

Report 12.584
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Committee Council
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Bulk water supply development 2012

1. Purpose

To outline development options for the bulk water supply system.

To obtain approval to purchase land at Kaitoke for future water storage lakes.

2. The decision-making process and significance

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

2.1 Significance of the decision

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

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. Officers advise that there is no process for making this decision explicitly set out in the Local Government Act 2002 or any other enactment.

2.3 Consideration of the options

The options for developing the bulk water supply are outlined in section 4, with additional detail in Attachment 1. The benefits and costs of the various options in terms of the economic, environmental, social and cultural well being of the community are covered in sections 4 and 6, and potential risks are identified in section 7.

The report clearly identifies that purchase of the AgResearch land is necessary to provide medium to long-term certainty of choice for decisions on water infrastructure development.

3. Background

The Council's Long Term Plan 2012-22 sets a way forward for water supply development. Two specific areas of work for 2012/13 are included

- Confirm the preferred option for a significant new water storage facility; (a dam on the Whakatikei River or a large storage lake at Kaitoke).
- Investigate options for an interim solution to increase water supply capacity from 2020.

This report addresses both of these points and other matters.

There is no immediate need to make a decision on a significant new water storage facility. Given the current uncertainty around population growth, water allocation and demand affecting development timing, there is significant advantage in keeping a range of development scenarios open, for as long as possible, but without being tied to individual projects or timings. The investigation of two medium-scale water storage options at Kaitoke can be advanced in the meantime, to prepare for a lower cost development to proceed more quickly, if preferred, when a development decision is needed.

Greater Wellington Regional Council currently holds an option to purchase land owned by AgResearch Ltd at Kaitoke for additional water storage and this option expires in December 2012. The option was extended in February 2012 and a second extension seems unlikely to be agreed to by the landowner.

This report provides information to assist in making a decision on whether or not to exercise the purchase option.

In previous work comparing the benefits of a dam on the Whakatikei River and a large storage lake at Kaitoke, it was recognised that the former had emergency supply benefits as it was closer to Porirua and Wellington cities than the Te Marua/Kaitoke infrastructure, and on the same side of the Wellington Fault. However if the suggested incremental development approach outlined in the report is adopted, it could be several decades before a Whakatikei Dam is constructed, and these benefits become available. Therefore a number of sites for potential emergency water storage reservoirs have been examined as outlined in the separate report 12.585.

Building new water storage infrastructure is a supply-side response. Equally important are the demand-side issues. GWRC and its customers are putting considerable effort into reducing demand. The decreasing per capita demand shown in section 2.2 of Attachment 1 is evidence of the success of this effort.

Evidence from other cities indicates that water use could be reduced further. GWRC and its customers are investigating what further actions may be viable based on current information. Our aim is to have developed this assessment by 30 June 2013.

Also not addressed to date is universal water metering, which many people have passionate views on, both for and against. The capital cost of water

meters to meter residential properties in the four cities is estimated at about \$80M, plus ongoing operational costs.

4. Options

4.1 Water source development – current situation

Provision of \$10M has been made in the Council's 2012-22 Long Term Plan (LTP) between 2017 and 2020 for a minor water supply enhancement to be available by 2019-20. Without enhancement, the security of supply standard may be breached at that time if there is no further reduction in per capita water demand. The current water supply development strategy allows for a large dam on the Whakatikei River to follow that minor enhancement, subject to gaining all the required approvals. The alternative is to develop a large storage lake (Lake 3) on farmland at Kaitoke, east of the Te Marua Water Treatment Plant.

4.2 Incremental approach to development

The recent reduction in per capita water demand has extended the period until water source development will be needed to 2019-20, based on projections of population growth. There is uncertainty in how water demand will trend in the future and projected population change sits within wide boundaries 10 to 20 years out. As a result, the next development may not be needed until some time after 2019-20 if total water demand does not increase as forecast. There is also uncertainty in what impact the Regional Plan review may have on the allocation of water resources

These uncertainties suggest that water supply development needs to be more adaptive to changing circumstances rather than embarking on costly large-scale infrastructure development as a first priority. An incremental approach to development, that retains flexibility in the timing and choice of future development options for as long as possible, will help defer the cost of large capital development until when necessary, and enable the Council to better manage its debt. Effectively the current generation would not be paying off debt incurred to meet the needs of future generations.

A number of water supply development possibilities are identified in Attachment 1 section 4, which represent an incremental approach to water supply development. This approach would provide choices in scale, development time and cost for the next stage of development, relative to the currently preferred option of a Whakatikei Dam. Decisions on the development of new capacity could be made closer to the time that it is needed with planning based on the revised Regional Plan and more current population projections and water demand information.

4.3 Additional use of existing sources

The Local Government Act 2002 Amendment Act 2012 requires infrastructure to be provided in the most cost-effective way. The most cost-effective way of meeting increased water demand would be through an increase in the use of existing sources and infrastructure. However, this approach would require

some change to the amount of water allocated to public water supply in the Regional Freshwater Plan. This plan is currently under review as part of the Regional Plan review process.

GWRC is exploring the use of a collaborative approach to identifying catchment-specific allocation limits, an approach that would ensure community participation in establishing an appropriate balance between the allocation of water resources for consumptive use and environmental values.

Any change to the current water allocations may provide more or less water for public consumption. If more water were to be allocated, the development of new storage would be deferred, and the cost to the community for future water supply reduced. It is not expected that any additional allocation would provide for more than three to six years of population growth. In the meantime, it is necessary to proceed with planning for new storage.

4.4 Medium-scale option – Pakuratahi Lakes

The possibility of two storage lakes at Pakuratahi, with staged construction and operated in a variety of ways, is outlined in Attachment 1.

Under current conditions, the first lake will need to be completed by 2020 to maintain the standard for security of supply that has been agreed with the community. This would normally require a decision to proceed by 2014, allowing six years to consent, design and build a lake. However, some of the lake investigation and design work could proceed in parallel with other processes, reducing the six year timeframe. A decision to proceed with construction could therefore be delayed until 2016.

If additional water from existing sources were available, then the first of the lakes may not be required for several years beyond 2020, and a decision to start construction works could be deferred accordingly.

4.5 Larger-scale options - Whakatikei Dam or Kaitoke Lake 3

Constructing the two Pakuratahi storage lakes would negate the requirement to complete the Whakatikei Dam or Kaitoke Lake 3 for several decades. Apart from ensuring the sites are available, a choice is not required at this time between the Whakatikei site and Kaitoke Lake 3. It is important that the availability of both options is preserved for a future decision. This involves both land ownership/tenure and appropriate Regional Plan provisions.

4.6 Other water supply infrastructure

As additional water storage is developed, there is an associated requirement for new or upgraded pumping stations in the distribution system. When the population reaches about 465,000 the Te Marua WTP will require upgrading from 140 to 180 MLD. This is currently projected for 2050. Exact dates for the upgrading work depend on a number of factors, but no further planning is required at this time.

5. AgResearch land at Kaitoke

The medium-scale option of the Pakuratahi storage lakes and the larger-scale development of Kaitoke Lake 3 both rely on the availability of the AgResearch land at Kaitoke.

Without access to the AgResearch land, the only viable development option known at this time is the Whakatikei Dam, which together with the associated reservoir would be on land already owned by GWRC.

The AgResearch land is one of the few areas of relatively flat land close to the existing water supply infrastructure that is suitable for significant off-river water storage. A relatively small part of the AgResearch land is on the south side of State Highway 2 and may also be suitable for water storage, but this has not been investigated.

The option GWRC negotiated to purchase the land expires at the end of 2012 and has already been extended once. Sale would be at market price and AgResearch are interested in leasing all or parts of the land back for several years. Currently, the farmed land consists of 10 blocks with a total area of approximately 206.6ha. Rateable value is currently \$3.775M. A map of the land is shown in Attachment 1.

From a strategic perspective, the land could accommodate three storage lakes of about 8,000 ML in total (excluding the land south of State Highway 2). This is 2.4 times the volume of the Stuart Macaskill Lakes.

Purchase of the land is budgeted for in the 2012/13 Annual Plan.

6. Community views and preferences

6.1 Council Long Term Plan process

As part of the Council's Long Term Plan consultation, the public were invited to respond to 11 specific issues. One of the questions was 'Do you support continuing to meet our commitments to provide long-term infrastructure for the region?' Over 1000 submissions were received and 88% said yes or indicated positive support through comments.

While Council infrastructure is wider than just water supply, specific comments about water supply were received. Submitters had a mix of views on the most appropriate form of additional water storage capacity for the future (dam versus lake storage). There was support for increased water conservation to defer the need to provide additional water storage capacity, for both economic and environmental reasons.

6.2 Consultation as part of Lake 3 feasibility study

In 2010, GWRC provided a letter to adjacent property owners and other potential stakeholders outlining the planned feasibility study for a storage lake on the AgResearch land, at its western end. Potential stakeholders were identified as local iwi (Wellington Tenth Trust and Taranaki Whanui Inc.), the Department of Conservation and NZ Transport Agency, local residents and

recreation groups. Information on the feasibility study was also placed on the GWRC website, including a list of frequently-asked questions, with answers.

As part of the feasibility study, URS Consultants carried out preliminary consultation, including an open session presentation of a possible storage lake development on the AgResearch land. Favourable responses were received from residents on the recreational opportunities that might be available through GWRC ownership of the land and development of a lake. Favourable responses were also recorded on the use of the land for a storage lake. Concern was raised about the impact that a storage lake may have on the water take at Kaitoke and the potential for dam break and flooding.

Meetings were also held with the Wellington Tenth Trust (owners of adjacent land), Department of Conservation (DoC) and NZ Transport Agency (NZTA). Wellington Tenth Trust expressed interest in the project. DoC concurred that the land was a highly modified environment but identified fish migration as the most significant aspect of the development.

6.3 Discussions with Customers

Preliminary discussions (May and November 2012) have already been held with water supply/infrastructure managers of the four city councils about developments for the bulk water supply system in the Te Marua/Kaitoke area and the possibility of building one or more water storage lakes. They are in support of the investigation work so far.

If the Council confirms the incremental approach to water source development then further discussion can be held with the four city customers

6.4 Further consultation

The 2012-22 LTP provides a sum for purchasing the AgResearch land at Kaitoke and \$10M for water supply development prior to 2020. Further consultation, once a detailed proposal is available, will be included in a future LTP or Annual Plan.

7. Risks

The incremental approach and each of the possible water supply capacity development possibilities carries elements of risk as discussed below.

7.1 Additional use of existing sources

There is uncertainty about the outcome of the Regional Plan review and the collaborative process under development by GWRC to determine the future allocation of water resources. In the event the outcome is less water for public supply, then building new infrastructure to store water would need to be brought forward, depending on the demand for water and population change. In such a case, it is expected there would be a transition period from the old to the new allocation to allow for the construction of the infrastructure.

7.2 Medium-scale option - storage lakes at Pakuratahi

No feasibility study, including environmental studies, has yet been conducted at this site, so unknown risks may be present. However, from the information available it seems unlikely that the construction of the storage lakes will present any significant environmental risk, apart from the normal issues of dust and contaminated runoff during earthworks construction. These would be managed in the best possible way. The layout of the lakes would avoid any impact on the Kaitoke Stream.

The lakes would be clear of the Wellington Fault, so movement of the fault would not have a significant effect. However, the pipeline that would connect the lakes to the existing pipeline near the Kaitoke weir crosses the fault and would be disrupted if the fault moved.

Since the water taken would be within the provisions of the current consent, the storage lakes concept is thought to have a very low environmental impact. There are few houses on land below the lakes, so the consenting risk is considered to be relatively low.

7.3 Larger-scale storage lake at Kaitoke (Lake 3)

There are several risks inherent in this project.

Diversion of the Kaitoke Stream is required and a tunnel is currently proposed to accomplish this. The tunnel would probably cross splinters of the Wellington Fault, which may create problems during construction. Tunnelling is itself a risky activity and significant cost over-runs could easily arise. There is also a small risk that the tunnel or the intake to it could be blocked by debris during a large flood. Since no secondary flow path is available the stream would back up, initially blocking SH2, then potentially flooding houses upstream. Consent to divert the stream would also be required. Preliminary studies suggest that the stream ecology is of low value and diversion of the upper section may not be an issue. However no in-depth study has been undertaken and issues may arise that make the consent for this diversion difficult and costly to obtain.

There is a possible seismic fault under the two embankments. The fault is an “inferred” fault, meaning that its presence has been inferred from topographic features, and there is no hard evidence that it actually exists. The consultants who undertook the feasibility study are confident that the embankments could be designed to survive a movement of this fault if it does exist. The implications of failure of the downstream embankment are not too serious as there are (currently) few houses or other developments downstream. However, should the upstream embankment fail there is a very high risk that several houses would be inundated by several metres of water.

Water for Lake 3 would be supplied from Kaitoke weir within the provisions of the current consent and returned to the Te Marua Treatment Plant using the same pipeline. This inlet/outlet pipeline would cross the Wellington Fault and would almost certainly be ruptured by a movement of the fault. There would be a risk to the water supply for the lake from any change to the water take consent conditions at Kaitoke weir.

7.4 Whakatikei Dam

The primary risk or disbenefit of the Whakatikei Dam is that it will have a significant impact on the terrestrial and aquatic ecology of the Whakatikei River valley. It is expected that consenting of the project would be difficult but achievable.

Visual and recreational impacts have been lessened, and recreational (swimming) opportunities provided, by moving the dam about 200m upstream of the previously identified site, around a bend in the river.

The Whakatikei Dam has other benefits by virtue of its location on the western side of the Wellington Fault. Its location will allow quicker recovery of the water supply into Porirua and Wellington Cities by around two weeks, following a major disaster such as a Wellington Fault earthquake. BERL Consultants have analysed the benefits of quicker business recovery in terms of the regions GDP and have estimated them to be worth \$227M, expressed as an NPV in 2008\$ and based on a 10% probability of a Wellington Fault earthquake in the next 100 years (as currently predicted by GNS Science).

7.5 Changes in demand

The demand for water can change at a greater or lesser rate than expected. Sharp fluctuations in demand occurred between 2000 and 2005, but total consumption and per capita demand has been decreasing since 2006. Having options available to increase supply capacity – that are planned and have preliminary work completed – allows a faster response to change in demand. Since the planning costs of any new infrastructure are a small percentage of the total cost, it is better to plan early rather than late.

8. Financial

A summary of option costs (refer Attachment 1) is:

- Further development of existing sources, up to \$10M
- Pakuratahi Lake 1 \$30M
- Pakuratahi Lake 2 \$26M \$56M
- Kaitoke Lake 3, including \$30M treatment plant upgrade \$120M
- Whakatikei Dam - Stage 1 \$157M
- Stage 2 \$41M \$198M
- Network pumping station upgrades (when required) \$20-25M

9. Discussion

While developing a large dam can significantly increase the security of supply, the current generation has to pay the financial servicing costs for future generations for capacity it doesn't need, even at low levels of annual debt reduction.

A development approach that utilises existing sources of water is the most cost-effective option to increase supply capacity, but whether such an option is available will not be known until the Regional Plan review is completed. However, a medium-scale option to increase the security of supply is available, (subject to completing investigations) in the form of Pakuratahi Lakes 1 and 2, with water sourced from the Kaitoke weir under the provisions of the current consent.

The \$30M cost for Pakuratahi Lake 1 is considerably less than development of the larger-scale Whakatikei Dam or Kaitoke Lake 3. While a Pakuratahi lake does not provide for as much demand growth as the other two options, it is much more affordable and will maintain the security of supply for at least 10 years. Because of the uncertainty in population growth and water demand, an incremental approach, rather than large scale approach, to the development of new water sources is recommended.

In order not to breach the security of supply standard, new water supply capacity is required by the summer of 2019-20. A continuation of the downward per capita annual demand trend, even at a lesser rate than at present, will push this date further into the future. Greater certainty of timing will be known after the next census and further review of an emerging downward trend in water use. The greatly reduced demand in 2011/12 may be a one-off event due to a poor summer and increased advertising calling for careful use of water while one of the Stuart Macaskill Lakes was empty for upgrading works.

By carrying out investigations and preliminary design for Pakuratahi Lake 1 now, the time from when a decision is made to proceed with a new storage lake to commissioning it will be considerably reduced. But that requires certainty that the land will be available when required, which is ideally achieved through ownership of the land.

The AgResearch land has the potential to accommodate the development of three water storage lakes with a total volume of 2.4 times the volume of the Stuart Macaskill Lakes. The purchase option GWRC holds to buy the land expires on 21 December 2012.

For the longer term, there is no need to make a choice now between the Whakatikei Dam and Kaitoke Lake 3, in fact there are benefits in delaying that decision. However, purchasing the AgResearch land locks in the ability to choose between these two large-scale options at a later date. And over the very long term, both options may indeed be needed.

10. Communications

A media release has been made to coincide with the release of this report to the public.

Identified stakeholders have been contacted directly about the recommendation in this report to purchase the land, and the further stages of consultation that would occur before any decision is made to construct water storage on the land.

If the Council decides to approve negotiations to purchase the AgResearch land at Kaitoke, then a media release would be appropriate following completion of the sale and purchase agreement.

The four city water supply customers will be advised of the Council's decision.

11. Recommendations

It is recommended that Council:

1. **Receives** the report.
2. **Notes** the contents of the report.
3. **Notes** that augmentation of water supply sources will be required by 2019-20 to maintain the security of supply standard, based on existing water allocation, current demand and population projections.
4. **Agrees** that smaller scale, lower cost solutions for water supply augmentation are preferred to a long term, higher cost Kaitoke Lake 3 or Whakatikei Dam.
5. **Notes** that small scale augmentation of the existing water sources may be possible, but any opportunity for augmentation will not be known until review of the Regional Plan is well advanced.
6. **Notes** that a medium term and lower cost augmentation solution potentially exists with Pakuratahi Lakes 1 and 2 on the AgResearch land, and a feasibility study on these lakes will commence in 2013.
7. **Agrees** that a decision on developing either the Whakatikei Dam or Kaitoke Lake 3 is not necessary at this time, and that it is important to retain the ability to develop either, or both, of these options in the future.
8. **Authorises** officers to enter into negotiations with AgResearch Ltd to purchase the 206.6ha block (more or less) of land at Kaitoke, and delegates to the Chief Executive the authority to enter into a sale and purchase agreement for the land within the sum identified in the 2012-22 Long Term Plan.

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Attachment 1 – Supporting information