



Notice of Meeting

An Extraordinary Meeting of the Tararua District Council will be held in the Council Chamber, 26 Gordon Street, Dannevirke on **Tuesday 31 October 2023** commencing at **9:00am**.

Bryan Nicholson
Chief Executive

Agenda

- 1. Welcome and Meeting Opening**
- 2. Apologies**
- 3. Declarations of Conflicts of Interest in Relation to this Meeting's Items of Business**
- 4. Reports**
- 4.1 Dannevirke Impounded Supply - Request for Funding 3**
- 5. Closure**

Report

Date : 26 October 2023
To : Mayor and Councillors
Tararua District Council
From : Roger Earp
3-Waters Manager
Subject : **Dannevirke Impounded Supply - Request for Funding**
Item No : **4.1**

1. Recommendation

- 1.1 *That the Council delay the decision to commence the remediation works to the Dannevirke Impounded Supply until the design work is complete including geotechnical investigation and liner system confirmation. It is likely this will mean a delay to any permanent repairs until the 2024/25 construction season.*
- 1.2 *That the Council approve the Project Objectives for the detailed design of the repairs to the Impounded Supply.*
- 1.3 *That the Council approve up to \$3,200,000 to purchase a pre-treatment plant, and \$400,000 to purchase the raw water storage Kliptanks.*
- 1.4 *That the Council approve up to \$2,500,000 to purchase a 6 mega litre treated water storage tank.*
- 1.5 *That the Council notes the other works being investigated to improve resilience to the Dannevirke water supply of which any implementation decision will be brought back to Council.*

2. Reason for the Report

- 2.1 The reason for this report is to provide an update on progress since the 25% design peer review workshop and to request approval for the next steps in the programme.

- 2.2 This report does not seek a decision on whether to proceed or not with repairs to the Impounded Supply.
- 2.3 It does require a decision on whether to proceed with solutions that will provide an increased level of resilience while permanent solutions are determined and implemented.

3. Background

- 3.1 The Dannevirke Impounded Supply was commissioned in 2013 to provide bulk raw water storage to manage high turbidity and low flow events on the Tamaki River, provide resilience for unexpected water supply infrastructure failure.
- 3.2 In 2021 a leak was detected in the Impounded Supply liner and subsequently repairs were undertaken. Issues with elevated sub soil drain discharges continued to be observed and further temporary repairs were undertaken in 2023. Since then, sub soil drainage flows have remained at an acceptable and stable level, however, some further minor degradation in the sub soil drains has been detected. This demonstrates the Impounded Supply continues to deteriorate, however imminent failure is less likely.
- 3.3 If the Impounded Supply fails or is required to be dewatered (drained) Dannevirke will be solely reliant on water drawn directly from the Tamaki River with no buffer. This includes during periods of high turbidity where the treatment plant cannot produce compliant drinking water, and during periods of low flow when Council's water abstraction limit may be insufficient to meet town demand. Enhanced monitoring is in place and is a key mitigation for dam safety and water supply risks associated with the current state of the Impounded Supply. An update on dam safety monitoring was provided to the Audit and Risk Committee on 25 October 2023.
- 3.4 In addition to dam safety monitoring the Impounded Supply is being operated at a maximum of 8 metres to reduce the risk of deterioration and the safety consequences of a failure. To enable it to be emptied below six metres a pump has temporarily been installed on the cover. Its operational capability to draw water to low levels is not able to be tested.
- 3.5 It is almost certain the Impounded Supply will continue to deteriorate, and officers are working towards a permanent solution for the Impounded Supply and security of the supply of water to the Dannevirke community. An optioneering workshop with consultants, Iwi and other stakeholders was conducted in May 2023 and the outcome was reported to Council at its meeting on 31 May 2023.
- 3.6 On the 20 September 2023 a report was presented to the Infrastructure, Climate Change and Emergency Management Committee titled 'Dannevirke Impounded Supply' (attached). The purpose of the report was to update the Committee on the progress for remediation since the previous report in July 2023. In addition, the Committee was informed of the detailed design 25% peer review workshops and provided an update on each of the enabling projects and lines of work.

- 3.7 Since the September report the detailed design 25% peer review workshops have occurred. This activity included three workshops – a review of the detailed design at the 25% completion point, a review of the risk register and a safety in design workshop. It was facilitated by Tonkin and Taylor and was attended by four staff from TDC (including the Chief Executive), the peer review team from Damwatch, liner/cover supplier/installers (including representatives from Australian geotextile companies), a local earthworks contractor and supporting staff from Tonkin and Taylor.
- 3.8 During the detailed design workshop, the peer review team challenged several of the options presented. This has caused additional analysis and ongoing interaction between the parties to finalise the recommendation for the liner system and to what extent, if any, the eastern embankment requires remediation. At time of writing the project team are still waiting on the results of geological investigation and analysis of the site.

4. Recommendation to Delay to Repair Works

- 4.1 The advice of Officers remains that repairing the Impounded Supply will significantly reduce the risk of failure as the resulting structure will be fully repaired, modifications made to the inlet, outlet and spillway, monitoring equipment installed and will meet modern seismic specifications.
- 4.2 In the September 2023 report to the Infrastructure, Climate Change and Emergency Management Committee, it was intended that repairs to the Impounded Supply would commence in January 2024.
- 4.3 Prior to commencing the repairs officers required the full results of geological investigations, a completed design, procurement of earthworks contractors, and suppliers and installers for the liner system and cover.
- 4.4 In addition, the advice was that pre-treatment capability was required prior to dewatering the Impounded Supply to mitigate the risk that Council could not continue to meet its legislative obligation to provide compliant drinking water during turbid events, which could result in boiled water notices.
- 4.5 For the Impounded Supply to be repaired this construction season it was identified that it must be dewatered in late November 2023 and the earthworks commence in January 2024. This was essential to ensure contractors had the entire construction season available to complete repairs.
- 4.6 An outcome of the 25% detailed design peer review was that further soil samples were required and Officers are expecting the final results and analysis in early December 2023. The purpose of the geological investigation is to determine if any repairs need to be completed to the eastern embankment which could significantly increase the repair's total cost.
- 4.7 Detailed design has not progressed as quickly as anticipated either due to the many challenges at the site, and the latest programme provided pushes out the

completion of the design to January 2024. This impacts the procurement and commencement of earthworks. This also assumes weather that is conducive to the very weather sensitive construction methodology.

- 4.8 The liner system design has also not been finalised as it is also waiting on peer review confirmations and as such Officers are unable to order the required materials in time for them to be available for installation in March 2024 due to long lag times from order to delivery.
- 4.9 We are advised that the lead time for a relocatable pre-treatment plant to be constructed and installed is between 20 to 24 weeks. Officers have explored many options in this space, and our process engineer has identified that there are very few suppliers of this product that can deliver in the timeframe specified.
- 4.10 Because of the above factors, it is recommended that the decision to repair the Dannevirke Impounded Supply be delayed until we have all the information required.
- 4.11 However, given the unknown condition of the Impounded Supply it is recommended that various additional risk mitigation measures are implemented to ensure the ongoing security of the water supply to Dannevirke. These measures include:
 - 4.11.1 Purchase additional pre-treatment in the form of a relocation membrane plant to ensure a continuous supply of water in more adverse river flow situations;
 - 4.11.2 Purchase or repurpose a Kliptank to provide supplementary raw water for periods of high turbidity;
 - 4.11.3 Purchase additional treated water storage in the form of a 6 mega litre tank;
- 4.12 Officers will continue to progress the following mitigation / resilience measures:
 - 4.12.1 Investigate an alternate water source for the Alliance Meatworks, and an alternate source for the Dannevirke water supply. Drilling of the test bores is scheduled to commence 30 October; the outcome of the testing will show whether the water volume and quality of those bores are suitable to mitigate high turbidity events and low flows in summer.
 - 4.12.2 Demand Management, including: metering of unmetered users between the Tamaki River gallery and reservoir #2; a district wide water conservation education program and water restrictions as and when required both of which will have the aim of encouraging conservative water use especially in times of restricted supply.
- 4.13 To enhance the current dam safety monitoring regime and provide Council with early warning of further deterioration, and the best chance to act to maintain the Impounded Supply in operation the following actions are being taken:

- 4.13.1 Purchase a Remotely Operated Underwater Vehicle so that Council officers can conduct site inspections of this and other district water infrastructure rather than contract in the service at a similar cost;
- 4.13.2 Investigate the installation of flow meters on all the sub-soil drains in the 2050mm manhole;
- 4.13.3 Conduct further failure mode analysis at different water levels to assess potential impact;
- 4.13.4 Investigate the possibility of installing inception drains on the eastern embankment;
- 4.13.5 Assess the condition of the Tamaki River intake / gallery to identify if any remedial work is required;
- 4.14 Concurrently, complete the detailed design for remediation of the impoundment issues. Once completed, a recommendation will be brought to Council regarding repair or decommission of the Impounded Supply.
- 4.15 In order for the detailed design work to be completed it is recommended that Council approve the 'Project Objectives' attached.

5. Project Objectives

- 5.1 During the 25% Review it was identified by the Peer Reviewer that Project Objectives had not been set for the repairs. Subsequently, Tonkin and Taylor have prepared Project Objectives for approval. It is recommended that the Council approve the Project Objectives that will guide the completion of the detailed design process.

6. Pre-Treatment Capacity and Raw Water Storage

- 6.1 The Dannevirke water treatment plant is designed to treat water supplied from either the Impounded Supply or directly from the Tamaki River and the Impounded Supply provides a raw water 'buffer' for times of low flows and high turbidity events.
- 6.2 A review of data from 2019-2023 shows the occurrence of turbidity events on the Tamaki River has been highly variable but it is expected these events will occur most years and at times will last for several days.
- 6.3 Currently the Impounded Supply provides water to the treatment plant during turbidity events, and this would be unavailable if it were dewatered or under repair. Supply would then be limited to the current 1 day of treated storage which if exhausted would then put Dannevirke's water into a non-compliant state. Non-compliant water may contain pathogens and requires the issuing of a of a boil water notice until the water supply network has been cleared over 3 days.

- 6.4 Summer 2021/22 was when Council last time issued a boil water notice for Dannevirke caused by high turbidity in the Tamaki River coupled with insufficient capacity in the Impounded Supply.
- 6.5 Installation of pre-treatment and additional raw water storage is a mitigation for turbidity events if the Impounded Supply is unavailable.
- 6.6 Extensive investigations have been completed by an external consultant and peer reviewed to identify which process option would best address the specific turbidity found in the Tamaki River, provide a flow rate to meet town demand, and be installed and commissioned as soon as possible.
- 6.7 Options explored have included:
- 6.7.1 Leased relocatable membrane plant from Australia;
 - 6.7.2 Purchased relocatable membrane plant (certified);
 - 6.7.3 Purchased relocatable membrane plant (not certified);
 - 6.7.4 Lamella clarifier plant;
 - 6.7.5 Raw Water bladders;
 - 6.7.6 Kliptank storage tanks.
 - 6.7.7 In addition, DIA, Auckland Watercare, Wellington Water, National Lifelines, NEMA and NZ Water has been contacted to identify any other potential pre-treatment capability options.
- 6.8 The recommended option is to purchase a certified relocatable membrane plant at a cost of up to \$3,200,000. This cost includes installation (earthworks, electrical upgrades, pipework), and commissioning of the plant as well as a 10-20% contingency. Suppliers have estimated a maximum 24 weeks to manufacture, install and commission a certified relocatable membrane plant that meets design specifications. It has been indicated this could be operational in May 2024.
- 6.9 In addition to the pre-treatment plant, it is recommended that a 2,300 m3 Kliptank at a cost of \$400,000 be installed in the vicinity of the current treatment plant to further mitigate high turbidity events, and to a lesser extent, periods of low flow.
- 6.10 The advantages of the preferred approach are:
- 6.10.1 A pre-treatment capability, owned and operated by Council, could be operational within 24 weeks;
 - 6.10.2 Mitigates the risk that the NZ Drinking Water Standards cannot be met during periods of high turbidity should the Impounded Supply fail, be dewatered or be emptied for repairs;

- 6.10.3 A purchased pre-treatment plant can be capitalised as part of the Impounded Supply asset (rather than a leased option, which would be an operational cost funded through rates in the year it is incurred);
- 6.10.4 Could be redeployed anywhere in the District should an existing plant fail or require additional treatment capability, creating greater resilience;
- 6.10.5 Asset could be sold or leased to another council or entity.
- 6.11 The disadvantages of the preferred approach are:
 - 6.11.1 Upfront cost to purchase the pre-treatment plant;
 - 6.11.2 Increased operating costs;
 - 6.11.3 Costs and logistics of sludge disposal of waste product generated by process;
 - 6.11.4 Increased operator input during use / periods of high turbidity;
 - 6.11.5 Consenting;
 - 6.11.6 Land acquisition and/or easements and works compensation. The cost of land acquisition is not included in the above budget and will require a separate Council decision. Land acquisitions are usually funded from the General Purpose Reserve, which is sufficiently funded for this purpose;
- 6.12 The risks of the preferred approach are:
 - 6.12.1 The Impounded Supply may fail before the plant is installed;
 - 6.12.2 The availability of a suitability qualified and experienced project manager to oversee this project on behalf of Council;
 - 6.12.3 There is a risk that land acquisition negotiations will not be successfully completed in a timely manner. To mitigate this risk, officers have commenced early engagement with landowners;
 - 6.12.4 In any project there is a tension between time, cost, and quality. With the urgency of this project there is pressure on the time component that may lead to project outcomes not being reached (quality), and higher costs. To mitigate this, officers have explored options widely across the industry, undertaken early engagement with potential suppliers, had proposals peer reviewed, and utilised a procurement specialist;

7. Purchase of Additional Treated Water Storage

- 7.1 It is recommended that a second water tank of 6,000 m³ be built adjacent to reservoir # 2 at the top of Blue Gum Lane in addition to pre-treatment, and raw water storage.

- 7.2 Additional treated water storage would double the amount of treated storage available from at least 1 to 2 days' supply based on normal demand.
- 7.3 While the Impounded Supply is unavailable, additional storage is a mitigation for high turbidity events in the Tamaki River where treatment or pre-treatment cannot produce enough complaint water, low flow events where supply cannot meet demand, and for other unforeseen events that impact water supply infrastructure.
- 7.4 While this is an important mitigation for planned or unplanned dewatering of the Impounded Supply it will provide ongoing resilience to the water supply by providing treated water storage at the level recommended by industry standards. It will also provide resilience in the event of unforeseen events that impact water supply infrastructure, and to provide redundancy for maintaining the existing tank.
- 7.5 Three quotes have been received to date. The expected period to install is 6 months.
- 7.6 The advantages of installing additional treated water storage are:
- Provides mitigation to supply risk for turbidity events, and to some extent for low flow events.
 - Provides ongoing resilience in accordance with industry standards.
 - Compliments the existing tank and allows for maintenance capability and redundancy.
- 7.7 The disadvantages of establishing additional treated water storage are:
- Cost
 - Would require the purchase of additional land. Land acquisitions are usually funded from the General Purposes Reserve, which is sufficient funded for this purpose;
- 7.8 The risks of establishing additional treated water storage are;
- The availability of a suitability qualified and experienced project manager to oversee this project on behalf of Council.

8. Alternative Water Sources update

- 8.1 Alliance Meatworks. Investigations to establish a bore and associated storage to meet all the water requirements for the Alliance Meatworks continue. This would reduce town demand by approximately 20% therefore increasing capacity / resilience to the system. The drilling of a test bore including an initial assessment of water quality and quantity is scheduled to commence within weeks of this paper depending on contractor availability. The bore will require Council to apply

for a new or amended resource consent to implement permanently, which could include the Laws Road bore sites, item 8.2 below, if they prove successful. If the result is positive a paper recommending a permanent bore to be installed in partnership with the Alliance Group will be bought to Council.

8.2 Laws Road. Investigations to establish if two bores adjacent to the Tamaki River to the south of the Water Treatment Plant could meet some or all the water required to supply Dannevirke continue. This would enable water to be drawn further downstream where the flow is greater. In addition, drawing from a bore is likely to reduce turbidity. The drilling of the bores including an initial assessment of water quality and quantity is schedule to commence within weeks of this paper depending on contractor availability. If the result is positive two permanent bores would be drilled, a pump station built and a 400mm pipeline installed to the water treatment plant. As noted in item 8.1 above, the bores will require Council to apply for a new or amended resource consent.

8.3 It is important to note that the viability of both locations to supply water to the extent required has yet to be proven. If the test bores are successful in meeting quality and quantity specifications, works could commence in the New Year subject to Council approval and the granting of a resource consent.

9. Timeline

9.1 The table below outlines the key dates that have been identified to support the delivery of the programme.

Item	Activity	Forecast Delivery Date
1	Laboratory testing of soil samples complete	13 November 23
2	Review outcomes of soils samples against detailed design	18 December 23
3	Kliptank Installed and operational	12 January 24
4	Alliance Meatworks Bore completed (subject to resource consent)	09 January 24
5	Alternative Water Source Laws Road completed (subject to resource consent)	01 April 24
6	Pre-treatment Plant installed	03 May 24
7	Treated water tank installed and operational	1 July 2024

10. Financial Considerations

10.1 To date officers have sought approval of funding for the following;

10.1.1 Planning of permanent repairs and function improvements (\$1.085 million September 2022)

10.1.2 Additional funding for repairs required under urgency after liner inspections were completed (\$300,000 July 2023)

- 10.1.3 Approval to proceed with detailed design work including a second geotechnical investigation (\$600,000 July 2023)
- 10.2 Total additional budget approvals of \$1.985 million of which Council has incurred costs totalling \$1.688 million to date.
- 10.3 As has previously been reported in the August 2023 Management Report to the Finance and Performance Committee, Council's borrowing headroom within its self-imposed borrowing limits for the 2023/2024 Annual Plan was \$18.956 million.
- 10.4 Implications to Council's headroom limits when officers factor in the additional unplanned borrowing requested in this report for the purchase of a container pre-treatment solution (\$3.2 million), additional raw water storage (\$400,000) and additional treated water storage (\$2.5 million) this reduces the headroom availability to \$13.095 million for the 2023/2024 year.
- 10.5 When officers consider what the implication of the additional unplanned borrowing are in conjunction with borrowings required for year 4 capital projects (\$9.789 million) this reduces headroom availability to \$2.858 million.
- 10.6 It is important for Council to note that the borrowing headroom availability does not include the cost of repairs to the Impounded Supply. The final cost of repairs is likely to exceed its self-imposed borrowing limits which reinforces the need to confirm total costs before committing to a repair decision.
- 10.7 As a result, a reassessment of the Capital Projects programme may need to be undertaken to prioritise spending.
- 10.8 The process of reviewing Council's self-imposed borrowing limits is currently underway as part of the 2024/34 Long Term Plan.
- 10.9 Council's ability to borrow funds as and when required is a mitigation for the following risks in the Strategic Risk Register and Long Term Plan. These risks should be considered in any decision that may reduce Council's financial headroom;
- Climate Change;
 - Natural Disaster;
 - Waka Kotahi Funding;
 - Three Waters Renewals;
 - Inflation;
 - Economic downturn;
 - Population Growth.

- 10.10 There will be an operational budget implication associated with this request with potential increases to operating expenditure required. These may be offset with savings within the current budgets set for the 2023/24 financial year however this impact is yet to be assessed. There will be unbudgeted interest costs associated with the additional borrowings, and any net unbudgeted costs not able to be offset will be recovered in subsequent years.

11. Iwi and Stakeholder Engagement

- 11.1 Representatives from both Iwi recently attended a detailed design review meeting with Tonkin and Taylor in Wellington whilst they attended the Water NZ Conference in conjunction with TDC staff. Both Iwi have been advised of the proposed delay to repairs and the risk mitigation measures that have been proposed to ensure the security of the water supply to the Dannevirke community.
- 11.2 The Waikato Regional Council and Horizons Regional Council continue to be engaged in relation to consenting requirements for both building and water take consents with support from WSP.

12. Public Consultation and Engagement

- 12.1 Council must always be aware of its obligations under the Local Government Act 2002 (“the LGA”) and its own Significance and Engagement policy in its decision making.
- 12.2 Council’s decisions about whether or not to purchase pre-treatment capability and additional storage are significant decisions in the context of the Council’s Significance and Engagement policy.
- 12.3 Council is being asked to make these decisions about pre-treatment and storage in isolation from its decision to repair or not repair the Impounded Supply, as they are necessary mitigations for the later decision Council will make. The requirement to consult or engage with the community in respect of these two decisions must be balanced against the urgency with which these decisions must be made.
- 12.4 To support Council’s decision making, officers have obtained legal advice on Council’s obligations to consult under its Significance and Engagement Policy and the LGA in respect of the key decisions presented. Council officers have also discussed the decision-making process with Audit New Zealand.
- 12.5 The legal advice obtained has reaffirmed officers’ views that Council is not subject to a mandatory explicit requirement to consult before making these urgent decisions as the decisions do not engage section 97 of the LGA because there is no significant change to levels of service.
- 12.6 Council remains subject to the mandatory discretionary considerations under section 76(1) of the LGA and must comply with the LGA requirements under

sections 77, 78 and 79, but in the circumstances, Council can reasonably exercise its discretion not to consult prior to making these urgent decisions. The genuine urgency of the two immediate decisions can reasonably support a decision not to consult before making the decisions, especially when the options analysis indicates that these options are necessary regardless of Council's later substantive decision to repair or not repair the Impounded Supply.

- 12.7 As detailed above, Council has been advised that it must take urgent action to mitigate the risk of failure and the risk that it will be unable to continue to supply Dannevirke residents with safe drinking water that meets national drinking standards in periods of high turbidity. The need for urgent action by Council has been reinforced by the recent observed deterioration of the Impounded Supply. Council is advised that the decisions presented in this report must be made urgently. For this reason, it is considered there is no ability for Council to carry out the full public consultation process it normally would prior to taking these time critical decisions.
- 12.8 Purchasing the pre-treatment system and additional storage provides Dannevirke with resilience both if the Impounded Supply is not repaired, and if the repairs are completed during the 24/25 construction season. This additional capability will also be a key mitigation should the Impounded Supply fail or begin to deteriorate further requiring dewatering before repairs can commence.
- 12.9 It is noted that there has already been some community engagement on the broader matter (so the fact of the decisions being made would not take the community by surprise). Council has engaged with the community and kept them informed as to progress at public water meetings held in December 2022 and June 2023, through five previous Council and Committee update reports presented at publicly attended meetings and articles in the Bush Telegraph, on social media and on Council's dedicated Impounded Supply page on its website.
- 12.10 This engagement will continue, and officers will prepare a community engagement plan for these decisions as well as the broader programme of works and will present this to Council for approval. The engagement plan will include the use of approved methods of public engagement provided for in Council's Significance and Engagement Policy, in line with legal advice received. It is intended that public engagement will take several forms to ensure it is accessible to our communities, including publications on Council's social media accounts and website, articles in the Bush Telegraph, public Council reports and public meetings.
- 12.11 Council will continue to assess its obligation and ability to consult or engage with the community on the substantive decision to repair or not repair the impounded supply, and on the broader programme of remediation or decommissioning works as further information becomes available. If Council decides to delay its decision making to a later date, this may present the opportunity for more thorough consultation with the community. It is anticipated that there may be elements in the broader programme of works that will also be able to be meaningfully consulted on.

- 12.12 Officers have considered the risk that making the two urgent decisions without consultation effectively binds the Council to a particular larger programme of works in such a way that there is nothing that could be meaningfully consulted on in that larger programme (in the absence of the section 97 trigger to consult), potentially compromising the later decision-making process. However, it is considered that these decisions can be made in isolation from the substantive decisions, as the resilience provided by the pre-treatment capacity and additional storage is a mitigation for all potential options.
- 12.13 The assessment of the two urgent decisions has been completed in isolation from considering the specific details of the broader programme. However, in the circumstances in which the urgent decisions are required, it is recommended that the Council proceed to make the necessary decisions (as Council is legally able to) and that later decisions be assessed when details of them become known, against Part 6 LGA 2002 decision-making requirements.

13. Future Decisions

- 13.1 Several major decisions will be presented to Council over the coming months as more information becomes available including:
- A recommendation on the future of the Impounded Supply;
 - Approval to purchase additional land;
 - Approval to proceed with the installation of an alternative water source for the Alliance Meatworks;
 - Approval to proceed with the installation of an alternative water source for Dannevirke in the form of two bores on Laws Road.

14. Conclusions

- 14.1 Since the temporary repairs to the Impounded Supply in June 2023 the focus has been on preparing to complete permanent repairs in the 2023/24 construction season. The inability to source a pre-treatment capability, and delays to the geological investigation, and a final decision on the liner system has meant there is insufficient information to recommend a decision to Council.
- 14.2 However, the risk that the Impounded Supply could fail remains. To address this possibility officers advise that the installation of a pre-treatment capability, and additional treated water storage should proceed now. In addition, this will position Council for potential repairs in the 2024/25 construction season.
- 14.3 Officers continue to investigate a number of other risk mitigation measures to ensure that the Impounded Supply continues to provide water to the Dannevirke community until an informed decision can be made about the future of this asset.

Attachments

- 1 [↓](#). Impounded Dam Report to ICCEM September 2023
- 2 [↓](#). Project Objectives



Report

Date : 14 September 2023
To : Chairperson and Committee Members
Infrastructure, Climate Change and Emergency Management Committee
From : Roger Earp
3-Waters Manager
Subject : **Dannevirke Impounded Supply**
Item No : **11.2**

1. Recommendation

- 1.1 *That the report from the 3-Waters Manager dated 13 September 2023 concerning the Dannevirke Impounded Supply be received.*

2. Reason for the Report

- 2.1 The purpose of this report is to provide the ICCEM with an update regarding the Dannevirke Impounded Supply, the monitoring regime to mitigate the risk of failure and the progress made to prepare for and complete repairs to the Impounded Supply and ensure the provision of drinking water to the Dannevirke community.

3. Background

- 3.1 On the 19 July 2023 a report was presented to Council titled Dannevirke Impounded Supply – Proceed to Detail Design (attached). The purpose of this report was to provide Council with an update regarding the Dannevirke Impounded Supply and to seek approval to complete a second geotechnical investigation and to commence the detailed design phase for the repairs.

The various repair options that had been previously presented were outlined and a recommendation made that the full repair (option 1) be selected, and the detailed design commence. Council was verbally advised that the completion date of detailed design phase had been delayed and would not now occur until December 2023 with the intention that the repairs to the Impounded Supply would commence in January 2024.

It highlighted that there are significant risks of water supply disruption while the Impounded Supply is temporarily decommissioned, and remedial works completed

if no mitigation measures are put in place. These risks include water safety, water supply, and upgrading the existing water treatment plant to enable treatment of highly turbid water from the Tamaki River. An update was also provided on the Public Consultation considerations and financial implications to date.

4. Current Situation

- 4.1 Since the last report the second geotechnical investigation was completed, and the soil samples are presently at laboratories both here and in Australia for detailed analysis. The result of these investigations will inform what, if any, remediation works are required to the eastern embankment of the Impounded Supply. This involved the drilling of two bores, which then facilitated the installation of piezometers in both bore holes to monitor the water content in the soil at various depths. This information from the piezometers has been added to the other information collated as part of the monitoring regime and a comprehensive dam status report is received weekly from Tonkin and Taylor.

Further deterioration of the sub-soil drains was identified by a routine Remotely Operated Vehicle (ROV) inspection of the Impounded Supply on the 14 August 2023. Deterioration has occurred in the sub-soil drains under two previously identified depressions and an additional depression was also located. However, no holes or tears in the liner were found and the seepage coming out of the sub-soil drainage network has not increased and remained consistent, between 3-5 litres per second. This most recent inspection has reinforced the urgency to commence remediation works as soon as possible.

4.2 Programme Management

A Programme Manager has recently been engaged from Damwatch to manage the whole programme, ensure timelines are met and support the financial and administrative aspects of the programme.

4.3 Remediation Works to the Impounded Supply

25% Peer Review. On the 21/22 September in Wellington Tonkin and Taylor will host the 25% peer review of the detailed design with Damwatch, TDC representatives and identified suppliers. In addition, a Safety in Design workshop and a Risk Workshop will occur.

Building Consent Applications. Tonkin and Taylor have commenced preparing two Building Consent Applications that will be submitted to the Waikato Regional Council on behalf of TDC in their capacity as Dam specialists and advisors for Local Government authorities.

4.4 Additional Water Treatment

The results of the turbid water sample have been received and identified that the particles in the water are extremely small. A preferred treatment solution has been identified – a portable membrane plant currently in Australia that is available for

lease. Potential suppliers are being identified and a proposal will be presented to Council.

4.5 Alternative Source Identification

On the 18 September 2023 a drilling company will inspect the bore sites that have been identified for the Alliance Meat Works and Dannevirke Water Supply in preparation for test bore holes to be drilled in both locations.

4.6 Demand Management

The Mayor and Councillors continue to meet with landowners between the Impounded Supply gallery on the Tamaki River and the Treated Water Reservoir #2.

4.7 Additional Water Storage

A preliminary inspection of the Treated Reservoir #2 site on Blue Gum Lane has been conducted by a geologist which confirmed that it would be possible to build a second treated water storage reservoir in this location.

4.8 Land Acquisition

Land acquisition negotiations continue.

4.9 Tamaki River Gallery Assessment (New)

The capacity of the Dannevirke Impounded Supply Gallery on the Tamaki River has continued to deteriorate and it is now restricting the volume of water that can be drawn from the river. An inspection of the gallery is occurring on the 15 September 2023 to assess the condition and capacity of the gallery and what, if any, works are required to future proof this part of the water supply system.

4.10 Iwi and Stakeholder Engagement

The regular meeting between TDC and the HRC is occurring on the 13 September 2023 to update the Regional Council on progress and seek their guidance and support to process consent applications for alternative water storage for both the Alliance Meat works and the Dannevirke Water Supply. Engagement with Iwi continues as commitments allow.

4.11 Public Consultation and Engagement

It is proposed that a third public meeting is held in October 2023 to update the community on the outcomes of the 25% Peer Review of the detailed design, supporting projects, to outline the timeline for the repair works and to discuss water conservation measures for this summer / autumn.

4.12 Procurement

The procurement process to acquire a Head Contractor and the supplier of the Liner and Cover have commenced and will be completed as soon as possible to enable these contractors to contribute to the detailed design process.

4.13 Water Conservation Education Programme

An education programme for the community is currently being prepared and will be rolled out over the next few months to ensure the community is well prepared to deal with any periods of low flow or high turbidity whilst the Impounded Supply is being repaired.

4.14 **Risk Management**

A Risk Workshop is being conducted as part of the 25% Review occurring on the 22 September 2023 to review and update the current risk register to ensure the security of water supply over the summer period when the Impounded Supply is being repaired.

A comprehensive report will be presented to the full Council meeting on 25 October 2023. This report will include the outcome of the 25% Review and the progress made in all the supporting projects including costs to implement.

Attachments

1. Dannevirke Impounded Supply - Proceed to Detailed Design

Table 3.1: Project objectives and performance requirements

Item	Adopted Value	Source / basis	Comment
Project objectives			
Overall objective	Undertake remedial works to secure the supply of safe drinking water to the Dannevirke community and remove the imminent risk of an uncontrolled release (or dewatering to avoid a release).	To be specified / confirmed by TDC	As discussed in Section 3.2.2.1, Steps 1 to 3 in the potential failure mode are expected to essentially be eliminated by the remedial works. The risk of Steps 4 to 7 is expected to be reduced but not completely eliminated since this would likely require rebuilding the eastern dam embankment / trench through the embankment, which is not considered reasonably practicable in one earthworks season.
Component objectives: • Completion of remedial works	Remedial works to be completed this 2023 / 2024 earthworks season. <i>This objective means the design needs to be as technically straightforward and constructable as possible to meet programme for design, review, and construction.</i>	To be specified / confirmed by TDC. <i>Surveillance indicates that the situation at the dam continues to deteriorate rapidly. There is a high risk that this could accelerate to an uncontrolled release or require dewatering to avoid an uncontrolled release. The precise timeframe cannot be calculated but the current enhanced surveillance regime is intended to manage the risk while providing time to prepare for a more robust repair.</i>	Time: Programme for design, review, consenting, and construction
• Duration of dewatering for remedial works	Reservoir to be unavailable for operational use (water supply) for the minimum possible time during remedial works. <i>This objective limits the scale of works that can be completed. Of note, we assume that restricting dewatering to one earthworks season will preclude significant modification of the eastern dam embankment and outlet pipe through the embankment. The risks / vulnerabilities related to the original construction of the dam and outlet pipe will be reduced substantially by repairing the upstream lining and underdrainage system. We will also consider measures to mitigate the risk further, such as installation of filter collars and a filtered toe berm, possibly installed at a later stage without dewatering. However, there will likely be residual risk that is accepted by TDC and managed by surveillance as discussed further in Section 4.</i>	To be specified / confirmed by TDC	Time: Programme for construction
• Expected life of 100 years	Service life of 100 years with a reasonable level of maintenance and renewals, including replacement of the floating cover 3x within the service life, and replacement of the basal liner coinciding with the second floating cover replacement. <i>There are no examples of modern geomembrane liner systems that have been installed for more than 50 years. HDPE was first introduced in the 1980s, and other materials like EIA and CSPE came later. Moreover, service life depends on the complex interaction of multiple factors and specific site and installation conditions. Achieving the 100 year service life is limited to an informed judgement based on observations of performance in the last few decades, supported by accelerated aging tests in laboratories. Material warranties (as opposed to service life) will be less than 100 years.</i>	To be specified / confirmed by TDC	Quality and cost: Longevity of the design. Risk of future costs and future interruptions to supply.
• Future-proofing	No unexpected major remedial works for dam safety for at least 30 years. TDC does not want to be in the current situation again. It is noted that the Building (Dam Safety) Regulations, which come into force in May 2024, will increase the likelihood of detecting new dam safety issues and remediation requirements at all NZ dams in the future. The objective of avoiding unexpected remedial works for dam safety at Dannevirke Raw Water Reservoir in the next 30 years is intended to be fulfilled by: • Identifying dam safety issues during the detailed design process. These issues may not be directly related to the observed developing failure mode.	To be specified / confirmed by TDC	Quality and cost: Longevity / future acceptability of the design fo dam safety. Future costs.

Item	Adopted Value	Source / basis	Comment
	<p>Identification of issues will be limited by necessity to the information available and current industry practice and knowledge.</p> <ul style="list-style-type: none"> Fixing dam safety issues during the 2023 / 2024 remedial works to the extent possible while fulfilling the objectives in this table. There will be a strong priority on fixing issues that are most readily addressed while the reservoir is dewatered. Dam safety issues that cannot be addressed during the 2023 / 2024 remedial works while fulfilling the objectives in this table, will be identified (to the extent practicable based on current information and industry practice as noted above), so that they are no longer “unexpected” and can be planned for. These residual issues are most likely to relate to the downstream dam embankment and subsoil outlet pipe through the embankment, which are discussed further in Section 4. Consideration of these issues may involve a risk-based decision making approach rather than standards-based approach. 		
<ul style="list-style-type: none"> Expense must be justified by the benefits provided 	<p>Provide value to ratepayers. This will be based on comparison of initial and operational costs at a preliminary level. Detailed costing of options will not be possible within the timeframes.</p>	<p>To be specified / confirmed by TDC</p>	<p>Cost: Expense must be justified by the benefits provided.</p>

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