

From: [REDACTED]
Sent: Mon, 27 Jan 2025 09:21:11 +1200
To: [REDACTED] "Councillors"
Cc: [REDACTED]
Subject: Update on Shotover Wastewater Treatment Plant
Attachments: 20250127 Shotover WWTP Fact Sheet.pdf

Good Morning Councillors,

There have been a number of comments and questions from councillors over the past week regarding the issues with the Shotover disposal field, including some queries regarding the need to halt ongoing development in the Wakatipu basin.

Staff have prepared a fact sheet which is attached, this document provides a summary of the plant's operation, the current situation, and considers the matter of restricting development.

This is intended to provide councillors with an overview of the current scenario and guidance around the question of stopping new growth in the basin. Please note this is provided for your information and guidance only.

Now the Enforcement Order has been lodged with the court, that will set in train a formal process between QLDC and the ORC to address how best to restore the performance of the field and/or find an alternative disposal process that can be supported by all parties. In the meantime, we have both long and short-term investigations underway into how to achieve that, along with a wider network investigation that will test the appropriateness of a multi-site waste management system for the Wakatipu basin focussing on capacity, greater resilience, and more interconnected network solutions

In response to Cllr Gladding's most recent memo, we are reviewing the Enforcement order, and as can be seen from the joint memorandum to the court, QLDC is supportive of collaborating with ORC. Much of what the first part of the order canvases is either already available to the ORC, underway, or matters that we are happy to voluntarily commit to (and we have advised the ORC of this). QLDC does already have significant capital funding set aside to address the substantive issue and once we have an agreed programme with ORC we will know how that will be spread in the coming years.

We will continue to update the Infrastructure Committee on progress on a regular basis.

Regards

[REDACTED]

Acting Chief Executive

T [REDACTED] Avery | General Manager, Property and Infrastructure
Queenstown Lakes District Council



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Memo

To:	Councillors
From:	T. Avery
Date:	Monday, 27 January 2025
cc:	M. Theelen
Subject:	Shotover WWTP Fact Sheet

1. Introduction

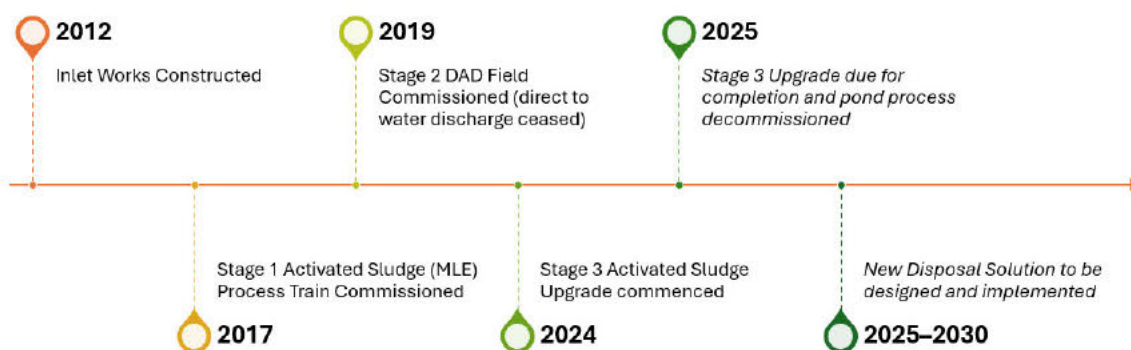
QLDC's Shotover Wastewater Treatment Plant (WWTP) is suffering from challenges associated with the operational performance of the Dose and Drain (DAD) disposal field, which returns the treated water from the facility to the environment.

This memo looks to summarise the key information related to the treatment plant, its performance, an overview of recent and planned investment, the history of the disposal field and its challenges as well as an overview of the regulatory action, in one place for ease of reference.

2. Timeline of Investment

QLDC has invested heavily in wastewater management over the last decade or so, this has seen the district move progressively away from a poorly performing and overloaded oxidation pond system to a modern treatment process capable of producing a high-quality treated water.

The investment timeline is summarised below:



Over this period approx. \$90M of capital investment has occurred, with an additional \$77M assigned for the alternative discharge project.

3. Wastewater Treatment at Shotover

The treatment facility currently is made up of two discrete treatment processes, which operate in parallel but are blended together prior to receiving ultraviolet (UV) disinfection and discharge to the disposal field.

The combined raw wastewater flows are screened to remove coarse inorganic material and then passes through a grit separation device which settles out grit and fine sediment. The screened

wastewater is then split between the two treatment processes at a ratio of approx. 80% to the activated sludge process and 20% to the oxidation ponds.

The activated sludge process is a relatively conventional treatment process which involves a separate 'reactor' tank, where the treatment processes occur and a discrete clarifier which is responsible for settling the biomass from the treated water under gravity. The specific process utilised at Shotover is referred to as the Modified Ludzack-Ettinger (MLE).

This part of the treatment process is capable of providing a high degree of treatment, with the treated water from this process consistently achieving results for Total Nitrogen (TN), Total Suspended Solids (TSS) of less than 10mg/l.

The oxidation ponds provide a basic level of treatment, and are largely ineffective at removing Nitrogen from the wastewater.

To enable compliance with the consent conditions to be achieved, the flows from the two treatment processes are blended together carefully to maintain a clarity of discharge that allows the UV disinfection process to operate effectively. The system continuously monitors the Ultraviolet Transmissivity (UVT) of the water and reduces the flow rate from the oxidation ponds should this level decrease outside of the allowable tolerance for the disinfection equipment.

The treatment facility does not include a filtration step, and as such there is not a physical barrier to prevent the release of solids in the event of a process upset. Such an upset could result from mechanical failure, operator inattention or toxic shock from the influent.

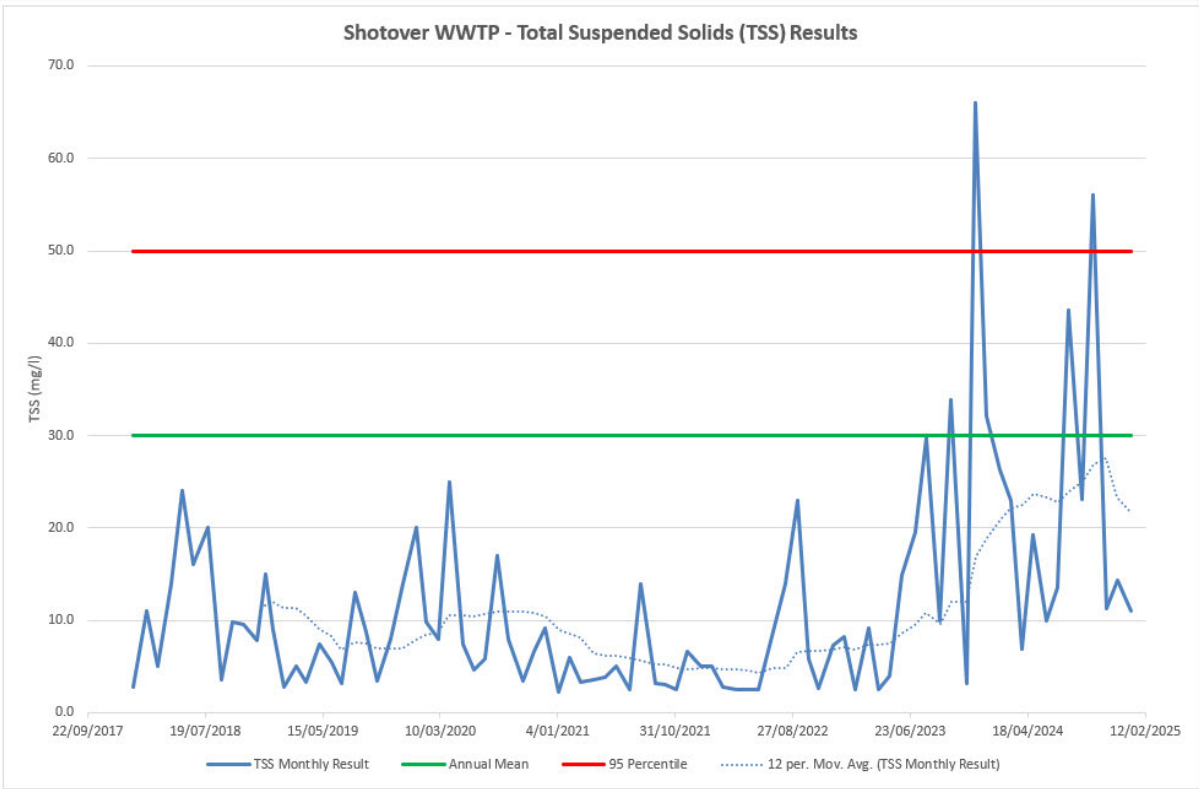
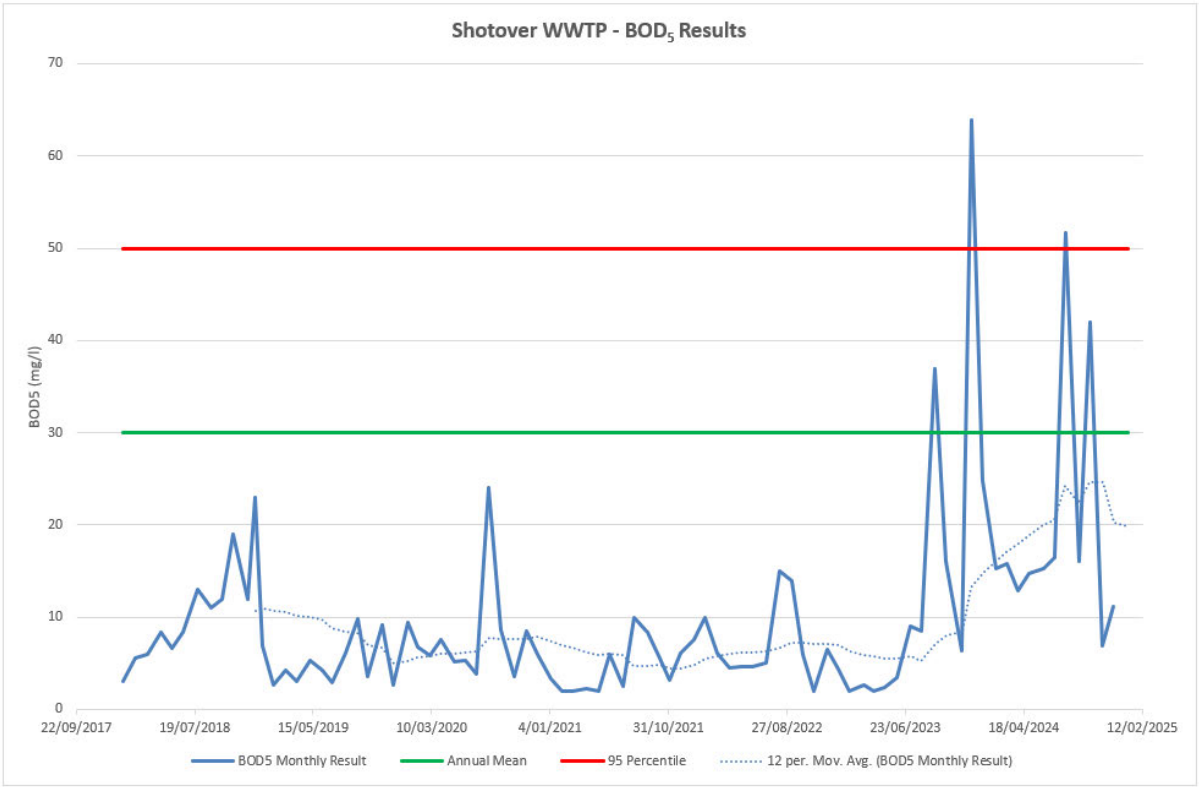
4. Effluent Quality

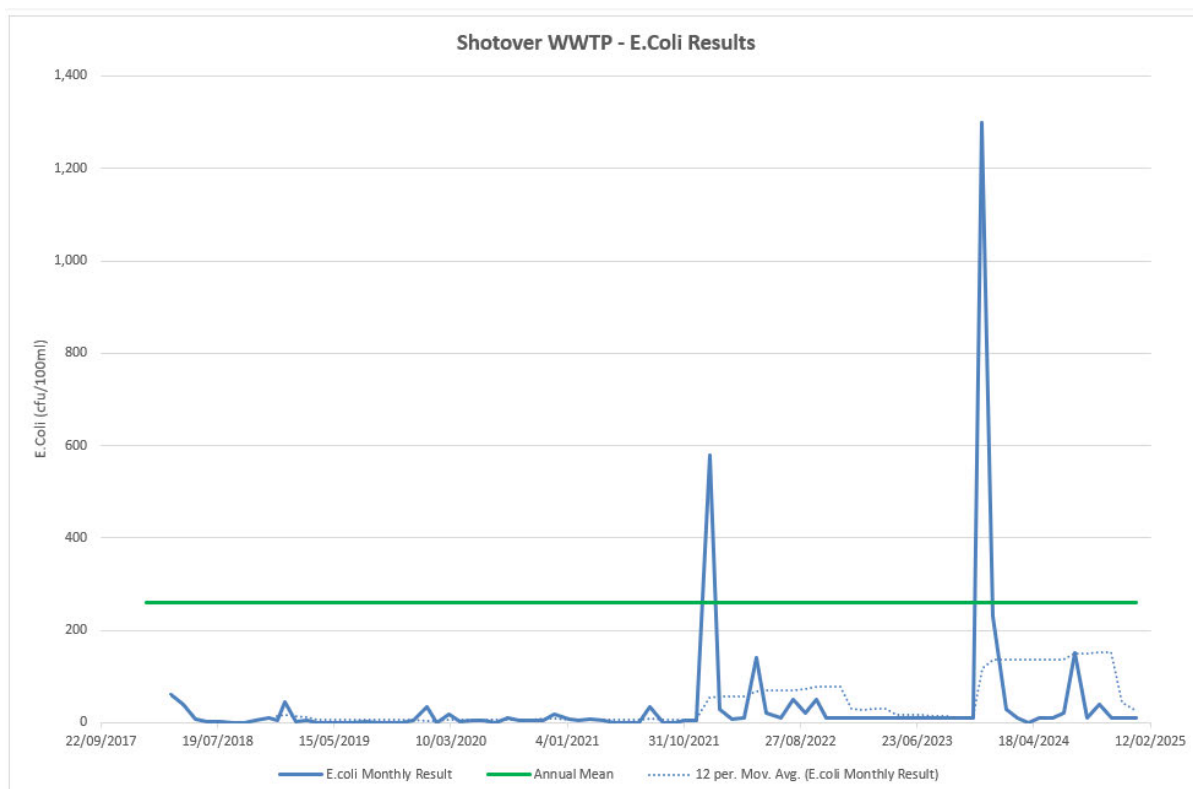
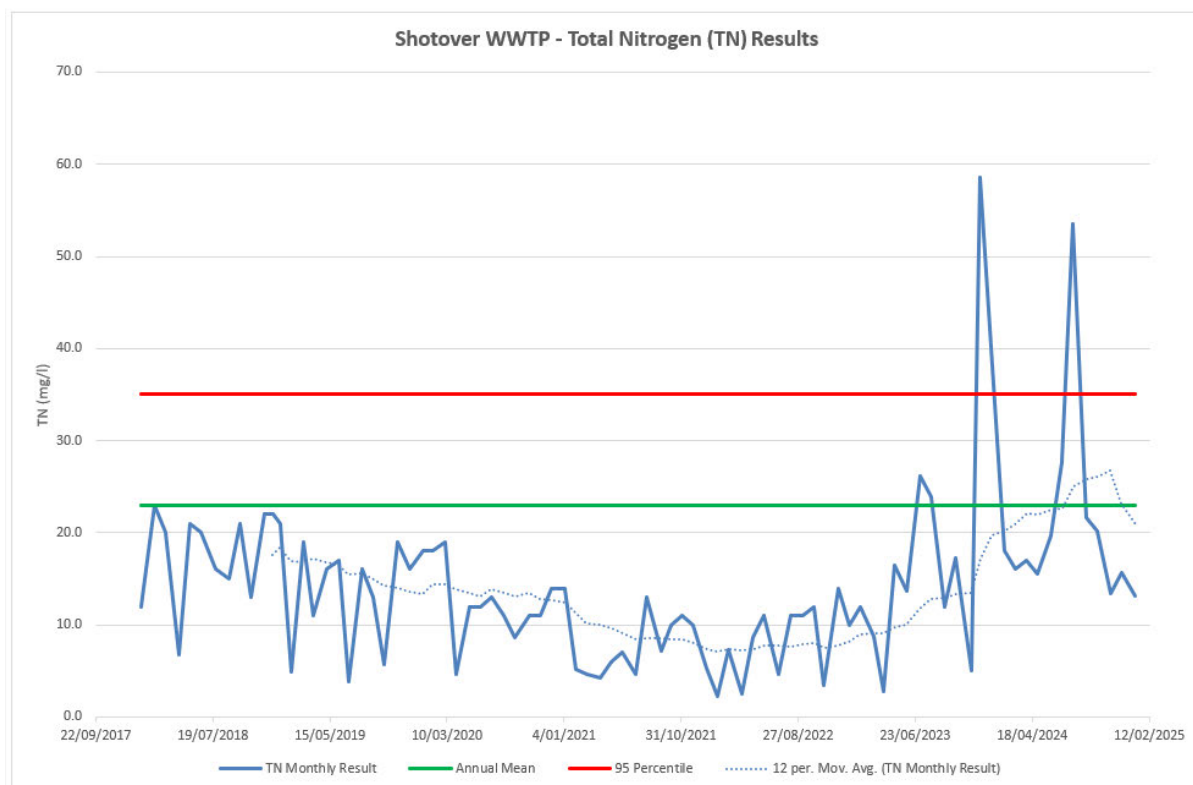
Historically the treatment plant has performed well and consistently achieved compliance with the quality standards set out in the Resource Consent. However, there were two notable periods of non-compliance recently. The first occurred across December 2023/January 2024 and was associated with a failure of the aeration system, and the second occurred in July/August 2024 as a result of failures with the mixing systems.

QLDC and its contractor, Veolia, have been working hard in the wake of these events to ensure steps are in place to protect against these failures (or similar) reoccurring in the future. These steps include:

- A review of critical spares held on site.
- Introducing additional monitoring associated with aeration grid performance.
- Recruitment underway for an additional QLDC resource with a focus on overseeing and auditing contractor performance in regard to treatment plant operation.

The effluent quality results for the treatment plant are shown in the following charts. These reflect the consent samples which are taken immediately downstream of the UV plant and prior to entering the disposal field.





Once treated water from the Shotover WWTP is discharged to the disposal field, any further measures can be affected by other sources (e.g., bird life, dogs) and are not included within consent limits. However, QLDC does undertake additional sampling within the ponded areas of the disposal field, with the most recent sample results from the southernmost point (7 January 2025) returning an E.coli result of 190 CFU/100ml and Total Nitrogen a result of 14.9 mg/l. Both of these parameters are still within the compliance levels of the discharge consent, although the consent relates to the

treated water entering the disposal field, not water within the field that could be subject to external contaminants.

To help understand the risk arising from the treated water it is useful to appreciate the national guidelines for recreational water. Under these categorise any river or lake with a reading equal to or less than 260 E.coli/100mL is categorised as 'green'. More than 260 E.coli/100mL is considered 'orange' and an increased risk of contracting illness from recreational contact, while more than 540 E.coli/100mL poses an unacceptable health risk from swimming.

5. Dose and Drain (DAD) Disposal Field

The treated water from Shotover WWTP is designed to be returned to the environment, in this location the receiving environments are the Shotover and Kawarau rivers. Prior to 2019, the treated water was discharged directly to the Shotover River (in accordance with the consent conditions of the time).

Currently, treated wastewater is discharged from the plant to the 'Dose and Drain' disposal field instead of directly to water. The intention of the DAD field was to provide for land contact prior to the water entering the rivers. The field consists of eleven discrete zones 'soakage' zones, constructed from stormwater drainage 'crates'. The individual zones receive a portion of the flow of treated water according to a set 'recipe' within the control system. At any one time it was intended that only a small number of zones would be receiving flow, approx. three at average flows, such that the other zones would have time to rest and drain.

Under the consent the disposal field is not relied on to undertake a treatment function i.e. provided the quality requirements of the consent are met the treated water is suitable for discharge into the downstream environment directly. However, there is benefit of discharging through the gravels and this will provide a 'polishing' treatment function, although this is difficult to quantify.

The disposal system has experienced performance issues which has resulted in persistent ponding within the field as the treated water is not soaking into the ground at the rate it was designed to. The field is particularly sensitive to the presence of biological solids, which has the effect of clogging the silty gravels and dramatically reducing the rate of discharge into the ground.

QLDC and its advisors have undertaken extensive investigations to understand the issues being faced, as well as trialed a number of strategies to improve performance, including:

- Using hydrogen peroxide to remove biological material from the crates
- Construction of additional soakage trenches
- Construction of rapid infiltration basins between the original zones and increasing bund height to maximise the soakage area available and increase the driving head for soakage.

However, it has become apparent that the current field does not function as intended as does not have the capacity to return the treated water into the environment in the manner intended. As a result, the field is now constantly ponded across the full extent and regular spillage of treated water from the site into the adjacent delta area occurs.

The Figure below shows the historical primary river channel (light blue), the existing high flow channel which the disposal field predominantly drains into (yellow), along with the two surface channels utilised to drain the treated water to the Shotover River in the past (dark blue and orange).



6. 'Stage 3' Upgrade

The 'Stage 3' upgrade of the treatment facility incorporates a duplication of the existing MLE process, effectively doubling the capacity of the activated sludge process train. Once completed there will be sufficient capacity between these two process trains to enable the oxidation ponds to be fully decommissioned.

Decommissioning of the ponds will achieve a step change in the quality of the treated water, as the proportion of wastewater currently treated through the pond process is of a significantly poorer quality and has the net effect of reducing the quality of the water treated within the MLE process.

The upgrade includes for the decommissioning of Pond 1, with the reclaimed land area utilised for stormwater management and emergency/calamity storage of raw wastewater. Ponds 2 and 3 will be decommissioned as part of a future project as they continue to be relied on as part of the treatment process until the second MLE train is fully operational.

This upgrade is well underway and is commissioning is due for completion in November 2025.

7. Long Term Alternative Disposal Project

QLDC has allocated \$77M in the 2024-34 Ten Year Plan to establish a new disposal solution for the Shotover WWTP. The project has now commenced and GHD engaged to lead the identification of the new disposal approach. The project team are currently refining the Multi-Criteria Analysis (MCA) criteria and will shortly commence the assessment of the long list of possible solutions.

Iwi representatives from both Aukaha and Te Ao Marama are inputting into the project to ensure the cultural aspects and sensitivities are well considered through solution development.

Due to the nature of this project and the risk of a protracted consenting process, the conservative timeline for the project is outlined below:

- Application for Resource Consent by 28 April 2026
- Engineering Design completed by 21 December 2027
- New disposal system operational by 31 October 2030

8. Available Interim Disposal Measures

Recently both Mott MacDonald (under instruction of ORC) and GHD (for QLDC) have considered the available options for managing the treated water flows until a long-term solution can be achieved.

Mott MacDonald recommended expanding the DAD area, backfilling the existing field, raising the height of the DAD bed, and utilising the ponds for buffer storage to reduce instantaneous flows arriving at the field. Both GHD and QLDC considered these options and assessed them as largely unachievable/unlikely to achieve the desired outcome for the following reasons:

- Expanding the footprint would require a new consent and as such slow to implement. In addition, the cost of expansion would be significant, and given the approach has proven to be flawed this would represent an unwise investment for QLDC.
- Backfilling and raising the height of the DAD field would likely introduce notably greater risk of overflows, uncontrolled discharges and potential for associated adverse effects due to the loss of storage volume and increase in driving head relative to the natural river channels.
- Temporary storage of treated water is not feasible until Pond 3 is decommissioned. Given this process can only start following completion of the Stage 3 upgrade it is anticipated that such a solution could only be implemented by late 2027.

GHD advised that reliance on soakage of wastewater to ground in the short term is expected to be challenging due to:

- Shallow groundwater levels and potential for unforeseen daylighting of discharge treated wastewater prior to reaching the river.
- Significant stratification and spatial variability of alluvial deposit permeability, resulting in constraints on vertical infiltration and a propensity for preferential flow in shallow channels.
- The volume of wastewater that may need to be managed at present, and when the DAD performance degrades further.
- Significant disturbance and land area requirements.

As a result of these factors and given the need for timely implementation and surety of outcomes, sole reliance on land application as an option for managing excess wastewater flow was not considered a viable option.

The recommended approach was therefore to pursue a full or partial return to a direct to water discharge, utilising the historical discharge channel. Such an approach would require a new, short term, discharge consent to be obtained.

Doing so would achieve an immediate improvement in the control and management of the treated water on the delta, and also enable the existing field to be dried out and maintenance more effectively undertaken. However, we are cognisant of Iwi concerns around this approach and are looking to gauge the ORC's and Iwi reaction to such a step well before any consent application is lodged.

9. Implications for Growth

The question has been raised around whether the current performance challenges at the disposal field should lead to restrictions on development within the Wakatipu basin to limit or control inputs into the plant. There are a number of dimensions to address that suggestion, and the plant's performance and capability is a key factor.

There is no evidence that plant needs to stop receiving wastewater up to its planned capacity. This is because the plant is effectively treating the wastewater it receives and can do so for larger planned volumes, noting the substantial capacity unlocked through the Stage 3 upgrade. There is however a very real need to ensure that the disposal system (i.e. the disposal field) is capable of matching the plant's processing capacity, which it currently is not.

It is also important to consider the disposal of wastewater in the long term from future developments across the Wakatipu basin. Traditional models have relied on large, centralised plants such as occurs at Shotover (although this isn't large by some standards). Increasingly councils are moving away from large plants. The high consequence of failure for these large facilities has been demonstrated in recent years both at Bromley in Christchurch and more recently in Lower Hutt with the failure of the Seaview plant.

From a reliance point of view concentrating networks on single plants is increasingly being questioned with improved plant technology and remote management systems making the adoption of localised package plants, and distributed networks more reliable. This change of thinking has informed how we are currently looking at how we deal with the next step change in demand, and we are both independently interrogating, and working with developers in the southern corridor to consider options for facilities in that part of the district.

Should a decentralised approach be adopted in the future, the Shotover WWTP will not be made redundant, but it will create more diversified capacity and potentially an ability to divert parts of the current waste system away from Shotover (e.g. Kelvin Heights). It needs to also be remembered that plants, particularly modern biological plants, rely on a steady input of product to ensure that they operate in an optimal manner.

In addition, the Government is also reviewing the standards for wastewater treatment and disposal, and they have signalled that they may both mandate lower standards and prevent regional councils from imposing higher operating standards on wastewater systems. This includes reviewing the current presumption that disposal to land is the preferred model of final disposal. The current government has signalled some comfort with a return to disposal direct to water and a number of councils around the country) are advocating for such a return.

Council currently has BECA carrying out investigations on the longer-term Southern Corridor option and how this, and possibly other plants, will in the long term complement the Shotover WWTP as part of QLDC's longer-term wastewater management strategy.

On the specific question posed as to who would make the decision to halt development pending resolution of the plant performance, any decision to stop urban development and further connections to the WWTP would need to be made by Council. It could not prevent development consented under the Fast Track Approvals Act 2024, but in that case, would provide its comments when invited to do so.

Any decision to stop further development would require the Council to determine that it could not safely process wastewater and this would provide a foundation for Council declining subdivision or building consents. Council's District Plan provides the rules for development, and declining consent on the premise that the plant cannot process further connections could create legal liability for

Council. Landowners have a legitimate expectation that their land is appropriately zoned and as such suitably zoned and serviced land can be developed.

As the consent authority for the Shotover WWTP, the ORC has not suggested that the current consent non-compliances are resulting in adverse environmental nor have they suggested that QLDC should be looking to restrict volumes entering the treatment facility. On that basis, there is no foundation for curbing development, and any decision to do so would most probably attract unprecedented levels of legal proceedings.

10. Regulatory Action & Enforcement Order

As result of the on-going performance issues at the treatment facility QLDC have been served with two abatement notices and a number of infringement notices (thirteen to date).

As a result of the duration for which the non-compliances and the abatement notices have been in place without resolution ORC has now seen it necessary to lodge an Enforcement Order with the Environment Court. ORC had two paths of regulatory escalation available to them; the other being prosecution. The decision to proceed down the path of an Enforcement Order reflects the ORC's understanding of the complex challenges faced at this location and the fact that any solutions (short or long term) will take some time to implement.

QLDC officers are broadly supportive of a number of the conditions of the Enforcement Order but have raised concerns to the ORC that a number are unachievable, undesirable, or due to the scale of investment required risk comprising QLDC's ability to deliver a suitable long-term solution.

ORC and QLDC have agreed to enter into mediation as the next step, with the objective of agreeing a set of mutually acceptable conditions.