

Technical Memo

Beachlands South Private Plan Change Fast-Track Application

Wastewater Collection and Treatment Summary Beachlands South Limited Partnership (BSLP)

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1. INTRODUCTION/SUMMARY

GWE has been engaged by BSLP to develop a concept design for the required collection and wastewater treatment to service the Beachlands South Private Plan Change (PC88), which rezones approximately 307 hectares of land from Rural Countryside Living to a series of residential and business zones and Future Urban zone. PC88 was granted by independent hearing commissioners on 12 April 2024. This memo has been prepared to support the listing application for Schedule 2A of the Fast Track Bill for the live-zoned land at Beachlands South, being approximately 160 hectares, "the Project".

The collection system for the proposed development has been developed with a focus on practicality, reliability and site-specific factors in accordance with PC88. The wastewater treatment solution has been developed with a focus on proven and best practice treatment, reliability and regulatory compliance.

- A low pressure sewer (LPS) system is proposed as the collection system for the proposed development.
- A membrane bioreactor (MBR) wastewater treatment plant (WWTP) is proposed to treat wastewater to a very high degree.
- There are viable options for the discharge of the highly treated wastewater, including the following:
 - Land disposal (Live Zone only) – irrigation of the 9-hole golf course area and land that is zoned as the future urban zone (FUZ) through pressure compensating dripper irrigation (PCDI). PCDI wastewater disposal is a common method of wastewater disposal within Auckland and New Zealand.
 - Polishing wetland and discharge to a coastal marine area (CMA) – A series of tertiary polishing wetlands will provide further treatment of wastewater, prior to discharging to a permanent stream subsequently to the CMA.

- A potential alternative to the standalone MBR system and associated on-site disposal is to discharge raw wastewater to Watercare’s Beachlands wastewater treatment plant (B-WWTP) for treatment and discharge. Detailed discussions with Watercare have progressed well with regard to this option. This is the current preferred option for servicing the development site.

2. METHODOLOGY

GWE’s methodology has incorporated a detailed approach to ensure the wastewater collection and treatment systems are efficient, reliable, and capable of meeting anticipated demands;

- Wastewater design philosophy: the wastewater strategy for the proposed development in line with PC88 is based on a philosophy of reliability and independence, with best-practice and proven solutions.
- Wastewater flow and load calculations: GWE has undertaken calculations to accurately estimate the future wastewater flows and loads from the site. The calculations were based on the anticipated development within the site and reference documents representing best practices and established standards in New Zealand’s wastewater sector.
- Wastewater collection: GWE investigated a number of potential reticulation options, including LPS systems and conventional gravity sewer systems. A series of specific key factors were used to evaluate the systems, with an LPS system determined to be the most practical option.

Wastewater treatment: GWE investigated a number of potential treatment options, including an MBR and other conventional treatment options. Based on the key drivers for the PC88, including regulatory compliance and providing best-practice and proven solutions, an MBR WWTP was proposed.

- Wastewater discharge:
 - The land discharge option reviewed key hydraulic and nutrient loading criteria and incorporated separation distances to key features in accordance with established standards in New Zealand’s wastewater sector.
 - The discharge to a CMA option incorporated assessments and design by Tonkin & Taylor, including further removals of key nutrients including nitrogen and phosphorus.

3. CONTEXT

The existing Beachlands and Maraetai areas, including the Beachlands 1 Precinct development are serviced by the B-WWTP. The existing discharge consent for the B-WWTP is due for renewal on 31 December 2025. Watercare have identified the B-WWTP is operating close to its peak capacity.

Watercare are currently in the process of reviewing the future infrastructure needs of the area and investigating upgrades to the B-WWTP to support growth in the area and a renewed discharge consent.

While a connection to the B-WWTP is the preferred option for the proposed development, a standalone solution was also pursued, with the following being taken into consideration to ensure a robust and reliable standalone wastewater solution for the site:

- Technology selection – GWE have selected modern and robust technologies for both wastewater collection and treatment. The technologies selected have also been proven in New Zealand.
- Best practice design – GWE’s design has focused on an approach that leads to improved environmental outcomes by providing a very high level of treatment, well above the standard quality of discharges from wastewater treatment systems within New Zealand.
- Regulatory compliance and planning – The wastewater systems have been designed in alignment with the Resource Management Act (RMA) and guidelines that regional authorities refer to. The systems have been carefully designed to balance development needs with the imperative to protect the local environment.

4. PLAN CHANGE 88

The following summary outlines the key components of a standalone wastewater system.

- Wastewater Collection – LPS System
 - This system requires a pump chamber containing a grinder pump on each lot (or cluster of residential/commercial buildings). The pump chamber is connected to a pressure main which transfers wastewater to the WWTP.
 - LPS systems are reliable, typically require no intermediary pump stations, have minimal infiltration and inflow (I&I), and have a lower risk of odour than other methods of reticulation. These systems are also less constrained by site topography and therefore offer greater flexibility in the siting of the wastewater treatment system.
- Wastewater Treatment – MBR System
 - The MBR process will biologically treat the wastewater, with the membranes acting to separate any solids from the wastewater before it leaves the process. The system will be configured to optimise nitrogen removal and remove phosphorous. Whilst the membranes act as a physical barrier to most pathogens, ultraviolet (UV) disinfection will also be incorporated to further reduce pathogens in the treated wastewater.

- All odour generating processes at the proposed MBR WWTP will be connected to an extraction system, with odour treated by an odour control system.
- The WWTP site is bounded on three sides by native bush and will be planted out on the fourth side to reduce visual intrusion. It is also outside the 1 in 100 year flood plain to ensure the site’s resilience.
- Wastewater Discharge
 - The land discharge option utilises PCDI to irrigate a 9-hole golf course area and FUZ land. The disposal system is designed to cover the peak flow.
 - A land discharge would permit the sustainable irrigation of the golf course area and provide essential water and trace nutrients to maintain vegetation, particularly during dry periods. Opportunities for re-use (subject to regulatory acceptance), including the irrigation of native plantings and forestry areas were also considered in order to have a sustainable wastewater management strategy.
 - Polishing wetlands would also be included within the golf course to provide aesthetic benefits and permit the storage of treated wastewater prior to irrigation.
 - The discharge to a CMA option would include a vertical flow wetland (VFW) followed by a surface flow wetland (SFW) to permit further polishing, providing additional nutrient removal. Following the additional treatment, wastewater is discharged to a permanent stream which then discharges into a CMA.

Where a connection to the B-WWTP is pursued, a separate MBR WWTP and discharge would not be necessary.

5. PROPOSAL

The following table summarises the anticipated flows from the land subject to PC88.

Table 1: PC88 - Anticipated Flows

STAGE	HUE	DESIGN FLOW ¹
Live Zone	2,900	1,500 m ³ /d

Notes:

¹Includes an allowance of 15% for commercial, community and mixed-use developments.

The following table summarises the key components of the proposed wastewater infrastructure for the proposed development, outlining the elements designed to service the development efficiently and sustainably:

Table 2: Proposed Wastewater Infrastructure Summary

ITEM	OPTION	DESCRIPTION
Wastewater Collection LPS System		Grinder pump chambers installed on each property/cluster of properties.
Wastewater Treatment and Discharge	MBR WWTP and on-site discharge to land	Highly treated (nutrient removal and disinfection) wastewater discharge to the 9-hole golf course and FUZ land.
	MBR WWTP and on-site discharge to a CMA	Highly treated (nutrient removal and disinfection) wastewater discharge to polishing wetlands and to a CMA.
	Discharge to Watercare's B-WWTP	Wastewater would be collected and transferred to Watercare's B-WWTP for treatment and discharge.

6. ASSESSMENT OF EFFECTS

The design of wastewater infrastructure for the proposed development has focused on mitigating potential environmental and operation effects. Key details are as follows:

- The LPS system is a robust and reliable method of reticulation and has been assessed by GWE to be the most appropriate based on a series of key factors and an evaluation of potential alternatives.
 - The LPS system ensures minimal I&I occurs, preventing large flows sourced from stormwater and groundwater (particularly during wet weather) that can adversely impact the WWTP.
 - The LPS system is able to fully service the catchment while minimising the requirements for additional reticulated related infrastructure.
- The MBR WWTP provides for best practice treatment and the expected effluent quality far exceeds the standard quality of discharges from wastewater treatment systems within New Zealand. This is consistent with the development's approach to ensuring improved environmental outcomes and mitigating potential effects.
 - The MBR WWTP is expected to consistently and reliably achieve stringent effluent quality limits.
- Discharge of highly treated wastewater
 - A land discharge would permit the beneficial reuse of wastewater and is consistent with the wider sustainability objectives of the development.
 - A discharge to the CMA area would involve polishing of the treated wastewater through a series of wetlands, further improving quality.
- A potential alternative to the standalone treatment and discharge option is the discharge to Watercare's B-WWTP which would permit an integrated approach (with the wider Beachlands area) to wastewater management.

7. CONCLUSION

In conclusion, GWE have adopted accepted engineering methodologies while preparing the wastewater collection and treatment concept for the proposed development on the land subject to approved PC88.

By focusing on proven and best practice treatment, reliability and regulatory compliance, the proposed wastewater system is able to service the site whilst providing for improved environmental outcomes and mitigating potential effects.

8. LIMITATIONS

This report has been prepared for the sole benefit of Beachlands South Limited Partnership as our Client, and their appointed representatives, according to their instructions, for the specific objectives described herein. This report is qualified in its entirety and should be considered in the light of our Terms of Engagement with the Client and the following:

- a. Data or opinions contained within the report may not be used in other contexts or for any other purpose without our prior review and written agreement. Any reliance will be at the parties' sole risk.
- b. No responsibility is assumed for inaccuracies in reporting by the information providers. In no event, regardless of whether GWE's consent has been provided, does GWE accept any liability, whether directly or indirectly, for any liability or loss suffered or incurred by any third party to whom this report is disclosed placing any reliance on this report, in part or in full.
- c. GWE has relied on information provided by the Client and by third parties to produce this document and arrive at its conclusions. GWE has not verified information provided (unless specifically noted otherwise) and we assume no responsibility and make no representations with respect to the adequacy, accuracy, or completeness of such information.

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