

MEMO

AUTHORS [REDACTED]

COPIED TO [REDACTED]

DATE 29 May 2023

TOPIC **HIGH LEVEL STATEMENT ON CAPACITY OF SWDC WASTEWATER TREATMENT PLANTS WITH RESPECT TO THEIR CAPABILITY TO SUPPORT GROWTH**

Summary

South Wairarapa District Council have requested a statement on the current capability of the wastewater treatment plants (WWTP) to compliantly treat wastewater and support growth within their respective catchments. This memo outlines Wellington Water’s high-level assessment of these plants, based on available data at the time of its preparation, with further investigations due to take place at a project level.

In summary, all four of the plants are at or beyond design capacity for at least one element of consent compliance (refer Table 1) and therefore pose risk to SWDC’s capacity to support growth and achieve the Community Outcomes of the Long-Term Plan.¹

Regulatory enforcement action is increasingly likely and remains a factor outside of Wellington Water’s control.² Within the level of funding provided, every effort is being made by Wellington Water to manage the risk and operate the plants compliantly.

Wastewater Treatment Plant compliance is technical and complex, Wellington Water is happy to support this memo with any further information (webinar, meeting etc.) that could assist in SWDC’s understanding of the risk the WWTPs pose to the district’s growth.

Table 1: Summary of available capacity for growth for key factors

| Plant | Hydraulic loading | Organic loading | Nutrient loading |
|---------------|-------------------|--------------------------|------------------|
| Martinborough | N | N | N |
| Greytown | N | N | N |
| Featherston | N* | Y (to 2032) ³ | Y |
| Lake Ferry | N | Y | N |

*Based on the 2022-2023 level of inflow and infiltration observed at the Featherston WWTP.

1 Community Outcomes detailed in SWDC Long Term Plan 2021-31

2 SWDC Active Risk Dashboard Quarter 2 2022/23

3 The Featherston plant capacity is dependent on the upcoming resource consent renewal, which is only forecast to cater for growth to 2032.

Featherston WWTP

The 2023 estimated population⁴ of Featherston is 2534. The plant is operating under the expired 2012 consent; a new discharge consent application was lodged with Greater Wellington Regional Council (GWRC) in May 2023. Note that the final conditions for the receiving environment from the current resource consent process are not yet approved.

The resource consent application defines the current pond organic loading rate as 74 kgBOD/ha/day, which is within the design capacity of the ponds. The organic loading rate of the pond treatment system is currently projected to be reached around 2032, allowing for growth at the 50th percentile population projections, as described in the consent application.

The Featherston WWTP experiences a high degree of inflow and infiltration into the wastewater network during wet weather, which can peak at over 10 times the dry weather flow. The wet weather discharge volume is the main capacity risk at the Featherston WWTP; both the discharge to Donald's Creek and the proposed land-based disposal route are driven by the need to manage the extreme wet weather volumes. The wet weather volumes may become limiting on growth, depending on what resource consent limits are approved in the new consent, noting that the recent summer has exceeded the basis of design. Currently there are no improvements underway to manage I/I on the scale required to mitigate the inflow and infiltration problem.

The consent approval process currently underway will better inform the long-term suitability and acceptability of the proposed dual-receiving environments, and therefore the required capacity of the WWTP to cater for growth in Featherston beyond 2032.

Greytown WWTP

The 2023 estimated population of Greytown is 2595. The impact of seasonal loads is not well understood at this stage. The plant is operating under Stage 1B of its resource consent which expires in 2051. Pond based wastewater treatment processes with dual discharge routes (to water and land) are complex interactive systems for which it is difficult to explicitly define their capacity.

The primary facultative pond is operating beyond its design capacity⁵. The primary facultative pond is 1.85 hectares which has the capability to treat the wastewater load from approximately 2200 people. There is a subsequent 1 ha pond at Greytown; the current additional BOD and solids are in effect treated within this second pond. However, there is a point where relying on the second pond for adequate organic load treatment is not tolerable, as it will result in non-complying odour from the primary pond. Therefore, the current arrangement is considered at capacity.

The need to desludge these ponds remains a critical operational measure for providing minimum water depth conditions for optimal treatment performance. Once desludging has occurred, pond upgrades to provide additional treatment capacity (such as aerators or baffling) can be safely installed on the pond without adverse effect on other treatment aspects. Adding this equipment to the pond could unlock additional potential for growth in Greytown but the design team engaged must define what is possible on this pond system, in line with the results of a growth study defining expected future loadings.

The effect of operating the Greytown WWTP above its design capacity is best determined by the level of nutrients discharged from the treatment plant. Nutrients are not treated within a pond-based treatment process. Currently the concentration of a particular form of nutrient – ammonia – and its effect in the

4 Population data for Featherston, Greytown & Martinborough supplied by South Wairarapa District Council. Figures used are from spreadsheet "Pop_by_SA2_annual.csv", 50th percentile values for 2023. Lake Ferry population data is not available, number of dwellings has been used instead.

5 Primary facultative design loading rate of 89 kg BOD/ha, at a winter temperature 9°C. The design Biochemical Oxygen Demand (BOD) contribution per person is 75 g BOD/person/day.

receiving environment is under investigation. The consent condition for maximum ammonia concentration in the Papawai Stream downstream of the discharge point will be non-compliant for the period ending 30 June 2023. Specialist ecological monitoring undertaken in 2023 also shows evidence that the treated effluent discharge to Papawai Stream is having an ecological effect downstream of the discharge point. Stream ecology is affected by a wide variety of parameters outside the control of the WWTP; the discharge to Papawai Stream should be considered against long-term monitoring and effects, rather than one-off results. Although the consent only requires quantitative reporting on these advanced ecological parameters, it is highly likely that the impending investigation results will receive further attention from the regulator, GWRC. Further population growth in the network would be expected to exacerbate these effects.

For the current compliance period (1 July 2022 – 30 June 2023), the plant is expected to be non-compliant with its annual average discharge volume of 750m³/d to the Papawai Stream. Further regulatory attention to this condition can be expected.

The plant discharges treated effluent to the Papawai Stream and the adjacent Stage 1B 35-hectare land irrigation area. Use of the irrigation area is shared with a gliding club and a cropping lease holder. The volume of water discharged to the irrigation field is considerably limited by the competing land use requirements of these parties, particularly the glider club. The ability to irrigate to the Stage 1B land without constraint is a critical measure in reducing the effect of discharging elevated nutrients to the Papawai Stream (i.e. the ammonia issues currently experienced) and complying with the resource consent volume limits to the Papawai Stream. Development of the Stage 2A land irrigation area to the north of the WWTP will also help to unlock capacity for growth and achieve compliance with the resource consent conditions for discharge volumes to the Papawai Stream.

Recent ecological sampling reports on extensive aquatic plant growth in the Papawai Stream below the discharge point, where there is currently no riparian margin. Although 'aquatic growth' is not directly a consent condition, it is an indicative measure of the overall health of the Papawai Stream, which is of concern to the nearby Papawai Marae, the local community and GWRC. Riparian planting in this area is a condition of the resource consent; the Riparian Management Plan is certified and requires funding to implement.

A compliance upgrade project is currently underway however the scope of that does not currently allow for growth. While the project should unlock capacity for growth in several areas more specific work will be required to quantify growth demand and then include (and fund) capacity increases in the upgrade scope.

Martinborough WWTP

The 2023 estimated population of Martinborough is 2147. The impact of seasonal loads is not well understood at this stage. The plant is operating under Stage 1B of its resource consent which expires in 2051. As noted above, pond-based wastewater treatment processes with dual discharge routes (to water and land) are complex interactive systems for which it is difficult to explicitly define their capacity.

The facultative treatment pond is operating beyond its design capacity. The primary facultative treatment pond is 1.65ha, which has the capacity to treat the wastewater load from approximately 1950 people. Unlike Greytown, there is no significant second pond with four small maturation ponds only providing nominal additional treatment.

The level of accumulated sludge within the pond is reducing the effective treatment capacity of the pond process, and also limiting the ability to safely install additional aerobic treatment capacity on the pond such as aerators. Adding this equipment to the pond would unlock additional potential for growth in Martinborough but the design team engaged must define what is possible on this pond system, in line with the results of a growth study defining expected future loadings.

The effect of operating the Martinborough WWTP above its design capacity is realised in the nutrients discharged from the treatment plant. Nutrients are not treated within a pond-based treatment process. A brief study commissioned by Greater Wellington Regional Council indicates that there is little effect on the

Ruamāhanga River from the discharge of these nutrients. However, consent compliance remains a requirement. The effect of elevated nutrients results in excessive algae growth within the maturation ponds, which in turn affects the effective performance of the current ultra-violet (UV) disinfection system. The result is discharge of non-compliant effluent which is not desirable from a human health and cultural perspective.

For the current compliance period (1 July 2022-30 June 2023), the plant is expected to be non-compliant with its annual average discharge volume of 650m³/d to the Ruamāhanga River. Further regulatory attention to this condition can be expected.

The current Stage 1B land disposal area is too small to manage the current disposal volume in a 'dry' irrigation season where discharge to the Ruamāhanga river during low flows is not permitted, and land disposal is the only discharge route. Developing the larger Stage 2A irrigation block (Pain Farm) is required to unlock hydraulic capacity to achieve compliance and permit growth in Martinborough.

A compliance upgrade project is currently underway however the scope of that does not currently allow for growth. While the project should unlock capacity for growth in several areas more specific work will be required to quantify growth demand and then include (and fund) increases in capacity in the upgrade scope.

Lake Ferry WWTP

Lake Ferry is a small township with an estimated 59 dwellings, a campground and several hotels. The plant is operating under a resource consent which expires in September 2025.

The Lake Ferry treatment plant is a package 'Innoflow' system which treats effluent that has been pre-treated in on-site septic tanks. The treated effluent is then discharged to a 3-hectare disposal field or a wetland. Due to this process configuration, assessment of this system is from an operational and compliance perspective, as the proprietary design parameters are not defined by the supplier.

The efficacy of the treatment process depends on the on-site septic tanks being emptied (upon inspection determining emptying is required). Recently progress on emptying septic tanks has been limited due to funding constraints. This results in additional load to the Innoflow treatment stage, and thus increased likelihood of the system discharging non-compliant effluent.

At the time of design, assumptions on flows and loads were made based on number of dwellings and occupancy fluctuations in Lake Ferry, but the reality is somewhat different to those assumptions. The annual average volume treated is in the order of 16m³/d, with a 95th percentile volume of 30m³/d. In a dry season, this volume is managed within the treatment process. The system is consented for discharge of 200m³/d and 700m³/week to the disposal field; experience shows the disposal field soils are not hydraulically capable of accepting these high volumes in a sustained manner.

Nutrient loading to the disposal field has approached its consented limit in years where disposal to land is the primary discharge route, indicating additional significant growth in Lake Ferry would require development of additional land for disposal.

Due to high rainfall experienced in the past year, discharge to wetland has occurred for a significant portion of time, rather than discharge to the disposal field. This highlights the hydraulic limitation of the current disposal field. There is currently no limit to the volume discharged to wetland, although this may change in a new consent.

Given the operational constraints experienced, additional connections to the system are therefore likely to require additional treatment and land disposal capacity. It is expected that decisions around growth and development of additional treatment & disposal capacity will coincide with the resource consent renewal process undertaken by 2025.

Looking ahead

A Wellington Water priority is to support the growth plans of our client councils. We appreciate the dependency of communities on the functioning of their wastewater systems and that the complexity of their function is not immediately apparent. We would welcome any opportunity to continue providing council with further information that can give assurance that within constraints the plants are being managed efficiently and optimised to support growth.