

IN THE ENVIRONMENT COURT

**CRI-2016-041-002447
[2017] NZDC 16716**

BETWEEN

**HAWKES BAY REGIONAL
COUNCIL**

Prosecuting Authority

AND

**CENTRAL HAWKES BAY
DISTRICT COUNCIL**

Defendant

**CENTRAL HAWKES BAY DISTRICT COUNCIL REPORT TO THE COURT IN
RELATION TO SUPPLEMENTARY ENFORCEMENT ORDERS**

10 September 2019

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1. INTRODUCTION

- 1.1 On 20 March 2017, the Central Hawkes Bay District Council ("CHBDC") pleaded guilty in the Hastings District Court to a charge laid by the Hawkes Bay Regional Council ("HBRC") that discharges from the Waipawa Wastewater Treatment Plant ("Waipawa WWTP") contravened section 15(1) of the RMA.
- 1.2 At the sentencing hearing, Counsel for the CHBDC and the HBRC, respectively, advised the Court that they agreed that, rather than a fine being imposed, it would be appropriate to seek enforcement orders requiring an independent two stage technical review of the Waipawa WWTP with a view to implementing any recommendations that may be made in that review for improvements or upgrades. On 31 July 2017 the Court made the enforcement orders sought ("Original Orders").
- 1.3 On 26 July 2018 the Court made Supplementary Orders. The Supplementary Orders permanently suspended paragraphs 16 to 20 of the Original Orders, required further monitoring of the Waipawa WWTP until 31 May 2019, and required a report to the Court by no later than 30 June 2019. The reporting date was subsequently changed to Friday, 30 August 2019 and then Friday, 13 September 2019 at the request of the HBRC with agreement from the CHBDC.
- 1.4 The report is required by Order 4 of the Supplementary Orders, which states the following:

"4. *By no later than 30 June 2019, CHBDC shall provide a report to the Court and the HBRC which shall, as a minimum, address:*

- (a) The wastewater treatment solution the CHBDC proposes to implement for wastewater from Waipawa and the technical rationale for same;*
- (b) The process and time frame for implementation, including whether any new consents or changes to conditions of consent are required to implement the wastewater solution and the estimated time frame for preparing and lodging any applications for same;*
- (c) The estimated cost of implementing the wastewater solution; and*
- (d) The proposed process and timing for securing the funding necessary to implement the wastewater solution.*

Unless the Court makes an order to the contrary, CHBDC shall implement the proposed wastewater solution as soon as reasonably practicable"

Scope of report

- 1.5 The above matters are addressed in this report by reference to the following headings:
- (a) Waipawa WWTP monitoring results (Section 2).
 - (b) Proposed Waipawa WWTP solution (Section 3).

Agreed statement

- 1.6 The approach detailed below is agreed to by CHBDC and HBRC. While there are short term improvements that need to be undertaken it is agreed that better long term treatment of wastewater is needed to help address the cumulative impacts of all activities in the Tukituki Catchment on water quality. Plan Change 6 to the Hawke's Bay Regional Resource Management Plan aims to improve water quality progressively over time so that freshwater objectives are achieved by 2030. CHBDC needs to account for the nutrients discharged from its wastewater treatment plant(s) and demonstrate that these are changed and upgraded to contribute towards the required catchment improvements.

2. WAIPAWA WWTP MONITORING RESULTS

- 2.1 Ongoing monitoring of the Waipawa WWTP to 31 May 2019 indicates that:
- (a) The floating wetlands:
 - (i) are having little or no positive impact on treatment apart from some reduction in suspended solids; and
 - (ii) may be having a detrimental effect on water quality by preventing oxygen transfer to the water, leading to anaerobic conditions, release of hydrogen sulphide (odour and corrosive) and potentially solubilizing nutrients from the accumulated sludge layer below.
 - (b) The consent limits for ammonia, dissolved reactive phosphorus, *E. coli*, and total suspended solids are not being met.
- 2.2 Compliance with consent limits for dissolved reactive phosphorus, *E. coli*, and total suspended solids can likely be achieved with significant labour input and by undertaking minor to moderate works within the existing treatment plant.

- 2.3 As reported in the Stage 1 report to the Court (Crawford – 2017):
- (a) the combination of processes installed at the Waipawa WWTP is not capable of consistently achieving the ammonia limits required by the consent conditions; and
 - (b) the treatment plant is unlikely to be able to be modified to deliver the ammonia limits required by the existing consent conditions.
- 2.4 However, a recent technical report by Aquanet (2019) indicates that, while there is non-compliance with discharge limits, the impact of the current discharge on the river system is largely indistinguishable from the existing background environment. A copy of the report is **attached as Appendix 1**.
- 2.5 Despite the largely indistinguishable impact on the river system, the upshot of growth in the communities served by the system and the likelihood that effluent quality expectations will increase over time mean that the impact, both annually and seasonally, may become more noticeable and unacceptable to the community. It is therefore evident that either:
- (a) the disposal method needs to be changed (away from the River); or
 - (b) a fundamentally different combination of unit processes/ new treatment plant needs to be installed, primarily as a means of future-proofing the community and the CHBDC.
- 2.6 Such upgrades or changes are not required to mitigate in-river effects of current non-compliance as, based on the Aquanet report, such effects do not appear to be occurring.

3. **PROPOSED WAIPAWA WASTEWATER TREATMENT SOLUTION**

- 3.1 Subsequent to the Stage 1 report, the CHBDC has undertaken significant engagement with the community to determine the most appropriate wastewater treatment solution for discharges from the Waipawa WWTP.
- 3.2 That engagement included convening a Wastewater Reference Group ("WRG") to represent community views, engaging with tangata whenua, and engagement with the general public. Details of the engagement process are set out in **attached Appendix 2**. HBRC representatives were an integral part of the WRG, attending all seven meetings of the WRG, and provided general input and specific comment and guidance on consenting issues.

- 3.3 As part of engaging with tangata whenua, CHBDC engaged with Taiwhenua at a meeting on the 12th of November 2018, and received a letter supporting the use of a Hawkes' Bay Maori world view as part of the process to develop the wastewater solution. CHBDC has also committed to commissioning a cultural impact assessment by Taiwhenua once the solution has progressed.
- 3.4 As a result of the engagement with stakeholders, and in accordance with technical advice, the CHBDC intends to construct a new biological nutrient removal treatment ("BNR") plant at Waipawa to treat wastewater from both Waipawa and Otane and change the discharge method at the Waipawa WWTP to a discharge to rapid infiltration beds ("RIBs"). The CHBDC intends to stage that work and related works, which include removal of the wetlands at the Waipawa WWTP and renewals and operational adjustments at the existing Waipawa WWTP prior to construction of the new BNR. Consideration will be given in the future to also piping wastewater from Waipukurau to be treated by the new BNR plant.
- 3.5 The CHBDC has purchased suitable land for the RIBs at Walker Road, Waipawa.
- 3.6 The remainder of this report focuses on the works proposed at the Waipawa WWTP as that is the plant that the Supplementary Orders relate to.

Technical rationale

- 3.7 It is proposed that the RIBs will be constructed into river the river gravel soils near the Tukituki River at the Walker Road site and the discharge from the existing treatment plant will be to the RIBs. The discharge from the new BNR plant, when it is constructed, will also be to the RIBs.
- 3.8 The RIBs have been proposed to address community concerns, including those of tangata whenua, regarding discharges directly to surface water. The RIBs will provide additional treatment by removing more suspended solids and pathogens than is presently the case with the direct discharge to surface water.
- 3.9 It is uncertain if the rapid infiltration system itself will be sufficient to result in consistent compliance with the *E. coli* limit in the existing consent conditions. That is because the extent of *E. coli* removal may be variable and will depend on system design and location and the type of soils into which the discharge occurs. Prior to construction of the new BNR plant, further work is proposed within the existing treatment plant to lower the *E. coli* levels being discharged.
- 3.10 The rapid infiltration system is unlikely to result in the amount of ammonia reaching the river being significantly reduced, however, it may provide for a

time lag for the wastewater to discharge to the river so the discharge is spread over time and space and therefore minimizes any direct localized discharge impact.

- 3.11 The proposed new BNR plant would be based on an activated sludge process and would reduce nitrogen levels significantly. In that regard, almost all ammonia would be converted to nitrite or nitrate and this would avoid ammonia toxicity issues. Total nitrogen (TN) would be reduced to something in the order of 10 mg/l compared to the current discharged effluent value of approximately 20 mg/l TN.
- 3.12 Once the new BNR plant is constructed and operational, it will discharge to the rapid infiltration beds at Waipawa, but exploration of beneficial reuse options (e.g. irrigation of land) will be explored in the future. Potential beneficial reuse options are not required to ensure appropriate water quality limits will be met in the future in the Tukituki River; but beneficial reuse options will be explored in response to community aspirations identified through the engagement process to identify the proposed wastewater solution for discharge of wastewater from Waipawa.

Staging

- 3.13 The CHBDC proposes to stage the implementation of the proposed wastewater solution as follows:
- (a) Stage 0 – Investigations and technical reports (including consideration of piping Waipukurau wastewater to the Waipawa WWTP in the longer term), consenting of proposed wastewater solution, procurement, and interim minor improvements (estimated to occur in years 2019/20-2021/22):
 - (i) Waipawa Trunk Sewer Main renewal - 2.2km trunk inlet main to Waipawa WWTP;
 - (ii) Landfill leachate removal and irrigation back to landfill;
 - (iii) Removal of floating wetlands at the Waipawa WWTP;
 - (iv) Renewals and operational adjustments within the existing Waipawa WWTP to address performance with regard to reducing total suspended solids, soluble reactive phosphorous, and *E. coli*;
 - (v) Other improvements as outlined in Table 1 below and addressed in the memo **attached as Appendix 3**;

- (b) Stage 1 – Construction of rapid infiltration beds (estimated years 3-6);
- (c) Stage 2 – Construction of new BNR plant (estimated years 7-10); and
- (d) Stage 3 – Explore beneficial reuse and land-based disposal options. (year 11+).

Table 1

Improvement	Description	Expected Completion
I&I Studies and Network Improvements	Consider implementing a network improvement plan in order to reduce flow towards the plant.	30/06/2021
De-sludge the pond	It is estimated that more than half of the process volume is currently sacrificed for sludge storage.	30/06/2020
Septage pit improvement	Mitigate screen blockages.	30/10/2019
Remove the unscreened overflow to river connection	This is not required as the pond overflows in event of emergency. The regular pond overflow is more benign to the environment.	30/10/2019
Repair and service the inlet screen.	The Waipawa inlet screen has a big hole in it – to be repaired	30/09/2019
Change the programming of the inlet screen	A pre-screen should run intermittently based on the differential head generated by the screenings build-up.	30/11/2019
Review and change the pond arrangement	Aerators can be repositioned to create a better usage of the pond volume and avoid solids dropping out at the inlet.	Completed
Remove the BAS and clean it prior to re-installing	The Biological Attachment Surfaces (BAS) system is envisaged to reduce ammonia. The way it is installed however it cannot work. To make it work the area underneath must be free of sludge and aeration must be installed underneath. The BAS cloth needs to be cleaned from heterotrophic bacteria which grow much faster than the desired nitrifiers. Alkalinity in the wastewater must be high enough for the nitrification (ammonia removal) to complete.	To be evaluated further
Desludge the area under the BAS		
Install Differential Pressure Piping aeration under BAS system		
Sampling campaign to determine alkalinity of the wastewater		
Remove wetlands	The floating wetlands are set up in a way that they would serve a denitrification purpose only. Remove and de-sludge	30/06/2020
Desludge area under wetlands		30/06/2020
Coiled pipe flocculator on feed to lamella settler	The feed towards the lamella settler needs more reaction time than it currently gets.	Completed
Test flocculant dosing on the clarifier feed	The lamella settlers' capacity is likely too small for the plant flow even if reductions in hydraulic load are achieved. It is worth testing whether a flocculant dose downstream of the alum dose helps increasing the settlers' capacity.	30/06/2021
Change the programming of the settler	The automation of control loops around the settler need to be verified. This is best done after the process set-up has changed.	30/11/2019
Discharge pump from the settler	Use a discharge pump to evacuate sludge from the settler. Gravity is insufficient to direct the sludge to the geobag area.	30/06/2020
Excavate out the geobags area		30/12/2019

Install a sludge dewatering facility	The geobags are at capacity and returning phosphorus laden floc to the pond system which can only be viewed as a self-defeating exercise.	Evaluate feasibility
Replace augers and liner of washboxes on sand filter annually	Augers and liners of wash boxes on the sand filters are not a tight fit and wear quickly. They need replacement at higher frequencies in order to make the sand filter more effective.	30/06/2020
Isolate sand filter compartments	Consider isolating the sand filter compartments as to avoid sand migration which leads to preferential flow and deteriorated effluent quality.	Evaluate feasibility
Install flow meters on inlet and bypass	The inlet and bypass flow are not (accurately) measured which means no good design information is available for plant improvement	30/11/2019
Augment tertiary treatment	Currently an unknown but potentially large amount of water is bypassing the tertiary treatment. I&I improvements will help.	To be evaluated further
Connect the phosphorous instrument and log the records.	Connect instrumentation	30/10/2019
UV system	UV appears understrength, Servicing has been completed and improvements have been seen – monitor	Monitor
Lamella Clarifiers	High frequency intermittent vibration on lamella clarifiers to plate framework to loosen sludge – Trial for improvements	30/06/2020

3.14 It is anticipated that the Stage 0 works will ensure compliance with all existing water quality limits in the conditions of the consent for the Waipawa WWTP, except possibly for ammonia.

3.15 The new BNR plant in subsequent stages will undoubtedly achieve compliance with the ammonia limits. In relation to the current ammonia concentration in the discharge, the Aquanet report concludes that:

*"Although NH₄-N concentrations in the Waipawa River were generally higher downstream of the Waipawa WWTP than upstream, rolling 12-month 95th percentile unionised ammonia (NH₃-N) concentrations at the downstream site between May 2005 and April 2019 were consistently below the PC6 limit⁵ (maximum concentration = 4.3 ppb) (Figure 17 and Table 8). The PC6 limits are based on the application of the ANZECC (2000) guidelines with a 99% species protection level. This limit was met downstream of the Waipawa WWTP, indicating that the risk of ammonia from the discharge causing toxicity effects on aquatic fauna is low. It also indicates that the Waipawa WWTPs non-compliance with the post-upgrade effluent NH₄-N consent limits is probably not causing adverse effects on aquatic life."*¹

3.16 Given the above, and in the event that the ammonia limit cannot be complied with prior to construction of the new BNR plant, the CHBDC will apply for a change of conditions application so that the existing end-of-pipe consent limit is made less stringent until the new BNR plant is constructed.

¹ Aquanet report, page 24.

- 3.17 In addition to addressing current compliance at Stage 0, CHBDC intends to undertake further investigations, prepare concept designs, resource consent applications, supporting assessments of environmental effects, and supporting technical reports within the next two to three years (by no later than 30 June 2022) for the RIBs and new BNR plant.
- 3.18 In addition to any compliance monitoring reporting CHBDC will report back to HBRC on progress on implementing stage 0 improvements, and on progress on securing funding for subsequent stages, at six monthly intervals.

Estimated cost

- 3.19 The RIBs, conveyance pipelines, storage and new BNR plant at Waipawa to service Waipawa and Otane have an estimated capital cost of \$21 million, and could be constructed within the next ten years and be funded from rates, industrial contributions and some other funding sources to be confirmed. The RIBs, storage and conveyance would be constructed first within the next 6 years at an estimated cost of \$12 million, with the new BNR plant to follow as soon as reasonably possible within the ten-year period at an additional cost of \$9 million (in today's money).
- 3.20 Piping Waipukurau discharges to the new BNR plant at Waipawa is estimated to have a capital cost of \$6 million. Larger RIBs would be required to manage all flows and it is estimated they would cost \$6 million. The new BNR plant at Waipawa WWTP would have to be upgraded to treat Waipukurau wastewater flows as well as those from Waipawa and Otane. The cost of the upgrade has not been estimated yet, but it would be in the millions of dollars.
- 3.21 The CHBDC will be exploring this option of combining all three plants during Stage 1, but its focus in the shorter term is on the discharges from the Waipawa WWTP, as required by the Supplementary Orders, and the Otane WWTP.
- 3.22 In comparison, the alternate cost of a treatment plant upgrade at Waipukurau (RIBs, conveyance, storage and the discharge to gravels within Waipukurau) is estimated to have a capital cost of \$20 million, which is an estimated increase in capital cost of \$3-4 million in comparison to a combined system.
- 3.23 These figures exclude investigation, design and consenting fees, as well as the expected increase in operational costs. These costs are outlined within the package report **attached as Appendix 4.**

Securing funding

- 3.24 A funding feasibility assessment has been undertaken by BECA, and the CHBDC has commissioned an affordability study, which is **attached** as **Appendix 5**.
- 3.25 Preliminary analysis has been undertaken in regard to funding the proposed Waipawa wastewater solution and a wider wastewater solution that includes Waipukurau and Otane. At present, the rates funding sources and amounts for Waipawa are as follows:
- (a) CHBDC general rate increase of approximately \$12m (this represents the current funding headroom in CHBDC budgets and rate affordability thresholds); and
 - (b) Targeted rates of approximately \$2m, comprised of a trade waste levy of approximately \$1m and development contributions of approximately \$1m.
- 3.26 That leaves a shortfall in funding of approximately \$6-7m which will need to be sought from:
- (a) Central government schemes - Freshwater Improvement Fund, Provincial Growth Fund, and / or Crown Infrastructure Partners; and / or
 - (b) Hawkes Bay Regional Council – Freshwater Catchment Programmes.
- 3.27 Given there is a shortfall between funds CHBDC can raise directly and capital required for the project, it is envisaged it will take approximately 6 months to confirm the residual funding requirements for Waipawa for Stage 1.
- 3.28 CHBDC are conscious that funding applications need to demonstrate benefit to the set criteria relevant to that funding source, and that may influence the staging and the timing of the relevant funding.

Changes to consent conditions and new consents

- 3.29 As noted above, in the event that the Stage 0 works do not enable the current end-of-pipe ammonia limit to be met, CHBDC will apply for a change of consent conditions to amend that limit on the basis that there are unlikely to be any adverse effects on the receiving environment after reasonable mixing as a result of ammonia discharges. Nevertheless, the CHBDC recognises that water quality has to be improved over time, and the new BNR plant will ensure this occurs insofar as wastewater discharges are concerned.

3.30 The investigations to date have identified that new consents will be required. The scope of new consents will be dependent on design refinements yet to be determined, but are likely to relate to the following:

- (a) Modifications to the existing treatment plant – The site is designated and so land use consents are not likely to be required except as described in paragraph 3.31 below or for movement of contaminated soil if this is identified, but new discharge consents or changes to the conditions of existing discharge consents may be required if new storage facilities (e.g. ponds) or treatment processes (e.g. new air discharge consent for new inlet works and activated sludge reactors) are required.
- (b) Discharge – the discharge to rapid infiltration beds will require a new discharge to land consent.

3.31 Any wastewater treatment process results in the accumulation of wastewater treatment sludges. There are a range of options for managing this material, including landfilling in an existing landfill, a new landfill, or an on-site monofill. Piping Otane wastewater to Waipawa for treatment in the new BNR plant will result in greater volumes of sludge to be disposed of. If an on-site monofill is constructed for this purpose it would require a new land use consent and may also require consents for discharges to land and air.

DATED AT AUCKLAND this 10th day of September 2019



S J Berry / C D H Malone

Counsel for the Central Hawkes Bay District Council

APPENDIX 1

AQUANET WATER QUALITY REPORT

APPENDIX 2

DETAILS OF ENGAGEMENT PROCESS TO IDENTIFY PROPOSED WASTEWATER SOLUTION

APPENDIX 3

IMPROVEMENTS PROPOSED MEMO

APPENDIX 4

OVERALL PACKAGE REPORT

APPENDIX 5

FUNDING & AFFORDABILITY ASSESSMENT