MEMORANDUM **Job 10584**

To: Sarah Burgess

From: Katie Beecroft and Henry van der Vossen

Date: 20 May 2020

Subject: Walker Road – Rapid Infiltration Basin – Conceptual Design

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Good Morning Sarah,

Following on from your discussion with Katie yesterday, this memo gives a high level summary of the discharge concept for wastewater from Otane, Waipawa and, for one option, Waipukurau. This memo is focussed on the discharge to 51 Walker Road. Further detail of the discharge to Ford Road is to follow.

BACKGROUND

The proposed system and progressive stages will allow for the full discharge of being up to 4,500 m^3/d of flow from Otane, Waipawa and Waipukurau to be assessed in the two options, as follows:

- Option A: Upgrade Waipawa's WWTP to receive combined Waipawa and Otane wastewater, with discharge to rapid infiltration basins (RIBs) at a site on Walker Road. Separately upgrade Waipukurau WWTP with discharge to RIBs at a suitable site (Ford Rd). Otane WWTP to be decommissioned.
- Option B: Flows from all three catchments sent to an upgraded WWTP at Waipawa. Discharge to RIBs at Walker Rd. Otane and Waipukurau WWTPs to be decommissioned.

LEI has developed the design using the same wastewater flows as you, but we have used the 2015 to 2019 flows and projected these through to 2028 and 2048 using the Beca Basis of Design percentage growth. Allowing for the development of the monthly average flow profile, in which the highest individual monthly average was used for the design of the Rapid Infiltration Bed (RIB).

STAGING

The RIB development is staged to initially receive Otanes treated wastewater (to address the requirements of the current Otane discharge resource consent). Stage 2 allows for the discharge of wastewater treated to the current (with minor upgrade) quality from Waipawa and Otane (to 2028 flows). Stage 3 allows for the discharge of wastewater from the new plant to 2048 flows, and allows for Waipukurau flows to be discharged to the RIB system.

It is important to note that the flow designs are very slightly different from the Beca Report due to the method of analysis using the maximum monthly flows. This allows for sustained higher than average flows expected over the winter months. The area of each RIB is assessed for the irrigation rate of 200 mm/day. However, this may change once the groundwater investigation has been completed and could result in a higher or lower hydraulic loading being applied. Correspondingly, the total area of the RIB may increase or decrease as necessary to manage the hydraulic load.

The final conceptual design will incorporate

- Provisions of buffers to the property boundary;

- Results of geotechnical assessments of potential for an impact on the stopbank structural integrity; and
- Groundwater mounding model results under and around the discharge site.

Indicative discharge basal areas for each stage are given in Table 1. The areas are the minimum requirement for a daily discharge of 200 mm.

Table 1: Staged Land Area Requirements

Site	2028		2048	
	Maximum Monthly Flow (m^3/d)	Required RIB Area (ha)	Maximum Monthly Flow (m^3/d)	Required RIB Area (ha)
Otane (Stage 1)	222	0.11	245	0.12
Waipawa (Stage 2)	1,467	0.73	1,496	0.75
Waipukurau (Stage 3)	-	-	3,090	1.54
Sum	1,690	0.84	4,832	2.42

If Option B is selected, then the Stage 3 upgrade of the Waipawa WWTP and Walker Road will occur. The WWTP will be designed for the 4,500 m^3/d assessed by Beca. The larger 4,832 m^3/d used for the RIB sizing is due to the highest month daily average being used as noted previously.

RIB LOCATION

Figure 1 shows the south western portion of the 51 Walker Road site. Site investigations and subsequent groundwater background research has identified the area outlined in blue as being most suited for positioning a rapid infiltration system based on the soil and groundwater properties. In total it occupies 3.4 ha and would, therefore, be suitable for the discharge of the communities' wastewater. Buffers are required from the stopbank (western property boundary), property, boundaries and public accessway. The size of these buffers are dependent on the final RIB design.

The representative areas for each of the three stages are also shown in **Figure 1**. Stage 1 (0.12 ha) is shown in Pink, Stage 2 area (0.90 ha) is shown in light blue, and the Option B (or Stage 3) area of 2.42 ha is shown in Green. The Stage 2 development will allow for discharge through to 2048 if Waipukarau is not connected to the network.

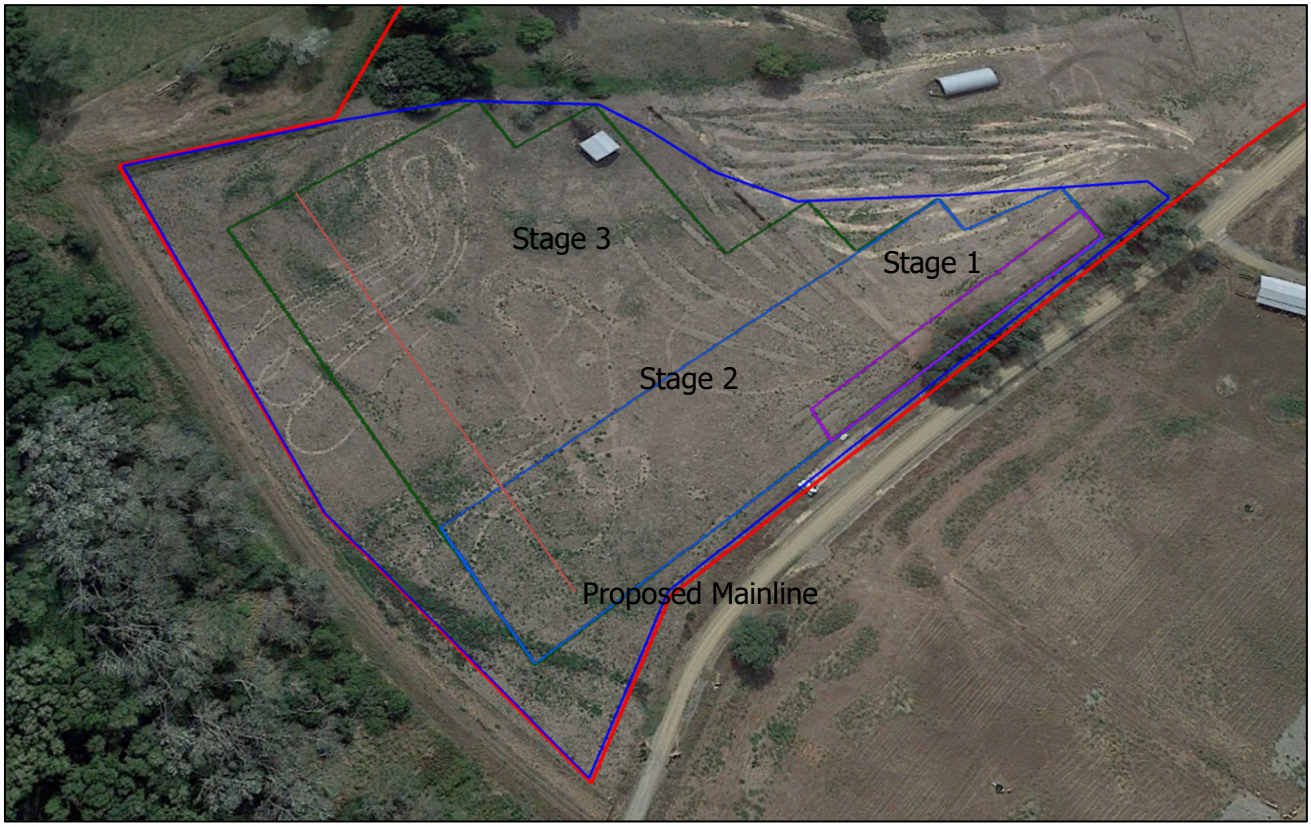

Figure 1: Potential Stage development of Rapid Infiltration Basin

RIB APPLICATION METHODS

The site is considered to be well suited to gravity drainage systems. Three types of rapid infiltration methods considered are a conventional bubble up discharge to a high permeability basin, low pressure effluent dosing (LPED) and dose and drain (DaD). All allow for natural soil drainage at very low or gravity pressure. A discharge basin allows fo easy maintenance access. The latter two methods allow for the treated wastewater to be discharged below the topsoil layer. This may be a benefit due to the proximity of the public accessway.

STORAGE AND FLOW BUFFERING

Flows from Waipawa and Waipukurau are known to have very high peaking factors. Given the availability of land for storage at the Walker Road site and the potential to repurpose the treatment ponds at Waipawa following the plant replacement, the cost of providing buffer storage to enable the discharge to be maintained at a monthly average is likely to be less than for a system designed around peak flows.

Configuration of storage is yet to be decided pending decisions about pipe and pump sizing. It is expected that these decisions will be iterative amongst the RIB (LEI) and reticulation (Beca) teams.

SUMMARY

Overall, it is concluded that the proposal will provide for the design flows and allow for staged development to occur as planning and funding permit. The full assessment of the groundwater is still waiting on the bores to be installed; however, a more in-depth preliminary assessment has been carried out.

Please contact Katie or myself if you have any further queries.

Yours sincerely

Lowe Environmental Impact

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