

Te Mato Vai Project Management Unit / GHD  
Avarua  
COOK ISLANDS

Takau Rangatira Eric Short (Turangi),  
Robert Wigmore (Avarua)  
Te Vai Ora Maori  
PO Box 020 Muri, Rarotonga  
COOK ISLANDS  
justine@islandbooth.com

## **PACI TRIAL REGIME REQUEST**

7 Dec 2020

Kia orana,

A trial conducted according to scientific method requires baseline values against which to track change. Based on reporting to landowners on the trial-operation of Ngatoe (28 Sept - 11 Oct 2020) the sampling parameters and regime is inadequate.

To enable independent interpretation and evaluation of the PACI dosing system, the following is requested at all ten water treatment facilities.

### **1. Sample points**

Readings of (Turbidity, E. Coli, Dissolved Aluminium must be taken at all four treatment path sample points (see attached figure for approximate locations):

- A) Stream;
- B) Settling Tank (post PACI mixing);
- C) Post Settling Tank (end of tank);
- D) Post AVG (finished water).

### **2. Additional data for each sample**

- a) PACI dose (at time of sampling);
- b) weather conditions (e.g. streamflow, wind, operator notes e.g. *landslip recorded in catchment valley*);
- c) unique operator/manager identifier.

### **3. Water quality data to be collected *without* PACI dosing**

- a) Sampling should be conducted in all four waterflow states: *dry, wet weather, after rain, sustained dry* (after two weeks without rain).
- b) A minimum of two days of data collection before commencing chemical dosing.

### **4. Concurrent trial**

(Further to 3.) At facilities with dual chamber settlement tanks, and dual AVG filters, PACI should be dosed to one treatment path and not the other to enable direct comparison of operation with-, and with-out the use of PACI.

## **5. Environmental monitoring**

As per Environment Effects (*Information to support approval to commission Te Mato Vai Stage 2'* Nov 2019), in addition to dissolved aluminium, turbidity, and pH, the streamwater dataset to include:

- a) total hardness;
- b) dissolved organic carbon;
- c) dissolved oxygen.

These parameters impact on the bioavailability/toxicity of dissolved aluminium and provide an indicator of streamhealth.

## **6. Additional stream sampling/monitoring point**

Expert assessment (Mar 2020) identified the risk of overflow from the settlement tank mixing chamber.

- a) Records to be maintained of the incidence of overflow and the operational discharge from the settlement tank to the stream (from the mid level drain).
- b) Monitoring of dissolved aluminum levels.

## **7. Streamlife**

Appropriate indicator organisms (flora and fauna) must be identified to establish a biodiversity monitoring program. If PACI use is sustained, this program to be sustained for 18-24 months to account for inter-seasonal and inter-annual variation.

## **8. When releasing data, reports should include:**

- a) Test method (equipment/processing) for each water quality parameter.
- b) The Cook Islands standard for each water quality parameter.

*Figure (overleaf): Ngatoe treatment facility showing approximate location of proposed sample points.*

Kia manuia,