



greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

If calling please ask for: Democratic Services

6 October 2017

Wellington Regional Council

Order Paper for the meeting of the Wellington Regional Council to be held in the Nicholson Room, Copthorne Hotel, 100 Oriental Parade, Wellington on:

Wednesday, 11 October 2017 at 10.00am

Membership

Cr Laidlaw (Chair)

Cr Blakeley
Cr Donaldson
Cr Kedgley
Cr Lamason
Cr Ogden
Cr Staples

Cr Brash
Cr Gaylor
Cr Laban
Cr McKinnon
Cr Ponter
Cr Swain

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Public Business

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Report 17.393
Date 6 October 2017
File CCAB-8-1301

Committee Council
Author Dave Humm, General Manager Corporate Services/CFO

2017/18 Bulk Water Programme changes

1. Purpose

For Council to approve changes to the 2017/18 capital and operating expenditure programmes to enable completion of Waterloo water quality work in time to meet the region's summer demand.

For Council to authorise the drilling of a second exploratory bore to provide information to enable a decision to be made on the preferred alternative water source for Wellington and to approve additional 2017/18 operating funding.

2. Background (Waterloo water quality)

Safe and healthy drinking water is vital to the health and prosperity of our region and its people. In April 2017, Wellington Water started a formal investigation into the three positive *E. coli* test results received from the water drawn from the Waiwhetu Aquifer by the Waterloo Wellfield, and subsequently supplied by the Waterloo Water Treatment Plant. Permanent chlorination of the water supplied to parts of Lower Hutt City and Wellington City also started in April 2017.

During the investigations and following discussions with Hastings District Council, which was managing the Havelock North response, an emerging protozoa risk was identified which required a response. Investigations were undertaken to understand the risk, which has resulted in a special testing regime for protozoa and proposed modifications to the Waterloo Treatment Plant to ensure public health. Wellington Water has progressed this work in close consultation with Regional Public Health.

The Waterloo Wellfield Water Quality Contamination Investigations Report (August 2017) was completed in late July 2017 and provided to the Greater Wellington Regional Council (GWRC), other councils, and was subsequently released to the public. At its 10 August 2017 meeting, the Council (Report 17.281) approved both permanent chlorination and installation of ultraviolet (UV) water treatment at the Waterloo plant. This decision was required in order to ensure Council's continued compliance with the New Zealand

Drinking Water Standards 2005 (revised 2008) which it is required to do under the Health Act 1956. At the time, costs of the additional treatment and modifications at the plant were indicatively estimated to be \$5M.

Implementing UV treatment was fast-tracked due to the water contamination risk to the region’s bulk water supply customers. The project design and engineering options for UV treatment have evolved since late August. Wellington Water has been progressing the programme of work based on achieving sufficient treatment capacity by Christmas 2017, so that a sufficient quantity of safe and healthy water can be supplied, to meet the summer demand.

Four bores in the Waterloo Wellfield remain offline due to either positive *E. coli* test results, or high total coliforms. With the UV system operational Wellington Water is able to reinstate these bores.

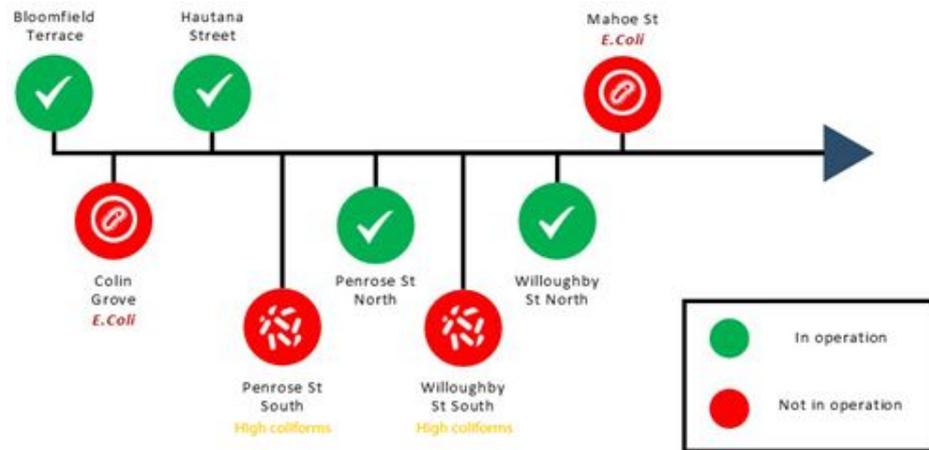


Fig 1: Current operational status of the Waterloo Wellfield

The two biggest production bores are Willoughby Street and Penrose Street South. Including these bores are vital for the availability of drinking water to meet peak summer demand.

3. Comment (Waterloo water quality)

The design of the water treatment approach at Waterloo is based on permanent chlorination of the Lower Hutt City network and UV treatment of all water from the plant, which supplies customers in Lower Hutt City and Wellington City. This approach aligns with international best practice.

The eight bores on the ‘Knights Road spine’ source water from the Waiwhetu Aquifer to the treatment plant. When the pumps in the bores first start-up, they generate misty water, which cannot be treated effectively by the UV plant. This initial ‘pump start-up water’ needs to be diverted away from the plant until it runs clear. It is important to note that the pumps supplying Waterloo treatment plant stop and start throughout the day to meet the regional demand, resulting in a significant volume of start-up water. Furthermore, misty water on pump start-up is a normal operational characteristic of ground bores.

The use of the term 'misty' is potentially misleading as the water is unlikely to have any aesthetic difference when compared to clear water. However, the UV system requires water to be clear of particles in order to be effective against the potentially harmful organisms that could be shielded by these particles.

The 'misty' aquifer water that is unsuitable for UV treatment needs to be diverted away from the treatment plant to a waterway. Initial design assumptions made by Wellington Water in July 2017 were on the basis that the volume of start-up water could be diverted to the Opanu stream or stored within the treatment plant. Given the capacity limitations of the Opanu stream and the finite physical space at the treatment plant this initial assumption proved to be incorrect. This was discovered through the detailed design phase in mid-August 2017.

4. Reasons for change in costs (Waterloo water quality)

At the 10 August 2017 Council meeting, Wellington Water signalled that the capital cost associated with the full treatment at Waterloo was in the region of \$5M in 2017/18. As the programme of work has progressed the costs associated with the diversion of the 'pump start-up water' escalated quickly. Multiple approaches to managing the significant volume of water were considered during the design phase. However, the only viable option (from an engineering and consenting perspective) involves the construction of a 1.5km pipeline from the bore field to Te Awa Kairangi / Hutt River.

Initial scope of the UV treatment system was based on storing unsuitable water at the treatment plant, and diverting manageable volumes to the Opanu Stream. This was the basis of the \$5M indicative cost.

A full options analysis concluded that water unsuitable for UV treatment should be diverted to Te Awa Kairangi / Hutt River via a new pipeline. This has increased the cost of the water quality programme to \$11M, including contingencies. The new pipeline to the river also introduces a new resilient pipeline into our critical network, and has the capability to meet the workings of the plant into the future.

The pipeline will divert aquifer water directly to Te Awa Kairangi / Hutt River from the Knights Road area. The water will be entirely contained within the pipe and water entering the river will therefore be of the same quality as the abstracted groundwater. The Waiwhetu Aquifer is fed by river-water seeping down into the ground, and the pipeline will be transferring river water back to river water.

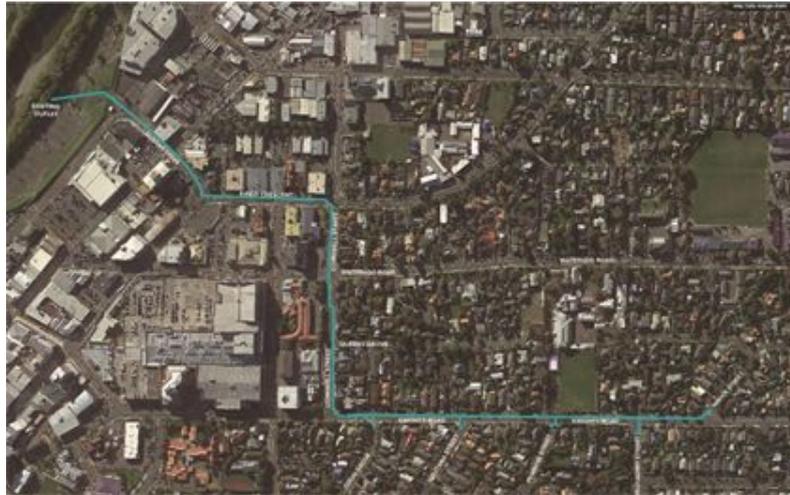


Fig 2: Route of 1.5km pipeline to enable UV treatment to be effective

5. Risks of not completing the upgrade (Waterloo water quality)

Wellington Water has been progressing this project on the basis that the Waterloo treatment plant will be equipped to continue supplying safe and healthy drinking water. Not completing this project as soon as possible generates the following risks:

- Supplying drinking water with the risk of protozoa
- Not being able to supply water to meet summer demand.

The UV installation at Waterloo comprises two units. The first unit will be fully operational by mid-October, supplying most of Lower Hutt City and parts of Wellington City. This first unit has capacity to meet the spring demand, and ‘pump start-up’ water can be managed with existing water supply infrastructure.

The second unit (combined with the first) will be capable of effectively treating the volume of water required to meet the summer demand, and does require water to be diverted to Te Awa Kairangi / Hutt River via the proposed pipeline.

The optimisation of the region’s bulk water supply system requires careful management to ensure that demand is always met. Figure 3 below illustrates the importance of suitably equipping the Waterloo treatment plant by Christmas 2017 to enable it to continue to provide safe and healthy drinking water.

The financial implications of the proposal for the 2017/18 bulk water programme are provided in section 9.

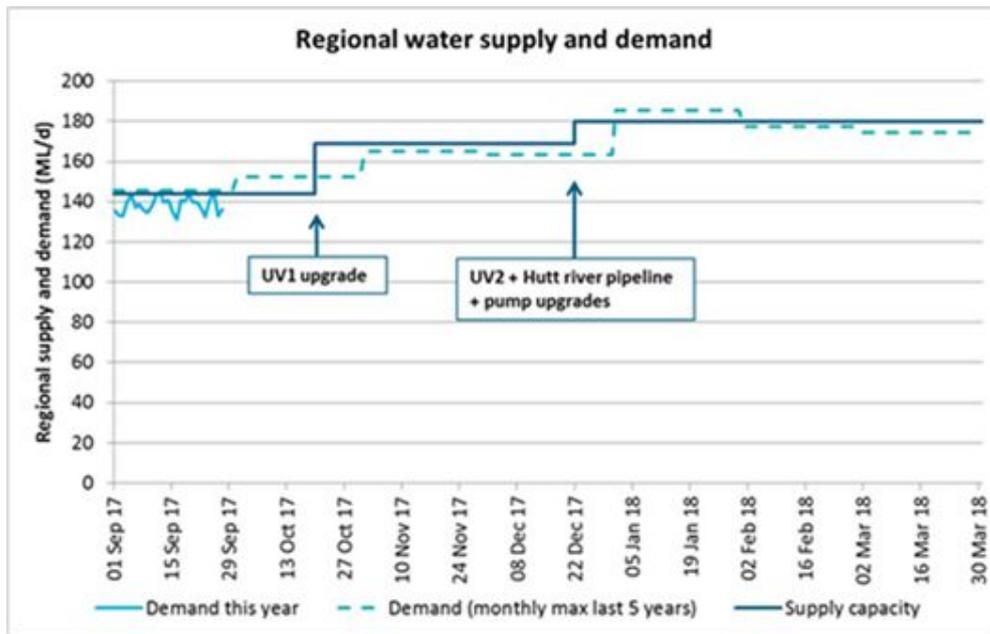


Fig 3: Meeting summer water demand

6. Resource Management Act consenting

An application for resource consent and assessment of environmental effects is due to be lodged with Council in early October. A land use consent is required for the outfall structure that will enter Te Awa Kairangi / Hutt River. The consent application covers the potential effects on flood defences, and flood flows. Wellington Water's view is that the effects are no more than, or less than minor, but this determination will be made by GWRC after the application is lodged for processing.

Meetings between Wellington Water and GWRC Flood Protection have discussed the proposed design of the pipework through the Riverside Car Park stopbank including the alignment, depth of cover, and measures to ensure the stopbank's integrity would not be compromised. The option to provide a water supply via the outlet structure for the future RiverLink scheme was also discussed. GWRC Flood Protection indicated that it had no objections to the proposed works subject to approvals being formally sought for Affected Party, Section 176 and Landowner Consent.

Written approval pursuant to section 95 of the RMA is currently being sought from GWRC flood protection. The remaining approvals outlined above will be submitted in the week commencing 9 October 2017. Approvals are likely to take one week to confirm.

An information document outlining the design approach was shared with Ngāti Toa and Te Atiawa – Taranaki Whānui in September 2017. It is viewed that the

issue of the mixing of waters and the mauri/mouri is not applicable. There is no issue with inter-catchment transfer as the water source is the Te Awa Kairangi / Hutt River catchment, the aquifer comes from that same water source, and is ultimately returned to that source.

There are no other potentially adverse environmental effects relevant to the pipeline and associated works.

7. Alternative water source for Wellington

Wellington Water’s Water Supply Resilience strategy identified the need for a resilient water supply, as it is anticipated that after a major seismic event much of the eastern and southern suburbs of Wellington City (including the CBD) could be without water for up to 100 days.

The philosophy of the resilience strategy was set to ensure dual water supply to all cities to deliver on the emergency levels of service for the region.

The Cross Harbour Pipeline (CHP) project included in the GWRC Long Term Plan can achieve this resilience outcome sought for Wellington City.

As part of the development of the CHP, Wellington Water has identified a potential alternative (Offshore Bores) that may deliver the outcomes sought for the city’s water supply. GWRC supported the idea to explore the Offshore Bores’ viability by investing in the exploratory investigations. Wellington Water is pursuing the Offshore Bores project in order to have every potential water source in the Wellington Region’s bulk water supply area identified. The forecast for completion of the Offshore Bores project is significantly less than the CHP forecast of \$105M.

Table 1 below details the planned exploratory investigations. The project is currently progressing through Stage 1.

| Steps | Phase Name | Purpose |
|-------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Stage 1 - Exploratory Investigations | <p>Action: Complete 1-3 exploratory bores to confirm the presence of aquifer, and potential viability of bores project.</p> <p>Outcome: Understand the water quality and indication of the yield.</p> <p>Hold point: Analyse and report on the results. If viable continue with Stage 2; if not commence CHP development.</p> |
| Steps | Phase Name | Purpose |

| | | |
|---|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Stage 2 - Exploratory Investigations | <p>Action: Complete set of production and monitoring bores required for yield testing.</p> <p>Outcome: Understand the water yield and confirm the feasibility of the bores project.</p> <p>Hold point: Analyse and report on the results. If viable continue with the Harbour Bores option; if not commence CHP development.</p> |
|---|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 1: Exploratory investigations staging

8. Comment (alternative water source for Wellington City)

The first exploratory bore has now been completed. The first bore was successful in that it confirmed the aquifer extends across the harbour. But water quality and quantity standards were not met to enable development at this location. The information received indicates a shift in position may improve these elements. If this second location is successful then the cost of the Offshore bores option will go up \$5M due to the extra length of pipeline involved (this has been included in the latest cost estimate of \$60M).

The results can be summarised as follows:

- An aquifer layer was located at the estimated depth of the Upper Waiwhetu Aquifer
- Pump testing indicates this aquifer is linked to the Waiwhetu Aquifer but has a lower than originally expected yield potential
- Laboratory testing confirms the Upper Waiwhetu aquifer is a fresh water source but has contaminants (Iron, Manganese, Ammonia) that will require high cost treatment
- Other gravel layers and Aquifer (Moera) were identified below the Upper Waiwhetu Aquifer.

In summary, although the first exploratory bore has not been successful it has provided sufficient information to enable Wellington Water to make a recommendation to proceed with the second exploratory bore.

The reason for the recommendation is the analysis suggests that the quality and yield will improve at the new location (bore 2). The reasons for this are due to the proximity to the subterranean channel, the expected thickness of the aquifer and potential improved water flow and quality.

Furthermore, the information indicates that the next location will help Wellington Water form a conclusive picture of the aquifer. This will assist decision making on the viability of the Offshore Bores project. It also means that exploratory bore 3 will no longer be required.

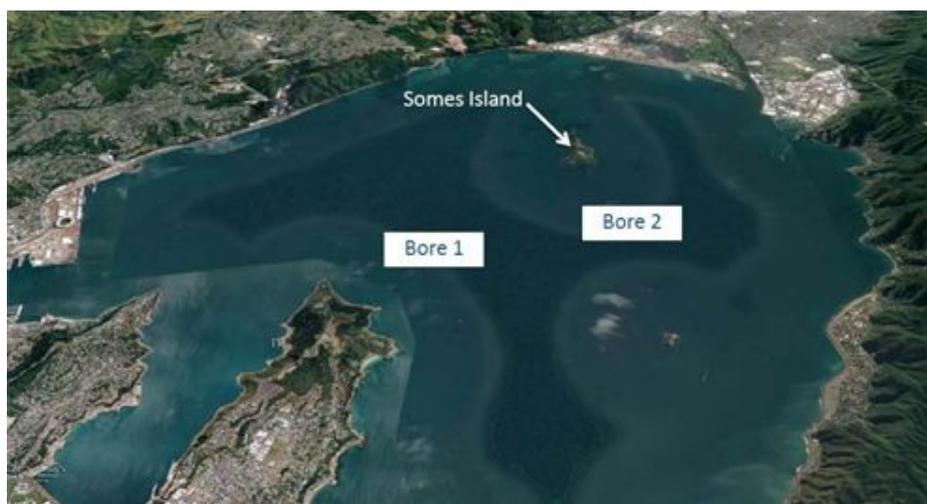


Fig 4: Bore 1 has been completed. Wellington Water recommends progressing to Bore 2

9. Reasons for change in costs (alternative water source for Wellington)

In the original analysis and design it was planned to undertake up to three exploratory bores. Wellington Water's budgeting was planned around a single bore, on the assumption that this bore would provide sufficient information to provide a recommendation on the preferred alternative source option. The change in the Offshore Bores budget programme is associated with the proposal to proceed with the second exploratory bore.

To complete the Stage 1 exploratory investigations (completion of bore 1, bore 2 and options analysis) additional operational funding is required in the 2017/18 financial year.

9.1 Next steps

- a) Complete bore 2 to finalise stage 1 of the exploratory investigations and reporting by December 2017
- b) Undertake the options analysis for the Cross Harbour Pipeline and Harbour Bores by January 2018
- c) Report back to Council with the findings of the options analysis by February 2018
- d) Commence the next phase of the Alternative Water Source project in financial year 18/19.

10. Financial implications

In total, an additional \$2.2M in 2017/18 capital expenditure funding is required above Water Supply's budgeted capital expenditure from the 2017/18 Annual Plan.

An additional \$3.7M 2017/18 operating expenditure funding is required above what is budgeted to complete the Offshore Bores investigation, and to maintain safe and healthy water from Waterloo.

Both the additional capital and operating expenditure will be funded by debt, the servicing costs of which will be funded through future bulk water levy charges which will be approximately \$0.5M annually.

10.1 Capital Expenditure (2017/18 programme)

The total estimated value of the Water Quality programme has increased from \$4.6M to \$11M. An additional \$6.4M in 2017/18 is required to complete the project, which will be partially funded from the reallocation of \$4.2m existing capital budget, with an additional \$2.2M required.

The reallocation of funding means that some planned water supply projects will be re-programmed into future years. Included in the reprogrammed capital expenditure is \$2.7M for the Offshore Bores project to fund a monitoring bore, which was originally budgeted for 2017/18, and is now planned to proceed in 2018/19 if the second exploratory bore results are successful. There is no significant impact on service delivery risk expected with these changes

Table 2 below summarises the overall impact on the 2017/18 capex programme:

| Project | Current Budget 17/18 \$M | Proposed Budget 17/18 \$M | Difference | Other 17/18 Programme Adjustment | 17/18 Budget Implications \$M |
|----------------------|--------------------------|---------------------------|------------|----------------------------------|-------------------------------|
| Water Quality Capex | \$4.6 | \$11.0 | -\$6.4 | | |
| Offshore Bores (CHP) | \$2.7 | \$0.0 | \$2.7 | | |
| | | | -\$3.7 | \$1.5 | -\$2.2 |

Table 2: Proposed impact on 17/18 operating expenditure programme

10.2 Operational Expenditure (17/18 programme)

As indicated in Wellington Water's paper to Council on 10 August 2017 (*Water treatment at Waterloo Treatment Plant (Report 2017.281)*) there are additional operational costs associated with increased investigation, monitoring, power and chemicals that are required to maintain safe and healthy water. These costs are now estimated at \$1.7M for 2017/18 with an ongoing cost of approximately \$0.5M for future years.

Financial planning for the Offshore Bores project was based on a single exploratory bore, with capital expenditure provision for a monitoring bore as a next step. The proposed requirement for a second exploratory bore means

additional operating expenditure of \$3M is required to complete the investigation phase.

Due to the size and nature of the investigative work, GWRC has debt funded the investigative phase of the project to date. The additional expenditure will also be debt funded and repaid over twenty years.

The net effect of these changes on the 2017/18 operating expenditure programme is shown in Table 3 below:

| Opex Project | Current Budget 17/18 \$M | Proposed Budget 17/18 \$M | Difference | 17/18 Programme Adjustment | 17/18 Opex Budget Implications \$M |
|-------------------------------|--------------------------|---------------------------|------------|----------------------------|------------------------------------|
| Additional Water Quality Opex | \$0 | \$1.7 | -\$1.7 | | |
| Offshore bores (CHP) | \$0 | \$3.0 | -\$3.0 | | |
| | | | -\$4.7 | \$1.0 | -\$3.7 |

Table 3: Proposed impact on 17/18 operating expenditure programme

11. Communication

Wellington Water has been working closely with the Council's regulatory teams and Hutt City Council with respect to the 'pump start-up' water diversion options and pipe route to Te Awa Kairangi / Hutt River to ensure resource consent requirements are understood and can be met

Wellington Water has kept their council customers up-to-date with all required work for UV treatment. Particularly the Hutt and Wellington City Councils which receive safe and healthy water from the Waterloo Treatment Plant. Wellington Water has also been working closely with Hutt City Council due to the impact on residents and traffic.

Residents in the Knights Road area will have access and parking affected by the construction works. Direct communication began in early September. Wellington Water's collaboration with the Hutt City Council's central business development unit will ensure commercial operators and retailers are fully informed of the construction schedule, and any potential effect on transport disruption.

12. Consideration of Climate Change

The matters requiring decision in this report have been considered by officers in accordance with the process set out in the GWRC Climate Change Consideration Guide.

12.1 Mitigation assessment

Officers have considered the effect of the matter on the climate. The construction work associated with implementing the new water treatment (UV units), and the additional electricity consumption of operating the treatment, will have some climate impact. Officers recommend that the effect is not considered significant.

Officers note that the matter does not affect the Council's interests in the Emissions Trading Scheme (ETS) and/or the Permanent Forest Sink Initiative (PFSI)

13. The decision-making process and significance

The matters requiring decision in this report has been considered by officers against the requirements of Part 6 of the Local Government Act 2002 (the Act).

13.1 Waterloo water quality

13.1.1 Significance of the decision

Officers have considered the significance of the matters, taking the Council's significance and engagement policy and decision-making guidelines into account. Officers recommend that the matter be considered to have medium significance.

While the Council is being asked to approve unbudgeted capital and operating expenditure to enable completion of Waterloo water quality work, this is to ensure that the Council is able to continue supplying safe water, which it is required to do under the Wellington Regional Water Board Act 1972 and Health Act 1956.

13.1.2 The decision-making process

Officers have taken into account the principles set out in section 14 of the Act and the need to manage the Council's resources prudently, and the fact that a response to this matter is urgent

13.2 Second exploratory bore

13.2.1 Significance of the decision

Officers have considered the significance of the matters, taking the Council's significance and engagement policy and decision-making guidelines into account. Officers recommend that the matter be considered to have low significance.

The Council has previously supported the idea to explore the Offshore Bores' viability by investing in the exploratory investigations. The Council is being asked to approve unbudgeted capital and operating expenditure to enable the investigation of a second bore.

13.2.2 The decision-making process

Officers have taken into account the principles set out in section 14 of the Act and the need to manage the Council's resources prudently. Investigating a second bore, while an unbudgeted expense, provides the opportunity to develop

additional resilience in water supply for the four cities in the Wellington Region.

14. Engagement

Engagement with Hutt City Council is being progressed with respect to the construction of the proposed Hutt River pipeline.

15. Recommendations

Water Quality recommendations

That the Council:

- 1. Notes that a full options analysis concluded that diversion of aquifer water needs to be to Te Awa Kairangi / Hutt River via a new pipeline. This has increased the cost of the water quality programme to \$11M.*
- 2. Notes that notwithstanding this increase in project scale, Wellington Water remains confident that customers receiving water from the Waterloo Treatment plant will have fully treated water to meet summer demand following completion of the Hutt river pipeline.*

Alternative water source for Wellington recommendations

- 3. Endorses completion of a second exploratory bore to enable a full options analysis to be completed in 2017/18.*

Overall impact on Council's 2017/18 programme

- 4. Approves the proposal to reprioritise capital programmes in the 2018/19 programme to manage service risk and cost to enable Council to operate to minimise impact on the bulk water levy.*
- 5. Approves an additional \$2.2M 2017/18 capital expenditure for Bulk Water above what was approved in the 2017/18 Annual Plan to complete the Waterloo Water Quality project.*
- 6. Approves an additional \$3.7M 2017/18 operating expenditure required above what was approved in the 2017/18 Annual Plan to complete the Offshore Bores investigation and to continue delivering safe and healthy water from Waterloo.*

Report prepared by:

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