Taipa WWTP evidence summary
Becky Macdonald Wastewater Treatment

Introduction

My evidence covers:

- Existing wastewater treatment and disposal system;
- Future treatment and disposal of wastewater from the Plant; and
- Proposed conditions.

Existing System

The existing Wastewater Treatment Plant (Plant) is a pond-based system. Initially wastewater flows into the Plant through a new rotary screen to remove large solids with screenings stored in an open topped skip. The screened wastewater flows into three deep (4.0 meters) basins which operate in series and have a combined volume of approximately 6,070 cubic meters. These basins were originally designed with two surface aerators each, however, over time the operation has changed. Basin 1 currently has two 7.5 kW, sub surface, directional (impellor style) aerators and is fully mixed. Basin 2 has no aeration and solids build up in the base over time. Basin 3 contains one 7.5 kW sub surface, directional (impellor style) aerator. Basin 3 discharges into a 1.6 meter deep oxidation pond with a surface area of approximately 11,300 square meters, which contains no mixing or aeration. At the outlet of the oxidation pond, wastewater is pumped through two 30kW pumps (operating in duty / standby arrangement) along a single pressure pipeline to the wetlands, located approximately 1km away.

There are four constructed wetlands, 0.5m deep, operating in series, with a total surface area of approximately 8,850 square meters. These wetlands are planted with native wetland plants and have a sub-surface connection between each wetland. Wetland 4 discharges into a local unnamed creek (drain) which flows into Parapara Stream, approximately 200 meters upstream of dairy farm effluent ponds. FNDC advised that the farm recently stopped milk production and is currently only used for stock grazing.

FNDC have advised that the basins, oxidation pond, and wetlands are all clay lined. The sub surface, directional (impellor style) aerators in basins 1 and 3 create well mixed condition. Recent desludging showed signs of scouring of the liner and, as a result, seepage from the basins may be occurring.

The Plant currently provides adequate treatment of biological oxygen demand (BOD), total suspended solids (TSS), and a reduction in pathogens (measured as *faecal coliforms*). Thus, I have concluded that improvements to provide disinfection, to reduce pathogens are not required. However, adequate ammonia (NH_3-N) treatment is not being achieved and improvements to the existing Plant are required to improve ammonia (NH_3-N) treatment.

Future wastewater treatment and disposal

Wastewater treatment and disposal are intrinsically liked and cannot be considered in isolation. Some disposal solutions require a higher level of wastewater treatment, whereas others require a larger land area for disposal.

I have estimated the future wastewater flow to the plant based on recent flows and applying a 2 percent population growth over 10 years and including a safety factor. Using this approach, this estimated future ADWF is 790 cubic meters per day and the 95 percentile wet weather flow is 2,130 cubic meters per day.

Previous studies identified a longlist of 14 treatment options, which following consultation, was reduced to a shortlist of 7 treatment options. A comprehensive multicriteria assessment was carried out which included; technical, operational, environmental, and stakeholder/iwi considerations. My assessment of the shortlisted options concluded that upgrading the Plant so that the basins operate as a Sequencing Bio-Reactor (SBR) would provide the required treatment improvements. This conclusion is based on the specific requirement to reduce concentration of ammonia at the outlet of the Plant.

Consultation with local iwi identified that only land disposal of treated wastewater was acceptable. Thus, only land disposal has been considered for the long-term disposal of treated wastewater from the Plant. Previous studies have assessed various land disposal locations against eight criteria, including topography, distance from the Plant, proximity to people, available land area, and power supply. A short list of two sites have been identified for further investigation.

Further investigation of the soils and hydrogeology of both disposal sites is required assess the suitability and define the discharge conditions such as nitrogen loading and hydraulic loading rates. Land would need to be purchased, or agreement reached with the landowners to use the land for treated wastewater disposal. Further planning requirements for the land and project funding would need to be addressed. From my previous experience I anticipate that these steps would take several years to complete.

I recommend a two-staged approach as a pragmatic way forward. This would involve short-term improvements to the existing treatment and disposal of wastewater, whilst a robust and sustainable long-term solution is put into place. I have concluded that upgrading the Plant with to an SBR process as a short term, interim solution would provide improved ammonia treatment and reduced effects on the environment. In parallel, robust investigations into long-term land disposal options should be undertaken.

<u>Conditions</u>

I have proposed changes to the conditions recommended in the s42a report, including the Monitoring Programme in Schedule 1. In summary I recommend:

- A dry weather day shall be defined as any day with less than 10 mm rainfall and that the ADWF not exceed 790 cubic meters per day.
- Within three years the preferred treatment to option reduce ammonia be implemented and have been operating for at least 1 year.
- Within three years a preferred option for the disposal of treated wastewater be identified and agreed.
- Within eight years the preferred discharge option for the disposal of treated wastewater be implemented.