MEMORANDUM **Job 10684**

To:	Darren de Klerk, Central Hawke's Bay District Council (CHBDC)
From:	Katie Beecroft, Lowe Environmental Impact (LEI)
Date:	9 February 2021
Subject:	Porangahau and Te Paerahi Wastewater Discharge Concept

OVERVIEW OF PROGRESS TO DATE

Central Hawke's Bay District Council (CHBDC) is responsible for the management of wastewater from the communities of Porangahau and Te Paerahi. Porangahau has a pond treatment system with treated wastewater being discharged via a wetland drain to the Porangahau River. Te Paerahi has a pond treatment system with treated wastewater being discharged to sand dunes.

During the previous consent process, iwi gave a strong direction that discharge to the Porangahau River should be ceased. A preference for removal of the treatment system at Te Paerahi was also indicated, and this has subsequently been reinforced as an essential item to address the cultural sensitivity of the peninsula and its many wahi tapu. The Porangahau Environmental Management Team (PEMT) was established on commencement of the current consent. The PEMT identified potential treatment options for the two communities and recommended further investigation. Investigations were undertaken but were not able to be progressed at the time.

CHBDC entered into discussions and consultation with the community in 2019 to progress changes to the two treatment and discharge systems. The community reiterated the desire to avoid wastewater in the Porangahau River and to move the Te Paerahi wastewater treatment plant (WWTP). An updated investigation was carried out into the previously identified treatment options being:

- In- pond enhancements
- Post-pond enhancements
- Pond alternatives
- Natural treatment systems (e.g. worms)
- Chemical phosphorus precipitation
- Disinfection

Discharge options were also examined. Discharge to land emerged as the preferred means to stop the current discharges. Investigation was undertaken to determine the suitability of land within 10 km of the two plants to receive wastewater discharge. Feedback was sought from the community and iwi about areas that should be avoided. Following the investigation and meetings, specific properties were identified and land owners approached.

Site investigations were undertaken with interested land owners. Work is ongoing.

Discussions with iwi and land owners, and an archaeologist site visit are the start to investigating the sites occupation and use history. Work is ongoing.

The current consents for the two discharges are due to expire. CHBDCs plan is to apply for a transitional consent which will allow for the long term discharge to be refined to take account of:

- System sustainability (ensure can be operated to high standard for at least 35 years);
- Suitability for the community and environment (a system where there are resources locally to operate successfully);
- Acceptability to land owners and to Tangata Whenua (make sure design is compatible with the current and historic use of the site).

The proposed term for the transitional consent is 4 to 6 years. This allows for the consenting process, the detailed design, construction and commissioning of the new treatment plant and discharge system. Key dates are:

- System concept consented by **2022**
- Te Paerahi treated wastewater to new site (no discharge to sand dunes) by **2023**
- Porangahau treated wastewater to new site by **2025**
- Construction of new treatment plant by **2028**
- Te Paerahi and Porangahau raw wastewater to new treatment plant by **2029**
- Te Paerahi wastewater pond removed and remediated by **2030**

Some key information for the future discharge planning follows.

PORANGAHAU AND TE PAERAHI'S WASTEWATER

At Porangahau, wastewater is conveyed from the community to the oxidation pond adjacent to the Porangahau River at the end of Jones Street for treatment. Wastewater is discharged to a small drain flowing into the river.

At Te Paerahi, wastewater is conveyed from the community to the oxidation pond within coastal sand dunes. Wastewater is discharged from the plant to a small discharge field via soakage.

At both sites, over the course of the current consent, regular testing has occurred which has been used to predict future flows and wastewater quality. A detailed evaluation of the existing systems, alongside flow and quality characteristics is provided in:

> Beca. (2020:P:C.10a). Te Paerahi and Porangahau Options Report.

Following new population growth projections, future wastewater flows and quality were revised and are described in the memo:

> Beca. (2020:P:C.10b). Growth Impact Assessment – Small WWTPs.

The proposed future discharge anticipates that:

- Average annual and daily wastewater volumes for discharge at the start of the new consent will be **78,000 m^3/year and 214 m^3/day** for Porangahau and Te Paerahi.
- Average annual and daily wastewater volumes for discharge by the end of a 35-year consent term will be **153,300 m^3/year and 420 m^3/day** for Porangahau and Te Paerahi.

OPTIONS CONSIDERED

Options for the continuation or combination of the existing WWTPs, as well as treatment and discharge options were identified and evaluated. Details of the option evaluation are given in the report:

> Beca. (2020:P:C.10). Te Paerahi and Porangahau Options Report.

Options available for the discharge were presented to the community in March 2020. Here, the community expressed a clear preference for options which resulted in discharge to surface water being avoided. Under no circumstances will the community accept a continuation of the Te Paerahi discharge to sand dunes due to wahi tapu located extensively over the dunes and peninsula. Options which can include the participation from the community were favoured.

The CHBDC website provides a handy summary of the preferred options:

> https://www.chbdc.govt.nz/our-district/projects/the-big-wastewater-story/porangahau-and-te-paerahi-wastewater-system-upgrades/

Additional information regarding the upgrade programme is given in the memo:

> Lowe Environmental Impact. (2020:P:C.36). Te Paerahi and Porangahau – Community Wastewater Management into the Future – A Strawman Approach.

Following the directive from the community, CHBDC with assistance from LEI and Beca, set out to identify suitable land and interested land owners, and to determine a workable discharge regime.

SITE INVESTIGATED

A high level review of land suitability around the Porangahau and Te Paerahi WWTPs for irrigation of wastewater identified that land between the two communities, overlying the Porangahau River alluvial plain as well as coastal sand dunes was well suited to irrigation with wastewater. Details of this evaluation are provided in:

> Lowe Environmental Impact. (2021:P:B.11). Porangahau and Te Paerahi Wastewater Upgrade – Land Suitability for Discharge.

Following enquiries, land owners of suitable properties were approached and investigations were undertaken on a suitable property. Details for the selected property are as follows:

	Southern Parcel	Northern Parcel
Legal Description	LOT 2 DP 3877	LOT 3 DP 2741
Property Address	474 Beach Road, Porangahau	474 Beach Road, Porangahau
Map ref, centre of site	-40.293396°S, 176.651210°E	-40.288176°S, 176.654672°E
Area (ha)	75.3	32.5
Distance to Porangahau WWTP (km)	3.3	4.1
Distance to Te Paerahi WWTP (km)	2.4	3.8

The location of the site is shown below.

Further details of site investigations are given in the report:

> Lowe Environmental Impact. (2021:P:B.15). Evaluation of Soils to Receive Porangahau and Te Paerahi's Wastewater.

The investigation identified two main soil types across the property, dominantly clayey and dominantly sandy. Field measurements did not indicate any limitations to an agronomic (for plant use) rate of irrigation to the soil surface but noted that high groundwater and lower permeability soils to the southwest of the site will have a shorter irrigation season.

DESCRIPTION OF THE DISCHARGE ACTIVITY

The discharge system is planned to be developed over time to manage the cost and to allow for the approvals, design and construction. Priority is to be given to Te Paerahi wastewater to stop of discharge to the sand dunes as quickly as possible. The key stages of the system development will result in discharge portioning as follows.

Initially the current discharges will continue while a pipeline is installed from the Te Paerahi WWTP to the land for discharge (2021-2022). At the same time, around 4 ha of irrigation will be installed on the discharge property. A high rate system such as a wetland or overland flow system will be installed if funding allows (MfE Freshwater Improvement Fund).

At the commencement of the discharge, only Te Paerahi's wastewater flows will be applied to land, with Porangahau's discharge being incorporated at the second stage (2023-2025). The third stage is the development of a new treatment system for the combined wastewater flows from both Porangahau and Te Paerahi and the construction of a storage pond for the treated wastewater to avoid discharge to the land when it is too wet (2025-2029). A summary of the construction at each stage is as follows.

Stage	Asset	Date Range
1	Pipe from Te Paerahi WWTP to land discharge area	2021-2022
	Establish high rate land dispersal	
	Establish initial irrigation	
2	Pipe from Porangahau WWTP to land discharge area	2023-2025
	Establish remainder of irrigation	
3	New combined WWTP and storage	2025-2029
	Remove Te Paerahi WWTP	

The wastewater volumes going to the different discharge environments (direct to river, to high rate discharge and irrigated to land) are shown in the following table

Discharge component		Stage			
		1	2	3	3 (future flows)
Date for development		2021-2022	2023-2025	2025-2029	2048
Community		Porangahau & Te Paerahi*	Porangahau & Te Paerahi	Porangahau & Te Paerahi	Porangahau & Te Paerahi
Average annual volume (m^3)		78,000	78,000	78,000	153,300
To River (m^3)		53,000	Up to 12,000	0	0
To High Rate Land Passage (m^3)		Up to 25,000	Up to 25,000	Up to 5,000	Up to 5,000
To Land	**Area (ha)**	6 ha	15 ha	40 ha	40 ha
	Volume (m^3)	Up to 25,000	Up to 60,000	Up to 78,000	Up to 153,300
Storage available (m^3)		0	500	35,000	55,000

*For the first stage, only Te Paerahi's wastewater flows are being directed to either the high rate land passage or to land for irrigation. All of Porangahau's flows (53,000 m^3) are still being discharged to the river. It is only when the second stage becomes operational that Porangahau's flows can be discharged to land.

River Discharge

Details of the Porangahau River flow regime, existing water quality in the Porangahau River and impact of the current discharge on the Porangahau River water quality is given in the report:

Beca. (2020:P:B.24). Water Quality Assessment: Porangahau River.

The discharge will continue with minor improvements such as re-engineering of the current wetland drain to ensure it functions as a proper wetland, for the term of the transitional consent as described in the forthcoming report:

Beca. (2021:P:D.25). Water Quality Effects Assessment: Porangahau River.

Land Discharge

There are two land discharge options proposed. One is a high rate discharge that will result in a small amount of additional treatment of the wastewater and a more diffuse discharge to the Porangahau River near to the irrigation site. The second is irrigation at a low rate to supply water and some nutrients to plants for growing.

The proposed irrigation regime for each stage is the same. The difference between the stages is that over time there is an increase in the amount of land that can be irrigated, also that the

wastewater available to irrigate increases as Porangahau wastewater is piped to the site and the amount of storage increases. The controls on the discharge to land are:

- Wastewater available on any day to discharge;
- A maximum discharge of 15 mm to 20 mm for any irrigation event for clay and sandy soils respectively (to supply plant requirements);
- Not to be applied when soils are wet (to avoid excessive drainage and to optimise plant use of applied water). This is determined from irrigation record, rainfall records and soil moisture measurement).

In a typical year this will result in an average annual application of 400 mm, similar to typical irrigation in the district. The table above allows for as little as 150 mm to be applied in a year or to discharge 500 mm to the sandy soils. This would result in an average nutrient loading to the site of around:

- 23 to 75 kg N/ha/year; and
- 8 kg 25 P/ha/year.

These nitrogen (N) and phosphorus (P) loads are below requirements for most farming land use and it expected that fertiliser will be needed. The appropriate nutrient loads to the site can be determined using Overseer™ (or similar nutrient modelling software) to ensure that adverse environmental effects can be mitigated while supplying sufficient nutrients for plant growth.

Storage

Storage enables the timing of irrigation or river discharge to be controlled so that:

- Discharge to the high rate system is avoided when the river is in low flow and is particularly sensitive to nutrient inputs;
- Discharge doesn't occur to wet soils when they are vulnerable to damage or to excessive drainage to groundwater and subsequently surface water.

The proposed location for storage to be constructed is to be determined but may be adjacent to the new wastewater treatment plant location or developed in natural hollow landforms towards the north of the irrigation property.

IN CONCLUSION

This memo provides a summary of the proposed changes to the management of the Porangahau and Te Paerahi WWTPs. The following reports provide a more detailed description of the information summarised here:

- Beca. (2020:P:B.24). Water Quality Assessment: Porangahau River.
- Beca. (2020:P:C.10). Te Paerahi and Porangahau Options Report.
- Beca. (2020:P:C.10a). Growth Impact Assessment – Small WWTPs.
- Lowe Environmental Impact. (2021:P:B.11). Porangahau and Te Paerahi Wastewater Upgrade – Land Suitability for Discharge.
- Lowe Environmental Impact. (2021:P:B.15). Evaluation of Soils to Receive Porangahau and Te Paerahi's Wastewater.
- Lowe Environmental Impact. (2020:P:C.36). Te Paerahi and Porangahau – Community Wastewater Management into the Future – A Strawman Approach.

- https://www.chbdc.govt.nz/our-district/projects/the-big-wastewater-story/porangahau-and-te-paerahi-wastewater-system-upgrades/

Some of these reports are still in progress. Where available, completed reports are included in this package of information. If you have additional queries, please contact the project team.