy Waterways Strategy*.

Key challenges facing the achievement of this outcome over the next five years include:

- > **reducing pollutants** – greater quantity and frequency of litter, nutrients (including via stormwater runoff and the sewerage system) and pollutants entering waterways and bays
- > **protecting natural processes** – vegetation clearing and grazing, and interference with natural water flows continue to add to the stresses facing the natural processes that underpin healthy waterways
- > **controlling pests** – increasing risk of aquatic and marine pest introductions and spread in estuaries as water temperatures rise and boat traffic grows with population.

To contribute effectively to the delivery of this outcome, the sewerage (treatment) service must overcome challenges such as:

- > **protecting receiving environments as Melbourne grows** – more people means more sewage requiring treatment and ultimately higher levels of nutrients entering our bays and Bass Strait at the end of the treatment process. This is particularly relevant for the WTP. The sewerage catchments of this plant have experienced a higher percentage of Melbourne's overall population growth over the past five to 10 years and this trend is expected to continue (*Victoria in Future Small Areas*, 2019) (sewage demands are discussed in further detail in **Section S5.4**). Combined with a prudent 'just-in-time' augmentation philosophy a number of elements of the WTP are now at capacity based on current population levels.

> **greater expectations and responsibilities** – relating to greenhouse gas emissions and biosolids management:

- the *Statement of Obligations (Emissions Reduction)* introduced in March 2018 sets Melbourne Water a target of 204,380 tonnes carbon dioxide-equivalent (t CO₂-e) greenhouse gas emissions by 2025 – this is approximately a 50 per cent reduction against the baseline period. We are also required to determine a path to net zero by 2030.
- Melbourne Water's emissions from both the ETP and WTP are also subject to reporting and management obligations under the *National Greenhouse and Energy Reporting Act 2007*. In particular the *safeguard mechanism*, which came into effect on 1 July 2016, requires responsible emitters to manage their emissions against a baseline. Where either the ETP or WTP has, or is likely to, exceed its baseline, Melbourne Water is obliged to manage the excess emissions situation, including via the purchase of approved (Australian carbon credit units) offsets. Our growing population and activities such as maintenance on biogas capture systems increase direct emissions and are likely to trigger the need to purchase offsets under the safeguard mechanism during PS21.
- the Environment Protection Authority (EPA) has indicated its intent to require Melbourne Water to achieve 100 per cent re-use of annual production of biosolids from the WTP within a reasonable timeframe. Based on a consultation process with customers and regulators, Melbourne Water proposed targets of at least 40 per cent (approximately 17,000 tonnes per annum) re-use by 2025-26 and 100 per cent (approximately 45,000 tonnes per annum) re-use by 2030-31, both of which are expected to be approved by the EPA.

- > **Keeping an eye on new risks** – emerging contaminants are potentially harmful substances in sewage that are not yet regulated. These include small plastic particles in cosmetics, nanoparticles in food and personal care products, new and existing chemicals, and emerging pathogens and their genetic material. Some of these substances are toxic to marine organisms and can also bioaccumulate in the environment.

Existing assets, such as sewage treatment plants and constructed wetlands contributing to our delivery of this outcome, also require maintenance and renewal as they age to ensure they continue to do the job they were designed to do.

What we heard through engagement

We sought customer input into the design of appropriate levels of service for a number of activities funded by the waterways and drainage charge. We also asked households and businesses for their views on how we should best discharge our responsibilities in relation to greenhouse gas emissions and biosolids management.

- > Customer support for investment in **waterway condition** including vegetation, estuaries and wetlands, and stormwater controls was consistent and strong across the focus groups, customer preference and willingness-to-pay surveys, and deliberative panel. The top two reasons customers cited as driving the worthiness of the overall waterways and drainage charge were a *"Need to look after and keep our waterways clean"* and *"Good for the environment"*. Support for specific service elements included (unless otherwise stated 'customers' include residential, rural and business customers):
 - The deliberative panel was very interested in **stormwater quality and harvesting**, and reinforced strong quantitative survey results, which included a clear desire for an increase in current levels of service – greater removal of stormwater pollution and collection and re-use of stormwater. Stormwater harvesting and quality were the number one and two priorities under the preference modelling for each customer segment.
 - **Vegetation for environment** – customers expressed a clear preference that we work to maintain the current condition of waterways, acknowledging that to be achieved, a lift from the current spend is required.
 - Customers (via the quantitative survey) indicated a willingness to fund an improvement in condition and extent of **natural wetlands** from 600 hectares to 1,500 hectares (20 to 63 wetlands) managed by Melbourne Water.
 - Similarly, a higher level of service was desired for **estuary management**, with all customers willing to fund an increase from minimal management activities (current) to active management of 10 (business customers) to 13 (residential and rural customers) high priority (those with the highest benefits for wildlife and recreation) estuaries. During the first deliberative panel session, estuary research was fully supported by 58 per cent and mostly supported by an additional 27 per cent.
 - While the quantitative survey indicated strong customer support for an increase in the level of service for **litter management** in our rivers, wetlands and estuaries, further exploration at the deliberative panel agreed a stronger focus on prevention (representing a smaller increase in expenditure) rather than downstream litter removal was preferable.

- > Those surveyed were strongly supportive (80 per cent agree) of research into **biosolids** re-use, as well as re-using and recycling as much as possible (74 per cent). When tested quantitatively, 64 per cent of respondents indicated a willingness to fund activity beyond the minimum required by the EPA. This level of support reduced to 54 per cent when tested simultaneously with other initiatives, suggesting it was seen as a lower priority overall.
- > Customer views on how Melbourne Water meets its **emissions target** were sought in relation to the purchase of carbon offsets. Customers expressed a preference that Melbourne Water become more energy efficient, rather than needing to buy offsets. Carbon offsets are a mechanism viewed with some caution by community respondents as some people feel unsure of how they work, and there is perceived risk of greenwash. Despite this most survey participants showed a high level of interest in climate action, with 63 per cent supporting purchase of offsets above and beyond our current obligations – either in the form of offsetting emissions ahead of the target, or paying more for offsets that deliver additional social or environmental benefits. Overall, 37 per cent of respondents preferred obligations be met at a lowest cost, while 34 per cent of respondents indicated a willingness to fund the highest benefit offsets and cut emissions as quickly as possible.

What we will do to protect Melbourne's environment

Sewerage

Our bulk sewerage (treatment) service will contribute to the achievement of this outcome via investments and activities that maintain what we already have while ensuring service standards are maintained as we accommodate more and more people across Melbourne. We will continue to meet our treatment plant licence requirements and also deliver against our obligations in relation to emissions reduction and biosolids management.

Specific activities and investments include:

- > **Maintaining what we have** – our renewal program includes an increase in spend across the five years (compared to PS16). This represents the combination of ongoing renewals of civil, mechanical and electrical assets and a number of large renewal projects such as the renewal of the WTP's biogas plant, anaerobic pot cover segments, and the ETP's power station. We are also increasing our focus on civil asset renewals at ETP and WTP in order to address emerging groundwater quality risks.
- > **Adding new capacity** – investments such as the WTP primary treatment augmentation and 55E ASP Upgrade, will enable us to protect Melbourne's receiving environments while handling and treating more sewage than ever before, particularly at the WTP. Our 'just-in-time' augmentation philosophy means these large projects in particular are needed to prevent the degradation of service standards as we deal with demand increases associated with recent population growth (**Section S5.4**). Growth driven capital investment in our two major treatment plants is typically lumpy rather than steady. The discussion in **Section S5.4** includes reference to the stronger historical and forecast growth within the catchment of the WTP (catering for an additional half a million people between 2016 and 2026). This is a strong driver of the increase in growth expenditure at this plant.
- > **Meeting our greenhouse gas emission targets** – including via:
 - Realisation of the benefits of increased renewable energy generation projects constructed during the current regulatory period to reduce Scope 2 emissions (114,000 t CO₂-e). Further reductions in Scope 2 emissions will result from projects planned for the PS21 period to maximise utilisation of captured biogas through upgrade and renewal of biogas handling infrastructure at the ETP and WTP and renewal and augmentation of the power station at the ETP (48,000 t CO₂-e).

- Purchase offsets against direct treatment process (Scope 1) emissions commencing in 2021-22. We will purchase a mixed portfolio of Australian Carbon Credit Units to meet the *safeguard mechanism* from 2021-22 and an additional portfolio of global offsets from 2024-25 to meet the Victorian target. This approach will see us focus on meeting our obligations and delivering a mixed portfolio of offsets that meets the diverse expectations of our customers (our Carbon Pledge summary document contains further details and is available upon request).
- Development of a carbon forestry project to gain expertise in self-generating offsets and help meet customer preferences for local offsets.
- Scope 1 abatement projects, emission measurement and investigations.

> **Meeting our biosolids management targets** – via a mixture of continued partnerships with local farmers to reuse biosolids from the WTP and local (opportunistic) reuse opportunities within Melbourne. We propose to meet at least the minimum 40 per cent target at the WTP in terms of both scale and timing.

- Reuse quantities can vary significantly from year to year, but in 2019-20 Melbourne Water achieved over 100 per cent reuse from the WTP by stimulating agricultural demand in western Victoria. This was achieved on the back of investment over a number of years in relationships with farmers to take WTP biosolids for land application. Farmers value our biosolids and their steady and timely availability is critical to the maintenance of an ongoing relationship.
- Our decision to fund the achievement of the minimum 40 percent target from 2021-22 is based on a combination of the need to maintain and grow existing levels of demand over the coming period in order to be able to meet the 100 percent reuse target in 2030-31, as well as majority customer support (54%) for earlier achievement of commitments.

- In the 2016 regulatory period we demonstrated the value of large one-off reuse opportunities, by using over 1 million tonnes of biosolids stockpiled at the ETP to remediate a local landfill and for geo-technical works at the ETP. The shorter haulage distances involved (approximately 15 kilometres) yielded savings in excess of \$19 million during PS16 compared to agricultural reuse where haulage distances are typically between 50 and 120 kilometres.

These measures are based around the funding required to prepare and transport biosolids from treatment plant to reuse site (Melbourne Water receives no income from the reuse). Both are critical to our ability to meet our commitments and contribute to the achievement of the *Melbourne Sewerage Strategy* (2018) goals of greater resource recovery via the transition to a circular economy.

> **Effectively managing known and emerging risks** – including via

- ongoing monitoring of, and research into, the risks posed by known and emerging contaminants found in the effluent streams from our treatment plants, helping to identify mitigation strategies and preparing for likely future regulation. This includes risks to land and groundwater. The management approach proposed for PS21 includes enhanced monitoring programs for soil and groundwater, controls associated with water retaining civil structures, including condition monitoring and renewal programs, and assessment of the risks to receiving environments, and potential beneficial uses.
- increased odour monitoring at the WTP to support compliance with the site's EPA licence as WTP's odour risk profile increases due to a combination of increased organic load and encroaching development. We are not proposing an increase above base year expenditure on opex management activities, meaning Melbourne Water will bear the risk that more expensive opex measures or capital investments are needed to manage odour at the WTP during the regulatory period.

Waterways and drainage

Our stormwater and healthy waterways service portfolios will play central roles in the delivery of this outcome, supported by the land, and emergency and pollution portfolios. Key actions we will take to deliver this outcome include:

- > **Waterway condition** – we will protect and enhance waterway condition via continued investment in vegetation for the environment, focusing on protecting high-value areas, and uplifts in estuary and natural wetland investment. Respecting customer willingness-to-pay for an uplift in natural wetland investment our approach in PS21 is predicated on a pilot program to gauge landowner willingness and costs given these wetlands are on private property, prior to considering a larger uplift ahead of PS26. To ensure that our efforts deliver against the customer outcome above, and the objectives of the *Healthy Waterways Strategy*, we will continue to invest in monitoring, evaluation, reporting and improvement.
- > **Stormwater management** – reflecting both the underlying need and strong community preference for more work in this area, we will increase (both operating and capital expenditure) investment in stormwater management. This includes a \$96 million increase in capital investment to deliver up to 8 gigalitres of stormwater capture and an increase in our maintenance expenditure. We will also continue to support and provide incentives to empower other relevant stakeholders to contribute further in this space.

> **Land management** – as the second largest landholder in Victoria, we will continue to provide a strong focus on managing our substantial portfolio of land to minimise safety risks, manage pests and invasive species and protect sites of biodiversity significance.

> Reflecting the deliberative forum's final views on **litter management**, our efforts in this space will be strategic, seeking to focus on high-impact activities rather than a material uplift in litter collection activities. This activity supports both this outcome and that "*Melbourne remains liveable as it deals with the impacts of climate change and population growth*".

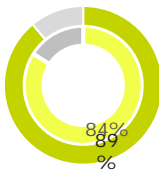
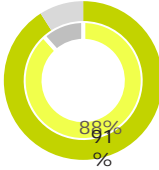
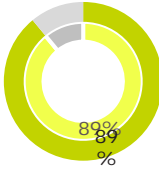
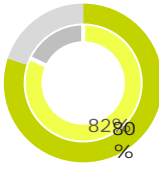
Service-based expenditure (excluding corporate expenditure) supporting the achievement of this outcome is summarised below.

Tracking performance

We propose four output measures (**Table 26**) to demonstrate our commitment to the achievement of this outcome. The first focuses on the health of our waterways via a lead indicator, while the second focuses the quality of our sewage discharges from treatment plants. The third and fourth outputs address the work we are doing with biosolids and greenhouse gas emissions to deliver better environmental outcomes. Each of these measures received high support and clarity ratings from our deliberative panel.

Expenditure	PS16 determination	PS21 expenditure	Impact on prices
Sewerage			
Opex	Annual average \$85m (\$424m in aggregate)	Annual average \$91m (\$454m in aggregate)	Average impact per customer will increase from \$50.3 per customer in 2020-21 to \$53.7 per customer at the end of 2025-26 – an annualised increase of 1.3 per cent
Capex	Annual average \$121m	Annual average \$192m	
Waterways and drainage			
Opex	Annual average \$64m (\$322m in aggregate)	Annual average \$65m (\$326m in aggregate)	Average impact per customer will decrease from \$30.5 per customer in 2020-21 to \$29.2 per customer at the end of 2025-26 – an annualised decrease of 1.3 per cent
Capex	Annual average \$34m	Annual average \$64m	

Table 26 Measuring success – “Melbourne’s environment is protected”

Measuring success		Suitability of measure					Customer view			
Output 1 Rivers (10 sites rated in high or very high condition) will not decline in health as indicated by macroinvertebrates. Target set as 100% of target sites maintain current rating level. The baseline ratings for the target sites were established in 2018-19 as part of the finalisation of the <i>Healthy Waterways Strategy</i> .		Macroinvertebrates (small but visible animals without a skeleton, such as insects and crustaceans) are an excellent indicator of overall river health. They are sensitive to impacts such as increased turbidity and nutrient levels in waterways caused by greater impervious surface areas and climate change (temperature) as well as management interventions. Melbourne Water has a long-term macroinvertebrate dataset, with more than 9,000 samples collected over the past two decades and a commitment to continue to collect this data. We also have a robust statistical model that predicts macroinvertebrate response to urban pressures and climate change for the greater Melbourne region. The <i>Healthy Waterways Strategy</i> has considered individual threats, as well as cumulative impacts, to waterways such as the combination of climate change and changing intensity of stormwater flows. Macroinvertebrates are a key environmental value used to track <i>Healthy Waterways Strategy</i> long-term outcomes to protect and improve river condition.								
Output 2 Compliance with treatable parameter effluent discharge limits as specified in the ETP and WTP EPA licences.		The treatment plants are designed for removal of specific contaminants known as ‘treatables’ (biological oxygen demand, ammonia and suspended solids), which have environmental impact above certain levels particular to the receiving water.								
Output 3 Maintain beneficial re-use of WTP biosolids. Re-use of at least 40% of that financial year’s production (dry tonnes) – three-year rolling average).		The EPA requires Melbourne Water to beneficially re-use biosolids from the WTP, with staged targets of at least 40% of annual production by 2025-26 and 100% by 2030-31 (measured as a three-year rolling average). Over 30 years of biosolids production from the ETP has recently been re-used and the ETP is presently not included in the EPA requirement. Biosolids from Melbourne Water sites are re-used in the agricultural, and land remediation sectors.								
Output 4 Net greenhouse gas (GHG) emissions (kt CO2-equivalent)		Globally, reducing greenhouse gas emissions will reduce the environmental impacts of climate change. Melbourne Water’s Carbon Pledge sets a target to limit emissions to less than 204.38 kilotonnes CO2-e (kt CO2-e) by 2024-25. This target has been proposed as the output KPI target for 2024-25 and 2025-26. We are not proposing to set output KPI targets for earlier years.								
■ Agree or strongly agree with statement “I fully support Melbourne Water measuring their performance through this” ■ Agree or strongly agree with statement “This measure is clear to me”										
Output	Past performance				Expected	Target for PS21				
Year	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Output 1	New	New	100%	100%	100%	100%	100%	100%	100%	100%
Output 2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Output 3	2.9%	7.1%	10.1%	44.3% ¹	61.3% ¹	≥40%	≥40%	≥40%	≥40%	≥40%
Output 4	440	456	431	514	495	N/A	N/A	N/A	<204.38	<204.38

Note 1: Interim as at 14/8/20, pending completion of WTP biosolid stockpile volume surveys, which have been delayed as a result of the COVID-19 pandemic.

S3.1.3 Melbourne remains liveable as it grows

Customer outcome

Melbourne remains liveable as it deals with the impacts of climate change and population growth

25% of community ranked this **#1 or 2**

#3 priority for retail water companies

Melbourne Water's response to this outcome will be delivered primarily via our flood risk, stormwater, urban development, coastal management, and community access, involvement and recreation services – services funded by the waterways and drainage charge. Our water and sewerage services will also contribute via modest programs that represent high-value additions to core service provision.

Our customer councils were both highly supportive of actions that address liveability challenges, noting the importance of these to households and businesses. Community members described a strong affinity with this outcome and were widely supportive of making more natural spaces available for Melburnians to use recreationally. Feelings expressed by community members included:

"This is my favourite outcome – it makes complete sense that areas around pipelines and waterways should be utilised and managed to that people can use them. It is important to the community that they can access areas around waterways given that land is so precious and so much land is being lost and aligns well with this value."

Challenges facing the achievement of this outcome

What we already knew

Key challenges we are seeking to address in delivering this outcome include:

- > growing **flooding risks** to people, property, infrastructure and the natural environment as the frequency and intensity of storms increase, sea level rises, and the number of people living in Melbourne (and within already flood prone areas) and the level of impervious surfaces continues to grow
- > the number of people wanting **access** to green space (including waterways) **for recreation** increases as our population grows.
 - A specific recreational challenge for Melbourne Water includes playing its role in supporting the State Government's whole-of-State water plan, *Water for Victoria*, which includes an expectation that Victoria's water resource managers consider and support the wellbeing of communities who enjoy the recreational benefits these assets provide (or could provide).
 - While Melbourne Water's reservoirs are currently optimised for the core purpose of drinking water supply, reservoir parks open to the community at Melbourne Water's major reservoirs are located downstream of the reservoir walls, with access to the upstream catchment generally excluded (in all but Sugarloaf) to protect water quality.

- An initial screening assessment of several recreation/fishing options at Melbourne Water's reservoirs, including on-water and off-water options, indicated that additional water treatment (and cost) would be necessary to manage the risks on-water and off-water recreation options (including shore and canoe-based fishing) pose to Melbourne's drinking water supplies. The assessment found that recreational benefits may be greater than mitigation costs at Tarago and Yan Yean reservoirs (subject to further assessment).

What we heard through engagement

Our customers were engaged on the topic of greater access to Melbourne Water land and water assets via social research. Separate surveys were conducted for the waterways and drainage service, and the water and sewerage service. Similarity in content was limited to access to land for improved community connection and recreation.

- > **Flood risk management** – customer support for flood risk management activities was strong with both residential and rural customers supporting an increase in efforts to minimise the damage caused by flooding and better prepare the community in order to minimise damage and loss when flooding does occur.
 - Some respondents felt that flood preparedness was important to develop more resilient communities, while some felt that the service was only relevant for people living in flood-prone areas who would already be prepared, and so money would be better spent elsewhere. A few also highlighted the importance of prevention or mitigation to reduce repair and insurance costs and maintain reliable drainage systems.
- > **Vegetation for amenity** – distinct from vegetation for the environment, this aspect of the waterways and drainage service covers management of vegetation in urban areas for aesthetic, shade, cooling and other amenity benefits. The majority of residential customers reflected a desire to maintain current levels of service and expenditure, while business and rural customers were content with a lowering of expenditure and service level. Focus groups considered this a very highly appreciated program.
- > **Access to open space and recreation** – in relation to greater open space and land-based recreational activities, customers expressed a preference that we consider opportunities to:
 - open up more Melbourne Water land for community access and public open space, such as retarding basins, where suitable from an operational perspective
 - transform more concrete drains back to natural creeks, and improve open space and community access, noting that residential customers (where this program is currently in place) were happy with the current level of investment, while rural and business customers were willing to fund an expansion in the scale and scope (greater level of intervention) of works to reinvigorate creeks and improve community access to green spaces
 - increase access along major rivers for recreational boating and kayaking
 - co-invest and work with partners such as councils and community groups to make spaces safe along pipetrack land (water and sewerage service).
- > **Recreation on reservoirs** – there is some support for the concept of opening up new recreational activities on water supply reservoirs.

Quantitative survey results testing this question individually and via SIMALTO model suggested that up to 58-62 per cent of customers would be willing to pay more on their water bill to fund open space and recreation opportunities on reservoirs.

What we will do to contribute to Melbourne's ongoing liveability

Waterways and drainage

Over the next five years Melbourne Water's waterways and drainage charge will fund a range of **flood risk management, community access and recreation activities**, and **vegetation for amenity** activities that will contribute to our achievement of this outcome. We will reduce flood risk and impact, transform more concrete drains into community spaces, increase use and accessibility of flood prone land and plant trees to improve urban amenity and urban cooling. Key actions we will take to deliver this outcome include:

- > delivering an uplift in our **flood mitigation and preparedness** activities – both capital and operating – targeting known high-risk areas, while maintaining our efforts to renew and maintain existing assets
- > **vegetation for amenity** – continuing to provide a strong focus on our vegetation for amenity activities, maintaining expenditure and level of service at current levels in line with the expressed preference of our customers. We will also maintain litter and mosquito management efforts in this space
- > **recreation** – reflecting community support for greater activation of available land for recreation, we will increase our expenditure in areas relating to recreational paddling access (co-establishing five new platforms), activating retarding basins (two to four sites), and investing in four to five new sites under the *Reimagining Your Creek* program that transforms drains into naturalised waterways.

Water and sewerage

Melbourne Water's water and sewerage services will also make a modest contribution to the achievement of this outcome, generally in line with historical levels of expenditure.

Key actions our water and sewerage charges will fund to deliver this outcome include:

- > Support **community access, involvement and recreation** at the WTP by employing a dedicated Visitation Support Officer and improving visitation infrastructure at the site and along the decommissioned Main Outfall Sewer ('Greening the Pipeline' project).
- > Acknowledging community support for these works was moderate (44 per cent support), Melbourne Water will invest \$6.0 million (A10412) to deliver necessary works (such as a safe path network around key birdwatching sites) to address safety risks to visitors and operators, meet statutory, policy and strategic obligations and at the same time enhance the experience of existing visitors.
- > in relation to **recreation on reservoirs**, Melbourne Water has included an allocation to facilitate the necessary works to enable recreation on one of two reservoir catchments (either Yan Yean or Tarago) during the regulatory period.

Service based expenditure (excluding corporate expenditure) supporting the achievement of this outcome is summarised below.

Tracking performance

We propose two output measures (**Table 27**) to demonstrate our commitment to the achievement of the liveability outcome. The first output measure focuses on a reduction in flood risk. This measure was supported by a majority of deliberative panel respondents, but received a less than 50 per cent rating around clarity. We remain of the view that this is a key measure of our work to protect Melbourne's liveability and propose to include plain English descriptions of the work we do and our performance against this outcome in our performance reporting. The second output will measure community perceptions of the work we do to make Melbourne Water land useable. This is a new measure and moves away from tracking projects to tracking community value. It was rated highly in terms of both support and clarity.

Expenditure	PS16 determination	PS21 expenditure	Impact on prices
Waterways and drainage			
Opex	Annual average \$32m (\$161m in aggregate)	Annual average \$39m (\$197m in aggregate)	Average impact will be \$17.7 per customer at the end of 2025-26, up from \$16.7 in 2020-21.
Capex	Annual average \$41m	Annual average \$39m	
Water and sewerage			
Opex	No comparable prior spend	Annual average \$1.1m (\$5.5m in aggregate)	Average impact will be \$0.63 per customer at the end of 2025-26.
Capex		Annual average \$2.1m	

Table 27 Measuring success – “Melbourne remains liveable as it grows”

Measuring success	Suitability of measure	Customer view								
Output 1 Flood risks are reduced for customers most at risk.	<p>Melbourne Water delivers a number of programs designed to reduce both the likelihood and the consequence of a flood event impacting property.</p> <p>Melbourne Water has developed a model to quantify the risk (in dollar terms) a flood event poses to customers within the Melbourne region. This risk is quantified in annual average damages (AAD).</p> <p>The model includes assumptions related to mitigative actions (including actions taken by others) including flood education and warnings (and assumed customer response), land use planning (including Planning Scheme Amendments/overlays) and physical works such as stormwater barriers or conveyance infrastructure.</p>	<table><tr><td>48%</td><td>52%</td></tr></table>	48%	52%						
48%	52%									
Output 2 Community benefit achieved for 100% of projects where land or assets are activated for community use.	<p>Urbanisation (driven by population growth) is typically associated with densification of suburbs and a decrease in available public green open spaces – particularly when considered in a hectare per person context. There are a number of studies highlighting the benefits communities derive from access to open space and nature for health and wellbeing.</p> <p><i>“Human interaction with nature is vital for physical health and mental well-being, and positions a community to be resilient to urban stressors.”⁸</i></p> <p>This output helps the city to cope with urbanisation by increasing the stock of usable green space via Melbourne Water-controlled lands that are presently unusable or underutilised.</p> <p>So that the output can talk meaningfully to the outcome, this output will be measured in terms of community benefit. Is the community aware of the change to the space and would they, or do they, use it now that it is available?</p>	<table><tr><td>79%</td><td>87%</td></tr></table>	79%	87%						
79%	87%									
<div><div></div> Agree or strongly agree with statement “I fully support Melbourne Water measuring their performance through this”</div> <div><div></div> Agree or strongly agree with statement “This measure is clear to me”</div>										
Output	Past performance				Expected	Target for PS21				
Year	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Output 1	New – measure presented as a declining AAD value				\$735m	\$733.1m	\$730.8m	\$728.7m	\$727.2m	\$725.5m
Output 2	New	New	New	New	New	100%	100%	100%	100%	100%

⁸ Lev E, Kahn PH Jr, Chen H and Esperum G. (2020) *Relatively Wild Urban Parks can Promote Human Resilience and Flourishing: A Case Study of Discovery Park, Seattle, Washington*. Front.Sustain.Cities 2:2. doi: 10.3389/frsc.2020.00002

S3.1.4 Melburnians are empowered to support the design and delivery of service outcomes

Customer outcome

Melburnians are empowered to support the design and delivery of service outcomes

16% of community ranked this **#1 to 3**

#6 priority for retail water companies

This outcome covers the work we do in partnership with local government and community groups in the delivery of our waterway and drainage services. It also includes our efforts to empower the community through education (for example, via increased understanding of the water cycle) so it can better contribute to water-saving initiatives, step changes in the use of stormwater and recycled water, and programs that seek to protect and enhance the health of our waterways.

While not rated as a top priority by either customer councils or the community, both groups recognised the importance of this outcome in supporting the effective delivery of other outcomes and empowering the community to get involved in matters that affect them. Some of the feelings expressed by community members included:

"It does make sense to have some community involvement in the health of rivers and it is something Melbourne Water should aim for as this is easier to manage with extra help."

"Strongly agree that this level of community engagement is needed as it would be really beneficial to Melbourne Water if everyone was more conscious of their environmental footprint as it will affect our water and sewerage systems."

Challenges facing the achievement of this outcome

What we already knew

Our ongoing engagement programs have highlighted the growing desire of our customers to be involved in the design of personalised products or services in all areas of their lives. We are also conscious of the growing expectations being placed upon us to deliver more and more while keeping bills as low as possible. Empowering our customers to co-deliver or co-contribute to cost-effective and, in some cases transformational, service provision will become increasingly important to our ability to meet customer expectations in this regard.

The *Healthy Waterways Strategy* (2018) is a pertinent example of this challenge. It provides a roadmap for a **shared** approach to the maintenance and improvement of Melbourne's waterways. It articulates both the challenges associated with a growing population and changing climate as well as the opportunities for better waterway management. It highlights the need for a collaborative, community-based approach to addressing the many challenges facing our local environment. The *Flood Management Strategy* (draft 2020) also clearly articulates the need for shared responsibility in reducing flood risk across the region in light of climate change and population growth and the important role the community plays in being flood prepared and flood resilient.

Challenges of shared responsibility are also apparent in our water and sewerage services. Addressing the medium to long-term impacts of population growth, climate change, and affordability requires us to find new, more cost-effective and, in some cases transformational, ways of delivering our core services, and/or rising to meet new community expectations (for example, greater utilisation of resources). Whether through behavioural change, which can help to delay costly augmentations, or willingness to adopt new technologies, such as stormwater harvesting or use of recycled water in the home, the key challenge is to broaden and deepen our conversations with our customers.

Melbourne Water also has obligations in relation to Aboriginal values and Traditional Owners that are directly relevant to this outcome. Among other things, we are required to:

- > consider Aboriginal cultural values and uses
- > consult and engage with Traditional Owners through strategic planning and development
- > integrate economic, environmental, and equity considerations with Aboriginal cultural considerations.

The *Healthy Waterways Strategy* establishes a range of relevant performance objectives and identifies that cultural values are currently not well understood or documented. Improved data, methodologies and Traditional Owner knowledge are needed to better understand the cultural values established in the *Healthy Waterways Strategy*, so that catchment-specific targets and performance objectives can be developed for both Aboriginal and other cultural values.

What we heard through engagement

Our customers have indicated a strong preference that we consider opportunities to:

- > support greater levels of community involvement in, and understanding of, waterways and the role they play in Melbourne's environment and liveability. This was wholeheartedly supported during engagement with the WDCC, with the council expressing concern about a perceived lack of end-user understanding of the value and complexity of waterways, and its impact on community support to deliver on the objectives of the *Healthy Waterways Strategy*.

> increase levels of community education about major rivers and creeks across the region, as well as the water cycle as a whole:

- 73 per cent of those surveyed agree that it is important for Melbourne Water to educate Melburnians about what they do, and 67 per cent believe educating Melburnians more about the water cycle is a worthwhile investment
- 56 per cent (tested simultaneously with other initiatives) of those surveyed indicated support for a small increase in their water and sewerage bills to fund greater expenditure on digital education programs
- in every group, focus group participants spontaneously commented that they thought the public should be educated about the waterways and drainage charge, even once they understood that money from the charge would need to fund this (though without any specific dollar amounts discussed). They saw value in this because the education they received in the group discussions had given them much more acceptance of the charge as well as a sense of ownership, and some even noted that it might flow on and encourage people to treat waterways better.

The quantitative survey did not test cultural values as a service but it was covered in the qualitative focus groups. While the focus groups highlighted a lack of understanding about what this activity involves within the waterways and drainage space, most participants were eager to learn more. There was also general agreement about the importance of involving Traditional Owners in waterway management and that cultural values should be acknowledged.

What we will do to empower Melburnians

Melbourne Water intends that the delivery of this outcome will become part of the way we deliver each and every service outcome. By empowering Melburnians to collaborate with us on the design and delivery of services they value, we will deliver more than we could on our own. Specific actions we will take over the next five years to achieve this outcome include:

Waterways and drainage

- > In relation to **cultural values** over the longer term, one of our priorities is to form trusted relationships with Traditional Owners and promote our region's 'living culture' through our *Reconciliation Action Plan*. Within the PS21 period we propose to continue to develop a culturally competent organisation by partnering with Traditional Owners on a range of activities and projects, and by implementing our *Reconciliation Action Plan*.
- > **Healthy waterways** – provide strong backing to the *Healthy Waterways Strategy* implementation plan, seeking to deliver an uplift in co-delivery from partners and the broader community. This will include regular engagement with a broad range of stakeholders including DELWP, Parks Victoria, local government, community groups and retail water companies.
- > Collaborate with project partners, community representatives and residents to transform creeks via the *Reimagining your creek* program and improve accessibility to Melbourne Water land. By co-designing these transformations with people most likely to use the creeks and open space, we are creating waterways and desirable places where the community can interact with nature in cooler, healthier environments. This will include:

- empowering Melburnians (including local government, community groups, not-for-profit organisations, research bodies, landholders, Traditional Owners) via our **partnerships program** to deliver and co-deliver waterway health and stormwater management outcomes
 - **co-investment in stormwater management (Section S3.1.2)** to deliver important pilot projects in stormwater harvesting and infiltration with local government and retail water company (Western Water) partners.
 - actions outlined in **Section S3.1.3** to increase the level at which we co-contribute to structures that enable the community to better access the waterways themselves, such as kayaking platforms and entry points.
- > Our flood preparedness activities (also outlined in **Section S3.1.3**) will also serve to empower Melburnians by providing better information around vulnerability to flooding events and actions that can be taken to reduce flood risks.

Water and sewerage

Households and businesses make decisions every day relating to how much water they consume and what they put into the sewerage system. Empowered customers are able to make informed choices in relation to how they interact with these services and the impact their choices have in terms of the cost of the service. For example, individual decisions to achieve Target 155 support our collective ability to avoid/delay restrictions or augmentation. Households and businesses are also better able to contribute to informed discussions around longer-term planning decisions when well informed.

This is particularly the case where choices involve commonly used but high-cost solutions, and lower cost but less commonly used (and potentially transformational) solutions. Some transformational solutions require changes to community values, as well as to policy and regulatory settings. Public education over a long period (in the order of 10 years) is essential to achieve this. Improved public awareness of the sewerage system will also contribute to the achievement of the *Melbourne Sewerage Strategy's* (2018) Community Stewardship goal.

We will therefore continue, and prudently expand in line with customer feedback (outlined above), our efforts to increase the water literacy of Melburnians. Our proposal focuses on **increased investment in digital education resources** to significantly expand their current reach. Our proposed investments in this space include a capital allocation (component of A10441) for increased digital resources, \$480,000 in opex (over five years) to continue current education activities (such as supporting the Kids Teaching Kids conference) and maintain our existing education and cultural precinct at the WTP.

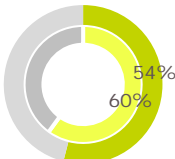
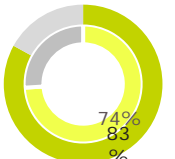
Service based expenditure (excluding corporate expenditure) supporting the achievement of this outcome is summarised below.

Tracking performance

We propose two output measures (**Table 28**) to demonstrate our commitment to the achievement of this outcome. We will measure the level of participation in the waterways and drainage incentive programs, focusing on the work we do to empower others to contribute to healthy waterways outcomes in particular. In response to support and clarity ratings of 54 and 60 per cent respectively we have introduced a definition for "active participation". As a second output measure we will measure community water literacy, targeting an improvement from current levels to a greater than 75 per cent rating for those surveyed with moderate or above ratings. This measure received high support and clarity ratings from the deliberative panel.

Expenditure	PS16 determination	PS21 expenditure	Impact on prices
Waterways and Drainage			
Opex	Annual average \$7m (\$37m in aggregate)	Annual average \$9m (\$43m in aggregate)	Average impact will be \$3.43 per customer at the end of 2025-26, up from \$3.32 in 2020-21 – an annualised increase of 0.6%.
Capex	Nil	Nil	
Water and sewerage			
Opex	No comparable prior spend	Annual average \$0.5m (\$2.0m in aggregate)	Average impact will be \$0.27 per customer at the end of 2025-26.
Capex		Annual average \$1m	

Table 28 Measuring success – “Melburnians are empowered ... ”

Measuring success		Suitability of measure				Customer view				
Output 1 The level of active participation in waterways and drainage incentives programs will be maintained		<p>Education, support and empowerment of our community and service delivery partners is critical in delivering service outcomes relating to improved vegetation, runoff management and erosion control.</p> <p>Achievement of <i>Healthy Waterways Strategy</i> performance objectives is dependent on our ability to work with and leverage the support of private landholders and others.</p> <p>Providing financial incentives and associated support is key to driving engagement with private landholders and others (e.g. local government), creating and supporting long-term partnerships that enable us to achieve outcomes in priority locations where we otherwise could not.</p> <p>‘Active participation’ will be defined by:</p> <p>a) organisations and private landholders who have made successful grant applications in a given year</p> <p>b) number of projects that received funding in a given year.</p> <p>To meet the target, either of the above definitions needs to be maintained for the given year, relative to the baseline.</p>								
Output 2 Increase the proportion of the community with a moderate (or better) level of water literacy		<p>‘Water literacy’ is knowledge about all aspects of the water cycle including rainfall and runoff, rainfall and non-rainfall based water supplies, stormwater management, sewage management and other related issues.</p> <p>A water literate community comprises customers who are informed about the cost-benefit trade-offs associated with decisions relating to water cycle management at the household and system level. Informed customers are empowered to participate in the shaping of Melbourne’s water future, via consumption decisions (e.g. adopting water saving behaviours) and via engagement on decisions such as augmentation with non-traditional water sources.</p> <p>Our water literacy measure utilises a survey that ranks people using a low, moderate, high scale. Achieving our target requires us to target those with a low ranking, moving them to moderate or better via effective education programs.</p>								
<div>■ Agree or strongly agree with statement “I fully support Melbourne Water measuring their performance through this”</div> <div>■ Agree or strongly agree with statement “This measure is clear to me”</div>										
Output	Past performance				Expected	Target for PS21				
Year	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Output 1	New	New	New	1,000 / 830	Maintain FY20 levels (at least 1,000 projects, or 830 participants)					
Output 2	New	New	New	69%	70%	≥75%	≥75	≥75	≥75	≥75

S3.1.5 Easy, respectful, responsive and transparent customer service

Customer outcome

Easy, respectful, responsive and transparent customer service

65% of community ranked this **#6**

#5 priority for retail water companies

This outcome covers the work we do across our business to engage with, and respond to, the various customer groups we introduced in **Section S1.1**. It includes the work conducted by our Customer Service Centre, established in October 2015, which operates as a formal, first point of contact for Melbourne Water customers. It also extends throughout our business to the many and varied points of interaction we have with our retail water company customers, developers, local government and engaged community groups, industry groups and the State Government. It includes the way we communicate and engage with our customers as we develop strategies, plan and execute works, and respond to feedback, queries or complaints.

Great customer service was a consistent theme of our engagement program and is reflected strongly in the customer outcomes of our retail water companies. 'Easy', 'respectful', 'responsive' and 'transparent' were the key words our customer councils felt best encapsulated the way they would like their interactions with Melbourne Water to be.

While not rated as a top priority by either customer councils or the community, both groups expect Melbourne Water to deliver against this outcome.

Challenges facing the achievement of this outcome

What we already knew

We have worked hard in recent years to improve our relationship with our various customer groups, but we know there is more work to be done. We understand that our customers are many and varied and that each customer has a different expectation of how we deliver services and interact with them. Some of the key challenges we face going forward include:

- > **Declining trust and transparency** – Our annual environmental scan process has highlighted that trust in institutions and organisations is declining globally, with the community seeking greater levels of organisational transparency and social responsibility, irrespective of industry or sector. If we allow this to translate to lower trust in Melbourne Water it will impede our ability to work with our customers to deliver the services they desire now and into the future.
- > **Changing expectations** – Our environmental scans also show we are entering an era of hyper-connectivity as the community's expectations shift from seeking information to receiving personalised, real-time content, on the device or channel of an individual's choosing. People are increasingly looking for a relationship with service providers that goes beyond the transactional. We know this applies to us too.
- > **More interactions** – As the number of people calling Melbourne home grows, so too does the number of people accessing our services, making enquiries and contributing to, and being impacted by, our works. Managing more and more interactions as Melbourne grows, while striving to address changing expectations, is our core customer service challenge.

What we heard through engagement

The WSCC emphasised consistently throughout the engagement program its desire to see a strong focus on customer service in our proposals. This was derived from the council's own review of its member customer outcome statements, under the banner of 'modern and innovative services':

"The broader community expects timely communication and engagement, simple and convenient services and that retail water companies are 'easy to deal with' and the service is simple and convenient."

Focusing on the development of PS21, the WSCC placed a strong focus on transparency as it relates to the triumvirate of risk, expenditure and pricing in its December communicate.

Through our community deliberative panel we heard:

"Most of us have to, at some time or another, try to communicate with providers about issues and I have to say that I often dread it as it is often likely not to be easy, responsive or in fact transparent."

"Customer service has deteriorated so badly across most industries, which brings frustration and anger having to try to get any result or sense out of the call centre employees."

"Transparency is something that we all want and the ability to communicate with the providers is a way of fostering a long-term relationship between consumer and provider."

What we will do to deliver easy, respectful, responsive and transparent customer service

> **Focus on trust and transparency today and tomorrow** – our *Customer and Community Strategy* already commits us to the delivery of services that are highly valued through "*stronger relationships that deliver on expectations*" and "*exceptional experiences for those we interact with*". Over the coming period we will:

- continue to focus on our digital channels (including our *YourSay* website) to reach more people – in both number and diversity – providing easy and transparent access to information about our strategies and programs
 - implement our *Customer Improvement Plan* to steer our business focus on to the customer and align customer outcomes with service portfolios to build understanding that each business unit has control of specific outcomes
 - establish a *new* customer forum(s) (**Section S2.3.2**) to support an ongoing conversation with our customers on our performance, appropriate responses to underperformance (or notable over-performance) and on their preferences as they relate to the services we provide and the manner in which we provide them.
- > Adapt our customer service approach to **meet changing community expectations** – we continue to identify and implement more meaningful ways for our customers and the community to express their preferences, inform our decisions and, where possible, work with us to co-design solutions. One of the ways we are seeking to do this is through our NextGen Community Engagement Program, which aims to embed best practice engagement at all points in our business.
- Continue to apply a continuous improvement mindset to adapt and improve our customer service harnessing customer and community insights gained through engagement, social and customer research, relationship management and other feedback processes.
 - Further develop our digital services (customer portal, website, social media) to enable our customers to interact with us how and when they want to, on the device of their choosing.

Expenditure (predominantly waterways and drainage service and excluding corporate expenditure) supporting the achievement of this outcome is summarised below.

Tracking performance

We propose a customer satisfaction/experience measure in four parts (one for each major service area) for this outcome (**Table 29**). This measure is a deepening of our existing reputation survey and will create a sharper focus on each service area. This approach received high support and clarity ratings from our deliberative panel.

Putting responsive and transparent customer service into action

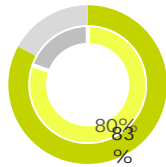
Responding directly to requests from the WSCC Melbourne Water is pleased to commit to the introduction of GSLs relevant to our bulk water and sewerage services and the conduct of a comprehensive review of our tariff structures.

We propose to report on progress on these matters via the proposed customer forum(s). Delivery of these commitments will form a key plank of our “performance” assessment as part of our next price submission.

Our GSL commitment is outlined in **Section 3.3** of the Price Submission. Our tariff structure review commitment is described below.

Expenditure	PS16 determination	PS21 expenditure	Impact on prices
Opex	Annual average \$17m (\$85m in aggregate)	Annual average \$20m (\$102m in aggregate)	Average impact will be \$8.08 per customer at the end of 2025-26, up from \$7.51 in 2020-21 – an annualised increase of 1.5%.
Capex	Nil	Nil	

Table 29 Measuring success – “Easy, respectful, responsive and transparent ... service”

Measuring success	Suitability of measure	Customer view								
Output 1 Customer satisfaction – bulk water services	<p>The CSAT (customer satisfaction) score provides us with the ability to report against key components of transparency, ease of doing business and timeliness.</p> <p>Currently measured for customers via a reputation study. We have established a baseline for customer satisfaction, but the sample size needs to expand to increase our level of confidence in the results.</p> <p>Reputation is a metric for brand health, a more mature CSAT metric is currently under development to measure CSAT by service, and will have the ability to report against key components of transparency, ease of doing business and timeliness.</p>									
Output 2 Customer satisfaction – bulk sewerage services										
Output 3 Customer satisfaction – waterways services										
Output 4 Customer satisfaction – drainage services										
<div>■ Agree or strongly agree with statement “I fully support Melbourne Water measuring their performance through this”</div> <div>■ Agree or strongly agree with statement “This measure is clear to me”</div>										
Output	Past performance				Expected	Target for PS21				
Year	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Output 1	N/A	8.3	7.5	7.7	7.7	7.9	8.0	8.1	8.2	8.3
Output 2	N/A	6.8	7.3	7.7	7.9	7.9	8.0	8.1	8.2	8.3
Output 3	N/A	7.3	7.3	6.4	6.6	6.8	7.0	7.2	7.4	7.5
Output 4	N/A	6.5	6.4	6.2	6.4	6.5	6.6	6.6	6.7	6.8

Water and Sewerage Tariff Structure Review

Responding directly to a second request from the WSCC, Melbourne Water is also committing to a comprehensive review of our tariff structures, to conclude not later than October 2022. Key features of the review to be conducted by Melbourne Water include:

- > a review of bulk water and sewerage tariffs only. Review to include tariff structures and underlying cost allocation methodologies
- > consideration of the potential of non-tariff measures (for example, publication of long run marginal cost estimates) to address any issues identified with the status quo
- > review to be led by Melbourne Water and conducted collaboratively with DELWP and all retail water companies receiving a bulk water or bulk sewerage tariff from Melbourne Water
- > Melbourne Water will seek to establish a process and timeline that concludes not later than October 2022. Where practicable, and where supported by affected retail water companies, Melbourne Water would explore the potential for implementation of any agreed changes to coincide with the commencement of the next retail water company regulatory period
- > Melbourne Water proposes the following key stages for the review:

Stage 1 – Establish baseline

Melbourne Water to develop an explicit tariff strategy document that outlines how we design (for example, allocate costs) and structure (for example, fixed and variable elements) our tariffs. This will explicitly set out how we believe our current tariffs support WIRO/policy/ESC principles.

Stage 2 – Co-design objectives

Work collaboratively with DELWP and retail water companies to define key issues/end outcomes seen as desirable for participants within the Melbourne market. Input from the ESC may be sought on an as-needs basis to test proposed objectives against the WIRO or other elements of the regulatory framework.

Reference to DELWP reform projects/ investigations that are underway would likely

be required to ensure policy alignment wherever practicable.

Clearly identify and define any differing or competing objectives of the members of the review.

Melbourne Water to consider and propose its criteria for evaluating any recommendations made by the participants in the review. This may be particularly relevant to the resolution of issues for which there are competing preferences or recommendations among the group. For example, possible criteria (in addition to better meeting the WIRO tariff principles) may include: 1) impact on revenue risk; 2) alignment with DELWP or Ministerial policy positions; and 3) alignment with clear customer preferences.

Stage 3 – Options development and evaluation

Work collaboratively with DELWP and retail water companies to define and evaluate key tariff and non-tariff measures available to achieve end outcomes identified in Stage 2. The impacts of changes would be modelled by Melbourne Water and shared to aid in evaluation by the interested parties.

Stage 4 – Recommendations

Relevant parties would be asked to make recommendations to Melbourne Water on their preferred future state and implementation pathway or considerations.

Stage 5 – Decision making and implementation (if any)

In evaluating the recommendations made by the interested parties Melbourne Water would refer to the baseline established in Stage 1 and the co-design objectives in Stage 2.

Where a decision is made to alter the design and/or structure, Melbourne Water would prepare a plan to implement the revised tariffs, seeking feedback from impacted parties on factors such as when (for example, at commencement of Melbourne Water's PS26 regulatory period or at commencement of next retail water company regulatory period) and how (for example, staged impact or immediate impact).

The review does not include revisitation of the revenue requirement or form of price control.

S3.2 Balancing service and price

S3.2.1 Bills kept as low as possible

Customer outcome

Bills kept as low as possible

38% of community ranked this **#1 or 2**

#2 priority for retail water companies

We understand affordability and financial hardship are key concerns for many members of the community, now more so than ever. We also understand that affordability is personal and subjective to each individual, household and business. Our commitment to keep bills as low as possible is our way of supporting bill paying customers.

This outcome is addressed via the way we manage our business to deliver the services our customers value. Critical business processes across customer engagement, strategic planning, capital planning, and delivery and operational management all contribute to our ability to keep bills low while delivering our service commitments.

This outcome is highly valued by both of our major customer segments. Retail water companies ranked this a clear number two priority, after safe and reliable water and sewerage services. Similarly, this outcome was identified as a core priority at the community forum's commencement, and 38 per cent ranked it as a top-two priority on the forum's final day.

"Keeping bills low would be priority one [for me] at the moment."

"I'm certainly glad to see that Melbourne Water is working hard to keep our bills low ... considering I'm only on a low income myself, it's definitely good to see them wanting to keep our bills as low as possible!"

Our customers expect us to deliver on the five service-focused outcomes. They expect

us to do this in a manner that also keeps their bills as low as possible.

Challenges facing the delivery of affordable services

What we already knew

Key challenges facing our achievement of this outcome include:

- > **delivering the service outcomes our customers value requires investment** – the challenges facing the delivery of our service-focused outcomes are described above. What each of these have in common is that they all seek to maintain or improve the current level of service we provide, while accommodating more people and dealing with external challenges such as climate change. This requires investment, which places upward pressure on our revenue requirement and prices
- > **new service obligations and inflation add to the challenge** – externalities that add to the challenge for Melbourne Water are new service obligations arising from our regulatory environment (for example new EPA expectations relating to biosolids management, or government policy to explore recreation on water storages, manage cultural values and provide coastal erosion advice) and general price inflation
- > **affordability challenges are very real and our customers cannot 'opt out'** –

"In 2015-16, the overall poverty rate in Victoria was 13.2%. The poverty rate was 12.6% in greater Melbourne and 15.1% in the rest of the state."

Victorian Council of Social Services (2018)

- The poverty measure cited above is one end of a broader affordability spectrum. Poverty and affordability are real challenges that affect many of the households and businesses who consume or access our services. We recognise the privileged position Melbourne Water holds as a monopoly service provider, the significant role our charges play in the affordability of the services provided by the retail water companies, and ultimately our impact on household and business budgets.

What we heard through engagement

Customer affordability and value for money were recurring themes of our engagement program. This message was prominent and consistent in the feedback we heard from our retail water companies via the WSCC:

- > As well as requesting opportunities to understand and test our emerging expenditure proposals, the WSCC expressed a clear and consistent desire that Melbourne Water work to maintain flat (or declining) prices.

"We have been consistent in our feedback that the submission should seek to achieve flat (or declining) prices. ... Our customers want stable or declining prices and we would like Melbourne Water to explore more options, such as smoothed or individual price paths, before the final submission is made." (WSCC, May 2020.)

Affordability was also prominent in our engagement with households and businesses; however, the insights we received from both our waterways and drainage (Newgate, 2020) and water and sewerage service customer research (Where to, 2020), showed that some customers were open to the idea of small increases to their bills in exchange for higher levels of service across the majority of topics tested.

- > For water and sewerage services tested via community research, group discussions and the online survey revealed strong levels of support for a

majority of the initiatives proposed. Via the SIMALTO survey, respondents indicated a willingness to pay in the order of an additional \$8.80 on their annual bill to help fund their choice of initiatives. This excludes the \$10.08 annual bill component related to smoothing the effect of paying for water orders from the Victorian Desalination Plant.

- > Survey results for waterways and drainage services indicated that customers (72 per cent of residential, 67 per cent of rural and 61 per cent of business customers) were willing to pay a slightly higher charge overall. A SIMALTO model was then used to identify the optimal service mix based on customer preferences.

The WDCC did not discount the importance of focusing on affordable service delivery, however it preferred to emphasise the service challenge in delivering on the *Healthy Waterways Strategy's* outcomes and the additional investment this was perceived to entail. In its strategic advice to Melbourne Water it stated:

"A business-as-usual level of investment will result in a significant decline in the health of our waterways and increased flooding impacts. A step-change of investment in the health of our waterways is required. Our waterways are subject to unprecedented pressures of climate change and urbanisation, and have already deteriorated due to lack of investment. Current or reduced pricing for the waterways and drainage charge will result in a radical reduction in the health of our waterways and a severe decline in the ecological benefits that waterways provide. ... An increase of anything less than 5% in the charge will result in a sharp degradation in the next five years and will incur longer-term increases in costs and a significant reduction in asset values."

Keeping prices as low as possible

Our approach to the delivery of this outcome for PS21 is founded upon a mixture of a commitment to robust management

processes, an increased focus on transparency and a conscious shifting of risk from customers to Melbourne Water:

- > A track record of, and commitment to, continuous operating expenditure efficiency. We are delivering a base controllable opex forecast that is declining in real terms at **0.05 per cent per annum** across the period while supporting a growing population.
- > Robust capital governance ensuring a capital program that is both prudent and efficient, and deliverable via a scalable delivery engine capital program – *Our approach to capital development and delivery is described in **Section S6.2**.*
 - > Deliberate shift of risk from customers to Melbourne Water via deferral of \$498 million in projects with sound business cases deferred entirely until the early years of PS26 and a further of \$271.3 million in capex from years one and two, into years three (\$9.3 million), four (\$45.3 million) and five (\$216.6 million). The effect of this second decision is to reduce our aggregate revenue requirement by \$42.9 million.
- > Significant increase in the annual rate of capitalisation of Victorian Desalination Plant security payments (water service only) – total of \$399 million over the regulatory period – an increase of \$235 million compared to PS16. *Our approach to capitalisation of security payments is described in **Section S6.5**.*
- > An increased focus on expenditure transparency between pricing periods. Our retail water companies requested 10 to 15-year forward views of expenditure and pricing. Responding to this, Melbourne Water (and in addition to the forecasts presented in this submission) will publish an annual view of the two core drivers of long-term prices that are within Melbourne Water's control:

1. Operating expenditure per connected property.
2. Regulatory asset base size (RAB) (closing balance) per connected property.

Further discussion of our opex and capex forecasts and their development is provided in **Section S6**. Forecast RAB values are provided by major service in **Section S7**.

What this will include

These two building blocks, when combined with the return on and of capital, form the basis for our tariffs. These values would be divided by total connected households (per service) to normalise for the households who ultimately pay our tariffs. For both of these drivers we will publish historical (actual expenditure) and forecast values on a \$/customer basis (inclusive of any known new obligations), with reasonable assumptions about the longer term. Comparison with the determination forecasts would also be presented.

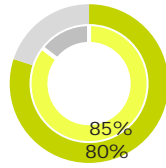
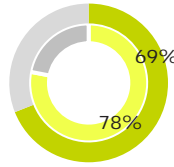
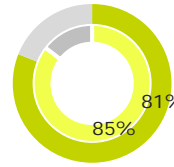
We are open to exploring assumptions about future cost of capital and depreciation assumptions which would convert the RAB driver into a \$/customer price impact.

Figure 5 and **Figure 6** in **Section 3.5** of the *Price Submission* are illustrative of the way we intend to present these metrics.

Tracking performance

We propose three output measures to demonstrate our commitment to the achievement of this outcome (**Table 30**). The first focuses on our commitment to ongoing efficiency gains, while the second and third focus on our control of expenditure and increased transparency of operation within regulatory periods. Each of these measures received high support and clarity ratings from our deliberative panel.

Table 30 Measuring success – “Bills kept as low as possible”

Measuring success		Suitability of measure				Customer view				
Output 1 Identify and commission new efficiency projects (New net opex benefits of >\$500k identified and committed each year)		<p>Melbourne Water’s opex is a significant contributor to total revenue requirement and customer bills.</p> <p>Melbourne Water’s total opex building block is estimated to rise from \$440m in FY22 to \$510m in FY26 (4 March 2020 estimate).</p> <p>Embedded within the opex allowance for PS21 is a positive allowance for growth and a negative allowance for efficiency.</p> <p>Melbourne Water’s ability to meet this target over time is dependent upon its commitment to the discovery, definition and delivery of new efficiency projects.</p> <p>This output builds on the commitments made within the pricing submission by proposing the identification of committed benefits that are in addition to the committed opex determination values.</p> <p>The output is deliberately agnostic as to whether or not the benefits are realised in PS21 or PS26. It is intended to demonstrate our mindset of continuous improvement and commitment to keeping customer bills low over time.</p>								
Output 2 Opex aligned to determination (%)		<p>PS21 is founded on our view of prudent and efficient expenditure. Our actual expenditure in the final year of a regulatory period forms the efficient ‘baseline’ for the subsequent regulatory period (with adjustments for one-off events or new obligations). Providing an annual reconciliation of actual expenditure to determination expenditure will:</p> <p>> increase transparency around how Melbourne Water is tracking to forecast (and how the subsequent regulatory baseline is progressing)</p> <p>> provide a year-on-year view of ‘new obligations’ and one-off events</p> <p>> increase the rigour with which we assess and sign off on new obligations in real time.</p>								
Output 3 Capex aligned to determination (%) Actual capex each year is equal to or greater than determination allowance each year (calculated on a rolling average basis so that where expenditure is brought forward in one year the subsequent ‘underspend’ against determination recognises this)		<p>Melbourne Water’s PS21 is founded on its view of prudent and efficient expenditure.</p> <p>Melbourne Water can ensure its capex contributes to low prices by minimising costs for delivered projects and minimising the deviation between forecast and actual delivery timing.</p> <p>Expenditure that is deferred is ultimately recovered too soon (keeping prices higher than they otherwise need to be).</p> <p>Expenditure that is higher than the P50 estimates underpinning PS21 places upward pressure on the subsequent pricing submission via the rollover mechanism.</p> <p>To report against this metric, Melbourne Water will measure and publish:</p> <p>> the determination capital allowance for the reporting year</p> <p>> the actual capex for the reporting year</p> <p>> these measures presented on both a year-on-year and cumulative basis, with commentary to describe variation (where >±2%) between determination and actual.</p> <p>Melbourne Water will also publish a secondary measure of cumulative performance against P50 estimates. This will highlight Melbourne Water’s success (or otherwise) in managing costs and scope. Where one or two large projects cause the cumulative performance to be above P50 the rationale for scope changes will be provided – demonstrating they are prudent.</p>								
<div>■ Agree or strongly agree with statement “I fully support Melbourne Water measuring their performance through this”</div> <div>■ Agree or strongly agree with statement “This measure is clear to me”</div>										
Output	Past performance				Expected	Target for PS21				
Year	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
Output 1	New	New	New	New	New	>\$500k	>\$500k	>\$500k	>\$500k	>\$500k
Output 2	New	New	New	New	New	>±5%	>±5%	>±5%	>±5%	>±5%
Output 3	New	New	New	New	New	>±2%	>±2%	>±2%	>±2%	>±2%

S4. Management and risk

Key references relating to this chapter:

1. PS21 Risk Strategy.

Section 3.5 of the Price Submission addresses the robust governance and assurance processes that were applied by the Board and Leadership Team in the delivery of PS21. It outlines how these processes guided the development of our prudent and efficient expenditure forecasts and the strategic consideration of risk.

The following section builds on the overview presented in **Section 3.5** of the Price Submission, particularly in relation to risk, while also addressing key regulatory proposals that impact risk, such as our treatment of Victorian Desalination Plant water orders, the length of our regulatory period, and form of price control.

S4.1 Strategic consideration of risk

S4.1.1 Effective risk management

Melbourne Water recognises that it is desirable that the prices we charge for our services reflect a robust, mature and transparent consideration of uncertainty in relation to our revenue requirement. In particular, the uncertainty that exists as we estimate our underlying expenditure over the coming five years.

Our *Enterprise Risk Management Framework* is made up of a number of key elements which, when combined, create an environment for effectively managing risk across the business. The framework details the elements of Melbourne Water's risk management systems, processes and culture that drives leading, effective and value-adding risk management.

Melbourne Water's enterprise approach to risk management drives consistent understanding, assessment, management and reporting of risk across the business to deliver effective planning, decision making and resource allocation in line with Melbourne Water's risk appetite.

Our risk management processes align with *AS/NZS ISO31000: Risk Management – Principles and Guidelines* which support the obligations of the Standing Directions of the *Financial Management Act 1994* and the Statement of Obligations of the *Water Industry Act 1994*.

S4.1.2 Applied to revenue building blocks

Melbourne Water undertook a robust process to identify and assess material uncertainties relating to the provision of our services for PS21. This included consideration of management/ mitigation options and who bears the residual risks post mitigation.

We started the consideration of risks for PS21 with reference to Melbourne Water's risk management processes guided by our risk management team. We engaged with senior managers across the business, including representatives from our operational, capital planning and delivery, customer and strategy and finance functions. We also borrowed from our retail water customers, via a review of their submissions, to aid in our discovery process.

Our emerging leaders, Leadership Team and customers (via the WSCC) have been central to the consideration and shaping of the risks presented below.

S4.1.3 Proposed use of ESC mitigation tools

Melbourne Water will continue to seek to recover predictable and controllable forecast expenditure via the application of a standard building block methodology and tariffs with a price cap.

Similarly, indexation of prices and the cost of capital mitigations apply as they do within the current regulatory period.

Melbourne Water believes that the retention of its current tariff structures continues to represent a reasonable balancing of risk between itself and retail water company and household and business customers.

Our regulatory period proposal is discussed in **Section S4.4.1**.

Melbourne Water proposes to apply pass-through mechanisms to:

- > the Victorian Desalination Plant security cost payment (*current practice*)
- > the cost of Victorian Desalination Plant water orders, as passed through by DELWP (*current practice*)
- > the cost of pumping and related activities to enable Melbourne Water to accommodate Victorian Desalination Plant water orders of various size (*new application for pass through*).

Melbourne Water does not propose any change to the definition or application of the uncertain or unforeseen events mechanism contained within its 2016 Determination.

S4.1.4 Key risks and their allocation

Key risks (aligned to the ESC's risk categories) and their allocations are summarised below and detailed in the tables that follow.

Inflow risk

The primary driver of the inflow risks (**Table 31**) (IN-R001, IN-R002 and IN-R003) related to degradation of service or increased expenditure is the occurrence of extended low rainfall and inflows into the Greater Yarra System. High per-capita

usage and high growth exacerbates this risk. Conversely, for risk IN-R004, a prolonged period of higher-than-forecast rainfall and inflows into the Greater Yarra System may lead to an unexpected and persistent turnaround in yield balance (that is, supply from rainfall-dependent sources outstripping demand).

Demand forecasting risk

Demand risks are outlined in **Table 32**. Divergence between actual and forecast demands is the underlying cause of all demand risk. Poor demand forecasting processes, including an inability to overcome a bias to underestimate demand/growth or overestimate of the impact of any T155 campaign, are key contributors to risks DM-R01, DM-R02, DM-R03, DM-R04 and DM-R05. Economic conditions are an additional contributor to DM-R06.

The tariff structure review outlined in **Section S3.2.1** will consider (among other things) the appropriate nature and level of tariff variability and may impact the assessment of demand forecasting risk should any changes be subsequently implemented. The adoption of a five-year regulatory period also serves to cap the duration of any divergence.

*COVID-19 and its potential impacts are discussed in detail in **Section 2.1** of the Price Submission.*

Operational risk

A combination of external events (for example, fire, flood), policy change (for example, opening up catchments, greater use of Victorian Desalination Plant) and/or failure asset management regimes/protocols sit behind each of the operational risks identified in **Table 33**. Our integrated management system and asset management regimes, including operating protocols, are front line mitigation tools for the majority of these risks.

Construction risk

There are a range of factors behind the single risk defined in **Table 34** that all essentially amount to a failure of process from planning through to delivery. These include use of inappropriate estimation techniques, inclusion of large contingency amounts, late delivery against forecast and inclusion of too many uncertain projects in the outer years of the regulatory period.

Regulatory and policy risk

Changes in shareholder/community expectation around the nature/level of service provided, related party procurement of assets and key policy changes (for example, use of the North–South Pipeline and/or industry reform) underpin the risks identified in **Table 35**.

Financial risks

Two of the three financial risks (F-01 and F-02) identified in **Table 36** related to differences between actual and forecast inflation. A third (F-03) risk relates to procurement practices that are declared non-prudent or inefficient by the ESC.

Business risks

Technology or shareholder decisions (these could, in some cases, also be considered under regulatory/policy risk) related to existing assets are the primary drivers of the business risks identified in **Table 37**.

Table 31 Summary of Inflow Risks

Risk	Implication/impact	Mitigation	Who pays/bears the risk
IN-R01. Water security outlook falls to levels requiring introduction of water restrictions.	Customers experience degradation of service via the introduction of restrictions (stages 1 and 2 in the first instance). <i>See demand forecasting risk for pricing implications of this risk.</i>	Close and continuous collaboration with retail water companies, including regular update of forecasts. Operational management process via Water Resource Management Group to provide forward visibility and advice based on a range of scenarios, including Victorian Desalination Plant water order advice annually. Roll out of T155 initiative. Planning for system augmentation. Increased use of existing desalination supply source.	Customers bear the risk that water restrictions will be introduced – reducing their current level of service. Melbourne Water bears risk in the form of lower revenue via variable charges and incremental costs associated with drought contingency activities (not included in opex allowance) and demand management initiatives.
IN-R02. Desalination water orders are required during the regulatory period.	Significant additional costs are incurred in paying for the production of the water order from the Victorian Desalination Plant.	As above. A long run marginal cost estimate is also provided to retail water companies to support their long-term investment planning in local sources.	Customers bear this risk. Desalination order costs are currently subject to a pass-through mechanism. Via the pass-through mechanism customers do not pay for water they have not ordered and Melbourne Water does not bear the cost of water ordered.
IN-R03. Trigger construction and commissioning of 50GL augmentation within in the PS21 regulatory period. <i>Bring forward risk.</i>	Significant additional costs are incurred in paying for the new supply capacity. <i>Note that current (August 2020) modelling suggests that costs associated with an augmentation would not be incurred during the PS21 period.</i>	Augmentation of the Victorian Desalination Plant is uncertain (scope, timing and delivery mechanism). The final decision to augment rests with the Minister and is expected to be led by DELWP. Apply a pass-through or uncertain event mechanism to recover any incurred (substantial) costs associated with its delivery in the PS21 period. The actual mechanism applied would depend upon the funding path selected: <ul style="list-style-type: none"> finance lease – propose to use the existing pass-through mechanism applied to the commissioned elements of the Victorian Desalination Plant capital asset on Melbourne Water's RAB – propose to bear the risk and 'rollover' any efficient expenditure within the PS21 period. 	<ul style="list-style-type: none"> If it is delivered via a finance lease, Melbourne Water proposes to use the existing pass-through mechanism applied to the commissioned elements of the Victorian Desalination Plant. Customer bears risk. If it is delivered by Melbourne Water as a typical capital asset, Melbourne Water proposes to bear the risk and 'rollover' any efficient expenditure within the PS21 period. Melbourne Water bears risk.
IN-R04. Projects designed to augment or supplement existing supplies able to be deferred beyond the PS21 period.	Customers paying for projects within the pricing period that are no longer needed.	NOT APPLICABLE – There are no relevant projects proposed for PS21 period.	Not applicable. Customers would generally bear this risk.

Table 32 Summary of demand forecasting risks

Risk	Implication/impact	Mitigation	Who pays/bears the risk
DM-R01. Actual customer water demand is materially higher than forecast.	Variable water tariffs are set based on forecast demand - these tariffs would be set higher than they should be. Higher transfer costs (e.g. via chemicals, energy) AND receive more revenue.	Robust demand-forecasting methodology using values developed in collaboration with retail water companies. Fixed structure for the security-based headworks tariffs – variable expenditure elements associated with these are minimal.	Melbourne Water bears the risk for the fixed tariffs – recovering forecast costs which are lower than actual. Customers bear the risk for the variable transfer tariff.
DM-R02. Actual customer demand for water is materially lower than forecast.	Variable water tariffs are set based on forecast demand - these tariffs would be set lower than they should be. Lower transfer costs (e.g. via chemicals, energy) AND receive less revenue.	Robust demand forecasting methodology using values developed in collaboration with retail water companies. Fixed structure for the security-based headworks tariffs – variable expenditure elements associated with these are minimal (zero in the case of the Victorian Desalination Plant security charge).	Customer bears the risk for the fixed tariffs. Melbourne Water bears the risk for the variable transfer tariff.
DM-R03. Actual customer sewage demand (including inflow and infiltration) is materially lower than forecast.	Actual variable costs (i.e. those dependent upon megalitres transferred/ treated) are lower than forecast – particularly energy and chemicals. Less revenue than forecast via the variable tariff elements.	Robust demand-forecasting methodology using values developed in collaboration with retail water companies. Robust understanding of variable cost elements and appropriate expenditure controls. Sewer renewal program – reducing infiltration rates.	Melbourne Water bears the risk that sewage demand is materially lower than forecast. The current tariff structure using long run marginal cost (LRMC) values means that Melbourne Water would not recover its efficient fixed costs for lower demand.
DM-R04. Actual customer sewage demand (including inflow and infiltration) is materially higher than forecast.	Actual variable costs (i.e. those dependent upon megalitres transferred/ treated) are higher than forecast – particularly energy and chemicals. More revenue than forecast via the variable tariff elements.	Robust demand-forecasting methodology using values developed in collaboration with retail water companies. Robust understanding of variable cost elements and appropriate expenditure controls. Sewer renewal program – reducing infiltration rates.	Customers bear the risk that sewage demand is materially higher than forecast. The current tariff structure using LRMC values means that customers would pay for fixed costs in excess of those actually incurred by Melbourne Water.
DM-R05. Actual property growth is materially lower/higher than forecast.	Over/under-recovers against efficient costs via waterways and drainage charges that are set too high/low.	Robust demand forecasting process. Application of a price cap - Melbourne Water retains ability to set prices lower than cap in any given year.	Customers bear the risk where property growth is higher than forecast. Melbourne Water bears the risk where growth is lower than forecast.
	Build growth assets well in advance of actual growth. OR service levels deteriorate due to failure to build growth assets in time.	Robust demand-forecasting process. Apply capital rollover mechanism in the event that growth expenditure needs to be brought forward.	Shared.
DM-R06. Actual developer contributions differ materially from forecast (higher or lower).	Melbourne Water's revenue received is lower/greater than forecast. This relates solely to waterways and drainage.	Robust demand-forecasting process.	Customers bear the risk where contributions are higher than forecast. Melbourne Water bears the risk where contributions are lower than forecast.

Table 33 Summary of operational risks

Risk	Implication/impact	Mitigation	Who pays/bears the risk
OP-R01. Damage to people, property, environment caused by Melbourne Water operations/ assets – breach of operating licences/ general environmental duty.	Legal liability for damages. Contingency costs (e.g. additional desalinated water in event of dam failure). Unplanned incident response and remediation costs.	Integrated management system. Asset management regimes, including operating protocols and renewals programs. Emergency management protocols and capability to reduce the consequence once events occur. Melbourne Water has a robust insurance program covering most major perils to the extent available in the commercial insurance market.	Customers fund this insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water.
OP-R02. Breach of operating licence and environmental duty (sewerage transfer).	Unplanned incident cost and/or payment of penalties to regulator.	Integrated management system. Asset management regimes, including operating protocols and renewals programs. Public liability insurance (limited coverage).	Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water. Insurance does not cover first party costs (i.e. bring forward capital works, early replacement, augmentation, etc.). Any licence penalties would be paid using after tax funds.
OP-R03. Existing assets (and any contingency plans) unable to provide water to required standard – and requiring unplanned capex.	<i>Capital expenditure impact:</i> Unplanned capital expenditure to repair/ augment assets following incident - e.g. new water treatment plant brought forward with costs incurred by Melbourne Water in the PS21 regulatory period in order to meet demand. <i>Other impacts:</i> Issue of boil water notice. Reputational damage to Melbourne Water and Melbourne community.	Integrated management system. Asset management regimes, including operating protocols and renewals programs. Crisis management protocols. New treatment to ensure fit-for-purpose water is uncertain and would be triggered by a major event. Melbourne Water has management plans in place to minimise this risk. Apply pass-through or uncertain event mechanism. Contingency plans for key assets minimise the likelihood of this risk.	Melbourne Water bears this risk – it is not insured. Any capital expenditure to repair or augment (e.g. via additional treatment stage) assets would be incurred by Melbourne Water and efficient expenditure rolled over at the start of the subsequent regulatory period.
OP-R04. Infrastructure or management regime (including contingency plans) failure causing breach of health standards – and requiring unplanned opex.	<i>Operating expenditure impact:</i> Direct incident costs in response to major interruption to water supply. Indirect costs from implementation of water supply contingencies such as use of desalinated water or pumping costs. Depending on nature and scale of event potential for bring forward of capital expenditure to build new treatment capability – refer above.	Asset management regimes, including operating protocols and renewals programs. Crisis management protocols. Contingency plans for key assets minimise the consequence of this risk. Forecast opex allowances include levels of expenditure that reflect normal operating levels, with prudent levels of preventative expenditure in line with asset management and operating protocols.	Melbourne Water bears this risk (it is not insured). Due to the uncertainty associated with these events (likelihood rated as rare) Melbourne Water does not propose to include an allowance to cover the management of these events.

Risk	Implication/impact	Mitigation	Who pays/bears the risk
OP-R05. Material sewage spills to waterways and/or minor damage to sewage/water treatment or dam assets.	Unplanned operating expenditure on incident management and service rectification.	Asset management regimes, including operating protocols and renewals programs. Capped insurance for flood events and sudden and accidental pollution events as well as gradual pollution events. Spilling from ETP into Patterson River, could require emergency discharge authorisation from the EPA. Would mitigate operationally, e.g. by maximising volume available in effluent holding basin (EHB) system, maximising tertiary plant throughput to draw down EHBs etc. Forecast opex allowances include levels of expenditure that reflect normal operating levels, with prudent levels of preventative expenditure in line with asset management and operating protocols.	Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water. Due to the uncertainty associated with these events (likelihood rated as unlikely) Melbourne Water does not propose to include an allowance to cover the management of these events.
OP-R06. Significant sewerage spills to waterways and/or material damage to sewage/water treatment or dam assets.	Unplanned capital expenditure to repair/ augment assets following incident.	Asset management regimes, including operating protocols and renewals programs. Melbourne Water has capped insurance for flood events, and sudden and accidental pollution events as well as gradual pollution events. Property insurance would also cover damage to Melbourne Water property but does not include underground assets, natural assets, cultural assets.	Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water. Any capital expenditure to repair or augment (e.g. via additional treatment stage) assets would be incurred by Melbourne Water and efficient expenditure rolled over at the start of the subsequent regulatory period.
OP-R07. Significant effort to bring fire under control and remediate damage to catchments/land/ waterways.	Melbourne Water incurs opex costs (incident response) that are in excess of opex allowance. Indirect costs from implementation of water supply contingencies such as use of desalinated water or pumping costs.	Melbourne Water has a number of controls in place to prevent and respond to bushfires. Insurance cover. Re-prioritisation of existing program expenditure – e.g. waterways and drainage; or asset maintenance expenditure where the asset is damaged and the expenditure is no longer required– where practicable.	Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water. Melbourne Water bears the majority of risk in this instance.
OP-R08. Biological, chemical or physical contamination of storm water or waterways.	Unplanned expenditure on clean-up and repairs to waterways (could be multi-year program).	Integrated management system. Asset management regimes, including operating protocols and renewals programs. Insurance policies. Capped insurance – subject to legal obligations to clean-up. Forecast opex allowances include levels of expenditure that reflect normal operating levels, with prudent levels of preventative expenditure in line with asset management and operating protocols.	Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water.

Risk	Implication/impact	Mitigation	Who pays/bears the risk
OP-R09. Onsite energy production across period materially below forecast.	Energy costs higher than forecast.	Asset management regimes, including operating protocols and renewals programs. Limited insurance for electricity import costs. Forecast opex allowances include levels of expenditure that reflect normal operating levels, with prudent levels of preventative expenditure in line with asset management and operating protocols.	Melbourne Water predominantly bears this risk. Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water.
OP-R010. Breach of health/ environmental standards (sewage or recycled water).	Direct incident costs in response to recycled water supply outage and additional treatment plant costs. Indirect costs from implementation of contingencies such as use of potable water.	Asset management regimes, including operating protocols and renewals programs. Limited insurance. Forecast opex allowances include levels of expenditure that reflect normal operating levels, with prudent levels of preventative expenditure in line with asset management and operating protocols.	Melbourne Water predominantly bears this risk. Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water.
OP-R011. Supply chain failure for critical materials – chemicals.	Increased costs from sourcing chemicals (particularly chlorine) from other sources or suppliers.	Plant upgrades to reduce use of chlorine gas included in capital and opex forecasts. Contracts for supply. Limited and capped insurance coverage. Alternative chemical suppliers are being investigated.	Melbourne Water predominantly bears this risk. Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water.
OP-R012. Supply chain failure for critical materials – energy.	Increased costs from incident response and manual operation of assets.	Solar and other alternative power sources as included in capital program. Generators at critical assets – water supply. Contingency plans to reconfigure the network away from high-energy assets. Insurance coverage capped and limited to additional costs of working subject to property damage at suppliers' premises.	Risk is shared. Customers bear the risk of service disruption due to power failure. Melbourne Water bearing risk of unplanned expenditure to manage supply chain failure. Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water.
OP-R013. Pumping of significant amounts of water from Cardinia Reservoir to Silvan Reservoir.	Increase in energy usage above forecast. Foregone hydro-electric energy production benefit. <i>Estimates provided above.</i>	Propose a regulatory pass-through allowance for pumping related to the management of Victorian Desalination Plant water orders. <i>Detail of pass-through mechanism considered in final submission document.</i> Melbourne Water able to recover costs, while customers do not pay for pumping that does not occur.	Customers bear this risk.

Risk	Implication/impact	Mitigation	Who pays/bears the risk
OP-R014. Fire in office complexes or operational assets.	Costs to respond to and repair assets in infrastructure.	Emergency Response Arrangements and Capability. Insurance. Asset management (including contingency planning) and operating procedures.	Risk is shared. Melbourne Water holds insurance that covers declared assets (i.e. does not covered underground, natural or cultural assets). Customers fund insurance and therefore bear the cost for insured levels of risk, while residual risk is borne by Melbourne Water.

Table 34 Summary of construction risk

Risk	Implication/impact	Mitigation	Who pays/bears the risk
CS-R01. Incurred construction costs are materially above/below forecast (certain projects).	Capital allowance is set higher (lower) than efficient costs. Melbourne Water over (or under) – recovers from customers who are charged for forecast costs, not actuals during the period.	Use of P50 and a robust cost estimation process. Melbourne Water's Portfolio Management Office oversees expenditure and manages program costs and performance. Uncertain projects have been identified and excluded from the PS21 revenue requirement. Capital expenditure rollover mechanism which adjusts forecast expenditure to actual prudent and efficient expenditure at the start of any new regulatory period. Standard inflation applied to cost forecasts. No specific reference to actual construction index (currently much higher than general price inflation).	Notwithstanding the capital rollover mechanism, there remains some residual risk of over or under-recovery against the capital expenditure elements of the revenue requirement. Where capital program expenditure is higher than forecast, Melbourne Water bears that risk within the PS21 regulatory period. Where capital program expenditure is lower than forecast, customers bear that risk within the PS21 regulatory period.

Table 35 Summary of regulatory and policy risks

Risk	Implication/impact	Mitigation	Who pays/bears the risk
RP-R01. Melbourne Water's responsibility for emergency event activities/number of activities increases materially.	Increased cost incurred by Melbourne Water in dealing with increased responsibility or increased frequency of events (without corresponding increase in government support).	Robust WDIP development process includes robust engagement with shareholder and shareholder representatives. Occurrence of events will remain highly uncertain. Allowances included within the waterways and drainage operating expenditure forecast are based on historical levels only.	Melbourne Water bears this risk.
RP-R02. Melbourne Water builds an asset in anticipation of a new regulation that does not materialise at assumed time.	Customers are paying for an asset/level of service that is not explicitly required.	Engage with customers to gauge support for construction/change ahead of legislative change. Robust capital prioritisation program with tension between those 'in' and those 'out' of the program. Where possible, deferral of an approved project would be replaced with equivalent expenditure on a prudent and efficient project within the same service line.	Customers bear this risk where a prudent and efficient replacement capital project cannot be found.
RP-R03. Melbourne Water is required to substantially increase its litter management effort.	Opex allowance is set lower than efficient costs. Melbourne Water under-recovers from customers.	Robust stakeholder engagement program.	Melbourne Water bears this risk.
RP-R04. Misalignment of payment recovery and asset-use profiles.	Existing customers are paying for capacity they are not using and/or paying off an asset in advance of its useful life. Using the Victorian Desalination Plant example, their annual charges are higher than they would be for an asset funded directly from the RAB.	Use of special financial asset mechanism – e.g. capitalisation of Victorian Desalination Plant security payments to enable spreading of revenue requirement over life of asset rather than life of lease. The application of the special financial asset mechanism increases the financial risk to Melbourne Water by shifting the tariff revenue for an asset to no longer be aligned with the payments it must make for the asset. Melbourne Water must make up the shortfall via borrowings.	Customers bear this risk – noting that it typically extends across multiple regulatory periods.
RP-R05. New expenditure obligations that are not within the determination revenue requirement.	Melbourne Water incurs expenditure which is not able to be funded by tariff (or contract – in the case of new recycled water obligation) revenue during the regulatory period.	Pass-through mechanism for material changes in obligation (e.g. new services). Prior to triggering the pass-through mechanism, Melbourne Water would evaluate the scale of the new expenditure and its timing in relation to the remaining years of the regulatory period.	Customers bear the risk where a pass-through mechanism is applied. Melbourne Water bears this risk where a pass-through mechanism is not applied.

Risk	Implication/impact	Mitigation	Who pays/bears the risk
RP-R06. Melbourne Water's revenue cost allocation model no longer reflective of industry/customer structure.	Unknown at this time – could include reallocation of revenue requirement via tariffs and/or a change to prices.	Melbourne Water proposes the use of a pass-through mechanism to reopen and potentially amend the tariff structure.	Customers bear this risk – Melbourne Water continues to recover appropriate revenue but some customer prices may no longer be appropriate without change. Prices may rise for some customer groups with reopen mechanism or be too high without reopen mechanism.
RP-R07. Water is transferred via North–South Pipeline. <i>(requires change in policy).</i>	Costs incurred associated with transfer of volume are not recovered through customer prices.	Pass-through mechanism. Based on current policy settings, this risk is seen as having a low likelihood of occurrence.	Customers bear the risk where a pass-through mechanism is applied. Melbourne Water bears this risk where a pass-through mechanism is not applied.

Table 36 Summary of financial risks

Risk	Implication/impact	Mitigation	Who pays/bears the risk
F-R01. Inflation assumptions underpinning cost forecasts differ from actual inflation effects (particularly relevant for categories such as labour, energy and chemicals which can differ significantly from the broad CPI measure published by the ABS).	Melbourne Water does not recover efficient costs due to changes in the cost of goods while delivering the same standard of service. Prices are indexed to inflation, meaning that there is an allowance for price movements year on year. The consequence here is therefore driven (either way) by the difference between the general CPI measure and actual cost for the goods and services purchased.	Specific forecasts are made for volatile categories such as energy and chemicals where longer-term contracts are employed. Efficiency targets/programs are applied to offset rising costs.	Melbourne Water bears the risk that the year-to-year cost of input goods and services rises above inflation. Customers bear the risk if the year-to-year cost of input goods and services is below inflation.
F-R02. Inflation assumptions underpinning cost of debt differ from actual.	Melbourne Water does not recover efficient financing costs due to changes in actual inflation. Where there is a low inflation environment (as currently) Melbourne Water gearing ratio naturally increases, leading to higher finance costs.	Prices indexed to inflation. Continue to use the 10-year trailing average cost of debt adjustment. Mature treasury function.	Melbourne Water bears the risk that the inflation assumption underpinning the return to capital is above actual inflation. More likely in current economic environment. Customers bear the risk that the inflation assumption underpinning the return to capital is below actual inflation.
F-R03. ESC declares committed contract costs inefficient and	Melbourne Water unable to recover costs incurred.	Melbourne Water is already bearing this risk for the AGL contract. Controls in place include more robust challenge of expenditure as part of base expenditure	Melbourne Water bears this risk.

Risk	Implication/impact	Mitigation	Who pays/bears the risk
approves a lower allowance (e.g. green energy contract with AGL).		build. Robust procurement processes generally mitigate this risk for purchases of goods and services – whether capital or operating in nature.	

Table 37 Summary of business risks

Risk	Implication/impact	Mitigation	Who pays/bears the risk
B-R01. An asset with residual capital value on the RAB is no longer productive or foreseeably likely to be productive (including security or options value) and is considered 'stranded'.	Customers are paying for an asset that has no productive value to them. Melbourne Water must dispose of the asset (i.e. remove from the RAB). When (if) this occurs, Melbourne Water retains any residual debt associated with the asset but loses any ability to earn income against it.	Robust capital planning process reduces the risk of assets being built with no productive value. Melbourne Water would need to 'dispose' of the stranded asset. Annual price review process to consider the loss of the asset from the RAB. Melbourne Water to set a lower price than the maximum allowed under the determination.	Melbourne Water bears the financial risk associated with disposal of stranded assets. Removal of the asset from the RAB would automatically increase Melbourne Water's gearing level as the debt associated with the asset would remain. Customers bear the risk that they are paying for a stranded asset where the decision is made to 'dispose' of the asset after the commencement of the pricing period.
B-R02. Material change to Melbourne Water operating model (e.g. shareholder sale of assets).	Flow on impacts to efficient cost structure – Melbourne Water would likely incur temporary costs to manage the change and would have a new efficient cost base. Tariff structures would not be aligned with efficient costs.	Melbourne Water proposes the use of a pass-through (unforeseen event) mechanism for this type of risk.	Shared risk. Melbourne Water may incur costs during any transition that it cannot recover from customers. Conversely, customers bear the risk that any change that materially lowers the efficient cost base is not passed on via opex and capex allowances.
B-R03. Melbourne Water is expected to lower its bills to customers beyond ESC levels of prudent and efficient business during the regulatory period.	Melbourne Water unable to recover efficient costs.	Robust shareholder and customer engagement programs.	Melbourne Water bears the risk that prices will be lowered beyond level justified by cost base and regulatory building blocks. Customers bear the risk that, in the longer term, service degrades as a result of forced expenditure reduction/deferral.

S4.2 Desalination water order

Melbourne Water currently applies a pass through to Victorian Desalination Plant water order costs. Melbourne Water expects Victorian Desalination Plant water orders to occur more often and for larger volumes over time to counter a growing gap in the supply/demand balance driven by lower yields (climate change) and greater demand (population growth).

Retail water company customers have indicated they would prefer a pricing and forecasting approach that minimises price shocks associated with the order process, while recognising that the annual water order process (combined with rainfall/yield fluctuations) makes five-year forecasts inherently uncertain.

- In line with the feedback they have received from their customers, Melbourne Water's retail water companies have expressed a desire for an approach that minimises the price shock associated with annual water orders, while accepting that the size of the final order remains uncertain and subject to year-by-year Ministerial decision making.
- The WSCC issued a communique in December 2019 expressly asking Melbourne Water to:

"Include a forecast desalination order with mechanisms to vary prices should the water order differ from the forecast."

Directly related to the water order process, Melbourne Water will frequently need to pump water out of Cardinia Reservoir into Silvan Reservoir to accommodate desalinated water. This has occurred for the water order the Minister placed in April 2019. Melbourne Water incurs costs associated with this pumping activity, including energy costs associated with using pumps to move water and foregone income from hydro-electric assets. Indicative costs for pumping volumes of 15-40 gigalitres (aligned to typical order sizes) are presented in **Table 38**.

Melbourne Water currently has no mechanism via which it can recover pumping costs associated with the management of Victorian Desalination Plant orders that vary according to both water order and system conditions.

Proposal

Melbourne Water proposes to retain a pass-through mechanism for costs associated with a water order from the Victorian Desalination Plant, with an amendment to enable Melbourne Water to recover costs (**Table 33**) associated with accommodating the water order within the Cardinia Reservoir. In order to eliminate the risk of over-recovery against these costs, Melbourne Water intends to apply an offset mechanism, where the actual costs associated with accommodating a water order in year 1 would be recovered in year 2. This mechanism could then extend across regulatory periods should costs be incurred in year 5. A robust methodology to identify only actual costs associated with pumping and foregone hydro-electric plant revenue will be applied.

S4.3 Regulatory matters

S4.3.1 Regulatory period

Melbourne Water proposes a five-year regulatory period to run from 1 July 2021 to 30 June 2026. Refer to **Section S2.3.4** for an outline of how we engaged our customers in arriving at this proposal.

S4.3.2 Form of price control

Melbourne Water proposes to continue to apply a price cap form of control for the PS21 regulatory period for its services. Refer to **Section S2.3.4** for an outline of how we engaged our customers in arriving at this proposal.

Table 38 Costs to accommodate water orders of circa 125 GL (indicative)

Cost description	Indicative cost	Basis
Mechanical and electrical (M&E) asset maintenance (increased maintenance)	\$0.25m	Each instance of bladder replacement – sporadic depending on cumulative cycle times year on year – for 5 x back-to-back large orders >125 GL expect to have two bladder replacements within that period.
Chemical savings	\$0.17m	125 GL order – fluosilicic acid not required at Silvan and/or Cardinia as desalinated water already contains fluoride.
Electricity (pumping)	\$0.46m-\$2.1m	125-150 GL order (15-40 GL pumped to Silvan). Assumes 110 GL of desalinated water transferred via gravity to Cardinia Reservoir.
Electricity (hydro-electricity – foregone offset income)	\$1.13m-\$1.26m	125-150 GL order (15-40 GL pumped to Silvan). Assumes 110 GL of desalinated water transferred via gravity to Cardinia Reservoir. Loss of water from Silvan to Cardinia to generate hydro-electricity. Variation dependent upon electricity price.

Estimates only – February 2020. System generally operated with flows from Silvan to Cardinia, enabling capture of hydro-electricity to offset purchased electricity. Accommodating desalinated water requires reversal of flows. Hydro-electricity generation capacity is foregone under this operating scenario.

S5. Demand

Key references relating to this chapter:

1. PS21 Water Sewerage Demands

Demand forecasts are central to Melbourne Water's ability to deliver on its customer promise. They inform our forecasts of prudent expenditure and help establish the levels at which our tariffs are set. While we acknowledge that forecasts almost always differ from what actually occurs, we have applied a robust methodology to the development of PS21 forecasts and sought to consider the implications for customers of our forecasts being higher or lower than actual levels of demand.

The following section is structured to outline:

- > what we mean by demand (by service), and how we use the forecasts we develop
- > how we went about developing demands for each service for PS21. This section is presented by service and includes:
 - a reflection on how past forecasts have varied against actual and evaluation of which drivers/assumptions have the biggest impact on forecasts
 - the methodology we applied to develop PS21 forecasts
 - key assumptions that underpin each forecast
 - our demand forecasts.

S5.1 What demands are relevant to our services




Melbourne Water's bulk water and bulk sewerage services are essentially measured in terms of the volume (megalitres) of water supplied and the volume (megalitres) and load⁹ (tonnes of various parameters) of sewage treated. Transfer networks and treatment assets are designed to meet these demands.




Our waterways and drainage services are more diverse and include the management of lengths of linear assets (for example, drainage assets, waterways) in kilometres, catchment areas, flood risk areas (hectares) and emergency response activities (number of events). Ultimately, however, these services are provided for the benefit of properties (households and businesses). It is also, at the aggregate level, the stock of properties that drives the level of activity we must perform to deliver our services. As outlined in **Section 2.2** of the Price Submission, an increase in the number of properties within Melbourne tends to come with an increase in impervious surface areas, increased runoff and other environmental stressors.

Recognising these factors, and the differences between our services, **Figure 15** highlights the measures of demand with greatest relevance to our development of tariff and expenditure forecasts. This figure explains the nature of each measure and its relevance to service, tariffs and expenditure forecasting. These measures form the key demands which are presented below on a service-by-service basis.

⁹ Sewage treatment systems are designed for a wide range of parameters. Total suspended solids (TSS), inorganic total dissolved solids (iTDS), biological oxygen demand (BOD) and total Kjeldahl nitrogen (TKN) are discussed further in this section as they are critical "treatable" load parameters that impact both tariffs and treatment plant design.

Figure 15 Critical PS21 measures of demand

Measure (relevant service)	Nature of measure	Relevance to... Tariffs	Expenditure forecasts
Population size (properties) 	<ul style="list-style-type: none"> Number of properties in our service area. Properties can be residential, non-residential or rural. Only connected properties contribute to water and sewage demand. Rate of creation of new properties (via greenfield or brownfield development) impacts change in property numbers. 	<ul style="list-style-type: none"> Waterways and drainage charge is levied per property with different rates for residential, non-residential and rural customers. Rate of development impacts developer contribution revenue which in turn impacts tariff revenue. 	<ul style="list-style-type: none"> Bottom up budgets for planning, maintenance and overhead costs use the growth factor associated with household level growth.
Supplied / received volumes (ML) 	<ul style="list-style-type: none"> Volume of bulk water supplied to meet household and business demand. Volume and loads of bulk sewage generated by households and businesses that we transfer and treat. Change / level of demand influenced by number of connections, per connection usage, leakage / infiltration and retail water corporation supply. 	<ul style="list-style-type: none"> Water – transfer tariff is 100% variable. Tariff level is set by dividing total transfer revenue requirement by aggregate demand to create a \$/ML price. Sewerage – fixed tariff level is set for each retail water company using demand forecasts. <ul style="list-style-type: none"> For flow based variable charges total flow per retail water company is used. For load based variable charges only Category A load forecasts are used. 	<ul style="list-style-type: none"> Bottom up budgets for energy and chemicals dependent upon volume and load estimates.
Bulk entitlement volumes (BE ML) 	<ul style="list-style-type: none"> Fixed in nature. Established by DELWP and associated with bulk water supply sources. Melbourne Water does not supply any bulk water products that are not associated with allocated BEs. Change driven by new bulk supply source creation. 	<ul style="list-style-type: none"> Basis on which unit rate of headworks charge is set. Total revenue requirement for headworks related services is divided by total BE allocation. 	<ul style="list-style-type: none"> Play no role in capital or operating expenditure forecasts.

Legend
 Water
 Sewerage
 Waterways and drainage

The following sections discuss these key measures in greater detail, including the underlying drivers of change and the approach we followed to developing our demand forecasts for PS21.

S5.1.1 How we have approached price elasticity of demand

Previous studies indicate that price elasticity of demand is relatively inelastic for water (and sewerage) services – that is levels of consumption do not vary materially as price goes up or down.

Our water and sewerage demand forecasts are built on forecasts provided by the retail water businesses. They are prepared using end use models which make a number of assumptions about the uptake of water efficient appliances and changes in water use behaviour including expected wholesale prices. The retailers exclude elasticity estimates from the end use models baseline demand forecasts to avoid double counting demand response to a movement in price.

We consider this to be appropriate and have not sought to add any elasticity response to our demand forecasts. We have relied on the retailers' forecasts for both residential and non-residential customers in respect of elasticity.

For waterways and drainage, we consider the price to be perfectly inelastic. That is, changes in the waterways and drainage charge will have no impact on the number of residential, non-residential or rural dwellings that the charge is levied upon.

S5.2 Property forecasts

Ultimately, growth in demand for all of Melbourne Water's services is driven by changes in population size. A growing population leads to more residential and non-residential properties, each of which then add to the collective demand for water and sewerage services. As outlined above, new properties lead directly to additional demand for waterways and drainage services.

S5.2.1 How we approached PS21 forecast development

Recognising the challenges associated with applying a one-size-fits-all forecast to property growth, we adapted our property forecasting methodology to take into account more data points and the need for residential, non-residential and rural-specific assumptions.

Property level forecasts were therefore developed with reference to a number of available data sources and included consideration of the degree to which past forecasts aligned with actual growth in new properties.

- > Past forecasts –sourced from Melbourne Water’s PS16.
- > Actuals – Melbourne Water relies on retail water company to identify and capture new properties. These are categorised as either residential, non-residential or rural.
- > PS21 forecasts – a range of forward-looking sources were considered in the development of final property growth forecasts:
 - *Victoria in Future 2019* (VIF2019), *Population and Household Projections* (July 2019)¹⁰
 - *Customer Connections Forecast Report (January 2020)* – report prepared by BIS Oxford Economics for Melbourne Water (*a copy of this report is available upon request*)
 - Retail water company connection (residential and non-residential) forecasts.

Past forecasts and actuals are discussed in **Section S5.2.4**.

Table 39 provides an outline of the insights derived from the other three data sources mentioned above.

Key assumptions

Melbourne Water has adopted the assumptions shown in **Table 40** to underpin our property growth forecasts.

S5.2.2 Property growth forecasts

Melbourne Water’s property growth forecasts for the next two regulatory periods are shown in **Table 41**.

S5.2.3 Developer contribution forecasts

Forecast PS21 developer contributions of \$658.6 million are 21 per cent lower than PS16 actuals/forecast of about \$838.4 million (**Table 42**).

This represents a significant reduction in growth expectations compared to recent trend, which has been double the PS16 Determination amount. In the context of the COVID-19 pandemic and its possible impact on demand (**Attachment 1** to the *Price Submission*) we believe our final forecasts are appropriate.

Land development capex is forecast to increase from \$589 million (PS16) to \$705 million in PS21. The uplift in expenditure is driven by front ended infrastructure costs for the Arden Macaulay and Fisherman’s Bend urban precincts and delivery of assets already funded by developers.

¹⁰ Victoria in Future (VIF) projections are an estimate of the future size, distribution and composition of the population in Melbourne. They are developed using mathematical models and expert knowledge, relying on trend analysis and assumptions about future change.

Table 39 Relevant insights into property growth from identified sources

Source	Relevant insights																												
<i>Victoria in Future 2019</i> (VIF2019), <i>Population and Household Projections</i> (July 2019)	<div><div>> We have taken and considered projected household growth from 2021 to 2031.</div><div>> On an annualised basis the growth rates forecast for the 2021 to 2026 period (2.05%) are higher than the subsequent five years (1.85% for 2026 to 2031).</div><div>> We have also calculated an annualised growth rate for the full 10-year period 2021 to 2031 of 1.95%.</div></div> <div>Victoria in Future 2019 (July 2019) – 10-year property (household) growth projection</div> <table><tr><th>Greater Melbourne Capital City Statistical Area</th><th>2021</th><th>2026</th><th>2031</th></tr><tr><td>All household types</td><td>2,018,428</td><td>2,234,032</td><td>2,447,869</td></tr></table> <div><div>Compound annual growth rate</div><div><div><div>2.05%</div><div>1.85%</div><div>1.95%</div></div></div></div>	Greater Melbourne Capital City Statistical Area	2021	2026	2031	All household types	2,018,428	2,234,032	2,447,869																				
Greater Melbourne Capital City Statistical Area	2021	2026	2031																										
All household types	2,018,428	2,234,032	2,447,869																										
<i>Customer Connections Forecast Report</i> (January 2020)	<div><div>> Melbourne Water commissioned BIS Oxford Economics to produce forecasts of building activity across greater Melbourne in order to understand growth waterways and drainage customers over the period 2021-2026.</div><div>> BIS Oxford Economics did not consider rural customer growth in its analysis.</div></div> <div>Total customer forecasts – growth rates only</div> <table><tr><th>Category</th><th>2021-22</th><th>2022-23</th><th>2023-24</th><th>2024-25</th><th>2025-26</th><th>CAGR</th></tr><tr><td>Residential</td><td>2.00%</td><td>2.37%</td><td>2.49%</td><td>2.33%</td><td>2.20%</td><td>2.28%</td></tr><tr><td>Non-residential</td><td>2.24%</td><td>2.11%</td><td>2.01%</td><td>1.97%</td><td>1.94%</td><td>1.61%</td></tr><tr><td>Aggregate</td><td>2.01%</td><td>2.35%</td><td>2.45%</td><td>2.30%</td><td>2.18%</td><td>2.23%</td></tr></table> <div><div>> The analysis was performed at a greater Melbourne level and as such did not consider spatial differences that may occur within retail water company territories.</div><div>> BIS Oxford Economics also compared its underlying population projection forecasts with VIF2019 data for the FY21-FY26 period and identified differences in assumptions around migration and fertility rates. Were BIS Oxford Economics to adopt the VIF2019 assumptions, the residential growth rates shown above would be higher.</div><div>> On this basis the residential forecasts shown above are considered conservative.</div></div>	Category	2021-22	2022-23	2023-24	2024-25	2025-26	CAGR	Residential	2.00%	2.37%	2.49%	2.33%	2.20%	2.28%	Non-residential	2.24%	2.11%	2.01%	1.97%	1.94%	1.61%	Aggregate	2.01%	2.35%	2.45%	2.30%	2.18%	2.23%
Category	2021-22	2022-23	2023-24	2024-25	2025-26	CAGR																							
Residential	2.00%	2.37%	2.49%	2.33%	2.20%	2.28%																							
Non-residential	2.24%	2.11%	2.01%	1.97%	1.94%	1.61%																							
Aggregate	2.01%	2.35%	2.45%	2.30%	2.18%	2.23%																							
<i>Retail water company – water connection forecasts</i>	<div><div>> The retail water companies provided Melbourne Water with forecasts for both total water demand and residential connections.</div><div>> Residential connections growth across the areas serviced by City West Water, South East Water and Yarra Valley Water is forecasts to be 2.1% annually from 2018-19 to 2025-26, slowing somewhat across the subsequent period.</div><div>> This value does not include connections growth in fast growing regions such as Western Water’s service territory, an area which is within the waterways and drainage charge boundary.</div></div>																												

Table 40 Key property growth assumptions

Element	Assumption	Rationale
<i>Residential properties</i>	> Adoption of the year-to-year BIS Oxford Economics forecasts for the PS21 period.	Represents the best local area view of growth and is in line with the VIF2019 and retail water company forecasts.
<i>Non-residential properties</i>	> Adoption of the year-to-year BIS Oxford Economics forecasts for the PS21 period.	Represents the best local area view of growth and is in line with the VIF2019 and BIS Oxford Economics forecasts.
<i>Rural properties</i>	> Adoption of the year-to-year BIS Oxford Economics forecasts for the PS21 period.	Represents the best local area view of growth and is in line with the VIF2019 and BIS Oxford Economics forecasts noting that it was prepared for Greater Melbourne and has been applied to adjoining rural areas.
<i>Price elasticity of demand</i>	> Not applied.	The waterways and drainage charge is not considered in any way material to decisions about population growth or development of new housing stock.

Table 41 Customer number forecasts (000's) and growth rates by property type

	PS16		PS21					PS26				
Category	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Residential	1,924.5	1,963.2	1,998.7	2,042.4	2,092.0	2,142.4	2,190.8	2,235.8	2,278.6	2,322.2	2,366.7	2,412.0
<i>Annual %Δ</i>	2.34%	2.01%	1.81%	2.19%	2.43%	2.41%	2.26%	2.05%	1.91%	1.91%	1.91%	1.91%
Non-residential ^a	158.6	161.6	164.4	167.1	169.9	172.7	175.7	178.8	182.2	185.7	189.3	192.9
<i>Annual %Δ</i>	2.12%	1.86%	1.74%	1.67%	1.65%	1.68%	1.71%	1.75%	1.91%	1.91%	1.91%	1.91%
Rural	110.5	111.9	114.0	116.5	119.3	122.2	124.9	127.5	129.9	132.4	135.0	137.5
<i>Annual %Δ</i>	1.73%	1.33%	1.81%	2.19%	2.43%	2.41%	2.26%	2.05%	1.91%	1.91%	1.91%	1.91%
Total^b	2,193.6	2,236.7	2,277.0	2,326.0	2,381.2	2,437.3	2,491.5	2,542.1	2,590.8	2,640.4	2,690.9	2,742.4
<i>Annual %Δ</i>	2.29%	1.96%	1.81%	2.15%	2.37%	2.35%	2.22%	2.03%	1.91%	1.91%	1.91%	1.91%

Note a: Non-residential customer numbers include customers charged the minimum fee and customers charged the rate in \$NAV. Only the minimum fee customers are represented in the ESC's Financial Template, total NAV is shown for rate in \$NAV customers.

Note b: Numbers may not add due to rounding.

Table 42 Developer contributions – actuals and forecast

\$ millions	PS16					PS21				
	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Total Developer Contributions Revenue	157.4	177.0	177.6	196.5	130.0	127.5	127.5	133.5	127.9	142.3
	838.4					658.6				
Developer Contributions Capex Component (offset to RAB)	147.3	165.6	166.2	183.9	121.7	119.3	119.3	124.9	119.8	133.1
Developer Contributions Opex Component (Other Revenue)	10.1	11.3	11.4	12.6	8.3	8.2	8.2	8.5	8.2	9.1

Developer contribution forecasts are informed by engagement with the land development industry take into account factors such as recent levels of lot production and assumptions around future rates of land development for growth areas and the delivery capacity of the land development industry.

Gifted assets (which are mainly developer contributed assets) are not included in these forecasts and they are not added to the RAB in accordance with regulatory practice.

Our forecasts for gifted assets are found in the accompanying financial template.

S5.2.4 Comparison of trend and forecast

Property growth has been strong over the five years to 30 June 2019. **Figure 16** shows that aggregate properties within Melbourne Water's waterways and drainage service area have increased at a compound annualised growth rate (CAGR) of 2.6 per cent.

Figure 16 Actual growth in properties (2015-2019)

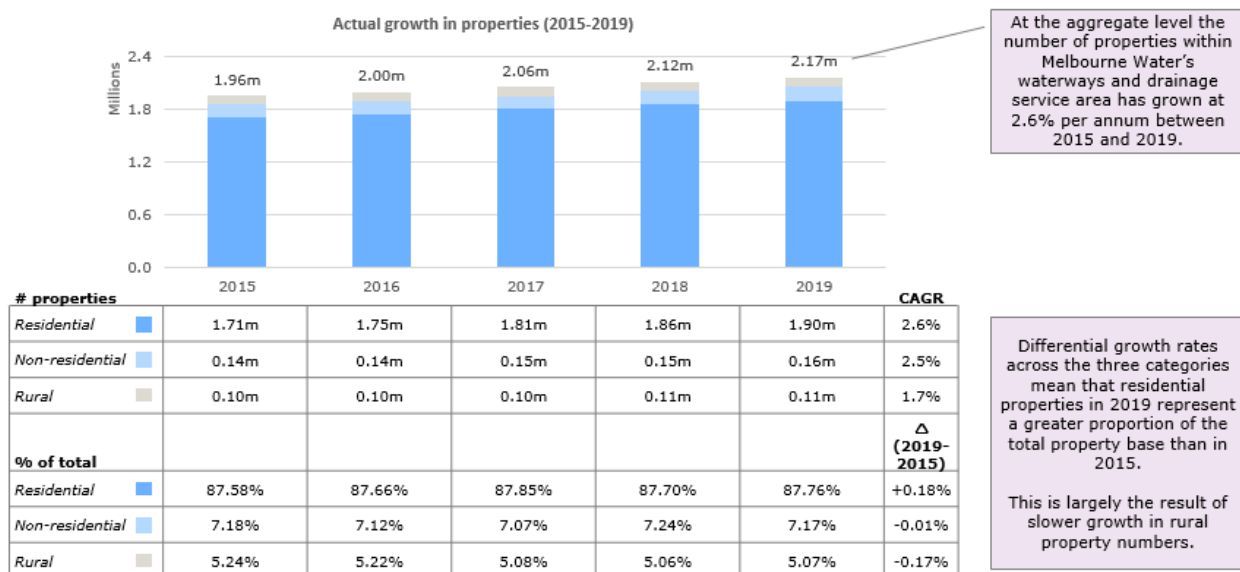


Figure 16 also highlights the significance of residential properties (>87 per cent and generally growing) to Melbourne Water's customer base and the slow decline in the proportion of rural customers.

The CAGR rates shown above compare to a constant 1.8 per cent rate applied to each category for Melbourne Water's PS16. Note that for direct comparison purposes, the CAGR for the 2016 to 2019 period for residential (2.8 per cent) and non-residential (3.0 per cent) have been a full percentage point higher than was forecast in 2016 for the first three years of the current regulatory period.

S5.3 Bulk water forecasts

Melbourne Water uses water demand forecasts to underpin both our expenditure (opex and capex) forecasts and tariff levels. Tariffs for our harvesting, storage and treatment assets (headworks) are apportioned on the basis of bulk entitlements, while the transfer tariff is 100 per cent variable.

Alignment of component forecasts to retail water company 2018 water price reviews

Melbourne Water notes that its three largest customers, City West Water, South East Water and Yarra Valley Water have each provided forecast updates based on VIF2019 data. This reflects an update to the growth assumptions contained in the 2018 regulatory determinations which were based on a 2016 dataset. Actual connections growth and consumption to the end of 2018-19 was also used in the forecasts. Other material changes in assumptions include lower non-revenue water values and a common assumption relating to the impact of demand management programs such as Target 155.

S5.3.1 How we approached PS21 forecast development

As a wholesaler with no direct insight into household level consumption decisions we rely on our retail water company customers to develop our demand forecasts. Our forecasts represent an aggregation of recent forecasts developed by the retail water companies. We request and examine key underlying assumptions made by each retail water company, applying a materiality test to the question of whether or not further refinement or clarification of assumptions is required.

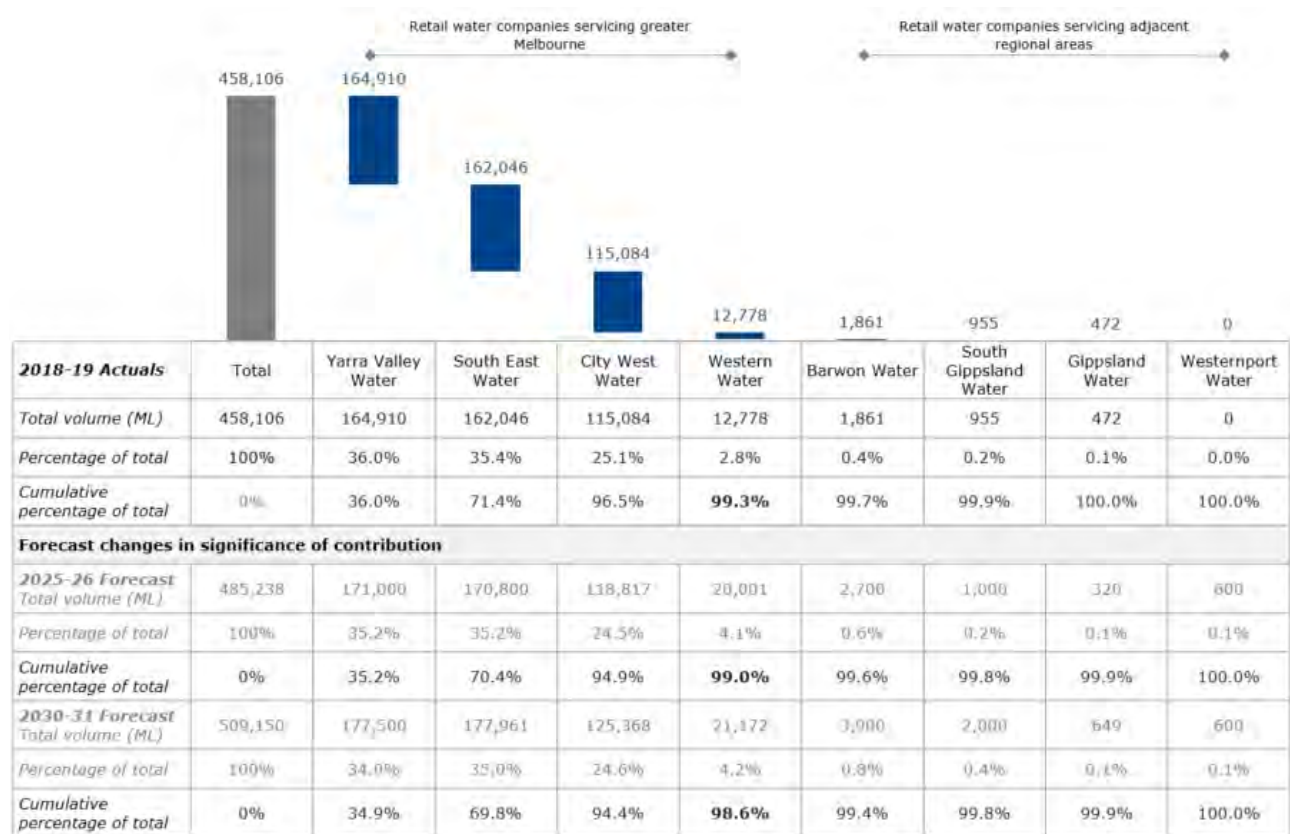
This is the methodology we applied in developing our PS16 forecasts.

In December 2019 the retail water companies provided demand forecasts to support the development of PS21, water outlook and desalinated water order advice. Revised forecasts were provided by Western Water in May 2020 to provide consistency with assumptions used in Western Water's Price Submission 2020 and Corporate Plan. These forecasts comprise residential, non-residential and non-revenue water elements.

To contextualise the materiality of key assumptions a high-level breakdown of total forecast demand is provided in **Figure 17**. It shows that the four retail water companies which service greater Melbourne (Yarra Valley Water, South East Water, City West Water and Western Water) accounted for 99.3 per cent of total water supplied by Melbourne Water in 2018-19.

These four will continue to dominate demand over the coming regulatory periods (99.0 per cent at the end of 2025-26, and 98.6 per cent at the end of 2030-31) despite growing demand on the Melbourne system from the adjacent regional retail water companies. The following summary of the approaches and assumptions focuses primarily on these four companies due to their relative significance to overall forecasts.

Figure 17 Relative demands (ML) from customer retail water companies



Assumptions relevant to the four adjacent regional retail water companies are collated in within our underlying water demand model (*available upon request*).

Key assumptions relevant to greater Melbourne demand forecasts

City West Water, South East Water, Yarra Valley Water and Western Water all use an integrated-supply demand planning (iSDP) model with inputs taken from end use studies which are refreshed periodically. Key features of the iSDP modelling approach include:

- > total demand estimate is a function of separate residential, non-residential water and non-revenue water forecasts
- > ability to incorporate efficiencies of some appliance-based end uses and other parameters, such as showering frequency and duration

- > use of a number of calibration variables such as residential water demand for outdoor water use, non-residential water demand and non-revenue water
- > use of the most recently completed end use studies.

Key assumptions underpinning the forecasts for the City West Water, South East Water, Yarra Valley Water and Western Water are summarised in **Table 43**.

S5.3.2 Bulk water demand forecasts

Melbourne Water's water demands for the PS21 period and associated annualised changes are outlined in **Table 44**.

Table 43 Key assumptions – metropolitan retail water companies and Western Water

Category	Nature of key variables	Assumptions
----------	-------------------------	-------------

Category	Nature of key variables	Assumptions
Residential		
Number of connections	<i>Baseline – existing number of connections</i>	<ul style="list-style-type: none"> > Connection level data is taken from their retail billing systems. > Actual connections vary from the forecasts provided by retail water companies for their 2018 price submissions.
	<i>Connection growth</i>	<ul style="list-style-type: none"> > Residential connection growth figures are underpinned by <i>Victoria In Future Small Area</i> (VIFSA) (2019) data for population growth. This provides population growth data for each VIFSA region of Melbourne which has then been mapped back to retail water company areas. > Internal retail water company data sources relating to construction activity and dwelling mix are considered in the finalisation of connection growth forecasts. > Western Water advise their growth is based on VIF2016/idPlacemaker17 forecasts, (adjusted for recent customer increases) and that a preliminary comparison with VIF2019 has indicated that the difference (in aggregate) is small.
Usage per connection	<i>Persons per connection</i>	<ul style="list-style-type: none"> > Forecast changes to usage per connection includes assumptions around the population density (persons per household) of new connections. As for connection growth above, estimates rely on VIFSA (2019) data, corrected for retail water company specific insights into development activity within their regions.
	<i>Water efficiency/behavioural change</i>	<ul style="list-style-type: none"> > All retail water companies include ongoing assumptions around improved water efficiency, which are understood to be generally consistent with the assumptions used for the previous Urban Water Strategy. > City West Water and Yarra Valley Water assume 1% annual reduction in water use arising from behaviour change programs, while South East Water has not applied an efficiency factor at this time. > Retail water companies provided forecast scenarios with and without assumed efficiencies from the rollout of digital meters. By consensus the forecasts adopted exclude and digital metering efficiency assumptions.
	<i>Recycled water</i>	<ul style="list-style-type: none"> > Substitution of potable water demand through the provision of recycled water occurs for all four retail water companies. > Locally relevant assumptions on growth in recycled water uptake are included in the forecasts.
	<i>Outdoor water use</i>	<ul style="list-style-type: none"> > A range of climate related scenarios were modelled by the retail water companies. The forecasts in this submission are based on average climatic conditions.
Non-residential <i>Forecasts rely on bottom-up aggregation of historical demands and projections using observed trends or relationships to factors such as residential demand or population.</i>		
Number of connections	<i>Baseline – existing number of connections</i>	<ul style="list-style-type: none"> > Connection level data is taken from their retail billing systems. > Actual connections vary from the forecasts provided by retail water companies for their 2018 price submissions.
	<i>Connection growth</i>	<ul style="list-style-type: none"> > Non-residential growth estimates are based on historical data or aligned with residential growth, consistent with past practice.
Usage per connection	<i>Water efficiency/behavioural change</i>	<ul style="list-style-type: none"> > Non-residential growth estimates are based on historical data or pegged to residential growth.
	<i>Recycled water</i>	<ul style="list-style-type: none"> > As for residential above.
	<i>Outdoor water use</i>	<ul style="list-style-type: none"> > As for residential above.
Non-revenue water <i>Forecasts rely on observed trends or relationships to factors such as residential demand or population, adjusted for any future non-revenue water management activities.</i>		
Non-revenue water	> Rolling average percentages of the total residential and non-residential potable demands.	

Table 44 Water demand forecasts (000's) and growth rates (%)

Regulatory Period	PS16			PS21					PS26				
Category	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Water (ML)	458,106	467,693	461,415	463,707	470,131	475,263	481,122	485,238	489,652	494,469	499,810	505,053	509,150
Annual %Δ		2.09%	-1.34%	0.50%	1.39%	1.09%	1.23%	0.86%	0.91%	0.98%	1.08%	1.05%	0.81%
CAGR %	◀ 0.83% ▶												
By retail water company													
City West Water	115,084	115,133	115,074	115,725	116,476	117,431	118,165	118,817	120,205	121,538	122,722	124,084	125,368
Annual %Δ		0.04%	-0.05%	0.57%	0.65%	0.82%	0.63%	0.55%	1.17%	1.11%	0.97%	1.11%	1.04%
South East Water	162,046	161,032	162,813	164,028	165,743	167,291	168,927	170,800	172,593	174,391	176,163	177,708	177,961
Annual %Δ		-0.63%	1.11%	0.75%	1.05%	0.93%	0.98%	1.11%	1.05%	1.04%	1.02%	0.88%	0.14%
Yarra Valley Water	164,910	165,500	166,000	167,000	168,500	169,500	170,000	171,000	172,000	173,000	174,500	176,000	177,500
Annual %Δ		0.36%	0.30%	0.60%	0.90%	0.59%	0.29%	0.59%	0.58%	0.58%	0.87%	0.86%	0.85%
Western Water	12,778	13,628	13,540	14,367	16,890	18,153	20,176	20,001	19,068	19,588	20,108	20,578	21,172
Annual %Δ		6.65%	-0.64%	6.11%	17.56%	7.48%	11.14%	-0.87%	-4.67%	2.73%	2.65%	2.34%	2.89%
Barwon Water	1,861	10,600	2,500	1,100	1,000	1,300	2,200	2,700	3,600	3,500	3,600	3,700	3,900
Annual %Δ		469.59%	-76.42%	-56.00%	-9.09%	30.00%	69.23%	22.73%	33.33%	-2.78%	2.86%	2.78%	5.41%
South Gippsland Water	955	800	800	800	800	800	800	1,000	1,200	1,400	1,600	1,800	2,000
Annual %Δ		-16.23%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	20.00%	16.67%	14.29%	12.50%	11.11%
Westernport Water	0	600	600	600	600	600	600	600	600	600	600	600	600
Annual %Δ		N/A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Gippsland Water	472	400	87	88	122	188	254	320	386	451	517	583	649
Annual %Δ		-15.25%	-78.25%	1.15%	38.64%	54.10%	35.11%	25.98%	20.63%	16.84%	14.63%	12.77%	11.32%

S5.3.3 Comparison of trend and forecast

Analysis presented below is limited to City West Water, South East Water and Yarra Valley Water due to their overall significance and the fact that Western Water (and others) only draw part of their total water supply from the Melbourne system. Data is presented to show actual growth over the past four years of actuals (to the end of 2018-19 at the time the analysis was completed), and the forecasts from 2019-20 onwards.

Conclusions

The analysis shows that overall forecasts include a tendency to assume lower levels of demand than recent trends, due to a combination of a forecast slowing in connections growth (while still high and in line with VIF2019 forecasts) and an ongoing reduction in average kilolitres consumed per connection (both residential and non-residential).

The underlying assumptions provided by the retail water companies (and outlined in **Table 43**) are not considered to be unreasonable and are consistent with their past (approved) regulatory submissions.

On this basis we have adopted the forecasts presented in **Section S5.3.2**.

We are confident our capital planning processes give sufficient regard to demand forecasting uncertainty to minimise the risk that augmentation activities are undertaken too soon.

We acknowledge that should demand growth be higher than forecast (in line with recent observed trends) the variable tariff may be set lower than its efficient level, but note that the variable tariff accounts for approximately 15 per cent of our total water revenue annually (even less when the impact of water orders is included).

Analysis

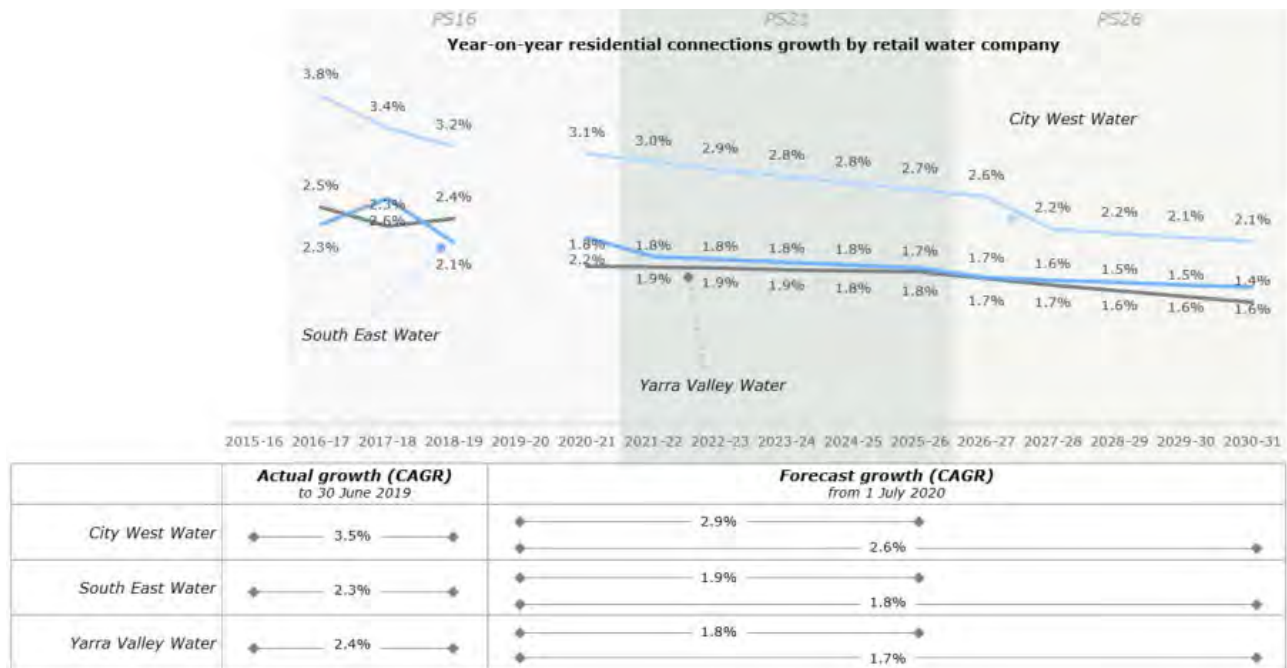
Connections

Connections growth (both residential and non-residential) trends are presented on **Figure 18** and **Figure 19**. Note that residential connections account for the vast majority of connections, ranging from 91 per cent (City West Water) to 93 per cent (Yarra Valley Water) across the retail water companies shown.

Compared to the period 2015-16 to 2018-19, the retail water companies are forecasting a decline in the rate of growth of residential connections across the next two regulatory periods (**Table 45**). A similar trend is evident for non-residential connections growth.

Overall connections growth forecasts are in line with the VIF2019 projections (**Table 39**), with the higher connections growth rates forecast by City West Water in line with the VIFSA2019 dataset (refer **Section S5.4** for further discussion of VIFSA2019 trends).

Figure 18 Historical and forecast growth in residential connections



Note: Refer to Section S5.2.2 and Table 41 for waterways and drainage property growth rate.

Figure 19 Historical and forecast growth in non-residential connections

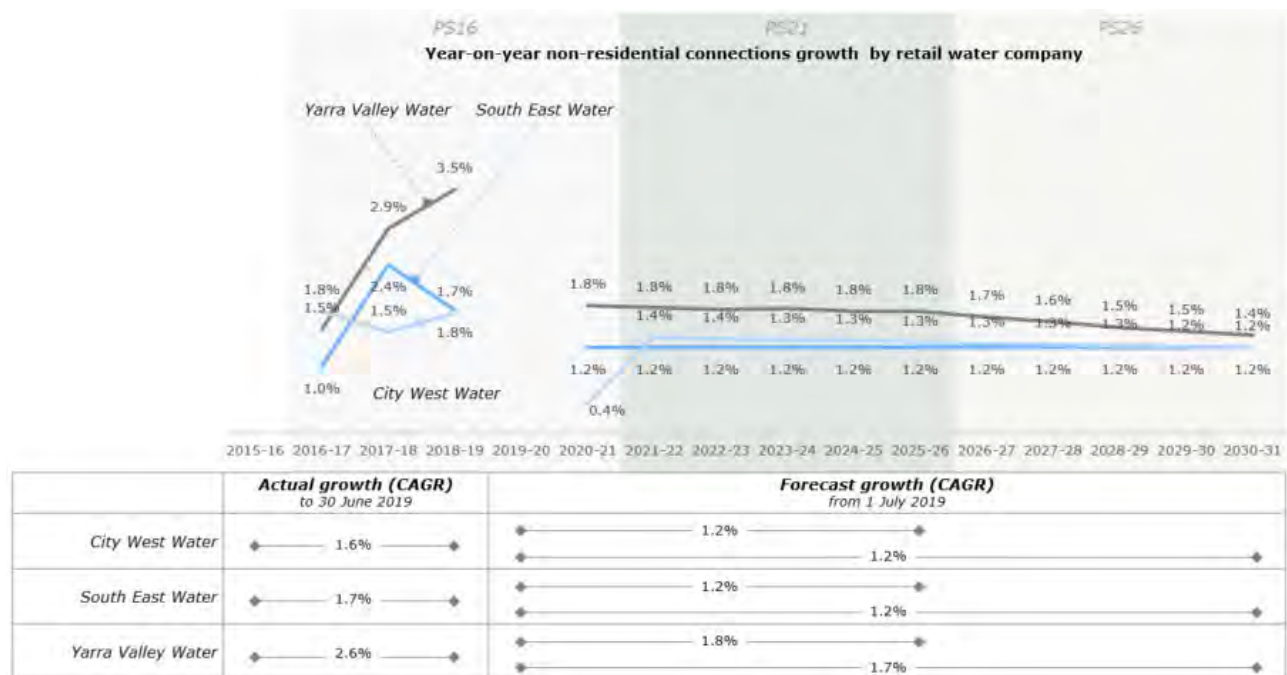


Table 45 Residential connections growth rates

Year	2015-16	2018-19	CAGR	2025-26	CAGR	2030-31	CAGR
Total connections	1,771,317	1,913,254	2.6%	2,189,877	2.1%	2,387,891	1.9%
<i>Yarra Valley Water</i>	712,451	764,589	2.4%	867,910	1.8%	936,530	1.7%
<i>South East Water</i>	669,211	717,091	2.3%	793,247	1.9%	860,027	1.8%
<i>City West Water</i>	389,655	431,574	3.5%	528,720	2.9%	591,334	2.6%

Consumption

The rate of water consumption underpinning Yarra Valley Water, South East Water and City West Water forecasts is considered in **Table 46**.

Recent reductions in demand per residential connection have varied materially between retail water companies, with Yarra Valley Water (-0.5 per cent) experiencing half the rate of reduction that City West Water (-1.0 per cent) and South East Water (-1.3 per cent) have seen. A similar effect is evident for demand per non-residential connection.

Forecasts show different expectations across the three retailers underpinned by different assumptions in persons per new connection and efficiency gains from appliances. Over the next regulatory period these forecasts represent:

- > Yarra Valley Water – a near doubling of the annual rate of reduction in per connection demand for both residential and non-residential connections.
- > South East Water – a slowing in the annual rate of reduction in per connection demand for both residential and non-residential connections.
- > City West Water – a marked increase in the annual rate of reduction in per connection demand for residential connections and a slowing of the rate of reduction in per connection demand for non-residential connections.

Non-revenue water

Analysis of non-revenue water forecasts shown in **Table 47** quantify the impact of assumptions relating to improvements in the ratio of non-revenue water to total water sold (residential demand plus non-residential demand).

Each retail water company exhibits a degree of annual variation in their ratios of non-revenue water to total water sold over the four years to 2018-19, with annual ratios ranging from 9 per cent (City West Water in 2018-19) to 15.3 per cent (South East Water in 2018-19). For the purpose of the analysis presented in **Table 47** we have calculated a benchmark non-revenue water (NRW) to total water sold ratio using the average value observed over the four years of actual data provided. On the basis of the raw demand forecasts provided, it is apparent that:

- > City West Water's assumed rate of improvement for PS21 is materially higher than both South East Water and Yarra Valley Water, with the rate of improvement increasing again in the subsequent regulatory period
- > South East Water is not assuming any noticeable improvement in non-revenue water ratios across the forecast period.
- > Yarra Valley Water is forecasting a steady improvement in non-revenue water ratios across the two regulatory periods.

Table 46 Consumption rate forecasts – kilolitres per connection

Year	2015-16	2018-19	CAGR	2019-20	2025-26	CAGR	2030-31	CAGR
Status	Actuals			Forecast (CAGR values from 2019-20 base)				
	kL	kL	%	kL	kL	%	kL	%
Yarra Valley Water								
Residential	157.3	154.8	-0.5%	149.3	140.4	-1.0%	135.0	-0.9%
Non-residential	564.9	555.4	-0.6%	533.9	499.6	-1.1%	483.9	-0.9%
South East Water								
Residential	154.5	148.5	-1.3%	151.1	143.5	-0.9%	138.3	-0.8%
Non-residential	572.1	558.3	-0.8%	554.4	539.1	-0.5%	522.1	-0.5%
City West Water								
Residential	149.8	145.3	-1.0%	140.3	126.9	-1.7%	124.3	-1.1%
Non-residential	1,079.4	1,030.4	-1.5%	1,001.3	935.9	-1.1%	886.3	-1.1%

Table 47 Non-revenue water analysis

Non-revenue water (NRW)	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
City West Water																
NRW	10,539	10,586	12,920	9,544	10,372	10,286	10,262	10,247	10,101	10,075	9,303	9,260	9,218	9,165	9,133	9,095
NRW:total sold ¹	10.4%	10.3%	12.7%	9.0%	9.9%	9.8%	9.7%	9.6%	9.4%	9.3%	8.5%	8.3%	8.2%	8.1%	7.9%	7.8%
Forecast YOY ratio change – relative to prior forecast						-0.9%	-0.9%	-0.9%	-2.4%	-1.0%	-8.9%	-1.7%	-1.7%	-1.7%	-1.6%	-1.6%
Average of recent actuals	10.6%	NRW if no improvement			11,118	11,121	11,193	11,274	11,391	11,471	11,622	11,774	11,920	12,051	12,199	12,340
Impact of improvement assumptions (annual)							-931	-1,027	-1,290	-1,396	-2,319	-2,514	-2,702	-2,886	-3,066	-3,245
Impact of improvement for regulatory period (as percentage of forecast)							-6,963 (-1.2%)					-14,413 (-2.3%)				
South East Water																
NRW	19,216	18,620	20,711	21,513	20,413	20,637	20,900	21,291	21,486	21,549	21,815	22,078	22,326	22,537	22,717	22,759
NRW:total sold ¹	14.1%	13.8%	14.8%	15.3%	14.5%	14.5%	14.6%	14.7%	14.7%	14.6%	14.6%	14.7%	14.7%	14.7%	14.7%	14.7%
Forecast YOY ratio change – relative to prior forecast						0.0%	0.6%	0.9%	0.0%	-0.8%	0.1%	0.2%	0.1%	-0.1%	-0.1%	0.0%
Average of recent actuals	14.5%	NRW if no improvement			20,367	20,593	20,730	20,922	21,118	21,346	21,579	21,800	22,025	22,251	22,449	22,479
Impact of improvement assumptions (annual)							169	369	368	203	237	278	301	286	268	279
Impact of improvement for regulatory period (as percentage of forecast)							1,346 (0.2%)					1,412 (0.2%)				
Yarra Valley Water																
NRW	18,881	14,122	17,315	14,843	17,852	17,963	17,696	17,934	17,681	16,939	16,703	16,458	16,208	16,579	16,875	17,196
NRW:total sold ¹	13.3%	10.3%	12.0%	9.9%	12.1%	12.1%	11.9%	11.9%	11.6%	11.1%	10.8%	10.6%	10.3%	10.5%	10.6%	10.7%
Forecast YOY ratio change – relative to prior forecast						0.4%	-2.3%	0.5%	-2.2%	-5.0%	-2.2%	-2.3%	-2.3%	1.6%	1.0%	1.2%
Average of recent actuals	11.4%	NRW if no improvement			16,789	16,834	16,978	17,121	17,264	17,405	17,546	17,687	17,829	17,958	18,095	18,229
Impact of improvement assumptions (annual)							718	813	417	-466	-842	-1,229	-1,621	-1,379	-1,220	-1,033
Impact of improvement for regulatory period (as percentage of forecast)							640 (0.1%)					-6,482 (-0.7%)				

Note 1: Water sold is the sum of residential and non-residential demand.

Using the benchmark non-revenue to total water sold ratio outlined above only City West Water is assuming lower total levels of non-revenue water for the PS21 period. Both South East Water and Yarra Valley Water are forecasting total volumes of non-revenue water that are marginally above the volumes implied by the benchmark rate for the PS21 period.

S5.4 Bulk sewage forecasts

Sewage forecasting is particularly challenging

Demand forecasting for sewage is inherently more uncertain than demand forecasting for water or property as a result of a number of factors:

- > a greater number of parameters requiring measurement – five rather than one:
 - one volumetric (flow) parameter
 - four load-based (inorganic total dissolved solids (iTDS), total suspended solids (TSS), biological oxygen demand (BOD), and total Kjeldahl nitrogen¹¹ (TKN)) parameters.
- > great number and diversity in the sources of sewage (over 1 million household and commercial connections plus industrial connections with significant individual and collective load contributions)
 - > absence of comprehensive metering across the network – unlike water, where every residential and non-residential connection is metered, measurement of sewage flows and loads occurs at a limited number of locations:
 - all treatable parameters are measured at the inlet to each treatment plant – flow is measured directly using flow meters, while daily samples are captured for laboratory analysis of iTDS, TSS, BOD and TKN
 - at defined (by the Bulk Sewerage Supply Agreements) boundary points (circa 19 boundary flow meters), volumetric flow is measured – these measured values support the apportionment of flows between the retail water companies and between the eastern and western sewage treatment systems (however the load distribution of the treatable parameters is not measured between the retailer water companies)
 - at industrial (Category A) customer premises – all parameters are measured at a frequency stipulated by the agreement between the relevant retail water company and the industrial business
 - this form of measurement is conducted by the retail water companies, with data passed to Melbourne Water for billing purposes on a monthly basis
 - flow and load parameters from commercial (Category B) customers are not measured
 - > a transfer network that is inherently more open to inflow of stormwater and groundwater than the water network (which is designed and operated to eliminate this).

The way we develop and use sewage forecasts is designed to mitigate and manage this uncertainty

- 1) We apply a transparent, collaborative and fit-for-purpose methodology.

¹¹ Total Kjeldahl nitrogen (TKN) is the sum of organic nitrogen and ammonia – it is a commonly measured sewage parameter which captures the treatable fractions of nitrogen in sewage.

- Sewage flow and load forecasts were derived via a highly collaborative process with the retail water companies using the methodology developed initially in 2014 for the Demand Forecasting and Capacity Planning Improvement Project (the Demand Project). The process included the development, aggregation, challenge and refinement of retail water company forecasts. Wherever possible the group sought to align on key underlying assumptions, applying local assumptions only where appropriate.
 - Key benefits of this approach include:
 - the ability to consider different growth rates for different customer/demand segments
 - greater scope (for retail water companies) to positively influence loads produced by each segment to deliver least community cost sewage management outcomes
 - alignment of major assumptions and methodology which improves confidence in the accuracy of the *proportional* contribution each retail water company is expected to make to sewage flows and loads over the forecasting period.
- 2) We apply a staged approach to tariff development and price setting that limits the impact of forecasting uncertainty on individual retail water companies.
- Allocate our total (by system) sewage revenue requirement to retail water companies on the basis of their *proportional* contribution to sewage flow and loads.
 - Combine long and short run marginal cost prices with forecast demands at the retail water company level to calculate expected variable revenue and then set the fixed tariff component.
 - A key implication of the staged approach we apply to tariff development and price setting is that it is the relative, not absolute, demands that are most critical to the way in which retail water companies pay for their sewerage service.
 - Importantly, a change to a core assumption, for example relating to residential sewage contribution per person, would impact the forecasts for each retail water company, with minimal impact on their proportional contributions.
- 3) We build our capital program on a 'just-in-time' basis.
- We do not initiate projects on the basis of forecast demand alone. Capital projects are only put forward when the observed the performance of a treatment or transfer asset demonstrates that it is approaching, or has reached, its capacity limits. Limits are regularly reviewed and challenged to optimise the value we achieve from existing assets.
- 4) We apply fit-for-purpose processes for developing robust operating expenditure forecasts.
- Operating expenditure forecasts are discussed further in **Section S6.1**; however, expenditure forecasts for chemicals, energy, and Scope 1 emission offsets in particular take into account base year expenditure and the sensitivity of each transfer or treatment asset's operating expenditure to forecast increases in flow and load.

5) We use the forecasts to develop revised estimates of long run marginal cost (LRMC).

- Forecast accuracy impacts LRMC estimates in that changes in the timing of the modelled augmentation have an implication for the time value element of the calculation. This will not create an order of magnitude type change in the actual value. The price signal element would remain reasonable.
- Forecasting risk related to the calculation and use of LRMC is limited to the relative split between fixed and variable tariff components.

Alignment of component forecasts to retail water company 2018 water price reviews

The methodology applied by the Demand Project is different to the methodologies applied by the retail water companies in the development of their own forecasts. For example, South East Water advise that its 2018 Price Submission sewage forecasts were based on the water demand forecasts built using their end-use model. The Demand Project has included more recent estimates of actual population growth, forecast population growth and observed flows and loads at the ETP and WTP.

S5.4.1 How we approached PS21 forecast development

As outlined above, we applied a new methodology to the development of our sewage forecasts for PS21. This methodology represents a greater level of engagement and collaboration between Melbourne Water and the retail water companies than has occurred in prior price submission forecasts. It moved from a simple aggregation of forecasts provided by each retail water company (PS16) to the application of a common methodology with agreed assumptions underpinning retail water company level forecasts.

Given the nature of the sewerage system, forecasts are split into two systems (eastern and western) based around the catchments of the ETP and WTP.

The methodology applies a baseline-plus-growth approach.

Baseline determination

- > Flows and loads were considered from both top-down and bottom-up perspectives.
- > The top-down approach **used a weighted average of the past five years of measured data** (2014-15 to 2018-19) at the treatment plants to set the baseline. A stepped weighting was applied to each year, with more recent values given greater weighting in the calculation.
- > The bottom-up approach used measured 2018-19 data for the key segments that contribute to the make-up of sewage flows and load outlined in **Table 48**. As raw data quality informing each segment varies, a mixture of measured, calculated, modelled and literature-derived is used.
- > The top-down and bottom-up approaches were compared, with the differences accounted for by a balancing item. A long-term objective of the Demand Project is to reduce the size of the balancing item wherever possible.

Growth factors

- > Different growth is assigned to each key segment as appropriate.
 - Growth factors for each segment vary according the quality and availability of data. A mixture of bespoke (direct forecasts provided for large industrial customers), modelled and literature data is used to determine growth factors.

Definitions and key assumptions for each category are outlined in **Table 48** and **Table 49**.

Table 48 Sewage demand residential category – definition and key assumptions

Category and definition <i>Including major sub-categories</i>	Key assumptions/variables
Residential	
<p><i>This category includes low, medium and high-density residential customers.</i></p> <ul style="list-style-type: none"> > Baseline residential (population) figures are calculated by using <i>Victoria In Future Small Area</i> (VIFSA) (2019) data. This provides data for each VIFSA region of Melbourne which has then been mapped back to retail water company and treatment plant catchment. > As this method only uses areas that fall within a treatment plant catchment, and focuses on population rather than households, growth rates differ to those shown here differ from the household level forecasts shown in Table 41. 	<ul style="list-style-type: none"> > Size (#) and percentage (%) of new population discharging to ETP or WTP. Population growth forecasts vary spatially across Melbourne, leading to different growth rates in the ETP and WTP catchments – this is consistent with historical experience. The forecast population growth rate in the WTP catchment is similar to Melbourne overall, while in the ETP catchment it is significantly lower. > Over the 2016 to 2026 period (shown below) the proportion of Melbourne's total population whose sewage is treated by the WTP and ETP declines from 85.6 to 83.3%. > Per person impact on treatment parameters – taken from an industry endorsed residential end-use study 2017-18: <ul style="list-style-type: none"> – L/person per day (flow) – declining assumption from 140L/p/day (2018-19) to 129 L/p/day (2030-31). Residential water demand forecasts have assumed two different types of properties – detached and multi-unit. Detached properties are assumed to use more water than multi-unit due to higher outdoor usage. For both property types, appliance efficiencies are also assumed. The distribution of detached and multi-unit properties has also been assumed to change towards more multi-unit properties over time. Both of these factors contribute to the steady drop in L/p/day that has been estimated – g/person/day (other parameters) held constant. > Transient population assumptions – primarily due to the significance of the population working in the city (WTP catchment).

VIFSA (July 2019) – population growth projection

Population forecast	2016	2021	2026
Melbourne	4,683,972	5,270,871	5,803,337
CAGR			
WTP catchment	2,302,383	2,616,022	2,882,274
CAGR			
ETP catchment	1,706,229	1,826,989	1,951,942
CAGR			

Table 49 Sewage demand non-residential categories – definition and key assumptions

Category and definition <i>Including major sub-categories</i>	Key assumptions/variables
Non-residential – <i>This category includes all non-residential flows arising from commercial and industrial premises</i>	
<p><i>Category A</i></p> <ul style="list-style-type: none"> > Split into Category A (top) and Category A (group) cohorts. > Category A (top) customers are defined as a single industrial customer that will contribute more than 1% of a particular treatment plant's load for a parameter. > Category A (group) are the remaining Category A customers. 	<ul style="list-style-type: none"> > Category A (top) forecasts were provided by retail water companies based on their customer engagement activities and incorporate expected increases and decreases at a customer level. For example, engagement by one retail water company identified customer plans to install on-site pre-treatment to reduce the strength of their waste (BOD and TKN most impacted), with forecasts adjusted from 2020-21 accordingly. <ul style="list-style-type: none"> – All forecast growth in Category A (top) to plateau within the year forecasting period to 2030-31 > Category A (group) growth was assigned a zero-growth factor by retail water companies for both treatment plant catchments – based on recent past actuals over a period of time. <p><i>We have relied on the collaborative nature of the methodology and the top-down analysis presented in Section S2 to evaluate the reasonableness of overall forecasts.</i></p> <p><i>It should be noted that the largely uniform nature of this assumption means the impact of any underestimation of Category A growth is likely to be shared across each retail water company via the cost allocation model.</i></p>
<p><i>Category B</i></p> <ul style="list-style-type: none"> > Segment is representative of the smallest contributors from the industrial and commercial sectors. 	<ul style="list-style-type: none"> > Data estimated using calculated flows and load by industry category. > Growth assigned at the level of ANZSIC (Australian and New Zealand Standard Industrial Classification) industry groupings. > For the period 2016-17 to 2020-21, a mixture of employment forecasts¹² (25 industry groups) and population growth (all other industry groups) was applied. > For the period 2021-22 to 2025-26 population growth forecasts was applied to all industry groups. > A small number of industry groups (eight) were assigned zero growth on the basis that their growth was unrelated to population.
<p><i>Sludge</i></p> <ul style="list-style-type: none"> > Some of Yarra Valley Water's treatment plants discharge waste sludge back into the network (both systems). > Small contribution but delineated as a segment to assist with future planning. 	<ul style="list-style-type: none"> > Forecast growth is based on increases in flows at local treatment plants up to their capacity. Beyond local treatment plant capacity, the whole volume of sewage will be transferred to Melbourne Water. This is captured in the catchment-based forecast for each treatment plant.
<p><i>Western Water</i></p> <ul style="list-style-type: none"> > Western Water is expected to become a City West Water customer in 2021, meaning catchment level sewage (primarily residential but with some non-residential contributions) from Western Water will enter the WTP. 	<p>City West Water have provided the following in relation to the Western Water sub-categories:</p> <ul style="list-style-type: none"> > The Mutual Sewage Transfer Agreement (the agreement between City West Water and Western Water to transfer sewage between our assets) is in its final stages of being finalised. The agreement includes provision for metering and/or monitoring of discharges to ensure accurate recovery of costs. > Planners at both companies have worked closely on the sewage volumes forecast in the Mutual Sewage Transfer Agreement, with support by Regulatory Managers, to ensure alignment with growth plans and pricing submissions.
Inflow and infiltration	

¹² Source: *Work Package 2.0 – Demand Forecasting and Capacity Planning- Development of Forecast Model – Methodology* – Table 3.

Category and definition <i>Including major sub-categories</i>	Key assumptions/variables
<i>Groundwater infiltration</i> > The degree to which groundwater enters the network via sewers that are at or below the level of the local water table.	> Baseline flows were estimated via the Melbourne Sewage Model 2014, with loads estimated using representative concentrations from literature reviews. > Zero growth assumption on the basis that the overwhelming majority of new sewers joining the network in the future would be reticulation sewers that would not be susceptible to groundwater infiltration. > Renewal program to offset the deterioration of older sewers.
<i>Rainfall derived inflow and infiltration</i> > The degree to which stormwater enters the network via illegal connections, manholes and other apertures.	> Baseline figures are estimated from using 20 years of existing rainfall datasets and total treatment plant flows for three separate scenarios: dry, average and wet. A percentage of total treatment plant flows were determined along with estimates of splits to ETP and WTP, including how those splits change over time. > Growth based on "A review of inflow and infiltration study methodologies for flow and concentration" which concluded a 12% uplift in rainfall derived inflow and infiltration between 2016 and 2051.
Balancing item	
> The balancing item comprises the remaining contributions to the sewer that have not been captured in the current forecast segments. A negative balance item highlights the need to better define current segment volumes and concentrations arriving at both treatment plants.	> Two growth scenarios were considered: 1) Zero growth. 2) Proportional to population growth. The proportional to population growth scenario was adopted by consensus.

The impact of the assumptions outlined in **Table 48** on demand forecasts for flow, TSS, BOD, TKN and iTDS at each treatment plant is shown on **Figure 20**, **Figure 21**, **Figure 22**, **Figure 23** and **Figure 24** respectively. Commentary in these figures addresses underlying trends and factors behind growth rate differences for different categories and retail water companies. Note that 100 per cent of City West Water's sewage flows to the WTP.

Note that iTDS is only shown for the WTP as there is not currently a charge for this parameter at the ETP.

S5.4.2 Bulk sewage demand forecasts

Melbourne Water's sewage forecasts for the next two regulatory periods are shown for the eastern and western systems in **Table 50** and **Table 51**. These are *total* forecasts. For load parameters they include non-measured load estimates that are not used in the calculation of load-based charges.

Figure 20 Category contribution and growth (CAGR) for flow – by retail water company

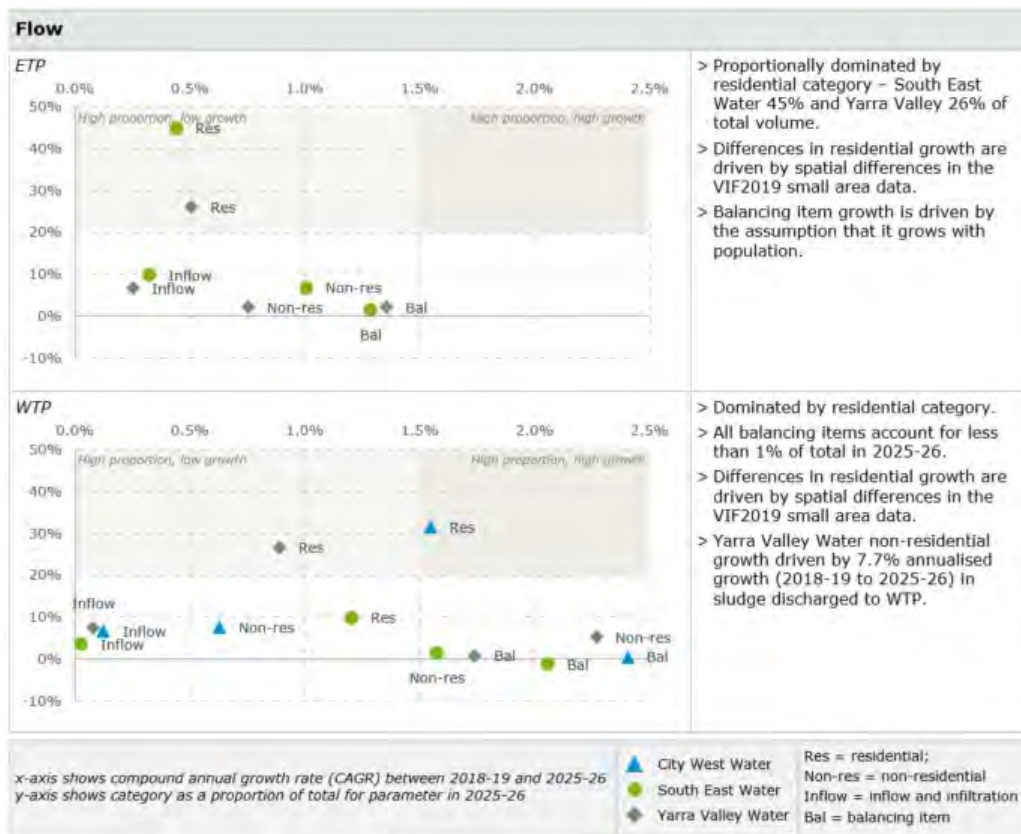


Figure 21 Category contribution and growth (CAGR) for TSS – by retail water company

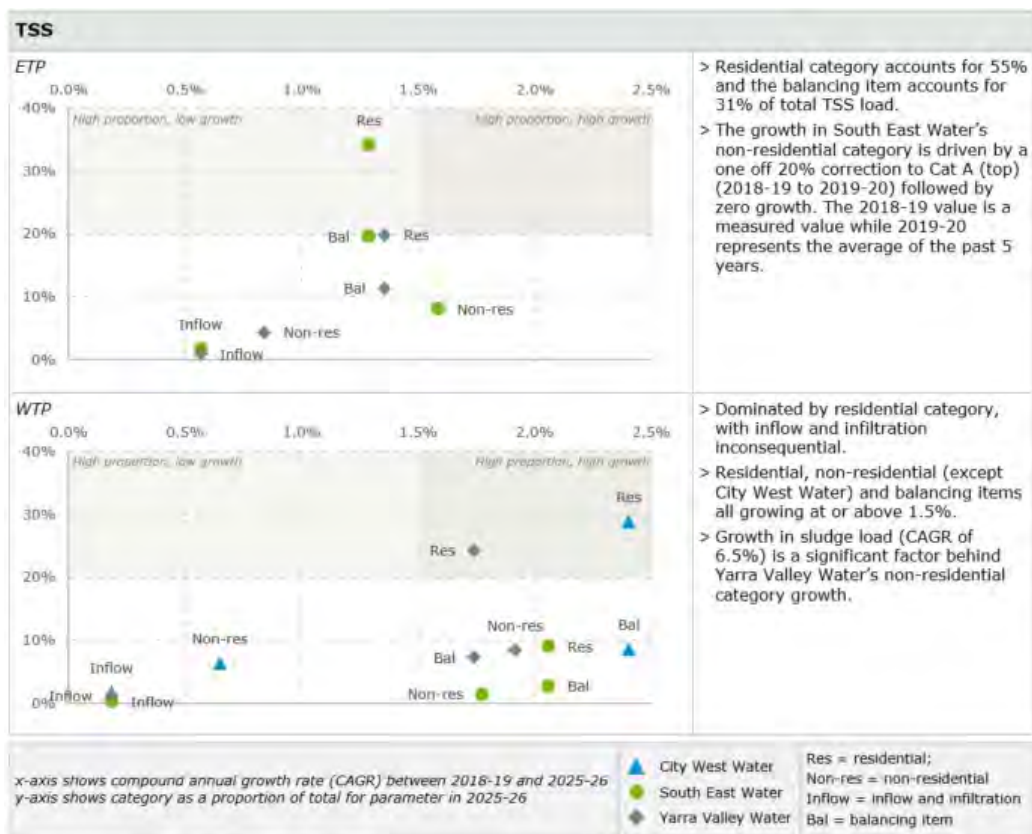


Figure 22 Category contribution and growth (CAGR) for BOD – by retail water company

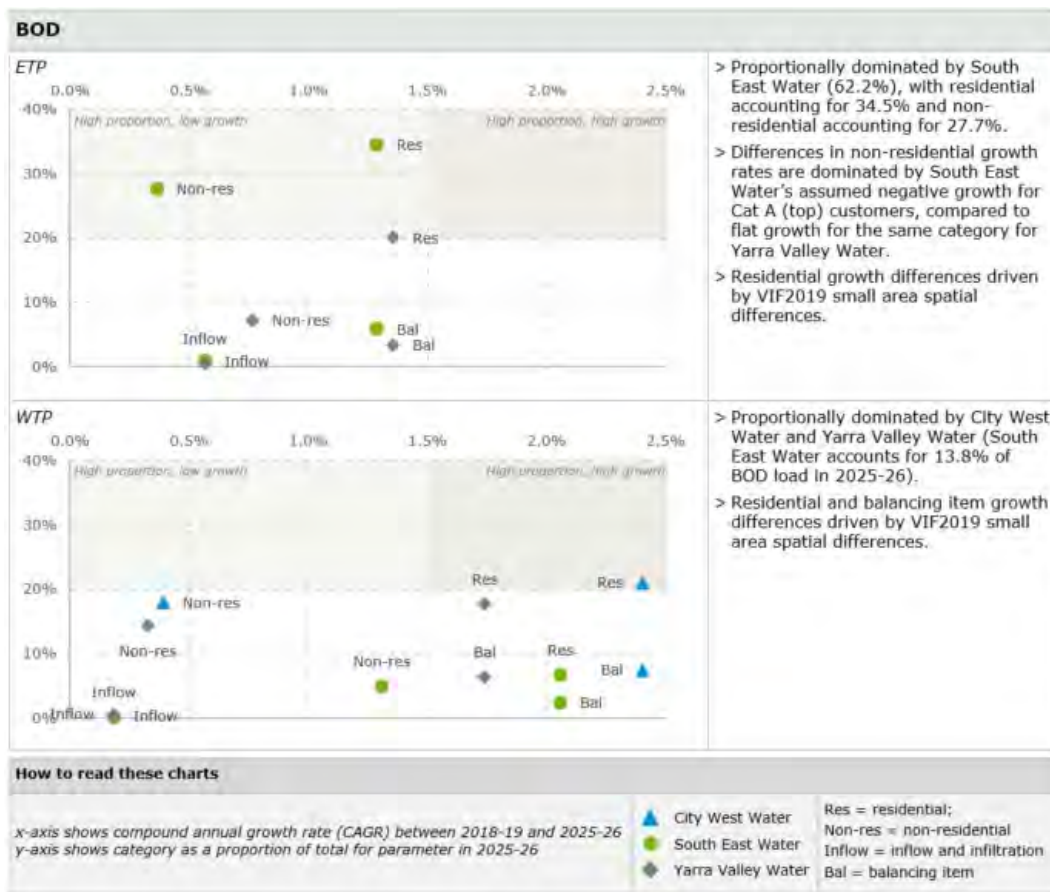


Figure 23 Category contribution and growth (CAGR) for TKN – by retail water company



Figure 24 Category contribution and growth (CAGR) for iTDS – by retail water company

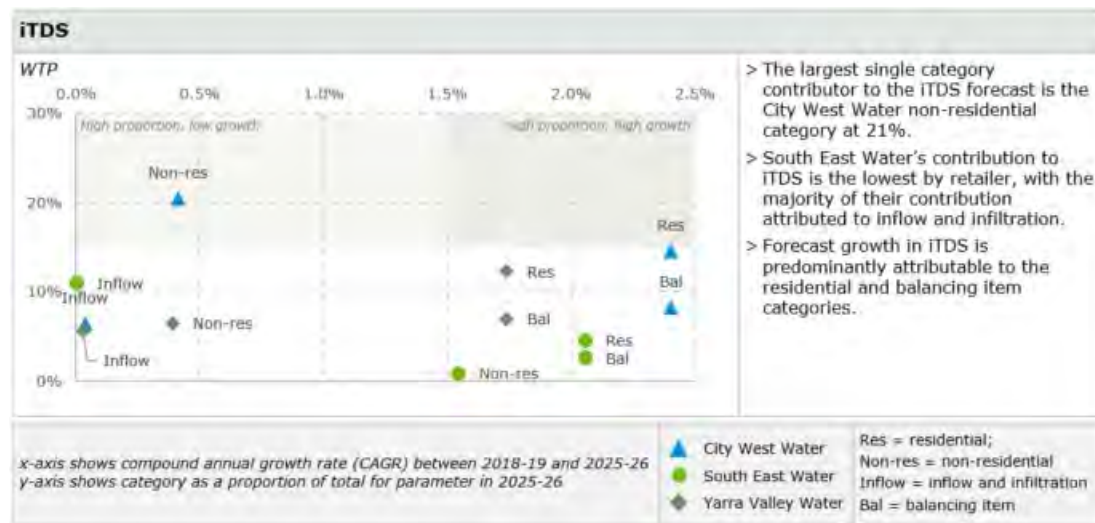


Table 50 Eastern system sewage (by parameter type) forecasts and growth rates (%)

	PS16			PS21					PS26				
Category	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Sewage (GL)	128.0	128.8	128.9	129.7	130.4	131.2	131.9	132.6	133.3	134.1	135.5	136.2	137.6
Annual %Δ		0.66%	0.04%	0.62%	0.60%	0.57%	0.55%	0.52%	0.56%	0.54%	1.08%	0.51%	1.05%
TSS (kt)	57.9	58.9	59.6	60.4	61.1	61.9	62.6	63.3	64.1	64.9	65.6	66.4	67.1
Annual %Δ		1.74%	1.19%	1.27%	1.25%	1.22%	1.20%	1.17%	1.20%	1.18%	1.17%	1.15%	1.14%
BOD (kt)	47.6	48.6	48.3	48.9	49.4	49.9	50.4	51.0	51.5	52.0	52.6	53.1	53.7
Annual %Δ		2.14%	-0.52% ¹³	1.10%	1.09%	1.07%	1.05%	1.04%	1.05%	1.04%	1.03%	1.02%	1.01%
TKN (kt)	8.4	8.5	8.5	8.6	8.7	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6
Annual %Δ		1.20%	0.31%	1.31%	1.28%	1.25%	1.23%	1.20%	1.24%	1.22%	1.21%	1.19%	1.17%

¹³ Negative growth in this year driven by expected commissioning of on-site pre-treatment for large Category A (top) customer.

Table 51 Western system sewage (by parameter type) forecasts and growth rates (%)

	PS16			PS21					PS26				
Category	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Sewage (GL)	189.6	191.9	193.7	195.7	197.9	199.9	201.8	203.8	205.1	206.4	208.8	210.0	212.3
Annual %Δ		1.23%	0.91%	1.07%	1.10%	1.01%	0.97%	0.95%	0.68%	0.64%	1.15%	0.59%	1.10%
TSS (kt)	71.1	72.5	74.1	75.5	77.0	78.4	79.8	81.2	82.3	83.5	84.6	85.7	86.7
Annual %Δ		1.88%	2.29%	1.88%	1.90%	1.84%	1.81%	1.80%	1.38%	1.35%	1.33%	1.29%	1.26%
BOD (kt)	81.6	82.1	83.9	85.1	86.6	87.8	89.0	90.2	91.3	92.4	93.4	94.4	95.5
Annual %Δ		0.61%	2.16%	1.46%	1.70%	1.45%	1.37%	1.38%	1.19%	1.15%	1.13%	1.10%	1.08%
TKN (kt)	12.6	12.8	13.1	13.4	13.6	13.9	14.1	14.4	14.6	14.8	15.0	15.2	15.4
Annual %Δ		1.27%	2.41%	1.97%	2.01%	1.80%	1.75%	1.81%	1.52%	1.47%	1.43%	1.39%	1.36%
ITDS (kt)	133.0	134.9	136.5	138.0	139.7	141.0	142.4	143.8	145.0	146.1	147.3	148.5	149.6
Annual %Δ		1.43%	1.20%	1.14%	1.19%	0.91%	0.99%	0.99%	0.84%	0.80%	0.80%	0.79%	0.77%

S5.4.3 Comparison of trend and forecast

The following analysis compares observed values from 2010-11 to 2017-18 with forecasts from the baseline year – 2018-19. Annualised growth rates are provided to aid in the comparison, while commentary is intended to address material differences between trend and forecast.

Differences between observed historical and forecast loads by individual retailer may be influenced by the adoption of improved assumptions for the price submission to close the gap between metered load and total load measured at the treatment plants.

Further information trend and forecast information comparison is available on request.

Sewage volumes

The following series of charts (**Figure 25**, **Figure 26**, **Figure 27**, **Figure 28** and **Figure 29**) places historical 'as-billed' (measured) volumes alongside forecast sewage volumes (megalitres) in order to:

- > show the scale of observed annual variability in a sewerage system that is open (inflow and infiltration) and largely unmonitored (actual volumes and loads placed into the system by residential and most non-residential customers are not measured)
- > provide an appropriate level of transparency between what we observe and what we are forecasting for PS21 – CAGR values are shown for the period 2010-11 to 2018-19 for context and from 2018-19 (base forecasting year) to 2025-26 (end PS21) and 2030-31 end PS26).

Through the ongoing application and refinement of the forecasting methodology outlined above we hope to reduce the gap between observed and forecast where we can, but accept that significant annual variation in observed flows and loads will remain a systemic feature of the sewerage system for the foreseeable future.

Forecast growth for both systems is lower than population growth (reflecting flat growth assumptions for non-residential segments such as Category A), while flow growth in the western system is expected to be twice as much as for the eastern system – consistent with VIFSA spatial projections outlined above.

Melbourne Water and the retail water companies do not believe that this historical trend for the ETP represents a reasonable expectation of future flows. Record-breaking rainfall across Melbourne in 2011¹⁴ is likely to have contributed to higher levels of inflow and infiltration in the early years of the period shown, distorting the observed rate of growth.

Total suspended solids

Figure 26 compares historical TSS loads with forecast loads (tonnes) to demonstrate the impact of the methodology and assumptions outlined above on the final forecast.

Forecast growth for both systems is lower than population growth. Similar to forecast flows, TSS growth is expected to be higher within the western system than the eastern system.

The forecast decline for City West Water is less pronounced due to forecast growth in commercial businesses and general population growth (including the connection of major Western Water growth areas to the metro sewerage system) offsetting historical declines in major industrials which are not expected to fall further.

Biological oxygen demand (BOD)

Figure 27 compares historical BOD loads with forecast loads (tonnes) to demonstrate the impact of the methodology and assumptions outlined above on the final forecast. Forecasts for both systems are higher than the historical period analysed. Significant growth in the west is reflected in a relative increase in City West Water's BOD forecast. Melbourne Water and the retail water companies are comfortable that the underlying assumptions represent a collective best estimate of future demand for BOD.

Total Kjeldahl nitrogen

Figure 28 compares historical TKN loads with forecast loads (tonnes) to demonstrate the impact of the methodology and assumptions outlined above on the final forecast.

Forecasts for both compare reasonably with observed loads. Forecasts for both systems are marginally higher than observed growth rates. TKN forecasts are dominated by residential load as shown on **Figure 23**. Different growth rates between the western and eastern system are a function of the higher proportional population growth (VIFSA dataset) in the western catchments.

Higher forecasts for City West Water and South East mainly reflect a significant pick up in population growth which dominates this measure.

Inorganic Total dissolved solids

No eastern system forecasts are provided as no charges are levied for iTDS for this system.

Figure 29 compares historical iTDS loads with forecast loads (tonnes) to demonstrate the impact of the methodology and assumptions outlined above on the final forecast.

Forecasts for the western system are higher than the historical period analysed. Observed iTDS levels are heavily influenced by inflow and infiltration events, which in turn are function of climatic conditions. As

¹⁴ Bureau of Meteorology – Melbourne climate summaries archive – http://www.bom.gov.au/climate/current/statement_archives.shtml?region=vic&period=annual

such, annual variability is expected in observed loads.

iTDS load can increase for a sustained period following exceptional wet weather events (inflow and infiltration as a percentage of total flow is; Dry 5.1 per cent, Average; 9.1 and Wet; 13.6 per cent). The incidence of wet weather events is declining due to climate change. Therefore, lower than historical forecasts

for lower growth areas are considered reasonable. Infill development is not expected to add to infiltration (and iTDS) and greenfield development is expected to be about 1 per cent.

Melbourne Water and the retail water companies are comfortable that the underlying assumptions represent a collective best estimate of future demand for iTDS.

Figure 25 Comparison of historical sewage flow (ML) and forecast



Figure 26 Comparison of historical TSS load and forecast

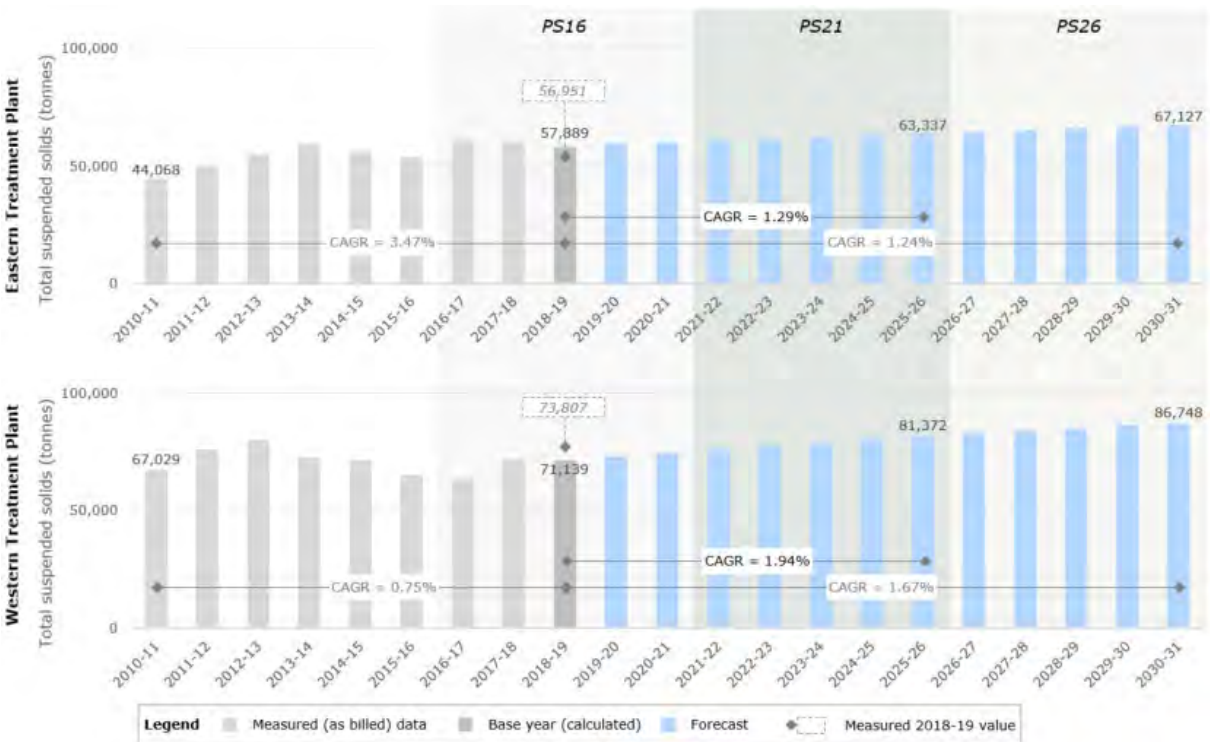


Figure 27 Comparison of historical BOD load and forecast



Figure 28 Comparison of historical TKN load and forecast

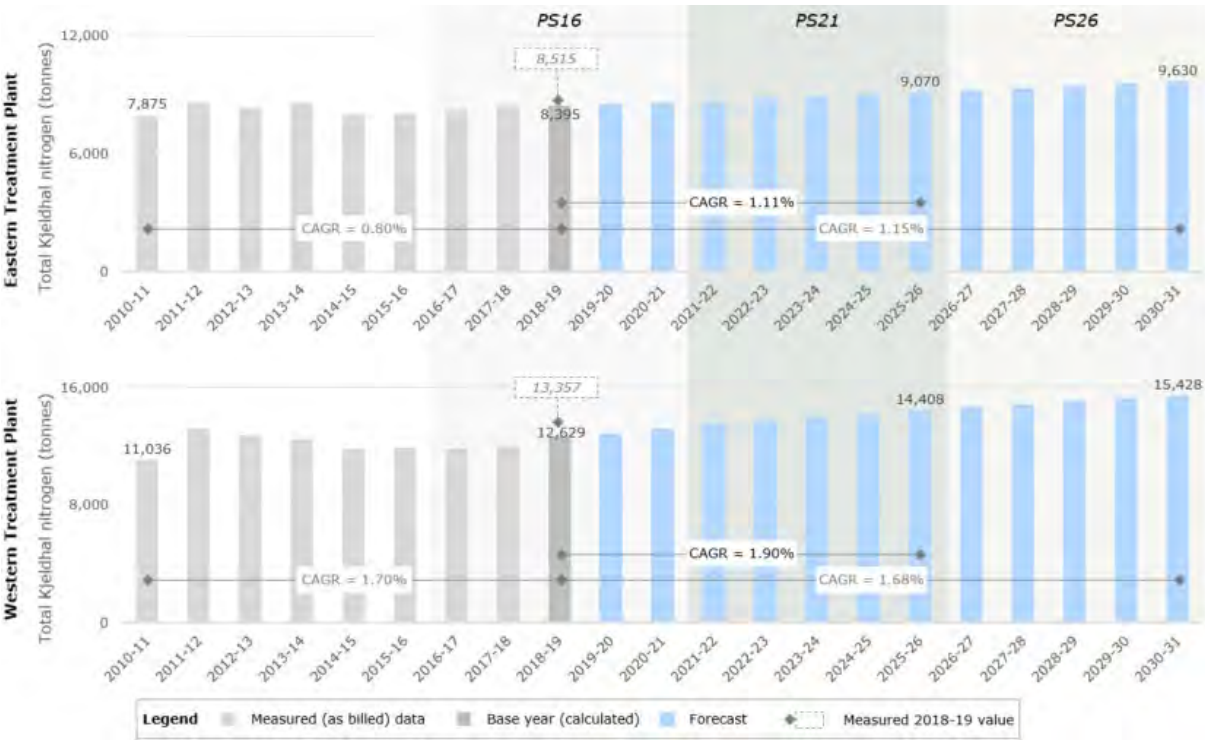
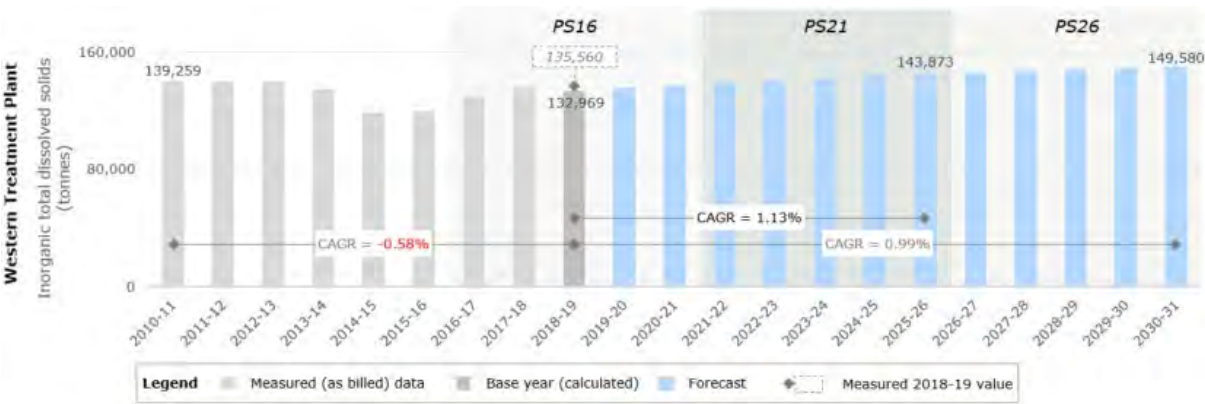


Figure 29 Comparison of historical iTDS load and forecast



S6. Expenditure forecast development

Key references relating to this chapter:

1. Cost allocation methodology
2. PS21 Opex Supplementary Information

S6.1 Operating expenditure

S6.1.1 Forecasting process

Operating expenditure forecasts are presented in the service-based view in **Section S6.7** along with discussion related to baseline expenditure development and the efficiency hurdle achieved for water and sewerage (combined), and waterways and drainage.

Melbourne Water has robust practices in place to govern, monitor and report on its proposed and actual operating expenditures. A 'top-down, bottom-up' approach is taken to the development of our forecasts so that the business can clearly define its proposed expenditures within the parameters of our current regulatory period.

Using the bottom-up methodology, budgets and forecasts are developed taking into account: Underlying changes in base costs (controllable and uncontrollable) including:

- > known or expected efficiencies that impact rate, productivity or quantum of inputs consumed (for example, avoided electricity purchases via behind-the-meter generation; new contracts with lower rates)
- > known or expected cost escalation (for example, energy price increases; licence fees)
- > operating expenditure arising from newly-commissioned capital items
- > new or escalated costs associated with meeting a new regulatory standard for existing services
- > new costs associated with fulfilling newly allocated obligations (for example, works required under the *Marine and Coastal Act 2018*).

From a top-down perspective, consideration is given to:

- > the appropriate allocation of shared costs categories (for example, corporate costs)
- > the efficient base year (net of adjustments and new obligations)
- > reasonable rates of growth and efficiency applied to the base year (excluding non-controllable items and new obligations)
- > material operating expenditure risks (for example, behind-the-meter energy generation).

Identifying opex impacts of capex decisions

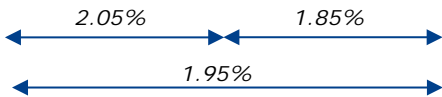
The opex impacts of capital project completion are considered as part of forecast preparation. Where new assets are coming online, the ongoing opex costs and/or savings are built into future forecasts based on the estimated capital completion date. Ongoing opex costs and/or savings for new assets largely fall under the maintenance, chemicals and energy categories.

As an example, during PS21 the ETP solar plant is scheduled to come online. In preparing the opex forecasts, the ongoing maintenance for the new assets has been built in as an additional cost (\$1.7 million over five years), while the electricity reduction caused by avoidance of grid import as well as grid exports has also been factored into the forecasts as an ongoing cost reduction (\$22.8 million over five years).

S6.1.2 Material assumptions – major cost categories

Underlying assumptions for major cost categories used in the development of cost forecasts for each service are described in **Table 52**.

Table 52 Assumptions underpinning major cost category forecasts

Category	Assumption								
Growth	<p><i>Note that these assumptions have not been adjusted to take into account any COVID-19 impacts to growth. The manner in which we have addressed the COVID-19 pandemic is outlined in Section 2.1 of the price submission.</i></p> <ul style="list-style-type: none">> Melbourne Water's growth considerations for the development of operating expenditure consider both price growth (e.g. via the consumer price index – CPI) and volume growth (i.e. new connections/households consuming our services).> For price growth we have generally applied a CPI forecast (noting that all expenditure is forecast in real terms), with escalation (or de-escalation) of prices above (below) CPI occurring by exception only where contract rates are known over the forecast period. We have applied the midpoint of the Reserve Bank of Australia's target band (2.5 per cent) for all years.> For volume growth we have applied the same growth rates for water and sewerage, and waterways and drainage services. We have taken VIF2019 <i>Population and Household Projections</i> (July 2019)¹⁵ and considered projected household growth from 2021 to 2031. On an annualised basis the growth rates forecast for the 2021 to 2026 period (2.05 per cent) are higher than the subsequent five years (1.85 per cent for 2026 to 2031). Given the uncertainties associated with growth forecasting we have adopted the annualised growth rate for the full 10-year period 2021 to 2031 of 1.95 per cent. <p>Victoria in Future 2019 (July 2019) – 10-year growth projection (households)</p> <table><tr><th>Greater Melbourne Capital City Statistical Area</th><th>2021</th><th>2026</th><th>2031</th></tr><tr><td>All household types</td><td>2,018,428</td><td>2,234,032</td><td>2,447,869</td></tr></table> <div><p>Compound annual growth rate</p></div> <ul style="list-style-type: none">> We have used the 1.95 per cent household growth rate as our customer growth factor for the purposes of the derivation of our controllable opex forecasts. Customer growth ultimately underpins the expansion of our asset base and the quantity of water and sewage we supply/treat. On this basis we consider a VIF-derived household growth factor to be reasonable for the purposes of the top-down growth and efficiency factor test the ESC applies to our controllable opex forecasts.> As outlined in Section 2.1 of the <i>Price Submission</i> COVID-19-adjusted <i>population</i> growth forecasts provided by Macroplan (1.93 per cent growth from 2021-22 to 2025-26) are largely aligned with the VIF2019 population growth rate (1.95 per cent) for the same period. We have not adjusted our selected growth factor on the basis of these insights.	Greater Melbourne Capital City Statistical Area	2021	2026	2031	All household types	2,018,428	2,234,032	2,447,869
Greater Melbourne Capital City Statistical Area	2021	2026	2031						
All household types	2,018,428	2,234,032	2,447,869						

¹⁵ Victoria in Future (VIF) projections are an estimate of the future size, distribution and composition of the population in Melbourne. They are developed using mathematical models and expert knowledge, relying on trend analysis and assumptions about future change.

Category	Assumption
<i>Efficiency</i>	<ul style="list-style-type: none"> > Melbourne Water has applied a 2 per cent annual efficiency factor to its controllable opex forecasts for all major services. This figure repeats the 2016 Determination efficiency target and has been maintained while responding to climate change challenges and pressures of urban growth. > For water and sewerage the 2 per cent efficiency factor combined with a growth factor of 1.95% means we are delivering compounding real efficiencies of 0.05 per cent on our controllable cost base.
<i>Labour</i>	<ul style="list-style-type: none"> > The <i>2020-21 Corporate Plan (March 2020)</i> labour forecast has been used as the base for labour for the purpose of the PS21 opex forecast development. > Labour rates assume a 2 per cent (nominal) year-on-year escalation across all labour categories (that is, all enterprise agreement, executive and management staff). Melbourne Water's primary enterprise agreement expired in June 2019; negotiations were concluded with in-principle agreement reached in March 2020 and Government approval of the proposed <i>Melbourne Water Enterprise Agreement 2020</i> received in July 2020. Forecasts represent the outcomes of these negotiations. The agreement came into effect on 24 September and its nominal expiry date is 30 June 2023. Waterways and land delivery crew staff are covered by an additional enterprise agreement (<i>Melbourne Water Waterways and Land Delivery Enterprise Agreement 2017</i>) which expired on 30 June 2020. Negotiations are expected to commence for this agreement in the first quarter of 2020-21. The assumptions of the primary agreement have been used in preparing labour forecasts for these staff. > Labour volume (full-time equivalent (FTE)) has been assumed as remaining flat post the forecast June 2021 position. Over the PS21 period this is expected to be 1,165.1 (actual FTE at June 2020 was 1,128.3). > Labour forecasts incorporate a 3 per cent vacancy rate to reflect the average staffing vacancies that exist across each year.
<i>Electricity</i>	<ul style="list-style-type: none"> > Melbourne Water proposes to continue to bear the cost differential between our existing green energy contract and the benchmark rate for black electricity. > We have calculated a benchmark rate using the same methodology as applied by the ESC for our PS16. <i>Workings are set out below.</i> > We have applied the benchmark methodology to electricity that we propose to buy (i.e. purchase from AGL) and sell (e.g. hydro-electricity income) via this contract. > Any electricity that is consumed 'behind the meter' (e.g. solar power production that is consumed on site) represents a reduction in the megawatt hours purchased from AGL. Avoided purchase of electricity has been included in the development of the efficient base year.
<i>Leases</i>	<ul style="list-style-type: none"> > The International Accounting Standards Board issued IFRS 16 Leases (the new Standard) in January 2016, requiring lessees to recognise all leases on balance sheet, except for short-term leases and leases of low value assets. These changes were issued by the Australian Accounting Standards Board in February 2016 and are effective for periods beginning on or after 1 January 2019. > A notable impact of this new standard is that Melbourne Water's leases for property (circa \$8.4 million in 2025-26) are no longer treated as an operating expense for accounting purposes. > For regulatory (and revenue building block) purposes, however, Melbourne Water intends to continue to treat operating leases as an operating expense. > This approach continues the current manner in which customers pay for leased assets such as property. Property is 'used' by Melbourne Water each year and is currently paid for on that basis. The cost to Melbourne Water is being recovered from customers via an operating expenditure line.

Category	Assumption
Recycled water services	<ul style="list-style-type: none"> > Melbourne Water provides recycled water to City West Water, South East Water, Southern Rural Water and some direct use customers through negotiated contracts from the ETP and WTP. > Recycled water prices are set through negotiated contracts. While Melbourne Water aims to achieve full cost recovery via these contracts, customer willingness to pay and the availability of alternative water for irrigation means that there is typically a revenue shortfall. > This shortfall is included in the bulk sewerage revenue requirement. > Recovery of the shortfall in this manner is consistent with the principles of polluter pays and retail water companies (and therefore end-use customers) pay for the shortfall through sewerage tariffs.

Derivation of benchmark electricity allowance

We have followed the ESC's derivation of a benchmark electricity allowance to build a forecast taking into account the key assumptions outlined in **Table 53**. The forecasts are presented in **Table 54**.

We have also itemised forecast electricity demand that we will meet or avoid using "behind-the-meter" on-site electricity generation assets (such as solar panels) and the efficiencies associated with automation projects that will reduce demand for electricity at the asset level. These efficiencies from the derivation of benchmark energy – that is the megawatt-hours shown indicate total forecast demand *before* the application of automation project efficiencies and *inclusive* of megawatt-hours that will be supplied by on-site generation. These efficiencies are accounted for within the efficiency base year estimates presented in **Section S6.1.4** and **S6.1.5**. We have done this to reflect the fact that these efficiencies are to the benefit of customers and are independent of the benchmark cost derivation as they benefit customers by avoiding the purchase of electricity via the AGL contract.

In calculating the "avoided" purchase costs we have elected to apply the contract price, effectively doubling the benefit that customers would have received had we included these within the benchmark derivation shown.

Electricity exported to the grid is included within the benchmark electricity derivation as it directly offsets contract costs.

Accepting opex risk

In building its opex forecast, Melbourne Water has sought to minimise the degree of risk we are asking customers to bear. This has meant budget owners examining factors driving uncertainty, such as weather, and consciously taking a conservative approach to the building of baseline budgets.

Some examples of how we are taking risk on behalf of our customers include:

- > Reducing the insurance cost escalation below expected market-based price increases. Against recent global price rises of 14 per cent (as high as 23 per cent in the Pacific region) we have applied a 10 per cent price escalation to our insurance costs.
- > Drainage maintenance costs are increasing however Melbourne Water has chosen to not pass these costs on to customers. New drainage infrastructure areas to maintain are increasing by approximately 5 per cent per annum – however our forecasts costs flat across the PS21 period.

As outlined in **Section S4.2** we propose to apply a pass-through mechanism to pumping costs associated with water orders from the Victorian Desalination Plant.

Table 53 Key assumptions for benchmark energy

Item	ESC's 2016 approach	Melbourne Water's 2021 approach
<i>Electricity consumption</i>	> Energy use forecasts provided by Melbourne Water.	> Energy use forecasts built using a site-by-site model as per PS16. > For PS21 we have estimated total energy consumption and forecast grid consumption, with the difference being energy supplied via on-site generation.
<i>Wholesale energy price</i>	> Wholesale energy price referencing the ESC's minimum electricity feed-in tariff (2015-16) plus a 20 per cent margin for retail costs, market fees and likely fluctuations in price over five years.	> Wholesale energy price of \$72.6 per megawatt-hour, taken from the ESC's <i>Minimum electricity feed-in tariff to apply from 1 July 2020 – Final Decision</i> (Feb 2020) plus a 20 per cent margin for retail costs, market fees and likely fluctuations in price over five years. > The structure of the feed-in tariff has changed to include single rate and time-varying tariffs. > We have applied the single rate tariff.
<i>Electricity feed-in credits</i>	> Electricity generated by Melbourne Water and exported to the electricity grid credited at the same wholesale price and with no retail margin allowance.	> As per ESC's <i>Final Determination 2016</i> we have applied the wholesale energy price above less the retail margin.
<i>Renewable energy proportion and price</i>	> Renewable energy certificate price of \$70 per MWh representing the mid-point of prices for large scale generation certificates over the prior year. > Renewable energy proportion of 20 per cent, based on the aspirations set in the State government's <i>Renewable Energy Roadmap</i> .	> We have elected not to include an allowance here. > We note that with our own on-site generation we will be self-generating in excess of 20 per cent of our energy needs across the period. > We also note that the renewable energy certificate price is materially lower than the \$70 per MWh used in 2016, with forecasts for even lower prices going forward.
<i>Network costs</i>	> Forecast network costs post-Australian Energy Regulator determination.	> Historical network costs relevant to each major site. > Our forecasts do not incorporate a forward view of network prices from the most recent AER determination covering the period 2021-2026.

Table 54 Benchmark electricity allowance derivation

<i>Numbers may not add due to rounding</i>		2021-22	2022-23	2023-24	2024-25	2025-26
Total electricity consumption	MWh	235,216	230,885	244,657	251,362	270,669
Electricity Exported to Grid	MWh	54,179	86,501	67,883	75,243	60,356
Avoided purchase (new) (self-generation and automation)	MWh	17,069	33,287	35,660	52,201	52,804
(A) Network charges and other	\$	\$11.8m	\$14.3m	\$11.8m	\$13.3m	\$13.8m
Contract electricity price	\$/MWh	\$174.8	\$175.2	\$175.2	\$175.2	\$175.2
(B) Contract electricity	\$	\$41.1m	\$40.5m	\$42.9m	\$44.0m	\$47.4m
Electricity feed-in price	\$/MWh	\$173.2	\$173.7	\$173.7	\$173.8	\$173.8
(C) Electricity feed-in income	\$	\$9.4m	\$15.0m	\$11.8m	\$13.1m	\$10.5m
(D) Forecast electricity purchase costs (gross) = A + B - C	\$	\$43.5m	\$39.7m	\$42.8m	\$44.3m	\$50.7m
Wholesale electricity price	\$/MWh	\$72.6	\$72.6	\$72.6	\$72.6	\$72.6
Margin (20%)	\$/MWh	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5
Benchmark electricity price	\$/MWh	\$87.1	\$87.1	\$87.1	\$87.1	\$87.1
(E) Benchmark electricity	\$	\$20.5m	\$20.1m	\$21.3m	\$21.9m	\$23.6m
Benchmark electricity feed-in price	\$/MWh	\$72.6	\$72.6	\$72.6	\$72.6	\$72.6
(F) Benchmark electricity feed-in income	\$	\$3.9m	\$6.3m	\$4.9m	\$5.5m	\$4.4m
(G) Benchmark electricity allowance = A + E - F	\$	\$28.3m	\$28.1m	\$28.1m	\$29.8m	\$33.0m
<p><i>Aligning energy forecasts with ESC template</i></p> <p>Our forecast actual electricity purchase costs are calculated using the forecasts electricity purchase costs (gross) less the forecasts avoided electricity purchase costs associated with automation and behind-the-meter projects across the period.</p> <p>For meaningful comparison with historical actuals these are the values presented in the ESC's financial template and discussed in Section S6.1.2.</p>						
(H) Avoided electricity purchase costs	\$	-\$3.3m	-\$6.2m	-\$6.6m	-\$9.5m	-\$9.6m
(I) Forecast electricity costs (net) = D - H	\$	\$40.2m	\$33.5m	\$36.2m	\$34.8m	\$41.1m

S6.1.3 Cost allocation (including corporate and other shared costs)

Ahead of the development of PS21, we have refined and formalised our approach to cost allocation. Our new approach continues to allocate all cost centres to one of our major service areas (that is, water, sewerage, recycled water (ultimately part of sewerage), waterways and drainage, and direct services) according to the following hierarchy:

1. Costs directly allocated to service wherever a clear 'line of sight' exists between the cost incurred and the service/sub-service.
2. Allocated costing with established causal relationship (for example, effort to manage capital portfolio for major project delivery). Where a causal relationship can be identified between a shared cost and service/sub-service, we use an appropriate allocation method (for example, Capital Plan profile) to allocate the costs to the service/sub-service.
3. Allocated costing – no causal relationship. For remaining costs we use one or more non-causal allocation methods that reflect a reasonable approximation of the scale of resources required by the services to which the shared costs are being applied (for example, revenue from service/Full-Time Equivalents).

The change in our methodology has resulted in minimal overall impact to prices but is a clearer articulation of the level of corporate support consumed by each of our services. In this way it aligns with the WIRO principle that prices be reflective of the efficient cost of providing a service.

S6.1.4 Water and sewerage opex forecasts

The following discussion addresses key elements of our opex forecast including uncontrollable costs, base year adjustments and additions to the efficient base year (step change allowances). Our treatment of electricity, and growth and efficiency factors is outlined in **Section S6.1.2**

Recycled water opex is included in the following analysis but not itemised. It is itemised separately in the ESC's financial template consistent with past practice.

Total and annual forecast opex

Table 55 shows Melbourne Water's opex forecast for the PS21 period (aggregate controllable opex forecast of \$1,194.1 million), including an outline of controllable and uncontrollable elements and the derivation of our efficient base year.

Table 55 Water and sewerage efficient base year (\$ millions)

		Base	Current	PS21 Regulatory Period					PS Total
Numbers may not add due to rounding		2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	
Overall forecast	Total 2019-20 opex	\$858.7							
	Victorian Desalination Plant security payments (A)	\$587.4	\$544.5	\$493.1	\$485.2	\$473.0	\$457.0	\$443.9	\$2,352.2
Uncontrollable opex	Land Tax, LGRE, Fire Services Levy	\$23.2	\$20.3	\$19.9	\$19.9	\$19.9	\$19.9	\$19.9	
	Licence Fees	\$1.7	\$2.3	\$2.1	\$2.1	\$2.1	\$2.1	\$2.1	
	Total uncontrollable opex (B)	\$24.9	\$22.6	\$21.9	\$21.9	\$21.9	\$21.9	\$21.9	\$109.7
Controllable opex	Efficient base derivation	2019-20 baseline (gross)	\$246.3						
		less electricity	-\$44.4	-\$45.9	-\$43.0	-\$39.3	-\$42.4	-\$43.8	
		add base year adjustments	\$2.8						
		2019-20 baseline (net)	\$204.8						
		Efficiency factor		-2.00%	-2.00%	-2.00%	-2.00%	-2.00%	
		Growth factor		1.80%	1.95%	1.95%	1.95%	1.95%	
		Efficient base year		\$204.4	\$204.3	\$204.2	\$204.1	\$204.0	
		Efficient base year forecast		\$204.9	\$204.3	\$204.2	\$204.1	\$204.0	\$1,020.3
		Difference between base and forecasts			\$0.0	\$0.0	\$0.0	\$0.0	
		Additions to efficient base year							
		Benchmark electricity allowance			\$28.0	\$27.8	\$27.9	\$29.5	\$145.8
		Water quality management			\$1.8	\$2.6	\$3.7	\$4.0	\$16.8
		Carbon Pledge			\$3.0	\$0.4	\$0.5	\$3.5	\$11.2
	Total controllable opex (C)			\$237.1	\$235.0	\$236.2	\$241.0	\$244.9	\$1,194.1
	Total regulatory opex = (A) + (B) + (C)			\$752.1	\$742.1	\$731.1	\$720.0	\$710.7	\$3,656.0

Uncontrollable opex

Uncontrollable costs for Melbourne Water are limited to land tax and the licence fees we pay to our technical regulators such as the ESC and EPA. Our land tax forecast includes an increase in the rate of tax we pay, tempered by land sales which will reduce future taxable land volumes.

We have included Victorian Desalination Plant security payments here, with the declining values showing the impact of our decision to increase the amount we capitalise each year.

As part of the ESC 2016 price submission review and in recognition of Melbourne Water's green energy contract, electricity expenditure was ring fenced from the efficiency target and separately benchmarked against the energy market to determine an electricity allowance. We have adopted the same approach in this submission. The benchmark allowance, while more accurately a "controllable" expenditure is described here for consistency with the ESC's financial templates.

Energy costs, and our derivation of the benchmark allowance are described in **Section S6.1.2**.

Controllable opex

The 2019-20 financial year forms the basis of our controllable opex forecast. Actual total operating expenditure for 2019-20 was \$271.2 million. This included \$24.9 million in uncontrollable costs and \$44.4 million in actual energy costs.

Base year adjustments

The 2019-20 actuals have been reviewed to identify any one-off (non-recurring) expenditure or savings that should be included in the development of the base

year forecasts. Identified adjustments are shown and described in **Table 56**.

Additions to efficient base year

Proposed additions to the efficient base year are introduced in **Table 55** and relate to emissions reductions and a step change in water quality management expenditure. These additions contribute \$27.8 million cumulatively to our PS21 opex forecast and are described in **Table 57**.

S6.1.5 Waterways and drainage opex forecasts

The following discussion addresses key elements of our opex forecast including uncontrollable costs, base year adjustments and additions to the efficient base year (step change allowances). Our treatment of electricity, and growth and efficiency factors is outlined in **Section S6.1.2**

Diversions opex is included in the following analysis but not itemised. It is itemised separately in the ESC's financial template consistent with past practice.

Total and annual forecast opex

Table 58 shows Melbourne Water's opex forecast for the PS21 period (aggregate opex forecast of \$798.4 million), including an outline of controllable and uncontrollable elements and the derivation of our efficient base year.

Uncontrollable opex

Uncontrollable costs for Melbourne Water are limited to land tax and the licence fees we pay to our technical regulators such as the ESC and EPA. Our land tax forecast includes an increase in the rate of tax we pay, tempered by land sales which will reduce future taxable land volumes.

Table 56 Base year adjustments – water and sewerage

Category	Value (\$m)	Description
Cover maintenance – WTP	2.3	<ul style="list-style-type: none"> During the PS21 period the anaerobic pot covers at the WTP for treatment lagoons 55E and 25W will either be replaced or reinstated following pot maintenance works. A replacement would be treated as capex while a reinstatement would be treated as maintenance opex. It is not possible to determine whether or not reinstatement is possible until work has commenced. Given this we have assumed that one of the covers will be able to be reinstated and one will need replacing. This assumption reduces our capital forecasts by \$22.6 million and adds \$11.3 million to PS21 opex forecasts (cost of reinstatement does not include a new cover). To account for this increase in opex resulting from the approach outlined above, an adjustment to the 2019-20 base year of \$2.3 million has been made (five-year average of \$11.3 million) which represents an annualised maintenance cost for the reinstatement of one cover.
Wet weather impacts – sludge drying	0.2	<ul style="list-style-type: none"> 2019-20 was considered to be a wetter year than is reasonably expected to be the average climatic conditions for PS16 and PS21. The Bureau of Meteorology website notes that Melbourne's rainfall was above average this summer (December 2019 – February 2020) and very much above average for autumn (March-May 2020).¹⁶ As such, sludge drying conditions were below average for the drying pans at ETP, preventing the harvesting of average volumes of biosolids. The impact of which was a \$0.2 million non-recurring reduction in harvesting expenditure.
Telecoms refund	0.1	<ul style="list-style-type: none"> A Melbourne Water challenge to historical Telstra charges resulted in a refund being issued in September 2019 for data charges covering the period March 2017 to September 2019. This refund was fully accrued in the 2019-20 financial year, serving to temporarily reduce base year expenditure.
Internal audit program	0.2	<ul style="list-style-type: none"> The internal audit program in 2019-20 was delayed due to two scheduled audits being deferred. The impact of which was a \$0.2 million non-recurring reduction in expenditure. PS21 forecasts represent a stable, recurring schedule of internal audit activity that supports the Board approved program.
Total	2.8	

¹⁶ "Rainfall totals in summer were **above average** at all sites in Greater Melbourne, due to heavy rain at times in **January and February** <http://www.bom.gov.au/climate/current/season/vic/archive/202002.melbourne.shtml> "Autumn (i.e. **March-May 2020**) rainfall across Greater Melbourne was **very much above average** at most reporting sites, ranging from 138% above average at Ferny Creek, to 221% above average at Melbourne Airport". <http://www.bom.gov.au/climate/current/season/vic/melbourne.shtml>

Table 57 Additions (aggregate) to the efficient base year – water and sewerage

Category	Obligation	Response
<p><i>Emission Reduction Obligations (Carbon Pledge and Safeguard Mechanism)</i></p> <p>Value: \$11.2M</p>	<p>Our obligation to act to reduce or offset our carbon emissions is two-fold:</p> <p><i>Victorian Government's Carbon Pledge</i></p> <ul style="list-style-type: none"> The Victorian Government has committed to a long-term target for Victoria of net zero greenhouse gas emissions by 2050. The policy requires government owned corporations like Melbourne Water to, 'pledge' to reduce their emissions. Water for Victoria includes an action reflecting this wider process and requires Melbourne Water to examine an option of accelerated progress to reach net zero emissions by 2030. Melbourne Water's pledge was submitted in May 2017, committing Melbourne Water to a reduction of 50% by 2024-25 from a baseline of 408,760 tonnes CO₂-e per year (204,380 tonnes CO₂-e per year net of growth). A Statement of Obligations (Emission Reduction) signed in March 2018 formalises the emissions targets for all water corporations and outlines applicable policy, rules for calculating emissions, and reporting requirements. <p><i>Federal Clean Energy Regulations</i></p> <ul style="list-style-type: none"> Melbourne Water is also subject to the Clean Energy Regulator's Safeguard Mechanism which limits direct scope 1 emission from Australian's largest emitters. Under this mechanism, exceeding a pre-set baseline results in a mandatory purchase of Australian Carbon Credit Units (ACCUs) to the amount the baseline is exceeded. The purchase of ACCUs to meet Safeguard Mechanism obligations also reduces Melbourne Water's reportable emissions for the purpose of the Carbon Pledge. A lowering of the trigger level from 145,000 to 100,000 tonnes CO₂-e per year, combined with additional emissions resulting from growth and the cover segment replacement works, will trigger the Safeguard Mechanism at the WTP for the first time from 2021-22 onwards. 	<p>Melbourne Water's approach to delivering against these new obligations is funded by predominantly by the sewerage service as the primary source of emissions. Activities described below are sewerage service funded unless otherwise stated and values are aggregate PS21 expenditures.</p> <ul style="list-style-type: none"> Purchase offsets against direct treatment process (Scope 1) emissions commencing in 2021-22. We will purchase a mixed portfolio of ACCUs and global offsets to meet our obligations at least cost to customer (\$8.8 million). Development of a carbon forestry project to gain expertise in self-generating offsets and help meet customer preferences for local offsets (\$0.1 million). Scope 1 abatement projects (\$0.9 million), emission measurement (\$0.7 million) and investigations (\$0.2 million), and associated labour and other supporting expenditure (\$0.4 million). Additional energy storage and scope 2 abatement projects to support the Carbon Pledge (\$0.2 million) – <i>bulk water service</i>. <p><i>Further detail is available in our Carbon Pledge summary which can be provided to the ESC upon request.</i></p>

Category	Obligation	Response
<p>Water quality management</p> <p>Value: \$16.8M</p>	<p>Under the <i>Safe Drinking Water Act 2003</i>, Melbourne Water is required to identify risks to potable water quality, assess them, and set out the steps to be taken to manage those risks. To address the emerging risks on drinking water catchments, Melbourne Water's <i>Drinking Water Quality Strategy</i> identified the need for new investments in PS21 to mitigate risks related to microbial hazards.</p> <p>The Department of Health and Human Services (DHHS) has published a guidance paper – <i>Guidance – Risk management plans, appendix 2: quantify microbial hazards</i> which provides information to assist with:</p> <ul style="list-style-type: none"> • documenting a methodology for quantifying microbial hazards • outlining the risks assessment approaches that can be undertaken in order to demonstrate safe drinking water. <p>The risk assessment approaches encompass the microbial health-based target (HBT) adopted by the World Health Organisation (WHO).</p> <p>In a letter provided to assist with our planning for PS21, the DHHS states that:</p> <p><i>"the microbial-health-based target can also assist planning improvements for drinking water safety with the foremost outcome of protecting human health. This should be applied within the context of the preventative risk management framework to minimise system vulnerabilities and enhance protections for the provision of safe drinking water."</i></p> <p>Recent risk assessments have identified a number of catchments with a category 2 rating under the HBT risk assessment framework. The appropriate HBT benchmark for microbial risks is the WHO's 1 microDALY/person/year target for safe drinking water.</p>	<p>The most cost-effective approach to meet the HBT in the 'chlorine only' systems (Silvan Reservoir and all upstream sources, Greenvale Reservoir, and Cardinia Reservoir) is to manage these as a category 1 catchment. To shift from the current category 2 rating requires improved management regimes to prevent microbial contamination including restricting human access to the outlet reservoirs and catchments through better security and surveillance and improving exotic fauna management (particularly on deer control).</p> <p>The improved management regimes include:</p> <ul style="list-style-type: none"> • development of a new compliance and enforcement program (including education, surveillance and prosecutions) to complement the installation of new fencing • eradication of deer from the Silvan and Cardinia reservoir catchments and containing deer numbers within the larger Upper Yarra, O'Shannassy and Thomson catchments. <p>The alternative is to continue manage this 'chlorine only' system as category 2 catchment and install additional ultraviolet and/or filtration treatment at significant capital cost.</p> <p>This water quality management expenditure represents a step change to our business-as-usual activities, contributing \$16.8 million to our PS21 opex, reaching a forecast steady state of \$4.6 million per annum in 2025-26.</p> <p><i>This is a significant incremental change to a base of \$3.8 million in annual expenditure on catchment management program activities.</i></p>

Table 58 Waterways and drainage efficient base year (\$ millions)

		Base	Current	PS21 Regulatory Period					PS Total
		2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	
Overall forecast	Total 2019-20 Opex	\$149.9							
Uncontrollable opex	Land Tax, LGRE, Fire Services Levy	\$8.7	\$7.6	\$7.4	\$7.4	\$7.4	\$7.4	\$7.4	
	Licence Fees	\$0.3	\$0.4	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	
	Environmental Contribution Levy	\$0.0	\$0.0	\$0.9	\$0.9	\$0.9	\$0.9	\$0.9	
	Total uncontrollable opex (A)	\$9.0	\$8.0	\$8.6	\$8.6	\$8.6	\$8.6	\$8.6	\$43.1
Controllable opex	Efficient base derivation	2019-20 baseline (gross)	\$140.9						
		less electricity	-\$0.4	-\$0.4	-\$0.4	-\$0.4	-\$0.4	-\$0.4	
		add base year adjustments	\$1.3						
		2019-20 baseline (net)	\$141.8						
		Efficiency factor		-2.00%	-2.00%	-2.00%	-2.00%	-2.00%	
		Growth factor		1.80%	1.95%	1.95%	1.95%	1.95%	
		Efficient base year		\$141.5	\$141.4	\$141.4	\$141.3	\$141.2	\$706.5
		Efficient base year forecast		\$145.7	\$141.4	\$141.4	\$141.3	\$141.2	\$706.5
		Difference between base and forecasts			0.0	0.0	0.0	0.0	
		Additions to efficient base year							
		Benchmark Energy Allowance			\$0.3	\$0.3	\$0.3	\$0.3	\$1.7
		Traditional Owners			\$0.6	\$0.6	\$0.6	\$0.3	\$2.2
		Marine & Coastal Act			\$0.3	\$0.3	\$0.3	\$0.3	\$1.5
		Customer derived levels of service			\$7.8	\$8.0	\$8.3	\$9.5	\$43.5
		Total controllable opex (B)			\$150.4	\$150.5	\$150.8	\$151.6	\$755.3
		Total regulatory opex = (A) + (B)			\$159.1	\$159.2	\$159.4	\$160.2	\$798.4

Controllable opex

The 2019-20 financial year forms the basis of our controllable opex forecast. Using 12-months of actuals, our total operating expenditure for 2019-20 was \$149.9m. This included \$9.0 million in uncontrollable costs and \$0.4 million in actual electricity costs.

Base year adjustments

The 2019-20 actuals have been reviewed to identify any one-off (non-recurring) expenditure or savings that should be included in the development of the base year forecasts. Identified adjustments are shown and described in **Table 59**.

Additions to baseline expenditure

Proposed additions to the efficient base year introduced in **Table 58** relate to step change in expenditure associated with new responsibilities (Traditional Owners and coastal erosion advice) and customer-derived levels of service (**Section S2.3.3**

Each addition to the efficient base year is described in **Table 60**. Additional detail associated with customer-derived levels of service is then presented in **Table 61**.

Table 59 Base year adjustments – waterways and drainage

Category	Value (\$m)	Description
Wet weather impacts – sediment disposal	1.1	<ul style="list-style-type: none"> 2019-20 was a wetter year than reasonably expected to be the average climatic conditions for PS16 and PS21. The Bureau of Meteorology web-site notes that Melbourne's rainfall was above average this summer (December 2019 – February 2020) and very much above average for autumn (March-May 2020)¹⁷. As such, sediment drying conditions were below average for the wetlands desilting program, thus preventing average volumes of sediment to be disposed of in FY2020. The impact of which was a \$1.1 million one-off (non-recurring) saving. PS21 forecasts represent an average of \$9.6 million per annum (equivalent of 35,000m³ in volume), and therefore an adjustment has been made for this one-off (non-recurring) expenditure inconsistency reported in FY2020.
COVID-19 impacts	0.2	<ul style="list-style-type: none"> COVID-19 restrictions had an impact on effectively undertaking business as usual for the Sites of Biodiversity Significance (SoBS) program. Activities that were considered not time-critical activities were postponed to prioritise the safety of Melbourne Water employees. The impact of which was a \$0.2 million non-recurring reduction in expenditure on this program between March and June 2020.
Total	1.3	

¹⁷ Rainfall totals in summer were **above average** at all sites in Greater Melbourne, due to heavy rain at times in **January and February** <http://www.bom.gov.au/climate/current/season/vic/archive/202002.melbourne.shtml> "Autumn (i.e. **March-May 2020**) rainfall across Greater Melbourne was **very much above average** at most reporting sites, ranging from 138% above average at Ferny Creek, to 221% above average at Melbourne Airport". <http://www.bom.gov.au/climate/current/season/vic/melbourne.shtml>

Table 60 Additions (aggregate) to the efficient base year – waterways and drainage

Category	Description
<p><i>Traditional Owners</i></p> <p>Value: \$2.2M</p>	<ul style="list-style-type: none"> Amendments to the <i>Water Act</i> in 2019 require Melbourne Water to consider opportunities to provide for Aboriginal cultural values and uses of waterways. The plan requires Melbourne Water to recognise Aboriginal values and objectives of water, include Aboriginal values and traditional ecological knowledge in water planning, support Aboriginal access to water for economic development, and build capacity to increase Aboriginal participation in water management. The base year adjustment of \$0.25 million represents the PS21 steady state forecast for this activity however in the first three years expenditure will be higher at \$0.56 million to cover the research required to understand cultural values and acquire this new knowledge.
<p><i>Marine and Coastal Act 2018</i></p> <p>Value: \$1.7M</p>	<ul style="list-style-type: none"> Under the <i>Marine and Coastal Act 2018</i>, the Minister for Water has authority to request Melbourne Water provide technical advice on coastal erosion in its waterway management district, including matters relating to or affecting the marine and coastal environment. Provide advice to DELWP and Councils and property owners. Base year costs only include the work currently undertaken in the flood and waterways space and do not include this additional service. We expect to incur costs providing this advice from year one of the price submission. Forecast costs have been based on our experience running similar advice-based programs and include labour, data collection and system costs.
<p><i>Customer derived levels of service</i></p> <p>Value: \$43.5M</p>	<ul style="list-style-type: none"> As outlined in Section S2.3.3, our waterways and drainage customers help us to set the level of service for a number of key services via the following process: <ul style="list-style-type: none"> > Eight customer focus groups were held to test what services should be included in the willingness to pay survey given the constraints on how many services and activities could be tested via the survey. > The Waterways and Drainage Customer Council helped ensure the process we designed was transparent and would deliver customer value. > A quantitative online survey of a representative sample of 1,024 residential and 150 non-residential customers was conducted. The research used a Simultaneous Multi Attribute Level Trade Off (SIMALTO) tool. The SIMALTO Final Report (February 2020), which identifies customer service preferences and willingness to pay, is available on request. > The outcome of the survey was a preferred mix of services at a preferred price (increase of \$8 on customer bills) for a majority of customers. > We tested a few services with the Waterways and Drainage Deliberative Panel in further detail where we thought there might be a better way to deliver outcomes that customers were willing to pay for, but at a lower price, given the importance of balancing service levels and affordability. > Following the panel discussion a final set of services was documented in the <i>2020 Waterways and Drainage Investment Plan</i> (WDIP). Copies of the deliberative panel outcomes and WDIP are also available on request. The opex impact of delivering the levels of service customers desire equates to a cumulative uplift of \$47.3 million across PS21 – as shown in Table 61. We have been able to absorb \$3.8 million of this uplift within the efficiency and growth factor hurdles, leaving an additional \$43.5 million as an addition to the efficient base year.

Table 61 Derivation of step change in expenditure due to customer derived levels of service

Activity	Base year 2019-20	Proposed expenditure		
		Annual average	Average annual uplift	PS21 aggregate
Managing Litter and Pollution	\$1.1m	\$1.1m	\$0.1m	\$5.7m
Stormwater quality treatment assets	\$11.3m	\$16.1m	\$4.8m	\$80.4m
Large Scale Stormwater Harvesting	\$0.8m	\$1.5m	\$0.7m	\$7.5m
Vegetation for Environment	\$12.7m	\$14.1m	\$1.4m	\$70.6m
Wetland Condition	\$0.9m	\$1.2m	\$0.3m	\$6.0m
Estuary Condition	\$0.2m	\$0.2m	\$0.0m	\$0.9m
Vegetation for Amenity	\$1.4m	\$2.1m	\$0.7m	\$10.4m
Land access (retarding basin activation)	\$0.2m	\$0.3m	\$0.1m	\$1.7m
On water access (recreational paddling access)	\$0.0m	\$0.0m	\$0.0m	\$0.1m
Flood Preparedness	\$0.3m	\$0.6m	\$0.3m	\$3.0m
Flood Mitigation	\$0.3m	\$1.1m	\$0.7m	\$5.3m
Waterway restoration (liveable waterway corridors)	\$0.0m	\$0.0m	\$0.0m	\$0.2m
Community involvement in waterways	\$0.2m	\$0.5m	\$0.4m	\$2.7m
Totals (annual)	\$29.5m	\$38.9m	\$9.5m	
Totals (cumulative)	\$147.3m			\$194.6m
Cumulative uplift to meet customer service level expectations				\$47.3m
Absorbed within efficiency and growth factors				\$3.8m
Additions to efficient base year – cumulative				\$43.5m

S6.1.6 Analysis of trends

In developing our final forecasts we have examined major cost categories to identify, consider and explain trends in major cost categories that underpin in our forecasts. The analysis addresses expenditure at the whole of business level and focuses on key cost categories underpinning the controllable forecasts presented in **Table 4**. In addition to the labour, energy, IT and chemicals categories itemised in the ESC's financial templates, we have included analysis of our maintenance and external services management accounts. Energy costs are shown and discussed in total cost terms – (that is, inclusive of unfunded the component) and benchmark terms.

Trend analysis

This analysis shown **Table 62** is inclusive of proposed new obligation expenditure.

Labour

Labour costs for the forecast period are set to decline 1.0 per cent per annum from the base year, against a recent trend of 2.2 per cent per annum growth. Labour costs are a function of price (wages) and quantity (full-time-equivalents (FTE)).

Having built our labour forecast in nominal terms (and applying a 2 per cent per annum labour price increase in nominal terms) we de-escalated using a CPI forecast of 2.5 per cent. As a result, we are forecasting a 0.5 per cent per annum decrease in the price of labour.

In quantity terms we are forecasting no growth across the period with FTE assumed as remaining at the forecast June 2021 position of 1,165.1 FTE. This assumption is based on current and planned efficiency, outsourcing and other strategies which may affect FTE numbers over time.

We note that FTE has grown, from a base of 899.5 (PS16 forecast) across the PS16 period, largely as a result of key operational decisions to insource previously outsourced activities:

- > **Waterways and Land Delivery maintenance function** – poor safety outcomes from the external provider, combined with an expected ability to deliver efficiencies in maintenance management, and increase quality and consistency in service delivery led to the decision to insource 120 FTE in early 2015-16 (this figure was forecast at 61 FTE in late 2015).
- > **Delivery execution contractor workforce** – following an operational review in August 2018 (and on the back of the success of the waterways and land delivery insourcing) we insourced a delivery execution contractor workforce of 40 FTE. This has delivered better management of industrial relations matters, more efficient purchase of materials and consumables and lower training costs.
- > **IT function** – across 2017 and 2018 we insourced approximately 50 FTE, across activities such as application development, mobility functionality, business intelligence and automated digital processes in order to achieve productivity improvements, cost savings and improved delivery outcomes.
- > **A stand-alone safety function** – established with its own General Manager to improve Melbourne Water's safety culture and outcomes. This has brought in-house the previously ad-hoc use of external safety specialists/consultants.

We will continue to manage our workforce (inclusive of insource/outsource decisions) in a prudent and efficient manner, taking into account overarching customer outcomes, approved business strategies and other emerging risks and issues.

Table 62 Historical and forecast trends – major cost categories (\$2021)

	PS21 regulatory period					PS21 regulatory period						Trend (CAGR)	
	2016-17 Actual	2017-18 Actual	2018-19 Actual	2019-20 Base year	2020-21 Forecast	2021-22	2022-23	2023-24	2024-25	2025-26	Total PS21	2016-17 to base year	Base year to 2025-26
<i>Labour¹</i>	135.58	135.77	139.81	144.69	141.59	137.52	137.87	137.28	137.15	136.57	686.39	2.2%	-1.0%
<i>Energy – total¹</i>	39.97	40.78	41.30	49.87	46.34	40.23	33.51	36.23	34.78	41.09	185.84	7.7%	-3.2%
<i>Energy – benchmark</i>						28.3	28.1	28.1	29.8	33.0	147.3		
<i>IT¹</i>	23.70	24.72	24.91	25.64	26.37	28.42	29.43	30.54	31.39	31.87	151.65	2.7%	3.7%
<i>Chemicals¹</i>	8.91	8.98	9.12	9.36	9.90	9.80	10.22	10.63	10.52	10.65	51.82	1.6%	2.2%
<i>Maintenance²</i>	78.6	82.3	79.2	82.5	85.2	98.6	98.4	99.1	97.6	99.6	493.4	0.7%	3.5%
<i>External services³</i>	50.0	49.0	47.7	51.2	51.4	54.7	54.3	54.3	54.8	54.4	272.5	0.7%	1.0%

Note 1: Aligns directly to ESC financial template Expenditure_Detail tab.

Note 2: Melbourne Water management account category – exclusive of labour, energy, IT and chemicals costs shown above and a sub-set of “Operations and maintenance” category on Opex_Breakdown tab of ESC financial template.

Note 3: Melbourne Water management account categories – exclusive of labour, energy, IT and chemicals costs shown above. This category includes “customer service and billing” expenditure which is shown on Opex_Breakdown tab of ESC financial template.

Energy

This discussion talks to the energy-total values presented in **Table 62**, noting the derivation of the benchmark energy allowance is presented in **Section S6.1.2**.

For the water and sewerage services, energy expenditure mainly relates to treatment plant operation (pumping and aeration activities) and harvesting of river water at Sugarloaf reservoir (costs to run the Yering Gorge pumps to transfer water from the river to storage).

Energy opex is forecast to decrease by 3.2 per cent per annum predominantly as a result of capex driven energy savings of \$35.2 million arising from solar energy generation and automation projects which reduce energy consumption.

IT

Melbourne Water continues to invest in necessary IT infrastructure to support the delivery of its core services. IT investment is guided by Melbourne Water's *Digital Strategy*, which includes a focus on cloud data and storage for operational technologies (OT) and internet of things (IoT) across PS21.

Expenditure for IT has been growing at 2.7 per cent per annum and will increase to 3.7 per cent per annum across the period as shown in **Table 59**.

The forecast increase amounts to a cumulative total of \$22.7 million (from the base year to 2025-26), an increase that is driven by:

- > ongoing opex associated the IT capital investment program and covering software licencing, maintenance and servicing, and support – \$16.2 million
- > additional allowance for security and disaster recover activities – \$2.1 million
 - includes additional penetration testing across IT and OT networks, disaster recovery testing and cloud security

- > other adjustments (such as licencing and support costs from PS16 capex, business strategy decisions and contract price adjustments), net of identified efficiencies (such as contract price adjustments and product simplification) – \$0.5 million.

We continue to invest in technology-driven service and productivity improvements. Examples include improved procurement functionality to improve purchasing efficiency, using augmented reality to provide simulated operational training and increased investment in mobility solutions to enable staff to work more efficiently from site. Technology investments will continue to be a critical part of our efficiency story across PS21.

Chemicals

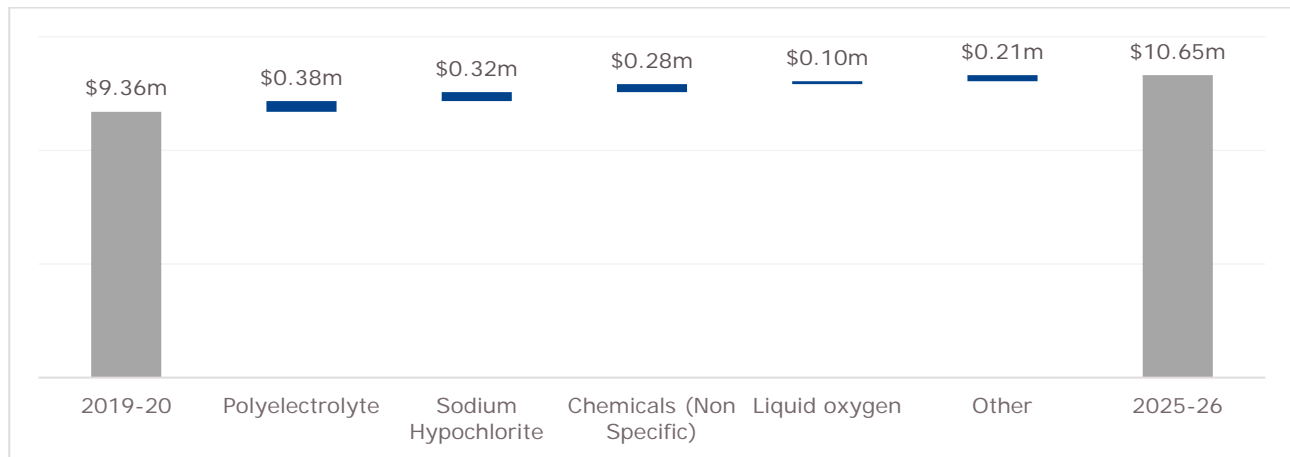
Chemical costs have been growing over the past four years at 1.6 per cent per annum and are forecast to increase further across PS21 (2.2 per cent CAGR) with total chemicals expenditure rising from \$9.36 million in 2019-20 to 10.65 million in 2025-26. This increase is predominantly driven by the four chemicals categories shown on **Figure 30**.

Polyelectrolyte increase accounts for 29.1 per cent of the chemicals increase and is driven by an increase in quantity consumed (77 tonnes) at ETP following the Sludge Digestion Capacity Upgrade due for completion by 2022-23

Sodium hypochlorite accounts for 24.6 per cent of the chemicals increase and is driven by an increase in quantity consumed (1,409 kilolitres) at the water treatment plants in line with forecast growth in water treated

Chemicals (non-specific) accounts for 21.9 per cent of the chemicals increase and is driven by the Yan Yean treatment plant coming back online in 2022-23, and is representative of the preliminary water treatment process and corresponding units estimated for water treated.

Figure 30 Breakdown of chemical costs increases from base year to 2025-26



Liquid oxygen accounts for 7.8 per cent of the chemicals increase and is driven by an increase in quantity consumed (266,585 standard cubic metres) at ETP in line with forecast growth in sewerage treated

The other category accounts for 16.6 per cent of total chemicals increase and is driven by increases in magnesium hydroxide (3 per cent CAGR), fluosilicic acid (1 per cent CAGR) and hydrated lime (2 per cent CAGR).

General forecasting notes

Quantity changes are generally driven by forecast increases in demand, however operational decisions may also impact forecast chemical consumption.

- > The water supply network is required to adjust for operational and customer needs, meaning supply proportions from each treatment plant can differ year on year based on the forecast operating plan. Chemical prices have been held flat in real terms at each treatment plant, however treatment processes (and therefore dosing requirements) and contract prices differ from plant to plant, meaning adaptive changes to the operating plan will alter the overall chemicals expenditure profile.
- > Plant upgrades and service obligations can also result in changes in treatment

processes and can further alter the expenditure profile for associated chemicals. Some examples include the ETP Sludge Digestion Capacity Upgrade due for completion by 2022-23, and Yan Yean Water Treatment Plant Upgrade due for completion by 2022-23

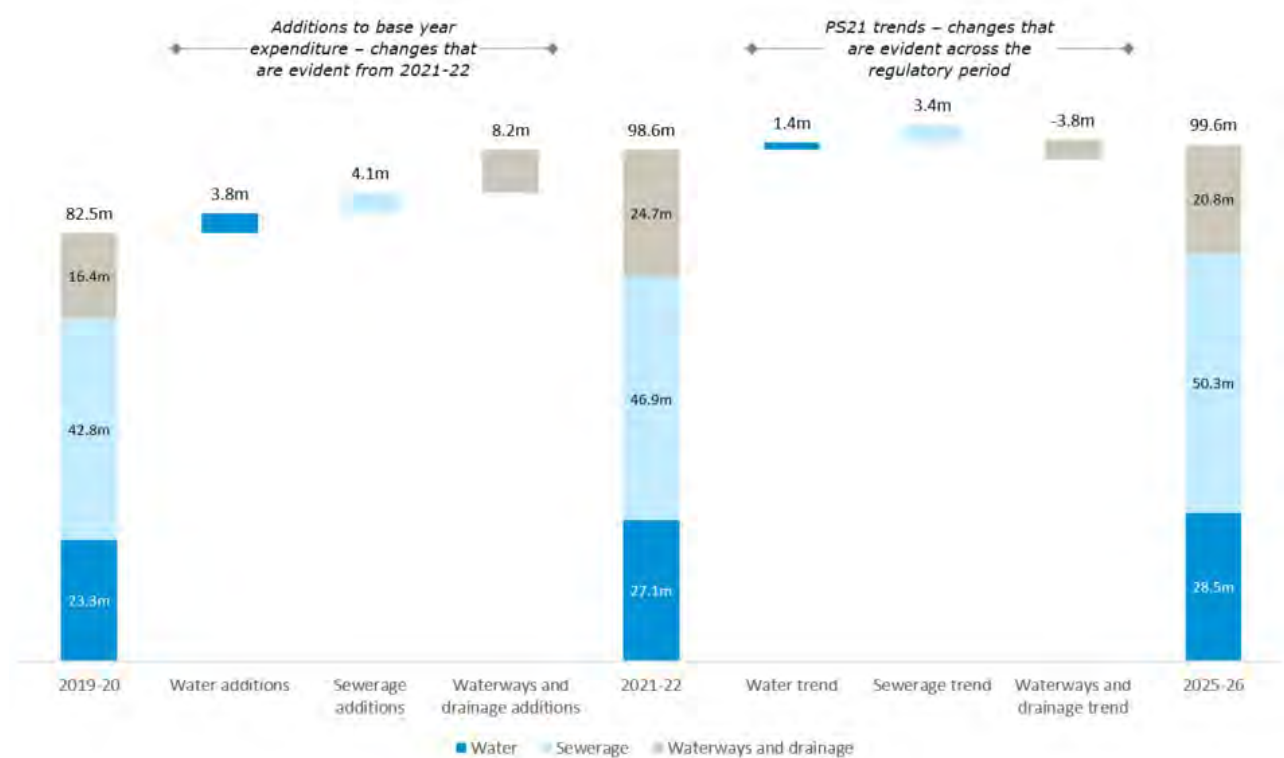
- > The Winneke treatment plant has been converted from the use of chlorine gas to sodium hypochlorite as an alternate treatment which has resulted in both current and future cost savings and safety improvements.

Maintenance

Maintenance is our second largest expenditure category after labour and is forecast to grow from \$82.5 million (base year) to \$99.6 million (2025-26) across the period, an annualised growth rate of 3.5 per cent and a net increase of \$17.1 million.

As shown in **Table 62**, \$16.1 million of this increase occurs between the base year and the first year of the new regulatory period, with expenditure growth within PS21 accounting for the remaining \$1.0 million. **Figure 31** shows how the category changes from base year to the start of the regulatory period and then across the period. It shows that the increase in expenditure from base year is driven by additions that occur prior to and during the first year of the regulatory period.

Figure 31 Breakdown of maintenance category increases from base year to 2025-26



Maintenance expenditure is increasing for each service, with the largest increase (in percentage terms) apparent in waterways and drainage. The majority of this increase will be realised in the first year of the regulatory period, with overall maintenance expenditure flat across the regulatory period. Key drivers of increases in overall maintenance expenditure are described below. These increases are net of efficiencies we have delivered such as a \$1.5 million per annum reduction in our electrical maintenance contract.

Additions by service

Forecast water and sewerage maintenance increases are associated with our growing asset base, and actions to further protect our water supply from environmental risk and maintaining high standards of water quality.

- > Catchment maintenance and fire protection activities (water service) will enhance bushfire reduction activities and reduce the risk of pathogens (\$3.2 million per annum).

- > Condition monitoring of water supply assets, water quality monitoring and sludge disposal services will collectively increase by about \$0.4 million per annum.
- > Estimated maintenance costs associated with Yan Yean water treatment plant coming back online during 2022-23 (\$0.8 million per annum).
- > Sewerage related opex is forecast to increase as a result of a number of capital projects at WTP and ETP. Existing assets such as lagoon covers need additional maintenance due to increased volume and load treated. Sludge dredging and harvesting management costs are also increasing.
- > Asset decommissioning program being established as a public safety risk mitigation measure in response to recent industry events (\$0.8 million per annum).
- > Estimated maintenance costs associated with new solar farms at Winneke and ETP that are due for completion during 2021-22 (\$0.4 million per annum).

As outlined in **Section S2.3.3** our waterways and drainage customers have told us they value an increase in service levels for a number of maintenance-intensive activities. The increased expenditure associated with these activities accounts for the majority of the waterways and drainage maintenance cost increase.

- > Stormwater quality and quantity were the most strongly supported programs for an increase in level of service. Forecast costs include an increase in the wetland desilting program from 35,000 cubic metres in 2019-20 up to 50,000 cubic metres in 2021-22. This program will decline to 25,000 cubic metres in 2024-25 and explains the majority of the regulatory period trend shown in **Figure 31**.
- > The de-silting program also faces rising landfill levy costs (expected to double from current levels over three years). We are offsetting these increases via efficiencies in sediment management which will provide \$2.3 million in aggregate savings (over 5 years).
- > Vegetation management costs are \$2.6 million per annum higher than 2019-20 to meet customer expectations for level of service in environmental and amenity-based services.
- > Our flood preparedness program is delivered in partnership with the State Emergency Service and will see costs increase by \$0.6 million per annum to deliver the increase in level of service our customers told us they desired.

External services

Our external services expenditure category is forecast to grow from \$51.2 million (base year) to \$54.4 million (2025-26) across the period, an annualised growth rate of 1 per cent and a net increase of \$3.2 million.

As shown in **Table 54**, \$3.6 million of this increase occurs between the base year and the first year of the new regulatory period, with an expenditure reduction of \$0.4 million being accounted for within the PS21 period.

Figure 32 shows how the category changes from the base year to the start of the regulatory period and then across the period. It shows that the increase in expenditure from base year is driven by additions that occur prior to and during the first year of the regulatory period. Major components of external services expenditure are the billings and collection expenditure we pay retail water companies for waterways and drainage retail services, external professional services, and research and development costs. The billings and collection costs as in comparison to the overall external services spend is outlined in **Table 63**.

External services expenditure is increasing for each service, with the largest increase (in percentage terms) apparent in waterways and drainage. The majority of this increase will be realised in the first year of the regulatory period, with overall maintenance expenditure flat across the regulatory period. Key drivers of increases in overall maintenance expenditure are described below.

Additions by service

- > Commencement of Scope 1 emissions research, monitoring and abatement projects in 2021-22, including a investigations and test work in support of carbon pledge and biosolids reuse obligations (\$0.2 million per annum).
- > Increased investigations and modelling costs in 2021-22 contributing to the mid-Yarra catchment management project that commits to reduce agrichemical pollutants in the catchment through education and construction of physical barriers (\$0.2 million per annum). The budget for this project has been optimised to deliver an efficient program with minimum cost, with the objective to avoid future water quality treatment augmentations at Winneke Water Treatment Plant.

Figure 32 Breakdown of external services category increases from base year to 2025-26

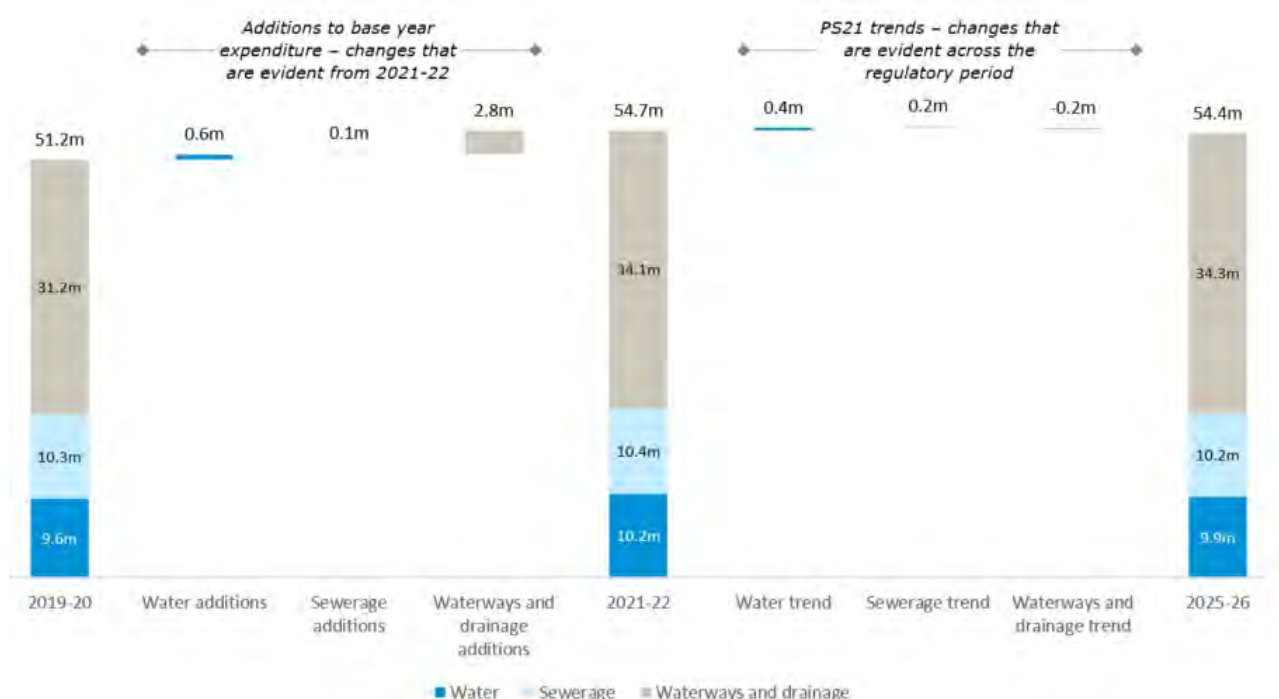


Table 63 External services – actual 2019-20 expenditure and forecast 2020-21 to 2025-26

Sub-category	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	PS21 Total
	Actual	Forecast						
Billing and collection charges	\$14.4m	\$14.6m	\$14.9m	\$15.1m	\$15.4m	\$15.6m	\$15.9m	\$76.9m
Other	\$36.7m	\$36.9m	\$39.9m	\$39.2m	\$38.9m	\$39.1m	\$38.5m	\$195.7m
Total	\$51.2m	\$51.4m	\$54.7m	\$54.3m	\$54.3m	\$54.8m	\$54.4m	\$272.5m
<i>Numbers do not add due to rounding</i>								

As outlined in **Section S2.3.3** our waterways and drainage customers have told us they value an increase in service levels for a number of activities. The increased expenditure associated with these activities accounts for the majority of the waterways and drainage external services cost increase.

- > Billings and collection fees are forecast to increase in line with the service agreements (\$1.4 million per annum) and reflecting a growing customer base.

- > Stormwater quality and quantity were the most strongly supported programs for an increase in level of service (\$0.9 million per annum).

Our flood preparedness program is delivered in partnership with the State Emergency Service and will see costs increase to deliver the increase in level of service our customers told us they desired (\$0.8 million per annum).

S6.2 Capital expenditure

S6.2.1 Capital development process

Asset management

Effective asset management is critical to our ability to deliver against both the service and affordability outcomes (**Section S3**) our customers have told us they desire.

We are obligated by both our Statement of Obligations and Standing Directions to have in place a system which adequately manages the assets we own and operate. The obligations require alignment to the *ISO 55000 Asset Management* series of standards and compliance with Victorian Treasury's Asset Management Accountability Framework (AMAF), both of which set out a methodology to ensure the efficient and effective delivery of services through the development and implementation of an Asset Management (AM) System.

Our AM System is documented in our Asset Management System Manual. The Manual describes the boundaries and design of our AM System, as well as how the key elements of our AM System align with and/or meet ISO55000 and AMAF requirements.

Development and delivery of our Asset Management Plans (AMPs) forms a key part of the AM System. AMPs are developed for 'systems' of assets and describe the approaches we follow to deliver our Service Objectives within each system. Development and update of our AMPs to improve alignment with ISO 55000 and AMAF requirements is part of our Total Asset Management Improvement Program (TAMIP). The AMP improvement activity is well underway, with ongoing (regular) review and update of AMP content to continue over the PS21 regulatory period.

The TAMIP identifies and tracks our priority asset lifecycle management and AM System continuous improvement initiatives. It demonstrates our commitment to continuously evolve and mature our asset management approaches, which then enables us to deliver our services and asset management outcomes more efficiently and effectively. Implementation of the TAMIP is reported to the Managing Director on a monthly basis via the Monthly Business Reporting process.

As our approach to asset management continues to evolve and mature, we also regularly benchmark and test our asset management maturity, and assess our compliance with AMAF and ISO 55000 standards via a number of means, including:

- > WSAA Asset Management Customer Value benchmarking (every four years).
- > maturity self-assessment (annually) using the Institute of Asset Management's SAM+ (39 subjects) tool.
- > annual attestation to the AMAF
- > various risk-based programs of assurance to verify compliance with obligations, adherence to policies and procedures and to identify opportunities for improvement, including:
 - Integrated Management System Assurance Program, incorporating the requirements under ISO 55000 and the AMAF.
 - Corporate Internal Audit Program, developed annually and informed by the business environment, compliance obligations, known and potential issues, prior assurance results and management and Board feedback on areas for focus/improvement.

Capital forecasting

Melbourne Water's capex forecasts for PS21 has been developed using the strategies, policies and frameworks which govern our annual corporate planning process and which form part of our asset management framework. Our *Corporate Plan* includes an annual extract of the first five years of our long-term *20 Year Capital Plan*.

The relationship between the *20 Year Capital Plan*, *Corporate Plan* (updated annually) and PS21 is depicted schematically in **Figure 33**.

At the highest level our *Capital Plan* is driven by our *Strategic Direction*, with the *Customer and Community Strategy* and supporting policy documents such as the *Service Policy* and service strategies providing the clarity around what we need to do and why. The *Capital Investment Framework* establishes the critical governance and operational layer to help ensure that we are able to efficiently and effectively identify, define and prioritise where we need to invest and the best way to do it in order to deliver the quality services our customers desire.

Our three service strategies (and related asset management plans) guide the selection and design of appropriate asset and non-asset solutions to ensure we are able to continue to deliver the high-quality services a growing Melbourne values.

This framework (and supporting processes and procedures) ensures that only projects with a clearly identified need, with demonstrated alignment to our strategic direction and customer and community strategy, are added to the *20 Year Capital Plan*. The *20 Year Capital Plan* details profiles of:

- > twenty years of forecast capital expenditure by service, investment program and driver (refer to **Figure 34** for a schematic showing this hierarchy and its relationship to major and minor projects and allocations)
- > the first five years of the *20 Year Capital Program* to be used to form the capital component of Melbourne Water's next *Corporate Plan*.

Structured project and allocation planning

The *Capital Investment Framework* and associated policy documents define the process via which a project (or allocation) is identified, defined, developed, prioritised and delivered. It provides clarity around roles and responsibilities at all stages of the capital life cycle, and establishes a robust stage-gate process for the management of major and minor projects, and allocations. The *Stage-Gate Framework* (**Figure 35**) identifies major decision points as a project progresses from identified need through to approved project budget.

Melbourne Water's stage-gate process applies to the management of both major and minor projects and allocations. Allocations typically relate to asset renewal programs and only pass the BNI gate. Each investment decision made under an allocation is considered to be a project and is then subject to the project approval gating process.

Determining an efficient servicing solution

To determine an efficient servicing solution for investment evaluation Melbourne Water applies the Department of Treasury and Finance (DTF) Victoria investment management standard (IMS) process for major projects. This is mandatory for all projects that exceed an estimated cost of \$50 million which require DTF approval.

The IMS follows a line of enquiry to establish an evidence-based problem, strategic, feasible and meaningful options analysis, flexible, deliverable solutions in the face of uncertainty and measurable benefits realisation.

The IMS is progressively being extended to projects down to \$10 million in value via an in house adaptation, the Investment Logic Map (ILM) process.

Remaining projects are evaluated using conventional project evaluation techniques. This principally consists of consideration of OPEX and CAPEX alternative solutions factoring in risk and options evaluation in present value terms.

Figure 33 Capital planning framework

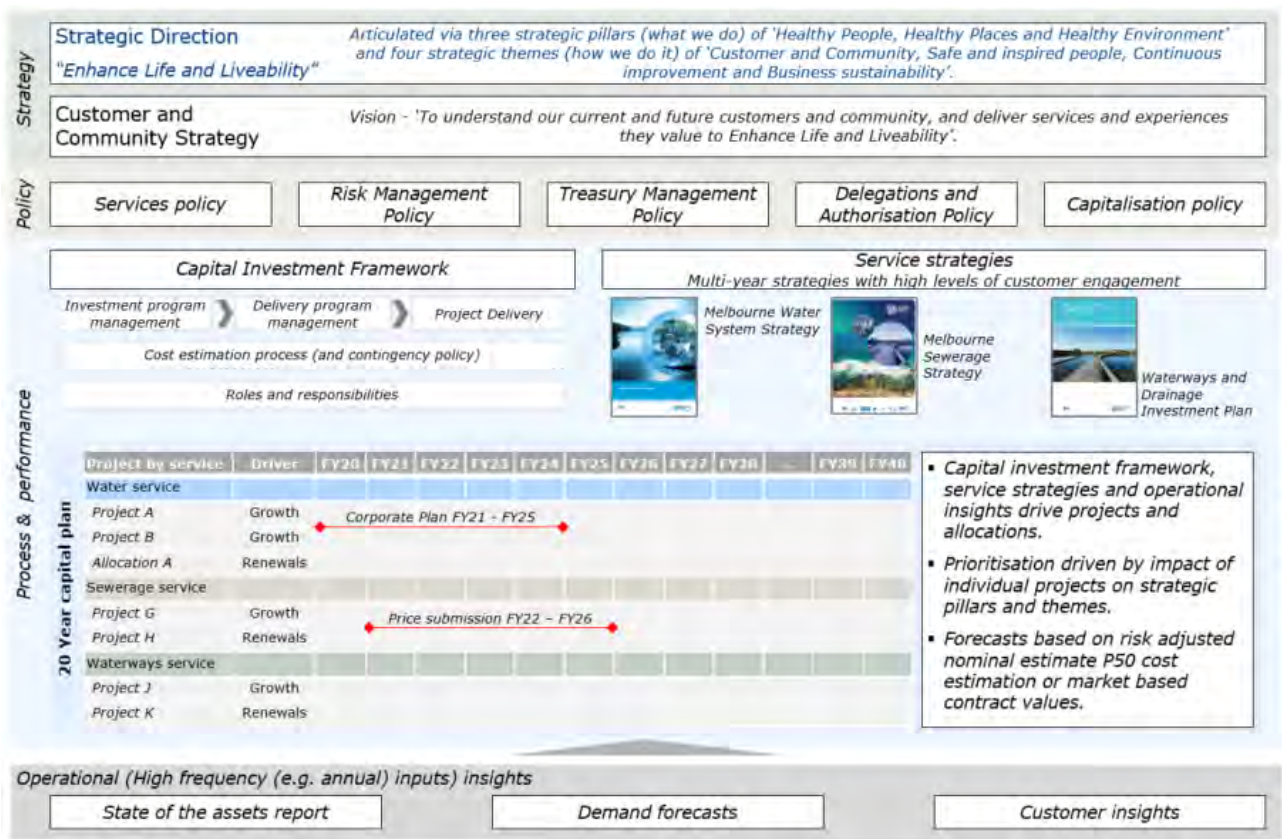


Figure 34 Service and investment program hierarchy

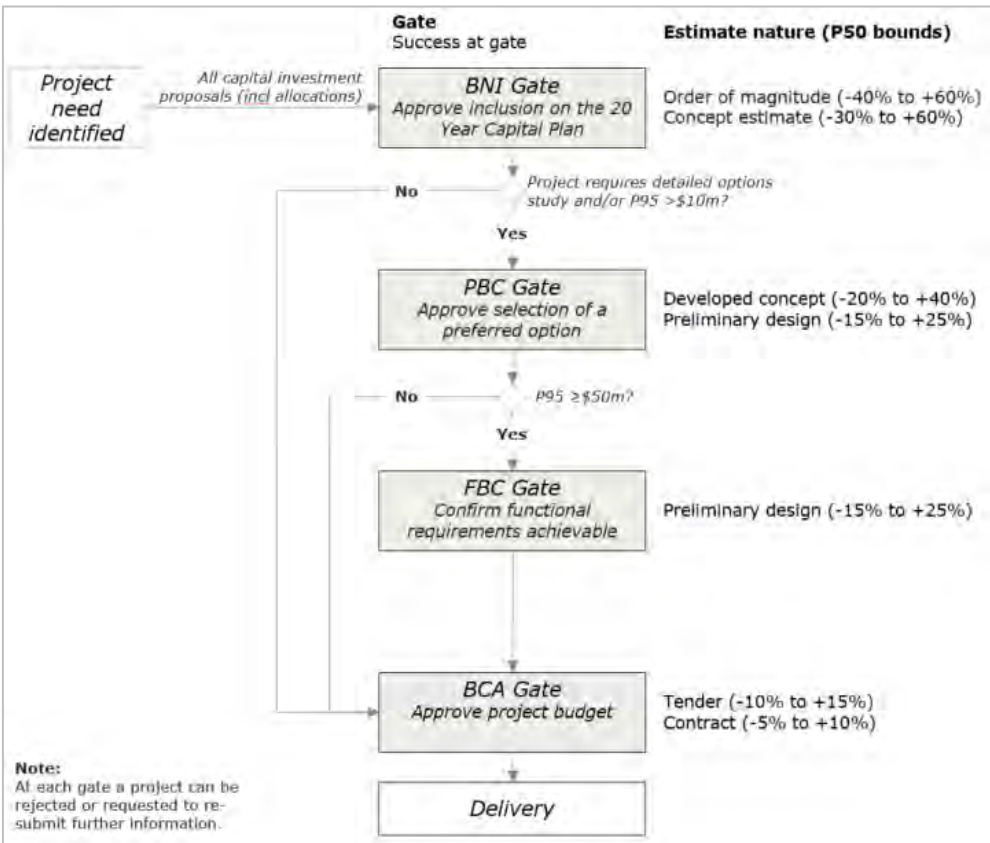
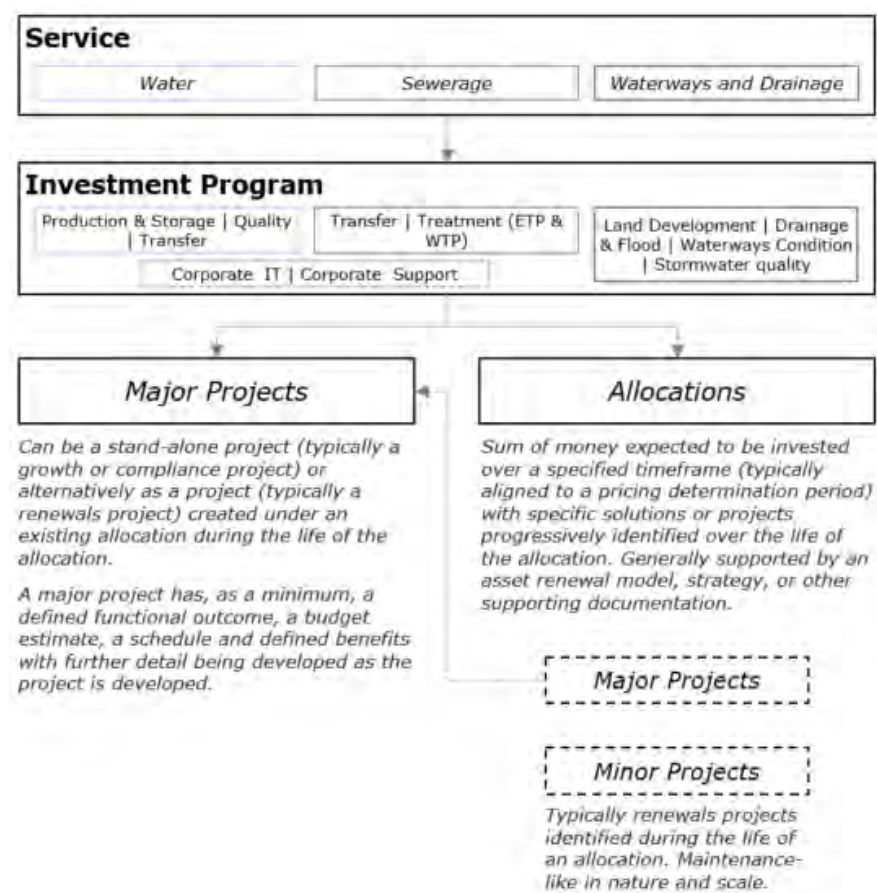


Figure 35 Stage-Gate Framework



Cost estimation

The *Capital Investment Framework* outlines the key inputs required at each stage of the stage-gate process. This includes the requirement to submit a cost estimate.

Cost estimation is guided by the *Capital Management Procedure: Project Cost Estimation*. A key feature of this procedure is the requirement to complete a Risk Adjusted Nominal Estimate (RANE).

All projects with estimated costs of >\$1 million must complete a RANE. Melbourne Water's RANE process comprises two core elements and a Monte Carlo simulation:

- 1) Base cost identification and quantification – *conducted by the estimator*.
 - a. Template contains defined fields against which estimates must be provided.

- b. Expected costs along with lower and upper-bound estimates are entered for each item – the lower and upper bounds must not be outside the P50 bounds shown in **Figure 35**.
- c. Costs are allocated for all elements of a project, including contractor base costs, contractor margin, contractor risk allowance (for example, wet weather days), Melbourne Water project/contract management costs.
- d. Estimates for each project element at the BNI, PBC and FBC stages are drawn from Melbourne Water's Expert Estimator Tool, which is backed by a database of recent similar projects. This database is kept current by the estimator, who updates rates and cost categories with recent tender data and incurred project costs. At the BCA gate costs are drawn from completed tenders –

reflecting market-based contract values.

2) Risk costs (Melbourne Water-only risks) – *facilitated risk and opportunity workshops*.

- Each risk (for example, damage to services that are not identified on tender drawing/site schematics) is defined and a base cost estimated along with a minimum and maximum range. Contaminated materials is a common risk for which Melbourne Water identifies a risk cost.
- Specific price-related risks, such as the purchasing of overseas equipment, are considered in the estimate and individual risks. As individual projects need to consider the relevant risks, there is no over-inflation of the project estimates.

3) Monte Carlo simulation.

- Melbourne Water uses a Monte Carlo simulation with a triangular distribution to develop a probability-based cost curve.
- The simulation sums the distributions generated by the base case (certain cost items with a low, expected and high cost) and risk cost (cost items with an assigned likelihood of occurrence as well as low, expected and high costs) elements.
- The combination of the lower and upper bounds (**Figure 35**) and risk cost elements means that the P50 estimate (equal chance of costs being lower and higher than this value) is typically in the order of 20 per cent higher than the base cost.

Melbourne Water uses the P50 estimate as the basis for its capital forecasts for the pricing submission. As the RANE is prepared in nominal terms (using a consumer price index rather than a construction index) capital forecasts are converted to \$real\$2021 dollars.

Melbourne Water also applies options analysis for all capital projects in excess of \$1 million. This includes multi criteria analysis and net present cost assessment of a base case “do nothing” option, increased inspections and maintenance or alternative costed capital expenditure options. An example of this in practice is renewal of the Gardiners Creek Main Sewer which involves increased CCTV inspections to enable rehabilitation of less lengths of sewer main than otherwise would be planned.

Renewal efficiency

We continue to drive material capital efficiencies in the way in which we deliver our capital program. During PS16 we have introduced major framework agreements delivering in the order of a quarter of the total program (annually). Incentive-based clauses in the agreements are delivering savings in the order of \$6.5 million per annum (assuming a \$200 million program through the framework agreements). Over the course of PS21 these agreements will continue to drive improvements, including delivering greater self-performance of works, reducing the reliance on (and cost of) sub-contractors.

Supporting information

Our capital projects and programs estimates are based on robust business cases and analysis. Further information supporting the estimates provided is available upon request and includes:

- > business cases inclusive of options and risk analysis performed
- > procurement process applied (or expected)
- > program prioritisation and cost estimation methodologies.

S6.2.2 Water and sewerage capex forecasts

Melbourne Water's proposed capex program for water and sewerage is 46 per cent higher than the determination capex from PS16.

The high-level drivers of this increase in capex for PS21 are outlined in **Section 3.5** of the *Price Submission*. Service-specific insights are presented for the water service in **Table 64** and the sewerage service in **Table 65**.

Sewerage renewals commentary

Renewal expenditure covers expenditure across M&E and civil assets. We use a probabilistic model as the foundation for our M&E capex forecasts and a deterministic model for our civil capex forecasts.

- > The probabilistic model uses asset life and replacement cost information together with a probability density function to predict future renewal needs. We regularly review the model and underlying dataset to ensure our forecasts reflect up to date information.
- > The deterministic model is calibrated with asset condition data over time, and reflects the highly diverse nature (size, complexity, material and environmental condition) of our civil asset base.

For example, over the past five years an increased focus on condition monitoring, has shown that our concrete sewers are deteriorating faster than anticipated. This insight, along with failure incidents (for example a Maribyrnong River Main event in late 2017), has led to a recalibration of how we plan sewer transfer renewals on a large portfolio of aging assets. This means increasing our focus on early intervention, such as relining small sewers and increasing ventilation in large sewers, in order to defer or avoid far more costly whole of asset replacements.

Over the course of PS16 we have invested in additional strategic/risk management capital activities to inform whole of life decision-making, such as:

- > Increased CCTV monitoring effort. Since 2015 Melbourne Water has inspected and formally reviewed over 230 kilometres (or two thirds) of the overall sewerage network.
- > Purchased a state-of-the-art long-range sewer monitoring boat to conduct wall thickness measurements and void detection in large concrete sewers.
- > Commenced research projects to better understand the root cause of the increased corrosion rates.

Growing assets and growing risks place upward pressure on renewals

The uplift in the PS21 renewals capex forecast compared to the revised PS16 forecast (representing four years of actuals and a 2020-21 forecast) is driven by the interaction of the factors outlined above. In summary these include:

- > We have a large, old (some brickwork sewers were originally built in the 1890s) and growing asset base that is becoming more complex over time (an example of this occurring is the increasing mechanisation of the WTP).
- > We are more aware of the condition of our assets than ever before and this has highlighted growing risks to the continued delivery of **safe and reliable sewerage services**.
- > The Hobsons Bay Main Yarra Crossing Duplication Project alone (\$135.8 million) accounts for 20 per cent of our sewerage renewal forecast. This is \$90 million larger than the largest sewerage renewal project forecast at the time of the PS16 determination.

Table 64 Bulk water service capex by driver and by program

Category	PS16 ^a	PS21	Variance to PS16	Commentary
Water capex (excl. Corporate)	\$608m	\$791m	\$182m	<i>Note that disaggregated numbers are approximate due to rounding</i>
by Driver				
Growth	\$59m	\$198m	\$140m	New transfer infrastructure (mains, pumps & service reservoirs) to service the north, north west and south east of greater Melbourne and augmentation of surface water resource at Cement Creek
Renewals	\$332m	\$332m	-\$0.3m	Replacement of end of life water harvesting assets in the Maroondah part of the supply system
Improvement/ Compliance	\$217m	\$260m	\$43m	Upgrades to meet the new fluoride code and treatment plant disinfection requirements
by Program				
Production & Storage	\$212m	\$232m	\$20m	Renewal of water harvesting assets in the Maroondah supply system and upgrade works at Cardinia Reservoir
Drinking Water Quality	\$120m	\$199m	\$79m	Compliance upgrades at treatment plants and new catchment management interventions to reduce risks to public health and mitigate risks against bushfires
Water Transfer	\$276m	\$360m	\$84m	New transfer infrastructure (mains, pumps & service reservoirs) to service the north, north west and south east of greater Melbourne

Note a: PS16 numbers include actuals and forecast and therefore do not reconcile with the ESC's financial template, which includes determination values for the 2020-21 year, rather than forecast.

Table 65 Bulk sewerage service capex by driver and by program

Category	PS16 ^a	PS21	Variance to PS16	Commentary
Sewerage capex (excl. Corporate)	\$982m	\$1,531m	\$549m	<i>Note that disaggregated numbers are approximate due to rounding</i>
by Driver				
Growth	\$248m	\$626m	\$378m	Primary treatment capacity augmentation (and 55E ASP Upgrade) are much more significant "growth" projects than in the current regulatory period. These and other "growth" projects are due to strong population growth across the current regulatory period.
Renewals	\$488m	\$685m	\$197m	Renewals are increasing across the 3 sewerage programs but is greatest for sewer transfer. <i>A comparison with sewerage renewal capex forecasts submitted for PS16 shows that the proportion of allocations to projects remains steady across periods at around 35 per cent of total forecast.</i> <i>Further discussion of this uplift is provided below.</i>
Improvement/ Compliance	\$246m	\$220m	-\$26m	The completion of business efficiency projects including ETP large scale solar and WTP Power Station Stage 4 contribute to a decline in the collective spend across these drivers.
by Program				
Sewerage Transfer	\$297m	\$518m	\$221m	Condition assessments have highlighted the need for an increase in investment in sewer renewals, the majority of the increase is related to a particularly significant renewal project, the Hobsons Bay Main Yarra River Crossing Duplication.
Treatment ETP	\$269m	\$298m	\$29m	Consistent ongoing spend on renewals and smaller growth projects is planned for ETP in PS21.
Treatment WTP	\$415m	\$715m	\$300m	The increase in spend at WTP is related to the need for the Primary Treatment Capacity Augmentation.

Note a: PS16 numbers include actuals and forecast and therefore do not reconcile with the ESC's financial template, which includes determination values for the 2020-21 year, rather than forecast.

Capex forecasts by project and allocation

Table 66 and **Table 67** show forecast capex by major project and capital allocations respectively. The ten largest projects (by PS21 aggregate expenditure) account for \$1 billion – 44 per cent – of the water and sewerage capex program.

Table 66 shows the top 10 projects by aggregate PS21 expenditure as well as forecast annualised expenditure for PS26 where the project continues into this period.

Table 67 shows forecast PS21 expenditure by capital program and allocation at a more disaggregated level than the program level shown in **Table 64** and **Table 65**, which show total capital expenditure by Service and Program. **Table 66** and **Table 67** include major capital projects and capital programs or allocations, but do not include an additional \$705 million in projects and therefore do not reconcile with **Table 64** and **Table 65**. Our consideration of historical and forecast costs is provided at the aggregate program level in **Table 64** and **Table 65** as this provides the best like-for-like comparison of expenditure inclusive of projects and allocations.

As introduced in **Section S6.2.1** during the course of a regulatory period capital allocations are reduced in size as projects are defined. In developing the forecasts presented in **Table 67** Melbourne Water takes into account a range of factors including historical levels of expenditure, asset age, type and condition and other external factors (such as demand growth and environmental conditions).

Further information relating to the programs and allocations presented in **Table 67** is available upon request.

S6.2.3 Waterways and drainage capex forecasts

Melbourne Water's proposed capex program for waterways and drainage is 27 per cent higher than the determination capex from PS16.

The high-level drivers of this increase in capex for PS21 are outlined in **Section 3.5** of the *Price Submission*. Driver and program level specific insights are presented for the waterways and drainage service in **Table 68**.

Capex forecasts by project and allocation

Table 69 shows forecast capex for waterways and drainage broken down by major program area and separately highlighting major projects and capital allocations.

It shows forecast PS21 expenditure by capital program and allocation at a more disaggregated level than the program level shown in **Table 68**. Our consideration of historical and forecast costs is provided at the aggregate program level in **Table 68** as this provides the best like-for-like comparison of expenditure inclusive of projects and allocations.

As introduced in **Section S6.2.1** during the course of a regulatory period capital allocations are reduced in size as projects are defined. In developing the forecasts presented in **Table 69**, Melbourne Water takes into account a range of factors including historical levels of expenditure, asset age, type and condition and other external factors (such as demand growth and environmental conditions).

Further information relating to the programs and allocations presented in **Table 69** is available upon request.

Table 66 Bulk water and sewerage service – major capital projects

Project name			Scope (what is it?)	Expenditure profile	PS21 \$																								
Service	Outcome	Driver			% PS21\$																								
					Project \$																								
WTP Primary Treatment Augmentation			Provide preliminary treatment (screening and grit removal), primary treatment (sedimentation tanks), and sludge treatment (thickening and anaerobic digestion). This will reduce the load on the existing anaerobic pots to sustainable levels and provide capacity for future growth.	<table><tr><th>Year</th><th>Expenditure (\$m)</th></tr><tr><td>2020-21</td><td>\$0.4m</td></tr><tr><td>2021-22</td><td>\$1.8m</td></tr><tr><td>2022-23</td><td>\$6.0m</td></tr><tr><td>2023-24</td><td>\$128.2m</td></tr><tr><td>2024-25</td><td>\$166.0m</td></tr><tr><td>2025-26</td><td>\$13.3m</td></tr><tr><td>2026-27</td><td>\$0.0m</td></tr><tr><td>2027-28</td><td>\$0.0m</td></tr><tr><td>2028-29</td><td>\$0.0m</td></tr><tr><td>2029-30</td><td>\$0.0m</td></tr><tr><td>2030-31</td><td>\$0.0m</td></tr></table>	Year	Expenditure (\$m)	2020-21	\$0.4m	2021-22	\$1.8m	2022-23	\$6.0m	2023-24	\$128.2m	2024-25	\$166.0m	2025-26	\$13.3m	2026-27	\$0.0m	2027-28	\$0.0m	2028-29	\$0.0m	2029-30	\$0.0m	2030-31	\$0.0m	\$315.3m
Year	Expenditure (\$m)																												
2020-21	\$0.4m																												
2021-22	\$1.8m																												
2022-23	\$6.0m																												
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2026-27	\$0.0m																												
2027-28	\$0.0m																												
2028-29	\$0.0m																												
2029-30	\$0.0m																												
2030-31	\$0.0m																												
S	2	G	14%																										
			\$316.2m																										
WTP 55E ASP Upgrade			Upgrade the existing 55 East Activated Sludge Plant to a modern shortcut nitrogen removal process, while reusing existing infrastructure (clarifiers). The new design will reduce energy demand and eliminate safety risks associated with working over water.	<table><tr><th>Year</th><th>Expenditure (\$m)</th></tr><tr><td>2020-21</td><td>\$0.5m</td></tr><tr><td>2021-22</td><td>\$68.4m</td></tr><tr><td>2022-23</td><td>\$132.9m</td></tr><tr><td>2023-24</td><td>\$6.9m</td></tr><tr><td>2024-25</td><td>\$2.2m</td></tr><tr><td>2025-26</td><td>\$1.1m</td></tr><tr><td>2026-27</td><td>\$0.0m</td></tr><tr><td>2027-28</td><td>\$0.0m</td></tr><tr><td>2028-29</td><td>\$0.0m</td></tr><tr><td>2029-30</td><td>\$0.0m</td></tr><tr><td>2030-31</td><td>\$0.0m</td></tr></table>	Year	Expenditure (\$m)	2020-21	\$0.5m	2021-22	\$68.4m	2022-23	\$132.9m	2023-24	\$6.9m	2024-25	\$2.2m	2025-26	\$1.1m	2026-27	\$0.0m	2027-28	\$0.0m	2028-29	\$0.0m	2029-30	\$0.0m	2030-31	\$0.0m	\$211.4m
Year	Expenditure (\$m)																												
2020-21	\$0.5m																												
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2028-29	\$0.0m																												
2029-30	\$0.0m																												
2030-31	\$0.0m																												
S	2	G	9%																										
			\$214.4																										
HBM Yarra Crossing Duplication			Duplicate the Hobson's Bay Main sewer Yarra River crossing, then rehabilitate the existing crossing, which cannot be rehabilitated under live conditions.	<table><tr><th>Year</th><th>Expenditure (\$m)</th></tr><tr><td>2020-21</td><td>\$2.4m</td></tr><tr><td>2021-22</td><td>\$29.1m</td></tr><tr><td>2022-23</td><td>\$90.0m</td></tr><tr><td>2023-24</td><td>\$16.8m</td></tr><tr><td>2024-25</td><td>\$0.0m</td></tr><tr><td>2025-26</td><td>\$0.0m</td></tr><tr><td>2026-27</td><td>\$0.0m</td></tr><tr><td>2027-28</td><td>\$22.0m</td></tr><tr><td>2028-29</td><td>\$0.0m</td></tr><tr><td>2029-30</td><td>\$0.0m</td></tr><tr><td>2030-31</td><td>\$0.0m</td></tr></table>	Year	Expenditure (\$m)	2020-21	\$2.4m	2021-22	\$29.1m	2022-23	\$90.0m	2023-24	\$16.8m	2024-25	\$0.0m	2025-26	\$0.0m	2026-27	\$0.0m	2027-28	\$22.0m	2028-29	\$0.0m	2029-30	\$0.0m	2030-31	\$0.0m	\$135.8m
Year	Expenditure (\$m)																												
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2030-31	\$0.0m																												
S	1	R	6%																										
			\$163.4m																										
Yan Yean to Bald Hill Pipeline			Construction of new pump station at Yan Yean and associated scope of works to install new pipeline.	<table><tr><th>Year</th><th>Expenditure (\$m)</th></tr><tr><td>2020-21</td><td>\$3.8m</td></tr><tr><td>2021-22</td><td>\$38.2m</td></tr><tr><td>2022-23</td><td>\$52.7m</td></tr><tr><td>2023-24</td><td>\$4.8m</td></tr><tr><td>2024-25</td><td>\$0.0m</td></tr><tr><td>2025-26</td><td>\$0.0m</td></tr><tr><td>2026-27</td><td>\$0.0m</td></tr><tr><td>2027-28</td><td>\$0.0m</td></tr><tr><td>2028-29</td><td>\$0.0m</td></tr><tr><td>2029-30</td><td>\$0.0m</td></tr><tr><td>2030-31</td><td>\$0.0m</td></tr></table>	Year	Expenditure (\$m)	2020-21	\$3.8m	2021-22	\$38.2m	2022-23	\$52.7m	2023-24	\$4.8m	2024-25	\$0.0m	2025-26	\$0.0m	2026-27	\$0.0m	2027-28	\$0.0m	2028-29	\$0.0m	2029-30	\$0.0m	2030-31	\$0.0m	\$95.7m
Year	Expenditure (\$m)																												
2020-21	\$3.8m																												
2021-22	\$38.2m																												
2022-23	\$52.7m																												
2023-24	\$4.8m																												
2024-25	\$0.0m																												
2025-26	\$0.0m																												
2026-27	\$0.0m																												
2027-28	\$0.0m																												
2028-29	\$0.0m																												
2029-30	\$0.0m																												
2030-31	\$0.0m																												
W	1	G	4%																										
			\$100.4m																										
Maroondah Res Outlet and Aqueduct Stage 3A			Decommission the Maroondah Outlet Tower and Maroondah aqueduct which have reached the end of their service lives. Construct a new outlet and pipeline from Maroondah Reservoir to the downstream end of Myers Creek siphon.	<table><tr><th>Year</th><th>Expenditure (\$m)</th></tr><tr><td>2020-21</td><td>\$0.2m</td></tr><tr><td>2021-22</td><td>\$0.7m</td></tr><tr><td>2022-23</td><td>\$0.7m</td></tr><tr><td>2023-24</td><td>\$2.5m</td></tr><tr><td>2024-25</td><td>\$21.4m</td></tr><tr><td>2025-26</td><td>\$32.9m</td></tr><tr><td>2026-27</td><td>\$19.2m</td></tr><tr><td>2027-28</td><td>\$2.9m</td></tr><tr><td>2028-29</td><td>\$0.0m</td></tr><tr><td>2029-30</td><td>\$0.0m</td></tr><tr><td>2030-31</td><td>\$0.0m</td></tr></table>	Year	Expenditure (\$m)	2020-21	\$0.2m	2021-22	\$0.7m	2022-23	\$0.7m	2023-24	\$2.5m	2024-25	\$21.4m	2025-26	\$32.9m	2026-27	\$19.2m	2027-28	\$2.9m	2028-29	\$0.0m	2029-30	\$0.0m	2030-31	\$0.0m	\$58.2m
Year	Expenditure (\$m)																												
2020-21	\$0.2m																												
2021-22	\$0.7m																												
2022-23	\$0.7m																												
2023-24	\$2.5m																												
2024-25	\$21.4m																												
2025-26	\$32.9m																												
2026-27	\$19.2m																												
2027-28	\$2.9m																												
2028-29	\$0.0m																												
2029-30	\$0.0m																												
2030-31	\$0.0m																												
W	1	R	3%																										
			\$80.8m																										

Project name			Scope (what is it?)	Expenditure profile	PS21 \$																						
Maribyrnong Main Sewer Augmentation			Increase the capacity of the Maribyrnong River Main (MRM) by constructing a 1 km gravity sewer from the existing MRM to the North West Sewer. This will include 800 m of tunnelling at 20-40 m depth, and a pipe bridge crossing of the Maribyrnong River with pedestrian/bike access.	<table><tr><td>2020-21</td><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td><td>2026-27</td><td>2027-28</td><td>2028-29</td><td>2029-30</td><td>2030-31</td></tr><tr><td>\$0.9m</td><td>\$29.5m</td><td>\$25.8m</td><td>\$1.6m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td></tr></table>	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	\$0.9m	\$29.5m	\$25.8m	\$1.6m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$56.9m
					2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31												
					\$0.9m	\$29.5m	\$25.8m	\$1.6m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m												
2%																											
S	1	C			\$59.0m																						
Winneke TP – UV Disinfection System			Install UV disinfection at Winneke Water Treatment plant.	<table><tr><td>2020-21</td><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td><td>2026-27</td><td>2027-28</td><td>2028-29</td><td>2029-30</td><td>2030-31</td></tr><tr><td>\$0.4m</td><td>\$1.3m</td><td>\$27.2m</td><td>\$14.5m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td></tr></table>	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	\$0.4m	\$1.3m	\$27.2m	\$14.5m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$43.1m
					2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31												
					\$0.4m	\$1.3m	\$27.2m	\$14.5m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m												
2%																											
W	1	C			\$45.4m																						
Olinda - Mitcham Water Mains Replacement Stage 1			Renew 4.5 kilometers of the Olinda-Mitcham main on the existing alignment. Three pipelines to be replaced by two new pipelines.	<table><tr><td>2020-21</td><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td><td>2026-27</td><td>2027-28</td><td>2028-29</td><td>2029-30</td><td>2030-31</td></tr><tr><td>\$0.7m</td><td>\$4.6m</td><td>\$33.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td></tr></table>	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	\$0.7m	\$4.6m	\$33.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$37.7m
					2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31												
					\$0.7m	\$4.6m	\$33.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m												
2%																											
W	1	R			\$38.4m																						
WTP Gas Plant Renewal			Construct a new biogas handling plant and associated suction and delivery manifolds. As well as replacing existing assets at end of life, the new design will improve level of service, reduce single points of failure and reduce safety hazards relative to the existing design.	<table><tr><td>2020-21</td><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td><td>2026-27</td><td>2027-28</td><td>2028-29</td><td>2029-30</td><td>2030-31</td></tr><tr><td>\$0.0m</td><td>\$2.4m</td><td>\$2.4m</td><td>\$4.6m</td><td>\$13.2m</td><td>\$12.9m</td><td>\$2.1m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td></tr></table>	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	\$0.0m	\$2.4m	\$2.4m	\$4.6m	\$13.2m	\$12.9m	\$2.1m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$35.5m
					2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31												
					\$0.0m	\$2.4m	\$2.4m	\$4.6m	\$13.2m	\$12.9m	\$2.1m	\$0.0m	\$0.0m	\$0.0m	\$0.0m												
2%																											
S	2	R			\$37.6m																						
ETP Power station renewal			The ETP power station generates renewable energy from biogas and serves as the site's emergency backup power supply. The existing engine fleet is approaching end of life. This project will refurbish the existing engines to extend their life, and augment capacity.	<table><tr><td>2020-21</td><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td><td>2026-27</td><td>2027-28</td><td>2028-29</td><td>2029-30</td><td>2030-31</td></tr><tr><td>\$0.0m</td><td>\$0.3m</td><td>\$0.3m</td><td>\$18.9m</td><td>\$14.1m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td><td>\$0.0m</td></tr></table>	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	\$0.0m	\$0.3m	\$0.3m	\$18.9m	\$14.1m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$33.7m
					2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31												
					\$0.0m	\$0.3m	\$0.3m	\$18.9m	\$14.1m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m	\$0.0m												
1%																											
S	2	R			\$33.7m																						

Service: W = water; S = sewerage.

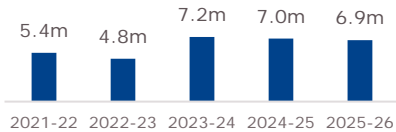
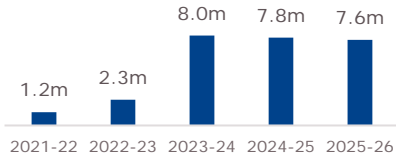

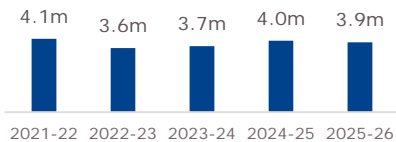
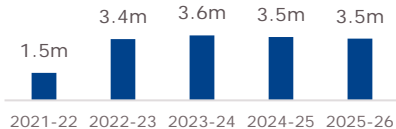
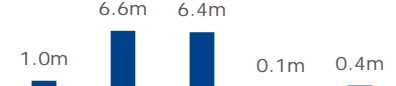
Outcome: 1 = Access to safe and reliable water and sewerage services; 2 = Melbourne's environment, rivers, creeks and bays are protected ...

Driver: G = growth; R = renewals; IC = improvement /compliance.

Table 67 Bulk water and sewerage service – capital programs or allocations

Project name		Scope (what is it?)	Underlying allocations and related project	PS21 Expenditure Profile	PS21\$										
Service	Outcome				% PS21\$										
ETP M&E		This program provides for renewal of M&E assets at the ETP. A probabilistic model forms the foundation for renewal of the approximately 30,000 M&E assets at the ETP. This foundation is complemented by condition assessments, which are used to confirm optimal renewal timing.	A10209 (Tertiary); A10215 (ETP Influent, Effluent, Power); A10426 (Primary-Secondary); A10427 (Solids Handling) Aligned PS21 projects: > Y10278 ETP Power Station Renewal > Y10222 ETP Tertiary Ozone Fugitive Emissions Elimination	<table><tr><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td></tr><tr><td>14.9m</td><td>15.2m</td><td>16.9m</td><td>16.1m</td><td>15.7m</td></tr></table>	2021-22	2022-23	2023-24	2024-25	2025-26	14.9m	15.2m	16.9m	16.1m	15.7m	\$78.8m
2021-22	2022-23				2023-24	2024-25	2025-26								
14.9m	15.2m	16.9m	16.1m	15.7m											
S	2				13%										
Water M&E		A probabilistic model forms the foundation for renewal of the approximately 16,000 M&E assets at its water treatment plants. This foundation is complemented by condition assessments, which are used to confirm optimal renewal timing.	A10229 (Water Quality Renewals), A10361 (Winneke Electrical Infrastructure), A10236 (Minor), A10450 (Catchment Plant & Equipment)	<table><tr><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td></tr><tr><td>3.6m</td><td>10.6m</td><td>16.8m</td><td>16.2m</td><td>14.7m</td></tr></table>	2021-22	2022-23	2023-24	2024-25	2025-26	3.6m	10.6m	16.8m	16.2m	14.7m	\$62.0m
2021-22	2022-23				2023-24	2024-25	2025-26								
3.6m	10.6m	16.8m	16.2m	14.7m											
W	1				10%										
Catchment management		Up to 80% of Melbourne’s drinking water supply from the protected natural catchments to the north and east of Melbourne. This program provides for catchment management and bushfire risk reduction activities that are critical to protecting drinking water supplies. We are also obliged to consider opportunities to provide for social and recreational uses of waterways whilst managing the above risks.	A10387 (Protecting Drinking Water Supply Catchments), A10410 (Recreation), A10234 (Managing Access), A10434 (Hydrological Monitoring)	<table><tr><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td></tr><tr><td>18.0m</td><td>8.5m</td><td>10.2m</td><td>10.3m</td><td>8.2m</td></tr></table>	2021-22	2022-23	2023-24	2024-25	2025-26	18.0m	8.5m	10.2m	10.3m	8.2m	\$55.1m
2021-22	2022-23				2023-24	2024-25	2025-26								
18.0m	8.5m	10.2m	10.3m	8.2m											
W	1				9%										
Sewerage transfer M&E		This program provides for renewal or overhaul of M&E assets across our 8 sewerage pump stations. Melbourne Water uses a probabilistic model as the foundation for renewal of the approximately 5,000 M&E assets in the sewerage transfer system. This foundation is complemented by condition assessments, which are used to confirm optimal renewal timing.	Q04683 (2016PD Sewer Transfer M&E), A10428 (Major Pump Renewals), A10205 (Minor Pump Renewals)	<table><tr><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td></tr><tr><td>4.6m</td><td>8.9m</td><td>12.0m</td><td>11.7m</td><td>11.4m</td></tr></table>	2021-22	2022-23	2023-24	2024-25	2025-26	4.6m	8.9m	12.0m	11.7m	11.4m	\$48.7m
2021-22	2022-23				2023-24	2024-25	2025-26								
4.6m	8.9m	12.0m	11.7m	11.4m											
S	1				8%										

Project name		Scope (what is it?)	Underlying allocations and related	PS21 Expenditure Profile	PS21\$
Water transfer civils		<p>This program covers our water transfer civil asset base including water mains, service reservoirs and earthen basins.</p> <p>This program provides for risk-based intervention for 3 earthen basin embankments in the PS21 period followed by another 3 in the subsequent period. It also provides for renewal of sections of service reservoir tanks where condition data identifies a risk to safe drinking water supply.</p>	<p>A10280, A10240</p> <p>Aligned PS21 projects:</p> <ul style="list-style-type: none">> Q02707 M76 Water Main Renewal> D10101 Olinda-Mitcham Water Mains Replacement Stage 1> M22-M46 Water Mains Renewal	<div><div>8.5m</div><div>8.3m</div><div>9.6m</div><div>9.4m</div><div>9.2m</div></div> <div>2021-222022-232023-242024-252025-26</div>	<p>\$45.0m</p>
W	1				8%
WTP civils		<p>WTP is supported by a number of large civil assets. This program provides for the renewal of eroded lagoon foreshore embankments, renewal of sludge drying pans and for risk-based interventions of civil assets where condition data identifies a risk to sewage treatment.</p>	<p>A10216 (Renewals), Q07237 (SDPs), A10217 (Ops Minor)</p>	<div><div>5.6m</div><div>6.6m</div><div>10.0m</div><div>9.7m</div><div>9.5m</div></div> <div>2021-222022-232023-242024-252025-26</div>	<p>\$41.4m</p>
S	2				7%
Sewerage transfer Civils		<p>This program provides for renewals of civil infrastructure including sewer pipelines, ventilation stacks and manholes.</p> <p>We apply a risk-based approach to sewers by adopting a comprehensive condition monitoring program to support intervention by sewer relining rather than sewer renewal.</p>	<p>Q07187 (Sewers), A10204 (Ops Minor), A10199 (Managing Access)</p> <p>Aligned PS21 projects:</p> <ul style="list-style-type: none">> Q05708 HBM Yarra Crossing Duplication> Q05622 & D10129 WTS – Shallow Conduit Rehabilitation> Y10234 NYM Sewer Rehabilitation> P33546 Hawthorn Main Renewal-Rehab	<div><div>7.6m</div><div>7.5m</div><div>7.3m</div><div>7.1m</div><div>7.0m</div></div> <div>2021-222022-232023-242024-252025-26</div>	<p>\$36.6m</p>
S	1				6%
Water production and storage civils		<p>This program provides for assets that capture, store and transfer raw water prior to being treated, approximately 16,000 assets in total. The majority of assets are large civil structures such as 16 dams and associated outlet towers, weirs and aqueducts. Approximately 6,000 M&E assets are included in this program.</p>	<p>A10230 (Production & Storage), A10278 (Half-share Fencing)</p> <p>Aligned PS21 projects:</p> <ul style="list-style-type: none">> P31340 O’Shannassy Reservoir Outlet Pipe Renewal	<div><div>4.3m</div><div>7.5m</div><div>8.3m</div><div>8.1m</div><div>7.9m</div></div> <div>2021-222022-232023-242024-252025-26</div>	<p>\$36.2m</p>
W	1				6%
Odour and corrosion		<p>This program provides for rehabilitation or intervention works to manage corrosion in large sewers. It also provides for investments to comply with the obligation to limit odour complaints from the sewerage system.</p>	<p>A10429 (Odour and Corrosion)</p>	<div><div>7.2m</div><div>7.0m</div><div>6.9m</div><div>6.7m</div><div>6.5m</div></div> <div>2021-222022-232023-242024-252025-26</div>	<p>\$34.3m</p>
S	1				6%

Project name		Scope (what is it?)	Underlying allocations and related	PS21 Expenditure Profile	PS21\$
ETP civils		The program provides for the renewal of civil assets such as sludge drying pans, supernatant and effluent holding basins, concrete tanks and channels. Condition assessments are used to inform optimal renewal timing.	A10206 (Civil), Q04447 (Minor Civil)		\$31.4m
S	2			5%	
WTP M&E		This program provides for renewal or overhaul of M&E assets at the WTP. A probabilistic model form the foundation for renewal of the approximately 8,000 M&E assets at the WTP. This foundation is complemented by condition assessments, which are used to confirm optimal renewal timing.	A10221 (M&E) Aligned PS21 projects: > Y10266 Gas Plant Renewal > Y10276 25W ASP Diffuser and Lateral Renewal		\$27.0m
W	1			5%	
Other enhancements		Allocations for obligations relating to: > Water supply and sewage treatment public education > Management of biodiversity values at the Ramsar listed WTP > Protection of heritage assets > Reducing carbon emissions.	A10412 (WTP Visitation), A10441 (ETP Education), A10326 (Greening the Pipeline), A10413 (WTP Centre of Excellence), AA10408 (WTP Biodiversity), A10327 (Pilot Carbon Offset), A10402 (Pipetrack Recreation), A10417 (IW Resource Model)		\$23.0m
W	1			4%	
Sewerage security and controls		This program provides for renewals of controls and security assets across the sewerage service.	A10391 (ST), A10389 (ETP), A10390 (WTP), A10467 (Intelligent Network Enablement)		\$19.3m
W	1			3%	
Water security and control systems		This program provides for renewals of controls and security assets across the water service.	A10394 (Treatment), A10393 (Transfer), A10392 (Production), A10466 (Intelligent Network Enablement)		\$15.6m
W	1			3%	
Ringwood sewer		This allocation provides for projects that support compliance with Waters of Victoria SEPP by both augmenting the Ringwood South Branch Sewer and improving water quality in	P30738		\$14.5m

Project name		Scope (what is it?)	Underlying allocations and related	PS21 Expenditure Profile	PS21\$
S	1	Dandenong Creek. Projects targeting specific improvements to beneficial uses of the waterways will be delivered under the Enhancing our Dandenong Creek #2 Project.			2%
Sewerage transfer Condition monitoring		This program provides for asset data creation activities created under our sewerage transfer condition monitoring program.	A10201 (Condition monitoring)	<div><div>2.3m2.2m2.2m2.1m2.1m</div><div>2021-222022-232023-242024-252025-26</div></div>	\$10.9m
S	1				2%
Water condition monitoring		This program provides for asset data creation activities created under our water condition monitoring program.	A10237 (Water Transfer – Con Mon and CP Renewals 2021-26), A10306 (Major Asset Inspections – SWAM), A10225 (Water Production and Storage - Con Mon 2021-26)	<div><div>1.9m1.9m1.9m1.8m1.8m</div><div>2021-222022-232023-242024-252025-26</div></div>	\$9.3m
W	1				2%
Automation		This program provides for the delivery of business efficiencies through the delivery of automation projects in the Water Service.	A10200	<div><div>0.9m0.9m0.9m0.9m0.8m</div><div>2021-222022-232023-242024-252025-26</div></div>	\$4.4m
W	1				1%

Service: W = water; S = sewerage.

Outcome: 1 = Access to safe and reliable water and sewerage services; 2 = Melbourne's environment, rivers, creeks and bays are protected ...

Table 68 Waterways and drainage service capex by driver and by program (excluding Corporate)

Category	PS16 ^a	PS21	Variance to PS16	Commentary
Waterways and drainage capex (excl. Corporate)^b	\$962m	\$1,220m	\$258m	<i>Note that disaggregated numbers are approximate due to rounding</i>
by Driver				
Growth	\$592m	\$701m	\$109m	Forecast land development activity primarily funded by Developer Contributions revenue.
Renewals	\$105m	\$119m	\$14m	Increase in wetland rectification and sediment removal driven by increased sediment volumes, contamination and landfill levy increases as well as a number of drainage assets reaching end of life including Port Melbourne pump station and Shakespeare Grove drain.
Improvement/ Compliance	\$265m	\$399m	\$134m	Customer driven increases in level of service particularly stormwater harvesting and flood modelling and mapping as well as new obligations around social and recreational programs.
by Program				
Drainage and Flood Protection	\$203m	\$155m	-\$48m	Completion of a significant program of ANCOLD upgrades of Retarding Basins contribute to a reduction in overall spend despite customer driven increases in flood mitigation and some major drainage renewals
Land Development	\$589m	\$705m	\$117m	Forecast land development activity primarily funded by Developer Contributions.
Stormwater Quality	\$52m	\$148m	\$96m	Customer driven stormwater harvesting program is the major driver of increases as well as renewals of wetlands due to increased sediment volumes, contamination and landfill levy increases.
Waterways Condition	\$118m	\$211m	\$92m	Customer driven increases in level of service particularly natural wetlands, estuaries, and new obligations around social and recreational programs and waterway restoration and providing greater access to our land.

Note a: PS16 numbers include actuals and forecast and therefore do not reconcile with the ESC's financial template, which includes determination values for the 2020-21 year, rather than forecast.

Note b: Amounts also include diversion expenditure, including one project of \$2.14 million in the PS21 period.

Table 69 Waterways and drainage – capital projects and allocations breakdown

Program summary	Scope (what is it?)	Expenditure profile	PS21 \$
Drainage and flood protection – aligns with “Melbourne remains liveable as it deals with the impacts of climate change and population growth”			\$155.5m
Projects	16 projects in total		\$57.3m
FS 4903 DP001 Port Melbourne Pump Station Renewal <i>Renewal driver</i>	Replacement of the four pumpsets, associated internal pipework and valves to ensure the ongoing flood protection of the Port Melbourne area.	<div><div></div><div>0.8m</div><div>10.7m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$11.4m
Regan Street Retarding Basin <i>Improvements/ compliance driver</i>	Land purchase and construction of a retarding basin in Regan Street, St Albans.	<div><div></div><div>7.6m</div><div>0.1m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$7.7m
Shakespeare Grove MD renewal <i>Renewal driver</i>	Renewal of section of Shakespeare Grove Main Drain to ensure it continues to provide safe access and appropriate drainage.	<div><div></div><div>7.4m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$7.5m
Allocations	9 programs or allocations in total		\$98.2m
Physical Flood Risk Reduction 2021-26 <i>Improvements/ compliance driver</i>	Construction of flood risk mitigation works.	<div><div></div><div>0.0m</div><div>10.5m</div><div>15.9m</div><div>15.5m</div><div>15.1m</div><div>16.0m</div><div>15.9m</div><div>15.9m</div><div>15.8m</div><div>15.8m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$57.1m

Program summary	Scope (what is it?)	Expenditure profile	PS21 \$																																												
Flood Modelling and Mapping 2021-2026 <i>Improvements/ compliance driver</i>	Develop, and renew existing, joint flood models to produce flood information (maps, models and reports) for drainage catchments in the Port Philip and Westernport region, for use in reducing flood impacts.	<table><tr><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td><td>2026-27</td><td>2027-28</td><td>2028-29</td><td>2029-30</td><td>2030-31</td></tr><tr><td>3.0m</td><td>2.9m</td><td>2.9m</td><td>2.9m</td><td>3.0m</td><td>0.0m</td><td>0.0m</td><td>0.0m</td><td>0.0m</td><td>0.0m</td></tr></table>	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	3.0m	2.9m	2.9m	2.9m	3.0m	0.0m	0.0m	0.0m	0.0m	0.0m	\$14.7m																								
2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31																																						
3.0m	2.9m	2.9m	2.9m	3.0m	0.0m	0.0m	0.0m	0.0m	0.0m																																						
Land development— aligns with “Melbourne remains liveable as it deals with the impacts of climate change and population growth”			\$705.5m																																												
Projects	175 projects in total		\$268.1m																																												
Frequency distribution shown to highlight the scale of individual land development projects <i>Growth driver</i>	Individual project scope details are available upon request Values shown above bars represent the expenditure per cohort and number of projects. Percentages shown refer to cumulative expenditure by cohort.	<table><tr><th>Expenditure Cohort (\$m)</th><th>Number of Projects</th><th>Cumulative Expenditure (\$m)</th><th>Cumulative Percentage</th></tr><tr><td>\$0.00m - \$0.10m</td><td>14</td><td>\$0.8m</td><td>0%</td></tr><tr><td>\$0.10m - \$0.40m</td><td>42</td><td>\$10.0m</td><td>4%</td></tr><tr><td>\$0.40m - \$0.70m</td><td>36</td><td>\$19.3m</td><td>11%</td></tr><tr><td>\$0.70m - \$1.00m</td><td>13</td><td>\$11.2m</td><td>15%</td></tr><tr><td>\$1.00m - \$2.00m</td><td>30</td><td>\$42.4m</td><td>31%</td></tr><tr><td>\$2.00m - \$3.00m</td><td>9</td><td>\$23.8m</td><td>40%</td></tr><tr><td>\$3.00m - \$4.00m</td><td>9</td><td>\$30.2m</td><td>51%</td></tr><tr><td>\$4.00m - \$5.00m</td><td>11</td><td>\$50.6m</td><td>70%</td></tr><tr><td>\$5.00m - \$6.00m</td><td>2</td><td>\$10.7m</td><td>74%</td></tr><tr><td>>\$6m</td><td>9</td><td>\$69.2m</td><td>100%</td></tr></table>	Expenditure Cohort (\$m)	Number of Projects	Cumulative Expenditure (\$m)	Cumulative Percentage	\$0.00m - \$0.10m	14	\$0.8m	0%	\$0.10m - \$0.40m	42	\$10.0m	4%	\$0.40m - \$0.70m	36	\$19.3m	11%	\$0.70m - \$1.00m	13	\$11.2m	15%	\$1.00m - \$2.00m	30	\$42.4m	31%	\$2.00m - \$3.00m	9	\$23.8m	40%	\$3.00m - \$4.00m	9	\$30.2m	51%	\$4.00m - \$5.00m	11	\$50.6m	70%	\$5.00m - \$6.00m	2	\$10.7m	74%	>\$6m	9	\$69.2m	100%	\$268.1m
Expenditure Cohort (\$m)	Number of Projects	Cumulative Expenditure (\$m)	Cumulative Percentage																																												
\$0.00m - \$0.10m	14	\$0.8m	0%																																												
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\$0.40m - \$0.70m	36	\$19.3m	11%																																												
\$0.70m - \$1.00m	13	\$11.2m	15%																																												
\$1.00m - \$2.00m	30	\$42.4m	31%																																												
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\$4.00m - \$5.00m	11	\$50.6m	70%																																												
\$5.00m - \$6.00m	2	\$10.7m	74%																																												
>\$6m	9	\$69.2m	100%																																												
Allocations	9 programs or allocations in total		\$437.3m																																												
Land Development Works 2021-26 <i>Growth driver</i>	Construction of waterway and drainage projects that are delivered by urban developers on Melbourne Water's behalf and administered through Melbourne Water's Development Services Schemes.	<table><tr><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td><td>2026-27</td><td>2027-28</td><td>2028-29</td><td>2029-30</td><td>2030-31</td></tr><tr><td>5.4m</td><td>19.9m</td><td>98.3m</td><td>121.6m</td><td>115.7m</td><td>126.5m</td><td>127.3m</td><td>128.2m</td><td>129.1m</td><td>130.2m</td></tr></table>	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	5.4m	19.9m	98.3m	121.6m	115.7m	126.5m	127.3m	128.2m	129.1m	130.2m	\$361.0m																								
2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31																																						
5.4m	19.9m	98.3m	121.6m	115.7m	126.5m	127.3m	128.2m	129.1m	130.2m																																						
Arden Macaulay Flood Mitigation Infrastructure 2021-26 <i>Growth driver</i>	Flood mitigation and drainage infrastructure to enable development of the Arden Macaulay precinct. Includes above and below ground flood storage capacity (28.5 ML combined capacity); pressure and gravity underground pipes to convey flood water; and pump stations and other infrastructure.	<table><tr><td>2021-22</td><td>2022-23</td><td>2023-24</td><td>2024-25</td><td>2025-26</td><td>2026-27</td><td>2027-28</td><td>2028-29</td><td>2029-30</td><td>2030-31</td></tr><tr><td>0.0m</td><td>2.8m</td><td>9.5m</td><td>0.0m</td><td>15.8m</td><td>0.0m</td><td>0.0m</td><td>0.0m</td><td>0.0m</td><td>0.0m</td></tr></table>	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	0.0m	2.8m	9.5m	0.0m	15.8m	0.0m	0.0m	0.0m	0.0m	0.0m	\$28.2m																								
2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31																																						
0.0m	2.8m	9.5m	0.0m	15.8m	0.0m	0.0m	0.0m	0.0m	0.0m																																						

Program summary	Scope (what is it?)	Expenditure profile	PS21 \$
Fishermans Bend Flood Mitigation Infrastructure 2021-26 <i>Growth driver</i>	Flood mitigation and drainage infrastructure to enable development of the Fishermans Bend precinct. Infrastructure required in 2021-26 period includes construction of ~2km pipes in the Montague-Lorimer area to convey flood water and alleviate flooding and drainage.	<div><div>0.0m</div><div>0.0m</div><div>2.3m</div><div>9.3m</div><div>10.7m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$22.3m
Stormwater quality-- aligns with "Melbourne's environment, rivers, creeks and bays are protected"			\$148.3m
Projects	12 projects in total		\$16.0m
Hallam Valley RB Wetland renewal <i>Improvement/compliance driver</i>	Rectification of Hallam Valley RB Wetland to restore the wetland function to its designed treatment capacity of 3.9 tonnes nitrogen per annum.	<div><div>2.2m</div><div>4.2m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$6.4m
Gladstone Street Wetland Rectification <i>Improvement/compliance driver</i>	Rectification of Gladstone St Wetland to restore the wetland to its designed treatment capacity of 1.8 tonnes nitrogen per annum.	<div><div>4.2m</div><div>1.2m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$5.4m
Allocations6 programs or allocations in total			\$132.3m
Wetland rectification works 2021-26 <i>Renewal driver</i>	Investigation, design and works to undertake renewal of major wetlands to maintain nitrogen and sediment removal capacity.	<div><div>2.7m</div><div>4.7m</div><div>10.8m</div><div>10.7m</div><div>10.7m</div><div>10.8m</div><div>10.7m</div><div>10.7m</div><div>10.7m</div><div>10.7m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$39.5m
Upper Merri Creek Stormwater Harvesting 2021-26 <i>Improvement/compliance driver</i>	Design and construction of stormwater harvesting infrastructure including pump stations, storage and transfer pipelines to manage the impact of urban development on the Upper Merri Creek catchment	<div><div>0.5m</div><div>0.5m</div><div>4.1m</div><div>18.6m</div><div>20.3m</div><div>0.8m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div><div>0.0m</div></div> <div>2021-222022-232023-242024-252025-262026-272027-282028-292029-302030-31</div>	\$43.9m

Program summary	Scope (what is it?)	Expenditure profile	PS21 \$																																
Sunbury Stormwater Harvesting Infrastructure 2021-26 <i>Improvement/ compliance driver</i>	Construction of stormwater harvesting infrastructure, including pump stations and transfer pipelines, to manage the impact of urban development on Jacksons and Emu Creeks in the Sunbury Growth Corridor.	<table><tr><th>Year</th><th>2021-22</th><th>2022-23</th><th>2023-24</th><th>2024-25</th><th>2025-26</th><th>2026-27</th><th>2027-28</th><th>2028-29</th><th>2029-30</th><th>2030-31</th></tr><tr><td>Expenditure (\$m)</td><td>4.5</td><td>7.8</td><td>4.8</td><td>4.2</td><td>3.7</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td></tr></table>	Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Expenditure (\$m)	4.5	7.8	4.8	4.2	3.7	0.0	0.0	0.0	0.0	0.0	\$25.0m										
Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31																									
Expenditure (\$m)	4.5	7.8	4.8	4.2	3.7	0.0	0.0	0.0	0.0	0.0																									
Regional Stormwater Harvesting for Healthy Waterways <i>Improvement/ compliance driver</i>	Construction of infrastructure to manage, through stormwater harvesting and infiltration, the increasing volumes of stormwater arising from Greater Melbourne's growth and densification.	<table><tr><th>Year</th><th>2021-22</th><th>2022-23</th><th>2023-24</th><th>2024-25</th><th>2025-26</th><th>2026-27</th><th>2027-28</th><th>2028-29</th><th>2029-30</th><th>2030-31</th></tr><tr><td>Expenditure (\$m)</td><td>3.0</td><td>3.7</td><td>6.8</td><td>9.9</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td></tr></table>	Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Expenditure (\$m)	3.0	3.7	6.8	9.9	0.0	0.0	0.0	0.0	0.0	0.0	\$23.4m										
Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31																									
Expenditure (\$m)	3.0	3.7	6.8	9.9	0.0	0.0	0.0	0.0	0.0	0.0																									
Waterways condition-- aligns with "Melbourne's environment, rivers, creeks and bays are protected"			\$210.5m																																
Projects	80 projects in total		\$18.2m																																
Frequency distribution shown to highlight the scale of individual waterways condition projects <i>Compliance driver</i>	Individual project scope details are available upon request. Values shown above bars represent the expenditure per cohort and number of projects. Percentages shown refer to cumulative expenditure by cohort.	<table><tr><th>Expenditure Cohort</th><th>Number of Projects</th><th>Expenditure (\$m)</th><th>Cumulative %</th></tr><tr><td>\$0.00m - \$0.03m</td><td>8</td><td>\$0.1m</td><td>1%</td></tr><tr><td>\$0.03m - \$0.05m</td><td>10</td><td>\$0.3m</td><td>2%</td></tr><tr><td>\$0.05m - \$0.10m</td><td>15</td><td>\$1.0m</td><td>8%</td></tr><tr><td>\$0.10m - \$0.20m</td><td>24</td><td>\$3.6m</td><td>28%</td></tr><tr><td>\$0.20m - \$0.50m</td><td>18</td><td>\$6.1m</td><td>61%</td></tr><tr><td>\$0.50m - \$1.00m</td><td>3</td><td>\$1.9m</td><td>72%</td></tr><tr><td>>\$1m</td><td>2</td><td>\$5.1m</td><td>100%</td></tr></table>	Expenditure Cohort	Number of Projects	Expenditure (\$m)	Cumulative %	\$0.00m - \$0.03m	8	\$0.1m	1%	\$0.03m - \$0.05m	10	\$0.3m	2%	\$0.05m - \$0.10m	15	\$1.0m	8%	\$0.10m - \$0.20m	24	\$3.6m	28%	\$0.20m - \$0.50m	18	\$6.1m	61%	\$0.50m - \$1.00m	3	\$1.9m	72%	>\$1m	2	\$5.1m	100%	\$18.2m
Expenditure Cohort	Number of Projects	Expenditure (\$m)	Cumulative %																																
\$0.00m - \$0.03m	8	\$0.1m	1%																																
\$0.03m - \$0.05m	10	\$0.3m	2%																																
\$0.05m - \$0.10m	15	\$1.0m	8%																																
\$0.10m - \$0.20m	24	\$3.6m	28%																																
\$0.20m - \$0.50m	18	\$6.1m	61%																																
\$0.50m - \$1.00m	3	\$1.9m	72%																																
>\$1m	2	\$5.1m	100%																																
Allocations	6 programs or allocations in total		\$192.3m																																
Waterway Vegetation Condition 2021-26 <i>Improvement/ compliance driver</i>	Delivery of waterway condition improvement and management activities along priority waterway reaches.	<table><tr><th>Year</th><th>2021-22</th><th>2022-23</th><th>2023-24</th><th>2024-25</th><th>2025-26</th><th>2026-27</th><th>2027-28</th><th>2028-29</th><th>2029-30</th><th>2030-31</th></tr><tr><td>Expenditure (\$m)</td><td>14.3</td><td>15.6</td><td>16.7</td><td>17.0</td><td>17.0</td><td>17.7</td><td>17.6</td><td>17.6</td><td>17.5</td><td>17.5</td></tr></table>	Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Expenditure (\$m)	14.3	15.6	16.7	17.0	17.0	17.7	17.6	17.6	17.5	17.5	\$80.5m										
Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31																									
Expenditure (\$m)	14.3	15.6	16.7	17.0	17.0	17.7	17.6	17.6	17.5	17.5																									

Program summary	Scope (what is it?)	Expenditure profile	PS21 \$																						
Reimagining Your Creek 2021-26 <i>Improvement/ compliance driver</i>	Investigation, design, and civil works on Melbourne Water owned and maintained modified waterways to restore previously engineered stormwater channels back to more natural spaces for community enjoyment.	<table><tr><th>Year</th><th>2021-22</th><th>2022-23</th><th>2023-24</th><th>2024-25</th><th>2025-26</th><th>2026-27</th><th>2027-28</th><th>2028-29</th><th>2029-30</th><th>2030-31</th></tr><tr><td>Expenditure (m)</td><td>3.4</td><td>5.5</td><td>7.0</td><td>2.3</td><td>1.8</td><td>4.4</td><td>4.4</td><td>4.4</td><td>4.4</td><td>4.4</td></tr></table>	Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Expenditure (m)	3.4	5.5	7.0	2.3	1.8	4.4	4.4	4.4	4.4	4.4	\$20.0m
Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31															
Expenditure (m)	3.4	5.5	7.0	2.3	1.8	4.4	4.4	4.4	4.4	4.4															
Physical Form Management 2021-26 <i>Improvement/ compliance driver</i>	To manage threats to waterway physical form and improve physical habitat.	<table><tr><th>Year</th><th>2021-22</th><th>2022-23</th><th>2023-24</th><th>2024-25</th><th>2025-26</th><th>2026-27</th><th>2027-28</th><th>2028-29</th><th>2029-30</th><th>2030-31</th></tr><tr><td>Expenditure (m)</td><td>3.6</td><td>3.6</td><td>3.6</td><td>3.6</td><td>3.6</td><td>3.6</td><td>3.6</td><td>3.6</td><td>3.6</td><td>3.5</td></tr></table>	Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Expenditure (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	\$18.0m
Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31															
Expenditure (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5															
Instream Connectivity 2021-26 <i>Improvement/ compliance driver</i>	To improve instream connectivity by increasing fish passage through the removal of priority barriers.	<table><tr><th>Year</th><th>2021-22</th><th>2022-23</th><th>2023-24</th><th>2024-25</th><th>2025-26</th><th>2026-27</th><th>2027-28</th><th>2028-29</th><th>2029-30</th><th>2030-31</th></tr><tr><td>Expenditure (m)</td><td>3.1</td><td>3.1</td><td>3.1</td><td>3.1</td><td>3.1</td><td>3.1</td><td>3.1</td><td>3.1</td><td>3.1</td><td>3.1</td></tr></table>	Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Expenditure (m)	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	\$15.5m
Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31															
Expenditure (m)	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1															

S6.2.4 Capital delivery

Figure 36 shows Melbourne Water's forecast PS21 delivery (\$3.7 billion with a peak year of \$960.0 million, excluding desal capitalisation), in conjunction with its forecast for the current regulatory period (\$2.7 billion, peaking at \$630.2 million in the final year). The PS21 capital program represents a total increase of 36 per cent from period to period and a 52 per cent increase on the peak year expenditure.

Melbourne Water is well versed in the management and delivery of large capital works programs running across multiple years, and frequently alongside substantial operations and maintenance programs.

Figure 37 shows that over the past 15 years (completed financial years) total capital expenditures of \$8.7 billion have been added to Melbourne Water's total RAB, with average annual expenditure of \$584.1 million and a peak annual expenditure of \$1.415 billion.

Figure 36 Actual and forecast capex using current delivery model

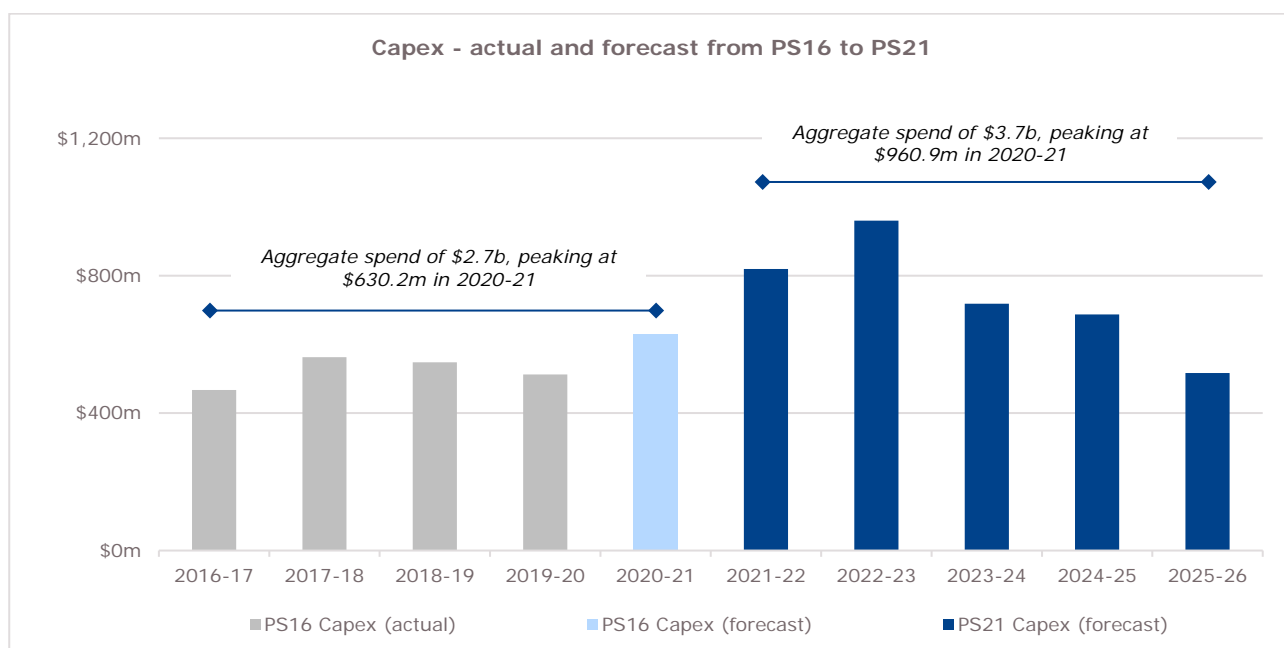
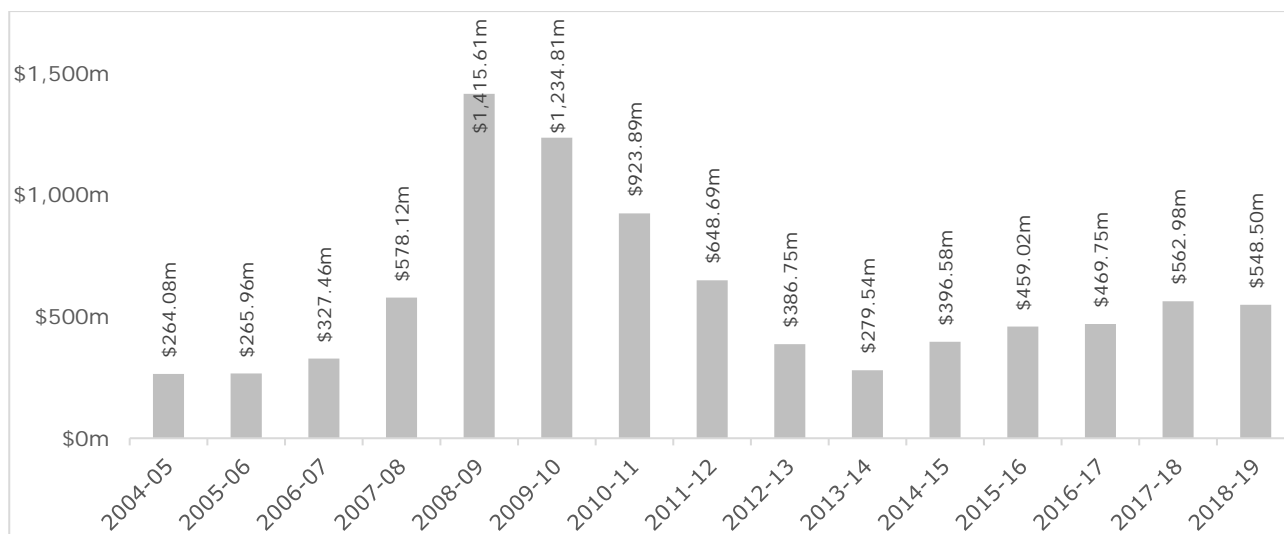


Figure 37 Historical scale of capital delivery expenditure (2004-05 to 2018-19)



Capital delivery model

As **Figure 37** shows Melbourne Water is not unfamiliar with the proposed levels of investment outlined above, having delivered five straight years of >\$800 million capital investment between 2007-08 and 2011-12 as we responded to the millennium drought. Learnings from this period, combined with the mature capital delivery model we have in place today (outlined in **Table 70**) mean we are well placed to deliver the proposed program.

Figure 38 shows how we anticipate the PS21 capital program will be delivered across each of these segments – bubble size representing aggregate PS21 expenditure. The x-axis shows the percentage segment growth in peak year terms from PS16 to PS21, while the y-axis shows the percentage segment growth in aggregate terms. A short discussion of the high aggregate and high peak growth segments (Major Works – Market, Other and Waterways) is presented below.

Major Works – Market

The Major Works – Market segment is expected to deliver circa 28.0 per cent of the total five-year capital program, via a total of 24 projects with forecast expenditure during the period.

- > Where market conditions place pressure on tendering via the Major Works – Market segment, Melbourne Water has the option of exploring the use of the Major Works – Framework segment. The Framework segment is forecast to deliver a similar scale of works during PS21 (up 1.4 per cent in aggregate terms) and has been established as a flexible arrangement with the capacity to rapidly scale up or down as required.
- > While 92 per cent (**Figure 39**) of expenditure is driven by the 10 largest projects only the top five projects (cumulative value of \$816.3 million) automatically trigger open market tenders (>\$50 million).
- > We do not anticipate any material challenges in securing market support for the delivery of this program of work.

Figure 38 Delivery Segment Growth (PS16 to PS21) – Aggregate v Peak

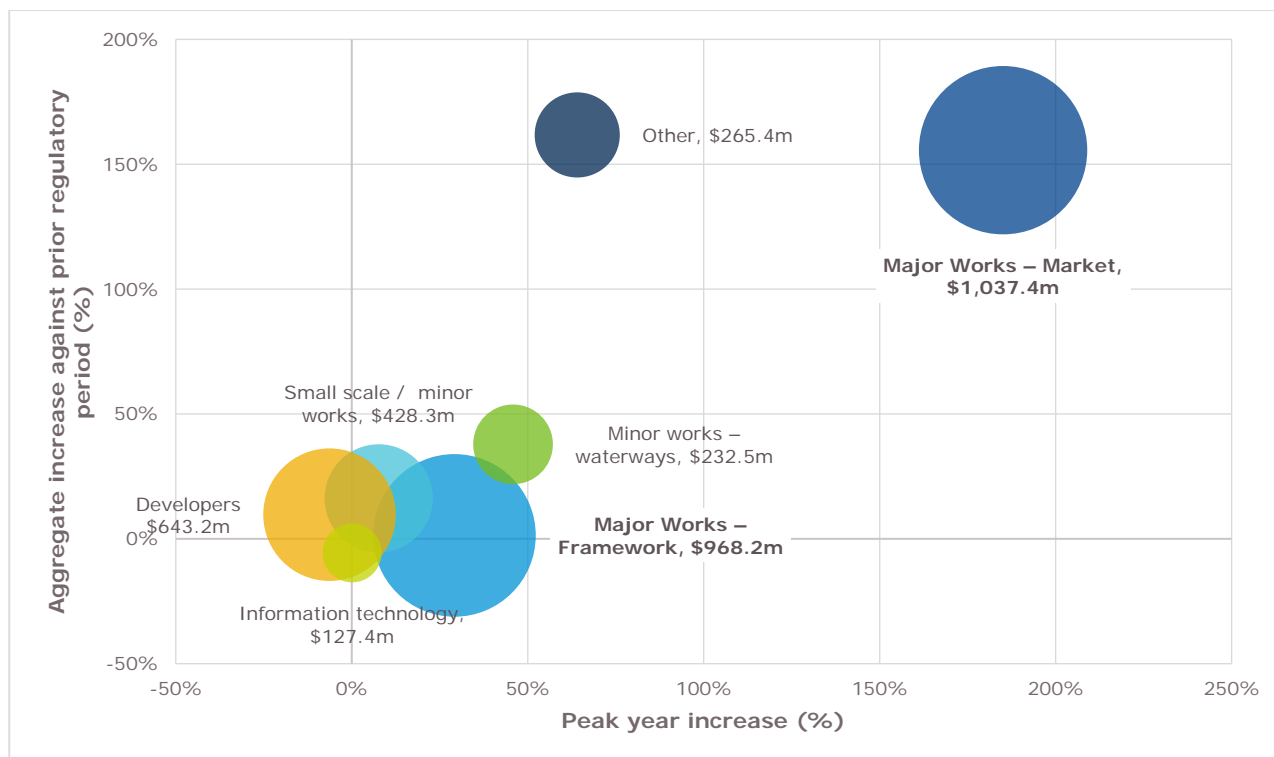
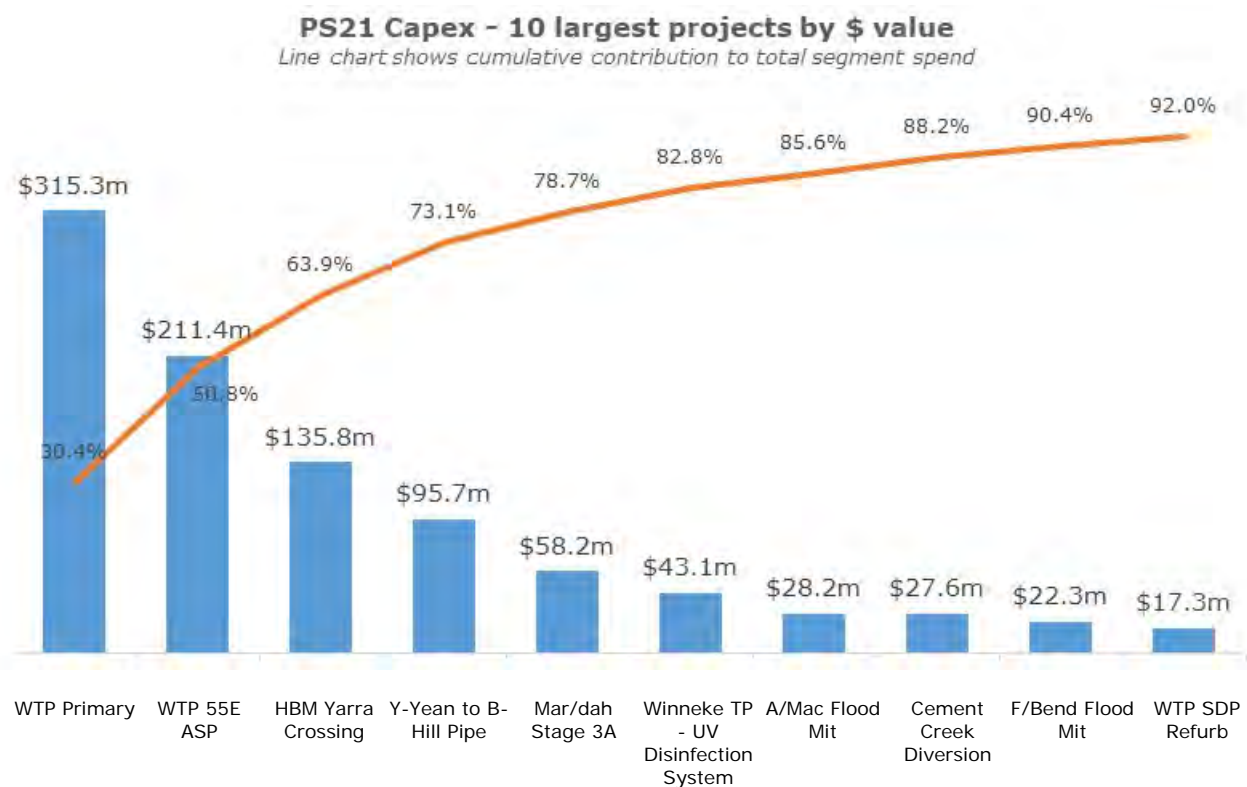


Table 70 Capital delivery model overview

Delivery segments	Key features
Major works – open market	<ul style="list-style-type: none"> > Any works >\$50 million are tendered on the open market. > Projects of this scale also require a Department of Treasury and Finance business case.
Major works – framework agreement	<ul style="list-style-type: none"> > Water and sewerage capital projects in the range of \$5-\$50 million are typically put to competitive two-party tender via the Major Works Framework Agreement. > Two Tier 1 service providers were appointed (via open tender) to a 3+7 year framework agreement which came into force in 2019: <ul style="list-style-type: none"> – Safety Focused Performance Joint Venture (JV) (RCR, Abergeldie and Stantec) – John Holland-KBR JV. > Contract term (+7) decision is expected to be made in 2021.
Small-scale/ minor works	<ul style="list-style-type: none"> > Projects up to \$10 million delivered via one of three mechanisms: <ul style="list-style-type: none"> <i>Major works – small scale (works in the range \$200,000 to \$10 million):</i> <ul style="list-style-type: none"> – Small-scale framework agreement with AquaMetro Services executed in 2017 (following open tender process). <i>Minor works – works up to \$200,000 (traditionally works more aligned with maintenance):</i> <ul style="list-style-type: none"> – Wood Group appointed to 4+3+3 contract via competitive tender process in 2012 – Maintenance and capital delivery contract, with capital works issued directly via asset management system – Currently exploring contracting model for post contract expiry (2022) – expect expression of interest in late 2020, followed by tender and award in 2021. <i>Contestable – works in the range \$200,000 to \$2 million:</i> <ul style="list-style-type: none"> – In 2020 Melbourne Water commenced issuing competitive tenders between AquaMetro Services and Wood Group – projects awarded under individual contracts.
Minor works – waterways	<ul style="list-style-type: none"> > Waterways and drainage projects typically ≤\$200,000 but uncapped within their area of expertise (typically not >\$5 million) – flexible totex delivery model. > Internal delivery (predominantly project and contract management) with high levels of sub-contracting (Minor Field Services Panel) support: <ul style="list-style-type: none"> – internal crews used where it fits their capability (internal crew usage increased from 5 per cent to 20 per cent over past few years) – based around civil works (e.g. revegetation, weed, grass management, drains, aqueducts). > Minor Field Services Panel commenced (2+1+2+1) term in 2016 with 25 members (down from 247 service providers): <ul style="list-style-type: none"> – Current expectation is to re-tender for similar capabilities in 2022.
Information technology	<ul style="list-style-type: none"> > Delivery of the program is fulfilled by a combination of suitably qualified Melbourne Water staff and third-party contractors. > Open tenders are used for contracts valued over \$500,000, or above \$100,000 for high-risk activities. The decision to go to open tender is made on a case-by-case basis in accordance with the Melbourne Water Procurement Buying Tool (an online tool with business procurement rules built in that automates procurement decision making).
Developers	<ul style="list-style-type: none"> > Waterways and drainage projects delivered by land development industry to capture efficiencies associated with delivery of multiple (predominantly civil) services (e.g. roads, stormwater etc.) in a coordinated manner. > Melbourne Water acts as tender authority and asset owner. > Developers must tender works and provide tender evaluation to Melbourne Water. > Developers may appoint higher cost, but reimbursement based on lowest cost tender.
Other	<ul style="list-style-type: none"> > Combination of direct procurement (using Melbourne Water's procurement framework), capitalisation of internal labour and/or unassigned delivery segment.

Figure 39 Major projects delivered via the Major Works – Market segment



Other

Figure 38 shows substantial growth for the Other segment. This segment includes a material element of expenditure that is currently unallocated to a delivery segment. Predominantly smaller scale projects, including those with a strong automation focus, these are likely to be delivered via the Small-scale/Minor works segment as the individual projects mature.

Melbourne Water is confident that this expenditure (once allocated) will be able to be accommodated by the remaining delivery segments.

Minor Works – Waterways

The Minor Works – Waterways segment is expected to deliver circa 6.3 per cent (\$232.5 million) of the total five-year capital program, with a peak of \$61.6 million in 2021-22. As shown in **Figure 38** this represents a 42.5 per cent increase in aggregate spend and a 56.2 per cent increase in peak spend.

Delivery of this work will be via the Waterways and Land Delivery channel which is well equipped to handle this increase in volume, including via:

- > a hybrid internal/external delivery model that has shown itself to be flexible and scalable. An internal workforce is complemented by a panel of external Minor Field Services providers (MFSP) for all work, with much of the capex work delivered through the MFSP and managed by internal project managers. We have flexibility with internal/external resourcing between the two teams based on program needs, capability and capacity of our internal workforce
- > delivery of increasing volumes throughout PS16 such as a scale up with the total expenditure (totex) delivered from \$50 million in 2017 to \$82 million this year (capex component has grown from \$25 million in 2017 to \$37 million in 2019-20)

- > increased capability to deliver larger projects over this time has increased (now delivering projects up to ~\$2 million to \$4 million in value)
- > centralised planning and scheduling leading to better visibility of the forward program, and higher rates of utilisation for both our internal resources and our service providers from the MFSP
- > current MFSP contracts will expire in December 2021, giving us the opportunity to review the services required, prepare for program growth in PS21 and also test the market at an opportune time in 2021
- > as an internal service provider with strong forward visibility of program growth, additional project management and planning resources (up to six, with flexibility for some fixed term/contract or internal resources) have already been factored into our overall resource planning.

S6.3 Return on the RAB

S6.3.1 PREMO assessment and equity allowance

Melbourne Water has assessed its PREMO rating as **advanced** and applied the corresponding return on equity of 4.8 per cent.

Reflecting our ambition for this price submission and our customers we have diligently worked to deliver a high-quality proposal that unashamedly puts the needs of customers first. We believe we have delivered against this ambition and prepared a submission that aligns with the ESC's "advanced" level of ambition as shown on **Table 71** and **Figure 7**. Our rating of each element is described below – the rationale is outlined in the *Price Submission* (**Section 4**).

Figure 40 An "advanced" submission



Table 71 PREMO self-assessment – rating and score

Element	Rating	Score
Outcomes	Very confident the element is advanced	3.25
Management	Satisfied the element is advanced	3.0
Engagement	Confident the element is advanced	3.25
Risk	Very confident the element is advanced	3.50
<i>Total</i>		<i>13.0</i>

A response to each of the ESC's guiding questions for risk is provided in **Table 72**.

Table 72 Response to ESC guiding questions for Risk

Question	Response
To what extent has Melbourne Water demonstrated a robust process for identifying risk, and how it has decided who should bear these risks?	Our robust process for identifying risk and deciding who should bear them is outlined in Section S4 . This section also highlights the clear oversight of this process by the Leadership Team and Board.

A response to each of the ESC's guiding questions for engagement is also provided in **Table 73**.

Table 73 Response to ESC guiding questions for Engagement

Question	Response
To what extent has Melbourne Water justified how the form of engagement suits the content of consultation, the circumstances facing it and its various customer groups?	<p>Section S2.2 sets out the key features of our engagement approach, including our ambition for the engagement program.</p> <p>Right from inception we sought to move to a deeper engagement form (towards collaboration), with broader content (towards performance stewardship) and earlier timing (towards an ongoing conversation). We believe the engagement program outlined in Section S2 demonstrates we delivered on this ambition.</p> <p>As outlined in Section S2.2.2 and Section S2.2.3 we reflected on the nature of our services and customer groups and adopted a fit for purpose engagement approach. To that end we established two dedicated customer forums – a Water and Sewerage Customer Council (WCCC) and a Waterways and Drainage Customer Council (WDCC) – to serve as strategic engagement channels via which we sought insight into customer preferences, appropriate forms of engagement and other strategic matters as they arose. These two forums worked collaboratively with Melbourne Water for over 12 months to help shape and refine both our engagement activities and our response to key service and regulatory matters.</p>
To what extent has Melbourne Water demonstrated that it provided appropriate instruction and information to its various customer groups about the purpose, form and content of the customer engagement?	<p>Both customer councils had clear terms of reference and collaborated with us to identify the matters they would like to explore through the engagement program.</p> <p>A work program for each council was confirmed to ensure appropriate time was provided to each topic area and meetings were scheduled to cover off on all issues over an 18-month period. We also identified specific elements of the price submission requiring Council deliberation and ensured these were planned into the work program with adequate time provided for feedback.</p> <p>Information related to each topic area was prepared to suit the audience and disseminated with time for review. We used multiple channels to ensure a broad cross section of the community could find out more and participate if they were interested, including digital channels (social media and our YourSay digital engagement hub) and the more traditional method of stalls at community festivals.</p> <p>We included a link to translating services on our YourSay page.</p> <p>Our social research program implemented representative sampling and engagement approaches to ensure we heard from harder to reach and disadvantaged groups. As well as balanced age and gender representation, we specifically targeted people on lower incomes, people who spoke another language at home or with parents and people with a chronic illness or disability who might otherwise find it hard to participate.</p> <p>Information disseminated in support of engagement activities was written in plain English, made available in audio format and supported by short videos.</p> <p>Feedback from each stage in the community research (Stage 1 – Community assessment of services, Stage 2 – Preferences and willingness to pay, Stage 3 – Deliberative forum on Customer Outcomes) consistently reflected the usefulness/appropriateness of the information provided, participants often started out knowing very little about Melbourne Water and once they had worked through the information provided (e.g. pre-reading packs and short service videos) were surprised and often impressed about the scale and scope of services we are responsible for. Each of the research reports attest to this.</p> <p>The WCCC acknowledged the "genuine effort by Melbourne Water to engage the council during this process and commends their efforts".</p>

Question	Response
To what extent has Melbourne Water demonstrated that the matters it has engaged on are those that have the most influence on the services provided to its various customer groups and prices charged?	Our engagement program followed three clear stages as described in Section S2 seeking to test customer values and focus areas in Stage 1. During this stage, we used the dedicated customer forums to identify key matters of interest to our customers as well as any areas where their preferences could have a material bearing on our proposal. Our best offer has been heavily influenced by the work we undertook with these councils and the influence our customers have had on our proposal is highlighted in Section S2.3 .
To what extent has Melbourne Water explained how it decided when to carry out its engagement?	Section S2.2.1 sets out how we engaged with our various customer groups, commencing in the pre-planning stage of our price submission development process. Our engagement program followed three clear stages as described in Section S2 seeking to test customer values and focus areas in Stage 1, understand customer preferences in Stage 2 and validate our proposals in Stage 3.
To what extent has Melbourne Water demonstrated how its engagement with its various customer groups has influenced its submission?	Our engagement program has influenced nearly every aspect of the development of this submission including our expenditure levels, treatment of Victorian Desalination Plant security payments, the introduction of GSLs, the length of our regulatory period and much more. Section S2 of the supplementary document outlines our engagement journey in greater detail, while Section S2.3 highlights the key areas where customers have influenced our submission.

A response to each of the ESC's guiding management questions is also provided in **Table 74**.

Table 74 Response to ESC guiding questions for Management

Question	Response
To what extent has Melbourne Water demonstrated how its proposed prices reflect only prudent and efficient expenditure?	In Section S4 , Section S5 and Section S6 we set out the management, demand and expenditure forecasting actions we have taken to satisfy ourselves that our prices are based on prudent and efficient expenditure. Management actions include robust internal (finance, senior managers, Leadership Team and Board) and external (KMPG) reviews challenging the basis for forecast costs and ensuring that we are not asking customers to bear an inappropriate level of risk in those costs we do take forward (see Risk for further discussion of this point). Our demand forecasts have been prepared collaboratively with retail water companies, reviewed by KPMG and tested thoroughly by our project team. We have applied the ESC's base-step-trend process to the development of our opex forecasts, again with strong Leadership Team and Board oversight. We have self-applied the energy benchmarking approach preferred by the ESC in 2016. Our capital forecasts are underpinned by major projects and programs for which P50 estimates and business cases are available, and we propose to deliver large parts of our program using competitive processes such as the open market and our major framework agreement. We have clearly identified and mitigated uncertain expenditure such as pumping costs associated with accommodating water from the Victorian Desalination Plant.
To what extent has Melbourne Water justified its commitment to cost efficiency or productivity improvements?	We are delivering significant capital efficiencies in the way in which we deliver our capital program. Major framework agreements in place are expected to deliver 26.2 per cent (\$968.2 million) of the total program. These agreements include incentive-based clauses that will deliver savings in the order of \$10 million per annum by the end of the PS21 period. We have committed to an additional, and transparently reported, efficiency program, over and above the 2 per cent efficiency factor (delivery not tied to this regulatory period however).

Question	Response
To what extent have senior management, including the Board, demonstrated ownership and commitment to the proposals in its submission?	<p>In Section S4 we set out the actions the Board and Leadership team have taken to demonstrate their ownership of, and commitment to, the price submission and its proposals.</p> <p>Management actions include robust internal (Leadership Team and Board) and external (KMPG) reviews challenging the basis for forecast costs and ensuring that we are not asking customers to bear an inappropriate level of risk in those costs we do take forward (see Risk for further discussion of this point).</p> <p>In addition to regular briefings the Board members took an active interest in our engagement activities with customers. This included some board members observing our final waterways and drainage community deliberative panel on Saturday 18 April 2020, and our final customer outcomes community deliberative forum held from 22-29 April 2020.</p> <p>Members of our Leadership Team were actively involved in our dedicated customer councils, frequently opening council meetings. This afforded them the opportunity to hear customer feedback firsthand and respond to queries directly.</p>
To what extent has Melbourne Water justified or provided assurance about the quality of the submission, including the quality of supporting information on forecast costs or projects?	<p>In Section S4 we set out the actions the Board and Leadership team have taken to demonstrate their ownership of, and commitment to, the price submission and its proposals, including actions taken to assure the quality of the submission.</p> <p>Management actions include robust internal (Leadership Team and Board) and external (KMPG) reviews challenging the basis for forecast costs and ensuring that we are not asking customers to bear an inappropriate level of risk in those costs we do take forward (see Risk for further discussion of this point).</p> <p>A robust assurance process was applied including both internal (cross-functional project team, internal audit, Management and Board) and external (KPMG) resources. The program assessed each element of the submission, supplementary document and other supporting materials for quality and adherence to the ESC's guidance paper. An attestation report was provided to the Board and Leadership Team, including the results of any close out actions.</p>
To what extent has Melbourne Water provided evidence that there is senior level, including Board level, ownership and commitment to its submission and its outcomes?	<p>In Section S4 we set out the actions the Board and Leadership team have taken to demonstrate their ownership of, and commitment to, the price submission and its proposals.</p> <p>Our Leadership Team and Board are committed to the customer-centric performance management framework outlined in Section S2.3.2. This also attests to our collective ownership of, and commitment to, the delivery of the outcomes that are central to this submission.</p> <p>Board level ownership and commitment is further demonstrated by their willingness to sign the attestation statement.</p>

A response to each of the ESC's guiding outcomes questions is also provided in **Table 75**.

Table 75 Response to ESC guiding questions for Outcomes

Question	Response
Has Melbourne Water provided evidence that the outcomes proposed have taken into account the views, concerns and priorities of its end-use customers and water retailers?	<p>The manner in which we engaged demonstrates clear evidence we have taken into account views, concerns and priorities of end-use and retail water company customers – the process we followed is outlined in Table 22.</p> <p>We sought the views of our customers on their priorities and provide evidence of their feedback in Section S3. Customers were unanimous in their view that safe and reliable water and sewerage services were their priority outcome. We propose to not only continue to deliver to the high standards we already meet for these services AND introduce, for the first time, GSLs between ourselves and the retail water companies.</p>
Has Melbourne Water provided sufficient explanation of how the outcomes it has proposed align to the forecast expenditure requested?	<p>For each outcome we have aligned major expenditure and provided a comparison between PS16 and PS21 to demonstrate the change in the level of investment aligned to each outcome (refer Section S3).</p> <p>Our engagement process revealed the relative importance of each customer outcome and we have identified which outputs are relevant to our water and sewerage and waterways and drainage services.</p> <p>Our expenditure clearly reflects the priorities of our customers, with 82.2% of our total revenue requirement (inclusive of sewage treatment) supporting "Access to safe and reliable water and sewerage services" – a clear priority outcome for all our customers.</p>

Question	Response
Has Melbourne Water proposed outputs to support each of its outcomes, which are measurable, robust and deliverable?	In Section S3 we propose outputs to support each of our customer outcomes. Each of these are measurable, robust and deliverable. In our outcomes supporting document (available upon request) we explain how each output will be measured, demonstrating that we have already put in place a plan to implement these output measures – measures which in many cases already exist today.
Has Melbourne Water provided evidence that the outputs it has proposed are reasonable measures of performance against stated outcomes?	In Section S3 we introduce our proposed outputs along with a statement of suitability outlining why each output is a reasonable measure of performance against the stated outcome. Each output has been assigned a relevant baseline or identified as a new metric. Where new metrics have been created an explanation is provided to attest to the reasonable nature of the target. We also asked our customers what they thought. The results of this engagement are shown against each output measure and demonstrate a high level of customer support for proposed output measures.
Has Melbourne Water demonstrated a process to measure performance against each outcome and to inform its end-use customers and water retailers?	We have proposed a robust customer-centric performance management approach (Section S2.3.2), including the creation of an ongoing customer forum representing our diverse customer base. We commit to a customer-centric performance management approach that includes a commitment to transparency and robust discussion of performance and possible remedies. We also commit to the introduction of GSLs for the first time.

S6.3.2 Cost of debt

Melbourne Water continues to apply the 10-year trailing average cost of debt as per the current regulatory period.

S6.4 Regulatory depreciation

Melbourne Water continues to adopt a straight-line methodology to the calculation of regulatory depreciation. Melbourne Water applies the asset lives shown in **Table 76** to the calculation of regulatory depreciation. For new capital assets, wherever practicable a project-based asset life is assigned, calculated with reference to a comprehensive *Guide to Asset Lives* that supplements the *Final Cost Reporting* procedure. Where project lives are not assigned, Melbourne Water uses the standard asset lives shown in **Table 76**.

S6.5 Desalination security payments

S6.5.1 Context

Victorian Desalination Plant

The Victorian Desalination Plant complements Melbourne's water supply by providing a rainfall-independent source of water for the city. It is a large-scale, guaranteed source of water capable of supplying up to 150 gigalitres a year when required. The payments made for the Victorian Desalination Plant reflect the costs of having the plant, associated water transfer pipeline and operational power supply financed and built, and maintained in a state ready for use when a water order is made.

The Victorian Desalination Plant is operated and maintained by Aquasure under the terms of a public-private partnership agreement managed by DELWP on behalf of the State. Under the terms of the agreement, Aquasure will receive payments from the State until 2039 (a period of 27 years since commissioning in 2012). Payments due to Aquasure are passed on to Melbourne Water and included in our wholesale water charges.

Table 76 Regulatory asset lives – old and new assets

Asset class	RAB (old assets) <i>Estimated remaining life</i>	New assets <i>Standard asset life</i>
Water		
Production/storage program	106	54
Drinking water quality	42	18
Water transfer program	118	82.5
Sewerage		
Sewerage transfer assets	82	60
ETP	37	45
WTP	61	29
Waterways and drainage		
Drainage and flood protection	77	70
Stormwater quality assets		25
Waterway condition assets		25
Land development program		75
Recycled water		
Recycled water	32	32
Corporate		
Corporate support	11	11
IT		3

Under the regulatory building block methodology these lease payments have historically been treated under the opex building block. Applying this approach, in the absence of any special treatment of the lease payments, customers would cease paying for the Victorian Desalination Plant (with a weighted average asset life of 68 years) at the end of the 27-year term of the lease. Customers benefiting from the use of the asset after this time would effectively receive the service it provides for free.

How customers pay for it today

As part of our price submission in 2016 we examined whether or not this was an appropriate way in which to recover the costs for the Victorian Desalination Plant from customers. At this time, we sought public comment on a range of options, consulted with retail water companies and conducted a research program that included three deliberative-style forums and a separate quantitative survey of over 801 residential customers. At the heart of alternative payment options is the concept of 'capitalising' a portion of the payments that would otherwise be passed directly through to customers as part of our opex building block.

At the conclusion of the regulatory review period, and consistent with the ESC's 2016 Determination, we commenced capitalising an annual amount of \$33 million of the security payments associated with the Victorian Desalination Plant.

Revisiting the amount we capitalise

In its 2019 Guidance document, the ESC asked us to revisit the issue of capitalisation, with a focus on putting forward a capitalisation approach that signals the efficient cost of service provision to current and future customers. The ESC also asked us to describe the scenarios we considered and what we heard from our customers in re-considering this matter.

S6.5.2 How we engaged

As part of our engagement with our customer councils and the community we consistently heard the desire for flat or declining prices and the avoidance of bill shocks. Given the significance of the Victorian Desalination Plant security payments to water bills, the amount capitalised has a material bearing on the final level of our bulk water prices for City West Water, South East Water and Yarra Valley Water and their customers.

We engaged with the WSCC in February 2020, seeking their views on the merits of engaging again on this topic with end consumers. It was agreed that focusing on engaging with the WSCC would be appropriate given the strong feedback Council members had received from their customers in 2018 on the topic of affordability. Melbourne Water accepted this view, noting that should any divergence of views arise, the opportunity to engage with end consumers would remain open at a later date.

In developing a final proposal Melbourne Water modelled the customer repayment profiles of a base case (Option 1), two alternate (Options 2 and 3) and two reference (contract and Typical asset) scenarios as described in **Table 77** and shown in **Figure 41**. We have not modelled residential and non-residential level customer impacts as the manner in which our wholesale charges are allocated to residential and non-residential customers is the province of the retail water companies and their individual tariff structures.

Figure 42 shows the average per connection (using total connections) impacts that were presented to the WSCC to aid in their consideration of a preferred approach.

S6.5.3 What we heard

The WSCC told us:

"The Council supports the principle of intergenerational equity. At its core, only capitalising \$30m is inequitable."

We reiterate our view that flat prices are a core desire of our customers, but we don't understand the implications associated with future augmentations. We don't want future price shocks and we understand that capitalisation can be a lever to avoid future price shocks now and in the future."

We support Melbourne water exploring alternate capitalisation profiles and timings (including a stepped approach) that better enable prices to remain flat over the next and subsequent pricing periods."

Table 77 Scenarios used for engagement

Option		Description (payment path refers to customer cost recovery)
1	Base case \$33m	Our PS16 commitment is the capitalisation of an annual amount of \$30 m \$FY16. Converted to \$FY21 this becomes \$33m.
2	Principal paid down (PPD) ¹	Capitalise the annual amounts assumed as capital payments for tax purposes from the start of the PS21 period.
3	PPD catch up	Capitalise the annual amounts assumed as capital payments for tax purposes from the start of the PS21 period AND Capitalise (during PS21) the difference between the amount capitalised during the PS16 period and the capital payments for tax purposes during the PS16 period. <i>This option effectively back dates the adoption of the principal paid down methodology.</i>
Reference scenarios		
Contract	Lease payments	No capitalisation. Recover, via opex allowance, sufficient revenue to cover the costs as incurred via the lease repayment schedule.
RAB	Typical asset	Assumes that the Victorian Desalination Plant was funded by Melbourne Water via its RAB. From the point of commissioning Melbourne Water recovers a capital allowance over the remaining life of the asset. Straight line depreciation is assumed.

Note 1: Of note is that, in its Final Decision (2016), the ESC suggested that: “the annual amounts assumed as capital payments for tax purposes may provide a reasonable benchmark to ascertain the amount to be capitalised in any one year”.

Figure 41 Customer repayment profiles for modelled capitalisation scenarios

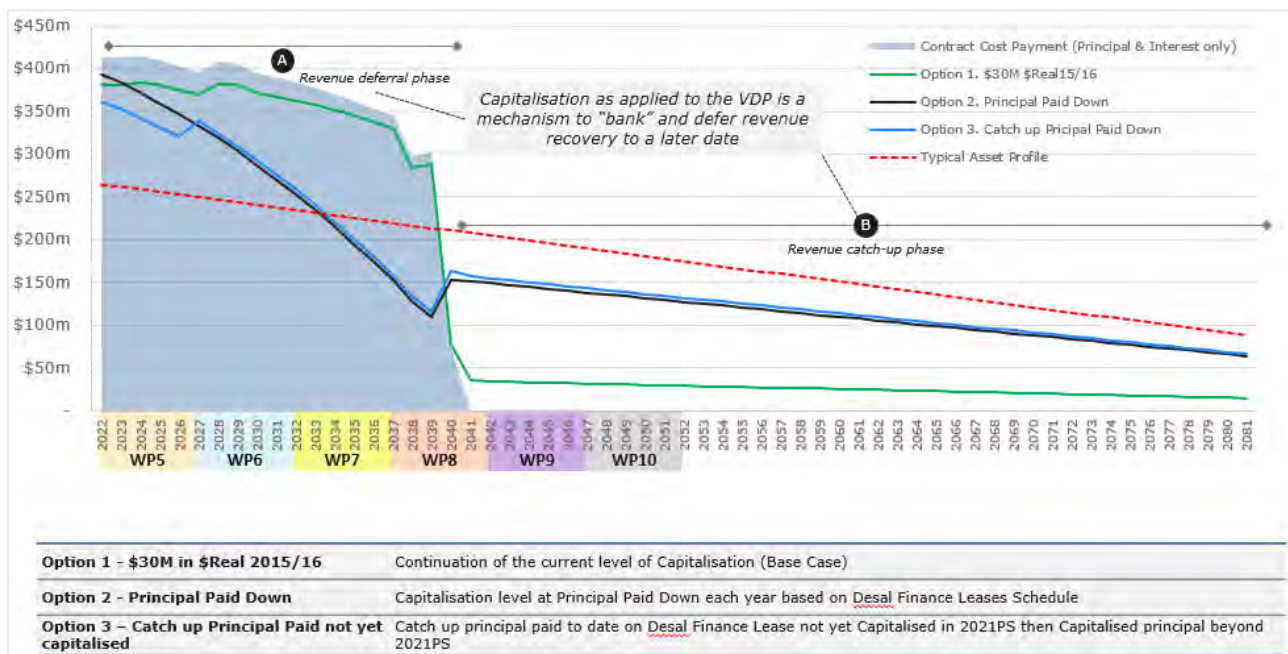
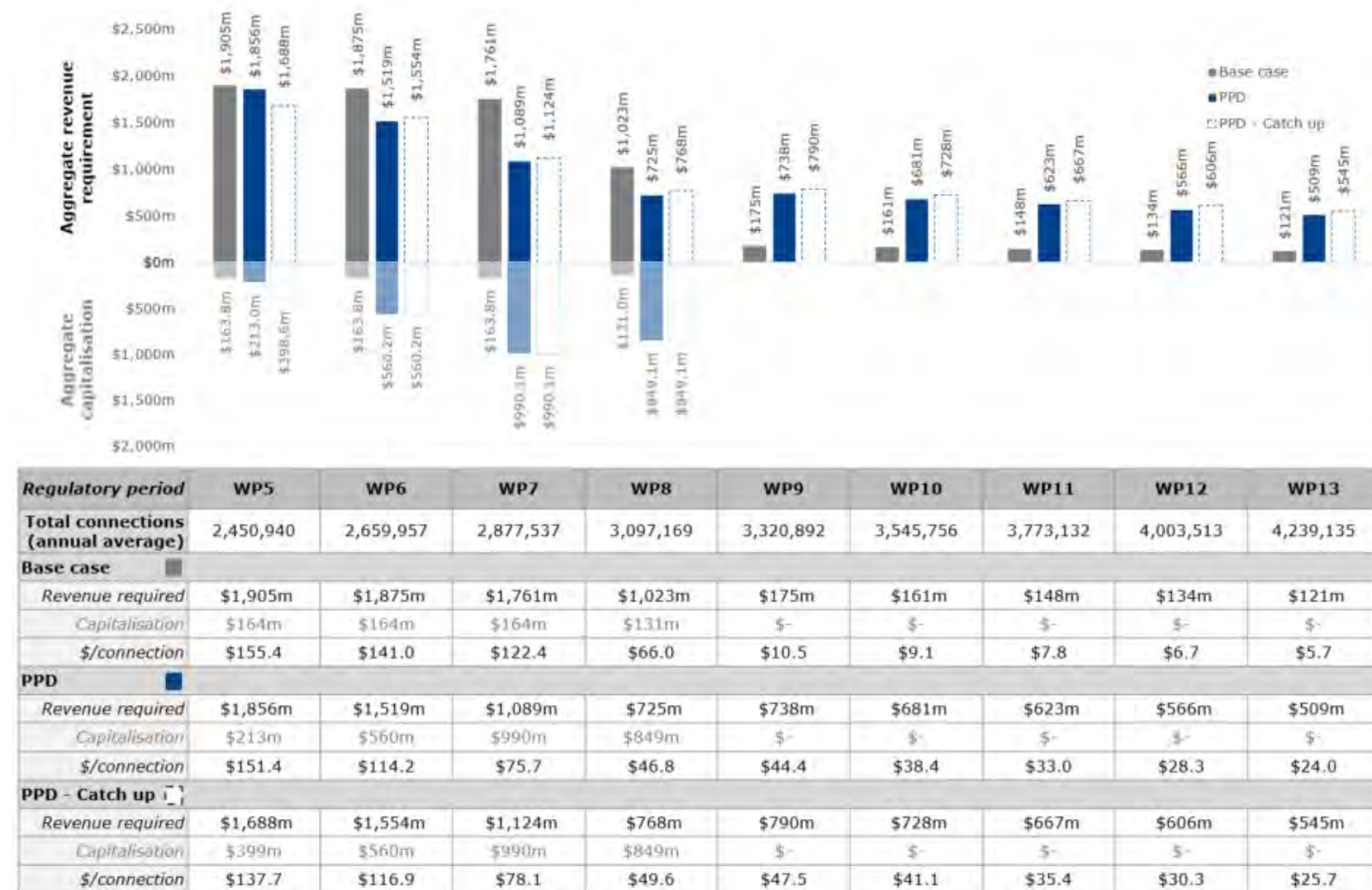


Figure 42 Victorian Desalination Plant capitalisation analysis (5-year aggregate values)



S6.5.4 Proposed PS21 treatment of desalination security payments

Through the combination of lease repayments and capitalisation Melbourne Water already aligns cost recovery with the life of the asset. We believe that it remains appropriate to continue this alignment.

We propose to amend our current approach to align the amount we capitalise each year with the annual amounts assumed as capital payments for tax purposes. This represents a more equitable approach to the sharing of repayments across the generations of Melburnians who will benefit from this asset (as is shown in **Figure 41**). This approach aligns with the WSCC's stated support for intergenerational equity.

In order to meet both the WSCC's desire for flat prices, and to further contribute to our achievement of the outcome "Bills kept as low as possible" we propose to capitalise an additional \$186 million across the regulatory period. This amount represents the difference between the (cumulative) \$164 million (FY2021) we capitalised during the PS16 period and the corresponding (cumulative) capital payments for tax purposes. This additional capitalisation contributes to our ability to deliver a necessary uplift in our capital program without causing a corresponding rise in prices.

We have modelled the impact of this capitalisation proposal on a range of relevant financial indicators (including the financial indicators specified in the *Guidance Paper*) and are comfortable that we will remain financially sound after accounting for the impact of the additional borrowing that this proposal entails.

Melbourne Water will review its financial indicators prior to confirming any capitalisation to be undertaken in future regulatory periods. The impact of any future water supply augmentations may be material in this regard.

Further information on how we have calculated security payments, and the overall asset life is available upon request.

S6.6 Tax allowance

Melbourne Water's tax allowance for the purposes of determining the required revenue has been calculated in accordance with the ESC's Guidance and Information Template. We are forecasting a company tax rate of 30 per cent for all years. The tax allowance for each service is included in the revenue requirement tables in the following section.

Corporate annual tax payment forecasts for 2021 to 2031 can be provided on request.

S6.7 Growth capital discussion

This section is provided for information purposes only in response to a request for greater transparency around growth capex from the WSCC.

What we heard from our retail water company customers

The Regulatory Managers Forum expressed the view that there is merit in the careful and staged introduction of new customer contributions charging for Melbourne Water's bulk water and sewerage growth expenditure. The WSCC, via its 5 December communique, requested that Melbourne Water's submission:

"Provide transparency on growth-related expenditure and associated charges (including water and wastewater (sic) that "preserves the opportunity" for future developer related charging"

How we have responded

Melbourne Water acknowledges the questions of equity raised by the WSCC in relation to the manner in which population growth driven infrastructure is funded by existing customers. At this time Melbourne Water is not planning for the design or

introduction of a new customer contribution in this space.

We have, however, sought to meet the council's request via **Table 78**, which shows growth capex by bulk water and bulk sewerage service as well as the related revenue requirement and impact on end customer bills (measured on a dollar per connection basis). We also show the impact growth expenditure has on total customer bills in percentage terms.

It shows that growth capex drives between 0.4 and 3.4 per cent of the average customer bill in dollar per connection terms across the regulatory period

Table 78 Growth capex and impact on PS21 revenue requirement by service

\$ (millions)	Regulatory period 2021-26				
	2021-22	2022-23	2023-24	2024-25	2025-26
Growth capex					
Bulk water service	56.4	98.4	39.0	3.5	1.1
Bulk sewerage service	115.9	147.9	139.1	181.4	41.8
Total growth capex	172.3	246.3	178.1	184.8	42.9
Revenue impact					
Related revenue requirement (depreciation and return to capital)	5.1	15.1	26.0	36.3	46.3
Customer impact					
<i>(using City West Water, South East Water and Yarra Valley Water connections only)</i>					
Growth capex customer bill impact (\$/connection)	\$2.31	\$6.78	\$11.43	\$15.66	\$19.56
% of total customer bill impact	0.4%	1.2%	2.0%	2.7%	3.4%

S7. Revenue and tariffs by service

Tariff structures remain largely unchanged. Water and sewerage tariffs will be reviewed with the retail water companies in the lead-up to their 2023 Price Submission to explore alternative structures that may better meet the requirements of Clause 11 of the WIRO.

S7.1 Summary

S7.1.1 Aggregate revenue requirement

The total five-year revenue requirement for the 2021 regulatory period is \$8,183.2 million. Bulk water/sewerage services, and waterways and drainage services make up \$6,731.6 million and \$1,430.8 million respectively of the total. The balance is composed of recycled water, diversion and miscellaneous services. The total revenue requirement has decreased by \$303.1 million compared to the *PS16 Determination*.

The 2021 revenue requirement expressed in terms of the regulatory building block model are set out in **Table 79**.

S7.1.2 Aggregate rolled forward RAB

The rolled forward regulatory asset base is presented in **Table 80**. These values have been calculated according to the ESC's stipulated methodology including adjustment of the opening RAB (at 1 July 2016) for inflation using the Australian Bureau of Statistics' Consumer Price Index – All Groups, Australia.

S7.1.3 10% price cap

Melbourne Water's prices as described in the submission are declining for bulk water and sewerage services and inclining slightly for waterways and drainage.

Sewerage treatment volume and load prices are based on unadjusted LRMC values, whereby some fixed costs are made variable in a revenue neutral way to incentivise demand management. Where LRMC-based prices decrease, there is a commensurate increase in fixed cost pricing. These volume and load prices are wholesale in nature with retail water companies determining how they are passed on to end use customers.

The 10 per cent price rule has been considered in the context of a wholesaler to retailer relationship. Cost increases in sewerage are passed on along with declining water costs on the same bill to majority of end use customers. Melbourne Water has shared its modelling with the retailers which indicates that end use customer impacts will decline for Melbourne Water's combined bulk services.

S7.2 Water service

S7.2.1 Revenue requirement and RAB

The revenue requirement for the bulk water service is presented in **Table 81** and the underlying RAB is presented in **Table 82**.

S7.2.2 Tariffs

Proposed bulk water tariffs are presented in **Table 83**. Headworks charges for the Greater Yarra System include a 9.4% reduction for the first year of the pricing period, followed by year to year increases of between 3.5 and 4.8 per cent. Capitalisation of Victorian Desalination Plant security payments means that there will be a price decrease each year of the PS21 period. The one-off increase in 2026-27 is due to the end of the "catch-up" phase of capitalisation, while the 0.2 per cent price rise in 2028-29 is driven by the nature of the repayment profile forecast.

Table 79 Revenue requirement – aggregate

<i>\$million</i> (numbers may not add due to rounding)	Regulatory period 2021-26					Regulatory period 2027-31				
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Operating Expenditure - Desal	493.1	485.2	473.0	457.0	443.9	467.3	452.8	453.6	435.0	415.6
Operating Expenditure - Excluding Desal	418.1	416.1	417.5	423.1	427.3	427.3	427.3	427.3	427.3	427.3
Return on Assets	450.4	474.7	496.8	513.3	525.1	535.3	546.8	556.4	565.1	573.5
Regulatory Depreciation	189.4	203.6	222.6	243.3	265.6	287.0	300.8	316.0	329.3	340.5
Tax Liability	28.4	28.6	28.8	27.6	30.7	28.0	31.3	35.0	38.2	41.1
Total revenue requirement	1,579.5	1,608.2	1,638.7	1,664.3	1,692.6	1,744.9	1,759.0	1,788.3	1,794.9	1,798.0
PS21 Aggregate	8,183.2									

Table 80 Regulatory asset base

<i>\$million</i>	Regulatory period 2021-26					Regulatory period 2027-31				
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Opening RAB	11,419.2	11,978.8	12,680.0	13,129.4	13,533.4	13,744.3	14,065.8	14,337.6	14,564.2	14,789.9
plus Capital Expenditure	819.4	960.0	718.5	687.4	516.9	665.6	601.8	556.4	559.9	539.7
plus Desal Plant Capitalisation	57.4	67.0	82.3	91.8	100.0	72.1	100.8	117.1	126.9	143.4
less Customer Contributions	119.3	119.3	124.9	119.8	133.1	121.9	122.7	123.5	124.4	125.4
less Government contributions	-	-	-	-	-	-	-	-	-	-
less Regulatory Depreciation	189.4	203.6	222.6	243.3	265.6	287.0	300.8	316.0	329.3	340.5
less Proceeds from Disposals	8.5	2.9	3.9	12.1	7.3	7.3	7.3	7.3	7.3	7.3
Closing RAB	11,978.8	12,680.0	13,129.4	13,533.4	13,744.3	14,065.8	14,337.6	14,564.2	14,789.9	14,999.9

Table 81 Revenue requirement – bulk water service

Revenue requirement- \$million <i>(numbers may not add due to rounding)</i>	Regulatory period 2021-26					Regulatory period 2027-31				
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Operating Expenditure – Victorian Desalination Plant	493.1	485.2	473.0	457.0	443.9	467.3	452.8	453.6	435.0	415.6
Operating Expenditure – (excluding Victorian Desalination Plant)	107.3	106.5	108.9	110.1	111.0	111.0	111.0	111.0	111.0	111.0
Return on Assets	181.0	189.6	198.1	204.1	209.4	215.7	222.5	229.3	236.4	242.9
Regulatory Depreciation	56.6	60.1	64.9	71.3	76.9	81.2	85.3	89.2	92.4	95.1
Tax Liability	11.4	11.4	11.5	11.0	12.3	11.2	12.7	14.4	15.9	17.4
Total revenue requirement	849.4	852.8	856.2	853.6	853.4	886.4	884.3	897.5	890.7	882.1

Table 82 Regulatory asset base (RAB) – bulk water service

Revenue requirement- \$million	Regulatory period 2021-26					Regulatory period 2027-31				
	2021-22	2022-23	2023-24	2024-25	2026-27	2026-27	2027-28	2028-29	2029-30	2030-31
Opening RAB	4,609.4	4,793.0	5,055.7	5,233.2	5,371.4	5,508.1	5,695.8	5,864.4	6,049.6	6,229.9
plus Capex	189.9	258.1	161.5	120.5	117.6	200.9	157.2	161.4	149.8	116.5
plus Victorian Desalination Plant capitalisation	57.4	67.0	82.3	91.8	100.0	72.1	100.8	117.1	126.9	143.4
less Proceeds from Disposals	-7.1	-2.3	-1.4	-2.8	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
less Regulatory Depreciation	-56.6	-60.1	-64.9	-71.3	-76.9	-81.2	-85.3	-89.2	-92.4	-95.1
Closing RAB	4,793.0	5,055.7	5,233.2	5,371.4	5,508.1	5,695.8	5,864.4	6,049.6	6,229.9	6,390.6

Table 83 Bulk water tariffs – 10-year price path

	Approved	Regulatory period 2021-26					Regulatory period 2027-31				
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
1.1 Bulk water headworks charges - Greater Yarra System – Thomson River											
\$/ML entitlement	362.46	328.21	339.68	356.15	370.23	383.38	393.35	406.31	419.09	431.26	442.36
YoY % change		-9.4%	3.5%	4.8%	4.0%	3.6%	2.6%	3.3%	3.1%	2.9%	2.6%
1.2 Bulk water headworks charges - Victorian Desalination Plant											
\$/ML entitlement	3,445.17	3,287.20	3,234.91	3,153.21	3,046.98	2,959.21	3,115.10	3,018.46	3,023.81	2,900.10	2,770.68
YoY % change		-4.6%	-1.6%	-2.5%	-3.4%	-2.9%	5.3%	-3.1%	0.2%	-4.1%	-4.5%
1.3 Victorian Desalination Plant Water Order charge											
\$/ML entitlement	actual cost										
1.4 Bulk water headworks charges - North South Pipeline											
\$/ML entitlement	490.89	492.79	491.59	490.63	490.11	489.84	489.03	487.86	487.53	487.61	488.13
YoY % change		0.4%	-0.2%	-0.2%	-0.1%	-0.1%	-0.2%	-0.2%	-0.1%	0.0%	0.1%
1.5 Bulk water usage charges -Transfer											
\$/ML supplied	254.24	249.12	254.32	263.81	270.93	278.22	282.92	289.42	295.38	300.83	306.13
YoY % change		-2.0%	2.1%	3.7%	2.7%	2.7%	1.7%	2.3%	2.1%	1.8%	1.8%
1.6 Bulk water headworks charge – Gippsland Water											
\$/per month		3,344.25	3,461.04	3,628.88	3,772.36	3,906.38	4,007.96	4,139.95	4,270.24	4,394.24	4,507.35
YoY % change			3.5%	4.8%	4.0%	3.6%	2.6%	3.3%	3.1%	2.9%	2.6%

Gippsland Water

The water tariff structure for Gippsland Water was ring fenced from DELWP's 2015 bulk entitlement reforms. It consists of variable headworks and transfer charges for which Melbourne Water does not incur any variable costs. The variable charge is therefore based on fixed costs divided by an estimate of average annual usage.

This arrangement was satisfactory in an environment of low and predictable demand. However, since 2018-19 demand has been higher than forecast leading to the potential for revenue over recovery. Melbourne Water addressed this issue for the remainder of PS16 by capping variable demand for pricing purposes and engaged with Gippsland Water on tariff reform.

For PS21 Gippsland Water's headworks charge will become a fixed charge and the transfer charge will be discontinued. This better reflects the fixed cost nature of Melbourne Water's services. Gippsland Water is supportive of the revised tariff structure.

S7.3 Sewerage service

S7.3.1 Revenue requirement and RAB

The total revenue requirement for the bulk sewerage service is presented in **Table 84** and the underlying RAB is presented in **Table 85**.

S7.3.2 Tariffs

Proposed bulk sewerage tariffs are presented in **Table 86**. Sewerage usage charges for treatment and transfer are based on estimates of long and short run marginal cost which do not change from year to year.

The existing sewerage price cap transfer charges based on short run marginal cost will be retained. Disaggregated treatment plant tariff structures for the ETP and WTP applying LRMC for volume and load will also be retained. Fixed charges will continue to make up the shortfall between variable charges and the total revenue requirement for these services.

Table 84 Revenue requirement – bulk sewerage service

\$million	Regulatory period 2021-26					Regulatory period 2027-31				
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Operating Expenditure	147.0	145.7	144.6	148.1	151.1	151.1	151.1	151.1	151.1	151.1
Return on Assets	199.4	210.8	221.0	228.8	233.0	235.4	239.0	241.0	242.1	243.4
Regulatory Depreciation	99.2	101.7	107.2	114.6	126.3	138.5	143.4	150.0	155.4	160.0
Tax Liability	12.7	12.8	12.9	12.4	13.8	12.4	13.8	15.3	16.5	17.6
Recycled water shortfall	4.8	4.7	4.6	4.5	4.4	4.4	4.4	4.4	4.4	4.4
Total revenue requirement	463.1	475.8	490.3	508.4	528.6	541.7	551.7	561.7	569.4	576.5

Table 85 Regulatory asset base – bulk sewerage service

\$million	Regulatory period 2021-26					Regulatory period 2027-31				
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Opening RAB	5,046.7	5,312.4	5,638.5	5,843.7	6,039.7	6,061.7	6,166.0	6,249.6	6,271.7	6,302.4
plus Capital Expenditure	366.0	428.1	314.6	319.5	151.2	245.6	229.9	175.0	188.8	201.6
less Proceeds from Disposals	-1.1	-0.3	-2.2	-9.0	-2.9	-2.9	-2.9	-2.9	-2.9	-2.9
less regulatory depreciation	-99.2	-101.7	-107.2	-114.6	-126.3	-138.5	-143.4	-150.0	-155.4	-160.0
Closing RAB	5,312.4	5,638.5	5,843.7	6,039.7	6,061.7	6,166.0	6,249.6	6,271.7	6,302.4	6,341.1

Table 86 Bulk sewerage tariffs – 10-year price path

	Approved	Regulatory period 2021-26					Regulatory period 2027-31				
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
1.7 Bulk sewerage usage charge – Treatment (\$/ML) *											
Western	293.29	74.10	74.10	74.10	74.10	74.10	74.10	74.10	74.10	74.10	74.10
Eastern	78.79	50.80	50.80	50.80	50.80	50.80	105.50	105.50	105.50	105.50	105.50
1.8 Bulk sewerage usage charge – Transfer (\$/ML) #											
Western	40.12	39.05	39.05	39.05	39.05	39.05	39.05	39.05	39.05	39.05	39.05
Eastern	5.73	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58
1.9 Bulk sewerage usage charge – Load (\$/per tonne) *											
BOD – western	195.20	398.55	398.55	398.55	398.55	398.55	398.55	398.55	398.55	398.55	398.55
BOD – eastern	367.65	318.86	318.86	318.86	318.86	318.86	499.68	499.68	499.68	499.68	499.68
SS – western	113.40	670.92	670.92	670.92	670.92	670.92	670.92	670.92	670.92	670.92	670.92
SS – eastern	603.68	733.36	733.36	733.36	733.36	733.36	290.47	290.47	290.47	290.47	290.47
TKN – western	269.58	1,364.26	1,364.26	1,364.26	1,364.26	1,364.26	1,364.26	1,364.26	1,364.26	1,364.26	1,364.26
TKN – eastern	210.34	95.53	95.53	95.53	95.53	95.53	103.85	103.85	103.85	103.85	103.85
iTDS – western	31.96	31.96	31.96	31.96	31.96	31.96	31.96	31.96	31.96	31.96	31.96
1.10 Bulk sewerage service charges (\$/per month) (charges rounded to nearest whole dollar)											
City West Water	5,695,721	7,414,366	7,634,119	7,922,691	8,230,261	8,632,422	8,874,323	9,056,353	9,234,718	9,371,246	9,492,992
YoY % change		30.2%	3.0%	3.8%	3.9%	4.9%	2.8%	2.1%	2.0%	1.5%	1.3%
South East Water	13,272,465	13,825,031	14,211,809	14,710,219	15,236,490	15,928,189	15,962,203	16,280,474	16,594,961	16,836,453	17,055,268
YoY % change		4.2%	2.8%	3.5%	3.6%	4.5%	0.2%	2.0%	1.9%	1.5%	1.3%
Yarra Valley Water	11,367,599	13,046,040	13,408,972	13,890,359	14,398,705	15,067,962	15,254,652	15,566,675	15,874,367	16,111,950	16,326,829
YoY % change		14.8%	2.8%	3.6%	3.7%	4.6%	1.2%	2.0%	2.0%	1.5%	1.3%

* Sewerage Transfer Prices are based on SRMC's - no annual movement in price.

Sewerage Treatment and Load Prices are based on LRMC's - no annual movement in price.

S7.4 Waterways and drainage service

S7.4.1 Revenue requirement and RAB

The total revenue requirement for the waterways and drainage service is presented in **Table 87** and the underlying RAB is presented in **Table 88**.

S7.4.2 Developer charges

The land development industry continues to support Melbourne Water principle-based approach to the calculation of developer charges. Current arrangements will therefore continue with the only adjustment being to introduce floor space as the measure for calculating contributions for urban renewal precincts as the current measure (developable hectares) is applied to greenfield development. Current pricing arrangements for storm water quality offsets will also remain unchanged.

Development services scheme charges will be calculated by:

- > identifying future capital expenditure for each year of the expected life of a development services scheme
- > identifying forecast developable hectares for each year using an estimate of development density for greenfield schemes and forecast developable floor area for urban renewal precincts
- > applying a pre-tax real discount rate (consistent with the pre-tax discount rate applicable to that regulatory year) to convert future cash flows into present value terms
- > setting the developer charge such that the present value of future income equals the present value of future costs, where future income is equal to the developable hectares/floor area in each year multiplied by the developer charge.

All active schemes are financially reviewed each year and, where required, an engineering review is undertaken (which leads to renewed financials).

S7.4.3 Tariffs

Waterways and drainage

Price caps will be retained for waterways and drainage charges. Residential customers will remain on a single fixed charge which reflects the shared regional nature of the service. Non-residential waterways and drainage customers will continue a 10-year transition from property-based charges to a flat charge 1.5 times greater than residential customers. Proposed waterways and drainage charges are shown in **Table 89**.

S7.5 Other

S7.5.1 Patterson Lakes

Melbourne Water will continue to maintain jetties for the Tidal Waterways community and conduct bore flushing and water quality inspections in the Quiet Lakes on a fee for service basis.

Jetty renewals charges will reduce by a one off \$60 and \$37 amount per annum amount for concrete and timber jetties respectively, reflecting a reduction in borrowing costs.

Quiet Lakes property owners on lakes Legana and Illawong were invited to complete an independently-run survey on their preferences for increased bore flushing and algae testing under a property owner-funded arrangement. The residents indicated, via a majority response, a preference to move to a higher level of service at a cost of \$188 per year (**Table 90**).

Melbourne Water will bear the cost of continued bore flushing trials at Lake Carramar. If they are successful, it is anticipated that Lake Carramar residents will move to a fee-for-service price in 2026.

Their preference was reconfirmed in a follow-up engagement process to assess the influence of COVID-19.

Table 87 Revenue requirement – waterways and drainage

\$million	Regulatory period 2021-26					Regulatory period 2027-31				
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Operating Expenditure	159.1	159.2	159.4	160.2	160.6	160.6	160.6	160.6	160.6	160.6
Return on Assets	67.7	72.1	75.6	78.3	80.7	82.4	83.4	84.2	84.9	85.4
Regulatory Depreciation	31.5	39.6	48.7	55.7	60.8	65.6	70.4	75.2	79.9	84.3
Tax Liability	4.3	4.3	4.4	4.2	4.4	4.5	4.9	5.4	5.9	6.3
Total revenue requirement	262.6	275.2	288.1	298.4	306.4	313.0	319.2	325.4	331.2	336.5

Table 88 Regulatory asset base – waterways and drainage

\$million	Regulatory period 2021-26					Regulatory period 2027-31				
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Opening RAB	1,701.7	1,813.5	1,927.4	1,995.4	2,066.3	2,119.7	2,150.5	2,171.5	2,192.2	2,208.4
plus Capital Expenditure	263.0	273.2	241.9	246.8	247.6	218.8	214.4	219.8	220.9	221.4
less Customer Contributions	-119.3	-119.3	-124.9	-119.8	-133.1	-121.9	-122.7	-123.5	-124.4	-125.4
less Proceeds from Disposals	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
less regulatory depreciation	-31.5	-39.6	-48.7	-55.7	-60.8	-65.6	-70.4	-75.2	-79.9	-84.3
Closing RAB	1,813.5	1,927.4	1,995.4	2,066.3	2,119.7	2,150.5	2,171.5	2,192.2	2,208.4	2,219.8

Table 89 Waterways and drainage tariffs – 5-year price path

	Approved	Regulatory period 2021-26				
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Residential (\$ per annum)	104.32	105.36	106.42	107.48	108.56	109.64
Non-residential charges:						
Minimum fee (\$ per annum)	156.72	158.29	159.87	161.47	163.08	164.71
Rate in \$NAV (cents per annum)	0.4447	0.4171	0.3704	0.3104	0.2446	0.1805
Rural charge (\$ per annum)	57.28	57.85	58.43	59.02	59.61	60.20

Table 90 Patterson Lakes charges

Charge element	Approved	Regulatory period 2021-26				
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Timber Jetty charge ¹	1,484.00	1,447.00	1,447.00	1,447.00	1,447.00	1,447.00
Concrete Jetty charge ¹	1,031.00	971.00	971.00	971.00	971.00	971.00
Jetty Annual Maintenance	135.56	135.56	135.56	135.56	135.56	135.56
Quiet Lakes Bore Flushing	118.00	188.00	188.00	188.00	188.00	188.00

Note 1: These charges are “nominal” charges, meaning we do not apply CPI adjustments year-to-year. We have not applied forecast inflation to deflate them in real terms.

S7.5.2 Koo Wee Rup–Longwarry

Melbourne Water charges property owners in the Koo Wee Rup–Longwarry Flood Protection District a special drainage area rate. It covers maintenance services on an extensive network of channels used to drain the area and mitigate flood risks.

Continued transition

It is proposed to complete the implementation of ESC approved changes to the district's precept rates which commenced in 2013. This involves a transition to one rate for all properties in the district to reflect the common services and benefits provided by the infrastructure across the area, rather than different rates for different areas within the district.

The former rates in the \$NAV have been replaced with unique price paths for individual properties to transition to the single cost reflective price. This transition will be complete by 2025-26.

As Koo Wee Rup–Longwarry customers (4,434 in 2020-21) each pay a unique price as part of the transition arrangement for the purpose of the financial template we have shown the year-on-year annual average of all the unique prices paid by customers.

Revised levels of service

Melbourne Water invited property owners in the Koo Wee Rup–Longwarry Flood Protection District to have their say on proposed service levels and prices for 2021-26. Based on advice from the District Advisory Committee, and in response to a survey of residents and businesses, we are proposing an increase level of service (and price) to cover additional flood protection and waterway improvement works. This would lead to an average price of \$237 per property, per annum.

However, follow up engagement indicated a change of preference due to COVID-19. In response to customer feedback we propose to continue with current (2020-21) prices, while continuing to monitor customer preferences. When customers indicate they are comfortable to do so, we will move them to the higher level of service and \$237 per property per annum (on average) rate.

S7.5.3 Miscellaneous charges

Pricing for Melbourne Water's miscellaneous services is set on a cost-recovery basis. These services include provision of:

- > property information statements
- > property flood level information
- > hydrological data
- > build over of Melbourne Water assets and stormwater connections
- > flood feasibility studies.

For PS21, charges for miscellaneous services were reviewed to ensure they were cost-reflective. Following this review, prices for building over Melbourne Water assets, stormwater connections fees and flood feasibility studies will increase annually by CPI only. Property information statements will decrease by 6.1 per cent, while charges for hydrological and flood level information will increase by 4.9 per cent and 6.8 per cent in 2021-22, followed by CPI increases only for the remaining 2021 regulatory period. Changes have been proposed following consultation with representatives of our main applicants.

Miscellaneous services and prices are set out in **Table 91** (as a diversion related prices – see **Section S7.5.4** for discussion).

As listed in **Table 91**, revenue for diversions and miscellaneous services is recovered through an extensive list of individual charges that apply to small number of customers. For the purpose of the financial template individual charges and customer numbers or megalitre demands are not listed. Net forecast tariff revenue from these services has been included in the financial template in the “Other Revenue” category consistent with approach taken in past regulatory submissions such as PS16.

Detailed price-quantity-revenue calculations for diversions and miscellaneous services for 2021-22 to 2030-31 can be provided upon request.

Table 91 Miscellaneous services

	Approved 2020-21	Regulatory period 2021-26				
		2021-22	2022-23	2023-24	2024-25	2025-26
3.1 Miscellaneous services						
Flood level information						
Property information statements	4.99	4.69	4.69	4.69	4.69	4.69
Flood level certificates	41.71	44.55	44.55	44.55	44.55	44.55
Flood feasibility study (per half day)	839.55	839.55	839.55	839.55	839.55	839.55
Hydrological data						
Storm frequency analysis for selected storm events	143.92	151.03	151.03	151.03	151.03	151.03
Hydrological data (\$per dataset – daily, hourly, 6 minute)	89.50	93.92	93.92	93.92	93.92	93.92
Other requests (\$ per hour)	143.92	151.03	151.03	151.03	151.03	151.03
Construction, works & connections						
Application/connection fee	157.52	157.52	157.52	157.52	157.52	157.52
Inspection fee	433.95	433.95	433.95	433.95	433.95	433.95
Application fee for construction over or near Melbourne Water easements or assets	213.05	213.05	213.05	213.05	213.05	213.05
Fast Track Assessments	1,091.73	1,091.73	1,091.73	1,091.73	1,091.73	1,091.73
Water Supply Inspections (per hour)	136.44	136.44	136.44	136.44	136.44	136.44
Additional inspections (\$308 for 1 inspection (includes 3 sub-inspections) or \$134.44 per hour)	136.44	136.44	136.44	136.44	136.44	136.44
3.2 Waterway diversion charges – unregulated waterways						
Licence service fee – all licences types (\$ per annum)	260.09	273.53	273.53	273.53	273.53	273.53
Power generation licences (\$ per kilowatt)	23.36	24.57	24.57	24.57	24.57	24.57
Volume charges (\$ per ML):						
– All-months licence	34.14	35.90	35.90	35.90	35.90	35.90

	Approved 2020-21	Regulatory period 2021-26				
		2021-22	2022-23	2023-24	2024-25	2025-26
– On-stream winter–fill	17.19	18.08	18.08	18.08	18.08	18.08
– Off-stream winter–fill	17.19	18.08	18.08	18.08	18.08	18.08
– Licensed farm dam	17.19	18.08	18.08	18.08	18.08	18.08
– Non-consumptive	2.17	2.28	2.28	2.28	2.28	2.28
Works operating licences						
General (\$ per annum)	58.66	61.69	61.69	61.69	61.69	61.69
Hazardous Dams (\$ per annum)	99.30	104.43	104.43	104.43	104.43	104.43
3.3 Waterway diversion charges – regulated waterways						
Licence service fee – All licences (\$ per annum)	260.09	273.53	273.53	273.53	273.53	273.53
Volume charges (\$ per ML):						
- All months licence	71.44	75.13	75.13	75.13	75.13	75.13
- Off-stream winter fill	17.19	18.08	18.08	18.08	18.08	18.08
3.4 Stormwater harvesting charges						
Licence service fee	260.09	273.53	273.53	273.53	273.53	273.53
Volume charge (\$ per ML) – All-months licence	34.14	35.90	35.90	35.90	35.90	35.90
3.5 Application Fees						
Transfer – Sale of Land (\$)	330.18	330.18	330.18	330.18	330.18	330.18
Amalgamation, subdivision (existing licences) (\$)	432.66	432.66	432.66	432.66	432.66	432.66
Minor Amendment (e.g. add / remove parcel, party or existing entity to existing licence) (\$)	125.23	125.23	125.23	125.23	125.23	125.23
Transfer – Downstream Trade (\$)	728.74	728.74	728.74	728.74	728.74	728.74
Transfer – Upstream Trade (\$)	1,076.05	1,076.05	1,076.05	1,076.05	1,076.05	1,076.05
Transfer – Repeat Trade Application (\$)	159.39	159.39	159.39	159.39	159.39	159.39
New Licence – Stormwater (\$)	1,081.72	1,081.72	1,081.72	1,081.72	1,081.72	1,081.72
New Licence – Non-consumptive / Power Generation (\$)	728.74	728.74	728.74	728.74	728.74	728.74
Additional Charge Where Irrigation and Drainage Plan required (\$)	284.63	284.63	284.63	284.63	284.63	284.63
Works Licence – Amendment (e.g. Pump replacement) (\$)	387.13	387.13	387.13	387.13	387.13	387.13
New Works Construction Licence – Dam / Stormwater (\$)	825.54	825.54	825.54	825.54	825.54	825.54
New Works Construction Licence – Pump Only (\$)	649.01	649.01	649.01	649.01	649.01	649.01
Reissue – Failure to renew – D&S (\$)	187.84	187.84	187.84	187.84	187.84	187.84
Reissue – Failure to renew (all licences) (\$)	284.63	284.63	284.63	284.63	284.63	284.63
Reissue – Following Revocation (\$)	1,503.03	1,503.03	1,503.03	1,503.03	1,503.03	1,503.03
Copy of Record (\$)	56.91	56.91	56.91	56.91	56.91	56.91
D&S Dam Registration (\$)	102.44	102.44	102.44	102.44	102.44	102.44
Application to Renew (\$)	330.18	330.18	330.18	330.18	330.18	330.18
Land Information Statement (\$)	113.83	113.83	113.83	113.83	113.83	113.83

S7.5.4 Diversions

Diversion services and price will remain largely unchanged following a survey of customer preferences.

River diverters have been engaged on their preferred level of service following qualitative research and consultation with the two diversion advisory committees, the Diversions Management Advisory Committee (Yarra catchment customers) and the Keilor Diverters Advisory Committee (Maribyrnong catchment customers) and an online survey. The online survey was informed by the previous engagement with the committees and utilised Melbourne Water's YourSay platform. Customers were asked to rank four service proposals (including associated costs). The survey was promoted to diversion customers using various methods such as direct SMS, *StreamNews* (annual diversion customer newsletter) and email.

The engagement has indicated a clear preference for the Standard package which was selected as first preference in 56 per cent of survey responses. This package:

- > maintains current customer service levels; and
- > increases the metering and telemetry program to meet the Victorian Governments Non-Urban Metering Policy.

Prices are based on the principle of cost recovery and reflect direct expenditure and capital works as well as a provision for overheads. This has resulted in a proposed real price uplift of 5.2 per cent for the first year of PS21.

Melbourne Water is proposing that prices for diversion-related application fees remain flat in real terms.

The proposed service level and price path have been communicated to the DMAC and KDAG committees via email on 3 July 2020 and our YourSay webpage was also updated to communicate the proposed prices and services for diversion licence holders.

S7.6 Non-prescribed revenue

Melbourne Water's only non-prescribed activity relates to revenue from land sales at the Riverwalk Development in Werribee and associated opex. We have appropriately 'ring-fenced' revenues and associated opex and excluded them from regulated expenditure and revenue calculations. These are shown in **Table 92**.

Melbourne Water oversees non-prescribed land sales (proceed from disposals) as part of the Riverwalk development in Werribee, which is a joint venture between Melbourne Water and Development Victoria. Melbourne Water's equity is the land and Development Victoria's equity is the development costs and expertise. The financial return to Melbourne Water in excess of the land value and remediation expenditure is recorded as unregulated revenue (from a regulatory perspective) as it is outside the normal course of business. This is consistent with the approach taken in the 2016 Price Determination.

Table 92 Revenue and costs associated with non-prescribed land sales

\$ millions	2021-22	2022-23	2023-24	2024-25	2025-26
Proceed from Disposals					
Riverwalk Land Sales	26.5	26.0	17.7	19.0	21.6
Operating Expenditure					
Cost associated with land sales at Riverwalk	0.1	0.1	0.1	0.1	0.1

S7.7 Financial position

Melbourne Water has rigorous processes as part of its financial management practices to monitor and forecast its financial position across the short, medium and long term.

The Department of Treasury and Finance (DTF) sets performance targets against a range of financial indicators as part of its Corporate Plan Guidelines to government business entities. In addition, Melbourne Water is independently assessed by a credit rating review agency; the last time this review was undertaken was 2016 and we planned a review for early 2020. Guidance received from DTF in March 2020, however, advised that due to the extraordinary circumstances faced as a result of the COVID-19 pandemic, the existing independent credit rating would be accepted for the 2020-21 financial year.

It is expected that the postponed review will be undertaken in 2021-22. The 2016 credit rating review resulted in an uplift in Melbourne Water's investment grade credit rating, further information on this review is available upon request.

Melbourne Water's financial position remains sound across the PS21 regulatory period as evidenced by financial metrics presented in the supporting financial templates.

S8. Price adjustment

We propose to retain our annual price adjustments contained in Melbourne Water's *2016 Price Determination*, which allows for the following annual price adjustments:

- > Adjustment 1: Desalination Plant Water Order cost
- > Adjustment 2: Desalination Plant Contract costs changes
- > Adjustment 3: Annual update to the weighted average cost of capital (WACC).

Adjustments are to be applied to the tariffs as listed in **Table 93**.

Additionally, in our annual price adjustment for Victorian Desalination Plant Water Order costs we propose to add a new term to the adjustment formula to enable recovery of costs incurred by Melbourne Water in the management of water orders as described in **Section S4.2**. Refer to Formula 1.

Adjustment 1 - Victorian Desalination Plant Water Order price adjustment

This price adjustment includes the addition of a new term (DWOM) to facilitate the recovery of water order management costs as outlined above.

This adjustment will apply when the water order volume in any regulatory year differs from a water order of 0 gigalitres and/or when Melbourne Water has incurred pumping costs in moving desalination water through the system in the prior year.

Formula 1: Desalination water order cost adjustment

$$P(\text{VDP order})_{j,t} = (\text{DWO}_t + \text{DWOM}_{t-1}^{\text{act}}) \times \text{Percentage}_{j,t}^{\text{DWO}}$$

Where:

$P(\text{VDP order})_{j,t}$	Is the desalination water order costs allocated to retail water business j in year t
DWO_t	Is the desalination water order (DWO) costs invoiced to Melbourne Water by the Department of Environment, Water, Land and Planning
Q_t^{DWO}	Is the total desalination water order (ML)
$\text{Percentage}_{j,t}^{\text{DWO}}$	Is the percentage of desalination water order costs allocated to retailer j, based on Victorian Desalination Plant Entitlement shares.
$\text{DWOM}_{t-1}^{\text{act}}$	Is the actual desalination water order management (DWOM) costs incurred by Melbourne Water in year (t-1) to manage desalination water through its storage system. This will be in real\$ year (t-1).

Table 93 Price adjustment applicable tariffs

	Adjustment 1 <i>Water order costs</i>	Adjustment 2 <i>Desalination contract costs</i>	Adjustment 3 <i>Annual WACC updates</i>
Water & Sewerage charges			
1.1 Bulk water headworks charges – Greater Yarra System – Thomson River			Y
1.2 Bulk water headworks charges – Desalination Plant		Y	*
1.3 Desalination Plant Water Order charge	Y		
1.4 Bulk water headworks charges – North South Pipeline			Y
1.10 Bulk sewerage service charges			Y
Waterways & Drainage charges			
2.1 Residential waterways and drainage charge			Y
2.2 Non-residential minimum charge			Y
2.3 Rural charge			Y

*As Victorian Desalination Plant headworks charges are a direct pass through of contract costs and treated as regulatory opex, there are no “return on” revenue requirement impacts. As a result, WACC price adjustments for Victorian Desalination Plant headworks charge is not applicable. This is a proposed change to the annual WACC update adjustment from 2016 Price Determination.