Progress Towards a Preferred Option for Rotorua WWTP - beyond December 2019

Summary by Warren Webber, RPSC Chair 20th August 2015

Three Key Topics

A. Treatment Prior to Discharge
B. Consenting Challenges re TN & TP discharge
C. Actual Discharge Location & Affects Assessment

Treatment Prior to Discharge

Two treatment options have emerged as front-runners:

1. Option 3a

   WWTP base upgrade + denitrifying tertiary filtration + UV

   NPV $39.7m

1. Option 6b

   WWTP base upgrade + 100% MBR + extra P removal + UV

   NPV $37.2m

Option 3a

WWTP base upgrade + denitrifying tertiary filtration + UV

NPV $39.7m

Pros:

- Greatest potential TN reduction
  - TN: 2.63mgTN/L x 20ML current influent = 19.2tTN per year (target<30tTN per year)
  - TN: 2.63mgTN/L x 23.81ML projected influent Year 2051 = 22.9tTN per year (target<30tTN pa)
- Adequate TP reduction
  - TP: 0.20mgTP/L x 23.81ML projected influent Year 2051 = 1.7tTP (target< 3tTP)

Cons:

- Backwash requirement for sand-filter adds variability to performance
- Capacity risk under extreme events
- Technology proven overseas but not (yet) used in NZ
- UV can be effective for pathogen kill (unless filtration is bypassed), but is only a single barrier system to remove pathogens

Option 6b

WWTP base upgrade + 100% MBR + extra P removal+ UV

NPV $37.2m

Pros:

- Excellent TP removal. ie. 0.175mgTP/L x 23.81 projected influent = 1.5tTP (target< 3tTP)
- Makes full use of influent carbon in raw wastewater by bypassing the existing primary treatment tanks
- A **double barrier** (MBR + UV) to remove pathogens

Cons:

- TN removal is adequate **but** projected TN discharge for Yr 2051 **at limit of 30tTN acceptable level** (possible consent challenge?)
  - TN: 3.53mgTN/L x 20ML current influent = 25.8tTN per year (target<30tTN per year)
  - TN: 3.53mgTN/L x 23.81 projected influent Year 2051 = **30.7tTN** per year (target<30tTN per year)
- Hydraulically limited (can only pass a fixed amount through membranes, so membrane selection and adequate capacity is important). Note: management of capacity & storage can avoid this issue

Consenting Challenge re TN & TP discharge

Under **Option 6b** at 3.53mg/l and a 20ML discharge the upgraded plant would discharge approx. **26tTN p.a**.

Hypothetical "worst-case" scenario: for simplicity, assume 5yr for LTS Legacy Load to deplete, with 6tTN p.a. reductions

- 2019: WWTP discharge via LTS = max. 30tTN per year
- 2020: WWTP discharge 26tTN per year + max. 30tTN per year as LTS legacy load = 56tN
- 2021: WWTP discharge 26tTN per year + max. 24tTN per year as LTS legacy load = 50tN
- 2022: WWTP discharge 26tTN per year + max.18tTN per year as LTS legacy load = 44tN
- 2023: WWTP discharge 26tTN per year + max. 12tTN per year as LTS legacy load = 38tN
- 2024: WWTP discharge 26tTN per year + max. 6tTN per year as LTS legacy load = 32tN
- 2025: WWTP discharge 26tTN per year + max. 0tTN per year as LTS legacy load = 26tN

Discharge Location
& Affects Assessment of Discharge Location

Three discharge options have emerged as front-runners

1. **Puarenga Stream Discharge after Land Contact**
   a. Modest financial cost ($..m?)
   b. Significant cultural cost for iwi associated with the Puarenga (Ngati Hurunga Te Rangi, Ngati Hinemihi, Ngati Te Kahu, and Ngati Tumatawera)
   c. Improves dilution of discharge before reaches lake, and therefore has lowest risk of localised algal blooms in the lake
2. **Sulphur Bay Discharge after Land Contact**
   a. Modest financial cost ($..m?)
   b. Lesser cultural impact?
   c. Minimal dilution of discharge before reaches lake. Risk of algal blooms comparable to offshore option?
   d. Potential for constructed rock-bed (open) or gabion-baskets (exposed at ground-level only) through to lake shore
   e. Lined discharge channel to minimise infiltration of old dump site?
   f. How would this be configured?
3. **Offshore (2km) Lake Bed Discharge with Diffuser**
   a. Expensive (capital approx. $10m?)
   b. Possible increased risk of algal blooms compared to Puarenga option. Difference may not significant.
   c. How would this be configured?