WATERCARE SERVICES LIMITED

AGENDA	BOARD MEETING	Tuesday, March 30, 2021
Venue	Watercare Services, Level 3 Boardroom, 73 Remuera Road, Remuera	
Time	8.30am	

Open Public Meeting

	Item	Spokesperson	Action sought at governance meeting	Supporting Material
1	**Opening Karakia**	Brendon Green		
1.1	Meeting Administration	Chair	For discussion	Verbal update
2	**Apologies**	Chair	Record apologies	Verbal
3	**Minutes of Meeting**	Chair	Approval of minutes of the meeting of 26 February 2021	Minutes of the meeting of 26 February 2021
4	**Disclosure of Directors' Interests**	Chair	For noting	Report
5	**Public Deputations**	Chair	For information	Verbal
6	**For information**			
6.1	Taumata Arowai (the Water Service Regulator): Bill Bayfield, Chief Executive Officer via Teams	Anin Nama	For information	Briefing
6.2	February 2021 Central Interceptor Report	Shayne Cunis	For information	Report
6.3	Drought Update	Mark Bourne	For information	Presentation
6.4	Watercare's Metropolitan Drought Standards	Mark Bourne	For information	Report
6.5	Iwi Relationships	Richie Waiwai	For information	Report
6.6	Shovel Ready projects	Ilze Gotelli	Ilze Gotelli	Report
6.7	CCO Review Update	Rob Fisher	For information	Report
7	**For discussion**			
7.1	Safety Moment	All	For sharing	Presentation
7.2	Aurecon Drought Preparedness Report	Rob Fisher and Marlon Bridge	For discussion	Report
7.3	Acting Chief Executive's Report	Marlon Bridge	For discussion	Report
7.4	Board Committee Updates	Committee Chairs	For discussion	Verbal update
8	**Directors' Corporate Governance Items**			
8.1	Board Planner	Chair	For noting	Report
8.2	Disclosure of Senior Executives' Interests	Chair	For noting	Report
8.3	Directors' Appointment Terms and Committee Memberships and meeting attendances	Chair	For noting	Report
9	**General Business**	Chair	For discussion	Verbal update
9.1	Closing Karakia	Brendon Green		Verbal

Date of next meeting	Thursday 29 April 2021

MINUTES

SUBJECT WATERCARE SERVICES LIMITED BOARD MEETING

VENUE Watercare, Level 3 Boardroom, 73 Remuera Road, Remuera

DATE 26 February 2021

TIME 10.30am

	PUBLIC SESSION		
	Present: Margaret Devlin (Chair) Dave Chambers David Thomas Frances Valintine Nicola Crauford Brendon Green Graham Darlow	**In Attendance:** Marlon Bridge (Acting CEO) Steve Webster Amanda Singleton Rebecca Chenery David Hawkins Shayne Cunis Shane Morgan (via Teams) Mark Bourne Anin Nama Rob Fisher Jason Glennon Nigel Toms Bronwyn Struthers Richard Waiwai Jodie Atkin Pinaz Pithadia	**Guests:** Councillor Linda Cooper (Auckland Council Liaison Councillor) Claire Gomas (Principal Advisor, Auckland Council) Sarah Naudé (Propero)
1.	**Opening Karakia** Brendon Green opened the meeting with a karakia. **1.1 Meeting Administration** The Chair welcomed Graham to his first meeting and noted that this was the last meeting for David Thomas. She also advised that recruitment of the new Chief Executive Officer was being finalised. The offer had been accepted, the contract signed, and an announcement as to who would be filling the position was to be made the following week. The Chair also recognised the 10-year anniversary of the Christchurch Earthquakes, and the contribution that Watercare made in the immediate aftermath of the event. Rob Fisher (Company Secretary) recognised the resilience of the people of Christchurch during and since the earthquakes of 2011 and the extraordinary work done by Watercare employees in restoring the water supply for Christchurch over a period of six weeks. Some 26 temporary chlorination stations were designed, constructed and installed.		
2.	**Apologies** Apologies were received from Hinerangi Raumati-Tu'ua.		
3.	**Minutes of Meeting** The Board **resolved** that the minutes of the public session of the Board meeting held on 29 January 2021 be confirmed as true and correct with one minor amendment in respect of Nicki Crauford's Distinguished Fellowship from Engineering New Zealand.		

4.	**Disclosure of Directors' Interests** Nicki Crauford advised that she is no longer a Board member of Kāinga Ora, Homes and Communities.
5.	**Public Deputations** There were no public deputations.
6.	**For Information** **6.1 January 2021 Central Interceptor Report** The report was taken as read. Shayne Cunis (Executive Programme Director CI) advised that this project is running well and more sites are opening. Rob Fisher asked about the 'First Day Back' programme. Shayne explained that CI had taken a different approach this year. The programme was leader led. People who have been on the project for quite some time also refreshed their induction. In response to a question from the Board, Shayne advised that there are four significant areas of work being done on a 'safety town hall'. The main issue is fatigue and managing health, safety and wellbeing. He noted that staff are very keen to work any and all hours they are offered, so this needs to be managed to ensure that issues of fatigue do not arise. Shayne noted that people are getting tired on site so the concrete pour scheduled for the Thursday evening of the previous week was cancelled. The project leaders took the decision to ensure that safety was prioritised over the programme schedule. The Board asked how getting staff into the country was progressing in terms of obtaining MIQ places. Shayne explained that there is some disconnect as the government authorities do not appreciate the need for trades such as concreters and carpenters with the specialised skills required for this project. The issues with getting flights and MIQ places coordinated is also ongoing. However, all necessary personnel, at this stage, are now in the country. Shayne noted that there has been some adverse media coverage pertaining to the 'poaching' of staff. He noted that no such activity is occurring and there is no bidding war. However, he also noted that there are only a limited number of people in New Zealand who are able to run TBMs. Watercare is working cooperatively with CRL. **6.2 Drought Update** Mark Bourne, Head of Servicing and Consents, provided the Drought Update. The Board asked whether the increase to the actual daily usage of water is of concern. Mark advised that he is not concerned as an increase in use is expected at this time of year. In a 'normal' year (in which there is no drought) it is expected that the daily usage would be 540MLD (million litres daily). However, we were expecting usage of 511MLD this month, so the current figure of 447MLD for February is extremely pleasing. It was noted that we are expecting a relatively dry March. Mark explained that March is a shoulder month and water consumption can be highly variable. As such our performance for March will now be judged by taking two 2-week blocks as we move from the February target of less than 511MLD to the March target of less than 465MLD. The Board asked about the proportion of water used by residential and commercial customers. Mark explained that normally, 70% of our water is used by residential customers, and 30% by commercial customers. Of the 12 billion litres that have been saved since restrictions were implemented last May, 7 billion litres were saved by industry, and 5 billion by residential customers. Most of those commercial savings came from changes to irrigation. Our biggest irrigator is Auckland Council which has made a significant change for which all credit is due to them. It was also noted that many of our commercial customers have made changes to their operations, in terms of water use, that are permanent, so their water savings will continue.

	Mark also noted that Watercare is working with Auckland Council to include further savings of drinking water. They are looking at where non-potable water can be used rather than potable. For example, water from the Rosedale Wastewater Treatment Plant (WWTP) could be used to irrigate Rosedale Park. Councillor Cooper advised that the Auckland Croquet Association have asked why drinking water is used to water their fields. Anin Nama (Manager of the Improvement Programme) advised that he will assist with this query. The Chair recognised the huge amount of work that has be done, over the past year, on the drought response programme, in particular by Steve Webster, Mark Bourne, Anin Nama, Amanda Singleton, Priyan Perera, Shane Morgan and their teams. She asked that they pass her thanks onto their teams on behalf of the Board. The Board asked whether the proactive leak detection that is being done here in Auckland, is done right across the country. Anin advised that it is, but not on the scale currently being done here. The Board then had a discussion about leak rates, noting that there is a tipping point at which it becomes uneconomical to continue to proactively pursue leaks. Further work needs to be done to establish the economic level of leakage. Whilst this work is undertaken, the proactive leakage programme will continue. The Board also discussed what is meant by 'theft'. This currently includes intentional and unintentional unauthorised use of water from the network. All such usage is fully investigated before being referred for legal action. There is currently one person being prosecuted for theft of water. The Board asked that the progress of the prosecution be included in the report. It was decided that the word 'theft' in the report be changed to 'unauthorised use' or some other similar term. **6.3 Iwi Relationships** Richard Waiwai (Poutiaki, Tikanga Māori (Principal Advisor)) presented this report. Richard noted that he has been very careful about what he has included in writing about the two iwi, Te Ākitai Waiohua and Ngāti Tamaoho. This, Richard explained, is because the only way to really know an iwi "is to go and knock on the door of the marae". Richie noted that both iwi are connected to the Waikato-Tainui and are kin to two of our Directors, Brendon Green and Hinerangi Raumati-Tu'ua. Both iwi were heavily involved in the Pukekohe Bore and the Waikato 50 project negotiations. They both have an interest in the Board of Inquiry process for the take from the Waikato River and are concerned about how they will fit into that. They are also both interested in the kawenata signed with Watercare. The Board recognised the importance of iwi. It is important for Watercare to think about their aspirations and how Watercare can support them. Richard acknowledged the work of the Operations and Infrastructure staff who have gone to unprecedented lengths to engage with iwi.
7.	**For discussion** **7.1 Safety Moment** The Board discussed the COVID-19 vaccination and what position Watercare will take on this issue. Concerns included whether there will be staff who may be unwilling to have the vaccination, and subsequently, whether there may be staff who refuse to work with anyone who is not vaccinated. It was considered preferable that Watercare's position be consistent with Auckland Council group. Rob Fisher noted that the Ministry of Health will take a 'hearts and minds' approach to encouraging the uptake of the vaccination. Watercare has obtained legal advice about its options. It was noted that there is a need to ensure that the appropriate time period is allowed between people receiving the standard flu vaccination and the COVID-19 vaccination, and a plan is in place to provide for this. There will be no policy on the matter, but it is important to establish a clear position. The emphasis will be on ensuring that the vaccination process is collaborative, and any issues will be addressed as and when they arise.

7.2 Preparing for ongoing drought

Mark Bourne spoke to this paper which was taken as read. He noted that it sets out management's proposed response should the drought continue into a third year.

Mark explained that the water usage restrictions resulted in a significant decrease in the use of water compared to last year. He explained the water level in our storage dams has declined at a slower rate because savings have been higher than expected and also because we now have new sources of water available. As the new sources have been added to the system, headroom has been created. This increase in headroom then influences when interventions (such as restrictions) are required. He noted that 106MLD has been added to the system (which is not shown in the graph attached to the paper).

Mark noted that it is important not to focus too much on weather and drought forecasts. He advised that we need to plan for drought and have the ability to make changes as required.

Mark explained that modelling is based on 170 years of real data. This has then been extrapolated to create 1000 years of synthetic data, and this does indicate worse droughts than are seen in the real data over the last 170 years. In answer to a question from the Board, he confirmed that climate change is not factored into this as the data is only created from the extrapolation of existing data.

He advised that longer dry periods and wetter wet periods are indicated. The model is used for making day-to-day decisions, such as which source to abstract from.

The Board discussed the effects of climate change as well the effects that the changing workplace (more people working from home) may have on water use. The need to be clear about the assumptions in the model was also noted. The Board went on to discuss restrictions and the need for consistent definitions of the stages of restrictions across all of New Zealand. The Board considered that there is a need for more public relations activities by way of proactively engaging with industry groups and business.

The Board asked whether there are other things that we could be doing and investigating, such as putting more concentrated efforts into water re-use; can water from rivers be used to re-charge the dams, can the aquifers be re-charged; and could urban farming be encouraged to assist with creating food with less water. Marlon Bridge (Acting CE) confirmed that an innovation fund is being created in this year's budget that will allow us to look at these kinds of projects.

Rob Fisher said that WSAA (the Water Services Association of Australia) have already started looking at innovation in the water industry. He advised that we are aware of the legal framework and perceptions around water re-use being used and there will be a need to engage with the new regulator early on this. We also need to work closely with Auckland Council. The take from the Waikato River was reduced from 200MLD to 150 MLD because we are looking at other options.

The Chair noted that we need to formalise our thinking about innovation.

Amanda Singleton (Chief Customer Officer) advised that Watercare's trust score is trending down due to the drought and the recent announcement of price increases to come. In response, her team along with the Communications team, has developed a trust recovery plan.

7.3 Acting Chief Executive's Report

Marlon Bridge answered questions about this report which was taken as read.

- It was noted that we need to write to Waikato-Tainui and the River Authority about the River Restoration Trust to arrange meeting dates and progress this project.
- The Board discussed the HSW report and questioned whether Watercare needs to consider if there are any further actions that we need to be taking. Bronwyn Struthers (Head of HSW) advised that we are beginning our external review of HSW with a general survey. This will be followed by focus groups. The leadership will then do a discovery session which will be similar to that done by Fletcher Building and other large entities.

	• Asked by the Board whether Watercare can deliver its Kāinga Ora projects, Steve Webster confirmed that we can. However, he noted that they are moving quickly so we are developing a new operating model to enable us to keep up. • The Board asked that the second graph on page 47 be corrected; '%' is to be removed. • Mark Bourne confirmed that the hearing of the consent for the Huia Water Treat Plant (WTP) replacement will reconvene on 14, 15 and 16 April and the Commissioners have stated that they have the information they need to make a decision. • The Chair asked what the timeline is to for everyone at Watercare to have completed the Watercare Way Immerse module. Jason Glennon (Chief People Officer) will report back on this. **7.4 Board Committee Updates** **Climate Change Action Committee (CCA)** Brendon Green, Chair of this committee, advised that the CCA met on 19 February. Tonkin and Taylor gave a presentation at the meeting about climate risk mitigation. The presentation highlighted the increased reporting that will be required of organisations; and the increase in legal actions being brought by legal teams and interest groups against councils and organisations who may not be meeting their obligations in this space. The Committee discussed Watercare's target of a 45% reduction in emissions, compared to Council's target of 50%. The Committee Chair noted that as our use of energy is increasing, to enable us to meet growth, we are not likely to meet that target on our current pathway. He advised that a paper will be presented to the Board regarding Watercare's carbon mitigation plan and the associated funding requirement. **AMP and Major Capex Committee** Nicki Crauford, Chair of this committee, advised that the committee met on 18 February. A Deep Dive into fire risks in tunnelling was presented. The AMP was reviewed and will come to the May Board meeting, which will be held on 1 June. Feedback is currently being provided on the new format and an additional meeting is being arranged for April to review the draft. The usual reviews of each of the major projects, including the Huia WTP replacement and the Hūnua 4 grout spill, were undertaken. **Te Tangata Komiti** Dave Chambers, Chair of this committee advised that the last meeting of the TTK was held before the January Board meeting and a full report was provided at the January Board meeting.
8	**Directors' Corporate Governance Items** **8.1 Board Planner** The Chair noted that three directors have volunteered to attend the CCO Oversight Committee meeting at Council on 23 March. Site visits to CI sites and other water sites are still to be arranged, and are to be done in very small groups, rather than large numbers or all of the Board at once. **8.2 Disclosure of Senior Executives' Interests** There were no changes to be made to the senior executives' interests. **8.3 Directors' Appointment Terms and Committee Memberships and Meeting Attendances** The appointments of directors to the sub-committees have been changed. The appointments are now as follows: Audit and Risk: Hinerangi Raumati-Tu'ua (chair), Margaret Devlin (ex-officio), Brendon Green, Graham Darlow.

	Te Tangata: Dave Chambers (Chair), Margaret Devlin, Frances Valintine. AMP and Major Capex: Nicola Crauford (Chair), Margaret Devlin, Hinerangi Raumati-Tu'ua, Graham Darlow. Committee for Climate Action: Brendon Green (Chair), Dave Chambers, Nicola Crauford, Frances Valintine.
9	**General Business** Councillor Cooper advised she is chairing a panel that is considering whether the Water Supply and Wastewater Network Bylaw 2015 is still adequate. She advised that input is required from both Watercare and Council regarding changing the wording of the bylaw to refer to 'water demand' rather than 'drought'. The Chair noted that the definitions of restrictions need to be clarified. Councillor Cooper also advised that RIMU (Auckland Council's research and Evaluation Unit) is scientist rich and could be a great resource in relation to innovations such as urban farming. She noted that Council will also struggle to meet its emissions targets because of growth. In closing, the Chair recognised that that this is David Thomas' last meeting, having served for more than six years as a director of Watercare. She thanked David for his service, and the knowledge he has shared during a time when Watercare changed from an engineering focussed organisation, to one that is now centred around our customers. David will be missed by Management and the Board. **9.1 Closing karakia** The closing karakia was performed by Richard Waiwai. The meeting closed at 12.35pm.

CERTIFIED AS A TRUE AND CORRECT RECORD

.....

Margaret Devlin, Chair

Watercare
An Auckland Council Organisation

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 meeting

4

Disclosure of Directors' interests

Purpose			Team	
Information	Discussion	Approval	Prepared and Recommended	Submitted
			Rob Fisher Company Secretary	**Marlon Bridge** Acting Chief Executive

Intellectual capital	People and culture	Community and stakeholder relationships	Financial capital & resources	Natural environment	Assets and Infrastructure

1. Purpose and context

Section 140 of the Companies Act 1993 requires all directors to keep an Interests Register, which must be disclosed to the Board of the company.

2. The details

Watercare Services Limited's Directors' Interests Register is set out below.

Director	Interest
Margaret Devlin	• Director and Chair, Lyttleton Port Company Limited • Director, Waikato Regional Airport • Director, Titanium Park (wholly owned subsidiary of Waikato Regional Airport) • Director, Waimea Water Limited • Director, Aurora Energy • Director, IT Partners Group • Councillor, Waikato University • Deputy Chair, WINTEC • Independent Chair of Audit and Risk Committee, Waikato District Council • Director, Infrastructure New Zealand • Chair, Advisory Board Women in Infrastructure Network • Chair, Hospice Waikato • Chartered Fellow, Institute of Directors • Member, Institute of Directors, Waikato Branch Committee
Nicola Crauford	• Chair, GNS Science Limited • Chair, Electricity Authority • Director and Shareholder - Riposte Consulting Limited

Director	Interest
	• Director – CentrePort Limited Group
	• Trustee – Wellington Regional Stadium Trust
Brendon Green	• Director, Kaitiaki Advisory Limited
	• Director, Tainui Kawhia Incorporation
	• Director, Hiringa Energy Limited
	• Director, Peak2Peak Limited
	• Executive Director, Advanced Biotech NZ Limited
	• Management contract, Tainui Kawhia Minerals
	• Australia-NZ representative, Wattstock LLC (USA)
	• Representative of Waipapa Marae, Kawhia, Te Whakakitenga o Waikato Tainui
	• Runanga Manukau Institute of Technology - Te Whakakitenga o Waikato representative
	• Member – Waikato District Council – Infrastructure Committee
	• Advisor – Te Taumata Aronui – Ministry of Education
	• Adjunct Senior Fellow – University of Canterbury – Department of Chemical Engineering
Hinerangi Raumati-Tu'ua	• Chair, Parininihi Ki Waitotara Incorporated
	• Chair – Te Rere O Kapuni Limited
	• Trustee, PKW Trust
	• Chair, Ngā Miro Trust
	• Chair, Nga Kai Tautoko Limited
	• Chair, Te Kiwai Maui o Ngaruahine Limited
	• Director, Taranaki Iwi Holdings Management Limited
	• Chair, Aotearoa Fisheries Limited
	• Director, Sealord Group Limited
	• Director, Port Nicholson Fisheries GP Limited
	• Director, Te Puia Tapapa GP Limited
	• Director, Tainui Group Holdings Limited
	• Executive Member, Te Whakakitenga O Waikato
	• Member, Venture Taranaki
Dave Chambers	• Director, Paper Plus New Zealand Limited
	• Director, Living Clean NZ Limited
	• Director, Turners and Growers Fresh Limited
Frances Valintine	• Director and CEO, The Mind Lab Limited
	• Director and CEO, Tech Futures Lab Limited
	• Director, Harcourt Jasper Limited
	• Director, Pointed Tangram Limited
	• Director, Harper Lilley Limited
	• Director, On Being Bold Limited

Director	Interest
	• Director, Sandell Trustees Limited • Selection Advisor, Edmund Hillary Fellowship • Trustee, Dilworth Trust Board • Futures Advisor, BNZ Bank
Graham Darlow	• Business Executive, Acciona Infrastructure NZ Limited • Director and Shareholder, Brockway Consulting Limited • Chair, Frequency NZ Limited • Director, Hick Bros. Civil Construction Limited • Director, Hick Bros. Infrastructure Limited • Chair, Holmes GP Structure Limited • PAB Member, Piritahi Auckland Civils Alliance (Kāinga Ora) • Director, Tainui Auckland Airport Hotel GP (No.2) Limited • Director, City Care Limited • Director, Hick Bros. Heavy Haulage Limited • Director, Hick Bros. Holdings Limited

Report to the Board of Watercare Services Limited

Prepared for the 30 March 2021 Board meeting

Central Interceptor report for February 2021

HIGHLIGHTS AND LOWLIGHTS

- A crane failure at the Haycock shaft resulted in a serious close call. The hook block of the crane dropped on the roof of an excavator at the bottom of the shaft. Three workers were in the shaft at the time but no injuries were sustained as the workers were in the safe zone.
- All 'expat' staff across the project who returned to their home over the Christmas period have now returned to New Zealand. The ability to secure managed isolation quarantine spaces (MIQ) remains a concern, with long lead times to secure spaces for new expat team members.
- Shaft lining has continued at Māngere Pump Station with wall lining lift 3 completed on the inlet shaft and lift 2 completed on the main pump station shaft.
- May Road Shaft A is now 48.5m below ground level and the bell-out of the base of the shaft for launching the MTBM (micro tunnel boring machine) has begun. Assembly of the MTBM continued during the month.
- The Wilsons precast facility in East Tamaki is now complete with the first 50 tunnel rings for the main tunnel now produced, and the Hynds Pipe facility in Pokeno has begun production of the jacking pipe for the link sewers.
- The stakeholder and communications team for the project delivered a truck safety programme at the May Road School. Tunnelling is due to start at the May Rd site in the coming months resulting in an increased presence of trucks in the area.

FUTURE OUTLOOK

- The Tunnel Locomotive for the main tunnel is to arrive on site in March, along with the Gantry Cranes for both the main tunnel and micro tunnelling.
- Preparation for the effluent channel crossings for the Rising Main works are complete and the physical works are set to start in early March.
- The Confluence Chamber interface design options workshop will be completed, and a preferred option selected.

Shayne Cunis
Executive Programme Director, Central Interceptor

1. PROJECT SUMMARY

HEALTH, SAFETY & WELLNESS

Serious Close Call at Haycock:

- There was a crane failure during the lifting of an excavator from the Haycock shaft. As tension was applied, the end of the wire rope of the crane slipped through the wedge and socket assembly causing the hook block to drop onto the roof of an excavator (unmanned) which was rigged for removal and a section of wire rope to spiral down into the shaft. Three workers were in the shaft at the time, but no injuries were sustained. All three were positioned in the safe zone away from the load. All crane operations on the project were temporarily suspended pending crane inspections, by specialist crane investigators. A more detailed account is attached showing how the incident was investigated and follow up actions.

Health, Safety and Wellness (HSW) Town Hall:

- The project held its first HSW Town Hall meeting. This was led by the Project Directors, and the HSW leaders, along with engagement from workers from across the project. Its purpose is to bring senior leadership and workers together to discuss HSW related issues. The key topic of discussion for the inaugural meeting were the results from the recent Safety Climate Survey. Workers had the opportunity to ask questions and discuss HSW related topics raised by the survey.

COVID-19 Response:

- The project operated under COVID-19 Level 3 protocols from 15 – 18 Feb and again from the 28 Feb - 7 March. As there are now well established plans for working at this enhanced Alert Level, there were no suspension of works.

DELIVERY

Māngere Pump Station:

- Shaft dewatering remains ongoing and unchanged with no evidence of environmental impact
- Permanent walls continue to be installed in the inlet shaft (10.5m) and the pump station shaft (7m)
- Installation of the rising main continues, with work to cross the odour beds commencing

May Road:

- Shaft A excavation has continued to depth of 48.5m below ground level. The bell-out of the base of the shaft for launching the MBTM has begun

Keith Hay Park:

- Construction of the Branch 9B diversion chamber has continued

Haycock Avenue:

- Excavation of the shaft has continued and has reached a depth of 19.5m below ground level

Dundale Avenue:

- Capping beam construction has been substantially completed

Miranda Reserve:

- Construction works have ceased and will recommence in Q2 2021

Walmsley Park:

- Site establishment activities have continued

PEOPLE

- The granting of multiple entry visas to our Australia based team members has greatly aided the process for their travel to and from NZ. It negates the requirement to seek an exemption to enter New Zealand each time they return. The ability to secure managed isolation spaces (MIQ) remains a concern, with long lead times to secure spaces for new or returning expat team members
- Following the conclusion of the WSL Summer Internship programme, two of the interns who spent their summer as part of the Central Interceptor team have remained on the project as Student Engineers. This is in line with the project's Engineering Pathways programme which aims to develop the next generation of Engineers with a focus on Māori and Pasifica students

CONSENTS & APPROVALS

- Council inspection at Walmsley Park, Haycock Avenue and Dundale Avenue. Full compliance
- A joint stormwater management approach for 54 Roma Road (Watercare land) and 105 May Road (leased land) continues to be developed as part of a variation to the lease agreement. Negotiations commenced in August 2019 to agree on an accessway alignment through 105A – 109A May Road and are expected to conclude next month. While the new lease includes benefits for all parties, additional costs and claims are expected and the WSL Commercial team are involved in negotiations

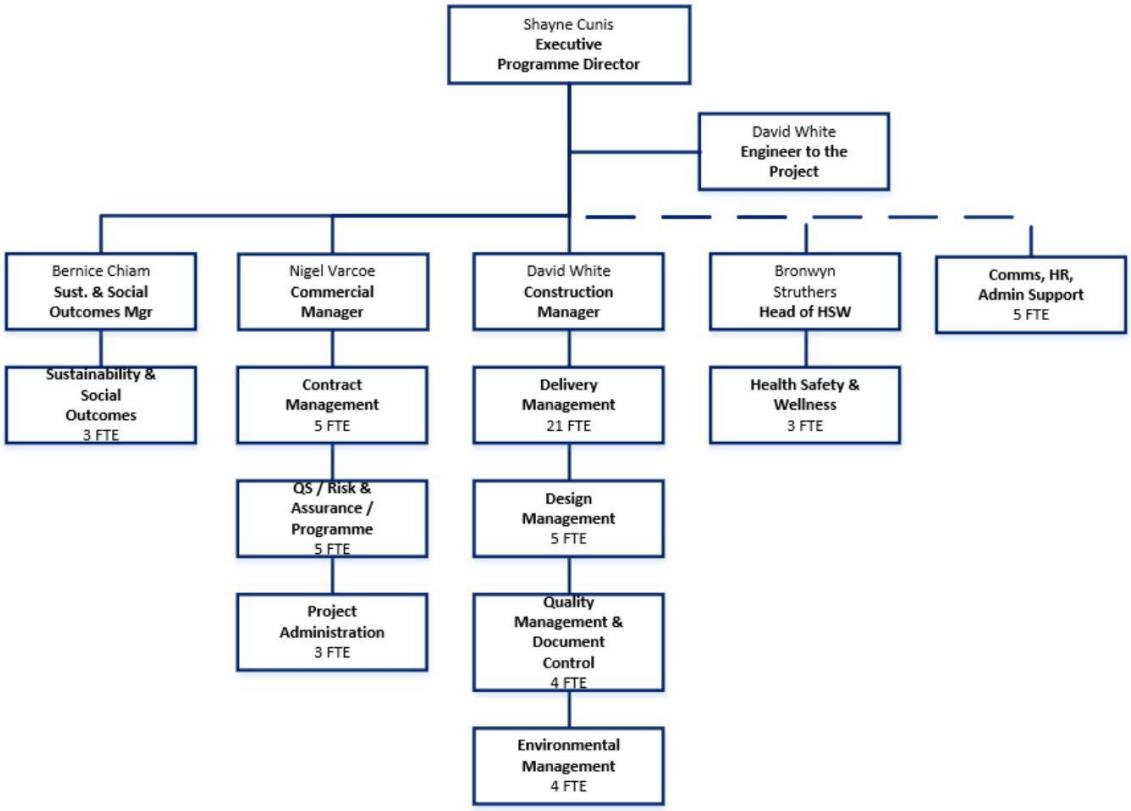
RISKS

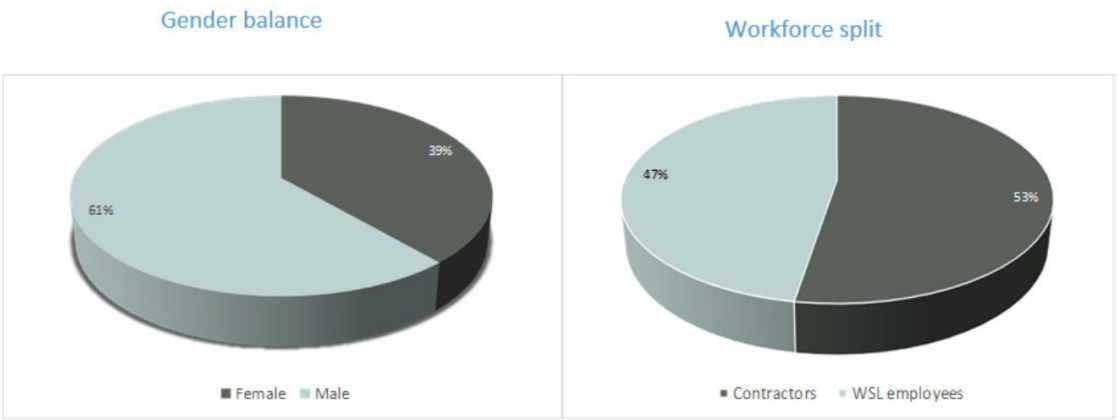
- Section 5 provides greater detail on the current risks in play. There have been no significant risk developments during the month of February
- The risk associated with suspended loads has been realised with an incident occurring at Haycock Ave. Lifting works were halted project wide with all controls being reviewed before work was able to recommence
- Resurgence of community COVID transmission resulted into Level 3 lockdowns in Auckland and associated site controls implemented
- Resourcing issues due to offshore travel restrictions and significant local competition in the labour market continue to present risks and challenges to the project
- Preparations to commence tunnelling continues with heightened focus on tunnelling associated risks e.g., fire in the tunnel

STAKEHOLDER & COMMUNICATIONS

- Produced and delivered project newsletter by post and email to some 5,500 subscribers as well as local board members, Councillors and the Mayor's office
- Delivered presentations to Puketāpapa and Whau local boards during the month on further works at Keith Hay Park's southern end, and a construction update and progress on the replacement play-space for the Glenavon neighbourhood
- Delivered the first major public engagement for the Discovery Centre at the Big Gay Out, 14 February (with 16,000 event attendees)
- Planning continues for communication with local residents and 'Meet the Contractor' event for PS23 in Hillsborough
- Hosted a GAJV truck safety lesson for 80 pupils at May Road, Mt Roskill

2. ORGANISATION STRUCTURE





3. Health, Safety & Wellbeing

Watercare, its partners and the GAJV worked a total of 72,741 hours in February 2021. The rolling Lost Time Injury Frequency Rate (12 monthly) is 1.23 and the Total Recordable Injury Frequency Rate (TRIFR) is 2.46 per million hours

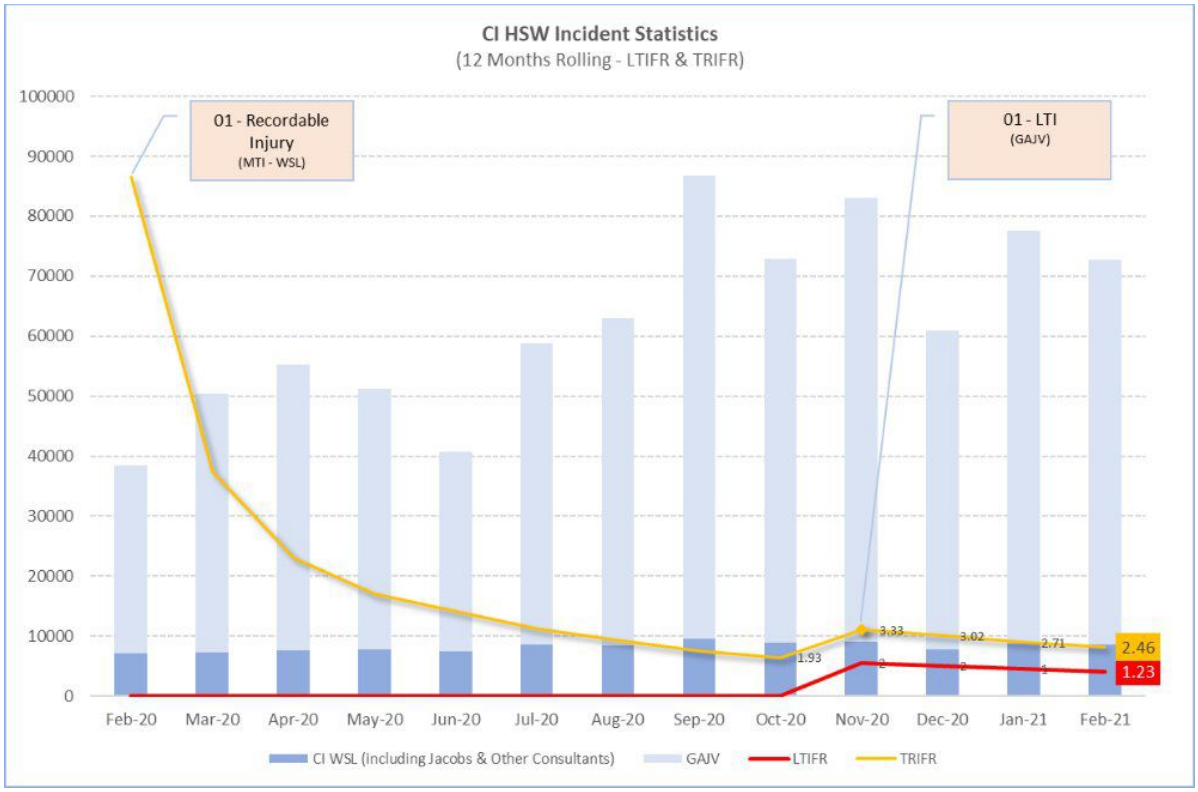


Figure 1: H&S Statistics (12 months rolling rate)

GAJV reported a total of six first aid, six close call and three minor property damages during this period.

	Hours Worked*	FAI	MTI	LTI	Close Call	PD	RO	NI
Watercare Employees	4,347	0	0	0	0	0	0	0
Jacobs Construction Management	2,296	0	0	0	0	0	0	0
Other Consultants*	1,972	0	0	0	0	0	0	0
Ghella Abergeldie JV	64,126	6	0	0	6	3	1	0
Total	**72,741**	**6**	**0**	**0**	**6**	**3**	**1**	**0**

*Includes Jacobs Design Support and Grey Lynn Tunnel (84% of hours worked)

Classification	Description
First Aid Incident (FAI)	Refers to any injury that can be treated on the job site without causing lost workdays. Treatment for first aid incidents includes cleaning minor cuts, scrapes or scratches, treating a minor burn, applying bandages or dressings, cold compress, cold pack, ice bag or splint.
Medical Treatment Injury (MTI)	A medical treatment injury (MTI) is defined as an injury or disease that resulted in a certain level of treatment (not first aid treatment) given by a, physician or other medical personnel under standing orders of a physician. This does not include preventive medications
Restricted Duties Injury (RDI)	A restricted duties injury (RDI) is defined as an injury or disease that resulted in a physician or other medical practitioner limiting a worker's hours or work activities for a period of time.
Loss Time Injury (LTI)	A lost-time injury is something that results in a fatality, permanent disability or time lost from work. It could be as little as one day or shift
Close Call	A close call is an incident which did not result in injury, illness or damage, but could have potentially done so.
Property Damage (PD)	Is when a structure, plant, light vehicle etc. has occurred
Report Only (RO)	An incident, injury, illness that is not work related and or has happened away from the project, vehicle accident to and from works etc.
Notifiable Incident (NI)	An incident that requires to be Notifiable to WorkSafe
Combination of incidents	In a result where there are multiply classifications the highest severity and outcomes must be taken into consideration

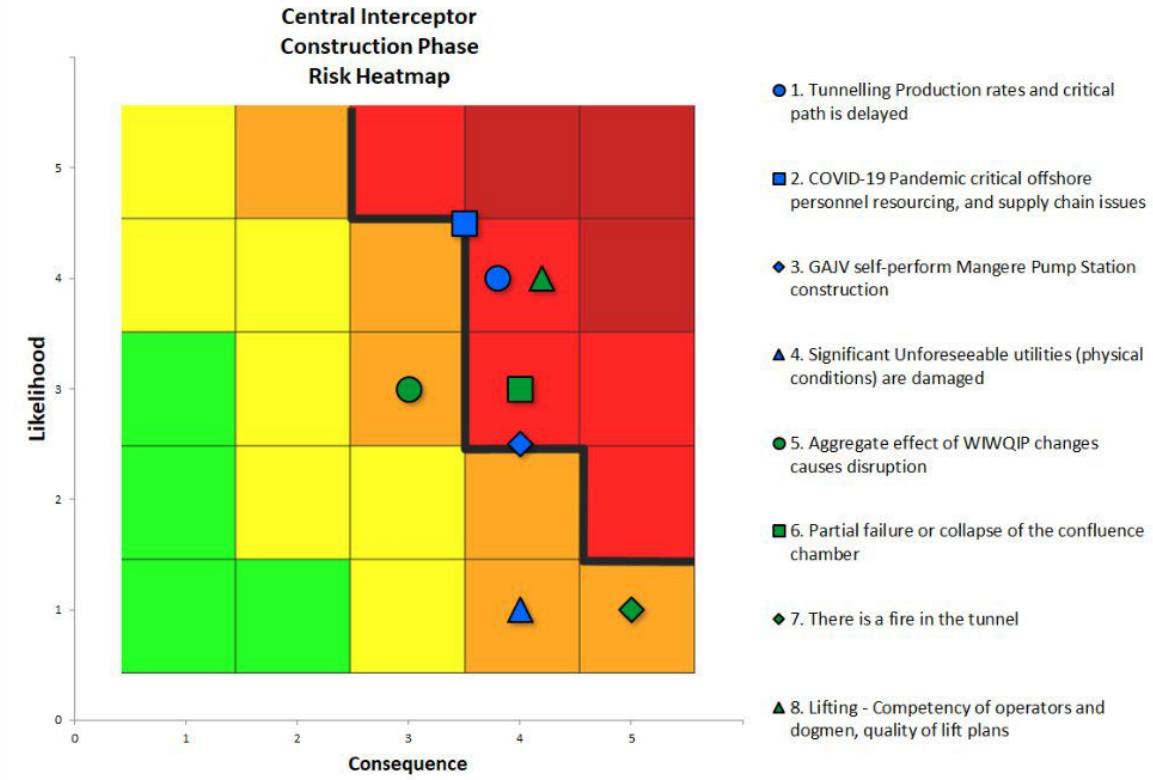
4. Risks

There have been no significant movements in any of the existing risks over the month however, the risk associated with suspended loads has been realised with an incident occurring at Haycock Avenue. This led to an immediate stop-work notice for all lifting activities project wide while all controls were reviewed prior to work recommencing on any site. This risk has now been added to the risk heatmap.

February saw the resurgence of community Covid-19 cases and two Level 3 lockdowns in Auckland. This risk continues to be monitored and all controls reviewed.

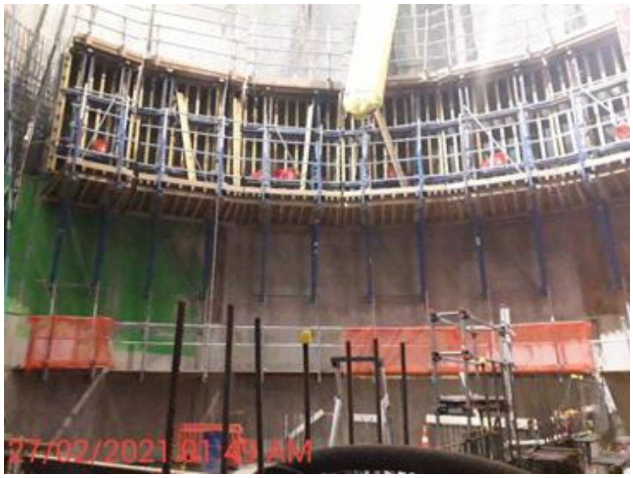
Resourcing issues due to offshore travel restrictions and significant local competition in the labour market continue to present risks and challenges to the project. However, GAJV have had some success in recruiting experienced and talented local resources to the project.

Preparations to commence tunnelling continues with heightened focus on tunnelling associated risks, in particular the risk associated with fire in the tunnel due to the tunnel lining. Workshops and planning with GAJV continue in order to manage these risks appropriately.

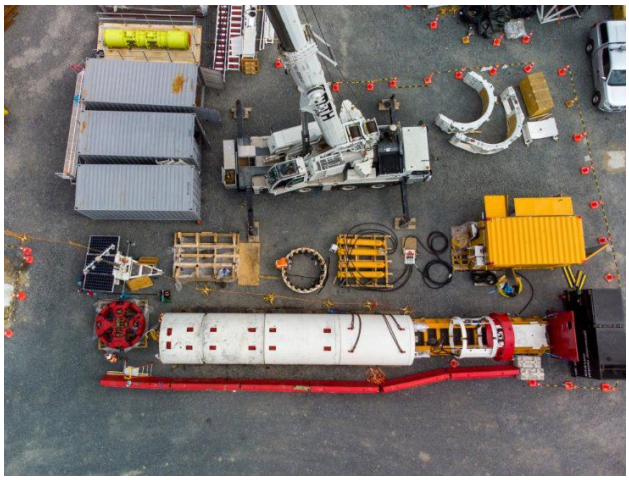


Risk Description		Risk Reduction Actions
Tunnelling production rates and critical path is delayed Ground conditions are more adverse than baselined in GBR results in delays to programme and additional costs.		Additional probe drilling for specific ground conditions. We will actively monitor ground conditions and tunnelling rates during operation. TBM has facility for real-time monitoring.
COVID-19 Pandemic critical offshore personnel resourcing and supply chain issues Resourcing – critical staff not able to obtain exemptions to be able to enter New Zealand. Now presents a critical risk to the project.		$5M expenditure to procure TBM from Germany instructed in late February 2020. Engagement with GAJV for critical resourcing requirements from overseas. WSL can offer endorsements if necessary, to pass government requirements. GAJV have recruited a number of local resources for critical roles. Close monitoring of supply chain impacts due to COVID-19 incl. engagement with suppliers.
GAJV self-perform Mangere Pump Station construction Contractor proposing to self-perform delivery of Mangere Pump Station works. Quality and/or commissioning issues arising from Insufficient capability within Contractor to successfully deliver works.		Approval process and in-depth review of contractor capabilities. Engagement of appropriate sub-consultants where required. The GAJV presented their delivery plan, but it had significant areas of concern. At this time, we have not approved and highlighted that any delays in delivery are, in our view, a result of the contractor's performance.
Significant utilities (unforeseeable physical conditions) are damaged Utilities not shown on drawings or with visible evidence on site. Inadequate investigations		Ensure services investigations are undertaken by the Contractor Review Contractor method statements and risk assessments for utility location.
Aggregate effect of WIWQIP changes causes disruption Sum of WIWQIP changes impacts GAJV scheme procurement activities. Limited internal WSL resource availability to manage additional workload causes delays.		Change management process in place. Considering all viable options for delivery of WIWQIP work, and impact of timeframe for delivery of works without impacting CI performance warranties. Jacobs resourcing available to support CI team members.
There is a fire in the tunnel Construction with pre-installed liner, some incident e.g. electrical fire causes the lining to catch fire. Fire in the tunnel impedes evacuation and rescue operations.		Electric locomotive to reduce flammable risk. Detection and suppression systems. PHMPs being agreed with Worksafe. Tunnel mgmt controls around ignition sources. AME system - real-time personnel tracking Integrated and comprehensive emergency management system Early contractor engagement with mines rescue Limiting visitor and personnel access to essential only. Comprehensive underground induction.
Partial failure or collapse of the confluence chamber A lack of understanding/underestimation/inaccurate assessment of the existing asset condition The Contractor's methodology is unsuitable, or a deviation from the approved approach.		Provisional Sums removes cost pressure for condition survey and investigation to provide the most appropriate solution. Work will proceed on least risk option. Shutdown works to be programmed for dry season/periods of low flow. Workshop between contractor, designers, and treatment plant to identify the most appropriate solution
Lifting Suspended loads pose a risk of being dropped and causing injuries to staff.		Competent operators and dogmen. Ensure high quality of lift plans. Establishment of critical rules, with a specific rule to eliminate workers under suspended loads.

5. Photo Update – February 2021



MPS – Pump Station shaft - Installation of jumping formworks for lift 3



May Road – Assembly of the MTBM for Testing

May Road – Drilling in preparation for rock bolt installation

Dundale Ave – Construction of the capping beam nearing completion

MPS – Site overview

6. Construction Programme

Watercare
An Auckland Council Organisation

When is the Central Interceptor being built?

Central Interceptor
Watercare

6.2

Building the
CENTRAL INTERCEPTOR

Crane Rigging Failure at Haycock Avenue

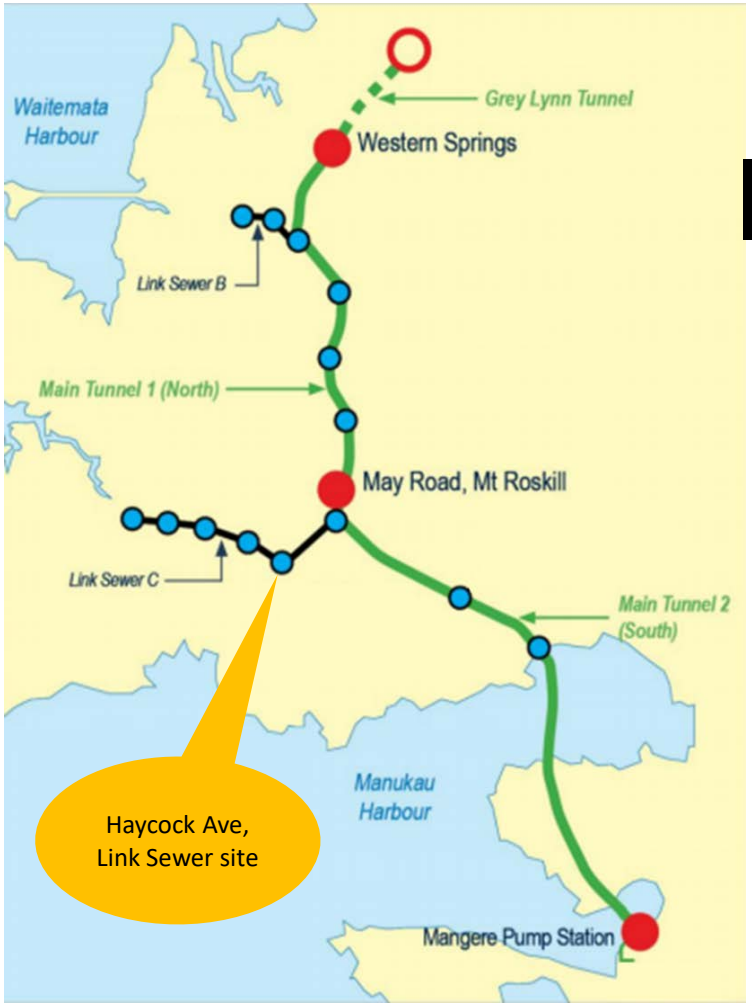
Chris McCarthny – Lead Engineer

30 March 2021

Central Interceptor | Watercare
An Auckland Council Organisation

Location

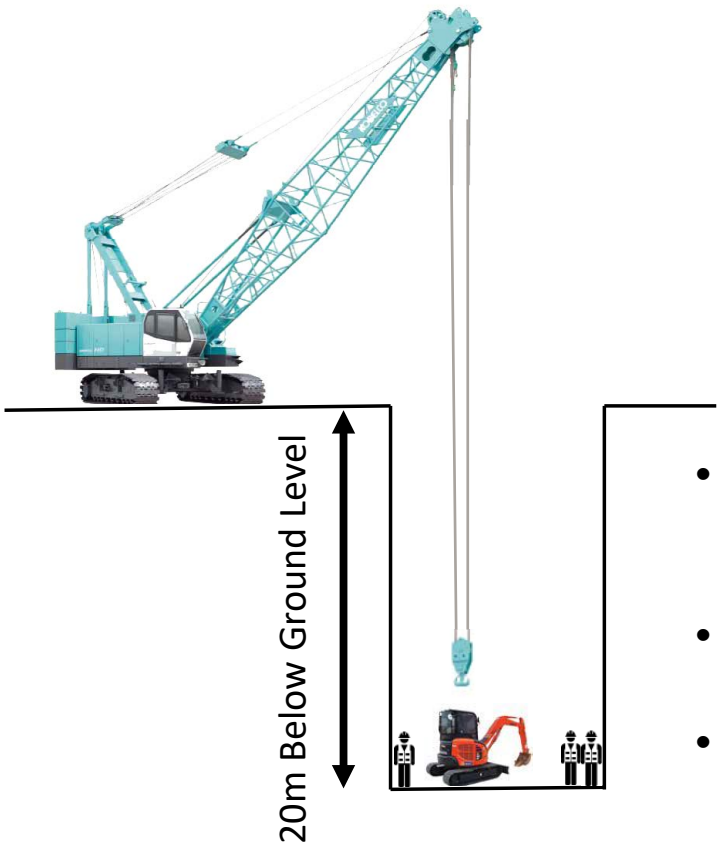
2 & 4 Haycock Avenue, Mt Roskill.

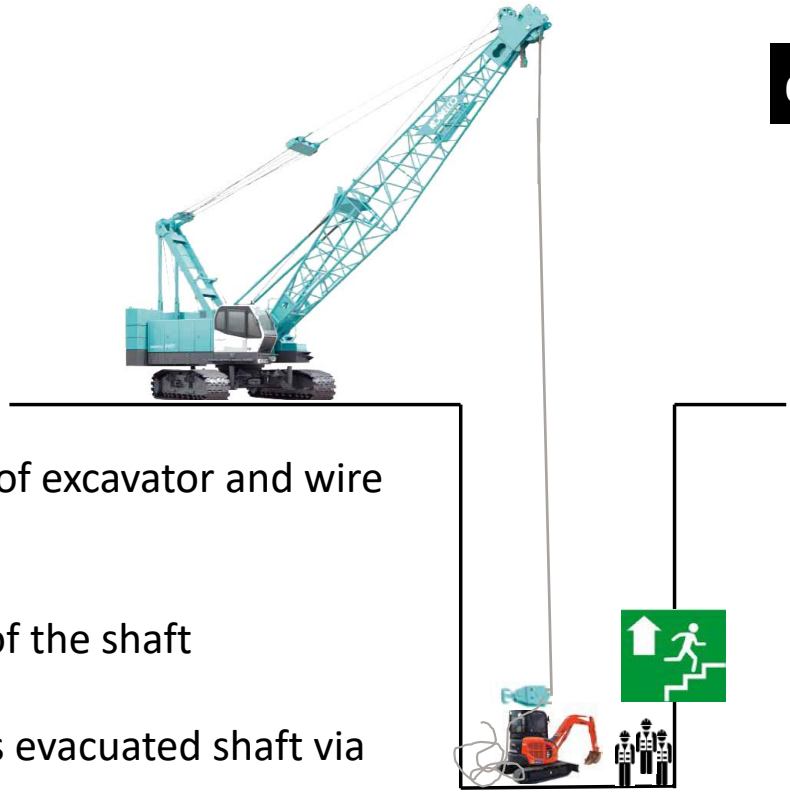


Central Interceptor

Watercare
An Auckland Council Organisation

Incident Overview – Saturday 27 February 2021



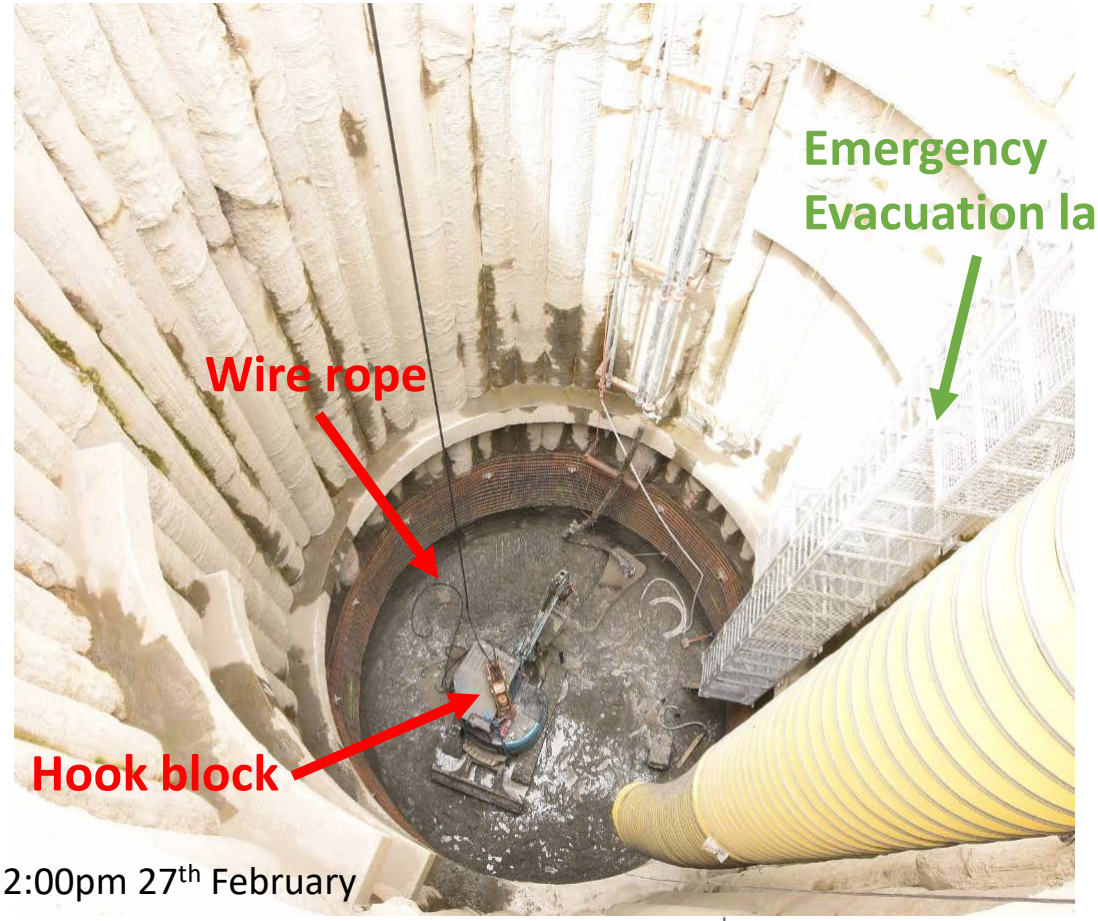


- Hook block dropped onto roof of excavator and wire rope fell to base of shaft
- 3 workers present in the base of the shaft
- Following the incident, workers evacuated shaft via emergency ladder

Central Interceptor | Watercare An Auckland Council Organisation

Immediate Actions – Saturday

- Site evacuated and secured
- Notifications
  - Worksafe
  - Project Teams
  - Project Leaders
  - WSL Board Chair & CEO
- Witness reports collected
- Mates in Construction onsite
- Incident investigation team appointed
  - Watercare & GAJV
- Suspended lifting across all CI sites



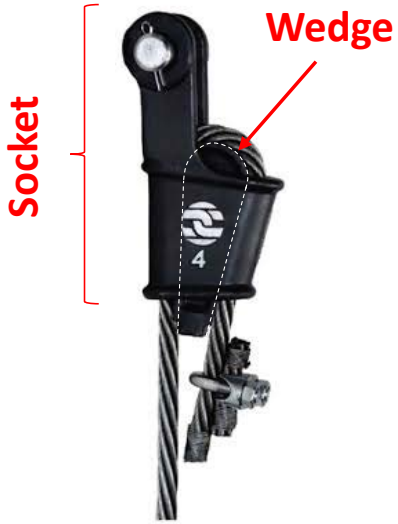
2:00pm 27th February

Central Interceptor | Watercare An Auckland Council Organisation

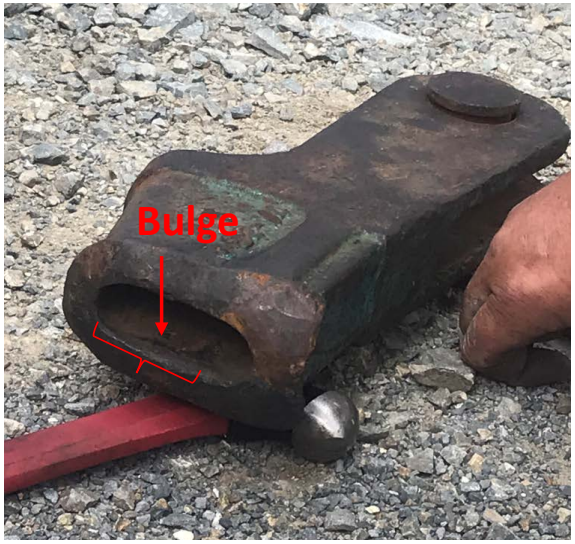
Initial Findings

Immediate Cause

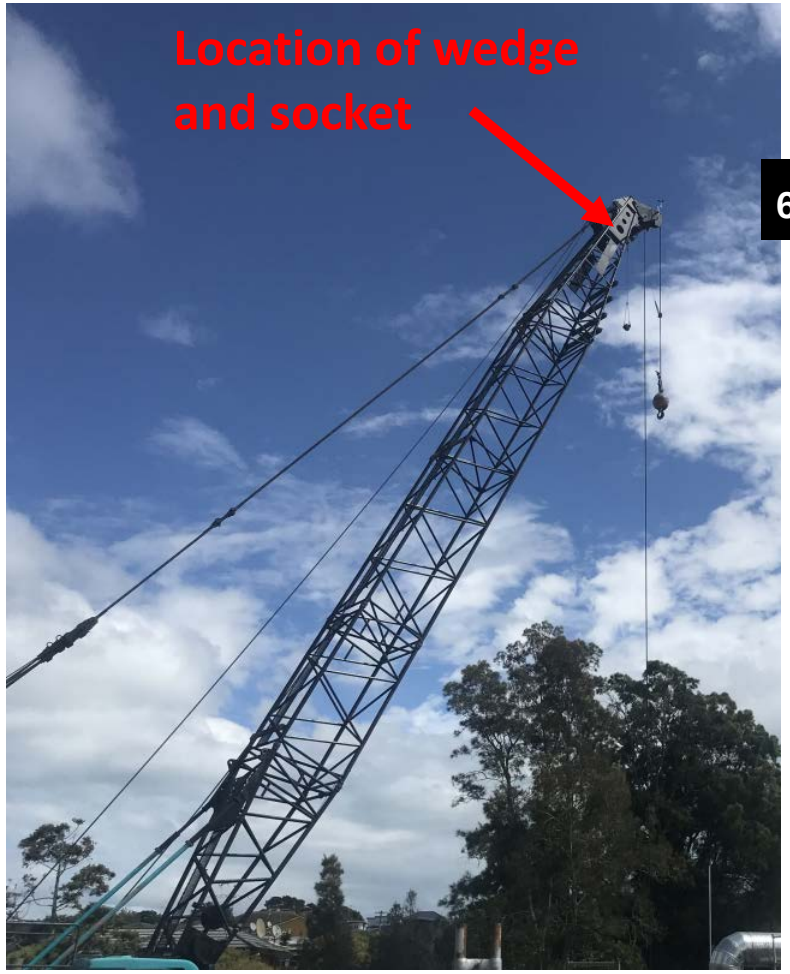
As tension was applied, the wire rope slipped through the wedge and socket assembly located at the tip of the jib



Typical wedge and socket



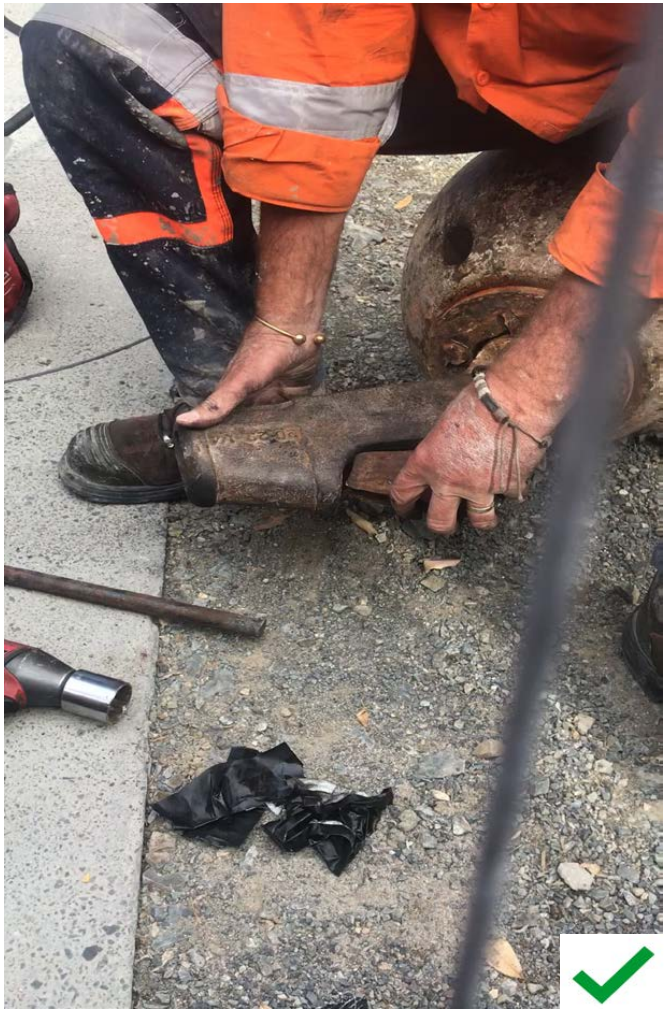
Actual wedge and socket from incident



6.2

Central Interceptor | Watercare An Auckland Council Organisation

Wedge & Socket Operation

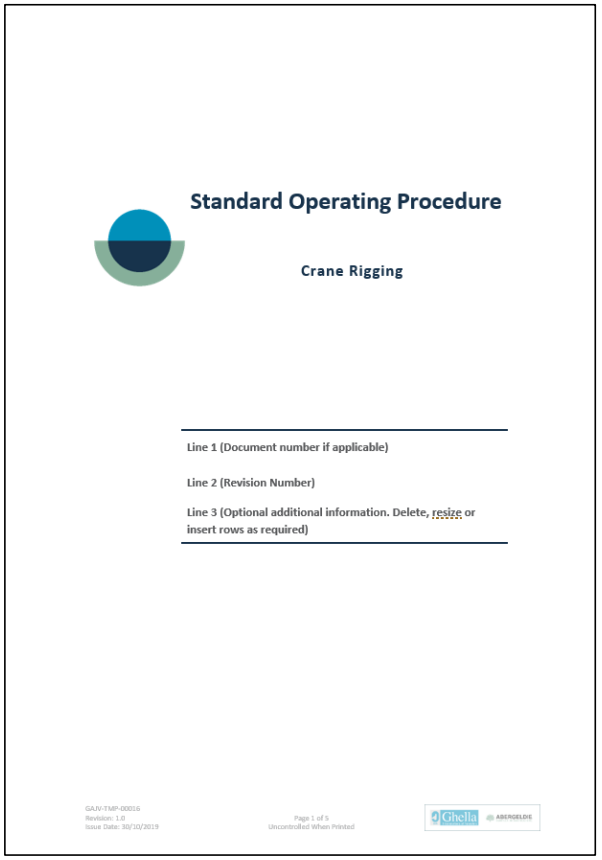


Central Interceptor | Watercare An Auckland Council Organisation

Key Findings & Outcomes

- The key findings are:
  - Wedge and Socket were not a matching pair, and did not function correctly
  - The crane was supplied in this configuration
  - This defect was not identified by a number of certified parties

- Key Outcomes
  - Industry wide Safety Alert issued
  - A new Safe Operating Procedure implemented to ensure adequate checks for all crane rigging activities
  - Ensure adequate planning so that re-rigging of cranes on site is eliminated as much as possible


Standard Operating Procedure

Crane Rigging

Line 1 (Document number if applicable)

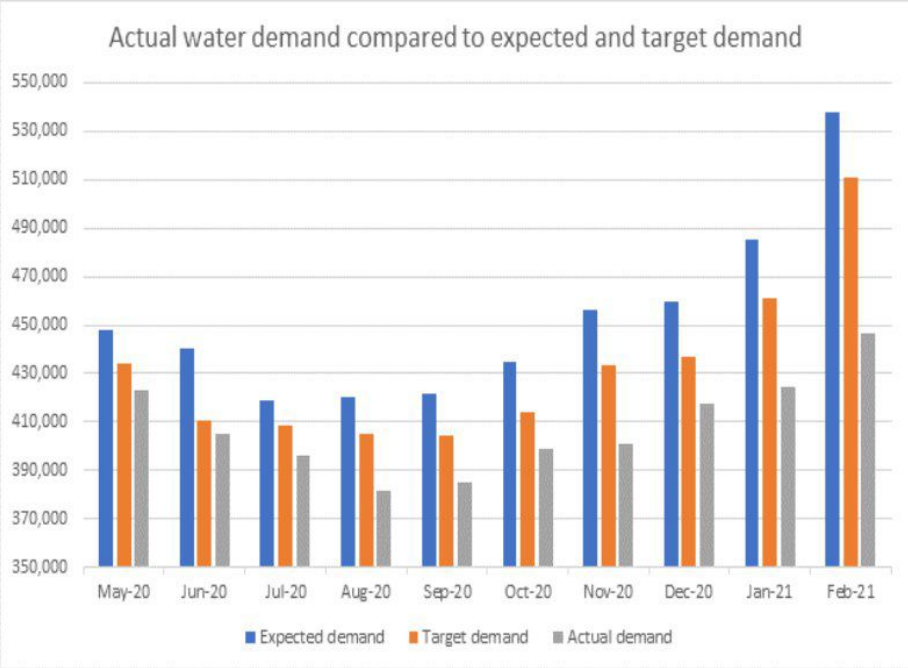
Line 2 (Revision Number)

Line 3 (Optional additional information. Delete, resize or insert rows as required)

Watercare
An Auckland Council Organisation

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 Board meeting

Drought Update



The graph here represents the water use savings. Most notably, Aucklanders have saved over 13 billion litres of water (to the end of February) since water restrictions were implemented in May 2020.

The **expected demand** is the daily volume we expected to occur had restrictions not been imposed and voluntary savings not been asked for.

The **target demand** is the expected demand less the savings target. We want actual demand to be less than or equal to the target demand.

Year	Month	Expected Demand	Demand target	Actual Demand	Cumulative savings	Reduction compared to expected	Reduction compared to target
2020	May	448,000	434,126	422,996	555,451	5.6%	2.6%
2020	June	440,000	410,300	405,168	1,600,397	7.9%	1.3%
2020	July	419,000	408,525	395,720	2,322,089	5.6%	3.1%
2020	August	420,000	405,300	381,713	3,508,994	9.1%	5.8%
2020	September	421,500	404,640	384,992	4,604,248	8.7%	4.9%
2020	October	435,000	414,338	398,805	5,726,299	8.3%	3.7%
2020	November	456,000	433,200	400,872	7,380,136	12.1%	7.5%
2020	December	460,000	437,000	417,771	8,689,245	9.2%	4.4%
2021	January	485,000	460,750	424,385	10,568,295	12.5%	7.9%
2021	February	538,000	511,100	446,571	13,128,302	17.0%	12.6%

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 Board meeting

Augmentation and non-revenue water status update for 18 March 2021 have been covered in below tables. Up to date storage and forecast figures will be provided during the Board meeting.

AUGMENTATION STATUS UPDATE – TO 18 MARCH 2021

Location	Pukekohe Bore Capex Approved	Hays Creek dam in Papakura Capex Approved	Waitākere Water Treatment Plant Capex Approved
On track			
Action	Bringing this bore back into service by setting up modular Water Treatment Plant and local network connections.	Bring this dam back into service by setting up modular Water Treatment Plant and local network connections.	Maximising abstractions.
Additional supply and date that supply comes online	Production outcome of 5MLD has been achieved. WTP has been preforming extremely well, consistently producing ~5 MLD Phase 2 works are underway, to be completed late March 2021.	Yield = 8MLD Daily Peak = 12MLD Stage 1 = 5MLD In Service Stage 2 = 12MLD	Peak = Restore peak production capacity from 16 to 24MLD ETA: 24MLD August 2021.
Action underway	Phase 2 works are underway: • Site reinstatement works complete • Completion of mechanical and electrical installation works • Control System enhancements • Installation of fluoride dosing systems – has been delayed due to complexities associated with the current good practice guidance and process control requirements.	• WTP has operated reliably for the past 7 days • Event to celebrate the reinstatement of water supply from the Hays Creek Dam and the Papakura WTP site held on 16 March • Work on Stage 2 is in flight, detailed design processes are underway, as are the development of key site civil works including the installation of the WTP retaining wall and platform.	• Working through confirmation of design improvements and methodologies • Filter design review report received • Solids handling system improvements to be confirmed, will require external support to assess current loading and determine necessary system improvements.

Report to the Board of Watercare Services Limited

Prepared for the 30 March 2021 Board meeting

Location	Waikato Water Treatment Plant (existing plant)	Ardmore Water Treatment Plant Awaiting Capex Approval	Onehunga Water Treatment Plant Capex approved
On track			
Action	Maximising abstraction.	Reduce minimum flow to reduce abstraction pressure on dams.	Maximising abstractions.
Additional supply and date that supply comes online	Waikato WTP now operates at a maximum production capacity of 175MLD.	Reduction of Water Treatment Plant output to allow enhanced conjunctive use of other water sources underway. ETA: December 2020 Long term improvements: TBC – Whole of System Operational Validation Required.	Maximise production from the existing Water Treatment Plant Restore Maximum Production Capacity up to 24MLD Stage 1: 22MLD by January 2021 Stage 2: 24MLD by April 2021.
Action underway	Waikato Chemical Upgrade is progressing on site with blower improvements and Hypo and Lime facility construction. This will further improve the reliability and sustainability of the 175MLD production. Piling and foundation work of the lime and hypo facilities are complete and precast concrete and steel frame structures have been erected. High Voltage (HV) works progressed. Mechanical fitout progressed and hypo tanks delivered.	Ardmore current minimum flow has been increased to 140 MLD to ensure that our system is resilient for the summer period. Transition to a minimum of 80MLD will occur late Autumn/Early Winter 2021.	• Stage 1 has been completed but due to dry conditions the aquifer level is low and plant operation is limited by aquifer level control which reduces production to 16MLD • Stage 2 has commenced • Filters 9 and 10 completed and now in-service • Filter 2 to be returned to service next week Filters 7, 8 and 3 being prepared for rehabilitation

Report to the Board of Watercare Services Limited

Prepared for the 30 March 2021 Board meeting

Location	**Waikato 50** **Capex approved**
On track	
Action	Design, consent and build new plant to process the additional water available under the seasonal take and the 2013 application when granted – Waikato A Capex needs development.
Additional supply and date that supply comes online	Stage 1 = 50MLD by June 2021.
Action underway	• For stage 1 - Project team consisting of Watercare staff, designer and contractor is working together with a co-located office on site. • Typically, over 300 contractors on site. Still over 10 staff working on some final design elements with detailed design substantially complete. • BOI 150MLD consent application lodged and open for public comment. • Boost pump station construction progressed ahead of schedule, pumps and motors installed, precast building construction started, major pipework spools received on site, all consents obtained. • Waikato 50 expansion on schedule for 50MLD by 28 June 2021. • Floating intake pump station piling progressed, consent obtained, and pontoons, screens and pumps on site with assembly of pump station progressed. • Risks reviewed on a fortnightly basis - mainly congested site, COVID-19 delays, impact on existing plant, supply chain issues regarding COVID-19 and resource availability. • Long lead items procurement delivery monitored closely with minor delays so far. • Iwi weekly update hui arranged. • Treated water pump station piling and foundation slab complete and precast walls progressing, HV room progressed, Waikato 50 treatment plant underground pipework and slab complete, package switchroom on site. Granular Activated Carbon (GAC) and membrane tanks installed together with pipe racks and secondary treatment facility. Mechanical pipework and electrical works have progressed working 24/6. • Waikato 50 raw water pipeline works progressed on site and HDPE pipe welding and pipe install nearing completion. • Major tie-in work completed successfully at both the boost pump station and Waikato WTP sites. • Largely due to the risk associated with the effects of COVID-19 on logistics the “into service date” could be delayed by a maximum of four weeks.

Report to the Board of Watercare Services Limited

Prepared for the 30 March 2021 Board meeting

NON-REVENUE WATER STATUS UPDATE – TO 18 MARCH 2021

Activity	Creating smaller District Metered Areas and Pressure Management
On track	
Action	65% of the City with District Meter Area's less than 10,000 connections installing meters and valves to create geographical areas in which we can measure: • Supply • Consumption • Non-revenue water.
Actions Underway	Stage 1 Waitākere: • Rezoned from 6 to 24 DMAs by August 2020 (95% completed - delay due to shutdown scheduling conflict at one site). Stage 2 Maungakiekie: • Rezoned from 1 to 4 DMAs (40% completed -traffic plans application sent to AT) • Design is 95% complete, construction is 35% complete • New change request has been finalised and approved. New completion date is June 2021 • Total 18 sites (these are sites where valves, meters and PRV's are being installed to create the watertight boundaries of the 4 zones being created): 7 completed, 4 currently under construction, 2 under design review, 5 awaiting TMP approval from AT. One PRV installation was removed from scope as it would adversely affect several key customers. One of the 4 new DMAS (Sylvia Park zone) will therefore not be pressure managed but will still function as a DMA. The pressure management of this zone will be integrated into Tranche 2 of the pressure management works. Stage 3 to be integrated with pressure management programme Tranche 2 • Scoping of the next tranche of 30 DMA's has commenced in Māngere and Torbay. Preliminary investigative work is underway • Internal scoping and design have begun of Māngere bridge zone boundary, and Lincoln-Swanson sub-zone • Following this a subject to funding a business case to establish the 30 DMAs will be put forward for FY20-21. The capex will be completed by June 2021. This will allow pressure reduction in almost 20% of the city's metropolitan network (by volume).
Estimated Benefits	• The creation of DMAs is an enabler to maximise the efficiency of pressure management and leakage control. • DMAs enable the benefits of all NRW initiatives to be monitored and tracked.
Future Expenditure for both pressure management & creating smaller DMAs	Total 8.6MLD savings estimated 11 months from approval of tranche 2. Tranche 2 expected to commence in FY22 following a business case approval. • Opex: $1.4M • Capex: $7.7M.

Report to the Board of Watercare Services Limited

Prepared for the 30 March 2021 Board meeting

Activity	Leakage Control
On track	
Action	Increase ground surveying of leak detection to 6,000km a year. Contractor has been appointed. Fix all moderate to major leaks detected within 5 days.
Actions Underway	Zones currently in progress • Owairaka 201km (100% completed) • Crownhill high 19km (50% completed) • Wiri 92km (50% completed) • Riverhead 36km (delayed in favour of completing Flatbush faster) • Pukekohe Kitchener 141km (80% completed) • Konini 259km (40% completed) • New Lynn 150km (started) • Khyber 187km (started) • Hill Park 65km (started) • Total km surveyed to date: approx. 3500 • Total leaks found: 2761 • Total MLD confirmed saved: 5.91MLD • Zones completed (Maungakiekie, New Lynn, Ōtara, Clarks Beach, Green Bay, CBD, Onehunga, Ōtāhuhu, Northcote, Devonport, Pakuranga, Bombay, Pukekohe, Māngere, Waiuku, Mangawhau, Montana, Duke Street, Hillsborough, and Flatbush, Owairaka) • Unmetered cross connection found between Watercare network and Veolia. It is understood that a previously recorded valve was opened on 24 November 2020. The cause and quantum of this opened valve are still being verified.

Estimated Benefits	Total: 6000km surveyed and 8.9MLD saving by June 2021 (Opex funding of $780K budgeted and approved). Based on progress to date and projected savings of the remaining zones, it is expected that the programme will achieve 8.9MLD savings by end of June 2021 (93% of original target of 9.6 MLD) due to less savings being achieved than projected in each of the zones completed to date. Note: these savings are realised under the basis of:
	• All leaks detected can be fixed within 5 days of reporting.
	• A renewals program is overlaid alongside the leak detection works and is in its design life. This is evident in Maungakiekie where a second sweep of the zone revealed that over 130 new underground leaks had occurred within 6 months period.
	• Estimated of 1.6MLD saved every 1000km. This is a conservative estimate based on 75% of the savings achieved throughout FY19 of:
	  ○ 394km swept in Maungakiekie – (1MLD predicted savings)
	  ○ 260km swept in Māngere Airport – (0.4MLD predicted savings).

Future Expenditure	Total 15 MLD savings estimated for FY22 which would require: ○ Opex: $800K (Leak detection 9.6MLD, management approval) ○ Capex: $60M (Watermain renewals, Board approval).

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 Board meeting

Activity	Meter Replacements
On track	
Action	Improve accuracy of customer meters by replacing per year: • 30,000 domestics NOTE: This work will decrease the volume of water consumed-unbilled. It is unlikely decrease demand.
Actions Underway	• Work started in July 2020 and ongoing throughout FY21: o 22,227 domestic meters replaced YTD, progress will be reported on the first week of every month • Meter stock is low, but more are expected to be delivered by May. Most logger deployments should not be delayed due to meter replacements as most can be retrofitted • 300 loggers have been planned to be installed for the Month of March. Additional staff member has been appointed to support the smart meter project. • While installing a logger a private leak was found at a school which was leaking 14,000 L/d.
Estimated Benefits	Benefits are $3.6M per annum additional revenue based on: • 8% revenue gain in domestic meters 6% revenue gain in non-domestic meters. • 460 l/d average consumption of domestic meters. • 22,000 l/d average consumption of non-domestic meters. • Value of water sold: $4.36 per 1KL.
Future Expenditure	$1.2M annually in additional water and wastewater charges which requires: o Capex: $6.75M (Meter replacement capex).

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 Board meeting

Activity	Unauthorised use
On track	
Action	Meter fire connections in specified properties to monitor for illegal use. NOTE: This work will decrease the volume of water consumed but unbilled. It is unlikely to decrease demand.
Actions Underway	Property fire supply is being monitored to determine if unauthorised use is occurring. All 6 sites now installed. A West Auckland shopping centre has shown a pattern of constant use through their fire main. The sensor used is a new technology which is based around temperature change (when water flows from the main into the private network it will decrease the temperature). Site audit was undertaken on 9 February. Unrecorded meter located and inspected. A backflow investigation was done on 26 February and it is suspected that the customer sub meters within the shopping complex may have been installed on the meter. A full shutdown of the shopping centre to confirm the matter was delayed due to COVID-19, currently being rescheduled. Potential unauthorised cases are reported to the Revenue Assurance team, they also conduct weekly audits at greenfield sites to identify additional unauthorised use from the water network. Alongside managing unauthorised use of wastewater, the Revenue Assurance team have managed the following cases for FY21 YTD: • Investigation of 208 unauthorised water use reports of which 138 reports have been confirmed, 70 cases confirmed as authorised • 63 of the confirmed cases have had the connection disconnected or a meter installed, and all costs to resolve have been invoiced • The remaining 75 cases are in progress • 25 of these confirmed cases were found in February Prosecution update: Late last year charges were filed against a company under the Health Act and Water Supply and Wastewater Network Bylaw. This matter is currently being considered by the court
Estimated Benefits	• Benefits will be determined post trial.
Future Expenditure	• Increased expenditure Depending on trial results • Unit costs to be determined at end of trial.

Watercare
An Auckland Council Organisation

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 Board meeting

Watercare's Metropolitan Drought Standards

6.4

Purpose			Team		
Information	Discussion	Decision	Prepared	Recommended	Submitted
✓			**M Bourne** Head of Servicing and Consents	**S Morgan** Chief Operations Officer	**M Bridge** Acting Chief Executive

Intellectual capital	People and culture	Community and stakeholder relationships	Financial capital & resources	Natural environment	Assets and Infrastructure
✓	✓	✓	✓	✓	✓

1. Recommendation and key points

That the Board note the current Levels of Service regarding drought resilience, the associated drought standards, and the implications of these standards.

Key points

Watercare has two levels of service that enable it to manage drought conditions and the resulting impact on water supply:

- 1st Level of Service – Proactive demand restrictions are to be required for an event no more frequent than that with a 5% probability of occurring.
- 2nd Level of Service – Annual average demand within the metropolitan supply area can be met in a drought with a 1% probability of occurrence leaving 15% residual capacity in its water supply lakes.

These levels of service provide the framework to plan Auckland's metropolitan water supply.

2. Purpose and context

The period January 2020 to April 2020 was the driest on record for the Auckland water supply catchments. In January and February 2020 there were records set for daily demand. Watercare implemented its Drought Management Plan, initially with a requirement for a voluntary reduction in demand in early February 2020, then in May 2020, at Watercare's request, Auckland Council implemented Stage 1 water use restrictions.

The establishment of drought standards are critical for water supply planning and are an important component of the Drought Management Plan.

The Aurecon review of Watercare's drought preparedness, commissioned by the Board, recognised that water use restrictions are a sensible response to droughts as they reduce demand and stretch water supplies (refer page 2 of Aurecon's Preparedness for Drought Summary) but recommended that the drought standards and Drought Management Plan should be reviewed (Recommendation 1). This paper sets out the current Levels of Service regarding drought resilience, the associated drought standards, and the implications of these standards.

3. The details

When discussing Watercare's drought standards most are familiar with the phrase '1-in-100-year with 15% residual storage' with less focus on the frequency of restrictions. This 1-in-100-year event is a simplification of the 1% probability of occurrence in the 2nd Level of Service. While Watercare operates to ensure that there is sufficient water to meet a 1-in-100-year drought, proactive demand restrictions will be required in advance to ensure that a drought more severe than the design drought can be survived; stretching out the 1-in-100-year drought supply to survive any probable event.

We have commissioned NIWA to undertake initial analysis of the return period of the current drought. This indicates that for the period 1 November 2019 to 30 April 2020 the drought return period was greater than a 1-in-200-year event in the Hūnua Ranges and a 1-in-150-year event in the Waitakere Ranges. This was the worst drought experienced in our catchment areas and was the reason restrictions and other interventions were implemented as the return period exceeded the drought standard.

The recovery of the drought is still ongoing, and the rainfall experienced over the 16 months, November 2019 to February 2021, has a return period of 1-in-30 years. This still exceeds the frequency period expressed in the 1st Level of Service.

Annual Drought Standard and Yield

A drought standard serves two purposes. It establishes the likelihood that restrictions are required to reduce water demand and the yield of water available from the various sources. For instance, if a 1 in 1000 year drought standard was adopted the likelihood of restrictions would be less than for a 1 in 100 year drought standard. However, the water yield for a 1-in-1,000-year drought would also be less as the yield is determined by the rainfall that occurs over the selected rainfall return period. Accordingly, the drought security standard establishes the total yield of the water system for a given return period. By way of example, the yield of Lower Nihotupu dam is 24.25MLD. This is the average volume that can be extracted each day over a year during a 1-in-100-year drought. This would result in the dam levels not dropping below 15% storage during the drought. However, in a normal rainfall year around 38MLD is available across the year. For planning purposes, the yield of 24.25MLD is used, rather than the normal water availability.

The balance between total system yield (the sum of yields from all sources) and the annual average demand determines the timing of when future water sources are required.

The 1-in-100-year with 15% residual storage drought standard is an evolution of Watercare's earlier 1-in-200-year with no residual storage (0.5% probability) level of service from the mid 1990s. The 1- in-200-year standard was adopted by the legacy Auckland Councils following the 1993–94 drought. This standard did not initially mention return periods or probabilities, instead focusing on comparative inflows and remaining storage. The addition of both the Onehunga Aquifer and Waikato River to Watercare's water supply portfolio necessitated a change to this standard to incorporate these non-storage water sources. At this time the drought standard was translated into a probability and included the concept of residual storage as there was concern that the 1-in-200- year with no residual storage standard implied that "Watercare planned to fail". The drought standard was a key element of the Bulk Water Agreements between Watercare and the legacy Councils.

Immediately prior to 1993–94 drought the drought standard was 1-in-50-year with no residual storage. There is limited documentation on the history of Auckland's drought standard. But analysis of available water yields and demand growth through the 1970s and 1980s show that Watercare's predecessors were typically struggling to achieve a 1-in-50-year standard as growth outstripped the rate at which new sources could be developed. Following the construction of Mangatangi Dam a drought yield for a 1-in-1000-year event was achieved. Through the 1980s and early 1990s this yield

was eroded with a combination of growth and continued deferral of developing new water sources until the 1993–94 drought event. Similarly, when the Waikato Water Treatment Plant is expanded the observed drought standard will be greater than the 1-in-100-year with 15% residual storage drought standard until growth erodes the headroom created.

Restrictions Drought Standard

In the 1st Level of Service – Proactive demand restrictions are to be required for an event no more frequently than that with a 5% probability of occurrence, or a 1-in-20-year restriction frequency. This has two purposes:

- The first is to reduce demand so that there is sufficient water to make it through an event more severe than the annual drought standard. The frequency of restrictions was developed at the same time as the annual drought standard. Restrictions for drought management follow a staged approach, typically starting with a voluntary approach then low impact measures that increase in severity as the drought develops.
- The second purpose of demand restrictions is to manage peak demand periods that typically occur during dry summers. The frequency of restrictions assists in determining the peak production and distribution capacity required. Many New Zealand cities and communities impose water restrictions each summer to trim peak demand. As Auckland's historic peak demand compared to average demand has not been excessive, summer restrictions are uncommon in Auckland.

In recognition of the recommendations within the Aurecon review of Watercare's drought preparedness we expect that Auckland Council will discuss any potential change to the drought standards in the Auckland Waters Strategy which is currently being developed by Council following the recommendation by the CCO Review Panel.

New Zealand Context

Watercare's metropolitan water sources are atypical in a New Zealand setting. Typically, most New Zealand communities rely on a single water source that has a significant reliability of supply. For example, Hamilton relies solely on the Waikato River whereas Watercare relies on storage lakes in two different catchments, Waitākeres and Hūnuas, groundwater sources at Onehunga and the non-storage source, the Waikato River which has a separate large catchment area of 14,063kms^2 upstream of the intake. Aurecon refers to the Waikato River as being 'a reliable source' (page 16). New Zealand has one of the lowest variations in stream flows globally which demonstrates reliability, compared to Australia and South Africa which have 3 and 4 times the variation respectively.

Due to the relatively reliable nature of most of New Zealand water sources (rivers and streams) only a limited number of reticulated supplies utilise raw water storage (water supply lakes) as well. Those that do, such as Wellington and Gisborne, use them as peak water sources. They have sufficient non-storage water sources to meet a base demand to ensure that their water supply lakes are fully replenished for the following summer.

Given the above, most New Zealand water utilities do not have an annual drought standard comparable to Watercare's 1-in-100-year level of service. Instead most are focused on meeting peak summer demand and applying annual restrictions on use is very common throughout the country. For these communities there are three constraints that would lead to summer 'peak' restrictions.

1. Source constraints
    a. Water allocation limits
    b. Low flow conditions restricting takes below allocation limits

Infrastructure constraints

c. Water treatment plant capacities
d. Conveyance limits

2. Budget constraints
    a. Operational budgets are largely fixed for those areas without volumetric charging

International Context

Internationally there are a number of levels of services and drought standards that have been developed bearing in mind these drought standards are designed to suit the specific hydrology, geology, annual rainfalls and community. For example:

South East Queensland

- To meet the projected regional average urban demand estimated by Seqwater, so that medium level water restrictions on residential water use will (on average) not occur more than once every 10 years, be more severe than 140 litres per person per day, or last more than 1 year
- To provide an essential minimum supply volume of 100 litres per person per day in an extreme drought event (ie. a 1-in-10,000 year event), so that key storages (ie. Baroon Pocket, Wivenhoe and Hinze dams) will not reach their minimum operating level more than once in every 10,000 years on average.

Conversations with colleagues in Melbourne and Sydney have highlighted that consideration is being given to increasing their drought resilience towards a 1-in-1,000 to 1-in-10,000-year event given their concerns that savings from drought restrictions will not be sufficient for a worse probable event.

In the United Kingdom they have a highly regulated water sector via Ofwat which specify levels of service. Southern Water have developed the levels of service outlined below for their 2019 Water Resources Management Plan. The Environment Agency, Natural Resources Wales and Ofwat are currently updating their guidelines for the 2024 Water Resources Management Plans with the draft guidelines following consultation expecting water supplies '*to be resilient to any drought of a return period of once in 500 years*'

Drought actions	**Likelihood of use**
Temporary Use Bans	Water restrictions –once in 10 years on average.
Drought order to restrict water use (non-essential-use bans)	Wider water restrictions and for businesses – once in 20 years on average.
Standpipes and rota cuts (supplies limited to a few hours a day).	Emergency drought order for rota cuts and standpipes – unlikely to happen in our lifetime (once in 500 years) if drought permits and orders are introduced first.
Drought permits and orders to increase supplies	Applying for permission to take more water from rivers and aquifers – once in 20 years on average.

So, these are examples to which regard could be had in reviewing the drought standard for Auckland.

6.4

Watercare's preparedness for drought

a summary

aurecon

Whakahā ngā whakaaro
Kia maia, kia kaha, mahi tahi

Water confidence for Auckland

Auckland is experiencing a severe deficit in its surface water reserves, with reduced summer and autumn inflows to its dams.

Between 1 November 2019 and 30 April 2020, Auckland experienced its worst drought with only half the normal rainfall in its water catchment areas. Dam levels fell from 90% in November 2019 to less than half that by May 2020. This triggered low-level water restrictions which heightened interest in the security of Auckland's water supply. Recognising that the community wants assurance that Watercare is well prepared to manage droughts, the Watercare board initiated an independent review to find out.

About the review:

Aurecon reviewed Watercare's plans and reports, spoke to a variety of customers and stakeholders, used our experience with similar cities around the world and looked at future risks for the Auckland Region.

Our findings focussed on Watercare's Drought Management Plan, water supply security, drought resilience, preparing and responding to drought and communication, engagement and governance.

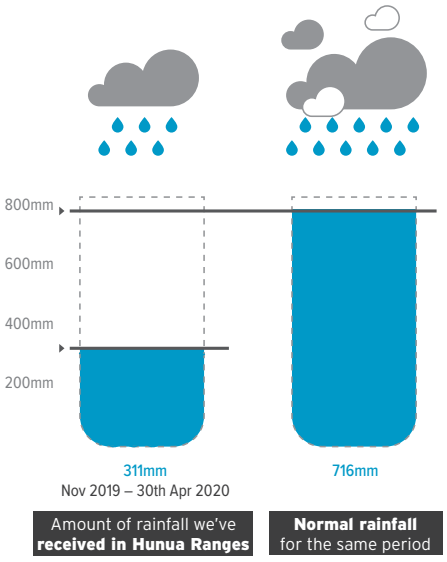
About Watercare

Watercare supplies drinking water to greater Auckland region. It is New Zealand's largest water and wastewater company and is owned by Auckland Council. Watercare's mission is to provide safe, affordable and efficient water and wastewater services.

Every day Watercare supplies more than 400 million litres to 1.7 million Aucklanders and this is increasing with a growing population and economy.

Watercare sources water from dams in the Waitakere and Hunua Ranges, from the Waikato River and from groundwater. It then treats the water and supplies it to homes and businesses by a massive network of pipes, pumps and reservoirs.

Watercare plans, designs, builds, maintains and operates the entire water and wastewater systems for Auckland and recovers most of the cost of this through its water and wastewater charges.



The challenge of droughts

Droughts are a natural occurrence and like many cities around the world, Auckland is not alone in this challenge.

Droughts bring uncertainty; how do we know we are in a drought, when did it start, how long will it last and how serious is it? Cities around the world grapple with these questions to decide how to prepare and respond to droughts. Assuming the worst case or hoping for the best can result in excessive expenditure or severe shortages.

Drought resilience is a shared outcome - the water supplier, the water users and the government working together to achieve an agreed level of drought resilience but this comes at an additional cost to everyone.

A diverse range of sources helps with drought resilience. Dams, lakes, stormwater and rivers are ready sources of water but these depend on climate and rainfall. Recycled water is a little less dependent but there is not enough of it. Sea water desalination is almost independent of climate, but it needs a lot of energy and can have adverse environmental impacts.

Cities around the world have been working out solutions to meet the drought challenge while maintaining reliable, affordable and equitable supply.

Watercare's approach to droughts

Watercare has a Drought Management Plan and an Asset Management Plan for the future, to make sure that Auckland has sufficient water supplies with sensible management of demand.

The city benefits from having diverse water sources in the Auckland and Waikato region, which together provide adequate water security to meet the drought standard.

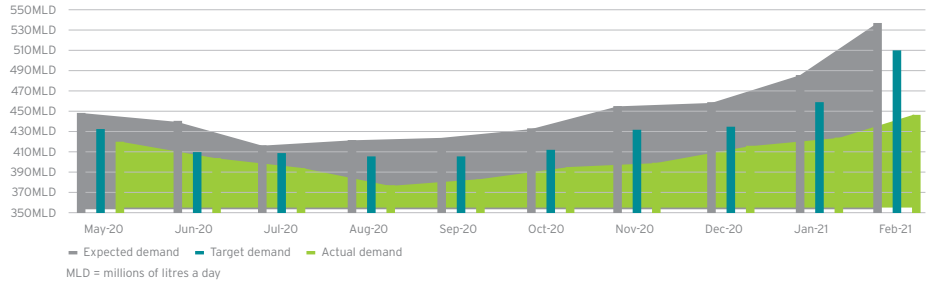
The drought plan is reviewed regularly and the triggers for increasing water supplies and managing water demand are reset as required. Water restrictions are part of a sensible response to droughts, as they reduce demand and stretch water supplies.

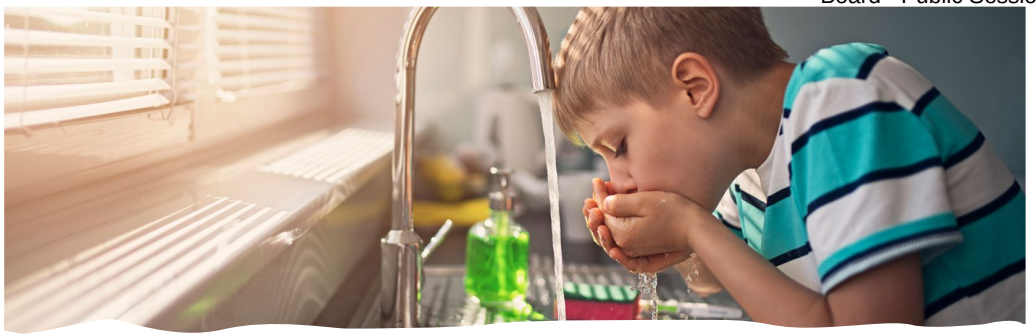
By keeping an eye on its storage and weather forecasts, Watercare calculates water supply and demand and then manages the supply system to deliver effectively. When supply levels drop to trigger levels, it takes measured steps to reduce the overall risk to Auckland.

Auckland Council has the responsibility to set the drought standard and approve water restrictions while Watercare has the responsibility to determine the best way of managing water supplies and demand to meet the standard, and to advise council on when to apply and lift restrictions.

This current drought triggered restrictions for Auckland, in accordance with the drought plan.

Aucklanders response to the current drought was exceptional, with demand significantly lower than forecast, as shown in the graph below.





What the review found

The review found that Watercare was well prepared and has managed this drought effectively but could do better in some areas.

What Watercare is doing well

- it has a range of water sources and is investigating others
- it is managing the supply and demand for water well
- its people and systems are well prepared to respond when droughts occur
- the organisation has matured over the last four years with an increasing focus on customer service
- Watercare's response to the drought was timely and it was on track with additional water supplies for a growing Auckland

Where Watercare needs to improve

There were three related areas for improvement which together will build Auckland's drought resilience

- creating an Integrated Water Security Programme which clearly sets out for everyone how Auckland will manage its water supply as climate conditions change
- being more proactive with Council, businesses and the community to develop a mutual understanding of the roles we all play to ensure water security and how we can support each other to achieve it
- work together with Aucklanders to be prepared for future climate conditions and to achieve an agreed level of drought resilience

Q&A

How are droughts managed?

Drought preparedness begins with having an agreed drought standard in place and implementing the actions and investments required to meet the standard. It also needs both a long-term outlook to manage supply and a short-term outlook for agile operational responses.

What is drought resilience?

Drought resilience is a shared outcome- the capability and capacity of the community to live with droughts. It requires local government, water service providers and the community to work together to manage water supply, demand and system operation.

How does my organisation, home or business play a part in drought management?

Everyone in Auckland has an important part to play in drought management. For it to be successful, Watercare, Council, customers and the community need to work together to increase supplies, improve operations and reduce water demand – this is a collective effort.

From forecasting rainfall, managing supply, consenting access, approving investments, conserving water or reducing demand, drought management requires a shared understanding of Auckland's Drought Management Plan and a coordinated response.

The review found there needed to be a high-level of capability, collaboration and resources and that timely communication and early engagement during planning were necessary to ensure that people understand, trust and support the drought measures and responses.

It found wider understanding of Watercare's drought management measures was likely to give people greater confidence in drought management, build drought resilience and create support for drought response measures.

Watercare's customers responded very well to the company's requests to reduce their water use, achieving far greater water savings than expected.

Does Auckland have water security?

The review found that with all the supply and demand measures that Watercare has already initiated, Auckland's long-term water supply security will meet maximum demand (with or without restrictions) every year for the foreseeable future.

Supply measures include access to additional Waikato River flows and recommissioning and augmentation of surface water and groundwater sources. Watercare's modelling shows that over the long-term, the storage capacity and access to Waikato River water is adequate to supply Auckland.

Watercare has started considering climate-independent sources of water for future generations. This includes desalination, purified recycled water and stormwater.

Can we learn from the experience of other global cities to develop drought resilience?

Watercare is an active member of New Zealand and Australian water industry associations and incorporates the learnings of other cities into its everyday practice. In 2019, an external review of water restriction in its Drought Management Plan considered the experiences of other major cities. This is positive and should continue. Many cities have faced droughts, some reaching 'Day Zero', to the point of rationing supply to basic human need of 20 litres per person per day. There are lessons to be shared and adapted as relevant.

We would love for you to help us.

Do you have the time to be part of a customer discussion group and share your ideas on how we can keep the water flowing?

If so, drop us an email at xxxxxxxxxxxxx

If you are interested in more details, you can read the review here:
place of link

Report to the Board of Watercare Services Limited

Prepared for the 30 March 2021 Board meeting

Iwi Relationships Report for March 2021

Te Ahiwaru – Makaurau Marae

Hoeā tō waka tapu kia tau atu ki te Puketāpapatanga a Hape
Tirotiro kau atu ki ngā wairere o te Mānukanuka-ō-Hoturoa
E ū ana ki te awa Ōruarangi
Takatakahi ngō tapuwae ki te Ihu ō Mataoho
Kia tae ake ra ki te Waharoa ō Makaurau
Ka tū te Tupuna a Tāmaki Makaurau e pōwhiri ana
Nau Mai, Haere Mai!

Makaurau marae is in Ihumātao, Māngere, five minutes from Auckland International Airport.

The principal hapū are Te Ahiwaru and Te Ākitai of the Waiohua iwi, which affiliate with the Waikato confederation.

The original name for Ihumātao is Te Ihu o Mataoho – The nose of Mataoho
Makaurau Marae is situated in the heart of Ihumaatao Pa. Surrounded by their tupuna awa, Ōruarangi, and the historic Otuataua Stonefields, it is a marae rich in culture and history.

Nga Tapuwae o Mataoho -The sacred footprints of Mataoho-Pukaki
Te Pane o Mataoho - The Decapitated head of Mataoho- Mangere Mountain
Te Upoko o Mataoho - The Head of Mataoho-Mangere Mountain
Te Ipu o Mataoho -The bowl of Mataoho-Mt Eden.

- Te Ahiwaru – Makaurau marae has three entity structures with three separate chairpersons
- Makaurau marae has had a long historical relationship with Watercare
- Māngere wastewater treatment plant, Manukau harbour, Ōruarangi awa and Te Motu ā Hiaroa
- A number of cultural wānanga held at Makaurau marae

Te Ahiwaru- Makaurau Marae engagement with Watercare

- Central Interceptor project
- All consents in Māngere area
- Waikato River 2013 application
- Section 330, of the Resource Management Act 1991, use of emergency powers, environmental flow reductions.

Te Kawerau Iwi Tribal Authority & Settlement Trust

Karanga mai ko Te Kawerau ā Maki, Ko Te Wao nui a Tiriwa
Mai Te Korekore ki Nga Tai a Rakataura
Ko Rangihina, Ko Whangaparaoa, Ko Mahurangi
Na Maki te mana me te rangatiratanga!

Te Kawerau ā Maki, the descendents of Te Waonui a Tiriwa
From Te Korekore to the shores of Rakataura
There lies Rangihina, Whangaparaoa, Mahurangi
From Maki is our authority!

General background

The tribal origins of Te Kawerau ā Maki lie in the district between Tāmaki Makaurau (the Auckland isthmus) and the northern Taranaki-Kāwhia area. Te Kawerau ā Maki are the descendants of the famous warrior chieftain Maki and his wife Rotu who, in the early seventeenth century, migrated with their family and a large group of followers from Kāwhia to what is now the Tāmaki (Auckland) region. They initially named and occupied Tāmaki, and later settled in the southern Kaipara, Waitākere, Whenua roa ō Kahu (North Shore) and Mahurangi districts.

Takiwā / Rohe - Boundaries

Southern Kaipara, Te Whenua roa ō Kahu (the North Shore), Hikurangi (West Auckland) Waitākere River and Piha areas and maintained the only papatipu settlements in the West (Te Henga). Whangaparaoa, Mahurangi, Matakanakana, Pākiri, Aotea (Great Barrier Island), and Te Hauturu ō Toi / Little Barrier Island.

The Crown and Te Kawerau a Maki initialled a Deed of Settlement on 19 January 2013.

Chair & Chief Negotiator – Te Wārena Taua
Office - 2/3 Airpark Drive, Airport Oaks, Auckland

Te Kawerau ā Maki engagement with Watercare

- Whangaparaoa, Army Bay WWTP discharge consent
- Warkworth, Snells – Algies discharge consent
- Māngere wastewater treatment plant
- Redhills Sewer
- Mairangi Bay – Sidmouth Street Wastewater Pump Station project
- Retrospective consents for existing WWTP oxidation ponds
- Reduction environmental flows from the Waitakere Storage Lake
- Te Motu a Hiaroa (Puketutu Island)
- Ōruarangi awa

Website: www.tekawerau.iwi.nz

Watercare
An Auckland Council Organisation

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 Board meeting

6.6

Watercare Shovel Ready Projects Supporting the Kāinga Ora Housing Programme

Purpose		
Information	Discussion	Decision
✓		

Team		
Prepared	Recommended	Submitted
I Gotelli Head of Major Developments	**S Webster** Chief Infrastructure Officer	**M Bridge** Acting Chief Executive

Intellectual capital	People and culture	Community and stakeholder relationships	Financial capital & resources	Natural environment	Assets and Infrastructure
✓	✓	✓	✓	✓	✓

1. Recommendation and key points

That the Board note this paper providing an update on Watercare's Shovel Ready funded projects that support the Kāinga Ora Housing Programme in three Redevelopment Precincts: Mt Roskill, Māngere and Tāmaki.

Key points

- Three water and wastewater bundles were approved under the Government Shovel Ready Programme totalling $115 million. The projects support Kāinga Ora and wider infill growth in the Kāinga Ora Redevelopment Precincts in **Mt Roskill, Māngere, and Tāmaki**. Figure A.1 in the appendix shows the location of these Precincts.
- The Shovel Ready funding is being managed by the Ministry of Housing and Urban Development ("MHUD") via Kāinga Ora. Watercare has a contract with Kāinga Ora to deliver 13 of the 16 projects within the bundles. The Watercare projects total $107 million.
- Board approval will be required for some of the Shovel Ready projects. This paper provides an overview of all Watercare delivered projects within the three bundles, giving context to the upcoming approvals and visibility across the programme.
- The Shovel Ready funding will allow the building of over 23,000 houses.
- Watercare is assessing the additional resources required to support Kāinga Ora's housing development programme, including the delivery of the Shovel Ready programme, and recruitment is underway.

2. Purpose and context

This paper gives an overview of Watercare's Shovel Ready funded projects. It also provides context for the project approvals that will be required to implement the programme. The Shovel Ready funding does not cover all projects that are required for Kāinga Ora housing development.

3. Government Shovel Ready Programme

In July 2020 the Government announced 147 projects totalling approximately $2.6 billion of 'Shovel Ready' funding. Of this Shovel Ready funding, approximately $685 million was allocated to various projects in the Auckland Region.

Watercare applied for several projects under the Shovel Ready Programme. The three bundles of projects to support the Kāinga Ora housing programme were the only ones approved. Details of the bundles are outlined in Table 1 below.

The Shovel Ready funding is being managed by MHUD under contract with Kāinga Ora. In turn, Watercare has a contract with Kāinga Ora to deliver 13 of the 16 projects within the bundles. The projects delivered by Watercare total of $107 million.

Table 1: Shovel Ready Bundles in support of Kāinga Ora Housing Programme

Precinct	Number of Projects	Shovel Ready Funding - Watercare	Shovel Ready Funding – Kāinga Ora
Mt Roskill – $65 million	6 Projects delivered by Watercare	$62.3m	
	1 Projects delivered by Kāinga Ora		$2.7m
Māngere – $25 million	4 Projects delivered by Watercare	$20m	
	2 Projects delivered by Kāinga Ora		$5m
Tāmaki – $25 million	3 Projects delivered by Watercare	$25m	
Total		**$107.3m**	**$7.7m**

4. Project Bundles

4.1 Mt Roskill Water and Wastewater Bundle

Kāinga Ora plans to build 20,000 new homes in the Mt Roskill Precinct. Two neighbourhoods are currently underway: Roskill South and Owairaka. The next two neighbourhoods are **Wesley and Waikowhai**, both of which will be subject to plan changes this year. The Waikowhai plan change is expected to be lodged in July and the Wesley plan change is anticipated in 2022.

The projects within each bundle are key infrastructure upgrades that unlock development across the Wesley and Waikowhai neighbourhoods and support the wider water and wastewater network to enable the development in these areas. Figure A.2 in the appendix shows the Shovel Ready projects in Mt Roskill.

4.1.1 Water projects

The existing water network cannot cater for the level of growth envisioned under the Kāinga Ora housing programme and wider infill housing development in the target areas over the next 30 years. Critical upgrades are needed to support this growth.

Wesley

Two projects support growth in the Wesley neighbourhood. The proposed watermain upgrades in Wesley will enable an uplift of approximately 9,800 dwellings, of which the Kāinga Ora development makes up 65 percent of the growth.

The first project is a new Bulk Supply Point (BSP) at the intersection of Winstone Road and Memorial Ave. This project was separated from the wider Wesley water project to enable delivery as part of the current Watercare Huia 1 project. Construction of the BSP commenced in March 2021.

The second Wesley project is a suite of watermain upgrades and the construction of an additional BSP to provide capacity and redundancy within the network. Significant water modelling has been undertaken since the original proposal was put forward in the Shovel Ready application. This modelling has resulted in a reconfiguration of the network upgrades to achieve a better outcome. The modelling work in this area has now been completed.

The preliminary design for the watermain upgrade projects has now commenced. Construction timeframes will be subject to design and consenting requirements. Work is being undertaken to determine a practical staging of the projects to achieve the delivery timeframes of the Shovel Ready Programme.

Waikowhai

The existing Waikowhai network is heavily constrained both in terms of supply and redundancy. While the Unitary Plan allows intensification, Kāinga Ora is seeking a plan change within this neighbourhood to enable additional density along transportation corridors. The Waikowhai project will allow for better service in the new zone and enable an uplift of approximately 3,400 dwellings, of which Kāinga Ora will deliver around 26 percent.

The Waikowhai project proposes the construction of a new potable water pump station, several watermain upgrades, and new bulk supply points. These will improve both the supply and resilience within this area of the network. The new pump station will be located in a more suitable site, removing the need to upgrade to the existing Hillsborough pump station and associated network. The new configuration separates the water network currently feeding across the Southwestern motorway. This separation reduces the scope for other upcoming projects to the north of the motorway while catering for a more resilient solution in Waikowhai and enabling Kāinga Ora and infill development. Significant modelling work has been completed and this option has been confirmed as the preferred solution.

Construction commencement will be subject to design and consenting timeframes. Work is also being undertaken to determine the staging of the components of the project to align with the Shovel Ready Programme requirements.

Owairaka

A new BSP at La Veta Avenue is required to enable the supply of water to the proposed Kāinga Ora growth in the Owairaka neighbourhood. The project will relocate the existing BSP on Richardson Road to a more suitable location and increase its capacity to cater for growth. This project is currently in the preliminary design phase with construction commencement scheduled for Q3 2021. This will allow the BSP to be available in advance of Kāinga Ora's development demand.

4.1.2 Wastewater projects

Shovel Ready funding has been allocated to the Central Interceptor to enable the increased density proposed by Kāinga Ora. The two projects are:

- modifications of the May Road and Walmsley drop shafts entering the tunnel to allow for increased wastewater flows; and,
- upsizing of Branch 9B diversion from 600ID to 900ID to support increased development.

These works are an incremental increase in capacity for works being delivered by the Central Interceptor project. Construction has commenced on the drop shaft modifications. The upsizing for the Branch 9B diversion is currently in detailed design phase and construction will commence in May 2021.

4.2 Māngere Wastewater Bundle

Kāinga Ora plans to build 10,000 new homes in the Māngere Precinct. Māngere West A and Aorere are currently underway. The next two neighbourhoods are Māngere East A & B, which have been combined for Kainga Ora master planning, and Buckland-Wickman, to the north of Māngere East.

The Shovel Ready funding for the Māngere bundle focuses on four key infrastructure upgrades to unlock development capacity in the active and two upcoming neighbourhoods within the Māngere Precinct. These projects are referred to as Aorere Park, Rehua Place – Stage 2, Buckland-Wickman and Cottingham Crescent. These projects form part of the overall solution set for the Māngere wastewater network. The increased wastewater capacity will allow the development of approximately 2,000 new dwellings. Figure A.3 shows the Shovel Ready projects in Māngere.

Aorere Park and Rehua Place – Stage 2

Aorere Park and Rehua Place – Stage 2 were originally intended to be delivered by Kāinga Ora via Piritahi. However, Kāinga Ora has requested that they be delivered by Watercare. Kāinga Ora will deliver two projects in the bundle: Rehua Stage 1 and Aorere Stage 1.

There are several existing known capacity issues within the wastewater network surrounding Aorere Park and Rehua. Additional modelling is required for these projects to confirm the scope and alignment of these upgrades with Kāinga Ora's development plans for these areas. The timeframes for these projects will be subject to consents and other approvals.

Buckman-Wickman and Cottingham

Kāinga Ora has identified two major wastewater upgrades to unlock the neighbourhoods of Buckman-Wickman and Māngere East. A significant amount of modelling work and optioneering has

been required to confirm the best options for upgrading the wastewater infrastructure in this area to support the level of development envisioned by Kāinga Ora. Assessment of a shortlist of options is currently underway for the Buckman-Wickman and Cottingham projects including:

- increased pipe capacity via new gravity pipes;
- increased pipe capacity via new pump station and diversion to the Eastern Interceptor;
- a combination of both gravity and pumped solutions; and
- a combination of Buckland Wickman and Cottingham into a single Shovel Ready project with a joint solution.

Through early contractor engagement, the team have identified significant construction challenges with the initial proposals. The options are being reassessed and will be confirmed via modelling and site investigation.

4.3 Tāmaki Wastewater Bundle

The Shovel Ready funding for the Tāmaki neighbourhood is focused on wastewater upgrades that are required to service the next stages of the Tāmaki development. These are the Point England and Panmure North neighbourhoods located in the southern catchment of the Tāmaki Precinct (see Figure A.4). The population serviced by the existing wastewater network in the southern catchment is proposed to increase from 6,800 to over 21,700 in the next 20 years. The existing Dunkirk Pump Station cannot support further upstream growth and does not currently meet Watercare's requirements for overflow frequency. Any increased demand will increase the frequency of these overflows.

The two projects are a new wastewater pump station and rising main and the replacement of a large diameter gravity main along Dunkirk Road to the new pump station. The physical works and land acquisition for the pump station and associated pipelines is dealt with in a separate Board Paper. A key challenge for these projects is that Kāinga Ora also has a project funded under the Shovel Ready Programme to upgrade the stormwater culverts. These projects are being undertaken in the same physical area; thus, close coordination is required. Opportunities to reduce the combined delivery costs are also being pursued.

There is one additional smaller project in this bundle for the upgrade of key sections of wastewater pipe along Taniwha Street. This supports neighbourhoods that have been underway for a few years, but that was not required until the Glendowie Branch Sewer project was completed. The initial work on this project has commenced. The next stages of the project are subject to further landowner and consenting approvals.

Appendix A: Scheme Plans for the Shovel Ready Projects

Figure A.1 Kāinga Ora Redevelopment Precincts

Figure A.2: Mt. Roskill Shovel Ready Projects

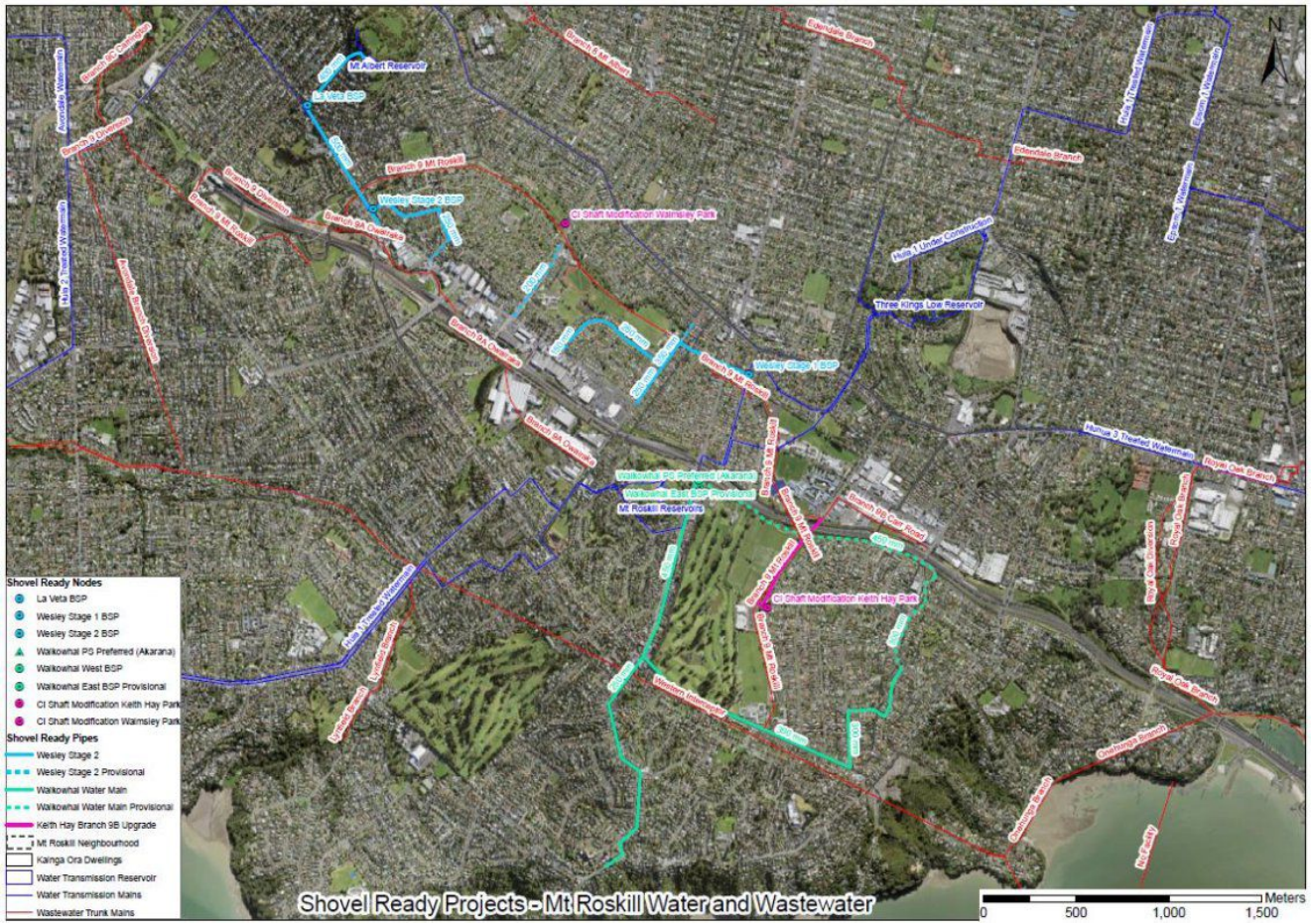


Figure A.3: Māngere Wastewater Projects

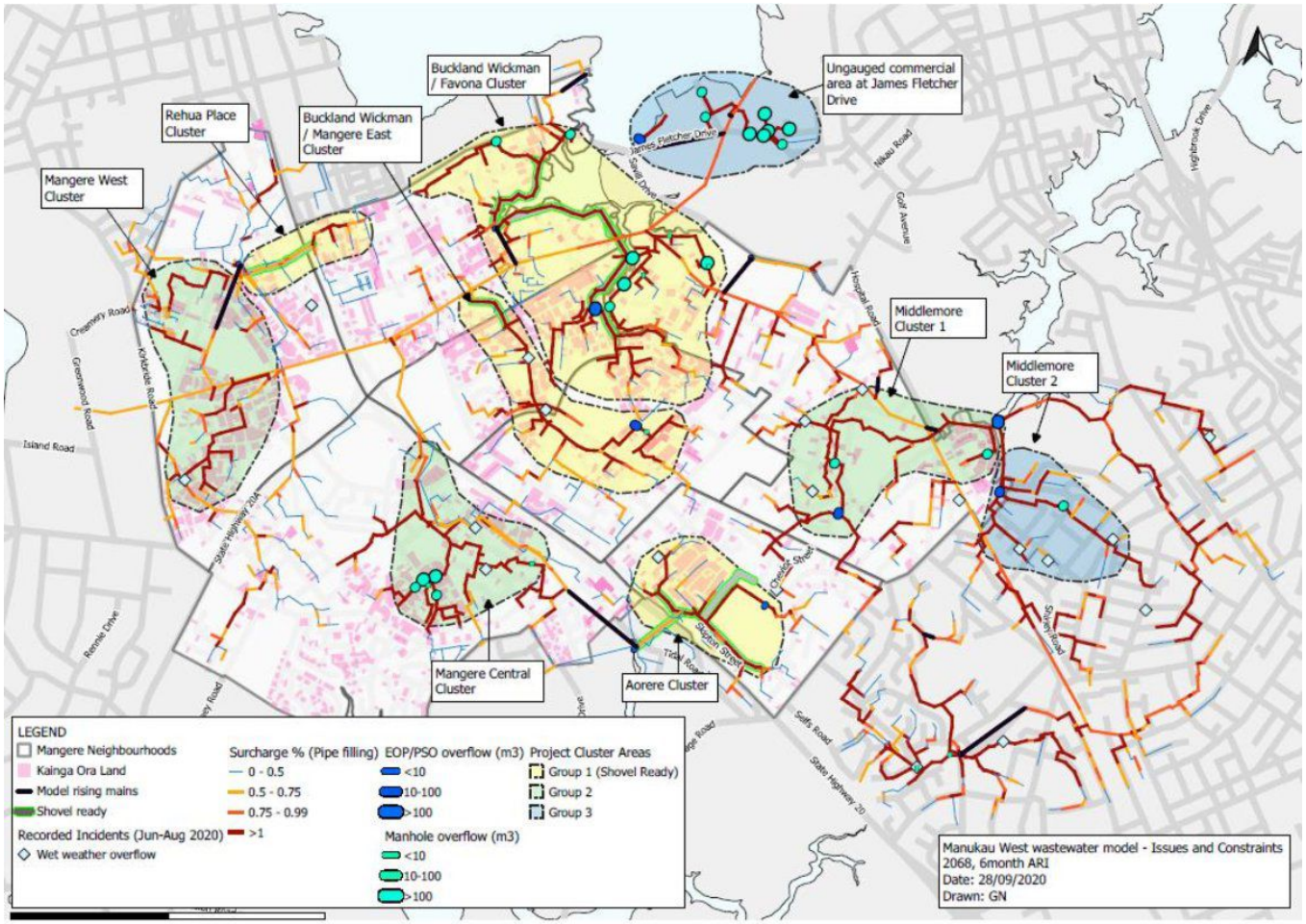
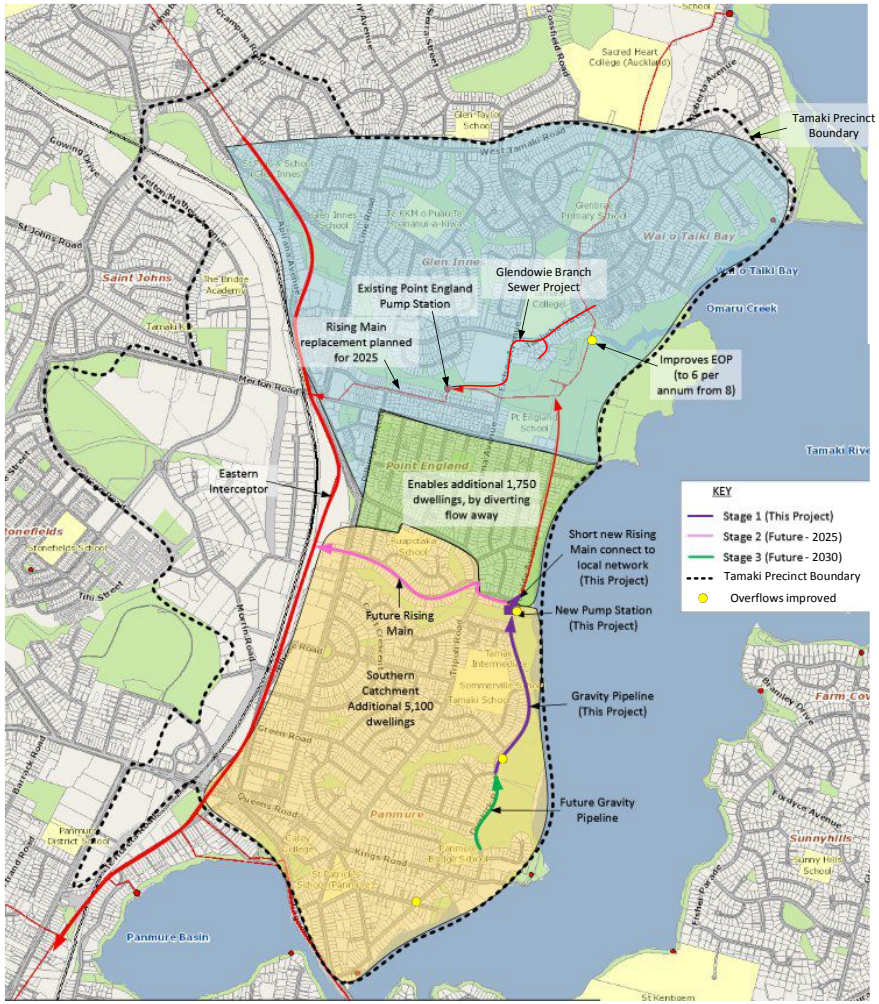


Figure A.4: Tamaki Wastewater Projects



Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 meeting

CCO Review Recommendations

Purpose			Team	
Information	Discussion	Approval	Prepared and Recommended	Submitted
✓			**Rob Fisher** Company Secretary	**Marlon Bridge** Acting Chief Executive

Intellectual capital	People and culture	Community and stakeholder relationships
💬	💬	💬

1. Purpose and context

Reporting bi-monthly to provide an update on progress implementing CCO review recommendations.

- Continuing to engage bi-weekly with the CCO Monitoring Group to progress and participate on recommendations as their scope and timeframes are confirmed.
- Status updates are provided on an exception basis where notable progress has been achieved.
- CCOs and local boards reset how they engage with one another (R-34). Working group met during January and February (Brent Evans, Manager Local Board/Stakeholder Engagement attended) to discuss feedback and proposed changes. Key points:
    - The development of a combined CCO engagement plan is progressing, actively providing feedback and working towards a collaborative outcome.
    - That all CCO's jointly attend 21 Local Board meetings to share unified approach.
    - A proposal to present a combined 6-monthly report has been rejected following feedback from local boards, as it doesn't meet their need of recognising the diversity and complexity of interactions or engagement.

  Further meetings scheduled the Local Board Area Managers to gain further feedback with a final proposal to be shared with local board chairs and CCO CE's.
- CCOs make more effort to co-ordinate how they consult the community on and implement local projects (R-53). Continuing to work with Auckland Transport and Panuku on initiatives to facilitate inter-agency liaison.

2. Progress made

Table 1 recommendations that can be actioned now.

2 of 24 are specific to Watercare:

- The council formulates a three waters strategy (R-15). Continuing, our contribution as part of a joint working group is to provide input to 'managing future water needs'. Currently developing long-term demand targets and reviewing the key contributing factors that were used in determining the 'recommended demand pathway' out to 2050:

    - Peak demand as a result of learnings from recent drought conditions.
    - Impacts from the LTP and AMP budgetary changes, notably leak management and smart metering.

  Learnings from the Gold Coast and Cape Town have been considered and are being incorporated into the overall strategy development process led by Council.
- Watercare (and AT) submit their AMPs and detailed supporting information (R-16). Pending response from Council and the LTP consultation process.

Non-Watercare specific:

- Council reviews the way it requires CCO's to monitor and report on risks and risk mitigation measures (R-19). Positive feedback received from Matthew Kerly (Council Risk Advisor) confirming that revised risk reporting is consistent and no changes required. Will continue to monitor and adjust as required.
- CCOs' first and third quarterly reports concentrate more on any emerging risks or any developments that may require CCOs to adjust their priorities (R-24). Report formats have been updated, ongoing.
- The council rewrites its governance manual so the focus is squarely on its expectations of CCOs, removing policies to a separate document and requiring incoming directors and senior managers to read the manual (R-29). Consideration is being given to dispense with the governance manual as the bulk of content may reside within the statement of expectation. Pending confirmation R-22.

Pending:

- Council establishes a strategic planning process in which CCO boards and the governing body hold workshops to discuss CCO work programmes and priorities, with the results fed into each CCO's letter of expectation and statement of intent, as well as into the annual budgeting and planning processes (R-21). Original workshops planned for October and November were reprioritised and replaced by LTP workshops during April and May to provide guidance to completing the SOI.
- The council prepares a letter of expectation setting out its expectations of each CCO and of CCOs generally (R-22). Council decided to issue a Statement of Expectation as a replacement to the Letter of Expectation. A draft has been received with initial comments provided. A working draft is expected mid-April for review.
- The council draws up a protocol governing information requests between the governing body and CCOs (R-32). Provided comment to the CCO Monitoring group suggesting all information requests should be managed through a centralised Council function. Expected to form part of a code of conduct protocol.

Table 2 recommendations that require CCOs and Council to work together,

3 of 18 are specific to Watercare:

- Resolve consent processing delays (R-17) and clear measurable minimum performance levels when reviewing consent applications and formal mechanism for objections (R-18). Following initial assessment in 2020, the working group has identified nine separate initiatives across three areas (quality, accountability and roles & processes). These have been assessed, prioritised and sequenced with noted interdependencies to other programmes of work and broadly align with Council's Regulatory Services plan. Planning and integrating these initiatives within the wider council whanau will require additional work.

Non-Watercare specific:

- CCOs use a template for their Māori responsiveness plans (renamed as Outcomes Plan) and collaborate with one another and seek input from Māori entities during the drafting process (R-37). The Māori Outcomes Plan was accepted at the February board meeting, noting the requirement to include additional measurements to be actioned by Richie Waiwai, Poutiaki, Tikanga Māori (Principal Advisor) and the Watercare Executive for final submission to Council in June.
- CCOs appoint a lead agency when working jointly on projects (R-45). CCO workshop to be scheduled late March to discuss the approach and timeframes (Richard McIntosh, Head of Design and Construction attending).
- Job descriptions refer to the need to contribute to Māori outcomes (R-52). Māori outcome statements have been reviewed and will be included in all future job descriptions.
- CCOs report regularly on the nature of the complaints they receive and how long they take to resolve them (R-54). The CE report currently includes the percentage of complaints resolved within the set SLA (currently 10 days) with analysis of contributing drivers and outcomes achieved. A working group has been established (Priya Thuraisundaram, Head of Customer Insight attending) in order to develop a consistent complaint framework.
- CCOs' statements of intent contain a key performance indicator on complaint-handling (R-55). The SOI is currently in draft and will include updated performance indicators once aligned and agreed across CCO's (as per #54).
- Council updates its brand guidelines to ensure clear and consistent use (R-57). Ongoing engagement with Council. Presentation to the CCO Oversight committee in February proposed changes to the use of the Pohutukawa logo (Rachel Hughes, Communications Manager attended). Effort is being driven by Council and Auckland Unlimited, with an expected final position due in April.
- CCOs follow the council's quality advice standards and encourage staff to participate in its quality advice training (R-59). Discussions continuing with CCO's to ensure consistency in approach, style and to consider impacts to Council and Councilors. Expected to conclude during April and May.
- The council and CCOs work together to draw up group policies on shared services, the development of leadership talent and remuneration (R-61).
    - Remuneration. Draft policy approved by the CCO CE group. On completion of final policy, to be reviewed with Board.
    - Shared Services. Raised at the February CCO CE meeting, with a co-design group to be established for the purpose of scope and policy development. Jason Glennon, Chief People Officer nominated as Watercare contact.
- CCOs discuss their proposed collective bargaining strategy with the council (R-63). Six collective agreements are represented within Watercare with no overlap with the wider Council family. Development of high-level strategy and principles of approach has started and once drafted, will engage with Council.

Table 3 recommendations that require further work.

Non-Watercare specific.

- Shared services have formal supplier/purchaser agreements, with agreed service levels (R-62). Progress continuing to align service levels with benefits tracking. Regular meetings in place between procurement leads and bi-monthly CFO meetings.
- The council makes compliance with the procurement policy mandatory on all CCOs to reduce costs and minimise duplication (R-64). The revised draft group procurement policy was approved at the February Audit and Risk Committee meeting, with a delegated authority for the acting CFO to approve the final version from Council (if no material change).

Table 1: Summary of Recommendations that can be actioned now

Rec.	Recommendations that can be actioned now and request Auckland Council chief executive to implement
15	The council formulates a three-waters strategy and includes a reference in the strategy to Watercare's obligation to consult the council about the broad direction of pricing and water services.
16	Watercare and Auckland Transport submit their asset management plans and detailed supporting information to the council every year so it can assess how well the plans give effect to its urban growth strategy.
19	The council reviews the way it requires CCOs to monitor and report on risks and risk mitigation measures.
20	The council establishes a small team to draw up detailed, implementable strategies that give CCOs more strategic direction, starting with strategies on water, economic development and stadiums.
21	The council establishes a strategic planning process in which CCO boards and the governing body hold workshops to discuss CCO work programmes and priorities, with the results fed into each CCO's letter of expectation and statement of intent, as well as into the annual budgeting and planning processes.
22	The council prepares a statement of expectation setting out its expectations of each CCO and of CCOs generally.
23	The council develops a template CCOs must use when drafting their statements of intent, as well as a set of common key performance measures they must include, to ensure consistency in length, detail, presentation and benchmarks.
24	CCOs' first and third quarterly reports concentrate more on any emerging risks or any developments that may require CCOs to adjust their priorities.
25	The council creates a senior position responsible for day-to-day management of council-CCO relationships to take some of the load off its chief executive.
26	Councillors have a day-long induction at the start of their three-year term on their responsibilities as CCO shareholders, the separation of governance from management, and how to best govern CCOs as arm's-length organisations.
27	The governing body spends half a day each year visiting each CCO to better understand its business and culture and to informally build relationships.
28	The council reviews the liaison councillor role at the start of the 2021 financial year.
29	The council rewrites its governance manual so the focus is squarely on its expectations of CCOs, removing policies to a separate document and requiring incoming directors and senior managers to read the manual.
30	The council gives its CCO governance and external partnership unit more resources to strengthen monitoring of CCOs.
31	The council updates and clarifies its no surprises policy.
32	The council draws up a protocol governing information requests between the governing body and CCOs.
35	The council, working with the Independent Māori Statutory Board, the Mana Whenua Kaitiaki Forum and CCOs, clarifies for CCOs what each of these three entities' respective roles are at the governance level, and how CCOs should engage with each entity.
43	CCO boards have a more ethnically diverse membership and include more individuals with relevant subject matter expertise and public sector experience.
48	CCO chairs meet four times a year to strengthen relationships, build trust and generally provide a forum to share information and views.
49	The quarterly meetings of council and CCO executive leadership teams have a formal agenda.
50	New council and CCO staff receive instruction during their induction on the need for CCOs to operate at arm's-length but also to be accountable to the council.
51	CCO chief and senior executives' job descriptions include requirements about collaborating with the council, following council directions and meeting council expectations.
58	The council monitors CCOs' compliance with its brand guidelines.

Table 2: Recommendations that require CCOs and the council to work together

Rec.	Recommendations where the Auckland Council chief executive is requested to work with CCO chief executive(s) to implement
2	The merged entity explores, at the council's direction, the critical need for joint management and operation of the city's four stadiums with the Eden Park Trust.
3	The council explores with the War Memorial Museum and MOTAT bringing both institutions into the merged entity and seeks such legislative change as is necessary.
4	Auckland Transport and the council jointly prepare the regional land transport plan, the draft of which the council endorses before going to the CCO's board for approval.
5	Auckland Transport and the council form a working group to clearly delineate their bylaw-making powers and formalise the result in a memorandum of understanding.
7	Auckland Transport and the council explore urgently with the Ministry of Transport and the New Zealand Transport Agency how to streamline funding processes.
17	The council, Watercare and Auckland Transport resolve consent processing delays and if this does not happen, the council assumes responsibility for assessing the water and transport components of consents.
18	The council reaches agreement with Watercare and Auckland Transport on clear, measurable minimum performance levels expected of them when reviewing consent applications, and establishes a formal mechanism to allow objections to the way both CCOs enforce their codes of practice.
36	The council urgently completes the Māori Outcomes Framework, which should include guidance on how CCOs engage with mataawaka, and afterwards CCOs update and align their Māori responsiveness plans accordingly.
37	CCOs use a template for their Māori responsiveness plans and collaborate with one another and seek input from Māori entities during the drafting process.
38	CCOs continue to work with the Independent Māori Statutory Board to monitor and report more effectively on Māori responsiveness plans.
39	CCOs engage directly and at a more senior level with the Independent Māori Statutory Board and the Mana Whenua Kaitiaki Forum to work on joint initiatives that benefit Māori.
40	Ngā Mātārae, the Mana Whenua Kaitiaki Forum and CCOs arrange a hui to establish a more co-ordinated and meaningful way of working together to reduce the number of meetings Māori entities are expected to attend and contribute to.
41	The council and CCOs review the quality of the service their call centres provide, including by ensuring an up-to-date, group-wide phone directory is on hand containing job descriptions and contact details of all staff.
44	The council and CCOs have common values and expectations of staff and management behaviour that collectively set the tone for the broader culture of all council organisations.
45	CCOs appoint a lead agency when working jointly on projects.
46	The council, Auckland Transport and Panuku jointly communicate to the public about urban development and transport infrastructure matters.
47	CCO chief executives establish a group, led by the council's chief executive, that meets monthly to deal with any common or significant problems, risks or developments.
52	Job descriptions refer to the need to contribute to Māori outcomes.
54	CCOs report regularly on the nature of the complaints they receive and how long they take to resolve them.
55	CCOs' statements of intent contain a key performance indicator on complaint-handling.
57	The council updates its brand guidelines to ensure the pōhutukawa logo is used in a clear, consistent and flexible way on all council-funded services, activities and facilities, including when used alongside CCO operational brands.
59	CCOs follow the council's quality advice standards and encourage staff to participate in its quality advice training.
61	The council and CCOs work together to draw up group policies on shared services, the development of leadership talent and remuneration.
63	CCOs discuss their proposed collective bargaining strategy with the council.

Table 3: Recommendations that require further analysis

Rec.	Recommend further analysis is undertaken and request that the Auckland Council chief executive works with the CCO chief executive(s) on how best to implement
8	The council identifies a more stable source of funding for Panuku during the preparation of the next long-term plan.
10	The council amends the Panuku constitution to make clear its twin purpose of redeveloping urban areas and managing the council's non-service property.
11	The council assumes responsibility from Panuku for disposing of non-service properties (excluding those in the CCO's own unlock-and-transform areas).
14	Panuku continues to manage the council's non-service property until the council produces a property strategy and considers whether to combine all property services in one place.
33	The council exercises its statutory powers under section 92 of Local Government Auckland Council Act 2010 if it has any concerns that a CCOs is not acting consistently with any strategy.
42	The council gives CCOs guidance on how to balance public and commercial interests and amends their constitutions to make explicit that each CCO must meet both objectives.
56	The council and CCOs explore options to give ratepayers a more effective voice in what happens in Auckland and also how, short of court proceedings, to challenge CCO or council decisions.
62	Shared services have formal supplier/purchaser agreements, with agreed service levels.
64	The council makes compliance with the procurement policy mandatory on all CCOs to reduce costs and minimise duplication.

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 Board meeting

7.2

Drought Preparedness of Watercare

Purpose			Team	
Information	Discussion	Approval	Prepared and Recommended by	Submitted
	✓		**Rob Fisher** Company Secretary	**Marlon Bridge** Acting Chief Executive

Intellectual capital	People and culture	Community and stakeholder relationships	Financial capital & resources	Natural environment	Assets and Infrastructure

1. Purpose and context

In July 2020, the Board commissioned an independent review to understand Watercare's preparedness and readiness for current and future droughts.

A summary of the report is appended as **Appendix 1.**

As with any independent review, there are some opinions expressed by people interviewed for the review that Management would debate. However, the main findings of the report should provide the Board, Council and the public with confidence that the drought has been and is being well managed.

In particular, Aurecon found:

- After the drought of 1993–94, a Drought Standard for Auckland was instituted by Auckland Council. This will be reviewed as part of the development of the wider water strategy as part of the CCO Review.
- That within the context of its operating environment, Watercare has achieved appropriate level of water supply security and reliability; and is technically proficient in supply and demand management. Its people, systems, processes, and assets are capable of ensuring continuity of water supply operations in the lead up to droughts as well as responding during droughts.
- The overall assessment of the Drought Management Plan (DMP) is that Watercare's drought management planning is technically sound and cost-effective, and that as a water service provider Watercare has responded well to ensure customer service and business continuity in maintaining essential water and wastewater services throughout this drought period. This is supported by the fact that for the drought experienced in 2019–2020 (considered to be worse than a 1-in-100-year event), Watercare managed to maintain the minimum storage level at 42%, well above the 15% expected under the DMP. This result is attributed to additional supply from the Waikato River, demand management and optimised operations.
- In terms of Auckland's water supply risk, this is adequately addressed through the set of surface water sources from the Auckland Region, the Waikato Region, and the Waikato River, which together provide adequate water security to meet the Drought Standard. Watercare's Integrated Storage Management Modelling (ISMM) indicates that this level of risk management is commensurate with the 1993–94 Drought Standard as specified in the Auckland Metropolitan Drought Management Plan.

- Timely communication and early engagement are essential to ensure that all stakeholders understand, trust and support the drought measures and responses and to engender assurance and avoid the perception of a crisis.
- The perception of drought risk needs to be better managed.
- "Water restrictions are part of a separate response to droughts, as they reduce demand and stretch water supplies" (refer **Appendix 1**).

2. Recommendations

The report contains 27 recommendations from Aurecon categorised as either critical, essential or desirable.

These recommendations reflect six themes being: water strategy; customer engagement; building trust; water literacy; stakeholder relationships; and drought standard and restrictions.

The response from Management follows these themes and is appended as **Appendix 2.**

7.2

Watercare's preparedness for drought

a summary

aurecon

Whakahā ngā whakaaro
Kia maia, kia kaha, mahi tahi

About Watercare

Watercare supplies drinking water to greater Auckland region. It is New Zealand's largest water and wastewater company and is owned by Auckland Council. Watercare's mission is to provide safe, affordable and efficient water and wastewater services.

Every day Watercare supplies more than 400 million litres to 1.7 million Aucklanders and this is increasing with a growing population and economy.

Watercare sources water from dams in the Waitakere and Hunua Ranges, from the Waikato River and from groundwater. It then treats the water and supplies it to homes and businesses by a massive network of pipes, pumps and reservoirs.

Watercare plans, designs, builds, maintains and operates the entire water and wastewater systems for Auckland and recovers most of the cost of this through its water and wastewater charges.

Water confidence for Auckland

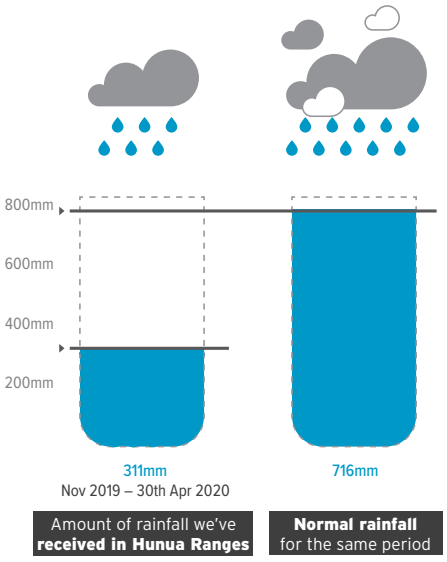
Auckland is experiencing a severe deficit in its surface water reserves, with reduced summer and autumn inflows to its dams.

Between 1 November 2019 and 30 April 2020, Auckland experienced its worst drought with only half the normal rainfall in its water catchment areas. Dam levels fell from 90% in November 2019 to less than half that by May 2020. This triggered low-level water restrictions which heightened interest in the security of Auckland's water supply. Recognising that the community wants assurance that Watercare is well prepared to manage droughts, the Watercare board initiated an independent review to find out.

About the review:

Aurecon reviewed Watercare's plans and reports, spoke to a variety of customers and stakeholders, used our experience with similar cities around the world and looked at future risks for the Auckland Region.

Our findings focussed on Watercare's Drought Management Plan, water supply security, drought resilience, preparing and responding to drought and communication, engagement and governance.



The challenge of droughts

Droughts are a natural occurrence and like many cities around the world, Auckland is not alone in this challenge.

Droughts bring uncertainty; how do we know we are in a drought, when did it start, how long will it last and how serious is it? Cities around the world grapple with these questions to decide how to prepare and respond to droughts. Assuming the worst case or hoping for the best can result in excessive expenditure or severe shortages.

Drought resilience is a shared outcome - the water supplier, the water users and the government working together to achieve an agreed level of drought resilience but this comes at an additional cost to everyone.

A diverse range of sources helps with drought resilience. Dams, lakes, stormwater and rivers are ready sources of water but these depend on climate and rainfall. Recycled water is a little less dependent but there is not enough of it. Sea water desalination is almost independent of climate, but it needs a lot of energy and can have adverse environmental impacts.

Cities around the world have been working out solutions to meet the drought challenge while maintaining reliable, affordable and equitable supply.

Watercare's approach to droughts

Watercare has a Drought Management Plan and an Asset Management Plan for the future, to make sure that Auckland has sufficient water supplies with sensible management of demand.

The city benefits from having diverse water sources in the Auckland and Waikato region, which together provide adequate water security to meet the drought standard.

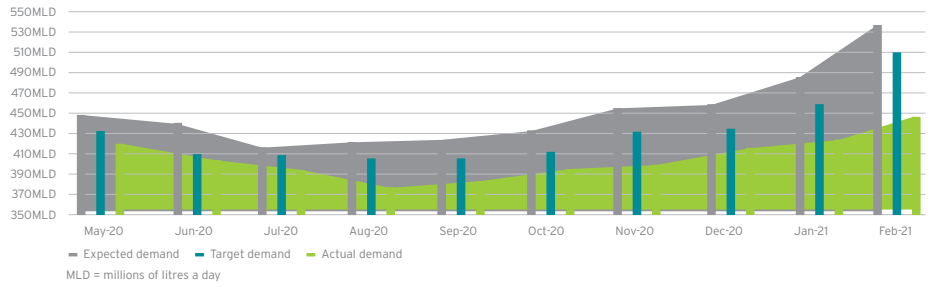
The drought plan is reviewed regularly and the triggers for increasing water supplies and managing water demand are reset as required. Water restrictions are part of a sensible response to droughts, as they reduce demand and stretch water supplies.

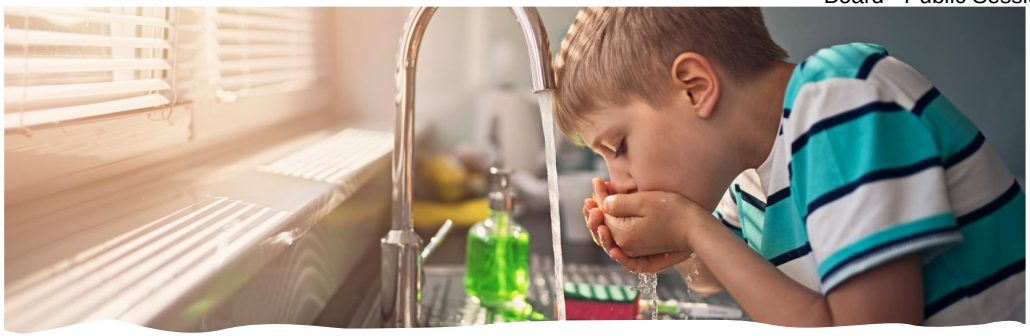
By keeping an eye on its storage and weather forecasts, Watercare calculates water supply and demand and then manages the supply system to deliver effectively. When supply levels drop to trigger levels, it takes measured steps to reduce the overall risk to Auckland.

Auckland Council has the responsibility to set the drought standard and approve water restrictions while Watercare has the responsibility to determine the best way of managing water supplies and demand to meet the standard, and to advise council on when to apply and lift restrictions.

This current drought triggered restrictions for Auckland, in accordance with the drought plan.

Aucklanders response to the current drought was exceptional, with demand significantly lower than forecast, as shown in the graph below.





What the review found

The review found that Watercare was well prepared and has managed this drought effectively but could do better in some areas.

What Watercare is doing well

- it has a range of water sources and is investigating others
- it is managing the supply and demand for water well
- its people and systems are well prepared to respond when droughts occur
- the organisation has matured over the last four years with an increasing focus on customer service
- Watercare's response to the drought was timely and it was on track with additional water supplies for a growing Auckland

Where Watercare needs to improve

There were three related areas for improvement which together will build Auckland's drought resilience

- creating an Integrated Water Security Programme which clearly sets out for everyone how Auckland will manage its water supply as climate conditions change
- being more proactive with Council, businesses and the community to develop a mutual understanding of the roles we all play to ensure water security and how we can support each other to achieve it
- work together with Aucklanders to be prepared for future climate conditions and to achieve an agreed level of drought resilience

Watercare's preparedness for drought

Q&A

How are droughts managed?

Drought preparedness begins with having an agreed drought standard in place and implementing the actions and investments required to meet the standard. It also needs both a long-term outlook to manage supply and a short-term outlook for agile operational responses.

What is drought resilience?

Drought resilience is a shared outcome- the capability and capacity of the community to live with droughts. It requires local government, water service providers and the community to work together to manage water supply, demand and system operation.

How does my organisation, home or business play a part in drought management?

Everyone in Auckland has an important part to play in drought management. For it to be successful, Watercare, Council, customers and the community need to work together to increase supplies, improve operations and reduce water demand – this is a collective effort.

From forecasting rainfall, managing supply, consenting access, approving investments, conserving water or reducing demand, drought management requires a shared understanding of Auckland's Drought Management Plan and a coordinated response.

The review found there needed to be a high-level of capability, collaboration and resources and that timely communication and early engagement during planning were necessary to ensure that people understand, trust and support the drought measures and responses.

It found wider understanding of Watercare's drought management measures was likely to give people greater confidence in drought management, build drought resilience and create support for drought response measures.

Watercare's customers responded very well to the company's requests to reduce their water use, achieving far greater water savings than expected.

Does Auckland have water security?

The review found that with all the supply and demand measures that Watercare has already initiated, Auckland's long-term water supply security will meet maximum demand (with or without restrictions) every year for the foreseeable future.

Supply measures include access to additional Waikato River flows and recommissioning and augmentation of surface water and groundwater sources. Watercare's modelling shows that over the long-term, the storage capacity and access to Waikato River water is adequate to supply Auckland.

Watercare has started considering climate-independent sources of water for future generations. This includes desalination, purified recycled water and stormwater.

Can we learn from the experience of other global cities to develop drought resilience?

Watercare is an active member of New Zealand and Australian water industry associations and incorporates the learnings of other cities into its everyday practice. In 2019, an external review of water restriction in its Drought Management Plan considered the experiences of other major cities. This is positive and should continue. Many cities have faced droughts, some reaching 'Day Zero', to the point of rationing supply to basic human need of 20 litres per person per day. There are lessons to be shared and adapted as relevant.

We would love for you to help us.

Do you have the time to be part of a customer discussion group and share your ideas on how we can keep the water flowing?

If so, drop us an email at xxxxxxxxxxxxx

If you are interested in more details, you can read the review here:
place of link

Recommendations from the Aurecon report

We will address the recommendations provided by Aurecon in themes, grouping together individual recommendations, to provide some structure and substance.

1. Water strategy

This theme relates to the following recommendations: 5, 6, 15, 25, 26 and 27.

Watercare have been working collaboratively with Auckland Council since August 2020 on the development of Auckland's Water Strategy. This has included coordinating discussions with other cities (Cape Town and Gold Coast) to learn from their approach in establishing their own water strategies. Watercare staff are currently working on specific issue papers as key input to the strategy development. The expected delivery date of the completed strategy is in quarter four of 2021.

2. Customer engagement

This theme relates to the following recommendations: 2, 6, 9, 12, 14, 20, 22 and 23.

a) Mass media (Owned)

We promote water efficiency on an ongoing basis through our owned channels (eg. website, social media, *Tapped In* customer newsletter, education programme, water audit service). On 10 February 2020, we launched a campaign to further promote water efficiency called 'Water is precious'. This included the launch of a new website – waterforlife.org.nz – which encourages everyone to play a role in protecting our water resources. The campaign continues to be communicated consistently across owned, paid and earned media.

To avoid staleness and water-saving fatigue, the campaign creative has been refreshed every three months:

- **Water is precious**, February to April 2020: General indoor/outdoor water saving tips. Increased seriousness of messaging in March/April as drought set in and dam levels fell.

- **Be a water saving superhero**, May to July 2020: Superheroes used to communicate indoor water savings tips; public-service style messaging to communicate water restrictions.

- **Be a local water saving hero**, August to October 2020: Water saving stories and tips from real-life people; public-service style messaging to communicate water restrictions. This is aligned with the 'live local' mindset that was an outcome of the Covid-19 lockdowns.

- **Water use dial and water restriction humour,** November/December to February/March: Water use dial introduced to help Aucklanders understand how the city's consumption is tracking; engaging and humorous videos/photography used to communicate the change in water restrictions**.**

- **Use water right and we'll be right**, March to June 2021: Campaign assets refreshed to include more indoor water-saving tips as we head into winter. Water use dial still in market. World Water Day used as lever to draw attention to the value of water in people's daily lives.

We have partnered with big brands to reinforce our messaging. For example:

- Countdown has distributed 45,000 shower timers
- Mitre 10 and Bunnings have distributed shower timers and promoted water efficient products
- Unilever promoted four-minute showers on 64,000 bottles of shampoo
- Active promoted running your dishwasher when only it is full on 156,000 bottles of detergent.

b) Mass media (Paid)

The campaign launched in February 2020 has been running across a wide range of paid channels, including:

- Radio (all radio stations, including translated adverting on ethnic stations and Spotify)
- Out of home channels (billboards, bus shelters, street posters, dairy posters)
- Print (consistently in ethnic newspapers, intermittently in mainstream newspapers)
- Social media (Facebook, Twitter, Instagram, WeChat)
- Digital (Stuff, Herald, You Tube, Metservice, Programmatic)
- Digital search.

Auckland Council has a panel of three preferred advertising agencies. Of these, Stanley St was selected because of the research they carried out for Council into reaching Auckland's diverse communities. The channels outlined above were selected by them to achieve maximum reach.

c) Mass media (Earned)

We engage with mainstream media on an ongoing basis and have close working relationships with key journalists. Our former Chief Executive, Raveen Jaduram, received issue-specific media training and our key messages are regularly peer reviewed by public-relations specialists SenateSHJ. In the months leading up to and following the implementation of water restrictions, we gave hundreds of media interviews, with well over 1000 pieces of media coverage. This achieved widespread knowledge of the drought and the need for water restrictions, as demonstrated in research carried out by Stanley St.

The media receive daily updates on Auckland's water supply situation. They are also invited to tour and/or receive media releases about our infrastructure projects to augment supply. Regular videos and photography are supplied to media.

d) Targeted face-to-face (Forums)

Our Commercial Customer strategy includes face-to-face engagements with customers on issues not related to our transactional relationship with them. This includes regular forums for the top 50 – 100, on-site visits. As a key learning from the drought, we have now also created segment specific forums. These include providing specific content, and learnings to schools through newsletters and forums in addition to specific industry forums. Working closely with the NZPPI (New Zealand Plant Producers Incorporated, and the ECIA (Exterior Cleaning Industry Association) along with Water tankers and construction businesses allows us to provide training documentation, collaboration around alternative sources and ensuring demand is being addressed in the most efficient manner.

As a result of the relentless focus on water efficiency in the ongoing engagements with our commercial customers, we have seen significant reduction in consumption by this segment. Most of these savings have been achieved through significant capital investment by the customers, which means they are long-term sustainable efficiencies.

We are also in ongoing discussions with a number of commercial customers who are keen on exploring innovative options for on-site recycling and reuse.

e) Co-design

To ensure we hit the mark on customer expectations, we regularly engage customers in co-design sessions aimed at resolving specific challenges. In this context it is worth noting that we have had a number of co-design sessions with both residential and commercial customers around, for example, smart meters. These sessions were intended to gain insights into customers' expectations on smart meters and the delivery of smart meter data. Extensive engagements with schools led to the prioritisation of smart meters being rolled out to all schools in Auckland.

f) Bespoke research

We are gaining topic specific insights from customers through a series of bespoke research-based engagements. In this context, our brief was:

As Auckland's population and business community continue to grow, the demand for water increases. At the same time, climate change is creating greater variability in the supply of water. Watercare needs to address this tension and important decisions around investments to protect Aucklanders' access to water need to be made.

As these investments will need to be funded and recovered through the prices Aucklanders pay for their water, insight is needed to ensure there is a deep customer perspective on these decisions.

Through the engagements (qualitative and quantitative) with both residential and commercial customers, we need to understand Aucklanders' willingness, motivations and barriers to pay for investments into water and wastewater infrastructure.

The first report (residential customers) was delivered in June 2020 and already informs our thinking and decisions. The second report (commercial) was delayed due to lockdowns but is now due in June 2021.

g) Deliberative democracy

We have recently teamed up with Koi Tū (the University of Auckland's Centre for Informed Futures) who are on a similar mission: to grow an informed citizenry, enabled and involved in complex decision-making. Funded by the MBIE Endeavour Smart Ideas Fund, and headed by Sir Peter Gluckman, Koi Tū is tasked with the development of a New Zealand-adapted participatory (read 'citizens' jury') approach. We believe that a process of deliberative democracy will enable us to improve our understanding of the water future that Aucklanders want and are willing to invest in (and pay for).

We have provided the project team with the following problem statement:

Watercare needs customer input to help us decide the right balance between price, service and investment to meet growth and demand in the city.

Many of the decisions Watercare needs to make on behalf of Auckland are very significant and very complicated. One of these decisions is to decide what the next source of water for our growing population should be. The trade-offs involved – time, money, quality, and carbon footprint, for example – work against each other and require time to understand and resolve.

More specifically, we are looking to achieve the following:

- To determine the level of investment, service levels and price that best reflects Aucklanders' willingness to invest in future water security.
- To understand the degree to which Auckland is willing to pay to achieve water security standards they require.
- To advance a partnership with our customers, recognising that customer communication and feedback represents an ongoing and evolving conversation rather than a problem to be fixed.

3. Building trust

This theme relates to the following recommendations: 6.

We are working to a TRUST RECOVERY PLAN. The high-level summary is:

Primary objective

To (re)build trust in our company through improved transparency in engagement.

Secondary objectives

To establish our position as playing our part to ensure water security for the people of Auckland and New Zealand, now and well into the future.

Positioning on these issues from 'legislative and regulatory compliance' mindset to an 'in the interest of our collective future' mindset; thus from compliance driven to principle led.

Key issues

- Auckland's water security
- Three waters reform
- Watercare leadership

Our engagements will focus on customer benefit, rather than the technical programmes.

4. Water literacy

This theme relates to the following recommendations: 3, 14, 16, 21 and 23.

We will continue with our water literacy initiatives to build a shared understanding of the value of water – learnings from both WSAA (Water Services Association of Australia) and our own research indicate we need to invest in educating our customers.

These initiatives include mass media as well as face-to-face engagements with customers (both residential and commercial) who are flagged as high users. For residential customers, we leverage our relationship with EcoMatters, offering in-home water efficiency audits and recommendations.

Our programmes with schools (both as customers and stakeholders) is entirely focused on water literacy.

5. Stakeholder relationships

This theme relates to the following recommendations: 4, 7, 18 and 26.

We are working hard to ensure our information and messaging is received throughout the Council group. This includes using Quarterly reports, CEO regular meetings, CCO monitoring and mayoral briefings.

In addition, we have well-established stakeholder forums, including the Kaitiaki Managers Forum, the Environmental Advisory Group and a number of community liaison groups.

Most of our larger treatment plants have community liaison groups as do many of our larger projects such as the Central Interceptor. Stakeholder and community engagement also forms a key part of our process to obtain statutory approvals for major projects. Although there can be opposition to major works, we use community liaison groups and a wide range of engagement tools to liaise with and seek feedback from the community. This approach resulted in successful outcomes for large wastewater discharge consents at Army Bay, the South West and North East where consent was obtained without significant opposition. The consultative approach does not avoid the difficult conversations but ensures there is transparency and helps to avoid the need for costly appeals which can cause lengthy delays.

Management will remain active in reviewing and submitting on central and local government policy frameworks that impact on the provision of water services. In particular we have, and will continue to support, polices that improve water supply reliability and ensure public health protection.

6. Drought standard and restrictions

This theme relates to the following recommendations: 1, 8, 10, 11, 13, 17, 19 and 24.

The drought standard is currently under review, optimising learnings from the current drought. This will be informed by customer insights obtained through engagements as discussed in section 2 above. Once completed, the details of a future restrictions framework and confirmation of tolerance to restrictions or preferred level of investment to increase resilience, will be developed, again in consultation with customers.

In addition, Management will build on the relationships already established through WSAA with the major Australian water companies to seek to jointly improve the collective response to droughts.

Drought Preparedness of Watercare: Review

Aurecon recommendations

Recommendation C= critical E= essential D= desirable	Status
1. P7. Watercare must review and revise the 2020 DMP. The revised Drought Standard should be based on all supply sources and should clearly state the level of service to customers.	C
2. P7. Watercare needs to engage with Auckland community and stakeholders on water security to ensure they understand the Drought Standard, water supply resilience and planned response to droughts.	E
3. P7. Watercare must monitor water security and update relevant strategies regularly to ensure they achieve the desired levels of service. Watercare should engage continually with the community to raise water literacy, maintain trust, and build shared understanding.	E
4. P7. Watercare must clarify for stakeholders on how Auckland's water security is being met and the basis for Watercare's confidence must be clearly conveyed to its stakeholders, especially Council.	C
5. P8. It is recommended that an Integrated Water Security Program for Auckland be developed, to ensure water supply security for Auckland for medium to long-term.	C
6. P9. Watercare should form a Customer Reference Group or similar body to inform, gain customer insights, co-design solutions, raise awareness and build support, to represent the voice of customers.	E
7. P9. Watercare to put in place agreed protocols which would clarify lines of communication and consultation.	E
8. P 9. Watercare undertake future scenario planning incorporating internal and external factors/forces of change and trends.	E
9. P9. Watercare should co-develop with key stakeholders, an agreed set of integrated 'top-down' future scenarios (most likely, probable, plausible, and preferable/ desirable), to stress-test and develop robust drought strategies and standards.	E
10. P15. Watercare must review and revise the 2020 DMP, the Drought Standard, IMP, and the Asset Management Plan (AMP). The revised Drought Standard should be based on all supply sources and should clearly state the level of service to customers.	C
11. P15. Watercare should review the Drought Standard at the same time as the DMP, IMP and the Asset Management Plan (AMP) and if necessary, appropriate revisions made to them.	C
12. P15 to align the Drought Standard and response measures with customer and community expectations, Watercare should develop a comprehensive desired Level of Service (LoS) for water supply security and resilience.	C
13. P15. Using climate change scenarios, Watercare should review the 2020 DMP including hydrology, yield, the Drought Standard, and the restrictions regime, and revise as required.	E
14. P16. To ensure drought resilience for the future, further assessment of the level of security in ongoing climate change, benefits of alternative decentralised supply sources, and willingness to pay for extent of drought resilience are recommended.	E
15. P16. Given the community support for stormwater/ rainwater harvesting for augmenting local supplies, Council and Watercare should explore mutually beneficial precinct level projects to engage with the broader community.	D
16. P20. Watercare needs to raise awareness and understanding of the stakeholders to provide assurance of water supply security and resilience and the integral role of water restrictions in achieving supply security and resilience.	D

17. P21. The lack of regulations and guidelines for use of recycled water is a constraint to supply diversification. This should be addressed at the earliest by the regulators, commencing with guidelines for outdoor use in parks, gardens and playing surfaces	C
18. P21. Watercare should consider leveraging off the Three Waters Reform opportunity to influence policy and planning to improve drought resilience and supply reliability	C
19. P27. Watercare's Board and Executive need to build a shared understanding of current and future level of water security and drought resilience by examining potential drought scenarios and the extent of drought resilience/ drought proofing to maintain Watercare's mission.	E
20. P27. Watercare needs to engage with Auckland community and stakeholders on water security to ensure they understand the Drought Standard, water supply resilience and planned response to droughts. Since Drought Resilience is a shared responsibility of service providers and consumers/ beneficiaries, the wider community needs to be consulted and have an opportunity to provide input.	E
21. P27. Watercare must continually monitor water security and update relevant strategies regularly to ensure they achieve the desired levels of service. Watercare should engage continually with the community to raise water literacy, maintain trust, and build shared understanding.	D
22. P27. Watercare must explore opportunities with large water users, water dependent/sensitive customers, emerging developments, CCOs, water utilities as well as industry researchers and on how to better incorporate water security into their business planning and to explore opportunities of mutual benefit.	E
23. P27. Watercare must clarify for stakeholders on how Auckland's water security is being met and the basis for Watercare's confidence must be clearly conveyed to its stakeholders, especially Council.	E
24. P27. Auckland could consider collaborating with its sister City Brisbane (given the similarities) to co-develop, adopt, adapt, and apply their collective wisdom and resources in achieving drought resilience.	D
25. P28. It is recommended that Watercare develop an Integrated Water Security Program for Auckland, with the objective of achieving water supply security for Auckland for medium to long-term.	C
26. P28. It is recommended that Watercare do a stocktake and map actions/ initiatives of Watercare, Council and stakeholders to create shared understanding of their status, gaps, overlaps, synergies, timeframes, and resources.	E
27. P28. It is recommended that Watercare leads and coordinates the development of the Integrated Water Security Program. Taking into consideration the accountability, capability, knowledge base and resources the component projects could be led in partnership with key stakeholders.	C

Drought Preparedness of Watercare

A Review of Watercare's Drought Preparedness

Watercare Services Ltd

7.2

aurecon

March 2021

Bringing ideas to life

Whakaaro whakaaro
Kia maia, kia kaha, mahi tahi

Document control record

Document prepared by:

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023

PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Document control						aurecon
Report title	A Review of Watercare's Drought Preparedness					
Document code			**Project number**	510214		
File path	Document1					
Client	Watercare Services Ltd					
Client contact			**Client reference**			
Rev	**Date**	**Revision details/status**	**Author**	**Reviewer**	**Verifier** (if required)	**Approver**
0	2020-12-07		A Immaraj C Port J Cullis	K Werksman	M Cobeldick	T Ryan
1	2021-01-21					
2	2021-03-07					
3	2021-03-12					
Current revision						

Approval			
Author signature		Approver signature	
Name	Abel Immaraj	Name	Tracey Ryan
Title	Director E&P Aurecon	Title	MD NZ Aurecon

Contents

Abbreviations

DMP	Drought Management Plan
ISMM	Integrated Storage Management Model
L/p/d	Litres per person per day
ML/d	Megalitres per day

Disclaimer

Important things you should note about this Report:

Exclusive Use

- This report has been prepared by Aurecon at the request of *Watercare Services Ltd* ("Client") exclusively for the use of its Client.
- The basis of Aurecon's engagement by the Client is that Aurecon's liability, whether under the law of contract, tort, statute, equity or otherwise, is limited as set out in the terms of the engagement.

Third Parties

- It is not possible to make a proper assessment of this report without a clear understanding of the terms of engagement under which the report has been prepared, including the scope of the instructions and directions given to and the assumptions made by the consultant who has prepared the report.
- The report is a report scoped in accordance with instructions given by or on behalf of Client. The report may not address issues which would need to be addressed with a third party if that party's particular circumstances, requirements and experience with such reports were known and may make assumptions about matters of which a third party is not aware.
- Aurecon therefore does not assume responsibility for the use of, or reliance on, the report by any third party and the use of, or reliance on, the report by any third party is at the risk of that party.
- A report of this nature is not a certification, warranty, or guarantee.

Limits on Information

- The report is based on information provided to Aurecon by other parties. The report is provided strictly on the basis that the information that has been provided is accurate, complete, and adequate.
- Aurecon takes no responsibility and disclaims all liability whatsoever for any loss or damage that the Client or any other party may suffer resulting from any conclusions based on information provided to Aurecon, except to the extent that Aurecon expressly indicates in the report that it has verified the information to its satisfaction.

No Comment on Commercial Feasibility

- The findings, observations and conclusions expressed by Aurecon are not, and should not be considered as, an opinion concerning the commercial feasibility of the property or asset.

Legal Documents etc.

- The report may contain various remarks about and observations on legal documents and arrangements such as contracts, supply arrangements, leases, licences, permits and authorities. A consulting engineer can make remarks and observations about the technical aspects and implications of those documents and general remarks and observations of a non-legal nature about the contents of those documents. However, as a Consulting Engineer, Aurecon is not qualified, cannot express and should not be taken as in any way expressing any opinion or conclusion about the legal status, validity, enforceability, effect, completeness or effectiveness of those arrangements or documents or whether what is provided for is effectively provided for. They are matters for legal advice.

If the reader should become aware of any inaccuracy in or change to any of the facts, findings or assumptions made either in Aurecon's report or elsewhere, we ask the reader to please inform Aurecon so that it can assess its significance and review its comments and recommendations.
This report, in whole or in part, may only be reproduced or published with the prior written permission of Aurecon, and this explanatory statement must accompany every copy of this report.

"Water security is less about hydrology and more about psychology" – Brian Haisman 1995

1 Executive Summary

Auckland is experiencing a severe deficit in its surface water reserves[1] , with reduced summer and autumn inflows to its dams two years in a row. The total storage level dropped from 97% in December 2018 to 59% in June 2019, then partially recovered to 90% by October 2019 and from that point on, dropped to 43% in May 2020. This necessitated the triggering of Level 1 water restrictions in accordance with Watercare's Drought Management Plan, which contains the trigger levels and prescribed restrictions.

This drought has drawn considerable attention to the state of Auckland's water security and drought resilience. The media and various stakeholders have commented on its severity[2], and questioned Auckland's resilience to future droughts. Stakeholders have stated that the impact of restrictions on specific businesses, the perceived delay in drought response, and the lack of timely and adequate consultation, have been the main reasons for their concern.

Auckland is not alone on this journey. Our observation on droughts across the world over the past decade is that the context of each drought is different, and that this context is important in understanding how the drought was perceived and managed. This is particularly relevant when comparing how each city has managed its drought and adopted learnings and practices and improved its resilience to future droughts. By '*managing drought*' we mean the continuum of *planning and preparing for droughts* as well as *responding to and recovering from droughts*.

By *drought resilience* we mean the joint capability and capacity of the community and the water utility to manage through future droughts. Drought resilience requires the government, water service provider and the community to work together to manage water supply, demand, and system operation.

An invaluable catalyst for resilience is *lived experience*. During their extended droughts, South East Queensland, Sydney, Cape Town, Melbourne, Adelaide, and Perth engaged extensively with stakeholders while developing supply and demand management strategies as well as drought management actions.

Australian utilities learned from each other with a healthy 'co-opetition' through industry-wide interaction through Australian Water Association (AWA) and Water Services Association of Australia (WSAA). This interaction helped moderate investment decisions and achieve a more balanced approach to drought resilience.

After the drought of 1993/94, a Drought Standard for Auckland was instituted by Auckland Council. Watercare developed an augmentation program with access to Waikato River flows to meet the Drought Standard.

Auckland has successfully navigated through previous droughts as it did in 2012-2015, but as its population and water demand continue to grow in quantity and diversity, the actual and perceived risks, as well as the impacts of droughts change and increase. This means that drought risk must be continually assessed, with an ongoing focus on maintaining drought resilience and community support in a changing environment.

The Board of Watercare initiated this high-level review *to understand Watercare's preparedness and readiness for current and future droughts*. To address the scope of the review, findings are grouped into the following six themes:

- Assessment of the Drought Management Plan
- Reliance on the Waikato River
- Water supply security and drought resilience
- Preparing for drought and actions at the beginning and/or prior to the drought (adequacy of preparation)
- Response during the drought with ongoing decline of water storages (current state of drought response)
- Communication, engagement, and governance.

Based on wide-ranging feedback from Watercare Board Directors, Executives and Managers; Councillors and Council Executives, customers, regulators and stakeholders; from our analyses of information; from the learnings of other cities; and taking future risks into consideration, we conclude that Watercare has responded in accordance with the Drought Management Plan and that there is room for improvement in planning and preparing for extended droughts.

[1] "Auckland is in a severe drought -record low rainfall January and February 2020" 2020 Drought - Implementing Auckland Water Restrictions – Watercare Briefing to Stakeholders

[2] "Watercare says forecast has moved water supply status to critical" Media Release 23 June 2020

The Main Findings

In summary, we found that within the context of its operating environment, Watercare has achieved appropriate level of water supply security and reliability; and is technically proficient in supply and demand management. The readiness and capability of its people, systems, processes, and assets was adequate to ensure continuity of water supply operations in the lead up period and during the drought.

The overall assessment of the Drought Management Plan (DMP) is that Watercare's drought management planning is technically sound and cost-effective, and that as a water service provider Watercare has responded well to ensure customer service and business continuity in maintaining essential water and wastewater services throughout this drought period. This is supported by the fact that for the drought experienced in 2019-2020 (considered to be worse than 1:100year event), Watercare managed to maintain the minimum storage level at 42%, well above the 15% expected under the DMP. This result is attributed to additional supply from the Waikato River, demand management and optimised operations.

In terms of Auckland's water supply risk[3], this is adequately addressed through the set of surface water sources from the Auckland Region, the Waikato Region, and the Waikato River, which together provide adequate water security to meet the Drought Standard. Watercare's Integrated Storage Management Modelling (ISMM) indicates that this level of risk management is commensurate with the 1993/94 Drought Standard as specified in the Auckland Metropolitan Drought Management Plan.

In summary, the physical risk of current drought has been well addressed, as evidenced by:

- Adequacy of water supply: Watercare was prepared and ready for the drought as per DMP requirements
- Drought response: Watercare implemented adequate response measures to manage demand well
- Operation of the system has been efficient and effective.

Droughts are natural occurrences, but their impacts are steadily increasing. This has a significant bearing on Watercare's ability to ensure water security, supply reliability, safe, efficient, and affordable water and wastewater services. Drought management is essentially the control of the resources, influences and impacts; before, during and after the drought, in such a way as to minimise undesirable effects and to provide stakeholders with assurance.

Timely communication and early engagement are essential to ensure that stakeholders understand, trust, and support the drought measures and responses, and to engender assurance and avoid perceptions of a crisis. Watercare's Board and Executive need to build a shared understanding of current and future level of water security and drought resilience, by examining potential drought scenarios and the extent of drought resilience/ drought proofing to maintain continuity of services. This shared understanding forms the basis for engaging with stakeholders to raise awareness of risks, co-develop options for risk-mitigation, test and select a mutually desired level of service.

Stakeholders suggested that better communication, timely consultation and earlier collaboration between Watercare, Council, customers, Iwi groups and regulators would have enabled a clearer shared understanding of the drought standard, the drought management plan, and reduced misconceptions amongst the stakeholders.

The perception of drought risk needs to be managed better because drought resilience is a shared outcome of Council, Watercare and Community working together.

- proactively engage with stakeholders and raise awareness of water security and drought planning
- increase engagement with Board, Council, community, and stakeholders to review the Drought Standard
- develop a collaborative approach with stakeholders and community/customer representatives to develop and implement drought communications and responses.
- Committed collaboration among the stakeholders (internal relationships and external facing partnerships)

We anticipate that risks in supply, demand and operations arising from climatic variability, population growth and distribution, network configuration and competing demands for water, will continue to grow and drive water supply security and drought resilience.

[3] Watercare's Asset Management Plan 2018-2038 identifies protracted drought conditions as a risk, but mitigation does not include source diversification with climate resilient/ independent supply options. It is noted that Watercare's AMP has recently been updated (AMP 2021- 2030).

Proactive and collaborative management of emerging risks would be prudent and expedient:

- Current management needs improvement – a more proactive and integrated water management program (integrated whole of water cycle supply, demand, and operations across the drought to flood continuum) is expedient.
- A greater focus is needed on mitigating extended droughts and the potential for increasing climatic variability, emerging risks and growing water demands and competition.

The Main Recommendations

The review makes recommendations and points to consider:

- Opportunities to improve drought response and preparedness
- Readiness for the future with the potential for increasing climatic variability
- Applicable learnings (risks and opportunities) for the current and future droughts

Watercare must review and revise the 2020 DMP. The revised Drought Standard should be based on all supply sources and should clearly state the level of service to customers.

Watercare needs to engage with Auckland community and stakeholders on water security to ensure they understand the Drought Standard, water supply resilience and planned response to droughts. Since Drought Resilience is a shared responsibility of service providers and consumers/ beneficiaries, the wider community needs to be consulted and have an opportunity to provide input.

Watercare must monitor water security and update relevant strategies regularly to ensure they achieve the desired levels of service. Watercare should engage continually with the community to raise water literacy, maintain trust, and build shared understanding. This understanding enables alignment, collaboration, and preparedness for droughts. Watercare must explore opportunities with its large customers, water dependent customers and developers on how to better incorporate water security into their business planning and to explore opportunities of mutual benefit.

Watercare must clarify for stakeholders on how Auckland's water security is being met and the basis for Watercare's confidence must be clearly conveyed to its stakeholders, especially to Council. This is not to say that the technical modelling needs to be explained in detail, but that it needs to be trusted by stakeholders.

The recommendations of the Review fall into three areas of drought resilience outcomes:

- For stakeholders to understand how Watercare ensures Auckland's drought resilience, an **Integrated Water Security Program** (IWSP) *is essential*. An IWSP will enable Watercare to operate smoothly across this continuum and deal with gradually changing conditions.
- To build trust and confidence in Watercare, increased **Stakeholder Engagement and Management of Expectations** *is critical*. This includes early engagement and deep exploration with Board and stakeholders.
- For stakeholders to understand and be prepared for emerging conditions, engagement through **collaborative planning for future scenarios** to explore and discuss what level of drought resilience *is desired*.

These three themes are interdependent, and all have the common objective of building Auckland's drought resilience through joint action, structured approach, and a shared perspective.

The Review identified twenty-seven recommendations for consideration, categorised as Critical (important and urgent), Essential (important but opportune) and Desirable (added benefit). A list of the Review Recommendations with Page references is in **Appendix E**. The recommendations are grouped into three areas as follows:

1. An Integrated Water Security Program for Auckland

***Why**: A program approach aligns the outcome (effective and efficient management of risk), the strategy (fair and equitable apportionment of risk) and the governance (sound structural arrangements/ relationships with clear responsibility and accountability).To properly manage drought risk[4], an **Integrated Water Security Program** (IWSP) will provide a structured approach for Council-Watercare collaboration in drought planning and implementation.*

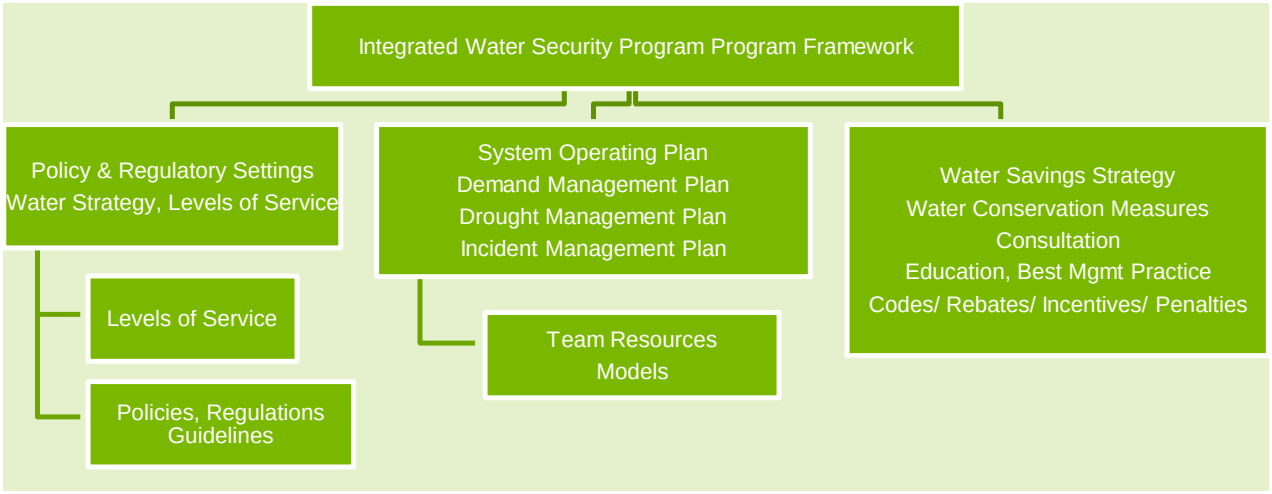
[4] CCO Review Recommendation 19: The council reviews the way it requires CCOs to monitor and report on risks and risk mitigation measures.

An integrated water balance covers supply-side, demand-side, and operational measures, across the drought to flood continuum. An integrated water security program will enable Watercare to operate smoothly across this continuum and address gradually changing conditions such as emerging droughts.

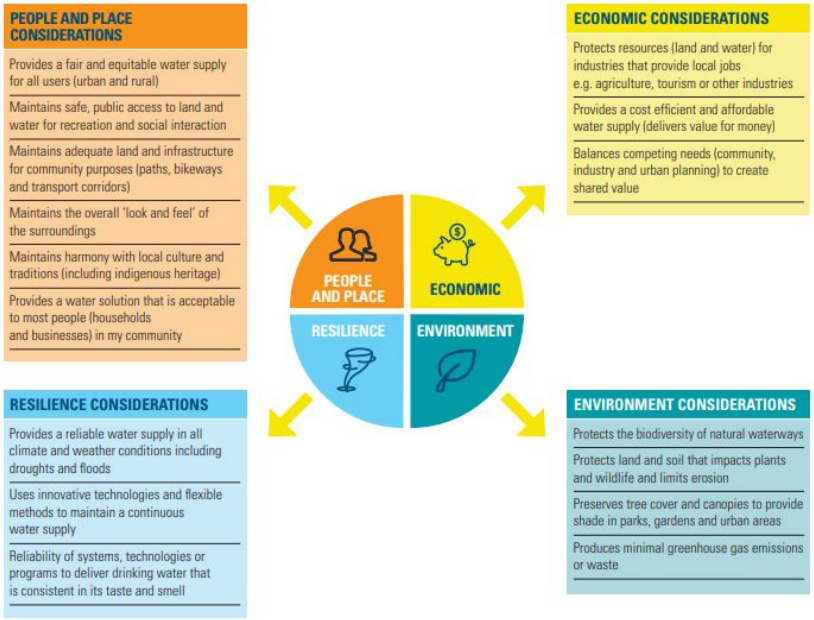
It is recommended that an **Integrated Water Security Program** (IWSP) for Auckland be developed, to ensure water supply security for Auckland for medium to long-term. The IWSP should include these three integrated activities:

- Development of policies and plans for water security, growth, droughts, floods, and climate change.
- Preparing and responding to climate change events and other incidents.
- Enabling recovery and building resilience of Auckland.

Using a programmatic approach, the Integrated Water Security Program brings together stakeholder interests and the various component plans and strategies that need to work together seamlessly to achieve drought resilience. An Integrated Water Security Program would benefit Watercare by bringing the diverse measures[5] for drought resilience into the one program that connects the measures clearly and coherently for stakeholders. This Program creates a cogent narrative that builds shared assurance and confidence which are essential for successful implementation.



An Integrated Water Security Program framework covers the gamut of social, environmental, and economic considerations, over the drought to flood continuum – *Source: South East Queensland Water Security Program*



[5] As demonstrated in various instruments: Drought Standard, Drought Management Plan, Incident Management Plan, Asset Management Plan, Water Savings Strategy, Communications Plans, the Water Strategy

2. Stakeholder Engagement and Management of Expectations

***Why**: Sustained drought resilience is a shared responsibility of Watercare, Council, water users and the community. To build trust and confidence in drought management and response, stakeholder engagement and management of expectations is critical. An Integrated Water Security Program (IWSP) helps stakeholders to understand drought resilience within the context of Watercare's operating environment. Watercare's diverse strategies and plans need to be integrated and presented coherently to stakeholders to understand the big picture as well as drought measures.*

An integrated Water Security Program with a clear narrative and evidence-base would greatly benefit stakeholder confidence and assurance. Based on our experience of drought management under different institutional set-ups, a joint committee for developing the Water Strategy is ideal. We understand that the Water Strategy work is already underway and is to include decision criteria, weightings, risk appetite and risk apportionment.

To achieve drought resilience, timely response to droughts, and effective demand management, the responsibility for managing stakeholder expectations must be shared by Watercare, Council and regulators. Coordinated and consistent engagement with stakeholders is important to maintain outcomes and social licence, especially during extended drought periods.

Watercare should form a Customer Reference Group or similar body to inform, gain customer insights, co-design solutions, raise awareness and build support, to represent the voice of customers in two-way engagement in Watercare's decision-making.

The 2020 Review of Council Controlled Organisations (CCO) has made recommendations dealing with the institutional arrangements and relationships between Council as an owner and the CCO.

In addition to the Statement of Intent, Spatial Plan, and the Water Strategy, it is recommended that Council and Watercare put in place agreed protocols which would clarify lines of communication and consultation. An approach to consider is to develop close relations at operational level with each functional area[6] of the Council separately to understand the Council's core interests, touch points, pain points and tipping points; and then develop a stakeholder management strategy to help strike a balance in the development and delivery of options.

3. Collaborative Planning for Future Scenarios

***Why**: For stakeholders to understand drought risk and emerging conditions, to be prepared for future scenarios and the water reform objectives, collaborative planning is critical. Watercare needs to engage with them in exploration and analysis; and to collaborate on developing the desired levels of drought resilience and levels of service.*

To land on a shared perspective on drought resilience, it is recommended that Watercare undertake future scenario planning incorporating internal and external factors/forces of change and trends in these areas: *organisational; socio-political; environmental; economic, financial and commercial; research and technological developments; regulatory and legislative*. Scenarios could incorporate climatic variability, population and demand, source diversification options.

Watercare should co-develop with key stakeholders, an agreed set of integrated 'top-down' future scenarios (*most likely, probable, plausible, and preferable/desirable*), that can be used to stress-test and develop robust drought strategies and standards. This collaborative approach will enable Council, Watercare and other service providers to identify shared planning drivers (such as population, economy, and climate change) and adopt agreed frameworks, assumptions, and resolution of issues. This collaboration is critical to maintain coherence among planning, implementation, and communication to maintain confidence and assurance in water security and drought resilience.

This Review Report captures the findings and recommendations as well as some learnings and considerations for future improvements. From the perspective of creating and maintaining drought resilience, the recommendations have been categorised into **Critical** (important and urgent), **Essential** (important but opportune) and **Desirable** (added benefit) has been proposed to assist Watercare in implementing these recommendations.

This drought has opened an invaluable opportunity for Watercare, Auckland Council and key stakeholders to collectively review drought preparedness and work together to improve drought resilience for the future. This collaboration will aid Watercare and Council in jointly addressing the national reform agenda to benefit Auckland (Three Waters Reforms, freshwater management and National Environmental Standards Reforms).

[6] Four functional areas: Control/ ownership, regulator/ consenting, statutory planning & policy; customer/ water user

2 Structure of the Review Report

Auckland is experiencing an acute deficit its surface water reserves, with reduced summer and autumn inflows into dams two years in a row. The total storage level dropped from 97% in December 2018 to 59% in June 2019, then partially recovered to 90% by October 2019 and from that point on dropped to 43% in May 2020. This necessitated the triggering of Level 1 water restrictions in accordance with Watercare's Drought Management Plan, which contains the trigger levels and prescribed restrictions. In the past decade, there have been previous instances of low rainfall and storage levels such as in 2014/15, but with growth and changes in population and water demand, the impact of droughts increases significantly.

The Board needs to ensure that the Drought Management Plan is fit for purpose for the current drought as well as for future droughts.

To that end, the Watercare Board requested a high-level review covering the following:

- Assessment of the Drought Management Plan and its implementation
- Understand the current state of readiness to respond to this drought
- Recommend opportunities to improve drought response and preparedness

The Board sought to understand Watercare's preparedness and readiness for current and future droughts.

To address the scope of the review, review covered:

- Preparation and readiness for the current drought as per the Drought Management Plan
- Adequacy of response efforts and implementation in the lead up to the drought
- Current Implementation and state of readiness to mitigate ongoing drought
- Readiness for the future with the potential for increasing climatic variability. Applicable learnings (risks and opportunities) for the current and future droughts.

The Review Report is presented in the following three sections:

Section 3. Review Approach: How the review was conducted to address the scope of the Review.

Section 4. Review Findings: What we found based on the internal and external consultations, review of information provided by Watercare and comparison with other utilities.

Section 5. Review Recommendations: What is recommended based on findings.

3 Review Approach

The drought preparedness review consisted of:

- Engagement with internal stakeholders to identify *inside-out* views; and Engagement with external stakeholders to identify *outside-in* views
- Review, analysis and assessment of information and documentation to understand Watercare's operating context
  - The Drought Management Plan and other documents relating to the drought
  - Watercare's drought management activities
  - Documents outlined in Section 3.2 and listed in **Appendix F**
- Comparison with experiences from other large cities affected by droughts.
- Our drought management experience to synthesise findings and recommendations.

3.1 Engagement with internal and external stakeholders

- An appreciative inquiry approach to draw out views and perspectives from Watercare and its stakeholders, on how the drought was managed and what could be done to improve management of future droughts.
- Watercare is a Council Controlled Organisation (CCO), a limited liability company registered under the Companies Act 1993, and a local government organisation under the Local Government Act 2002. Watercare's regulators include Auckland Council, Waikato Regional Council, and the Ministry of Health. Watercare's water, wastewater and the lifeline operations are governed by planning, health, and environmental regulations.
- We met with the following stakeholders to understand their interests, perspectives, and views, which formed a part of the information used in developing our findings and recommendations:

Organisation	Stakeholders
Watercare	Executives and Senior Managers Board Chair and Directors
Owning/Governing body Auckland Council	Mayor Four Councillors
Auckland Council	CEO and Directors: • Strategy • Infrastructure & Environmental Services • Healthy Waters, Healthy Waters Strategy • Customer & Community Services Previous CEO
Regulators	Public Health Environmental Health
Community	Environment Defence Society Mana Whenua Kaitiaki Forum
Industry	Building Industry Association Chamber of Commerce Employees & Manufacturers Association Infrastructure NZ
Major Customers	Auckland Airport Auckland Council Britomart Group Coca Cola Amatil New Zealand Defence Force Sky City
Advisors	Tonkin & Taylor - Water Modelling SHJ - Media and Liaison Cosgrove Partners - Media and Liaison GRC Partners - Media and Liaison
Central Government	Three Waters Reform Taumata Arowai Action for Healthy Waterways

3.2 Review of information and documentation provided by Watercare and other Stakeholders

The Plan-Prepare-Respond-Recover (PPRR) framework was used to structure the discussions, collate the information, to draw out findings and recommendations. We explored Watercare's ***P****lanning for droughts*, its ***P****reparation to take action*, its ***R****esponse to the drought* and, its ***R****ecovery from droughts*,

The documents central to this review included:

- The Auckland Metropolitan Drought Management Plans (2020, 2015, 2012)
- Watercare Incident Management Plan 2019
- Water Savings Strategy 2017-2020
- Our Water Future Tō tātou wai ahu ake nei 2019
- Watercare Asset Management Plan 2018-2038
- Drought status reports, Water Supply Updates, and briefings (internal and external, 2019-2020)
- Forecasts and modelling results (2018-2020)

Appendix F contains a comprehensive list of the documents reviewed.

3.3 Comparative analysis with other utilities

As a part of this review, Aurecon compared the operating environment of various utilities to help understand the context within which they operate, which influences how these utilities plan for, prepare, respond, and recover from droughts.

Based on the focus on drought preparedness Aurecon considered case studies of large metropolitan water utilities that are commensurate with Watercare in terms of services provided, population served, area of operations and infrastructure portfolios. A key difference worth noting is that Watercare's previous drought was 27 years ago in 1993/94, whereas the other cities have experienced drought conditions within the last 5 years.

It would be beneficial for Watercare to develop and maintain partnerships with comparable Australian water utilities such as Hunter Water and South East Queensland utilities to support each other in strategy, planning and operations.

Appendix G provides the comparative analysis with other utilities and **Appendix H** contains the Drought Case Studies of other cities comparable to Auckland in size and importance.

4 Review Findings

This review into Watercare's drought preparedness was commissioned by the Watercare Board.

In compiling our findings, we considered the information gathered from Watercare executives and Board, external stakeholders, an environmental scan of Watercare's operating environment, a comparative study with equivalent cities and drew on our experience working with water utilities across the world, in forming our views and findings.

Stakeholders generally agreed on the adequacy of Watercare's water supply planning and drought response, whereas in the level of drought preparedness and recovery there was disparity. This was reflected in such statements as "*confident that Auckland has adequate supplies for the next few years*" and "*Watercare could have acted sooner to impose demand management*" and "*we are not adequately prepared for future climate change scenarios*".

In relation to its service delivery, stakeholders have attested that Watercare has improved its reputation over the past four years, developing into a mature organisation with a focus on operations, asset management and increasingly, customer service. Customers pointed out that there was very little by way of *two-way* engagement, listening to customer insights, understanding needs and co-developing drought responses. Our observation is that Watercare is a technically capable organisation seeking to place customer interests at heart and there is evidence of improving customer communication and engagement. Watercare would be better placed to engage early and take its stakeholders on the journey and build strong relationships.

These are the main factors that influenced the management of Auckland's drought risk:

- There were two seasons of low rainfall commencing in 2019 (exceptionally low between January and May 2020) in both the Hunua and the Waitakere catchments which impacted significantly on yield. The low rainfall (meteorological drought) could be attributed to climate change, particularly climatic variability, which has also impacted on many cities in Australia and across the world. The likelihood of rainfall extremes and drought severity is expected to increase over time[7].
- Growth in Auckland's water demand from connected customers, uncertainties in demand projections, growth in demand from non-connected, non-customer communities. With increasing average temperatures, number of hot days and soil moisture deficits, the growth and diversity of demand will place greater pressure on services.
- Constraints posed by legacy structural and institutional arrangements and systems that are affecting collaboration and decision-making in access to water, security of supply, drought management, infrastructure investment, levels of service and implementation.
- Ability to access water supply from the Waikato River. Watercare has identified the Waikato as the preferred option to achieve water security and reliability for future growth and for droughts.

The review findings on Watercare's drought preparedness have been categorised in to six areas as follows:

4.1 Assessment of Auckland Metropolitan Drought Management Plan (DMP)

Effective drought management requires shared understanding of the Auckland Metropolitan Drought Management Plan (DMP) and a whole of system coordinated response, from the water service provider through to water users and the wider community, because everyone plays an important role in drought management – whether it's forecasting rainfall, managing supply, consenting access, approving investments, conserving water or reducing demand. This includes Watercare (Board, Executive and staff); Council and other regulators; weather and climate forecasters; as well as customers, community, and visitors. Robust debate on risk management as well as protocols for collective decision-making and implementation will help ensure Auckland's interests are understood and protected. These include water security as well as economic, environmental, socio-political interests.

Preparedness for droughts begins with having an agreed drought standard in place and implementing the preparatory actions and investments required to meet the standard. These actions and investments encompass an integrated suite of supply-side, demand-side, and operational measures. These actions are stated in Watercare's Drought

[7] NZ Ministry of Environment: Climate Change Projections 2018, Guidance Manual for Local Government 2008

Management Plan (DMP), Operations Plan and Asset Management Plan. Given the long lead-times for supply-side measures, drought preparedness has a long-term outlook; and given that demand-side and operational measures require agile responses in real-time, drought preparedness also has a short-term outlook.

Following the 1993/94 drought, Auckland Council adopted a 1:100year drought security standard with a 15% residual storage with normal demand for the Auckland Metropolitan Region. Prior to 1995 the drought standard was based on a 1:50 year drought. Watercare operates its system to meet full demand in a 1:100year drought with a storage reserve of 15%.

Based on the 1995 Drought Standard, Watercare develops a Drought Management Plan (DMP) with storage level triggers and drought response measures (a set of demand management measures and water restrictions).

Watercare reviews and revises the DMP every two years or so, taking into account supply, demand, and operational considerations, to meet the 1995 Drought Standard. Each revision of the DMP takes into account additional data and modelling outputs, which may revise the trigger levels and/or drought response measures.

Although drought management is a *shared* responsibility of Watercare and Council, the Drought Management Plan places the onus of drought risk and of managing droughts primarily on Watercare.

The DMP is considered to be adequate if it achieves the 1995 Drought Standard. It is noted that due to the rainfall and consequential recovery of storages between June and November, restrictions did not need to be triggered.

The 1995 Drought Standard does not adequately address future droughts triggered by climate change and the desired extent of drought resilience. We understand the scheduled periodic review of the DMP allows the incorporation of climatic variability and joint action by Council and Watercare in setting the drought standard.

Under current institutional arrangements, the Auckland Water Strategy, the Spatial Plan, and the Unitary Plan are important instruments that guide Watercare in its planning for water security and reliability, asset management and operations, covering normal operating conditions as well as droughts and other extreme conditions. The Council is yet to finalise the Water Strategy which meant that the 1995 Drought Standard remained as the point of reference during the drought. We heard that prior to the drought, there had been no formal review of the Drought Standard, nor debate on the desired level of drought resilience and levels of service.

To get a clear understanding of the effectiveness of the DMP, the Incident Management Plan (IMP), the system operating plan and the Asset Management Plan (AMP) all have to be concurrently reviewed, as all these plans act together to ensure water supply security and drought resilience. The elements of the system operating plan relating to supply, and demand profiles are essentially embedded in Watercare's Integrated Storage Management Model (ISMM). ISMM is Watercare's custom-built decision-support tool which has six operating modes including real-time operations mode, operational planning mode and demand management mode. This model is central to Watercare's planning and operations to meet the Drought Standard at lowest total cost.

- The 2015 DMP was in-effect during the 2018/19 drought. Due to the good rainfall and recovery of storages between June and November there was no need to trigger restrictions. Water balance modelling shows that the 2015 DMP would have performed adequately to meet the Drought Standard.
- In February 2020 Watercare revised the DMP taking into account additional supply measures and is still based on the 1995 Drought Standard. The 2020 DMP is technically fit for purpose to meet the 1995 Drought Standard. Watercare's modelling and the observed storage levels during 2019-20 show that the DMP is performing adequately against the Drought Standard.
- The drought response trigger levels in the DMP are based on the dynamic level of total system storage, which means the trigger levels change over the course of the year. This is a reasonable approach at it is based on the optimised system model, however it could also make it more susceptible to risk arising from spatial and temporal variability in rainfall patterns. ISMM has the functionality and ability to assess such risks and make necessary adjustments to storage operations.
- The Drought Standard as it is expressed (1:100year drought with 15% storage reserves) is adequate for modelling storage behaviour and supply management, to ensure that the standard is met.
- The Drought Standard and the DMP however, do not readily translate into drought impacts on customers and the community. Customers stated that the drought standard would be easier to understand and more meaningful, if it is expressed in terms of impact on end users (such as the expected frequency, duration, and intensity of a suite of defined restrictions); in terms of *reliability of access to water* and *the regime of restrictions,* as well as *per capita*

water use targets. Some internal stakeholders also held the view that the technical/ engineering hydrology source risk statement of the Drought Standard needs to be translated into risk to levels of service for water users.

- Watercare must review and revise the 2020 DMP, the Drought Standard, IMP, and the Asset Management Plan (AMP). The revised Drought Standard should be based on all supply sources and should clearly state the level of service to customers. It is understood that as part of developing the Water Strategy, Watercare and Council will jointly review these three plans concurrently.
- The 2011/12, 2015 and the 2020 DMPs all state that they have "*been prepared on the basis of full participation and support of the public*". This is taken to mean that Watercare acknowledges the need for public support. Equally important is the support from Council, regulators, and customers, for the DMP to be implemented effectively.
- For the Drought Standard and drought preparedness to be aligned with customer and community expectations, Watercare should develop a comprehensive desired Level of Service (LoS) for water supply security and resilience. This LoS should be at the heart of the Water Strategy developed in consultation with community and stakeholders and should be clearly communicated to the community on an ongoing basis.
- Using climate change scenarios, Watercare should review the 2020 DMP including hydrology, yield, the Drought Standard, and the restrictions regime, and revise as required. The revised Drought Standard should reference all supply sources and clearly state the level of service that customers and the community could expect. This would help stakeholders to understand the relationship between a meteorological drought (low rainfall and runoff), demand management and drought response measures.
- Watercare's drought response incorporates a level of demand management (water conservation programs and voluntary savings) and drought restrictions (triggered in stages), which is similar in approach to other utilities. Watercare's drought triggers are based on the instantaneous total storage level. The likelihood of triggering restrictions and the expected reduction in demand have been modelled as per the drought standard, using ISMM.
- Watercare considers droughts as *incidents* and when drought restrictions are triggered, DMP responses are implemented through the Incident Management Plan. While there are similarities in operational aspects in responding to droughts and other incidents, there are significant differences in planning for, preparing for, responding to, and recovering from droughts. Unlike other incidents, droughts have uncertain characteristics (their commencement and their conclusion) and they also create a sense of uncertainty for stakeholders.
- The emphasis in the preparation stage should be on addressing this uncertainty through communication and collaboration. The asymmetry in content and timing of messages from Watercare and Council caused some concerns for Councillors, who stated "*initially we were fully supporting Watercare, but our understanding and messages began to diverge and caused confusion*". Drought commencement, intensity and duration are hard to ascertain unlike other incidents. Proactive and early action is essential for drought resilience.
- From a drought risk management point of view, the uncertainty, unpredictability, the slow onset of drought events and wide disparity in risk perception, warrant a different approach from that of managing incidents which tend to be more sudden and certain. As stated by Watercare's incident manager "*incidents tend to be like sprints whereas droughts are like marathons*".
- Implementation of Watercare's DMP relies on the demand data. Watercare advised that there was unanticipated unprecedented demand, that the census data on population was inaccurate and increased demand from off-grid customers relying on Watercare's supplies. These too are Auckland residents and Watercare needs to review the level of service expected by residents who normally rely on rainwater tanks and other sources of water and manage these expectations cost-effectively.
- Cities that have experienced extreme droughts have developed comprehensive and integrated water strategies or water security programs, codified water efficiency and permanent water conservation measures, monitor continually and proactively commence early actions for demand management and drought preparedness. This includes engagement with key stakeholders on being ready for restrictions or alternative risk mitigation measures.

4.2 Reliance on the Waikato River

After the 1993/94 drought the 1995 Drought Standard was instituted on reviewing Auckland's water security. The Waikato River was identified as a reliable water source to augment surface water resources, for both drought resilience as well as for population growth. Even though the total cost of supply from the Waikato River is more than that from existing surface water storages, the Waikato was assessed as both a viable and the least-cost option to meet the 1995 Drought Standard, in comparison to desalination and recycling. The projection for 2055 shows that Auckland will access about 2% of the minimum Waikato flow which is 200cumecs at Tuakau (monthly average flow is around 360cumecs).

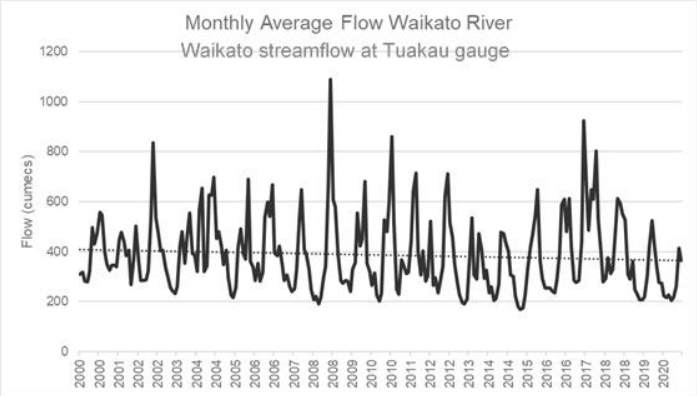
Watercare advises that it has voluntarily capped any future increases of water extractions from the Waikato River to a maximum of 300ML/d, which is less than 1% of the average flow.

In 2002 Watercare commissioned the Waikato water treatment plant and pipeline and upgraded since then to 175ML/d. Waikato River provides an annual average of 136 ML/d which is currently around 34% of total water supply.

Watercare advised that it has assessed climate resilient and climate independent sources of water including desalination and recycled water and is proposing to incorporate them in due course following further investigation. From an integrated water management perspective, there is potential for stormwater reuse as well as recycled water for specific uses, which could improve water security as well as supply reliability. Council's Healthy Waterways group and Watercare have commenced developing the Water Strategy which is expected to include options for stormwater and/or recycled water and assessment of their viability under future drought scenarios.

Watercare advised that the Waikato flow data has been analysed to ensure that the required yield is sustainable, and that risks have been taken into account. We recommend joint probability analysis of sustainable yield, integrated level of water security for increasing climatic variability, water quality risks and treatment/ energy costs.

- Post drought, the Australian cities have reviewed the hydrology of their systems to reassess available yield and dam capacities. Current science[8] indicates that snowmelt and loss of montane glaciers are particularly susceptible to a temperature rise of as small as +1.5^{0}C.
- The Waikato River is a reliable source of water, but the consenting process takes time, given environmental and cultural objectives, factors and competing interests.
- Future risks in upstream catchments such as poor water quality during flood events or sedimentation and contamination, need to be reviewed, assessed and if necessary, investments should be made in catchment management and risk mitigation.

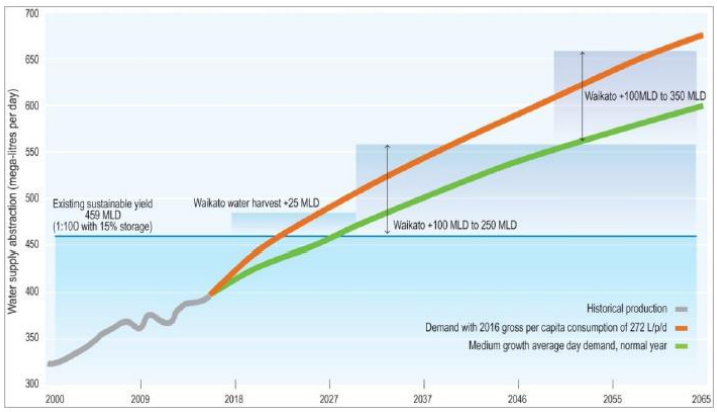


- Communities with legitimate interest and role under statutory provisions must be engaged early. Maori and Iwi stakeholders stated that they feel that they are consulted by Watercare and Council only when something is needed from them and late in the day when they have no recourse but to reluctantly agree to Auckland's demands.
- Customers and other stakeholders have a perception that Auckland has too much dependence on the Waikato River and that there is value in diversification of water sources. At present, access to Waikato water offers an adequate solution to addressing the physical risks of water supply.
- To ensure drought resilience for the future, further assessment of the level of security in ongoing climate change, benefits of alternative decentralised supply sources, and willingness to pay for extent of drought resilience are recommended. Maintaining continual engagement with customers and the community is invaluable.
- Given the community support for stormwater/ rainwater harvesting for augmenting local supplies, Council and Watercare should explore mutually beneficial precinct level projects to gain broader community support.

[8] International Centre for Integrated Mountain Development - ICIMOD David Molden 2019

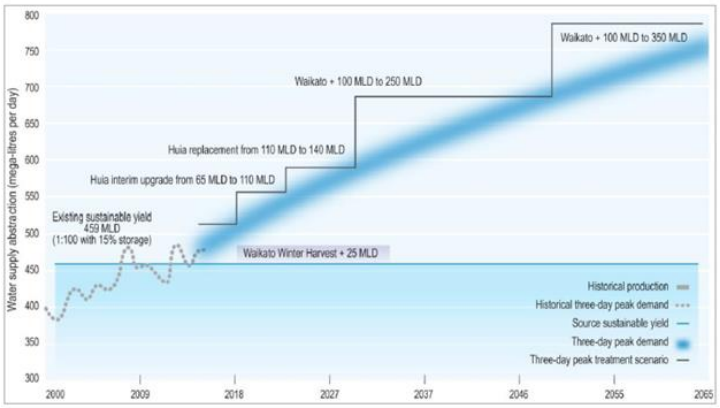
4.3 Water supply security and drought resilience

With all the supply and demand measures that Watercare has already initiated, Auckland's *long-term water supply security* is adequate under the current set of assumptions on yield and demand. Supply measures include access to additional Waikato River flows and recommissioning and augmentation of surface water and groundwater sources. Watercare's modelling shows (graph on the right) that over the long-term, there is assurance that the storage capacity combined with access to Waikato River is adequate to meet Auckland's 1995 Drought Standard. The basis for this assurance is not understood by some of the key stakeholders and this needs to be addressed.



Assurance of *supply reliability* however relates to the ability to meet maximum demand (with or without restrictions), every year of the planning period.

As shown in Watercare's modelling (the graph on the right), with the additional access to the Waikato River, Auckland has adequate supply reliability to meet the projected three-day peak demand. It is to be noted that Watercare has capped its maximum take to 300ML/d. With increasing climatic variability and/or greater demand peaks, Auckland's supply reliability may face future risks.

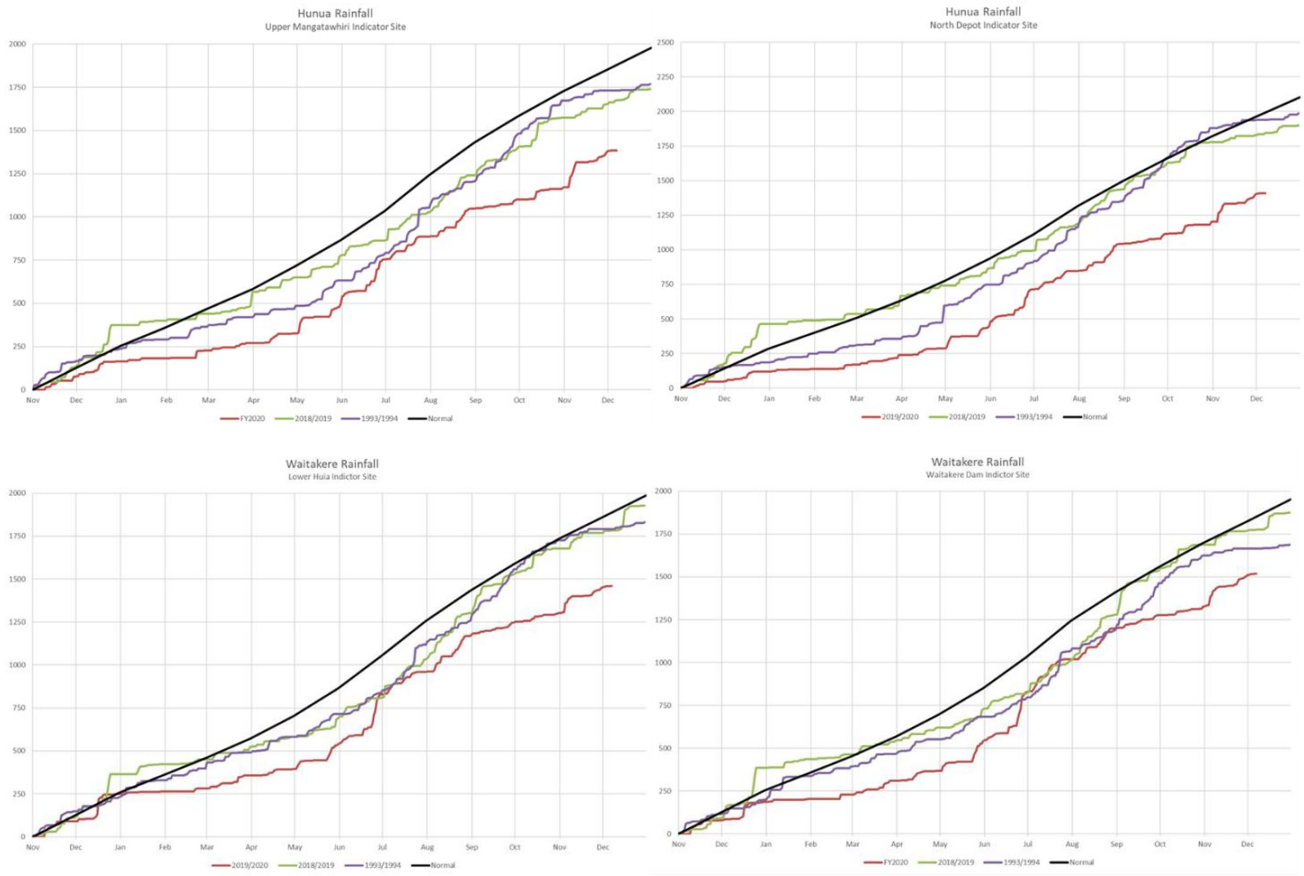


To assess this risk requires scenario planning for climate change and climatic variability. One scenario for example, could be *'a repeat dry year in 2021 accompanied by increased peak demand'*. Water balance modelling of such scenarios is required, and the level of drought risk needs to be considered by all key stakeholders and a risk management plan is required to test assurance of supply under climate change scenarios. The Drought Standard of 1993 and the Restrictions Regime as stated in the Auckland Metropolitan Drought Management Plan (DMP) are foundational to understanding the supply-demand balance and drought preparedness.

- Auckland's water catchments are normally dependable supply sources, receiving about 1750mm rain annually and therefore, Auckland has relied predominantly on climate dependent, cost-effective surface water storages. After the 1993/94 drought, the Waikato River was identified as a reliable source and since 2002, it has been augmenting Auckland's supplies. About 38% of Auckland's water supply is sourced from within the Auckland Region, with the rest from the Waikato Region (Hunua Ranges and the Waikato River)[9].

[9] Our Water Future Tō tātou wai ahu ake nei – Water Strategy Steering Group Auckland Council Feb 2019

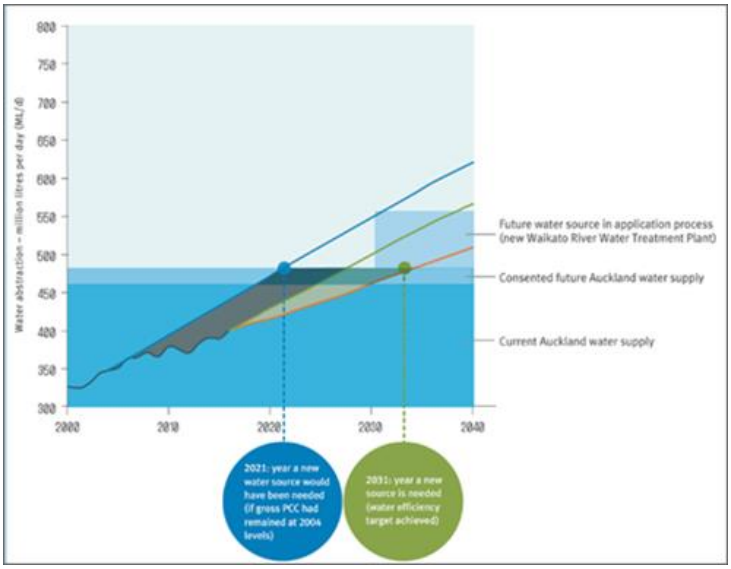
- The following four graphs show the cumulative rainfall deficit from normal at the four indicator sites in the Hunua and Waitakere catchments.



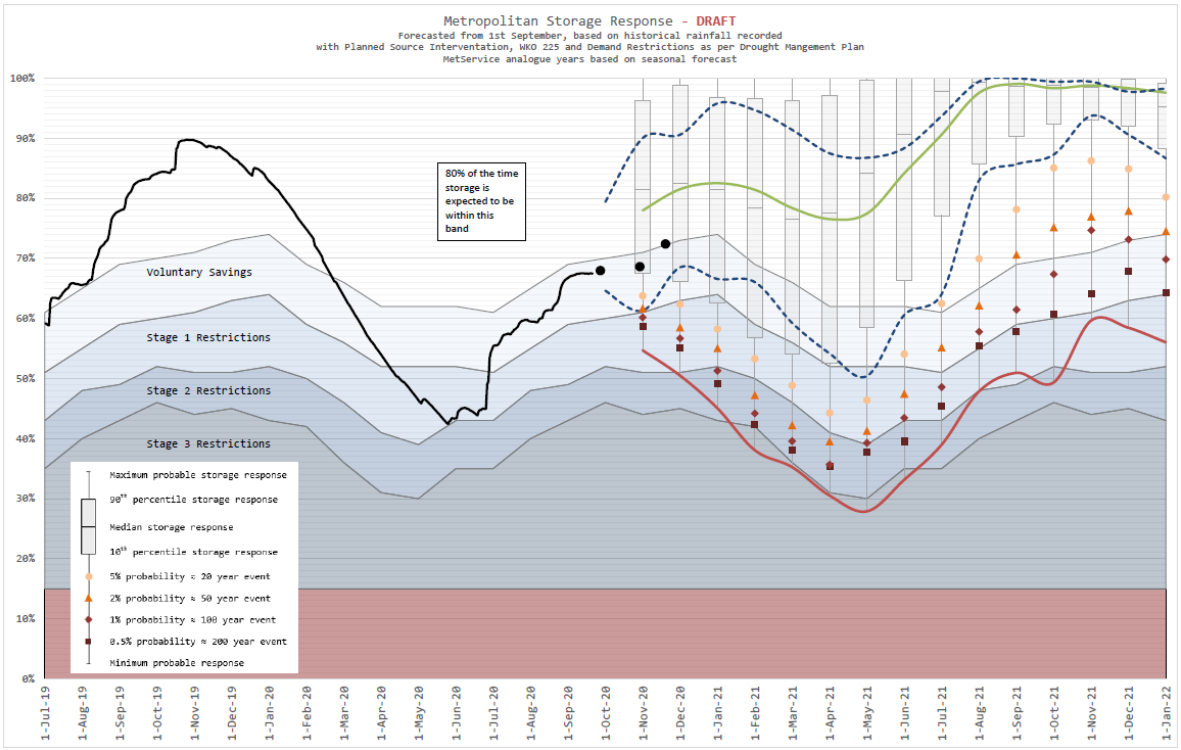
- Under the current operating strategy[10], biennial replenishment of storages is critical to maintaining water supply security. While rainfall during 2019 and 2020 has been very low, it is not unprecedented, as very similar cumulative rainfalls are noted for 2014/2015. It is also noted that the Hunua storages account for 82% of total capacity and as at November 2020, were 73% full, whereas the Waitakere storages account for 18% capacity and were 26% full. While this could be in part due to the operating strategy, it does suggest that Auckland's water security is increasingly sensitive to variability in rainfall and changing demand patterns. Climatic variability as well as long term trends in rainfall, runoff and temperature could be impacting both supply and demand.
- Taking into account the cumulative rainfall deficit for 2020, this drought is considered to be worse than a 1:100year drought. It is to be noted that under the current Drought Standard and Drought Management Plan, this could have resulted in storages dropping to 15%, whereas Watercare maintained the storages above 40% throughout 2018-2020. This good result is attributed to access to additional Waikato River flows, storage optimisation and effective management of demand.

[10] Optimised for short-run least-cost management of storages

- In view of projected growth in population and water demand, Watercare initiated supply-side measures such as additional water storage and treatment capacity and has also been in the process of obtaining consents for additional water from the Waikato and implementing works. This early action has benefitted drought preparedness.

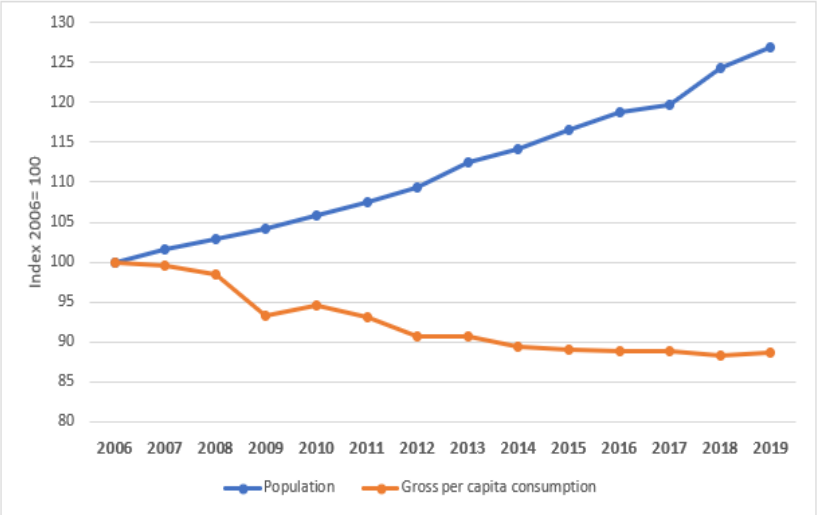


- As seen in the graph below, Watercare models forecast storage behaviour based on historical rainfall, with supply and demand interventions to ascertain risk and test for compliance with the Drought Standard.



Watercare has a good understanding of the current reliability of its water sources but relies on Council's projected growth in population, which drives the demand during droughts and influences water security. Population growth and water demand estimates need to be ratified by both parties.

- According to the Water efficiency strategy 2017 to 2020, Auckland's total water supply averaged 350ML/d. If demand had continued at that rate, the new Waikato River water source would have been needed in 2021. The average daily consumption for 2020 is currently around 385 ML/d.
- In 2008, Watercare, in collaboration with Auckland's former local councils, set a water efficiency target to reduce consumption from 298 L/p/d of 2004 to 253 L/p/d in 2025 (a 15% reduction). This graph on the right shows the % reduction in gross per capita consumption even with population increase of around 1.86%.



The Drought Standard and hence level of water security and resilience planned for by Watercare and Auckland Council should be driven by Auckland's Water Strategy which is yet to be finalised. The Water Strategy must address the issue of increasing drought risk, through increasing likelihood of occurrence and increasing consequences and enunciate the desired level of service for water supply security.

- Till mid-2020, the development of the Water Strategy had not been a priority, leading to a delay in an agreed position on drought management planning and investment. There are more proactive pathways that Watercare could have taken during 2019 to either ensure the strategy got developed, or to ensure there was a conversation with the community on water security and resilience and aligned position with Council on this issue.
- Auckland Council has recently re-commenced developing the Water Strategy jointly with Watercare. Auckland could have benefited from looking at how South East Queensland, Sydney, Melbourne, or Cape Town developed their water strategies. Since their drought experiences, these utilities, cities, and regions have taken approaches that have maximised collaboration between stakeholders, considering cost to provide, willingness/ ability to pay.
- Council and other external stakeholders expressed concerns that given Auckland's pre-eminence in New Zealand and considering climate risk exposure, the level of water supply security is not commensurate with stakeholder/ community expectations nor contemporary cities globally. This is accentuated by climate variability risks and implications for a major city with 1.3 Million residents contributing over 30% to the national economy, reliant on surface water reserves.
- Watercare needs to raise awareness and understanding of the stakeholders to provide assurance of water supply security and resilience and the integral role of water restrictions in achieving supply security and resilience.
- Overall, it appears the onus of drought resilience is being borne largely by Watercare, whereas it is a shared responsibility of Watercare, Council, regulators, and consumers/water users.
- A joint working group between Council, Watercare and potentially other key stakeholders would have helped in timely delivery of a high-quality Water Strategy, to assist in a shared understanding of drought management actions and future options. This includes proposed drought response in a prospective third year of low rainfall. This recommendation is being addressed following the Review of Council Controlled Organisations.
- Auckland's future water security is dependent on climate risks. Water security and reliability are predominantly a function of adequacy of source water *quantity, quality,* and *timing* as well as *controlled access and demand* for the community. Climate risks affect all these factors.

- On the water supply side, Auckland's surface water storages are entirely climate *dependent* supplies. Groundwater sources and the Waikato River flows may be considered as climate *resilient* as is recycled water. A pilot recycled water scheme is being trialled and will inform future investment decisions. There are currently no plans for climate *independent* sources (such as desalination) in the current planning period, but Watercare has commenced investigation of options for supply source diversification.
- The lack of regulations and guidelines for use of recycled water is a constraint to supply diversification. This should be addressed at the earliest by the regulators, commencing with guidelines for outdoor use in parks, gardens and playing surfaces.
- On the water demand-side, Auckland is a large city continually growing in population, industry, and economy, increasingly reliant on supply resilience. In addition, there is a growing water demand from residents using tanker supplies during droughts, and a potential for increased heat-driven demand. In terms of service-reliability, the system configuration (supplies in the far south and demand growth in the north) poses challenges for equitable distribution of water while meeting uniform levels of service across the whole system.
- Auckland's water security is a matter of national interest for New Zealand. The growing interest and scrutiny of the Central Government in water reforms is an opportunity for Watercare to generate support for authorisation and public investment.
- The Three Waters Reforms and the Action for Healthy Waterways are an indication of the proposed regulatory and institutional arrangements to ensure water security in New Zealand. Watercare should consider leveraging off this opportunity to influence policy and planning to improve drought resilience and supply reliability.

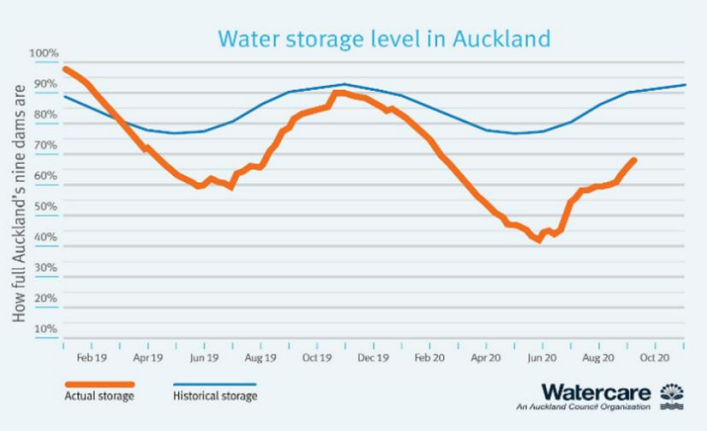
4.4 Preparing for drought and actions at the beginning and/or prior to the drought

In preparing for dry conditions and droughts, Watercare relies on NIWA and Metservice short-term weather forecasts, internal demand forecasts, and then assesses supply reliability using ISMM to evaluate performance against the Drought Standard. This process gives Watercare confidence in its ability to supply water, to adopt the right operating strategy, to implement demand management measures and to recommend restrictions in compliance with the Drought Standard. This is a reasonable approach to water supply operations and consistent with global water industry practice.

Engaging, communicating, and consulting with internal and external stakeholders is essential for Watercare to maintain stakeholder support and legitimacy for such proposed actions. This is especially relevant for government-owned/controlled natural monopoly providers of essential services.

It is noted that actual experience of droughts is a significant differentiator in drought resilience of cities generally, and particularly in preparing to initiate drought actions. Cities that have experienced a significant drought (requiring water restrictions) in the past 10 years tend to be more ready to initiate drought measures early, as has been experienced in Sydney and South East Queensland in 2019/20. This included extensive communication and consultations among stakeholders and the initiation of water conservation measures and preparations for restrictions and rebates.

Auckland's catchments have received low rainfall consequently storage levels are very low. Water restrictions are triggered based on storage levels although Auckland has an additional supply from the Waikato River (on average about 34% of the total annual supply). This inter-relationship between the two sources of supply and the restriction triggers is built-in to the ISMM logic. The trigger levels are determined through modelling, taking into account storage levels, Waikato flows and demand management. This is how Watercare navigates the dynamic relationship between meteorological drought, water supply risk and drought response measures.

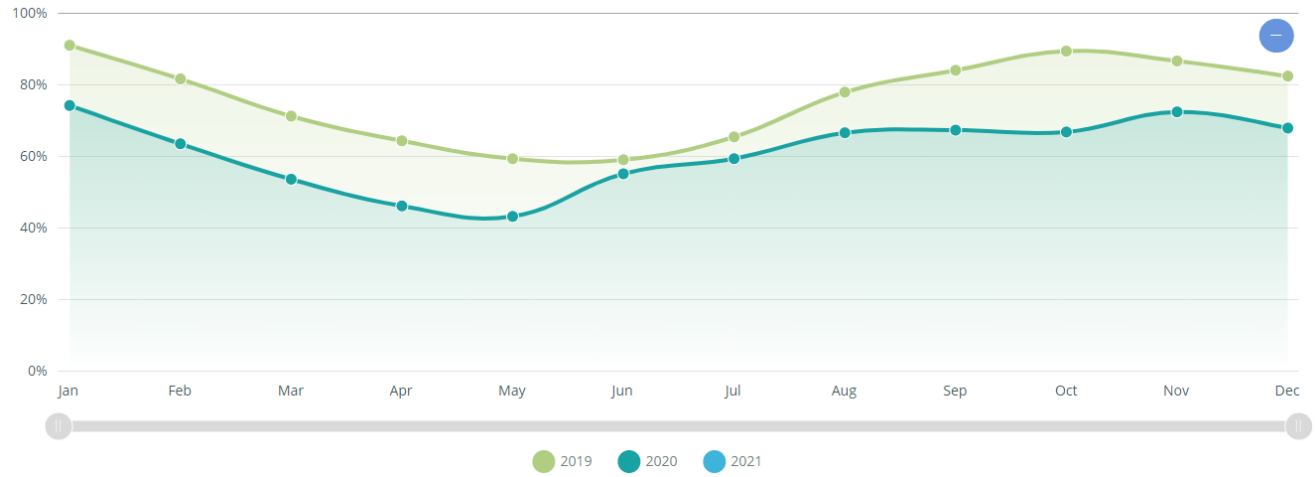


While level of storage and river flows are good visual signals of water reserves, an integrated water balance of supply, demand and operations is critical to understanding the true state of water security and drought resilience.

In 2017, Watercare initiated the 2017-2020 Water Efficiency Strategy to reduce water demand by 15% (from 298 L/p/d in 2004 to 253 L/p/d by 2025). Under drought conditions to achieve a 20% reduction in total demand, the demand per person target would be 200 L/p/d.

Although per capita water demand reduced because of the Water Efficiency Strategy and other factors, the effect of the population increase on water demand poses a greater pressure on water sources. Watercare has expressed concerns about the accuracy of population and water demand estimates, which creates uncertainty in planning for water security and drought resilience.

- Watercare could have acted a little sooner to lean forward and be on alert, by engaging with stakeholders to initiate demand management measures and prepare for restrictions. While the triggering of restrictions is set in the Drought Management Plan based on modelling, the storage level in Dec 2019 had declined to 83% whereas it was 98% in Dec 2018, and there was a steady decline in storage from October 2019 onwards. Given the increasing anomalies pointing to drier conditions and Watercare's perceptions of uncertainties in estimates of population and demand, it would have been prudent for Watercare to take action earlier to raise awareness and initiate demand management measures such as water conservation. It is recognised that in the early stages of a dry period which *may* or *may not* evolve into a drought, mobilising adequate resources is difficult. In March 2020 Watercare had to deal with additional disruption due to Covid-19 restrictions which led to deferral of meter readings.



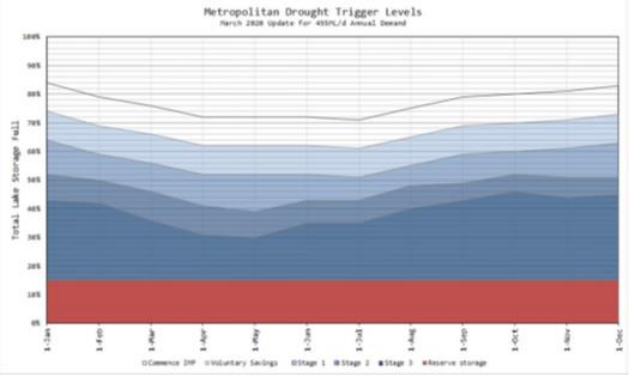
- In 2018/19 Auckland had its driest summer since 1993/94 with significant rainfall deficits, but this did not trigger Watercare's Drought Management Plan as the modelling indicated that their storages would remain healthy (given that additional access to the Waikato increased the probability for the storages to recover). From January to June 2019 the storage levels dropped to below 60% but recovered to 90% by October. Watercare had a level of comfort due to the following factors:
  - Access to the Waikato River and the investment in the Waikato pipeline and WTP was sufficient to ensure that their reservoirs were able to be recharged during the winter months.
  - successful demand management and modelling showed adequate water reserves for 36 months with restrictions.
  - continuing expectations of NIWA's predicted rainfall with a rapid recovery of storages (in 2019 storage levels recovered from 59% to 89% in four months).
- While Watercare could take some comfort in their strategy and this was not an unreasonable position, the driest summer on record could have provided Watercare with an opportunity to:
  - Consult early with customers and stakeholders on the Drought Management Plan and prepare the community for what *might* happen (even if viewed as *unlikely*), such as demand restrictions that *might* be imposed in the future. An early and open debate with Council on restrictions would have helped with understanding touch points and pain points and joint action to mitigate impacts.

- Work through potential drought scenarios in collaboration with Council to ensure they were well prepared and aligned on the strategy and how it would be implemented. This could have helped unearth some of the data integrity, governance, and other issues that played out in the following summer.

- Watercare could also have gained significant insight and improved its DMP by learning from other utilities affected by climate change over the past 10 years and had to revise their approach to drought and water security. In particular, the very similar experience and lessons learnt by other metropolitan water utilities on how best to engage with their councils, customers, regulators, community, and other stakeholders. It is worth noting that early in the onset of drought there was similar disconnect between these utilities and their stakeholders in awareness and understanding, leading to friction, and mitigating action.
- Watercare could have also taken the opportunity in 2019 to explore global drought experiences with a number of cities (including Sydney, Brisbane, Cape Town and Singapore – some going through their second 'unprecedented' drought) with lessons learnt on impacts of climate change, on how best to respond, and on stakeholder and community engagement before and during droughts. Each of these cities has developed insights, approaches, and techniques to build greater alignment among stakeholders, which are worth exploring and adapting to Auckland. It is noted that drought response is increasingly organic and adaptive to cater for uncertainties that accompany droughts.

4.5 Response during the drought with ongoing decline of water storages

On balance, considering Watercare's operating context and the results achieved during the current drought, we found that overall, Watercare's drought response actions have been timely and effective.



With a second year of low rainfall from about December 2019 to June 2020 the total storage level dropped to about 43% in May 2020 which triggered restrictions according to the Drought Management Plan (DMP). Watercare operated consistently with the Drought Management Plan (DMP) and took the necessary actions and measures as required under the DMP and the Incident Management Plan (IMP). The first action under the drought response is to commence the IMP, with the declaration of a Level 2 incident. The IMP does not distinguish between the types of incidents and treats droughts as a 'non-normal' situation. The DMP and the IMP are linked together to provide Watercare with the guidance on managing droughts with response functions and actions.

Responding to drought requires early actions to engage with stakeholders, to ensure that they are on alert and prepared for the drought measures and responses that are required of them. These include Council being ready for processing consents, conservation of water, demand management, announcing restrictions and allocating resources. These also include customers being ready to reduce water use and making alternative supply arrangements to maintain their businesses. This requires Watercare to *lead from behind* to ensure that preparatory work is done in anticipation of activating the next stage. One example of leading from behind is for Watercare and Council to jointly develop the set of restrictions and the plan to jointly implement them (announcing, monitoring and enforcement).

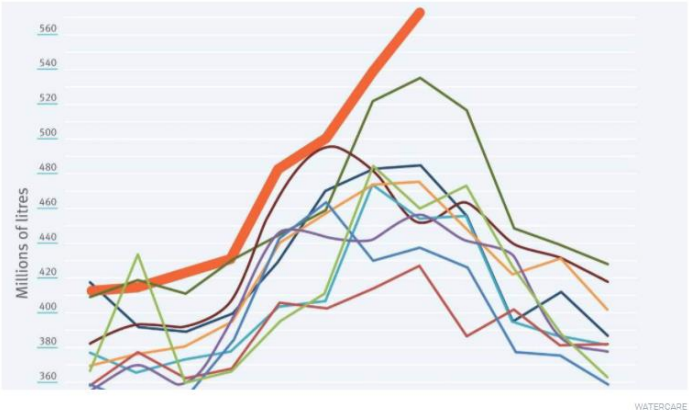
Some customers stated that restrictions are a blunt instrument in their effect, that they are imposed suddenly with unintended effects. The DMP responses are triggered by storage levels and in accordance with the restrictions schedule, and hence there is a tendency for restrictions to appear sudden and wide sweeping in their impact.

A '*lean forward*' stage (or Level 1 incident equivalent) would have assisted Watercare in early engagement and enabled greater awareness, buy-in and a shared understanding of risks and actions to mitigate risks.

In the initial stages of the drought, the interaction between Watercare and Council mainly involved keeping the Council informed at an officer level. There was limited joint exploration of likely scenarios before they began to emerge, which

meant that Council was not fully engaged in Watercare's drought response. Watercare reflected that in the early stages of responding to the drought there were issues of inadequate staff resources. Droughts require a different approach to managing 'traditional' incidents (like pipe breaks which are more sudden and certain) and they also require significant upfront effort to engage with stakeholders and set up the right environment for stakeholders to work collaboratively to respond to droughts.

- The NIWA and Metservice forecast precipitation anomalies (drier than normal) were much smaller than the actual anomalies during Nov 2019 to May 2020, which meant rainfall deficits were significant for both Hunua and Waitakere catchment areas. This has been regularly monitored, modelled, and reviewed by Watercare.
- In February 2020 the peak summer demand reached a record high of over 560ML/d over several days, compared to average annual water demand of 440ML/d. This period coincided with peak demand for tanker water from outside the Auckland metropolitan area. While in volumetric terms it is only a small fraction of a percentage of total demand, Watercare advises that it led to localised constraints in some systems. Media such as "*Two-month wait for Auckland water tank users as dry weather increases demand*" created significant concerns for stakeholders including Council.

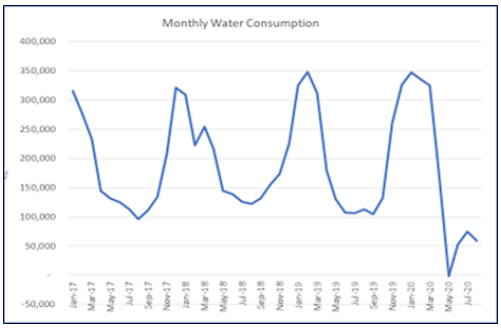


The bold orange line shows the current demand for water.

- When water levels were consistently falling (like in 2019) Watercare initiated its drought response, which was successful in reducing daily demand and avoiding serious water shortages. Some major customers indicated that their water consumption dropped significantly in March 2020 due to the Covid-19 lockdown and closing of businesses and has remained low.
- Watercare has also approved rapid investments in infrastructure that will improve Auckland's water security and supply reliability for the next 10 to 15 years, however there has not been room to check whether these investments reflect best value for customers and their risk/value preferences under a climate change/variability scenario.
- Some stakeholders referred to a 'lengthy delay' in obtaining consent for access to additional water from the Waikato. However, Watercare's program for additional access to Waikato was not expected to occur till 2024-25. It is also recognised that this is a complex governance matter that requires all stakeholders to address collegiately.
- Watercare advised that the Covid-19 lockdown and restrictions were taken into account in their decision on when to impose restrictions.
- On 9 September 2020 Watercare was granted consent to take an extra 100 ML/d from the Waikato River on a seasonal basis; enabling additional water extraction between May and September (inclusive) and at other times in the year during above the median flow. Waikato Regional Council has also granted consent for Watercare to temporarily share 25 ML/d with Hamilton City Council. In total, Watercare will cap its maximum take to 300ML/d.
- Supply augmentations are essential to assist water security but a key lesson from South East Queensland, Sydney and Cape Town drought crises is that both supply-side and demand-side interventions as well as improved systems operations are critical and inter-dependent.
- Most utilities serving large cities are planning for an increased likelihood of droughts and are developing diverse supply and demand management strategies, supported by innovations in system efficiency and effectiveness as well as co-delivery of services and shared value. Cape Town and South East Queensland are developing Integrated decision support systems (IDSS) or system digital twins to support optimised water balance.
- Successful reduction in demand was achieved through water conservation messaging and water restrictions. The target consumption for January 2021 is set at 461 ML/d, whereas the actual consumption was 424 ML/d (monthly average for Jan 2021), which is 8% better than the target (37 ML/d). During the summer of 2020, the daily water demand for Auckland peaked at 568 ML/d.
- Prior to the drought in 2019, the daily residential consumption averaged 280 L/p/d (gross per capita consumption of 380 L/p/d, including non-residential use and system leakage).

- As of mid-January 2021, with stage 1 restrictions in place, the daily residential consumption is averaging at 160 L/p/d (gross per capita consumption of 272 L/p/d, including non-residential use and system leakage).
- While water conservation messaging and restrictions have been effective to date, Watercare and the Council could have coordinated the implementation of the drought restrictions and the consultations with community and stakeholders could have been more effective in addressing the concerns of water reliant businesses and large water users. A better approach would have been to establish a joint working group including Council, Watercare, customer representatives and other stakeholders to engage early, maximise insight/experience and buy-in, prepare to respond, manage response and recovery.
- By late 2020, as the prospect of an extended drought and restrictions became the focus for action, it triggered collaborative effort, notably, the development of Auckland's Supplementary Water Supply Action Plan (Action Plan) jointly by Council and Watercare managers in October-November 2020. The Action Plan is a living document and is now being reviewed and revised as needed, initially with five response-oriented goals:
  - Monitor and Assess: Keep up to date on climate status (focus on prolonged dry weather conditions) and assess potential impacts on water users, and the environment.
  - Communicate current information to public and internal stakeholders (decision makers) to support community preparedness.
  - Coordinated response by Auckland Council, Watercare Services Limited, water carriers and other stakeholders.
  - Take agreed actions to reduce the adverse effect of prolonged dry periods on water users and the environment.
  - Develop a short, medium, and long-term plan based on lessons learnt and trigger thresholds.

  There are four response areas for the Action Plan:
  - Encourage individual water resilience and efficiency
  - Support industry
  - Increase infrastructure
  - Safeguard community well-being.



As a result of Watercare's water efficiency measures[11] and demand management measures, there has been a good response from the community in reducing monthly water consumption as shown in the graph on the right. The March-April 2020 drop in consumption was accentuated by the Covid 19 lockdown. On balance, considering Watercare's operating context and the results achieved during the current drought, we found that overall, Watercare's drought response actions have been timely and effective.

4.6 Communication, engagement, and governance

Watercare engaged well with customers, water users and younger citizens on matters of demand management and voluntary restrictions. This is borne out in the reduction in demand achieved. This will also benefit Watercare in future engagement on water security and climate resilience.

Both internal and external stakeholders have suggested that better communication, early consultation and collaboration between Watercare, Council, customers and other stakeholders would have enabled a clearer shared understanding of the drought standard, the drought management plan and reduced misconceptions on demand management and restrictions. Some of the external stakeholders do not have a sound understanding and assurance of water supply security and resilience and the integral role of restrictions in achieving supply security and resilience.

We heard from Council and regulator stakeholders that *communication*, *engagement,* and *governance* arrangements were inadequate for collaboration and buy-in. These three things are important to ensure confidence and assurance in the measures and actions taken to address the situation. While Watercare had confidence in its ability to manage the drought, several stakeholders have indicated that communication, engagement, and consultation could have been improved in both directions, for them to have similar confidence.

[11] As identified in Auckland water efficiency strategy 2017 to 2020 and reiterated in the Draft Auckland water efficiency strategy 2020-2025 (Oct 2020)

- Watercare would have benefited from early, pre-drought engagement with the Council, customers, community, stakeholders, and other major utilities globally, on water security and resilience:
  - for all parties to understand the restrictions and their implications, unintended consequences, and mitigation measures, which would have helped reduce surprises and ease the friction.
  - to align the level of water security investment and the response to drought, with customer and stakeholder expectations and drought experiences of global cities.
  - so that the Council, customers, community, and stakeholders better understand the context for restrictions and that water security is not absolute, i.e. that there are risk events that can result in a need for demand management.
  - for drought resilience benchmarking with equivalent water service providers overseas.
- Watercare would have benefitted from taking a proactive position of 'leading from behind' in co-designing and maintaining the Water Strategy for Auckland, and in building a more collaborative relationship with Auckland Council, asserting Watercare's accountability and responsibility for water security:
  - consistent with Watercare putting its customers at the heart of its business.
  - as the incumbent natural monopoly with the knowledge and capability to deliver water services, achieve outcomes, manage risks, and realise opportunities.
  - acknowledging Auckland Council's role as Watercare's governing body, its legitimacy and capacity to take matters of significance to its constituents.
- Watercare could have been more proactive in discussing and debating level of water security and strategic business risks:
  - while Auckland recorded its driest 6 months on record, discussions on the drought only occurred the following year after the second event of falling reservoir levels, some conversations occurred with no clear resolution.
  - dependence on Waikato source needs to be reviewed for joint probability of events and interests.
  - there may be benefit in considering how well Watercare is positioned to anticipate and respond to climate variability and/or other extreme risks and joint probabilities; and to engage with counterparts and industry researchers.
  - In view of the implications of the current drought, Watercare's climate change mitigation and adaptation strategy should be reviewed to ensure water security, energy security and liveability.
- Watercare showed a 'culture', perception, and/or reality of being capital constrained and this, driving decision making:
  - while independent economic regulation would address this, it would be prudent to undertake planning as if regulated, engage with customers so they co-own the plans, and wear a bold and confident customer hat when engaging with the Council.
  - it is prudent to be proactive in co-developing an integrated planning approach to diversified supplies (Three-Waters Strategy including recycled water) and demand management under alternative scenarios. While many supply alternatives have been investigated recently, it is worth considering a system water balance approach with integrated supply and demand for desired levels of service. Watercare and Council are jointly developing the Water Strategy, and this will address security of supply through source diversification.
- The culture of Watercare needs further evolution to become more future facing, strategic, more focussed on servicing customers and the community and confident in 'owning this':
  - There is increasing focus on customers (customer centricity) across the world and most large utilities have formalised mechanisms for customer engagement and collaboration, in co-developing and co-delivering levels of service, water conservation measures, drought response and restrictions.
  - there has been a significant positive shift in the culture within Watercare since the transformation project commenced – from asset operations to infrastructure resilience to customer service.

- over the past 4 years the diversity in the Executive and the Board has helped improve discussion, conversation, and relationship with Council.
- the Board could benefit from time taken out to focus on strategy and future risks/opportunities, allocate ample time to consider alternative scenarios for planning (likely, possible, plausible, preferable), debate and adopt agreed adaptive strategies to maintaining assurance and positioning for future challenges.
- there is room for improved cultural alignment between the Board and the Executive. Executive could proactively engage in raising awareness and understanding of issues and risk; in discussing options; and working towards agreed risk appetite and tolerances for planning and response pathways thus building trust.

5 Review Recommendations

Droughts are natural and globally, their frequency and potential impacts are steadily increasing. This has a significant bearing on the provision of reliable, safe, and efficient water and wastewater services. At the heart of this mission to provide services to the community is water security and supply reliability over the drought to flood continuum.

In forming our views and developing our recommendations, we considered the information gathered from Watercare executives and Board, external stakeholders, an environmental scan of Watercare's operating environment, a comparative study with equivalent cities and drew on our experience working with water utilities across the world.

We have drawn this set of recommendations, based on our analysis of the reports and documents relating to drought management, stakeholder views and comments, understanding of current and proposed reforms, the analysis of the drought management experiences and learnings in similar cities and regions in Australia and in South Africa. There are further recommendations and feedback from stakeholders in the Appendices for consideration.

- Watercare's Board and Executive need to build a shared understanding of current and future level of water security and drought resilience by examining potential drought scenarios and the extent of drought resilience/ drought proofing to maintain Watercare's mission. This forms the basis for engaging with stakeholders to raise awareness of risks, co-develop options for risk-mitigation, test and select a mutually desired level of service.
- Watercare needs to engage with Auckland community and stakeholders on water security to ensure they understand the Drought Standard, water supply resilience and planned response to droughts. Since Drought Resilience is a shared responsibility of service providers and consumers/ beneficiaries, the wider community needs to be consulted and have an opportunity to provide input.
- Watercare must continually monitor water security and update relevant strategies regularly to ensure they achieve the desired levels of service. Watercare should engage continually with the community to raise water literacy, maintain trust, and build shared understanding. This understanding enables alignment, collaboration, and preparedness for droughts.
- Watercare must explore opportunities with large water users, water dependent and water sensitive customers, emerging developments, CCOs, water utilities as well as industry researchers and on how to better incorporate water security into their business planning and to explore opportunities of mutual benefit.
- Watercare must clarify for stakeholders on how Auckland's water security is being met and the basis for Watercare's confidence must be clearly conveyed to its stakeholders, especially Council. This is not to say that the technical modelling needs to be explained in detail, but Watercare needs to be trusted by stakeholders.
- Auckland could consider collaborating with its sister City Brisbane (given the similarities) to co-develop, adopt, adapt, and apply their collective wisdom and resources in achieving drought resilience.
- The Recommendations of the Review fall into three areas of outcomes:
  - For stakeholders to understand how Watercare ensures Auckland's drought resilience, an **Integrated Water Security Program** (IWSP) is essential. Droughts are not sharp, sudden incidents but slowly occur over a flood to drought continuum. An IWSP brings together into one program, the related and inter-dependent strategies and plans to enable Watercare operate smoothly across the drought to flood continuum and clearly demonstrate a wholistic approach.

- To build trust and confidence in Watercare, increased **Stakeholder Engagement and Management of Expectations** is critical. This includes early engagement and deep exploration both at Board level as well as external stakeholders.
- For stakeholders to understand and be prepared for emerging conditions, engage with them through **collaborative scenario analysis** to explore and discuss what level of drought resilience is desired.

The recommendations have the overall objective of improving drought resilience: through closer engagement with stakeholders, by closing the knowledge gap and by collaborating on an integrated water security program. The recommendations are grouped into three areas:

- 6.1 An Integrated Water Security Program for Auckland
- 6.2 Stakeholder Engagement and Management of Expectations
- 6.3 Collaborative Adaptive Planning for Future Scenarios

From the perspective of creating and maintaining drought resilience for Auckland, the recommendations have been categorised into **Critical** (important and urgent), **Essential** (important but opportune) and **Desirable** (added benefit) has been proposed to assist Watercare in implementing these recommendations – Appendix E.

5.1 An Integrated Water Security Program for Auckland

***Why**: A program approach aligns the outcome (effective and efficient management of risk), the strategy (fair and equitable apportionment of risk) and the governance (sound structural arrangements/ relationships with clear responsibility and accountability).To properly manage drought risk , an Integrated Water Security Program (IWSP) will provide a structured approach for Council-Watercare collaboration in drought planning and implementation.*

An integrated water balance covers supply-side, demand-side, and operational measures, across the drought to flood continuum. An Integrated Water Security Program (IWSP) will enable Watercare to operate smoothly across this continuum and address gradually changing conditions such as emerging droughts. The Water Strategy currently being developed jointly by Watercare and the Council would become a foundational part of the IWSP.

It is recommended that Watercare develop an IWSP for Auckland, with the objective of achieving water supply security for Auckland for medium to long-term. The IWSP should include three interdependent components:

A. Development of strategies, policies and plans for water security, growth, droughts, floods, and climate change

B. Preparing and responding to climate change and other events

C. Enabling recovery and building resilience of Auckland

The Program should address both *quantity* and *quality* of all current and prospective water sources and water demands.

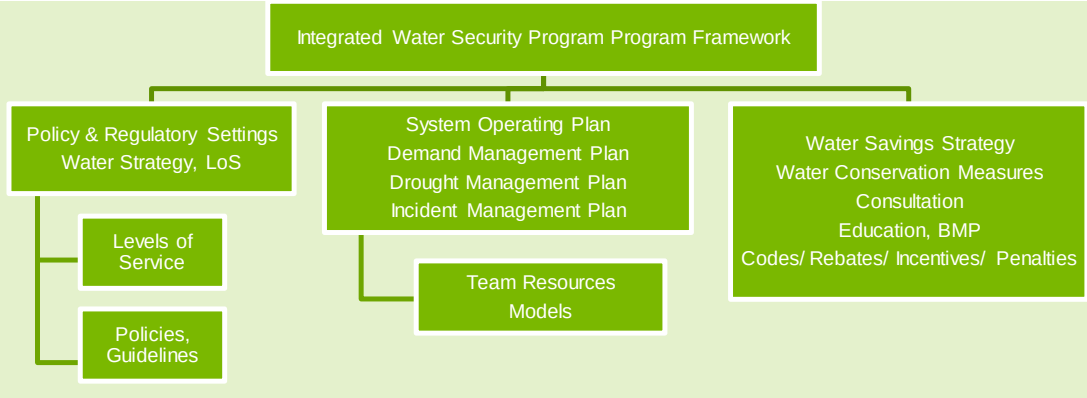
The Program should be co-developed by a joint team of Watercare and Council; with close consultation with regulators, Maori and Iwi stakeholders, consenting entities and water users/producers.

- It is recommended that Watercare do a stocktake and map actions/ initiatives of Watercare, Council and stakeholders to create shared understanding of their status, gaps, overlaps, synergies, timeframes, and resources.
- It is recommended that Watercare leads and coordinates the development of the IWSP. Taking into consideration the accountability, capability, knowledge base and resources, the component projects could be led as follows in partnership with key stakeholders:

	IWSP Component Projects	Lead agency
A.	Policy setting and planning for droughts and climate change	Auckland Council
B.	Preparing and responding to climate change events	Watercare
C.	Recovery and building resilience	Watercare

From the inception, the joint team scopes out the work to be undertaken, procures support and manages development of the IWSP. The Program comprises projects and work packages that can be supported by experts and involve active consultation from customers and community and maximises engagement with community and stakeholders both during the development of the IWSP and in implementing the strategy.

The IWSP brings together stakeholder interests and the various component plans and strategies that need to work together seamlessly to achieve drought resilience. The IWSP would benefit Watercare by bringing the diverse measures for drought resilience into the one program that connects the measures clearly and coherently for stakeholders. This Program creates a cogent narrative that builds shared assurance and confidence.



7.2

A. Policy settings and planning for droughts and climate change

Project A1. Policy settings

- Under the auspices of the Integrated Water Security Program, Watercare to initiate a joint regulatory review to identify policy gaps and overlaps and options to improve compliance and performance within the current regulatory framework as well as the proposed regulatory reforms (Three Waters Reform and Action for Healthy Waterways).

  This review could be extended to the statutory planning framework to assist Project A2 - Planning.

  This would help identify whether and what interpretations and explanatory notes on legislation, regulations, guidelines, and protocols are required, to develop shared understanding of roles, responsibilities, and accountabilities for drought management.

  These would also facilitate compliance and performance and successful implementation of policy, plans and programs.

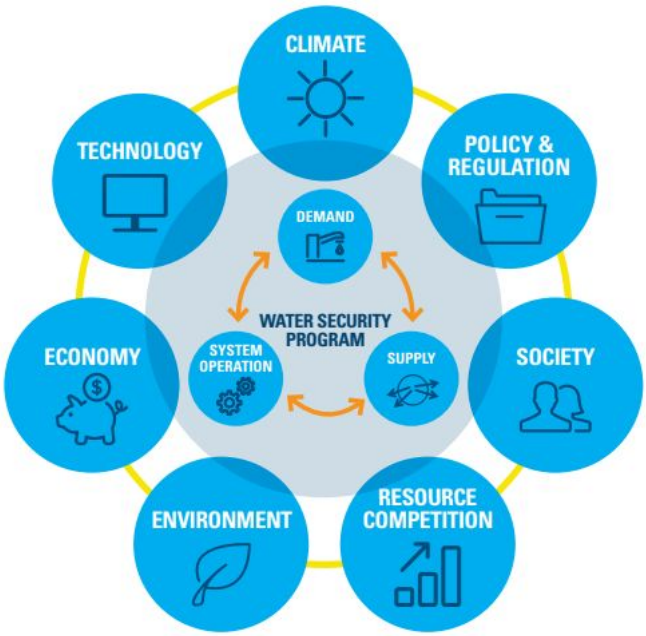
  Some of the frameworks/ policies/ guidelines/ protocols that have been identified include:

  - Regulatory framework for water security planning (specifying policy objectives and the criteria for setting level of service)
  - Policies and guidelines for consents, as well as access to, use of and disposal of stormwater, recycled water, and desalination. Regulations and guidelines for use of recycled water should be developed jointly by regulators, service providers and users.
  - Agreed Water Strategy as being jointly developed by Watercare and Auckland Council.
  - Policy for joint investment through special/limited purpose vehicles and for apportionment of risk.
  - Cost-recovery and pricing policy and strategy that caters for water scarcity and variability of supply and demand, including non-connected customers reliant on system supplies during drought.
  - Protocols for communication, engagement and consultation and negotiation with Maori and Iwi stakeholders.
  - Agreed protocols between Board and Council for triggering joint action under Drought Management Plan (DMP) and Incident Management Plan (IMP), for messaging, restrictions, enforcement/compliance. Partnering with the Liaison Councillor to keep each other informed and avoid surprises and conflicts.
  - Agreed methodologies, acceptable data sets and decision criteria for planning across Council entities.

- A framework policy for a water market and guidelines for water trading to ensure resilience over the whole system of water sources including the Waikato River.
- Agreed protocols for communications, consultations, applications, negotiations, and conflict resolution, with lead-times/turn-around times for approvals and information requests.

The figure on the right shows Seqwater's Water Security Program framework of interdependent factors and influences (Source: Water for Life Water Security Program 2019).

This framework brings external factors into focus for water supply security. For example, economic factors influencing investment decisions during a pandemic or extreme drought impacts on the economy and society.



Project A2. Planning for droughts and climate change

- Expedite the Auckland Water Strategy, if necessary, through an *interim* Water Strategy, to consolidate the current supply augmentation measures; to enable early commencement of long-term supply and demand measures; guide the exit from current drought; and embed permanent water conservation measures. The Australian Water Industry has adopted Water Services Association of Australia (WSAA) planning framework and guidelines[12] (**Appendix A**). This framework could be adapted for iteratively developing Auckland's Water Strategy, and should include:
  - Water Strategy drivers for asset management planning, capital program and operations – including compliance, water security, growth, increased service levels (across all enterprise risks and opportunities).
  - Agreed sets of data, assumptions and planning models and methodologies for service provision, security, and resilience. The data sets and the granularity of the data should be commensurate with the decisions to be made and required levels of service. As an example, weekly water demand data sets for district metering zones to assist water efficiency or demand management measures.
  - Agreed growth forecasts for population, water demand and economic growth; distribution and sequence of proposed developments and provision of infrastructure to achieve levels of service including lead times for implementation.
  - A source diversification strategy including climate dependent, climate resilient and climate independent sources, incorporating networked and decentralised options and adopt an Integrated Water balance (**Appendix B**)
  - Review water loss estimates as 13.5% appears low. In addition to pressure management to reduce losses, a greater overall benefit is likely to come from reducing per capita consumption – to say 150L/p/d and benefits the operational efficiency of the bulk system and storages.
  - Include the water demands of the non-connected population and other demands emerging during droughts and extreme temperatures/humidity.
  - Risk assessment of supplies from the Waikato River, integrated risk assessment of all supply sources, and analyse the components of the overall enterprise risk (insufficient treated water supply risk) to identify drought risks and mitigation options.

[12] WSAA OCCASIONAL PAPER 29 Urban water planning framework and guidelines, 2014

- An agreed set of 'top-down' future scenarios (most likely, probable, plausible, and preferable) to stress test the Water Strategy and develop continuity and contingency plans.
- Acceptable level of water security risk over a 30year period (acceptable to both Watercare and Council), taking into account, joint probability of events and consequences. This requires an iterative process of optimising desired Level of Service (extent of drought resilience or drought proofing), cost and risk.
- An adaptive approach to service plans – including strategy, planning and management components, to address transition risks such as uncertainty and volatility. This also enables Watercare to receive timely and useful feedback from Council, developers, and the water industry on options/alternatives.
- A revised drought standard based on stochastic analysis of catchment yields, taking into consideration climate change scenarios as well as climatic variability. This analysis should include modelling of Watercare's storages as well as Waikato River flows and other sources. (**Appendix C**).
- An investment plan that integrates investments in supply, demand, and operations (Watercare, Council and customers). This will most likely be required during the implementation of the Three Waters Reforms.
- An agreed review and revision process for the Water Strategy and the Water Security Program as a whole, with a short two-year planning cycle for the Drought Management Plan.

- Develop desired Level of Service expressed as:
  - the projected water demands for Watercare's area of operations, developed in consultation with the Council, that are to be met for each year over the next 30 years.
  - defined levels of restrictions, expected outcomes and triggers for imposing and lifting them
  - frequency, duration, and intensity of drought restrictions (**Appendix D**).
  - storage operating rules, acceptable probability of each storage reaching its minimum operating level.
  - investment strategies for source diversification that includes climate resilient and climate independent supplies.
  - a whole of system water balance taking into account customer investments in supply and demand measures.
  - emergency supply - an essential minimum volume is held in reserve for very low probability emergency events.
- Explore innovative solutions such as economic instruments and market solutions for example, water trading, offsets/ substitutions (Watercare investing in Hamilton to augment its supplies through stormwater harvesting and to reduce water quality risks).

B. Preparing and responding to climate change events

- Revise the current Drought Management Plan to align with the Interim Water Strategy and promote a shared understanding of the implications of restrictions.
- Include a *'lean forward'* stage in the Incident Management Plan to raise awareness and be prepared to 'stand up'. This stage correlates to the period of voluntary water savings. This 'lean forward' stage must also prepare the customers and community to move to Stage 1 restrictions and beyond, should it be necessary. This preparation should include working with large water users, water-dependent industry, critical customers, regulators, Met Services/NIWA, community/ interest groups. There are proven approaches to building social, economic, and environmental resilience to drought, such as subsidies, rebates, incentives, penalties, business continuity, circular economies, etc.
- Maintain programs for monitoring supply and demand - climate outlooks, weather forecasts, and incorporate citizen science, engagement, involvement, and support in drought response.
- Undertake a catchment management study of the Waikato River (integrated quality and quantity assessment and risk evaluation).
- Predictive analytics to address pipe breaks, water losses, and readiness to address water losses, leakage, excess water consumption, as heightened awareness of water conservation kicks in. Improve performance on leakage (best practice is about 9%) adopt economic level of leakage (or similar concept) in network asset renewal/maintenance planning.

- Carefully consider social platforms to create networks to identify/report issues and be set to take timely action. Third party impacts such as impact on traffic or fire safety compound the consequences of loss of water supply or pressure.
- Undertake spatial stochastic modelling of water balance - supply and demand behaviour, identify hot-spots and cold-spots in the network for intervention, for local and system-wide benefits. This could include smart water networks incorporating rainwater tanks and stormwater retention basins to maintain green spaces.
- A focus on managing demand of large commercial water users (including Council) and water dependent industries. A water footprint index can assist in stewardship of water. Explore opportunities for new business opportunities in circular economies, water trading, virtual water, waste to resource, industrial symbiosis.

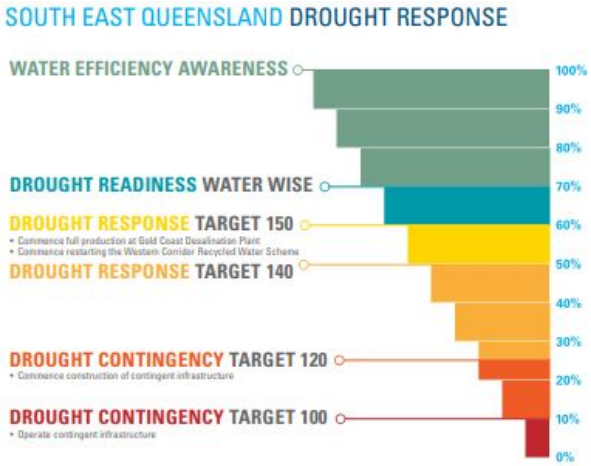
C. Recovery and building resilience

Recommended joint actions for Council and Watercare:

- Extend the scope of the Supplementary Action Plan to include a joint evaluation of integrated risk incorporating drought risk and climatic variability and a risk management plan for the next 12 months.
- Convene a post-drought workshop to capture learnings, schedule annual drought exercise/drill (along the lines of a Tactical Exercise without Troops - TEWT).
- Undertake an assessment of the Water Sensitive Cities Index[13] for Auckland to determine the baseline resilience and adopt the transition pathways to a water sensitive city.
- Commission an end to end (catchment to coast) system water balance study and develop ISMM's diagnostic/ decision support functionality to investigate options for supply augmentation, reuse, demand management, at a system level as well as sub-system level.
- Given the level of interest from key stakeholders in the role of rainwater tanks and stormwater harvesting, Watercare and Council should collaborate on investigating their potential and if appropriate, codesign solutions and programs.
- Adopt integrated approach for governance and management of water, wastewater, and stormwater, consistent with the Three Waters Reform and Healthy Waterways Initiative.
- Revisit the options for stormwater, desalination, and recycled water, within the context of climate adaptation /mitigation as well as circular economies.
- Watercare should monitor the health of its catchments and water quality risks; and consider protection/ prevention/ mitigation through regulations and maintenance works – this includes surface water catchments (including hot spots in the Waikato Catchment) as well as sewer catchments (potentially for recycled water).
- Revise urban planning, regulations, and codes for: permanent water conservation measures, water efficient devices/ buildings/ precincts, rainwater, stormwater, green roofs and bioretention basins, and other water sensitive urban design. Some of these measures also mitigate impacts of sewer overflows in wet weather events.

[13] Developed by the Cooperative Research Centre for Water Sensitive Cities.

- Maintain an education program for drought awareness, water literacy, embed conservation behaviours; and incorporate customer local knowledge and citizen science to create shared value for customers, community and for Watercare. Engage with major customers and water reliant industry to develop best-practice water efficiency practices and management. This can enable innovative solutions amongst the customers to prevent and/or solve supply-demand imbalances for individual customers or for entire sectors/industries. The graphic on the right shows the drought response measures at various levels of storage, which includes continuous focus on water efficiency awareness even at 100%.



- Consider an on-boarding of new customers and recognising inter-generational issues, develop an interactive process for engaging with customers to establish a collaborative relationship, especially with the younger age cohort of customers.
- Connect with Learning, Research & Development Programs for climate adaptation/ resilience, water security, recycled water, stormwater, desalination, local source augmentation. Several R&D avenues are available that are continually developing options and testing them out. The Cape Town Drought Response Learnings Initiative (CTDRLI) for example, aims to help utilities and agencies with drought adaptation and mitigation pathways to increase water security and resilience. Communities of Practice such as for adaptive planning aim are co-designing frameworks, guidelines, and code of practice, with a focus on water security and infrastructure investment decision-making.
- Consider modelling the effect of the future developments under Auckland Council's future urban land supply strategy and develop a proactive service strategy to incentivise sequencing of developments and local water source development (including stormwater, recycled water and managed aquifer recharge), to maintain/extend drought resilience.
- Scenario planning with identified social, economic and environmental events, undertaking an environmental scan (political, economic, social, technological, legislative, environmental PESTLE) and then test drought management plan using water balance modelling (compare using eWater's Source™ model or an integrated quality/quantity optimisation model such as Goldsim®, which has excellent visualisation capability for simple representation of complex modelling, useful for engagement with non-technical stakeholders).

This infographic below shows the extent of Seqwater's community engagement during 2019/2020 in developing the Water Security Program.

5.2 Stakeholder Engagement and Management of Expectations

***Why**: Sustained drought resilience is a shared responsibility of Watercare, Council, water users and the community. To build trust and confidence in drought management and response, stakeholder engagement and management of expectations is critical. An Integrated Water Security Program (IWSP) helps stakeholders to understand drought resilience within the context of Watercare's operating environment. Watercare's diverse strategies and plans need to be integrated and presented coherently to stakeholders to understand the big picture as well as detailed measures.*

The clear narrative and evidence-base of the IWSP would greatly benefit stakeholder confidence and assurance. Based on drought management experience under different institutional set-ups, we recommend a joint committee for developing the IWSP (which should include decision criteria, weightings, risk appetite and apportionment). The joint committee should include representatives from Watercare, Council, regulators, and customers.

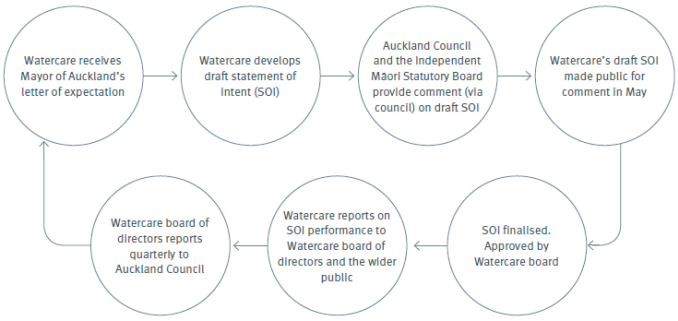
Currently, the onus of drought resilience is being borne largely by Watercare, whereas in fact it should be a shared responsibility of Watercare, Council, regulators, and consumers/water users. This is evident in the Supplementary Water Supply Action Plan[14] which is a joint Auckland Council (Healthy Waters) and Watercare initiative, which rightly identifies goals and actions relating to drought planning, preparation, response, and recovery.

- It is recommended that Watercare engage with Central Government agencies and key decision-makers in government, Maori and Iwi groups, industry, community and special interest groups to raise awareness and understanding of drought risk, to gain support, to influence policy and to maintain relevance and credentials.

In our experiences of droughts across the world, we note that there is often push-back and opposition to the proposed drought actions or perceived inaction. One type of opposition is *outrage* that arises due to asymmetry in knowledge and understanding and is based on emotional factors that influence perception of risk. The risks that are considered involuntary, systemic, and unfair are often given more weight than factors that are thought of as voluntary, natural, and fair. Risk = Hazard + Outrage[15]. A stakeholder management strategy with a focus on communicating and achieving a shared understanding of risk and mitigation options is recommended. This requires identification of unintended consequences and options for adaptation and mitigation.

- Watercare should continue to build on the CCO review recommendations and proactively catalyse collaboration among stakeholders and bring them to the table in co-developing drought strategies and plans, as well as in co-delivering the Water Strategy and the Drought Management Plan.

To coordinate these plans, the joint committee for Water Strategy should determine the decision criteria, weightings, risk appetite and jointly undertake risk evaluation and apportion risk should be formed. As a member of the committee Watercare could lead discussions, inform debate, and support decision-making on plan objectives, drought standard or levels of service and priority actions.



- The arrangements and protocols for developing Watercare's Statement of Intent (SoI) are explicit as shown in the process diagram above. Watercare should initiate discussion with Council and other regulators, on incorporating water security and drought resilience in the next SoI and develop rigour and commitment to joint drought action.
- In relation to management of drought risk[16], we suggest that the Integrated Water Security Program will provide a structured approach for Council-Watercare collaboration in planning and implementation.
- Watercare should consider forming a Customer Reference Group or an equivalent forum to raise awareness and build support, to represent the voice of customers in two-way engagement in Watercare's decision-making.

Coordinated and consistent engagement with stakeholders is important. Some of the learnings from Covid-19 response are adaptable to managing droughts in general and restrictions especially. Terms such as 'flattening the curve, clusters and hot-spots' may be useful in communicating drought response measures to the community.

[14] Auckland Supplementary Water Supply Action Plan November 2020 – Auckland Council and Watercare
[15] 'Responding to Community Outrage: Strategies for Effective Risk Communication' Peter Sandman 1993
[16] CCO Review Recommendation 19: CCOs to monitor and report on risks and risk mitigation measures.

5.3 Collaborative Planning for Future Scenarios

Why: *For stakeholders to understand drought risk and emerging conditions, and to be prepared for future scenarios, Watercare needs to engage with them in discussion, exploration, and analysis; and to collaborate on developing the desired levels of drought resilience and levels of service.*

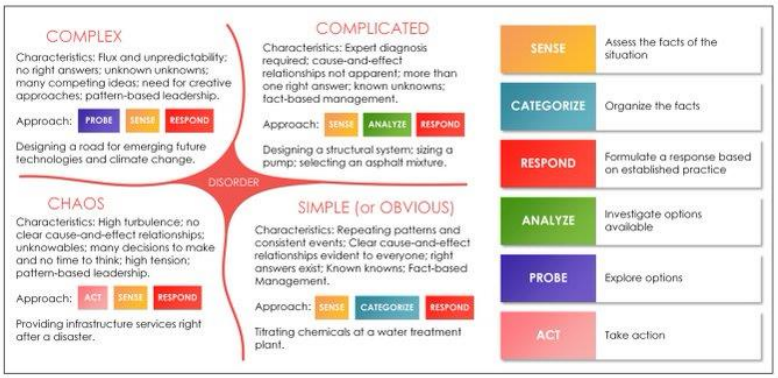
- To land on a shared perspective on drought resilience, it is recommended that Watercare undertake future scenario planning incorporating internal and external factors/forces of change and trends: organisational; socio-political; environmental; economic, financial and commercial; research and technological developments; regulatory and legislative. Factors include climatic variability, population and demand, source diversification/ mix of options.
- Co-develop with key stakeholders an agreed set of integrated 'top-down' future scenarios (most likely, probable, plausible, and preferable), which can be used to stress-test and develop robust drought strategies and standards. This collaborative approach will enable Council, Watercare and other service providers to identify shared planning drivers (such as population, economy, and climate change) and adopt agreed frameworks, assumptions, and resolution of issues. This collaboration is critical to maintain coherence among planning, implementation, and communication to maintain confidence and assurance in water security and drought resilience.

7.2

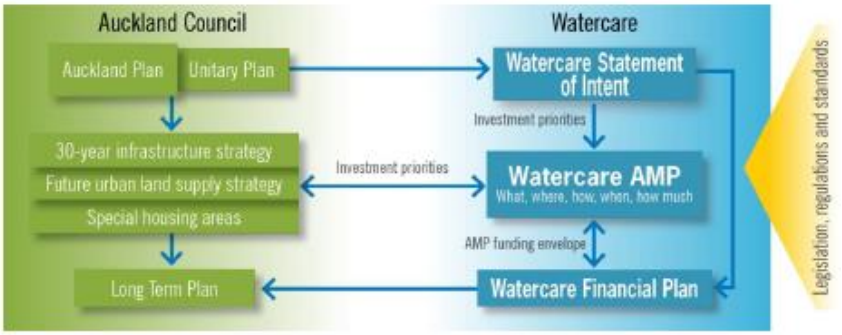
An approach for Watercare to consider is to develop close relations at operational level with each functional area of the Council separately to understand the Council core interests, touch points, pain points and tipping points; and then develop a stakeholder management strategy to help strike a balance in the development and delivery of options.

Water resource management, water security and reliability and provision of essential services is increasingly complex, with volatility, uncertainty, complexity, and ambiguity (VUCA) in a range of physical factors as well as institutional arrangements. Water supply security is not just a complicated engineering problem to be solved through models but requires collaborative adaptive planning.

The more stable, certain, simple, and clear the planning paradigm, the less likely that the plan will be able deal with VUCA. This is not to say that plans shouldn't be clear and simple, but rather that complexity is dealt with first and then simplified for the audience.



The Complex quadrant in the *Cynefin* framework[17] (schematic on the right) is useful for understanding water security planning, drought planning, preparedness, response, and recovery.



Functional relationships between Watercare and Council are defined through legislation and strategies. For example, how Watercare's Asset Management Plan priorities interact with those of the Council.

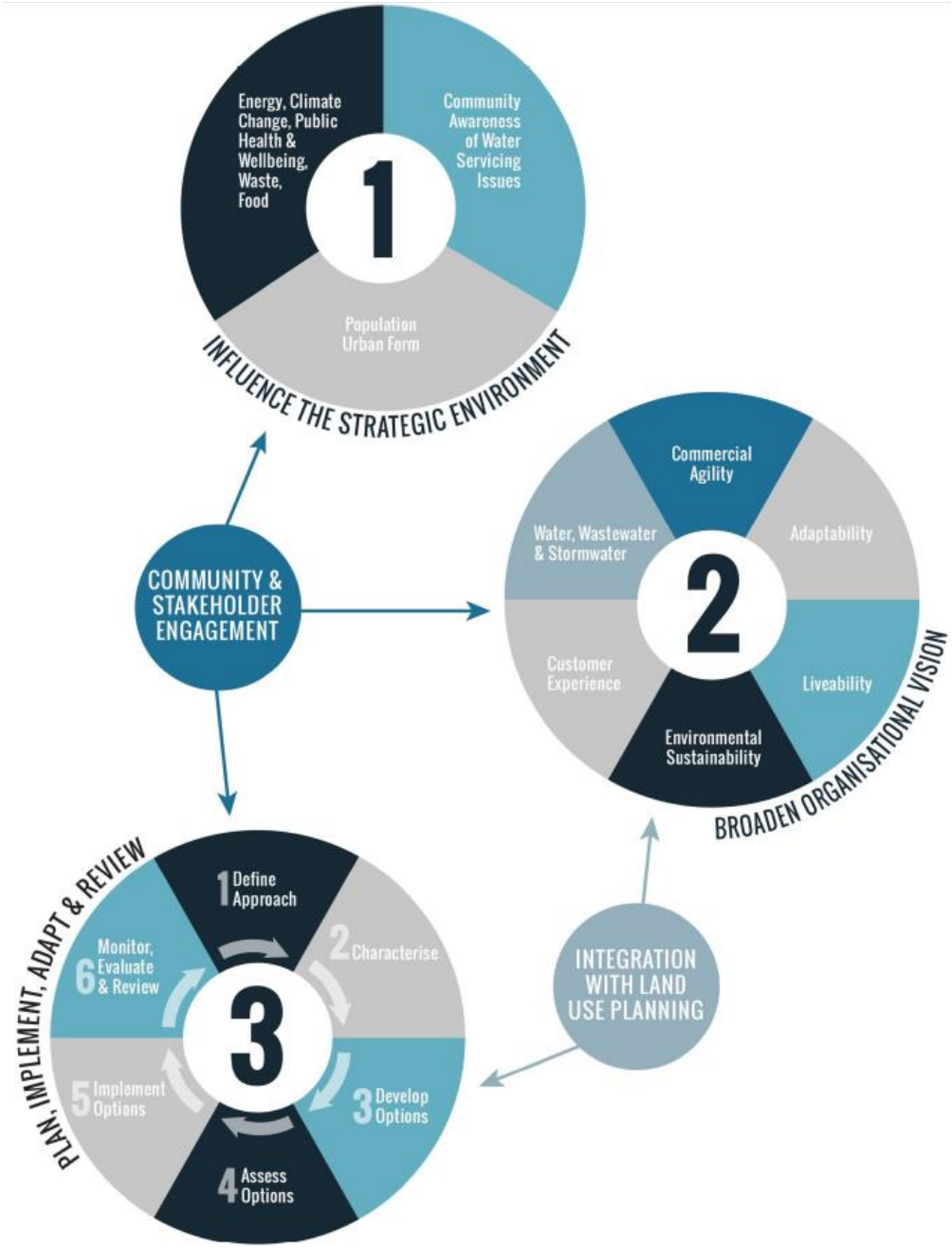
For these functions to be carried out effectively, both parties need to develop a shared understanding of planning objectives, parameters, assumptions, processes, outputs, and outcomes. Any proposed changes to plans and developments need to be made in close consultation amongst the Council, regulators and Watercare, as there may be untended consequences on other parties, resulting from changes by one party.

[17] Cynefin (*kuh nev in*) Framework David J. Snowden and Mary E. Boone 1993/ revised 2007

6 Appendix A – WSAA Urban Water Planning Framework

The Water Services Association of Australia (WSAA) Urban Water Planning Framework and Guidelines, which could be adapted for the Integrated Water Security Program[18]. This framework is supported with a range of processes, systems and a body of knowledge covering planning, preparing, responding, and recovering from droughts.

Resource regulators and economic regulators in Australia use this framework in their assessment of supply security, desired levels of service, full-cost recovery, prudency, and efficiency of capital investment.



[18] OCCASIONAL PAPER 29 Urban water planning framework and guidelines 2014

7 Appendix B – System Water Balance Considerations

This figure depicts a generalised water balance model for supply security for desired level of service, for a range of demands and diverse sources. To achieve long-term water security this requires a stochastic, iterative, and adaptive approach with at least a 30-year planning horizon under possible future scenarios.

A generalised model for informing integrated decision support systems for optimal water balance.

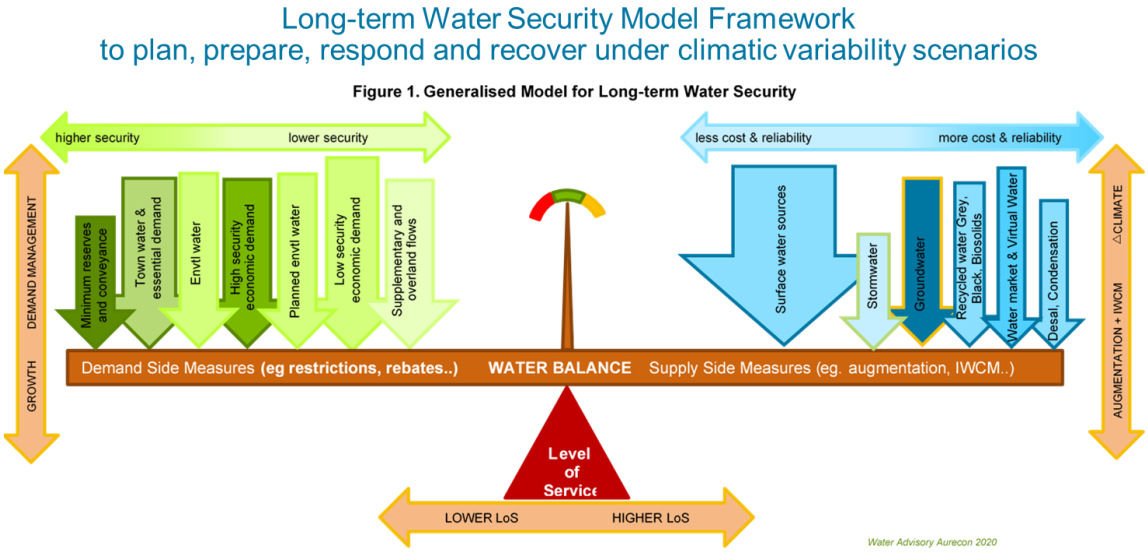


Figure 1. Generalised Model for Long-term Water Security

Whole of system measures including supply-side, demand-side and system operation measures:

- Investigate drivers for supply and demand and test assumptions. For example, test whether climatic variability changes the yield characteristics of the catchment regions; test whether commercial water demand grows proportionally with economic development.
- Review and revise catchment and river flow hydrology (storage volumes, catchment yield, capacity curves and river flow trends).
- Adopt an "*all options on the table*" approach within an integrated water management framework for managing supply, demand, system operations and cost-recovery. There may be innovative economic instruments such as market mechanisms and *regional or city deals*[19] that can assist in achieving a balance through co-benefits.
- Consider enlarging storage, either in the Waitakere Ranges or the Hunua Ranges; upgrading/ dam raising in the Hunua Range dams could be an option.
- Managed Aquifer Recharge (MAR) and rainwater tanks although not the most viable options and account for a small percentage of the demand, they could be strategic within a system to improve overall operational performance and gain stakeholder support.
- Tariff structures such as nodal pricing, premium levels of service, administered scarcity pricing; Rebates and incentives for voluntary demand management; Test the tariff structures for drought conditions.
- Market mechanisms incorporating virtual/embodied water to achieve efficiency targets, demand reduction targets and supply-demand balance. This enables options beyond long, linear network-based approaches to decentralised/ nodal/ modular options to be factored in.
- Permanent Water Conservation Measures (PWCM) to lock in behavioural changes and water efficient measures (system-wide to plumbing fittings and devices). PWCM also buffer against rapid fluctuations in restrictions.
- Based on water-balance analysis, drought restrictions (say Low 10%, Medium 20%, High 30% demand reduction target) to be triggered as the slope of the TSS curve declines (say below 80%, 70%, 60%). **Appendix D** contains considerations in further developing an adaptive restrictions regime.

[19] partnership between government and community to work towards a shared vision for productive and liveable regions/ cities. https://www.infrastructure.gov.au/cities/city-deals/

8 Appendix C – Considerations for ISMM

Based on discussions with Watercare, Tonkin & Taylor (T&T) and a review of ISMM documentation, we found the Integrated Storage Management Model ISMM to be a sophisticated tool, custom-built for Watercare. Some observations are made for Watercare's consideration in planning and modelling for droughts and climate resilience:

- Work with T&T advisors to organise modelling workshops, initially to raise internal awareness and assurance, followed by an external session with key external stakeholders including Council.
- Diagnostic analysis: A comparison of the scenarios modelled with the actual drought response (predicted versus observed) would be useful for lessons learnt and potential improvements to the model; future scenario planning (including climate change and source diversification).
- Integrated analysis: While ISMM has capability to model supply, demand, and operations; supply modelling is robust, but operational and demand inputs need to be tested to the same level.
- Consider updating all the hydrological inputs to the model (post 2012 data). Incorporate total yield from all the catchments and the Waikato River as part of an integrated system.
- Detailed examination of the last 20 years of data and include it in the data set for stochastic analysis. Re-evaluate the yield of proposed supply interventions and if necessary, recalibrate the underlying hydrological models.
- Additional scenarios where you can "force" the hydrology, say with specific years and or various climate scenarios in order to do sensitivity testing and comparison with pre-1994 droughts. Consider linking the stochastic analysis with some seasonal forecasting information.
- Model supply diversification strategies with integrated additional/alternative supply sources (Waikato River, desalination, recycled water, stormwater, rainwater tanks, WSUD measures).
- While annual evaporation is typically less than rainfall in NZ, it would be prudent to model (monthly basis may be adequate) to take into account possible seasonal and interannual shifts in rainfall. Test whether this results in a net positive evaporation. It also impacts on water use/ demand for outdoor and green spaces.
- Additional analysis using the NIWA data (forecasts for 3+ months) with the focus on improving the yield and system modelling for water supply to Auckland.
- Review the demand estimates, particularly the total demand for Auckland and the seasonality of demand, and the information used to estimate evaporation and other losses. Consider linking ISMM with demand data and forecasting system (for example a system like Demand Management Tracking Tool).
- In addition to lowest-cost objective for optimisation, consider economic, social, and environmental costs of drought in general and drought restrictions particularly to Council, customers, community and third parties. Consider extending model objective function to include operational efficiency and resilience of the overall system, consistent with Watercare's system operating strategy.
- Review relative weightings of cost and storage reserves and consider adjusting risk-cost factor. We note that all the major utilities are striving to find a balance in the mandated least-cost or efficient-cost objective and the desired levels of service.
- In setting targets and measures for demand management and restrictions, consider both a top-down approach of achieving water saving targets as well as bottom-up combinations of water efficiency measures and restrictions. Consider modelling customer/ community/ environmental impacts (For example, is it preferable for individual users to restrict their demand than to pay for the higher price of alternative supply options or is it more acceptable to mitigate potential negative ecological impacts).
- Engage with peer utilities on effective modelling to deal with complexity, variability, and uncertainty in supply sources, managing demand and system operations.

9 Appendix D – Considerations for Restrictions

Considerations when reviewing the restrictions regime

- In developing a restrictions regime, test the assumptions in estimating potential water efficiencies, water savings, demand management and costs (economic and financial), by undertaking end-use studies (using surveys and a sample cohort of smart meters for major demand categories), and by engaging with Council, regulators and relevant industries/ customer segments. Explore the complexities of restrictions, then simplify for the lay person.
- Consider mandating water efficiency measures through regulations/ codes/ similar measures/ incentives/ rebates; and build in Permanent Water Conservation Measures (PWCM) to achieve future water saving targets. This 'groundwork' requires more effort and engagement, but it helps achieve buy-in and 'flatten the demand curve'.
- Adopt an *evidence-based* approach to restrictions policy and an *effects-based* approach to implementation plan. A demand management module should be integrated into the Operations Model. This model could test and predict on the same time-step as for ISMM, for example, lead-times to achieve water savings, hot day impacts on demand, effect of water-efficiency measures combined with restrictions and water saving targets.
- Consider modelling a mix of system wide measures (including incentives and restrictions) combined with measures sub/system specific (e.g. District Metering Area DMA)/ specific locations (e.g. suburb or development) or specific uses (outdoor watering) to ascertain if there are better alternative approaches to demand management.
- Option to remove the current Stage 1 Level Restriction, as a 5% reduction is difficult to monitor within a voluntary stage. It is also difficult to maintain customer goodwill for voluntary measures if the whole community is not compelled to 'do their bit'. Instead, consider incorporating these voluntary measures into permanent water conservation measures and water efficiency measures.
- Demand management measures and restrictions should be based on TSS trend (*slope* of the curve) rather than fixed points (alternatively the trend could be modelled, and a midpoint adopted as TSS trigger level).
- Change the target levels to something more substantial threshold levels: say Moderate 10%, Severe 20%, Extreme 30% and Emergency (i.e. Day Zero) 50%, with associated levels of likelihood of occurrence (or AEP), say 1:10, 1:50, 1:100, 1:1000 levels of probability. Different trigger levels, restriction limits and probabilities, could be modelled/tested to determine the best set of measures.
- Use a stepped tariff for water use and associate specific increases in these with each of the various restriction levels – these are still probably the best mechanism for achieving restrictions.
- Identify the outliers and unintended consequences of restrictions on specific uses/ customers/ beneficiaries such as cleaning businesses, Council, schools, sporting clubs. Develop measures to mitigate unintended impacts including rebates/ discounts/ payment plans. An example of this is the prospect of closure of playing fields or swimming pools which have financial, social, economic, and structural risks.

Considerations when applying conservation measures and restrictions

- Consider a Water Efficiency Program, with end-to-end options, ranging from runoff and baseflow protection, storage evaporation through to conveyance, transmission, and reticulation efficiencies, through to scarcity pricing, water efficient precincts, buildings, fittings and devices, rebates, incentives, and penalties.
- Consider co-developing a Drought Incentives and Restrictions Management Plan with Council and customers, covering community awareness, messaging, preparedness, imposition, compliance, and enforcement, lifting restrictions, and locking in conservation behaviours.
- For residential users, the guidance for water use reduction should be defined by specific targets (i.e. per household per day) and should not only be limited to outdoor usage. For example, specify things like reducing the length of showers, reducing the number of toilet flushes, garden watering only in the evenings, mandatory pool covers and limits on filling using municipal water, etc.
- Enforcement and introducing measure to assist with compliance (e.g. the water usage maps) and when pressure/flow regulating/restriction devices can be fitted to non-compliant users.
- Identify specific industries (large water users such as nurseries/agriculture) that could be subject to water rationing with or without compensation based on their dependence on water; and determine their contribution to achieving the overall usage targets under each level of restriction.

10 Appendix E – Review Recommendations

Sections 5.1, 5.2 and 5.3 contain the core recommendations in detail, and Appendices B, C and D contain considerations in specific areas of interest.

These recommendations took into consideration, the valuable insights from Watercare Board, Executives and Managers, Councillors and Council Executives, customers, regulators, and stakeholders.

Summary of Review Recommendations (Page referenced)

Recommendation C= Critical E= Essential D= Desirable	Status
1. P7. Watercare must review and revise the 2020 DMP. The revised Drought Standard should be based on all supply sources and should clearly state the level of service to customers.	C
2. P7. Watercare needs to engage with Auckland community and stakeholders on water security to ensure they understand the Drought Standard, water supply resilience and planned response to droughts.	E
3. P7. Watercare must monitor water security and update relevant strategies regularly to ensure they achieve the desired levels of service. Watercare should engage continually with the community to raise water literacy, maintain trust, and build shared understanding.	E
4. P7. Watercare must clarify for stakeholders on how Auckland's water security is being met and the basis for Watercare's confidence must be clearly conveyed to its stakeholders, especially Council.	C
5. P8. It is recommended that an Integrated Water Security Program for Auckland be developed, to ensure water supply security for Auckland for medium to long-term.	C
6. P9. Watercare should form a Customer Reference Group or similar body to inform, gain customer insights, co-design solutions, raise awareness and build support, to represent the voice of customers.	E
7. P9. Watercare to put in place agreed protocols which would clarify lines of communication and consultation.	E
8. P 9. Watercare undertake future scenario planning incorporating internal and external factors/forces of change and trends.	E
9. P9. Watercare should co-develop with key stakeholders, an agreed set of integrated 'top-down' future scenarios (most likely, probable, plausible, and preferable/ desirable), to stress-test and develop robust drought strategies and standards.	E
10. P15. Watercare must review and revise the 2020 DMP, the Drought Standard, IMP, and the Asset Management Plan (AMP). The revised Drought Standard should be based on all supply sources and should clearly state the level of service to customers.	C
11. P15. Watercare should review the Drought Standard at the same time as the DMP, IMP and the Asset Management Plan (AMP) and if necessary, appropriate revisions made to them.	C
12. P15 to align the Drought Standard and response measures with customer and community expectations, Watercare should develop a comprehensive desired Level of Service (LoS) for water supply security and resilience.	C
13. P15. Using climate change scenarios, Watercare should review the 2020 DMP including hydrology, yield, the Drought Standard, and the restrictions regime, and revise as required.	E
14. P16. To ensure drought resilience for the future, further assessment of the level of security in ongoing climate change, benefits of alternative decentralised supply sources, and willingness to pay for extent of drought resilience are recommended.	E
15. P16. Given the community support for stormwater/ rainwater harvesting for augmenting local supplies, Council and Watercare should explore mutually beneficial precinct level projects to engage with the broader community.	D

Recommendation C= Critical E= Essential D= Desirable	Status
16. P20. Watercare needs to raise awareness and understanding of the stakeholders to provide assurance of water supply security and resilience and the integral role of water restrictions in achieving supply security and resilience.	D
17. P21. The lack of regulations and guidelines for use of recycled water is a constraint to supply diversification. This should be addressed at the earliest by the regulators, commencing with guidelines for outdoor use in parks, gardens and playing surfaces	C
18. P21. Watercare should consider leveraging off the Three Waters Reform opportunity to influence policy and planning to improve drought resilience and supply reliability	C
19. P27. Watercare's Board and Executive need to build a shared understanding of current and future level of water security and drought resilience by examining potential drought scenarios and the extent of drought resilience/ drought proofing to maintain Watercare's mission.	E
20. P27. Watercare needs to engage with Auckland community and stakeholders on water security to ensure they understand the Drought Standard, water supply resilience and planned response to droughts. Since Drought Resilience is a shared responsibility of service providers and consumers/ beneficiaries, the wider community needs to be consulted and have an opportunity to provide input.	E
21. P27. Watercare must continually monitor water security and update relevant strategies regularly to ensure they achieve the desired levels of service. Watercare should engage continually with the community to raise water literacy, maintain trust, and build shared understanding.	D
22. P27. Watercare must explore opportunities with large water users, water dependent/sensitive customers, emerging developments, CCOs, water utilities as well as industry researchers and on how to better incorporate water security into their business planning and to explore opportunities of mutual benefit.	E
23. P27. Watercare must clarify for stakeholders on how Auckland's water security is being met and the basis for Watercare's confidence must be clearly conveyed to its stakeholders, especially Council.	E
24. P27. Auckland could consider collaborating with its sister City Brisbane (given the similarities) to co-develop, adopt, adapt, and apply their collective wisdom and resources in achieving drought resilience.	D
25. P28. It is recommended that Watercare develop an Integrated Water Security Program for Auckland, with the objective of achieving water supply security for Auckland for medium to long-term.	C
26. P28. It is recommended that Watercare do a stocktake and map actions/ initiatives of Watercare, Council and stakeholders to create shared understanding of their status, gaps, overlaps, synergies, timeframes, and resources.	E
27. P28. It is recommended that Watercare leads and coordinates the development of the Integrated Water Security Program. Taking into consideration the accountability, capability, knowledge base and resources the component projects could be led in partnership with key stakeholders.	C

11 Appendix F – Reference Documents

1. Auckland Council 2015. Water Supply and Wastewater Network Bylaw (GB/2015/62) 25 June 2015
2. Auckland Council, 2018. Auckland Plan 2050, Auckland: Auckland Council. Auckland Council, 2019. Auckland Plan 2050: Auckland Population. [Online] Available at: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/auckland-plan/about-the-auckland-plan/Pages/aucklands-population.aspx [Accessed 1 September 2020].
3. Auckland Council, 2019 Our Water Future - Tō tātou wai ahu ake nei, A discussion document February 2019 [Accessed 1 September 2020]
4. Auckland Council May 2020. Emergency Committee 7 May 2020. Open Minutes
5. Auckland Council May 2020. Emergency Committee Open Addendum Agenda
6. Auckland Council Healthy Waters and Watercare Services Limited 2020 Auckland Supplementary Water Supply Action Plan 2020. 19 NOVEMBER 2020
7. Brett, M. & Porteous, A., 2013. NIWA: 2012-2013 drought- a summary. [Online] Available at: http://www.niwa.co.nz/sites/niwa.co.nz/files/2012-2013%20drought%20-%20a%20summary.pdf [Accessed 1 September 2020].
8. Bureau of Meteorology Australia 2020 National performance report 2019–20: urban water utilities
9. Chappell, P., 2015. The Climate and Weather of Auckland. 2nd ed. Auckland: National Institute of Water and Atmospheric Research (NIWA).
10. City of Cape Town, 2019. Cape Town Water Strategy, Cape Town: City of Cape Town.
11. City of Cape Town, 2019. Cape Town Water Strategy - Our Shared Water Future, s.l.: s.n.
12. Cooperative Research Centre for Water Sensitive Cities 2016 – 'Water Sensitive Cities Index - How Water Sensitive is your city?'
13. Department of Water & Sanitation, 2019. Annual Status Update 2019, Cape Town DWS, South Africa 2019.
14. Kerr, T., 2013. The contribution of snowmelt to the rivers of the South Island New Zealand. Journal of Hydrology (New Zealand), 52(2), pp. 61-88.
15. Keys, H., 1988. 1988 survey of the glaciers on Mt Ruapehu Tongariro National Park-A baseline for detecting effects of climate change. Wellington, New Zealand: Science and Research Directorate.
16. Metservice 2020. Watercare Seasonal Forecast. Metservice Presentation to Watercare
17. Ministry for the Environment 2018. Climate Change Projections for New Zealand: Atmosphere Projections Based on Simulations from the IPCC Fifth Assessment, 2nd Edition. Wellington: Ministry for the Environment.
18. Ministry for the Environment, 2008. Climate change effects and impacts assessment: A guidance manual for local government in New Zealand. [Online] Available at: https://www.mfe.govt.nz/publications/climate-change/climate-change-effects-and-impacts-assessment-guidance-manual-local-51 [Accessed 1 September 2020].
19. Muller, M., 2017. Understanding the origins of Cape Town's water crisis. Civil Engineering, June. pp. 11-16.
20. NIWA National Institute for Water and Atmospheric Research. 2020. NIWA Mid-month climate update for Watercare
21. Communications between Aurecon and Watercare staff relating to information and points of clarification.
22. Tonkin and Taylor June 2020. Drought Restrictions Report for Watercare.
1. Water New Zealand 2020. NZ Water and Wastes Association. National Performance Review 2018-2019
2. Watercare, (undated). Auckland Drought Management Plan: 2011-12, Auckland Watercare.
3. Watercare, 2018. Auckland Water Efficiency Strategy: 2017-2020, Auckland: Watercare.
4. Watercare Nov 2029. Watercare Incident Management Plan 25 November 2019.
5. Watercare, April 2020. Drought Update 9 April 2020.
6. Watercare May 2020. 2020 Drought Implementing Auckland Water Restrictions. Watercare Briefing 4 May 2020
7. Watercare, June 2020. Drought Update 18 June 2020.
8. Watercare June 2020. Media Release 23 June 2020
9. Watercare, June 2020. Letter to Mayor Auckland Council 24 June 2020.
10. Watercare June 2020. Auckland metropolitan drought response – summary of tactical overview 24 June 2020
11. Watercare, July 2020. Drought Update 2 July 2020.
12. Watercare, July 2020. Drought Update 30 July 2020.
13. Watercare Aug 2020. Water Resources: Rainfall and Demand vs. Wastewater Report 16 August 2020

14. Watercare, Sept 2020. Drought Update 17 August 2020.
15. Watercare, Sept 2020. Drought Update 24 August 2020.
16. Watercare, Sept 2020. Auckland water supply update 15 September 2020
17. Watercare, Sept 2020. Drought Update 10 September 2020.
18. Watercare 2020. Drought 2020 Demand Management.
19. Watercare, 2020. Auckland Water Efficiency Strategy: 2020-2025, Auckland: Watercare.
20. Watercare, 2020. Auckland Metropolitan Drought Management Plan, Auckland: Watercare.
21. Watercare, 2020. ISMM Explanation and Draft storage response curves, Auckland Watercare.
22. Watercare, 2020. Adjusting Stage 1 outdoor water use restrictions. Report to Board
23. Watercare, 2020. Watercare: Drought Response. [Online] Available at: **https://www.watercare.co.nz/Water-and-wastewater/Drought-response**

12 Appendix G – Comparison with Other Utilities

As a part of this review, Aurecon undertook some benchmarking of the operating environment of various large metropolitan utilities considering their operating context, services provided, population served, area of operations and infrastructure portfolios. This helps to understand how these utilities plan for, prepare, respond, and recover from droughts. A key difference worth noting is that Watercare's significant (mid-level restrictions or higher) previous drought was 27 years ago in 1993/94, whereas all the other cities have experienced significant drought conditions within the last 10 years.

Utility and Institutional Arrangements	Area of Operations and Operating/ Regulatory Environment	Water Services (per Year unless stated)	Service area, water mains length and number of connections	Drought Planning and preparedness	Drought Response and Recovery
Watercare Services Limited Council Controlled Organisation/ Company Council appointed Board	Servicing Greater Auckland, New Zealand: Population served: 1.5M All districts except Papakura (serviced by Veolia Water under a franchise agreement) Economic Regulator: NA Water quality Regulator: Taumata Arowai, Auckland Regional Public Health Service Environmental Regulator: Financial Provider: Auckland Council	Bulk water storages, treatment, transmission, Water, retail water services, distribution/ reticulation; wastewater Catchment Area: Surface water dams: 12 (95.5GL) WTP: 16 Recycled Water: Pilot plant Desalination: NA Potable Production: 166,074ML/y NRW: 21,900 ML 16% Revenue: $0.715B	Service Area 5,000 km^2 Water mains length: 9429 km Connections: Residential 307,300. Non-residential 131,700 Total connections 439,000	Drought Standard set in 1994 (1:100year drought with 15% reserve or 1:200year drought with 0% reserve) Source Diversification: Mostly climate dependent (surface water and Waikato River) Days of storage Reserve: 220 days Other supplies: Waikato River 175ML/d	2020 Drought Management Plan Water Restrictions and use targets Voluntary restrictions, but no permanent water conservation measures. Water Efficiency Strategy but no building codes/ rebates Customer Reference Group: No
Seqwater South East Queensland Bulk drinking water supplier State Owned Authority Board appointed by Portfolio Minister and Shareholding Treasurer	Area of operations: Servicing all 12 Local Government Areas in South East Queensland, Australia Economic Regulator: Qld Competition Authority Water quality and Dam Safety Regulator: Office of Water Supply Regulator Environment and Resources Regulator: Dept of Natural Resources, Mines and Energy Financial Regulator: Qld State Treasury	Water sources: surface water, groundwater, desalination, and recycled water Bulk water storages, treatment, and transmission Surface water dams: 12 (2750GL) Groundwater 14,842ML/y WTP 36 Recycled Water: 3 AWTP 220ML/d 1 Desalination: 150ML/d Potable Production: 331,292ML/y NRW: 926 ML Revenue: $1.045B	Area: 16,600 km^2 Bulk transmission pipelines: 600km Five customer retailer entities: (Urban Utilities, Unity Water, Gold Coast Water, Logan Water and Redland Water) Population served: 3.6 Million including off-grid supplies to 53,000 people in 16 village communities	Water Security Program with Level of Service and Restrictions Regime set in 2019. Source Diversification: Climate dependent 365 GL/y, Climate resilient 14.84GL/y Climate Independent 14.64 GL/y Bulk storage reserves > 1500 days Continuous drought response measures active from 100% storage and triggered at various levels.	Demand Management and Drought Management Plans Water Restrictions and use targets Permanent water conservation measures. Water Efficiency Strategy building codes/ rebates Water Efficiency Management Plans for major water users Customer Reference Groups

Utility and Institutional Arrangements	Area of Operations and Operating/ Regulatory Environment	Water Services (per Year unless stated)	Service area, water mains length and number of connections	Drought Planning and preparedness	Drought Response and Recovery
Urban Utilities Retail drinking water and all sewer services Council Owned Organisation (Five shareholding councils) Board appointed by Shareholding Councils	Area of operations: Servicing five local government areas of South East Queensland: Brisbane City Council, Ipswich City Council, Lockyer Valley Regional Council, Scenic Rim Regional Council, Somerset Regional Council Population served: 1.57M Water quality and Dam Safety Regulator: Office of Water Supply Regulator Environmental Regulator: Dept of Environment & Science Resources Regulator: Dept of Natural Resources, Mines and Energy Financial Regulator: Qld State Treasury	Largest of Five distributor retailers in South East Queensland Treated bulk drinking water supplied by Seqwater Potable Water distribution (98GL, MDD 577ML/d). Wastewater services. Recycled water supplies 4,532ML Water Sourced: 136 GL NRW: 16,127 ML 16% Revenue: $1.45B	Area: 14,384 km^2 Water mains length: 9560 km Connections: Residential 610,642. Non-residential 31,324	SEQ Water Security Program with Level of Service and Restrictions Regime set in 2019. Since 2013, the clear water reservoirs (of Seqwater as well as Urban Utilities and other retailers across South East Queensland) are managed as a system.	Demand Management and Drought Management Plans Water Restrictions and use targets SEQ Permanent Water Conservation Measures. Customer Reference Group: Yes
Sydney Water Corporation State Owned Authority Board appointed by Portfolio Minister and Shareholding Treasurer	Area of operations: Greater Sydney, New South Wales Australia: Sydney Region, Illawarra Region, Blue Mountains Region Population served: 5.7M Water Quality Regulator: NSW Health Dam Safety Regulator: NSW Dams Safety Authority Environmental Regulator: NSW EPA Resources Regulator: NSW Office of Water Economic Regulator: NSW Independent Pricing and Regulatory Tribunal Financial Regulator: NSW State Treasury	Water Sources: Surface water, groundwater, desalination, stormwater, recycled water Surface water dams: NA Desalination plants: 1 Recycled water plants: 16 Bulk Water treatment, transmission, storage, distribution; wastewater, stormwater, recycled water Recycled water supplies 31.9 GL/y Desalination: 71GL/y Potable Production: 532.730 GL/y NRW: 58.85GL/y 11% Revenue: $2.923B	Area: 12,700 km^2 Water main length 23,244 km Connections: Residential 2M+. Non-residential 120,000+	Metropolitan Water Plan 2019 Greater Sydney Water Strategy and Water Security Program (currently being revised) with Levels of Service and Restrictions Regime Source Diversification: Climate dependent 460 GL/y, Climate Independent 71GL/y Bulk storage Reserves >1800days	Demand Management and Drought Management Plans Water Restrictions and use targets Permanent water conservation measures. Water Efficiency Strategy building codes/ rebates Water Efficiency Management Plans for major water users Customer Reference Group: Yes

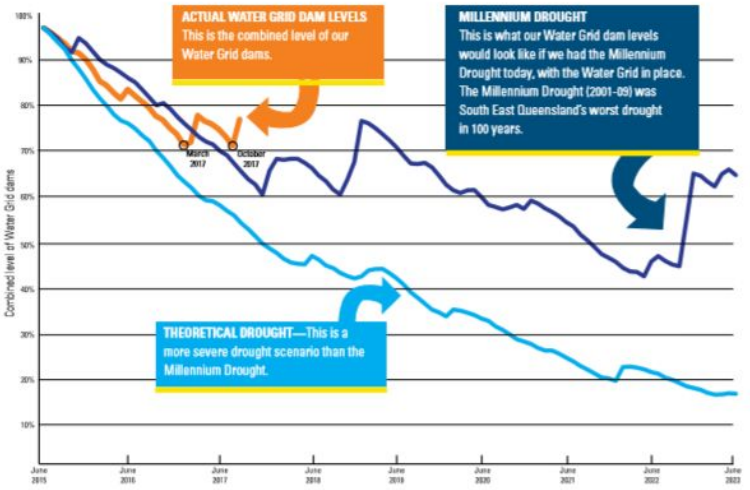
Utility and Institutional Arrangements	Area of Operations and Operating/ Regulatory Environment	Water Services (per Year unless stated)	Service area, water mains length and number of connections	Drought Planning and preparedness	Drought Response and Recovery
Yarra Valley Water Corporation State Owned Company Board appointed by Portfolio Minister and Shareholding Treasurer	Area of operations: Melbourne, Victoria, Water Quality Regulator: Vic Health Dam Safety Regulator: Vic Dams Safety Authority Environmental Regulator: EPA Resources Regulator: Dept Environment, Land & Water Economic Regulator: Essential Services Commission of Victoria Financial Regulator: Vic State Treasury	Largest of three retailers in Melbourne region. Retail Water services, wastewater, recycled water Bulk drinking water supplied by bulk water supplier Melbourne Water Potable Water distribution 156GL/y Wastewater services Recycled water supplies 1.29 GL/y Water Sourced: 158.8 GL/y NRW: 12.92GL/y 8.1% Revenue: $1.135B	Service Area: 4,000 km^2 Length of water mains 10,766 km Connections: Residential 781 Non-residential 58	Water Security Program with Level of Service and Restrictions Regime set in 2019 Source Diversification: Climate dependent 156.4GL/y, Climate resilient 1.29GL/y	Demand Management and Drought Management Plans Water Restrictions and use targets Permanent water conservation measures. Water Efficiency Strategy building codes/ rebates Water Efficiency Management Plans for major water users Customer Reference Group: Yes
Water and Sanitation Department National Department of Water and Sanitation (DWS) in partnership with the City.	Servicing Greater Cape Town Region, South Africa Population served 4.2M	Bulk water treatment, transmission, storage, distribution; wastewater, stormwater, recycled water, Wastewater services. Surface water dams 14 (900GL) WTP 12 (1.6GL/d) Potable Water distribution 549GL/y Recycled water supplies Nil Water Sourced: ~600GL/y NRW: ~40 GL/y Revenue: R3.024B ($266M)	Service Area: 2,455 km^2 Length of water mains 20,000 km Connections: 650,000 Residential 606,500 Non-residential 17,500	2019 Cape Town Water Strategy Bulk storage Reserves >750days Source Diversification: Climate dependent 1504GL/y, Climate Resilient 96GL/y Future supply diversification by 2040: 75% Surface water +11% Desalination+ 7% Reuse + 7% Groundwater	Demand Management and Drought Management Plans Permanent Water Saving Regulations Water Restrictions and use targets Water Efficiency Plans for commercial users

13 Appendix H – Drought Case Studies

In the case studies that are outlined below, there are some valuable learnings, from investing 'too little for too long' prior to the drought, followed by 'too much too late' during the drought; the importance of stakeholder commitment, perceptions and acceptance of recycled water and water restrictions; and the value of adaptive planning to minimise likelihood of stranded assets[20].

1. South East Queensland (SEQ) - Seqwater and Urban Utilities

South East Queensland's two droughts:



"The Millennium Drought" began around Jan 2003 and continued till December 2010. SEQ total surface water storage levels dropped to 20% of full supply level.

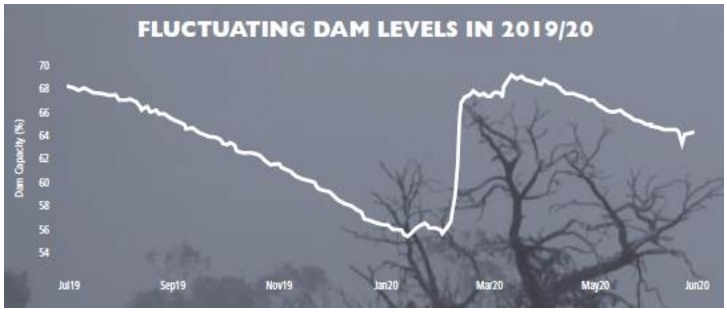
Qld Water Commission was formed, there was a comprehensive program of investment in source diversification, the SEQ Water Grid built incorporating interconnectors, a desalination plant and 3 Advanced Water Treatment Plants, a complete overhaul of governance, regulatory, institutional, operational and financing arrangements of the water sector.

As a result of this drought legislation was passed to ensure drought security in the form of a Water Security Program incorporating desired levels of service. This is considered to be a best practice approach to achieve long-term water supply security and short-term supply reliability.

SEQ Water Security Legislation Ch 2A (S340) Section 344 (4) of the Act states 'the desired LOS objectives for water security include the duration, frequency and severity of water restrictions that may be expected by end users of the water' and may include other objectives. Water efficiency was embedded through building codes.

The Millennium Drought ended with the 2011 floods which devastated parts of SEQ and Queensland. Subsequently the desalination plant was out into 'hot standby' mode and the recycled water plant was mothballed. Traveston Dam option was abandoned, and Wyaralong Dam has remained offline for 10 years.

"The big dry" began in 2017. By 1 July 2019 the drinking water supply capacity of the South East Queensland (SEQ) water grid dropped to 68% and on 30 June 2020 to 64%. Despite beginning and ending the year in a state of 'drought readiness' (the trigger between 60% and 70% capacity), the months in between proved challenging, especially for many off-grid communities in the service region.



Throughout the year, Seqwater and Urban Utilities jointly developed and delivered various initiatives to encourage water conservation within the community.

APRIL-JULY 2019 Drought Response and Recovery Action Plan was activated soon after SEQ water grid storage fell to 70% (drought readiness trigger) in April 2019. In the following months, the Drought Response Working Group set about delivering the actions identified in the plan, including preparing for the potential recommissioning of the Western Corridor Recycled Water Scheme and the introduction of water restrictions. The working group also explored further recycled water opportunities for non- residential users and minimising leaks in the network.

AUGUST 2019 awareness campaign on spotify campaign reached an audience of 2.2 million. The Australian Water Association named it the most innovative way a water utility has encouraged customers to save water.

[20] At the end of the Millennium Drought, each of the Australian Cities grappled with over-investment in water assets – resulting in increased fixed costs, sale of land resumed for dams, hot-standby/ mothball/ decommissioning of assets

There are many communities not connected to the SEQ water grid, serviced by standalone water treatment plants. High level restrictions based on local triggers were imposed progressively as local sources dried up.

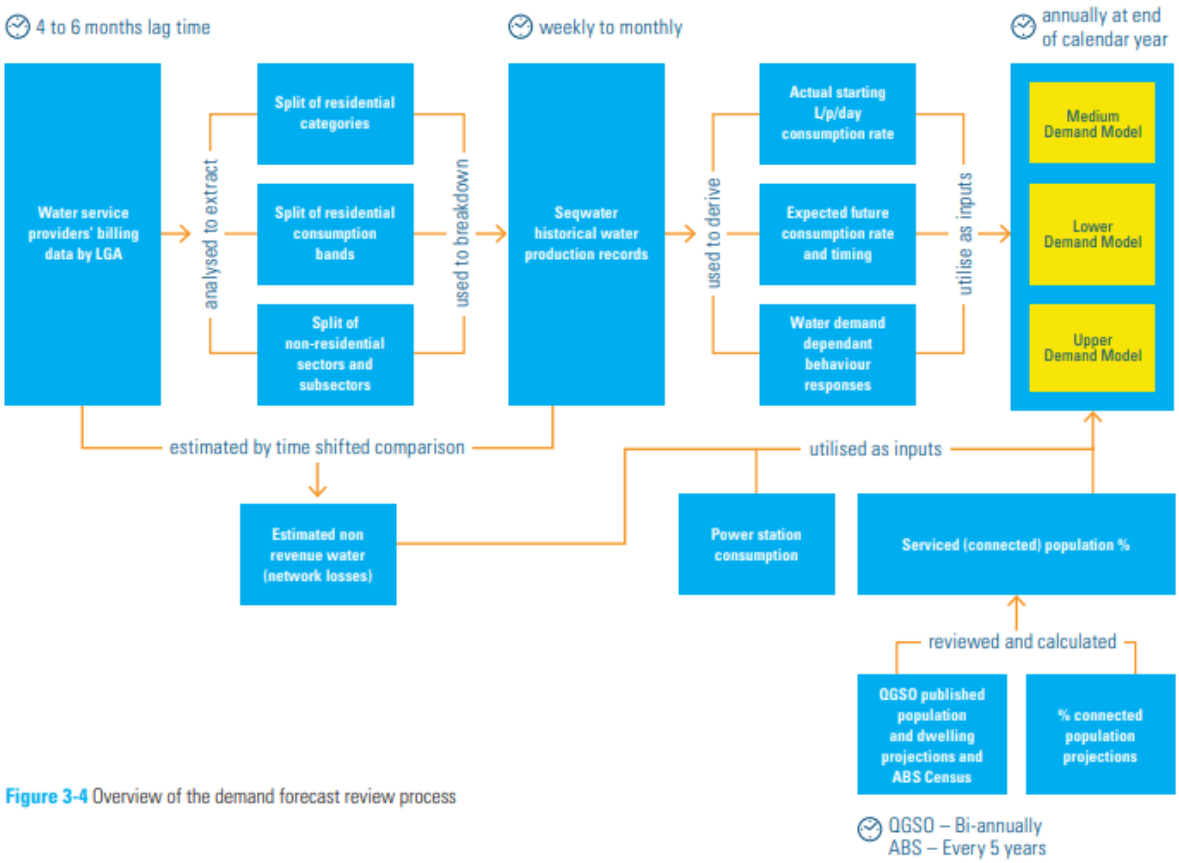


Figure 3-4 Overview of the demand forecast review process

Learnings and Legacies

- Very low consumption rates are not sustainable for lengthy periods. Around 120L/p/d is the lowest level that a water efficient community could sustain before health and social impacts begin to affect sections of the community. System impacts include water quality (Cl residual), higher pressures, lower sewer flows and odour issues.
- Perceptions change significantly and loss and leakage prevention become a focus of attention.
- Customers are still paying off the debt accumulated because of the fast-tracked drought response expenditure in infrastructure due to the absence of adequate prior planning for drought preparedness. This has left a legacy issue for future drought investments and cost-recovery.
- Ten years have passed since the Millennium Drought ended, new customers and population changes means that while some memory/ experience has been retained, broader community knowledge and sense of importance has been lost.
- Structural, institutional, and regulatory arrangements have helped maintain active focus on monitoring drought status by all water utilities and state agencies, with clear allocation of roles and responsibilities.
- The Millennium Drought reforms have been tested during 2017-2020 and revised – drought management requires continuous improvement (monitoring, evaluation, reporting).
- Water restrictions save water, reduce revenue, and may increase water charges. This tension must be addressed through engagement, consultation, and joint action by affected stakeholders.
- Community consultation should cover restrictions regime, minimum services levels, essential minimum supply reserves, ability, and willingness to pay.
- Community engagement on direct and indirect potable reuse is an extremely difficult process and requires careful planning and considerable resources and expertise. Some of the standard methods for engagement (surveys) are not likely to be successful.

2. Greater Melbourne – Melbourne Water

Melbourne's Millennium Drought (1997-2010)

Melbourne Water (MW) is the bulk water supplier to four (currently being consolidated to three) retail providers, including Yarra Valley Water (YVW) in Melbourne, Victoria. The water supply now consists of a diversified portfolio including surface water (mostly from the eastern mountain ranges) providing most of the supply, but supplemented with recycled water for non-drinking purposes, desalinated sea water, and transfer schemes between neighbouring regions (see Figure 1). MW supplied 449 GL of drinking water in 2019-2020. The Victorian Desalination Plant operated by AquaSure can supply up to 150 GL/year.

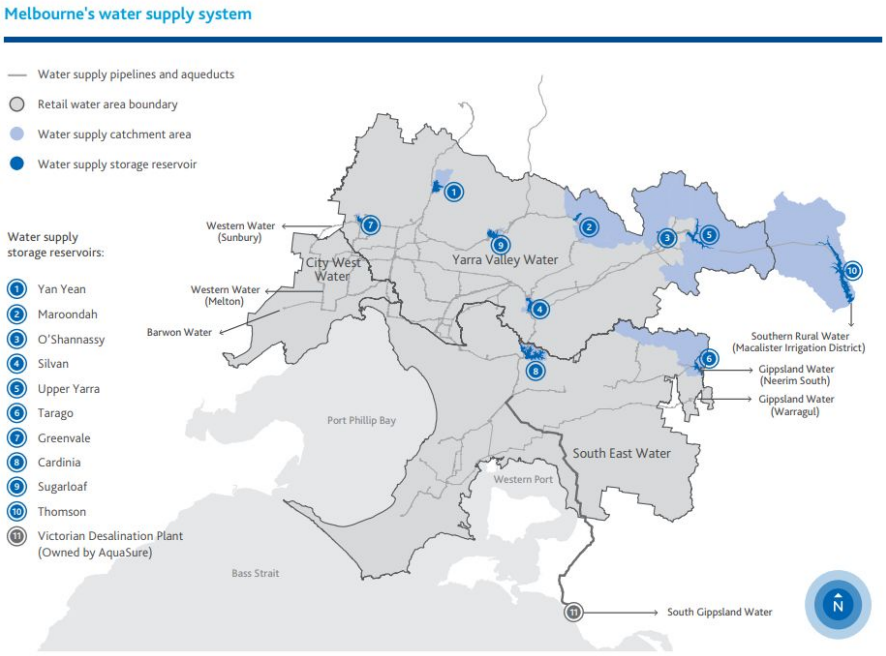


Figure 1 Overview of the Melbourne's water supply system[21]

What became known as the Millennium Drought in Eastern Australia began in 1997 with the last above average rainfall for more than a decade with inflows into Melbourne's main water reservoirs 34% lower than the long-term average as shown in Figure 2. The result was that reservoir levels dropped to historic volumetric lows. This is illustrated in Figure 3 by two historically unprecedented reservoir volume depletions in a short period of time. The fist began in 1997 with one of the lowest inflows on record after a series of above average years resulting in storage levels at almost 100%. Storage levels dropped by over 35% without abatement over the next year and half until the typical winter and fall rains returned in 1998. Another drop of 20% occurred in 2006 and over 30% by the time replenishing inflows occurred in mid-2007. This brought storage levels down to just 30%.

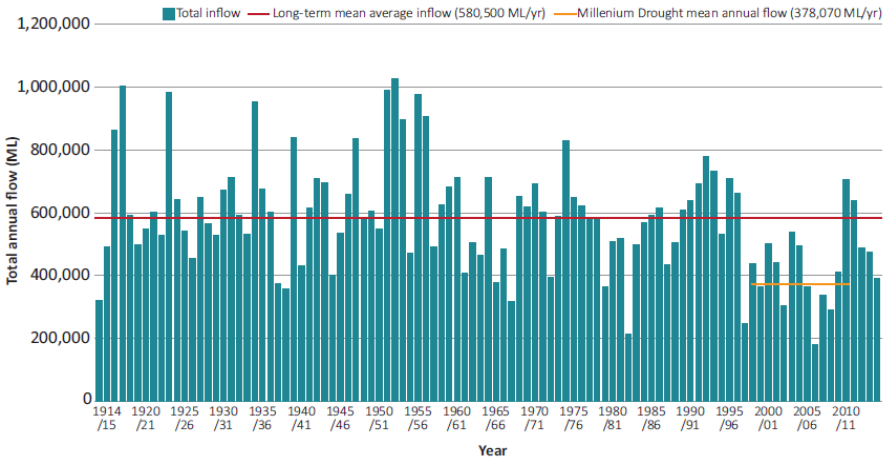


Figure 2 Annual inflows to Melbourne's main harvesting reservoirs (Maroondah, O'Shannassy, Upper Yarra and Thomson Reservoirs)[22]

Melbourne Water and the water retailers including Yarra Valley Water along with Department of Environment, Land, Water and Planning (DELWP) developed a number of infrastructure responses including the construction of the Victorian Desalination Plant (VDP), recycled water for non-drinking uses and intra- and inter-regional transfers as well as non-infrastructure responses including improving Drought Management Planning, increased efficiency and demand management, revising water entitlement regime, improved water markets and. The impacts of improving efficiency and demand management during the drought has led to a sustained reduction in per capita consumption as illustrated in Figure 4. It is interesting to note that the gains in demand management decreased the total demand to less than the average inflows over the Millennium Drought (378 GL/year). However, due to population increases over the last 10-15 years and no new efficiency improvements the current demand levels are not sustainable if a similar drought eventuates in the future.

[21] Melbourne Water Annual Report 2019-20

[22] Managing extreme water shortage in Victoria: Lessons from the Millennium Drought, Department of Environment, Land, Water and Planning (DELWP), 2016

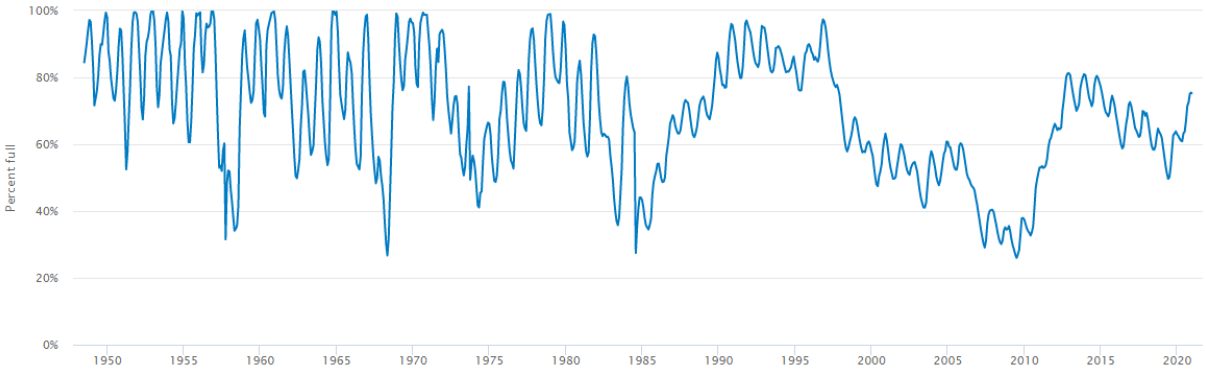


Figure 3 Total reservoir storage levels for the Melbourne Water. *Note the volume has changed over the years with the last major change more than doubling the total capacity to approximately 1,800 GL in 1984[23]

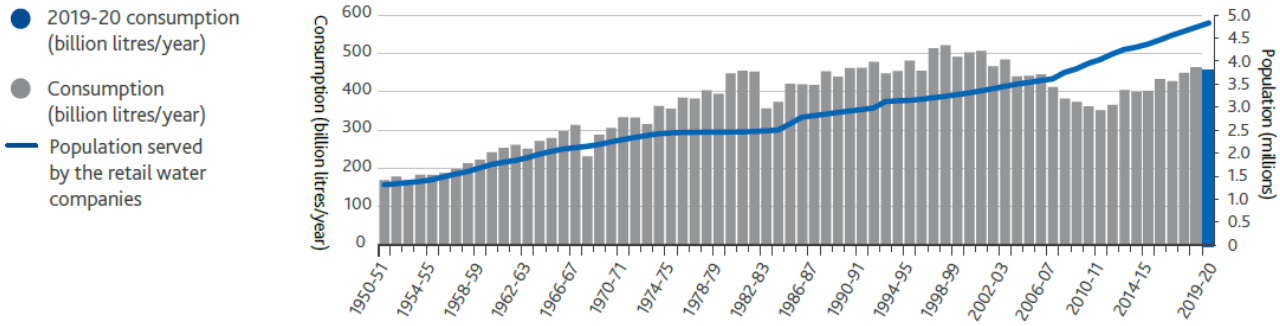
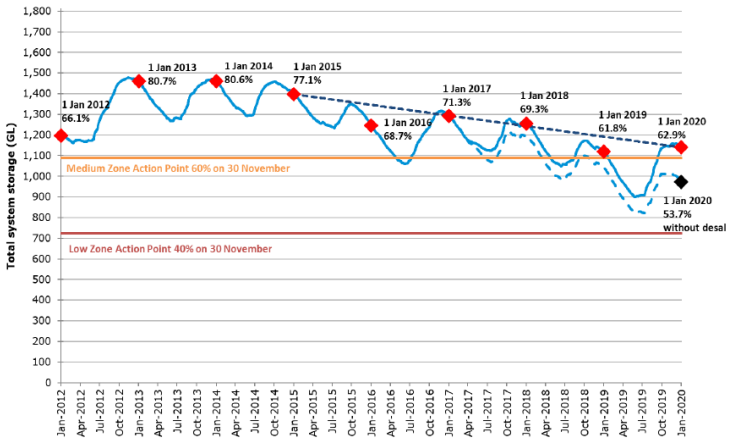


Figure 4 Long-term total consumption by financial year

As a result of the precipitous drop in reservoir volumes through 2006 and into 2007, the Victorian government announced the plans to build a desalination plant – the Victorian Desalination Plant (VDP) in June 2007. The plant was financed through a public private partnership (PPP) to supply up to 150 GL/year (expandable to 200 GL/year) on a "take or pay" commercial model. This allows for a fee to be paid to the VDP operator – AquaSure – when no water production is required and separate higher fee to be paid when water supply is ordered by the Victorian Government. There are alternative operations and payment models used in Australia including for the Gold Coast Desalination plant where it has been in "hot standby" mode (not always producing but able to be brought on line on short notice) mode since construction in 2009 and is an important part of Seqwater's resilience in times of drought as well as floods.

By the time the plant was completed at the end of 2012 no water was ordered due to the recovery of the dams' levels. AquaSure was paid to keep the VDP in "cold standby" (not always producing but mothballed requiring up to 9 months from notification to be full production capability) mode until the Victorian Government ordered water in 2016. A total of approximately 167 GL of desalinated water has been delivered up to January 2020. The impact of the additional supply from the VDP is shown in Figure 5.

Figure 5 Melbourne water storage levels including with and without contribution from VDP



Key Learnings and Legacies:

It is now forecast that Melbourne will need additional water supply within the next 5-10 years due to growth and climate variability resulting in predicted periods of reduced reservoir inflows. The existing VDP and expansion may be part of the future supply and not just used for drought mitigation. It is also of note that demand management and efficiency gains earned by Melbournians in the early 2000's was at least as much as the production capability of the VDP and that the combination of demand management with supply augmentations is critical to achieving water security.

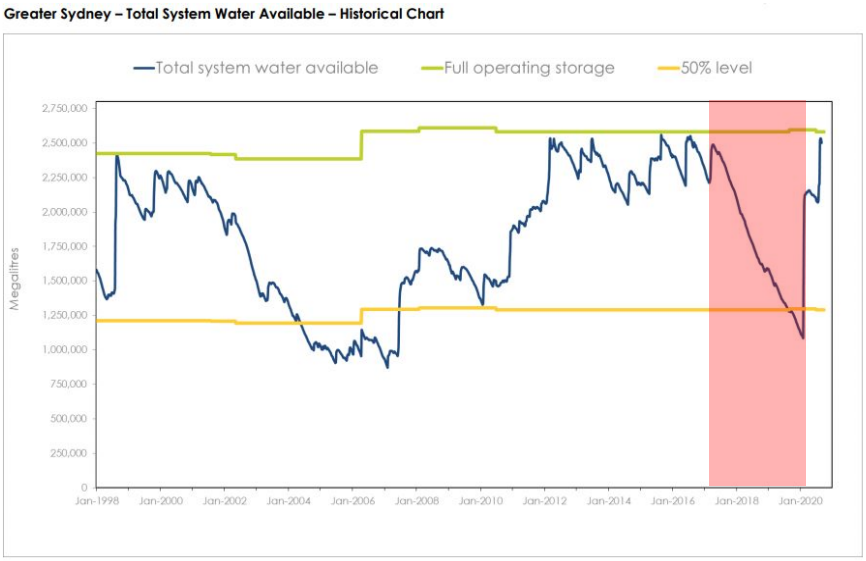
[23] https://www.melbournewater.com.au/water-data-and-education/water-storage-levels#/

3. Greater Sydney – Sydney Water

Greater Sydney Drought 2017- 2020

Between July 2017 and February 2020, Greater Sydney (along with most of New South Wales) experienced one of the worst drought periods on record. Storages declined by over 50 per cent, from over 90% in late 2017 to close to 40 per cent in early 2020 (41.7% on 7 February 2020).

Inflows to dams over the period were significantly lower than what had been experienced in previous severe droughts including the Millennium drought (2003 – 2010) and the 1940s drought, with dam levels declining approximately 22% per year.



Drought Response

The Metropolitan Water Plan 2017, administered by the NSW Department of Planning and Environment, is the water plan for Greater Sydney and provides the broad triggers and measures for drought response. In September 2018, after 18 months of dry conditions and steady rates of depletion in storage, dam levels had reached below 70% Sydney Water commenced a dedicated drought response program to provide a centralised, coordinated and comprehensive response to the drought, in collaboration with WaterNSW (bulk water supplier) and the NSW Government (Department of Planning, Industry and Environment), in alignment with the Metropolitan Water Plan.

The drought response program was designed to achieve the following objectives:

- Ensure a resilient water supply for Greater Sydney through extended drought (by increasing water supply and/or reducing demand).
- Maintain and enhance customer trust
- Maintain and enhance Sydney Water's reputation as a leader in water management
- Minimise cost to customers by ensuring prudent and efficient expenditure

The drought response program included the following program streams, working together to provide an enterprise wide response:

1. Community awareness – including community campaigns to boost awareness of drought, waterwise behaviours and requirements under water restrictions.
2. Water efficiency – working with customers and business to improve water efficiency
3. Leaks and breaks – to decrease water loss through leaks and breaks in the network
4. Data analytics and intelligence – to better understand how people use water, monitor usage and program effectiveness
5. Water restrictions – educating the public on requirements of water restrictions, administering exemptions, issuing fines where necessary
6. Water recycling – maximising production and use of recycled water
7. Drought infrastructure – infrastructure projects to increase drought resilience and additional supply
8. Drought operations – adaptation of system operations in case of ongoing severe drought conditions.

Outcomes and achievements

Program outcomes included:

- Overall water savings of 11.4% (against forecast June 2019 – March 2020). This equates to over 76.4 billion litres of water saved (over seven weeks supply).
- Over 85,000 customer interactions since June 2019 (onset of water restrictions) with around 100,000 views per month on drought dedicated website www.lovewater.sydney
- Over 14,000 homes fitted with water efficient taps and fittings (with over 48,000 repairs/replacements) through the WaterFix program (July 2019 – March 2020), which will continue to save 404 million litres per year.
- Increase in active leak detection, from 9,000kms/year to 18,000kms/year.
- Over 75 billion litres of water delivered by the Sydney Desalination Plant (also seven weeks supply).
- Infrastructure projects 'plan ready' if drought conditions return to facilitate additional supply (e.g. desalination expansion) and increase system resilience (inter-system linkages).

These outcomes have helped Sydney survive the drought and be better prepared for future droughts.

Following extensive rainfall in February 2020, replenishing dam storages to around 80%, the elements of the drought response program were transitioned to 'business as usual' functions. This included handover of risks, lessons learnt, actions and responses.

Key Learnings and Legacies:

Key learnings from the 2017-2020 drought included:

- **Drought planning:** ensure drought is adequately catered for in water plans (often developed when not in drought). When testing drought management plans (e.g. to 'design drought'), sensitivity test scenario of 'worst case' conditions to understand and inform contingency plans. The conditions encountered in 2018-2020 were worse than the 110 years of records.
- **Resource planning:** Droughts frequently run for many years. Plan how resourcing/programs will be scaled up when needed and maintained in times of drought.
- **Government collaboration:** clear roles and responsibilities between govt stakeholders and utilities for efficiency in a prompt response and to avoid confusion, duplicate effort.
- **Communication and engagement:** engage early with the public, it takes time to raise awareness of drought and longer to change behaviour.
- **Water efficiency:** an ongoing water conservation program is essential. Improving the water efficiency of a major city is a slow, cumulative process and very hard to initiate in a drought for significant water savings.
- **Leakage/system losses:** Work to continue outside of drought to further reduce leakage, water theft, unaccounted for water, system losses etc.
- **Funding:** have agreed, clear means of funding/cost recovery to cover the cost impacts of drought to be accessed when needed. (Recently addressed in IPARTs determination for Sydney Water to include 'drought pricing').

4. Cape Town - Dept of Water & Sanitation

For three years between 2015 and 2018 the City of Cape Town (CoCT) in South Africa, experienced a severe water crisis that became known as the "Day Zero" crisis as a result of a speech made by the Mayor of Cape Town, highlighting the potential that the City could be the first global city to run out of water. Water for the CoCT is provided primarily from the Western Cape Water Supply System (WCWSS) which consists of six major dams and a network of inter-based transfers and small reservoirs and dams (Figure 1).

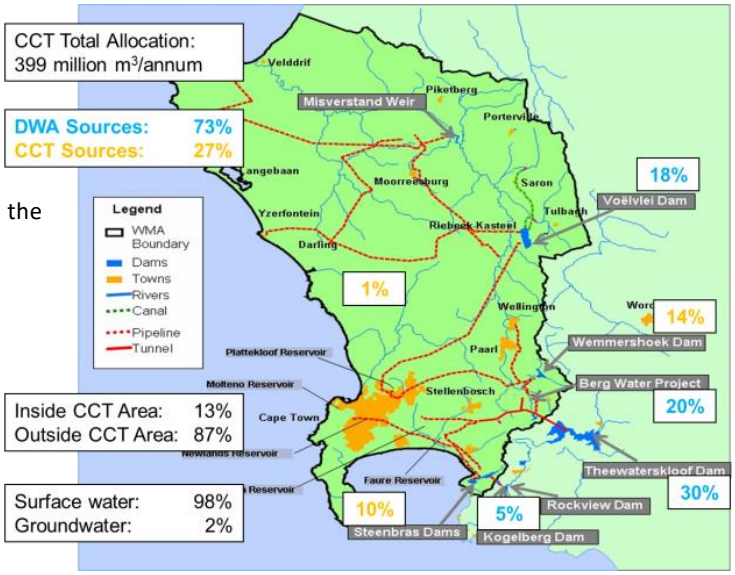


Figure 1 Overview of the Western Cape Water Supply System and water supply sources for the CoCT[24]

The primary cause of the crisis was three years of below average rainfall in part due to a persistent high-pressure system which forced the usual winter cold fronts to move further south, missing critical mountain catchment areas for Cape Town's main water supply dams. The estimate recurrence interval of the three-year drought even was around 1 in 350 years and dam levels dropped to a minimum of 19% total storage for the WCWSS, CoCT and other users (Figure2).

The combined inflow for the years 2015, 2016 and 2017 was lower than any other consecutive three-year period in the 90-year record, so the crisis has been defined as a 1-in-590-year event. Most global climate models predict lower rainfall for the Cape Town region, with more frequent low rainfall years. Apart from rainfall, water availability is affected by temperature and wind. It's possible that Cape Town is experiencing a step change in water availability due to climate change.

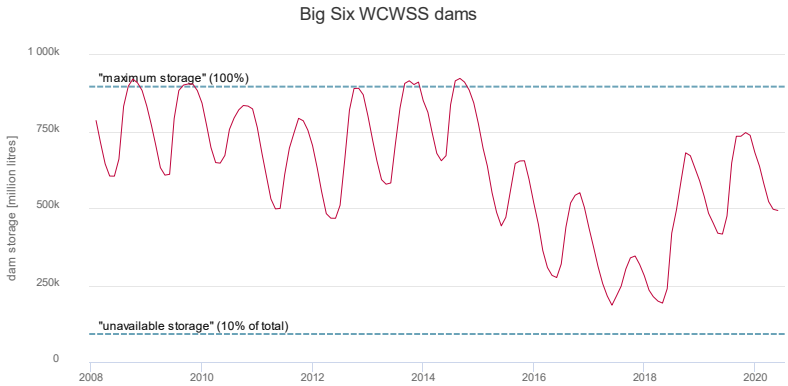


Figure 2 Total dam storage levels for the WCWSS that supply Cape Town

Water supply was maintained through extreme water saving measures which resulted in water usage dropping to around 50% of the previous average demand with a target consumption of 50 L/c/d (Figure 3) as well timely rainfall (although below average). Two years later, the dams filled are now spilling.

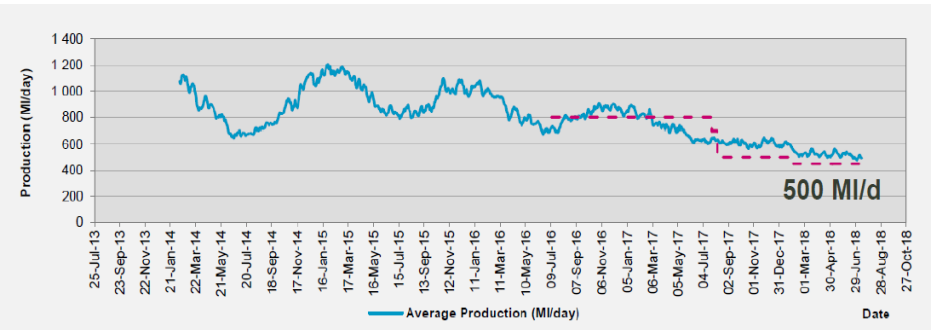


Figure3 Total water consumption showing target production levels

A comprehensive review was commissioned, to understand the causes of the water crisis. Hydrologically, it showed that the overall actual yield of the system was lower by approximately 6 % of the modelled. This is attributed to several possible causes - long term decline in total rainfall, rainfall variability, streamflow, catchment characteristics through increase in forestry and invasive plants (Figure 4) . It is likely that climate change will continue to contribute to a reduction in surface water availability as a result of both reduced precipitation and increasing evaporation losses.

[24] Department of Water and Sanitation (DWS) was formerly called Department of Water Affairs (DWA)

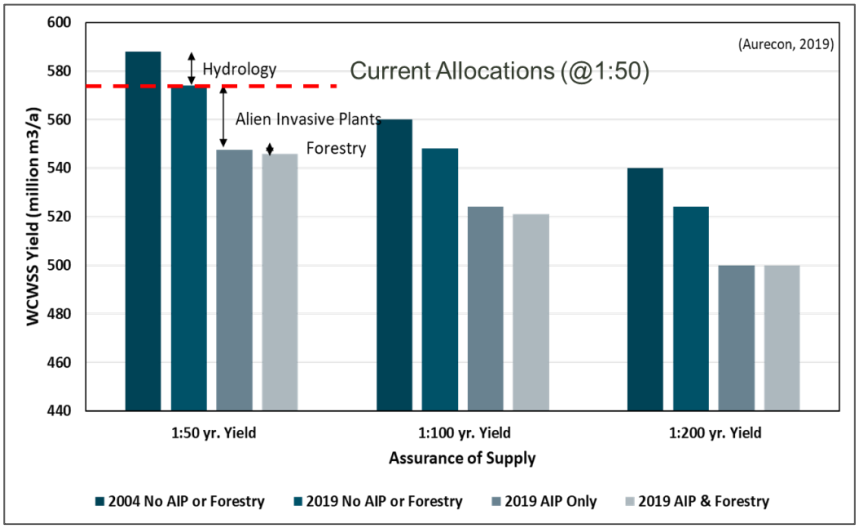


Figure 1: Impact on WCWSS yield as a result of revised hydrology following the drought (Aurecon 2019)

CoCT has a long history of water resources planning including the use of stochastics and system modelling to determine future water security risk and to identify and prioritise possible augmentation options. Recognising emerging issues, even before the 2018 crisis CoCT has been investigating alternative water supply options including both desalination and direct potable reuse (DPR). In 2019 the water strategy was updated with a plan to transition to 25% of supply from alternative climate-resilient sources. In addition, there was a renewed commitment to catchment management, improved water use efficiency, demand management and enhanced water sensitive urban design (WSUD). The strategy also proposed updated trigger levels for restrictions and a desire to move to a higher level of assurance of supply.

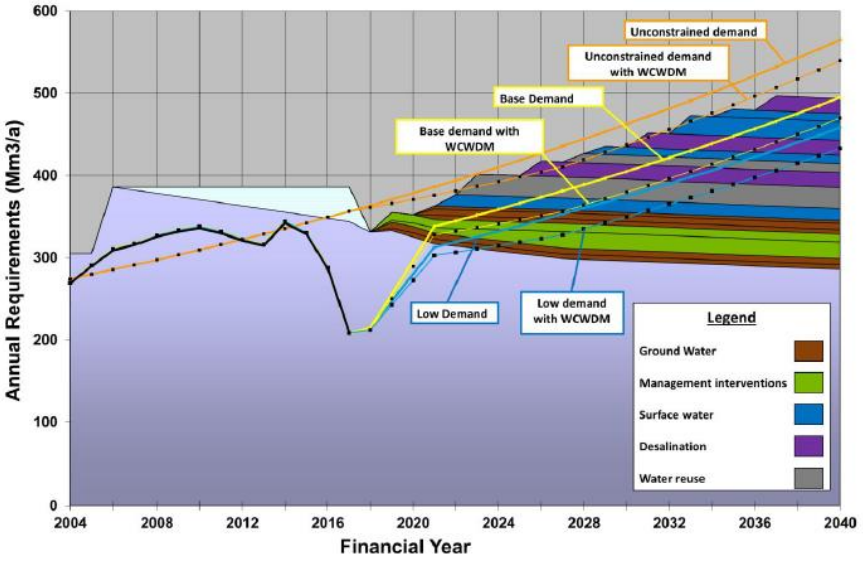


Figure 2: Reconciliation of planned augmentation options with alternative demand forecasts showing a transition to alternative water supply sources (CoCT 2019).

Both CoCT and Auckland are growing and mainly reliant on surface water sources. They are located on similar latitudes and share a similar climate with winter rainfall. The population of CoCT is four times greater than Auckland's. Although Auckland has a higher average annual rainfall of 1212 mm compared to the 515 mm of annual average rainfall for CoCT, the rainfall over the catchment areas is similar. Auckland's water supply catchments receive an annual average rainfall between 1000mm and 2000 mm and this is similar to that of CoCT surface water catchments which are located mainly in the mountains to the east of the city. A significant difference, however, is that CoCT has a much higher seasonal and inter-annual variability in rainfall and therefore a greater storage capacity in its dams, with a total available storage capacity of the Western Cape Water Supply System of around 900GL, or roughly 143kL/p.

Learnings and Legacies:

CoCT commissioned a comprehensive review which included a review of the available yields of existing sources and possible climate change risks as well as investments into improved water use efficiency and protection of water supply catchments.

As was the case with CoCT, with a possible increased seasonality of rainfall patterns for Auckland as well as changes in catchment conditions and the nature of demand, it might be necessary for Auckland too, to consider the need for additional storage capacity and also better integration of its system and the use of demand management during periods of drought.

During the drought an agreement was reached on accountabilities and roles, and the current CoCT Water Strategy has been endorsed by National, Regional and Local Authorities.

In 2018/19, Moody's Investors Service affirmed the CoCT long-term and short-term global-scale rating of Baa3 and Prime-3 and updated its outlook to stable from negative due to the expectation that the City will maintain its strong operating performance and liquidity and stable cash flow. This reflects Moody's view that the City's new Water Strategy will more effectively adapt the City's water sector to the continued environmental risk posed by climate change.

The water crisis should have been better addressed and partially mitigated earlier, more proactively, and more cost effectively. The lessons learnt are to be analysed and internalised into the City's risk management strategy.

Document prepared by

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Bringing ideas to life

Whakaaro whakaaro
Kia mau, kia kaha, mahi tahi

aurecon

Report to the Board of Watercare Services Limited
Prepared for 30 March 2021 Board Meeting

Acting Chief Executive's Report for February 2021

HIGHLIGHTS AND LOWLIGHTS

1. People & Capability and Health, Safety & Wellbeing – including the Covid-19 Update and the Tsunami Incident Team Action Plan

- There were two Lost Time Injuries (LTI) and three Restricted Duties Injuries (RDI) involving Watercare employees in February 2021.
- There was one Lost Time Injury involving a contractor in February 2021.
- The rolling 12-month Lost Time Injury Frequency Rate (LTIFR) for employees is 6.68 per million hours, exceeding our target of ≤5.
- The rolling 12-month Total Recordable Injury Frequency Rate (TRIFR) for employees is 13.83 per million hours, more than comfortably meeting our target of ≤20.

2. SOI Measures and Customer Service

- Our rolling trust score is steadily increasing to 50 with all metrics, other than the "water is safe to drink", which is increasing. Solving issues and customer service are driving impact on trust.
    - Water quality perception has been impacted by the halo effect of negative water quality issues across New Zealand in the media.
- Water efficiency metric (rolling average) remains well ahead of target at 73%, 1% lower than January 2021, driven by an increase in people who are not at all water efficient. Customers who are water efficient are more likely to refer to water quality and therefore value water.
- 12-month rolling average of complaints closed within SLA is at 96.4%. We are starting to rollout Watercare wide capture of complaints, rather than just the those that come in through the frontline call centre. This will result in an increase in complaints.
- Rolling customer NPS is +40, with all areas showing improvement. In particular, the faults and field service crew improved during peak summer demand at +57 NPS (net promoter score) in February 2021, which is an increase of 28 points compared to February 2020. Agent satisfaction and FCR (first call resolution) were ahead of targets for the month.
- Rolling agent behaviour score (satisfaction with our services) continues to increase, at 75.2%, led by faults, field service crew and billing frontline teams taking extreme ownership, demonstrating knowledge and providing better service.
- eBilling continues to increase and is now at 61.1%. This was achieved by focusing on driving customers to sign up to eBill after every interaction.

3. Community and Stakeholder Relationships

- **Local Boards:** Over the past month, workshop briefings were held with the Franklin, Whau and Albert Eden local boards providing information on local projects such as the Central Interceptor, Huia Watermain and Clevedon water and wastewater servicing. Other project information such as progress on resource consents was shared with the relevant local boards in the interests of no surprises.
- **Waikato District Council:** Work has continued on the delivery of the DIA-funded reform projects and the H&S audit was completed in February with positive feedback, and the report is expected in early March.
- **Legislation and policy update, including submissions on various bills:** Public submissions on the Water Services Bill closed on 2 March 2021 and have been referred to the Health Select Committee. Watercare developed a joint submission with Auckland Council, and will present with Council to the Select Committee in late-March.
- **Māori Engagement & Outcomes:** Numerous engagements are listed. Meetings were held with EPA staff re: Board of Inquiry process and Watercare 2013 application, mana whenua engagement. Support was provided to Amokura Panoho, AKLD Council re: Matatini festival in Tāmaki Makaurau, support from Watercare.
- **Communications snapshot**: We promoted the innovative mobile water tanker filling stations which are a New Zealand-first, our presence at the Big Gay Out with water stations and a stand and the capability development programme, Future Stars. We also promoted the fundraising efforts of staff for Hospice and goods donated to charity Orange Sky.

4. Natural Environment

- Water Resources position: total system storage decreased through February, starting at 63.1% and finishing the month at 58.1%.
- Rainfall for February was well below normal for Auckland's catchments.
- Storage remains below levels that would normally be experienced for this time of the year.
- Rainfall for March is forecast to be near or above normal for Auckland.

5. Strategic Consents

Among the strategic consent updates in this report are:

- **North East Wastewater Conveyance - Warkworth to Snells:** Additional resource consents are required for earthworks in the private properties. An application for those works will be lodged April 2021.
- **Papakura WTP - Discharge Consent:** An application for the permanent WTP 'off-spec' discharge will be lodged late March 2021.
- **Shovel Ready Projects – Dunkirk Road Wastewater Capacity Upgrade:** Currently aiming for construction to start early July. Any delays to Council processing of consent could postpone construction.

6. Enterprise Model Update

- Building on the strong alignment position agreed at the February governance meeting, the Joint Governance Board and Programme Control Group are to meet in March to review and commit to acceleration opportunities.
- Programme wide construction partner allocation has been reassessed, following allocation of drought augmentation projects. Individual projects are reviewed prior to the design phase to ensure the best placed construction partner continues into delivery.

7. Resource Consent Compliance

- Watercare currently holds 525 active consents across Auckland and Waikato. Of these, 201 relate to water takes or discharges to water, air, or land. Water takes and discharges to water, air and land are the activities most likely to have non-compliances.
- In February 2021, conditions with 13 of our 201 discharge and take consents were non-compliant: all under Auckland Council and none under Waikato Regional Council, and only one was not either category one or two which is about technical non-compliance.

8. Delegated Authority of the Chief Executive

There were two documents signed in February under the authority delegated to the Acting Chief Executive, in relation to property. There were 9 Capex/Opex contracts, over $100,000 approved by the Acting Chief Executive and there were no capex approvals signed in accordance with the delegated authority of the Acting Chief Executive by the Board in relation to Capex approvals below a threshold of $15million.

9. Media coverage of testing wastewater for the Covid-19 virus

An article recently appeared in the media regarding the testing of wastewater for the presence of Covid-19. To clarify the story, Neil Leat, Watercare's Head of Microbiology, explained that while it is true that the RNA (Ribonucleic Acid) from SARS-CoV-2 particles can be detected in wastewater, there is no evidence that *infectious* virus particles have been found. He said that "traces of genetic material from the virus can be found in wastewater". He cited a recently published research article that says, *"[b]ased on the evidence presented, there is no currently available epidemiological data that establishes a direct link between wastewater sludge or biosolids and risk of infection from the SARS-CoV-2. Despite shedding of the virus RNA in faeces, there is no*

evidence supporting the transmission of SARS-CoV-2 through the wastewater system including biosolids". The article also provided a reminder about health and safety procedures, saying *"[e]ven though there is no evidence establishing the presence of infectious SARS-CoV-2 in wastewater or biosolids, workers should remain vigilant, practice good hygiene and effective safety practices to minimize the risks of exposure to any viruses or other pathogens from these potential workplace sources". (Kari Fitzmorris Brisolara et al, 'Assessing and managing SARS-CoV-2 occupational health risk to workers handling residuals and biosolids', Science of the Total Environment (Elsevier) Volume 774, 2021, https://doi.org/10.1016/j.scitotenv.2021.145732).*

10. Environmental law reform - The NZ resource management system

Mark Bishop attended the Environmental Law Summit on 9 March.

He reported that a potentially, huge resource management system reform (as recommendations) is on the way. The key takeaways were:

- These proposed reforms are about resource management system reform – not just RMA reform – reforms potentially far wider than just the RMA
- The RMA would be largely replaced, BUT Part 2 to remain, but very much amended.
- Three new acts coming –
    - Natural and Built Environment Act (NBA) – 'Exposure draft' due May 2021 (for consultation), then bill open for consultation late 2021;
    - Strategic Planning Act (SPA) (Bill mid/late 2021), and;
    - Managed Retreat and Climate Change Adaptation Act (Bill due 2022/23).
- Focus will be on outcomes – not effects mitigation/avoidance – the (Responsible) Minister will set limits. Focus on achieving specific outcomes in the natural and built environment, rural areas, tikanga Māori, natural hazards, and climate change.
- Greater national direction – review/amend all existing NPS's/NES's?
- Regional spatial strategic plans will be mandatory.
- Regional combined plans will be mandatory – no more individual RPS/regional/district/city plans.
- Reduction in the number of resource consents, removal of non-complying activity status.
- Greater use of economic instruments – more consent monitoring and enforcement, greater coordination between infrastructure planning and land use.
- Amendments also required for the Land Transport Act, Local Government Act, Climate Change Response Act.

Overall themes:

- Centralisation of central government powers – some dis-empowering of local government/local democracy discussion-making. Independent Hearings Panels to hear all Plans reviews, MfE to assess and audit 'plan quality'. Minister to set environmental bottom-lines. This centralisation is also reflected in the three waters reform proposals and within the Urban Development Act.

- Greater iwi/hapū/tanga/mana whenua involvement – Part 2 – to be amended to "give effect to" the principles of the Treaty. Possible substantial strengthening in the recognition of Māori values and tikanga, and strengthening of mana whenua role in strategic decision-making in both NBA and SPA.
- Legislation very outcome focused – more "what should be achieved" – less "not what to do"
- Some shift from 'rules-based' approach to 'principles-based' approach – Te Mana o te Wai and Te Mana o te Taiao as objectives/principles.

Outstanding questions:

- Government commitment to see through these recommendations (from the Randerson Report)?
- Government capacity/capability to draft these three new acts?
- Institutional/organisational/Council capacity/capability/culture to implement these reforms? Planning/consenting issues could actually worsen?
- Can the media/public/consent holders keep up with these changes?
- The long-game – current estimation is that these reforms will take up to 10 years to be fully embedded.

11. Three Waters Reform

Attached is the latest update from the Department of Internal Affairs on the programme for possible water reform in New Zealand.

Three Waters Reform Programme

A proposal to transform the delivery of council-owned three waters services

Te Tari Taiwhenua
Internal Affairs

MARCH 2021

email: threewaters@dia.govt.nz
webpage: https://www.dia.govt.nz/Three-Waters-Reform-Programme

1. BACKGROUND

Over the past three years central and local government have been considering solutions to challenges facing the regulation and delivery of three waters services. This has seen the development of new legislation and the creation of Taumata Arowai, the new water services regulator.

Through our work in a joint Steering Committee, both central and local government acknowledge that there are broader challenges facing the delivery of water services and infrastructure, and the communities that fund and rely on these services.

As Crown Treaty partners, Iwi/Māori also raised concerns about current arrangements and have a significant interest in Te Mana o Te Wai and improving outcomes in Aotearoa. Both central and local government acknowledge the importance of rights and interests under the Treaty of Waitangi and the role of the Treaty partners in progressing these issues.

It is now clear that significant additional investment is required to increase public confidence in the safety of drinking water and to improve environmental outcomes of wastewater and stormwater networks. The scale of this investment need also requires a new way for three waters services to be delivered while retaining these assets in public ownership.

2. CHALLENGES

Our understanding of challenges has been improved by the most comprehensive data collection from councils on three waters assets and service delivery ever undertaken in New Zealand*.

PRELIMINARY ANALYSIS SHOWS:

The investment needed to maintain and enhance infrastructure, and meet requirements of growth, over the next 30 to 40 years, could be in the order of:	$50-$90 billion
The total investment, on top of maintenance and renewals, over the next 30 to 40 years could be in the order of:	$110-170 billion
Councils currently spend around $1.5bn annually which adds, over the next 30 years, to around:	$45 billion

Without this investment and efficient service delivery and infrastructure upgrades we can expect a continued decline in outcomes for our communities.

*Financial analysis available mid-2021

3. WHAT IS PROPOSED

Multi-regional entities of scale
Significant aggregation into a smaller number of multi-regional entities

Balance sheet separation
Complete structural separation from local authorities

Competency based boards
Professional directors on three waters boards

Public ownership
Entities must be publicly owned, with mechanisms to enable community and Iwi/Māori input, and prevent future privatisation

Asset ownership
Three waters entities responsible for ownership of all water infrastructure assets

Statutory entities
Three waters entities designed and established by legislation

SUCCESS FACTORS

4. WHY WILL THESE BIGGER ENTITIES BENEFIT COMMUNITIES?

Greater financial capability
Balance sheet separation and the ability of the entities to borrow at advantageous rates will enable the significant intergenerational investment required to ensure fit-for-purpose water services for our communities

Freeing Council balance sheets from funding water infrastructure and services will allow an enhanced capacity to focus on place-making and community well-being

Far more efficient providers
Large entities will be far more efficient providers than individual Councils and this will mean cheaper water services for households than otherwise would be the case

A step-change in operational scale will enable greater professional pathways for staff, contribute to improved procurement practices and lower operating costs while facilitating a more strategic and co-ordinated investment approach across catchments

Cost sharing across communities
Cost-sharing across larger areas of population will bring the average price of future water services down particularly for smaller communities, compared to having to meet those costs alone should Councils opt-out of the reforms

Improved outcomes for communities
Ensuring an affordable way for communities/households to meet cost of water services now and into the future

Significant contributions to improving water quality and environmental outcomes

More direct mechanisms for Iwi/Māori to influence outcomes with clearer accountabilities

Introduction of a range of protections for consumers through a new regulatory regime

5. OPTIONS RELATED TO IWI/MĀORI INTEREST

OPTIONS FOR STRATEGIC INFLUENCE
Council and mana whenua representatives could have a key role in governing the new entities through the Governor Representative Group or through a mana whenua forum

STATUTORY RECOGNITION
Statutory reference to both the Treaty of Waitangi and Te Mana o Te Wai

BOARD ACCOUNTABILITY
Statutory roles and responsibilities as Treaty partners

Competency requirement of all Directors and specific requirements for mātauranga Māori knowledge

LOCAL INFLUENCE
Capacity and capability support to ensure mana whenua are best supported to express Te Mana o Te Wai

Mechanism to enable mana whenua to influence local investment decisions and prioritisation processes

6. OPTIONS RELATED TO COMMUNITY INFLUENCE

STRATEGIC INFLUENCE
Council and mana whenua representatives could have a key role in governing the new entities through the Governor Representative Group

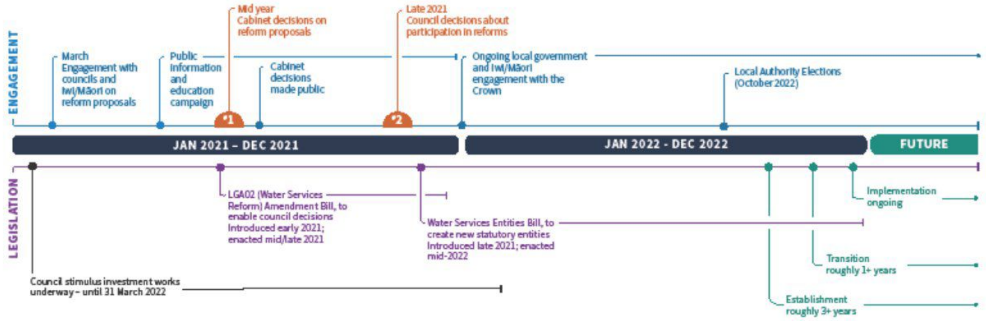
PLANNING MECHANISMS
Requirements for the new entities to work alongside, and with regard to, planning and mechanisms such as Long Term Plans and Resource Management Act tools (or replacement tools)

VULNERABLE CONSUMER PROTECTIONS
New mechanisms to protect interests of smaller communities and vulnerable consumers, for example through a Government Policy Statement

ECONOMIC REGULATION
An economic regulatory regime designed to ensure that entities act in the best interests of consumers

LEGISLATED REQUIREMENTS TO ENGAGE ON INVESTMENT DECISIONS
New mechanisms that require engagement and consultation on the core business documents outlining the entity's investment decisions

7. NEXT STEPS



THREE WATERS REFORM PROPOSALS - NOT GOVERNMENT POLICY

12. Leak management

Faults and field service crew obtained an all-time high customer service satisfaction score during the peak of summer at 57 NPS for February 2021. Collaboration across functions is improving customer outcomes (Operations, Customer, Field crew teams and communications):

- Combinations of the summer plan to increase resources across MSN and contractors; flexibility in managing planned and unplanned work during peak demand; aggressive leak management reducing overall overdue leaks by 5-fold from an average of 550 in February 2020 to under 100 during February 2021; proactive communication to customers of status and work required to manage expectations delivered a much better customer experience. The media have highlighted leaks during the drought and Watercare has undertaken a substantial amount of proactive leak detection work, so this is a great achievement.
- Overall faults volumes remained steady, but contact reduced by 23% across peak demand (December 2020–February 2021) as we attended leaks on time and reduced the need for repeat contacts.

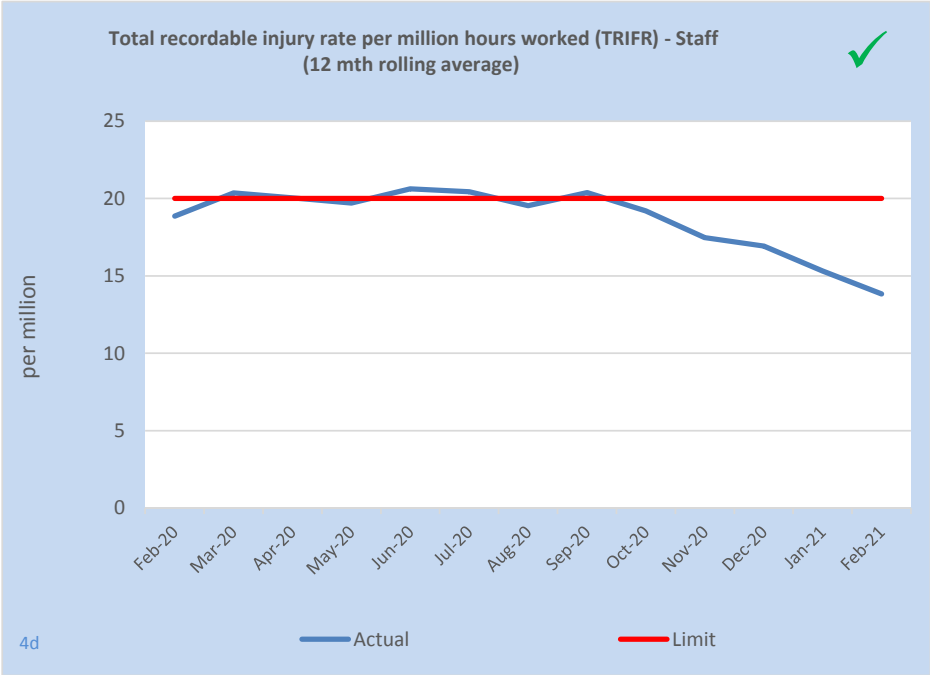
FUTURE OUTLOOK

Upcoming Board activity

Additional AMCC meeting	16 April 2021
Te Tangata Komiti meeting	28 April 2021
Board meeting	29 April 2021

Marlon Bridge
Acting Chief Executive

1. HEALTH, SAFETY & WELLBEING UPDATE



7.3

HEALTH, SAFETY & WELLBEING UPDATE continued

Worker, type of incident and location	Critical Risk (Yes/No) and Severity	Description of injury/incident	Our learnings	The actions we have taken
Watercare **LTI** Operations – Maintenance Delivery 17506 03/02/21	No – manual handling LTI – 2 days	A worker stood up from lunch and rolled their ankle. They thought it would get better but by the end of the day the ankle was swollen and sore to stand on. The worker went to their doctor and was deemed fully unfit for work for two days.	• Early reporting enables early treatment and best outcomes.	• Investigation showed no unevenness on the floor and footwear was in good condition. • Watercare Injury Manager providing return-to-work support.
Watercare **LTI** Operations - Maintenance Delivery 17889 17/02/2021	Yes – suspended load LTI – 2 days	Two workers were preparing to assemble a pump. They used lifting equipment in the process and were tidying the work area prior to starting. One worker went to the van. On his return, he found the other worker unconscious on the floor with a cut on his face. The worker was taken to hospital by ambulance where a minor laceration to his face was treated and he was deemed fully unfit for work for two days. A re-creation identified that the injury was caused by the chains from the lifting apparatus. They were running free under gravity and hit the worker in the face. WorkSafe was notified.	• Routine tasks can have unexpected risks and must be constantly reviewed for improvement.	• An investigation recreated the incident, and a video was used to share learnings across all relevant work teams. • A learning team, including workers, supervisor and design engineer, worked through solutions that could be implemented immediately and in the long-term.

Worker, type of incident and location	Critical Risk (Yes/No) and Severity	Description of injury/incident	Our learnings	The actions we have taken
Watercare RDI Customer – MSN 17688 02/02/2021	No – manual handling Restricted duties	A worker was breaking out asphalt. The shovel hit a hard piece of ground and jolted the worker's wrist. The HSW Business Partner managed a graduated return to full duties.	• Early reporting and treatment deliver best outcomes.	• Manual handling tasks being investigated through Industrial Athlete programme. • Next step is to develop alternate ways of working.
Watercare RDI Customer – Laboratory 18019 18/02/2021	No – manual handling Restricted duties	A Laboratory worker was completing repetitive tasks over a period of several days when they experienced pain in their back. The worker was assessed by a doctor and the HSW Business Partner managed a graduated return to full duties.	• Early reporting and treatment deliver best outcomes.	• Work tasks have been varied and modified. • Worker is completing exercises to strengthen their back.
Watercare RDI Operations – Maintenance Delivery 18136 26/02/2021	No – manual handling Restricted duties	A worker had been experiencing pain and discomfort which worsened. The worker was assessed by a doctor and the HSW Business Partner is managing a graduated return to full duties.	• Early reporting and treatment deliver best outcomes.	• Manual handling tasks being investigated through Industrial Athlete programme. • Next step is to develop alternate ways of working

Worker, type of incident and location	Critical Risk (Yes/No) and Severity	Description of injury/incident	Our learnings	The actions we have taken
Contractor **LTI** Infrastructure – Smyths Contractors contracted to McConnell Dowell 17828 11/02/2021	Yes – mobile plant LTI – 17 days	A sub-contractor hired a tow-truck to winch a pipe from an excavation. There is a standard methodology when pulling pipes that utilises large plant with winching capability. In this instance the normal operation was altered during the set-up of the winch operation. During the winching operation, a snatch-block failed and part of it hit a concrete block which then hit the winch operator's foot. The operator was taken to hospital by ambulance with a compound fracture and underwent surgery. The operator remained in hospital for two weeks. The winch operator and sub-contractor provided false information to the primary contractor. The operation on site did not follow the main contractor's processes and procedures. Reported to WorkSafe by principal contractor two weeks after the incident, once the extent of the incident was fully exposed.	• Where a change in methodology is made, a review must be completed that addresses the risk before operation begins. • Watercare and its principal contractors to continue to encourage reporting of all incidents. • The more layers that exist, the more difficult it is for a principal contractor or Watercare to influence behaviour. Subcontractors must be made aware of, and be regularly reminded of, their responsibilities.	• The principal contractor conducted a detailed investigation • Further investigation is required to understand why the subcontractor did not report the incident or the severity of the incident. • An industry safety alert will be, disseminated regarding the use of winching, including the impact of and processes around changing procedures. • Watercare's Chief Infrastructure Officer, Head of Design & Construction and Head of HSW met with principal contractor and sub-contractor • The sub-contractor will be closely supervised to complete current piece of work (6 days), and will not be used by Watercare or the principal contractor for future work. The tow truck company will not be utilised by Watercare or the principal contractor either. • All Watercare projects to review the levels of subcontractors being utilised on the sites. A campaign to be developed to lift awareness of the subcontractors.

1.1 SIGNIFICANT INCIDENTS/HAZARDS/CLOSE CALLS

There were three significant incidents in **February 2021**.

Worker, type of incident and location	Critical Risk (Yes/No) and Severity	Description of injury/incident	Our learnings	The actions we have taken
Contractor Incident Central Interceptor – GA-JV 16979 27/02/2021	Yes – suspended loads	A work team was lifting a mini excavator from a 20m deep shaft using a crawler crane. As tension was applied, the terminal end of the crane's wire rope slipped through the wedge and socket assembly located on the jib tip. This caused the main hook block to drop onto the roof of the excavator and a section of wire rope to spiral down into the shaft. There were three workers in the shaft at the time, but they were in the safe zone and as a result, nobody was injured. The initial investigation found that the wedge did not pass through the socket with the required clearance. As a result, the wedge did not position properly and there was poor grip on the wire rope. It was subsequently found that the wedge and socket were not an original pair.	• Crane work includes several significant risks which require expertise and vigilance to manage. • Sharing across industry is important.	• Crane work was stopped on all Watercare sites until the wedge and sockets on all cranes were independently inspected and certified. • The incident was investigated, and final outcomes are pending. • An Industry Safety Alert was disseminated. • Contractor has recruited lifting SMEs to provide additional oversight of lifting operations. • Draft procedure developed for crane inspections, prior to coming on site, following re-rigging and annual maintenance. This will be disseminated to the construction market.
Contractor Incident Infrastructure – Lawsons Creek 17774 11/02/2021	Yes – mobile plant	A work crew were undertaking civil works. The digger needed to relocate its position and a road plate was placed across a trench so the digger could relocate. The road plate was placed widthways across the trench resulting in shorter landing on each side of the trench. The trench collapsed while the digger was straddling the road plate causing damage to hydraulic shoring in the trench.	• Small changes in circumstances can lead to events unfolding quickly. • Planning and communication of exclusion zones ensured no-one was hurt.	• Contractor investigation let to modification of the site to allow additional room either side of the trench for the plate to be laid lengthways.

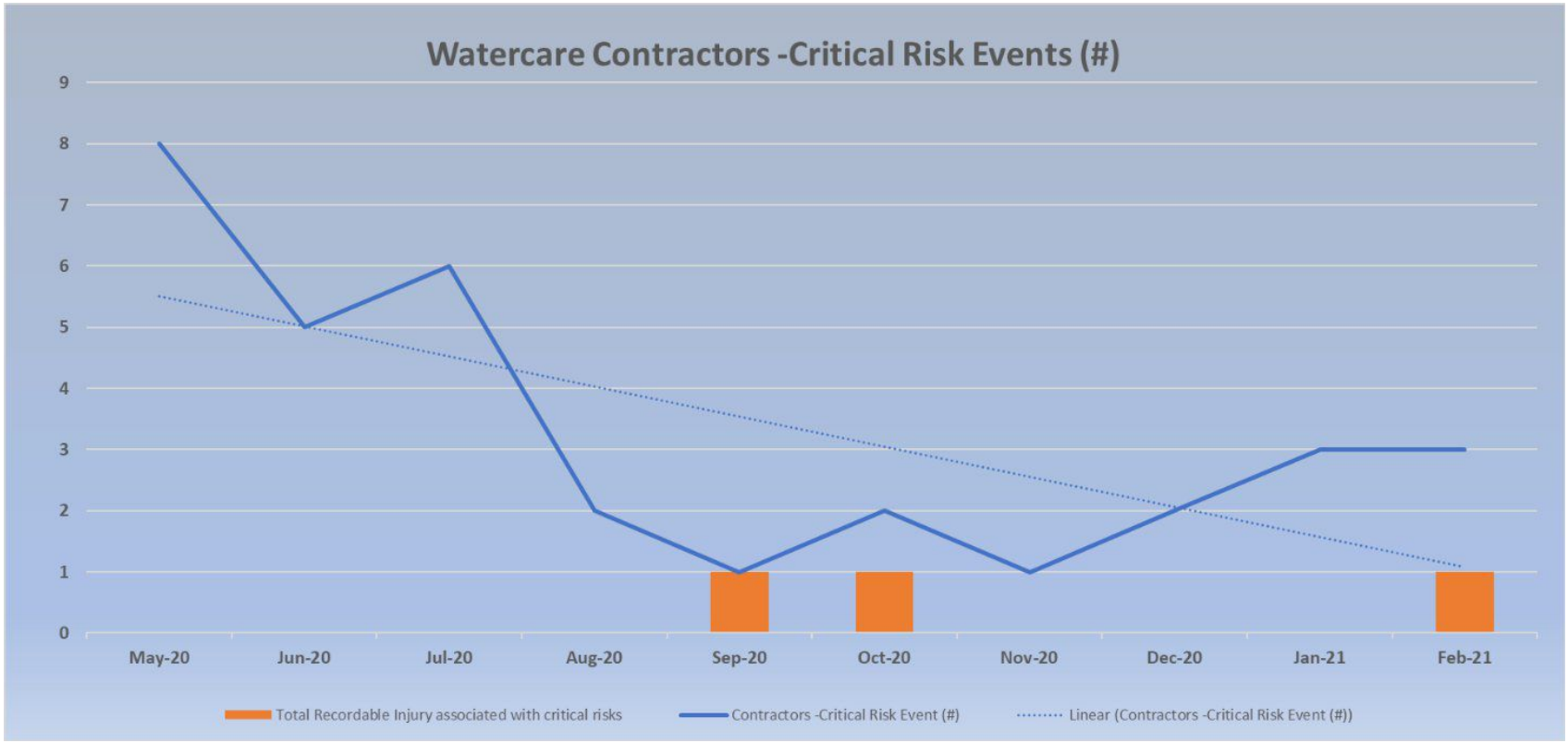
Member of the Public Meter-Reading Contractor – A D Riley MTI 17868 09/02/2021		A member of the public was mowing their front verge when they stepped on a water-meter cover. The cover was not securely in place and the person's leg was cut by the edge of the cover. The person received stitches at their local medical centre.  It is unknown whether the lid had been correctly re-positioned after it had been read.	• Assets in the public arena are vulnerable to being disturbed through a variety of circumstances. This must be considered when planning and installing assets.	• Customer Service team liaising with customer who has recovered and is back to work. • Contractor visited site to examine the water-meter cover. • No change to the lid is required. • A D Riley communicated to all teams regarding replacing covers correctly.

Watercare Contractor Critical Risk Incidents/Close Calls

Over the previous 10 months we have seen a declining number of critical risks associated close calls or incidents. We observed a peak after the initial Covid-19 lockdown periods in 2020. This was discussed at length with our contractors and found to be a trend across the construction sector. Following this uplift, we increased our focus on this area, for example our Back-to-Basics campaign.

The graph below indicates the month-by-month critical risk events across all our contractors (includes all Watercare delivered projects and maintenance activities). We will continue to focus in this area. Our Enterprise Model partners have both implemented processes engineered to provide and uplift the focus on these risk areas. For example: following their Dupont review, Fletcher implemented Risk Containment Reviews on their construction sites.

The recent lift in events, January and February 2021, once again appears to be an industry trend. We are working with our contractors to assess the reason for, and the extent of, the issue.



HSW External Review

Human Synergistics has initiated the survey for the external HSW review. The survey closes on 19 March.

The review will be delivered in three phases: a survey of all workers followed by face-to-face focus groups to inform a report to the executive and the Board. Following the report, Human Synergistics will facilitate a workshop with key Watercare representatives to develop a HSW plan.

Timeline:

- All of business awareness comms – 17 February
- Survey issued – 23 February
- Survey open – 23 February to 19 March
- Survey analysis delivered 26 March
- Focus groups – 1 to 12 April
- Final report no later than 26 April

Wellbeing and Safety Reward and Recognition Programme

Watercare will be implementing a Reward and Recognition Programme across our entire contractor base. This will build on the procedure that CI have successfully implemented on that project. The programme will actively encourage the identification of good wellbeing and safety behaviour by individuals, teams or entire sites. This will initially be a Watercare sponsored programme and will have initial funding of $100k per annum.

A governance structure will be stood up that includes senior leaders from both Watercare and our contractors. Watercare's Chief Executive will chair the governance group, communicating the commitment that Watercare places on improving wellbeing and safety on our sites. Reward and recognition will come in several forms, ranging from on the spot 'there and then awards' to annual awards. Rewards may also include sponsoring individuals or teams to wellbeing and safety conferences, events, or training. We propose to introduce a Watercare Board award, where a Board member(s) will be in attendance to present the award on the applicable site. The introduction of this programme will be communicated across the entire construction sector in New Zealand to encourage other client organisations to actively participate in positive recognition. The target date for the introduction of this programme is mid-April 2021.

Workers Confronted

During February on three occasions whilst working in the community, workers were the subject of verbal abuse. On one occasion, workers were threatened with a knife.
All cases have been referred to the Security team for follow-up and workers have received follow-up support.

Central Interceptor Climate Survey

In December, the CI Project conducted a HSW climate survey of all staff. More than 80% of workers completed the survey. Following initial analysis, HSW representatives from all parts of the project were brought together for three workshops to provide further detail for areas of concern and greatest success.

Mindful leadership was reported as the strongest positive attribute across the project, while concerns around programme before safety and fatigue were presented and discussed with the Project Leadership Team along with ideas for improvements.

An action plan is in development. This feedback also informed a recent Safety Management Review into lifting incidents on site.

Positive feedback – Good Stuff

Every day on all our worksites, workers are doing great work, putting HSW at the front of their thinking and managing challenges. Both the Central Interceptor and Infrastructure teams have been conducting regular Leadership Walks and are using our HSW reporting system to acknowledge good behaviour and outcomes.
In February we saw a reduction in the overall number of site walks, due to the COVID-19 lockdown. CI lodged 4 'Good Stuff' reports and Infrastructure, 10.
The language of HSW is changing to focus on learning from what works well and involving workers earlier and more often in work design and planning. This shift requires clear communication of a leader's intent and delegation of decision making to the front line.

HSW Focus Areas

Online HSW Inductions

Following success of online contractor HSW inductions, we are developing an online HSW induction for Watercare staff. Since December, more than 2000 contractors have completed online inductions and we are keen to build on this success, removing further delivery impost from the Operations Team. This will be delivered in May 2021.

Audit

Recent audit findings have highlighted a gap in our self-audit programme. Production sites and HSW system self-audits are being redesigned and the new programme will be launched in April 2021.

Reporting

We are updating our reporting to ensure all levels of the business have the information they need to lead and support HSW.

Control of work operations / infrastructure Interface

When projects are being delivered on operational plants, it is important that all parties are collaborating and communicating clearly so there are no issues arising from conflicting work. While this is currently working well, we are working with project managers and engineers as well as the operations team to identify any areas that require improvement.

Our Vision

Trusted by our communities for exceptional performance every day

Our Strategic Priorities

Customer Focus

Business Excellence

Financial Responsibility

Fully Sustainable.

Our Values

Respect

One Team

Accountability

We Make it Happen

Excellence

Health Safety & Wellbeing Team: Plan on a Page 2021

Leadership & Governance

Key Focus

- HSW is owned by the business
- HSW inherent in strategic planning and decision making
- Leaders have the capability, information and support they need to lead HSW
- Governance requirements are met

Deliverable

- Leading Safety on Site programme
- Improved Board Reporting
- Internal audit programme
- Develop and implement Leadership wall programme

People Capability and Engagement

Key Focus

- HSW is part of everything we do
- Injury Management delivered effectively
- Wellbeing is understood and embraced by the business
- Watercare -specific Safety training
- Manual handling improvement

Deliverable

- HSW Committee effectiveness
- HSR development
- HSW Learning Teams
- Develop and deliver safety training
- Injury Management review and improvements implemented
- Industrial Athlete
- Wellbeing strategic plan
- Deliver business specific safety training

System Improvement

Key Focus

- Leaders have visibility of HSW reporting system
- HSW reporting informs leaders at all levels
- Improve PTW and Control of Work systems
- HSW Management System accessible and useful

Deliverable

- iCare reporting improved
- HSW Management System review complete
- HSW landing page delivered
- Contribute to Job Care and electronic PTW
- Online HSW induction for workers

Critical Risk Management

Key Focus

- Workers understand critical risks and controls
- Improve use of technology to control risks
- Continuous improvement of critical risk management

Deliverable

- Ongoing critical risk review
- Support to industry critical risk improvement
- SOP library
- Plain language one-pagers for critical risk work

Contractor Engagement

Key Focus

- Build collaborative HSW relationship with contractors
- Become a HSW industry leader
- Contribute to Industry HSW improvement
- Support contractors to improve HSW

Deliverable

- Quarterly contractor breakfasts
- WatercareSafety Recognition Fund
- Contribute to Infrastructure Safety Leadership Group
- Collaborative HSW learning teams


Health Safety and Wellbeing 2021 RoadMap
January
February
March
April
May
June
July
August
September
October
Nov
Dec
Leadership
HSW Review
Leadership Walks
Board Reporting Review
Monitoring and Site assurance monitoring and planning
People Capability and Engagement
Team Fit including Industrial Athlete
Injury Management Review and Relaunch
Wellbeing Strategic Plan
HSW Committee review & HSR Development
HSW Learning Teams
Business-Specific Safety Training
HSW Comms Plan
System Improvement
iCare Reporting Improvement
HSW Management System Review
Job Care & ePTW
Online HSW Staff Induction
Critical Risks
Critical Risk Review- Ongoing Monthly Focus
Develop Critical Risk One Pagers
Create SOP Library
Contractor Engagement
Watercare's Safety Recognition Fund
Implement Quarterly Contractor Breakfasts
Back to Basics Campaign -Monthly Topics
Roll-Out Leading Safety on Site Workshops

PEOPLE, CAPABILITY AND LEARNING

Mentoring the Watercare Way

The newly created 2021 Watercare Mentorship/ Mentee / Reverse Mentor Programme has now been launched to the business. This is an exciting opportunity for the business to further support our people's development, harness their talent, enable further cross function networks and capability, share, and upskill both new starters and mid to long tenure employees, and further embed our succession plans during 2021–22. We went out to each area of the business to learn directly from our employees what they would like to see in this type of programme. We then designed a mentor/ mentee offering that is specifically tailored for Watercare.

A full range of mentor and mentee toolkits and support resources is now live and accessible by all employees including a leadership toolkit. To date we have had nineteen expressions of interest to take part as a mentor or as a mentee. We are currently completing our needs analysis and development of the programme.

Growing Greatness for Women in both Technology, and Engineering & Architecture

Six women across the business have been identified as our next participants within both programmes. The successful participants were selected on the basis of their succession and development plans for 2021–22 and because they were highlighted as talented on their business units' talent maps by their respective People & Capability Business Partners.

Watercare is hosting the 2021 Growing Greatness for Women programme at the head office in Newmarket, demonstrating our drive to support the People team's strategic goal of inclusivity. There are a further twelve women from other key New Zealand industries attending the programme which will allow Watercare to showcase its support in the Water, Engineering, and Technology sectors.

People from the following organisations will be attending the programme: Tauranga City Council, Sky City, Flux Federation, Beca, WSP, Harrison Grierson, Tonkin + Taylor, Ignite Architects, Warren and Mahoney and Jacobs

Leadership development

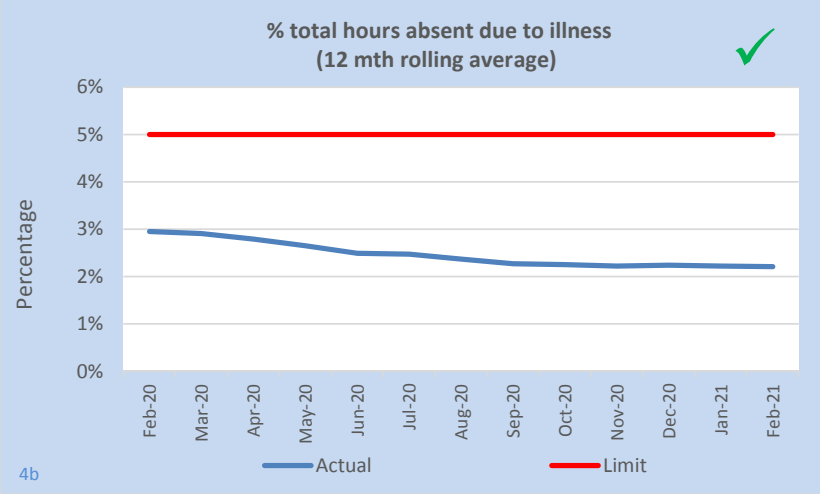
Leadership development continues throughout 2021, with a focus on ensuring the programs leveraging off the Korn Ferry 'The Inclusive Leader' model principles ultimately building in the leadership trust equation to meet our six capitals strategic goals.

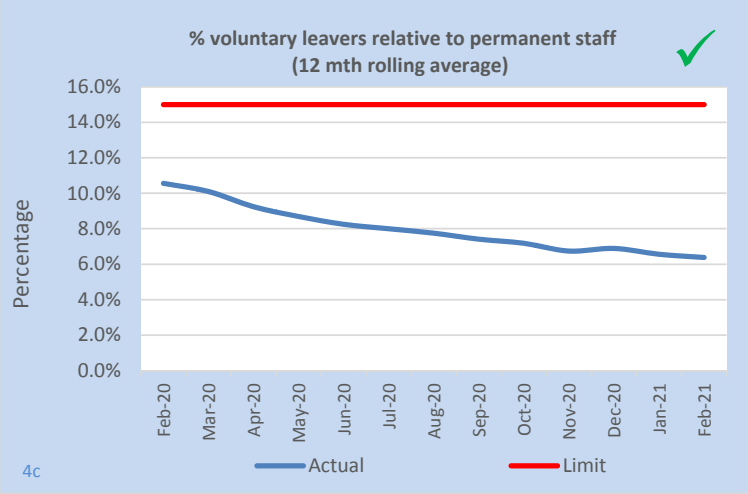
Currently 89% of tier, four, five, and six people leaders have attended or enrolled in the workshops of the Watercare leadership development pathway since February 2020. The targeted completion date for this phase is mid-April 2021.

Phases three, four, and five for leadership development: Leading with Communication, Coaching for Performance, and Giving Developmental Feedback at Watercare are scheduled into Immerse and are open for registration by All Watercare people Leaders.

In parallel, all leadership workshops will be accessible to our emerging, on-boarding, and non-people leaders for consistency in their development.

PEOPLE & CAPABILITY





1.2 COVID-19 PREPAREDNESS

Covid-19 Update 17 March 2021

We are currently at Alert Level 1 as is the rest of New Zealand.

Watercare has returned to normal operations, observing the Government's guidance of using face coverings on public transport, good hygiene and encouraging our employees to use the contact tracer app.

There have been no known Covid cases amongst Watercare staff or contractors.

The Watercare Covid-19 Incident team remains on standby to monitor developments and respond as needed. The team are also preparing a Watercare vaccination plan to support the Government's vaccine roll out announced last week.

The following email was sent out to all staff on 12 March 2021.

"Hello all

As you may be aware, **Auckland is at Alert Level 1,** effective from 12 noon today.

While we are at Alert Level 1, keep practicing these golden rules:

- Please keep checking the **locations of interest,** and if you have visited any of them during the listed times, please follow the specific advice listed on this page.

- Use the **COVID Tracer App with the Bluetooth functionality** turned on to record your movements.

- If you are required to **self-isolate or get tested,** please talk to your manager, keep them updated on your situation/test results and agree on your working arrangements with them.

- As always: maintain a high standard of **hygiene**, wear **masks** where you can't maintain physical distance and **stay home** if you are sick.

Stay safe and take care.

COVID-19 incident team"

1.3 TSUNAMI INCIDENT TEAM ACTION PLAN

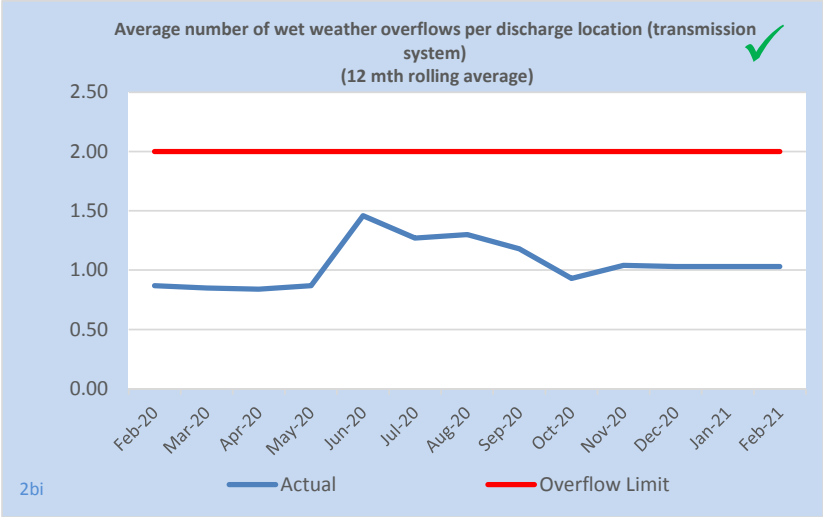
Prepared by Vaibhav Bhatnagar (Risk and Resilience Advisor)
Approved by Simon Porter (Head of Service Delivery)

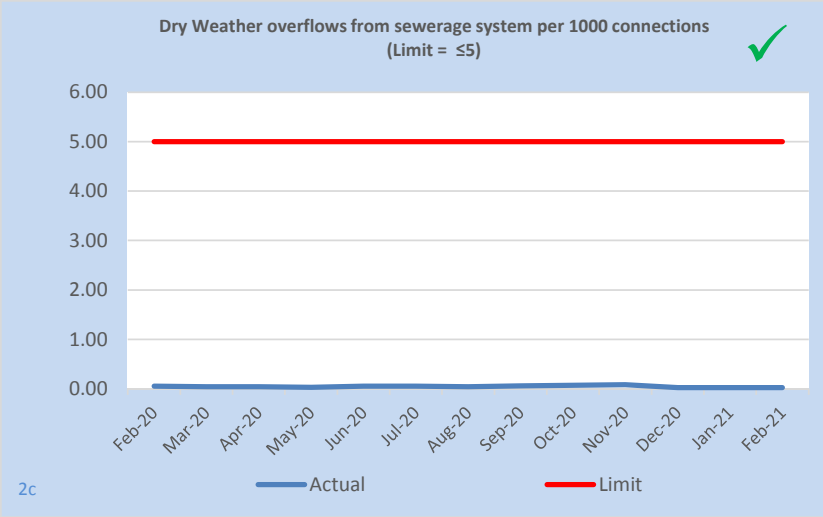
Action Plan			
Coordination Centre	Newmarket (and via Microsoft Teams)		
Type of report	Action plan		
Report number	1		
Incident	Tsunami		
Date and time issued	5 March 2021	Operational period covered	10:30-14:30
Summary of incident	On 5 March 2021, NEMA reported an earthquake of 7.1 magnitude east of the North Island. Following the initial report there were another 2 incidents reported, one of 8.1 and the other of 6.2 magnitude. Watercare stood up an Incident Team as below: Incident Controller: Simon Porter Assistant Incident Controller: Vaibhav Bhatnagar Planning Coordinator: Craig Mathewson Logistics Coordinator: Blair Morris Intelligence Coordinator: Keith Dias Operations Coordinator: Andrew Deutschle and Peter Rogers Communications Coordinator: Anusha Vishnampet Customer Coordinator: Theresa Malloy Welfare Coordinator: Emma Bale Auckland Council coordinator: Anin Nama Digital Coordinator: Adam Gower		
Aim	The aim of the incident team was to ensure that staff and assets are protected. It was also to ensure that service delivery was maintained.		

Timeline of action/strategy	10:30: Incident team stood up. Comms sent out to staff identifying any issues and next steps. This was to ensure that the comms were consistent across the sites. Communication from NEMA used as guidance. Add 11:30 session #1 to confirm comms plan to staff. Add 11:50 Exec briefing #1. Work started on identifying assets and infrastructure that may have been impacted by using GIS and the Tsunami maps. This included treatment plants, bores, headworks, and pump stations. Contact was made with contractors working on sites which were at risk and assurance was received that business continuity and H&S procedures were in place. All Watercare staff were contacted at treatment plants and confirmation was received that all staff and assets were safe and being monitored. Working commenced on surcharge incident planning and actions. Confirmed no one in low lying areas and staff have retreated from coastal areas. No planned work happening and reactive work on standby and faults will were to be reviewed. The intelligence function was constantly monitoring NEMA, CDEM, SCADA systems and the news. The risk was identified as low for coastal areas, but guidance was given to stay away from these areas. Faults team was briefed for possible surge issues and cleanup requests. IVR personnel put on standby for any updates. Contact was made with Auckland Council and they were advised that the Watercare Incident Team had been stood up. No information was provided by them on their incident team preparations. 12:30: The Watercare incident team was in a holding/ monitoring mode. Network contractors had been contacted and all checks were in place. Case by case risk assessment was done of all incidents. Planned work was put on hold and all staff were briefed. Location mapping continued by using EROAD.

	List of assets in low lying areas was shared and no staff were found working in the areas. Risk of surge was being monitored. Auckland Council were contacted again and advised of the Incident Team actions. No information on our counterparts had been shared. Weekend staffing for Incident Team was confirmed. Operations coordinated with faults of jobs on hold due to the incident. No major issues were anticipated at this time. Add 13:30 meeting to consider latest NEMA update. 14:00 Exec Briefing Dam assessment conducted and no issues found to assets or water quality. RT's tested and performed as per expectations. Comms sent to staff on standing down Incident Team and NEMA actions. NEMA confirmed that the risk profile had been reduced although coastal areas were still to be avoided. Controls remained in place until 16:00. Executive briefing completed. Incident team stood down but remained in place and contactable over the weekend in case of further escalations.

2. SOI MEASURES — 2020-21 — Natural environment





0

Non-compliance with RMA consents measured by number of abatements notices etc

2d

SOI MEASURES — 2020-2021 — Assets and Infrastructure

100% ✓

Volume of water complaint with standards

1a

100% ✓

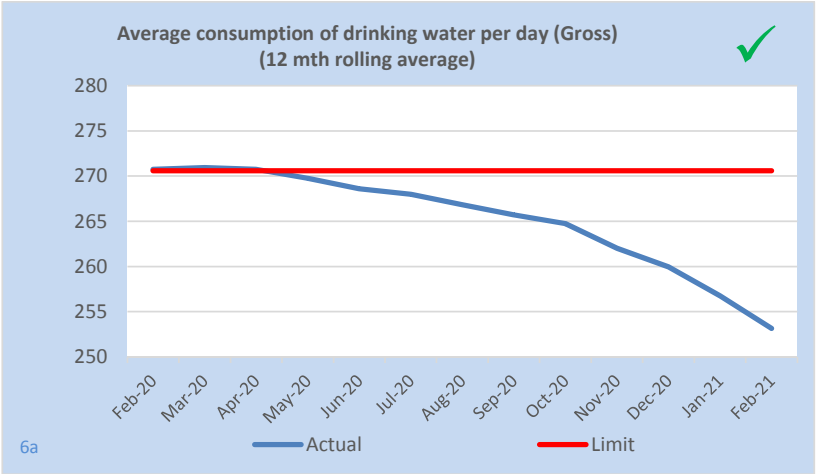
Compliance with Part 4 of the Drinking Water Standards (bacterial)

1a

100% ✓

Compliance with Part 5 of the Drinking Water Standards (protozoal)

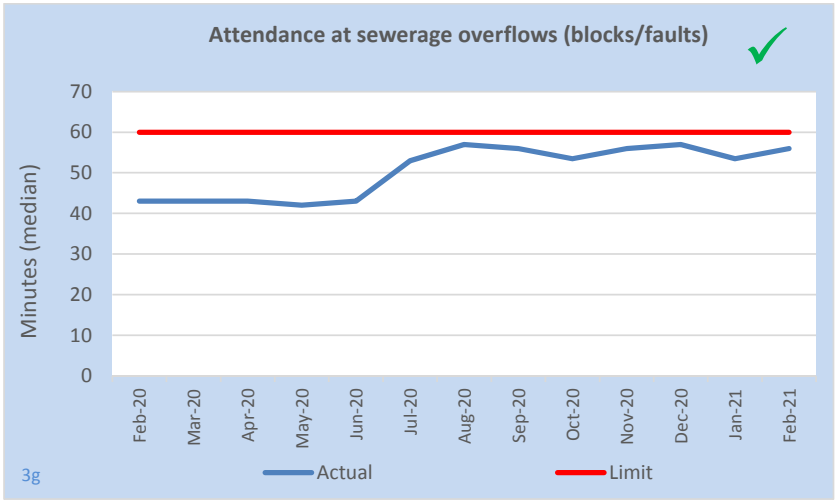
1b

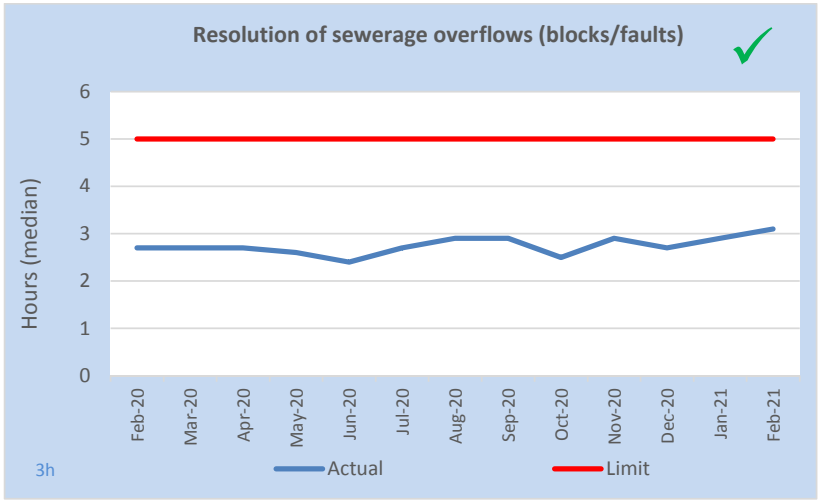


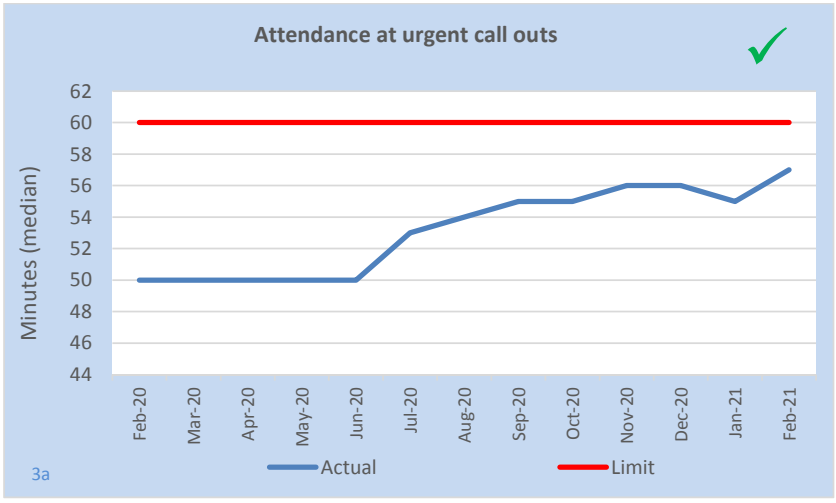
✓

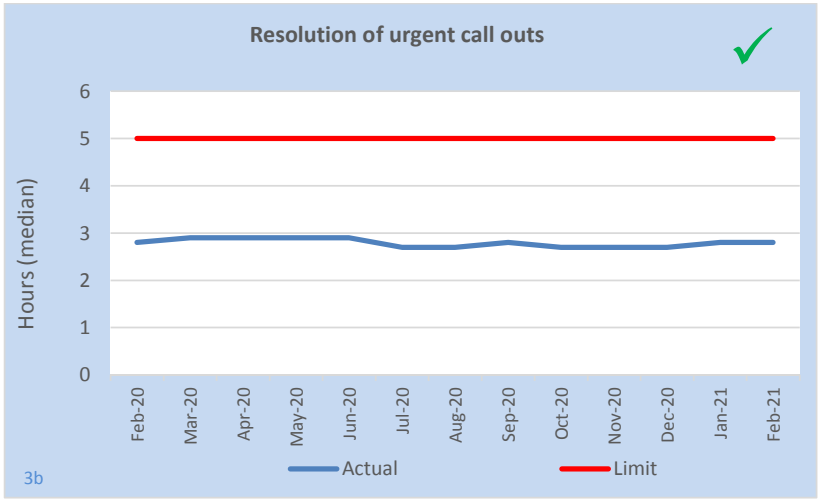
6a

SOI MEASURES – 2020-2021 – Community and Stakeholder relationships

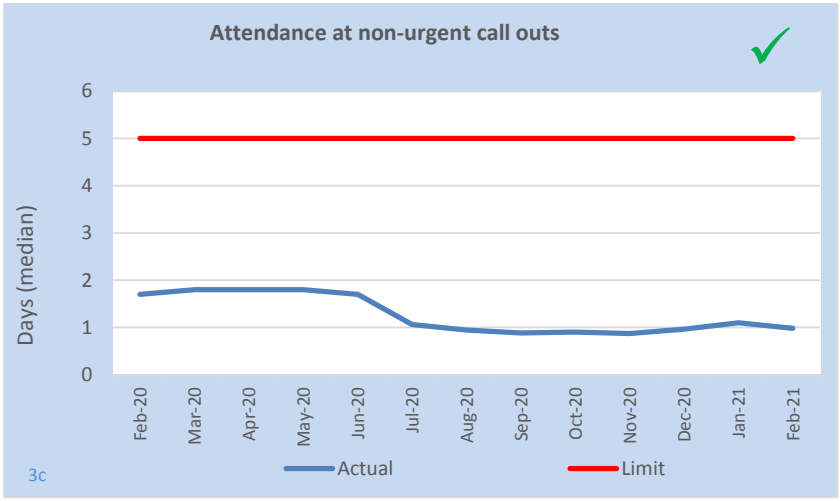


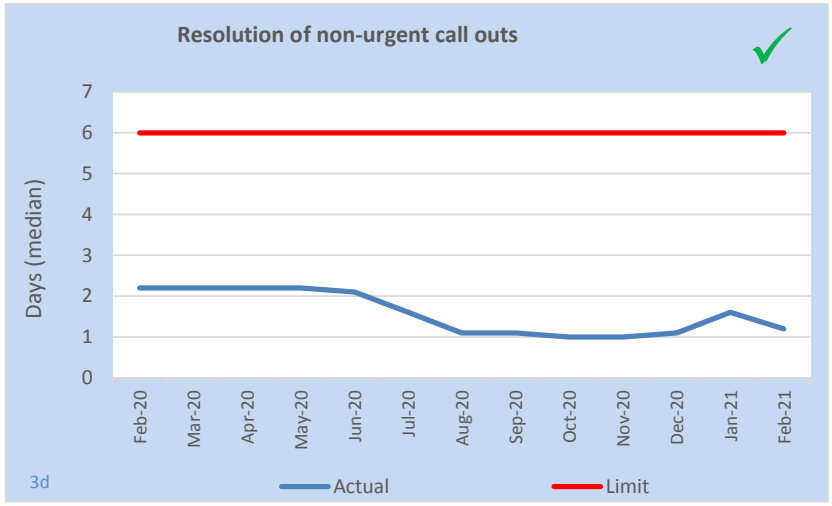


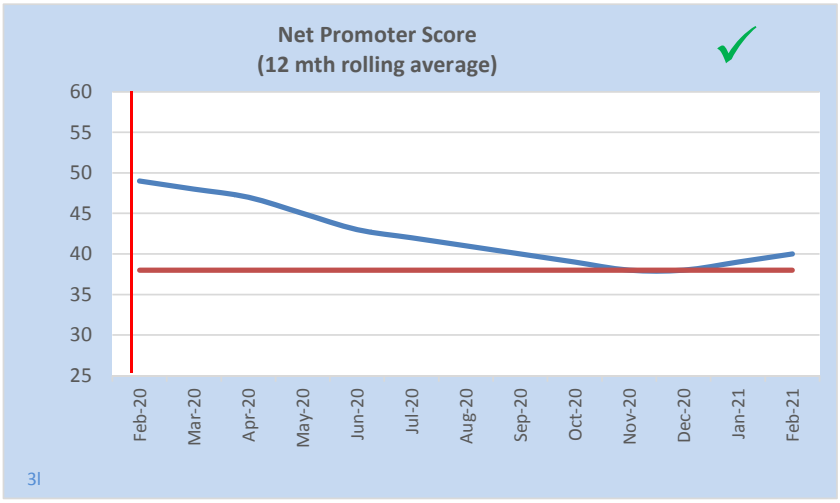




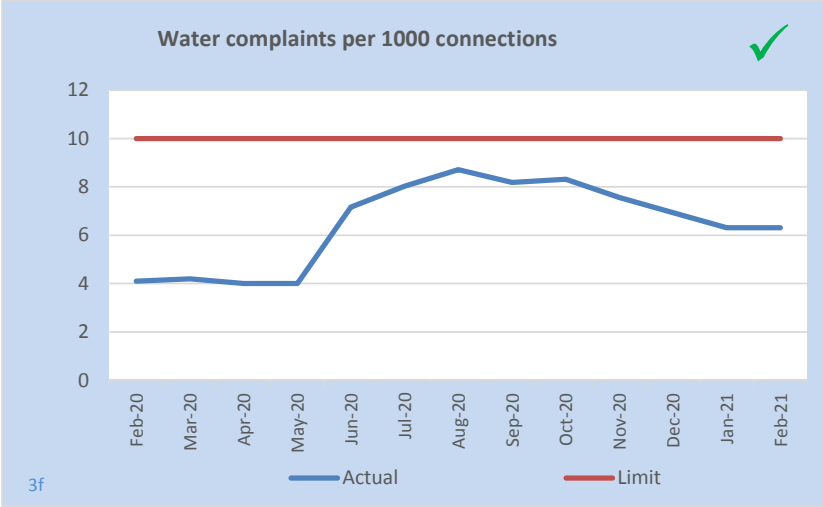
SOI MEASURES – 2020-2021 – Community and Stakeholder relationships

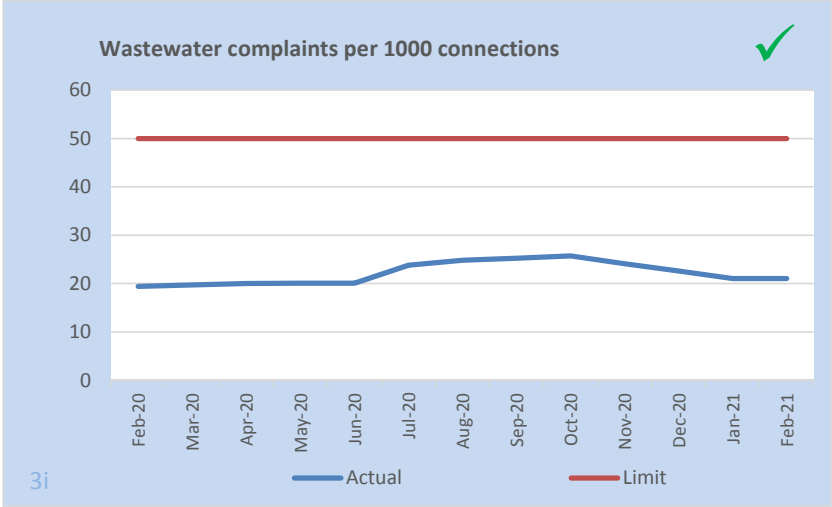






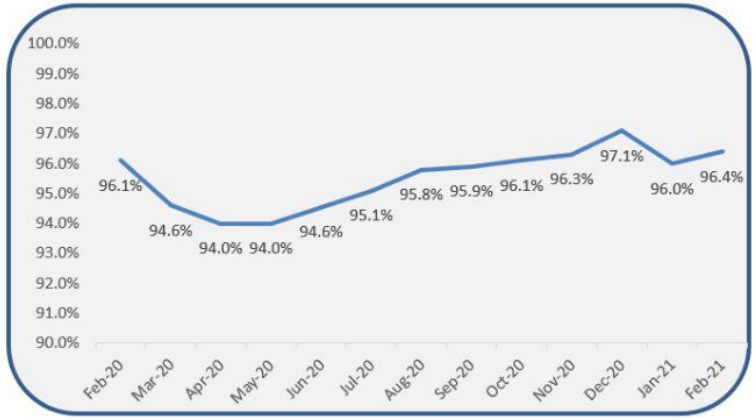
SOI MEASURES – 2020-2021 – Community and Stakeholder relationships





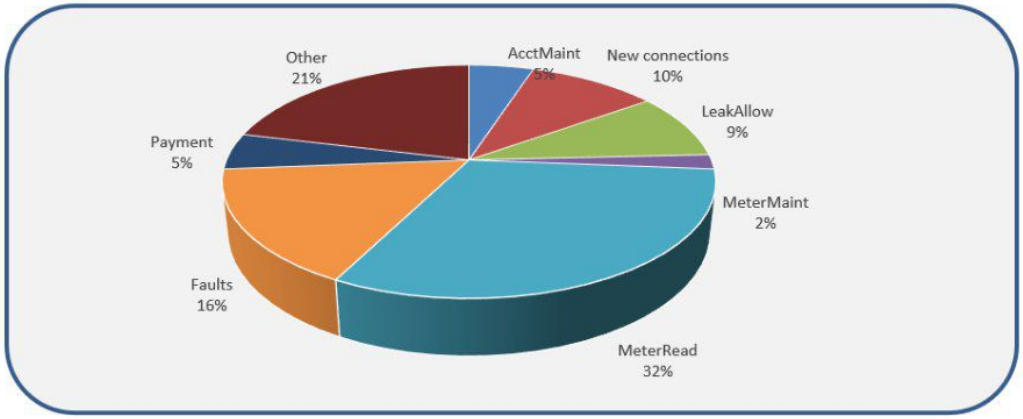
Complaints Performance – February 2021

Complaints within SLA



- Complaints closed within SLA (10 days) 12-month rolling average is at 96.4%, with an increase in the number of complaints captured.
- In line with our revised complaint resolution process we will be capturing complaints regardless of where they enter the organisation. As we roll this out across the business we will see an increase in the total number of complaints.
- New complaint codes and a new form are being designed to enable better insights.

Types of complaints



Main drivers:

- Meter reading challenges, mostly driven by the inability to access the meter - meter reader errors resulting in customer frustration with consecutive estimations.
- Leak allowance complaints largely disputing our process for how the leak allowance is calculated.
- Networks/Operations faults: time taken to repair, lack of shutdown notifications, point of supply dispute.

Outcomes:

- Meter read errors have been tabulated and sent to AD Riley to address. We have requested their PPE gear in line with H&S to ensure safe practices are being followed.
- Work in partnership with AD Riley to understand how we can improve this process by attending their tool box meetings.
- Content updated on website to help customers, and FAQs for agents to facilitate consistent triaging conversation on causes of high bill, with many estimations.

New SOI Measures for 2020-2023

Capital	Measure	SOI Target	Commentary/Result
Customer & Stakeholder Relationships	We contribute to the delivery of Māori outcomes and deliver on the joint outcomes agreed by Council and CCOs (At least one kōrero with each of the 19 iwi every year and work with them to develop meaningful measures for Māori outcomes)	At least one kōrero with each of the 19 iwi every year	Met with Deputy Chair and CE of Ngai Tai ki Tāmaki. Chair of Ngāti Tamaoho. Watercare Acting CE & Poutiaki Tikanga Māori have met with Te Runanga nui o Ngā Puhi Chair. We are scheduled to meet with Ngāti Tūwharetoa representative 24th March
Customer & Stakeholder Relationships	Watercare will operate responsibly. We will meet the 10 DIA targets that relate to customer and stakeholder relationships (refer Appendix E, numbers 3–12). (Meet 100% of DIA targets) (Complaints, Response/Resolution, Bacteria & Protozoal)	Pass/Fail	Pass Full compliance maintained for Bacterial and Protozoal compliance
People & Culture	We will improve our employee engagement. eNPS	≥20	34.3. Result has remained stable compared to the previous survey. Next survey will be live end of March 2021.
People & Culture	Watercare has committed to the Diversity Agenda Accord. Improve gender workforce split in departments where the split is uneven (Identify 2020/21 baselines and improve on baseline)	10%	No changes Q1 2020/21 to Q2 2020/21. Female representation in Operations increased by 4% however due to male representation also increasing this did not impact overall numbers. Next update once Q3 2020/21 is complete.
People & Culture	Watercare has committed to the Diversity Agenda Accord. Attract a more diverse range of applicants to apply for jobs at Watercare (Identify 2020/21 baselines and improve on baseline)	10%	Q1 2020/21 to Q2 2020/21 the number of applications from Maori and Pacifica have decreased, however there were significantly less applications made during quarter 2 2021. When comparing the number of applications made as a percentage of total applications: in Q2 7% were from Maori and Pasifika compared to 6% in Q1 20/21. Next update once Q3 2020/21 is complete.
Financial Capital & Resources	We manage operations efficiently, keeping costs to customers (collectively) at minimum levels. Percentage of household expenditure on water supply services relative to the average household income	≤1.5	0.86%

Capital	Measure	SOI Target	Commentary/Result
Financial Capital & Resources	We are a financially sustainable business. Watercare group's debt headroom (Set measure in conjunction with Council and establish baseline)	Baseline is 3.54	Financial Control has obtained the financial reporting calculation used in Auckland Council's group financial statements for the debt to revenue ratio and created their own template that automatically draws data from the monthly Management Reports. The Oct-20 debt to revenue ratio was 3.46, Nov-20 ratio was 3.26, Dec-20 was 3.07, Jan-21 was 3.1 and Feb-21 is 3.06.
Intellectual capital	We create new value in our infrastructure supply chain through the Enterprise Model. Establish and implement an Infrastructure Carbon Portal and corresponding toolkit to assess ways to reduce carbon emissions during the construction of water and wastewater assets. (Deliver and implement portal and toolkit. For the Enterprise Model, monitor and report on the target of a 40% reduction post 2024.)	Establish Baseline	Carbon portal progress being made through internal and external feedback sessions. Training modules continue to be completed with 144 sessions taken (across 3 modules) and there are now 69 users with access to the Carbon Portal. A trial of a 30kVA solar pod (hybrid solar generator) continues on the Waikato 50 construction site to demonstrate benefit of renewable generation on remote construction sites. The trial is also a low-cost innovation trial for P1st that can be rapidly deployed to other sites and replaces the need for electricity infrastructure to these sites and emissions from the BAU diesel generators.
Intellectual capital	We create new value in our infrastructure supply chain through the Enterprise Model. Establish and implement an Infrastructure Cost toolkit across the programme and project to deliver new ways to reduce costs during the construction of water and wastewater assets. (Deliver and implement the toolkit. For the Enterprise Model, monitor and report on the target of a 20% reduction post 2024).	Establish Baseline	An EM Toolkit structure has been set up. Recent tools added to the toolkit include a project scorecard and value capture process to measure, capture and share performance and 40:20:20 ideas/progress.
Assets and infrastructure	Watercare will operate responsibly We will meet the 2 DIA targets that relate to assets and infrastructure (refer Appendix E, numbers 14 and 15). (Meet 100% of the DIA and Auckland Plan targets) (Dry Weather and Wet Weather Overflows)	Pass/Fail	Pass

Capital	Measure	SOI Target	Commentary/Result
Assets and infrastructure	We will develop and use talent, processes and technologies to manage non-revenue water and ensure optimal supply efficiency. (Establish baseline and demonstrate continuous improvements on previous year) by 30 June 2021	Establish Baseline by 30 June 2021	Leak detection of 6000km/year is being conducted with the intention to train the capability in house. Pressure management and smart metering trials are underway citywide Planned Targets: • Maintain Real losses below 13.7% • By 2025 achieve 136 L/C/d
Natural Environment	Watercare will operate responsibly. We will meet all DIA natural environment targets (refer numbers 1 and 2 in Appendix E). (Meet 100% of DIA targets) (Compliance, PCC)	Pass/Fail	Pass
Natural Environment	We will implement Mitigation measures in line with our responsibility to keep global warming within 1.5oC. We will reduce annual greenhouse gas emissions from Scope 1 and Scope 2 emissions (operational mitigation). (• 2020/2021: Complete work on a plan to achieve a 45% reduction in operational emissions by 2030 • June 2021: Finalise targets in line with ACAP • 1 March 2022: Baseline established and roadmap targets published in our next SOI. These targets will consider the contribution to the region's interim 2030 and 2050 targets. • 30 September 2022: Report on first target and publish targets through to 2024 in the 2021–2024 SOI)	Finalise Targets by June 2021 Establish Baseline by 1 March 2022	Preliminary reduction pathway established. Presented to Exec and Committee for Climate Action. Phase two initiated on data validation, cost/benefit analysis and ways to close the gap between projection and target. WaterNZ have secured funding and delivered market RFP for understanding wastewater process emissions in NZ.
Natural Environment	Water is precious – We continue to encourage our customers to be mindful of their water use The average consumption of water per residential connection. (• 1 March 2021: Baseline established, and sector targets published in our next SOI • 30 September 2021: Report on target and publish targets through to 2024 in the 2021–2024 SOI)	Establish Baseline by 1 March 2022	Connections data and targets for residential water use have been identified, although we need to work through the requirement to ensure we capture apartment usage data as residential use, where and when it is appropriate (particularly as Auckland housing is densifying). This litres per dwelling per day measure is intended to provide greater granularity in performance ie. where we need to make better progress (ie leakage, residential or commercial water efficiency) in order to meet our 2025 target of 253 litres per person per day (gross per capita consumption). This measure will be consistent with our 2021-2025 Water Efficiency Plan.

Capital	Measure	SOI Target	Commentary/Result
Natural Environment	Water is precious – We continue to encourage our customers to be mindful of their water use The average consumption of water per non-domestic connection. (• 1 March 2021: Baseline established, and sector targets published in our next SOI • 30 September 2021: Report on target and publish targets through to 2024 in the 2021–2024 SOI)	Establish Baseline by 1 March 2022	Three key areas have been selected for this measure, covering over half of commercial water usage in Auckland. Sector-appropriate water efficiency targets and methodology have been created and documented for these three sectors and the source data has been identified. This measure will take a long-term (5 year) rolling measure of water efficiency. This measure will be consistent with our 2021-2025 Water Efficiency Plan.

3. COMMUNITY AND STAKEHOLDER RELATIONSHIPS UPDATE

3.1 WORKING WITH LOCAL BOARDS

- Over the past month, workshop briefings were held with the Franklin, Whau and Albert Eden local boards providing information on local projects such as the Central Interceptor, Huia Watermain and Clevedon water and wastewater servicing. Other project information such as progress on resource consents was shared with the relevant local boards in the interests of no surprises.
- Water situation updates continue to be shared with the Local Boards and other elected members. Papakura Local Board joined the Mayor to officially commemorate the reinstatement of the Hays Creek dam water supply and the first stage of the Papakura water treatment plant.
- Several elected member questions were responded to following information that was shared on Watercare's price path and capital expenditure for 2021. These included questions on the progress and commitment to major infrastructure projects such as the Western Isthmus water quality improvement programme.
- Watercare and the other CCOs continue to meet with Local Board services staff from Council to discuss improvements to local board liaison in response to the CCO review findings.

3.2 WAIKATO DISTRICT COUNCIL (WDC) STATUS UPDATE

- Work has continued on the delivery of the DIA-funded reform projects. Desludging is now underway, and the filter media replacement at the Water Treatment Plants has commenced. The SCADA server relocation project is underway, and the design for the renewal of the Ngāruāwahia wastewater bridge rising main is progressing. John Mackie of the DIA is due to visit in March to review progress.
- The H&S audit was completed in February with positive feedback, and the report is expected in early March.
- All plants are meeting demand with no need for restrictions outside of Pokeno, Tuakau, and Southern District zones supplied by Hamilton City Council.
- An 8-hour power outage occurred in Ngāruawāhia, impacting the water treatment plant and several pump stations. The outage was managed with no impact to customers. A meeting is being arranged with the provider to discuss notifications for extended unplanned outages.
- All contractual KPIs were met in February, except urgent response time within 40min (41min). The YTD figure is within KPI at 36min.
- Works are continuing on the Meremere WWTP upgrade.
- The Te Akua water treatment plant is being decommissioned due to on-going challenges with compliance because of the small scale of the catchment (20 customers), and the source changed to tanker supply until a review and options analysis is completed (Due May). Onewhero and Port Waikato are also part of the review; these plants will not be compliant under the new draft water quality standard.

3.3 LEGISLATION & POLICY UPDATE (UPDATES IN BLUE)

- Public submissions on the Water Services Bill closed on 2 March 2021 and have been referred to the Health Select Committee. Watercare developed a joint submission with Auckland Council, and will present with Council to the Select Committee in late-March.

- Waste Management New Zealand ("WMNZ") notified a series of resource consent applications (including land use consents, discharge and water permits) to construct and operate a new regional landfill in Wayby Valley (Dome Valley). WMNZ are also seeking a Private Plan Change to include a new precinct which would be included within the Auckland Unitary Plan. This plan change would specifically recognise this proposed Auckland Regional Landfill. Submissions closed 26 May 2020, and Watercare made submissions on the resource consents and the Private Plan Change. Watercare neither supported nor opposed these applications, and has sought that any decisions avoid where practical, and otherwise minimise, potential adverse effects on our existing and future operations. The Hearing commenced in November 2020 and Watercare presented its evidence on 2 December. A decision by the Hearing Commissioners is expected by March/April 2021, and many appeals to the Environment Court are expected.

3.4 MĀORI OUTCOMES AND ENGAGEMENT

Kia ora te umanga

- Meetings with EPA staff re: Board of Inquiry process and Watercare 2013 application, mana whenua engagement.
- Register Māori owned businesses to Watercare procurement.
- Makaurau Marae Laundry services business opportunity.

Kia ora te reo

- Watercare Māori (Māreikura) staff cultural wānanga.
- Support Watercare Board Chair, Margaret Devlin, te reo māori me ōna tikanga. Assist staff with learning mihimihi, conduct, body language.
- Watercare CI project, GAJV and mana whenua cultural inductions, Māngere Training Centre.

Kia ora te whānau

- Support Maurea Marae, Rangiriri, Kiingitanga and Poukai.
- Support Amokura Panoho, AKLD Council re: Matatini festival in Tāmaki Makaurau, support from Watercare.

Kia ora te taiao

- Oruarangi Awa hui, Te Kawerau a Maki, Edward Ashby, Watercare Peter Nicoll, property and transfer of riverbed back to iwi.
- Watercare CI project, GAJV and mana whenua cultural inductions, Māngere Training Centre.
- CI Project, GAJV and mana whenua working group, CI project dedications and consenting management plans.
- Engagements with iwi regarding Waikato Awa water consents and documents Waikato 50 Project, Waikato Tainui, Te Taniwha o Waikato, Ngāti Te Ata, Ngāti Tamaoho and Te Ākitai Waiōhua. Mana whenua engagement at Waikato Treatment Plant, Tuakau with Waikato Tainui, Te Taniwha o Waikato, Waikato River Authority, Ngāti Te Ata, Ngāti Tamaoho and Te Ākitai Waiōhua re: Waikato 50 project temporary upgrade, consent processes and timelines: Papakura project consents, Pukekohe project consents and engagements.
- Meremere wastewater discharge consent, Ngāti Naho kaitiaki.

Kia ora te hononga

- Relationship meeting Ngāi Tai ki Tāmaki, Deputy Chair, Billy Brown, CE Tama Potaka.
- Relationship meeting, Ngāti Tamaoho, Environment Manager, Carl Wawatai, former Chair, Dennis Kirkwood, and carving team.
- Relationship meeting with Ngāti Whātua Ōrākei, Alec Hawke, water issues and support for Americas Cup finals.
- Engagement with Ngāti Paoa, Haydn Solomon and kaitiaki Chrystal Cherrington.
- Support consents team with several consenting and policy issues regarding mana whenua and engagement.
- Watercare and Ngāti Whātua Ōrākei environment team meeting.
- Mana whenua managers Kaitiaki Forum February hui.

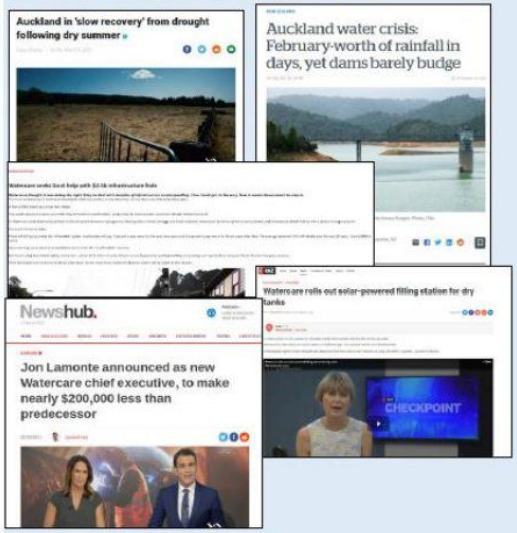
3.5 COMMUNICATIONS

Monthly snapshot of communications and stakeholder engagement

Enabling engaged communities and stakeholders

Media

Highlights this month include: our drought recovery efforts on Stuff and the Herald; our new mobile tanker filling stations on RNZ programme Checkpoint; the appointment of new CEO Jon Lamonte on Newshub and NZ Herald; and Covid's impact on our future spending on Newsroom.



Stakeholders

We continued to keep local boards and councillors informed about the water storage levels, consumption and water supply augmentation projects. Our Central Interceptor discovery centre made an appearance at the Big Gay Out event.

Enabling safe, happy and empowered teams

Staff

We promoted the innovative mobile water tanker filling stations which are a New Zealand-first, our presence at the Big Gay Out with water stations and a stand and the capability development programme, Future Stars. We also promoted the fundraising efforts of staff for Hospice and goods donated to charity Orange Sky.

Communities

Our water stations have been at more public events including: Big Gay Out; Blues Football Festy, Eden Park; Onehunga Community Festival; Ōtāhuhu Family Fun Day and the Pasifika Festival.

Big Gay Out was attended by more than 17,000 people and we provided water stations, as well as being part of the council group site where our Rainbow Network volunteers handed out almost 1000 shower timers and more than 200 notepads featuring water-saving tips.

Event attendees drank 767 litres of water from our water stations, which equates to around 1500 refills of a standard 500ml bottle.

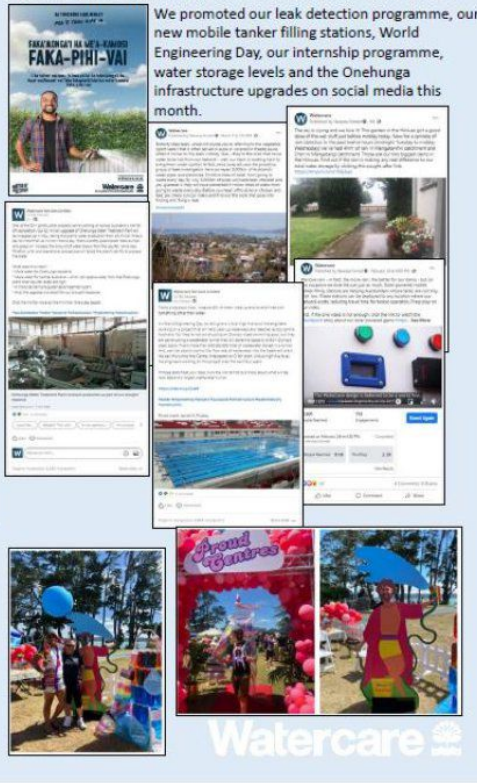
"The water stations were a great asset, worked wonders and were a life-saver..." – Big Gay Out event organiser

Enabling customer trust and value

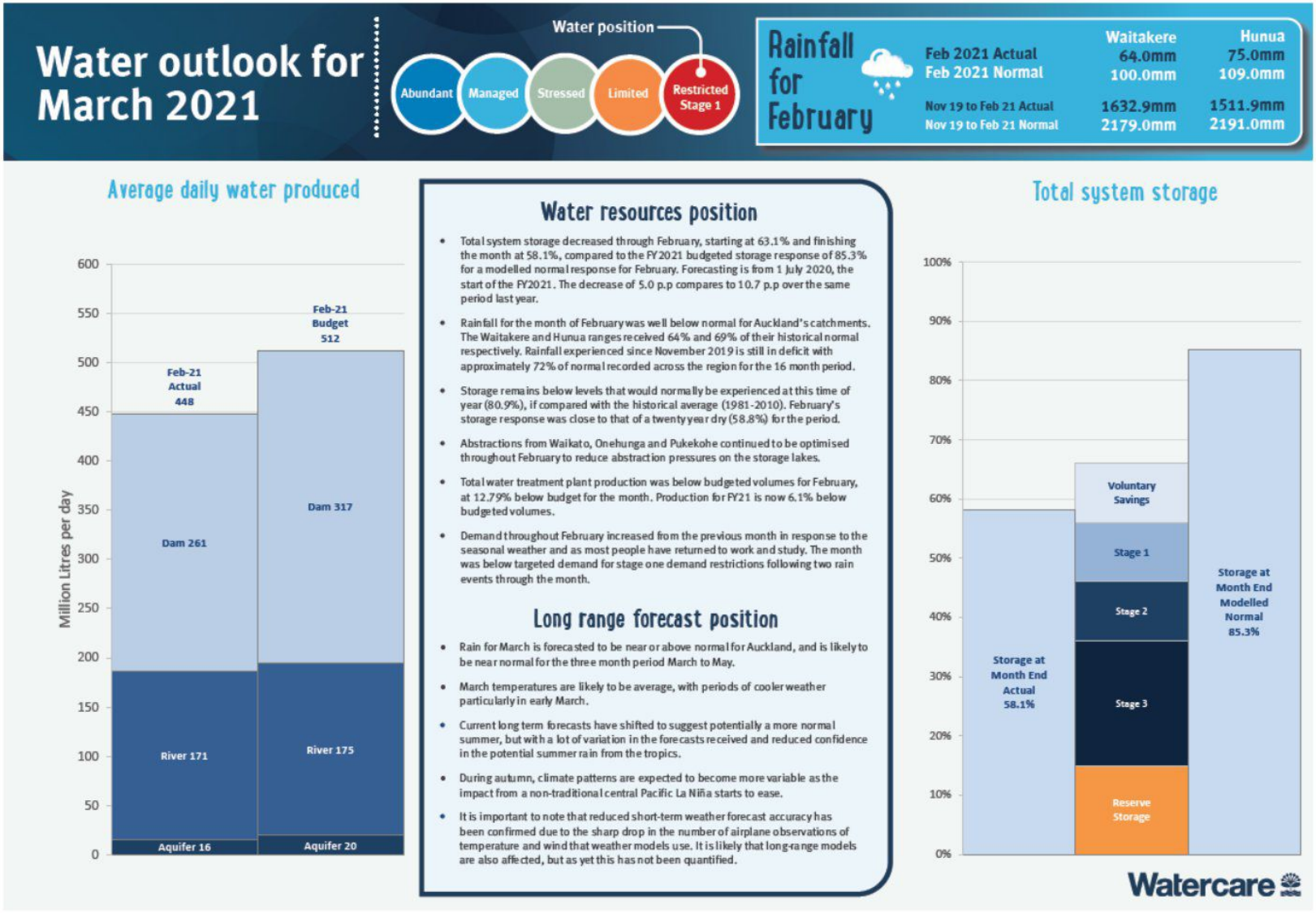
Customers

We began planning for the next phase of our water-saving campaign, while continuing to run advertisements and information in ethnic news media. We have an upcoming radio promotion for World Water Day.

We promoted our leak detection programme, our new mobile tanker filling stations, World Engineering Day, our internship programme, water storage levels and the Onehunga infrastructure upgrades on social media this month.



4. NATURAL ENVIRONMENT - Watercare's Drought Management Response



7.3

5. STRATEGIC CONSENTS

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
North East Wastewater Conveyance – Warkworth to Snells	New alignment, outside of road corridor, being consented for the NE wastewater conveyance project.	Existing resource consents apply where the project is within the park, and under the river, however a s127 is required to alter condition 1, to change the referenced plans. Additional resource consents are required for earthworks in the private properties.	The existing consents, gained in 2016 and 2019 provide for up to four pump stations on private land, and pipeline mainly within the road corridor. The proposed new alignment includes minor changes to works in Lucy Moore Park and the river crossing but moves the pipeline from the road corridor to being drilled at depth under private properties. Design investigation is progressing, and landowners have been approached. The new consents will be lodged as separate applications. The first application, for the works in Lucy Moore reserve, was granted in December 2020. An application for the works in private properties, where the launch pit is sited, will be lodged April 2021. This will enable these works to proceed while the final consents are being granted. Further applications for the full alignment will be lodged later in the year.	MULTIPLE APPLICATIONS AT VARIOUS STAGES	26/04/21	21/06/21	

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
Otara Catchment ww upgrade. (formerly called Otara WW capacity upgrades, Otara Sewer Diversion, 205R East Tamaki Road)	Medium and long-term wastewater improvements for the Otara catchment including re-use of the abandoned Hūnua 1 watermain, a storage tank adjacent to existing PS31, and a rising main option to follow the southern motorway.	Likely resource consents required for earthworks, vegetation alteration, diversion of water, structure in stream.	Consultation continues with Parks and the Local Board for the 3000m^3 storage tank and the proposed infrastructure in Billington Reserve. Kāinga Ora – Homes and Communities are proposing to develop their land on Billington Avenue (state housing subdivision). This provides an opportunity to purchase one or both of the residential sites at the head of the cul-de-sac and reconfigure the proposed elements that were to be erected in the Reserve onto one or both of the residential properties. This layout would be beneficial to all parties as it would remove the bulk of the structures from the reserve, open up the end of the street and entrance to the reserve, would allow easier construction and provide additional space if required at a later date. Watercare is currently negotiating with Kāinga Ora to purchase the property(ies). The alignment of the section of pipe through the property owned by George Weston Foods (Tip Top) or around the esplanade reserve that bounds this site is still being investigated. The final alignment has not been selected at this stage due to ongoing discussions with the landowner (who are Australia based). Consenting is on hold as the design concept is now under further investigation.	DESIGN UNDER REVIEW	TBC	TBC	
Papakura WTP – Discharge Consent	The Papakura WTP is being reinstated as a response to the drought.	Discharges to water	The temporary and permanent WTPs will require consents for discharge of off-spec water and stormwater into Hays Creek for both commissioning and operation. Consents for stormwater and off-spec water from the temporary WTP were granted in December 2020. The Temporary WTP is now in service. An OPW for the permanent WTP has been lodged and accepted. An application for the permanent WTP 'off-spec' discharge will be lodged late March 2021.	MULTIPLE APPLICATIONS AT VARIOUS STAGES	23/03/21	30/04/21	

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
Pukekohe WTP – Groundwater Take	The Pukekohe WTP is being reinstated as part of the drought response. The project includes renewing the existing groundwater and new spring permits.	Water take	A consent application for a ground water take was lodged with Council 21 August 2020. A formal s92 request was received seeking clarification on groundwater methodology and ecological matters related to the surface take. A formal response was provided to Council on 16 October addressing these matters. Draft conditions for the groundwater take consent have been reviewed by Watercare. Ngāti Tamaoho have queried the groundwater effects of the water take. Technical information has been provided to Ngāti Tamaoho with a formal response pending.	COUNCIL PROCESSING	21/08/20	26/03/21	
Pukekohe WTP – Spring Water Take	The Pukekohe WTP is being reinstated as part of the drought response. The project includes renewing the existing groundwater and new spring permits.	Water take	A consent application for a spring take was lodged with Council 21 August 2020. A formal s92 request was received seeking clarification on groundwater methodology and ecological matters related to the surface take. A formal response was provided to Council on 16 October addressing these matters. Council has issued a second s92 requesting more information on the ecological effects of the spring take. Watercare's response was provided on 4 November 2020. Proposed surface water take consent conditions have been prepared by Watercare and submitted to Council. The Council specialists have added additional conditions which need to be reviewed by Watercare.	COUNCIL PROCESSING	21/08/20	09/04/21	

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
Shovel Ready Projects – Dunkirk Road Wastewater Capacity Upgrade	Shovel Ready – New pump station, storage tank, bio filter and approximately 3 km of network in the road reserve from Dunkirk Road to Pilkington Road.	The new WWPS will require consents for infrastructure in a flood plain and overland flow path. Pipes mostly to be trenched in road with some small sections within parks and private property.	This Shovel Ready project is largely driven by Kāinga Ora growth, however there are also some existing level of service issues that will be resolved by the project. The business base for design and investigations was approved on 15 November 2020 with construction targeted to start from July 2021. Specialist reports to support the AEE are now being prepared, with lodgement of the application expected late March 2021. A pre-application meeting with Kāinga Ora specialist Council processing planners was held on 3 March 2021. Auckland Council Land Advisory Services have been notified that geotechnical investigations within Auckland Council Parks are planned for early April. Mana whenua consultation is ongoing.	APPLICATION PREPARATION	26/03/21	25/06/21	Currently aiming for construction start early July. Delays to Council processing of consent could postpone construction.
Waikato 'A' WTP Take, Discharges & Intake Structure	Water take, discharge and in-river works associated with a new supply from the lower Waikato River.	Water take and discharges to water.	A consent application has been lodged for an additional take and awaits processing by the Waikato Regional Council. We understand there are 103 applications ahead of ours to be processed. This application has now been “called in” and is covered below.	COUNCIL PROCESSING	23/12/13	TBC	

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
Waikato 'A' WTP, Water Take & Intake Structure – Board of Inquiry	Water take and in-river works associated with a new supply from the lower Waikato River.	Water take, occupation of riverbed	On 30 June 2020 Environment Minister David Parker "called in" Watercare's 2013 water take application from the Waikato River. The Environmental Protection Authority (EPA) administer the Board of Inquiry process. A three-member panel of commissioners has been appointed. The 2013 application has been refreshed to reflect new information. Watercare has fortnightly meetings with the Project Lead at the EPA to discuss progress, process and time frames. The refresh/amended application was submitted with the EPA on 11 December 2020. The EPA have concluded a completeness check of the application. The application was publicly notified on 12 February with public submissions closing 26 March. As of Friday 12 March, there were 14 submissions received with 8 in support and 6 opposed. Mana Whenua consultation is ongoing.	COUNCIL PROCESSING	11/12/20	12/11/21	

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
Waikato Interim (50MLD) WTP	An interim 50MLD WTP to be operational by May 2021.	Various Consents	Watercare has resolved to construct an interim WTP at the existing Waikato site to be commissioned by June 2021. The WTP will be independent of the existing WTP and will require the design and construction of a number of pieces of infrastructure. The proposal will include: • A new temporary intake structure which will be located adjacent to the existing intake structure. At this stage the location of the intake structure, including raw water pump, to be located on a floating barge adjacent to the existing intake structure and fixed into position either by fixing it to the riverbank, or by temporary piles. • A new 600mm diameter rising main from the intake structure to the temporary water treatment plant. • A new interim treatment plant with the capacity to treat 50 MLD of water, Treated Water Tank and Pump Station. Watercare met with WRC regulatory team 9 July 2020 to streamline the consenting process. The Project has obtained numerous construction-related consents: • Bulk earthworks • Contractors laydown area • Treated water raising main • Earthworks and stream works associated with the WTP • Raw water raising main • Geotechnical Investigations for the Water intake structure • Water intake structure (Floating Pump Station) • Commissioning discharge consent The only remaining consent has been lodged with WRC for: • Operational discharge consent	COUNCIL PROCESSING	23/12/20	30/04/21	

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
Waikato WTP Off-spec Water/ Stormwater/ Sparging Discharge Consent Replacement	Replacement of existing discharge permits from process, stormwater and air sparging to an unnamed tributary and the Waikato River.	Discharge to water.	The consents for the discharges from the existing Waikato River WTP expired in May 2017. An AEE and application for replacement consents was lodged in October 2016 and has been accepted for processing by Waikato Regional Council. All technical matters have been addressed with Council. The application has been placed on-hold pending the preparation of a cultural impact assessment by Waikato Tainui/Te Taniwha o Waikato (TToW). On-site meetings have been held in November 2019 on the project. A CIA in support of the application was received from TToW on 8 July 2020. The CIA and proposed conditions were provided to WRC on 10 July. WRC have provided draft conditions; these are being reviewed by Watercare operations team.	COUNCIL PROCESSING	26/10/16	30/04/21	
Western Water Supply Strategy	Upgrade or replacement of the existing Huia WTP. Includes: investigation of best location, new WTP; two new treated water reservoirs and associated pipelines.	Notice of Requirement, various regional consents.	The hearing for the resource consent application commenced on the 24 February 2020. The hearing was adjourned to allow for kauri dieback testing to be undertaken. The Commissioners appointed an independent facilitator to manage the discussions on how the testing for kauri dieback would be undertaken and then analysed. The company that all parties agreed should carry out the work has completed their surveying and forwarded their report on the testing to Watercare on 23 November 2020. A second round of discussions was held on 6 December 2020 to determine the appropriate kauri dieback protocols to be adopted. The hearing will be reconvened by Auckland Council on 14 April 2020. An Outline Plan of Works (OPW) for the construction of the plant and reservoirs was lodged on 20 December 2019. Watercare has agreed that the comments from the Council on the OPW can be deferred to the release of the decision of the resource consent application so as to allow for the alignment of the conditions for the two separate applications.	HEARING	24/05/19	09/04/21	

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
Westhaven - North Shore Boost Pump Station	Construction of a boost pump station for delivery of water to the south-eastern part of the North Shore through watermains NS 1 & 2.	Potential designation of site and consents.	The proposed site for the Boost Pump Station (BPS) has now been agreed with Panuku, the Local Board and Waka Kotahi, and is not opposed by Mana Whenua. The Project Team are working through Concept Phase investigations, including Geotechnical investigations and a Geophysical Survey of the underlying reef (Significant Site to Mana Whenua). Preliminary Design and Consenting is expected to begin in late March 2020.	CONCEPT DESIGN	02/08/21	29/10/21	

Project Name	Description of Activity	Reason for Consent / Designation	Note	Status	Lodgement Date (Target or Actual)	Decision Date (Target or Actual)	Consenting Impact on Project
Whenuapai and Redhills Wastewater Scheme	Provision of new wastewater infrastructure to provide for the proposed growth in Whenuapai. The infrastructure includes a new Brigham Creek wastewater pump station, 2km of rising main, and just over 1 km of 315mm rising main that will divert flow from Kumeu, Huapai, and Riverhead to the new pump station.	Notice of Requirement, various regional consents.	Watercare are providing infrastructure in line with the Whenuapai Plan Change, enabling growth in the north. The construction programme is two years long, completion due December 2023. Engagement with Mana Whenua commenced with a site visit undertaken in January 2020. The work is provided across 3 packages: Package 1 -The lodgement of this consent is due June 2021. A new location for the temporary pump station was agreed with the developer in September 2020, property negotiations are now proceeding. Design has been put on hold to resolve the options for the Massey Connector included in Package 2, but which will determine the termination point of the rising main under Package 1. The construction programme is 18 months long, completion due December 2022. To achieve this, resource consents need to be granted in August 2021. This is a risky target in relation to Council processing timeframes, but we intend to provide all draft management plans and assessments at time of lodgement. Package 2 - The lodgement of consent is due September 2021. A number of options are currently being considered for the Massey Connector pipeline. The preliminary design phase has been put on hold pending the outcome of the Massey Connector options assessment. Topographic surveys and Geotech investigations have been completed. The construction programme is 24 months long, completion due December 2023. To achieve this, resource consents need to be granted in December 2021. Package 3 - consenting tbc Geotech investigations and topographic surveys are underway. The construction programme is 6 months long, completion due December 2021.	APPLICATION PREPARATION	25/06/21	26/09/21	

6. ENTERPRISE MODEL

STATUS UPDATE AND OVERVIEW

The drought augmentation projects have progressed well and provided key delivery learnings that can be applied to the wider programme.

Prioritising and optimising the delivery programme to align with future AMP capital profile continues.

Procurement process to determine Enterprise Model Design Partners has commenced.

SUCCESSES TO DATE

EMA, Governance and Contract Deliverables

- Building on the strong alignment position agreed at the February governance meeting, the Joint Governance Board and Programme Control Group are to meet in March to review and commit to acceleration opportunities.
- Programme Control Group developing intervention processes, particularly at a contractual level, Value Capture framework and initiative roll out and adoption.
- The Wellbeing Health & Safety baseline measures have been approved by Joint Governance Board. The baseline is a significant advancement for wellbeing improvements and is likely to play a role nationally.

WORK ALLOCATION

- Programme wide construction partner allocation has been reassessed following allocation of drought augmentation projects. Individual projects are reviewed prior to design phase to ensure the best placed construction partner continues into delivery.
- The allocation will also be reflective of any programme adjustments arising from the prioritisation and optimisation process of the revised AMP capital profile.

PROGRAMME LEVEL OPPORTUNITIES AND OUTREACH

- Assessment of the drought augmentation projects digital delivery journey and the tools for asset management, construction delivery and digital design progressing well.
- Key supply chain initiatives identified. Market soundings and associated communication channels being established.
- Kāinga Ora Shovel Ready delivery programmes also provide opportunities for continuous improvement and learnings to be integrated into the wider capital programme.

- Watercare EM engagement sessions to Fulton Hogan and Fletcher project field crews continue. This was an opportunity to provide the field crews an EM update, encourage clever ideas to be fed back for continuous learning, and to launch the key “Mates in Construction” General Awareness training.

CARBON, COST AND WELLBEING BASELINES

- Carbon: this baseline has been developed utilising a Carbon Portal developed by Mott McDonald. This portal has been used internationally and modified for New Zealand. This is the first carbon baseline for an infrastructure programme in New Zealand. Our carbon baseline is 374,644 tonnes over ten years.
- Cost: this baseline is based upon the 2018 AMP and is $2.215 billion over ten years. This will be updated with the new capital programme.
- Wellbeing: this baseline is founded on three pillars of:
    - The New Zealand Workplace Barometer (Massey University)
    - Significant (High Potential) incident rate
    - Incident Severity

OPPORTUNITIES AHEAD

- An EM Joint Governance Board workshop to be held in March to identify the 3–5 key areas within the infrastructure delivery process that is either impacting cost, carbon and/or safety outcomes. These will be prioritised and resourced to deliver step changes in programme and/or project delivery.
- Supply chain and programme level initiatives are being coordinated with Watercare’s Supply Chain Team.
- Wider implementation of Enterprise Model and commercial principles through the Enterprise Model Framework and Project Management Frameworks.
- Implementation of KRA / KPI reporting structures for reporting against baselines and training regarding tools.
- The Watercare consenting team has successfully trialled an opportunity to leverage the Enterprise Model partnership to optimise the consenting process. This provided an opportunity for Watercare to understand how the Enterprise Model construction partners approach consenting in the field and how we can better approach consenting applications with Auckland Council. This opportunity can be widened out to other disciplines and teams.

RISKS & OPPORTUNITIES

There has been no material change in the risk and opportunities from the last report.

7. RESOURCE MANAGEMENT ACT COMPLIANCE

7.1 AUCKLAND COUNCIL

February 2021 Summary	Compliance proceedings	Nil	Environmental incidents of significance	0
	Category 4 non-compliant consents held by Watercare	0	Category 3 non-compliant consents held by Watercare	1

	Sep	Oct	Nov	Dec	Jan	Feb
Number of non-compliant consents held by Watercare in Auckland[1]	14	12	14	9	13	13
Number of non-compliant category 3 or 4 conditions[2] *Non-compliance where the result will have or has the potential to have an adverse or significant adverse effect on the environment, or where there has been a repeat of a lower score non-compliance.* *We would typically receive notification or have warning of a category 4 non-compliance well before we prepare this report.*	1	1	0	0	1	1
Number of non-compliant category 1 or 2 conditions[2] *Technical non-compliance with no more than minor potential or actual adverse effect to the environment. For example, reports provided after due date.*	12	9	14	8	11	12

Notes: 1 — excludes trade waste consents; 2 — excludes conditions duplicated across consents.

Area	Background and Reason for Non-Compliance	Summary of Current Actions	Current Self-Assessed Council Compliance Rating
WASTEWATER TREATMENT			
Helensville	The Helensville WWTP has had ongoing issues with the quality of its discharge to the Kaipara River. Tidal pond relining in 2020 addressed suspended solids and E. coli issues, but the effluent still has concentrations of ammoniacal nitrogen above the WWTPs consent limit Auckland Council has formally graded the WWTP a category 3 as a result.	• Oxidation pond desludging is taking place. This action will increase the residence time in the oxidation ponds and improve the treatment process. • It will take through to June–July 2021 to remove 500m^3 of accumulated sludge from the ponds. • Production staff anticipate it will take six weeks for the pond to settle. So, a return to compliance is not expected until late winter 2021.	3 – Ongoing non-compliance. No evidence of environmental harm.

7.2 WAIKATO REGIONAL COUNCIL

February 2021 Summary	Compliance proceedings	Nil	Environmental incidents of significance	Nil
	Category 4 non-compliant consents held by Watercare	Nil	Category 3 non-compliant consents held by Watercare	Nil

	Sep	Oct	Nov	Dec	Jan	Feb
Number of non-compliant consents held by Watercare in Waikato [1]	1	7	3	0	3	0
Number of non-compliant category 3 conditions[2] *Non-compliance where the result will have or has the potential to have an adverse or significant adverse effect on the environment, or where there has been a repeat of a lower score non-compliance.* *We would typically receive notification or have warning of a category 4 non-compliance well before we prepare this report.*	0	0	0	0	0	0
Number of non-compliant category 1 or 2 conditions[2] *Technical non-compliance with no more than minor potential or actual adverse effect to the environment. For example, reports provided after due date.*	1	4	3	0	3	0

Notes: 1 — excludes trade waste consents. Consents held by Watercare include the Waikato WTP, Pukekohe WWTP and associated pump stations, along with the Mangatangi and Upper Mangatāwhiri dams. The assets we operate for Waikato District Council are operated under consents held by WDC and are not included in this report. 2 — excludes conditions duplicated across consents.

8. DELEGATED AUTHORITY OF THE CHIEF EXECUTIVE

For the month of February 2021, there were two documents required to be signed by the Acting Chief Executive with the delegated authority provided to the Chief Executive by the Board in relation to deeds, instruments and other documents. Both were exemption certificates for the subdivision and disposal of surplus land.	**In February 2021, there were nine Capex/Opex contracts, over $100,000 approved by the Acting Chief Executive in accordance with the delegated authority provided by the Board.** • Cassidy Construction Limited – STPUK Pukekohe WTP Reinstatement - additional civil works • Beca Limited – 2021 Watercare Property and Infrastructure Material change & valuation • Cyma Limited – SoW for Control Systems Architect • Resource Co-Ordination Partnership – Watercare Planning Services (PM for Digester 3 accelerated refurbishment project) • Bluetree Solutions NZ Pty Limited – Budgeting and Forecasting solution using Infor d/EPM • Water Treatment New Zealand Limited – Design, Supply, Installation Support and Commissioning of BAC Contactors at Papakura WTP • Xylem Water Solutions NZ Limited – Te Kauwhata WWTP UV Unit Supply • Vector Limited – 74 Maybury Street, Point England • The Environmental Collective – Water quality sensors and ancillary equipment for use in a Watercare discharge consent project	**In February 2021, there were no capex approvals signed in accordance with the delegated authority provided to the Acting Chief Executive by the Board in relation to Capex approvals below a threshold of $15million.**

Board Planner 2020			Board Planner 2021											
		December	January	February	March	April	May	June	July	August	September	October	November	December
Meetings	Board	15-Dec 8am-11am (Teleconference) 23-Dec Public Board Meeting	29-Jan	26-Feb	30-Mar	29-Apr		1 June (May Results)	5-July (June Results) 29-July	30-Aug	30-Sep	28-Oct	30-Nov	14-Dec (Teleconference)
	Audit and risk committee			3-Feb			26-May			9-Aug 24-Aug		28-Oct		
	Te Tangata Komiti		27-Jan 3pm			28-Apr 10am			26-July 10am	19-Aug 10am			24-Nov 10am	
	AMP & Major Capex Committee			18-Feb 10am			20-May 10am			11-Aug 10am			18-Nov 10am	
	STP Committee													
	Committee for Climate Action			19-Feb 10am			14-May 10am			16-Aug 10am			3-Nov 10am	
	CCO Oversight Committee meetings	8 Dec (M Devlin)												
Events	Community and Stakeholder Relationships			TBC: Meet the Diversity & Inclusion Committee										
Governance	Charter reviews		Corpoate Governance charter				A&R Charter	Committee for Climate Action Terms of Reference		Corpoate Governance charter Te Tangata Charter				
	Policy reviews												Good Employer Policy	
	Risk report due to Council		Risk report (due to Council 22 February)			Risk report (due to Council 18 May)			Risk report (due to Council 23 August)		Risk report (due to Council 13 September)		Risk report (due to Council mid-November)	
	Enterprise Risk report to Board		Report to Board			Report to Board			Report to Board			Report to Board		
	Compliance		Statutory compliance			Statutory compliance			Statutory compliance			Statutory compliance		
	H&S Quarterly report			Oct-Dec 20 Report		Jan-Mar 21 Report			Apr-Jun 21 Report			Jul-Sept 21 Report		
	Shareholder interaction	Q1 briefing to CCO Oversight Committee TBC												
	Site Visits				Water sites CI sites									
Board Training	Board training & development	Privacy Law (once new laws are in place)		Mental Health & Wellbeing in the workplace		Personal Security - RISQ								
Business strategy	Strategic planning & Deep Dives													
Business planning	Key finance and business decisions	Auckland Council Draft Annual Plan - approve Watercare input^	Approve half year accounts	a) approve financials for Draft SOI including projected 21/22 price increases, b) approve long term financials for Auckland Council modelling		Auckland Council to notify Watercare of Group Treasury Interest Rate by 30 April	Present plan for Year End to A&R Approve Insurance Proposal Auckland Council and Watercare to review Treasury Interest rate by 31 May		Approval of 2020/21 Budget & updated SOI Financials	a) approve 2020/21 accounts, b) delegate final sign off of 2021/22 Annual Report c) Approve Auckland Council Reporting Pack		AMP		Auckland Council Draft Annual Plan - approve Watercare input^
	Statement of intent		2021/22 Letter of Expectation to be received	Draft 2021-2024 SOI for Board's review	Approval of Draft 2021-2024 SOI		Present shareholder SOI feedback at public meeting. Public Deputations received Final 2021-2024 SOI issued to shareholder		Final 2021/2022 SOI adopted by Auckland Council			2020/2021 SOI Results to be presented to Board at Public Meeting. Public Deputations received.		2022/23 Letter of Expectation to be received

* Statutory public Board meeting - deputations invited
^ Extraordinary Audit & Risk and Board Meeting to meet shareholder half year and annual report timeline

Report to the Board of Watercare Services Limited
Prepared for the 26 February 2021 Board meeting

8.2

Disclosure of senior executives' interests

Purpose			Team	
Information	Discussion	Approval	Prepared and Recommended by	Submitted
✓			**Rob Fisher** Company Secretary	**Marlon Bridge** Acting Chief Executive

Intellectual capital	People and culture	Community and stakeholder relationships	Financial capital & resources	Natural environment	Assets and Infrastructure
	✓	✓			

1. Purpose and context

One of key principles of good governance is transparency, and having an open and honest approach to working with the wider community. Watercare not only maintains an Interests Register for its directors (as required by law), but also voluntarily maintains an Interests Register for our senior executives.

2. The details

Watercare Services Limited's senior executives' Interests Register is set out below.

Senior Executive	Interest
Marlon Bridge	• Trustee – Te Motu a Hiaroa (Puketutu Island) Governance Trust • Director – WCS Limited
Rebecca Chenery	• Director – Lutra Limited
Shayne Cunis	• Director – The Water Research Foundation (USA)
Rob Fisher	• Deputy Chair – Middlemore Foundation • Trustee – Watercare Harbour Clean Up Trust • Trustee – Te Motu a Hiaroa (Puketutu Island) Governance Trust
Jason Glennon	• Director – Michaels Ave Investments Limited
David Hawkins	• Nil
Shane Morgan	• Committee Member – International Water Association, New Zealand • Director – Lutra Limited
Amanda Singleton	• Director – Die Weskusplek Pty Ltd (South Africa) • Trustee – Te Motu a Hiaroa (Puketutu Island) Governance Trust
Nigel Toms	• Director – TRN Risk & Resilience Consulting
Steve Webster	• Director – Howick Swimgym Limited

Report to the Board of Watercare Services Limited
Prepared for the 30 March 2021 meeting

8.3

Directors' appointment terms, committee memberships, and meeting attendances

Purpose			Team	
Information	Discussion	Approval	Prepared and Recommended by	Submitted
✓			**Rob Fisher** Company Secretary	**Marlon Bridge** Acting Chief Executive

Intellectual capital	People and culture	Community and stakeholder relationships	Financial capital & resources	Natural environment	Assets and Infrastructure
	✓	✓			

1. Purpose and context

This paper provides an update on:

- the tenure of the seven current directors of Watercare Services Limited
- details of the committees each director is a member of
- details of directors' attendance at Board and committee meetings over the calendar year.

2. The details

Table 1: We currently have seven directors
Our directors are appointed by Auckland Council.

Director	Original appointment date	End of term
Margaret Devlin (Chair)	1 November 2016	31 October 2022
Dave Chambers	1 November 2019	31 October 2022
Nicola Crauford	1 April 2014	31 October 2021
Brendon Green	1 November 2016	31 October 2022
Hinerangi Raumati-Tu'ua	1 August 2019	31 October 2021
Frances Valintine	1 November 2019	31 October 2022
Graham Darlow	3 February 2021	31 October 2024

Table 2: We have four committees to assist the Board in its corporate governance

Committee Chairs and members are appointed by the Chair. Attendance at Committee meetings by non-members is optional.

Director	Audit and Risk	Te Tangata	AMP & Major Capex	Committee for Climate Action
Margaret Devlin (Chair)	*	✓	✓	
Dave Chambers		Committee Chair		✓
Nicola Crauford			Committee Chair	✓
Brendon Green	✓			Committee Chair
Hinerangi Raumati-Tu'ua	Committee Chair		✓	
Frances Valintine		✓		✓
Graham Darlow	✓		✓	

**Board Chair attends in ex-officio capacity*

Table 3: Attendance at Board and committee meetings in 2021 is detailed in the table below:

Board member attendance 2021	Attendance at Board meetings											Attendance at Audit and Risk Committee meetings					Attendance at AMP & Major Capex Committee meetings					Attendance at Te Tangata Komiti meetings					Attendance at Committee for Climate Action meetings			
	Board 29 January 2021	Board 26 February 2021	Board 30 March 2021	Board 29 April 2021	Board 1 June 2021	Board 5 July 2021	Board 29 July 2021	Board 30 August 2021	Board 30 September 2021	Board 28 October 2021	Board 30 November 2021	A&R 3 February 2021	A&R 26 May 2021	A&R 10 August 2021	A&R 24 August 2021	A&R 28 October 2021	AMCC 18 February 2021	AMCC 16 April 2021	AMCC 26 May 2021	AMCC 11 August 2021	AMCC 18 November 2021	TTK 27 January 2021	TTK 28 April 2021	TTK 26 July 2021	TTK 19 August 2021	TTK 24 November 2021	CCA 19 February 2021	CCA 14 May 2021	CCA 16 August 2021	CCA 3 November 2021
Margaret Devlin	✓	✓										✓					✓					✓								
Nicki Crauford	✓	✓															✓										✓			
Brendon Green		✓										✓															✓			
David Thomas	✓	✓										✓										✓								
Hinerangi Raumati-Tu'ua												✓																		
Dave Chambers	✓	✓																				✓					✓			
Frances Valintine	✓	✓																									✓			
Graham Darlow		✓																												

8.3