

WA Ref: WA/004

Date: 13 September 2022

To: Rebecca Sanders

cc: Karl Cook, Barker and Associates
Kelsey Bergin, FRL

From: Robert White

Re: Riverhead – Response to Clause 23 - Wastewater

6.	Wastewater
6.1.	<p><i>Pressure systems are currently causing significant operational issues and expense. Please provide a more detailed assessment of the operation of the current system, including the need for plan change provisions that better manage the operation of private grinder pumps, including the broader use of smart meters that may improve operational outcomes, to avoid adverse effects on the network including odour and septicity. These are already proposed for The Botanic retirement village in Silverdale and could be applied more widely.</i></p>
	<p>Current issues are caused due to a number of factors that do not relate to the proposed plan change. Pressure sewers require sufficient flow to ensure that velocities are achieved (to prevent sedimentation and limit retention time, with these factors leading to anaerobic behaviour and issues with odour and septicity).</p> <p>Current issues have been caused by the following factors:</p> <ul style="list-style-type: none"> • Kumeū / Hupai and Riverhead were designed for an ultimate population, and at 220 L/person/day (rather than a recorded 140 L/person/day) using the probability method (which designs for maximum number of operating pumps at any one time – i.e., the 99.99th percentile of time). Recent studies suggest that the 99th percentile results in less than 60% of the number of pumps running at any one time than the maximum predicted by the probability method. 1% of the time is 15 minutes a day; and • Slow uptake of connections due to high cost to connect.

	<p>Combined, these factors have resulted in low flows relative to the design, settlement / sedimentation, high retention times, odour and septicity.</p> <p>The addition of more properties, designed using dynamic modelling rather than the probability method and adopting recorded actual per capita flows (~140 L/person/day with appropriate peak day factor), will improve the situation by increasing velocities and reducing residence time.</p> <p>New pressure sewer reticulation for the plan change area would be designed using dynamic modelling and appropriate design flows (and in accordance with the CoP) to ensure that sufficient velocities are achieved and retention times minimised.</p> <p>Additionally, the current issues at Riverhead Wastewater Pump Station are more due to the Kumeū / Huapai connection, rather than the Riverhead catchment. Due to the significant distance between the eastern end of Kumeū / Huapai and the Riverhead WWPS (280 DN PE pipe approximately 2.5km), required velocities are not achieved in the pipeline without the use of the flushing water booster pumps, and the length of pipe results in high residence times. If a terminal pump station was built at the eastern end of Kumeū / Huapai, which stored a volume of wastewater and then pumped it through the pipeline at the required velocity, flushing water would not be required.</p> <p>The wider adoption of a smart pressure sewer system is covered under item 6.3, as below.</p>
6.2	<p><i>Previous discussions circa 2020 identified a preferred option which continued the low-pressure sewer system rather than a gravity system. There are design issues to be worked through with the expected yield of 2,000 DUEs. An additional pipe may be required, and this should be addressed as a part of the Plan Change. Please address how this will be provided.</i></p>
	<p>There are twin pipes from the Riverhead Road / Coatesville Riverhead Highway intersection to the Riverhead Wastewater Pump Station (WWPS), of circa 100mm and 200mm diameter. At this time only the 100mm diameter pipe is in use. It is understood that Watercare is currently in the process of switching from the 100mm pipe to the 200mm pipe as the 100mm pipe is adding significant friction loss, resulting in pumps working at higher pump heads than appropriate. This is only now the case, after the system has been in operation for over ten years. The two pipes will provide sufficient capacity to the Riverhead WWPS for servicing the existing area and the Future Urban Zone.</p>

There is a single pipe from the Riverhead WWPS to the gravity connection in Whenuapai. Based on the proposed staging, as detailed below, this pipe can service the full 2,000 dwelling unit equivalents (DUE) anticipated (in addition to growth within the “live zoned” land in Kumeū, Huapai and Riverhead):

Stage 1 – No upgrades required:

- The Botanic Retirement Village is proposed to be serviced by a smart pressure sewer system that is programmed to not discharge during peak flow periods (i.e., 06:00 to 09:00 and 18:00 to 20:00).
- A further 1,000 DUE, serviced via conventional pressure sewer systems can be achieved (i.e., not programmed).

Stage 2 – Pump Upgrade

- Upgrading of the pumps within the Riverhead WWPS from a duty point of ~64 L/s at 56m pump head to 80 L/s at 79m pump head is proposed.

Stage 3 – Additional operational storage

- The addition of further operational storage within the Golf Club carpark is proposed, as originally designed.

Flow into / out of the Riverhead WWPS can be monitored to determine when the respective upgrades are required, i.e., when peak inflow over 60 minutes matches current pump duty point, larger pumps are to be installed.

It is noted that to service the proposed growth of Kumeū / Hupai, with approximately 800 ha designated Future Urban Zone, it is proposed (by Watercare) to divert flows from Kumeū / Hupai to Redhill and away from the Riverhead WWPS. When this occurs, it would effectively free up in the order of 2,500 DUEs from the Riverhead WWPS. Therefore, any upgrade of the Riverhead WWPS or construction of a duplicate rising main would become a sunk / wasted cost.

In order to minimise carbon and cost (in line with Watercare's 40:20:20 goal: a 40% reduction in construction carbon, a 20% reduction in costs and a 20% year-on-year improvement in wellbeing, health and safety) it is proposed to maximise the use of existing assets, rather than build new, ahead of Kumeū / Hupai being separated from Riverhead.

Reference: GHD, Riverhead Future Urban Zone Water and Wastewater Servicing Strategy Development, Riverhead Landowners Group, 28 June 2022

<p>6.3.</p>	<p><i>The smart system can mitigate effects on the network by programming the pumps not to operate during daily peak flow. The proposed development of the first 1,000 DUEs, can be serviced through the existing Riverhead pump station ahead of planned abandonment of the Whenuapai Village pump station. Please address whether smart pumps will be provided and whether the development will be staged around the provision of wastewater infrastructure.</i></p>
	<p>Smart pressure sewer pumps are proposed for the Botanic Retirement Village, Riverhead, as it is a private development with a single entity owning all the pump units and agreeing to the proposed programming of pump to only operate outside of peak flow periods.</p> <p>With the current pressure sewer ownership model, household pumps are privately owned and operated, and thus Watercare do not have control over their operation.</p> <p>The modelling undertaken by GHD has shown that the proposed 2,000 DUE can be serviced by the strategy / staging as detailed above. The adoption of a smart pressure sewer system throughout the development is therefore not required from a technical perspective.</p> <p>It is acknowledged that the adoption of a smart pressure sewer system provides additional benefits such as programming, remote control (i.e., isolation for maintenance) and allows inflow and infiltration to be determined on a house-by-house basis (water demand from a digital water meter can be compared to wastewater outflows).</p> <p>If alternative ownership options were adopted, to provide a consistent level of service to householders connected via gravity or serviced via pressure sewer system, such as Watercare ownership of the on-plot infrastructure / household pump stations, the option to adopt smart pressure sewer systems would be more feasible.</p> <p>To adopt a smart pressure sewer system, whilst retaining private ownership, or under an alternative ownership structure, is potentially achievable, but would require further steps to implement.</p> <p>Reference: GHD, Riverhead Future Urban Zone Water and Wastewater Servicing Strategy Development, Riverhead Landowners Group, 28 June 2022</p>

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