MEMORANDUM

To:	Darren de Klerk	**Date:**	13 Jun 2019
From:	Nanne de Haan		
cc:	Kim Reade, Wayne Termaat		
Subject:	**Waipawa WWTP recommendations in order to improve on resource consent compliance**		

This memo has been prepared by Veolia on request of CHBDC to support the environmental court case for the Waipawa WWTP.

Background

The Waipawa Waste Water Treatment Plant (WWTP) has historically struggled to comply with Resource Consent Conditions due to a variety of shortcomings. The WWTP operates on a consent expiring in September 2030. The plant is often non-compliant on Total Suspended Solids, E-coli and ammonia. It also struggles on flow rate. The remainder of this document outlines steps that can be taken for the plant to perform better especially with regard to compliance with the current Resource Consent.

Veolia recommendations towards WWTP performance improvement

- Consider implementing a network improvement plan in order to reduce flow towards the plant. Lower flows will solve a lot of hydraulic problems. It is known that the glazed earthenware trunk main will be relined this year which is a promising step in the right direction.
- Remove the unscreened overflow to river connection all together. It is not required as the pond overflows in event of emergency. The regular pond overflow is more benign to the environment.
- Consider directing the landfill leachate to a separate and dedicated treatment facility or pre-treat this leachate at the WWTP site prior to releasing it into the main process.
- Repair and service the inlet screen. The Waipawa inlet screen has a big hole in it and the brushes have not been renewed for years despite spares being present on site. An issue is that there is no spare screen or other bypass possibility.
- Change the programming of the inlet screen. A pre-screen should run intermittently based on the differential head generated by the screenings build-up. This way of running will save on energy and consumables. Also the suspended solids will get a chance of being screened out instead of piling up in the pond.
- Desludge the pond. The sludge levels are so high that at times of low flow an island can be observed. It is estimated that more than half of the process volume is currently sacrificed for sludge storage.

- Review the pond arrangement. There are many dysfunctional or faulting assets present. Aerators can be repositioned to create a better usage of the pond volume and avoid solids dropping out at the inlet.
- 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. Otherwise the BAS is better removed entirely together with the floating wetlands. The set of prerequisites for the BAS to work are:
    - BOD removal prior to the BAS must be fairly complete or the BAS will choke with heterotrophic bacteria. This means that the facultative area must be desludged and made functional for near complete BOD removal. This may include installing more aeration capacity.
    - Desludge the area under the BAS. It may be most practical to remove the BAS for this. The BAS will likely need a clean to remove heterotrophic bacteria.
    - Aeration must be installed below the BAS, for instance in the form of pressure differential piping. This aeration must remain switched on as long as flow goes through the plant. Nitrifiers are slow growing bacteria which are best bred in summer. In winter they survive but do not grow much. Expect a month of aeration before result can be seen.
    - Alkalinity in the wastewater must be high enough for the nitrification (ammonia removal) to complete. If leachate remains being sent to the WWTP the alkalinity will likely be too low. Otherwise a sampling campaign can determine what the situation is.
- The floating wetlands are set up in a way that they would serve a denitrification purpose only. There is however no consent requirement on nitrate and nitrite. As the wetlands currently do not serve a purpose towards compliance they are best removed. Care has to be taken as power cables appear to run across the wetlands. Those will need to be rerouted, and the equipment rewired and running before the wetlands are removed. Also the BAS is linked to the floating wetlands so this system will need new anchorage. After removal of the floating wetlands the area underneath will need desludging.
- The feed towards the lamella settler needs more reaction time than it currently gets. A coiled pipe flocculator will work or the contact tank could be reused as flocculation vessel. Agitation would then need to be installed though.
- 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. Flocculant dose systems can be loaned for such test. (Note: Flocculant carry-over to the sand filters will negatively affect these)

- The automation of control loops around the settler need to be verified. This is best done after the process set-up has changed.
- Use a discharge pump to evacuate sludge from the settler. Gravity is insufficient to direct the sludge to the geobag area.
- The geobags are at capacity and returning phosphorus laden floc to the pond system which can only be viewed as a self-defeating exercise. The bags contents need to be excavated out and a new sludge processing system must be placed. This can be like-for-like geobags, but desludging of the pond will quickly fill up a new batch of geobags A more mechanical dewatering system could be considered too as this will eventually be more efficient.
- 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.
- Consider isolating the sand filter compartments as to avoid sand migration.
- Install flow meters to more accurately measure the plant inflow and outflow
- After an acceptable peak factor has been established for the plant, consider augmenting the tertiary treatment.
- Connect the phosphorous instrument and log the records.