Akaroa Wastewater Proposal Friends of Banks Peninsula Response to Officers Report

Presented to Akaroa Wastewater Hearing Panel 13 October 2020

1 Analysis of Submissions

The Officers report notes that the Friends of Banks Peninsula submission was endorsed by 324 people but does not place any additional weight on this support in determining weightings. This is almost the same number of people as the total number of submissions.

In the analysis of support for Land based options, the ranking made by those who supported Harbour Outfall as their first choice are added to those who supported Land based options as their first choice. The report then states, for example that that 92 people ranked Inner Bays as the #1 preference. This is incorrect. The people who chose Harbour Outfall in answer to the first question have not chosen Inner Bays as the #1 preference (or any other land option). The total number of people who supported Land based irrigation and the Inner Bays option as #1 is 72. This is 21% of submissions.

39% of these submitters did not provide further information to explain their choice. It is not known whether they have supported land based irrigation because they fundamentally do not want wastewater in the harbour, but without an understanding of the effects of what is proposed on the resident communities or the environmental risks involved because these are not listed in the consultation document.

As well as supporting reuse in Akaroa by irrigation to parks and purple pipe, many submissions requested a system that builds resilience to climate change, by using the treated wastewater to improve Akaroa's water supply and by removing stormwater and groundwater infiltration into the sewer system. The Officers Report is inconsistent in its recognition of this overwhelming theme.

2 Misunderstanding of the FOBP proposed solution

We provide a response to specific points in the Officers Report regarding the FOBP proposed solution, where these points do not accurately reflect the solution being proposed.

Please note the following fundamental aspects of the FOBP solution proposed:

1. Comprehensive repair/replacement of the Akaroa wastewater network to substantially reduce the volume and unpredictability of wastewater flows. Any suggestion of downsizing aspects of the Councils' proposed solution (e.g. the raw wastewater pond) are as a consequence of this anticipated reduction in wastewater volume

2. Land contact treatment (via a wetland or similar) of *all* treated wastewater flows, based on the same design parameters as the Council's engineers used when designing both the Akaroa and Duvauchelle proposals
3. Treatment of all wastewater flows to *potable standard*, such that all recycling options are safe for both public health and the environment
4. Eventual elimination of all wastewater disposal, whether to the harbour or to land

Many of the points raised below are a consequence of these aspects not being fully understood.

2.1 Retirement of the Takapuneke wastewater treatment plant

1. [8.4.3] indicates Council has already applied for consent to continue using the Takapuneke ***wastewater plant for eight years*****,** as required while the land-based disposal is developed (assuming all goes to plan)
2. The FOBP solution requires only the use of the existing ***outfall*** for this time; the plant would be redundant as soon as the new plant is commissioned, with a corresponding significant ***reduction in the time*** before the current low-quality discharge ceases

2.2 Buffer pond size

1. [8.4.4] suggests that FOBP is advocating a reduction in the amount of buffering, but this is not the case
2. FOBP suggests the buffer pond could be reduced in size on the basis of a more substantial reduction in I&I:
    a. wet weather "spikes" in volume would substantially reduce, and
    b. The overall wastewater volume being received would be lower
3. FOBP have made this suggestion because it could free up space for further wetlands. Alternatively, the raw pond could be retained at its current size, meaning lower flows (from reduced I&I) may further reduce the frequency of raw sewage network overflows.

2.3 Wetland retention times

1. [8.4.8] states that a retention time of 2-3 days is not supported by Ngai Tahu, yet the current proposal for Duvauchelle includes substantial wetlands, discharging to the Pawsons stream, with a 2-3 day retention time.
    a. The Duvauchelle scheme report states:
    "*Following engagement with Council, Ngāi Tahu and Beca/PDP the RBT proposal has been refined as follows (Akaroa Golf Club Master Plan Rev B 15th June 2020)*", and;
    "*A minimum of 2-3 days residence time in the wetland is provided to effect meaningful treatment and "passage through land" to address cultural concerns of Ngāi Tahu*"
2. [8.4.9] states that the wetland proposed in Option 1 for Inner Bays would normally have a retention time of around two weeks
    a. The PDP report on wetland performance indicates the 2l/s flow proposed is based on 2-3 days retention time
    b. A retention time of greater than 2-3 days only occurs when the wetland is flooded and becomes a storage pond

2.4 Cost of proposed solution Stage 2

1. [8.4.11] claims the cost of extending the purple pipe will be $6.4-$8.4 million
    a. We estimated costings based on the proposed harbour outfall (option 4) with the outfall itself removed and the overland pipe extended an additional 500m to the current outfall location. Total estimated cost is approx. $5m less than option 4 and $12-$15m less than option 1.

2.5 Stage 3a

2.5.1 Reverse Osmosis (RO)

1. [8.4.12] Refers to sections 6.5.1 to 6.5.5 regarding the practicality of reverse osmosis (RO)
2. [6.5.1] correctly asserts that the treatment currently proposed is of an extremely high standard ***except for nutrient (nitrogen and phosphorus) removal***. RO removes nutrients.
3. [6.5.2] highlights that RO is only used in areas that are very short of water, with contaminants discharged to the ocean
    a. The CCC water strategy reports that additional water supplies may be required for Akaroa and Takamatua due to climate change, so this is a real consideration.
    b. The problem of totally eliminating discharges to the ocean is a uniquely New Zealand issue; hence in other schemes (California, Singapore) they do not address this problem. However, FOBP agree that avoiding discharge of contaminants to the ocean is highly desirable.
4. [6.5.3] compares RO versus ultrafiltration. Because RO is an ionic (rather than purely physical) barrier, it removes substances that ultrafiltration does not, including:
    a. RO has much higher virus removal performance, including small viruses
    b. RO has high removal of dissolved nutrients (nitrates, phosphorus); ultrafiltration does not remove these
    c. RO has high removal of other chemicals including hormones, emerging contaminants and “forever chemicals”; ultrafiltration does not remove these
5. [6.5.4] makes statements regarding key issues with RO that are not an accurate reflection of the technology:
    a. The Officers report claims the additional energy required would be $80,000 - $120,000 (similar to pumping the wastewater to the Eastern Bays). This equates to approx. 1.7-2.5kWh per m3, which is significantly more than the Singapore scheme’s ***total*** energy consumption (including for microfiltration, RO and post-treatment) of 0.8kWh per m3 (approx. $NZD38,000 per year). We disagree with the Officers calculation.
    b. The Officers report claims 20%-40% of the water treated by RO must be discharged as waste stream and will carry all of the contaminants removed (“retentate”). Other schemes (including Singapore) report retentate rates of only 10-15%
    c. Recent research into “zero drain” water pollution treatment suggests that retentate can potentially be avoided altogether:
        - The RO retentate can be recycled back through the treatment plant, *as is proposed by Beca for the ultrafiltration retentate*. This is beneficial to the plant’s operation because it provides nutrients needed for the first stage of treatment (nitrification)

- The amount of contaminant present in the RO retentate will be *extremely small* compared to that produced by the ultrafiltration stage, with the exception of dissolved nitrates; these will be cycled back through the plant for further biological removal by digestion. Recent research suggests this has no impact on the plant's nitrogen removal performance
- Excess nitrates and other chemical contaminants present in the retentate can be reduced to solids (and removed with the sludge) using a number of well-known techniques including precipitation (via chemical dosing) and electro-biochemical removal. Removal of nutrients (phosphorus and dissolved nitrates) via chemical dosing has been previously proposed by Beca as an option if required.

a. In summary, the retentate issue is likely to be much smaller than the Officers Report suggests, if it exists at all
b. The Offers Report states that the clean water from the RO process would be "*no more culturally acceptable to discharge directly to water*".
    a. FOBP proposes that all of this treated water pass through a land contact treatment such as a constructed wetland to meet cultural concerns; there is no expectation that RO will make the water more culturally acceptable, only that it will make it more physically suitable for reintroducing into the receiving environment

6. [6.5.5] states that there is "no obvious benefit" in using reverse osmosis.
    a. The purpose of applying reverse osmosis is so that the treated wastewater can be re-used in Akaroa to alleviate water shortages, rather than disposed of via the harbour or onto land.
    b. FOBP assert that recycling Akaroa's water in this manner to alleviate shortages and reduce stress on stream aquatic life is a major benefit.
    c. The purpose of applying RO is to raise the quality of the reclaimed wastewater to a standard such that water recycling becomes feasible.
    d. FOBP would **not** advocate applying RO to wastewater that was being disposed of in the harbour or on land. FOBP's proposed solution aims to eliminate all such disposal.
7. [8.4.13] states RO may still not make the water potable and that further steps may be required to remove some contaminants such as pesticides.
    a. RO provides the highest level of contaminant removal practicable, including much greater removal of nutrient and chemical contaminants compared to ultrafiltration; Akaroa currently uses ultrafiltration to remove such contaminants from Akaroa's ***potable supply*****,** so the RO-filtered water may produce an *improvement* in potable water quality. Other countries (USA, Singapore) use RO to treat wastewater prior to standard potable water treatment such as UV and chlorination.
    b. While pesticide and other farm chemical residues might occur in wastewater, they may also occur in Akaroa's current raw drinking water supply since the Akaroa catchment has been farmed for most of the town's history, and exposed to farm chemicals.
    c. FOBP do not propose to directly return the treated wastewater to the drinking supply; it would be blended with raw water and undergo the same treatment as Akaroa's current water supply

2.5.2 MAR

1. [8.4.14] states that MAR is not a viable option. We have retained MAR as a *potential* part of the solution because:
    a. The MAR feasibility study was terminated because of risk to drinking water supplies, but FOBP are proposing to treat the wastewater to potable standard first, so there would be no contamination risk, and
    b. The MAR feasibility investigation suggested it was feasible, but was terminated before physical testing was carried out
    c. MAR is not a critical component of the solution

2.5.3 Coastal infiltration gallery

1. [8.4.16] indicates that a coastal infiltration gallery lacks support
    a. We have included this idea as an alternative to using the existing outfall in the event that it is more acceptable to all parties overall; it is not a critical component of the solution
    b. We note that when this idea was consulted on in 2016, it was in conjunction with a lower treatment standard (including bypass flows).
    c. We also note also that CCC propose two coastal or near-coastal outflows (via streams): from the wetland at the Duvuachelle golf course, which will discharge 200-300m upstream from the shore after similar wetland treatment, and the wetland at pond site 10, which will discharge into the Childrens Bay stream approx. 500m upstream from the shore. Both of these discharges are into shallow bays.

2.5.4 Feasibility of Stage 3A

1. [8.4.17] states that Stage 3a is not considered a feasible option
    a. For the reasons given above, FOBP regard Stage 3A as a technically feasible option
    b. Stage 3A eliminates all direct disposal of treated wastewater
    c. Stage 3A provides substantial benefits to Akaroa from water recycling, and warrants further investigation.

2.6 Stage 3B Extended purple pipe (alternative solution)

1. [8.4.18] cites the current lack of regulation as a barrier to recycling treated wastewater. However, it would be several years before this option needed to be put into place.
    a. We note that since other regions (such as Auckland) are increasingly signaling the need to recycle water, it is not unreasonable to suggest that the legislation will be developed in the near future
    b. FOBP have proposed this option as a fallback in the event that Stage 3A does not proceed, since it provides a lower level of water re-use than stage 3A, but is not reliant on treatment to a potable standard. It is not part of the core solution

2.7 Stage 4 potable supply recharge

1. This stage is included as the final, logical step to complete a closed-loop water cycle.

8.4.14 and 8.4.21

2. [8.4.20 and 8.4.21] refer to issues regarding protection of water sources.
    a. The water being returned to the supply (via the stream) will be of *potable standard*, *prior to being treated by the Akaroa supply water treatment plant*.

b. This is the same as is done in Singapore with a portion of their recycled NEWater. In Singapore they note that the quality of the recycled water exceeds that of the raw feed.
c. As noted for 8.4.19, this option would be some years away, and there is a growing awareness in New Zealand of the need to recycle water to address future shortages, so it is likely that legislation will move in this direction

3. [8.4.22] suggests there will be cultural concerns:
    a. All of the water being returned to the stream/supply will have passed through a land contact treatment such as a wetland
4. [8.4.23] suggests it is contrary to Council's Te Wai Ora o Tane Integrated Water Strategy re protecting groundwater from contamination
    a. The water being returned to the supply (via the stream) will be of *potable standard*
    b. In contrast, the Council's preferred option of irrigation to land is expected to significantly increase leaching into groundwater, and the Duvauchelle tree trial report confirms that, even after the first three years, nutrient build-up in the soil increases nitrate leaching into groundwater.
    c. ***Thus, the Council's preferred option is expected to increase groundwater contamination***, whereas the return of potable water to the stream is not.
5. For the reasons given above, we believe that Stage 4 (indirect potable reuse) is feasible, and should be investigated further.

3 Other disputed statements

3.1 Inflow and infiltration

1. [6.3.4] suggests that new testing approaches mean they are hopeful of achieving a much higher I&I reduction that the "traditional approach of lining the pipes". This is at odds with the Beca report, which states that the issue is that repairing/replacing targeted faults (*rather than relining or replacing the pipes)* has limited success because groundwater rises and other faults will appear, i.e. the problem is the scope of repair, not the ability to locate the faults. They conclude for this reason that 20% is a valid target for this approach
    - FOBP advocate lining pipes in the lower part of Akaroa or replacing the lower section with a sealed, pressurized system, to eliminate I&I as far as possible at an achievable cost.
    - FOBP recognizes that this will cost more than piecemeal repair, and advocates *adding* the Government grant to the already budgeted funds. This provides a total of $6.2 m enabling a comprehensive approach such as lining or partial replacement with a sealed system, and for this work out to be carried out *prior to* sizing the rest of the system. In this way the I&I reduction cost will be offset by a reduction in later costs.

3.2 Protecting the harbour

1. [7.3.2] asserts that discharging treated wastewater to land protects the harbour
    a. The Duvauchelle tree trial demonstrates that for the land-based options an ***increase in nutrients leaching into groundwater*** is expected to occur.

b. Unlike a harbour outfall, where these nutrients are rapidly diluted and dispersed out to sea, with the Inner Bays scheme the nutrients will be discharged into a fresh water body and then travel to the harbour where they will meet the shallow Robinsons and Takamatua Bays and be absorbed into the clay bottom, adding to the nutrient load of these poorly flushing bays.
c. FOBP contend that this will be more detrimental to the harbour's health than a mid-harbour outfall.
d. FOBP's solution aims to remove as much nutrient and other contaminants to the harbour as possible, providing maximum protection to the health of the harbour

3.3 Climate change

1. [7.6.2] asserts that the land based options present a significant opportunity in achieving carbon offsets

a. The anticipated net carbon sequestration anticipated for Option 1 is similar to the total carbon emissions of around 10 houses, at a marginal cost (compared to a harbour outfall) of $7-10million. In contrast the same funds could purchase sufficient unproductive farm land to sequester the emissions of over 1,000 homes.
b. FOBP agree that carbon sequestration is a worthy goal, but the gains proposed are minimal in relation to the cost.

3.4 Risk of landslides and flooding

1. [9.6.2] asserts the land is suitable and will not create instability issues
2. Appendix L, Beca report (Thacker Site Robinsons Bay – Geotechnical Report) notes:
    a. A report by Tonkin and Taylor (2008) identifies areas of land instability in Robinsons Bay; this report does not cover the Thacker land [p4]
    b. Identifies instability risk and erosion in the alluvial soils at the river banks [p4]
    c. Increasing the moisture content near water courses or other slopes may cause the silt to slump following heavy rainfall or seismic activity [p11]
    d. Dispersive nature of the loess is likely to result in some localized erosion and potential instability in the higher areas [p11]

3.5 Property devaluation

1. [9.7.1] States that valuation information would need to be provided by a submitter regarding a reduction in property value.,
    a. Council has never informed or advised residents of this previously.
    b. Valuation advice was taken several years ago and indicated that devaluation would be expected by properties, with the degree based largely on proximity to the storage pond and irrigation fields.

2. [9.7.3] states that some community members have stated that large plantings of native trees may have benefits and increase property values.

3. Only three of the submitters supporting the Inner Bays option can be identified as property owners in those communities. Two of these #33810, #33729 own land required for the scheme and #34038 supports but with clear caveats for substantial I&I reduction and water reuse.

a. Our concern is for the neighbours and residents who gain no benefit, but take a loss to amenity and property values.
b. No compensation has been offered to owners for the loss in property values resulting from the decrease in amenity these properties suffer.

3.6 Risk of contamination

1. [9.8.1] asserts that irrigation rates have been selected based on infiltration testing
    a. Appendix L, Beca report (Thacker Site Robinsons Bay – Geotechnical Report) recommends that the effects on the local water courses be assessed if the scheme is developed
2. [9.8.2] asserts that the nitrate-nitrogen leaching rates of 2-47kg/ha is similar to grazed pasture:
    a. The average leaching rate has increased from 19.2 kg/ha to 27.8kg per ha after three years of wastewater irrigation, an increase of 45%
    b. In the worst case (flax), leaching has increased 250% (from 13.2kg/ha to 46.8 kg/ha) after three years
    c. A leaching rate of 46.8kg/ha is equivalent to a dairy farm, and experienced by <0.5% of Banks Peninsula by area (one dairy farm)
    d. Experience of other long-running schemes (Whakarewarewa, Levin) indicates that stream pollution from leaching can, and does, occur, and that it can take many years before the extent of the problem becomes apparent
3. [9.8.3] asserts that adverse effects on springs and streams is not expected; the above points indicate clear potential for pollution of groundwater, springs and streams

3.7 Insect/midge issues

1. [9.9.1-9.9.4] suggest insects/midges will not be a problem, or can be dealt with at the resource consent stage
    a. The Beca report specifically discusses potential mitigation options, and cites distance from the ponds as mitigation for insect problems in the outer bay options, suggesting midge issues may arise
    b. Tackling such issues at the resource consent stage is not a realistic option for many residents

3.8 Storage ponds leaking or bursting

1. [9.10.4] details various scenarios of dam burst during storms up to 1 in 100 years and concludes they would not reach building floors
    a. Ignores the anticipated increase in storm intensity and frequency from climate change
    b. Ignores known elevation modeling errors, where the ground elevation is over-estimated in the proximity of buildings; such errors are evident in the flood maps for the lower valley
    c. Assumes a dam collapse time of ten minutes. Beca indicated a five-minute sensitivity test was also carried out (which would be expected to show higher flood levels, and gives an indication of the sensitivity of the model to the speed of the dam collapse);

despite numerous requests (including a LGOIMA request) CCC have refused to release these results to FOBP, so it is impossible to assess the real risk

   d. Takes no account of the risk of the water exit path (including culverts and under bridges) being blocked, despite this being a major cause of historical flooding on Banks Peninsula
   e. Does not consider the risks for the river bank opposite, directly under the Pavitt cottage
   f. The Beca report stresses that the dam break assessment is conceptual/indicative only because it is based on a number of high-level assumptions
2. [9.10.5] concludes that the consequence of dam burst is minor and the overall risk rating is low
   a. Does not take the above factors into account
   b. Does not take damage to farm land into account
   c. Does not take community wellbeing impacts from the threat into account

3.9 Visual effects

1. [9.12.2] asserts that pond site 10 is not visible from SH75, and limited visibility from other vantage points
   a. Pond site 10 is directly in front of drivers/passengers approaching from Christchurch as they ascend the Takamatua hill. The view will change from a natural hill to an artificially flat engineered landscape, including fences and other structures
   b. Pond site 10 is visible from Akaroa township including the main tourist area at the south end of the town
   c. Pond site 10 is highly visible from Childrens Bay Farm which has Akaroa's most popular walking track – the Rhino Track.

3.10 Storage ponds too large

1. [9.13.3] asserts the effects on Pavitt Cottage will be minimal because it is over 100m away
   a. The storage dam face will be *above* the Pavitt cottage, posing an ever-present risk of inundation

3.11 Option is not re-use

1. [9.14.1-9.14.6] compare the proposed irrigation rate to the short-term maximum irrigation rates recommended by Beca/PDP and conclude that because the proposed irrigation rates are around half these maxima, the proposal is beneficial re-use (because it is not watering to the maximum rate possible)
   a. The irrigation rate is limited by the long term acceptance rate (LTAR), ***not*** the short-term rates
   b. The rates selected for all land-based proposals are the ***maximum*** allowed by the LTAR
   c. The irrigation schedule includes watering *up to and beyond field capacity, including when it is raining.* As well as being bad practice (because it increases nutrient leaching and erosion risk), it is of no benefit to the plants or soil, and may in fact be harmful. It also reduces the ability of the soil to break down contaminants in the applied wastewater.

d. If the land-based proposals could irrigate up to the short-term application rates as suggested, the land area/storage and subsequent cost of these options would be significantly reduced. Instead, PDP illustrate that the current proposals would not be viable if the available land area reduced by any significant amount
e. For these reasons **the land-based proposals are clearly disposal as defined by the US EPA**

3.12 Negative effects on historic sites

1. [9.13.2] Says proposed ponds do not encroach in former sawmill site.
    a. It is the site entrance and the dam burst bunds that encroaches on the former sawmill site and is extremely close to Pavitt Cottage.
    b. The current site access from Sawmill Road is the only apparent feasible entrance to the site for the construction of the storage ponds – an exercise requiring extensive earthworks and heavy equipment.
    c. This is part of the offence created by the storage pond.
2. [9.13.3] [9.13.6] states proposed ponds are located more than 100 meters from Pavitt Cottage and its setting and given this buffer distance ii is anticipated there would be minimal effects on the cottage and that the Project team does not expect the ponds to have a negative effect on nearby properties.
    a. The impacts on the cottage and its environs during construction will be extreme. Its peaceful setting turned into a heavy industrial site similar to an open cast mine, with all vehicles passing on the narrow road immediately in front of the cottage and then onto the site entrance along side
    b. The ongoing effects will be an ugly structure visible from the approach to the cottage, and which has the potential to develop odour and breed midges, and collapse.
    c. The bunds around the dam wall cannot be planted.
    d. Maintaining a viable use for heritage buildings is critical for their ongoing maintenance and preservation. Pavitt Cottage relies on income from guest accommodation. The proximity of the storage dams will reduce the attractiveness of the cottage to guests.
    e. For these reasons the negative effects on nearby properties, and the heritage values are extreme.
3. [9.15] states there were concerns from submitters about the effects on nearby historical sites, and the project team state they do not expect the proposal would have adverse visual effects or adverse effects on heritage features.
    a. The site entrance will be directly over the principal archaeological site. This site entrance will be traversed by heavy machinery and trucks for a lengthy period of time while the storage pond structure is excavated. This will involve earthmoving machinery excavating a 2.7ha hole in the paddock above the Pavitt Cottage and constructing a 4m high dam wall
    b. The archaeological sites behind the Pavitt Cottage will be planted in forest
    c. The forest will come to within 5 metres of the rear of Pavitt Cottage. This will obliterate the current heritage setting. The current view from the Pavitt Cottage

connects it with its heritage setting, looking through a vista of the original fruit and nut trees planted by the settlers to the Williams cottage further up the valley.

d. The view shaft up the valley will be removed as this forest develops.
e. The proximity of forest to the building creates a fire risk unless only low flammability species are planted.
f. The view shafts from Robinsons Valley Road, Sawmill Road, up the stock route and from many private properties will be of the storage pond.
g. This structure will:
    i. Be part empty or empty most of the time revealing an inner black plastic liner
    ii. Bunds cannot be planted to screen it because this would obscure leaks
    iii. There will be a fence around the outside of the structure and a road around the top
    iv. Introduces an industrial and threatening element to the character of the landscape, with the heritage features either subsumed by the wastewater scheme or in its grim shadow.

4. [9.15.2] Report states there will be opportunities to adjust the designs to accommodate any historical features that may be impacted.
    a. Does not state how this will be achieved and we do not consider it feasible.
    b. The areas behind the Pavitt Cottage up to the Williams Cottage would need to be excluded from the irrigation field. If this was done the Council would need to find additional land elsewhere.
    c. There is no other feasible site entrance because there is a deep gully between the pond and Sawmill Road. The site entrance must be beside the Pavitt Cottage over the mill site.
    d. The visual and amenity impacts could be made less if the storage pond was elsewhere or much smaller. The present system does not enable this and is the configuration the Council has settled on after 4 years of investigations.
    e. We do not believe it is feasible to adjust the design. The problem requires a different solution.
5. Omitted – the report does not consider the significance of the Pavitt Cottage and associated Sawmill site.
    a. This is the site of the first power sawmill in Canterbury, a significant development that changed and accelerated the deforestation of the area.
    b. Its significance has been recognized through the erection of a heritage site marker, the publication of a book about the enterprise. It features on the back cover of Gordon Ogilvie's "Banks Peninsula Cradle of Canterbury", the definitive reference book on Banks Peninsula.
    c. The cottage is the mill owners home, and has had a number of owners over the years.
    d. Descendants of the original owners have fully restored it and now hold it in trust for all descendants to enjoy
    e. It is the turangawaewae for all these families, many mill workers and the focal point of the community of Robinsons Bay to this day

6. [15.10.5] States that project team agree that the heritage site should be protected and conserved, but do not state how this will be done. See earlier statements that we do not think this is feasible. The heritage site will be obliterated.

4 Other issues raised by FOBP not in the Officers Report

The officers report has not addressed many of the big issues such as the risk that the system is undersized, the lack of room for expansion, vulnerability to climate change or taking an integrated three waters approach to deal with Akaroa's other pressing water issues.

The report does not address significant matters in the FOBP submission including:

1. That the system is at significant risk of being undersized due to
    a. the sensitivity of the assumptions used to model the system capacity
    b. Pushing all design parameters to their maximum limits
    c. a Native Tree irrigation system is a first in NZ. Native trees may not have the ability to absorb nutrients and water volume as predicted, particularly in wet weather
    d. Population growth modelling proving incorrect
2. That there is no expansion capability in the Inner Bays scheme without further private land acquisition
3. That I&I needs to be more fully addressed to provide climate resilience
4. That the shallow mud flat bays, being susceptible to nutrient build up, are at risk if wastewater drains to the streams due to any of the above reasons.