QUEENSTOWN LAKES DISTRICT COUNCIL

Resource Consent Application to Otago Regional Council for Discharge of Treated Effluent to Kimi-ākau/Shotover River

Prepared for

Queenstown Lakes District Council

Project Name:	Shotover WWTP Discharge of Treated Effluent to Kimi-ākau/Shotover River
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1. INTRODUCTION

Queenstown Lakes District Council (QLDC – the applicant) is responsible for the conveyance, treatment, and disposal of wastewater generated by the district in a manner that protects the health of its communities, the environment and is in accordance with the requirements of all relevant resource consents. The Shotover Wastewater Treatment Plant (WWTP) currently services the communities within the Whakatipu Basin of Queenstown, Arthurs Point, Frankton, Kelvin Heights/Willow Place, Quail Rise, Shotover Country, Lake Hayes Estate, Lake Hayes and Arrowtown. In the short to medium term, additional wastewater flows will also be received from Jacks Point Village, Hanley Farms, Ladies Mile and an extension of the Quail Rise residential development areas.

The currently consented[1] disposal system for treated effluent requires disposal through a dose and drain (DAD) field. Several non-compliances then led to enforcement action from Otago Regional Council (ORC). Due to significant issues and failures with the DAD disposal field, emergency works were undertaken on 31 March 2025 to commence the discharge of treated effluent through the historic discharge channel under section 330 of the Resource Management Act 1991 (RMA).

These emergency works were undertaken by QLDC to address what it, on the basis of discussions and correspondence with Queenstown Airport Corporation (QAC), determined to be an unacceptable risk to aircraft safety at Queenstown International Airport which required immediate action as a result of increased waterfowl presence from ponded water within and outside of the existing disposal field. This has necessitated the discharge of treated wastewater through the previous discharge channel to the Kimi-ākau/Shotover River, last used in 2019.

As the discharge of treated effluent contravenes section 15 of the RMA, and the adverse effects of the activity will continue[2], this application relates to the necessary resource consents required in respect of the continued adverse effects of the activity. The activities for which consent is sought are:

- Section 15 RMA - The discharge of treated effluent into water and onto or into land where it may enter water; and
- Section 13 RMA – Works to install a riprap outfall structure in the bed of the river.
- Variation of consent conditions of RM13.215.01 for discharge to air.

The ORC has statutory jurisdiction for the effects of the activity. The proposal requires resource consents for

[1] [RM13.215.03.V2, RM13.215.01, 2008.238.V2, 2008.242.V1, 2008.243.V1, 2008.241]

[2] Section 330A(2) RMA

discretionary activities under the Regional Plan: Water for Otago (RPW).

1.1 Background

The WWTP was established in the 1970s. Before 2017 wastewater treatment at the WWTP was basic, consisting of an aerated septage treatment lagoon and treated wastewater disposed directly to the lower Kimi-ākau/Shotover River.

In 2017 the Stage 1 plant upgrade works were completed which included the addition of a Modified Ludzack-Ettinger (MLE) treatment train (at a cost approximately $20 million). The MLE process provides a significant improvement of wastewater treatment performance compared to the oxidation ponds. At present, approximately 80% of the wastewater is treated through the MLE process, with the balance of flows being treated within the oxidation ponds. The two treated wastewater streams are then blended before receiving UV disinfection prior to disposal through the DAD field. Figure 1 below illustrates the current WWTP location.

The WWTP is currently being upgraded with a second MLE plant which will avoid the need for raw wastewater to be treated through the oxidation ponds and will provide a better-quality treated wastewater stream especially in terms of suspended solids, algae and nitrogen species.

QLDC has undertaken, and continues to undertake, further comprehensive upgrades of the WWTP site. These upgrades highlight the importance of addressing the problems associated with the WWTP and ensuring its performance and optimisation into the future. These include:

a) In 2019 installing the DAD disposal field (at a cost of $7.5m) and ceasing the use of a direct discharge to the Kimi-ākau/Shotover River. The DAD disposal field reduced the gravel volume required (and the construction cost) as well as a faster implementation timeframe at the time (Potts, 2018).

b) The present development of an additional MLE process train due for completion at the end of 2025 (at a cost of approximately $50m) that will result in the oxidation ponds no longer being required and a step change in the treated effluent quality.

c) Funding of $77m in the Long Term Plan (LTP) (across Financial Years 24/25 to 29/30) for consenting, designing and constructing a long-term sustainable discharge from the WWTP (investigations for this commenced in October 2024 and the target for the long-term disposal solution consent lodgement is May 2026).

d) Additional funding of $22.3m across the LTP period to enable decommissioning of the remaining oxidation ponds, along with other improvements and renewals at the facility.

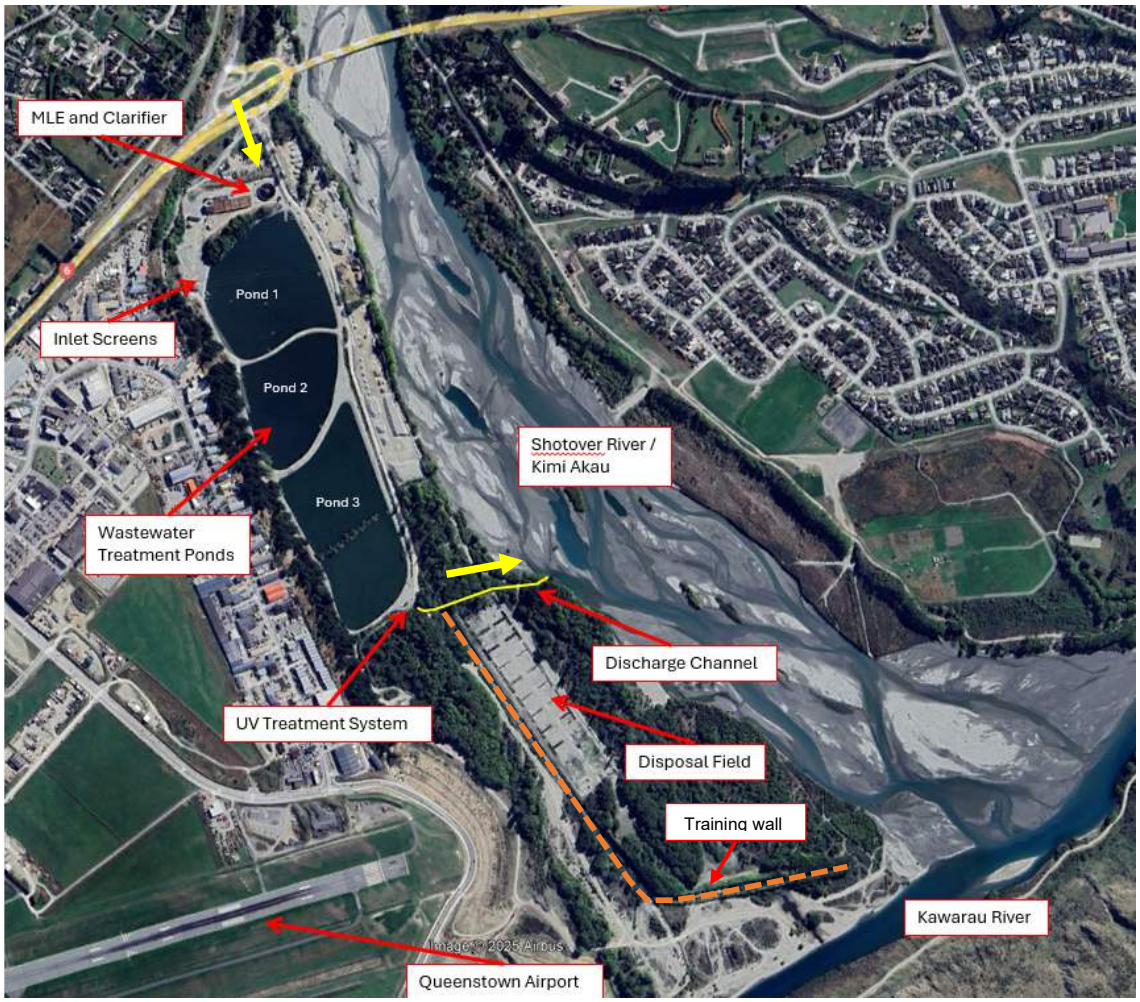

Figure 1: Site layout of Shotover WWTP (Imagery from Google Earth, April 2023). Yellow arrows show direction of flow into and out of treatment process. Note: Pond 1 is now empty and being decommissioned in line with the planned upgrades of the WWTP site.

1.1.1 Long term solution

Because the DAD disposal field is no longer operating as designed, and is struggling to cope with existing flows, in October 2024 QLDC commenced developing a new long-term disposal solution for treated effluent produced at the WWTP. The solution will replace the existing DAD disposal field and cater to the WWTP's long-term effluent disposal requirements in a culturally appropriate, environmentally friendly, and operationally effective manner.

Optioneering for a preferred long-term disposal solution is expected to be complete in mid-2025, followed by a preliminary design and Business Case in late 2025. Consent application will then follow in mid-2026. Detailed Design and Construction will follow and is expected to be complete and operating by 2030.

As mentioned above, QLDC's LTP has allocated $77M of funding for the replacement Disposal Field solution.

In the interim QLDC is facing increasing problems in relation to the uncontrolled treated wastewater discharges from the WWTP.

1.1.2 Problems with the DAD disposal field

As mentioned above, QLDC currently has consents allowing all treated wastewater to be returned to the environment using the DAD disposal field, located south of the existing treatment ponds and close to the Shotover Delta. The DAD disposal field was originally made up of 11 individual soakage sectors/dispersal fields, where treated wastewater is then dosed into each sector to drain through the gravel into the water table below. The intent was to remove the direct discharge of treated wastewater to the Kimi-ākau/Shotover River.

However, performance of the DAD disposal field has steadily deteriorated since 2020, and the field no longer operates as it was designed, or in compliance with the current consent. Since May 2024 this deterioration has accelerated. Surface water within the DAD disposal field is unable to be fully contained, leading to discharge from the southern end of the field and into the environment nearby. These events resulted in abatement notices being served by ORC on 27 May 2021 and 18 March 2024 for not complying for the conditions of its consent.

As the DAD disposal field has deteriorated, QLDC has undertaken a series of investigative works to determine the cause of the problem and to identify potential options to resolve it. The problem is primarily two-fold. The discharge from the treatment plant (especially the pond stream) contains suspended solids that have, over time, blocked the pores in the gravel soils reducing their permeability. In addition, biological growth has occurred inside the DAD cells, reducing the ability of treated wastewater to discharge from the cells into the surrounding gravels. QLDC trialled dosing the DAD cells with hydrogen peroxide to manage the biological growth but that had little, if any, beneficial effect (and accessing the cells is extremely difficult).

In April 2024 QLDC constructed Rapid Infiltration Basins (RIB) between the formal DAD cells to increase the storage volume and increase the soakage area available. The RIBs initially performed well and were able to manage the volumes within the disposal field area, however, with time these also became clogged and due to the saturation of the site further maintenance was not practical. In September 2024, to protect the fields' embankments, an overflow pipe was constructed from an area of the field to enable a controlled release of treated wastewater from the RIBs when the field water level becomes high.

Because the DAD disposal field is no longer operating as designed it cannot discharge existing flows to ground/groundwater through its individual soakage sectors/dispersal fields and consequently, treated wastewater has ponded within the DAD disposal field and flows (via an overflow pipe) outside the site and onto (and into) the Shotover delta.

As it is a braided river system, the Shotover delta has many historical channels, with the active channels regularly shifting. The DAD was constructed over an old channel of the Kimi-ākau/Shotover River, with

remnants of this channel extending from the DAD to the Kawarau River and is present as a natural depression Treated wastewater overflowing from the DAD has ponded in this former channel and area planted with willows to the south of the DAD disposal field, and to the north and south of ORC's training wall for the Kawarau River (installed in 2006). At times, there has been an extensive area of ponding extending from the DAD to the training wall (refer Figure 1 for location of training wall). The treated wastewater then discharged to the Kawarau River in one primary channel, and numerous ponded areas (as groundwater) over approximately 150m. The groundwater flow (with surface water flow and ponding in area) is predominantly towards the Kawarau River. In addition to the issues above with the DAD disposal field, in November 2023 and May 2024 there were issues with the operation of the WWTP resulting in effluent quality from the plant not achieving the quality parameters required under the resource consent for the discharge of treated wastewater to land. Those matters have now been resolved and the WWTP is currently operating properly and within its consent conditions.

QLDC was facing increasing problems in relation to the uncontrolled treated wastewater discharges from the failing (and failed) DAD disposal field. That resulted in Otago Regional Council filing enforcement order proceedings in the Environment Court on 22 January 2025 against the Council. By way of summary, the orders sought by ORC (Orders) relate to operational issues (of the WWTP itself) and discharge and ponding issues.

ORC, QLDC and the QAC attended mediation on 3 and 4 March 2025. The mediation included experts in wastewater process engineering, hydrogeology, water quality, ecology and planning. The parties provided a package, including revised Orders, to the Environment Court on 2 and 3 April 2025 largely resolving all matters. A further response is due with the Court on 6 May 2025.

1.1.3 Immediacy of bird strike risk

Bird surveys and monitoring in the area surrounding the WWTP have been undertaken in accordance with the Conditions for Specific Designations;[1] Designation #46 – QLDC Sewage Treatment Works, part C.33 of the Proposed District Plan. The monitoring and reports provided to QLDC and QAC indicate seasonal fluctuations and trends in use of the WWTP habitats. A copy of a report summarising relevant trends and findings is attached as **Appendix A**.

The monitoring data and survey results in Appendix A identify the risk the DAD disposal field poses as a aquatic foraging habitat for waterfowl and water roosting habitat. Following the decommissioning of Oxidation Pond 1 at the WWTP, waterfowl were surveyed moving between the oxidation ponds and the DAD disposal field (and into the ponded areas offsite on the Shotover delta). The decrease in bird numbers on the Ponds has corresponded at least in part with an increase in the use of the Disposal Field. Observations of flocks of waterfowl taking flight from around and over the WWTP area and across the eastern approach to the Queenstown Airport, highlights the risk of having high numbers of waterfowl present at this site. Ms Palmer notes in her report that "*the proximity of the open water closer to the Airport coupled with the disturbance*

and displacement of waterfowl from the Ponds increases the potential risk to aviation as disturbed birds may fly more widely before resettling or moving away from the WWTP area".

In light of these observations, and others, it was recommended by Ms Palmer in her report to QLDC that:

> *"given the high level of unsettled waterfowl activity and the displacement of waterfowl into the unanticipated open water habitat of the Disposal Field close to the Airport, the Disposal Field be drained by percolation into the ground of the Disposal Field and the site be kept dry and free of weeds. It will otherwise attract and hold waterfowl displaced by the Pond decommissioning works."*

Appendix A describes that this risk is heightened by the continuing effects of the enclosed nature of the disposal field making the waterfowl easier to startle. It was made aware to QLDC that the draining of the disposal field would reduce bird strike risk through reduced waterfowl habitat. A reduction in the available waterfowl habitats at the Disposal Field will lead to the displacement of the waterfowl that normally come to the Disposal Field. This will reduce the number of large bodied, flocking birds in close proximity to the eastern approach flight path of Queenstown Airport.

While this application is focused on seeking consents for the ongoing adverse effects of the emergency works, and not the use of emergency provisions itself, by way of context, QAC has advised QLDC of its significant concern relating to the increased waterfowl effect and risk potential for bird strike on the safe operation of the Airport on various occasions.

In 2024 there were two significant bird strike incidents at the Airport resulting in commercial passenger jet aircraft engine damage. One of these flights, a Virgin Airways flight to Melbourne, Australia, resulted in flames coming from its engine and it making an emergency landing at Invercargill airport. While there is no evidence that those bird strikes were linked to the WWTP, these events demonstrate the presence of birds (which are a known risk to aircraft operations) is a real and critical issue for QAC due to its extreme potential impact and the challenges of emergency landings in the district die to its terrain.

The uncontrolled discharge of treated wastewater creates the potential adverse effects which include the presence of pooled water within the DAD disposal field, and the ponding within the Shotover delta, is attracting waterfowl and other birdlife. While QLDC manages waterfowl across the WWTP treatment ponds, the new ponding areas have brought bird activity closer to the runway of Queenstown Airport. QAC and QLDC have discussed the ponding of water and increased risk of bird strike on various occasions and QAC advised QLDC in writing that urgent action should be taken to mitigate the potential risk of bird strike (the course of action being for QLDC to determine as owner of the WWTP) in a letter dated 25 March 2025 (attached as **Appendix B**).

In considering the adverse effects to support the emergency works QLDC is conscious that the general unsuitably (and unsustainability) of the existing situation is not itself acceptable. In addition to two abatement

notices, ORC commenced enforcement order proceedings in relation to it based on adverse amenity (visual and recreation) effects. However, for QLDC, the most significant adverse effect arises from the presence of pooled treated wastewater within the DAD disposal field, and the ponding within the Shotover delta, attracting waterfowl and other birdlife. While QLDC manages waterfowl across the WWTP treatment ponds, the DAD disposal field and new ponding areas are closer to the approach to the Airport (see Figure 1).

The standing water within the DAD disposal field is creating an additional and attractive habitat for waterfowl, and bird surveys have found there to be a substantial amount of bird movement between the oxidation ponds to the disposal field location (the birds are attracted by the cleaner water). Given the proximity of the DAD disposal field to the Airport, this change reflects an increasing risk to aviation activities. QLDC does, and must continue to, carefully manage birds in the area to mitigate any danger to the safe operation of the Airport, in accordance with condition 11 of its designation.

1.1.4 Options investigated to resolve issues

QLDC considered numerous options for managing the uncontrolled treated wastewater discharge and each options ability to immediately reduce ponding and the associated risk of bird strike. Stopping all discharges is not feasible as the WWTP must continue to operate. Alternative options to address the issues that were considered are also discussed later in section 8.1.3. They included the following:

1. **Option 1:** Doing nothing. This was not considered feasible given the effects arising from the existing unacceptable situation that QLDC needs to address.
2. **Option 2:** Manage public access to the uncontrolled discharge area beyond the DAD:
    - QLDC could close the gate across Shotover Delta Road, precluding vehicle access to the Shotover delta. However, public access is expected to continue via foot and bike, and due to the nature of the area these types of access would be challenging to restrict.
    - Installing signage at access points to the Shotover delta and within discharge areas. While this increases public awareness people often ignore signage, or proceed, albeit with initially more caution, past the signs. Given the high use of the area, and the need to cross the treated wastewater discharge area to reach the main delta, it is considered that signage has benefits but will not meaningfully reduce potential human contact. Signage is already in place at primary ponding locations.
    - Management of public access does not alter the potential bird strike issue.
    - Similar to Do Nothing, there will be very limited improvements and minimal risk mitigation against performance deterioration.
3. **Option 3:** Repair, expand, alter the DAD disposal field:

- QLDC has already attempted to rectify performance issues with the DAD disposal field. While the DAD disposal field still results in considerable discharge to ground, those attempts have proven unsuccessful at achieving reliable operation in compliance with the conditions of the Resource Consent, and discharges from the DAD disposal field (and site) are increasing.
- Further options to address issues with the DAD disposal field have been recently explored. These have included:
    - Increasing the DAD disposal field area. This would require a new consent. Further it is clear that the DAD concept is not working, nor are the recently constructed RIBs. Reliance on additional soakage to ground is not expected to be effective due to high groundwater levels (as seen with the ponding), significant stratification and spatial variability of alluvial deposit variability within the area, and the volume of treated wastewater.
    - Limiting effluent flow into the DAD disposal field by utilising the treatment ponds to buffer flow. Pond 1 has been decommissioned but is intended to be utilised for functions within the existing upgrade (emergency storage for raw wastewater and stormwater management). Ponds 2 & 3 are required to remain operational until the Stage 3 upgrades have been completed. Once the upgraded treatment systems are in operation by end of 2025, Ponds 2 & 3 can then be decommissioned and could be re-purposed as effluent storage. That process will take approximately 18 to 24 months for sludge removal and dewatering, based on Pond 1 experience. Therefore, by mid-2027 Ponds 2 & 3 become theoretically available. However, for the flow buffer concept to be feasible the disposal field will need to accommodate the daily discharge volume. Performance of the DAD disposal field deteriorated rapidly over time, and hence there is a low confidence of this capacity existing within the DAD disposal field (even if remediated).
    - Raising the depth of the DAD disposal field. While the concept is that this would provide more storage (and pressure to increase discharge rates), the extra height and size of the retaining walls required to achieve this would reduce storage volume. In addition, it would also increase the hydraulic gradients between the DAD disposal field and the surrounding delta which is likely to lead to more surface breakout of flows ("daylighting") downstream of the field.
    - Management of birds utilising any expanded DAD disposal field or discharge area/ponds could be managed by the use of nets, a floating cover or BirdBalls. The use of nets would require resource consents. To allow ongoing maintenance access to the DAD the nets would have to be raised above the 4ha DAD disposal field. Further, with the ongoing ponding outside the DAD disposal area, those

areas would also require netting resulting in a significant increase in netted area, vegetation removal and a change to the visual amenity of the Shotover delta area. The use of floating cover and Birdballs would similarly create additional difficulties for maintenance and operation activities particularly the need of maintaining good infiltration capacity of the DAD fields on a regular basis.

- Overall, the DAD disposal system is not fit for purpose, its rate of failure is increasing, and there are no viable options to remedy its ongoing efficiency and use.

4. **Option 4:** Use of the present treatment ponds (Ponds 2 and 3) for treated wastewater storage and buffer of the discharge into the DAD disposal field. Theoretically, the ponds could be used for additional land discharge through conversion to RIBs (or other similar discharge mechanism). However, the ponds would only be available for this purpose once decommissioned – a process that is anticipated to take some 18 to 24 months and only be possible once the Stage 3 upgrades are completed by the end of 2025. As for use of the ponds as a buffer storage, the same implications discussed for Option 3 above. Further QAC wants the ponds to be decommissioned as soon as practicable (which is a factor why the upgrade work is being done), not reused for another purpose that retains standing water due to the bird habitat they also provide.
5. **Option 5:** Keep using the DAD disposal field with reduced volume and discharge the remaining flows through reuse of an existing or a new channel or pipe into the Kimi-ākau/Shotover River or the Kawarau River, including:
    - There are two previous drains used for past river discharges into the Kimi-ākau/Shotover River. Use of previous (and already created) drains minimises disturbance to the Shotover delta. One of these drains remains, albeit it has not received recent maintenance. This drain could be recontoured and its outlet fortified to provide a new, controlled discharge point.
    - An historical river channel to the south of the DAD disposal field, which is presently forming the uncontrolled discharge, could be channelised so that the flow and areas are more contained into the Kawarau River. There would need to be a pipe under the training wall. This does have an increased risk of seepage and ponding into low lying areas at the southern end of the delta, already observed at times.
    - Discharge to the Kimi-ākau/Shotover River has some benefits to a discharge to the Kawarau River including:
        - reduced risk of further contributing to on-going seepage and ponding associated with the natural river channel;
        - higher sediment load and lower water clarity than the Kawarau River; and

        - while still publicly accessible, fewer people pass the potential Kimi-ākau/Shotover River channel options than those accessing the Kawarau River.
    - Any of the options above (and others explored) could be piped. Piping has the primary benefit of more robustly avoiding public access to the discharged treated wastewater. However, a piped solution eliminates groundwater seepage, meaning all treated wastewater flows will be direct to the river.
- **Option 6:** Bypass the DAD disposal field and discharge the whole flow from the WWTP direct into the Kimi-ākau/Shotover River using the historic discharge channels. This option results in a greater discharge direct into surface water than continuing to use the DAD disposal field but the benefits include that this would:
    - enable the drying out of the DAD disposal field;
    - avoids current uncontrolled discharge of treated wastewater into areas of high public access and use in the summer months;
    - reduces waterfowl habitat both in the disposal field area an on the Shotover delta and the corresponding risks to aircraft at Queenstown Airport;
    - allows Ponds 2&3 to commence decommissioning from the end of 2025 further reducing waterfowl habitat;
    - avoid additional staff and contractor time, and expenditure, on maintaining an increasing failing DAD disposal field; and
    - regardless of solutions, it is highly likely the existing DAD decommissioning will ultimately be required, undertaking this sooner will provide greater flexibility in the implementation of its replacement.

Continuing the status quo approach was not considered feasible. Most of the short-term options identified above would require resource consent to be sought. However, while those consents are progressed, which could take years, the existing situation would continue and get worse. Therefore, consenting a short-term solution was not a feasible option to address the bird strike risk and other associated problems with urgency.

Whilst QLDC did consider netting of the disposal field as proposed by QAC, it too would have required consent meaning its impact could not have been with immediate effect. If netting was undertaken, it would cover the disposal field but not the offsite ponding. Therefore, with the inability to address the issue immediately and requirements for consent, it was not a viable option in QLDC's opinion. This was exacerbated by the fact it would also not address, rather would worsen, adverse amenity effects which were the key effects ORC wished to address through its enforcement order application.

Considering the options, diversion of treated effluent into the historical discharge channel north of the DAD disposal field (Option 6) was found to be preferable than other alternatives considered.

1.2 Section 330 Emergency Works

Considering all of the above, on 27 March 2025, QLDC made a decision to undertake emergency works. While this application for consents relates to the ongoing adverse effects of the works, the continuing discharge and channel rip rap / maintenance works, a brief summary of the background to QLDC implementing emergency works is set out below and a copy of the QLDC's Record of Decision is attached as **Appendix C**.

Section 330(1) of the RMA states:

(1) Where—

(a) any public work for which any person has financial responsibility; or

(b) any natural and physical resource or area for which a local authority or consent authority has jurisdiction under this Act; or

(c) any project or work or network utility operation for which any network utility operator is approved as a requiring authority under section 167; or

(ca) any service or system that any lifeline utility operates or provides—

is, in the opinion of the person, authority, network utility operator, or lifeline utility, affected by or likely to be affected by—

(d) an adverse effect on the environment which requires immediate preventive measures; or

(e) an adverse effect on the environment which requires immediate remedial measures; or

(f) any sudden event causing or likely to cause loss of life, injury, or serious damage to property—

the provisions of sections 9, 12, 13, 14 and 15 shall not apply to any activity undertaken by or on behalf of that person, authority, network utility operator, or lifeline utility to remove the cause of, or mitigate any actual or likely adverse effect of, the emergency.

The option chosen by QLDC which it considers preferable to immediately reduce the risk to the safe operation of the Airport is to discharge the full treated wastewater flow to the existing discharge channel and to the Kimi-ākau/Shotover River. Having heard QAC's concerns at mediation, and subsequent discussions and correspondence, this option of bypassing the DAD completing and discharging 100% of the treated wastewater flow to the Kimi-ākau/Shotover River was explored in detail, as the Council's preference.

The emergency works immediately relieves pressure on the DAD and quickly avoids ponding within and around the disposal field[3]. This option will quickly reduce and then avoid the habitat created for waterfowl created by the ponding, significantly reducing the safety risks at the Airport, whilst removing the adverse amenity effects which were the premise for ORC's enforcement order application.

QLDC carefully considered the effects, their likelihood and the need for an immediate response outside of the usual RMA process. It considered that the use of section 330 emergency work provisions in the RMA was

[3] The remaining ponding in the DAD disposal field has now nearly completely gone.

the appropriate course of action to adopt. The effects, identified above, are effects or likely effects from the overflow discharge on a natural and physical resource that QLDC has jurisdiction over under the RMA.

While the issue of the DAD disposal field is not new, its recent and fast deterioration is, and the recently identified increased and heightened risk to the safe operation of the Airport, QLDC considered required immediate action. The immediate action was exacerbated by the following:

- recent engineering advice received that the water level in the rapid infiltration basins needs to be reduced to achieve a freeboard of 400-500mm (thus reducing the storage within the DAD disposal field and increasing offsite discharges and ponding).
- more recent discussions with QAC have heightened the QLDC's understanding of the need to immediately address the effects related to Queenstown Airport operations.
- the increase in numbers of waterfowl within the ponded areas have recently reached the point where immediate steps to reduce the risk of bird strike on airport operations were considered necessary.

In considering the adverse effects to support the emergency works QLDC is conscious that the general unsuitably (and unsustainability) of the existing situation is unacceptable. The bird strike effect, while of low probability, is still considered by QLDC to be of an importance sufficient to consider it, for emergency works, a "likely" effect.

Section 330A imposes an obligation to seek resource consent retrospectively for any activity with continuing adverse effects on the environment:

330A Resource consents for emergency works

(1) Where an activity is undertaken under section 330, the person (other than the occupier), authority, network utility operator, or lifeline utility who or which undertook the activity shall advise the appropriate consent authority, within 7 days, that the activity has been undertaken.

(2) Where such an activity, but for section 330, contravenes any of sections 9, 12, 13, 14, and 15 and the adverse effects of the activity continue, then the person (other than the occupier), authority, network utility operator, or lifeline utility who or which undertook the activity shall apply in writing to the appropriate consent authority for any necessary resource consents required in respect of the activity within 20 working days of the notification under subsection (1).

(3) If the application is made within the time stated in subsection (2), the activity may continue until the application for a resource consent and any appeals have been finally determined.

As required by subsection (1), ORC was formally advised that the emergency works activity had occurred on Tuesday 1 April 2025.

Subsection (2) requires that, where an activity will have continuing adverse effects on the environment, an application for the necessary resource consents for the activity is submitted within 20 working days after the notification to ORC. QLDC sought an extension of time to lodge this application to enable more fulsome

assessment and consultation to occur, but ORC refused. Therefore, the date this application must be submitted is Thursday 1 May 2025 (taking account of public holidays of Good Friday, Easter Monday and Anzac Day). Through this application the potential ongoing adverse effects can appropriately be considered and determined.

Once lodged, the ongoing discharge activity may continue until this application for consent has been determined (subsection (3)).

1.2.1 Works carried out

A summary of the activities associated with the emergency works is provided below:

- As the channel had not been used for a number of years, the channel was overgrown. Vegetation clearance was undertaken using two excavators on 27-28 March 2025. These works were confined to the land parcels owned by QLDC and within the existing designation and did not include the final 100 m of the channel on the land parcel owned by the Department of Conservation (DoC).
- Discharge down the channel commenced at approximately 7:45 am on the 31 March 2025.
- Approximately two days of dual discharge to the DAD disposal field and discharge channel occurred. The discharge to the DAD disposal field was turned off at approximately 5:30 pm 1 April 2025.
- As expected, there was a noticeable colour change in the water in discharge channel once the treated wastewater from the oxidation ponds was directed to the channel.
- The current discharge is to a small braid/pool adjacent to the true right bank of the Kimi-ākau/Shotover River, therefore mixing is currently limited. A consent has been submitted (RM25.177) to allow for works in the river bed to form a channel to always direct some surface flow past the discharge point.

2. DETAILS OF PROPOSAL

2.1 Summary of proposal

Consent is being sought for the discharge of treated effluent to the Kimi-ākau/Shotover River via an existing discharge channel. Effluent will be treated via inlet screens and grit removal, secondary treatment with an MLE/secondary clarifier operating until December 2025 in parallel with the oxidation ponds, before the combined effluent passes through the UV channel for disinfection. Consent is sought for a duration until 31 December 2030.

Associated consents relating to works in the riverbed to protect the channel outfall are also being sought.

2.2 Location

The Shotover WWTP is located on the true right bank of the Kimi-ākau/Shotover River, downstream from the State Highway 6 bridge, within the Shotover Delta. The site layout is shown in Figure 1 above. With the discharge channel shown in Figure 2.

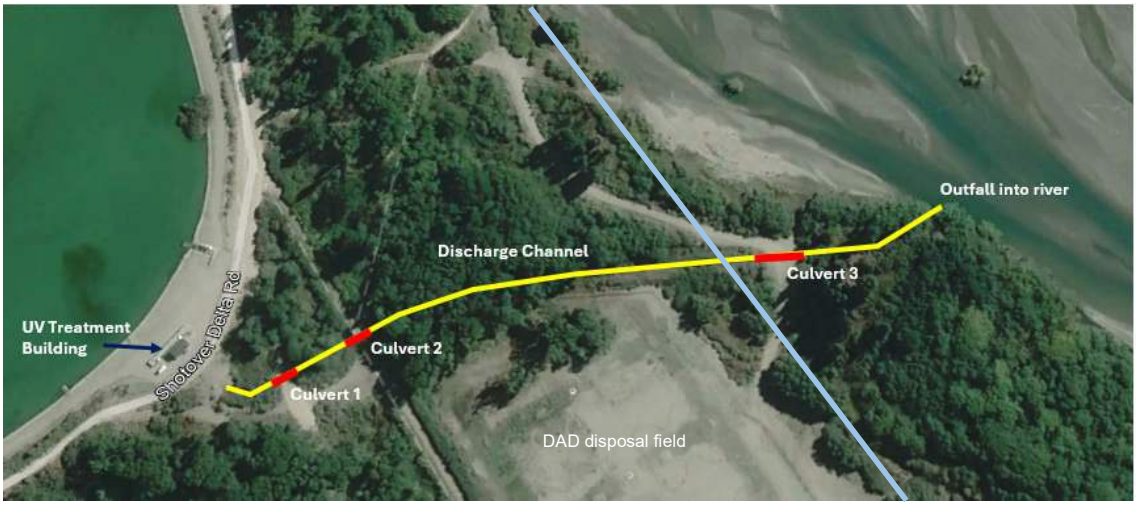

Figure 2: Discharge channel alignment with culverts identified. Approximate designation boundary shown in light blue, with designated area to the left of that line.

2.3 Existing Resource Consents

The following current or expired consents, issued by ORC and held by QLDC, relate to the wider Shotover WWTP operations.

Table 1: ORC consents granted to QLDC for Shotover WWTP-related activities

Consent no.	Purpose	Status
Discharge of treated wastewater to land		
2008.238.V2	To discharge treated wastewater to land for the purpose of operating the Queenstown Wastewater Treatment and Disposal System.	Expires 18/3/2044
RM13.215.03.V2	To discharge treated wastewater to land for the purpose of operating the Queenstown wastewater treatment plant. *Note: the WWTP is currently operating under this consent until the latest MLW plant upgrade is completed (end of 2025)*	Expires 31/12/2031
Discharge of odour		

Consent no.	Purpose	Status
RM13.215.01	To discharge contaminants to air for the purpose of operating the Queenstown waste water treatment plant	Expires 18/03/2044
Construction of disposal field		
2008.242.V1	To place a structure on the bed of the Shotover River for the purpose of constructing a low pressure effluent dosing system.	Expires 02/12/2030
2008.243.V1	To disturb the bed of the Shotover River for the purpose of gravel and vegetation removal, depositing gravel as well as constructing a low pressure effluent dosing system	Expires 02/12/2030
2008.241	To disturb the bed of the Shotover River for the purpose of removing and depositing gravel. Specific location for works: True right side of the Shotover River Delta, approximately 1.1 kilometres south east of the intersection of Glenda Drive and Margaret Place	Expires 02/12/2030
Decommissioning of oxidation ponds		
RM23.501.01	To discharge leachate to land in a manner that may enter water for the purpose of repurposing and permanently storing sludge solids	Expires 03/08/2038
Riverbed works associated with discharge to water (in process)		
RM25.177	To undertake works in the bed of the Shotover River to divert flow to ensure flowing water past the discharge channel outfall.	In process
Investigation activities		
RM25.123.01	To drill 11 wells for the purpose of groundwater investigation and monitoring	Expires 21/03/2028
Relevant expired consents to discharge to Shotover River		
RM13.215.02	To discharge up to 15,900 m3/day of treated wastewater to water at a rate of up to 352 L/s	Expired 28/02/2017
RM13.215.04	To discharge up to 17,000 m3/day of treated wastewater to water at a rate of up to 415 L/s	Expired 31/12/2022

The current discharge consent (RM13.215.03.V2) permits the discharge of treated wastewater to land from now to 31st December 2031. It was granted following a publicly notified process with the final consent issued by the Environment Court. Summary of the consent conditions is as follows:

- Condition 3 permits the annual average discharge volume of 11,238 m3/day and the maximum discharge loading rate averaged over the entire disposal area is within 1000 mm per day.
- Condition 4 permits a nitrogen load in the discharge not exceeding 75.5 tonnes per year.
- Condition 7 requires the collection of treated water samples during the first week of each

calendar month. Each sample must be analysed for biochemical oxygen demand, total suspended solids, total nitrogen, ammoniacal nitrogen, total phosphorus, and E. coli.

- Condition 8 requires the collection of groundwater samples from both upgradient and downgradient of the disposal field during the first week of January and July each year. Each sample must be analysed for total nitrogen, ammoniacal nitrogen, nitrate nitrogen, total phosphorus, and E. coli.
- Condition 9 outlines the groundwater level monitoring requirements for the disposal field area, specifying the installation of at least seven piezometers equipped with dataloggers.
- Condition 10 requires the monitoring and record-keeping of any groundwater mounding that rises above the ground surface and persists for more than 48 hours.
- Condition 12 sets wastewater quality limits for biochemical oxygen demand, total suspended solids, total nitrogen, and E. coli, with current mean limits of 30:30:23:260 (BOD, TSS, TN, E.Coli).
- Condition 19b requires the treated effluent quality to comply with mean limits of 10:10:10:10 (BOD, TSS, TN, E. Coli) following the completion of the Stage 3 upgrade.
- Condition 20 forbids ponding or surface run-off of treated wastewater.
- Condition 21 forbids mounding of groundwater to above the ground surface.

Once the Stage 3 upgrade has been completed, RM13.215.03.V2 is due to be surrendered and consent 2008.238.V2 will commence which authorises the discharge of treated wastewater to land up until 18 March 2044. This has similar consent conditions in respect of monitoring and not allowing groundwater mounding, ponding or surface runoff to occur, but provides for an increased discharge volume of up to 45,000 m3/day, daily loading rate of 1,330 mm/day on the disposal field, and mean discharge quality limits of 10:10:10:8:10 (cBOD, TSS, TN, TP E.Coli).

Copies of the 3 current consents relating directly to the ongoing WWTP operations are attached in **Appendix D**.

2.3.1 Relationship between this application and existing consents

2.3.1.1 Discharge to land or water

Following granting of this consent, RM13.215.03.V2 will be surrendered as the discharge will not be operating in accordance with this consent, and the second MLE clarifier will be operational which would have led to operations switching over to the 2008.238.v2 consent.

Condition (1) on permit 2008.238.V2 states that:

> *Discharge Permits RM13.215.02, RM13.215.03, RM13.215.04 or any variations to those permits, and any other existing consents for the discharge of treated municipal wastewater to land or water held by the consent holder for discharges within the Shotover Delta shall be surrendered within 6 months of the first*

exercise of this consent. The consent holder shall notify the Consent Authority in writing of the date when this resource consent is first exercised.

It is proposed that 2008.238.V2 will remain in place but not yet operative while the discharge to surface water is occurring under this new consent being sought. Condition (1) of 2008.238.V2 does not need to be amended to include this new consent number as it includes reference to "*any other existing consents for the discharge of treated municipal wastewater to land or water*". The 2008 consent does not lapse until December 2031 (conditions (4)).

The same quality limit conditions currently on the 2008 consent are proposed for this short-term surface water discharge consent once the second MLE plant is operational.

2.3.1.2 Discharge to air

RM13.215.01 authorises the discharge of contaminants to air from operations associated with the Shotover WWTP. Condition 1 of RM13.215.01 requires the exercise of this consent only in conjunction with discharge permits 2008.238.V2, RM13.215.02, RM13.215.03.V2 and RM13.215.04. RM13.215.02 and 04 have expired, however it is worth noting that these permits authorised the discharge of treated wastewater to water via the same mechanisms as the present application is seeking to authorise – meaning the discharge of contaminants to air via the operation of an open-air discharge channel to the Kimi-ākau/Shotover River was authorised up until December 2022.

As discharge permits 2008.238.V2 and RM13.215.03.V2 do not authorise the discharge of treated wastewater to water, the discharge of contaminants to air from the operation of the discharge channel is not within the scope of RM13.215.01. As such, the applicant is seeking an amendment to this consent to authorise air discharges associated with the subject discharge to water.

The following changes are sought to RM13.215.01, where additions are shown via *underlined italics* and deletions are shown via ~~strikethrough~~:

1. Legal description of consent location: ~~Pt Sec 141 and Secs 142 – 145~~*Lots 2 & 3 DP 422388*, *Lots 143-144* & 152 Blk I Shotover SD, Lot 1 DP 306621, ~~Lot 1 DP 15636~~*Lot 4 DP 421841*, *Area A SO 24812,* Section 4 SO 409393, ~~Crown Land Blk I Shotover SD~~
2. This consent shall only be exercised in conjunction with Discharge Permit 2008.238.V*2*, ~~Discharge Permit RM13.215.02,~~ Discharge Permit RM13.215.03, Discharge Permit ~~RM13.215.04~~*RM25.XXX.XX* [NB: this is the present consent being sought] and any subsequent variations to these permits.

In relation to Condition 1, the relevant legal parcels subject to the Shotover WWTP operations are shown in the below Figure 3. All those land parcels highlighted are owned by QLDC except Section 4 SO 409393 which is DOC owned land.

Figure 3: Legal parcels subject to RM13.215.01 (Source: GRIP)

2.4 Wastewater Treatment Process

The background of the Shotover Wastewater Treatment Plant is outlined in Section 1.1, this includes a high-level summary of the plants evolution in the past, and upgrades currently underway and planned.

As of April 2025, the Shotover WWTP includes preliminary treatment with inlet screens and grit removal, secondary treatment with an MLE/secondary clarifier operating in parallel with the oxidation ponds, before the combined effluent passes through the UV channel for disinfection.

After the Stage 3 upgrades, planned to be implemented by the end of 2025, the treated effluent quality from the Shotover WWTP will be improved considerably as the blending of clarifier effluent and the pond effluent will cease. The following Figure 4 outlines the Stage 3 upgrades planned.

As of the 31st March 2025, the treated effluent was diverted from the existing dose and drain (DAD) disposal field to the historical discharge channel, using emergency works provision under the RMA. More details on DAD and the emergency works are outlined in section 1.1.

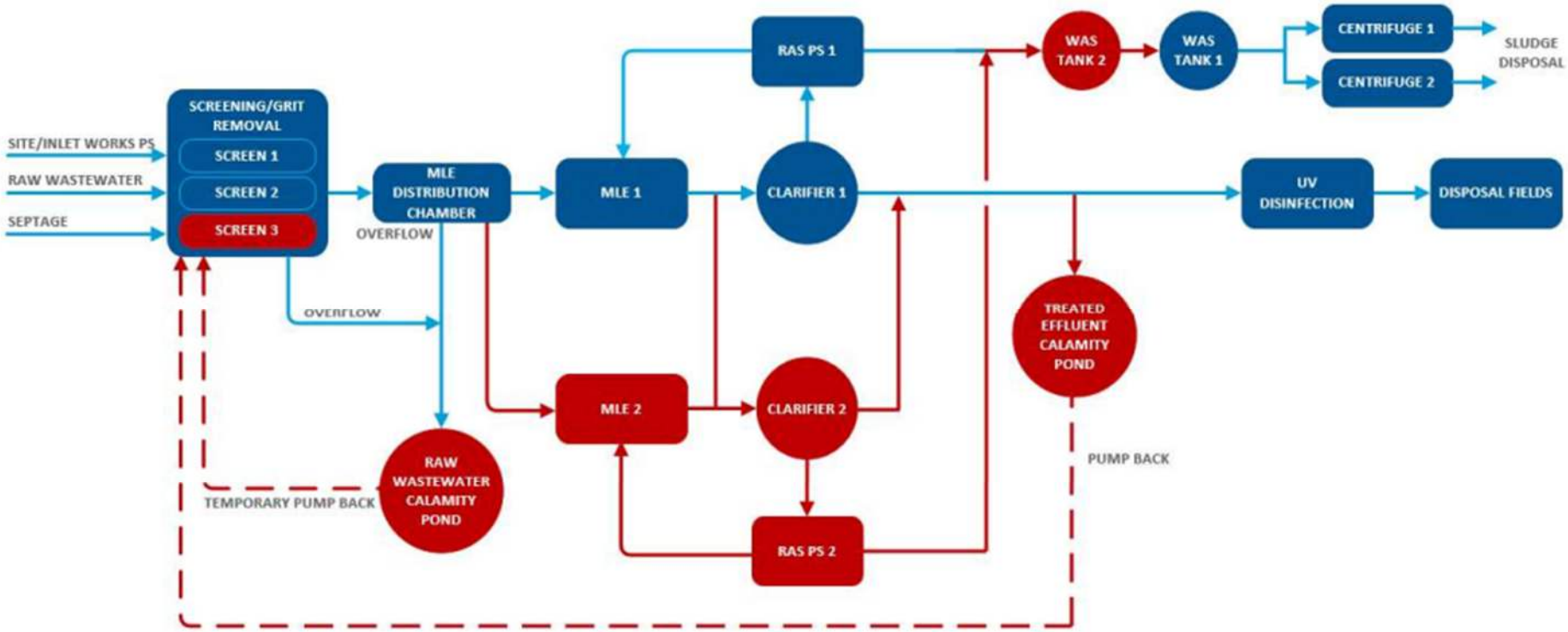

Figure 4: Shotover WWTP Stage 3 Expansion Process Schematic, Blue existing Red new (Beca, 2022)

2.5 Current WWTP Operation and Performance

The current WWTP operation splits the incoming wastewater flow approximately 80:20 to the MLE/Secondary Clarifier and the oxidation ponds (Ponds 2 and 3 only) before the combined effluent is blended upstream of the UV treatment. The flow to the oxidation ponds will increase when the incoming flows are high, and this is necessary to avoid overloading of the secondary clarifier. The practice will cease following the Stage 3 upgrade completion by end of 2025.

The Stage 3 update will provide an equal split of flow to the two MLE reactors followed by two secondary clarifiers. The Stage 3 WWTP upgrade has been designed for a 2048 horizon where the average daily flow (ADF) to the Shotover WWTP will reach 19,100 m^3/day, compared to the current average discharge volume of 11,000 to 12,000 m^3/day. During unexpected high flows (rare occurrence), a bypass weir will be activated to divert the high flows to the new raw wastewater calamity pond (21,200 m3), and the stored wastewater will then be pumped back into the MLE reactors when there is capacity available.

2.5.1 Discharge volume

The current discharge rates and volumes of the plant are outlined in the following

Table **2**. The 2024 flows were determined from the daily discharge flow data.

Table 2: Recent Wastewater Flows at the Shotover WWTP.

Flows	2018 – 2020 (Stage 3 Basis of Design) (m^3/d)	Current 2024 flows (GHD calculated) (m^3/d)
Average dry weather flow (ADWF)	9,850	10,800
Average daily flow (ADF)	10,500	11,500
Peak dry weather flow (PDWF)	12,650	16,469
Peak wet weather flow (PWWF)	21,700	20,534

2.5.2 Projected discharge rates and volumes

QLDC is in the process of updating the future population forecast and wastewater flow estimates, which will be available in mid-2025.

In the absence of the latest forecast, the Stage 3 expansion flow estimates have been adopted as the current growth forecast, and the estimated flows in Year 2038 have been assumed to be the design basis for the short-term disposal solution. Alternatively, the flows for 2030 could be determined by extrapolating the flows from 2028 and 2038 flows. The justification of adopting 2038 flows is that QLDC has observed a higher growth rate in the last couple of years. Thus, adopting the 2038 flows will provide more headroom for growth should the high growth rate continues.

The Shotover WWTP Stage 3 expansion has been designed to accommodate the growth up to 2048. Hence, the treatment plant is assumed to have adequate capacity to treat and handle the following wastewater volume (Beca, April 2022):

- Design ADF and PDWF of 19,100 and 22,300 m^3/day respectively.
- The secondary clarifiers will treat up to 34,560 m^3/day (~400 L/s).

The 400 L/s has been adopted as the peak instantaneous flow rate of the plant discharge for the short-term consent application.

The following Table 3 outlines the projected Shotover WWTP volumes for this short-term consent.

Table 3: Projected Shotover WWTP discharge volumes.

Flows	2038 flows (this short-term consent) m^3/d
ADF	16,900
PDWF	19,700
PWWF	29,100

2.5.3 Discharge quality

Veolia, the WWTP operator, has supplied the plant sampling results which include the discharge, this includes sampling at the clarifier outlet (2023 to 2025). The samples are collected at the UV outlet upstream of the DAD disposal field. Additionally, QLDC has monthly consent sampling data available since 2001.

Generally, the treated effluent quality complies well with the current discharge limits, except there were several process upsets have occurred in the past 2 years, impacting effluent water quality. Since these upsets in December 2023/January 2024 and July/August 2924, QLDC has been updating operational and maintenance practices to mitigate the risk of future critical failures, refer to Section **Error! Reference source not found.**.

The WWTP current operation blends MLE/Clarifier effluent with pond effluent, approximately 80:20. Hence samples collected at UV-outlet to-date do not accurately reflect the operation of the MLE/Clarifier alone (which will be occurring from end of 2025 onwards). Therefore, the sampling at the outlet of the clarifier was used when assessing the discharge quality expected of the WWTP in the following Table 4. However, the UV outlet sampling data, which includes the pond water, was also analysed and is outlined in sections 2.5.3.1 to 2.5.3.5 for each parameter. These confirm that both show similar trends in the sampling results.

The following Table 4 outlines the current discharge quality at the clarifier outlet. The data excludes data from December 2023/January2024 and July2024/August2024 as the data from these dates caused spikes in the parameters sampled, likely due to the process upsets occurring during this period. The results below show

that the clarifier outlet effluent quality complies not only with the current consent limits but also with the discharge limits following the completion of the Stage 3 upgrade.

Table 4 Sampling data from July 2023 to February 2025 taken at clarifier outlet (provided by Veolia, tested by Eurofins Lab).

Parameter	Median	90%ile
Carbonaceous Biochemical oxygen demand ($cBOD_5$)	6.0	9.6
Total suspended solids (TSS)	8.5	44
Total nitrogen (TN)	7.1	14
Escherichia coli (E.Coli in cfu/100mL)	Tested at UV outlet (median: 10, 90%ile: 158)	
Total Phosphorus (TP)	0.74	2.8
Ammoniacal Nitrogen (TAN)	0.1	7.6

The following sections 2.5.3.1 to 2.5.3.5 present graphs of the clarifier and discharge effluent sampling data. Full size versions of the graphs are in **Appendix E**.

2.5.3.1 Carbonaceous biochemical oxygen demand ($cBOD_5$)

Figure 5 below presents a graph of the $cBOD_5$ sampling data collected as part of the RM13.215.03 consent sampling regime. Data points which had noticeable spikes are marked in green and labelled. The figure shows spikes in $cBOD_5$ in December 2023 and August 2024 in the blended effluent for discharge, attributed to process upsets and operational issues at the time. Nonetheless, the treated effluent generally complies well with the current consent median and 95%tile limits of 30 and 50 mg/L respectively. An elevated sample result was noted on 7th January 2025, but this was an error in reporting as total BOD_5 measurement was used instead of carbonaceous BOD_5 hence the result was excluded in the figure.

Figure 6 displays sampling $cBOD_5$ sampling data collected by Veolia and processed by Eurofins at the clarifier outlet, starting October 2023. The clarifier effluent generally produces an effluent with less than 10mg/L $cBOD_5$.

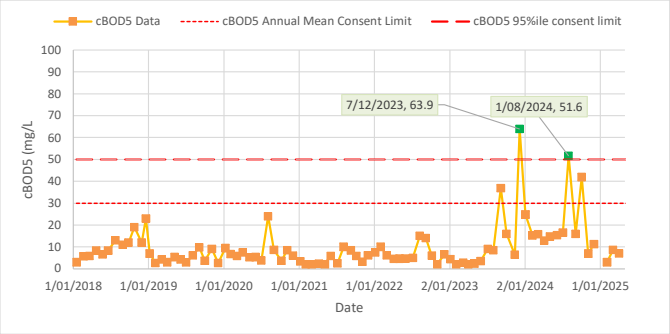

Figure 5 Monthly effluent $cBOD_5$ data measured against the current consent limits.

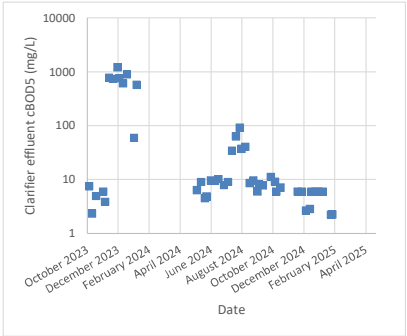

Figure 6 Sampling data for $cBOD_5$ at clarifier outlet (Eurofins) in log scale.

2.5.3.2 *Total Suspended Solids*

Figure 7 below presents a graph of the TSS sampling data collected as part of the RM13.215.03 consent sampling regime. Data points which had noticeable spikes are marked in green and labelled. The figures show a spike in TSS in December 2023 and August 2024, can be attributed to process upsets and operational issues. Generally speaking, the treated effluent generally complies well with the current consent median and 95%tile limits of 30 and 50 mg/L respectively.

Figure displays TSS sampling data collected by Veolia and processed by Eurofins at the clarifier outlet, starting from January 2024. From the TSS trend, the median TSS at the clarifier outlet is generally less than 10mg/L but with results exceeding 20mg/L as 90th percentile.

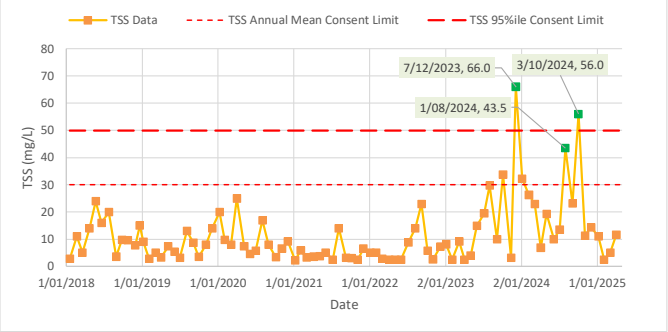

Figure 7 Monthly effluent TSS data measured against the current consent limits.

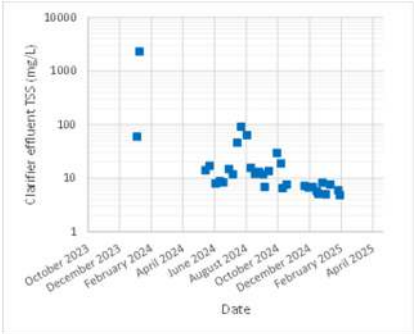

Figure 8 Sampling data for TSS at clarifier outlet (Eurofins) in log scale.

2.5.3.3 *Nutrients*

Figure below presents a graph of the TN sampling data collected as part of the RM13.215.03 consent sampling regime. Data points which had noticeable spikes are marked in green and labelled. The figures show

a spike in TN, attributed to process upsets and operational issues, in December 2023/January 2024 and again in July2024/August 2024. The treated effluent generally complies well with the median and 95%tile limits of 23 and 35 mg/L (as N) respectively.

Figure displays TN sampling data collected by Veolia and processed by Eurofins at the clarifier outlet, starting October 2023.

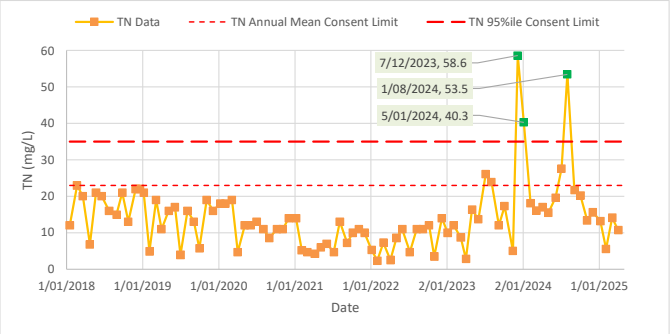

Figure 9 Monthly effluent TN data measured against the current consent limits.

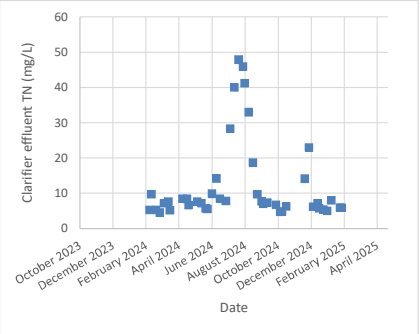

Figure 10 Sampling data for TN at clarifier outlet (Eurofins).

Figure 11 below presents a graph of the TP sampling data collected as part of the RM13.215.03 consent sampling regime. Data points which had spikes are marked in green and labelled. Figure displays TP sampling data collected by Veolia and processed by Eurofins at the clarifier outlet, starting October 2023. Elevated results obtained in Dec 2023/January 2024 in Figure 11 coincided with process upset reported in the same period. The treated effluent generally has total phosphorus concentration below 6 mg/L.

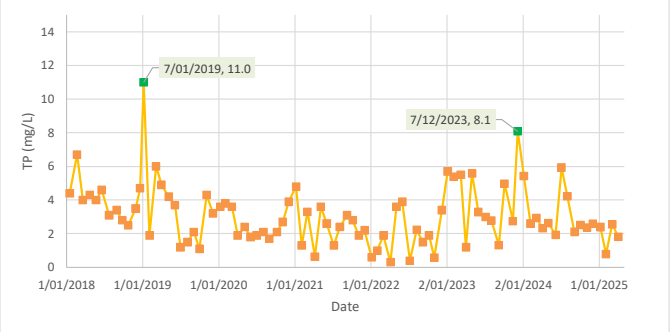

Figure 11 Monthly effluent TP data measured against the current consent limits.

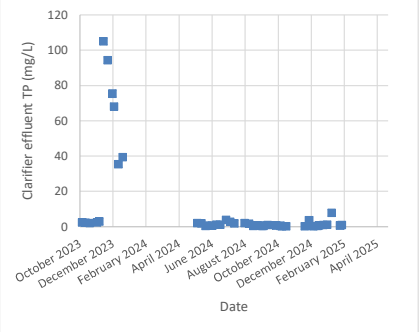

Figure 12 Sampling data for TP at clarifier outlet (Eurofins).

2.5.3.4 Ammonia

Figure below presents a graph of the TAN sampling data collected as part of the RM13.215.03 consent sampling regime. Data points which had noticeable spikes are marked in green and labelled. Figure 14

displays TAN sampling data collected by Veolia and processed by Eurofins at the clarifier outlet, starting from January 2024. From the figure, the TAN results at the clarifier outlet are generally less than 1.5 mg/L.

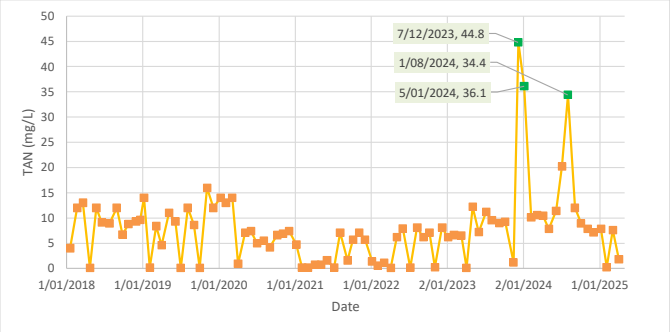

Figure 13 Monthly effluent TAN data measured against the current consent limits.

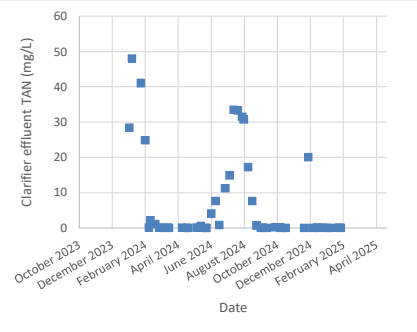

Figure 14 Sampling data for TAN at clarifier outlet (Eurofins).

2.5.3.5 *Microbiological*

Figure 15 below presents a graph of the E.coli sampling data collected as part of the RM13.215.03 consent sampling regime. Data points which had noticeable spikes are marked in green and labelled. The treated effluent generally complies with the current consent limit of 260 cfu/100mL. Figure 16 displays E.coli sampling data collected by Veolia and processed by Eurofins at the plant discharge, starting October 2023.

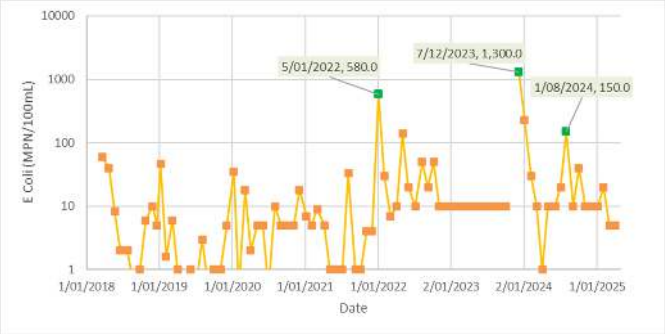

Figure 15 Monthly effluent E.coli data measured against the current consent limits.

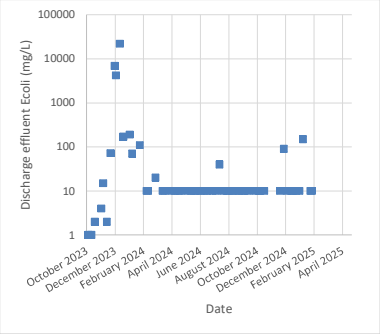

Figure 16 Sampling data for E.coli taken at discharge (Eurofins).

2.5.4 Projected discharge quality

The Stage 3 WWTP upgrade currently under construction and expect to be completed by end of 2025 (November to December). As such, the treated effluent quality targets at the discharge will have a transition period between now and 1st January 2026 (or when MLE2 is fully operational).

Currently the plant is required to meet the effluent requirements as required by Discharge Permit

RM13.215.03.V2. The Stage 3 WWTP upgrade was designed to meet the more stringent effluent requirements as required by Discharge Permit 2008.238.v1. This application does not seek to vary any of the existing limits.

Table 5 below outlines the projected discharge quality targets at the UV outlet, showing the discharge quality after 31st December 2025 will be more stringent following the completion of the second MLE reactor. As discussed in Section **Error! Reference source not found.**, once the second MLE reactor is online, the treated effluent quality at the UV outlet will be among the best quality standards around the country. Table 5 depicts projected discharge quality targets for the effluent at Shotover WWTP.

Table 5 Current consent limits and projected discharge effluent quality limits for the Shotover WWTP.

	Discharge quality up to 31st December 2025 (Note: these are the same as RM13.215.03.V2 limits)		Discharge quality from 1st January 2026 onwards (or when MLE2 is fully operational) (Note: these are the same as 2008.238.V2 limits, except for TAN)	
Parameter (in mg/L unless stated otherwise)	**Annual Median**	**Annual 95%ile**	**Annual Mean**	**Annual 90%ile**
$cBOD_5$ (Biochemical oxygen demand)*	30	50	10	20
TSS (Total suspended solids)	30	50	10	20
TN (Total nitrogen)	23	35	10	15
Ecoli in cfu/100mL	260	-	10	100
TAN# (Total Ammoniacal Nitrogen)	-	-	1.5	5
TP (Total Phosphorus)	-	-	-	-

** Carbonaceous BOD_5 is a more appropriate measurement of organic content in the wastewater than total BOD_5, as the testing requires addition of nitrification inhibitor to suppress the activity of nitrifying bacteria.*

 # Total Ammoniacal Nitrogen (TAN) limits have been added based on similar treatment facilities.

2.5.5 Odour

The WWTP operation will remain the same under this short term consent, with the exception of diverting the treated effluent discharge to the discharge channel.

Based on the experience with other wastewater treatment plants, and considering the level of treatment undertaken at the Shotover Wastewater Treatment Plant (i.e., primary, secondary, and tertiary treatment), there is some potential for the treated wastewater discharged at the outfall to generate odour. Such odours typically exhibit a 'musty', 'earthy', or 'algae-like' character. However, the intensity of these odours is expected to be no more than 'distinct', and they are more commonly described as 'very weak' or not detectable. Odours associated with the outfall (if any) are likely to be detectable only within approximately 50 metres of the discharge point.

The following Figure provides a visual of the 50m radius where the odours may be detectable. The figure also shows the nearest commercial and residential receptors which are approximately 600m away from the site. The residential receptors to the northeast have a **high** sensitivity to odour, and the commercial receptors to the west have a **moderate to high** sensitivity to odour.

Figure 17: Odour receptors near the Shotover WWTP discharge channel

2.6 Discharge Mechanism

Treated effluent will be discharged from the UV channel to the drain / discharge channel. As the treated wastewater flows along the discharge channel some may infiltrate the ground along the base and sides of the channel.

2.6.1 Discharge channel

The channel has an approximate total length of 270m to the Kimi-ākau/Shotover River, with three concrete culverts when crossing a footpath. The channel varies in width and depth across its length. Geometry of the existing channel was obtained from LiDAR information after refining with validations points via land survey. The channel has a longitudinal slope varying between 0.1% to 4%. Well-grown vegetation and debris cover most parts of the channel section (Figure 18) which have been recently cleared (Figure 19).

Figure 18: Well-grown vegetation and tree branches mostly blocking the previous channel (prior to vegetation removal)

Figure 19: Recently cleared section of the previous channel (prior to introduction of discharge)

The hydraulic capacity of the channel has been assessed using Manning formula to understand the likely

capacity to convey treated effluent discharge, refer to Figure 28 in Section 3 for a photo taken where the channel meets with the river.

The following Figure 20 provides a plan view of the drainage channel and cross sections analysed. The figure also shows where the drainage channel crosses the boundary line from QLDC land to DoC land.

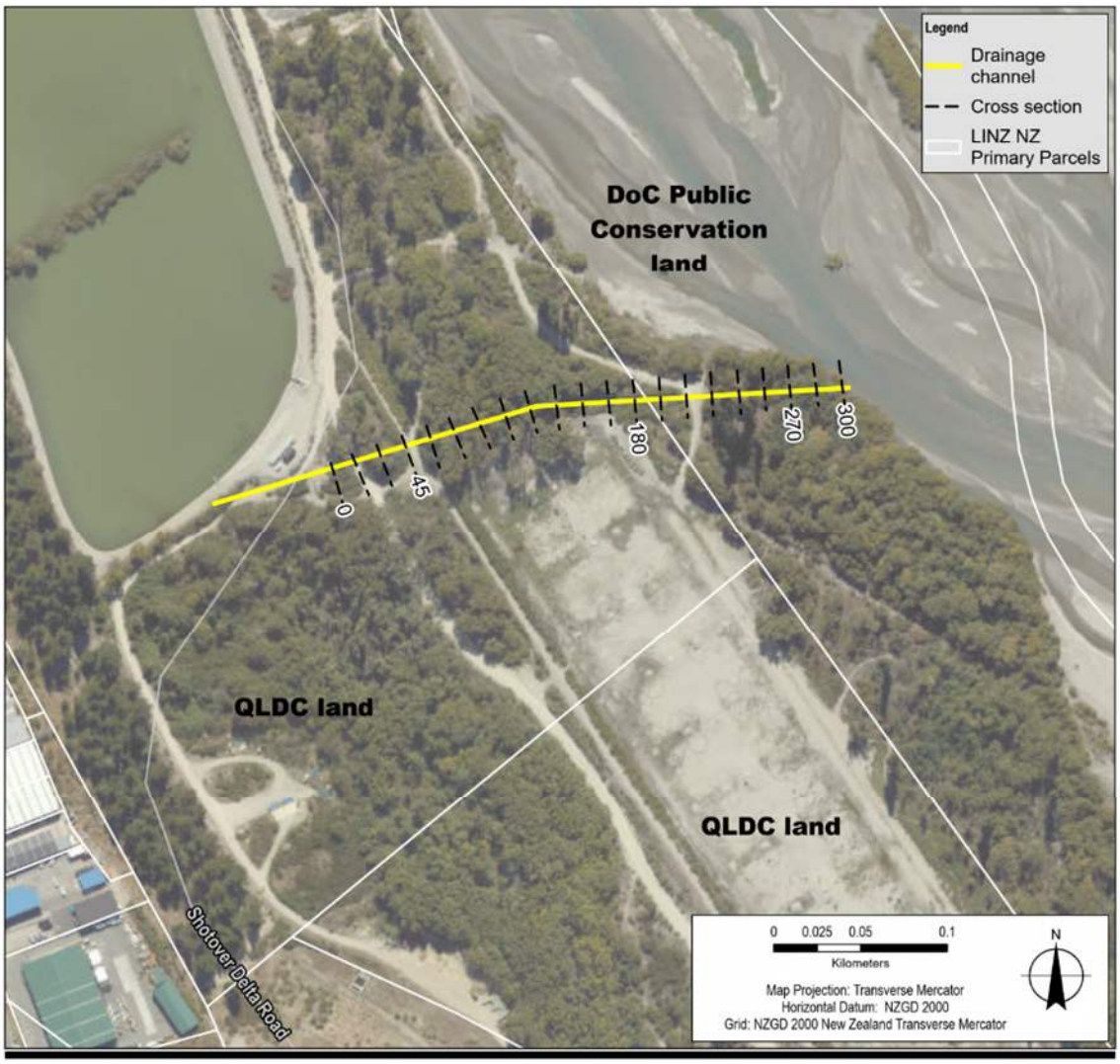

Figure 20: Plan view of the drainage channel and analysed cross sections.

Through the approximately 270 metre length of the channel, the cross sections of the channel vary from a defined prismatic section e.g., at chainage 45 (Figure 21 to some sections without a defined prismatic section e.g., at chainage 180 (Figure 21). A roughness of 0.035 has been adopted for the capacity assessments.

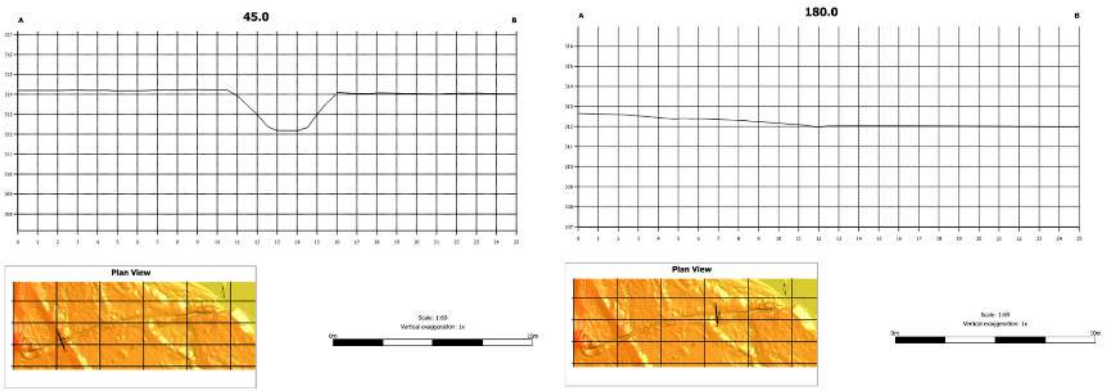

Figure 21: Well-defined cross section of previous channel at chainage 45 (left) and a cross section without a defined prismatic section at chainage 180 (right) obtained from LiDAR information

Those sections with the least cross-sectional area and at a flat grade (worst cases) have been chosen for this assessment. The results show most sections of the channel are expected to have sufficient capacity to convey an instantaneous flow of 400 L/s. However, some sections of the channel do not have a defined cross section to contain the flow, they are mostly located at the outlet of the existing culverts. Installation of earth embankments and improving the culverts' inlet and outlet at these sections are needed to shape a defined geometry. A typical section of such improvements is shown in Figure 22.

The extent of the proposed geometrical improvements is likely to be between chainages 180 to 210. These proposed improvements for the channel cross-section may extend approximately 30 metres upstream of the third culvert, meaning the works will occur on both QLDC and DOC owned land (refer to Figure 20 for land parcel boundaries). Additional improvements at the discharge to the Kimi-ākau/Shotover River is recommended to minimise erosion to the proposed earthworks.

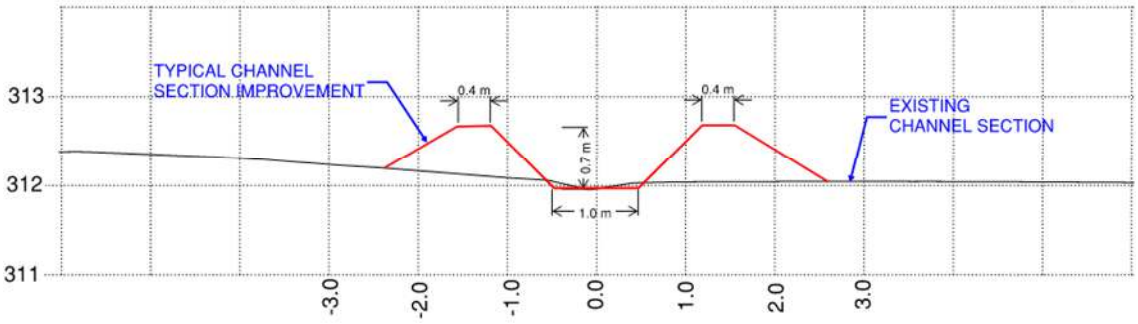

Figure 22: Typical improvements on previous channel's cross section (at CH180 of the existing channel)

The capacity of three existing culverts along the channel has also been assessed. The calculation shows that the culverts have capacity to convey 400 L/s for a DN600 pipe (based site observations, Figure 23) and a minimum grade of 0.5%. As discussed above, improvements for the culverts' inlet and outlet will be required

to reduce the risk of erosion and facilitate flow conveyance.

Figure 23 Existing culvert along previous channel

2.7 Risk Mitigation

In November 2023 and May 2024 there were issues with the operation of the WWTP resulting in effluent quality from the plant not achieving the quality parameters required under the resource consent for the discharge of treated wastewater to land. Those matters have now been resolved and the WWTP is currently operating properly and within its consent conditions.

In response to this recent monitoring and performance data, the applicant has reviewed the WWTP operation and maintenance programme to identify opportunities to improve reliability of performance and updated the Operations and Maintenance Manual (OMM) which will soon be submitted to ORC as identified in Table 6. To ensure future compliance with discharge standards the applicant is working with the contracted WWTP operator to ensure exceedances do not happen again and to improve plant operation and reliability through implementation or consideration of the risk mitigations in Table 6.

Table 6 Risk Mitigation Measures

Mitigation Measures	Description	Timeline
Internal Testing	Plant operators conduct regular testing (>2x per week) at various treatment stages to monitor plant performance on top of compliance testing using photospectrometer or other devices on site. This enables the operators to make the required process adjustments.	**Ongoing**
Weekly Testing of UV Treated Effluent	Plant operators collect UV treated effluent samples on a weekly basis and tested by an accredited laboratory on top of consent compliance testing (monthly frequency). Similar to "internal testing", this enables the operators to make the required process adjustments.	**Ongoing**
O&M Manual update	Plant operators will be working with an updated O&M manual with identification of critical equipment, installed redundancy and options of contingency measures. This improves the plant operation reliability and consistency.	**By June 2025**
Aeration system O&M practice & monitoring	This mitigates against issues with aeration system outages which could adversely affect the treatment performance.	**Completed in March 2025**
Turbidity online reading at Clarifier Outlet	This provides a continuous measurement of clarifier effluent quality, an important criteria of UV disinfection.	**By June 2025**
Receiving Environment Monitoring Plan	This outlines the receiving environment water quality monitoring in relation to the discharge of treated effluent via the channel. Also refer to Section 2.8.	In draft as of April 2025

2.8 Proposed Consent Limits

The maximum discharge volume and rate sought for this short-term consent are: 30,000 m^3/day and 400 L/s respectively. From 1 January 2026 (or when MLE2 is successfully commissioned and operational), the clarifier outflow meter will be representative of the plant discharge flow.

The discharge quality parameters will follow those in Table 5. These are the same as the current limits on RM13.215.03.V2 and 2008.238.V2 relating to pre and post the second MLE clarifier coming online. If this consent is granted after 31 December 2025 then the only limits proposed are those in the two right-hand columns of Table 5.

2.9 Proposed Sampling and Monitoring Regime

The proposed sampling and monitoring regime is included in **Appendix F**. It includes monitoring of the following:

Table 7 Proposed Sampling and Monitoring Regime

Sampling Locations	Parameters	Minimum Frequency
Plant Flows	Locations: Plant Inlet, Clarifier Outlet, Pond 3 Pump Station Type: Electro magnetic flowmeters Flow monitoring: Daily totals and instantaneous rates	**Continuous measurements**
Discharge Flow Rate	Before MLE2 is commissioned (till end of 2025): the sum of pond 3 pump station and clarifier outlet flowmeters After MLE2 is commissioned: Clarifier Outlet flowmeter	**Continuous measurements**
WWTP Influent (for operational monitoring)	24 hour time composite samples Parameters: COD, cBOD5, TSS, Tot N, TAN, TP, Alkalinity and pH.	**Weekly**
Clarifier Effluent (for operational monitoring)	Grab Sample Parameters: cBOD5, TSS, Tot N, TAN, NO3N, TP and pH.	**Weekly**
UV Effluent (Consent Compliance Location)	24 hour time composite samples, except for E Coli (grab samples) Parameters: COD, cBOD5, TSS, Tot N, TAN, NO3N, NO2N, TP, E Coli	**Monthly**
Receiving Environment	Upstream and downstream monitoring on Kimi-ākau/Shotover River and downstream on Kawarau River (weekly). Groundwater quality monitoring at BH02, BH03, BH04 and BH06 (monthly) A draft monitoring plan is provided as Appendix F with further details of parameters and frequency at specific locations.	**Various**

There is no receiving environment monitoring carried out in the Kimi-ākau/Shotover River under the current consent to discharge through the DAD disposal field, however, sampling is proposed at both upstream and downstream locations for the duration of this consent as well as ongoing groundwater monitoring in vicinity of the discharge channel.

2.10 Associated Activities

To ensure the ongoing effective operation of the discharge channel, the following works will be undertaken:

- Placement of rip-rap armouring below the discharge outfall, in the bed of the Kimi-ākau/Shotover River. This is proposed in order to minimise scour of riverbed at the point of discharge, and ensure the channel outfall does not erode or become unstable. Detailed design for the armouring is yet to occur, however at this stage the applicant is proposing armouring of the riverbank up to 6 m long and up to 2 m high, using locally sourced boulders.
- Localised earthworks on a section of the discharge channel, to enable additional conveyance capacity for treated wastewater. This is expected to involve minor increases in the height of the channel walls

upstream of culvert three over a length of approximately 30m as described in section 2.6.1.

2.11 Duration Sought

A duration through to 31 December 2030 is proposed. This will give the Council time to seek consent, design and implement a long-term solution for the disposal of treated effluent from the Shotover WWTP. The optioneering for the long-term solution is already well underway in conjunction with input from rūnaka representatives. Consultation with key stakeholders and the wider public on the preferred solution will occur prior to a consent application being submitted by 31 May 2026. The engineering design for the preferred solution will be completed by 31 December 2027, with construction and implementation by 31 December 2030.

3. DESCRIPTION OF RECEIVING ENVIRONMENT

3.1 Location and site description

The Shotover WWTP is located on the Shotover delta, to the south of the State Highway 6 bridge over the Kimi-ākau/Shotover River. The legal description of land at the discharge channel outlet is Section 4 SO 409393: Crown Land designated for conservation purposes under Section 62(1) of the Conservation Act 1987 (refer Figure 24 below for map showing land ownership).

The WWTP is located on the true right bank of the Kimi-ākau/Shotover River, below and to the east of the Frankton flats. The topography is generally flat, with most of the area surrounding the discharge channel vegetated with predominantly exotic species, including willow, poplar and sumac. Riverbed vegetation in the direct vicinity of the discharge channel outlet and to the south of the proposed discharge largely consists of willow, while the riverbed north, east and south of the discharge outlet is largely free of vegetation and comprised of fluvial gravels, as shown in Figure 25 to Figure 28.

The area where the Shotover WWTP is located is described by ORC in its Regional Water Plan as the Lakes subregion. This subregion contains a large area of high country and is dominated by the glacial lakes Hawea, Wanaka and Wakatipu. Rainfall in this region can vary from 600 mm in the Kawarau Gorge to over 8,000 mm in parts of the Southern Alps which feed the Clutha catchment. The landscape changes significantly as the Clutha River flows towards the coast, with the Southern Alps and glacial lakes giving way to broad tussock covered inland basins and coastal hills. Land use in the lower catchment has the potential to impact on water quality with activities including hydro-electric dams, urban development (small towns including Cromwell, Alexandra, Roxburgh and Balclutha) and intensive pastoral and horticulture development.

Figure 24: Land ownership/administration within the Shotover delta. Unmarked riverbed is crown-owned riverbed managed by LINZ

Figure 25: Typical exotic vegetation across delta looking back towards discharge channel outfall from riverbed facing west.

Figure 26: True right of the Kimi-ākau/Shotover River, facing north upstream of discharge.

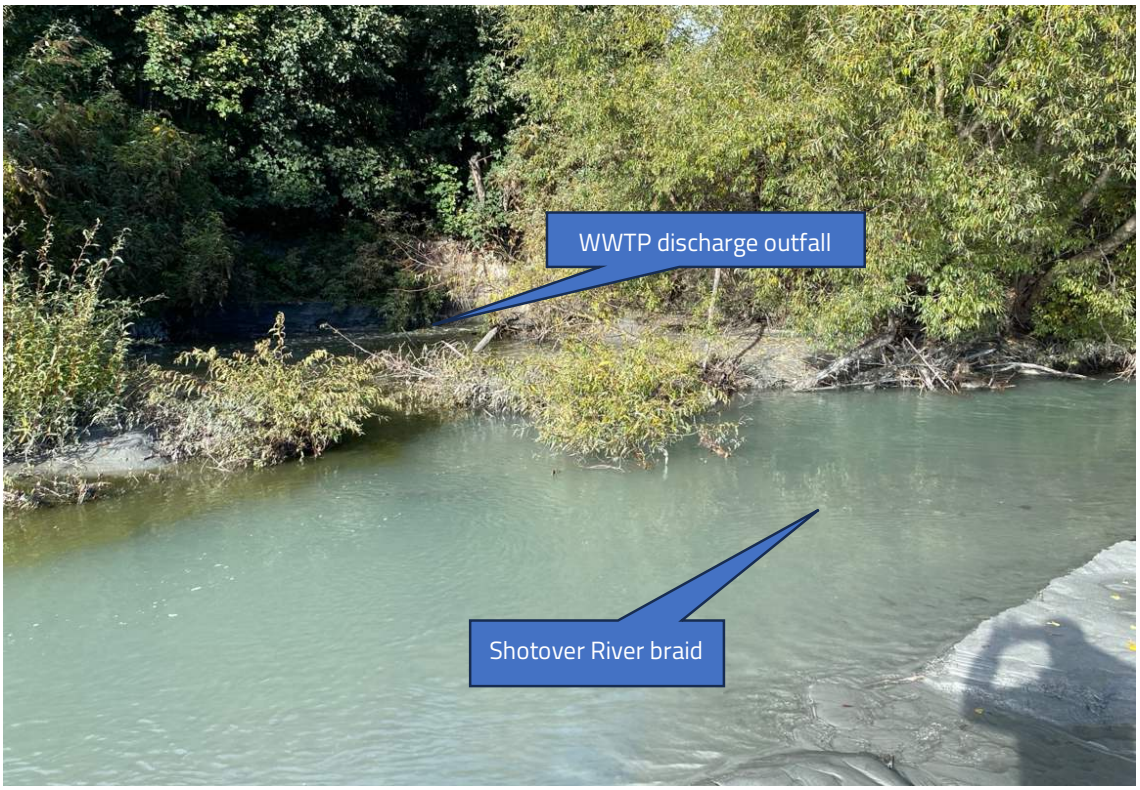

Figure 27: Facing WWTP discharge to Kimi-ākau/Shotover River.

Figure 28: looking south downstream of discharge location.

3.2 Climate

The average annual rainfall from 1990 – 2020 is shown in Figure 29. There appears to be relatively high variation in total annual rainfall between each year.

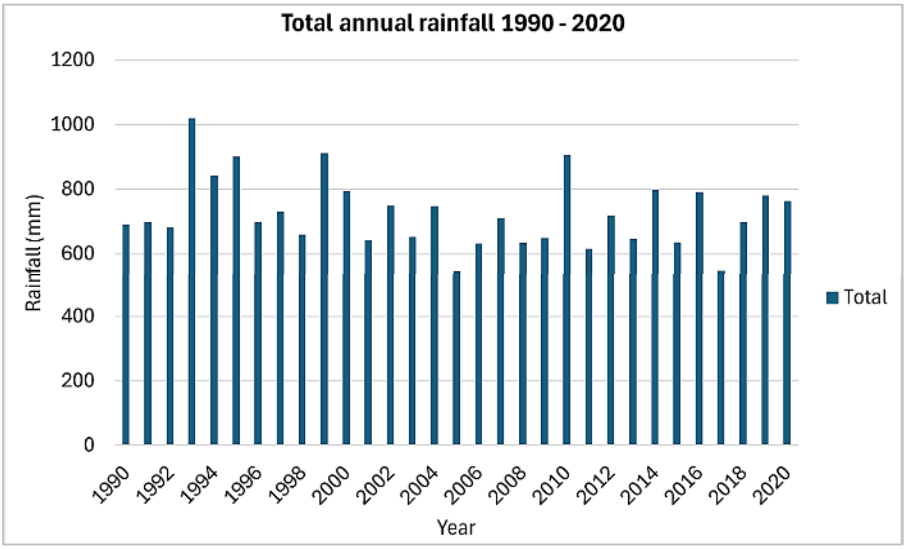

Figure 29: Annual rainfall in Queenstown from 1990 – 2020. Data source: NIWA climate database (StatsNZ 2023).

NIWA's annual climate summaries give results for sunshine hours and mean temperatures in Queenstown. From 2020 – 2024 the average annual sunshine hours was 2,338 and the mean temperature was 10.5°C (NIWA 2025).

The overall climate in Queenstown consists of warm summers, typically 20 – 30°C during the day and cold winters with occasional low elevation snowfall. Table 8 provides a summary of seasonal rainfall from 1990 - 2020 (StatsNZ 2023). Rainfall is typically highest in spring and summer due to the influence of westerly winds and frontal systems. Queenstown is situated on the eastern side of the Southern Alps. The prevailing westerly winds bring moist air from the Tasman Sea, which rises over the mountains, cools, and condenses, leading to precipitation (NIWA 2015).

Table 8: Seasonal rainfall summary from 1990 – 2020. Data sourced from NIWA Climate Database (StatsNZ 2023)

Season	Min (mm)	Max (mm)	Average (mm)
Autumn	103.4	271.6	179.3
Spring	70.3	333.2	181.0
Summer	83.6	454.8	190.5
Winter	100.4	273.1	175.0

Figure 30 presents a wind rose generated from wind data collected at the nearby Queenstown Airport meteorological station. This data has been used to inform the odour assessment described in Section 5**.**

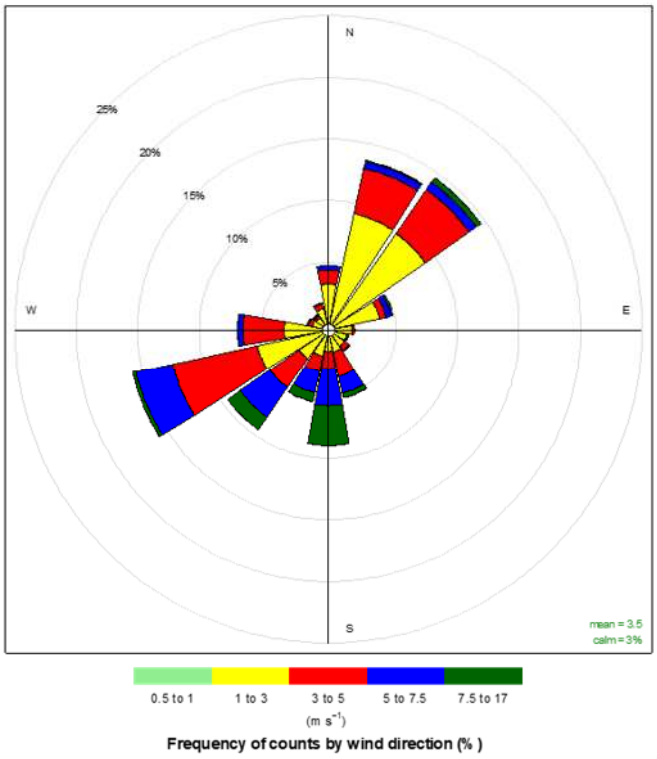

Figure 30: Queenstown Airport wind data presented as a windrose (2022 to 2024 – years inclusive)

3.3 Fluvial geomorphology

The Kimi-ākau/Shotover and Kawarau Rivers form major tributaries of the Clutha River. The key contributors of river flow and morphology in the Clutha catchment are high alpine rainfall, low rainfall and high evaporation rates in the semi-arid Central Otago valleys and high erosion risk in places throughout the catchment. The distinctive milky blue colour of the Kimi-ākau/Shotover River derives from high rainfall and sediment from erosion in its catchment.

The lower Kimi-ākau/Shotover River in the vicinity of the current Shotover WWTP discharge is characterised by several braided channels and a high flood frequency resulting in highly disturbed river habitat. The lower Kimi-ākau/Shotover River flows via a series of braided channels that form a broad delta at its confluence with the Kawarau River. This is a relatively unusual type of river delta, whereby deltaic sediments are deposited at the confluence of two rivers, rather than at the margin of a lake or the ocean. The Kimi-ākau/Shotover River converges with the larger Kawarau River at a 90 degree angle. During high flows the

Kimi-ākau/Shotover River can restrict the downstream flow of the Kawarau River, increasing the risk of flooding around the Lake Whakatipu shoreline. During these events, the delta acts as a floodplain, causing significant sediment deposits in the delta and often resulting in natural re-routing of the braided river channels.

In an attempt to address this flood risk to upstream communities, ORC have constructed a "training line" (an engineered rock wall) which is designed to "guide" the flow of the Kimi-ākau/Shotover River in such a way as to reduce the flow restriction effect on the Kawarau River during high flow events (Figure 31).

A recent consent application by QLDC[4] is also in process seeking authorisation to create a diversion channel within the Kimi-ākau/Shotover Riverbed (akin to a small braid) to ensure there is always flowing water past the point of discharge. A schematic of the proposed works is provided in Figure 32 below.

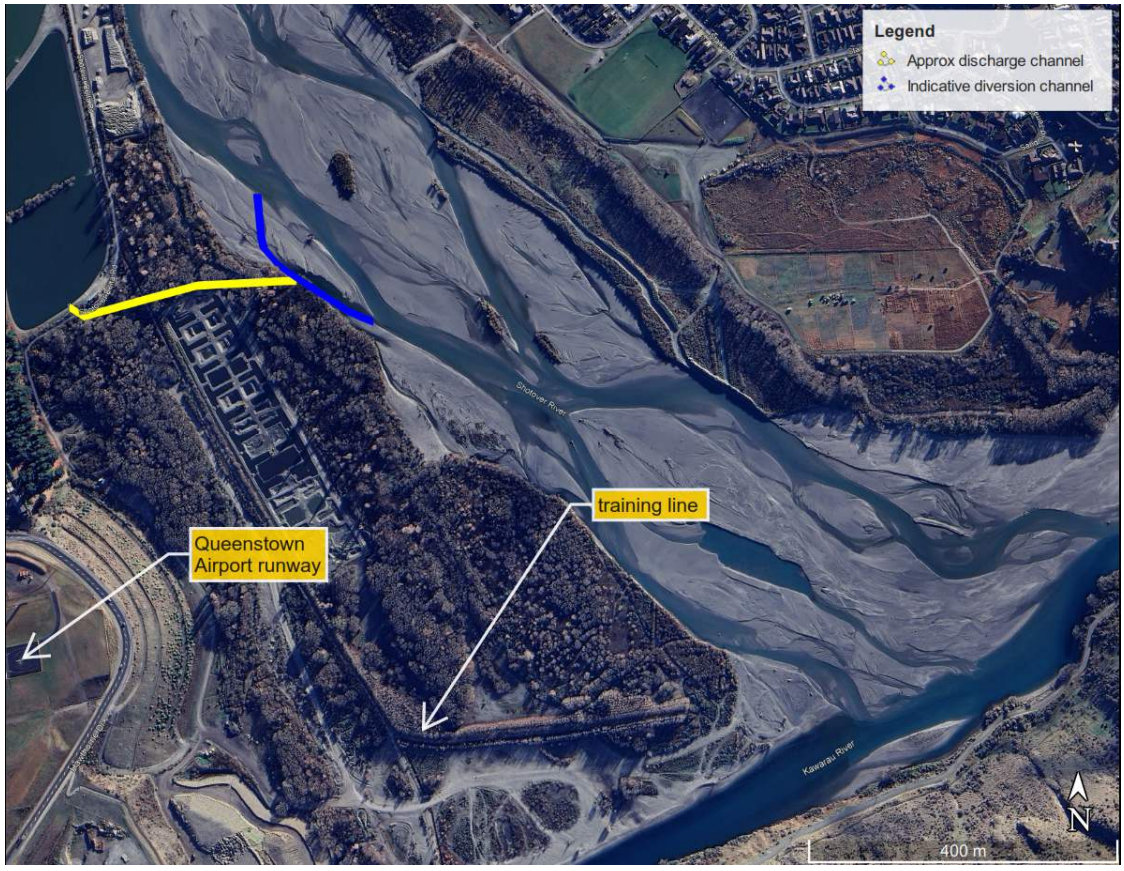

Figure 31: Site location and surrounding area, including Kawarau River confluence and ORC training line (Imagery: Google Earth)

[4] RM25.177 – QLDC application in process at ORC

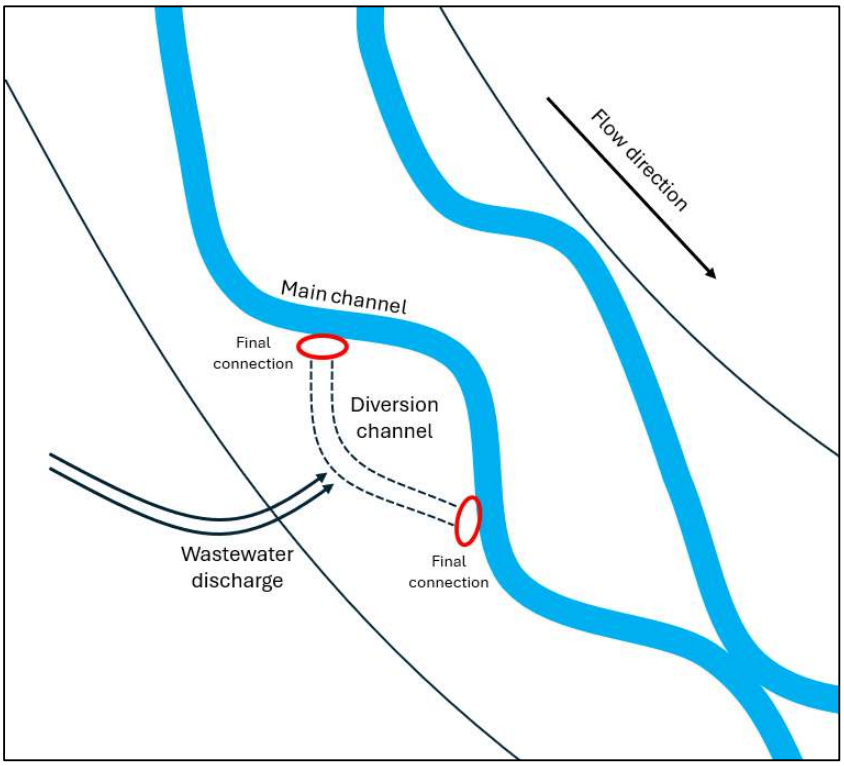

Figure 32: Schematic of proposed diversion works

3.4 Geology and Hydrogeology

A summary of the geology and hydrogeology/groundwater of the receiving environment is provided in the report attached as **Appendix G** prepared by GHD.

Several investigations have been undertaken to understand the geology of the Shotover delta, the locations of which can be seen in Figure 3.7 of Appendix G. These investigations have confirmed that the geology of the underlying the delta is predominantly a Sandy fine to coarse gravel with some cobbles. The gravel is made up of subrounded to subangular schist fragments. The gravel underlies a thin sandy topsoil. Deeper boreholes drilled during the investigation indicate that the sandy gravel is underlain by a layer of fine sand, at least at the Kawarau River end of the delta.

Inspection of the historical disposal channel prior to recommencement of wastewater discharge indicated that fine sediment and debris had accumulated in the channel base, to thickness ranging from 0.1 m to 0.2 m. Exposed soils in the channel walls and base were comprised fine to medium sand, with fine to coarse gravel.

The Appendix G report concludes the following in relation to hydrogeological properties on the delta:

> *Hydraulic testing indicated a very high hydraulic conductivity for deposits screened in some wells consistent*

with the sandy gravel lithology. This is considered to reflect the potential horizontal hydraulic conductivity, rather than the potential infiltration rate. In contrast, testing of the fine sand deposits indicates a significantly lower permeability more consistent with a deposit including some silt. The difference in permeability between materials is significant and layers or infilled zones of such material may influence groundwater flow direction.

The direction of groundwater flow across the delta is considered to be generally to the southeast, towards the Kawarau River, generally aligned with the direction of Kimi-ākau/Shotover River flow (refer Figure 3.9 in Appendix G). The discharge is located above the Shotover Alluvial Ribbon Aquifer (mapped as a "Draft aquifer" in the ORC GIS Viewer).

Monitoring of groundwater levels in the nearest boreholes since the discharge commenced indicates that the any soakage from the discharge channel does not appear to be notably influencing groundwater levels in these wells. GHD note in Appendix G that "*this is expected to be a function of the modest potential for vertical infiltration from the channel base, relative to the high horizontal hydraulic conductivity that rapidly dissipates infiltrating treated wastewater. Similar conditions were evidenced in and around the DAD, where high water levels in the DAD and infiltration, did not result in corresponding significant increases in water levels downgradient of the DAD.*"

3.5 Hydrology

A summary of the hydrology of the Kimi-ākau/Shotover River and Kawarau River is provided in the report in **Appendix G**.

The site is located on the Shotover delta approximately 1 km upstream of the Kawarau River confluence. The lower Kimi-ākau/Shotover River in the vicinity of the Shotover WWTP discharge is characterised by braided river channels, with frequent flood flows resulting in a moving gravel riverbed and changing channel locations. The lower Kimi-ākau/Shotover River with currently active baseflow flows and channels (true left hand bank) is approximately 650 m in width.

The Kawarau River is a large river fed by Lake Wakatipu and is the principal tributary of the Clutha River.

River flows in the Kawarau River are disturbed by floods to a lesser extent that the Kimi-ākau/Shotover River due to the buffering effect of Lake Wakatipu. The Kimi-ākau/Shotover River respond rapidly to rainfall, with flood flows characterised by high sediment load and turbid waters due to the geology and topography of the headwaters.

The following table illustrating flow statistics for the Kimi-ākau/Shotover and Kawarau Rivers is taken from the GHD report in Appendix G.

Table 9: Summary flow statistics (NIWA). Sourced from GHD Report - Table 3.2

River	Mean flow (m^3/s)	Median flow (m^3/s)	Mean annual low flow (MALF) (m^3/s)
Kawarau River	232.8	179.1	71.2
Kimi-ākau/Shotover River	56.5	43.4	18.1

The closest known wetland is the Shotover River Confluence Swamp RSU, approximately 550m to the northeast, on the far side of the Kimi-ākau/Shotover River.

3.6 Groundwater quality

A summary of groundwater quality in the receiving environment is provided in the report in **Appendix G**.

Groundwater quality is showing signs of influence relating to discharges to groundwater from the oxidation ponds and/or the DAD disposal field rather than the discharge channel. Observations include:

- Increasing relative proportion of sodium, potassium and chloride in groundwater, and increase electrical conductivity.
- Increasing nitrogen concentrations.
- A shift to low dissolved oxygen and reducing conditions, reflecting notable presence or influence of organic material/compounds and microbiological activity.
- The presence of nitrogen as ammoniacal-N.
- Total Coliforms and *E. coli* are elevated downgradient. However these microbiological contaminants were also detected upgradient of the discharge channel.

Results of recent groundwater sampling are provided in Table 3.6 in Appendix G.

3.7 Surface water quality

A summary of surface water quality in the receiving environment is provided in the report in **Appendix G**.

Wider water quality monitoring in the catchment undertaken by ORC indicates that the Kimi-ākau/Shotover River and Kawarau River are characterised as meeting the NPSFM 'A' attribute band for all parameters except for clarity as the Kimi-ākau/Shotover River has a naturally high sediment load due to the geology and topography of its upper catchment.

Background water quality samples were collected in August 2024 and the following is noted regarding these results:

- *"Increases in inorganic nitrogen concentrations (both nitrate-N and ammoniacal-N) between the*

upstream location S2 and downstream location S3, suggest a likely influence of wastewater management on the Shotover river downstream of the discharge area.

- *The detectable dissolved phosphorous concentration in S3 further suggests an ongoing influence from the area of wastewater management, approximately 5 years following cessation of wastewater discharge to the Shotover River.*
- *Visual clarity of the Shotover river is naturally low, and lower than that evident in the Kawarau River. This is concurrent with significantly lower temperatures than the Kawarau River, with both considered to reflect the influence of glacial melt."*

More recent baseline sampling in March 2025 (at the locations described in Table 3.8 in Appendix G), prior to the discharge to the Kimi-ākau/Shotover River recommencing indicate that:

- Nutrient concentrations are generally low in the Kimi-ākau/Shotover River, with most samples from the main braid close to or below laboratory detection limits (RS01-04 (these sites represent background water quality) and RS09).
- The low flow and nature of the braid/isolated pools close to the riverbank (RS06 and RS08) is reflected in sample results with higher ammoniacal-N and elevated electrical conductivity recorded most likely the influence of organic material decomposition in near stagnant waters, wildlife influence on water quality biological activity and/or groundwater discharges influenced by the upgradient wastewater management.
- Nutrients in the Kawarau River are elevated downstream (RS12 and RS13 - hydraulically downgradient of the DAD disposal field) compared to upstream (RS14).
- Sampling downstream of the Kawarau and Kimi-ākau/Shotover confluence is considered to be predominantly representative of the fully mixed Kimi-ākau/Shotover River water quality. Water samples from this monitoring location are expected to be influenced by activities within the Kimi-ākau/Shotover River and the diffuse groundwater discharges through the Shotover Delta gravels. While nutrient concentrations are low at this location, there is an order of magnitude increase in Nitrate-N concentration compared to RS14 (upstream Kawarau).
- Coliforms and *E. coli* are present within the Kimi-ākau/Shotover River, and not solely attributable to wastewater management on the delta, as demonstrated by detections at the upstream monitoring location RS01 (total coliforms of 547 and *E. coli* of 3 count/100 ml). Concentrations do increase moving into the delta area proper, including in areas distant from the riverbank and more centrally within the main braid, such as location RS09. The periodic increase in microbiological content due to catchment run-off are common and similarly, on braided rivers, local variation in microbiological concentrations can result from wildlife and localised areas, such as gravel islands with established vegetation and habitat. Whilst the source of measured microbes at location RS09 prior to and subsequent to discharge occurring is unclear, it is considered likely that localised upstream sources in this area may be influential during periods of low flow. The pre-discharge sampling of RS09 also demonstrated elevated organic nitrogen,

suggesting organic or ecological source.

3.8 Ecology

A summary of aquatic and terrestrial ecology in the receiving environment is provided in the report in **Appendix G**.

> *The Shotover river is a braided river system made up of loose gravels, cobbles and sand, with frequent high flow conditions. This poses an ever-changing environment resulting in locally and temporally variability in habitat and ecological communities. Braided rivers often have higher ecosystem sensitivity due to this, but also less potential for long term degradation than many lowland rivers.*
>
> *A survey completed in 2015 when the historical discharge to the Shotover River was occurring found that water and/or habitat quality at each site surveyed was "good" or "excellent" according to MCI and QMCI scores (Golder 2015). Periphyton, at low abundance was identified at one of the monitoring sites. Macroinvertebrates collected downstream and upstream of the WWTP discharge were similar, suggesting minimal impact, and dominated by Deleatidium mayflies (pollution-sensitive). The 2015 survey concluded that there was no evidence of increased periphyton growth due to the WWTP discharge (Golder 2015). A biological survey in 2016 showed similar results and stated that the macroinvertebrate fauna is typical of physically disturbed, alpine gravel bed rivers, where frequently high flows and high sediment loads result in an invertebrate community dominated by Deleatidium mayflies (Ryder 2016).*

Recent eDNA sampling in August 2024 identified several species of caddisfly, midges, mayflies, stonefly and flies in the Kimi-ākau/Shotover River. Didymo was present in all Kawarau River sites (Landpro 2024).

The Kawarau River and the Kimi-ākau/Shotover River have been found to provide habitat for native and endemic fish species such as longfin eels (*Anguilla dieffenbachii*, At Risk-Declining), bullies (Common bully, *Gobiomorphus cotidianus*, and upland bully, G. breviceps, both not Threatened), kōaro (*Galaxias brevipinnis*, At Risk-Declining), and trout (brown and rainbow *Oncorhynchus mykiss*, both Introduced and Naturalised) (Wildlands 2024) (E3Scientific 2024). In 2024, the ecological value of the freshwater fish species likely present near the WWTP site was assessed as high (E3Scientific 2024), due to the occurrence of these at-risk species.

The bird survey report provided in Appendix A notes that there may be some Threatened or At-Risk migratory nesting species present on the Kimi-ākau/Shotover River and delta, including terns, gulls and waders.

3.9 Recreational and commercial uses

The recreational and commercial uses of the Kimi-ākau/Shotover and Kawarau Rivers in vicinity of the

discharge as similar to those included in a report[5] prepared for the application for current consent 2008.238.V2:

> *"The Shotover and Kawarau Rivers are both used extensively for recreation including: fishing, jet-boating, white-water rafting, river surfing and bungy jumping. A number of commercial operators use the rivers for these activities. Large numbers of tourists partake in these activities, especially during the summer months. During busy summer months, jet-boats full of tourists regularly travel up and down the lower Shotover River. Boats pass the Shotover WWTP at least every half an hour. The banks of the Shotover River are often used by off-road vehicles, and there is a network of vehicle tracks through the willow stands on the Delta. Walkers also use the delta area, although there are numerous walking tracks closer to Queenstown that receive greater usage."*

> *"The Clutha River, of which the Kawarau is the major tributary, supports one of the most intensively used river trout fisheries in New Zealand[6], and water quality is regarded as a key issue in the catchment by anglers. The riverbed in the vicinity of the treated effluent discharge is often used for walking dogs."*

Since that report was written, cyclists now also frequently traverse the area over the discharge channel utilising the recently constructed Queenstown Twin Rivers Trail which runs along the landward side of the DAD disposal field.

3.10 Other water users

According to ORC's Consents in Otago GIS viewer:

- There are no water permits authorising abstraction from the Kimi-ākau/Shotover River downstream from the discharge; and
- The closest known consented water take from the Kawarau River downstream from the subject discharge is in Cromwell (more than 40 km downstream).

The closest registered drinking water supply downstream from the discharge is associated with Queenstown Bungy Limited (approx. 12 km downstream), noting that this supply appears to be from a tributary of the Kawarau River, not the main trunk of the Kawarau.

It is acknowledged that there may be potable water abstractions from the Kimi-ākau/Shotover or Kawarau

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[5] *Assessment of Environmental Effects on Water Quality and Ecology*. Prepared by Golder Associates (NZ) Ltd (2008).

[6] Deans, N., Unwin, M. Rodway, M. (2004). *Sport Fishery Management. Freshwaters of New Zealand.* J. Harding, P. Mosley, C. Pearson and B. Sorrell. Christchurch, New Zealand Hydrological Society and New Zealand Limnological Society.

Rivers that are permitted under the RPW, meaning there may be no record of their abstraction.

3.11 Conservation Order

Both the Kawarau and Kimi-ākau/Shotover Rivers are protected by the Kawarau River Conservation Order (1997). This order identifies certain "outstanding characteristics" and certain "restrictions or prohibitions". The outstanding characteristics for the Kimi-ākau/Shotover River in the order are:

- wild and scenic characteristics;
- natural characteristics, in particular the high natural sediment load and active delta at confluence with Kawarau River;
- scientific value, in particular the high natural sediment load and active delta at confluence with Kawarau River;
- recreational purposes, in particular rafting, kayaking, and jetboating;
- historical purposes, in particular goldmining.

The effects of this activity on these outstanding values have been assessed in Section 5 of this application.

The specified contract recreation water quality standards that are required to be met are:

(1) The visual clarity of the water shall not be so low as to be unsuitable for bathing.
(2) The water shall not be rendered unsuitable for bathing by the presence of contaminants.
(3) There shall be no undesirable biological growths as a result of any discharge of a contaminant into the water.

3.12 Schedule 1 of the RPW

Schedule 1 of the RPW outlines the natural and human use values of various watercourses throughout the Otago region. Table 10 summarises the natural values identified in Schedule 1A that apply to the Kimi-ākau/Shotover and Kawarau Rivers.

Table 10: Natural values identified in the Schedule 1A of the RPW that apply to the Kimi-ākau/Shotover and Kawarau Rivers

Kawarau River	
Ecosystem Values	▪ Large water bodies supporting high numbers of particular species, or habitat variety, which can provide diverse life cycle requirements of particular species; ▪ Bed composition of importance for resident biota – gravel and rock; ▪ Absence of aquatic pests (e.g. Lagarosiphon) identified in the Pest Management Strategy for Otago 2009;

	▪ Presence of indigenous fish threatened with extinction; ▪ Presence of eels, salmon & trout
Outstanding Natural Features	Outstanding: a) for its wild, scenic characteristics; b) natural characteristics, in particular the return flow in the upper section when the Kimi-ākau/Shotover River is in flood; c) for scientific values, in particular the return flow in the upper section when the Kimi-ākau/Shotover is in flood; d) for recreational purposes, in particular rafting, jet boating and kayaking. Spectacular and rugged river gorge, schistose landscape, fast flowing white water and rapids, old gold sluicing landscape, from confluence with Arrow River to Lake Dunstan.
Significant indigenous vegetation and significant habitat of indigenous fauna	Significant habitat for koaro including many tributaries.
Kimi-ākau/Shotover River	
Ecosystem Values	▪ Bed composition of importance for resident biota – gravel, boulder, sand, rock; ▪ Large water bodies supporting high numbers of particular species, or habitat variety, which can provide diverse life cycle requirements of particular species; ▪ Absence of aquatic pests (e.g. Lagarosiphon) identified in the Pest Management Strategy for Otago 2009; ▪ Presence of riparian vegetation of significance to aquatic habitats; ▪ Presence of a significant range of indigenous waterfowl; ▪ Presence of indigenous waterfowl threatened with extinction.
Outstanding Natural Features	Outstanding: a) for its wild and scenic characteristics; b) for its natural characteristics, in particular the high natural sediment load and active delta at confluence with Kawarau River; c) scientific value, in particular the high natural sediment load and active delta at confluence with Kawarau River; d) for recreational purposes, in particular rafting, kayaking and jet boating; e) for historical purposes, in particular gold mining.

	Spectacular and rugged river gorge, schistose landscape, fast flowing white water and rapids, old gold sluicing landscape, in main stem between confluence with Iron Stone Stream and Arthur Point. Wild and scenic characteristics, from confluence with Iron Stone Stream to its source.
Significant indigenous vegetation and significant habitat of indigenous fauna	*Significant habitat*: Areas of importance to internationally uncommon species - black fronted tern, banded dotterel - in main stem between Arthurs Point and its source.
Areas with a high degree of naturalness	A high degree of naturalness above 900 metres asl.

Schedule 1B of the RPW identifies rivers where the water taken is used for public water supply purposes. There are no Schedule 1B values listed for the Kimi-ākau/Shotover or Kawarau Rivers. Schedule 1D is addressed in Section 3.6.

Schedule 1C identifies registered historic places, with the following places listed for the subject rivers:

- Kawarau River: Kawarau Falls bridge and dam, Frankton, Queenstown; Kawarau Gorge Suspension Bridge, SH 6, Gibbston.
- Kimi-ākau/Shotover River: Oxenbridge Tunnel, Arthurs Point, Queenstown; Edith Cavell Bridge, Arthurs Point, Queenstown.

Schedule 1D identifies the spiritual and cultural beliefs, values and uses associated with water bodies of significance to Kai Tahu. The Kimi-ākau/Shotover and Kawarau Rivers are identified as having the following:

Watercourse	Schedule 1D beliefs, values and uses
Kawarau River	▪ Kaitiakitanga: the exercise of guardianship by Kai Tahu, including the ethic of stewardship ▪ Mauri: life force; ▪ Waahi taoka: treasured resource; values, sites and resources that are valued; ▪ Trails: sites and water bodies which formed part of traditional routes, including tauraka waka (landing place for canoes); ▪ Cultural materials: water bodies that are sources of traditional weaving materials (such as raupo and paru) and rongoa (medicines).
Kimi-ākau/Shotover River	▪ Kaitiakitanga: the exercise of guardianship by Kai Tahu, including the ethic of stewardship; ▪ Mauri: life force;

	▪ Waahi taoka: treasured resource; values, sites and resources that are valued; ▪ Mahika kai: places where food is procured or produced; ▪ Kohanga: important nursery/spawning areas for native fisheries and/or breeding grounds for birds; ▪ Trails: sites and water bodies which formed part of traditional routes, including tauraka waka (landing place for canoes); ▪ Cultural materials: water bodies that are sources of traditional weaving materials (such as raupo and paru) and rongoa (medicines).

3.13 Cultural and heritage values

QLDC's Operative and Proposed District Plan GIS mapping tool does not show any specific archaeological or cultural sites within or adjacent to the subject area.

Aukaha have previously provided information to support an understanding of cultural values associated with an application for the discharge of wastewater overflows in the District and this included a summary of cultural values and associations with the Kimi-ākau/Shotover River and Kawarau River. However, this has not been attached here as it was prepared for a separate consent application.

An understanding of the values which Māori place on the awa in this area can be drawn from several planning documents including the Proposed Otago Regional Policy Statement, Regional Plan Water: Otago and the Iwi Management Plans of Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku. QLDC acknowledges the importance of the awa to iwi and recognise that Ka Rūnaka maintain a role as kaitiaki (guardians).

Fresh water holds particular cultural and spiritual value to tangata whenua, as sources of mahika kai, for their mauri and in some instances as wahi taoka. Consideration of activities from a cumulative perspective over the whole catchment is required to reflect the values of ki uta ki tai where land and water are connected from mountains to seas. The health and well-being of fresh water is linked to its cleanliness and contamination of the awa will diminish the mauri.

At a local level the Kimi-ākau/Shotover River and Kawarau River are recognised wāhi tupuna, in particular through their use as ara tawhito (traditional travel routes - especially as a route towards the West Coast/Tai Poutini for pounamu), mahika kai (food gathering) and by Māori miners.

Ka Rūnaka (via Aukaha and Te Ao Marama) are best placed to provide a more detailed summary of Māori cultural and spiritual values associated with the Kimi-ākau/Shotover River and Kawarau River and consultation has been initiated with these parties.

3.14 Sensitivity of the receiving environment

The Kimi-ākau/Shotover River is a sensitive receiving environment. The river and those downstream are culturally important to the community and local rūnaka who have strong links to the area and value the rivers for their mahika kai values. The Kimi-ākau/Shotover River is also important from an environmental perspective with excellent overall water quality, providing habitat for indigenous and sports fishery values.

Many of the tourism and commercial activities which operate in the area are dependent on the quality of the river environment. The quality of the Kimi-ākau/Shotover River and downstream rivers are highly valued by the community for recreational purposes, including contact recreation, and the particular ruggedness of the natural character, landscape and amenity values of the river environment.

A discharge of treated wastewater at the site has been occurring since 1970, with the discharge only moving from being direct to surface water to land on the delta in 2019.

4. ACTIVITY CLASSIFICATION

4.1 Riverbed definition

Under the RMA (and RPW), the bed of a river is defined as 'the space of land which the waters of the river cover at its fullest flow without overtopping its banks'.

However, recent case law[7] indicates that the riverbed should be defined primarily by it's identified banks, with less emphasis on the river's 'fullest flow'.

As can be seen in the below figures, the bank of the Kimi-ākau/Shotover River in the vicinity of the discharge channel outlet is well defined, by both the sudden change in topography and the abrupt presence of mature trees.

[7] Canterbury Regional Council vs Dewhirst (2019) NZ Court of Appeals

Figure 33: Indicative discharge channel alignment in relation to approximated riverbank (Source: Google Earth)

Figure 34: Example of Kimi-ākau/Shotover Riverbed/bank delineation near the discharge outlet

On the above basis, the historic discharge channel currently being used to convey treated wastewater is located outside the riverbed. The discharge at the channel outlet is onto the riverbed.

4.2 Variation to existing consent

To authorise the discharge of contaminants to air from the wastewater discharge to water from the WWTP to the Kimi-ākau/Shotover River, the applicant is seeking a change to conditions of Consent No. RM13.215.01 under Section 127(1) of the RMA:

(1) The holder of a resource consent may apply to a consent authority for a change or cancellation of a condition of the consent, subject to the following:

> *(a) the holder of a subdivision consent must apply under this section for a change or cancellation of the consent before the deposit of the survey plan (and must apply under section 221 for a variation or cancellation of a consent notice after the deposit of the survey plan); and*
>
> *(b) no holder of any consent may apply for a change or cancellation of a condition on the duration of the consent.*

The application does not relate to a subdivision consent, and no change to the consent duration is being sought.

When determining whether an application to change a condition or conditions of consent is 'within scope' of Section 127, the accepted practice is for Council to determine whether or not the application will result in materially different effects from those that are currently consented. From this perspective, the application to change a condition of RM13.215.01 is considered to be within scope of s127, particularly on the basis that:

- The potential discharge of contaminants (odours) to air from the operation of the overland effluent discharge channel and associated discharge to water is consistent with the current purpose of RM13.215.01: *To discharge contaminants to air for the purpose of operating the Queenstown waste water treatment plant*. The proposed short-term discharge to water is critical to the ongoing effective operation of the WWTP and to enable necessary upgrades to the WWTP, and the discharge therefore forms part of the wider WWTP operations.
- The location is generally the same as that stated on the consent, being *1.2 kilometres south southeast of the intersection of Shotover Delta Road and Frankton-Ladies Mile Highway (State Highway 6)*. In this case, the discharge channel is approximately 1.1 to 1.15 km south-southeast of this intersection.
- The legal parcels that contain the discharge channel and discharge to water are the current equivalent of the historic parcels listed on RM13.215.01.
- Condition 1 states: *This consent shall only be exercised in conjunction with Discharge Permit 2008.238.V1, Discharge Permit RM13.215.02, Discharge Permit RM13.215.03, Discharge Permit RM13.215.04 and any subsequent variations to these permits*. While the applicant is seeking to add RM25.XXX.XX [discharge to water permit currently being sought] to this condition, expired consents RM13.215.02 and RM13.215.04 previously authorised the discharge of treated wastewater to

water via the same mechanisms as the present application seeks to authorise. The discharge of contaminants to air via the operation of an open-air discharge channel to the Kimi-ākau/Shotover River was authorised up until December 2022 under RM13.215.01.

- All other conditions are relevant and do not require amendment. Importantly, as will be discussed later in this report, the updated Odour Management Plan required under Condition 3 will capture the re-addition of the discharge of effluent to water via the discharge channel, and any required adjustments or additional measures needed to manage this from an air quality perspective. The Odour Management Plan was most recently updated in January 2025.

4.3 Regional Plan: Water for Otago

4.3.1 Treated wastewater discharge

Under the RPW, there are no permitted activities for the discharge of treated human sewage to water that are relevant to the proposed discharge.

As such, resource consent is required as a **discretionary** activity under Rule 12.A.2.1:

*12.A.2.1 Except as provided for by Rules 12.A.1.1 to 12.A.1.4, the discharge of human sewage to water, or onto or into land in circumstances where it may enter water, is a **discretionary** activity.*

4.3.2 Riverbed works

To prevent scour of the riverbed and bank at the discharge outfall, the applicant is proposing to install rip-rap armouring to a height of approximately 2 m and a width of approximately 6 m, with specific design details still to be confirmed.

Rule 13.2.1.4 provides for the placement of an outfall structure on the bed of a river as a permitted activity, provided the following conditions are met:

(a) The structure does not exceed 2 square metres in area provided that in respect of any flow or level recording device any catwalk to the nearest bank shall be excluded from the area calculation; and
(b) The structure, or its erection or placement, does not cause any flooding or erosion; and
(c) The Otago Regional Council is notified of the location and nature of the structure, at least seven working days prior to commencing the erection or placement; and
(d) Except in the case of a navigational aid, or the sight board of any gauge, any visible part of the structure is of a neutral colour to blend in with the surroundings; and
(e) The structure is maintained in good repair; and
(f) The site is left tidy following the erection or placement.

The proposed rip-rap armouring is considered to form part of the outfall structure. However, the initial design indicates that the armouring cannot comply with the maximum coverage (condition a). Given that there are

no other relevant rules for the placement of a structure in or on the riverbed, the proposed rip-rap armouring would constitute a **discretionary** activity under Rule 13.2.3.1:

> *Except as provided for by Rules 13.2.1.1 to 13.2.2.1, the erection or placement of any structure fixed in, on, under, or over the bed of any lake or river, or any Regionally Significant Wetland, is a discretionary activity.*

The disturbance of the riverbed and any resulting discharge or deposition of bed material associated with the placement of a structure on the bed of a river is a **permitted** activity (under Rule 13.5.1.1), providing:

(a) Except in the case of the demolition or removal of a structure, the structure is lawfully established; and

(b) Except in the case of (i), there is no increase in the scale of the existing structure; and

(c) If work is undertaken between 1 May and 30 September inclusive, the Department of Conservation and the relevant Fish and Game Council will be notified as soon as reasonably practicable in advance; and

(d) The bed or wetland disturbance is limited to the extent necessary to undertake the work; and

(e) The bed or wetland disturbance does not cause any flooding or erosion; and

(f) The time necessary to carry out and complete the whole of the work within the wetted bed of the lake or river does not exceed 10 hours in duration; and

(g) All reasonable steps are taken to minimise the release of sediment to the lake or river during the disturbance, and there is no conspicuous change in the colour or visual clarity of the water body beyond a distance of 200 metres downstream of the disturbance; and

(h) No lawful take of water is adversely affected as a result of the bed or wetland disturbance; and

(i) The site is left tidy following completion of the activity; and

(j) Except for activities covered by Rules 13.2.1.5, 13.2.1.6, or 13.2.1.8, there is no change to the water level range or hydrological function of any Regionally Significant Wetland; and

(k) Except for activities covered by Rules 13.2.1.5, 13.2.1.6, or 13.2.1.8, there is no damage to fauna, or New Zealand native flora, in or on any Regionally Significant Wetland.

The structure will be new and lawfully established via resource consent. Work undertaken from May through to September will be notified to DOC and Fish and Game Council. The disturbance is necessary to avoid erosion, and is not expected to cause any flooding. It is expected that the duration of the riverbed works will be no more than 10 hours, best practice erosion and sediment control measures will be employed during the works, and there is not expected to be any discernible change in colour or visual clarity of the water more than 200 m downstream from the disturbance. No lawful water take will be impacted by the works, the site will be left clean and tidy following completion of the works, and there will be no adverse effect on any Regionally Significant Wetland.

As such, disturbance of the bed of the Kimi-ākau/Shotover River associated with the proposed outfall armouring works is considered a **permitted** activity.

4.3.3 Works outside the riverbed

As discussed earlier, the applicant may need to undertake maintenance or upgrades to the discharge channel to ensure it is fit for purpose. These works may include channel dredging, re-shaping, widening or deepening.

Given that the discharge channel has been present for some time, is outside the bed of a water body, and is not specifically for residential development, there are no relevant rules in the RPW for this activity.

Furthermore, with regards to section 9 of the RMA, the activity does not contravene a national environmental standard, regional rule or district rule.

4.4 Regional Plan: Air for Otago

Rule 16.3.7.1 of the Region Plan: Air (RPA) provides certain discharges as a permitted activity. However, the activities exceed the BOD_5 limit in that rule therefore the current consent (RM13.215.01) was issued for a **discretionary** activity under Rule 16.3.7.3.

As per Section 4.2 above, it is considered that the discharge to air from the short-term discharge to water can be incorporated into RM13.215.01 via a s127 change of conditions.

4.5 Resource Management (National Environmental Standards for Freshwater) Regulations 2020

With regards to Part 3, Subpart 1 of the National Environmental Standards for Freshwater (NES-F), the closest known natural wetland is the Shotover River Confluence Swamp, approximately 520 m from the discharge to water at it's closest point (according to ORC's *Consents in Otago* GIS viewer). As such, Subpart 1 is not considered applicable to the proposal.

Regarding Part 3, Subpart 3, the applicant is not seeking to install or construct any physical structures in the bed of the river, meaning there will be no effects on fish passage. Specifically, there will be no culvert, weir, flap gate, dam or ford constructed as part of the short-term discharge works. Subpart 3 is subsequently not considered applicable to the proposal.

Overall, no consents are required under the NES-F.

4.6 Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007

The National Environmental Standards for Sources of Human Drinking Water (NES-DW) includes standards governing monitoring of water supplies and protection of abstraction points, water treatment plants and

distribution networks. Regulation 6 of the NES-DW relates to discharge permits with the potential to affect certain drinking-water supplies.

Regulations 7 and 8 only apply to an activity that has the potential to affect a registered drinking-water supply that provides no fewer than 501 people with drinking water for not less than 60 days each calendar year. They prevent the granting of discharge permits where the discharge will:

> *7 (a) - introduce or increase the concentration of any determinands in the drinking water, so that, after existing treatment, it no longer meets the health quality criteria; or*
>
> *8 (1)(a) - increase the concentration of any determinands in the water at the abstraction point by more than a minor amount;*

The nearest downstream water supply that supplies more than 501 people is the township of Cromwell. As assessed in Section 5, the discharge of treated effluent will not cause the downstream water quality below the mixing zone to no longer meet health quality criteria or increase by more than a minor amount.

Regulation 12 of the NES-DW relates to any activity that has the potential to affect smaller drinking water supplies of over 25 people. This regulation requires that the consent authority must consider whether the discharge activity may result in an event occurring that may have a significant adverse effect on the quality of the water at any abstraction point.

The nearest consented downstream water take that provides drinking water for more than 25 people is for Queenstown Bungy Ltd at their Kawarau bridge operations approximately 11km downstream, however it appears the source their water from a small tributary of the Kawarau River. As concluded in the assessment of effects on water quality in Section 5 below, the discharge of treated effluent will not result in any events resulting in a significant adverse effect on water quality at this location.

Therefore, no further consideration of the NES-DW is considered necessary.

4.7 Queenstown Lakes District Plan

4.7.1 Designation

The Shotover WWTP is subject to Designation #46 (QLDC Sewage Treatment Works) in the both the Operative and Proposed Queenstown Lakes District Plans, and has been designated for this purpose since around 1998. The relevant conditions of the designation are:

- All practicable measures shall be undertaken and maintained to minimise the risk of the site being inundated by water as a result of flooding that could cause pollution to enter the Kimi-ākau/Shotover and Kawarau Rivers. A risk management report on this issue shall be included with the Outline Plan referred to in Condition 10.

- Any upgrades or extensions to the facility shall ensure that public access to sport fishing and game-bird hunting venues in the vicinity is maintained.
- The Requiring Authority shall design, develop and manage the public work so that it does not attract any birds that are hazardous to aircraft or may endanger aircraft operations. The bird species that have been observed at the airport and which may be hazardous to aircraft are gull, oyster catcher, hawk, spur-wing plover and duck.
- 6 months prior to any work being carried out in accordance with an Outline Plan which increases access to water, monitoring of bird activity shall be undertaken by a suitably qualified person experienced in wildlife observation to determine a baseline of bird activity. Subsequently, from the date any work is carried out in accordance with the Outline Plan, the site and surrounding area shall be monitored monthly by a suitable qualified person experienced in wildlife observation and approved by the Territorial Authority. This person will monitor bird activity in and around the site as an impartial observer to enable any increased bird activity as a result of the work to be identified.
- The result of all monitoring shall be reported to the Territorial Authority and the Queenstown Airport Corporation Limited every three months.
- In the event of any hazard to Queenstown Airport operations arising from birds which have been shown to have or likely to have been attracted to the area by any work for which Outline Plan approval has been obtained, the Territorial Authority reserves the right to review the conditions of consent attached to this designation for the purpose of mitigating, remedying or avoiding any adverse effect on airport operations, that is apparent from the works or from on-going monitoring.

The WWTP and treated effluent discharge commences within but continues beyond that designation, as shown in the below figure.

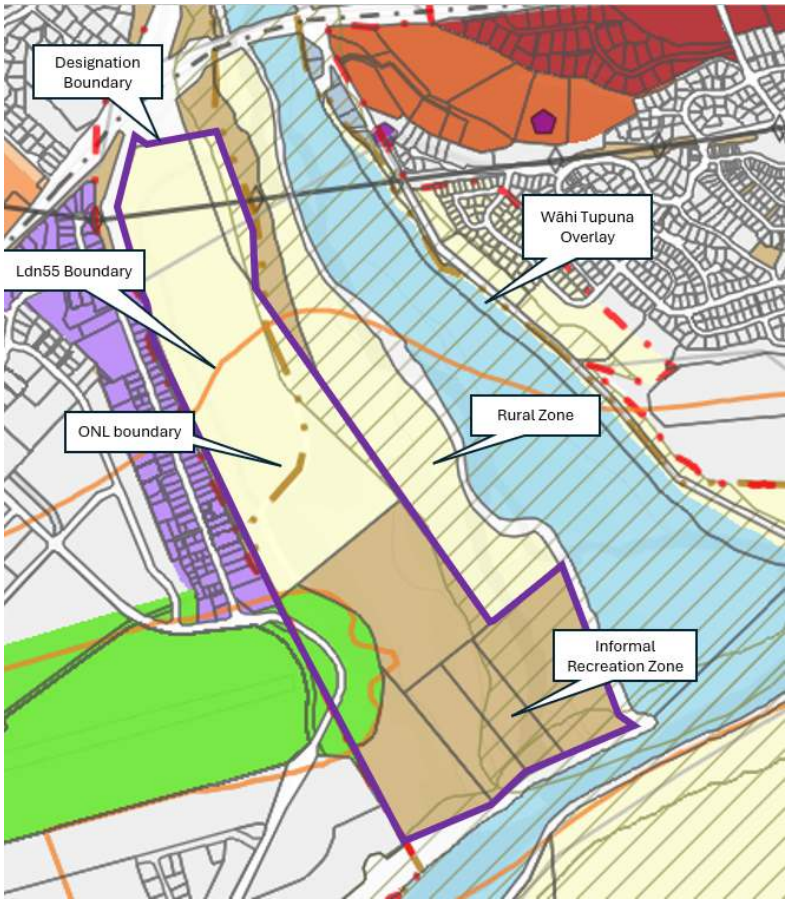

Figure 35: PDP zones, designations and overlays for the wider site

Section 176 of the RMA states:

(1) If a designation is included in a district plan, then—

(a) section 9(3) does not apply to a public work or project or work undertaken by a requiring authority under the designation;...

Section 9(3) prohibits the use of land in a manner that contravenes a district rule.

The works subject to this application (and associated ongoing works, such as discharge channel maintenance or upgrades) are a public work being undertaken by the requiring authority (QLDC) within the scope of the designation. It is therefore considered that any such works within the designation area are exempt from the relevant rules of the district plans, while works beyond the designation are still subject to district plan rules and associated resource consent requirements.

4.7.2 Proposed District Plan

The following map shows the relevant zones, designations and overlays under the Queenstown Lakes Proposed District Plan (PDP) for the subject area.

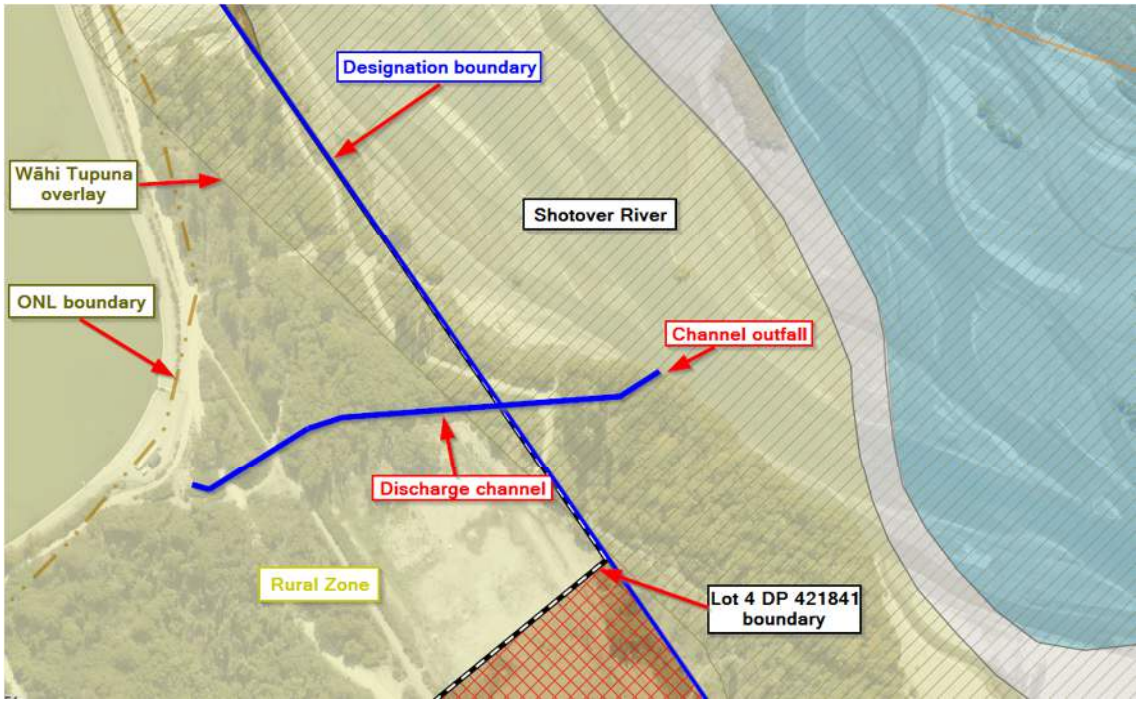

Figure 36: PDP zones, overlays and designations for the subject area

An assessment against the relevant rules of the PDP in relation to the part of the proposal outside of the designation boundary is provided in the following table.

Table 11: Relevant PDP rules and assessment

Section	Rule	Assessment
21 Rural Zone	No applicable rules	N/A
25 Earthworks	25.5.2 – maximum total volume of 10 m^3 earthworks within a ONL.	Proposed earthworks associated with the discharge channel improvements (see section 2.6.1) outside of the designation will exceed this threshold, and therefore constitute a **restricted discretionary** activity under Rule 25.4.2.
	25.5.6 – maximum total volume of 1000 m3 within the Rural Zone, Note that Rule 25.5.6 is still under appeal.	Proposed earthworks associated with the discharge channel geometrical improvements (see Section 2.6.1) outside of the designation will not exceed this threshold. No consent is required under this rule

Section	Rule	Assessment
	25.5.10A.2 – 10 m3 earthworks maximum in Wāhi Tūpuna areas as identified in Schedule 39.6 but not listed in 25.5.10A.1 where earthworks: a. are located within 20m of the boundary of any wetland, bed of any river or lake; b. are located at an elevation exceeding 400 masl, except within Ōrau (Wāhi Tūpuna 11); c. within Ōrau (Wāhi Tūpuna 11), are located at an elevation exceeding 600 masl; or d. modify the profile of a skyline or terrace edge when viewed from lower elevations of a public place within 2 kilometres.	Proposed discharge channel earthworks are greater than 20 m from the bed of the Kimi-ākau/Shotover River. No other conditions are triggered. On this basis, no consent is required under this rule.
	25.5.11.2 - Earthworks over a contiguous area of land shall not exceed 10,000 m^2 where the slope is less than 10°.	Any earthworks associated with refurbishment or maintenance of the discharge channel will be on land with a slope of less than 10°, and will not exceed the maximum area.
	25.5.12 – erosion and sediment control measures must be implemented and maintained during earthworks.	Prior to any earthworks being undertaken, an ESCP will be developed and implemented in accordance with the QLDC Guidelines for Environmental Management Plans.
	25.5.13 – dust from earthworks shall be managed through appropriate dust control measures to avoid nuisance effects beyond the site boundary.	A dust management plan will be developed and implemented prior to any earthworks being undertaken.
	25.5.15 – the maximum depth of any cut shall not exceed 2.4 metres.	Any cut associated with discharge channel earthworks will be less than 2.4 metres in depth.

Section	Rule	Assessment
	25.5.16 – the maximum height of any fill shall not exceed 2 metres.	Any fill associated with discharge channel earthworks will be under 2 metres in height.
	25.5.19.1 - Earthworks within 10m of the bed of any water body, or any drain or water race that flows to a lake or river, shall not exceed 5m3 in total volume, within any consecutive 12-month period. These rules shall not apply to… Earthworks to clear debris affecting existing structures including water intakes…	No earthworks on the final segment of the discharge channel. Maintenance works on the channel consisting of debris clearance is exempt from this rule.

4.7.3 Operative District Plan

The following map shows the relevant zones, designations and overlays under the Queenstown Lakes Operative District Plan (ODP) for the subject area.

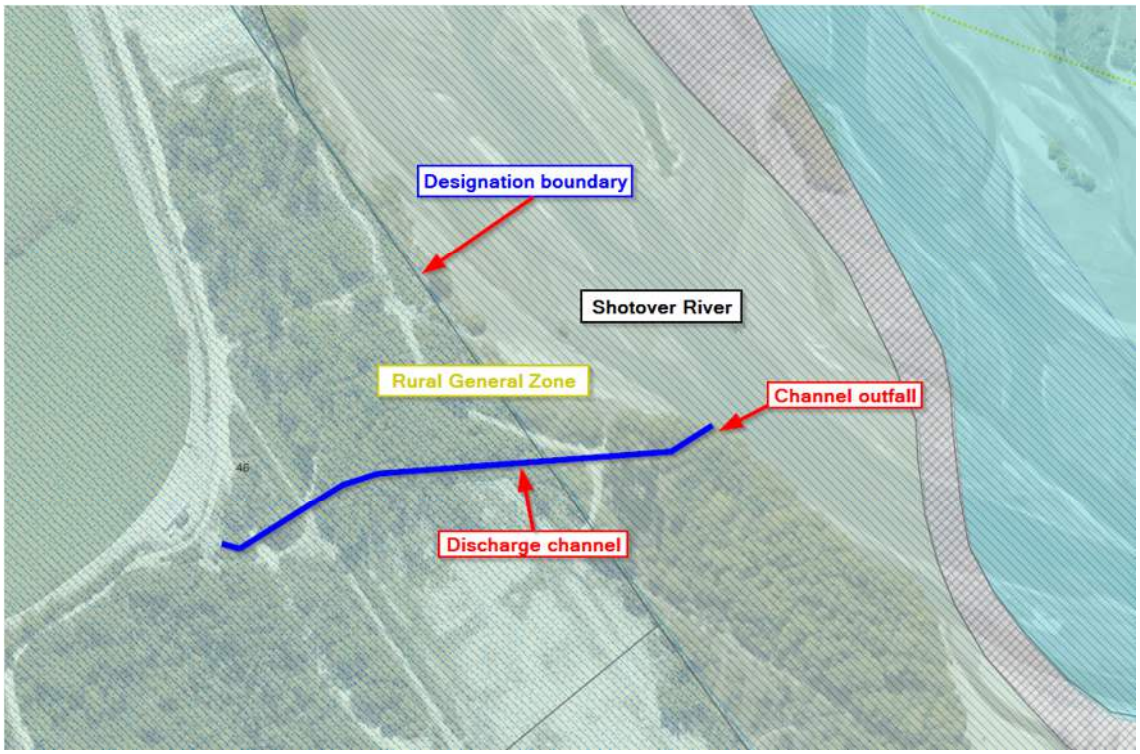

Figure 37: ODP zones, overlays and designations for the subject area

Table 12: Relevant ODP rules and assessment

Section	Rule	Assessment
5.3 Rural General and Ski Area Sub-Zone - Rules	No applicable rules	N/A
22.3 Earthworks Rules	22.3.3ii(a)ii – All cuts and batters shall be laid back such that their angle from the horizontal is no more than 65 degrees. iii – The maximum height of any fill shall not exceed 2 metres.	Any cuts and batters associated with maintenance or upgrades of the discharge channel outside the designation will be no more than 65 degrees, and the maximum height of any fill be no more than 2 metres.
	22.3.3iv – a. Any person carrying out earthworks shall implement sediment and erosion control measures to avoid sediment effects beyond the boundary of the site. b. Any person carrying out earthworks shall implement appropriate dust control measures to avoid nuisance effects of dust beyond the boundary of the site. c. Areas of exposed soil are to be vegetated / re-vegetated within 12 months from the completion of works.	For earthworks associated with the discharge channel outside the designation, the conditions will be complied with to the extent practicable. Given the nature and purpose of the discharge channel, it may not always be appropriate to vegetate or re-vegetated exposed soils after works are completed.
	Table 22.1 – Maximum total volume of 1,000 m^3 earthworks within any 12 month period.	Proposed discharge channel earthworks will not exceed 1,000 m^3 within any 12 month period.

There are no rules in the District Plan which control the effects of works within the riverbed itself as these are under the authority of the Regional Council.

4.8 Summary of Consents Required

Regional consents

- An RMA s127 change of consent conditions is required for the discharge of contaminants (odour) to air associated with the operation of the discharge channel and discharge to water. This is treated as **discretionary** activity.

- The discharge of treated wastewater to water is a **discretionary** activity under the RPW (RMA s15).
- The placement of a structure in the bed of a river (associated with rip-rap armouring below the outfall) is a **discretionary** activity under the RPW (RMA s13).

District consents

- Earthworks associated with improvement of the discharge channel outside of the QLDC Sewage Treatment Works designation constitute a **restricted discretionary** activity under the PDP (RMA s9).
- A separate application will be made to QLDC for the necessary district consents.

5. ASSESSMENT OF ENVIRONMENTAL EFFECTS

In addition to the application being made in the prescribed form and manner, Section 88 of the RMA also requires that every application for resource consent includes an assessment of the effects of the activity on the environment as set out in Schedule 4 of the RMA.

5.1 Positive Effects

The Shotover WWTP provides a significant utility service as part of QLDC's Three Waters functions. The WWTP services existing communities within the Wakatipu Basin, Arthurs Point, Frankton, Kelvin Heights/ Willow Place, Quail Rise, Shotover Country, Lake Hayes Estate, Lake Hayes and Arrowtown. The WWTP will also provide for additional flows received from developments at Jacks Point Village, Hanley Farms, Ladies Mile and an extension of the Quail Rise in the near future.

5.1.1 Benefits of discharge

The following benefits (recognising the original issues are associated with non-compliance of the consented discharge (under RM13.215.03.V2)), that will or have occurred as a result of directing the treated effluent to surface water via the discharge channel instead of to the failing DAD disposal field. These benefits are described more fully in Section 1.1.4 and include:

- Reduction in bird strike risk through reduced waterfowl habitat
- No large areas of ponding on delta within recreational areas leading to adverse amenity effects and potential health risks.
- Improvements in localised effects on groundwater quality in delta from cessation of DAD disposal field use.

5.2 Effects on Groundwater

5.2.1 Groundwater level and flows

The following assessment is taken from the GHD report in **Appendix G**.

"With groundwater levels during low flow conditions estimated to be approximately 2 m below the base of the channel, there is potential for loss of treated wastewater to ground via soakage along the channel's length. This has the potential to influence groundwater levels and flows. Groundwater investigations undertaken as part of this assessment indicate that the sandy gravels underlying the channel are highly permeable and allow relatively high rates of horizontal flow. Therefore, any wastewater that infiltrates the ground (noting that any silt in the base of the channel may limit infiltration) is expected to move laterally away with groundwater mounding effects expected to be localised and/or negligible. This inference is supported by water level monitoring to date, which indicates that changes in wastewater discharge volumes that occur daily, do not appear to be influencing groundwater levels, with no meaningful mounding identified."

Based on this assessment, the effects on groundwater levels and flows will be less than minor.

5.2.2 Groundwater quality

The GHD report in **Appendix G** has concluded the following in regard to effects on groundwater quality from the discharge:

- *"Groundwater monitoring has identified that groundwater down gradient of the discharge channel is influenced by wastewater management methods to date",* however *"the volume of wastewater that will be lost ground from the discharge channel is relatively unknown, given the variability of the alluvium and the historical use of the channel for wastewater discharge which can impact upon infiltration capacity."*
- "*The net effect of soakage of treated wastewater from the discharge channel on groundwater quality is expected to be significantly less than has resulted from operation of the DAD, due to the reduced volume of the discharge to ground. This shift in means and location of disposing of treated wastewater is also expected to result in improvements in groundwater quality across the broader delta, and improvements are expected in the localised effects on water quality caused by groundwater discharge to the Kawarau River.*"
- *"The potential for adverse effects of impacts on groundwater quality on upgradient water supply wells and groundwater as a resource is considered to be negligible, with the hydrogeological regime effectively limiting potential effects to the Shotover delta and immediate river environments surrounding it."*

Based on this assessment, the effects on groundwater quality is likely to be negligible and undoubtedly less than minor.

5.3 Effects on Surface Water Quality

A detailed assessment of the background water quality and both observed and predicted effects on water quality from the discharge is provided in the GHD report in **Appendix G**.

5.3.1 Effects of previous discharge (2017-2019)

Water quality monitoring from when treated wastewater was last discharged to the Kimi-ākau/Shotover River via the discharge channel (2017-2019) is summarised in section 3.8.2.2 of Appendix G and provides an indication of the effects on water quality that could be expected from this current discharge (2025). Samples were collected at the time from 50m upstream and 50m downstream of the outfall. The downstream location is within the mixing zone i.e. not fully mixed.

The downstream samples clearly showed an influence from the discharge with more pronounced effects during periods of low flows when there is less mixing available. The improvements in treated wastewater quality, in particular the level of disinfection, resulting from the plant upgrades also appears to have led to improvement in effects on water quality. The following graphs show the difference in upstream and downstream results for *E.coli*, total nitrogen and total phosphorus from 2017-2019. These previous results show that after a 50m mixing zone, towards the end of the monitoring period and when considering the upgradient water quality, the water quality standards in Schedule 15 of the RPW were generally met.

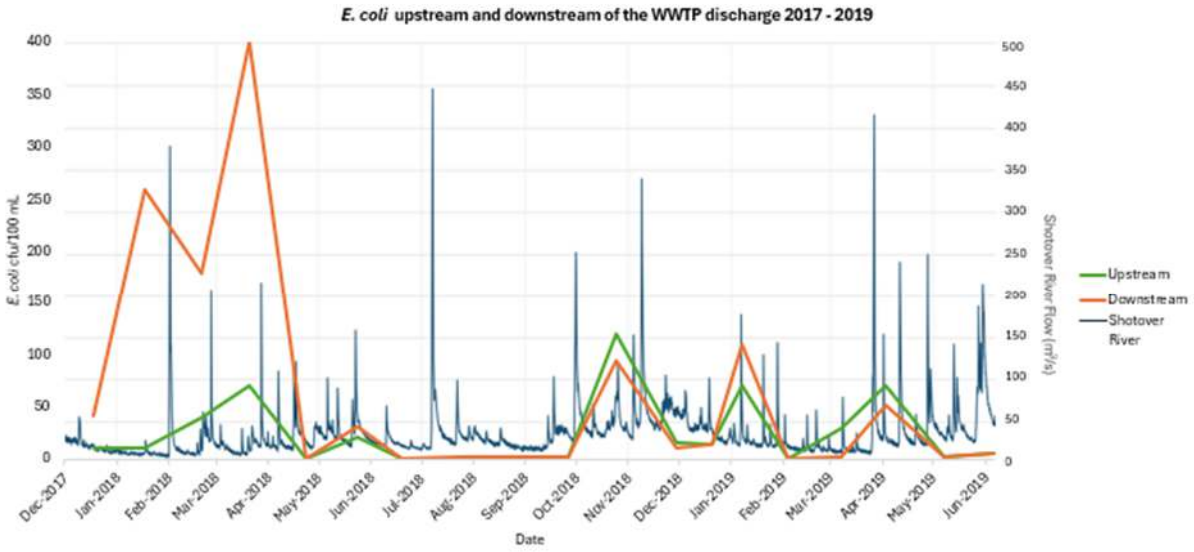

Figure 38: E. coli results from 50 m upstream and 50 m downstream of the WWTP discharge 2017 – 2019 (Figure 3.11 from Appendix G, GHD)

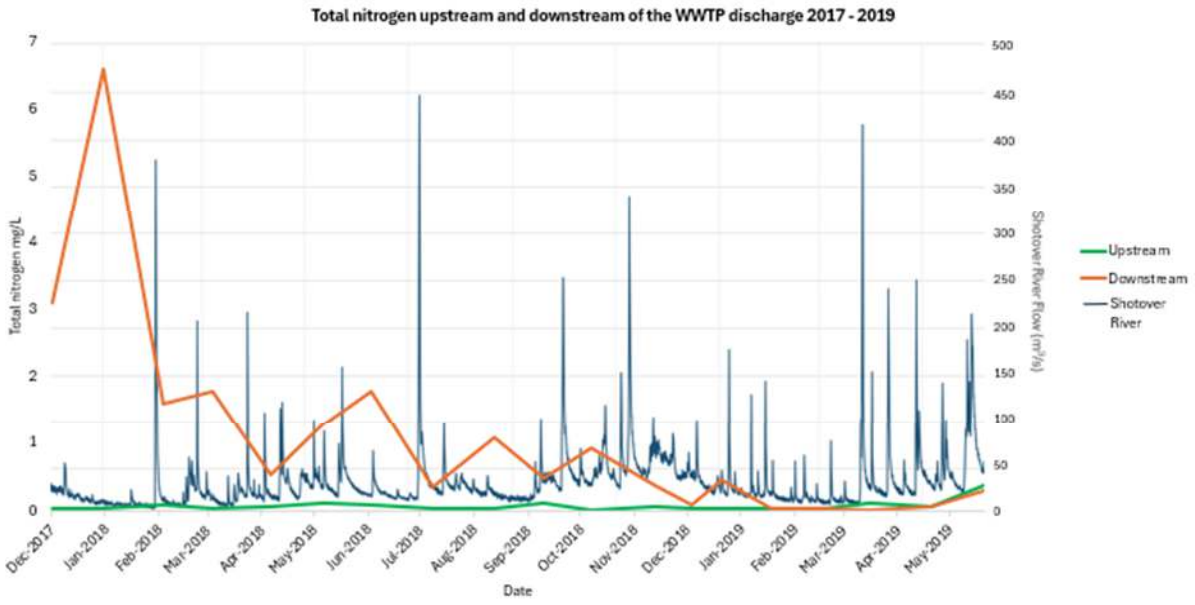

Figure 39: Total nitrogen results from 50m upstream and 50m downstream of the WWTP discharge 2017 – 2019 (Figure 3.12 from Appendix G, GHD)

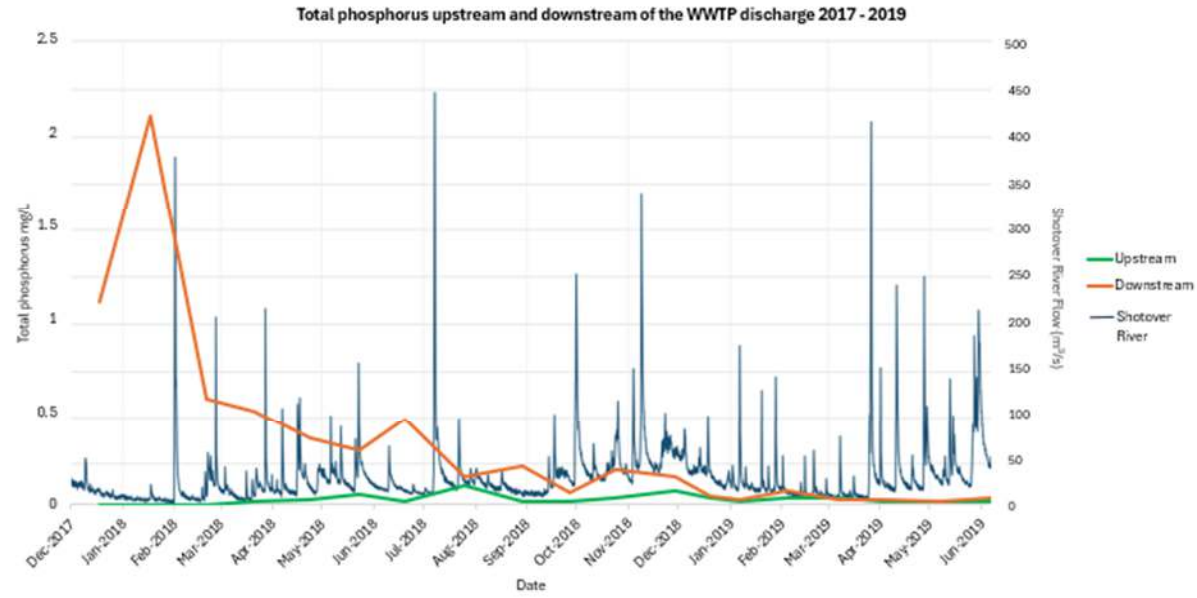

Figure 40: Total phosphorus results from 50m upstream and 50m downstream of the WWTP discharge 2017 – 2019 (Figure 3.13 from Appendix G, GHD)

5.3.2 Effects of current discharge

Initial water quality results

A summary from section 3.8.2.5 of Appendix G is provided below. Monitoring following the commencement of the discharge in April 2025, at a time that reflects seasonal low flow conditions, was undertaken both upstream and downstream of the discharge.

- Upstream monitoring locations reflected the variability in *E.coli*, nitrogen and phosphorus from upstream catchment influences on river water, and also demonstrated increases in phosphorus and *E.coli* in response to rain events in this period.
- Initial elevated concentrations of *E.coli* in the discharge were likely to be linked to disturbance of accumulated sediment and debris within the disused channel. Concentrations measured at the channel outfall have since reduced and are now more equivalent to the *E.coli* concentrations of the treated wastewater leaving the UV.
- Limited dilution under the very low flow conditions at the time of the initial discharge provided limited dilution in the initial mixing zone until mixing occurred further downstream where the riverbank channel joined a larger river braid. Increases in river flow that occurred in response to rain events demonstrated that greater dilution could be achieved at the location, with small increases in river water level.
- At sample location RS06B (after reasonable mixing):
    - No concentrations of *E. coli* measured exceed the national bottom-line for human water contact.
    - Total nitrogen concentrations ranged from 0.56 to 0.94 mg/L, reflecting an approximate 15-to-25-fold dilution of discharging water.
    - Nitrate-N concentrations have been measured in the range of 0.15 to 0.17 mg/L. While elevated relative to background, the concentrations remain low and significantly less than the upper bound for water meeting Attribute band A of the NPSFM.
    - Ammoniacal-N concentrations at RS06B, following the initial discharge period, have been in the order of 0.17 to 0.27 mg/l. Were these results taken as representative of the annual flow condition; it would reflect a localised change in NPSFM attribute band from A (upstream) to B (following nearfield mixing at location RS06B). Considering the limited dilution under the low-flow conditions at the time of monitoring, the average annual concentrations are expected to be significantly lower than measured.
    - Dissolved reactive phosphorous, in the order of 0.05 to 0.1 mg/l were measured, with total phosphorous in the range 0.075 to 0.18 mg/l measured.
- Overall, the concentrations of E. coli, nitrogen and phosphorous are generally consistent with the water quality measured at the downstream monitoring location during 2019, following

implementation of the plant upgrades.

- Implementation of mitigation measures to increase flows down the riverbank braid where the discharge occurs (riverworks consent for diversion currently in process) will allow for additional dilution prior to this downstream monitoring location and therefore contaminant concentrations will be significantly lower than has been measured.
- Following complete mixing with the Kimi-ākau/Shotover River main flow and the immediate confluence with the Kawarau River, at location RS10,
    - Concentrations of total nitrogen remained below detection levels (<0.1) over the period of monitoring.
    - Ammoniacal-N was detected at a very low level (0.02 mg/l) in the sample collected on 10 April, but was not above detection levels in sampling on the 8 April.
    - Concentration of *E. coli* is consistent with the local background, being generally lower than the upstream RS11, RS09 and RS06B.

Anticipated effects

The key conclusions from report in Appendix G with the current discharge quality (i.e. before the second MLE clarifier is operating) taking account of the results from sampling in April after the discharge recommenced are:

- Approximately 15-to-25-fold dilution of treated wastewater currently occurs under the low-flow conditions, within the first river braid.
- There is no visible change in colour or clarity apparent following reasonable mixing when the braid within which the discharge occurs joins additional braids (approximately 200m downstream).
- There are increases in wastewater indicators and nutrients in the immediate reach of the Kimi-ākau/Shotover River following initial mixing, however, other than for ammonia this remains within the A band attribute state as characterised by the NPSFM.
- The effects within initial mixing zone of the Kimi-ākau/Shotover River i.e. mixing with the minor river braid, are minor in nature.
- Below the Kawarau River confluence, at mean annual low flow conditions on the Kimi-ākau/Shotover River, at least 100-fold dilution is expected. While very small changes in water quality at that location were intermittently detected, the changes are not considered to be meaningful in terms of potential toxicity or eutrophication related effects. Additionally, the changes in microbiological contaminants, as measured by *E. coli*, were significantly smaller than increases induced by rain and run-off events i.e. considered to be within the background range.
- After complete mixing, as demonstrated by downstream water quality (RS10) the minimal change in contaminant concentrations is considered to constitute a less than minor effect on surface water quality, with no changes in attribute bands as characterised by NPFSM 2020 expected to occur.

These effects are temporary in nature for two reasons:

(1) This assessment considers the mixing at mean annual low flows and for 95% of the time, flows are higher than this therefore providing further mixing, with seasonal changes in water levels also expected.

(2) By 31 December 2025, the second MLE clarifier will be operational and the oxidation ponds will no longer be required for treatment which will increase the quality of the discharge (in particular clarity and suspended solids) to ensure the post-upgrade limits in Section 2.8 are met.

These two matters will mean that the influence of the discharge on both the extent of the mixing zone and mixed water quality will be further reduced, such that under the majority of flow conditions, there is unlikely to be any discernible change in concentrations of wastewater indicators beyond the initial mixing zone (200m).

From a cumulative effects perspective, there is no change from the currently consented (Rm13.215.03.V2 & 2002.238.V2) contribution of contaminant loads within the Kawarau River catchment compared to that under this discharge application, as ultimately any discharge to the DAD disposal field reaches the Kawarau River as well.

In order to mitigate the risk of ponding of treated wastewater within channels near the riverbank, a separate consent application (RM25.177) is in process to enable works in the riverbed to direct additional flow past the discharge point to increase the available mixing and dilution under low flow conditions and therefore reduce the length of the mixing zone.

Ongoing monitoring of the discharge and receiving environment is proposed as summarised in section 2.9 and Appendix F. This monitoring will allow for additional mitigation to be implemented if any increases in downstream water quality are likely to give rise to more than minor effects.

5.4 Effects on Hydrology

Any discharge into surface water and located on the river delta has the potential to both influence the regular flows and be affected by flood flows. A summary of the GHD report assessing these effects (**Appendix G**) is provided below.

As the discharge volumes are small relative to the flow in the Kimi-ākau/Shotover River, being in the order of 1% of flows under the mean annual low flow conditions, the treated wastewater discharge is not predicted to have a measurable influence on river flow, river level or the extent of the braided river channel.

The location of the discharge channel within a flood plain may result in stormwater and flood flows entering the channel in very significant events (e.g. 100 year return period storms) resulting in treated wastewater overtopping the discharge channel and flowing downstream with the flood waters. The potential influence of

the treated wastewater mixing with flood waters at such time is likely to be undetectable, given the broader impacts of flooding on the delta and the significant dilution that would occur during such an event.

The sediment contributions from the treated wastewater are negligible in the context of the Kimi-ākau/Shotover River sediment load. Small amounts of organic sediment, sourced predominantly from the oxidation contribution to flow, will continue to be present in the discharge waters until completion of the current upgrades (December 2025), however due to river water velocity and frequent high flow events, the potential for accumulation of such organic sediment on the riverbed is minimal.

Based on the above, potential effects on river hydrology are expected to be negligible.

5.5 Effects on Ecosystems

The potential effects to freshwater ecology and ecosystems predominantly relate to the following[8]:

- Direct toxicity effects, resulting from elevated concentrations of potential toxicants, such as ammonia.
- Direct changes in physical conditions as a consequence of limited dilution of discharge waters, such as temperature or clarity changes.
- Indirect changes in water quality related to trophic state, such as dissolved oxygen, resulting from high organic loads, or excessive microphyte and macrophyte growth promoted by high nutrient concentrations.

An assessment of the effects on ecological values has been provided in the GHD report in **Appendix G**. This assessment concludes that, similar to the previous discharge to surface water prior to 2019, the effects are expected to be less than minor, particularly due to:

- *"The typically high dilution available in the river, reducing the potential for elevated nutrient and contaminant concentrations.*
- *The frequently high velocity of river water, reducing the potential for algae to proliferate to the extent that downstream clarity and colour is affected.*
- *The frequently high sediment load of the river, which provides habitat for primarily sediment tolerant species.*
- *The moving gravel bed of the river that precludes establishment of macrophyte and algae on the riverbed."*

5.5.1 Effects on avifauna

The report in Appendix A provides a summary of effects on bird species as a result of the proposed works. In

[8] Taken from Section 4.7 of Appendix G

respect of the discharge, Ms Palmer notes that the draining of the disposal field will reduce the habitat for waterfowl and therefore reduce the number of large bodied, flocking birds in close proximity to the Queenstown Airport flight path and the risk of bird strike associated with the use of this habitat. In respect of the proposed works in the river, Ms Palmer concludes:

> *"Ultimately, my opinion is that these works, provided they are contained within the close vicinity of the existing channel and not extended into the open riverbed, will not impact waterfowl, terns, gulls and waders and will not conflict the safe operation of the site so long as the works do not create more open water habitats that may attract and concentrate or increase avifauna (waterfowl, terns, gulls and waders) in the Designation Area and do not impact on the braided river habitats of the open riverbed. My opinion in relation to rip-rap armouring and channel earthworks are provisional and may change on review of detailed plans."*

A condition is recommended to be included on the section 13 RMA consent requiring design plans and installation methodology for the riprap outfall structure to be developed in consultation with an avifauna specialist. On this basis, the effects on avifauna from the proposed works will be less than minor.

5.6 Effects on Public Health

Effects on public health can arise from a risk of infection through both contact recreation and food gathering when people are exposed to water contaminated with faecal sources. An assessment of the public health risk has been provided in the GHD report in **Appendix G**.

The GHD report concludes that:

- Wastewater disinfection indicates that a high level of pathogen reduction is being achieved, with concentrations of *E.coli* in treated wastewater being in the order of 10-15 count/100 ml.

- Following an initial flush of elevated *E.coli* and faecal coliforms in the discharge channel following commencement of the short-term discharge (due to accumulation of sediment, leaf litter, and other organic material include wildlife excrement and soil accumulated pathogens in the channel), the concentrations are back to levels more consistent with that of the treated wastewater itself.

- Primary contact (such as swimming) does not typically occur in the Kimi-ākau/Shotover River, but secondary contact through wading, kayaking or jet boating for example is likely. There is influence from the wider catchment on upstream microbiological contaminants which are generally low and safe (<130 *E.coli* /100 mL) in dry weather, but following rain events, "*monitoring suggests that there is a short period of elevated E.coli (>260 E. coli count/100 ml), resulting from catchment influence*" where there is a risk of infection from contact recreation activities.

- Following an assessment of upstream and downstream water quality results both pre and post short-term discharge, "*the influence of treated wastewater discharge on public health risk is considered*

to be minimal".

Based on the above, the effects on public health are expected to be less than minor.

However, a risk of infection will always exist with any form of treated wastewater discharge prior to reasonable mixing through exposure to water through recreational activities and food gathering. Therefore, it is recommended that the following mitigation measures are in place to ensure that the risk is appropriately managed and the need to avoid contact with the treated effluent discharge in the immediate mixing zone is communicated to the public:

- Fencing of the discharge channel to prevent public access; and
- Signage installed around the discharge channel and near and immediately downstream of the outfall on the river banks.

The specified contract recreation water quality standards that are required to be met within the Kawarau Water Conservation Order following reasonable mixing are:

(1) The visual clarity of the water shall not be so low as to be unsuitable for bathing.
(2) The water shall not be rendered unsuitable for bathing by the presence of contaminants.
(3) There shall be no undesirable biological growths as a result of any discharge of a contaminant into the water.

The assessment in Section 4.9 of **Appendix G** demonstrates that following mixing, these standards will be met, while also noting that catchment sourced sediment and pathogens that impact the Kimi-ākau/Shotover River water quality during run-off events are significantly more influential on the achievement of the contact recreation standards.

5.7 Effects of Odour

A qualitative assessment of the potential odour effects associated with the proposed outfall has been undertaken to support the air quality component of the application. This assessment has been carried out in accordance with the Ministry for the Environment's *Good Practice Guide for Assessing and Managing Odour* (MfE GPG Odour, 2016), which outlines a range of tools for evaluating odour effects. In this case, the FIDOL framework has been applied, which considers the key factors that influence odour impacts — namely Frequency, Intensity, Duration, Offensiveness, and Location.

The purpose of this assessment is to characterise the potential for off-site odour effects from the discharge of treated wastewater at the proposed outfall, taking into account the level of treatment, the nature of the surrounding environment, and typical meteorological conditions. A summary of the FIDOL assessment is presented in Table 13.

Table 13: Odour FIDOL Factors

FIDOL	Findings
Frequency	Frequency refers to how often odours may be experienced at off-site receptor locations. The wind rose in Figure 3 shows that light winds (i.e. winds below 3 m/s) occur from a variety of directions, with no more than 9% of light winds coming from any single direction. Light winds capable of transporting odours towards the nearest residential area to the northeast (i.e. winds from the southeast through to the northwest) occur less than 5% of the time. This represents a low frequency of occurrence. Given the infrequent nature of strong odours that could cause nuisance effects, combined with the low frequency of light winds blowing towards sensitive receptors, it is unlikely that odours will be regularly experienced at off-site locations.
Intensity	Treated wastewater has the potential to produce odours with a 'musty', 'earthy', or occasionally 'algae-like' character. These generally have a low odour intensity and are not considered offensive in most cases. Based on experience, odour intensity from the outfall is expected to be no more than "distinct", with typical observations being "very weak" or not detectable at all. Furthermore, as the odour travels downwind of the outfall, it will disperse and the odour intensity will reduce.
Duration	The generation of odour from the outfall is expected to be relatively continuous. However, it is unlikely that receptors would experience odour for any significant periods of time, given the other factors involved, such as the low odour intensity, distance to receptors and low frequency of suitable wind conditions (i.e. poor dispersive low-speed/calm winds). Overall, the likelihood of receptors observing odours for any meaningful duration of time is considered low.
Offensiveness	While treated wastewater can emit odour, the character ('musty', 'earthy', or 'algae-like') of such odour is not typically considered offensive, particularly given its low intensity and that as it disperses, it dilutes in the ambient environment. Overall, that odours associated with the outfall are unlikely to be considered offensive or objectionable**.**
Location	The location of the outfall relative to sensitive receptors is an important consideration. The nearest highly sensitive receptors (primarily residential receptor locations) are >500 m to the northeast of the outfall. There are commercial properties which have a lower sensitivity to odours located a similar distance to the west. There is also the

	potential for people using the Kimi-ākau/Shotover River to experience odour, however, it is likely that the frequency of exposure will be low. Overall, the buffer of ~500 m to receptors should provide a sufficient distance for any residual odours to disperse and not result in offensive or objectionable odours at the nearest receptor locations.
Overall Odour Assessment	*Considering the relatively low frequency of light winds that can cause effects, low intensity of odours discharged and distance to receptors, the odour emissions from the outfall are unlikely to cause offensive or objectionable effects at off-site receptor locations.*

5.7.1 Cumulative Odour Effects

In addition to assessing the potential for odour from the outfall alone, the cumulative odour effects of the WWTP and the associated outfall have been considered.

While the WWTP and outfall are physically linked, their odour sources and emission characteristics are significantly different. The WWTP itself has the potential to generate stronger and more offensive odours, particularly from processes such as sludge handling, inlet works, or biological treatment units. In contrast, the outfall typically discharges treated wastewater with relatively low odour potential.

The cumulative effects of odour will depend on whether odours from both sources can be experienced simultaneously at sensitive receptors or if the frequency or duration of off-site odours increases.

In regard to this assessment, the primarily odours sources associated with the WWTP are located ~1 km from the outfall, and both sources are separated a significant distance from receptors.

The outfall discharge point is located in an area where wind conditions regularly promote dispersion and dilution, and odour emissions are of low intensity and frequency.

As discussed in the FIDOL assessment, odour from the outfall is unlikely to be detectable at sensitive locations.

While there is the potential for odour from the WWTP to be detectable off-site, this would not typically coincide with odour from the outfall, due to differing emission strengths, wind conditions, and spatial separation. The frequency or duration of odours is not expected to increase as odours from the outfall are unlikely to be observed at off-site locations.

Taking these factors into account, GHD considers the risk of adverse cumulative odour effects to be low. Any odour from the WWTP is expected to dominate the odour character if detected, with the contribution from the outfall being negligible in comparison.

Furthermore, the outfall acts as a final stage of the treatment process, and does not involve the discharge of

untreated or highly odorous wastewater. As such, it is not expected to significantly exacerbate or extend the effects of any odour originating from the WWTP itself.

5.8 Effects on Recreation and Commercial Use

Potential adverse effects from the proposal on recreational and commercial uses in the vicinity of the site can be separated into the following categories:

- Adverse effects from the discharge of treated wastewater to the Kimi-ākau/Shotover River;
- Adverse effects from the ongoing operation of the discharge channel from the WWTP to the Kimi-ākau/Shotover River; and
- Adverse effects from temporary works on the discharge channel, such as maintenance or upgrades.

5.8.1 Discharge to water effects

The discharge of treated wastewater to water is not directly disruptive to recreational and commercial users of the riverbed; rather, any adverse effect would be related to public health risks associated with users in the direct vicinity and downstream of the discharge outfall.

As discussed in Section 5.3 and Appendix G, water quality monitoring following commencement of the discharge to the Kimi-ākau/Shotover River initially demonstrated elevated levels of *E. Coli* and faecal coliforms, however these have since dropped to levels more consistent with that measured in the treated wastewater prior to discharging into the channel. Furthermore, comparison of monitoring locations upstream and downstream of the discharge outfall indicate that there is only a relatively small increase in *E. coli* concentrations downstream of the outfall. This change in *E. coli* is less than the natural range during rain events.

Given that the most common forms of recreation in relation to the Kimi-ākau/Shotover and Kawarau Rivers are not high-contact activities (kayaking, fishing, boating, etc, as opposed to swimming), the key risk to public health is via secondary exposure (indirect exposure, such as from contacting contaminated surfaces). Non-recreational commercial operators in the Shotover Delta generally consist of gravel extraction operators, where the risk of contact exposure is even lower than for recreational users.

Notwithstanding the above, there remains a risk to public health, particularly from river users in the immediate vicinity of the discharge. This risk will be mitigated by the installation of signage upstream, downstream, and adjacent to the discharge outfall, as outlined in Section 5.6.

With signage installed at an appropriate distance both upstream and downstream from the discharge to water, it is expected that the contact recreation water quality standards in the Kawarau Water Conservation Order, following reasonable mixing, will be met and effects on recreational and commercial water users will be less than minor.

5.8.2 Discharge channel operation and maintenance effects

The key risk to recreational users outside of the riverbed is where Queenstown Trail passes over the discharge channel. The channel presents an existing risk to trail users as a fall hazard, and secondarily as a source of contamination should a person fall into the channel. If maintenance works are required on the channel in the vicinity of the trail, there is an additional safety risk to recreational users via moving machinery and active excavations. There is also a likely visual (though this will reduce once the ponds are decommissioned, and the second MLE plant is operational, by the end of 2025) and/or potential odour-related impact on trail users as they pass by the discharge channel, albeit this would be a very localised impact in the immediate vicinity of, and within, the designated WWTP site.

The key mitigation to manage the safety risk to trail users is the installation and maintenance of safety fencing to either side of the channel. As the below indicative photo shows, temporary fencing has already been installed around the discharge channel, connecting to existing fencing where roads or trails cross the channel via culvert. The applicant has plans to install permanent safety fencing around the channel.

Figure 41: Example of temporary safety fencing around discharge channel, along with culvert and pre-existing fencing

Furthermore, as can be seen in Figure 2 of this report, there are existing fenced culverts that enable safe passage over the discharge channel. In the case of the Queenstown Trail crossing over the channel, there is

also already permanent fencing erected to either side of the trail to prevent the public from falling into the channel. There will also be signs erected on either side of the trail crossing over the channel warning trail users of the hazard.

Finally, the visual impact of the channel on recreational users is expected to be relatively small, given that the channel has been present for approximately 14 years.

Overall, and based on the effects assessment above, adverse effects on recreational and commercial users of the riverbed and adjacent Queenstown Trail are less than minor.

5.9 Effects on Natural Character and Amenity

As presented in Sections 3.11 and 3.12, the Kawarau Water Conservation Order and RPW Schedule 1A list the Kimi-ākau/Shotover River as providing the following outstanding characteristics in relation to natural character and amenity:

- Wild and scenic (noting that Schedule 1A indicates that this may not be for the upper reaches and is not inclusive of the Shotover Delta);
- Natural characteristics, in particular the high natural sediment load and active delta at confluence with Kawarau River;
- Recreational purposes, in particular rafting, kayaking and jet boating.

The discharge of treated wastewater to the Kimi-ākau/Shotover River has the potential to create localised effects on natural character and amenity values through:

- The visibility of the discharge into the river;
- The possibility of odours from the discharge; and
- The general stigma associated with treated wastewater discharge in an area of the catchment used for recreational and tourism activities.

Both the visual and odour impact of the treated wastewater discharge to the river is expected to be highly localised, with observations taken at a monitoring site downstream from the discharge outfall (at Site RS06B) indicating that there is no discernible visual difference in water clarity or colour at approximately 200 m downstream from the outfall. This essentially limits the zone of visual impact to a 200 m reach of a side-braid of the Kimi-ākau/Shotover River to the southeast of the discharge.

As discussed in Section 2.5.5, it is anticipated that odours (if any) will only be detectable within a 50 m radius of the discharge outfall. Even if they may be detectable, they are unlikely to be objectionable. This indicates that any odour effects on amenity values will be highly localised, with much of that zone comprising areas that are difficult to access (due to dense willows and shrubs and/or distance from public access points).

Both visual and odour effects on amenity values from the discharge will be further reduced on or before December 31st, 2025, with the commissioning of a second MLE reactor with another secondary clarifier, and an additional inlet screen. These significant upgrades are expected to make further large improvements to discharge quality, and hence still further reduce the limited visual and olfactory impact of the discharge to water.

With regards to the commonly-held aversion to treated wastewater discharges to water, to key elements need to be considered:

(1) Consented discharge via the subject channel has occurred previously and up until quite recently (2019).
(2) Discharged wastewater is now treated to a higher standard that when consented discharges to the Kimi-ākau/Shotover River occurred, due to subsequent treatment infrastructure improvements (notably, the first clarifier). Further discharge quality improvements will occur by the end of the year, with the commissioning of additional treatment infrastructure.
(3) The proposed duration of the discharge to water is comparatively short, with a consent expiry of December 31 2030 sought (to allow a long-term sustainable solution to be consented, designed and constructed).

While the above points may not entirely address the negative perception of the treated wastewater discharge, they may help to reduce this stigma. Further, the less than minor anticipated physical effects will also potentially help reduce the stigma.

Based on the above assessment, adverse effects on the natural character and amenity values of the Kimi-ākau/Shotover River are expected to be less than minor.

5.10 Cultural Effects

No formal cultural impact assessment has been undertaken by Kā Rūnaka for this application due to the nature of emergency works and subsequent timeframe limitations for this application to be submitted under section 330A of the RMA (QLDC sought an extension of time but that was refused by ORC).

The applicant has engaged in consultation with tangata whenua in a limited capacity ahead of this application being submitted to ORC and will continue their dialogue following lodgement.

QLDC is well aware that Kā Rūnaka are concerned about activities that directly affect the water quality of the Kimi-akau/Shotover and Kawarau Rivers. QLDC acknowledge that any discharge of treated wastewater is culturally offensive as it will diminish the mauri of the awa tupuna, threaten the Ki Uta Ki Tai philosophy, and impact on the ability of tangata whenua to exercise culture and traditions, including mahika kai practices.

This recognition of the discharge of treated wastewater to waterbodies being an affront to Kai Tahu is included in the RPW as Issue 4.13.5 with the explanation:

> *"The discharge of untreated and treated human waste and other contaminants to water bodies is particularly offensive to Kai Tahu, since water is of both spiritual and practical importance to the indigenous culture of Otago. Degradation of any water body undermines the enduring cultural relationship iwi have traditionally enjoyed and seek to retain with their waters. In addition, the custom of gathering food (mahika kai) from water bodies is jeopardised, since the practice of consuming food gathered from resources contaminated by, in particular, human wastes is abhorrent to iwi. Severance of the spiritual relationship with, and of the customary use of, a water body strikes at the very identity and well being of the indigenous culture. This causes a failure as kaitiaki to protect and pass on to the next generation an intact mahika kai custom."*

Broader engagement with Kā Rūnaka through representatives at Aukaha and Te Ao Marama Inc is underway for the long-term optioneering, and the awareness of the importance of cultural values linked to the awa is one of the drivers in determining options for an appropriate long-term solution. A new long-term solution will go some way towards addressing the cultural offensiveness of treated wastewater discharges directly to the Kimi-akau/Shotover River associated with this application, however this interim consent is required to enable to new disposal system to be consented, designed and built, given the absence of practicable or realistic alternatives at the site.

The application site is not considered to be on, adjacent to and does not affect a statutory acknowledgement area. While Lake Whakatipu is subject to a statutory acknowledgment, it is not considered that the proposal will have any direct or indirect effect on this lake.

In light of the above, effects on cultural values are likely to be more than minor.

6. CONSULTATION

Clause 6(1)(f) of Schedule 4 of the RMA requires the identification of, and any consultation undertaken with, persons affected by the activity. Iwi have been briefly consulted with regards to the emergency effluent discharge to the Kimi-ākau/Shotover River, and consultation has also been initiated with DOC and Fish and Game alongside the application being lodged.

Feedback from local runaka in relation to the failing DAD disposal area and seeking an opportunity to discuss potential solutions, including the discharge through the previous discharge channel, was initially sought on 26th November 2024, and again on 17th February 2025. A formal letter to QLDC outlining matters of concern to iwi was received jointly from Aukaha and Te Ao Marama Inc on 7th April 2025 and a response provided by QLDC on 9th April 2025. Information that was requested and provided included:

- Summary of the alternative options that were considered and the rationale for their exclusion
- Circumstances and considerations leading up to the decision to use the emergency provisions; section 330 and 330A of the RMA
- Any consideration of alternatives to the use of emergency powers
- Any decisions and communications relating to engagement with Aukaha and Te Ao Marama Inc in relation to the short-term options for management of the treated wastewater

The tight timeframes in s330A of the RMA for lodgement of an application following emergency works (20 working days; QLDC sought an extension of time bur ORC refused) has meant that a more thorough consultation approach has not been possible.

Details on the WWTP upgrades and short-term disposal to the Kimi-ākau/Shotover River (including monitoring results) are being made available to the wider community via the QLDC website, although a formal consultation feedback mechanism is not part of that website at this present time.

7. NOTIFICATION

Section 95A of the RMA sets out the steps which must be followed by a consent authority when determining whether to publicly notify applications for resource consent. Public notification is not precluded or required by section 95C, any rule or NES. However, the effects on cultural values are likely to be more than minor, and there is wide public interest in the treated effluent discharge activity for which consent is being sought and it may be concluded that special circumstances exist in relation to this proposal. Therefore, public notification of the application is requested by QLDC.

Because public notification is requested, no further consideration of limited notification is required under Section 95B.

8. STATUTORY CONSIDERATIONS

Schedule 4 of the RMA requires that an assessment of the activity against the matters set out in Part 2 and any relevant provisions of a document referred to in Section 104 of the RMA is provided when applying for a resource consent for any activity. These matters are assessed as follows.

8.1 Resource Management Act

8.1.1 Part 2 of the RMA

The proposal is consistent with the purpose and principles of the RMA, as outlined in Section 5 of Part 2, which fundamentally is to promote the sustainable management of natural and physical resources; the

proposal enables the applicant to provide for their and the wider community's economic and social wellbeing while appropriately avoiding or mitigating adverse environment effects.

Part 2 contains section 6 – Matters of National Importance which decision makers must recognise and provide for. Other Matters which decision makers must have particular regard to are set out in Section 7. Section 8 – Treaty of Waitangi, requires decision makers to take into account the Treaty principles.

The provisions of Part 2 have been taken into account and are reflected in the national and regional planning documents relevant to this application. An assessment of those provisions has been undertaken in preparing this application and is contained below and in Appendix H of this application. As the principles of Part 2 are captured in the lower order planning instruments, specific consideration of the individual provisions of Part 2 is not necessary and not been undertaken (especially given the limited time available). Given the term sought for the activity, the positive and adverse effects of the activity (noting in particular the effects on Māori cultural and spiritual values), and the reasons for seeking to undertake the discharges, the activity is considered overall to achieve the sustainable management purpose of the RMA.

8.1.2 Section 104

When considering an application for a resource consent, the decision maker must have regard to the matters outlined in section 104, which include:

(a) any actual and potential effects on the environment of allowing the activity; and

(ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and

(b) any relevant provisions of—

- *(i) a national environmental standard:*
- *(ii) other regulations:*
- *(iii) a national policy statement:*
- *(iv) a New Zealand coastal policy statement:*
- *(v) a regional policy statement or proposed regional policy statement:*
- *(vi) a plan or proposed plan; and*

(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.

The actual and potential effects on the environment of allowing the activity, including positive effects, have been described in Section 5 of this document.

An assessment of the activity against the relevant provisions of a document referred to in 104(1)(b) of the RMA is included in section 8.2 to 8.6 of this document. Under the RMA, regional plans need to give effect to

higher order policy documents. For an application of this scale, an assessment of the application against the National Policy Statement for Freshwater Management (NPSFM), Otago Regional Policy Statement (RPS) and RPW is considered appropriate.

8.1.3 Section 105

As this application is for a discharge permit, section 105 requires that the consent authority must have regard to the following matters in making a decision:

> *(a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
> *(b) the applicant's reasons for the proposed choice; and*
> *(c) any possible alternative methods of discharge, including discharge into any other receiving environment.*

Each of these matters are discussed in turn below.

8.1.3.1 Nature of discharge and sensitivity of receiving environment

The nature of the discharge is described in Section 2 of this document. A description of the receiving environment, and an assessment of its sensitivity to the effects of the discharge is made in Section 3. The assessment found that given the characteristics of the treated effluent discharge and those of the receiving environment, the effects of the discharge on the receiving environment beyond the reasonable mixing zone are minimal, with the exception of effects on cultural values which are high. The Kimi-akau/Shotover and Kawarau Rivers as a receiving environment are identified as sensitive to the potential effects of the discharges, given the overall good water quality providing habitat for indigenous and sports fishery values, strong cultural association with the rivers including for mahinga kai, tourism and commercial uses and natural character, amenity and landscape values present in the river.

8.1.3.2 Reasons for proposed discharge

The reasons why the application has been made have been set out in Section 1 of this document. Principally, the applicant seeks consent to authorise the contravention of s15 of the RMA and the ongoing adverse effects of discharge of treated effluent to water that commenced as emergency works under the provisions of s330 of the RMA. Fundamental to this interim consent for less than 5 years is the need to ensure this discharge remains lawful until the long-term solution for the disposal of treated effluent can be consented, designed and implemented (by 31 December 2030). Important considerations for this application are the scale and nature of the discharge, the interim period for which consent is sought, the limited alternatives available for the treated effluent discharge from the current WWTP, and the progress towards a new long-term disposal solution that is already well underway by the applicant.

8.1.3.3 Assessment of alternatives

In addition to section 105(1)(c) of the RMA, section 6(1)(d)(ii) of the Fourth Schedule of the RMA requires that applications for discharge consents must include a description of *"any possible alternative methods of discharge, including discharge into any other receiving environment*". A summary of these investigated options is outlined in Section **Error! Reference source not found.**, and this section provides the assessment performed on these alternative solutions.

A number of alternative actions to the direct discharge of treated effluent to the Kimi-ākau/Shotover River were considered prior to emergency works being undertaken.

The alternative disposal options considered included buffer storage, DAD field expansion, adjustments to the existing DAD field operation, alternative disposal via previous drains (channels) and a combination of these. The previous channels which have both been used as discharge paths in the past are outlined in Figure 42 below.

Figure 42: Shotover WWTP previous channels

The following factors were used as benchmarks to determine the key success criteria of the short-term treated effluent disposal solution:

- No ponding: Ponding poses significant concerns for airport operations because of increased birds and hence the risk of bird strike, necessitating careful management to avoid disruptions.
- Localised impact near the DAD field: Given the DAD field has a limited capacity, and hydraulic performance has deteriorated over time. An overflow bund has been created. Overland or visible flows are a major concern for the community, requiring solutions that minimise these occurrences.
- Continuous treatment from the WWTP: The WWTP must maintain continuous treatment discharge and cannot be held back under any circumstances. There is currently negligible storage volume available in Ponds 2 and 3 until the second MLE reactor and clarifier are operational by the end of 2025.
- Fast implementation: Due to the potential aviation risk, the implementation of the short-term disposal solution must be timely.
- Land based discharge: Efforts made to minimise the effects on the receiving environment wherever possible, ensuring that the disposal solutions are environmentally responsible. Ie Land based discharge best case scenario.
- The feasibility of each option must be considered - this is dependent on if the option can actually be implemented ie cost, timeline to implement, physical nature of solution etc.

The following table (Table 14) presents a summary of assessing various short term disposal alternatives.

Table 14: Shotover WWTP short-term disposal options assessment summary

Option	Description & Comments	Key Criteria				Feasible	
		No ponding	Minimise localised impact near DAD	Continuous treatment from the WWTP	Fast implementation	Land based discharge	
1	Do Nothing	No	No	Yes	N/A	Only partial	No
2	Public access restriction of the uncontrolled discharge area beyond DAD	No	Yes	Yes	Yes	Only partial	No
3a	Increase DAD Field Footprint, say expand by 30%	Maybe – deterioration may still occur	Yes	Yes	No	Yes	Rate of deterioration is unknown
3b	Limit discharge volume to DAD field, and pump overflows from DAD field back to the treatment plant.	No	No	No	No	Yes	No – limited

Option	Description & Comments	Key Criteria				Feasible	
		No ponding	Minimise localised impact near DAD	Continuous treatment from the WWTP	Fast implementation	Land based discharge	
							by DAD capacity
3c	Similar to 3b, to pump overflows from post-DAD back to a buffer pond (pond 2 or 3).	No	No	No	No – Pond 2/3 only available from end of 2025	Yes	No – limited storage vol in Ponds 2 and 3
3c	Similar to 3b, to pump overflows from post-DAD back to a buffer pond (pond 2 or 3).	No	No	No	No – Pond 2/3 only available from end of 2025	Yes	No – limited storage vol in Ponds 2 and 3
3d	No expansion to the DAD field, however infill depressions downstream of DAD and at the Shotover Delta to reduce daylighting.	No	Yes	Yes	No	Yes	Yes (large quantity of gravel reqd)
3e	Similar to 3e, to continue using the DAD field, but only infill up to the Training Wall.	No & daylighting near river	No	Yes	No	Yes	No
3f	Raise existing DAD field to reduce ponding	Yes	No - more daylighting	Yes	No	Yes	Rate of deterioration is unknown
3g	Utilise DAD to its maximum capacity and use raw wastewater storage pond to avoid DAD overflow.	No	Yes / partial depends on DAD capacity recovery	No - minimal storage in Pond 1, also odour risk	No – require PS installation	Yes	No
4a	To divert excess treated effluent from upstream of UV to buffer storage ponds 3 and/or 2 when the DAD lacks sufficient capacity. Require draining and dewater of the ponds, removing sludge from Pond 3 over a 18-24 months period. Remediated Pond 3 only available from end of 2027.	No – Pond 3 could be full of water at times	Yes / partial depends on DAD capacity recovery	No	No	Yes	No
4b	Similar to 3d, but do not drain or dewater the ponds. Instead, use some of the available pond volume above the sludge level. This can commence once the ponds are out of service after December 2025.	No	Yes / partial depends on DAD capacity recovery	No	No – Pond 2/3 only available from end of 2025	Yes	No – even less storage volume than 3a
5a	Utilise DAD to its maximum capacity and direct overflow to the Kimi-ākau/Shotover River via a historical drain/channel	No	Yes	Yes	No	No	Low – high % of

Option	Description & Comments	Key Criteria				Feasible	
		No ponding	Minimise localised impact near DAD	Continuous treatment from the WWTP	Fast implementation	Land based discharge	
							bypass likely
5b	Implement a partial bypass to the Kimi-ākau/Shotover River using the historic channel 2, while utilising the existing DAD field to its maximum capacity.	No	Yes	Yes	Yes	Partial only	Low – high % of bypass is likely
6a	To decommission the existing DAD field and divert the treated effluent following the UV to the Kimi-ākau/Shotover River via the drain/discharge channel	Yes	Yes	Yes	Yes	No	Yes
6b	To use the bypass through the historic channel 2 to temporarily drain the existing DAD field and undertake remediation works to restore its higher infiltration capacity.	Maybe	Yes	Yes	No	Partial only	Low – high % of bypass is likely

As seen from the above table, diversion of treated effluent into the previous discharge channel north of the DAD disposal field (Option 6a) was found to be better than other alternatives considered.

8.1.4 Section 107

Section 107(1) of the RMA governs the grant of consents for the discharge of contaminants into water. Section 107(1) outlines specific criteria that must be met to ensure that discharges do not result in significant adverse effects on the receiving environment.

Under Section 107(1) of the RMA a consent authority may not grant a consent for the discharge of a contaminant into water, or onto or into land, if after reasonable mixing the discharge (either by itself or in combination with the same, similar or other contaminants or water) is likely to give rise in the receiving waters, to:

> *(c) The production of conspicuous oil or grease films, scums, foams, floatable or suspended material:*
> *(d) Any conspicuous change in the colour or visual clarity:*
> *(e) Any emission of objectionable odour:*
> *(f) The rendering of fresh water unsuitable for consumption by farm animals:*
> *(g) Any significant adverse effects on aquatic life.*

Each of these effects has been considered with respect to the proposed discharge of contaminants to water.

Oil, Grease, Scums, Foam, Floatable or Suspended Material

The wastewater treatment process is generally designed and managed to minimise the formation of oil, grease, scums foam, floatable or suspended material however, some level of these may still be present in the discharge. Visual monitoring of the effluent throughout the treatment process and prior to discharge occurs on a daily basis with formal water quality testing undertaken weekly. Should any issues be identified through this monitoring they can be rectified through modifications at the WWTP and if necessary, re-direction of the flow to calamity storage.

With the level of treatment and monitoring proposed, and the available mixing within the receiving environment, it is not anticipated that this discharge will result in the production of conspicuous oil or grease films, scums, foams, floatable or suspended material, both by itself and in combination with other discharges, after reasonable mixing.

Change in Colour of Visual Clarity

The treated effluent discharge is visibly different in colour and clarity compared to the Kimi-ākau/Shotover River receiving environment. The influence of treated wastewater from the oxidation pond on colour and clarity of the treated effluent is evident in the current discharge, however downstream of the first mixing zone (approximately 200m), there is no discernible influence on colour and clarity of river water. The clarity will continue to improve, and the reasonable mixing zone shorten considerably, following the completion of the second MLE clarifier by the end of 2025 as the oxidation ponds will no longer be required.

Objectionable Odour

As discussed in the FIDOL assessment (section 5.7), considering the relatively low frequency of light winds that can cause effects, low intensity of odours discharged and distance to receptors, odour emissions from the outfall are unlikely to cause offensive or objectionable effects at off-site receptor locations.

Suitability for Animal Consumption

The discharge into the Kimi-ākau/Shotover River will not affect the suitability of the water for consumption by farm animals. There are no farm animals that currently drink this water in proximity to the mixing zone. The key contaminants in the discharge of sediment and nutrients, such as nitrogen and phosphorus, at low concentrations following reasonable mixing. Overall effects on water quality and ecology the receiving environment is expected to be less than minor and therefore also likely to be suitable for consumption by farm animals.

Monitoring of downstream water quality in the Kimi-ākau/Shotover River and below the Kawarau confluence since the recent discharge began, and at times when the previous discharge occurred, indicates that contaminant levels will remain within acceptable thresholds for livestock drinking water in the Kimi-ākau/Shotover River at that point.

Significant Adverse Effects on Aquatic Life

Aquatic ecosystems in the Kimi-akau/Shotover River could be sensitive to increased nutrient loading, sedimentation, and changes in water clarity.

Completion of plant upgrade works by the end of 2025 will result in an improved level of wastewater treatment. This, together with the more typical flow rates that occur in the river, and the proposed mitigation measures to improve mixing of the treated wastewater during low flow periods is expected to limit potential effects to water quality, such that they are less than minor. The concentration of nutrients in the discharge is expected to be low, and the length of the minor braid within which ammonia toxicity effects occur is within a reasonable mixing zone which will minimise the risk of adverse effects in the broader receiving environment of the Kimi-ākau/Shotover and Kawarau Rivers. The river is naturally high in sediment and therefore water clarity is lower than the Kawarau River at the confluence 1km downstream of the discharge point.

The applicant will undertake ongoing water quality monitoring, and appropriate locations for the continued monitoring have been proposed, to ensure that any unforeseen effects are promptly identified and mitigated.

Based on the assessment above, no significant adverse effects on aquatic life are expected and are not known to have occurred in the past, evidenced by the monitoring data and instream evaluations from the previous consented discharge period, noting that the quality of the discharge is now significantly better.

8.2 Proposed Wastewater Standards

The Taumata Arowai proposed wastewater standards are a relevant 'other regulation' (section 104(1)(b)(ii)) to consider. Taumata Arowai are currently proposing new wastewater standards. If the new standards are adopted as currently presented, the receiving environment is categorised based on high-level environmental context (sea, rivers or streams, lakes and estuaries, land). In the case of rivers and streams, sub-categories are provided based on a potential dilution ratio. The discharge of treated effluent into the Kimi-ākau/Shotover River fits within the moderate rate category. This is where the river dilution ratio falls between 50 and 250 (moderate rate category).

The following Table 15 compares the different discharge limits as specified in the current consent (RM13.215.03.V3), Stage 3 WWTP upgrade (2008.238.v1) and the proposed limits under the moderate rate category by Taumata Arowai with the recent MLE/Clarifier Effluent Results (from the monthly consent sampling data).

Table 15: Discharge Standards Comparison

	Current Discharge Limits (prior to operation of Stage 3 upgrade)		Proposed Limits of WW Standards (at moderate dilution)		Treated effluent post Stage 3 upgrade (treatment target)		MLE/Clarifier Effluent Results (3/7/2023 to 4/3/2025)*	
Parameter (in mg/L)	**Annual Median**	**Annual 95%tile**	**Annual Median**	**Annual 90%tile**	**Annual Mean**	**Annual 90%tile**	**Median**	**90%ile**
BOD (Biochemical oxygen demand)	30	50	15	-	10	20	6.0	9.6
TSS (Total suspended solids)	30	50	15	-	10	20	8.5	44
TN (Total nitrogen)	23	35	10	-	10	15	7.1	14
E.coli (Escherichia coli)	260	-	-	6500	10	100	*Tested at UV outlet (median: 10, 90%ile: 158)*	
TP (Total phosphorus)	-	-	3	-	-	-	0.74	2.8
TAN (Ammoniacal nitrogen)	-	-	-	3	-	-	0.1	7.6

** Results skewed by operation efforts to address major process upsets which occurred December 2023/January 2024 and July/August 2024. These results have been excluded in the table.*

Table 15 indicates that the recent clarifier outlet effluent results generally fall within the proposed median limits. The recent results indicated potential exceedance to 90th percentile limits of TSS (20 mg/L) and TAN (3 mg/L). The nearly complete upgrades of MLE2 will improve the quality of treated effluent such as that TSS and TAN are expected to meet the 90th percentile limits post December 2025.

8.3 National Policy Statements

8.3.1 NPS for Freshwater Management 2020 (as amended October 2024)

The National Policy Statement for Freshwater Management 2020 (NPSFM) came into force on 3 September 2020 and provides direction to local authorities on managing freshwater under the RMA.

Te Mana o te Wai is the fundamental concept underpinning freshwater management in New Zealand, that recognises that *protecting the health of freshwater protects the health and well-being of the wider environment… Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.* Te Mana o Te Wai framework incorporates the following six principles:

(a) Mana whakahaere: the power, authority, and obligations of tangata whenua to make decisions that maintain, protect, and sustain the health and well-being of, and their relationship with, freshwater

(b) *Kaitiakitanga: the obligation of tangata whenua to preserve, restore, enhance, and sustainably use freshwater for the benefit of present and future generations*

(c) *Manaakitanga: the process by which tangata whenua show respect, generosity, and care for freshwater and for others*

(d) *Governance: the responsibility of those with authority for making decisions about freshwater to do so in a way that prioritises the health and well-being of freshwater now and into the future*

(e) *Stewardship: the obligation of all New Zealanders to manage freshwater in a way that ensures it sustains present and future generations*

(f) *Care and respect: the responsibility of all New Zealanders to care for freshwater in providing for the health of the nation.*

The Objective of the NPS-FM is to ensure that natural and physical resources are managed in a way that prioritises first, the health and well-being of waterbodies and freshwater ecosystems, second, the health needs of people (such as drinking water), and third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future (i.e., the hierarchy of obligations in Te Mana o te Wai). However, the RMA has recently (October 2024) been amended (s104(2F)) to specify that "…a consent authority must not have regard to clause 1.3(5) or 2.1 of the NPSFM 2020 (which relates to the hierarchy of obligations in the NPSFM 2020)."

The relevant policies of the NPSFM are assessed below.

***Policy 1**: Freshwater is managed in a way that gives effect to Te Mana o te Wai.*

Te Mana o te Wai refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It also recognises the need to restore and preserve the balance between the water, the wider environment, the community. The assessment provided in Section 5 address the effects on the environment and concludes that water quality in the receiving environment after reasonable mixing will be maintained. As the water quality in these rivers is very good, having a less than minor effect will ensure the physical health and well-being of the freshwater environment will be maintained. Notwithstanding it is acknowledged that the discharge of treated wastewater to water will harm the mauri of the water from a Māori perspective and thus the cultural and spiritual well-being of freshwater will not be protected. The discharge also stems from a piece of critical community infrastructure (being the WWTP) such that a balanced perspective is required when considering the short-term nature of the discharge activity for which consent is sought while a suitable long-term solution is consented, designed and implemented.

***Policy 2**: Tangata Whenua are actively involved in freshwater management (including decision making processes) and Māori freshwater values are identified and provided for.*

The Māori values of the Kimi-akau/Shotover River and Kawarau River have been identified through previous engagement, although engagement with Kā Rūnaka is ongoing for this short-term discharge application due to the short timeframe to submit an application under s330A meaning that a cultural impact assessment has not been sought. Broader engagement with Kā Rūnaka through representatives at Aukaha and Te Ao Marama Inc is underway for the long-term optioneering, and the awareness of the importance of cultural values linked to the awa is one of the drivers in determining options for an appropriate long-term solution.

***Policy 3**: Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of catchment basis, including the effects on receiving environments.*

An assessment of the effects of the proposed discharge on the receiving environment has considered both localised effects and cumulative effects within the broader Kawarau River catchment. Consideration of the current water quality standards which are set at a catchment scale has also been undertaken concluding that the discharge will meet the relevant standards after reasonable mixing. An assessment on other users within the area, in particular recreational use, has also been provided ensuring that an integrated approach to managing freshwater is not frustrated.

***Policy 5**: Freshwater is to be managed through a National Objectives Framework to ensure that the health and wellbeing of degraded water bodies and freshwater ecosystems is improved.*

The Kimi-ākau/Shotover and Kawarau Rivers are not showing signs of being degraded and in fact both meet the A band for all attributes within the NPSFM other than for sediment which is naturally elevated. The assessment of effects demonstrates that the A band attributes will continue to be achieved after reasonable mixing, however the proposed mitigation measure of directing additional flow into the discharge braid is necessary to provide additional dilution of ammonical-N in the discharge to meet the A band target.

***Policy 8**: The significant values of outstanding water bodies are protected.*

The Kimi-ākau/Shotover and Kawarau Rivers are recognised as outstanding water bodies and protected through the Kawarau Water Conservation Order. The assessment of effects has demonstrated that this discharge activity will not prevent those identified values from being protected after reasonable mixing of the discharge

***Policy 9**: The habitats of indigenous freshwater species are protected.*

The Kimi-ākau/Shotover and Kawarau Rivers are recognised habitats for indigenous species of fish and invertebrates. The assessment of effects has demonstrated that this discharge activity will not prevent the instream habitats from being protected after reasonable mixing of the discharge

***Policy 10**: The habitat of trout and salmon is protected, insofar as this is consistent with Policy 9.*

The Kimi-ākau/Shotover and Kawarau Rivers are recognised sports fishery habitats. The assessment of effects has demonstrated that this discharge activity will not prevent those habitats of trout and salmon from being protected after reasonable mixing of the discharge.

***Policy 13**: The condition of water bodies and freshwater ecosystems is systematically monitored over time and action is taken where freshwater is degraded to reverse deteriorating trends.*

Both the Kimi-ākau/Shotover and Kawarau Rivers are within the A band for all attributes within the NPSFM other than for sediment which is naturally elevated. A discharge of treated wastewater to the Kimi-ākau/Shotover River was occurring up until 2019 and the state of the environment monitoring results that contribute to the long-term trend in these waterbodies would have been with the influence of this discharge. No overall deterioration is shown. Appropriate monitoring of the receiving environment is proposed under this application and combined with the limits on the discharge quality will enable action to be taken if issues arise during the term of this consent.

***Policy 15**: Communities are enabled to provide for their social, economic and cultural wellbeing in a way that is consistent with this National Policy Statement.*

The provision of municipal wastewater treatment services as provided at the Shotover WWTP is a significant benefit for the community (and a lifeline utility) which enables them to provide for their social, economic and cultural wellbeing. Consistency with the NPSFM is demonstrated through the continued ability to meet the water quality attribute A band standards after reasonable mixing, and ensuring that contact recreation standards are also met which means the community can continue to utilise this area of the District for recreational purposes.

8.4 Otago Regional Policy Statements

Otago regional policy statements provide an overview of the resource management issues facing Otago and set policies and methods to manage Otago's natural and physical resources.

There are currently two regional policy statements in effect in Otago:

- Otago Regional Policy Statement 2019 (ORPS 2019) fully operative;
- Proposed Otago Regional Policy Statement (PORPS), which was first notified on the 26th of June 2021 and on 30 September 2022 for the freshwater instrument components. On 30 March 2024 the ORC notified its decisions on the submissions on PORPS 2021 with some matters still subject to appeal.

8.4.1 Otago Regional Policy Statement 2019

The relevant matters in the RPS are identified and assessed as set out in **Appendix H** of this application. The assessment found that the proposal generally meets the relevant objectives of the RPS and is generally consistent with its policies, other than the provisions relating to Māori cultural and spiritual values.

8.4.2 Proposed Otago Regional Policy Statement 2021

The relevant matters in the RPS are identified and assessed as set out in **Appendix H** of this application. The assessment found that the proposal generally meets the relevant objectives of the RPS and is generally consistent with its policies, other than the provisions relating to Māori cultural and spiritual values.

8.5 Regional Plans

8.5.1 Regional Plan: Water for Otago

The RPW was made operative on 1 January 2004 and sets objectives, policies and rules that apply to the management of water in the region.

The relevant matters in the RPW are identified and assessed as set out in **Appendix H** of this application. The assessment found that with the current and soon to be completed treatment, the water quality in the receiving environment following mixing complies with the RPW Schedule 15 standards and therefore the proposal generally meets the relevant objectives and policies. However, the discharge is not consistent with the provisions relating to Māori cultural and spiritual values.

8.5.2 Regional Plan: Air for Otago

The RPA was made operative on 1 January 2003, and sets out provisions that apply to the management of discharges to air in Otago.

The relevant matters in the RPA are identified and assessed as set out in **Appendix H** of this application. The assessment demonstrates that the proposal is generally in accordance with the objectives and policies of the RPA.

8.6 Iwi Management Plans

The proposed activities are subject to the below Iwi Management Plans (IMP):

- Kāi Tahu Ki Otago Natural Resource Management Plan 2005 (Kai Tahu Ki Otago NRMP)
- Ngāi Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan 2008 (Te Tangi a Tauira)

These IMPs set out Kāi Tahu natural resource and environmental management issues, and objectives and

policies to guide decisions in responding to issues expressed by the Papatipu Rūnaka representing hapū who hold manawhenua over the area. The documents also provide guidance to Papatipu Rūnaka when participating in resource management processes, and decision makers regarding cultural values and interests.

8.6.1 Kāi Tahu Ki Otago Natural Resource Management Plan

Included below is a list of policies included in the Kāi Tahu Ki Otago NRMP that are considered particularly relevant to the proposed activities:

- To require an assessment of instream values for all activities affecting water.
- To protect and restore the mauri of all water.
- To require land disposal for human effluent and contaminants.
- To require consideration of alternatives and use of new technology for discharge renewal consents.
- To encourage Kāi Tahu ki Otago input into the development of monitoring programmes.
- To require monitoring of all discharges be undertaken on a regular basis and all information, including an independent analysis of monitoring results, be made available to Kāi Tahu ki Otago.
- To encourage Management Plans for all discharge activities that detail the procedure for containing spills and including plans for extraordinary events.
- To require visible signage informing people of the discharge area; such signs are to be written in Māori as well as English.
- To require reticulated community sewerage schemes that have the capacity to accommodate future population growth.

8.6.2 Ngāi Tahu ki Murihiku Natural Resource and Environmental Management Plan

Included below is a list of policies included in Te Tangi a Tauira that are considered particularly relevant to the proposed activities, in relation to the High Country and Foothills section of the plan:

- Protect and enhance the mauri, or life supporting capacity, of freshwater resources throughout Murihiku.
- Promote the management of freshwater according to the principle of ki uta ki tai, and thus the flow of water from source to sea.
- Adopt a precautionary approach for any activity involving a waterway where there is an absence of detailed knowledge of that waterway (ecology, flow regimes, species, etc).
- Avoid the use of water as a receiving environment for the direct, or point source, discharge of contaminants. Even if the discharge is treated and therefore considered “clean”, it may still be culturally unacceptable. Generally, all discharge must first be to land. This general policy is a baseline or starting point. From this point, the Rūnanga can assess applications on a case-by-case basis.
- Assess discharge to water proposals on a case-by-case basis, with a focus on local circumstances

and finding local solutions.

- Consider any proposed discharge activity in terms of the nature of the discharge, and the sensitivity of the receiving environment.
- When assessing the alternatives to discharge to water, a range of values, including environmental, cultural and social, must be considered in addition to economic values.
- Any discharge activity must include a robust monitoring programme that includes regular monitoring of the discharge and the potential effects on the receiving environment.
- Ngāi Tahu ki Murihiku consider activities involving the discharge of contaminants to water a community issue. For this reason, ngā rūnanga may, where seen as appropriate, recommend that a consent application be notified.

8.6.3 Assessment of Iwi Management Plans

There is a strong preference throughout the identification of issues and associated policies in the IMPs for wastewater to be minimised, appropriately treated and discharged to land in an appropriate manner, and to avoid any discharges of wastewater to water.

The following points demonstrate where the discharge is consistent with several of the policies of both IMPs:

- Upgraded treatment nearly completed with the second clarifier due to come online by the end of 2025 that has been sized for expected growth;
- Improvements to the Operations and Maintenance Manual and procedures to minimise any poor plant performance and ensure contingency measures are in place;
- The provision of signage in Māori and English;
- A robust monitoring programme for both the discharge and receiving environment. Additional input into this programme from Kāi Tahu is welcomed and monitoring results will be made available when requested;
- A range of values, including some consideration of cultural values (through the identification of whether the option was to land or water), have been considered in the alternatives assessment associated with this short-term discharge, and will be further considered for the long-term solution;
- The water quality assessment in Section 5, demonstrates that traditional water quality attributes (e.g. microbiological, nutrient and sediment) will receive suitable dilution within the mixing zone and still provide for the natural and human use values within the river environment (e.g. recreational and amenity values).

Ultimately, however, the discharge is inconsistent with some and contrary to several provisions in the Kāi Tahu NRMP and Ngāi Tahu ki Murihiku NRMP, noting the cultural offensiveness of discharges of human sewage to water and strong mahinga kai values that Kai Tahu places on the rivers in the region. In particular, the proposal is at odds with the provisions that seek to avoid using water as a receiving environment for contaminants.

9. CONCLUSION

The Queenstown Lakes District Council is applying for consent to authorise the ongoing discharge of treated wastewater from the Shotover WWTP following the commencement of the discharge under the emergency works provisions of the RMA (s330). Alongside this, consent is also sought to install a rip-rap outfall structure on the discharge channel to provide erosion and flood protection of the channel for the next 5 years and for a minor variation to the air discharge consent.

The WWTP serves as a critical lifeline utility for the Queenstown area so cannot just cease operating, therefore a short-term duration through to 31 December 2030 is sought to provide time for a more sustainable long-term disposal solution to be consented, designed and constructed.

This application includes an assessment of the environmental effects of the proposed activities. The assessment concludes that the biophysical effects of the activity, including on the physical attributes of the receiving environment resulting from the discharge will be less than minor, provided that the WWTP is operated effectively and in accordance with the proposed limits and mitigation measures. The significance of the discharge on Māori cultural and spiritual values are acknowledged and are a key driver in options development for the long-term disposal solution.

The activity will be undertaken in a way that generally aligns with the relevant national and regional policy framework and will assist the community to achieve its economic and social wellbeing, while appropriately managing most adverse effects, with the exception of effects on Māori cultural and spiritual values. The activity is considered to meet the purpose of the RMA overall, particularly taking into account the term sought, and the role of the activity in leading to implementation of a long-term solution for disposal of treated wastewater from the Shotover WWTP. There is no regulatory barrier to the application being granted as applied for.

11. REFERENCES

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Appendix A: Bird Survey Report

BIRD SURVEY REPORT – SHOTOVER WASTEWATER TREATMENT PLANT

Dawn Palmer, Natural Solutions for Nature Ltd

Date 30 April 2025

Introduction

1. My name is Dawn Alice Palmer.

2. I am a terrestrial ecologist and Director for Natural Solutions for Nature Ltd. I have been in this position since 2002. I am responsible for all elements of my consultancy and for undertaking surveys for and reporting on ecological assessments, monitoring, preparation of the associated reports and provision of ecological advice.

3. I have been engaged by Queenstown Lakes District Council to prepare a report regarding the bird monitoring I undertake within the QLDC Sewage Treatment Works Designation Area.

Qualifications and Experience

4. My qualifications include a Diploma of Applied Science in Natural Resources obtained from Roseworthy Agricultural College, South Australia in 1985; Bachelor of Applied Science, Ecology/ Natural Resources, Canberra College of Advanced Education, 1987. I have been a member of BirdsNZ (the Ornithological Society of New Zealand) since 1998 and was elected as the Regional Representative for Otago for the BirdsNZ Council on 22 August 2023. I have been a member of the New Zealand Ecological Society since 2000; and the New Zealand Plant Conservation Network – since 2009. I have served as a Trustee on the Whakatipu Wildlife Trust between 2020 and July 2024. I was the project director and ecologist for the Friends of Tucker Beach Wildlife Management Reserve Jobs for Nature project and have been a Trustee of the Tucker Beach Wildlife Trust since 19 September 2023. I have been a member of the New Zealand Aviation Wildlife Hazard Group since 2021.

5. Prior to starting my Queenstown based ecological consultancy in 2002, I was Program Manager for Biodiversity Assets and a Conservation Officer for the Department of Conservation in Queenstown, New Zealand for 7 years.

6. I have experience in the preparation of ecological assessments for Resource Management Act processes, preparation of ecological evidence and expert witness advice for commercial and private entities, and QLDC at Council/ Commissioner and Environment Court Hearings for a range of projects including adventure tourism, subdivision and residential developments including many of the greenfield developments in the Queenstown Lakes District e.g. Peninsula Bay, Riverside, Three Parks, Kingston, Shotover Country, Gibbston Valley, Hāwea Special Housing Area (SHA) – peer review, Coneburn SHA, RCL / Hanley Farms.

7. I have prepared management plans for local reserves e.g. Matakauri Wetlands (2003, 2009, 2019), Whakatipu Islands (1995, 2021), and Tucker Beach Wildlife Management Reserve (2019) and co-authored the Conservation Status of Birds in Otago 2025 Report, Otago Threat Classification Series 6, prepared for Otago Regional Council.

8. I have been monitoring birds in the Shotover Wastewater Treatment Designation Area for Council since 2006, continuously since 2017, and more intermittently monitoring braided river birds on the Lower Shotover since 1993 in both a private and professional capacity. I have also been monitoring birds within the Whakatipu Basin for Queenstown Airport Corporation since 2013. I have monitored crested grebe on Lake Hayes and the broader Whakatipu Area since 1995,[1] regularly in 2007 and 2008; I organised the local effort for the national Australasian crested grebe census in 2004, 2014 and 2024 census as well as an Otago census in 2009. Additionally, I have contributed more than 1000 checklists, mostly in Otago to the New Zealand Bird Atlas scheme, a 5-year project concluding on 31 May 2024, run by BirdsNZ to update knowledge of the distribution and abundance of New Zealand birds for the NZ Bird Atlas.

9. I am therefore very familiar with the avifauna of the Queenstown Lakes District (**District**), the birds on the Kimi Akau/ Shotover River and the Whakatipu Basin.

Monitoring of the Shotover Wastewater Treatment Plant

10. As noted above, Natural Solutions for Nature Ltd (**NSN**) has undertaken monitoring at the area including and surrounding the Shotover Wastewater Treatment Plant intermittently since 2006 and continuously since 2017.

11. The purpose of and requirement for monitoring is set out in the Conditions for Specific Designations;[2] Designation #46 – QLDC Sewage Treatment Works, part C.33 of the Proposed District Plan.

12. Condition 11 specifies that:

> *"The Requiring Authority shall design, develop and manage the public work so that it does not attract any birds that are hazardous to aircraft or may endanger aircraft operations. The bird species that have been observed at the airport and which may be hazardous to aircraft are gull, oyster catcher, hawk, spur-wing plover and duck."*

13. Conditions 12 and 13 require the results of impartial monthly monitoring to be reported to the Territorial Authority and the Queenstown Airport Corporation (**QAC**) every three months; monitoring results are provided to both QLDC and QAC each month.

14. QLDC is currently undergoing a modernisation process of the WWTP which will result in the decommissioning of the oxidation ponds, their replacement with a Modified Ludzack-Ettinger (**MLE**) Activated Sludge filtering process and treatment plant and the discharge of treated wastewater to land through a disposal field.

15. However, intermittent localised ponding in the disposal field started to occur in August 2021. The field was extensively excavated in June 2024, berm heights were increased; the internal pits were filled with water following heavy rainfalls in September, October and November 2024. By November 2024 just under 4 hectares of open water habitat had been made available to avifauna where previously there was bare gravel. Prior to the development of the disposal field, the site was a river terrace/ gravel beach under a willow canopy with discharge from the oxidation ponds flowing to the Shotover River through the recently reestablished open channel.

[1] Chance, G.R. (2000): The return of the Australasian crested grebe (*Podiceps cristatus australis*) to the Wakatipu region, South Island, New Zealand. Notornis Vol.47(1): 59-62.
[2] https://districtplan.qldc.govt.nz/proposed/rules/0/243/0/33348/0/122

16. The monitoring and reports I have provided to QLDC and QAC provide an indication of seasonal fluctuations and trends in use of the WWTP habitats.

Methodology

17. The methodology used when undertaking the surveys is described in detail in the NSN Bird Monitoring – WWTP Report dated 4 April 2025 (Quarterly Report), which is attached as **Appendix 7** to this report.

Monitoring Surveys and Results

18. As noted above, I have continuously been monitoring the site since 2017. Accordingly, I attach as **Appendix 1 – 8** to this report, the survey results from site visits undertaken between May 2017 (included in the June 2023 report) and April 2025.

19. Broadly, I summarise some of the overarching general trends and findings noted during my surveys of the Wastewater Treatment Area over the past few years below:

    (a) Waterfowl have been distributed across the oxidation ponds and more recently, the disposal field. When river and water tables were higher in spring and early summer of 2024, waterfowl also moved into a small, flooded area south of disposal field, between the flood retention wall and the Kawarau River on the Delta.

    (b) I began monitoring waterfowl in the disposal field in August 2023 as waders and waterfowl began to roost and forage in that area; waders were observed to be nesting in the Spring of 2023. I added a monitoring station in the ponded area outside the disposal field, near the Kawarau River in December 2024 as waterfowl were moving between the Kawarau River habitats and the Wastewater Treatment Area.

    (c) Following the decommissioning and draining of oxidation pond 1, the waterfowl from that pond have been displaced. Ponds 2 and 3 have also experienced a reduction in waterfowl use over the 2023/2024 and 2024/2025 seasons. The reductions in bird numbers are likely to be result of decommissioning works including increased vehicle movements on the berms around Ponds 2 and 3, and the availability of other wetland habitat (including the Disposal Field).

    (d) All waterfowl (grey teal, shoveler, paradise shelduck, mallard and scaup) are using the ponds and the open water available within the Disposal Field. The decrease in bird numbers on the Ponds has corresponded at least in part with an increase in the use of the Disposal Field. Waterfowl have been observed to move between the treatment ponds and the open water of the Disposal Field habitat.

    (e) When flocks of waterfowl take flight, they often fly low over the ponds and settle quickly, this varies between species and as they progress through their moulting cycle. However, once birds regain flight after their moult, some large flocks have been observed to fly in wider circles at varying heights around and over the ponds, Shotover Delta, across the eastern approach to the Queenstown Aerodrome, towards the Kawarau River corridor and towards Lake Hayes before returning to the Ponds or being lost from sight. Fortunately, planes have rarely been present during the higher risk sightings of waterfowl crossing the eastern approach flight path.

(f) Below is a photograph taken by me on 24 March 2025 at 16:03:13 pm of 6 paradise shelduck flying towards the wastewater treatment area over the Shotover Delta in the eastern approach path to threshold 23 with an Air New Zealand flight over head. From the ground, it was difficult to ascertain how close the waterfowl were to the aircraft. The observation was reported to QAC with a note regarding uncertainty of the vertical distance between waterfowl and aircraft.

Figure 1: Paradise shelduck flying towards the wastewater treatment area

(g) These observations highlight the risk of having high numbers of waterfowl present at this site. When planes approach the aerodrome from the east, flying into the prevailing west wind, they tend to travel slower, at a lower elevation compared to planes taking off which climb more quickly and steeply above ground level.

(h) The proximity of the open water closer to the Airport coupled with the disturbance and displacement of waterfowl from the Ponds increases the potential risk to aviation as birds may be attracted to the open water and disturbed birds may fly more widely before resettling or moving away from the WWTP area.

(i) After consultation with QAC, I considered the situation described above, i.e. the design, development and management of the wastewater treatment plant has resulted in an increased risk to aircraft operations. This risk is heightened by the continuing effects of the planned decommissioning works of Ponds 1, 2 and 3 and the enclosed nature of the Disposal Field making the waterfowl easier to startle.

(j) Movement between habitats within the Whakatipu Basin over the next few years are likely to increase as the decommissioning process continues. Movements will be influenced by

availability of feed, the creation of new ponds, the management and conditions of existing ponds and lakes, including activities within the wastewater treatment area.

(k) In light of these findings, and others, I recommended that given the high level of unsettled waterfowl activity and the displacement of waterfowl into the unanticipated open water habitat of the Disposal Field close to the Airport, that the Disposal Field be drained by percolation into the ground of the Disposal Field and the site be kept dry and free of weeds. It will otherwise attract and hold waterfowl displaced by the Pond decommissioning works. This risk has a seasonality to it, however, a mallard was involved in a bird strike incident at Queenstown Airport in June 2024. The incident was filmed by a passenger and widely covered in the media. It occurred at a time when activity at the ponds is lower, but not nil; refer to Charts 2, 3a and 8 in the NSN Monitoring Report dated 4 April 2025.

Effect of Emergency Works

20. I have been asked by QLDC to address the following three questions:

(a) How draining the Disposal Field will decrease waterfowl activity in and around the disposal field?

(b) Does sludge attract waterfowl/birdlife?

(c) What affect will the placement of rip-rap armouring and localised earthworks on the discharge channel have on waterfowl?

21. I deal with these separately and provide the following comments below.

How draining the Disposal Field will decrease waterfowl activity in and around the disposal field?

22. Waterfowl numbers normally fall through the late autumn and winter months building up again in late spring after the breeding season. The site is very cold in winter and any surface water present in the disposal field may freeze for a period discouraging use by waterfowl. Refer to Charts 14 to 19 relating to the Disposal Field and 20 showing activity of mallard around the ponds in the Designation Area (NSN Monitoring Report dated 4 April 2025).

23. The availability of water in the Disposal Field has enabled some waterfowl breeding as chicks from several species (grey teal, mallard, paradise shelduck and scaup) were all recorded with downy chicks being attended from October 2024 to January 2025 (scaup). Nests would have been in the surrounding area with chicks led to the Disposal Field water after hatching. This suggests use would be likely to continue or increase if left as an open water habitat.

24. Water and berms of the Disposal Field both provide roosting and foraging habitat. Wader species (banded dotterel and pied stilts) have both nested on the berms between the ponded areas of the disposal field, banded dotterel nested on the dry gravel of the disposal field prior to excavation. Pied stilts and banded dotterel nested on the berms surrounding the oxidation ponds prior to the availability of the disposal field habitat. Spur-winged plovers have been recorded to roost on the disposal field margins; although they are more frequently observed to roost on the open Shotover Delta habitat.

25. Draining the Disposal Field will remove the aquatic foraging habitat for waterfowl, and it will remove the water roosting habitat. This reduction in the habitat for waterfowl will lead to a displacement of

the waterfowl that currently come to the disposal field back to the oxidation ponds or other open water habitats within the Basin. This reduces the number of large bodied, flocking birds (waterfowl with higher body mass) in close proximity to the eastern approach flight path (threshold 23) of Queenstown Airport. The reduced number of birds in close proximity to the aerodrome will reduce the risks of bird strike associated with use of this habitat, i.e. the site will not contribute to the risk to aircraft operations.

Does sludge attract waterfowl/birdlife?

26. I monitored bird responses to the desludging of the oxidation ponds for QLDC in 2006-2007. Sludge was excavated and stored in the clean fill area south of the RESA in the site currently managed by Fulton Hogan. The site at that time was surrounded by "seedy weeds" – e.g. broom, gorse, thistles, fathen (*Chenopodium album*), and grasses. Additionally, in 2010 the Frankton Flats had undergone major excavation of the foundation area in the Five Mile retail development area. The stockpiled soil on the Frankton Flats had been oversown with grass to control dust and in the following years had grown an extensive area of thistles, gorse and broom shrubland. Mixed finch flocks numbering in the hundreds developed in response to this habitat. The sludge did not attract the birds until seedy weeds were permitted to grow on it; these were reduced by mowing, spraying and removal of the weeds. The large finch flocks were supported by the habitat conditions on the broader Frankton Flats, this situation has been substantially reduced by development. Although willows on the Shotover Delta retain some autumn finch and silvereye flocks, this has not changed in response to management other than clearance for the disposal field and removal of willows from the wider Delta beyond the Wastewater Designation Area between 2011 and 2013 which reduced the willow habitat.

27. Pond 1 drainage commenced in October 2024. Sludge was dried, retained on site and incorporated into the fill.

28. Attached as **Appendix 9** is a spreadsheet showing the raw counts for Pond 1 prior to and following drainage. The shift in species using the changed habitat is obvious and so too is the reduction in the use of the habitat. As an explanatory note to the raw count data:

    (a) Of the species present, the grey teal and paradise shelduck "puddled" around in pockets of damp sludge as it drained and to investigate surface foraging opportunities but did not remain.

    (b) Pied stilts nested in the drying sludge and ground feeding pied stilts, starlings, chaffinch and California quail fed opportunistically. After stilt chicks became mobile cleanfill was introduced to the site and compacted, foraging opportunities were removed and these birds left the site. Evidence of this can be seen most prominently through the initial increase to 50 starlings foraging on the drying sludge in Pond 1 during January 2025 which later decreased to only 1 in February 2025, 3 in March 2025 and 1 in April 2025.

    (c) Passerine (perching songbirds) counts include birds in the surrounding trees and shrubs.

29. The key to management of sludge within a clean fill area or the future hardstand site is not to allow the soil medium to grow seedy weeds. In my opinion the presence of sludge itself does not attract birds, and the habitat can be managed to minimise the potential for fertile, organic material to provide foraging opportunities.

What affect will the placement of rip-rap armouring and localised earthworks on the discharge channel have on waterfowl?

30. I have not seen plans for this work, and am unfamiliar with the details however, I understand that QLDC are seeking to undertake the following works to ensure ongoing effective operation of the discharge channel which is currently discharging treated wastewater from the Shotover Wastewater Treatment Plant:

    (a) Placement of rip-rap armouring below the discharge outfall, in the bed of the Shotover River. This is proposed to minimise scour of riverbed at the point of discharge and ensure the channel outfall does not erode or become unstable.

    (b) Localised earthworks on a section of the discharge channel, to enable additional conveyance capacity for treated wastewater where necessary. This is expected to involve minor increases in the height of the channel walls upstream and downstream.

31. In my opinion, the works described both in relation to the placement or rip-rap and localised earthworks to increase the height of the channel walls will have no impact on waterfowl habitats provided they are undertaken along the existing channel, do not create additional areas of open, ponded water, and are undertaken outside the breeding season. If rock placement or earthworks (including extraction of gravel for works) are undertaken during the breeding season impacted areas must be surveyed to ensure measures are in place to avoid impacts on nesting and chick rearing. Whilst I have not seen detailed design for these works, their effects on waterfowl, terns, waders and gulls are likely to be inconsequential provided impacts on nesting and chick rearing are avoided during construction and works are confined to the vicinity of the existing channel.

32. Depending on the scale and extent of riprap placement and earthworks, there may be impacts on Threatened or At-Risk migratory species which nest, forage and roost on the Lower Shotover River and Delta, potential impacts on the river habitats will need to be assessed during the design phase of earthworks and riprap placement.

33. I will work with the QLDC team during the design and implementation process for these works in relation to any construction and post-construction potential for impacts on avifauna and matters consequential to the safe operation of aircraft at this site in consultation with QAC. Ultimately, my opinion is that these works, provided they are contained within the close vicinity of the existing channel and not extended into the open riverbed, will not impact waterfowl, terns, gulls and waders and will not conflict the safe operation of the site so long as the works do not create more open water habitats that may attract and concentrate or increase avifauna (waterfowl, terns, gulls and waders) in the Designation Area and do not impact on the braided river habitats of the open riverbed. My opinion in relation to rip-rap armouring and channel earthworks are provisional and may change on review of detailed plans.

Dawn Palmer

Ecologist

Natural Solutions for Nature Ltd

List of Appendices

No.	Document	Date
1	Bird Monitoring Survey Results (by email)	25 July 2023 – 26 July 2024
2	Assessment of Bird Hazards – Shotover Wastewater Treatment Facility	24 June 2024
3	Bird Monitoring Survey Results (by email)	3 October 2024 and 24 November 2024
3A	Updated Charts for Oxidation Pond Monitoring	27 August 2024
4	Bird Monitoring Survey Results (by email)	24 November 2024
5	Bird Monitoring Survey Results (by email)	23 December 2024
6	Bird Monitoring Survey Results (by email)	22 January and 18 February
7	Wildlife monitoring – Shotover Wastewater Treatment Area (Quarterly Report)	4 April 2025
8	Off-Aerodrome Wildlife Survey Summary	20 April 2025
9	Pond 1 Pre and Post Drainage – Raw Data Counts	January 2021 – April 2025

APPENDIX 1

dawn.palmer@xtra.co.nz

From: dawn.palmer@xtra.co.nz
Sent: Friday, 26 July 2024 12:20 pm
To: 'Iain Partington - External'
Cc: 'Simon Mason'
Subject: RE: SWTDA - Bird Survey Update 25-7-2024

Kia ora Iain and Simon,

I undertook the wildlife survey yesterday with the following summary of results:

There are very low numbers of waterfowl on the oxidation ponds (**75** in total comprised of 42 mallard and 33 scaup)
The disposal field had 46 mallards, 9 shoveler, 26 grey teal and 2 paradise shelduck – **83** in total.

I noticed that buddleia has been cut and pasted adjacent to the disposal field, it would be helpful to monitoring if further control could occur between the track and the disposal field.

No large flocks of other species (finches, gulls etc) were present, with the exception of welcome swallows, but finches, thrushes, blackbirds etc are present throughout the Designation Area along with silvereyes, fantails, harrier, tuis and bellbirds.

At least 40 welcome swallows were present at the disposal field – this is the single highest count since 2017. It will be interesting to see whether they are returning the District and will disperse from the site. Large autumn flocks have previously been recorded at the Frankton Marina and Jacks Point.

Noting that the recent bird strike at Queenstown aerodrome involved a mallard; mallards (which fly at night) are present on the ponds, disposal field and surrounding habitat of the River The lake and rivers are running at low levels creating a wide margin for foraging and roosting and at least 50 mallard were counted along the Kawarau River margins on the 24th July while surveying for QAC. I expect that they will currently be moving between these habitats.

We are beginning to see the return of braided river birds and for the Shotover Wastewater areas this will signal the return of banded dotterel (At-Risk – declining) and pied stilts (not threatened) both of which have nested around the ponds and disposal fields.

Looking ahead
With ongoing work between your two projects in this area, I anticipate there will be ongoing disturbances, these cannot be avoided but can be managed by:

- Ensuring movement around the ponds and disposal field are undertaken in a quiet manner with a pattern of movements that the birds remain/ become tolerant of and therefore are less likely to take flight from.
    - i.e. – low speeds,
    - minimise unnecessary driving/ walking around, - driving is preferable (its like a moving hide) and they seem to remain settled if not directly approached,
    - additional points of access – I see the new gate to Pond 2, are there options for additional gates to the dispersal field?

- Ensure crews are alert and responsive to how their activity affects the birds; add this to their toolbox talks with stress on the importance of avoiding activities which startle flocks into suddenly taking flight;
    - Note – mallards, paradise shelduck and scaup seem to take to water when disturbed, shoveler and teal take flight.

- Avoid banded dotterel nests that establish in the dispersal field – identify these as they establish. Tolerance to disturbance changes through the breeding season. I can point these out to the disposal field contractors if needed.

- As the oxidation ponds drain, based on previous discussions with Fish and Game and my ecological assessment for the pond decommissioning work, waterfowl will look for alternative sites to moult through the summer (after the breeding season).

    - There is an opportunity to liaise with Fish and Game and members of the community with ponds to get/ or give a heads up that people may experience an increase in numbers on their ponds – e.g. Lake Hayes, Mooneys Road, Oldham Pond (Hunter Rd), Downey's Pond (Coronet Peak Station), Hogan Gully Road area etc. It would be interesting to know if birds are displaced within the District or whether they leave the District/ Whakatipu Basin. We can reach out to those people to ask them to let us know. If we can document the response, it may be helpful to other District Councils going through a modernisation process.
    - This could also sync up with predator control groups as birds may need protection in those areas and also, where protection is already in place, the groups will understand that the increase in numbers in some of these areas isn't necessarily related to predator control efforts.

- Iain, I'm going to look into interspecies tolerance with respect to whether they will tolerate each other at higher densities on the other ponds as Pond 1 is drained or whether they are likely to move from the area, roost at the drained site or move to the dispersal fields.
- We may need additional monitoring at the two sites when the moulting flocks start to return later in the season.

Kind regards
Dawn

Dawn Palmer
Ecologist
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From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Tuesday, May 7, 2024 5:20 PM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Dawn

Thanks for the update. Interesting on the numbers of shovellers. There must be something about our site that they like !

Will continue to brief the site team. We are still a number of months away from draining Pond 1, but I will let you know in plenty of time, just to check if we need to take any precautions before doing so. Following that, and some air drying of the residual sludge, we will start earthworks in the drained pond. This will obviously be closer to Pond 2 than our current works, so we should review the methodology and see if there is any advice on how to mitigate the impacts.

Thanks
Iain

Iain Partington | Project Manager | Property & Infrastructure
Queenstown Lakes District Council
M: +64 27 487 0364
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QUEENSTOWN LAKES DISTRICT COUNCIL

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Tuesday, May 7, 2024 3:33 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Iain,

Waterfowl numbers continue to diminish, but it also appears that the flocks present are using the disposal field to the south of the ponds as well.

They continue to appear well settled on the ponds and appear to be tolerating the works well. Please advise if the working crews have experienced any behavioural changes to the contrary and remind them to move slowly around the margins of the ponds.

At this time of year, the duck hunting season has just opened and the waterfowl can become more sensitive to percussive noises with some (small numbers) temporarily returning to the ponds before leaving for their breeding habitat.

I had an interesting conversation with David Priest from Fish & Game who noted that our shoveller count appears to be near equivalent to 2/3rds of the Otago pre-breeding count.

We have no data regarding where shoveler may be coming from to join the post-breeding moulting flock on the Shotover Oxidation ponds. There have been no comprehensive studies on movement of the population since the 1970s. However, studies have shown the species to be highly mobile and responsive to El Nino and La Nina conditions which we have experienced over the past few years.

Kind regards
Dawn

Dawn Palmer
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SITEWISE GREEN 2023/24

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Tuesday, April 2, 2024 9:37 AM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Dawn

Thanks for the update.

No problem with you sharing the date with Fish & Game.

Many thanks
Iain

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Sunday, March 31, 2024 9:40 AM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Iain,

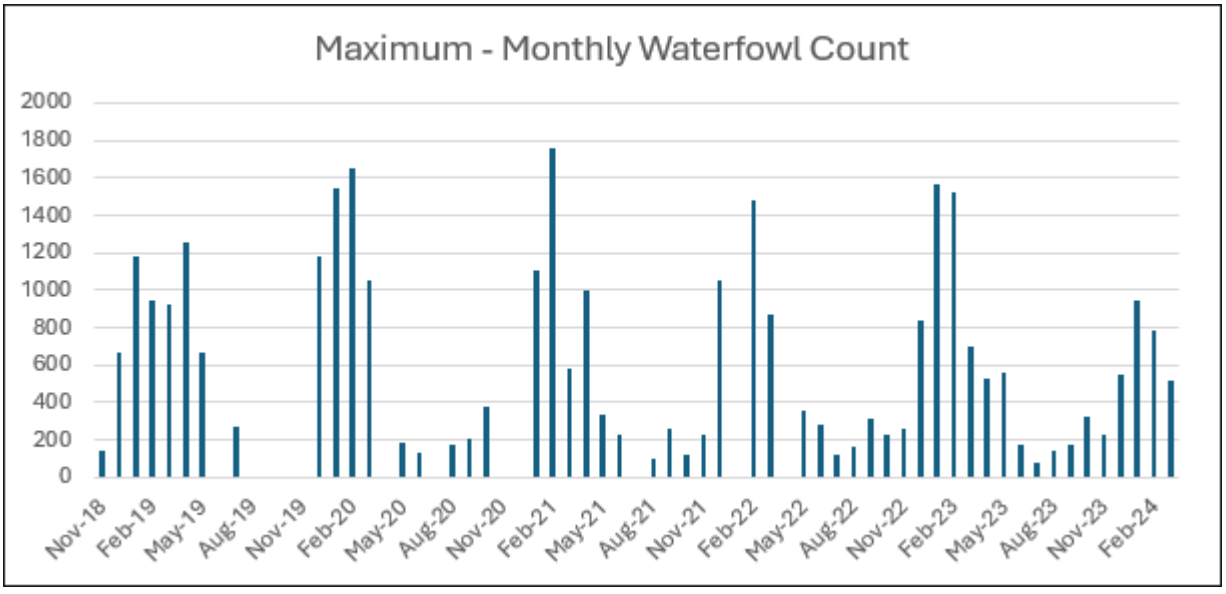
The oxidation pond flocks seem to have been smaller this year and I'll check the data but the quality of pond 1, seems to be holding more birds this season with the algal mat providing some foraging habitat for pied stilts.

Throughout the Shotover Waste Water Treatment Designation Area, finch flock remain small, some paradise shelduck, mallards and grey teal are roosting on the disposal field. Pond 3 – north bay – continues to hold the majority of waterfowl as they moult.

Overall, the total waterfowl flock has been smaller this year, the only species that has increased in Grey Teal. This may be due to a wetter spring/ summer compared to the dry La Nina summers over the past three years.

Waterfowl do not appear to have been disturbed by the progress of works.

Are you happy for me to share the waterfowl counts with Fish and Game? See attached spreadsheet.



Kind regards
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Tuesday, January 9, 2024 8:51 AM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Dawn

Happy New Year ! I hope you had a wonderful and relaxing break.

Thank you for the December report. I will be sure to pass on the request to drive slowly around the ponds.

Regards
Iain

Iain Partington | Project Manager | Property & Infrastructure
Queenstown Lakes District Council
M: +64 27 487 0364
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QUEENSTOWN LAKES DISTRICT COUNCIL

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Sunday, December 31, 2023 4:57 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Iain,

I undertook the survey on 22nd December.

Waterfowl numbers are continuing to increase.

Please talk to your contractors about driving slowly around the ponds so as not to flush them into the air.

Paradise shelduck are moulting so won't be as able to fly, but this will be variable within the gathering flock as they progress through their moult.

Pond 1 – Mallard (**4**), Grey teal (**4**), Pied stilts (**11**) – feeding out on the algal mats on the water

Pond 2 – Paradise shelduck (**8 Ad + 7 chicks)**, Scaup (**4**), shoveler (**2**), mallard (**47**), grey teal (**30**), pied stilt (**1**),

Pond 3 – North – Paradise shelduck (**315 Ad + 13 downy juvenile)**, Scaup (**13 + 3 chicks**), shoveler (**95**), mallard (**21 + 2 ch**), grey teal (**51 Ad + 5 chicks**),

Pond 3 – South – Paradise shelduck (**2 Ad**), Scaup (**31 Ad + 5 juvenile**), shoveler (**27**), mallard (**32 Ad + 5 chicks, + 2 juv**), grey teal (**60**), Coot (**1**)

Happy New Year,
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Monday, December 4, 2023 10:05 AM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: Re: SWTDA - Bird Survey Update 25-8-2023

Hi Dawn,
Thanks for the update. The plant is having a few challenges, which seems to be creating odour at the north end. Currently not coming from our construction works. We will be sending out some comms this week anyway in advance of the pond decommissioning works, so this will help at least get some info out.

Cheers
Iain

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Monday, December 4, 2023 8:44:07 AM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Iain,

Just a heads up, the Quail Rise/ Tucker Beach Facebook page is picking up several comments regarding complaints of odour – likely from the ponds.
I drove over the SH6 bridge several times over the weekend and had to roll my windows down after passing through the zone of odour to clear the car of the smell so its pretty strong at the moment.

Not sure if there's anything you can do but you may wish to consider front footing the issue if there is.

Kind regards
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Sunday, December 3, 2023 6:14 PM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Dawn

Thank you for the update.

Regards
Iain

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Sunday, December 3, 2023 1:15 AM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Iain,

I undertook the survey on the 21st November. A summary of numbers found on the ponds is provided below.

Pond 1 – Mallard (**7**), Pied stilts (**4**) – feeding out on the algal mats on the water

Pond 2 – Paradise shelduck (**10 Ad + 3chicks)**, Scaup (**5**), shoveler (**2**), mallard (**9)** grey teal (**5**), pied stilt (**1**),

Pond 3 – North – Paradise shelduck (**3 Ad + 4 chicks)**, Scaup (**16**), shoveler (**27**), mallard (**17**), grey teal (**22**),

Pond 3 – South – Paradise shelduck (**2 + 18 chicks**), Scaup (**73**), shoveler (**27**), mallard (**9**), grey teal (**104**), Coot (**2),** spur-winged plover (**2**)

Grey teal numbers are building.

The waterfowl numbers are otherwise low due to birds still breeding, chicks are still being seen on the ponds.

Kind regards
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Thursday, November 2, 2023 8:39 AM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Dawn
Thanks very much for the update.

Things seem to be going well on site. We will be starting to dredge the sludge out of Pond 1 (northern pond) around mid-November, which will take 2 months approximately. This is using a floating dredge. It is likely that we won't start draining the water out of it until February, but I will keep you posted on timing.

Many thanks
Iain

Iain Partington | Project Manager | Property & Infrastructure
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QUEENSTOWN LAKES DISTRICT COUNCIL

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Monday, October 30, 2023 6:35 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Good afternoon Iain,

I surveyed the oxidation ponds and the surrounding Designation Area on the 18th October. The number of waterfowl are about as expected for this time of the year with a bit of an uptick in the Scaup numbers.

Chicks are starting to appear so breeding is occurring but not on Pond 1. I also noticed Pond 3 (north) was looking quite green yesterday.

No banded dotterels were seen around the Ponds; they are nesting and chicks were present in the Disposal Field; the pied stilts also appear to have at least 1 nest in the Disposal Field.

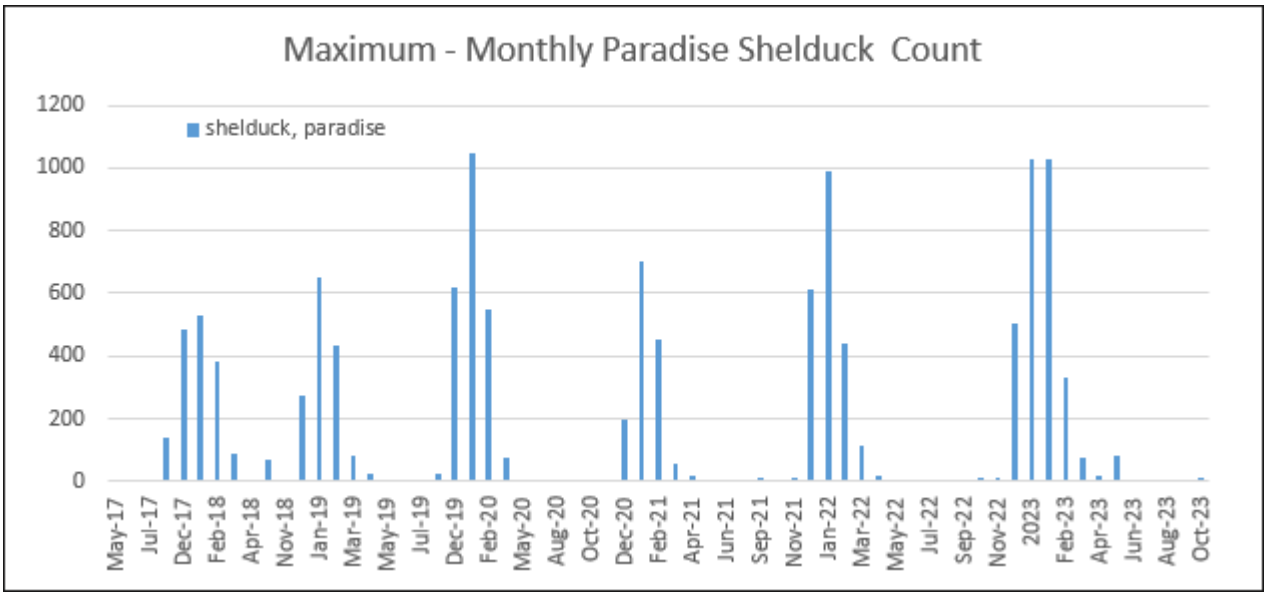
Below is a summary of numbers found on the ponds and a look at general trends in numbers for all the ponds combined.

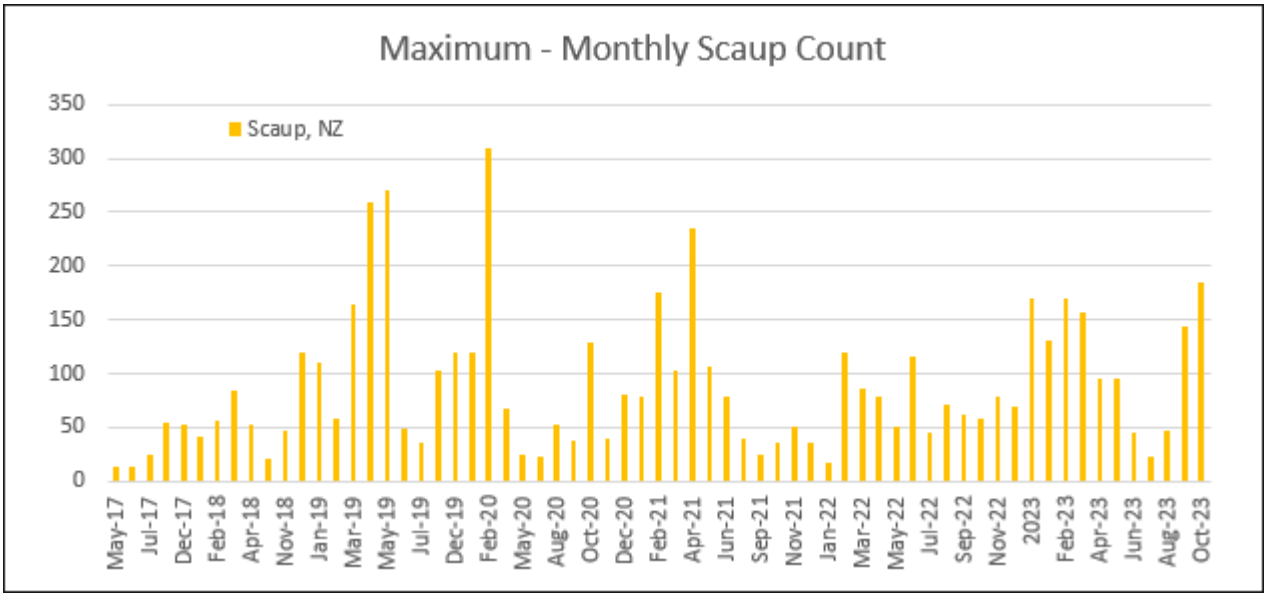
Pond 1 – Paradise shelduck (**2**)

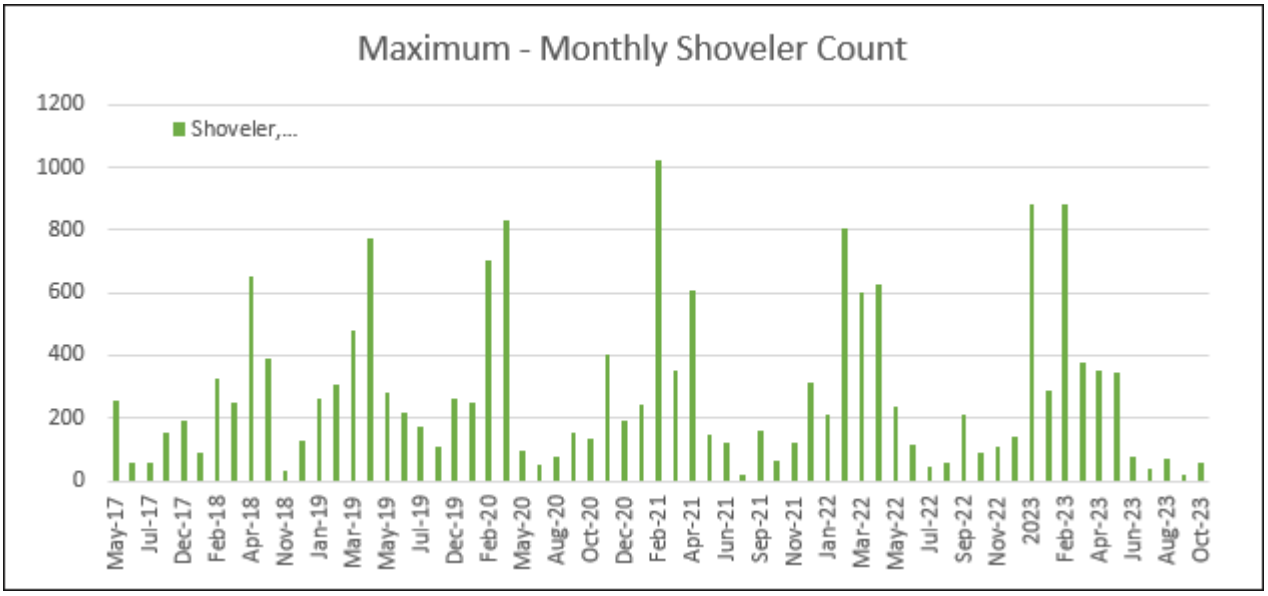
Pond 2 – Paradise shelduck (**13)**, Scaup (**15**), shoveler (**12 Ad + 6 chicks**), mallard (**4 Ad + 2 chicks**), grey teal (**5**), pied stilt (**1**),

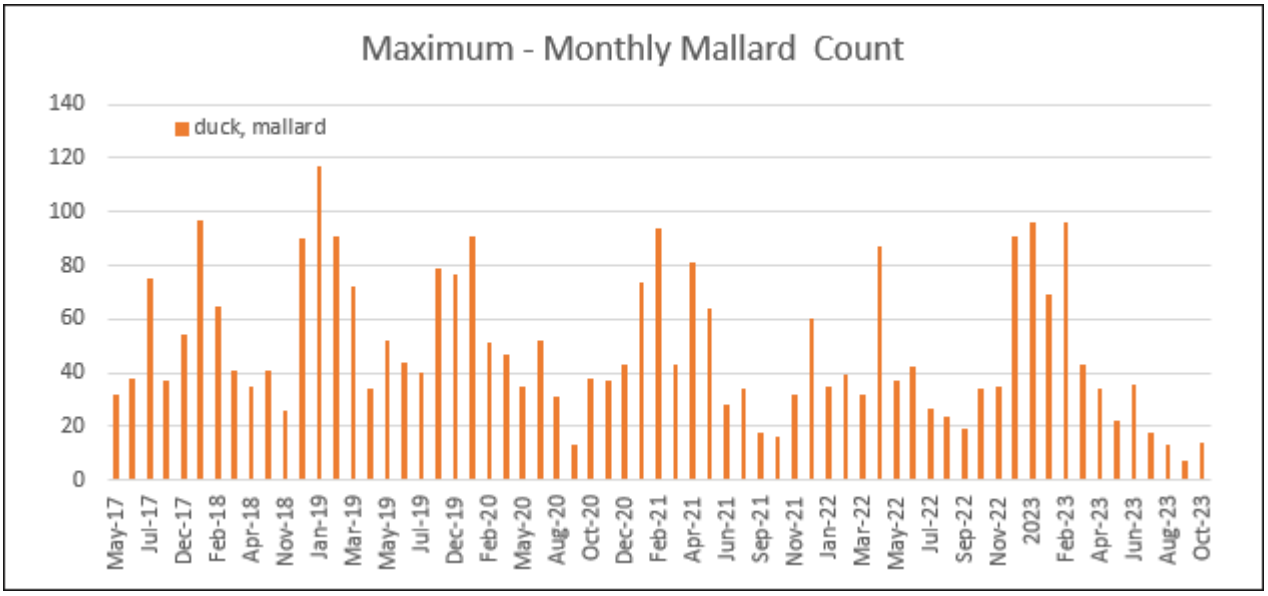
Pond 3 – North – Paradise shelduck (**4),** Scaup (**9**), shoveler (**58**), mallard (**2**), grey teal (**23**), Coot (**2**), pied stilt (**2**),

Pond 3 – South – Paradise shelduck (**2 + 8 chicks**), Scaup (**185**), shoveler (**21**), mallard (**14 Ad + 7 chicks**), grey teal (**50 + 7 chicks**), Coot (**4),** pied stilt (**2**)




Maximum - Monthly Scaup Count
Scaup, NZ
350
300
250
200
150
100
50
0
May-17
Jul-17
Dec-17
Feb-18
Apr-18
Nov-18
Jan-19
Mar-19
May-19
Jul-19
Dec-19
Feb-20
May-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Sep-21
Nov-21
Jan-22
Mar-22
May-22
Jul-22
Sep-22
Nov-22
2023
Feb-23
Apr-23
Jun-23
Aug-23
Oct-23


Maximum - Monthly Shoveler Count
Shoveler,...
1200
1000
800
600
400
200
0
May-17
Jul-17
Dec-17
Feb-18
Apr-18
Nov-18
Jan-19
Mar-19
May-19
Jul-19
Dec-19
Feb-20
May-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Sep-21
Nov-21
Jan-22
Mar-22
May-22
Jul-22
Sep-22
Nov-22
2023
Feb-23
Apr-23
Jun-23
Aug-23
Oct-23


Maximum - Monthly Mallard Count
duck, mallard
140
120
100
80
60
40
20
0
May-17
Jul-17
Dec-17
Feb-18
Apr-18
Nov-18
Jan-19
Mar-19
May-19
Jul-19
Dec-19
Feb-20
May-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Sep-21
Nov-21
Jan-22
Mar-22
May-22
Jul-22
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2023
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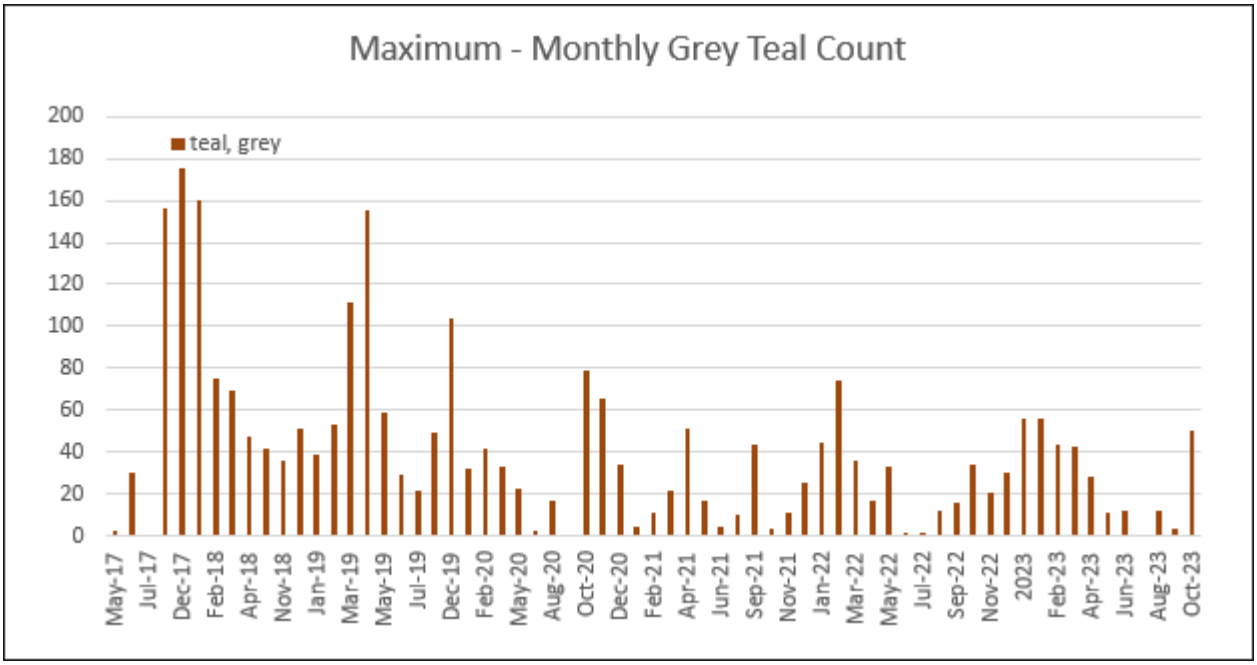
Oct-23



Kind regards
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Tuesday, September 26, 2023 9:51 AM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Thanks Dawn, yes the team are making good progress

Cheers
Iain

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Monday, September 25, 2023 4:43 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Some photos from today – progress

Dawn Palmer
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467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Monday, September 25, 2023 4:21 PM
To: 'Iain Partington - External' <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Iain,

I surveyed today; waterfowl numbers are about the same but shoveler and teal numbers are down and scaup numbers are up. Most are on the 3rd pond away from the decommissioning work.

The Shotover and Kawarau Rivers are still full and there are wet paddocks all over the Wakatipu Basin. Birds may be out foraging as well as some possibly/ likely displaced by the work in Pond 1.

The large flocks of Scaup and Coot have left Frankton Arm and Scaup numbers have increased on the ponds.

Pond 1 – no waterfowl.

Pond 2 – Paradise shelduck (**-**), shoveler (**-**), mallard (**7**), grey teal (**1**), black-backed gulls (-), black-billed gulls (**-**)

Pond 3 – North – black-billed gulls (**9**), scaup (**12**), grey teal (**3**), shoveler (**17**), mallard (**14**), Coot (1), 9 SIPO flew overhead downstream.

Pond 3 – South – Scaup (**143**), mallard (**3**), grey teal (**4**), Coot (**1**), Paradise shelduck (**2**), shoveler (**20**), black-billed gulls (**3**) – flew over,

2 pairs of banded dotterel and 7 pairs of pied stilt are settled in the Disposal Field.

Kind regards
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Thursday, August 31, 2023 6:14 PM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Dawn
Thanks for the update.

My contract isn't dealing with the disposal field, but I will forward this on to those I think are handling it to make sure they are aware. I'll see if I can get an update on the programme of works.

Thanks
Iain

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Tuesday, 29 August 2023 12:15 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: SWTDA - Bird Survey Update 25-8-2023

Hi Iain,

I undertook the survey last Friday 25/8/2023. The willows have been felled and mulched with residual tidy up work underway. A digger was present on a large mulch pile north of Pond 1.

Black-billed gulls, banded dotterels, South Island pied oystercatchers (SIPO) and black-fronted terns are back in the habitats on the surrounding the Lower Shotover River.
Pied stilts (not threatened but absolutely protected) are also back.
Waterfowl numbers are increasing.

Pond 1 had large algal mats on the surface, the baffles were running.
A pied stilt was seen flying around, pond 1 showing interest in the northern margin but was not observed to settle. There was otherwise very little activity on Pond 1 – 4 mallards, 3 black-billed gulls, silvereye ground feeding at the margins.

Pond 2 – Pied stilt – flew to Pond 1. Paradise shelduck (**3)**, shoveler (**6**), mallard (**10**), grey teal (**2**), black-backed gulls (1), black-billed gulls (**25**) are roosting on the berm between pond 2 and 3 (they are therefore recorded for Pond 3).

Pond 3 – North – The 25 black-billed gulls, scaup (**47**), grey teal (**10**), shoveler (**68**), mallard (**13**), 1 SIPO flew overhead.

Pond 3 – South – A kingfisher (not threatened but absolutely protected) was heard in the willows between the pond and the River. Scaup (**36**), mallard (**4**), grey teal (**12**).

Elsewhere stilts and dotterels were heard on the **Disposal field**. I therefore undertook a survey along the eastern fence line to determine use of that area by those species. There were **12** pied stilts and **2** male banded dotterel behaving territorially, which indicates potential breeding (males build the nest scrape).
Please advise the contractors working in the disposal field that it is an offence under the Wildlife Act to disturb the nesting of these species. Do you know what the work program is in that area? The stilts and dotterels both hatched chicks in there last year. They are obviously still settling in so it would be good to see where they settle and give them space.

I can arrange to put a few more predator traps in along the eastern fence – we already have them along the Queenstown Trail in that area.

Kind regards
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Tuesday, July 25, 2023 2:59 PM
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: SWTDA - Bird Survey Update

Hi Dawn
Thank you very much for the update.

As an update from me, the McConnell Dowell team will commence removal of the trees at the north end of Pond 1 tomorrow (26th). This will involve felling of all trees, mulching of branches, and logging of the trunks.

Regards

Iain

From: Dawn Palmer <dawn.palmer@xtra.co.nz>
Sent: Tuesday, 25 July 2023 2:48 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: SWTDA - Bird Survey Update

Hi Iain,

JULY 2023 MONITORING – SWTDA - SUMMARY

I thought I'd send a quick email after each monitoring visit so you know what's happening for the birds down there as the project tracks.

The pond counts are at their winter low with Scaup (28), Mallards (55) and Shoveler (38) on the ponds; the majority are on the 2nd and 3rd pond, only 13 mallards on the 1st pond and 1 scaup. Scaup look to have their breeding plumage on and may look to breed on the berm in the 3rd pond.

A flock of about 50 South black-backed gulls was roosting at the ponds today (berm between pond 1 and 2). They are mobile and will be moving between the river, wet paddocks and the transfer station. They are predatory on other nesting birds, they are not protected by the Wildlife Act.

No flocks of small birds were seen, most common birds noted were introduced (chaffinch, song thrush, sparrows, blackbirds, dunnock) with occasional natives tui, bellbird, silvereye, fantails and grey warblers south of the ponds in the willows and buddleia weeds. Welcome swallows were foraging over the 3rd pond and disposal field.

2 South Island pied oystercatchers (SIPO) flew over the site from the River heading towards the flats south of the Kawarau River/ Airport area. This marks the arrival of our seasonal migrants. SIPO (At-Risk: declining) usually lead the way, and have probably been here for a few weeks; I also noted that the lead flock of black-billed gulls (At-Risk: declining) was seen on Frankton Beach on the 10th July. The dotterel and black-fronted terns (Threatened: endangered) will no doubt be following shortly. Pied stilts and banded dotterel (At-Risk declining) have nested around the ponds and disposal field in the past (dotterels on berm between 1 and 2, 2 and 3 and along the margins of pond 3, disposal field); pied stilts have likely nested near Pond 1 &/ 2 and the disposal field. Noted that the North-east corner of Pond 1 was mown with little to no sheltering cover on it.

Rabbit density continues to be very high on the escarpments to the south. The attract hunting harriers to the eastern runway area. I am aware that QLDC has a rabbit control operation planned for July/ August.

Kind regards
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

Natural Solutions *for Nature* Ltd

MEMO

To: Iain Partington | Project Manager | Property & Infrastructure | QLDC

From: Dawn Palmer, Natural Solutions for Nature Ltd

Date: 24 June 2024

Subject: Assessment of Bird Hazards – Shotover Wastewater Treatment Facility

Background of the Sewage Treatment Works Designation Area

Proposed District Plan

Sewage Treatment Works Designation (STWDA) is identified in the Proposed District Plan (ePlan) Chapter 37: C.33 Designation # 46)[1] and RM 970647. The Designation specifies the conditions under which the Sewage Treatment Works Designation Area (STWDA) must be managed. The conditions applicable to this report have been copied below.

Condition 11 of the STWDA designation specifies that:

> *The Requiring Authority shall design, develop and manage the public work so that it does not attract any birds that are hazardous to aircraft or may endanger aircraft operations. The bird species that have been observed at the airport and which may be hazardous to aircraft are gull, oyster catcher, hawk, spur-wing plover and duck.*

Condition 12 of the STWDA designation requires that:

> *6 months prior to any work being carried out in accordance with the Outline Plan, monitoring of bird activity shall be undertaken by a suitably qualified person experienced in wildlife observation to determine a baseline of bird activity. Subsequently, from the date any work is carried out in accordance with the Outline Plan, the site and surrounding area shall be monitored monthly by a suitable qualified person experienced in wildlife observation and approved by the Territorial Authority. This person will monitor bird activity in and around the site as an impartial observer to enable any increased bird activity as a result of the work to be identified.*

Introduction

Natural Solutions for Nature Ltd (NSN) has been engaged by Queenstown Lakes District Council ("Council") to undertake impartial surveys of wildlife activity within the SWTDA. NSN undertakes monthly surveys at predetermined sites and has been undertaking these surveys on a consistent and continuing basis since May 2017, seven years.

Bird Strike Monitoring and Reporting by CAA

The CAA publishes Bird Incident Rate Reports each quarter for each aerodrome with a comparison to the combined national data. The data is reported as:

- On-Aerodrome 12-Month Moving Average Strike Rate per 10,000

[1] https://districtplan.qldc.govt.nz/proposed/rules/0/243/0/33404/0/103

- On-Aerodrome Quarterly Strike Rate per 10,000 Aircraft Movements
- Strike rates per 10,000 Movements – All Monitored Aerodromes (12 month moving averages) – Strikes On/ Off Aerodrome.
- Strike rates per 10,000 Movements – All Monitored Aerodromes (12 month moving averages) – Strikes – Bird Size

The quarterly CAA Bird Incident Rate Reports also assigns a risk category for each aerodrome based on the most recent 12-month average bird strike rate per 10,000. The categories are copied below:

Table 1 Strike Risk Category

Low	where the rate is less than 5 strikes per 10,000 movements.
Medium	where the rate is not less than 5 strikes per 10,000 movements but less than 10 strikes per 10,000 movements.
High	where the rate is not less than 10 strikes per 10,000 movements.

An incident trend category is also assigned for each aerodrome based on a straight-line approximation to the 3-year history of bird strike rates. The trend categories are copied below:

Table 2 Strike Incident Trend Category

Trending down	Where the trend graph has a slope of less than -0.059 strikes per 10,000 movements
Constant	Where the trend graph has a slope of between -0.059 and +0.059 strikes per 10,000 movements
Trending up	Where the trend graph has a slope of more than +0.059 strikes per 10,000 movements

Aerodromes maintain their own records relating to species present on the aerodrome and pilots report incidents to CAA. Airports are invited to supply data to the CAA. Not all strikes occur within Airport wildlife management areas.

Bird Monitoring in the SWTDA

Five Minute Bird Counts and stationary counts are undertaken each month by Natural Solutions for Nature Ltd (NSN) at 16 sites within the SWTDA.

Table 3 Distribution of Bird Count Stations (sites)

Area	Number of Sites
The oxidation ponds	4
Willows/ Disposal Field/ Lowest gravel flats	7
Frankton Flat Escarpment/ RESA/ Land Fill site/ stormwater draining from Hawthorn Drive & a ground disposal area	5

The four oxidation pond sites are analysed separately from the other sites which are combined for the analysis in this report. These counts are stationary counts that take longer than 5 minutes when the large flocks are present. Flocks are generally settled when counted.

The Queenstown Lakes District Council is currently undertaking a staged decommission of the oxidation ponds and plans to replace these ponds with a second, additional processing plant, calamity and stormwater ponds. Works are currently underway.

Treated wastewater is also discharged to a 4-hectare ground disposal field established on the Kimiākau/ Shotover Delta, however, this disposal field has required additional works and at the time of writing is substantially excavated with portions reinstated.

The disposal area is now monitored by a transect count with some species in the disposal field heard but not seen from three count stations on the Queenstown Trail immediately adjacent to the disposal area, the central most being Site 2.2A. Views of the disposal area have become obstructed by maturing buddleia requiring the transect count on the eastern margin. Release of views over the disposal field from the Queenstown Trail would remove the need to undertake the transect count.

This report provides information regarding the results of bird counts with a focus on species historically involved in strikes as reported by the Queenstown Aerodrome staff.

Queenstown Airport Corporation Ltd (QAC), like all aerodromes in New Zealand and abroad, hold their own on aerodrome bird strike, incident, and wildlife monitoring data. This is a requirement of the CAA and forms part of their Risk Management Assessment and response plans.

QAC also undertakes off aerodrome monitoring at 21 sites within the landing and take-off areas extending approximately 5 nautical miles from the aerodrome.

Off-aerodrome monitoring has been undertaken by NSN under contract to QAC since April 2021. This effort provides QAC with a broader understanding of the relationship between bird activity seen on aerodrome and the presence and indicative trends within the broader approach/ take off areas that may contribute to off aerodrome strikes or near strikes.

The combined monitoring of QLDC in the SWTDA and the broader Local Wildlife reporting using an Airport Reporting Inspection System for QAC, enables bird activity in the SWTDA to be well observed.

Queenstown Airport – Strike/ Near Strikes

Chart 1 below illustrates the reported Queenstown aerodrome strike rates per 10,000 aircraft movements as a moving average per quarter over the past three years.

Chart 2 provides a more specific assessment of reported strike rates per 10,000 aircraft

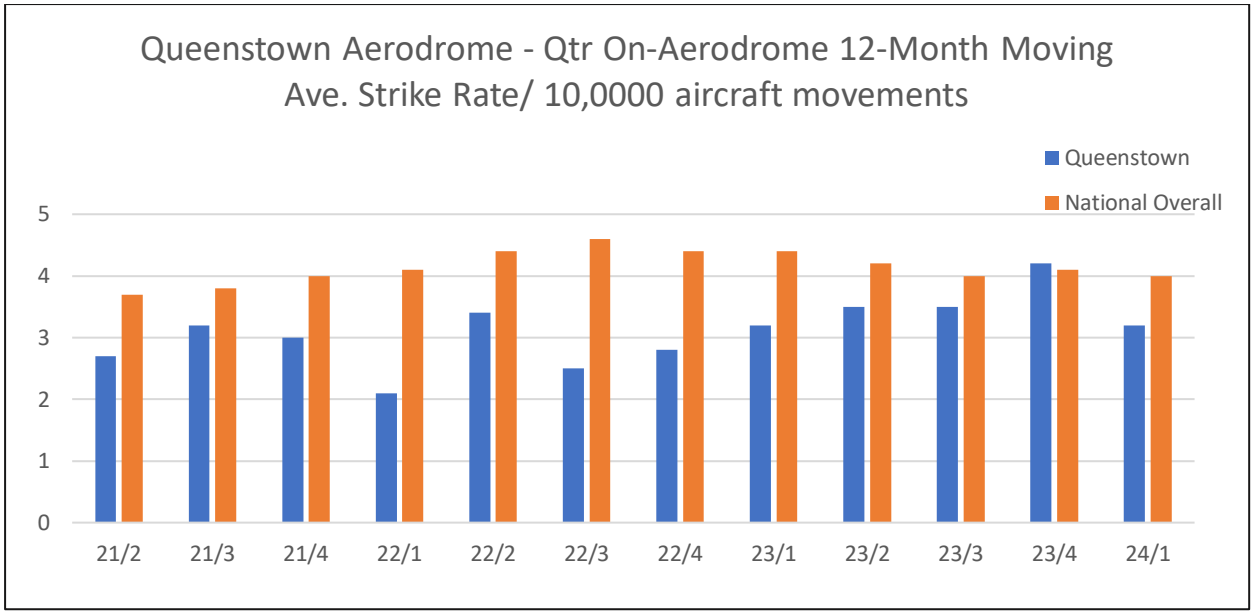

Chart 1: On-Aerodrome 12-Month Moving Average Strike Rate – Per Quarter for Queenstown and the National (overall) combined rates for all aerodromes in New Zealand.

Source: CAA – Bird Incident Rate Report January to March 2024.

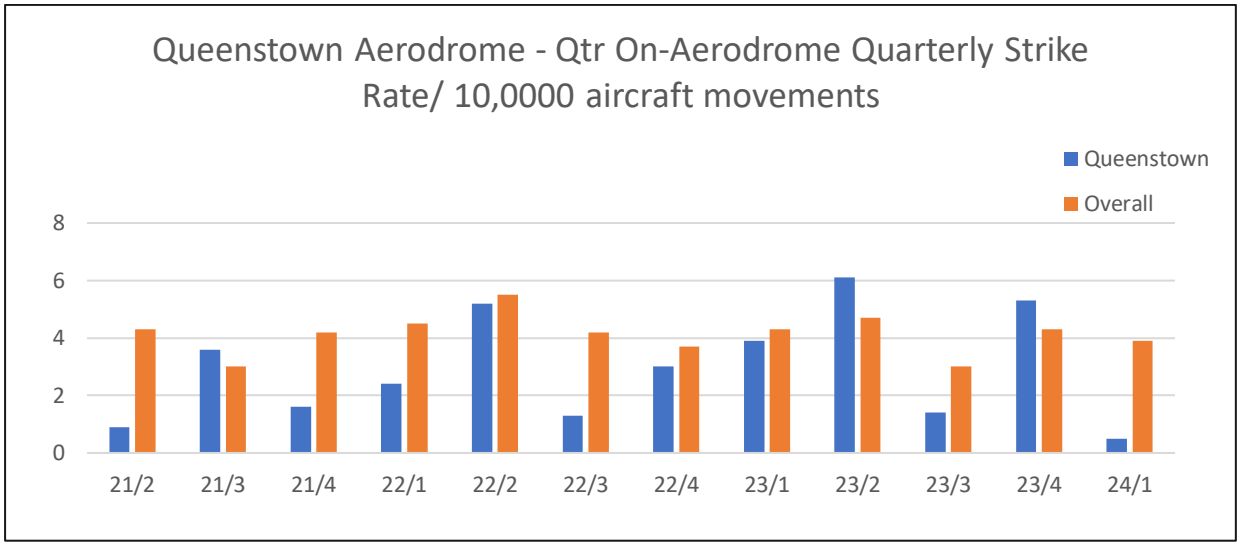

Chart 2: On-Aerodrome Quarterly Strike Rate for Queenstown and the National (overall) combined rates for all aerodromes in New Zealand.

Source: CAA – Bird Incident Rate Report January to March 2024.

Many of New Zealand's Aerodromes are located adjacent to water treatment plants, estuaries, rivers, coastal areas, farmed or urban land and landfill sites. The juxtaposition of these habitats can bring avifauna into contact with aviation activities.

The Queenstown Aerodrome is positioned on highly productive soils, on a terrace bounded by the shallower portion of the Frankton Arm of Lake Whakatipu, the Kawarau River to the south and east, the Shotover/ Kimiākau River to the northeast and east. The Shotover Oxidation ponds and wastewater disposal field are located along the

Shotover/ Kimiākau River northeast among willows and the braided river delta. Gravel extraction occurs on the Shotover River delta. Sports fields, shopping areas and residential development are progressively infilling the area known as the Frankton Flats surrounding the Aerodrome. Further afield, is a mixture of farmland, the Remarkables mountain range, a mixture of rural and residential land under continuing and significant development pressure.

The CAA AC139-16 – Wildlife Hazard Management at Aerodromes advisory circular dated 7 October 2011[2], identifies species that tend be involved in reported bird incidents, they are:

"Australian harrier (hawk) • finch (chaffinch, greenfinch and goldfinch) • magpie • mallard • paradise shelduck • pigeon • South Island pied oystercatcher • southern black-backed gull • sparrow • spur-winged plover • starling".

The three (3) species groups historically most involved in bird strikes at Queenstown Airport are plovers, sparrows, and finches; followed by "unknown species", starlings and black-fronted terns[3].

The eBird records[4] for spur-winged plovers in the Whakatipu Basin show their distribution to be strongly associated with the Lower Shotover River and the damp paddocks of the surrounding Whakatipu Basin and land south of the Kawarau River. They have been detected by the surveys undertaken in the SWTDA and broader wildlife surveys undertaken within the Basin on behalf of QAC.

Sparrows tend to be more abundant near urban environments but may join mixed species flocks in Autumn and Winter.

Finch species can form mixed species flocks, particularly in Autumn and may include sparrows, redpoll and yellowhammer which appear similar when seen in flocks and may be grouped as "finches" or "sparrows" when reported by pilots. They also tend to exhibit similar behaviour when ground feeding on seeds and within wasteland weeds. They have therefore been grouped together in the assessment below as "Finches and Introduced songbirds". Finches are often seen moving from willows, trees and shrubs to ground feeding sites around the Aerodrome and Frankton Flats where wasteland weeds (lupin, broom, thistles, fathen and the like) are available or where grass has been cut or produced seed. "Finches" may form large rolling, ground feeding flocks which take to the air when startled.

Starlings are medium sized birds that form large flocks that roost in structures and trees in the Whakatipu Basin. They can travel large distances between communal roost sites and foraging areas. They disperse during the day and after the breeding season, gather to communal roost sites.

The "unknown" bird strike category does not enable a comparison with other species recorded in the SWTDA. These birds are either not seen prior to impact or not recognisable after impact or not seen for long enough to enable an identification, or the pilots are insufficiently familiar with local birds or birds in general to identify the birds

[2] https://www.aviation.govt.nz/assets/rules/advisory-circulars/ac139-16.pdf
[3] **Source:** Queenstown Airport Corporation, email dated 12/8/2021
[4] (https://ebird.org/map/)

seen while otherwise busy landing or taking off in an aircraft. Some incidents may occur after civil twighlight or when dark preventing identification.

The CAA Bird Incident Rate Reports, provide summarised data on strikes and near strike incidents on and off aerodromes and the size of birds involved using the combined data from all New Zealand aerodromes. Charts 3 and 4 have been copied from the CAA Bird Incident Rate Reports January to March 2024; they indicate that on a national basis, most strikes and near strikes in New Zealand occur on Aerodrome and involve small to medium sized birds.

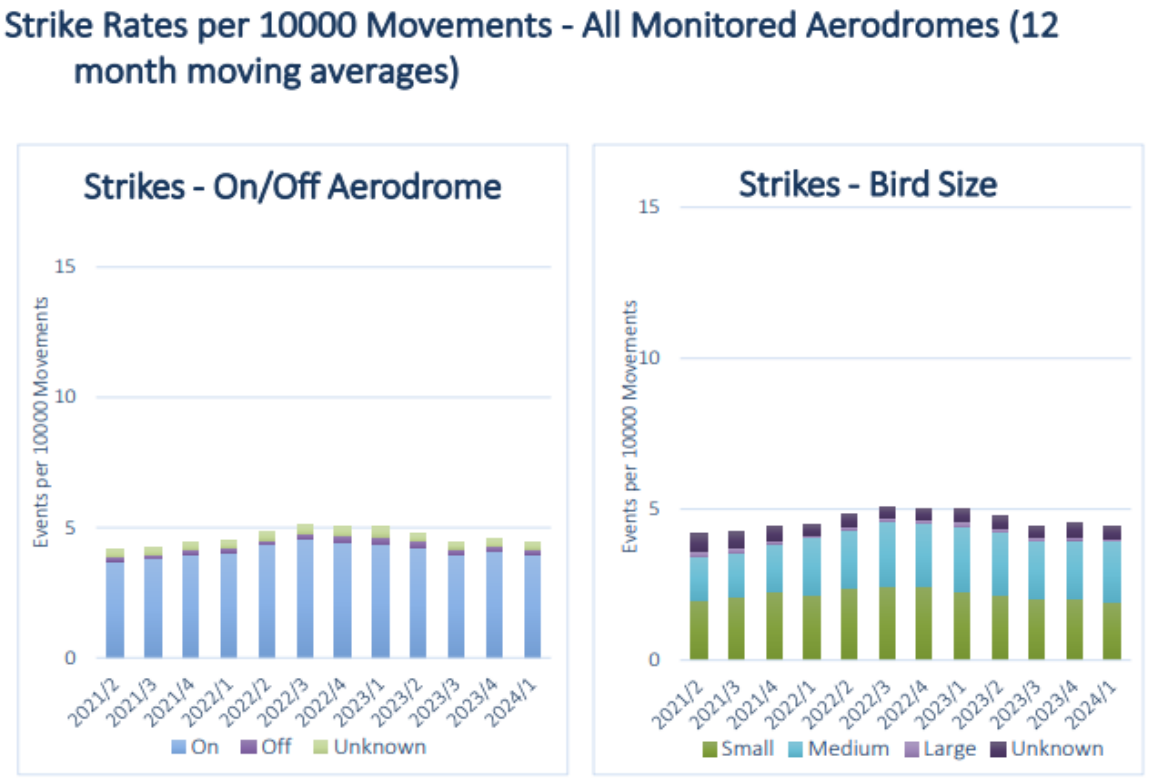

Chart 3: National On/ Off Aerodrome Strike Rates and size of birds involved – 12 month moving averages

Source: CAA – Bird Incident Rate Report January to March 2024.

The CAA Bird Incident Reports do not provide the criteria used to define the size of birds classified as small, medium and large for the purpose of their quarterly bird hazard reports. In this report, NSN has modified its definition of size criteria included in previous reports by adopting the Landcare Research Garden Bird Survey for small, medium and large birds[5] monitored in the SWTDA.

The majority of the bird counts, excluding counts around the oxidation ponds and disposal field, recorded small-bodied birds over the past 3 years, refer to **Chart 5** (<15cm).

[5] https://gardenbirdsurvey.nz/identification/

Small-bodied birds included in the SWTDA counts are silvereyes, welcome swallows, redpoll, goldfinch, chaffinch, dunnock and grey warblers. These are the “sparrows and finches” likely to be reported by QAC as problematic.

Medium-sized birds (between 15-30cm) recorded in the SWTDA counts include bellbirds, blackbirds, fantails, skylarks, banded dotterels, greenfinch, kingfisher, NZ pipits, starlings, black-fronted terns, song thrush, tui and yellowhammer.

Large-bodied birds (>30cm) include waterfowl, shags, gulls, falcon, harrier, herons, magpies, spur-winged plovers, black swans and South Island pied oystercatchers.

Chart 6 illustrates the that the average number of birds recorded in each monthly count (excluding counts from the oxidation ponds and disposal field) is relatively small. Small birds recorded tend to be in small flocks flying within and between the cover of willows. Large-bodied birds may be transiting through the area overhead moving to or from the oxidation ponds or to or from the river to or from foraging areas near the Shotover or Kawarau River, Frankton Flats, Frankton Arm or surrounding farmland. Medium sized birds tend to be in or foraging under willows, on or over the delta. Skylarks tend to sing aloft for long periods before returning to the cover grass cover.

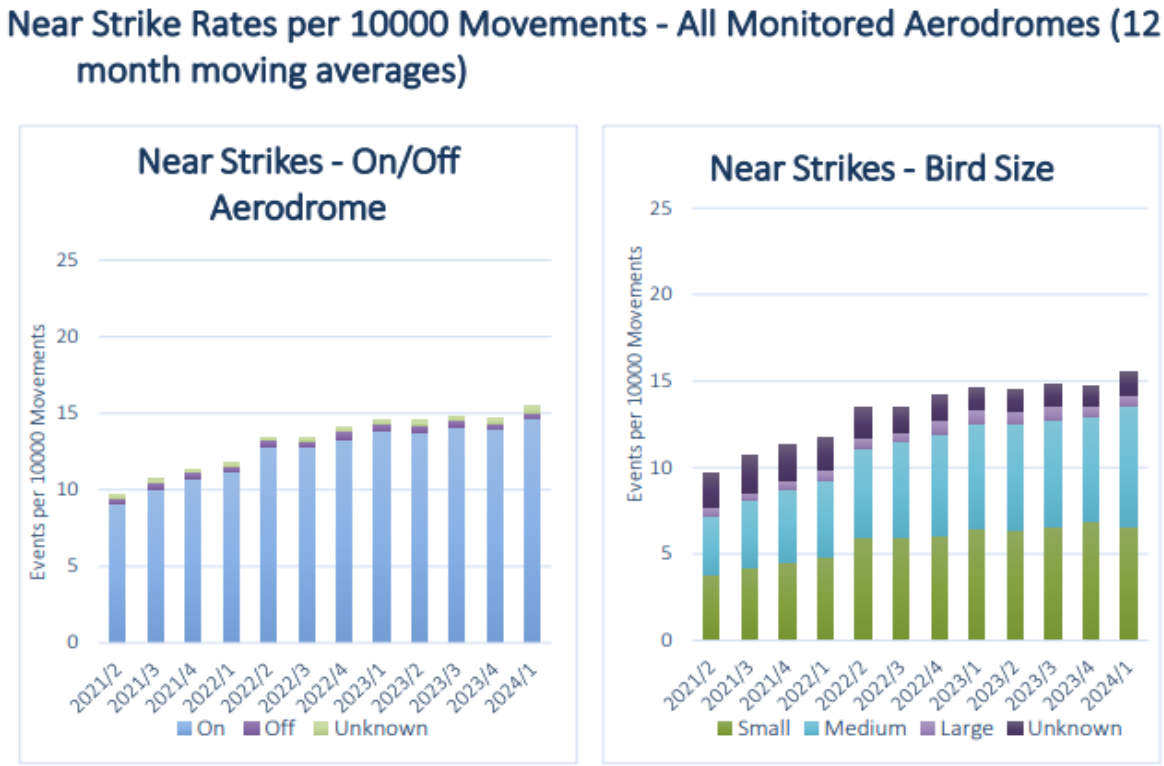

Chart 4: National On/ Off Aerodrome ***Near*** Strike Rates and size of birds involved. **Source**: CAA – Bird Incident Rate Report January to March 2023.

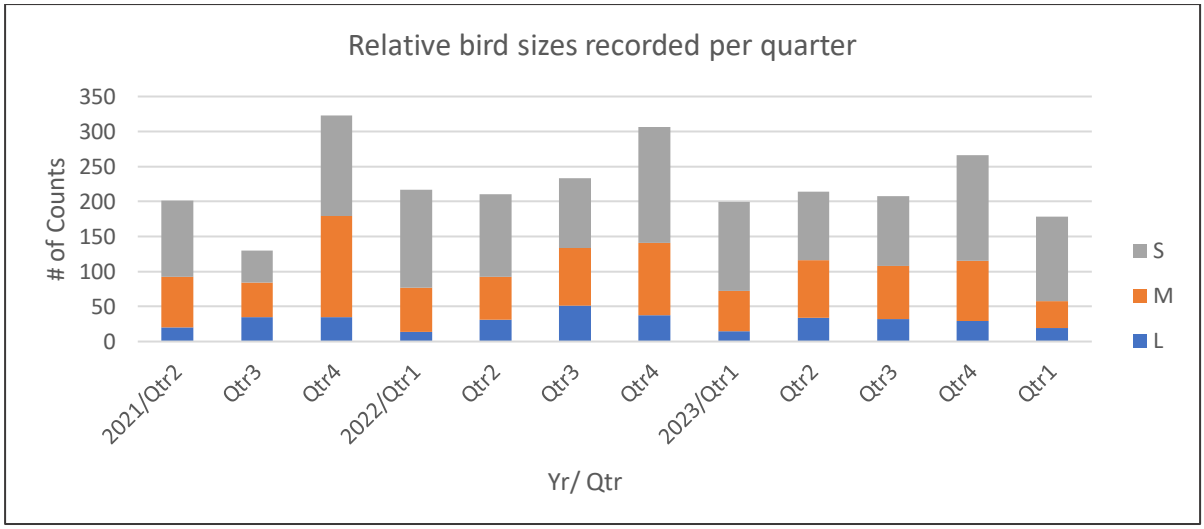

Chart 5: Number of counts per quarter where small, medium and large birds were recorded; excluding the oxidation ponds and disposal field areas

Source: NSN Monthly bird counts

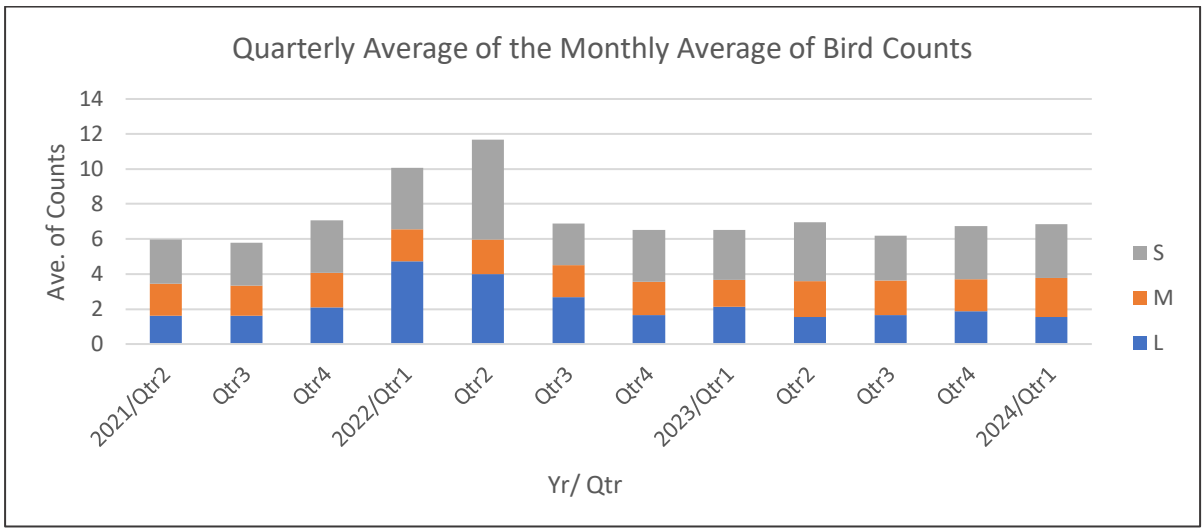

Chart 6: Quarterly average of the average of monthly counts per species of small, medium and large bodied birds excluding the oxidation ponds and disposal field areas

Source: Monthly bird counts (NSN)

Away from the ponds, **spur-winged plovers** are usually seen as single birds or in groups of 2 to 4 flying overhead.

The number of spur-winged plovers counted near the oxidation ponds included birds that were roosting around the ponds or flying to or from the Shotover River east of the gravel extraction activities. The number of spur-winged plovers recorded in bird surveys has reduced since the summer of 2021/ 2022, refer **Chart 7**.

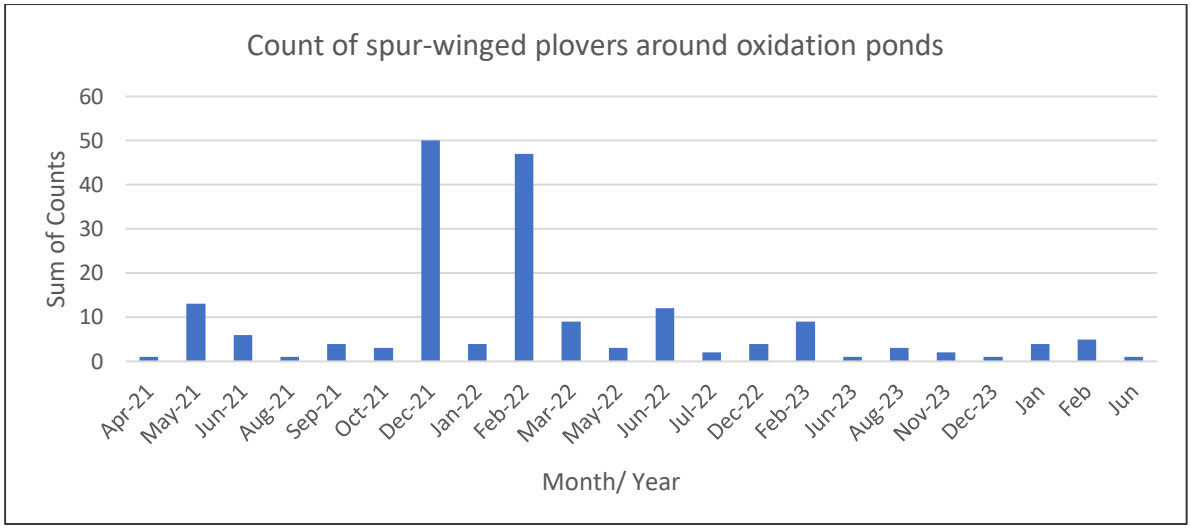

Chart 7: The sum of plovers counted per month around the Shotover oxidation ponds over the past three years.

Source: Monthly bird counts (NSN)

Black-fronted terns are seasonal migrants to the inland braided river systems of the South Island. They arrive in mid-August and most leave the district by late January to early February. Black-fronted terns nest on the gravels of the Shotover River and forage along the Shotover and Kawarau Rivers. They also range extensively across the the Whakatipu Basin in search of invertebrates and have been observed by the author foraging low to the ground over the mid-elevation western slopes of the Remarkables near the Trig point adjacent to the access road. Heavy rain resulting in flooding of the Shotover River may displace terns from their nesting colonies or river foraging areas resulting in an increase in foraging over farmland the open grassland surrounding the Aerodrome.

In the nesting seasons of 2022/23 and 2023/24, the terns nested in the Tucker Beach Wildlife Management Reserve north of the delta and the total adult nesting population was estimated to be 29 and 25 respectively for those seasons. In 2021/22, the tern colony established in the lower delta downstream of the SH6 bridge with 38 adults counted in total and 31 at the nesting colony downstream of the willow islands in the river. Despite this similar numbers of terns were recorded in the SWTDA surveys of during the 2021/22 and 2022/23 nesting seasons, including all count stations except the disposal field but only 1 or 2 were counted. No terns have been recorded in the disposal field surveys.

Waterfowl continue to represent the largest flocks recorded within the SWTDA. Their presence peaks over the summer after breeding with some species (paradise shelduck and shoveler) completing their annual moult on the oxidation ponds. Paradise shelducks are relatively flightless for a few weeks during their moult, while shoveler are able to fly during their partial moult. While most do not breed on the ponds, there has been some breeding recorded for most of the waterfowl species present. Most waterfowl disperse away from the ponds in Autumn.

Charts 8 and **9** illustrate the maximum count for the waterfowl species recorded on the oxidation ponds. La Nina conditions during 2021 – 2023 may have increased the use of

the ponds by waterfowl, while the commencement of the decommissioning process and associated activity in 2023/ 2024 may be reducing their use of the ponds.

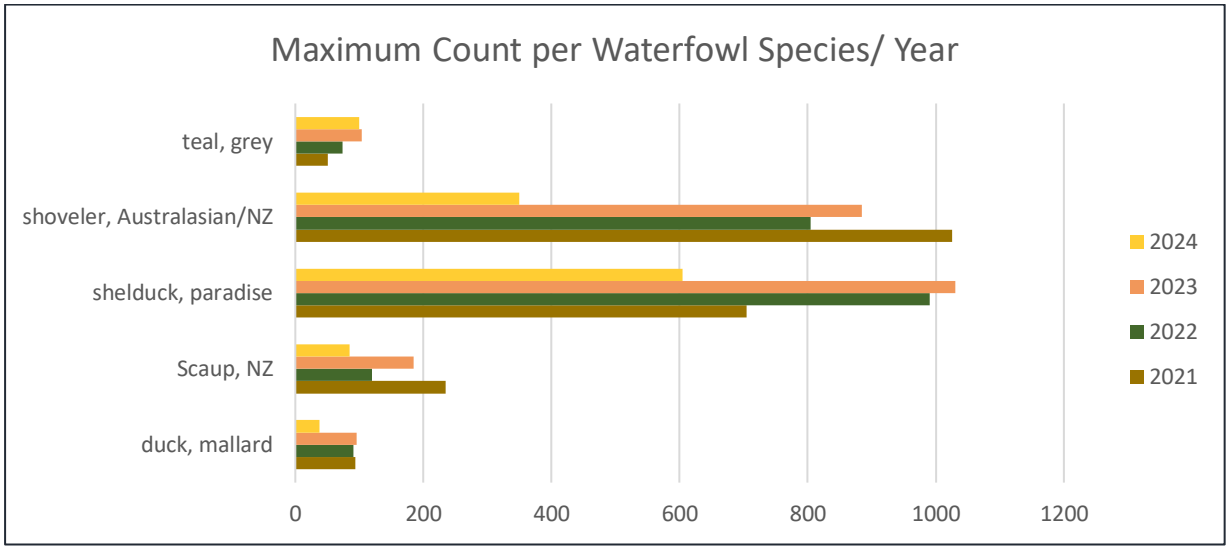

Chart 8: Annual maximum count of waterfowl species from the combined counts for the Shotover oxidation ponds for the past three years. **Source:** Monthly bird counts (NSN)

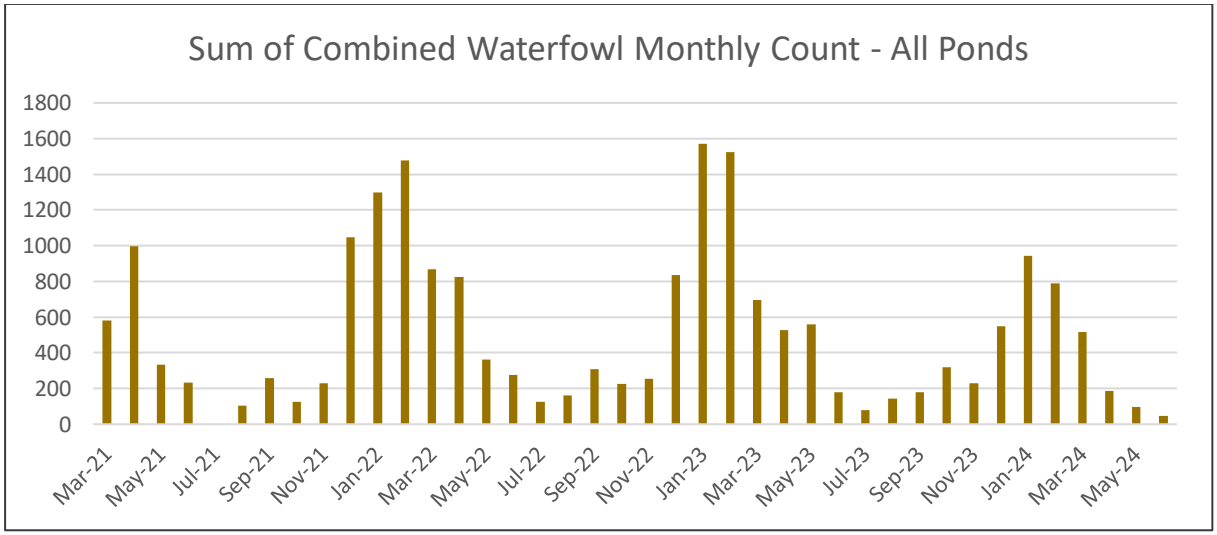

Chart 9: Monthly count of waterfowl species for the combined observations from the Shotover oxidation ponds for the past three years. **Source:** Monthly bird counts (NSN)

Disposal field

The disposal field was added to the survey from August 2023 and uses a travelling transect count rather than a 5-minute/ stationery count method.

The disposal field is a 4-ha fenced of gravel area and is being maintained free of weeds. It has retained surface water and while this may not have been by design, waterfowl, including grey teal, paradise shelduck, mallards, and scaup, pied stilts and banded dotterel along with welcome swallows have recognised the habitat.

Breeding is occurring with several pairs of banded dotterel and pied stilts nesting and hatching chicks the area during the 2023/24 breeding season. Pied stilts have fledged young, but monitoring was insufficient to conclude outcomes for banded dotterel.

The very high flow (600 cumec) on the Shotover River in September 2023 may have displaced dotterel into the disposal field as it been used in previous years and the dotterel have now identified it as breeding habitat.

Work is ongoing with the breeding season rapidly approaching. Dotterels and stilts will be returning to the District by July/ August.

Summary of Bird Hazards posed by the current operations in the SWTDA

On June 18th, 2024, there was a widely reported[6] bird strike at Queenstown airport. However, bird numbers and activity in the SWTDA is at a reduced and seasonally low level and was at the time of the strike.

NSN is aware through other monitoring that large coot flocks (ca. 400) are moving between lakes in the district settling in the Frankton Arm while most waterfowl have dispersed.

Based on the strike rates per 10,000 movements, CAA assessed (2024 Qtr 1) the risk category for Queenstown Aerodrome as low and the trend category as upward.

However, in the absence of data regarding bird species involved in strikes or near strike incidents at the Queenstown Aerodrome, a more detailed assessment of correlation between birds in the SWTDA and hazards to aviation is not possible.

Current Uses and Operations within the SWTDA include:

- The presence and operation of the oxidation ponds and the commencement of decommissioning works that may be resulting in more flight activity as waterfowl are displaced from the area, it may also be deterring waterfowl from settling on the ponds.
- Land disposal of treated wastewater – earthworks are underway within the disposal field. There has been some movement of waterfowl onto areas of open water in the disposal field but again, due to the level of activity, those birds are likely to be regularly disturbed. Breeding and use by a range of waders and waterfowl is occurring and the closer proximity to the aerodrome eastern takeoff requires this area to be managed to minimise surface water.
- Landfill – clean fill only, good control of herbaceous weeds removing attractants for finch species.
- Gravel screening and stockpiling. This area has long been managed for this activity with mitigation in place to minimise impacts on avifauna.
- Unmanaged activities on the Kimiākau/ Shotover Delta including dog walking via car, boat launching, motorbike use, 4WD activity, informal recreation.
- Presence of open gravel, broom, buddleia and lupin infested areas and willow thickets attracts foraging introduced birds including finch species.

[6] https://www.odt.co.nz/star-news/star-national/bird-strike-suspected-after-remains-found-airport-runway

Recommendations

The disposal field has been added to the survey and Station 3.1 has been removed as the area is sufficiently surveyed by stations 3.1A, 3.2 and 3.3. Clearance of buddleia from along the track has been initiated between the track and the road; it is recommended that this be extended to the berm between the track and the disposal field to provide a view of the disposal field from Site 2.2A and reduce spread into the disposal field.

Construction crews involved with the oxidation pond decommissioning work and disposal field work should maintain activity that avoids flushing flocks of waterfowl from the ponds into the air, e.g. reduced driving speeds and avoiding unnecessary travel around the pond perimeter once birds are settled.

Construction work within the disposal field should aim for completion prior to the breeding season and avoid the creation of ponds due to the closer proximity to the eastern approach/ take-off area of the Queenstown Aerodrome.

Dawn Palmer
Principal Ecologist
Dip App Sc. Nat Res; B App Sc. Ecology/ Nat Res
24 June 2024

APPENDIX 3

dawn.palmer@xtra.co.nz

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Monday, 25 November 2024 10:53 am
To: Dawn Palmer; Simon Mason
Subject: RE: Update - Wildlife Monitoring - Waste Water Treatment Area

Thanks Dawn, that is certainly reassuring !

I'll be sure to tell the Contractor to be mindful of activities.

Cheers
Iain

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Monday, 25 November 2024 10:11 AM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Update - Wildlife Monitoring - Waste Water Treatment Area

Hi Iain,

The water/ slurry looks pretty dry in Pond 1.
The stilts seem reasonably tolerant of work going on around them as long as the contractors don't "hoover" up the nests. They've picked the highest and driest spots to nest so there shouldn't be any issue.
If the sludge work is programmed for January there won't be an impact on nesting. Nesting should be done by then and they should be rearing their mature chicks and juveniles should be reasonably independent and will be able to walk to the other ponds/ fly away.
I'll note landing attempts etc during the scheduled surveys.

Ngā mihi,
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Monday, 25 November 2024 9:08 am
To: Dawn Palmer <dawn.palmer@xtra.co.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Update - Wildlife Monitoring - Waste Water Treatment Area

Hi Dawn,

Thanks for the update.

With regards to the pond 1 observations.

There is a small amount of shallow ponded water in the bunded area around the black geobags, which builds up with rain, but then drains out over dry periods. This is difficult to avoid, but hopefully not sufficient to

attract wildlife as a new environment. Having said that, it will be in-situ for a long time, so not a real issue if they do decide to take up residence.

Can you provide some guidance please on how we should deal with the two pairs of pied stilts that appear to be nesting on the sludge? The Contractor's plan is to continue to remove as much of the water/slurry from the pond as possible, which will be done slowly and via pumping, so isn't intrusive to any nesting birds. Once this is completed, the area will be left to dry over the Christmas period. They intend to get in and scrape up the dry sludge in January (assuming the sludge has dried sufficiently) to allow the main earthworks in the basin to occur. Please advise if this timing affects nesting season, and what we can do about it.

As recommended, please continue to record landing attempts as you see them, if this is important to report on.

I'll leave Simon to respond if required on the activities at the disposal field.

Regards,
Iain

Iain Partington | Project Manager | Property & Infrastructure
Queenstown Lakes District Council
M: +64 27 487 0364
E: iain.partington@qldc.govt.nz

QUEENSTOWN LAKES DISTRICT COUNCIL

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Sunday, 24 November 2024 8:15 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Update - Wildlife Monitoring - Waste Water Treatment Area

Good afternoon Iain and Simon,

Ponds
Pond 1 is now empty, and the sludge is drying, you'll both be well aware of this. Two pairs of pied stilts (not threatened) are nesting in the empty pond on nests built on high points within the sludge. These species are absolutely protected and their nesting should not be disturbed.

During the 5-minute count at Pond 1, I observed a mallard coming in to land, aborting this landing and flying into the ditch between the pond berm and the large, black bladders. It wasn't seen again during the count. Is there water in that area? It otherwise looked like there may have been a pretty hard landing. This is one of the impacts we want to watch, the "aborted landings", "go around flights" and activity associated with displacement.

I strongly recommend we record observations of landing attempts and any associated behaviour, i.e. a diversion to pond 2 or 3, leave the area, direction of flight to and from area, plane activity (ie jet/ATR

incoming/ outgoing; helicopter incoming/ outgoing; small plane flying around to join the cross runway/ approach/ takeoff from eastern runway (Threshold 23).

November is when we start to see waterfowl numbers on the ponds increase. However, the number of waterfowl on the ponds – all combined this month was just **57**, compared to 231 in November 2023 and 256 in November of 2022.

There are currently grey teal chicks on pond 3 confirming breeding there.

Disposal Field

The disposal fields as you are also no doubt aware are well flooded with the internal berms underwater, although with shallow water covering the berms in places. All species known on the disposal field have increased this month. The disposal field is currently holding more waterfowl than all the oxidation ponds combined.

Total numbers have increased from 20 adults in August, to 41 in September, 81 in October to 120 Adults in November. There are 45 downy chicks or moulting juveniles of mallard and paradise shelduck present in addition to the adults. Based on observations to date, I expect the waterfowl to continue to select the disposal field due to the higher water quality and relative separation from other activities. If we add the disposal field count to the pond waterfowl count we have **197** for the November count.

The count of adult waterfowl and waders on the disposal fields this month was comprised of:

Mon/ Yr	Dotterel, Banded	duck, mallard	Plover, Spur-winged	Scaup, NZ	shelduck, paradise	Shoveler, Australasian/NZ
Nov-24	3	23	-	**37**	12	24

The recent flooding of the disposal field has likely reduced the number of successful pied stilt and banded dotterel nests. On Friday 22nd November, there were 4 downy banded dotterel chicks, 3 of those were seen foraging on the flooded internal berms, a single chick on the outer berm was from another brood. 4 adult banded dotterels were present. The pied stilts are quite mobile between the ponds and the disposal field, 12 were counted across the ponds and 21 were counted in the disposal field. The maximum count last December was 27 so this count of 33 may not be too far off the mark.

The issue with the increasing numbers is the proximity to the eastern aerodrome threshold; I urge you to have a conversation with the team at Queenstown Aerodrome to discuss how this area is going to be managed through the summer.

I also urge you to remind all your contractors about the importance of not undertaking activity likely to flush waterfowl into the air.

- ***Move slowly and calmly in vehicles avoiding sudden, loud activities, get out of vehicles at the intended work site, the vehicle acts as a moving hide to some degree***
- ***Do not try to actively disperse them; note - the birds are absolutely protected under the Wildlife Act and it is an offence to harass or disturb them while breeding/ nesting. The arrival of small downy chicks confirms nesting and chick rearing is underway in the vicinity of ponds and nests have been confirmed for some species.***
- ***Most importantly, do not try to disperse or disturb them intentionally without prior knowledge of flight schedules and consideration for which direction flights are coming in/ flying out from the Queenstown Airport. A discussion with the QAC wildlife management team may be beneficial to improving understanding between all parties.***

Grey teal are probably the most easily flushed into flight and when this happens they may fly around and may return or leave so they make much bigger flight movements than other species.

Simon, may I share my monitoring observations with Queenstown Airport Corporation Aviation Safety/ Risk Management Team?

Iain, I know you have been in touch with Juliet Breen already.

I will (this evening) also be providing QAC with an update for broader off aerodrome monitoring I undertake for them throughout the wider Whakatipu Basin. I will also be recommending that QAC undertake monitoring (as outlined above) of behaviour around the drainage of Pond 1 as it provides an insight into what may happen with Ponds 2 and then 3.

This is an opportunity for collaboration and to share resources as the identification and management of aviation risk is the purpose behind my monitoring and the designation conditions require the findings to be shared with QAC.

Ngā mihi

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Friday, 25 October 2024 2:56 pm
To: 'Iain Partington - External' <Iain.Partington@qldc.govt.nz>; 'Simon Mason' <simon.mason@qldc.govt.nz>
Subject: RE: Updated Charts for the ponds - October; proposal for additional monitoring

Good afternoon Iain and Simon,

The dewatering process at Pond 1 is well underway; this pond experiences less use than the other ponds, so I do not anticipate that this will result in a significant level of displacement this season.

Waterfowl numbers are comparatively low across all ponds compared to previous years. Mallard numbers generally remain under 100 at their maximum and Paradise Shelduck numbers start to increase in December and January, peaking in February.

Year	September	October	Species
2020	209	382	Mostly Shoveler, Scaup, Grey teal
2021	258	125	
2022	310	225	
2023	179	320	
2024	72	28	

However, there is an increase in waterfowl use of the Disposal Field. Monitoring of that area started in August 2023 with the arrival of areas of open water.

The purpose of the monitoring for QLDC is the identification of activities that may increase risk or hazards to aviation. Increasing areas of open water close to the eastern end of the Queenstown Aerodrome may contribute to an increased risk to aviation if waterfowl use the habitat.

If waterfowl use the habitat, then it is important that the risk of disturbance or events that cause them to flush and take flight from the site are minimised, i.e. ensure predictable movements in vehicles (which can act as a hide), and minimise walking around in the fields where birds are nesting or roosting. Avoid rapid dewatering/ flooding of the field that causes birds to move in/ out of the area.

It is also important that we understand the patterns of bird activity and bird movement to/ from the ponds and Disposal Field to determine how best to manage the site with respect to any potential risk/ hazard for aviation going forward with this year's dewatering of Pond 1 providing a potential indication of how this may go – even though numbers using that pond are comparatively low.

Teal, mallard and paradise shelduck numbers are up at the Disposal field compared to last year and there are Paradise Shelduck, mallard and possibly grey teal chicks on the ponds. Banded dotterels have chicks hatching and pied stilts are nesting.

Some of the questions around management of the Oxidation Ponds and Disposal Field include

- where will the birds go if they are displaced from the site?
- Will they become disturbed such that the flight activity around/ across the eastern end of the aerodrome increases such that it poses an increased risk to aviation?

To address these questions, I recommend the addition of further monitoring sessions, additional to the existing program:
From November to April – being the period of highest activity and occupation of the ponds. I recommend the following:

Observations to determine the period of the day (including just after dark) when activity to/ from the ponds is likely to peak and how much movement **if any** is crossing the flight path or potentially impacting aviation at Queenstown Aerodrome.

This would involve:
Three x 30-minute to 1 hour observation sessions (morning, mid-day, evening) at each of

- the Ponds (1, 2, 3 north bay, south bay);
- the Disposal Field from the best available viewing point;
- the footpath at the eastern end of the Queenstown Aerodrome (Eastern Access Road/ Hawthorn Drive),

Allowing some time to set up for monitoring and travel between sites = 4 – 8 hrs x 3 per month = 12to 24 hrs;
Data entry and update 9 - 18 hrs/ month, giving a total of 24 to 48 hrs per month.
At my current rate to Council for this work this would be an additional $2760 to $5520 per month + GST.

This could be reduced with a single, central observation point at the ponds, with an elevated viewing platform e.g. a lifeguard tower borrowed from the pool if available; this would also be helpful at the Disposal field.

I also recommend that you both continue to engage with Juliet Breen at QAC regarding progress and management of the Shotover Wastewater Treatment Area.

Kind regards
Dawn

Dawn Palmer
Ecologist
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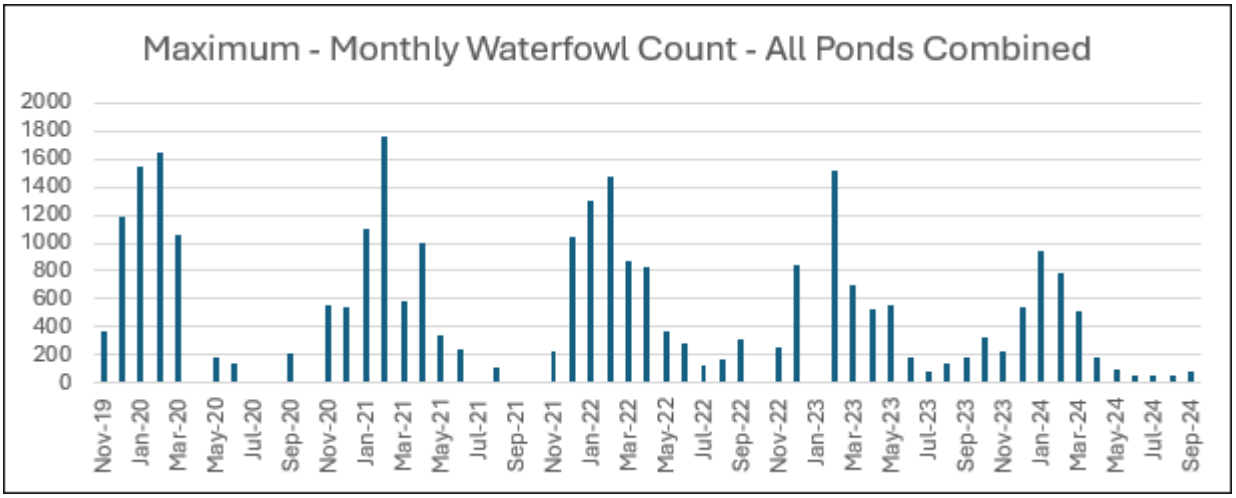
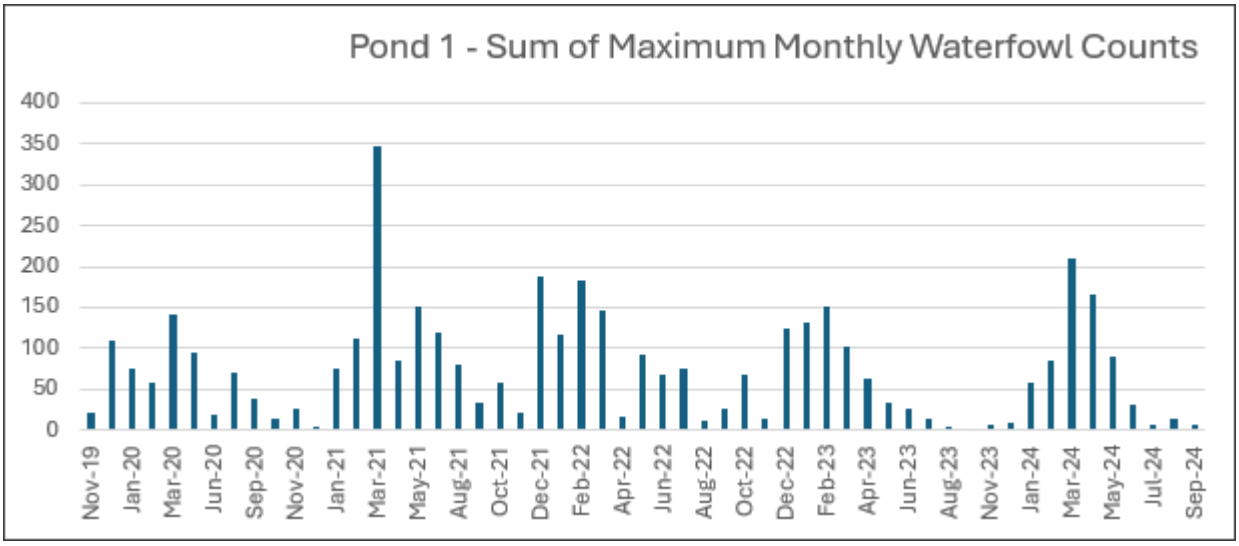
From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Thursday, 3 October 2024 2:48 pm
To: 'Iain Partington - External' <Iain.Partington@qldc.govt.nz>; 'Simon Mason' <simon.mason@qldc.govt.nz>
Subject: RE: Updated Charts for the ponds

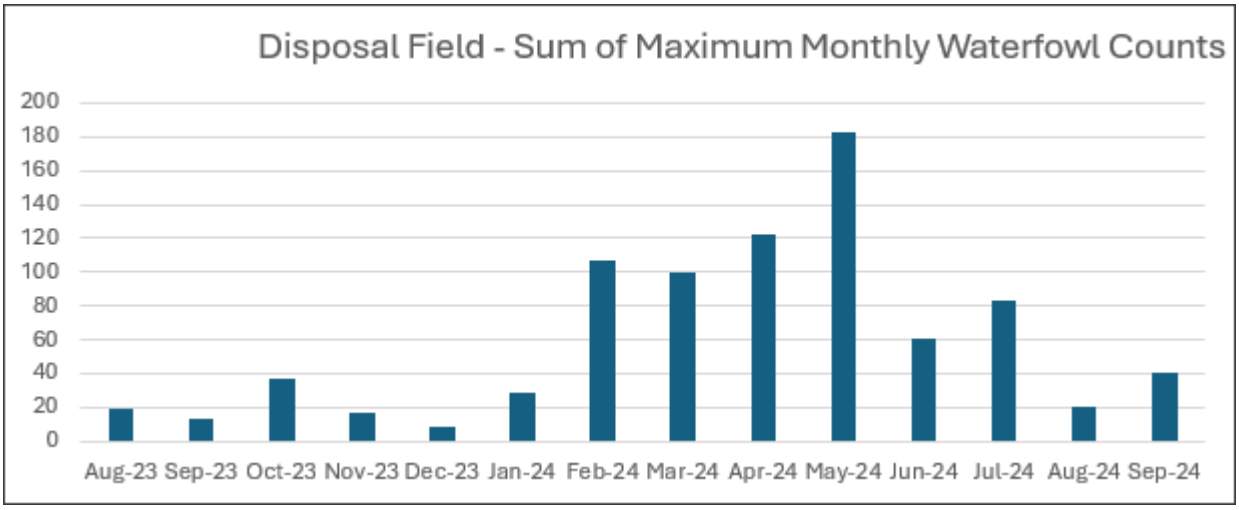
Kia ora Iain and Simon,

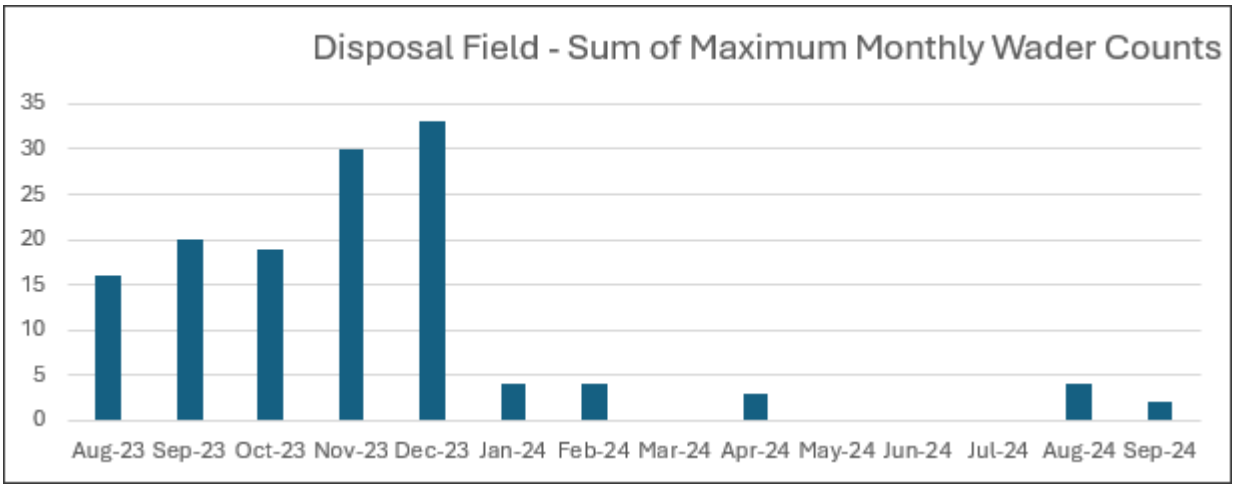
I undertook the survey of the Waste Treatment area on 23rd September.
Bird numbers remain low with a little over 100 waterfowl distributed between the ponds and the disposal field.
Waders have returned to the ponds and disposal field.
Pond 1 is at its usually low with waterfowl dispersed off site within their breeding territories.

Noting the very high September rainfall has created wet spring conditions again this year throughout the District, we will be watching to see how this impacts numbers locally through the season.
I wonder if the stormwater volume received lately has delayed the start of the dewatering?









Ngā mihi

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Thursday, 29 August 2024 8:44 am

To: Dawn Palmer <dawn.palmer@xtra.co.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Updated Charts for the ponds

Good morning Dawn,

Thank you for updating the charts, and for the summary information. Some interesting data in there in terms of overall changes.

As suggested, I will share this with Juliet at QAC for information.

Simon, can you please share as needed with the disposal field team? I'm happy to act as point of contact to share any ongoing project updates with QAC (in terms of major work activities or changes etc.) if that helps.

Regards,
Iain

Iain Partington | Project Manager | Property & Infrastructure
Queenstown Lakes District Council
M: +64 27 487 0364
E: iain.partington@qldc.govt.nz

QUEENSTOWN LAKES DISTRICT COUNCIL

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Tuesday, August 27, 2024 1:04 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Updated Charts for the ponds

Kia ora Iain and Simon

After our meeting with the QAC Aerodrome safety team on 31st July, I undertook to update the charts for the monitoring results in the Shotover Wastewater Treatment Area.

Attached are the updated charts for the period up to and including July 2024 along with a summary of the August 2024 survey, with a summary and recommendation.

I recommend that you reach out to Juliet Breen and her team to keep the parties informed about management of the two projects for the decommissioning and the disposal field management.

Let me know how I can support this process.

I will defer to your regarding how you share these results with the QAC team. However, I do recommend that these results are shared with QAC as required by the conditions of the Designation Area.

Kind regards
Dawn

Dawn Palmer
Ecologist

Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Wednesday, July 31, 2024 4:18 PM
To: 'Juliet Breen' <juliet.breen@queenstownairport.co.nz>; 'Iain Partington - External' <Iain.Partington@qldc.govt.nz>
Subject: Updated Charts for the ponds

Hi Iain

I went to update the charts for each of the ponds this afternoon and found a sorting error had occurred. I'll re-run the data before sending out the updated charts which means I won't be able to get this out today as hoped. So the handouts should be taken as indicative only.

I'll have them with you as soon as possible.

It was lovely to meet Maria and Rob today.

Kind regards
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

APPENDIX 3A

Natural Solutions *for Nature* Ltd | Frankton Road Queenstown 9300
E:dawn.palmer@xtra.co.nz |M: +64274427348

MEMO – Ecology

Application Reference:

From:	**Dawn Palmer** – Principal Ecologist, Natural Solutions for Nature Ltd
To:	**Iain Partington, Simon Mason (QLDC)**
Date:	**27/8/2024**
Subject:	**Updated Charts for Oxidation Pond Monitoring**

Further to a meeting on 31st July between Iain and Juliet Breen and her Aerodrome Safety team, NSN undertook to update the charted results of monitoring for the Wastewater Treatment Area. The updated charts for the waterfowl on the Shotover Oxidation Ponds are provided below.

The data suggests that total waterfowl numbers using the ponds is starting to dip, while there is an uptick in use of the disposal field following the availability of surface water.

In general, the northern bay of Pond 3 holds the highest waterfowl counts with both paradise shelduck and shoveler moulting on that pond.

Figures 8 and 9 show what I interpret to be displacement events from Pond 3 to Ponds 1 and 2 in 2021 and 2022. This arises from a high shoveler count (223) on Pond 1 in March 2021 and a high shoveler count (600) in March 2022 for Pond 2.

Iain explained in our meeting with Queenstown Airport Corporation staff, that there has been transitional management between Pond 1 to 2 as the first treatment pond. I therefore anticipate that there will continue to be changes in use of Ponds 2 and 3 as Pond 1 is decommissioned. Pond 2 has tended to hold more scaup whereas Pond 1 tended to hold more grey teal and mallards.

The Count for August – undertaken on 22nd August (not yet incorporated into the charts) found:

All Ponds

All Waterfowl Total = 55 about half of the previous August counts.

Shoveler (4), Mallard (21), Scaup (15), Grey Teal (15)

27 black-billed gulls roosting on berms as they move between the River and the transfer station.

The pond with the most waterfowl in August was Pond 2 with 28 – Grey Teal (15), Scaup (7), mallard (3); this follows the historical trend of use noted above.

Pond 1 had 14 waterfowl with Scaup (8), mallards (5) and shoveler (1).

Pond 3 (north bay) unusually had no waterfowl on the day of the count while Pond 3 (south bay) had 13 mallards only.

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Disposal Field – counted from 3 points on the Queenstown Trail

Grey Teal – 22	Pied stilt – 5	Mallard – 5
Shoveler – 2	Welcome Swallows – 73	

While use of the oxidation ponds appears to be diminishing, this could change if the drier winter transitions into a drier spring and traditional local habitats become dry. Some monitoring of alternative habitats and moulting sites may be useful. These should be identified in consultation with Fish and Game.

I have also reviewed the potential for inter-species aggression during the moulting period and I could find no references to aggressive behaviours outside the breeding season. My observations have been that the post breeding moulting flocks have a high level of tolerance for each other. While there is some partitioning between species in their use of the ponds, it seems more likely that waterfowl will leave the site if there is a reduction of or overcrowding of the available habitats as the ponds are decommissioned.

As discussed, measures to reduce potential to frighten birds into taking flight will be an important mitigation to management of this habitat, particularly once flocks begin to form in early summer.

The increased presence of surface water in the disposal field is likely to attract increased use by waterfowl to this habitat bringing these species closer to the eastern takeoff/ approach path of Queenstown Aerodrome.

NSN recommends QLDC develop plans to manage this situation and the potential for increased risk to aviation in consultation with QAC.

Regards

Dawn Palmer

Principal Ecologist, Natural Solutions for Nature Ltd

Natural Solutions *for Nature* Ltd | Frankton Road Queenstown 9300
E:dawn.palmer@xtra.co.nz |M: +64274427348

ALL PONDS – COMBINED DATA

Figure 1 -

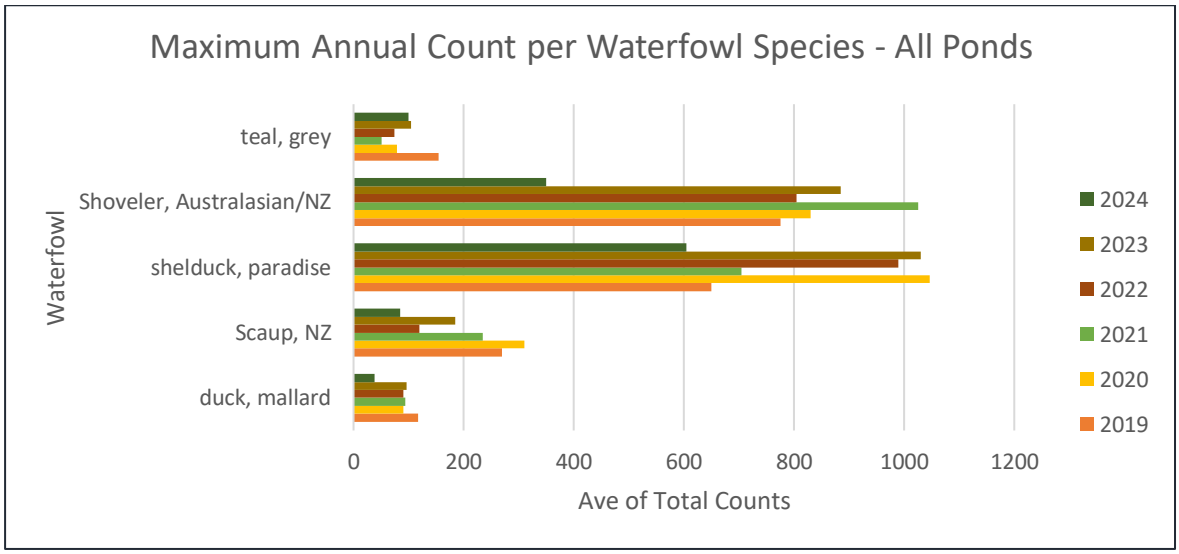


Figure 2 All Waterfowl Combined; All Ponds combined

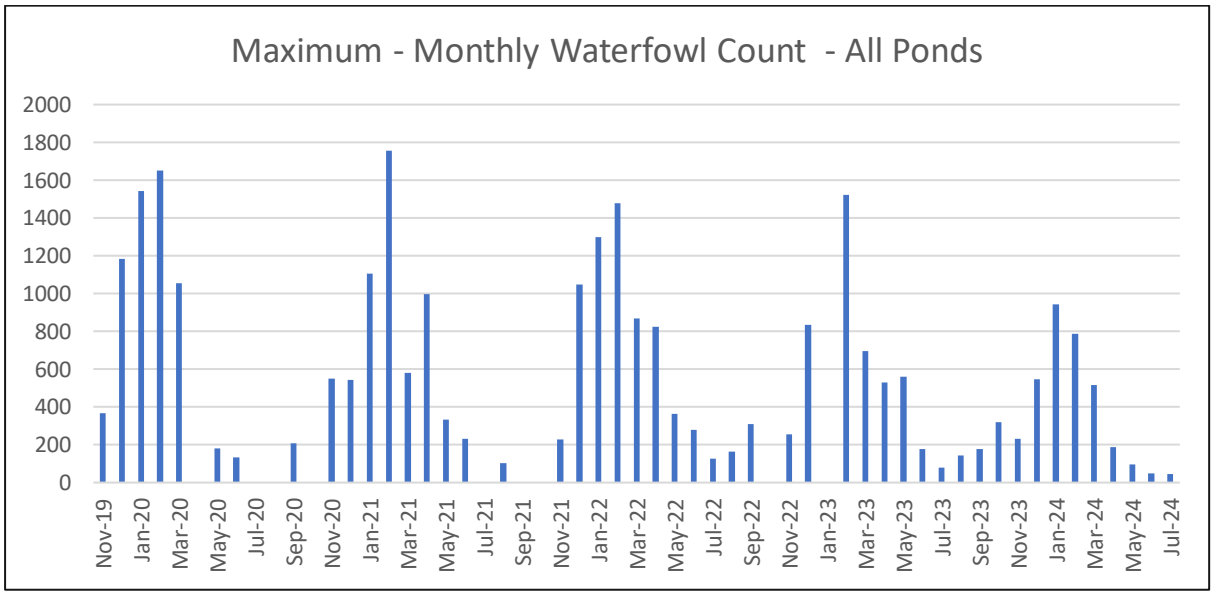


Figure 3

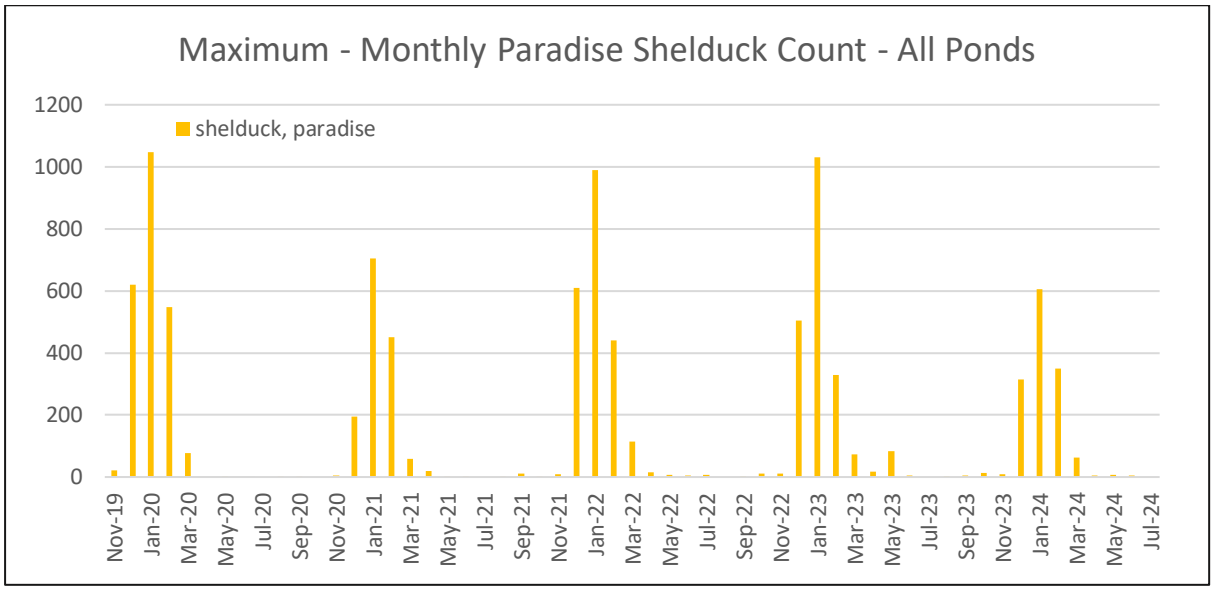


Figure 4

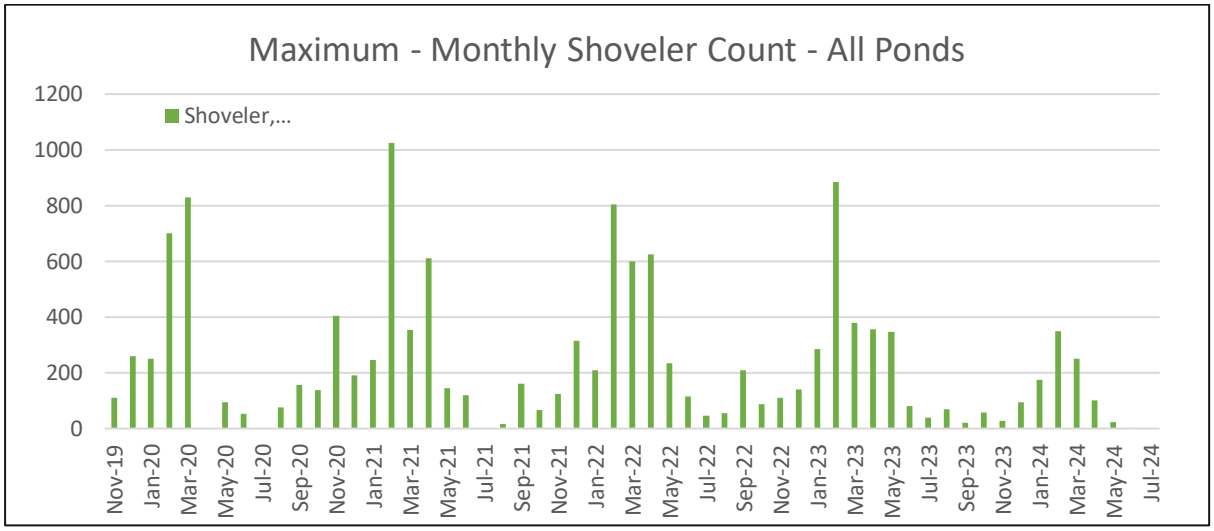


Figure 5

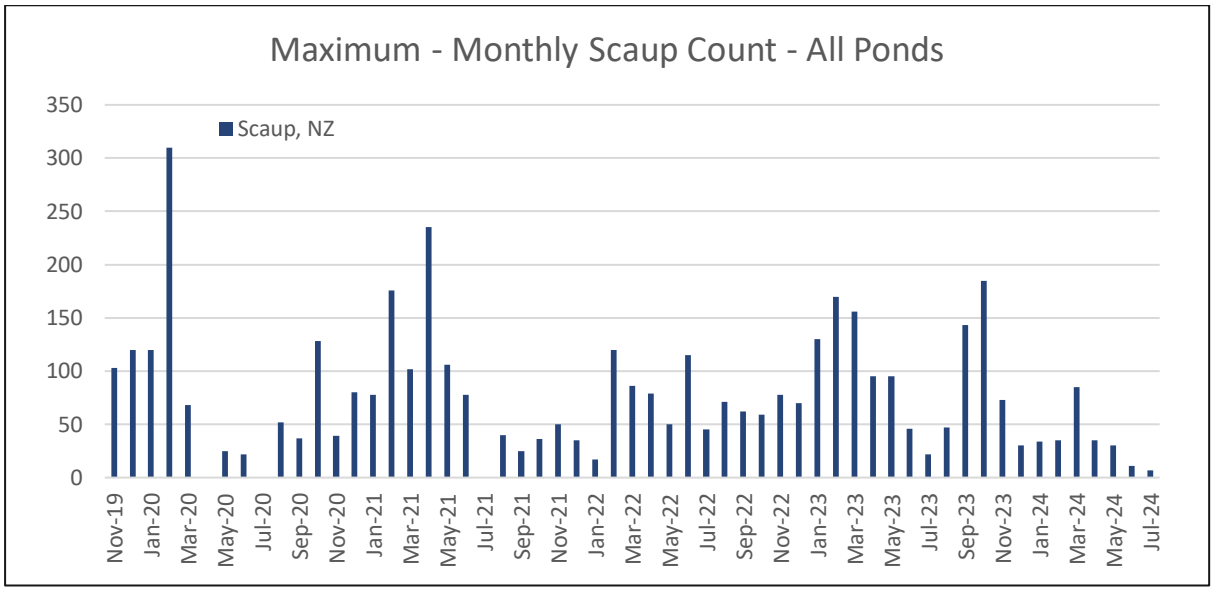


Figure 6

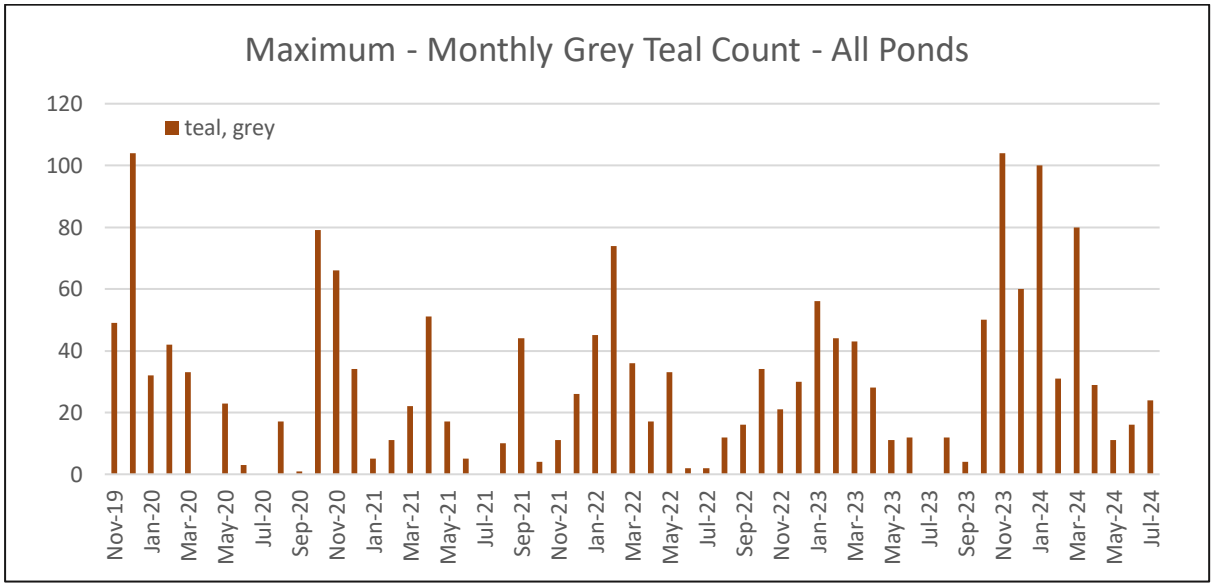


Figure 7

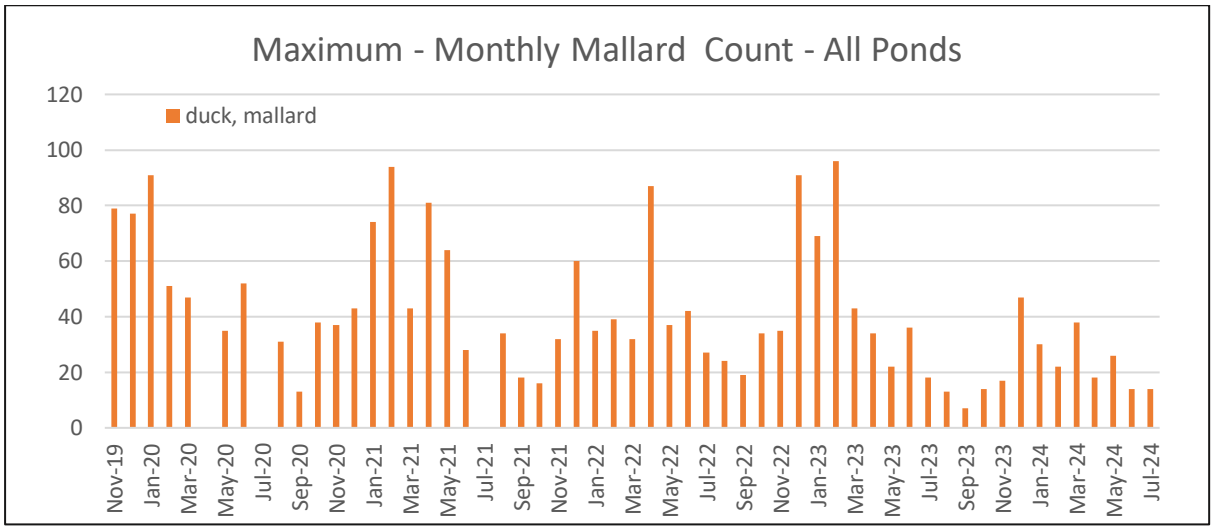


Figure 8 POND 1

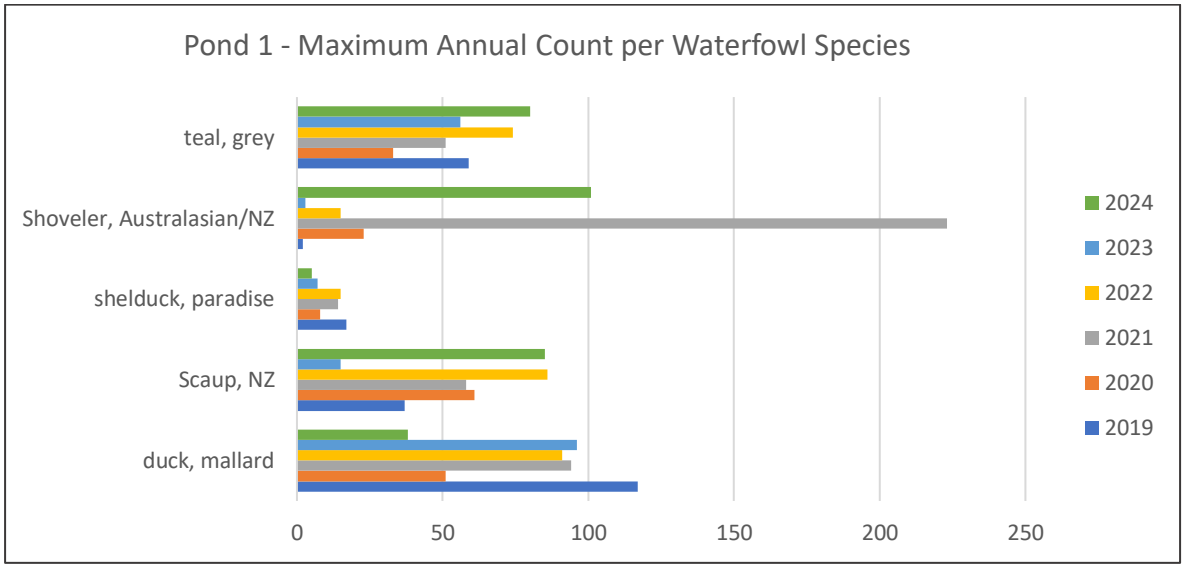


Figure 9 POND 2

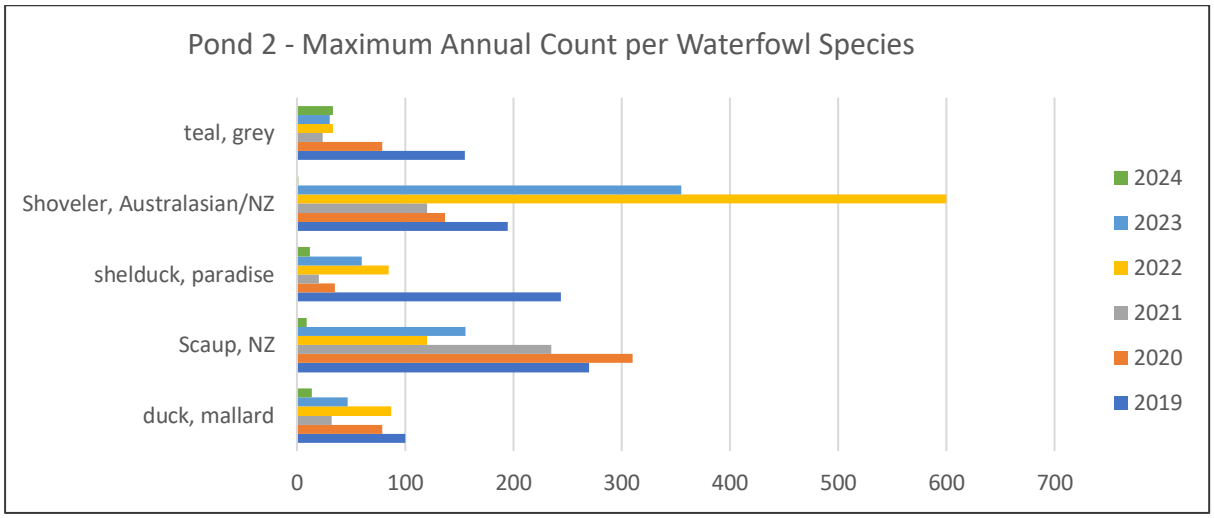


Figure 10 POND 3 – NORTH BAY

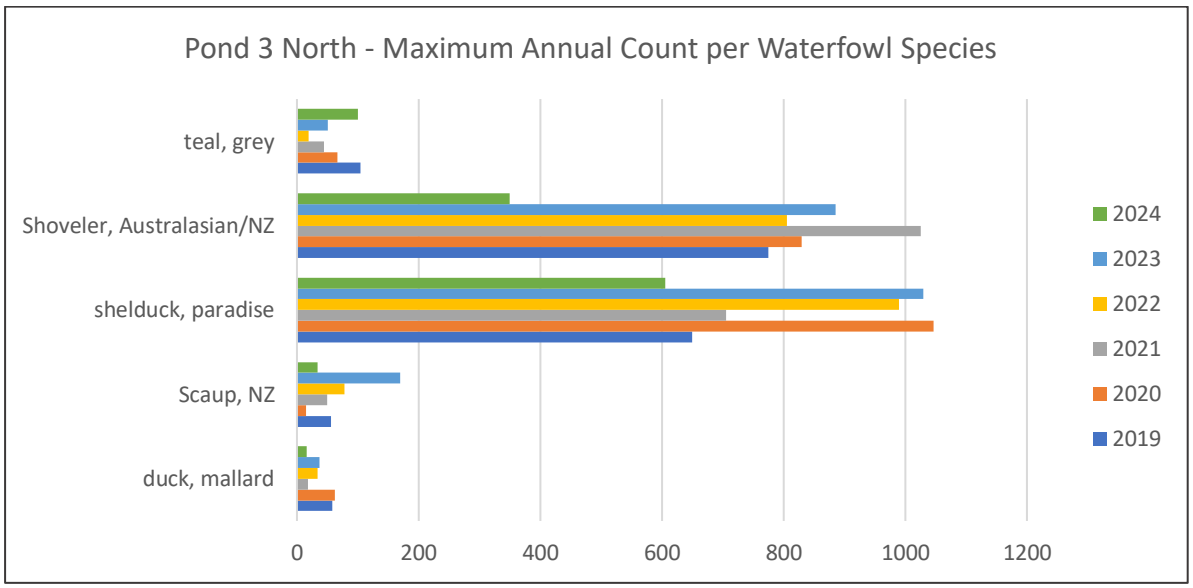
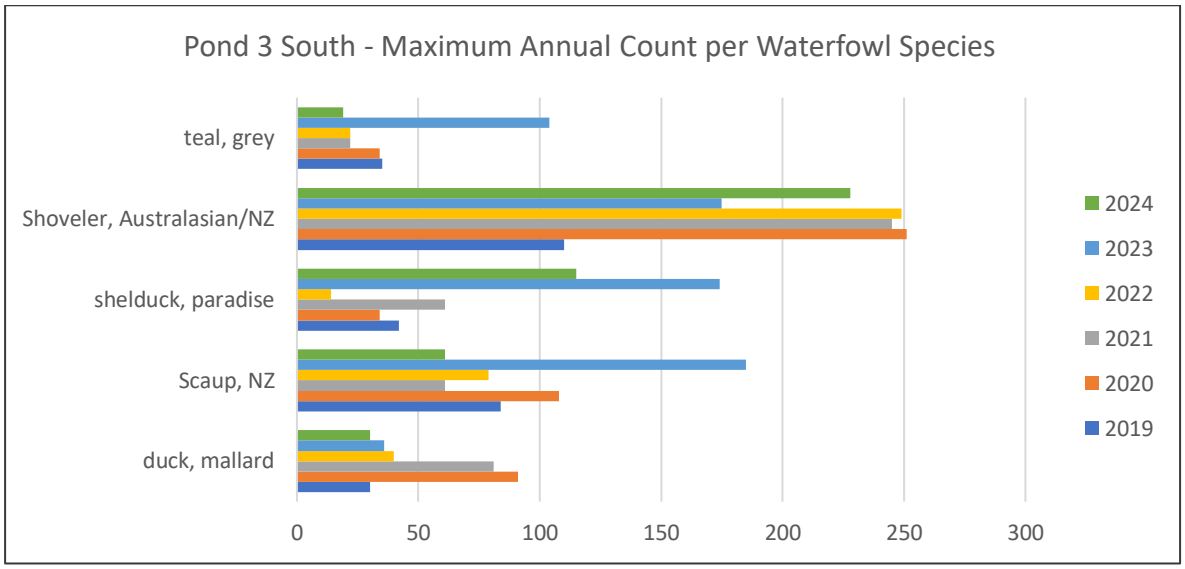


Figure 11 POND 3 – SOUTH BAY



DISPOSAL FIELD

Figure 12 – All Waterfowl Combined for walking transect count

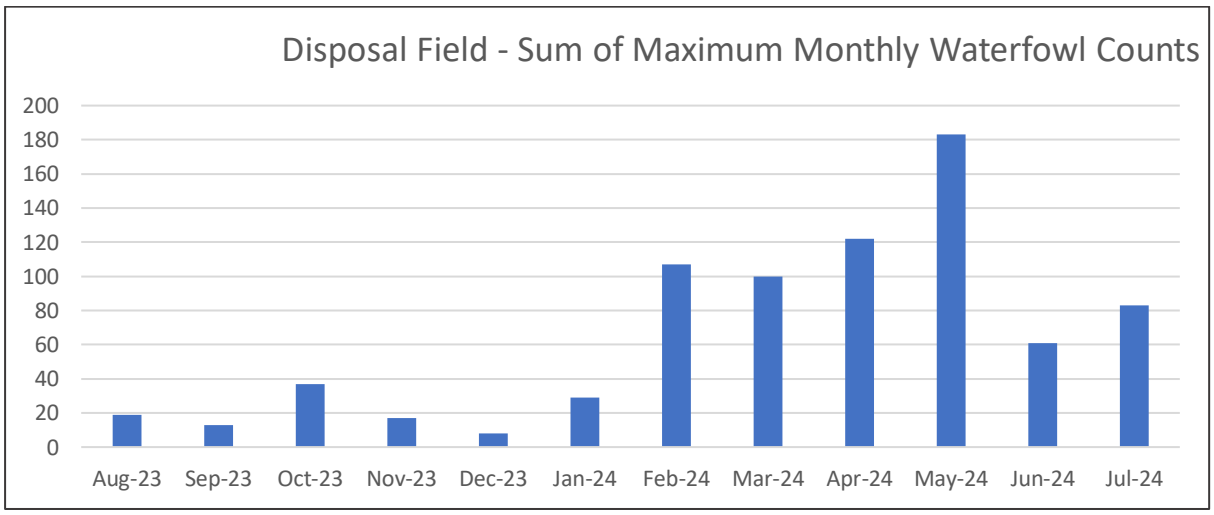


Figure 12 – All Waders Combined for walking transect count (banded dotterel, pied stilts, spur-winged plovers)

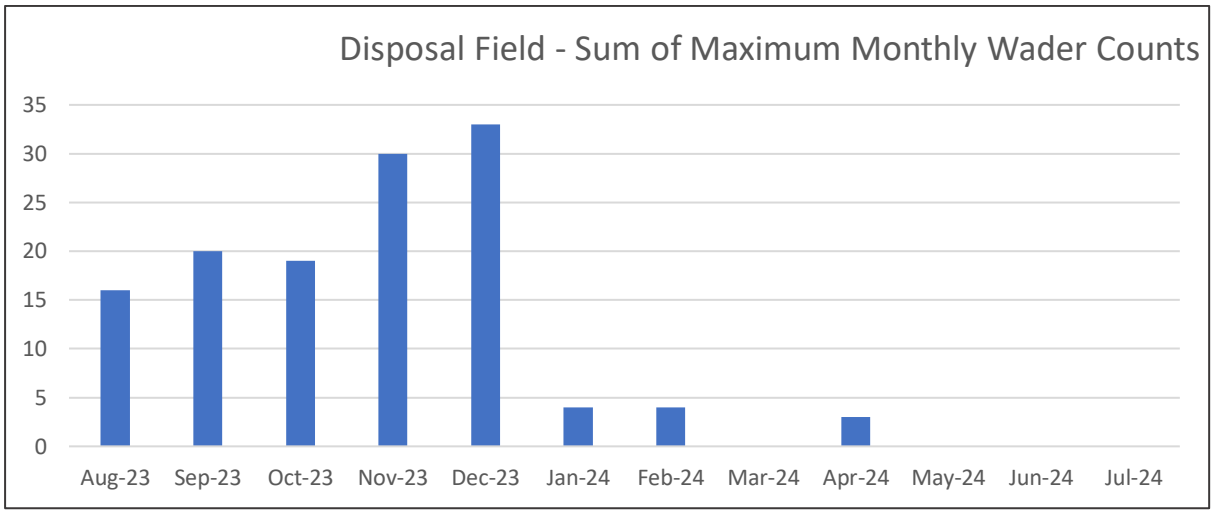


Figure 13 Disposal Field walking transect count annual maximum per waterfowl species

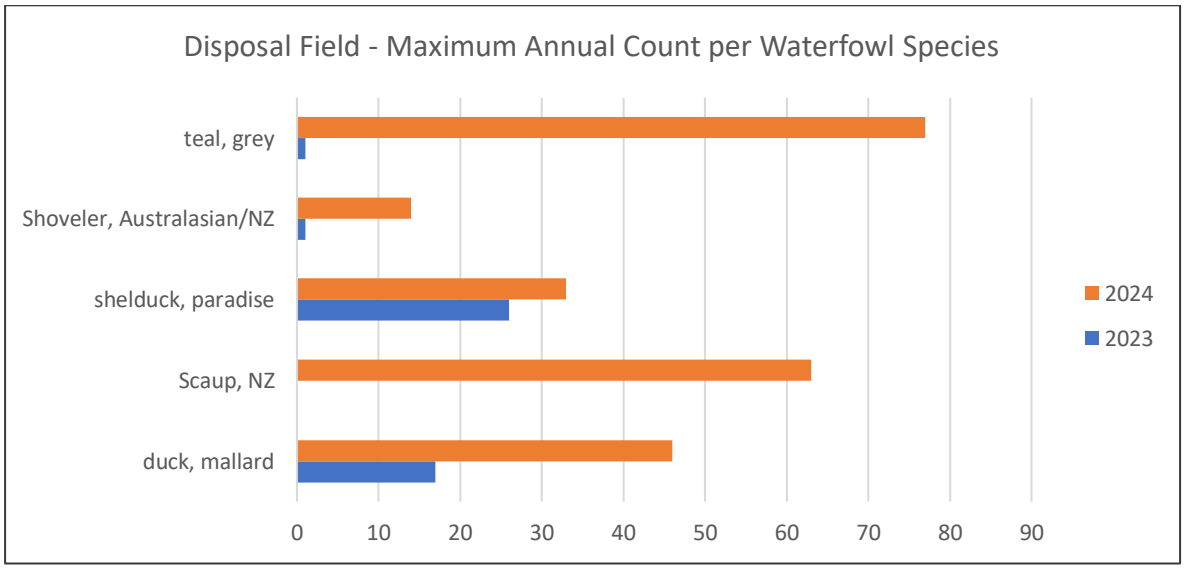


Figure 14 Disposal Field walking transect count annual maximum per wader species

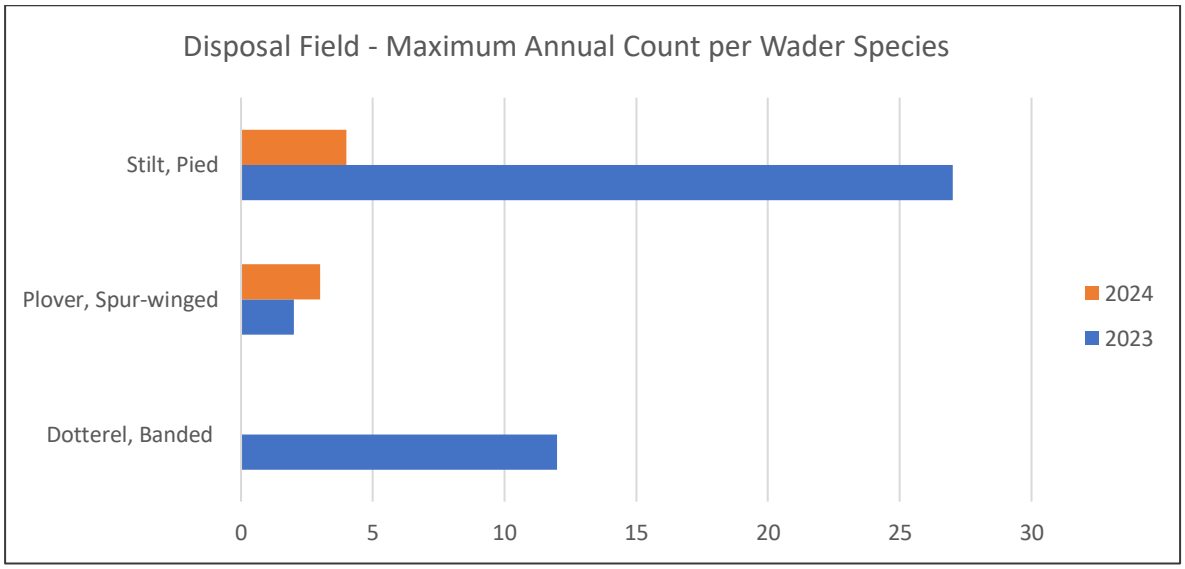


Figure 15 Disposal Field monthly walking transect counts commencing August 2023 indicates increasing use by Grey Teal

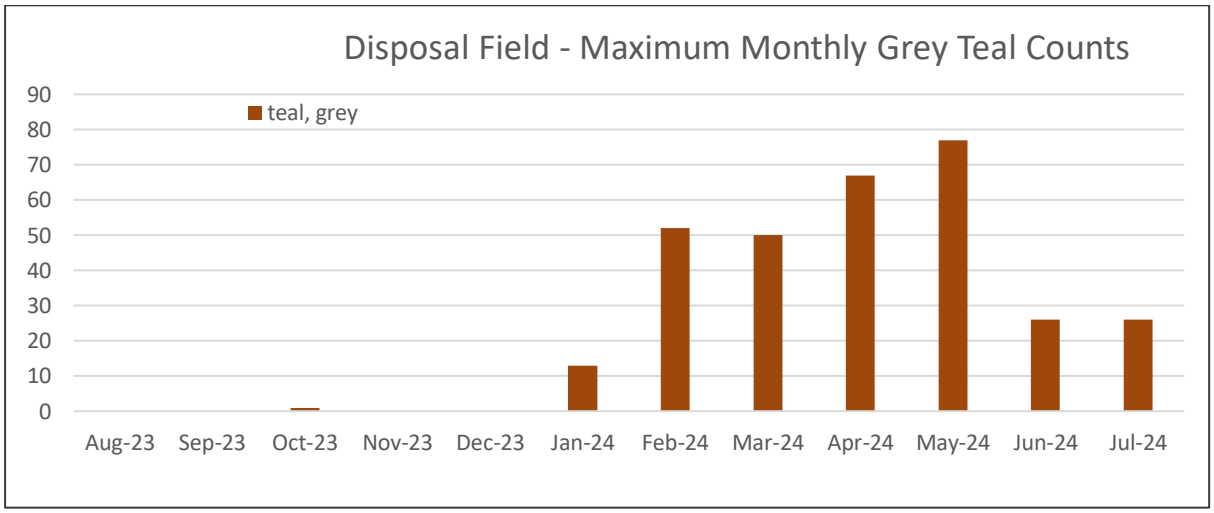


Figure 16 Disposal Field monthly walking transect counts commencing August 2023 indicates increasing use by Scaup

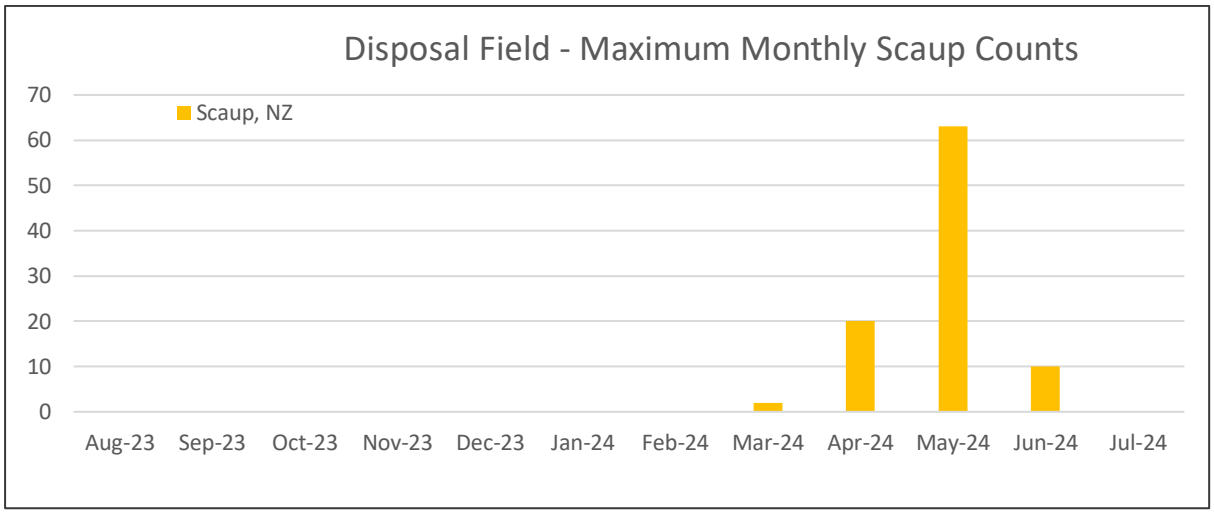


Figure 17 Disposal Field monthly walking transect counts commencing August 2023 indicates increasing use by Mallard ducks

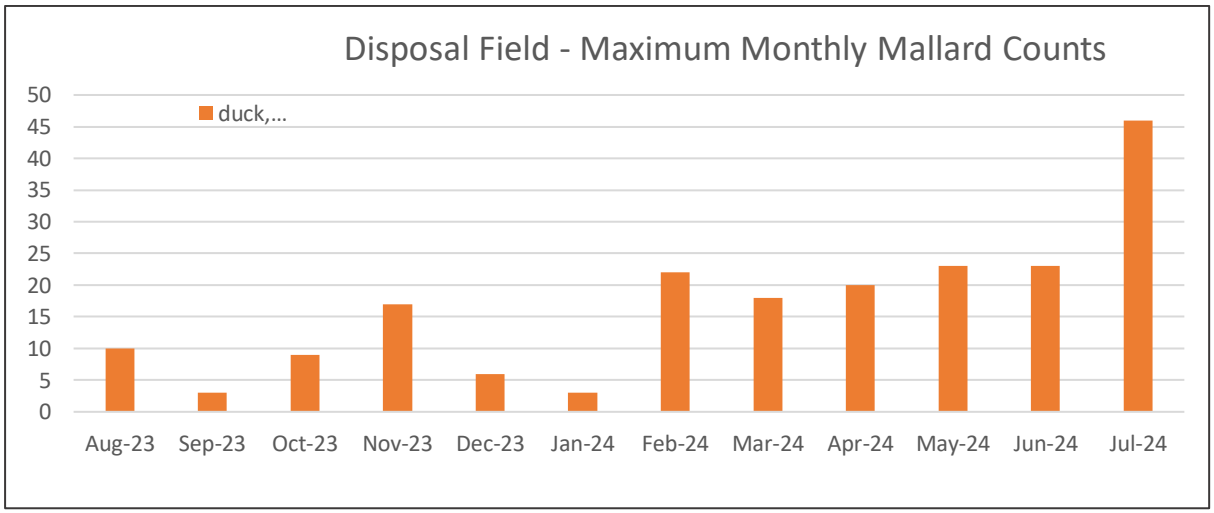


Figure 18 Disposal Field monthly walking transect counts commencing August 2023 indicates increasing use by NZ Shoveler

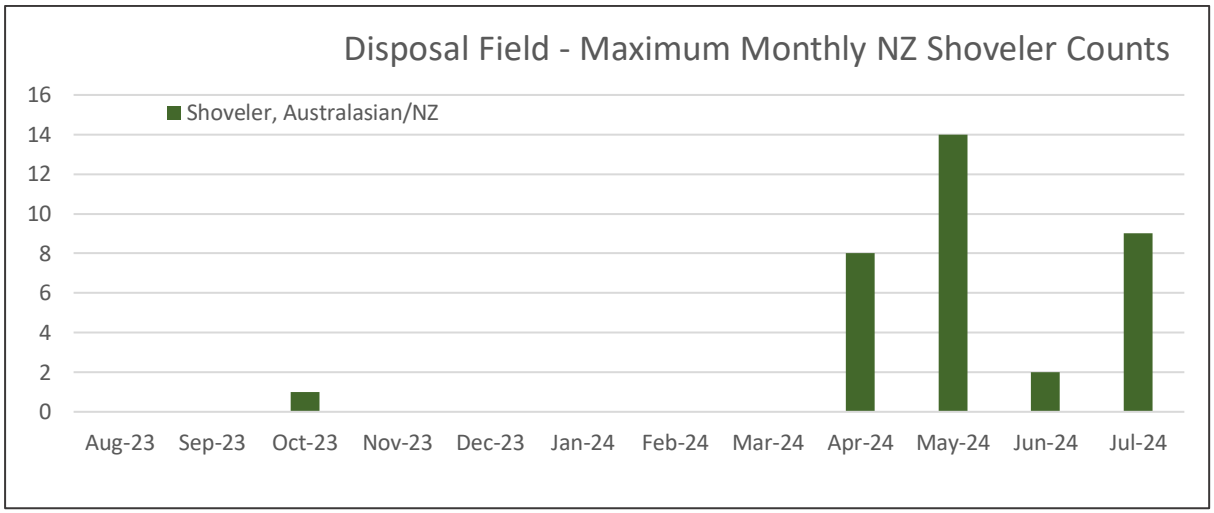
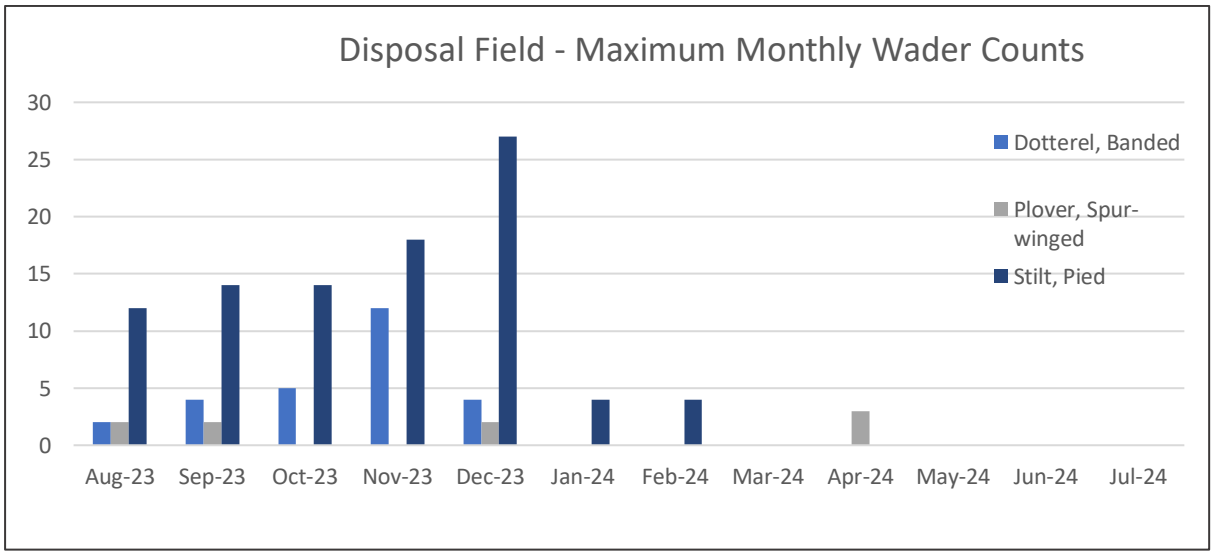


Figure 19 Disposal Field monthly walking transect counts commencing August 2023 indicates increasing use by NZ Shoveler



APPENDIX 4

dawn.palmer@xtra.co.nz

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Monday, 25 November 2024 10:53 am
To: Dawn Palmer; Simon Mason
Subject: RE: Update - Wildlife Monitoring - Waste Water Treatment Area

Thanks Dawn, that is certainly reassuring !

I'll be sure to tell the Contractor to be mindful of activities.

Cheers
Iain

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Monday, 25 November 2024 10:11 AM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Update - Wildlife Monitoring - Waste Water Treatment Area

Hi Iain,

The water/ slurry looks pretty dry in Pond 1.
The stilts seem reasonably tolerant of work going on around them as long as the contractors don't "hoover" up the nests. They've picked the highest and driest spots to nest so there shouldn't be any issue.
If the sludge work is programmed for January there won't be an impact on nesting. Nesting should be done by then and they should be rearing their mature chicks and juveniles should be reasonably independent and will be able to walk to the other ponds/ fly away.
I'll note landing attempts etc during the scheduled surveys.

Ngā mihi,
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Monday, 25 November 2024 9:08 am
To: Dawn Palmer <dawn.palmer@xtra.co.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Update - Wildlife Monitoring - Waste Water Treatment Area

Hi Dawn,

Thanks for the update.

With regards to the pond 1 observations.

There is a small amount of shallow ponded water in the bunded area around the black geobags, which builds up with rain, but then drains out over dry periods. This is difficult to avoid, but hopefully not sufficient to

attract wildlife as a new environment. Having said that, it will be in-situ for a long time, so not a real issue if they do decide to take up residence.

Can you provide some guidance please on how we should deal with the two pairs of pied stilts that appear to be nesting on the sludge? The Contractor's plan is to continue to remove as much of the water/slurry from the pond as possible, which will be done slowly and via pumping, so isn't intrusive to any nesting birds. Once this is completed, the area will be left to dry over the Christmas period. They intend to get in and scrape up the dry sludge in January (assuming the sludge has dried sufficiently) to allow the main earthworks in the basin to occur. Please advise if this timing affects nesting season, and what we can do about it.

As recommended, please continue to record landing attempts as you see them, if this is important to report on.

I'll leave Simon to respond if required on the activities at the disposal field.

Regards,
Iain

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Queenstown Lakes District Council
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E: iain.partington@qldc.govt.nz

QUEENSTOWN LAKES DISTRICT COUNCIL

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Sunday, 24 November 2024 8:15 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Update - Wildlife Monitoring - Waste Water Treatment Area

Good afternoon Iain and Simon,

Ponds
Pond 1 is now empty, and the sludge is drying, you'll both be well aware of this. Two pairs of pied stilts (not threatened) are nesting in the empty pond on nests built on high points within the sludge. These species are absolutely protected and their nesting should not be disturbed.

During the 5-minute count at Pond 1, I observed a mallard coming in to land, aborting this landing and flying into the ditch between the pond berm and the large, black bladders. It wasn't seen again during the count. Is there water in that area? It otherwise looked like there may have been a pretty hard landing. This is one of the impacts we want to watch, the "aborted landings", "go around flights" and activity associated with displacement.

I strongly recommend we record observations of landing attempts and any associated behaviour, i.e. a diversion to pond 2 or 3, leave the area, direction of flight to and from area, plane activity (ie jet/ATR

incoming/ outgoing; helicopter incoming/ outgoing; small plane flying around to join the cross runway/ approach/ takeoff from eastern runway (Threshold 23).

November is when we start to see waterfowl numbers on the ponds increase. However, the number of waterfowl on the ponds – all combined this month was just **57**, compared to 231 in November 2023 and 256 in November of 2022.

There are currently grey teal chicks on pond 3 confirming breeding there.

Disposal Field

The disposal fields as you are also no doubt aware are well flooded with the internal berms underwater, although with shallow water covering the berms in places. All species known on the disposal field have increased this month. The disposal field is currently holding more waterfowl than all the oxidation ponds combined.

Total numbers have increased from 20 adults in August, to 41 in September, 81 in October to 120 Adults in November. There are 45 downy chicks or moulting juveniles of mallard and paradise shelduck present in addition to the adults. Based on observations to date, I expect the waterfowl to continue to select the disposal field due to the higher water quality and relative separation from other activities. If we add the disposal field count to the pond waterfowl count we have **197** for the November count.

The count of adult waterfowl and waders on the disposal fields this month was comprised of:

Mon/ Yr	Dotterel, Banded	duck, mallard	Plover, Spur-winged	Scaup, NZ	shelduck, paradise	Shoveler, Australasian/NZ
Nov-24	3	23	-	**37**	12	24

The recent flooding of the disposal field has likely reduced the number of successful pied stilt and banded dotterel nests. On Friday 22nd November, there were 4 downy banded dotterel chicks, 3 of those were seen foraging on the flooded internal berms, a single chick on the outer berm was from another brood. 4 adult banded dotterels were present. The pied stilts are quite mobile between the ponds and the disposal field, 12 were counted across the ponds and 21 were counted in the disposal field. The maximum count last December was 27 so this count of 33 may not be too far off the mark.

The issue with the increasing numbers is the proximity to the eastern aerodrome threshold; I urge you to have a conversation with the team at Queenstown Aerodrome to discuss how this area is going to be managed through the summer.

I also urge you to remind all your contractors about the importance of not undertaking activity likely to flush waterfowl into the air.

- ***Move slowly and calmly in vehicles avoiding sudden, loud activities, get out of vehicles at the intended work site, the vehicle acts as a moving hide to some degree***
- ***Do not try to actively disperse them; note - the birds are absolutely protected under the Wildlife Act and it is an offence to harass or disturb them while breeding/ nesting. The arrival of small downy chicks confirms nesting and chick rearing is underway in the vicinity of ponds and nests have been confirmed for some species.***
- ***Most importantly, do not try to disperse or disturb them intentionally without prior knowledge of flight schedules and consideration for which direction flights are coming in/ flying out from the Queenstown Airport. A discussion with the QAC wildlife management team may be beneficial to improving understanding between all parties.***

Grey teal are probably the most easily flushed into flight and when this happens they may fly around and may return or leave so they make much bigger flight movements than other species.

Simon, may I share my monitoring observations with Queenstown Airport Corporation Aviation Safety/ Risk Management Team?

Iain, I know you have been in touch with Juliet Breen already.

I will (this evening) also be providing QAC with an update for broader off aerodrome monitoring I undertake for them throughout the wider Whakatipu Basin. I will also be recommending that QAC undertake monitoring (as outlined above) of behaviour around the drainage of Pond 1 as it provides an insight into what may happen with Ponds 2 and then 3.

This is an opportunity for collaboration and to share resources as the identification and management of aviation risk is the purpose behind my monitoring and the designation conditions require the findings to be shared with QAC.

Ngā mihi

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Friday, 25 October 2024 2:56 pm
To: 'Iain Partington - External' <Iain.Partington@qldc.govt.nz>; 'Simon Mason' <simon.mason@qldc.govt.nz>
Subject: RE: Updated Charts for the ponds - October; proposal for additional monitoring

Good afternoon Iain and Simon,

The dewatering process at Pond 1 is well underway; this pond experiences less use than the other ponds, so I do not anticipate that this will result in a significant level of displacement this season.

Waterfowl numbers are comparatively low across all ponds compared to previous years. Mallard numbers generally remain under 100 at their maximum and Paradise Shelduck numbers start to increase in December and January, peaking in February.

Year	September	October	Species
2020	209	382	Mostly Shoveler, Scaup, Grey teal
2021	258	125	
2022	310	225	
2023	179	320	
2024	72	28	

However, there is an increase in waterfowl use of the Disposal Field. Monitoring of that area started in August 2023 with the arrival of areas of open water.

The purpose of the monitoring for QLDC is the identification of activities that may increase risk or hazards to aviation. Increasing areas of open water close to the eastern end of the Queenstown Aerodrome may contribute to an increased risk to aviation if waterfowl use the habitat.

If waterfowl use the habitat, then it is important that the risk of disturbance or events that cause them to flush and take flight from the site are minimised, i.e. ensure predictable movements in vehicles (which can act as a hide), and minimise walking around in the fields where birds are nesting or roosting. Avoid rapid dewatering/ flooding of the field that causes birds to move in/ out of the area.

It is also important that we understand the patterns of bird activity and bird movement to/ from the ponds and Disposal Field to determine how best to manage the site with respect to any potential risk/ hazard for aviation going forward with this year's dewatering of Pond 1 providing a potential indication of how this may go – even though numbers using that pond are comparatively low.

Teal, mallard and paradise shelduck numbers are up at the Disposal field compared to last year and there are Paradise Shelduck, mallard and possibly grey teal chicks on the ponds. Banded dotterels have chicks hatching and pied stilts are nesting.

Some of the questions around management of the Oxidation Ponds and Disposal Field include

- where will the birds go if they are displaced from the site?
- Will they become disturbed such that the flight activity around/ across the eastern end of the aerodrome increases such that it poses an increased risk to aviation?

To address these questions, I recommend the addition of further monitoring sessions, additional to the existing program:
From November to April – being the period of highest activity and occupation of the ponds. I recommend the following:

Observations to determine the period of the day (including just after dark) when activity to/ from the ponds is likely to peak and how much movement **if any** is crossing the flight path or potentially impacting aviation at Queenstown Aerodrome.

This would involve:
Three x 30-minute to 1 hour observation sessions (morning, mid-day, evening) at each of

- the Ponds (1, 2, 3 north bay, south bay);
- the Disposal Field from the best available viewing point;
- the footpath at the eastern end of the Queenstown Aerodrome (Eastern Access Road/ Hawthorn Drive),

Allowing some time to set up for monitoring and travel between sites = 4 – 8 hrs x 3 per month = 12to 24 hrs;
Data entry and update 9 - 18 hrs/ month, giving a total of 24 to 48 hrs per month.
At my current rate to Council for this work this would be an additional $2760 to $5520 per month + GST.

This could be reduced with a single, central observation point at the ponds, with an elevated viewing platform e.g. a lifeguard tower borrowed from the pool if available; this would also be helpful at the Disposal field.

I also recommend that you both continue to engage with Juliet Breen at QAC regarding progress and management of the Shotover Wastewater Treatment Area.

Kind regards
Dawn

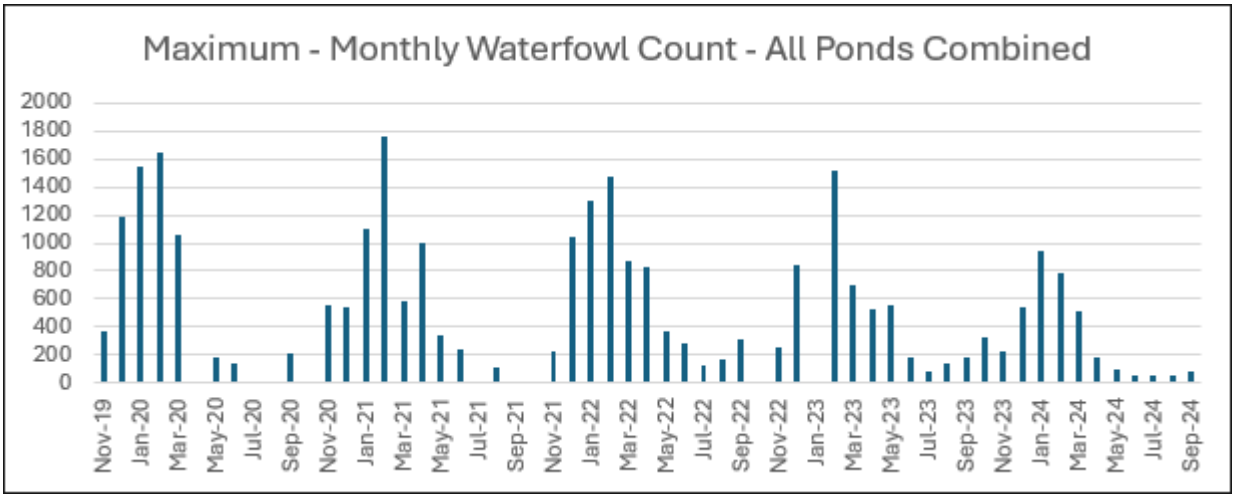
Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

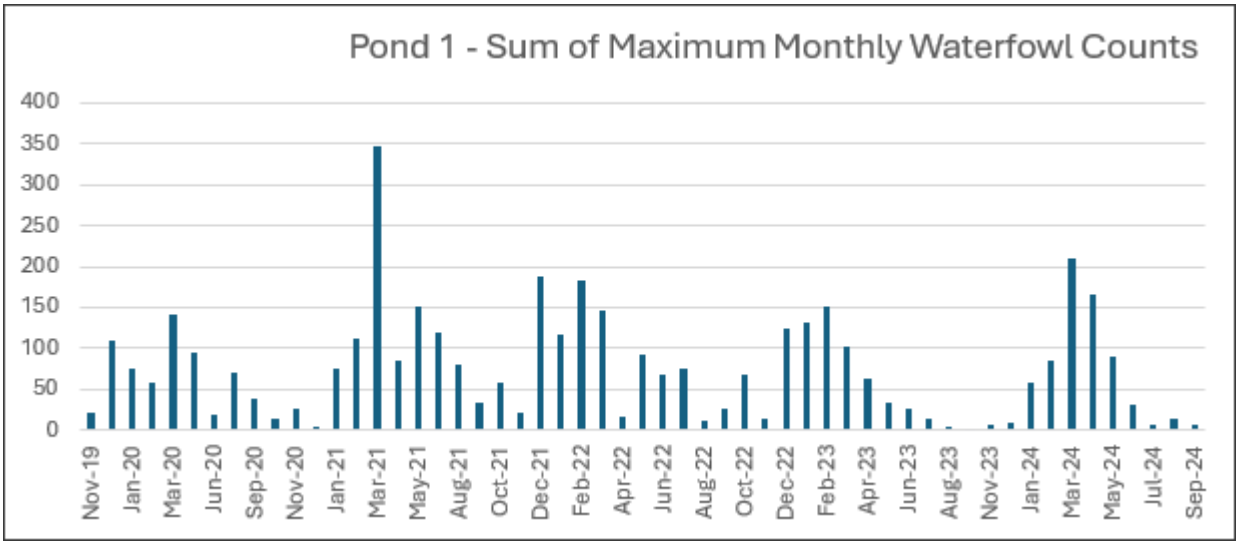
From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Thursday, 3 October 2024 2:48 pm
To: 'Iain Partington - External' <Iain.Partington@qldc.govt.nz>; 'Simon Mason' <simon.mason@qldc.govt.nz>
Subject: RE: Updated Charts for the ponds

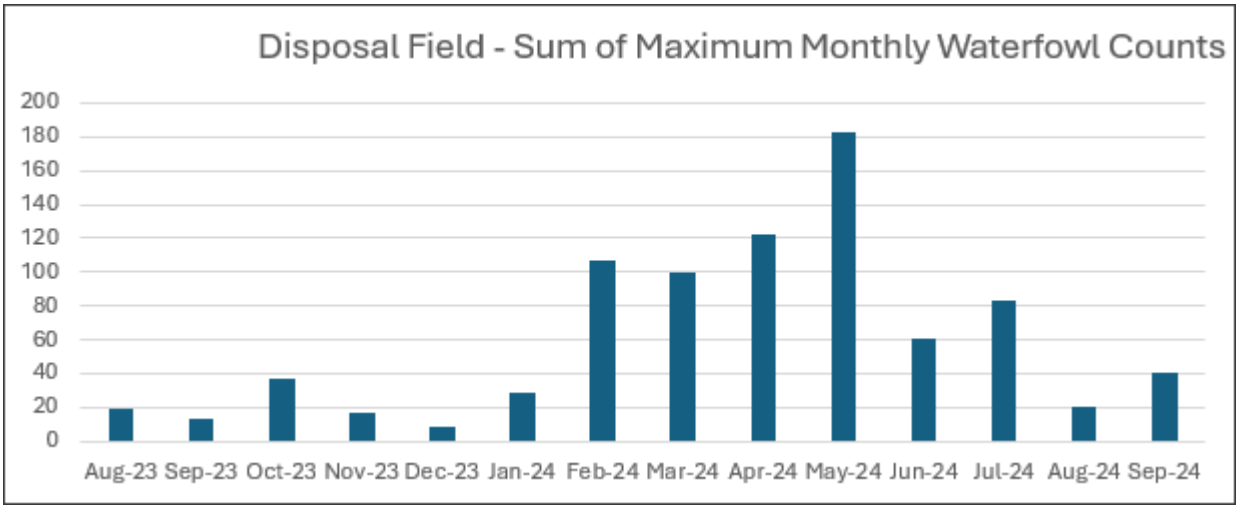
Kia ora Iain and Simon,

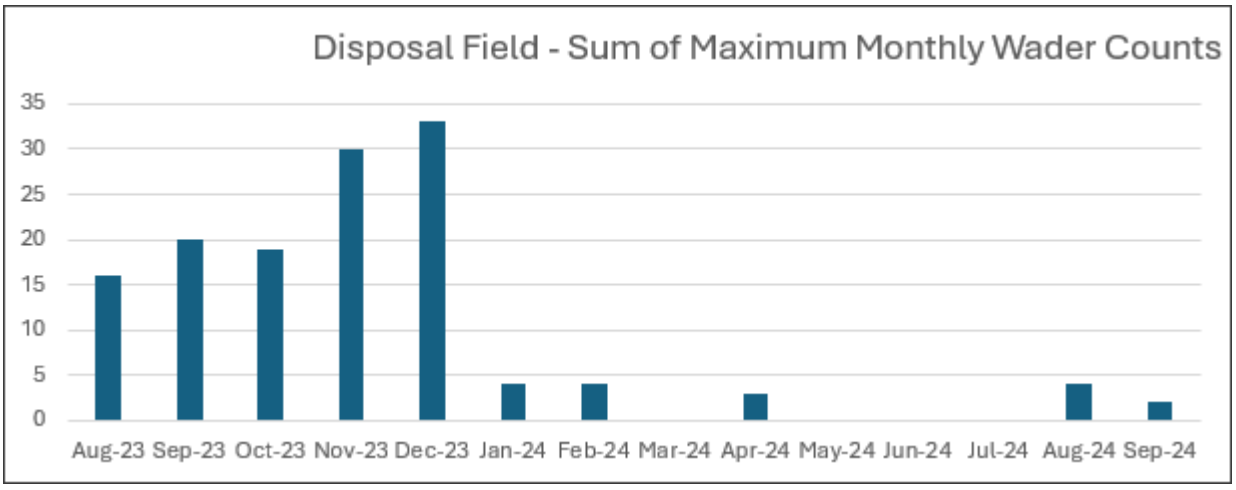
I undertook the survey of the Waste Treatment area on 23rd September.
Bird numbers remain low with a little over 100 waterfowl distributed between the ponds and the disposal field.
Waders have returned to the ponds and disposal field.
Pond 1 is at its usually low with waterfowl dispersed off site within their breeding territories.

Noting the very high September rainfall has created wet spring conditions again this year throughout the District, we will be watching to see how this impacts numbers locally through the season.
I wonder if the stormwater volume received lately has delayed the start of the dewatering?









Ngā mihi

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Iain Partington - External <Iain.Partington@qldc.govt.nz>
Sent: Thursday, 29 August 2024 8:44 am

To: Dawn Palmer <dawn.palmer@xtra.co.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Updated Charts for the ponds

Good morning Dawn,

Thank you for updating the charts, and for the summary information. Some interesting data in there in terms of overall changes.

As suggested, I will share this with Juliet at QAC for information.

Simon, can you please share as needed with the disposal field team? I'm happy to act as point of contact to share any ongoing project updates with QAC (in terms of major work activities or changes etc.) if that helps.

Regards,
Iain

Iain Partington | Project Manager | Property & Infrastructure
Queenstown Lakes District Council
M: +64 27 487 0364
E: iain.partington@qldc.govt.nz

QUEENSTOWN LAKES DISTRICT COUNCIL

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Tuesday, August 27, 2024 1:04 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Subject: RE: Updated Charts for the ponds

Kia ora Iain and Simon

After our meeting with the QAC Aerodrome safety team on 31st July, I undertook to update the charts for the monitoring results in the Shotover Wastewater Treatment Area.

Attached are the updated charts for the period up to and including July 2024 along with a summary of the August 2024 survey, with a summary and recommendation.

I recommend that you reach out to Juliet Breen and her team to keep the parties informed about management of the two projects for the decommissioning and the disposal field management.

Let me know how I can support this process.

I will defer to your regarding how you share these results with the QAC team. However, I do recommend that these results are shared with QAC as required by the conditions of the Designation Area.

Kind regards
Dawn

Dawn Palmer
Ecologist

Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Wednesday, July 31, 2024 4:18 PM
To: 'Juliet Breen' <juliet.breen@queenstownairport.co.nz>; 'Iain Partington - External' <Iain.Partington@qldc.govt.nz>
Subject: Updated Charts for the ponds

Hi Iain

I went to update the charts for each of the ponds this afternoon and found a sorting error had occurred. I'll re-run the data before sending out the updated charts which means I won't be able to get this out today as hoped. So the handouts should be taken as indicative only.

I'll have them with you as soon as possible.

It was lovely to meet Maria and Rob today.

Kind regards
Dawn

Dawn Palmer
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APPENDIX 5

dawn.palmer@xtra.co.nz

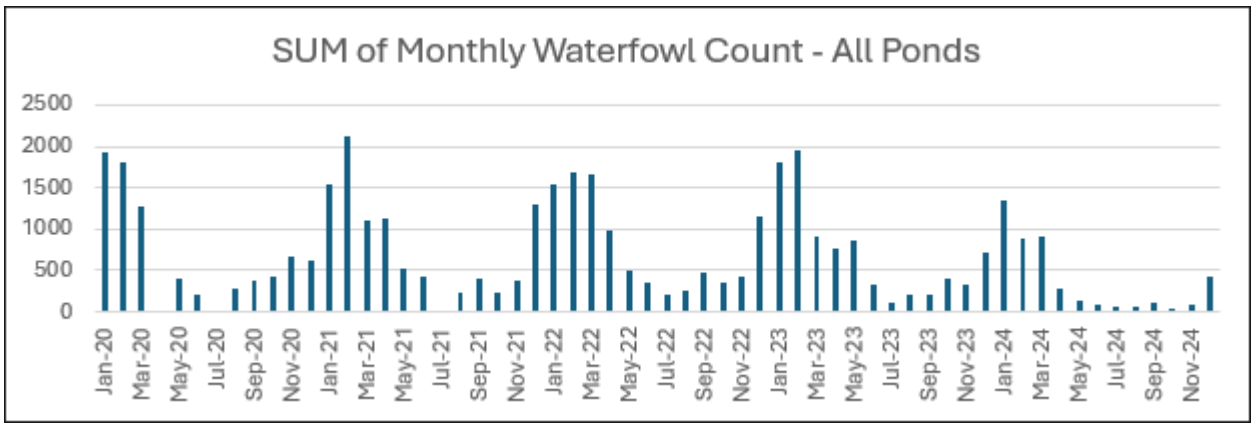
From: dawn.palmer@xtra.co.nz
Sent: Monday, 23 December 2024 5:23 pm
To: 'Iain Partington - External'; 'Simon Mason'
Cc: 'Juliet Breen (juliet.breen@queenstownairport.co.nz)'; Maria Jones; Rob Cowles
Subject: Update on Wastewater Treatment Area - Bird Survey - December 2024

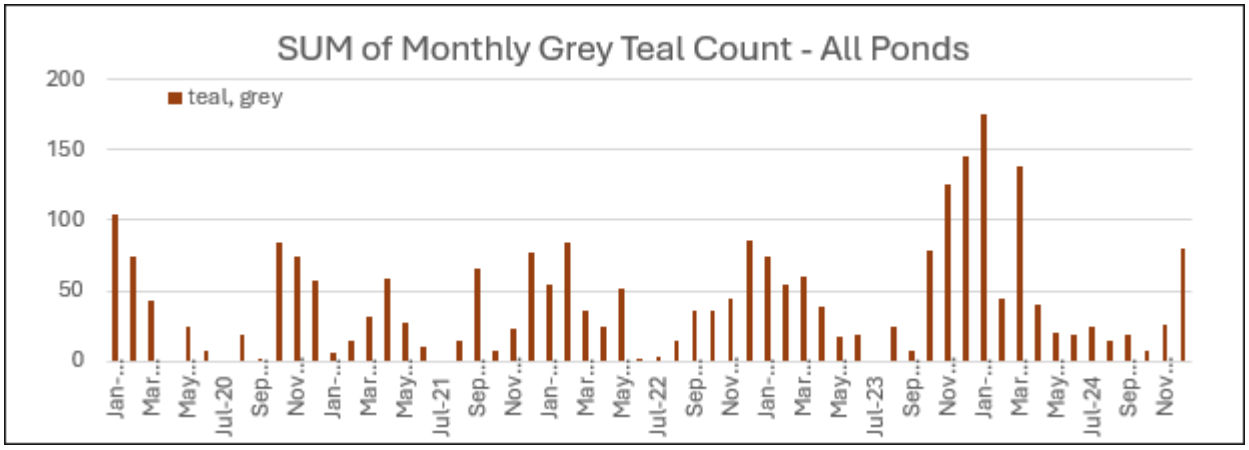
Kia ora Iain, Simon and the ZQN team,

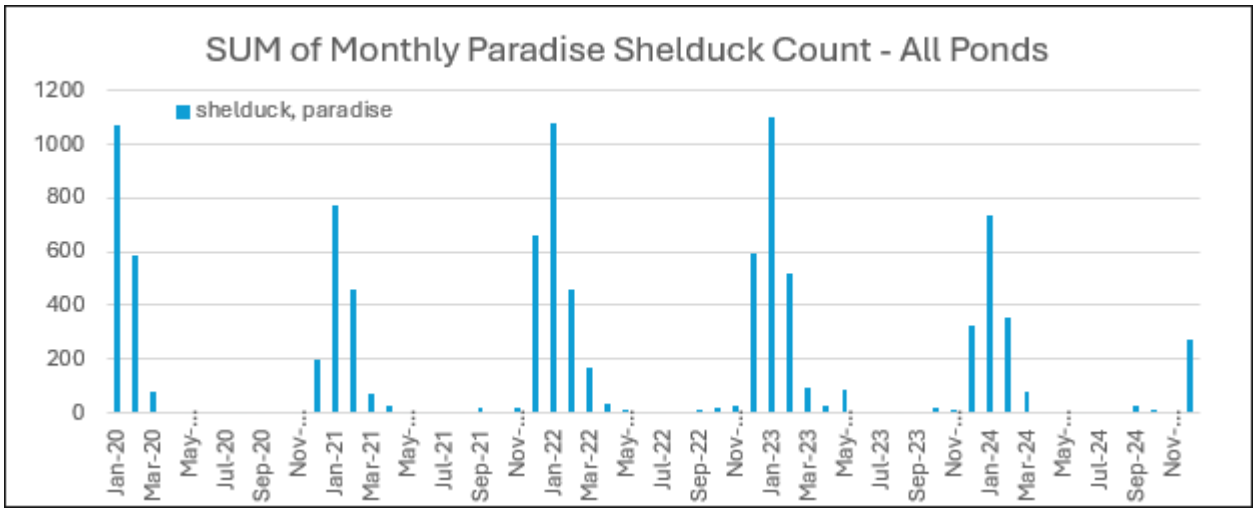
I undertook my survey of the Shotover Wastewater Treatment Area last week (20th) and have reviewed the results.

Key findings:
The waterfowl numbers are building up in the Wastewater Treatment Area as usually occurs at this time of year.

- Waterfowl are distributed across the Ponds, Disposal Field and a small, flooded area south of the Flood Retention Wall, between the wall and the Kawarau River on the Delta.
- The delta south of the flood wall has not previously been monitored but the waterfowl are moving between the Kawarau River habitats and the Wastewater treatment areas, I therefore included it in this month's count.
- Based on previous year's results, we can expect the number of waterfowl to be about double over the next two months.
- The total count of waterfowl across ponds, disposal field and the small, flooded area on the delta for December was **649,** this total was down from December last year **725** and December 2022 – **1142;** previous years did not include the delta area.
- As for previous years, the majority of waterfowl are Paradise Shelduck followed by Grey teal and Australasian Shoveler then Scaup and Mallard.
- Grey teal numbers are increasing.
- A further breakdown is provided below.




SUM of Monthly Grey Teal Count - All Ponds
teal, grey
200
150
100
50
0
Jan-...
Mar...
May...
Jul-20
Sep...
Nov...
Jan-...
Mar...
May...
Jul-21
Sep...
Nov...
Jan-...
Mar...
May...
Jul-22
Sep...
Nov...
Jan-...
Mar...
May...
Jul-23
Sep...
Nov...
Jan-...
Mar...
May...
Jul-24
Sep...
Nov...


SUM of Monthly Paradise Shelduck Count - All Ponds
shelduck, paradise
1200
1000
800
600
400
200
0
Jan-20
Mar-20
May-...
Jul-20
Sep-20
Nov-...
Jan-21
Mar-21
May-...
Jul-21
Sep-21
Nov-...
Jan-22
Mar-22
May-...
Jul-22
Sep-22
Nov-...
Jan-23
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Jul-23
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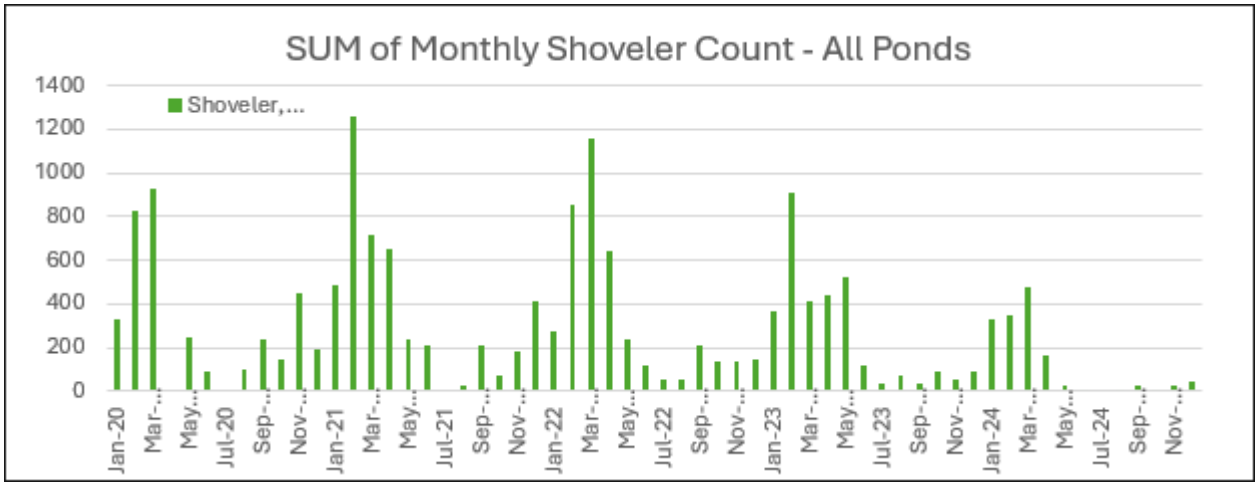
Nov-...
Jan-24
Mar-24
May-...
Jul-24
Sep-24
Nov-...


SUM of Monthly Shoveler Count - All Ponds
Shoveler,...
1400
1200
1000
800
600
400
200
0
Jan-20
Mar-...
May...
Jul-20
Sep-...
Nov-...
Jan-21
Mar-...
May...
Jul-21
Sep-...
Nov-...
Jan-22
Mar-...
May...
Jul-22
Sep-...
Nov-...
Jan-23
Mar-...
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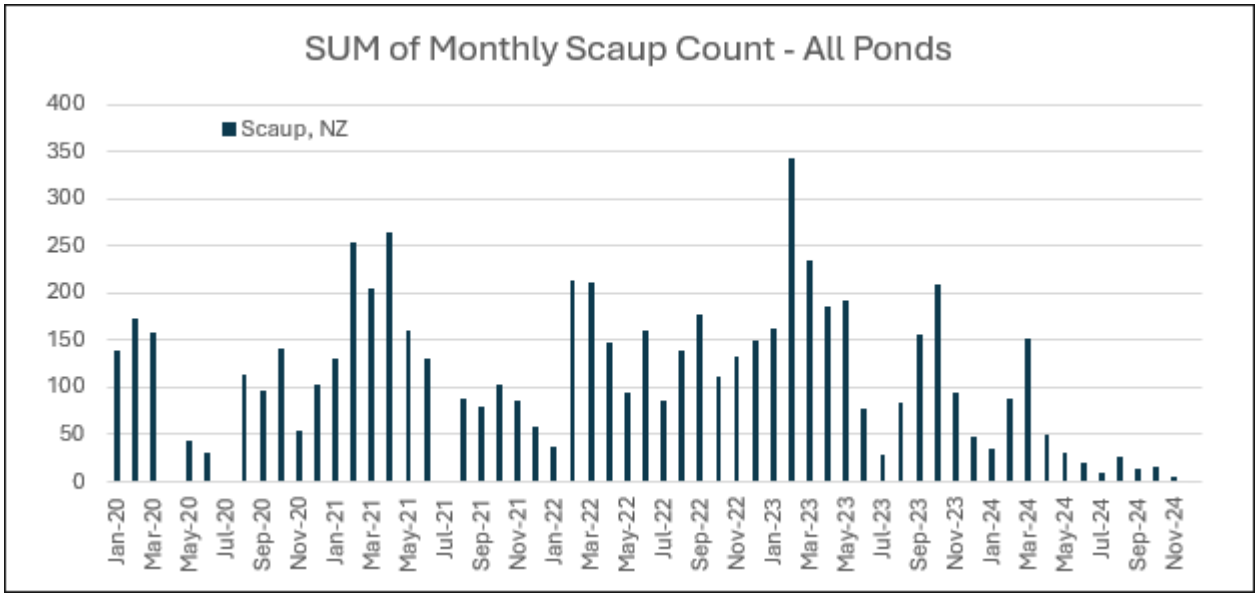
Nov-...
Jan-24
Mar-...
May...
Jul-24
Sep-...
Nov-...



Below is a table summary for the past 5 years showing the highest count recorded for each species, and the month that the highest count occurred.
From this you can see that:

- Paradise Shelduck numbers peak in January.
- Grey teal may peak in December/ January;
- Scaup peak in about February/ Late Feb/ March;
- Shoveler peak in Feb/ March
- Mallard appear to be quite variable and this may be a reflection of their movement between other habitats.

The Highest Count per year of each species Ponds 1, 2 and 3

Max of Total	Column Labels							
Year	Duck, (Grey or Mallard)	duck, mallard	Goose, Canada	Scaup, NZ	shelduck, paradise	Shoveler, Australasian/NZ	Swan, black	teal, grey
2020	2	274	1	174	1076	926		104
2021	4	142		265	773	1258		77
2022		167		214	1079	1157	1	86
2023		129	1	343	1105	914		145
2024		73		152	733	479		139

Year	Month of Highest Count Ponds 1, 2 and 3							
2020	Dec	Jan	Jun	Feb	Jan	Mar		Jan
2021	Mar	Apr		Apr	Jan	Feb		Dec
2022		Dec		Feb	Jan	Mar	Feb	Dec
2023		Feb	Jan	Feb	Jan	Feb		Dec
2024		Jan		Mar	Jan	Mar		Mar

Pond 1 is now drained, and the sludge is drying.
Grey teal, pied stilts and starlings are foraging in the sludge. Two pairs of pied stilt are rearing 3 chicks each.

All birds appear relatively settled **and I was impressed with how carefully the Veolia staff member moved between sites to sample water**. The birds remained quiet and settled as he drove and walked to sampling sites.

Pond 1 sludge had **27** waterfowl, 26 were foraging Grey Teal; Pond 1 also had 19 pied stilts with 6 chicks.
Pond 2 had **114**, 70 were paradise shelduck, 23 mallard and 20 grey teal.
POND 3 (north portion) held the highest count at **255**; 200 of these were Paradise Shelduck and 45 were Shoveler.
Pond 3 (south portion) held **38** waterfowl, 24 of those were Grey Teal.

The Disposal Field supported **143** adult waterfowl of which 55 were Scaup and 45 were Shoveler; chicks and juveniles were present but not included in the count. The ponds had the second highest count.

The Delta pond south of the flood wall held **76** waterfowl; 38 were Grey Teal, 29 were mallard.

There is also a pair of black swans (**2)** on the delta; black swans are being recorded along the Kawarau River as well in the Off-Aerodrome surveys for ZQN.

Gulls are flying between the Shotover River east of the Fulton Hogan yards and the Transfer Station.

I have summarised observations from the Wastewater Survey and incidental observations I have undertaken independently.

Incidental and independent observations reveal Paradise Shelduck numbers are high on the Mooney's Road ponds, Oystercatchers are now present in smaller dispersed flocks and are leaving the area.

Black-fronted terns are being seen in small numbers throughout the Basin with the main colony located in the Tucker Beach Wildlife Reserve where the main Black-billed gull colony is also nesting.

I note a toxic algal bloom was confirmed by ORC last week to be present on Lake Johnson, its unclear what if any impact this will have on the use of that habitat by waterfowl .

Key recommendation

- Continue to work quietly and minimise disturbance to waterfowl and waders in the wastewater management area east of the Queenstown Aerodrome (ZQN).

Ngā mihi,
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

APPENDIX 6

dawn.palmer@xtra.co.nz

From: Simon Mason <simon.mason@qldc.govt.nz>
Sent: Wednesday, 19 February 2025 2:02 pm
To: Dawn Palmer; Iain Partington - External
Subject: RE: Update on Wastewater Treatment Area - Bird Survey - January 2025

Thanks Dawn.

I have enquired with the operators as they haven't flagged any concerns with the ponds to me recently, and I had been enquiring in the wake of the DCC situation. However, the colour of the bond in your photo is certainly a concern.

Please keep us in the loop around how your budget is tracking, as this is very important work particularly with the status of the disposal field.

Regards,
Simon

Simon Mason | Infrastructure Operations Manager
Property & Infrastructure
Queenstown Lakes District Council
M: +64 27 643 1913
E: simon.mason@qldc.govt.nz

QUEENSTOWN LAKES DISTRICT COUNCIL

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Wednesday, 19 February 2025 1:54 PM
To: Simon Mason <simon.mason@qldc.govt.nz>; Iain Partington - External <Iain.Partington@qldc.govt.nz>
Subject: RE: Update on Wastewater Treatment Area - Bird Survey - January 2025

Hi Simon and Iain,

FYI - Here's a photo taken on Monday 17th February 2025. Note the approaching aircraft over the river.

Noting Pond 3 is quite brown. I noted it had floating algal mats as well. This is where the highest number of waterfowl are.

Are you up to speed with the Waikouaiti wastewater conditions that resulted in the outbreak of avian botulism?
Fish and Game have been involved with that event which we'd obviously like to avoid.

I'm not sure what the budget for my monitoring is, but I wanted to flag with you that the monthly hours are creeping up above what they have been in past years and so we may reach a limit sooner than for previous years.

Ngā mihi,
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: Simon Mason <simon.mason@qldc.govt.nz>
Sent: Wednesday, 19 February 2025 7:36 am
To: Dawn Palmer <dawn.palmer@xtra.co.nz>
Subject: RE: Update on Wastewater Treatment Area - Bird Survey - January 2025

Thanks Dawn.

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Tuesday, 18 February 2025 7:10 PM
To: Iain Partington - External <Iain.Partington@qldc.govt.nz>; Simon Mason <simon.mason@qldc.govt.nz>
Cc: 'Juliet Breen' <juliet.breen@queenstownairport.co.nz>; Rob Cowles <rob.cowles@queenstownairport.co.nz>
Subject: RE: Update on Wastewater Treatment Area - Bird Survey - January 2025

Tena koutou Iain, Simon and Juliet and Rob,

I undertook the survey of the Wastewater Treatment area on 15th February.
Pond 1 is being infilled with clean fill.
The waterfowl are very settled, paradise shelduck and shoveler are in moult, shoveler – in full moult including wing flight feathers, paradise shelduck moult is well through but still in progress.

Summary of counts:

Species	Pond 1 (infilling with cleanfill)	Pond 2	Pond 3 N	Pond 3 S	Disposal Field	Total
Paradise shelduck		13	465	6	43	527
Shoveler		2	160	10	3	175
Mallard		8		16	50	74
Grey Teal		43		12	100	155
Scaup			1	55	53	109
Starlings	1					1
Spur-winged plover	2	3	2		1	8
Pied stilts		3	7		2	12

I've charted up the distribution of waterfowl and waders between the ponds and the disposal field; remember that this habitat has only very recently become available to waterfowl and monitoring started in August 2023 as surface water became available as an addition to the bare gravel substrate.
I've provided the same chart for waders and gulls.
The number of waders in the disposal field has likely been reduced by the flooding of the internal berms this year.

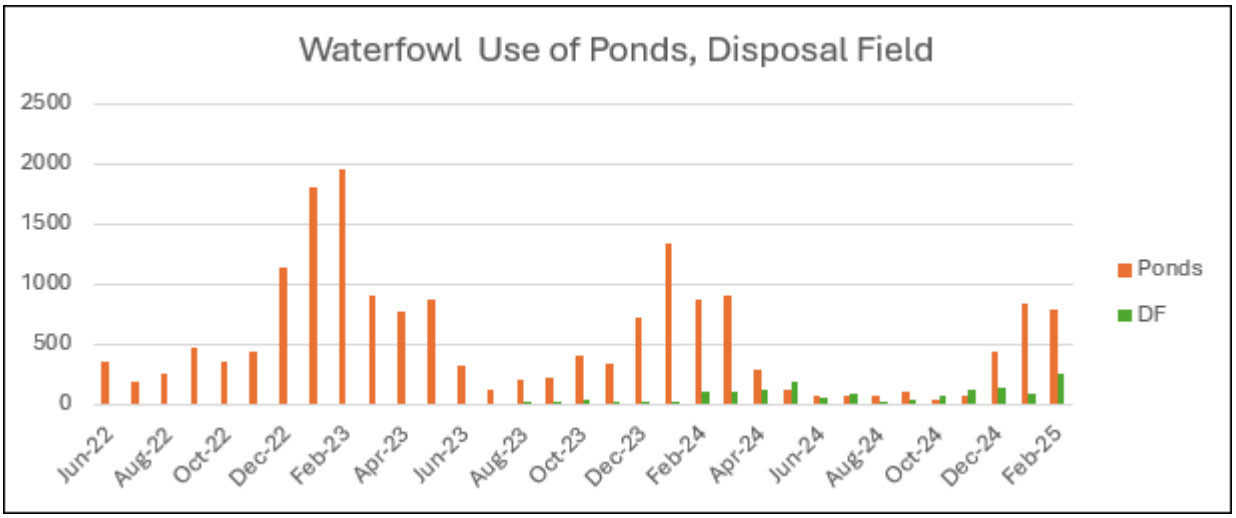
Out of interest, I checked the Mooneys Road swamps and counted 149 paradise shelduck on the 15th February after I finished the count in the Wastewater area. I only counted birds that could be seen from the Road.

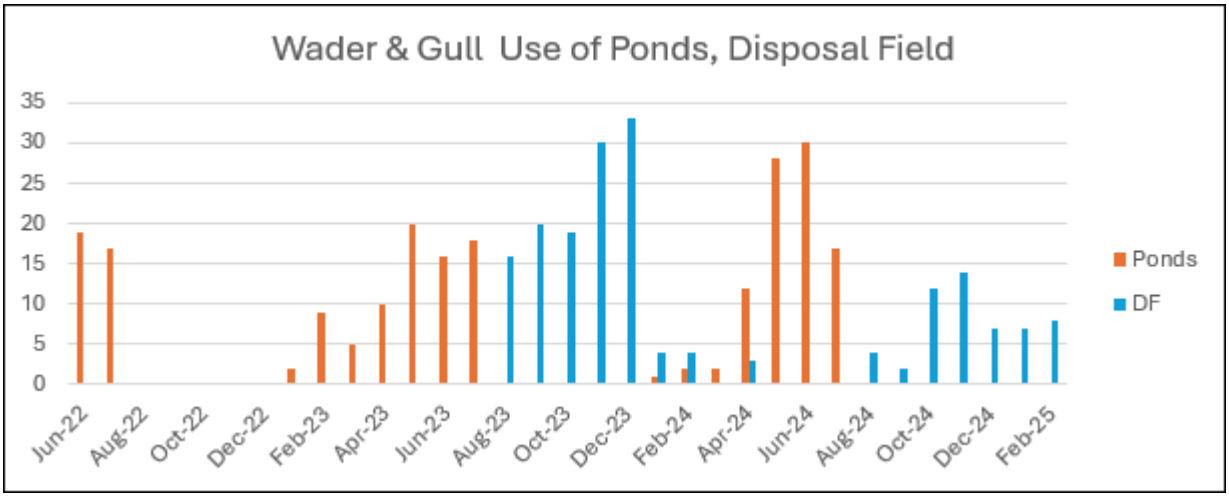
I've also received a public report of a large flock (potentially as many as 300) of paradise shelduck at Lake Tewa on the 17th February.

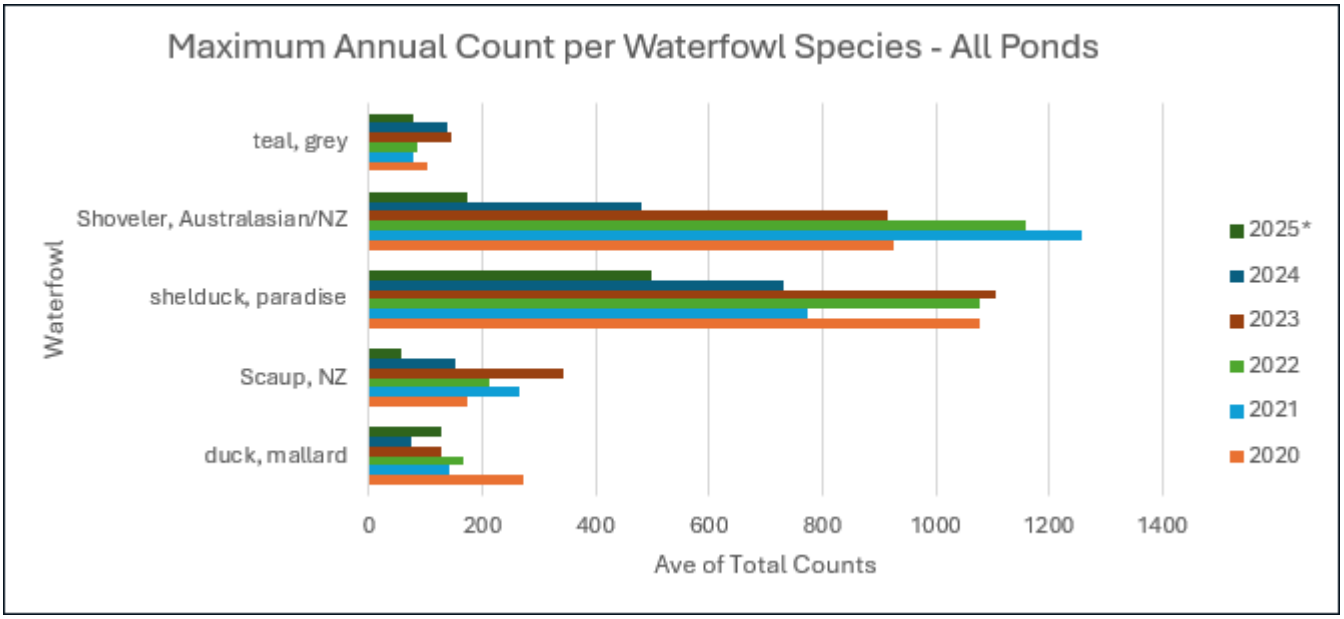
Below I've included a chart of the peak Pond count for each of the waterfowl species over the past 5 years.

Rob Cowles at ZQN shared Fish and Games recent (January) count of paradise shelduck:

Location	Year 2023	Year 2024	Year 2025
Waster Water Plant	1500	600	700
Mooney Road (Atwn)			400
Moke Lake			200







Ngā mihi,
Dawn

Dawn Palmer
Ecologist
Natural Solutions *for Nature* Ltd
467 Frankton Road Queenstown 9300| E dawn.palmer@xtra.co.nz | M 027 442 7348

From: dawn.palmer@xtra.co.nz <dawn.palmer@xtra.co.nz>
Sent: Wednesday, 22 January 2025 5:48 pm
To: 'Iain Partington - External' <Iain.Partington@qldc.govt.nz>; 'Simon Mason' <simon.mason@qldc.govt.nz>
Cc: 'Juliet Breen (juliet.breen@queenstownairport.co.nz)' <juliet.breen@queenstownairport.co.nz>; Maria Jones <maria.jones@queenstownairport.co.nz>; Rob Cowles <rob.cowles@queenstownairport.co.nz>
Subject: Update on Wastewater Treatment Area - Bird Survey - January 2025

Tena koutou Iain, Simon and the ZQN team,

I undertook surveys of the Wastewater Treatment area on 18th January, there was a small front end loader and digger at work during the survey in Pond 1 closest to the State Highway.

Dried/ drying sludge was being moved up onto the berm between Pond 1 and 2.

Noted was an uptick in Starling foraging on the drying sludge, 45-50, in Pond 1.

Birds were generally settled except for shoveler, mallard and grey teal which appeared less settled and took flight around the ponds when Pond 3 was counted.

Paradise shelduck are moulting and less inclined/ able to fly at the time of the survey.

The table provided in the December 2024 summary email is copied here to provide a comparison for the results

The Highest Count per year of each species Ponds 1, 2 and 3	
Max of Total	**Column Labels**

Year	Duck, (Grey or Mallard)	duck, mallard	Goose, Canada	Scaup, NZ	shelduck, paradise	Shoveler, Australasian/NZ	Swan, black	teal, grey
2020	2	274	1	174	1076	926		104
2021	4	142		265	773	1258		77
2022		167		214	1079	1157	1	86
2023		129	1	343	1105	914		145
2024		73		152	733	479		139

Year	Month of Highest Count Ponds 1, 2 and 3							
2020	Dec	**Jan**	Jun	Feb	Jan	Mar		Jan
2021	Mar	Apr		Apr	Jan	Feb		Dec
2022		Dec		Feb	Jan	Mar	Feb	Dec
2023		Feb	Jan	Feb	Jan	Feb		Dec
2024		Jan		Mar	Jan	Mar		Mar

Numbers on the ponds on Saturday (18/1/2025) are summarised below:

Species	Pond 1 (drained)	Pond 2	Pond 3 N	Pond 3 S	Disposal Field	Total
Paradise shelduck	1	5	450	42	8	506
Shoveler	0	0	115	0	18	133
Mallard	0	8	33	85	23	149
Grey Teal	0	9	13	55	22	99
Scaup	0	0	3	25	12	40
Starlings	50					50
Spur-winged plover	6		1			7
Pied stilts	2	14	7	0	4 Adults & 2 chicks	23

I counted the Ponds again on Sunday when I undertook the Basin survey for ZQN and to see if the presence of the work crew may have had an impact on the Saturday count. Shoveler and grey teal numbers were higher, mallard numbers were lower, paradise shelduck were similar on Sunday.

On Sunday, I also checked the irrigated farm paddocks on the Mee Farm south of the Kawarau River as paradise shelduck have been seen feeding there; only 1 was seen. But 50 Spur-winged plovers were counted there.

Numbers on the ponds on Sunday are summarised below, *unfortunately I did not count the Disposal Field*; however, the waterfowl present on the ponds are reasonably comparable (927 waterfowl Saturday and 1023 on Sunday) and so indicative of the numbers present. A count from the eastern end of the Eastern runway threshold 05 later in the day (about 4 hrs later) revealed just 12 waterfowl on the Disposal Field.

Sunday 19/1/2025 Pond Re-Count

Species	Pond 1 (drained)	Pond 2	Pond 3 N	Pond 3 S	Disposal Field	Total
Paradise shelduck	0	11	380	140	Not counted	531
Shoveler	0	0	260	5	Not counted	265
Mallard	0	0	24	40	Not counted	64
Grey Teal	0	0	90	50	Not counted	140

Scaup	0	0	0	23	Not counted	23
Starlings	45	0	0	0	Not counted	45
Spur-winged plover	7	0	0	0	Not counted	7
Pied stilts	1	2	4	0	Not counted	7

On Sunday, the ponds were quiet with no work in progress. However, Shoveler flushed from the margins of the pond on my arrival, a large flock of about 150 mostly shoveler but some teal and mallards took flight, most moved onto the water to join others, most of those that took flight flew low over the ponds and resettled within a few minutes. A flock of about 20 made wider circles at varying heights around and over the ponds and appeared to circle across the eastern approach of threshold 05 at least twice before flying towards Lake Hayes and being lost from sight. Fortunately, no planes were present during this time although a total of 4 jets took off into the east wind from the eastern threshold over the half hour that these observations were made.

This observation highlights the risk of having high numbers of waterfowl present at this site. Most of the time, they are settled and quiet. It is common for birds roosting on the pond margins to flush onto the water, and as the flock builds, the counts require additional time to allow them to settle on the water or climb back on to the berms away from the road before counts can commence. It is less frequent for birds to take flight, but it does happen.

Regarding the question of where the waterfowl may be displaced to with the progressive decommissioning work, eBird provides a potential source of information but without dedicated efforts, the data won't be available from that source. I understand from Rob Cowles at ZQN that Fish and Game will be undertaking their count of paradise shelduck soon.

On 14th of January 2025 Petrina Duncan (known by me to be a reliable source) counted 222 scaup on Lake Hayes,
https://ebird.org/checklist/S209199158; scaup numbers at the ponds peak later in the year and scaup move onto the Frankton Arm in Autumn for winter.

On 1st January 2025 Gareth Hughes (unknown to me) counted large numbers of waterfowl on the Mooney Road ponds
https://ebird.org/checklist/S207413678. This included 200 paradise shelduck, 40 shoveler, 50 grey teal, 40 scaup.

On 1st January 2025 Fynn Zade (unknown to me) also counted a large flock of paradise shelduck (150) on the Mooney Road ponds https://ebird.org/checklist/S207415141

On 23 December 2024 I counted 150 paradise shelduck on the Mooney Road ponds
https://ebird.org/checklist/S207138725

It is possible that some of the paradise shelduck have been displaced to the Mooney Road ponds.

Shoveler usually peak later in the season; Grey Teal numbers are similar to previous years and may be near their peak.

Recommendation
Continued quiet caution is required around the ponds.

Ngā mihi,

Dawn

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APPENDIX 7

NSN Bird Monitoring - WWTP

File Reference: NSN 80/2025_SWT1

From: **Dawn Palmer, Ecologist; Natural Solutions for Nature Ltd**

To: **Simon Mason, QLDC; Iain Partington, QLDC (contractor)**

CC: **Juliet Breen, Queenstown Airport Corporation**

Date: **4 April 2025**

Subject: **Wildlife Monitoring – Shotover Wastewater Treatment Area**

1 Introduction

Natural Solutions for Nature Ltd (NSN) has undertaken monitoring at the Shotover Wastewater Treatment Area intermittently since 2006 and continuously since 2017.

The purpose of and requirement for monitoring is set out in the Conditions for Specific Designations[1]; Designation #46 – QLDC Sewage Treatment Works, part C.33 of the Proposed District Plan. Condition 11 specifies that "the Requiring Authority shall design, develop and manage the public work so that it does not attract any birds that are hazardous to aircraft or may endanger aircraft operations." Conditions 12 and 13 require the results of impartial monthly monitoring to be reported to the Territorial Authority and the Queenstown Airport Corporation (QAC) every three months.

The following is a Quarterly Update for monitoring of the Wastewater Treatment Plant (WWTP).

The most recent counts were undertaken on 18 January, 15 February and 22 March 2025. The counts represent a monthly "snapshot" rather than day to day fluctuations. However, the counts do provide an indication of seasonal fluctuations and trends in use of the WWTP habitats. Condition 11 of the WWTP Designation identifies "gull, oystercatcher, hawk, spur-winged plover and ducks" as species observed at the Queenstown Airport that may be hazardous to aircraft.

QLDC is currently undergoing a modernisation process of the WWTP which will result in the decommissioning of the oxidation ponds, their replacement with a Modified Ludzack-Ettinger (MLE) Activated Sludge filtering process [2]and treatment plant and the discharge of treated wastewater to land through a disposal field.

However, intermittent localised ponding in the disposal field started to occur in August 2021. The field was extensively excavated in June 2024, berm heights were increased; the internal pits were filled with water following heavy rainfalls in September, October and November 2024. By November 2024 just under 4 hectares of open water habitat had been made available to avifauna where previously there was bare gravel.

[1] https://districtplan.qldc.govt.nz/proposed/rules/0/243/0/33348/0/122
[2] https://www.qldc.govt.nz/media/zoalghlx/qldc_shotover-wastewater-treatment-plant-infographic_mar25.pdf

2 Method and Monitoring Sites

Counts are undertaken in calm conditions on a sunny or overcast day in the mid to later part of each month between the hours of 8:00 am and 13:30 pm; counts follow a routine order repeated for each visit. Binoculars (8x42 or 10x42) are used. Counts are undertaken when birds are settled. If birds are startled onto the water or into flight, estimates of the species and number of birds taken flight are made and time for them to return to the Ponds (as they usually do) is given. Birds are easier to count if on the water rather than crowded together on the berms and so they may be approached quietly to encourage them onto the water. This usually happens naturally as the flocks become aware of my presence. Each species is counted in turn and any that fly during the count are noted. If birds are not well settled, repeat counts may be required with flight activity noted. When flocks are large, a thumb counter is used and birds are counted in groups of 5; repeat counts may be required. If counts vary, an average of the closest two counts is taken. Birds are counted for each individual pond, birds moving between the ponds are not double counted. Birds on the top of berms are allocated to the more southern pond because this is the direction that they tend to move when disturbed.

Pond counts occur from four monitoring sites (Count Stations) on the east side of each pond including the north and south bays of Pond 3 which are divided by a willow covered berm. Three Count Stations have been established on the western side of the disposal field along the Queenstown Trail. Buddleia screening the Disposal Field was trimmed to provide a view of the area; the numbered cylinders in the Field enable the counts to be partitioned. There may be some movement while walking between sites, however, if the counts is affected, it will be repeated.

A new station was established south of the Flood Retention Wall in December 2024 (refer to Figure 1 below) and two new stations are proposed along the True Right side of the Kimi-ākau / Lower Shotover east of the Disposal Field and near the reinstated open discharge channel.

Elsewhere, Count Stations are distributed within the willows, open Delta, Cleanfill area and Runway Extension Safety Area (RESA) to the west where wasteland weed control (e.g. thistles) is required to reduce/ avoid finch flocks. Two Stations near the southwest corner of the Oxidation Ponds enable counts of the Conifer habitat on the escarpment and Buddleia/ broom/ willow on the flats below.

A minimum of 5 minutes is spent at each Count Station. Counts at the Ponds and Disposal Field may take longer to obtain a count of birds present. The counts at all stations other than the Ponds and Disposal Field follow a the 5-Minute Bird Count method whereby all birds seen and heard are counted as unbounded, independent counts. No bird is knowingly double counted at any one site and no bird is knowingly omitted from a count. Birds heard at one site, may however also be counted at another. The average count is taken for all sites combined away from the Ponds and Disposal Field where counts are more focused on waterfowl, waders and gulls.

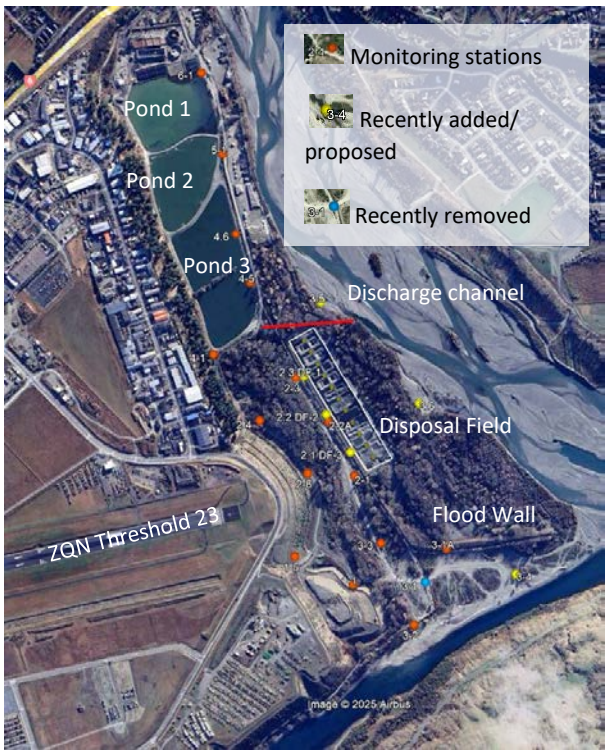


Figure 1: Bird Monitoring Stations

All red and blue stations have been monitored continuously since 2017. 1 Station was removed due to overlap with other stations.

3 stations (yellow) were added to the western side of the Disposal Field in August 2024.

1 Station south of the Flood Retention Wall was added in December 2024 following the creation of surface water in the Disposal Field and high water tables resulting from heavy rain and high river and lake levels in Spring 2024.

2 new Stations are proposed on the river margin east of Pond 3/ Discharge to River and the Disposal Field, starting April 2025.

Image Source: Google Earth Pro © 2025 Airbus; Imagery Date: 9/6/2024

Results are entered into a spreadsheet and results summaried in charts such as those provided in this report and shared with Council staff and QAC via an informal operational update. Larger reports such as this may be prepared on a Quarterly basis or when findings warrant a more comprehensive summary.

Note is made of weather conditions and river flows that may influence bird activity e.g. gulls, waders and terns.

NSN monitoring does not provide a correlation between bird activity in the WWTP and Bird Strike or Near Strike incidents at ZQN. CAA Bird Incident Rate Reports have historically been published on a Quarterly basis and are available from the CAA website[3]. They are usually released one or two Quarters behind the present time. Any correlation of the CAA reports with monitoring outcomes would therefore be retrospective. No Quarterly report was available for 2024 Q4 at the time of this report's preparation.

The decommissioning of Pond 1 (5.15ha) commenced in October 2024 with desludging underway as water levels dropped during the October monitoring visit. Ponds 2 (3.64ha) and 3 (3.42ha in the north and 2.68ha in the south) remained available as open water habitat[4]. The Disposal Field is about 3.82ha.

3 Summary of Species Present

Five waterfowl species form post breeding flocks on the Shotover oxidation ponds and more recently the open water in the disposal field where they undergo a moult (shedding and replacement of their feathers) rendering them flightless for a period of about 3 - 4 weeks. Newly fledged young are also

[3] https://www.aviation.govt.nz/safety/read-reports-and-statistics/bird-incident-rate-reports/
[4] Pond areas estimated using Google Earth Pro.

attracted to the flocks. The following is a summary of the behaviour of those species while in their moulting flocks at the Shotover WWTP.

Paradise shelduck/ Pūtangitangi are reasonably sedentry, birds from different moulting flocks rarely mix[5]. They are mostly herbivorous with most food taken from pastures, crops, stubble and seed heads. They gather at the WWTP from mid-December to March/ early April to undergo their moult. Simultaneous wing and tail moults render individuals flightless for about 3 -4 weeks. If startled, they take to the open water. Once able to fly, they can be flushed into the air from the Ponds before resettling and may fly to and from the ponds to foraging sites. Males, non-breeding birds, females and immature birds arrive at moulting sites over a period of months with peak numbers in January (refer Tables 1 and 2). Unpaired or non-breeding birds may return to flocks within moulting sites or prime feeding areas before dispersing to breeding sites. By April there are generally no adults in the moult sites (including the WWTP); duck hunting season starts in early May; birds are substantially dispersed by June[6], refer to Chart 2.

NZ Shoveler/ Kuruwhengi adults undergo a complete post-breeding moult during which they are flightless for a period of about 3 weeks from late January to mid February. Body feathers are replaced in a late summer/ autumn in a pre-breeding moult. During this period, shoveler flock at traditional pond and lake sites, their numbers peak at the WWTP in February/ March. They are a highly mobile species and will disperse many 100 kilometres from these summer moulting sites. They tend to roost on water or berms at the WWTP in the day feeding mostly at night, dusk and dawn. They are filter feeders taking a mix of mollusc, gastropods, invertebrates and seeds[7]. Shoveler are frequently observed feeding on the Shotover WWTP Ponds.

Scaup/ pāpango undergo a complete moult, timing and details of the their moult are not well known[8]; numbers on the oxididation ponds are variable but tend to peak in Autumn (refer Table 1). At least a few Scaup are present on the Ponds throughout the year. Scaup disperse from day roosts to feed elsewhere at night, but no nocturnal studies and no research on their movements have been undertaken; they are thought to be largely sedentry (Greene, 2021). They form more rafted post-breeding flocks on the Frankton Arm in autumn and winter (personal observation). Little is known about their diet but it includes a mixture of aquatic plants and invertebrates (Marchant & Higgins, 1990).

Mallard/ Rakiraki fly sometimes large distances to “traditional” moulting sites after the breeding season where they undergo a post breeding prebasic moult in which they replace all of their feathers; they are flightless for about 30 – 45 days while they replace their flight feathers (Ducks Unlimited[9]). Males and non-breeding females moult on lakes on open water away from shore; females moult near nesting sites. Mallards are usually found on the ponds in lower numbers compared to other species, they can be present year round; their numbers peak most frequently in January (refer Table 1). Ducklings have been recorded confirming that they are breeding nearby. They fly freely, rising steeply and often circle at altitudes of up to 500m above ground; like many waterfowl, they are most active at dusk and dawn. Their diet is mostly vegetative – seeds and fruit of aquatic plants but will also take insects, occasionally ripening grain crops and have been observed (personal observation) to fly to feed on known stubble crops.[10]

[5] Williams, M. 1972. Wildfowl 23: 94-102
[6] Marchant, S. & Higgins, P.J. (co-ordinating editors) 1990.
[7] Marchant, S. & Higgins, P.J. (co-ordinating editors) 1990.
[8] Ibid.
[9] https://www.ducks.org/conservation/waterfowl-research-science/mallard-annual-life-cycle accessed 3/4/2025
[10] Ibid.

Grey teal/ Tētē-moroiti are a highly dispersive species responding to climatic changes with movements over great distances; numbers on wetlands can change dramatically over a few days. Adults do not have to moult annually and they may postpone the moult as long as biologically possible depending on environmental conditions (e.g. prolonged wet seasons), (Marchant and Higgins, 1990). They undergo a complete moult loosing wing feathers (remiges) simultaneously, and then body, tertial feathers (on wings) and tails between December and March. Non-breeding birds may moult earlier. Breeding pairs attain fresh plumage by May. Flightlessness can be about 16 days within a 30-33 day moult duration. Diet is mostly plants and seeds from emergent vegetation, feed day and night mostly at dawn/ dusk.[11] Grey teal are often seen roosting on berms or on the water among the other waterfowl species. When able to fly, they may flush from the water and fly between Ponds or around the WWTP area before resettling or may leave the site completely.

3.1 Other Species

During WWTP monitoring on 22/3/2025, spur-winged plovers and gulls were heard on the Shotover Delta outside the normally monitored areas. An investigatory count at the proposed new site on the Shotover River east of Pond 3 revealed 80 spur-winged plovers and 32 southern black-backed gulls roosting mid-river east of the oxidation ponds, upstream of the willow islands in the river. Black-billed gulls are also present in the river environment during the breeding season (August to February) but their numbers are currently decreasing as these seasonal migrants return to coastal non-breeding habitats.

These species regularly fly from the Lower Shotover River/ Delta over the wastewater treatment area, occasionally roost on the berms. Spur-winged plovers fly between the Shotover Delta and Remarkables and Kawarau Station flats farm paddocks south of the Kawarau River and to the Frankton Flats/ ZQN and across the farmland of the wider Basin. Gulls (black-backed and black-billed) fly from the Delta/ Lower Shotover River to the Station paddocks, Transfer Station on Glenda Drive and Frankton Beach, Marina and Queenstown Bay.

Their presence and activity do not appear to be influenced by the management of the WWTP. These river roosting and nesting species are poorly represented in the counts as they are outside the designation area and only counted where they are heard or seen within the wastewater treatment designation area.

Most migratory waders, gulls and terns have left the District returning to non-breeding (coastal) habitats for the winter. They will not be reported on further in this update.

Finch species, introduced and native songbirds are also present however these are not present in numbers that are of concern to aviation with the possible exception of finches attracted to thistles, wasteland weeds and conifer (Pine) seeds on the eastern escarpment of the Frankton Flats.

Monitoring detects the build up of finch flocks in these areas; while wasteland weeds have been reasonably well controlled over the past few years in this area, finch (particularly goldfinch) flocks are increasing where thistle has produced seed on the Frankton Flats beyond the WWTP Designation Area.

Harriers can form winter flocks where food resources are abundant, but usually only 2 or 3 are seen at once over the Shotover WWTP and the immediately surrounding area. They have been observed[12] attempting to take paradise shelduck chicks from the surface of the Kawarau River and when they fly overhead, waterfowl (particularly paradise shelduck and mallard flocks) may be flushed into flight.

[11] Ibid.

[12] Personal observation

4 Decommissioning of the Oxidation Ponds

The decommissioning process anticipated that waterfowl will be displaced from a traditional moult site and will need to find a new habitat as the ponds are progressively decommissioned and the land repurposed.

However, the waterfowl response to progressive works and displacement was uncertain and this first stage of works on Pond 1, furthest from the aerodrome and holding lower flock sizes compared to Pond 3 provided important information regarding how the birds may respond to the removal of habitat and whether increased risks to aviation would arise.

Communication with ZQN and Fish and Game has been ongoing prior to and throughout the process.

Based on observations, consultation with Fish and Game, scientists with expertise in waterfowl ecology, and a literature review summarised in a report produced by NSN in May 2022, the behavioural responses anticipated during the decommission project include:

1. Abandonment of the site on initial arrival due to disturbance and loss of or reduced open water habitat with resettlement at an alternative site away from the WWTP and confluence of the Shotover and Kawarau Rivers. Sites such as the Kawarau River, Frankton Arm, Lake Hayes, small ponds across the Whakatipu Basin, Lake Tewa, Moke Lake, Lake Kirkpatrick and ponds further away may experience a commensurate increase in waterfowl.
2. Settled tolerance to progressive disturbance to and loss of the open water habitat, waterfowl numbers diminish as work progresses, displacement to other Ponds in the Whakatipu Basin or beyond. Occasional flush flights may occur if flocks are startled (*harriers are a common cause of flocks being flushed from the ponds*). This outcome relies on contractors and project teams operating in a calm and predictable way. Waterfowl at this site are used to heavy vehicles associated with the adjacent gravel extraction, screening, stockpiling and the reduction and replacement of those piles throughout the year and when flocks form in summer and autumn.
    a. Mitigations considered included erection of screen fencing if needed to visually separate trucks and work from the waterfowl on the unaffected Ponds (not required to date).
    b. Not working during the hours of dusk and dawn or night when birds can be more active, and their flights less/ not visible to Airport Wildlife Management Staff and Emergency Service Crews and pilots.
3. A period of unsettled activity, birds leaving and returning as they search for alternative sites. This may result in an increase in in nuisance complaints to Fish & Game. It could also give rise to the potential for unreported management by private landowners resulting in unauthorised and undocumented reductions in or disturbance/ deterence of the displaced local populations. This could lead to increased “flightiness”, unsettled flights between other sites or flush flights from the remaining Ponds with flocks circling and returning, increasing transit flights across ZQN resulting in an increased risk of hazard to aviation.

5 Findings

Monitoring undertaken for QLDC in the WWTP Area does not enable the anticipated responses described in Section4 above to be fully determined. However, a combination of all three are likely to be occuring.

Prior to the commissioning of the first MLE Activated Sludge filtering plant, Pond 1 was the first treatment pond and historically has held comparatively lower numbers of birds (refer Chart 10). Pond 1 has been drained, dried and is currently receiving cleanfill to repurpose the site. Waterfowl have been displaced.

Pond 2 has experienced a reduction in waterfowl use over the 2023/24 and 2024/25 seasons (Chart 11). Fill has been stockpiled between Ponds 2 and 3 and trucks have been driving along the berm surrounding Pond 2 which has previously been used as a roosting site.

Pond 3 is the final treatment pond prior to a process of UV treatment before discharge to land or the Shotover River (pre-2019[13]). Pond 3 has historically held the highest number of birds (refer Charts 12 and 13, Figure 1) with the northern bay of Pond 3 holding more than the southern bay. Paradise shelduck and shoveler counts over the past two seasons have been lower, refer to Table 2. Shoveler and Paradise Shelduck have likely been displaced.

5.1 Bird Count Results and Activity

All waterfowl (grey teal, shoveler, paradise shelduck, mallard and scaup) are using the ponds and the open water available within the Disposal Field closer to the approach path for Threshold 23 (the eastern runway) of Queenstown Airport, refer Figure 1. Waterfowl have been observed to move between the treatment ponds and the disposal field habitat as open water has become available in that area.

Table 1 below illustrates the month in which each species has recorded its highest count over the past 6 years.

Table 2 records the highest monthly count recorded for each of those years. For example, the highest paradise shelduck counts were recorded in January of each year, whereas the highest count of grey teal recorded in 2023 (145) occurred in December, but the highest count (139) in 2024 was in March.

The relative number of each species counted on the ponds and disposal field per month combined is illustrated in Chart 3 and 3A below. Table 2 and Chart 3A indicate reasonably stable numbers of mallard, with a potential increase in grey teal and decrease in scaup.

Bird counts for the south bay of Pond 3 have remained relatively stable, refer Chart 13, but the north bay of Pond 3 has experienced a reduction in waterfowl over the 2023/24 and 2034/25 seasons, Chart 12.

The most abundant species continue to be Paradise Shelduck and Australasian/ NZ Shoveler which usually achieve the highest count on Pond 3. The peak counts for Paradise Shelduck have been lower this season but it is too early to conclude Shoveler trends for 2024/25, which currently also appear to be lower, refer to Charts 1, 3 and 3A. Refer also the comparison provided in Charts 5 – 9 for each species on the Ponds, and Charts 14 – 19 for each species on the Disposal Field.

[13] Resumption of a discharge to the Shotover River occured after the 22 March 2024 survey.

The decrease in bird numbers on the Ponds has corresponded with an increase in the use of the Disposal Field (refer Charts 2, 3, 3A and 14).

However, all species will eventually be displaced by the decommissioning of the ponds over the next few

The reductions in bird numbers are likely to be result of decommissioning works including increased vehicle movements between Ponds 2 and 3, and the availability of other wetland habitat.

5.2 Disposal Field Habitat Use

The creation of a large open water habitat (almost 4 hectares in area) adjacent to the eastern threshold 23 of ZQN has resulted due to failures in the effective operation of the disposal field. This has allowed waterfowl displaced from the Ponds to move to the open water habitat close to and northeast of ZQN threshold 23.

The proximity of the open water closer to threshold 23 coupled with the disturbance and displacement of waterfowl from the Ponds increases the potential risk to aviation as disturbed birds may fly more widely before resettling or moving away from the WWTP area, refer to Section 5.3 below.

Waterfowl on the Disposal Field may also be more easily flushed due to the closer shelter of the willows reducing visibility of potentially disturbing influences (e.g. harriers). They may also fly from the Disposal Field to go foraging at other sites taking off and landing closer to the eastern threshold.

Charts 2 and 14 – 19 illustrate the use of the Disposal Field habitat by waterfowl following the progressive increase in open water. The site is enclosed by a dense stand of willows and buddleia providing a sheltered area with a mixture of deep water, partially submerged berms with dry loafing/ roosting areas. Use has been increasing as the availability of habitat has improved and the commencement of earthworks in Pond 1 and traffic on the berm between Pond 2 and 3.

Breeding on or near the disposal field margins has been confirmed for waders since 2022/23, and for both wader and waterfowl species in 2023/24 and 2024/25 although high water levels in the 2024/25 breeding season is likely to have resulted in the loss of some wader (dotterel/ pied stilt) nests.

5.3 Displacement and Off-site Influences on waterfowl movement

Charts 20 and 21 provide the average counts from monitoring stations other than the ponds and disposal field on the Shotover Delta, the RESA and tracks/ clearings within the willows.

Monitoring in June, July, October 2024 and March 2025 detected an increase in activity (flight) in mallards. This activity was observed from monitoring stations on the Delta, the RESA and count stations within the willows and along vehicle tracks elsewhere within the Designation Area. There was a particular “uptick” in February and March 2025, refer Charts 20 and 21.

A similar “uptick” in activity was recorded in October, December 2024 and March 2025 for Paradise shelduck; the drainage of Pond 1 commenced, and a more substantial availability of open water was also created in October 2024.

On 22 March 2025 when travelling between monitoring stations, a large flock of mallards (about 100 birds) was observed flying over the delta willows at 9:05 a.m. The main flock was detected flying

over the willows from the direction of the Disposal Field, it split into two sub-flocks, each with about 50 mallards. The flocks wheeled around the oxidation ponds before flying southwest towards the Queenstown Airport. The ZQN Emergency Services was notified; they observed one of the flocks flying east of the aerodrome transiting south across the Kawarau River.

Waterfowl (mallards and paradise shelduck) have been observed flying to and from the oxidation ponds and disposal field, and up and down the Kawarau River corridor to farm paddocks south of the River. They have also been seen flying below the height of the Frankton Flats terrace along the Kawarau River "flyway" and above the height of the terrace crossing the critical eastern threshold and the eastern approach/ take-off flight paths.

NSN has become aware that feed crops and stock feed have been planted, harvested and/ or provided (to stock) south of the Kawarau River. It is assumed these are ongoing farming practices. These food sources have attracted several 100 mallard and paradise shelduck from around the Whakatipu Basin with flight activity to and from the direction of these sites being observed by NSN.

A comparison of annual counts at the WWTP and those flocking to the foraging sites suggests that the paradise shelduck have substantially dispersed from the oxidation ponds and along with mallard are being attracted from other sites within the surrounding Whakatipu Basin. Just 38 mallard were recorded on the ponds and disposal field in March 2025 but the flocks observed confirm mallard are using a range of other sites throughout the Basin.

5.4 Weather/ Climatic Events

In 21-22 September 2023, heavy rain caused flooding in parts of Southland, Otago, and Canterbury, with a State of Emergency declared in Southland and Queenstown[14]. High water levels and flooding may have resulted in loss of nests and reduced local waterfowl populations, refer to Chart 22 which illustrates river flows for the Shotover River at Bowens Peak.

In Spring of 2024, Queenstown received 443mm of rain, 208% of the normal rainfall for the period and the Shotover River sustain a 600m3/s flow for two hours. There was widespread flooding in Otago, particularly eastern / coastal areas but wetlands and lakes remained full in the Queenstown Lakes. The Remarkables Skifield reported more than 2m of snowfall for the month of September[15]. These patterns of activity and the decrease in the waterfowl numbers seen on the ponds could be at least partially attributed to breeding failures during the extremely wet Spring of 2024.

Additionally, in previous years when maximum combined counts were over 2000 birds (2021; Chart 2), the Region was experiencing very dry conditions, birds may have been drawn to the Ponds temporarily increasing the size of the moulting flocks.

There is no research or monitoring data that NSN is aware of to inform this possibility further.

5.5 Off Site Monitoring

NSN has undertaken a limited amount of investigatory surveys in the surrounding area (e.g. Mooneys Road, Morven Ferry, and Willow Pond/ Lake Tewa), however as these areas have not been regularly monitored prior to the decommissioning project, changes observed can not be correlated to the works underway. Reported increases of paradise shelduck on Lake Tewa represent antecdotal observations. Additionally, grain crops planted and stock (deer) feed provided within the broader area may have altered the distribution and movement patterns of waterfowl (particularly paradise

[14] https://niwa.co.nz/sites/default/files/2024-03/Climate_Summary_Spring_2023_NIWA.pdf
[15] https://niwa.co.nz/sites/default/files/inline-images/Climate_Summary_Spring_2024_Final.pdf

shelduck and mallard) in the Basin (personal observation). There are many factors that influence the movement of waterfowl within the Basin.

Further consultation with Fish and Game is required to understand if they have received an increase in nuisance reports indicating the potential presence of displaced birds. NSN is aware that Fish and Game have initiated monitoring on other ponds in the Whakatipu Basin in anticipation of the removal of the Shotover oxidation pondsActivities and weather in the wider Whakatipu Basin may also influence the activity and movement of waterfowl however NSN monitoring is focused on bird activity in the wastewater treatment area.

6 Recommendations

Given the high level of unsettled waterfowl activity and the displacement of waterfowl into the unanticipated open water habitat of the Disposal Field close to ZQN threshold 23, NSN recommends that the disposal field be drained by percolation into the ground of the Disposal Field and the site be kept dry and free of weeds. It will otherwise attract and hold waterfowl displaced by the Pond decommissioning works.

After consultation with QAC, NSN considers the situation described above poses an increased risk to aviation. This risk is heightened by the continuing effects of the planned decommissioning works and the enclosed nature of the Disposal Field making the waterfowl easier to startle.

Due to the seasonality of waterfowl use of the Ponds, there is potential for a partial discharge into the Disposal Field to be resumed at a level that does not result in surface ponding. NSN acknowledges that would likely still require treated wastewater to be discharged to the Shotover River. This could however offer an interim means of reducing the discharge to water while solutions are sought to reinstate as discharge to land.

TABLES

Table 1: Month of highest count for waterfowl on the Oxidation Ponds only.

**2025 data for January to March only*

Year	Mallard	NZ Scaup	Paradise shelduck	Australasian/NZ Shoveler	Grey Teal
2020	Jan	Feb	Jan	Mar	Jan
2021	Apr	Apr	Jan	Feb	Dec
2022	Dec	Feb	Jan	Mar	Dec
2023	Feb	Feb	Jan	Feb	Dec
2024	Jan	Mar	Jan	Mar	Mar
2025*	Jan	Feb	Jan	Mar	Jan

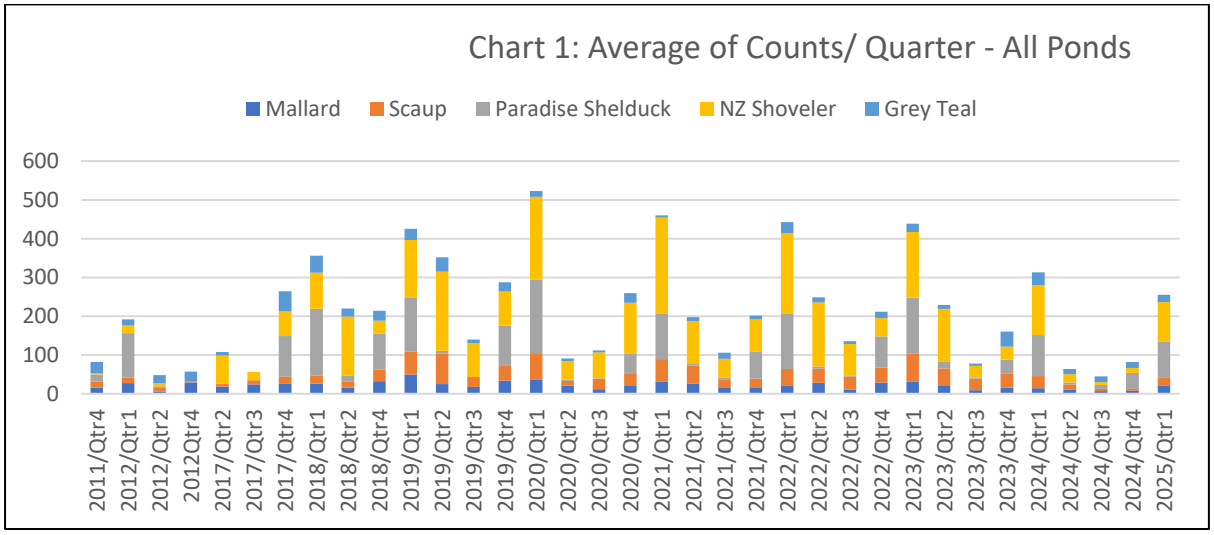
Table 2: Highest Monthly count of the Year on Oxidation Ponds only.

**2025 data for January to March only*

Year	Mallard	NZ Scaup	Paradise shelduck	Australasian/NZ Shoveler	Grey Teal
2020	274	174	1076	926	104
2021	142	265	773	1258	77
2022	167	214	1079	1157	86
2023	129	343	1105	914	145
2024	73	152	733	479	139
2025*	126	56	498	329	77

CHARTS

PONDS AND DISPOSAL FIELD WATERFOWL COUNTS



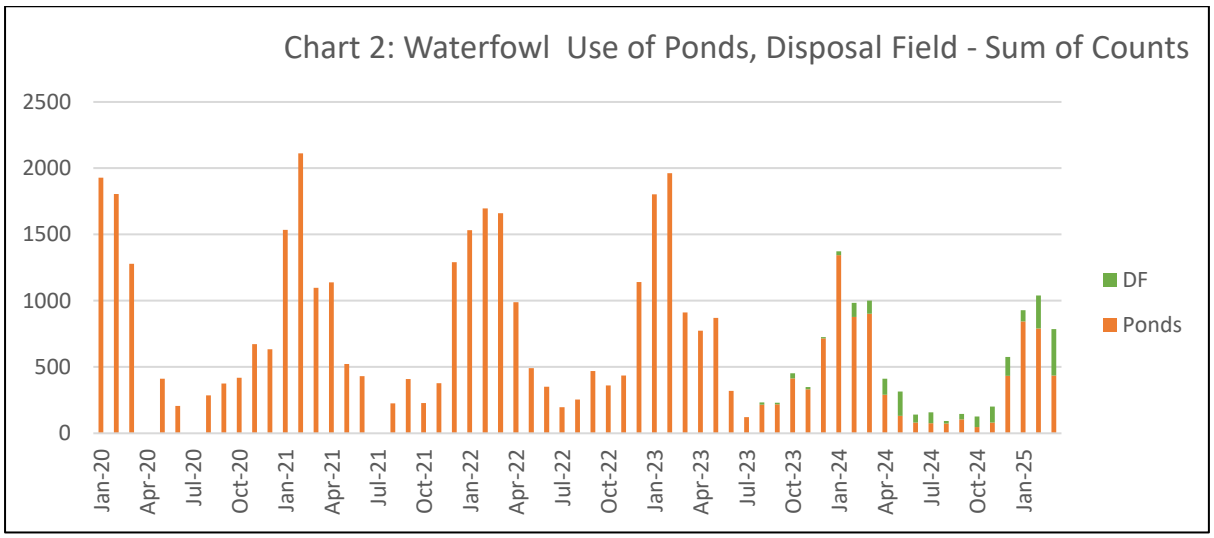


Chart 2: Waterfowl Use of Ponds, Disposal Field - Sum of Counts
2500
2000
1500
1000
500
0
Jan-20
Apr-20
Jul-20
Oct-20
Jan-21
Apr-21
Jul-21
Oct-21
Jan-22
Apr-22
Jul-22
Oct-22
Jan-23
Apr-23
Jul-23
Oct-23
Jan-24
Apr-24
Jul-24
Oct-24
Jan-25
DF
Ponds

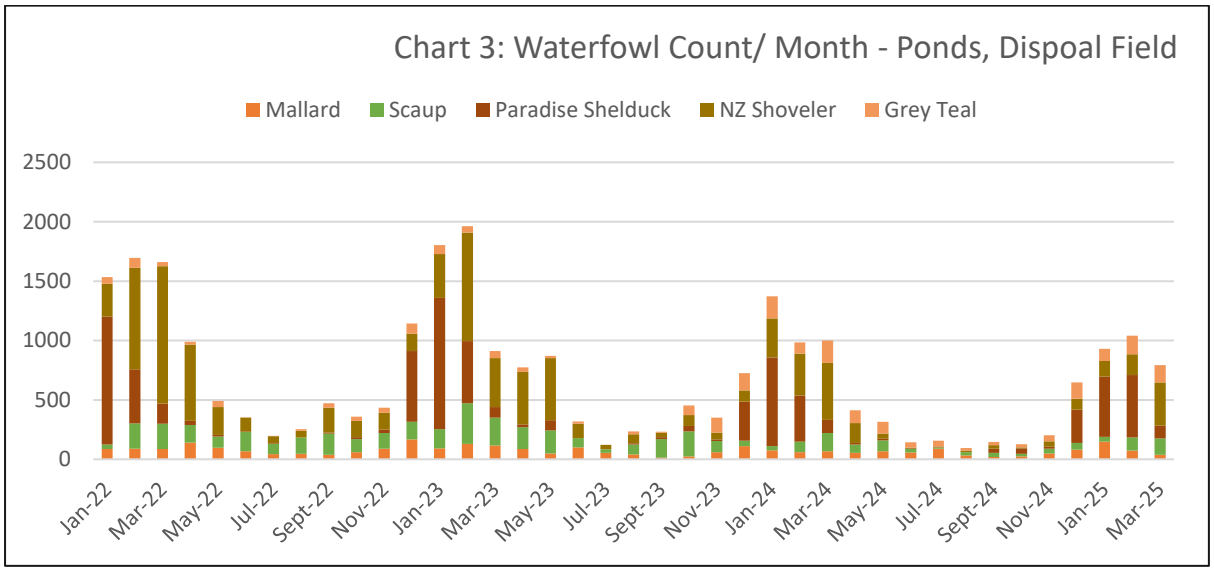


Chart 3: Waterfowl Count/ Month - Ponds, Dispoal Field
Mallard
Scaup
Paradise Shelduck
NZ Shoveler
Grey Teal
2500
2000
1500
1000
500
0
Jan-22
Mar-22
May-22
Jul-22
Sept-22
Nov-22
Jan-23
Mar-23
May-23
Jul-23
Sept-23
Nov-23
Jan-24
Mar-24
May-24
Jul-24
Sept-24
Nov-24
Jan-25
Mar-25

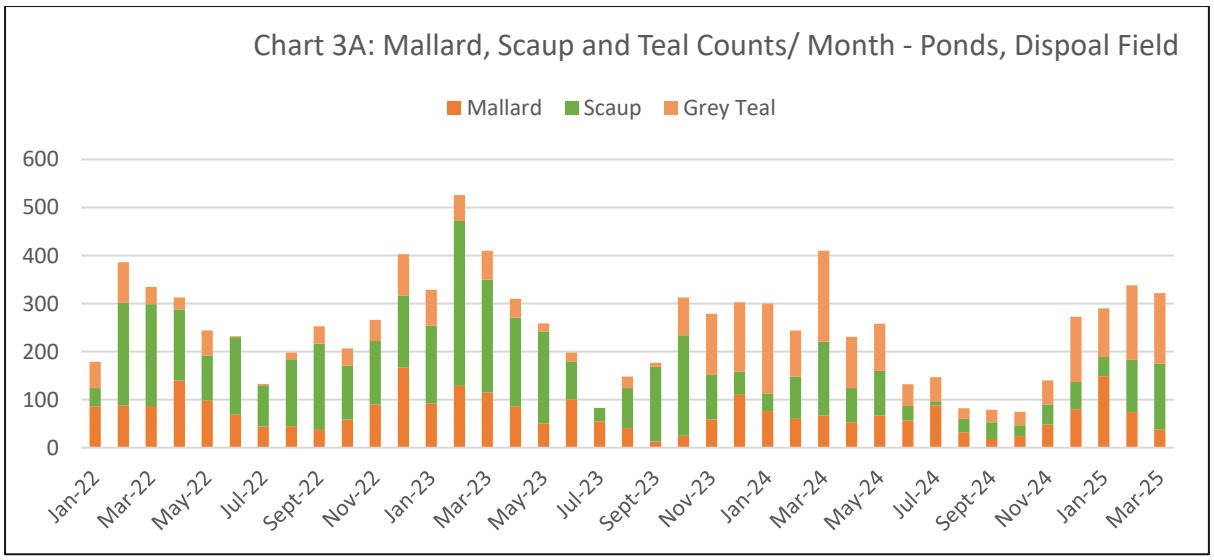
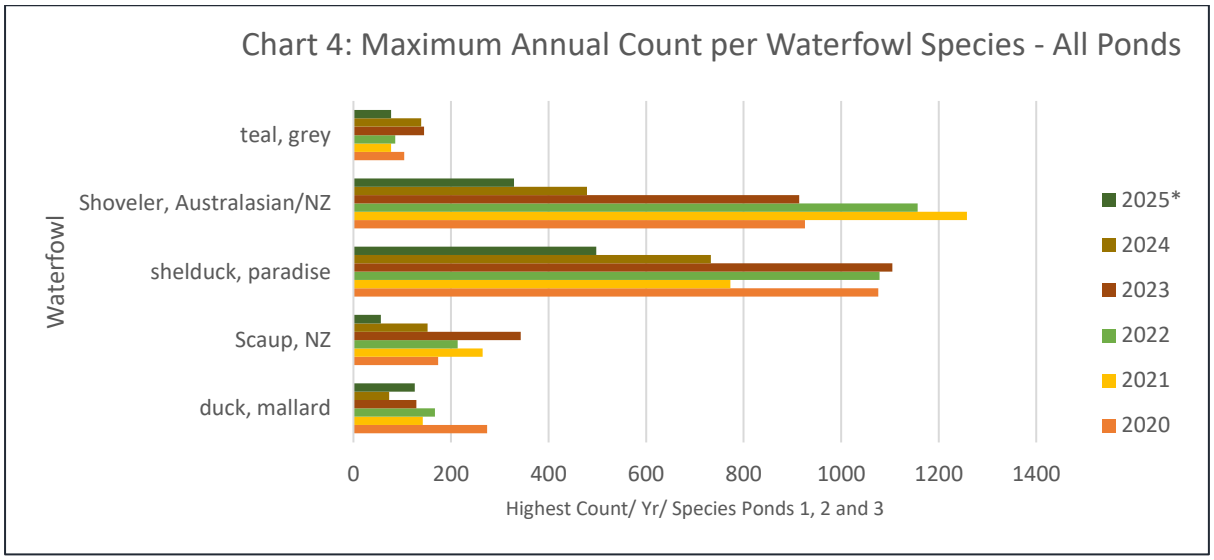
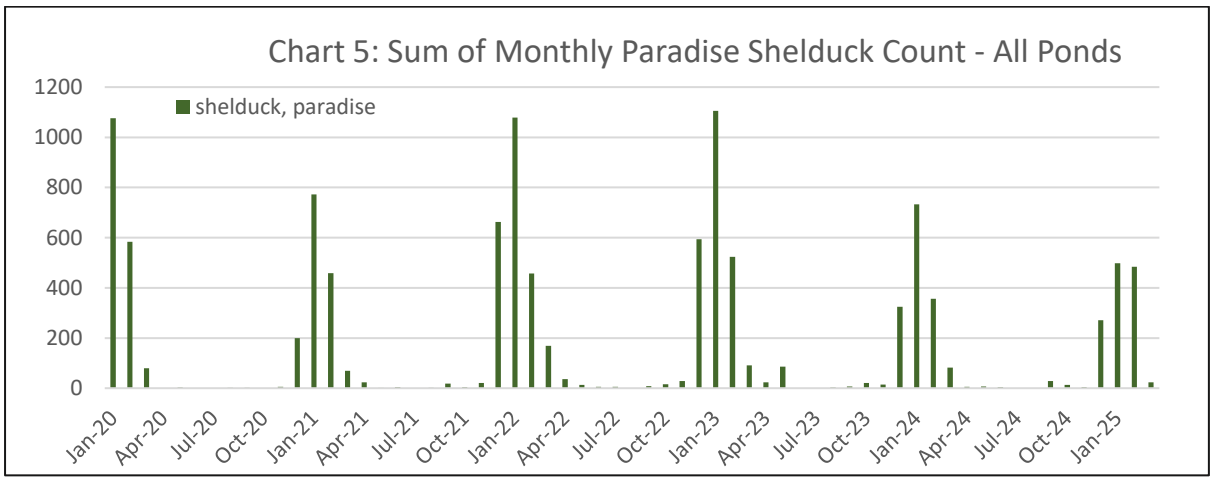
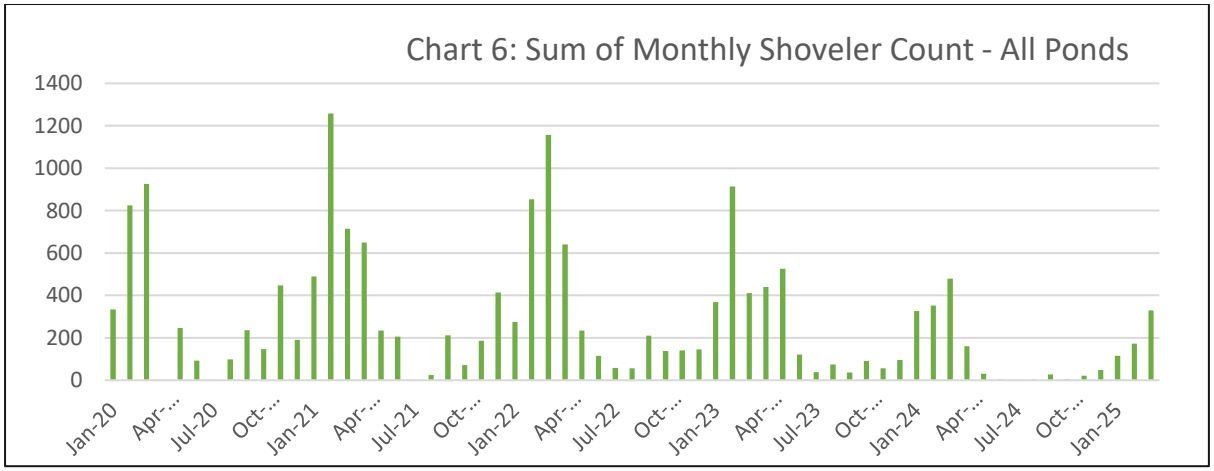


Chart 3A: Mallard, Scaup and Teal Counts/ Month - Ponds, Dispoal Field
Mallard
Scaup
Grey Teal
600
500
400
300
200
100
0
Jan-22
Mar-22
May-22
Jul-22
Sept-22
Nov-22
Jan-23
Mar-23
May-23
Jul-23
Sept-23
Nov-23
Jan-24
Mar-24
May-24
Jul-24
Sept-24
Nov-24
Jan-25
Mar-25

POND SPECIES COUNTS







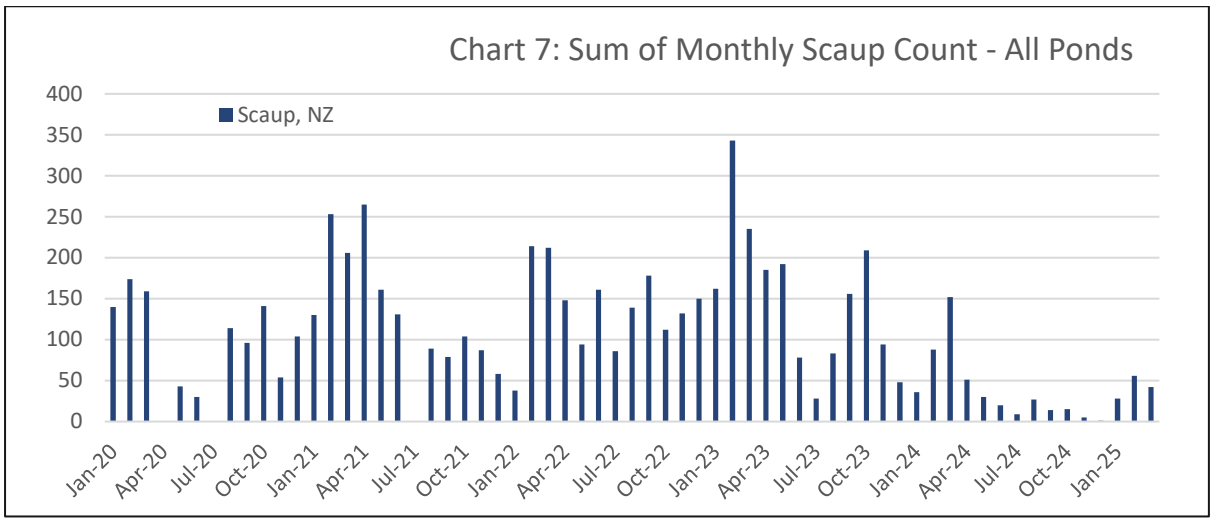


Chart 7: Sum of Monthly Scaup Count - All Ponds
Scaup, NZ
400
350
300
250
200
150
100
50
0
Jan-20
Apr-20
Jul-20
Oct-20
Jan-21
Apr-21
Jul-21
Oct-21
Jan-22
Apr-22
Jul-22
Oct-22
Jan-23
Apr-23
Jul-23
Oct-23
Jan-24
Apr-24
Jul-24
Oct-24
Jan-25

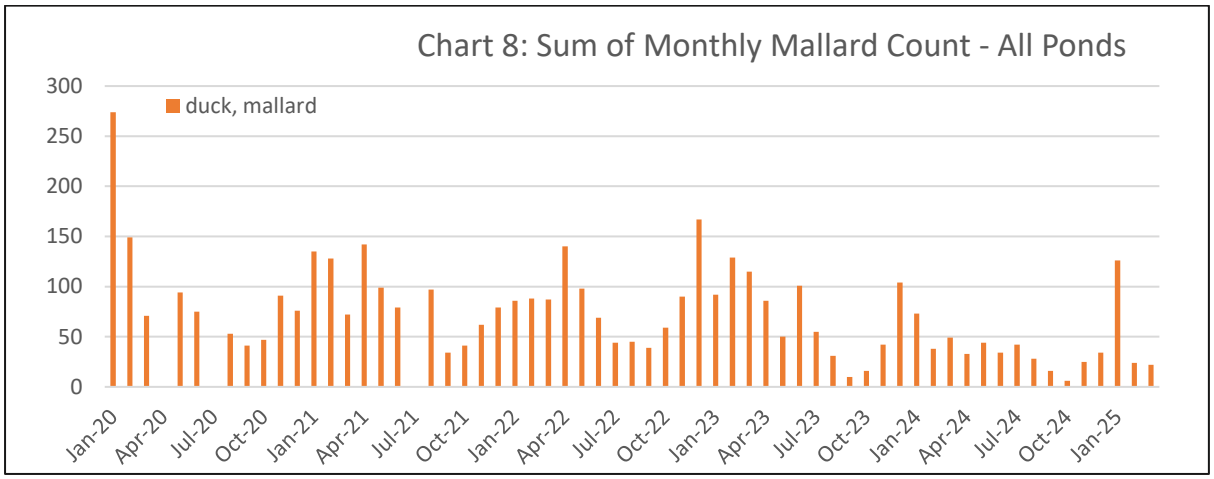


Chart 8: Sum of Monthly Mallard Count - All Ponds
duck, mallard
300
250
200
150
100
50
0
Jan-20
Apr-20
Jul-20
Oct-20
Jan-21
Apr-21
Jul-21
Oct-21
Jan-22
Apr-22
Jul-22
Oct-22
Jan-23
Apr-23
Jul-23
Oct-23
Jan-24
Apr-24
Jul-24
Oct-24
Jan-25

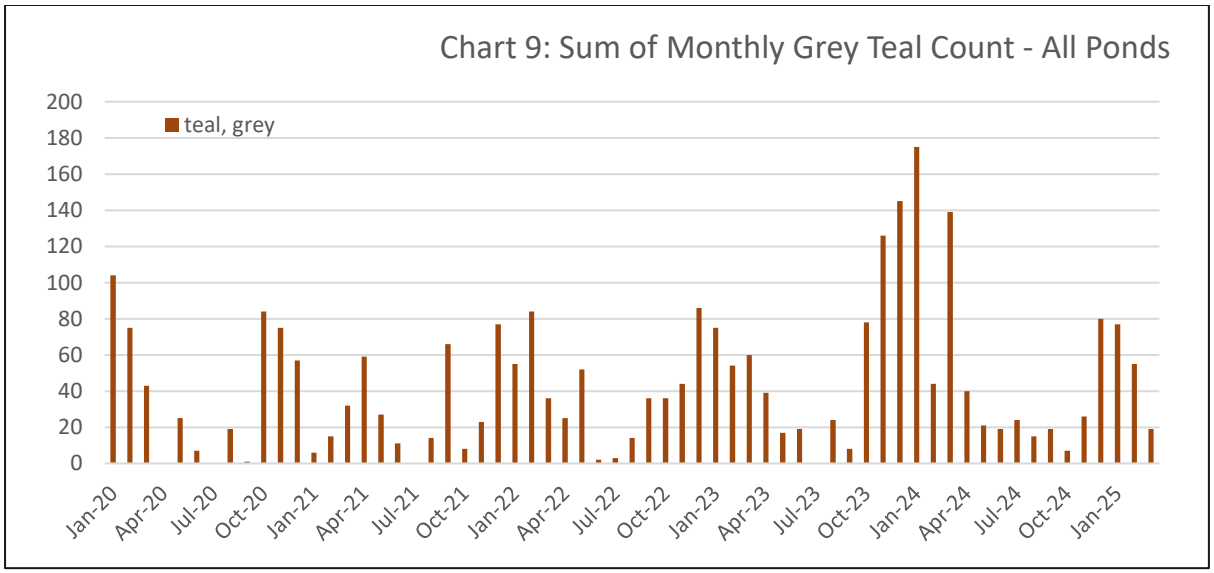
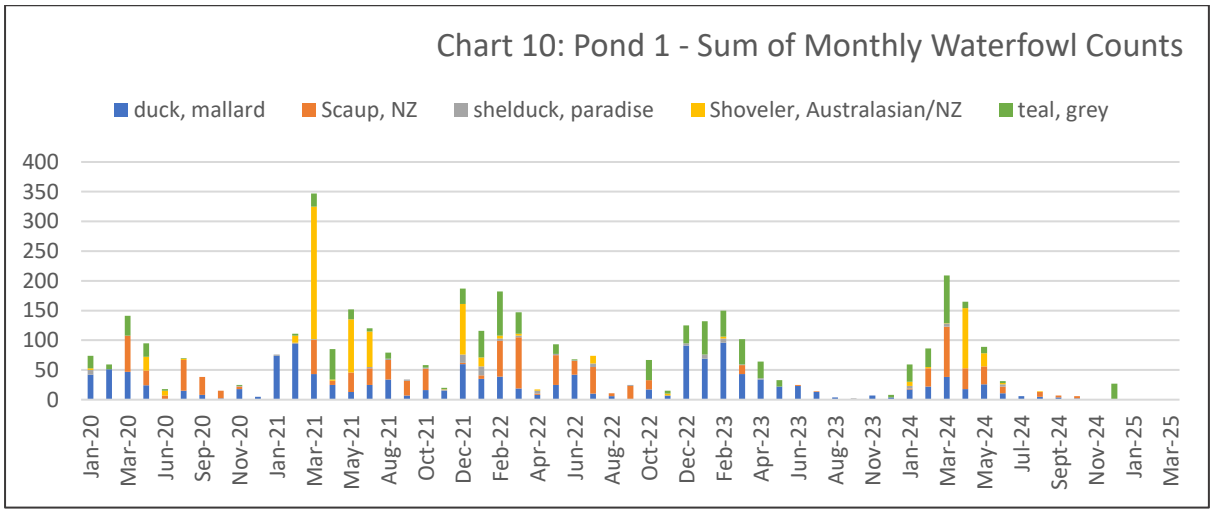
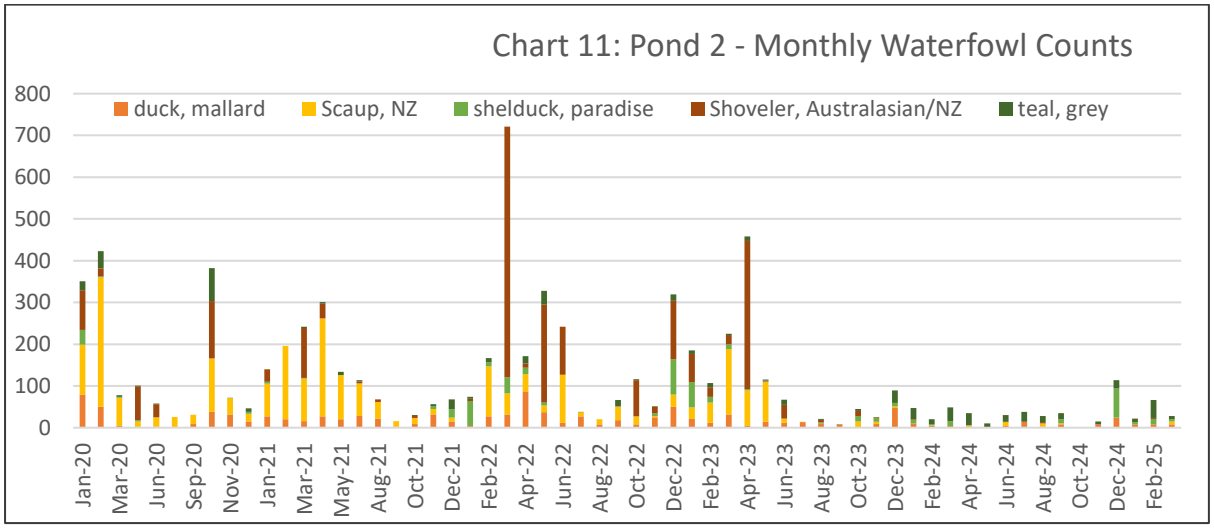
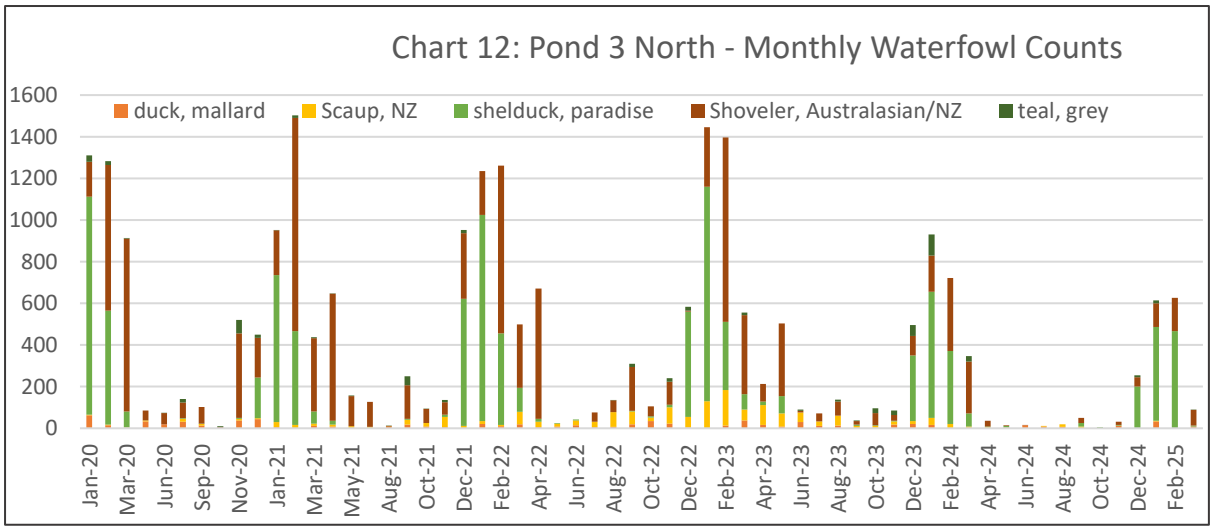


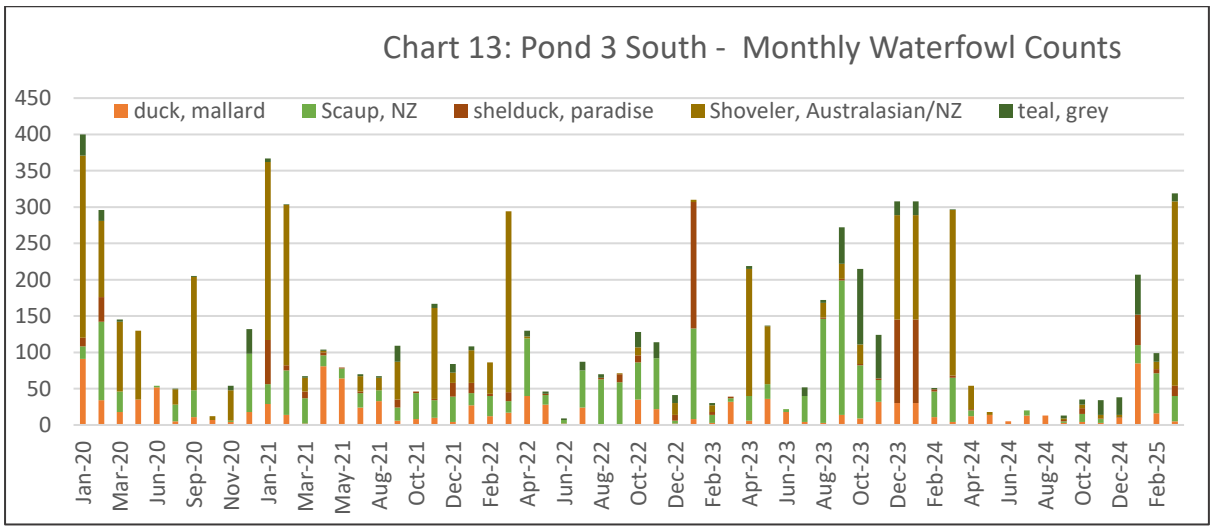
Chart 9: Sum of Monthly Grey Teal Count - All Ponds
teal, grey
200
180
160
140
120
100
80
60
40
20
0
Jan-20
Apr-20
Jul-20
Oct-20
Jan-21
Apr-21
Jul-21
Oct-21
Jan-22
Apr-22
Jul-22
Oct-22
Jan-23
Apr-23
Jul-23
Oct-23
Jan-24
Apr-24
Jul-24
Oct-24
Jan-25

INDIVIDUAL POND COUNTS

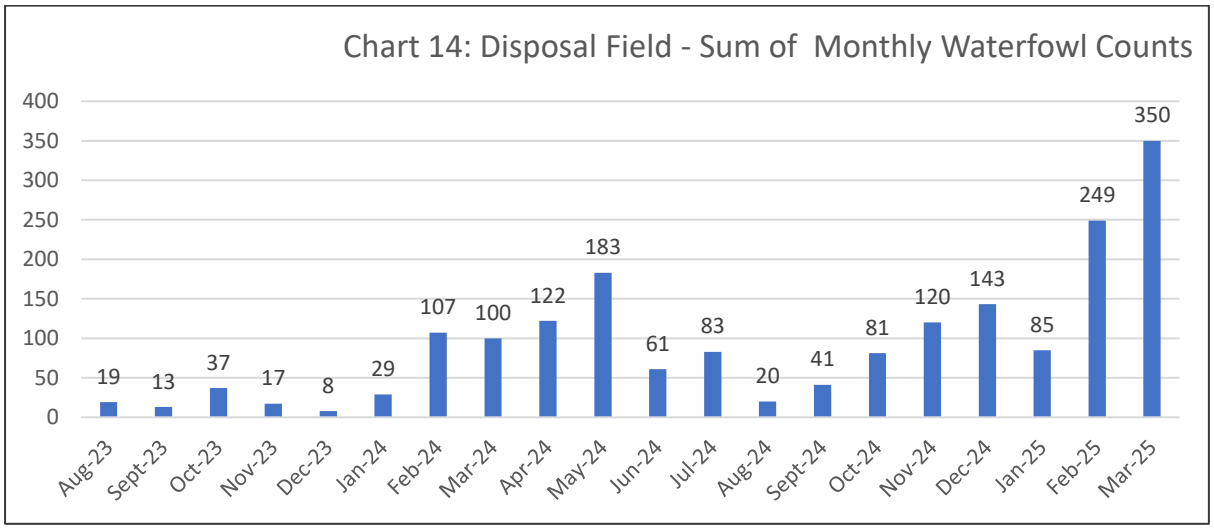


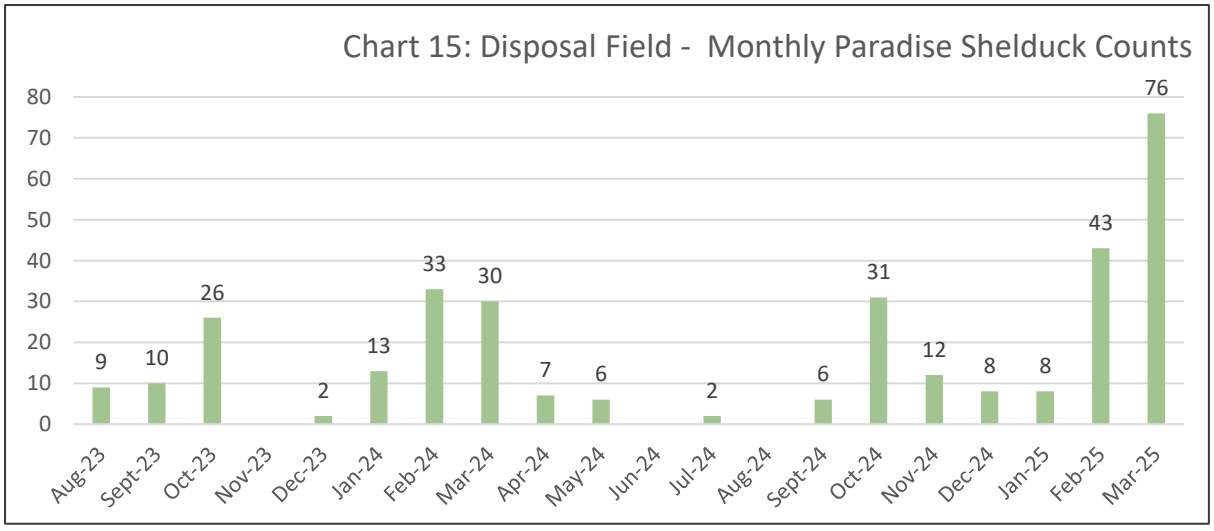






DISPOSAL FIELD CHARTS





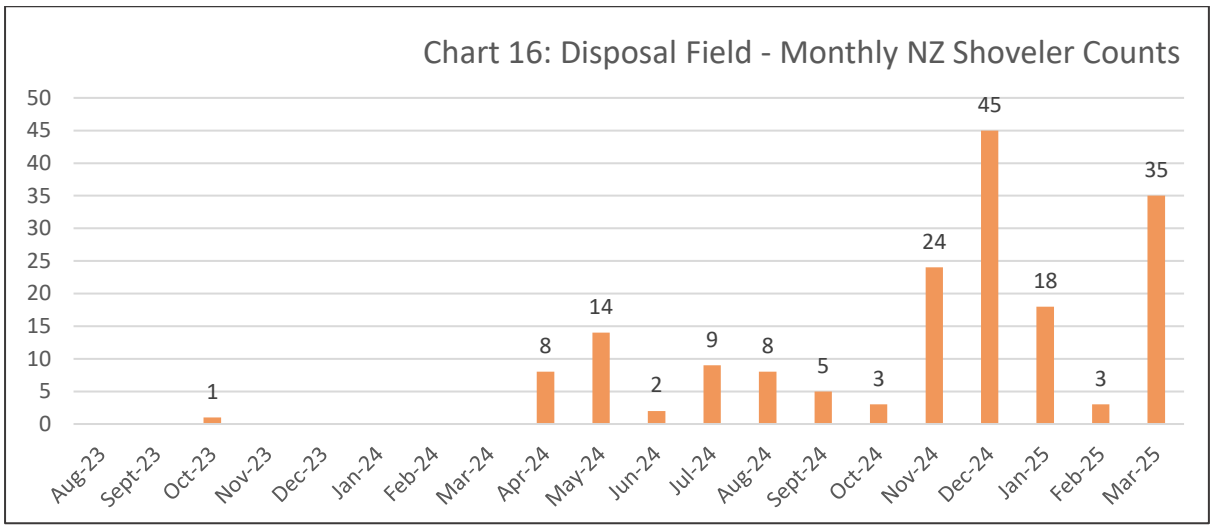


Chart 16: Disposal Field - Monthly NZ Shoveler Counts
50
45
40
35
30
25
20
15
10
5
0
1
8
14
2
9
8
5
3
24
45
18
3
35
Aug-23
Sept-23
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sept-24
Oct-24
Nov-24
Dec-24
Jan-25
Feb-25
Mar-25

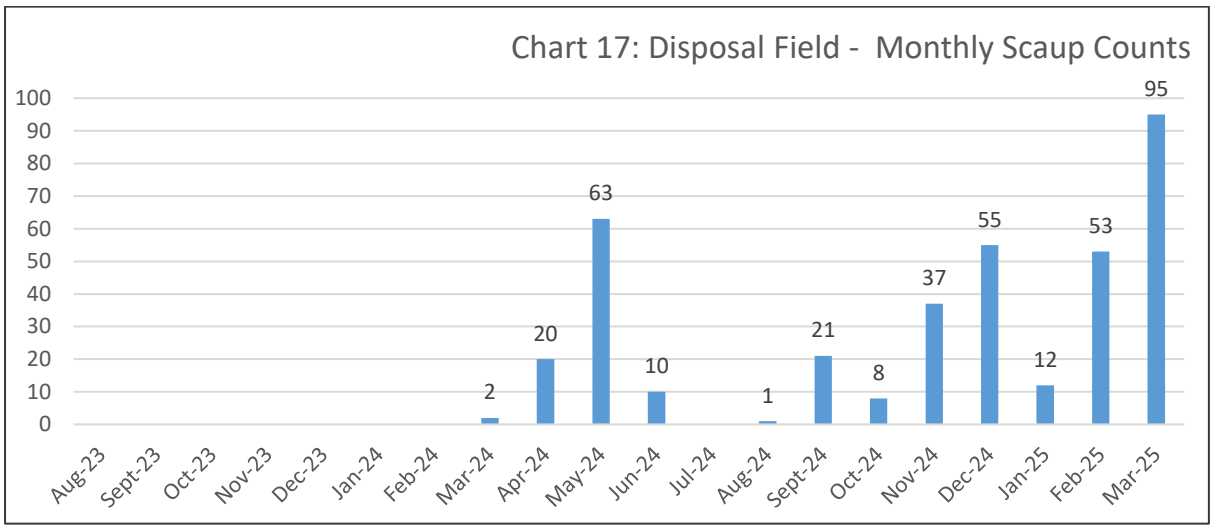


Chart 17: Disposal Field - Monthly Scaup Counts
100
90
80
70
60
50
40
30
20
10
0
2
20
63
10
1
21
8
37
55
12
53
95
Aug-23
Sept-23
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sept-24
Oct-24
Nov-24
Dec-24
Jan-25
Feb-25
Mar-25

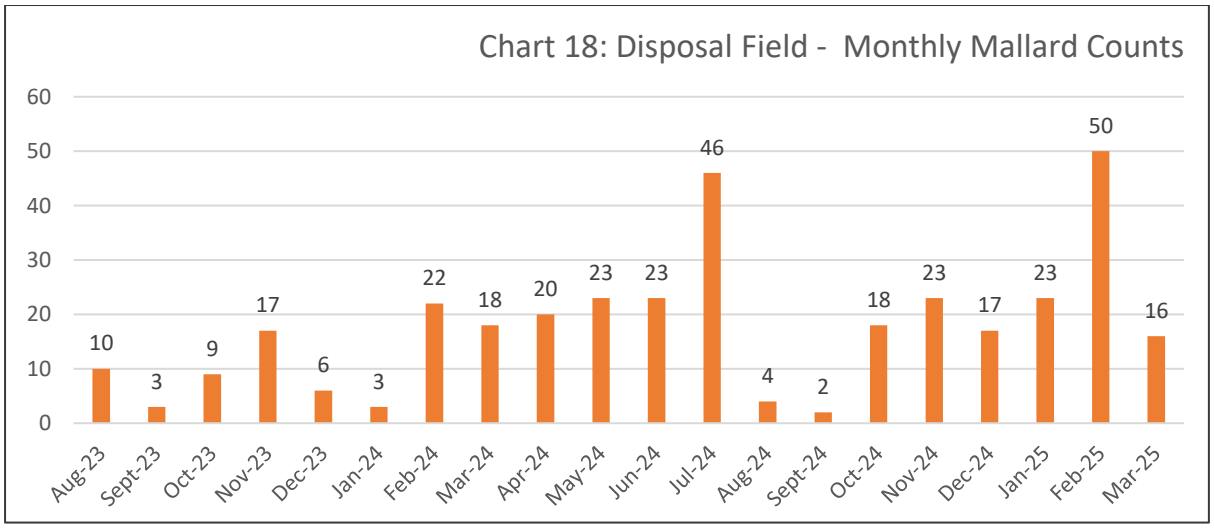
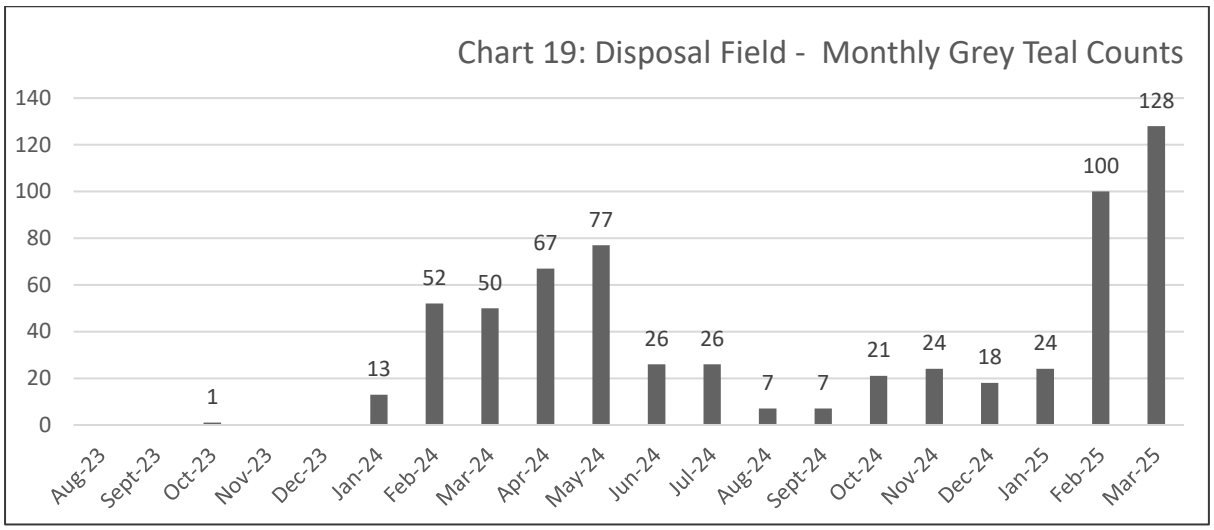
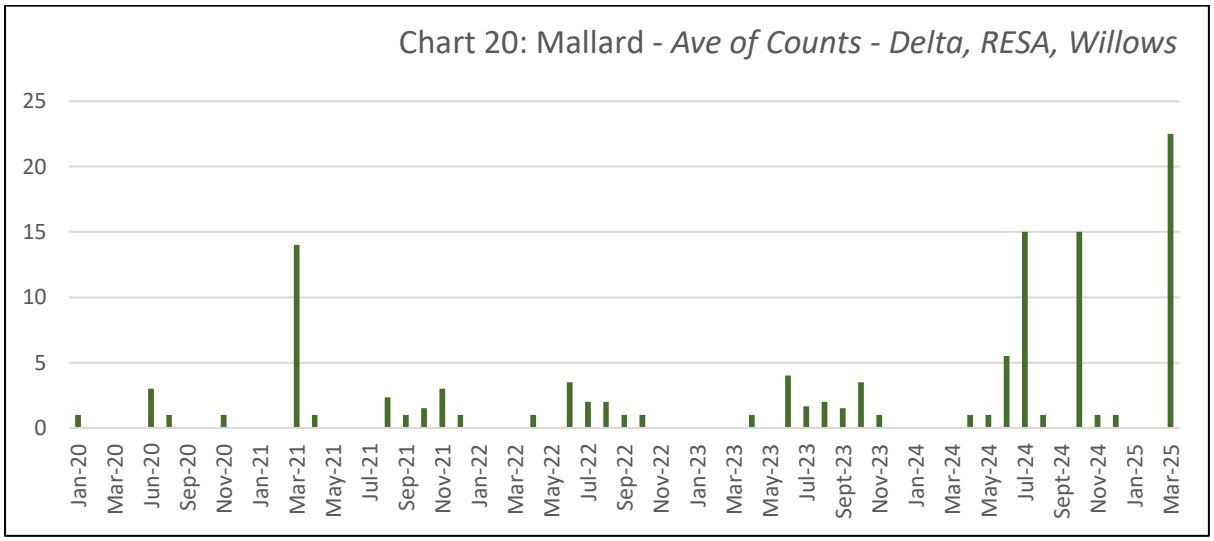
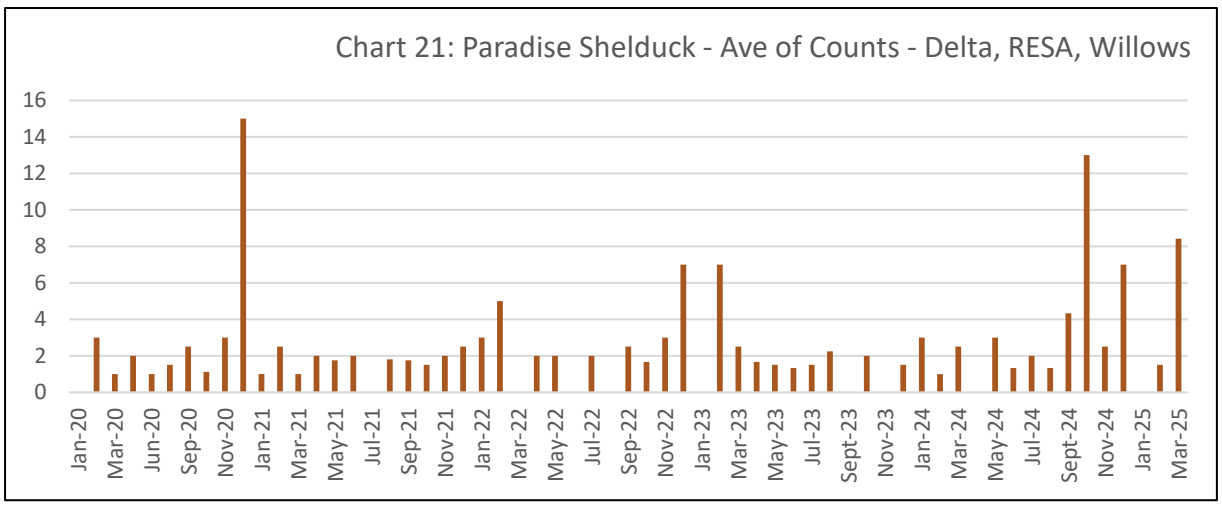


Chart 18: Disposal Field - Monthly Mallard Counts
60
50
40
30
20
10
0
10
3
9
17
6
3
22
18
20
23
23
46
4
2
18
23
17
23
50
16
Aug-23
Sept-23
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sept-24
Oct-24
Nov-24
Dec-24
Jan-25
Feb-25
Mar-25



MALLARD COUNTS AWAY FROM PONDS AND DISPOSAL FIELD





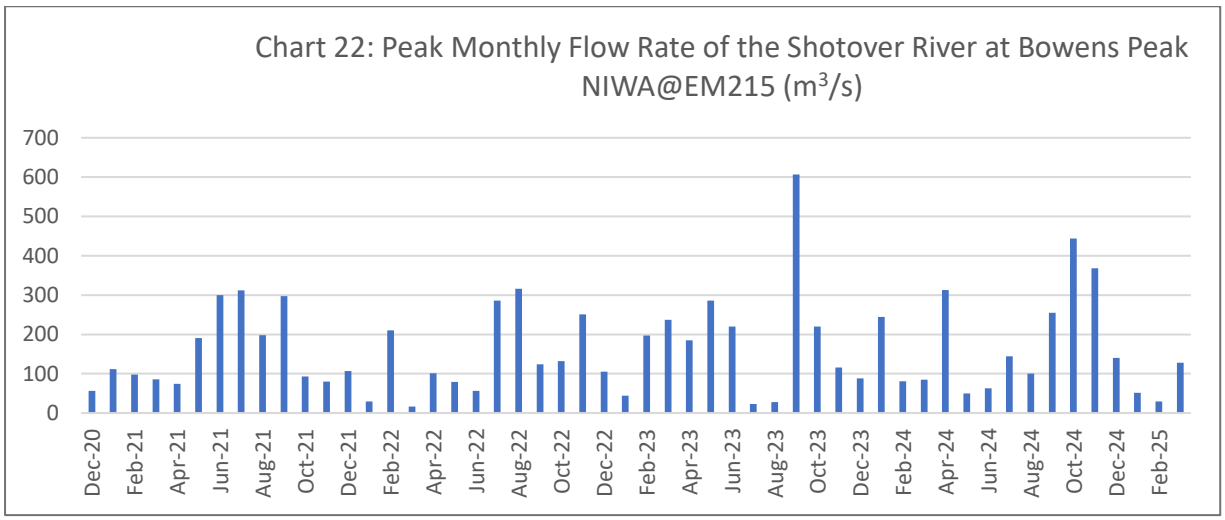


Figure 2: Flock of mallard flew from the direction of the disposal field, over the oxidation ponds, circled around flying high, crossing the critical portion of threshold 23 to the south of the oxidation ponds (southeast corner of Pond 3 visible in bottom right of view). This flock was immediately reported to the ZQN AES crew and was observed by that crew to transit towards the outlet of Lake Whakatipu. Photo taken 22/3/2025 at 09:08am by D Palmer.

Figure 3: Waterfowl visible on a Pond 3 and the berm between Pond 2 and 3, high counts of mallard, shoveler and scaup were recorded in February and paradise shelduck in January 2023; view from the Remarkables Road; taken 1 February 2023 by D Palmer.

References

Greene, B.S. (2021): Estimating the distribution, population status, and trends of New Zealand Scaup (Aythya novaeseelandiae). Notornis, 2021, Vol. 68:108-130 © The Ornithological Society of New Zealand Inc.

Marchant, S. & Higgins, P.J. (co-ordinating editors) 1990. Handbook of Australian, New Zealand & Antarctic Birds. Volume 1, Ratites to ducks; Part B, Australian pelican to ducks. Melbourne, Oxford University Press. Paradise shelduck: Pages 1201-121 0; plate 88; NZ shoveler: Pages 1340-1348; plate 95; Scaup: Pages 1358-1362; plate 96; Grey teal: 1266-1281; plate 91; Mallard: 1313-1320; plate 94.

Williams, M. (1972): Mortality and exploitation of paradise shelduck. Wildfowl 23: 94-102

APPENDIX 8

NSN Off-Aerodrome Survey Summary

File Reference: **NSN 80/ 20250417**

From: **Dawn Palmer, Natural Solutions for Nature Ltd**

To: **Iain Partington, QLDC**

Simon Mason, QLDC

CC: **Juliet Breen, ZQN; Rob Cowles, ZQN AES**

Date: **20/4/2025**

Subject: **Summary of Wildlife Survey – April 2025**

NSN undertook a monthly survey of the Shotover Wastewater Treatment Area on 17th April 2025. Conditions on the day were calm, overcast with occasional drizzle, the temperature was cool, and a constant 8°C.

Waterfowl numbers continue to drop as the moult season finishes and birds move back to winter and breeding territories. Scaup are forming autumn/ winter flocks on lakes and ponds, including the oxidation ponds, other species are dispersing.

Grey teal continue to roost on the dry margins of the Disposal Field, a habitat they appear to have preferred this season. Although the flock size is less than half of the peak recorded in March.

NSN has become aware of anecdotal suggestions that paradise shelduck have increased during the summer at Lake Tewa over the past few years. It is possible that paradise shelduck have moved to Lake Tewa from the oxidation ponds, but without more comprehensive monitoring of birds at alternative sites, it cannot be concluded that the increased numbers on Lake Tewa are from birds displaced from "Shotover WWTP".

Movement between habitats within the Whakatipu Basin over the next few years are likely to increase as the decommissioning process continues. Movements will be influenced by availability of feed, the creation of new ponds, the management and conditions of existing ponds and lakes.

These results are shared with Queenstown Airport to enable a corelation with CAA/ ZQN records of strike/ near strike data. However, CAA has not produced a quarterly report since Quarter 3 of 2024.

The following tables and charts provide an updated summary of survey findings.

Table 1: Maximum Monthly Count for Oxidation Ponds
Highest count per year highlighted (bold, blue); months where the highest of two counts is shown are highlighted in yellow, note only 1 survey per month has occurred from March 2020.

Yr/ Mo	duck, mallard	Scaup, NZ	shelduck, paradise	Shoveler, Australasian/NZ	teal, grey	Grand Total
Jan-20	**274**	140	**1076**	334	**104**	1928
Feb-20	149	**174**	584	824	75	1806
Mar-20	71	159	79	**926**	43	1278
May-20	94	43	3	246	25	411
Jun-20	75	30		93	7	206
Aug-20	53	114	2	98	19	286
Sept-20	41	96	2	236	1	376
Oct-20	47	141		147	84	419

Nov-20	91	54	5	447	75	672
Dec-20	76	104	200	190	57	634
Jan-21	135	130	**773**	490	6	1534
Feb-21	128	253	459	**1258**	15	2113
Mar-21	72	206	69	715	32	1098
Apr-21	**142**	**265**	23	649	59	1138
May-21	99	161	1	234	27	522
Jun-21	79	131	4	206	11	431
Aug-21	97	89	2	25	14	227
Sept-21	34	79	18	212	66	409
Oct-21	41	104	4	72	8	229
Nov-21	62	87	21	186	23	379
Dec-21	79	58	663	414	**77**	1292
Jan-22	86	38	**1079**	275	55	1533
Feb-22	88	**214**	457	853	84	1697
Mar-22	87	212	169	**1157**	36	1661
Apr-22	140	148	36	640	25	989
May-22	98	94	13	235	52	492
Jun-22	69	161	5	115	2	352
Jul-22	44	86	6	58	3	197
Aug-22	45	139		56	14	254
Sept-22	39	178	8	210	36	471
Oct-22	59	112	16	137	36	360
Nov-22	90	132	28	141	44	435
Dec-22	**167**	150	594	145	**86**	1142
Jan-23	92	162	**1105**	369	75	1804
Feb-23	**129**	**343**	523	**914**	54	1963
Mar-23	115	235	91	411	60	912
Apr-23	86	185	24	440	39	774
May-23	50	192	86	525	17	870
Jun-23	101	78		121	19	319
Jul-23	55	28		38		121
Aug-23	31	83	3	74	24	215
Sept-23	10	156	7	37	8	218
Oct-23	16	209	21	91	78	415
Nov-23	42	94	15	56	126	333
Dec-23	104	48	325	95	**145**	717
Jan-24	**73**	36	**733**	327	**175**	1344
Feb-24	38	88	356	352	44	878
Mar-24	49	**152**	82	**479**	139	901
Apr-24	33	51	6	160	40	290
May-24	44	30	7	30	21	132
Jun-24	34	20	4	4	19	81
Jul-24	42	9			24	75
Aug-24	28	27		4	15	74
Sept-24	16	14	29	27	19	105
Oct-24	6	15	13	5	7	46
Nov-24	25	5	4	22	26	82
Dec-24	34	1	271	48	80	434
Jan-25	**126**	28	**498**	115	**77**	844
Feb-25	24	56	484	172	55	791
Mar-25	22	42	24	**329**	19	436
Apr-25	34	**118**	7	156	27	342

Table 2: Month of Highest Count on the Oxidation Ponds

Year	duck, mallard	Scaup, NZ	shelduck, paradise	Shoveler, Australasian/NZ	teal, grey
2020	Jan	Feb	Jan	Mar	Jan
2021	Apr	Apr	Jan	Feb	Dec
2022	Dec	Feb	Jan	Mar	Dec
2023	Feb	Feb	Jan	Feb	Dec
2024	Jan	Mar	Jan	Mar	Mar
2025*	Jan	Apr	Jan	Mar	Jan

Table 3: Disposal Field Monthly Waterfowl Counts since open water habitat became available

Mon/ Yr	duck, mallard	Scaup, NZ	shelduck, paradise	Shoveler, Australasian/NZ	teal, grey	Sum of Waterfowl Count
Aug-23	10		9			19
Sept-23	3		10			13
Oct-23	9		**26**	1	1	37
Nov-23	17					17
Dec-23	6		2			8
Jan-24	3		13		**13**	29
Feb-24	22		33		**52**	107
Mar-24	18	2	30		**50**	100
Apr-24	20	20	7	8	**67**	122
May-24	23	63	6	14	**77**	183
Jun-24	23	10		2	**26**	61
Jul-24	46		2	9	**26**	83
Aug-24	4	1		**8**	7	20
Sept-24	2	**21**	6	5	7	41
Oct-24	18	8	**31**	3	21	81
Nov-24	23	**37**	12	24	24	120
Dec-24	17	**55**	8	45	18	143
Jan-25	23	12	8	18	**24**	85
Feb-25	50	53	43	3	100	249
Mar-25	16	95	76	35	**128**	350
Apr-25	2	4	9		49	64

Chart 1: Average Counts per Quarter on Oxidation Ponds

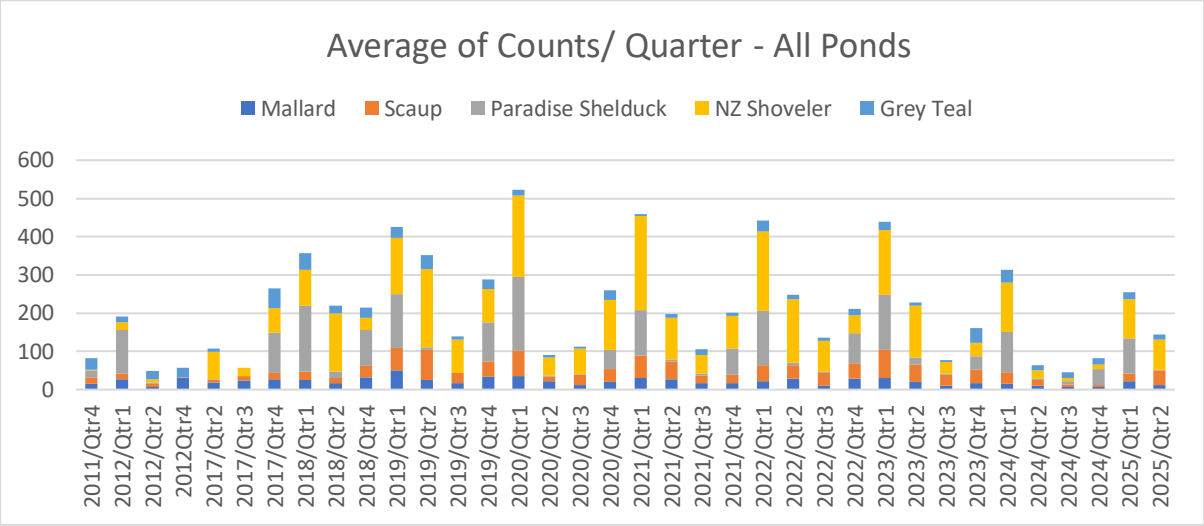


Chart 2: Disposal Field – Sum of Monthly Waterfowl Counts

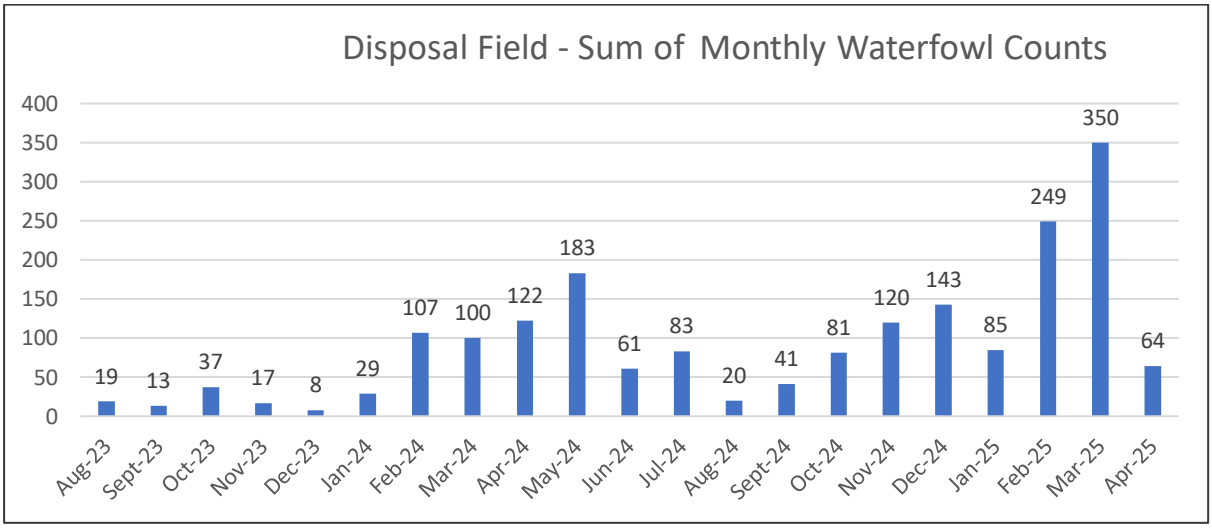


Chart 3: Waterfowl use of Ponds and Disposal Field

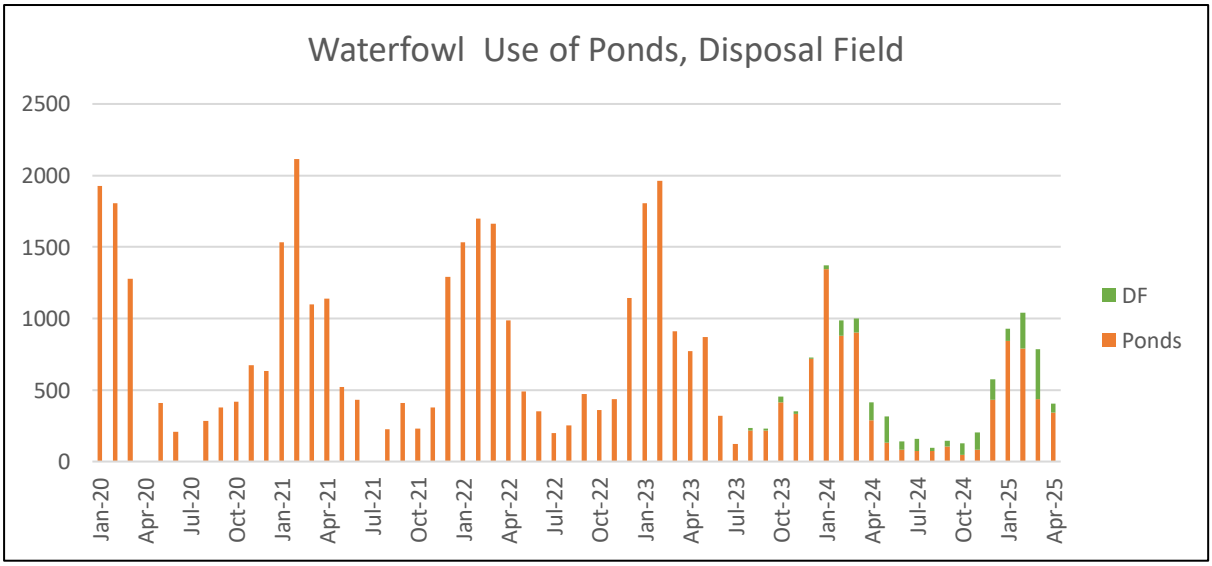


Photo 1: Wastewater Treatment Plant from Jim's Way. Photo taken 13/4/2025 by D Palmer

Photo 2: Pond 3, the NZ shoveler flock has reduced to about 156 birds roosting on the water. Photo taken 18/4/2025 by D Palmer

Photo 3: Disposal Field (north end) dry or very low water; photo taken 17/4/2025 by D Palmer

Photo 4: Disposal Field (middle section) water lower compared to 10 days previously (see below): photo taken 17/4/2025 by D Palmer

Photo 5: Disposal Field (middle section) water starting to drain from disposal field; photo taken 7/4/2025 by D Palmer

Photo 6: Photo of the Disposal Field taken from the Remarkables Skifield Road Trig Station (spot height 908m) on 16/4/2025 by D Palmer.

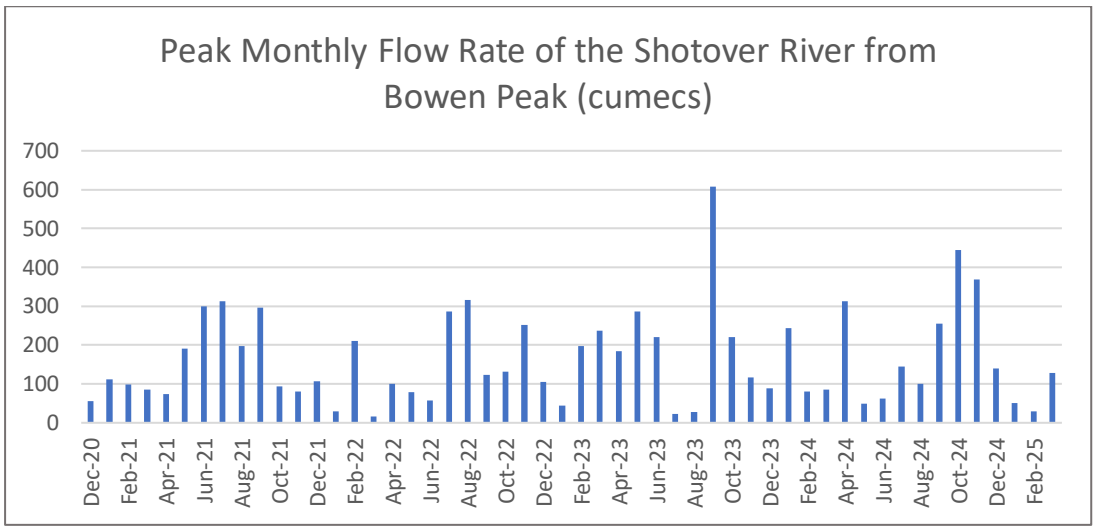


Chart 4: Peak monthly flow of the Kimi ākau/ Shotover River measured from the Bowen Peak flow station (EM215)

Source: ORC environmental data portal
https://envdata.orc.govt.nz/AQWebPortal/Data/Location/Dashboard/422/Location/EM215/Interval/Latest

APPENDIX 9

Station number Pond 1

	passerines			waterfowl		gulls & waders		other											
Max of Total Species																			
Month/ Year	Bellbird, (mainland)	blackbird	chaffinch	Coot, Australian	duck, mallard	Dunnock (Hedge Sparrow)	Falcon, NZ - eastern	Fantail, Sth Is	finch spp.	goldfinch	greenfinch	Gull, black-billed	Gull, southern black-	Harrier, Australasian	Oystercatcher, Sth Is Pied	Plover, Spur-winged	Quail, California	redpoll	
Jan-21		2			74							36			1				
Feb-21					94								5						
Mar-21		1	1		43				**2**							2			
Apr-21			1		25														
May-21					13													2	
Jun-21		1	1		25	**3**												1	
Aug-21			9		34							2	1			1	1		
Sep-21		3	5		7							6							
Oct-21		1	3		16													1	
Nov-21		2	2		15	2					2						2		
Dec-21		4	3		60							4	2			1	1		
Jan-22		7	2		35							**130**	2					2	
Feb-22			1		39											1			
Mar-22			2		19											3	2		
Apr-22					8	1													
May-22					25														
Jun-22		3	8	1	42								2	1					
Jul-22		1	**20**		10								**37**						
Aug-22		3	7		6							3	15	**2**					
Sep-22			**20**		1	1						7	13						
Oct-22			13		17								1						
Nov-22		1	2		7														
Dec-22		2	3		91	1					1	1							
Jan-23			1	1	69							3	3						
Feb-23		3	1		**96**		1				1	7	2	1					
Mar-23			3		43		1												
Apr-23			3		34														
May-23					22	1													
Jun-23		3	2		23														
Jul-23			5		13								10						
Aug-23		1			4							3							
Sep-23			5																
Oct-23	1	1	7			1					1		3						
Nov-23		5	1		7							2							
Dec-23		2	4		4	1													
Jan-24		2			17							3							
Feb-24					22								1						
Mar-24		1			38									1					
Apr-24			4		18	1													
May-24			2		26	2													
Jun-24		1	2		11									1					
Jul-24		1	8		6	1							2						
Aug-24			3		5	1													
Sep-24		1	7		4	1													
Oct-24					**2**										1				
Nov-24		**1**	**3**		**1**							1							
Dec-24		**1**	**6**		**1**						**1**		**1**		**1**	**3**			
Jan-25			**1**													**6**			
Feb-25			**2**													**2**	**31**		
Mar-25		**2**						**1**	**3**					**1**		**2**			
Apr-25	**1**	**1**				**3**					**1**						**4**		
Highest Count	1	7	20	1	96	3	1	2	3	1	2	130	37	2	1	6	31	2	

Scaup, NZ	Shag, Black	shelduck, paradise	Shoveler, Australasian/NZ	silvereye	sparrow, house	Starling	Stilt, Pied	Swallow, Welcome	teal, grey	Thrush, Song	Warbler, Grey	yellowhammer	Highest Count of any
		2						2					74
		2	12						3				94
58		1	**223**		1	0			22				223
7			2		1				51				51
33			89			2			17				89
28		2	60			1			5	1			60
33		2							10	1			34
25		2				1				1			25
36		2							4				36
		2	1		1				2				15
2		14	85				5	2	26			1	85
6		15	15	1					45				130
60		4	5	3		2			74				74
86		3	3			2			36				86
2		5	2										8
50		2							16	2			50
23		1				4		6	2				42
45		6	13										45
5										1			15
22		2											22
16						2			34				34
			3			1	4		5				7
		4					6		30				91
	1	7					2	1	56				69
		7	3				1		44				96
15		1			1				43				43
		2				14			28				34
									11				22
2						1				2			23
1													13
				1									4
				1									5
		2											7
						6	4			1			7
							11		4				11
2		4	7				4		29				29
31			2				11		31				31
85		5	1						**80**				85
35			101						11				101
30			22						11				30
11		4	2						3				11
					2								8
8			1										8
3													7
4						**1**				**2**			**4**
							5						**5**
						10	**19**	**1**	**26**			**1**	**26**
		1				**50**	**2**					**2**	**50**
					1	**1**				**1**			**31**
		1				**3**							**3**
		1		**1**		**1**							**4**
86	1	15	223	3	2	50	19	6	80	2	1	2	223

Appendix B: Queenstown Airport Corporation letter

Russell McVeagh

25 March 2025

Private and confidential
By email

Queenstown Lakes District Council
Private Bag 50072
QUEENSTOWN 9348

Email: mary.davenport@qldc.govt.nz

Dear Mary

SHOTOVER WASTEWATER TREATMENT PLANT – URGENT ACTION REQUIRED

Introduction

1. We act for Queenstown Airport Corporation Limited ("**QAC**") and write in relation to Queenstown Lakes District Council's ("**QLDC**") management of the Shotover Wastewater Treatment Plant ("**Shotover WWTP**"), near Queenstown Airport.

2. We understand there have been discussions between QAC and QLDC on the need to address the bird activity at the disposal field at the Shotover WWTP which, in QAC's opinion, presents an increased risk of bird strike. While QAC wishes to continue to work with QLDC to resolve the matter, QAC considers urgent action is required to reduce the risk of bird strike and we seek confirmation QLDC will act accordingly.

3. As the Shotover WWTP is a QLDC asset, we acknowledge it is ultimately for QLDC to determine how it wishes to address the matter and that any steps it takes will need be carefully considered in light of the sensitivity of the environment in which it operates.

Changes to the disposal field and impacts on QAC

4. We understand QLDC has undertaken works at the Shotover WWTP which have changed the nature of the disposal field such that it now comprises a series of bunded ponds which consistently contain water. Monitoring has demonstrated that this open water habitat is attracting birds that are hazardous to aircraft operations, and has brought bird activity closer to the Airport's runway which increases the risk of bird strike.

5. As safety is paramount to QAC, it is highly concerned about the bird activity at the disposal field and consequent risk of bird strike. The potential impacts of a bird strike event are significant, including loss of life. This is a matter QAC takes very seriously. Birds are a known risk to aircraft and QAC works extremely hard to ensure the risk of bird strike is as low as reasonably practicable. It is critical

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that activities in proximity to the Airport, including QLDC's Shotover WWTP, are also operated in a way that does not present an increased risk of bird strike.

QLDC's obligations under the RMA

6. QLDC has a general duty under section 17 of the Resource Management Act 1991 ("**RMA**") to avoid, remedy or mitigate any adverse effects on the environment arising from the Shotover WWTP, including a bird strike event which could adversely affect aircraft operations.

7. The conditions of QLDC's Designation 46 ("**Designation**") under the Queenstown Lakes Proposed District Plan also impose obligations on QLDC as the Requiring Authority in respect of the Shotover WWTP. Condition 11 states:

> The Requiring Authority shall design, develop and **manage the public work so that it does not attract any birds that are hazardous to aircraft or may endanger aircraft operations**. The bird species that have been observed at the airport and which may be hazardous to aircraft are gull, oyster catcher, hawk, spur-wing plover and duck.
>
> [Emphasis added]

8. By virtue of its obligations under the RMA as well as the conditions of QLDC's Designation, we consider QLDC is obliged to take steps to prevent the increased risk of a bird strike event and going forward, to manage the Shotover WWTP in a way that does not attract birds that are hazardous to aircraft operations.

Next steps

9. QLDC must take immediate steps to address the bird activity at the disposal field, and we request urgent confirmation of these steps.

10. While QAC wishes to continue to work collaboratively with QLDC on this matter, if QLDC fails to act in a timely manner, QAC reserves its right to take such steps as necessary to address the effects and will seek to recover its costs from QLDC in doing so. The most likely option to address this would be a netting solution, which will take several months to fully implement.

Yours faithfully
RUSSELL MCVEAGH

Lauren Rapley | Siobhan McDonald
Partner | Solicitor

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Appendix C: QLDC Record of Decision

RECORD OF DECISION

SHOTOVER WASTEWATER TREATMENT PLANT TREATED WASTEWATER DISCHARGES - EMERGENCY WORKS JUSTIFICATION

Background

1. Queenstown Lakes District Council (the **Council**) has consents allowing treated wastewater from the Shotover Wastewater Treatment Plant (**SWWTP**) to be returned to the environment using the dose and drain (**DAD**) disposal field, located south of the existing treatment ponds and close to the Shotover Delta. The DAD disposal field was originally made up of 11 individual soakage sectors/dispersal fields, where treated wastewater is then dosed into each sector to drain through the gravel into the water table below.

The problem

2. However, performance of the DAD disposal field has steadily deteriorated since 2020, and the field no longer operates as it was designed to do. Since August 2024 this deterioration has accelerated. Surface water within the DAD disposal field is unable to be fully contained, leading to discharge from the southern end of the field and into the Shotover delta environment nearby. These events resulted in an abatement notice being served by Otago Regional Council (**ORC**) for not complying with the conditions of its consent. In January 2025 the ORC initiated enforcement order proceedings in the Environment Court.

3. As the DAD disposal field has deteriorated, the Council has undertaken a series of investigative works to determine the cause of the problem and to identify potential options to resolve it. The problem is primarily two-fold. The discharge from the SWWTP (especially the pond stream) contains suspended solids that have, over time, blocked the pores in the gravel soils reducing their permeability. In addition, biological growth has occurred inside the DAD cells, reducing the ability of treated wastewater to discharge from the cells into the surrounding gravels. The Council has trialled dosing the DAD cells with Hydrogen Peroxide to manage the biological growth but that had little, if any, beneficial effect (and accessing the cells is extremely difficult).

4. In April 2024 the Council constructed Rapid Infiltration Basins (**RIB**) between the formal DAD cells to increase the storage volume and increase the soakage area available. The RIBs initially performed well and were able to manage the volumes within the disposal field area, however, with time these also became clogged and due to the saturation of the site further maintenance was not practical. In September 2024, to protect the fields' embankments, an overflow pipe was constructed from an area of the field to enable a controlled release of treated wastewater into and onto the Shotover delta when the field water level becomes high.

5. As a result, treated wastewater now flows from the disposal field, out of the site to the south. This is an uncontrolled discharge once it leaves the site. As it is a braided river system the Shotover delta has many historical channels, with the active channels regularly shifting. There is a preferential groundwater flow path following an old channel of the Shotover River resulting in ponding of treated wastewater within gravels and willows to the south of the DAD disposal field and to the north and south of ORC's training wall for the Kawarau River (installed in 2006). The groundwater flow (with surface water flow and ponding in areas) has followed the old channel. There is an extensive area of ponding from the DAD disposal area to the training wall. The treated wastewater flows under the training wall and

then discharges to the Kawarau River in one primary channel, and numerous ponded areas (as groundwater), over approximately 150m.

Adverse effects

6. The uncontrolled discharge of treated wastewater creates following potential adverse effects:

   (a) The presence of pooled water within the DAD disposal field, and the ponding within the Shotover delta, is attracting waterfowl and other birdlife. While the Council manages waterfowl across the SWWTP treatment ponds, the new ponding areas are occurring closer to the approach to Queenstown International Airport (the **Airport**). Queenstown Airport Corporation (**QAC**) has now formally indicated that Council must act immediately to mitigate the potential risk of bird strike in a letter dated 25 March 2025 (**attached**).

   (b) Areas affected by the present uncontrolled treated wastewater discharge are in a location with high public / recreational use.

   (c) The Shotover River delta has considerable amenity values which are adversely affected by the ponded treated wastewater.

   (d) While the wastewater is treated it is not treated to a drinking water standard. The treated discharge from the SWWTP meets the quality requirements for recreational water use (based on E.coli levels). But that assumes exposure within a water body rather than direct contact within the treated wastewater stream itself. A precautionary approach is therefore promoted by the Ministry for the Environment wherever there is potential for exposure to treated wastewater. Health risks associated with exposure to treated wastewater such as in this case typically derive from ingestion of impacted water while swimming / playing or eating of food that has contacted such waters. The health risk increases given the number of people potentially crossing or wading (or children playing) in the ponded or flowing areas of the treated wastewater to, and into, the Kawarau River.

7. The enforcement order proceedings by ORC against the Council are based on amenity and recreational effects. Enforcement order proceedings are not lightly taken and show the concern of ORC in relation to those effects. However, ORC had not factored in the effects of the activity on QAC's operations. This is an immediate and significant problem.

The present position

8. The Council is now of the opinion, based on expert advice, that the DAD disposal field cannot be remediated to a point where it will provide a meaningful level of discharge for the treated wastewater from the SWWTP. The expert advice is that even if remediation is attempted (during which time a portion of discharge would have to go offsite) the benefits of that remediation would only last months before deteriorating again. Further:

   (a) The effectiveness of the DAD is continuing to deteriorate so the overflow discharges of treated wastewater will keep increasing.

   (b) The water level within the existing RIBs needs to lowered by 400-500mm to preserve the integrity of the bund walls by protecting against wave action and associated scour, further reducing the capacity of the DAD

and increasing offsite discharges. Further, the inclusion of wave protection to the bund walls is recommended should the DAD disposal field be retained.

(c) The existing treatment ponds will not assist in resolving the situation as:

(i) They are required for treatment until the end of 2025;

(ii) Without full decommissioning (including removal of accumulated sludge) they provide very limited, and short term, storage that will not meaningfully reduce the offsite discharge of treated wastewater;

(iii) Sludge removal will take a minimum of 18 months from the end of 2025, so the ponds could not be utilised until mid-2027 at the absolute earliest;

(iv) Even if available to provide for buffer storage it is not anticipated that there is sufficient capacity in the existing disposal field to enable this option to provide anything but extremely short term benefits; and

(v) QAC does not want ongoing use of the ponds but rather is motivated to see all ponds removed from service and decommissioned as soon as practical.

Ongoing Council works

9. The Council has undertaken, and continues to undertake, a comprehensive upgrade of the SWWTP site. That has included:

(a) In 2017 installing a Modified Ludzack-Ettinger (MLE) treatment train (at a cost of approximately $20m) changing the treatment from 100% pond based to 80% MLE treatment (achieving a much higher standard of treatment).

(b) In 2019 installing the DAD (at a cost of $7.5m) and ceasing the use of a direct discharge to the Shotover River.

(c) The present development of an additional MLE process train due for completion at the end of 2025 (at a cost of approximately $50m) that will result in the ponds no longer being required and a step change in the effluent quality.

(d) Funding of $77m in the LTP (across Financial Years 24/25 to 29/30) for consenting, designing and constructing a long-term sustainable discharge from the SWWTP (investigations for this commenced in October 2024 and consents will be lodged in May 2026).

(e) Additional funding of $22.3m across the LTP period to enable decommissioning of the remaining oxidation ponds, along with other improvements and renewals at the facility.

Preferred option

10. The Council, with expert assistance, has considered numerous options for managing the uncontrolled treated wastewater discharge. The preferred option is to discharge the full SWWTP treated wastewater flow to the existing northern discharge channel and to the Shotover River.

11. The benefits of this option are that it:

(a) Provides a controlled discharge through an existing channel that is known to have worked (and was used until 2019).

(b) Removes the DAD disposal field from operation entirely, avoiding the presence of ponding both within the DAD field and on the Shotover delta, resulting in immediate reduction of areas for waterfowl to inhabit (and avoids those ponded areas reoccurring).

(c) The quality of the treated wastewater discharge is now significantly improved through the 2017 MLE plant and, from the end of this year the second MLE plant will be operational further enhancing the standard of treatment (through the decommissioning of the pond system).

(d) Is in an area with good access to a flowing branch of the Shotover River and of low recreational use (significantly reducing potential recreational, amenity and human health effects).

(e) Requires limited additional works to be utilised.

(f) Avoids ponding on the Shotover delta to the south, thereby avoiding recreational and amenity effects in those high use areas.

(g) Allows treatment ponds 2 & 3 to be decommissioned from the end of 2025, removing those areas for use by waterfowl.

(h) Allows the DAD disposal area to be decommissioned and its consideration for future use, if any, to be determined (and if used to be implemented more quickly).

The law

12. Section 330 provides for 'emergency works' to be carried out without resource consent first being obtained, in specific circumstances. The Environment Court has emphasised the limited application of s 330 as follows:[1]

> *Because of [s 330's] specifically defined circumstances of applicability … local authorities and others should not forsake or compromise their responsibilities under the [RMA's] wider framework of regional and district planning and control on a footing that s.330 is "always available if things go wrong." Important though [s 330] is, its terms are such that it cannot be viewed as an ultimate resort for every contingency.*

13. The Council is mindful of this statement when considering the potential use of emergency works.

14. Section 330 of the RMA reads (emphasis added):

Emergency works and power to take preventive or remedial action

(1) Where—

[1] See generally *Auckland City Council v Minister for the Environment* (1999) 5 ELRNZ 1 (EnvC) at 15–16.

(a) any public work for which any person has financial responsibility; or

(b) **any natural and physical resource or area for which a local authority or consent authority has jurisdiction under this Act**; or

(c) any project or work or network utility operation for which any network utility operator is approved as a requiring authority under section 167; or

(ca) any service or system that any lifeline utility operates or provides—

is, in the **opinion of the person**, authority, network utility operator, or lifeline utility, **affected by or likely to be affected by**—

(d) **an adverse effect on the environment which requires immediate preventative measures**; or

(e) **an adverse effect on the environment which requires immediate remedial measures**; or

(f) any sudden event causing or likely to cause loss of life, injury, or serious damage to property—

the provisions of sections 9, 12, 13, 14, and 15 shall not apply to any activity undertaken by or on behalf of that person, authority, network utility operator, or lifeline **utility to remove the cause of, or mitigate any actual or likely adverse effect of, the emergency**.

…

Section 330(1)(a)-(ca)

15. The Council is not concerned about any effect on the SWWTP itself, or on any other Council infrastructure. Rather, the concern is about potential adverse effects within and from the DAD disposal area on the environment. Therefore, the Council does not consider it can rely on s 330(a), (c) and (ca) in this case.

16. The Council has focused on determining whether the effect (or effects) in question fall under s 330(1)(b): are there effects or likely effects from the overflow discharge on a natural and physical resource or area that the Council has jurisdiction over under the RMA?[2]

17. As addressed above, the effects relied on by ORC for the enforcement orders relate to land (amenity and recreation). However, the increased waterfowl effect (and potential for bird strike) also relates to land being the operation of the Airport. The DAD disposal field, and the ponding within the Shotover delta caused by the uncontrolled treated wastewater discharges, are predominantly within the Council's designated area for wastewater and on land owned by the Council. Of critical concern to the Council is the increased risk of bird strike to the safe operation of the Airport (as set out in QAC's letter).

18. On that basis, the Council considers that it can, and does, rely on s 330(1)(b).

[2] 'Natural and physical resources' is defined as including "*land, water, air, soil, minerals, and energy, all forms of plants and animals (whether native to New Zealand or introduced), and all structures*."

Forming the Councils "opinion"

19. The opinion required under s 330 is that of the Council. In forming its opinion, the Council must act objectively and reasonably in the circumstances.[3] The Council has been careful to ensure, at each step of the process as required, it has viewed the effects and its proposed actions and decisions to act immediately, objectively and reasonably. The Council has worked with its expert advisors, and its legal team, to help inform it.

What are the adverse effects justifying emergency works?

20. In considering the adverse effects to support the emergency works the Council is conscious that the general unsuitably (and unsustainability) of the existing situation is not in itself sufficient. Specific adverse effects need to be identified.

Waterfowl

21. As summarised above, the presence of pooled wastewater within the DAD disposal field, and the ponding within the Shotover delta, is attracting waterfowl and other birdlife. While the Council manages waterfowl across the SWWTP treatment ponds, the DAD disposal field and new ponding areas are closer to the approach to the Airport. Bird surveys have reflected a migration of bird numbers from the oxidation ponds to the DAD disposal field location and the areas of ponding.

22. In 2024 there were two bird strike incidents at the Airport resulting in engine destruction. While there is no evidence that those bird strikes were linked to the SWWTP the presence of birds is a real, critical, and current issue for QAC, which has provided Council with a letter on 25 March 2025 expressing concern and obliging Council to act with immediate effect. This has elevated the need for Council to act with care, but to resolve the matter with urgency.

Are the effects actual or likely?

23. The effects must be either actual or likely.

24. The bird strike effect, while of low probability, is still considered by the Council (and QAC) to be of an importance sufficient to consider it, for emergency works, a "likely" effect. As summarised above:

    (a) The critical human health and safety related to airline operations and the effects of bird strike.

    (b) Bird numbers are increasing, and the DAD and ponded areas are located in close proximity to the main flight path.

    (c) Two ‘engine loss’ bird strike events have occurred within the past 12 months.

    (d) The discharges from the field will increase with time as the field continues to deteriorate, creating additional habitat for waterfowl to the south of the field and increasing the likelihood of bird strike events with time.

[3] *Auckland City Council v Minister for the Environment*, EnvC, A112/98.

Immediate response

25. To fall within s 330, immediate action must be required, again on a reasonably and objective analysis. The Council has borne in mind the Environment Court's explanation that:[4]

> *… the adverse effect in question must be of a kind as to require not only preventive measures or remedial measures, but also the immediate carrying out of such measures. The words used are strong in their tenor, embracing as they do both a mandatory factor ("require") and the factor of immediacy… The nature of the effect and its adversity must be commensurate with the type of situation predicated by the mandatory and immediacy factors ....*

26. While the issue of the DAD disposal field is not new, its recent and fast deterioration is, and this increases and heightens the risk to the safe operation of the Airport. In addition:

    (a) Only recently has engineering advice been received that the water level in the RIB needs to be reduced to achieve a freeboard of 400-500mm.

    (b) The enforcement order was only recently issued and mediation completed, a process that has heightened the Councils understanding of the need to immediately address the effects related to QAC land.

    (c) The increase in numbers of waterfowl within the ponded areas have recently reached the point where QAC has formerly requested that the Council takes immediate steps to reduce the risk of bird strike on airport operations.

27. While not strictly required, the Council has also been mindful of the potential adverse effects of any proposed emergency works, and the discharges, on the environment. The Council is mindful that it will need to seek consents for the ongoing adverse effects of its proposed works and discharge under s 330A of the RMA where those matters will appropriately be considered and determined.

Removal of the cause / mitigating the effect – what works are anticipated?

28. The Council's preference is to bypass the DAD disposal area and to discharge the full flow of treated wastewater to the Shotover River via the historic discharge channel that was utilised prior to the DAD disposal field's construction. This situation would have to stay in place until the long-term solution becomes operative. Under s 331, the Council will need to seek resource consents for the ongoing adverse effects of the emergency work. However, undertaking the works will immediately relieve pressure on the DAD and quickly avoid ponding within and around the disposal field. This will quickly reduce and then avoid the habitat created for waterfowl significantly reducing the safety risks at the Airport.

Conclusion

[4] *Auckland City Council v Minister for the Environment* (1999) 5 ELRNZ 1 (EnvC) at 10.

29. The Council has carefully considered the effects, their likelihood and the need for an immediate response outside of the usual RMA process. It considers that the use of s 330 emergency work provisions in the RMA is the appropriate course of action to adopt for the reasons set out above.

30. In undertaking the emergency works and the discharge the Council will:

    (a) Increase the flow into the channel over time to monitor its effectiveness.

    (b) Invite iwi, ORC and QAC to send representatives to witness any works and the initial use of the channel.

    (c) Take photographic and video records of all works and the initial use (and then at regular intervals) and share with iwi and ORC.

    (d) Undertake robust environmental monitoring and sampling including where possible before any works / discharge, during the works / discharge and then ongoing after the works and discharge while they remain in operation.

    (e) Report on the monitoring and sampling at regular intervals to iwi and ORC.

Record of decision made by Delegated Officer on 27 March 2025

Mike Theelen
Chief Executive
Queenstown Lakes District Council

Appendix D: Copies of Current Consents

ORIGINAL

Otago Regional Council

Our Reference: A766704 Consent No. RM13.215.03.*V2*

DISCHARGE PERMIT

Pursuant to Section 104B of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Queenstown Lakes District Council

Address: 10 Gorge Road, Queenstown

To discharge treated wastewater to land

For a term expiring: 31 December 2031

Location of consent activity:

Queenstown, approximately *1.25 kilometres south south-east of the intersection of State Highway 6 and Tuckers Beach Road,* ~~1.2 kilometres south southeast of the intersection of Shotover Delta Road and Frankton-Ladies Mile Highway (State Highway 6)~~

Legal description of consent location: *Lot 4 DP 421841 and Lot 2 DP 422388* ~~Pt Sec 141 and Secs 142 - 145 & 152 Blk I Shotover SD, Lot 1 DP 306621, Lot 1 DP 15636, Crown Land Blk I Shotover SD~~

Map Reference: NZTM 2000 *1266045E 5006801N* ~~E1265922 N5006626~~

Conditions

Specific

1. Under Section 125 of the Resource Management Act 1991, this consent shall not lapse until 1 January 2023.

2. Discharge Permit RM13.215.04 shall be surrendered within 6 months of the full exercise of this consent (all treated wastewater being discharged to land). The consent holder shall notify the Consent Authority in writing of the date of the first exercise of this consent.

3. The volume of wastewater discharged to the disposal field shall not exceed:
   (a) An annual average of 11,238 cubic metres per day; and
   (b) A maximum discharge loading rate ~~for~~ *averaged over the* ~~each~~ disposal field area ~~bed~~ of 1,000 ~~1,200~~ millimetres per *calendar* day *based on the total area of the disposal field.*

Otago Regional Council

4. The recorded daily flow and total nitrogen concentration of the effluent as monitored in accordance with Conditions 7 and 8 of this consent shall be averaged over the previous 12 month rolling period and when the mass of nitrogen reaches:
   (a) 73.2 tonnes per year, the consent holder shall implement the wastewater treatment plant upgrade process to meet the conditions of Consent 2008.238.*V2* within two years; and
   (b) 75.5 tonnes per year, the consent shall have commissioned the upgraded wastewater treatment plant to meet the conditions of Consent 2008.238.*V2*. This consent shall be surrendered within 6-months of this upgrade being commissioned.

~~5. The wastewater disposal field platform shall be raised above existing ground level such that there is a minimum unsaturated zone between the disposal manifold and permanent groundwater of no less than 600 millimetres.~~

~~6.~~*5.* No less than one month prior to construction of the wastewater disposal field, all detailed design drawings and calculations shall be provided to the Consent Authority.

~~7.~~*6.* Prior to the exercise of this consent, the consent holder shall install a flow meter on the outlet pipe from the treatment plant and continually measure and record the daily volume of effluent being discharged to the disposal field. The consent holder shall report the daily discharge volume for the previous calendar year in writing, and in electronic form, to the Consent Authority, by 1 February each year.

Performance Monitoring

~~8.~~*7.* Within the first week of each calendar month, the consent holder shall collect a representative sample of the treated wastewater, immediately prior to discharge to the disposal field. Each sample collected shall be analysed for:
   (a) Five day total biochemical oxygen demand;
   (b) Total suspended solids;
   (c) Total nitrogen;
   (d) Ammoniacal nitrogen;
   (e) Total phosphorous; and
   (f) Escherichia coli.

~~9.~~*8.* Within the first week of each month for the first five years of the exercise of this consent, and within the first week of January and July each year thereafter, the consent holder shall, collect representative samples of groundwater from bores up gradient and down gradient of the wastewater disposal field, which are to be located in consultation with the Consent Authority. Each sample shall be analysed for:
   (a) Total nitrogen;
   (b) Ammoniacal nitrogen;
   (c) Nitrate nitrogen;
   (d) Total phosphorous; and
   (e) Escherichia coli.

Groundwater sampling procedures shall be generally in accordance with "The New Zealand Guidelines for the Collection of Groundwater Samples for Chemical and Isotopic Analysis" science report 99/9, dated April 1999 and published by the Institute of Geological and Nuclear Sciences

9. *(a) Prior to commencement of this consent the Consent Holder shall install at least 7 piezometers which are to be located, in consultation with the consent authority, within and outside the disposal area for the purpose of providing representative sampling of groundwater levels around and within the disposal area.*
   (b) Groundwater levels in the piezometers shall be recorded to a datalogger with at least 24 months data storage, to record the date, time and groundwater level.
   (c) The piezometer shall be installed according to the manufacturer's specifications and instructions.
   (d) The consent holder shall ensure the full operation of the piezometer and datalogger at all times during the exercise of this consent. All malfunctions of the piezometer and/or datalogger during the exercise of this consent shall be reported to the Consent Authority within 5 working days of observation and appropriate repairs shall be performed within 5 working days. Once the malfunction has been remedied, the consent holder shall provide a report from an appropriately qualified professional certifying the operation of the piezometer and/ or datalogger has been verified as accurate complete with photographic evidence to the Consent Authority within 5 working days of the completion of repairs.
   (e) The installation of the piezometer and datalogger shall be completed to full and accurate operation prior to the exercise of the consent. The consent holder shall forward a copy of the installation certificate to the Consent Authority within one month of installing the piezometer and datalogger.

10. *The consent holder shall monitor and maintain records of any groundwater mounding above the ground surface within the operational disposal area that remains for over 48 hours.*
   (i) Records should include but not be limited to:
   (a) Photographic record;
   (b) Sampling of mounded water to determine presence of treated effluent as outlined in Condition 8;
   (ii) The Consent Authority shall be immediately notified of occurrences of mounding breakthrough that exceed 48 hours in writing.
   ~~*(d) Records to be supplied to consent holder annually.*~~

~~10.~~*11.* The results from the monitoring undertaken in accordance with Conditions ~~8 and 9~~ *7, 8, 9 and 10* of this consent shall be reported in writing to the Consent Authority ~~within one~~ monthly, together with a reading of the 24-hour wastewater discharge volume for the day of sampling.

~~11.~~*12.* The quality of the treated wastewater shall not exceed the following limits prior to discharge:

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Parameter	95%ile	Annual Mean
BOD_5 (g/m^3)	50	30
TSS (g/m^3)	50	30
TN (g/m^3)	35	23
E.Coli (cfu/100ml)	260 (90% ile)	260 geomean

* Means and percentiles apply to a rolling 12 calendar month period.

~~12~~*13.* All sampling techniques employed in respect of the conditions of this consent shall be acceptable to the Consent Authority. All analysis carried out in connection with this consent shall be performed by a laboratory that meets ISO 17025 or IANZ standards, or otherwise as specifically approved by the Consent Authority.

~~13~~.*14.* No less than three months before the commencement of the exercise of this consent, the consent holder shall prepare and forward to the Consent Authority an Operations and Management Manual for the treatment and disposal system to ensure its effective and efficient operation at all times. The system shall be operated in accordance with this manual, which may be updated as appropriate. The manual shall include, but not be limited to:

(a) A description of the entire treatment and disposal system, including a site map indicating the location of the various components of the treatment and disposal system, discharge locations and monitoring sites;
(b) Specific management procedures for key components of the system;
(c) Procedures to be utilised to monitor the operation and performance of the system;
(d) Monitoring and reporting procedures, including, but not limited to:
    (i) Contingency plans for system malfunction and breakdowns for each part of the treatment and disposal system; and
    (ii) Contingency plans for maintaining effluent quality during periods of peak flows.
    (iii) Monitoring plans for monitoring groundwater mounding and quality.
(e) Population numbers that the system is designed to accommodate,
(f) A complaints and system malfunctions recording system;
(g) Details of the measures to be taken to meet the quality of discharge set out in Condition 12 of this consent; and
(h) Procedures for continuous reviewing and improving of the manual.

The consent holder shall ensure that the Consent Authority has a copy of the current Operations and Management Manual at all times.

~~14~~.*15.* The consent holder shall submit a record of complaints and malfunctions to the Consent Authority within two weeks after any complaint or malfunction occurring, together with the details of the remedial measures taken or proposed to be undertaken.

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~~15~~.*16*. The consent holder shall, at three monthly intervals, undertake a visual inspection of the disposal field, to determine there is no vegetation die-off, or slumping, as a result of the discharge of treated wastewater to land.

~~16~~.*17*. By *1 February* ~~30 September~~ each year, the consent holder shall forward an annual report in writing to the Consent Authority. The annual report shall cover the period *1 January to 30 December* ~~1 July to 30 June~~ in the previous 12-month period and shall report on compliance with this discharge permit, including, but not limited to:

(a) Copies of the laboratory analytical results of all monitoring undertaken;
(b) Summary of the year's monitoring results, in context of previous years' results;
(c) Summary of volumes of treated wastewater discharged to land;
(d) Summary of quality of treated wastewater discharged to land;
(e) Summary of all analytical results from the monitoring bores to date, and an interpretation of the groundwater quality results, particularly with regard to the discharge of treated wastewater to land;
(f) *Summary of trends in groundwater mounding, any areas of mounding concern and outlining any changes to the system or operation to mitigate concerns.*
(g) ~~(f)~~ *(g)* Comments on compliance with the conditions of this discharge permit;
(h) ~~(g)~~ *(h)* Summary of any complaints received, the validity of each complaint and the corrective action taken; and
(i) ~~(h)~~ *(i)* Any other issues considered relevant by the consent holder.

~~17~~.*18*.(a) Within three months of the first exercise of this consent, the consent holder shall invite iwi representatives (Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku) and stakeholder representatives, including Public Health South and Remarkables Park Limited, to form a Reference Group. The purpose of the Reference Group shall be to facilitate consultation between the consent holder, stakeholder representatives and iwi representatives (Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku) during the upgrading of the wastewater treatment plant.

(b) The Reference Group shall have the following functions:

- To receive and review the monitoring data and reports from the physical and biological monitoring. If necessary, a reasonable level of technical expertise shall be made available by the consent holder to interpret the monitoring data.
- To receive and review the annual monitoring report.
- To receive and review the implementation plan for the upgrade of the treatment and disposal system.
- To make recommendations to the consent holder on management actions to avoid, remedy or mitigate any adverse effects of the treatment and disposal system.

(c) The consent holder shall, at least once every six months, invite the Reference Group to a meeting to discuss any matter relating to the exercise and monitoring of this consent. The consent holder shall meet reasonable costs of attending meetings of the Reference Group. The consent holder shall keep minutes of any meeting of the Reference Group and provide Consent authority with copies of the minutes.

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~~18.~~*19.* (a) Within three months of the first exercise of this consent, the consent holder shall provide the Consent Authority and the Reference Group with an Implementation Plan for the staged upgrade of the wastewater treatment plant.

(b) The Implementation Plan shall describe the program of work required to ensure that:

- By no later than 31 December 2017, flows of up to 9,000 cubic metres per day of treated wastewater are discharged to land.
- By no later than 31 December 2022, the discharge of treated wastewater to the Shotover River shall cease.
- By no later than 31 December 2031, Stage 3 (a full upgrade of the treatment and disposal system to achieve mean 10:10:10:10 (BOD:TSS:TN:E.Coli) effluent quality as required by Discharge Permit 2008.238.V1) is operational.

(c) By no later than 31 January each year, the consent holder shall provide an annual report to the Consent Authority and the Reference Group detailing progress made with the program of work outlined in the Implementation Plan.

General

~~19.~~*20.* No ponding or surface run-off of treated wastewater shall occur as a result of the exercise of this consent.

21. Mounding of groundwater:

(i) above the ground surface shall not occur in cumulative area greater than 100 m2 over the entire disposal area for more than 48-hours in any one event.

(ii) as a result of the exercise of this consent shall not result in surface breakthrough after the initial 5 year mounding trial period following the commencement of this consent.

22. In accordance with Sections 128 and 129 of the Resource Management Act 1991 Condition 20 and 21 shall be reviewed after a 5-year trial period for the purposes of dealing with any mounding issues, such as reassessing the area of acceptable mounding, testing the quality of mounded water to determine risk, or assessing the need for fencing and/or signage.

23. The Consent Holder shall advise the consent authority of any changes to the extent of the operational disposal area within 3-months.

~~20.~~*24.* There shall be no vehicle access over or through the land disposal area apart from designated access areas, such that it adversely affects the performance of the disposal area.

~~21.~~*25.* This permit does not authorise the discharge of sludge to land or water, other than to an approved landfill facility or alternative consented location.

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~~22.~~*26.* If the consent holder:

(a) Discovers koiwi tangata (human skeletal remains), or Maori artefact material, the Permit Holder shall without delay:

(i) Notify the Consent Authority, Tangata whenua and New Zealand Historic Places Trust and in the case of skeletal remains, the New Zealand Police.

(ii) Stop work within the immediate vicinity of the discovery to allow a site inspection by the New Zealand Historic Places Trust and the appropriate runanga and their advisors, who shall determine whether the discovery is likely to be extensive; if a thorough site investigation is required and whether an Archaeological Authority is required.

(iii) Any koiwi tangata discovered shall be handled and removed by tribal elders responsible for the tikanga (custom) appropriate to its removal or preservation. Site work shall recommence following consultation with the Consent Authority, the New Zealand Historic Places Trust, Tangata whenua, and in the case of skeletal remains, the NZ Police, provided that any relevant statutory permissions have been obtained. material, or disturbs a previously unidentified archaeological or heritage site, the Permit Holder shall without delay:

(i) Stop work within the immediate vicinity of the discovery or disturbance; and

(ii) Advise the New Zealand Historic Places Trust, and in the case of Maori features or materials, the Tangata whenua, and if required, shall make an application for an Archaeological Authority pursuant to the Historic Places Act 1993; and

(iii) Arrange for a suitably qualified archaeologist to undertake a survey of the site.

Site work shall recommence following consultation with the Consent Authority.

~~23.~~*27.* The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent within three months of each anniversary of the commencement of this consent for the purpose of:

(a) determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage;

(b) ensuring the conditions of this consent are consistent with any National Policy Statements, National Environmental Standards Regulations, relevant plans and/or the Otago Regional Policy Statement.

Issued at Dunedin this 5th day of June 2015

Reissued at Dunedin this 9th day of March 2017 for the purpose of amending the legal description and map reference and varying Conditions 3, 4, 5, 10, 13, 16 and the addition of new conditions 9, 10, 21, 22, 23."

Marian Weaver

Resource Manager Procedures & Protocols

Otago Regional Council

Our Reference: 1377847943-21156 Consent No. 2008.238.V2

DISCHARGE PERMIT

Pursuant to Section 104B of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Queenstown Lakes District Council

Address: 10 Gorge Road, Queenstown

To discharge treated wastewater to land

For the purpose of operating the Queenstown Wastewater Treatment and Disposal System

For a term expiring 18 March 2044

Location of consent activity:
The Shotover River Delta, *1.25 kilometres south south-east of the intersection of State Highway 6 and Tuckers Beach Road,* ~~approximately 1.1 kilometres south east of the intersection of Glenda Drive and Margaret Place,~~ Queenstown

Legal description of consent location:
Lot 4 DP 421841 and Lot 2 DP 422388
~~Sec 145 Blk 1 Shotover SD~~
~~Sec 144 Blk 1 Shotover SD~~
~~Sec 143 Blk 1 Shotover SD~~
~~Sec 142 Blk 1 Shotover SD~~
~~Pt Sec 141 Blk 1 Shotover SD~~
~~Pt Sec 152 Blk I Shotover SD~~
~~Lot 1 DP 306621~~
~~Lot 1 DP 15636~~
~~Crown Land Blk 1 Shotover SD~~

Map Reference: NZTM 2000 *1266045E 5006801N* ~~1265922E 5006626N~~

Conditions

Specific

1. Discharge Permits RM13.215.02, RM13.215.03, RM13.215.04 or any variations to those permits, and any other existing consents for the discharge of treated municipal wastewater to land or water held by the consent holder for discharges within the Shotover Delta shall be surrendered within 6 months of the first exercise of this consent. The consent holder shall notify the Consent Authority in writing of the date when this resource consent is first exercised.

2. The volume of wastewater discharged to the disposal field shall not exceed 45,000 cubic metres per calendar day, at a maximum discharge loading rate *averaged* over the land disposal area of ~~1,200~~ *1,330* millimetres per calendar day *based on the total area of the disposal field.*

3. From the commencement of this consent, treated wastewater discharged to the disposal field shall comply with the following criteria:

Parameter	Annual mean not to exceed	90th percentile not to exceed*
Five day biochemical oxygen demand (grams per cubic metre)	10	20
Total suspended solids (grams per cubic metre)	10	20
Total nitrogen (grams per cubic metre)	10	15
Total phosphorous (grams per cubic metre)	8	10
E.coli (colony forming units per 100 millilitre)	10 (geometric mean)	100 (95th percentile)*

* The 90th and 95th percentile applies to a rolling 12 calendar month period

4. Under Section 125 of the Resource Management Act 1991, this consent shall not lapse until December 2031.

Performance Monitoring

5. The consent holder shall install a flow meter on the outlet pipe from the treatment plant and continually measure and record the daily volume of effluent being discharged to the disposal field. The consent holder shall report the daily discharge volume for the previous calendar month in writing, or in electronic form, to the Consent Authority, within two weeks after the end of each calendar month.

6. Within three months of the commencement of this consent, the consent holder shall prepare and forward to the Consent Authority an Operations and Management Manual for the treatment and disposal system to ensure its effective and efficient operation at all times. The system shall be operated in accordance with this manual, which may be updated as appropriate. The manual shall be to the satisfaction of the Consent Authority and include, but not be limited to:
   (a) a description of the entire treatment and disposal system, including a site map indicating the location of the various components of the treatment and disposal system, discharge locations and monitoring sites;
   (b) specific management procedures for key components of the system;

(c) procedures to be utilised to monitor the operation and performance of the system;
(d) identification of potential equipment malfunctions and environmental situations that may lead to treatment system failure;
(e) monitoring and reporting procedures, including, but not limited to:
  (i) contingency plans including methods for monitoring and detecting out of specification influents/effluents, contingency procedures for managing the same, contingency procedures to manage system component malfunctions and breakdowns for both the treatment and disposal system;
  (ii) contingency plans for ensuring consistent effluent quality during periods of peak flows including proactive maintenance prior to peak flow seasons to achieve the same.
  (iii) Monitoring plans for monitoring groundwater mounding and quality.
(f) population numbers that the system is designed to accommodate for;
(g) reporting population growth and influent volumes and their consistency with the forecasts supplied at the time of granting
(h) a complaints recording system and malfunction recording system including actions and responses undertaken to rectify any system malfunction;
(i) details of the measures to be taken to ensure the attainment of the effluent quality requirements set out in Condition 3; and
(j) procedures for continuous reviewing and improving of the manual.

7. The consent holder shall submit the record of complaints and malfunctions to the Consent Authority within two weeks after any complaint or malfunction occurring, together with the details of the remedial measures taken. At all times, the consent holder shall ensure that the Consent Authority has a copy of the up to date Operations and Management Manual.

8. The analytical sampling results for each sample collected under Conditions 11 and 12 shall be reported in writing to the Consent Authority, within two weeks of the consent holder receiving the results, together with a reading of the 24-hour wastewater discharge volume for the day of sampling.

9. The Consent Holder shall, at five yearly intervals from the exercise of this consent engage a suitably qualified freshwater biologist to design and implement a survey of the true left bank of the Kawarau River. The purpose of the study shall be to determine if the wastewater discharge from the plant is affecting the biology and conservation values of the Kawarau River. The design and implementation of the monitoring program shall be approved by the Consent Authority and take into account, seasonality, the current flows to plant, the current footprint of the low pressure effluent dosing system field and the results of groundwater modelling and testing at hand. The results of the survey shall be reported to the Consent Authority within three months of the survey.

10. The consent holder shall by *1 February* ~~30 September~~ each year after the commissioning of the treatment system forward an annual report in writing to the Consent Authority. The annual report shall cover the period *1 January to 30 December* ~~1 July to 30 June~~ in the previous 12-month period and shall report on compliance with this discharge permit, including, but not limited to:
  (a) Copies of the laboratory analytical results of all monitoring undertaken;

(b) Summary of the year's monitoring results, in context of previous year's results;
(c) Summary of volumes of treated wastewater discharged to land;
(d) Summary of quality of treated wastewater discharged to land;
(e) Summary of all analytical results from the monitoring bores for the previous year, and an interpretation of the groundwater quality results, particularly with regard to the discharge of treated wastewater to land;
(f) *Summary of trends in groundwater mounding, any areas of mounding concern and outlining any changes to the system or operation to mitigate concerns.*
~~(f)~~ *(g)* Comments on compliance with the conditions of this discharge permit;
~~(g)~~ *(h)* Summary of any complaints received, the validity of each complaint and the corrective action taken; and
~~(h)~~ *(i)* Any other issues considered relevant by the consent holder.

~~General~~

~~11 11. The discharge shall only be treated wastewater, originated from the Queenstown Lakes District.~~

11. ~~12.~~ From the commencement of this consent, and within the first week of each calendar month, the consent holder shall collect a representative sample of the treated wastewater, immediately prior to discharge to the disposal field. Each sample collected shall be analysed for:
(a) Five day biochemical oxygen demand (BOD5)
(b) Total suspended solids
(c) Total nitrogen
(d) Total ammoniacal nitrogen
(e) Total phosphorous
(f) Dissolved reactive phosphorous
(g) Faecal coliforms

12. ~~13~~. Groundwater samples shall be collected from monitoring bores up gradient and down gradient of the disposal area. These bores shall be located in consultation with the Consent Authority. The groundwater samples shall be collected:
(a) The first week of each January and each July for the duration of the consent.
Each sample shall be analysed for:
(b) Total nitrogen
(c) Total ammoniacal nitrogen
(d) Nitrate nitrogen
(e) Total phosphorous
(f) Dissolved reactive phosphorous
(g) Faecal coliforms

13. ~~14.~~ Groundwater sampling procedures shall be generally in accordance with "The New Zealand Guidelines for the Collection of Groundwater Samples for Chemical and Isotopic Analysis" science report 99/9, dated April 1999 and published by the Institute of Geological and Nuclear Sciences

14. ~~15.~~ All sampling techniques employed in respect of Condition 13 of this consent shall be acceptable to the Consent Authority. All analysis carried out in connection with this consent shall be performed by a laboratory that meets ISO 17025 standards, or otherwise as specifically approved by the Consent Authority.

15. *(a) Prior to commencement of this consent the Consent Holder shall install at least 7 piezometers which are to be located, in consultation with the consent authority, within and outside the disposal area for the purpose of providing representative sampling of groundwater levels around and within the disposal area.*
(b) Groundwater levels in the piezometers shall be recorded to a datalogger with at least 24 months data storage, to record the date, time and groundwater level.
(c) The piezometer shall be installed according to the manufacturer's specifications and instructions.
(d) The consent holder shall ensure the full operation of the piezometer and datalogger at all times during the exercise of this consent. All malfunctions of the piezometer and/or datalogger during the exercise of this consent shall be reported to the Consent Authority within 5 working days of observation and appropriate repairs shall be performed within 5 working days. Once the malfunction has been remedied, the consent holder shall provide a report from an appropriately qualified professional certifying the operation of the piezometer and/ or datalogger has been verified as accurate complete with photographic evidence to the Consent Authority within 5 working days of the completion of repairs.
(e) The installation of the piezometer and datalogger shall be completed to full and accurate operation prior to the exercise of the consent. The consent holder shall forward a copy of the installation certificate to the Consent Authority within one month of installing the piezometer and datalogger.

16. *The consent holder shall monitor and maintain records of any groundwater mounding above the ground surface within the operational disposal area that remains for over 48 hours.*
(i) Records should include but not be limited to:
(a) Photographic record;
(b) Sampling of mounded water to determine presence of treated effluent as outlined in Condition 12;
(ii) The Consent Authority shall be immediately notified of occurrences of mounding breakthrough that exceed 48 hours in writing.

~~16.~~*17.* The consent holder shall, at three monthly intervals, undertake a visual inspection of the land disposal field, to determine there is no slumping, as a result of the discharge of treated wastewater to land.

General

~~11.~~*18.* The discharge shall only be treated wastewater, originated from the Queenstown Lakes District.

19. *The Consent Holder shall advise the consent authority of any changes to the extent of the operational disposal area within 3-months.*

~~17.~~*20.* No ponding or surface run-off of treated wastewater shall occur as a result of the exercise of this consent.

21. Mounding of groundwater:

(i) above the ground surface shall not occur in cumulative area greater than 100 m2 over the entire disposal area for more than 48-hours in any one event.

(ii) as a result of the exercise of this consent shall not result in surface breakthrough after the initial 5 year mounding trial period following the commencement of this consent.

22. In accordance with Sections 128 and 129 of the Resource Management Act 1991 Condition 20 and 21 shall be reviewed after a 5-year trial period for the purposes of dealing with any mounding issues, such as reassessing the area of acceptable mounding, testing the quality of mounded water to determine risk, or assessing the need for fencing and/or signage.

~~18~~*23*. There shall be no vehicle access over or through the land disposal area, such that it adversely effects the performance of the disposal area.

~~19~~*24*. This permit does not authorise the discharge of sludge to land or water.

~~20~~*25*. The consent holder shall erect and maintain signs at suitable locations about the discharge area indicating the presence of a treated wastewater discharge.

~~21~~*26*. The Consent Authority may, in accordance with sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent within three months of each anniversary of the commencement of this consent, for the purpose of:

(a) Determining whether the conditions of this consent are adequate to deal with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage, or which become evident after the date of commencement of the consent; or

(b) Ensuring the conditions of this consent are consistent with any National Environmental Standards; or

(c) Requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment arising as a result of the exercise of this consent.

Issued at Dunedin this 13th day of May 2010
Reissued at Dunedin this 5th day of June 2015 for the purpose of amending the map reference and varying Conditions 1, 3, 4 and 12.
Reissued at Dunedin this 9th Day of March 2017 for the purpose of amending the legal description and map reference and varying Conditions 2, 6, 10 and 11 and the addition of new conditions 15, 16, 19, 21, 22.
Reissued at Dunedin this 24th day of December 2024 after a correction to the consent document variation number pursuant to section 46 of the Legislation Act 2019.

Otago Regional Council

Jenny Ross
Team Leader Consents
24 December 2024

Our Reference: A766704 Consent No. RM13.215.01

DISCHARGE PERMIT

Pursuant to Section 104B of the Resource Management Act 1991, the Otago Regional Council grants consent to:

Name: Queenstown Lakes District Council

Address: 10 Gorge Road, Queenstown

To discharge contaminants to air for the purpose of operating the Queenstown waste water treatment plant

For a term expiring: 18 March 2044

Location of consent activity:
Queenstown, approximately 1.2 kilometres south southeast of the intersection of Shotover Delta Road and Frankton-Ladies Mile Highway (State Highway 6)

Legal description of consent location:
Pt Sec 141 and Secs 142 – 145 & 152 Blk I Shotover SD, Lot 1 DP 306621, Lot 1 DP 15636, Crown Land Blk I Shotover SD

Map Reference: NZTM2000 E1265922 N5006626

Conditions
Specific

1. This consent shall only be exercised in conjunction with Discharge Permit 2008.238.V1, Discharge Permit RM13.215.02, Discharge Permit RM13.215.03, Discharge Permit RM13.215.04 and any subsequent variations to these permits.
2. This consent shall not be exercised until Discharge Permit 2008.239 has been surrendered or has expired.

Performance Monitoring and Odour Reporting

3. The Consent Holder shall adopt the best practicable options (BPO) to prevent or minimise odour discharges from the site. The BPOs shall be set out in an Odour Management Plan that is to be peer reviewed by a suitably qualified air quality specialist appointed in consultation with the Consent Authority. The peer reviewed Odour Management Plan shall be provided to the Consent Authority and the Reference Group within 4 months of the first exercise of this consent for review and comment. The Odour Management Plan shall include, but not be limited to:
   (a) Details of the best practicable option(s) to prevent or minimise odour discharges from the site;
   (b) A description of the potential sources of discharges of odour to air on the site;
   (c) Methods adopted to minimise odour including, but not limited to, the operation and ventilation of the wastewater treatment system, and the storage and management of screenings and sludge;

(d) Method(s) for complying with conditions;
(e) Management and operational procedures and contingency plans to prevent or minimise odour;
(f) Decommissioning and Construction Odour Management Plan. This is to be updated at least 3 months prior to the decommissioning of any of the existing wastewater management and disposal facilities at the site, or any significant upgrade works. The plan shall include, but not be limited to:
i. A description of the proposed decommissioning or upgrade works;
ii. Proposed work schedule;
iii. An assessment of the likely odour effects of the work including, but not limited to, any temporary or permanent ponds, any screening or pre-treatment processes, any facilities for receipt of material other than through the sewage pipe network, any tanks and any processing facilities and ultimate disposal of treated wastewater and sludges (if on-site);
iv. Consideration of where dispersion modelling of odours is required to better understand the potential effects of odour emissions including consideration of katabatic winds;
v. Where upgrade works are proposed, identification of the best practicable options to control odours from each potential odour source taking into consideration the sensitivity of the receiving environment and risk of adverse effects;
vi. Consideration of alternative odour-minimising, decommissioning and construction methodologies and their respective odour generating potential;
vii. Management, of sludge from the ponds and channel;
viii. Proposed changes to the Odour Management Plan; and
ix. Any other issues considered relevant by the consent holder.

(g) Management and operational procedures and contingency plans to minimise odour during the commissioning phases;
(h) Method(s) for recording and responding to complaints from the public;
(i) A description of the monitoring required to comply with the conditions of this consent;
(j) Assignment of responsibility for implementing and updating the Odour Management Plan; and
(k) A plan showing the legal boundary of the Queenstown Wastewater Treatment and Disposal System site.

The consent holder shall ensure that the Consent Authority and the Reference Group have the most recent copy of the Odour Management Plan at all times.

4. (a) The Odour Management Plan shall be reviewed by the consent holder no less than once per calendar year. This review shall consider:
(i) The implications of any actual or anticipated increases in wastewater inflow, organic load and sludge generation on the performance of the treatment plant over the following 12 months, having particular regard to preventing generation of any new offensive or objectionable odours;
(ii) The recommendations of any odour performance reviews undertaken in accordance with Condition 5; and
(iii) The recommendations of any further details of the Decommissioning and Construction component of the Odour Management Plan.

(b) A report detailing the findings of the annual Odour Management Plan review shall be provided to the Reference Group within one month of the review being completed.
(c) The consent holder shall have any amendments to the Odour Management Plan independently peer reviewed by a suitably qualified air quality specialist engaged in consultation with the Consent Authority within three months of the amendments being made.

5. Within 3 years of the commencement of this consent and every 3 years thereafter, the consent holder shall submit a report to the Consent Authority reviewing the odour performance of the site over the preceding 3 year period. The report shall be prepared by a suitably qualified air quality specialist engaged in consultation with the Consent Authority. The review shall include, but not be limited to:
   (a) An assessment of the technology being used to manage site odour against technology currently available;
   (b) An assessment of development adjacent to the site and its potential implication on site odour management and compliance with the conditions of this consent;
   (c) An assessment of the effectiveness of the Management and Operational Procedures and Contingency Plans and Decommissioning and Construction Plans (as detailed in the Odour Management Plan) to minimise offsite odour discharges;
   (d) An assessment of what upgrades are required to ensure compliance with the conditions of this consent during the following 3 year period;
   (e) The results of the odour monitoring undertaken in accordance with the conditions of this consent;
   (f) A record of complaints regarding to odour from the site; and
   (g) Recommendations for improvements in management or operational procedures to ensure compliance with the conditions of this consent.

The odour performance review report shall be provided to the Reference Group within one month of the review being completed.

6. The Consent Holder walkover surveys of odours around the boundary of the site. The minimum frequency of odour walkover surveys shall be:
   (a) At least once per day for 30 days following the completion of any upgrade works that may result in the discharge of odour;
   (b) At least once per day for 3 days following any external complaints received and confirmed as coming from the site; and
   (c) At least once per day for 3 days following any off-site odour identification as coming from the site during the odour walkover survey.

The odour walkover surveys shall be undertaken by a person who may be employed by the consent holder or the treatment plant operator, but who does not work on the site.

7. Records of each odour walkover survey conducted in accordance with Condition 6 shall be maintained and kept for a minimum of 6 years. The records shall include, but not be limited to:
   (a) The date, start and finish times of the survey;

(b) The wind direction and strength, and weather conditions throughout the survey period;
(c) The location and strength/intensity, character and duration of any odours observed;
(d) Investigations into the source of any odour identified, whether from the site or elsewhere; and
(e) Plant operating conditions at the time of the survey.

8. The consent holder shall keep a record of any complaints received regarding discharges of odour from the site. The record shall, as a minimum, include the following:
(a) The time and place at which the complaint was generated;
(b) The nature of the complaint;
(c) Operating conditions at the time of the complaint, including any malfunctioning or breakdown of control equipment;
(d) Wind and weather conditions at the time of the complaint; and
(e) Corrective action taken by the consent holder to minimise the risk and extent of the recurrence of the causes of the complaint.

The consent holder shall submit a copy of the written record of the complaint to the Consent Authority within two weeks after any complaint being received, together with the details of the corrective actions taken.

9. (a) Within three months of the first exercise of this consent, the consent holder shall invite iwi representatives (Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku) and stakeholder representatives, including Public Health South and Remarkables Park Limited/Shotover Park Limited, to form a Reference Group. The purpose of the Reference Group shall be to facilitate consultation between the consent holder, stakeholder representatives and iwi representatives (Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku) during the upgrading and operation of the wastewater treatment plant.
(b) The Reference Group shall have the following functions:

- To receive and review the monitoring data and reports from the physical and biological monitoring. If necessary, a reasonable level of technical expertise shall be made available by the consent holder to interpret the monitoring data;
- To receive and review the annual monitoring report;
- To receive and review the implementation plan for the upgrade of the treatment and disposal system;
- Discuss any odour nuisance associated with the site;
- Discuss the performance of any emission control equipment;
- Discuss the outcome of any investigations or reports commissioned by the consent holder, Consent Authority or the Reference Group representatives in relation to the exercise of this consent;
- Discuss and make recommendations to any proposed or upcoming upgrade works; and
- To discuss and make recommendations to the consent holder on management actions to avoid, remedy or mitigate any adverse effects of the treatment and disposal system.

(c) The consent holder shall, at least once every six months, invite the Reference Group to a meeting to discuss any matter relating to the exercise and monitoring of this consent. The consent holder shall meet reasonable costs of attending

meetings of the Reference Group. The consent holder shall keep minutes of any meeting of the Reference Group and provide the Consent Authority with copies of the minutes.

10. (a) Within three months of the first exercise of this consent, the consent holder shall provide the Consent Authority and the Reference Group with an Implementation Plan for the staged upgrade of the wastewater treatment plant.
(b) The Implementation Plan shall describe the program of work required to ensure that:
- By no later than 31 December 2017 flows of up to 9,000 cubic metres per day of treated wastewater are discharged to land.
- By no later than 31 December 2022, the discharge of treated wastewater to the Shotover River shall cease.
- By no later than 31 December 2031, Stage 3 (a full upgrade of the treatment and disposal system to achieve mean 10:10:10:10 (BOD:TSS:TN:E.Coli) effluent quality as required by Discharge Permit 2008.238.V1) is operational.

(c) By no later than 31 January each year, the consent holder shall provide an annual report to the Consent Authority and the Reference Group detailing progress made with the program of work outlined in the Implementation Plan.

General

11. There shall be no discharge of odour, as a result of the exercise of this consent, that is noxious, dangerous, offensive or objectionable to the extent that is causes an adverse effect beyond the site boundary, in the opinion of an authorised officer of the Consent Authority. This shall include but not be limited to:
    a. Ensuring offensive or objectionable odour emissions from stored septage waste and primary screening facilities are treated via and appropriate odour treatment system to ensure compliance with Condition 11;
    b. Ensuring that there are no objectionable odour emissions as a result of storage and/or handling of sludge generated from any wastewater treatment processes, including within the existing wastewater treatment ponds, to ensure compliance with Condition 11;
    c. Ensuring that there are no objectionable odour emissions as a result of any disposal of effluent to land or as a result of any seepage of effluent ponding that may occur; and
    d. Condition 11 does not apply during a period of up to six weeks for the initial commissioning of the plant. The consent holder shall take all practical steps, as required in Condition 3, to minimise odour during this period.
    e. Ensuring that there are no offensive or objectionable odour emissions as a result of any flow or load balancing or temporary storage of raw influent wastewater under any future upgrade.

12. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent within three months of each anniversary of the commencement of this consent for the purpose of:

(a) to deal with any adverse effect on the environment, particularly odour discharges, which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage;
(b) ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Otago Regional Policy Statement; and
(c) requiring the consent holder to adopt the BPO to remove or reduce any adverse effect on the environment arising as a result of the exercise of this consent.

Issued at Dunedin this 5th day of June 2015

Christopher P Shaw
Manager Consents

Appendix E: Graphs of WWTP effluent sampling results

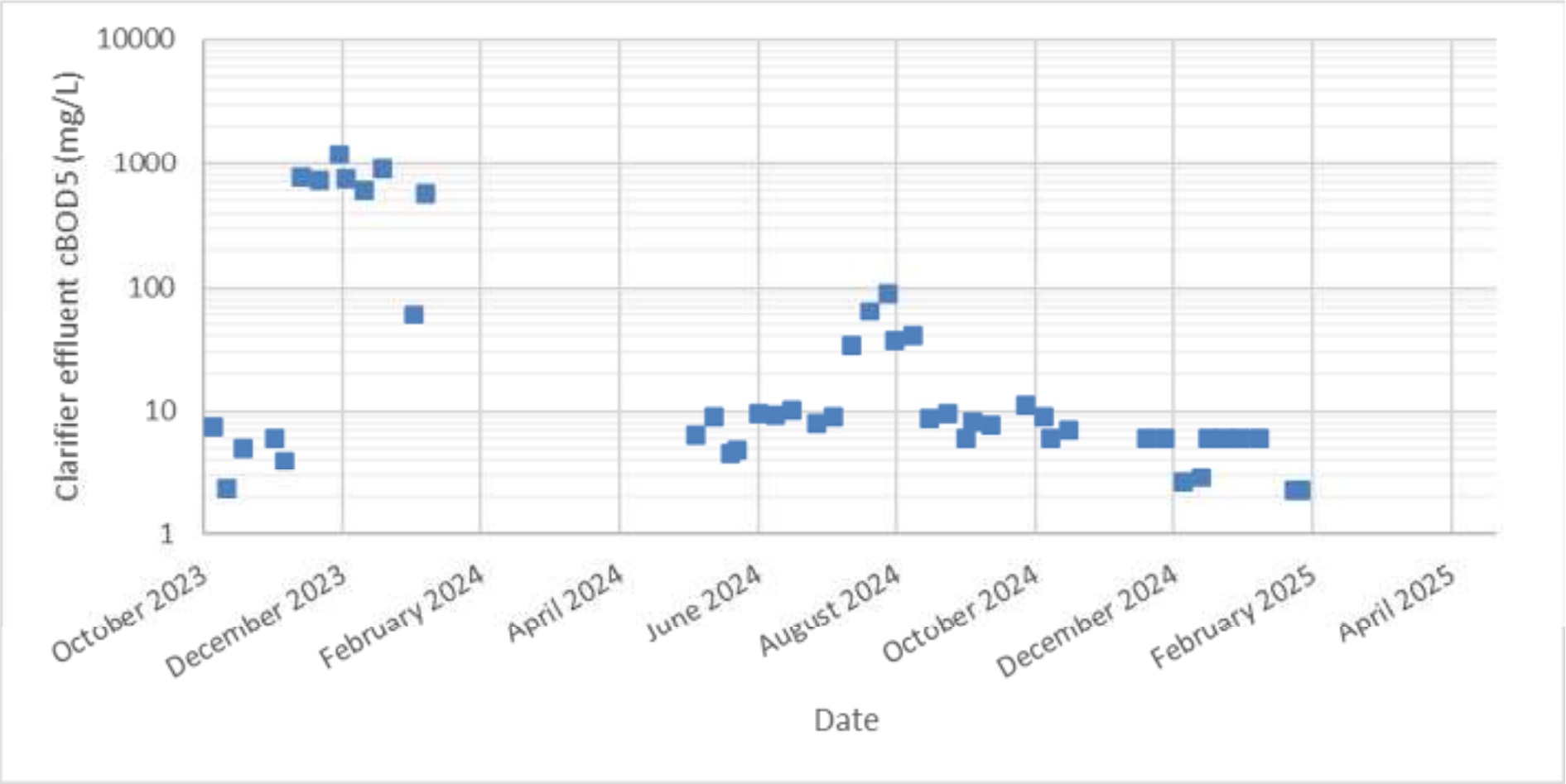

Figure 1 **Sampling data of $cBOD_5$ at the clarifier outlet, taken by Veolia and processed by Eurofins, displayed in log scale.**

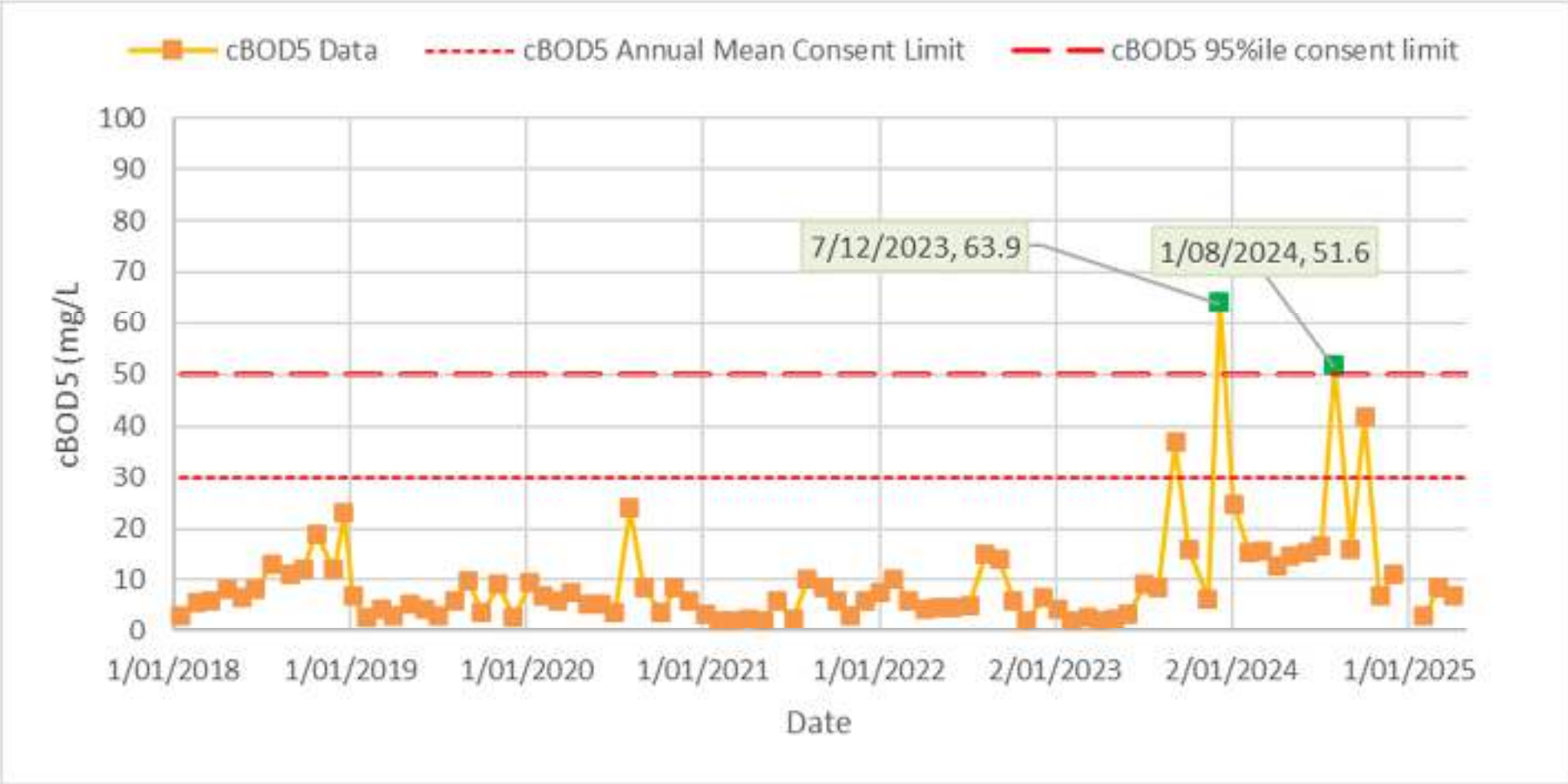

Figure 2 Monthly sampling of discharge effluent for $cBOD_5$, measured against the current consent limits. Sampling is performed as required by consent.

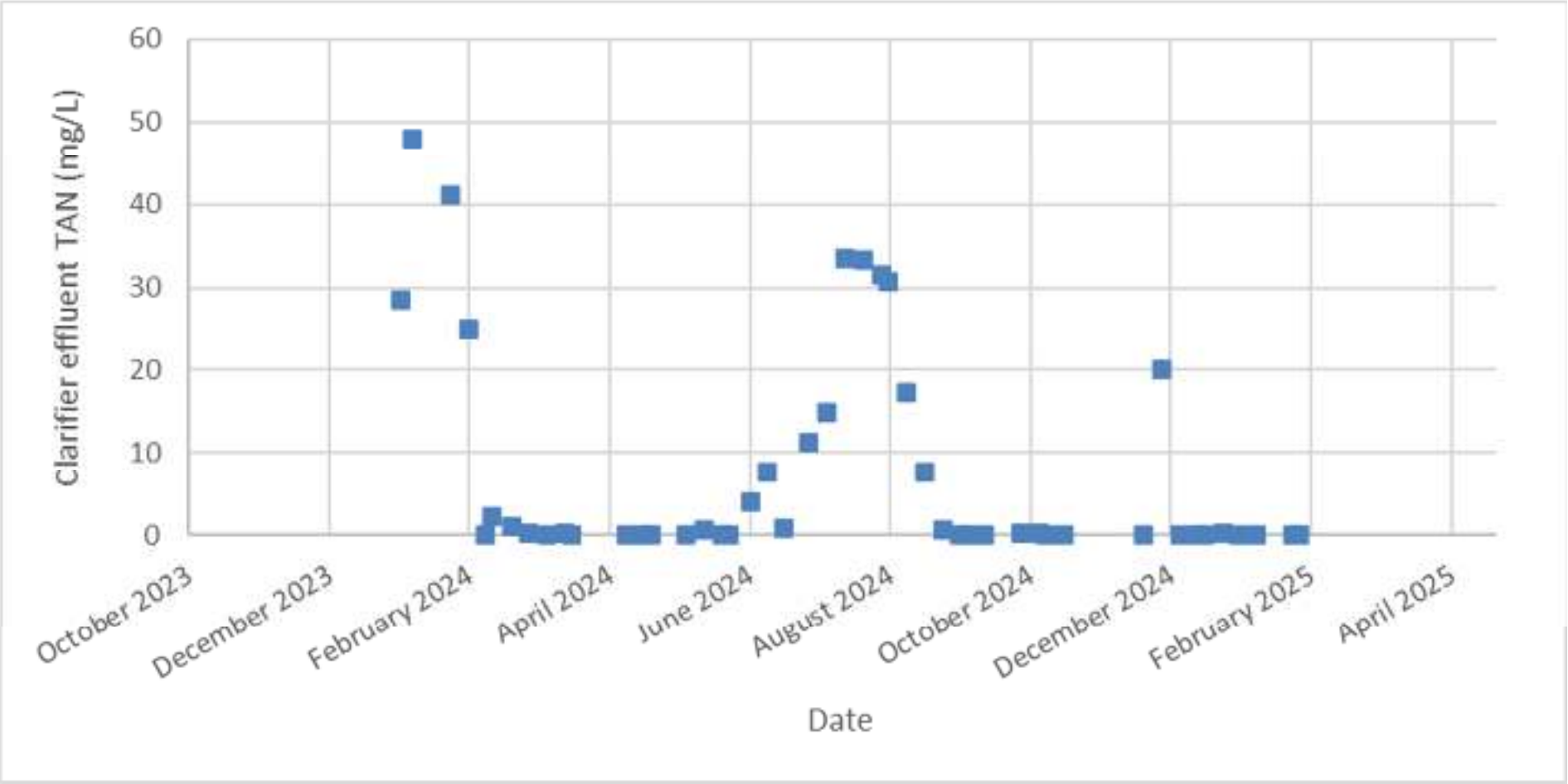

Figure 3 **Sampling data of TAN at the clarifier outlet, taken by Veolia and processed by Eurofins.**

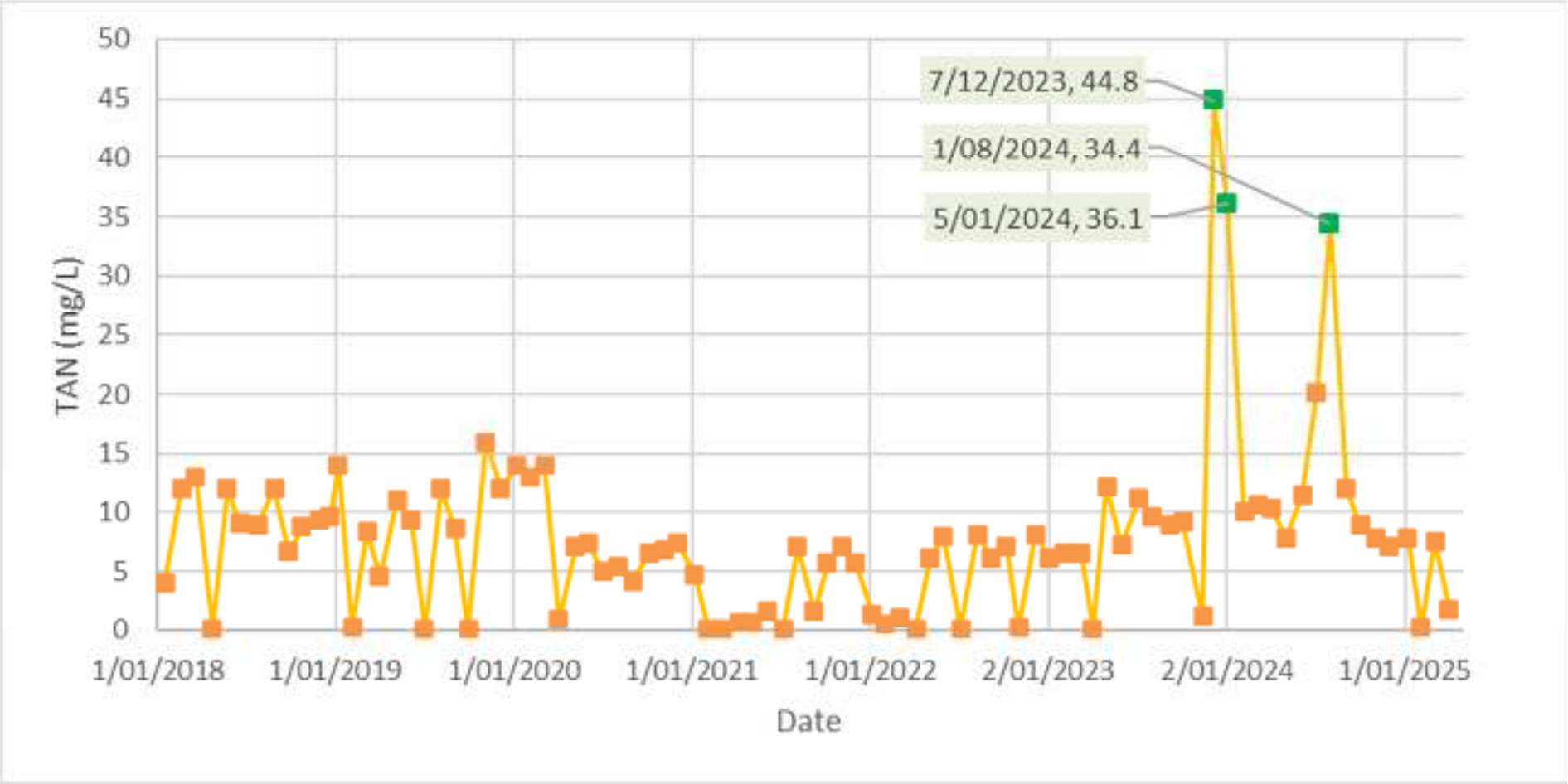

Figure 4 **Monthly sampling of discharge effluent for TAN, measured against the current consent limits. Sampling is performed as required by consent.**

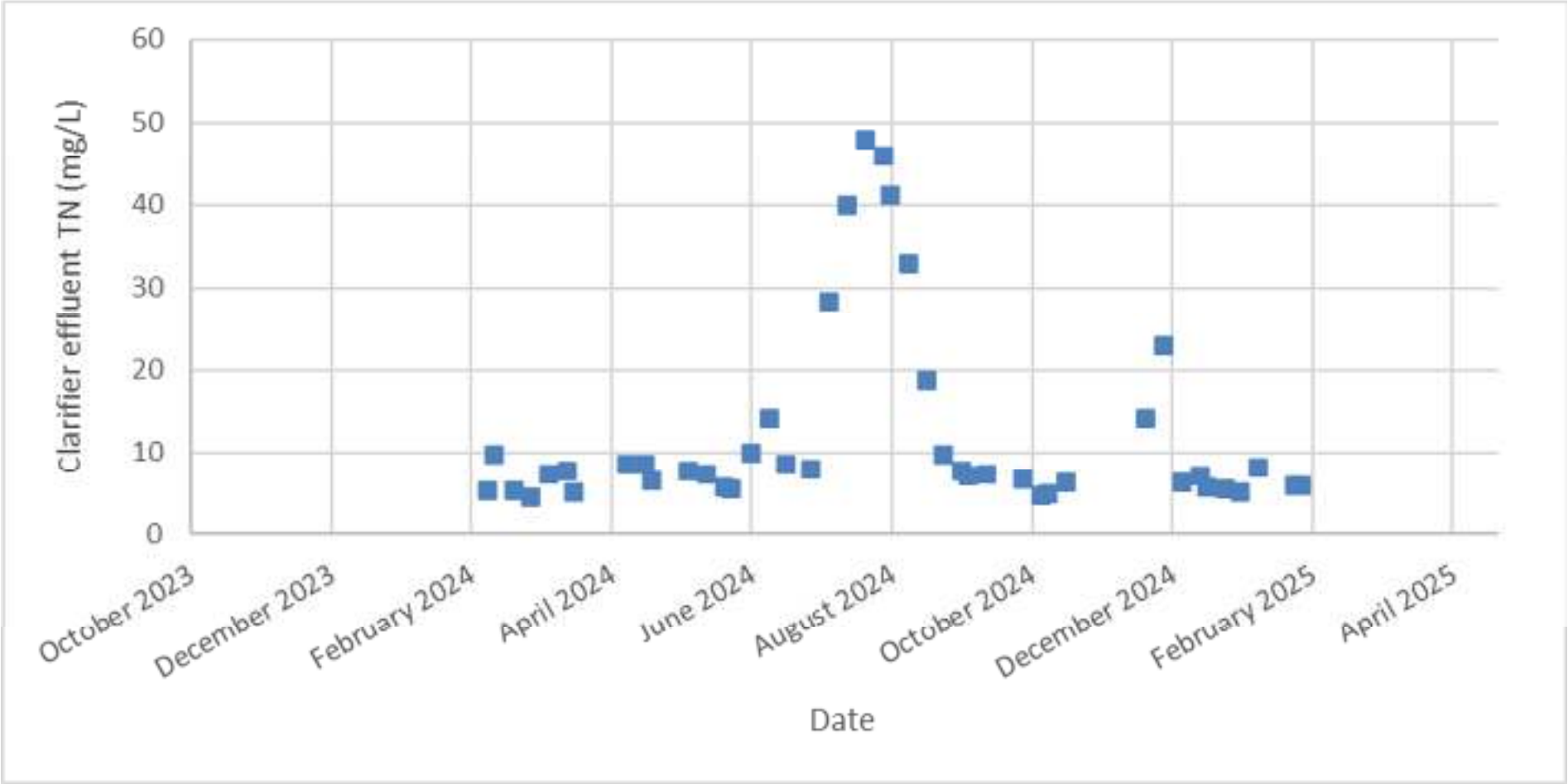

Figure 5 **Sampling data of TN at the clarifier outlet, taken by Veolia and processed by Eurofins.**

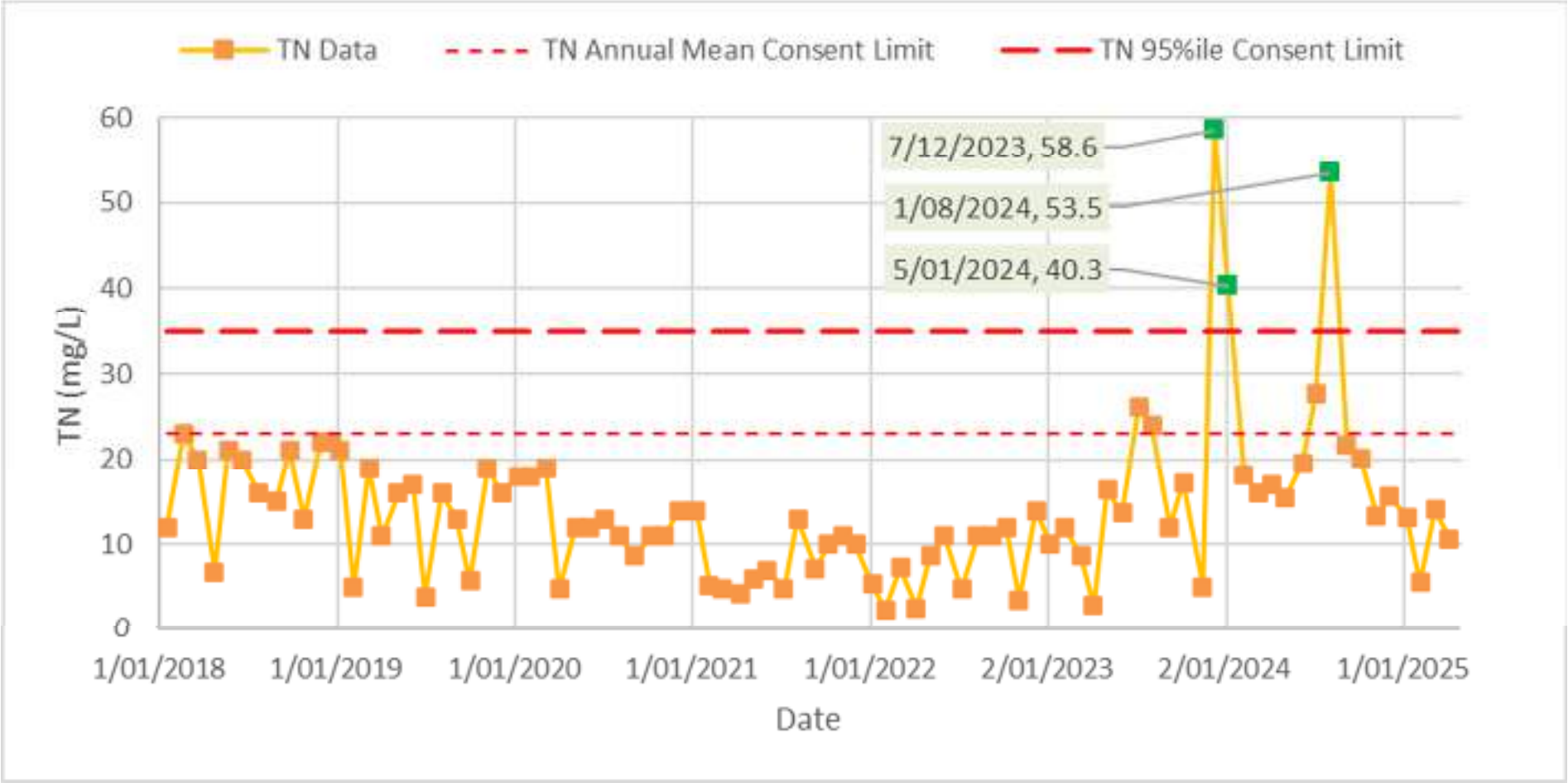

Figure 6 **Monthly sampling of discharge effluent for TN, measured against the current consent limits. Sampling is performed as required by consent.**

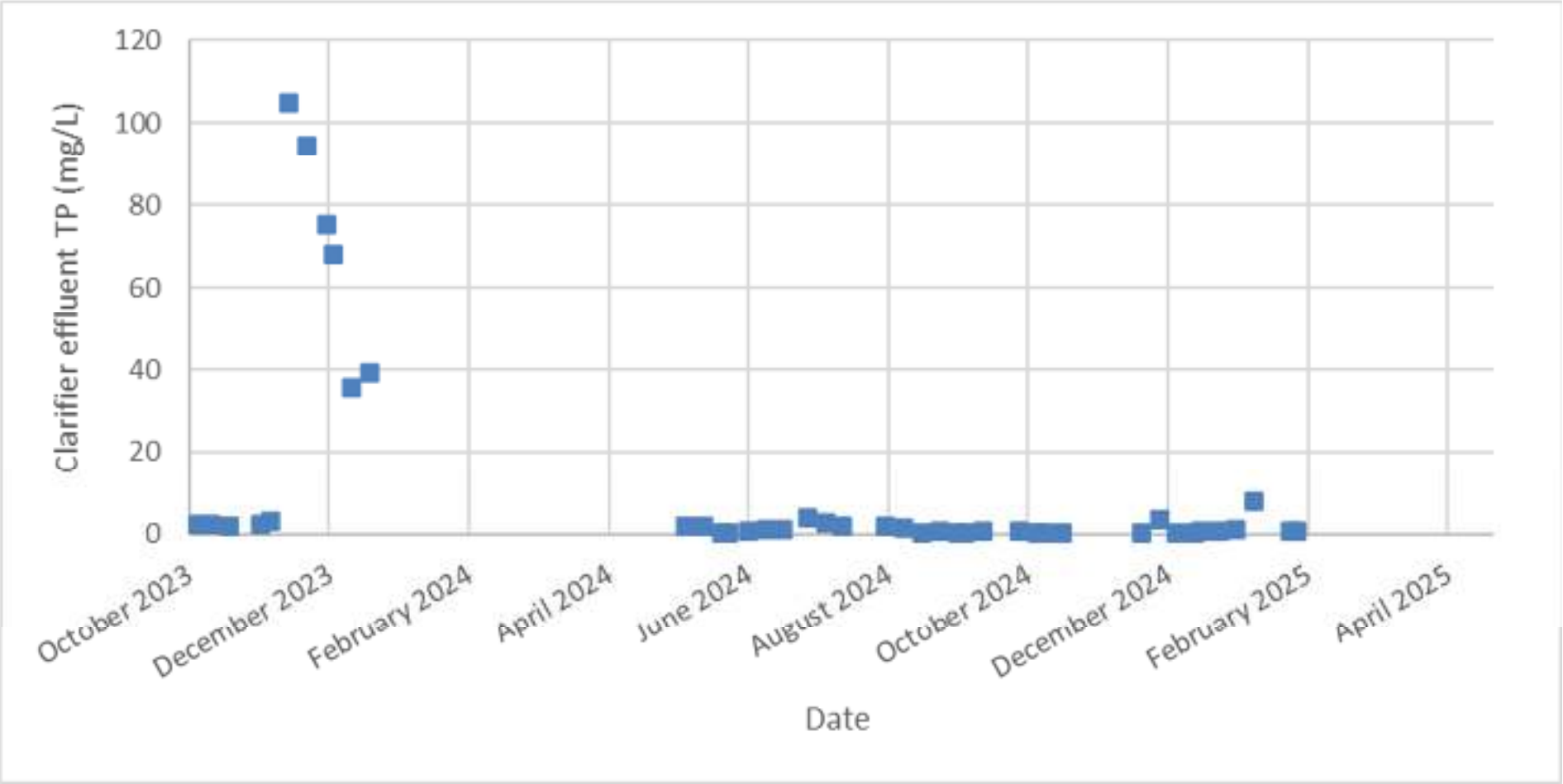

Figure 7 **Sampling data of TP at the clarifier outlet, taken by Veolia and processed by Eurofins.**

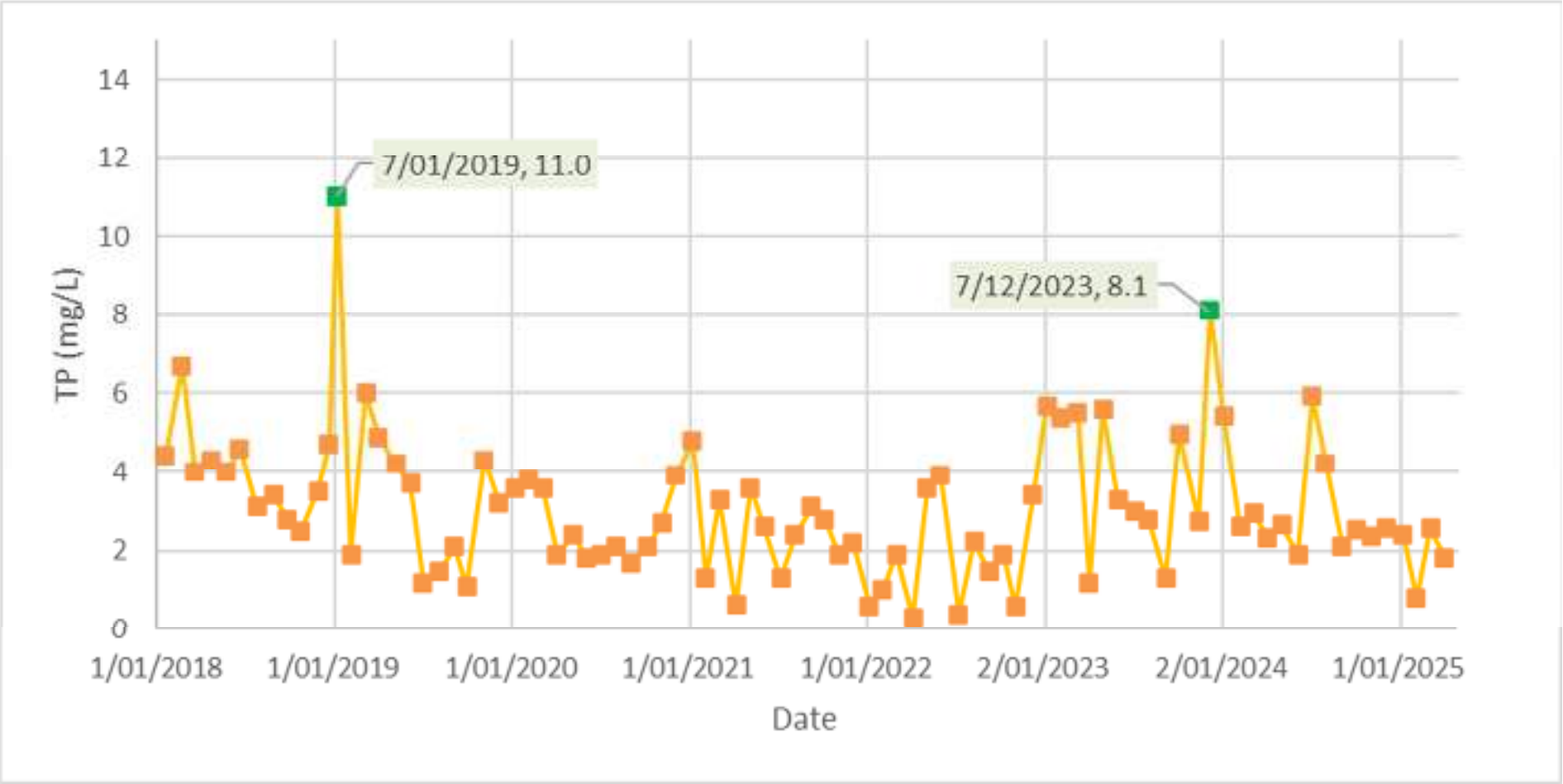

Figure 8 **Monthly sampling of discharge effluent for TP, measured against the current consent limits. Sampling is performed as required by consent.**

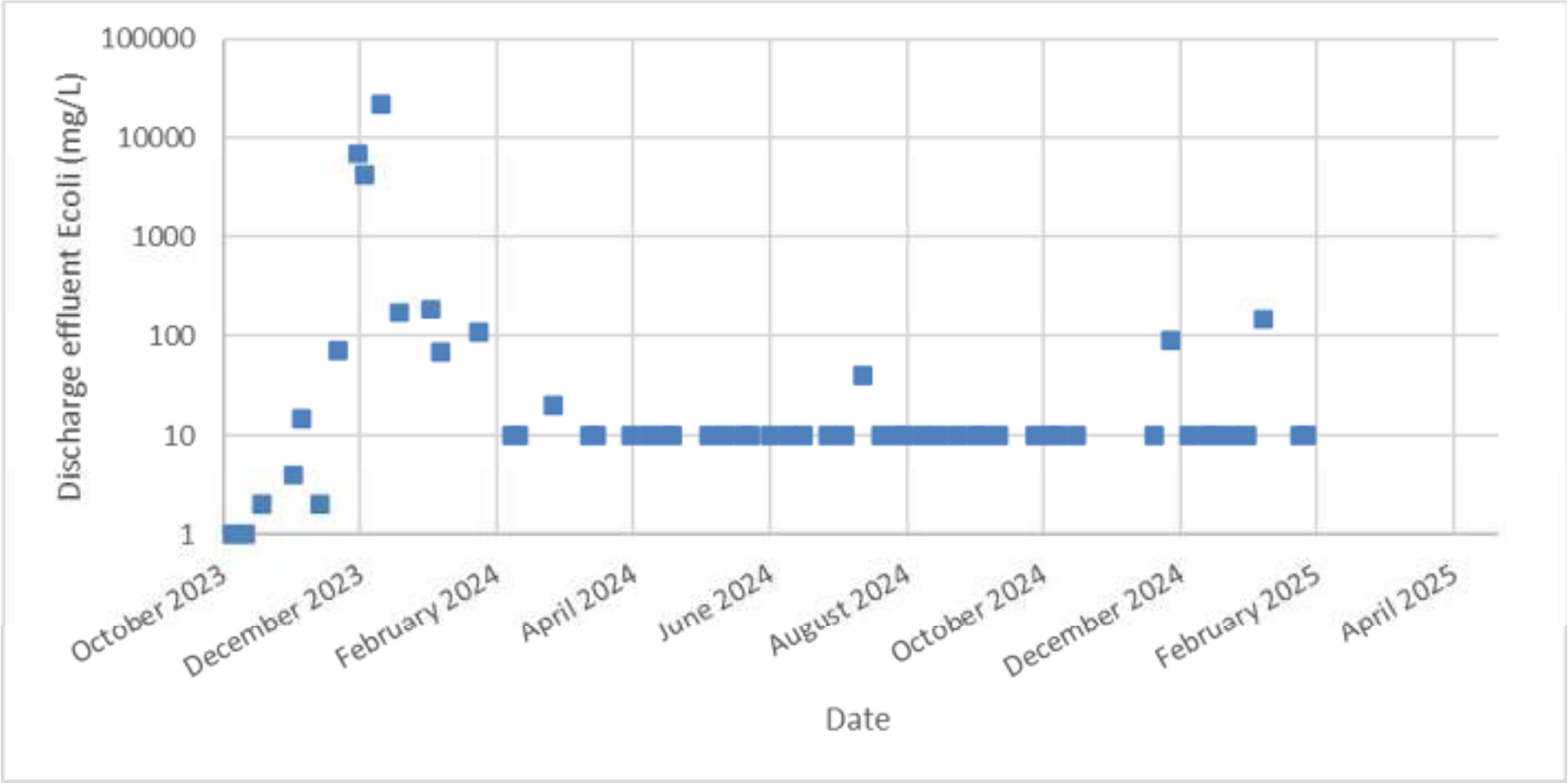

Figure 9 **Sampling data of E.coli at the clarifier outlet, taken by Veolia and processed by Eurofins.**

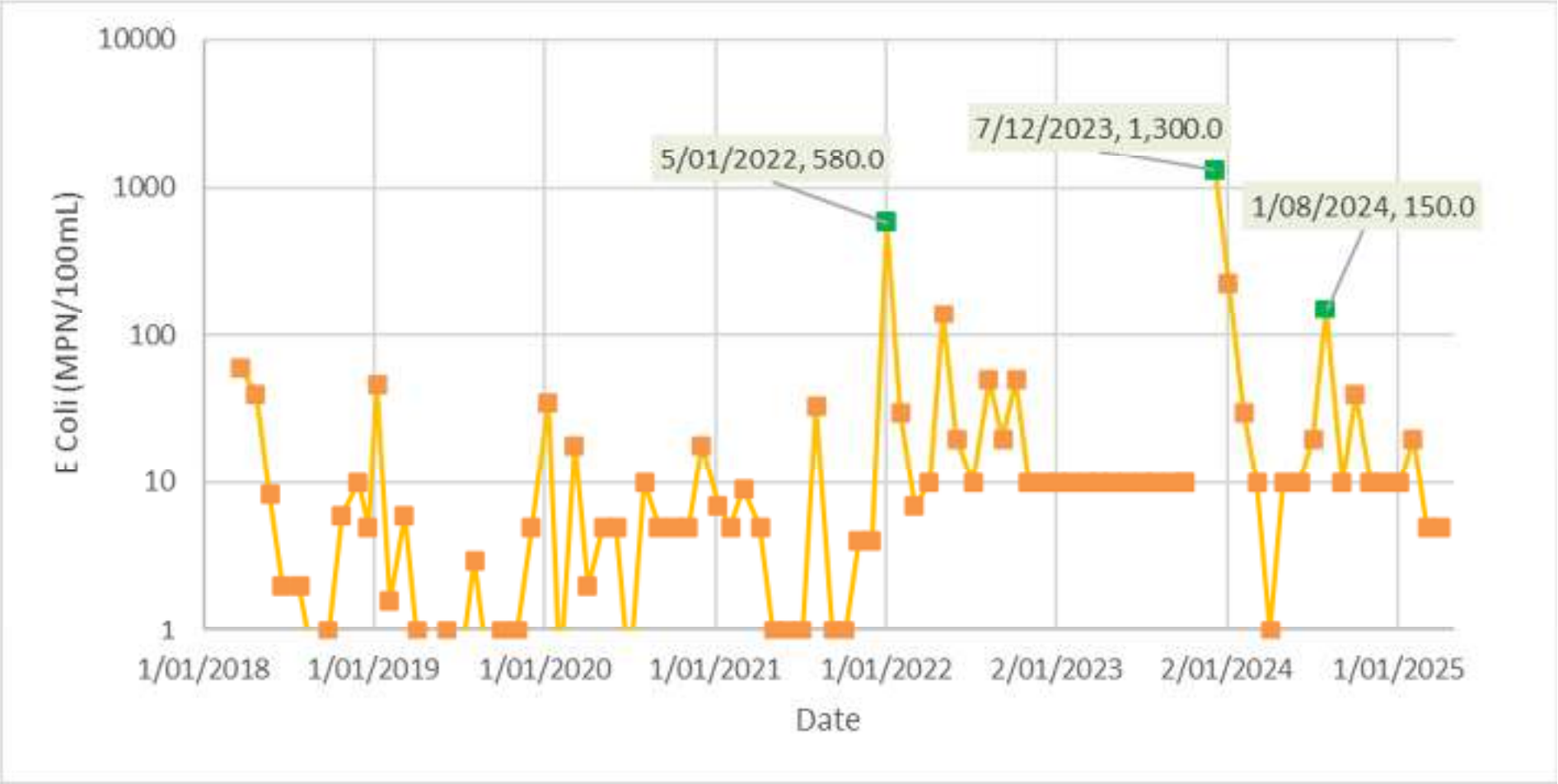

Figure 10 Monthly sampling of discharge effluent for E.coli, measured against the current consent limits. Sampling is performed as required by consent.

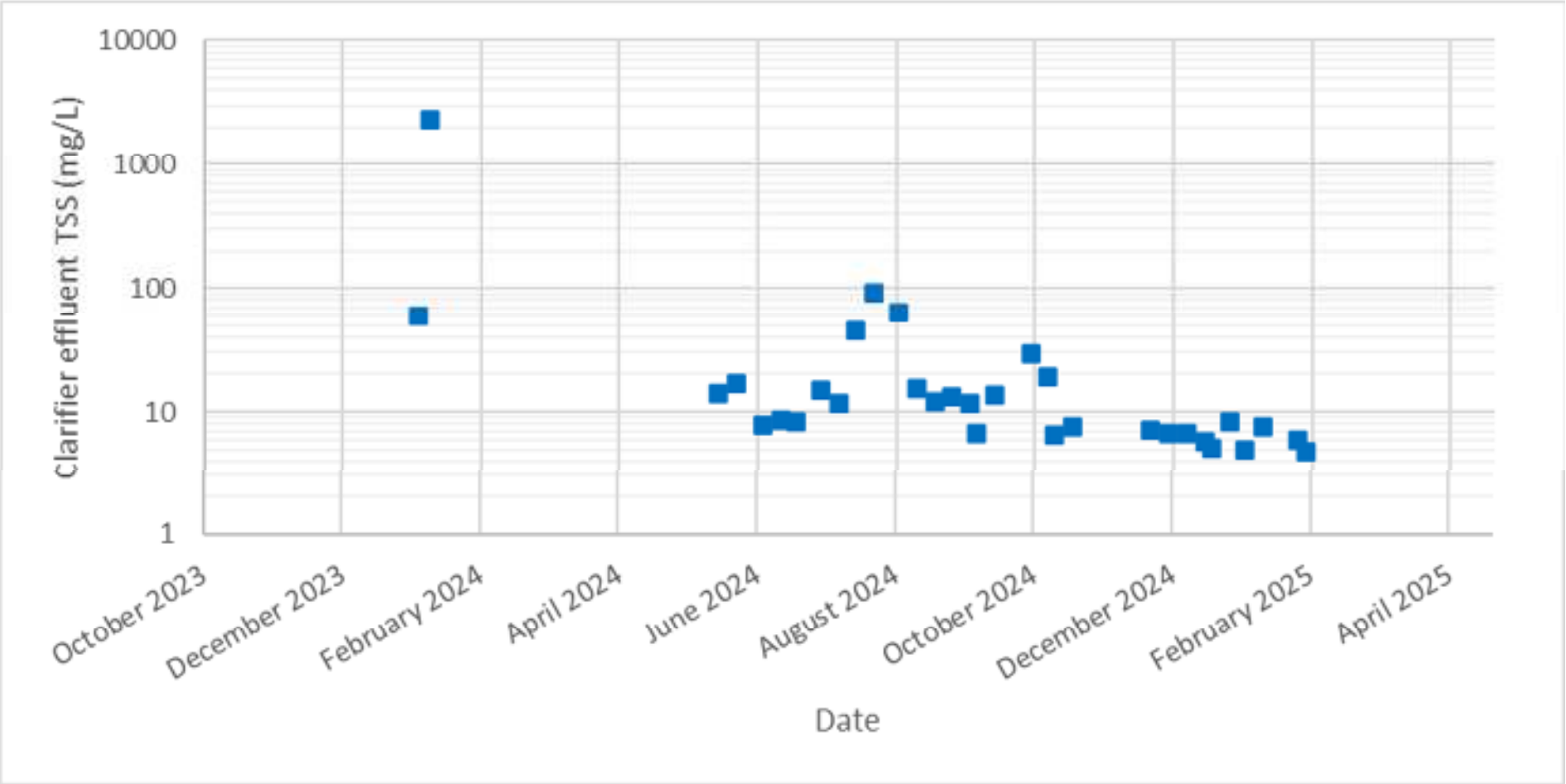

Figure 11 **Sampling data of TSS at the clarifier outlet, taken by Veolia and processed by Eurofins, displayed in log scale.**

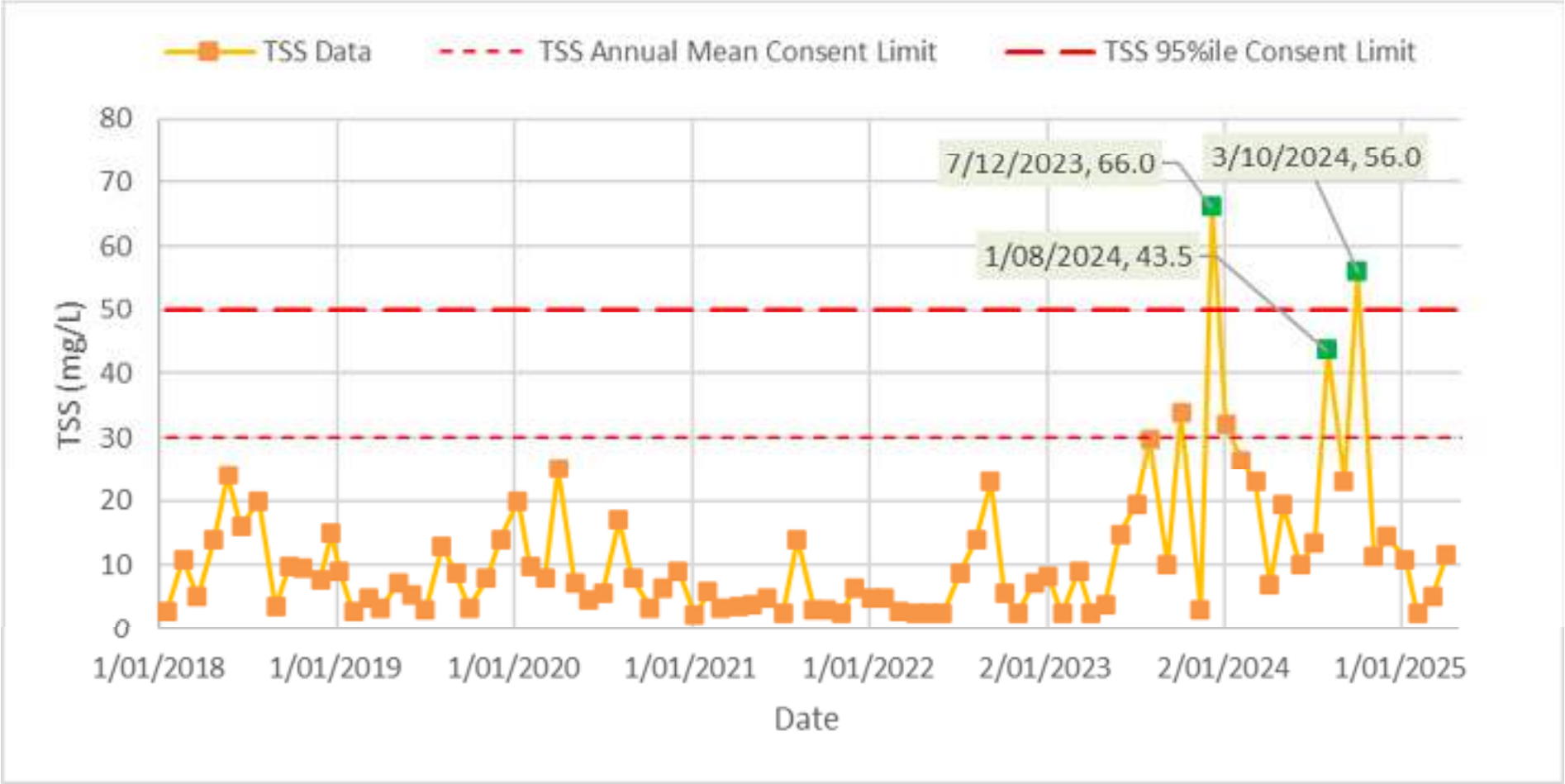

Figure 12 Monthly sampling of discharge effluent for TSS, measured against the current consent limits. Sampling is performed as required by consent.

Appendix F: Proposed Sampling and Monitoring Regime

Shotover WWTP

Draft Environmental Monitoring Plan – Short term consent

Queenstown Lakes District Council

30 April 2025

→ **The Power of Commitment**

Project name		Shotover WWTP Disposal Field Alternative Discharge					
Document title		Shotover WWTP | Draft Environmental Monitoring Plan – Short term consent					
Project number		12645246					
File name		12545246_REMP_short term.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	1	D. Mains	A. Kirk		R. Orr		30/4/2025

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Contents

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1. Introduction

This Receiving Environment Monitoring Plan (REMP) outlines the monitoring proposed for assessment of effects to water quality associated with the discharge of treated wastewater to the Shotover River via an existing open channel. The monitoring program includes:

– Water quality monitoring of surface water
– Field observations and measurements

It is recommended that the monitoring data is reviewed after 2 months of monitoring to ensure that the monitoring program remains appropriate It is expected that the monitoring plan may be adapted following this review.

1.1 Purpose of this report

The purpose of this report is to detail the monitoring associated discharge of treated wastewater to the Shotover River.

1.2 Scope and limitations

This report: has been prepared by GHD for Queenstown Lakes District Council and may only be used and relied on by Queenstown Lakes District Council for the purpose agreed between GHD and Queenstown Lakes District Council as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Queenstown Lakes District Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

GHD has prepared this report on the basis of information provided by Queenstown Lakes District Council and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Monitoring programme

2.1 Purpose of monitoring

This monitoring programme is intended to provide information to demonstrate compliance with conditions of resource consent (XXXXXXX) for discharge of treated wastewater to a discharge channel on the Shotover River delta and to the Shotover River via this channel. The monitoring results will also provide ongoing understanding of the water quality and ecological effects of the discharge. The discharge channel location is shown in Figure 1.

2.2 Discharge Flow Monitoring

Continuous measurement of the instantaneous rate of discharge of treated wastewater to the discharge channel is to be made at a frequency of no less than one measurement every 5 minutes. Measurement should be made using a calibrated flow sensor and appropriately timestamped.

2.3 Surface water monitoring

2.3.1 Sample collection method

Water quality sampling shall be undertaken by a suitably trained professional. Water samples shall be collected as grab samples using laboratory provided sample bottles.

At each monitoring site:

– Take photos of river channel or exposed water.
– Qualitative comment on flow (stagnant, low flow, approximately x m/s movement, etc.).
– Estimate of channel width and depth.
– Comment on clarity and colour.
– Weather conditions
– Time/Date

2.3.2 Locations

Samples are to be collected from the Kawarau River and Shotover River as listed in Table 1 and shown in Figure 1.

It is likely that surface water locations may need to be adapted to reflect variable river conditions. For the Kawarau River, samples may need to be collected further up the bank during high flow conditions than shown in Figure 1. Due to the dynamic nature of the Shotover River, both the width of channels and the location of river braids may change over time. Therefore, the sampling has been designed to reflect the first main channel with flowing water upstream or downstream of geographic locations as specified in Table 1.

Table 1 Surface water monitoring locations

Monitoring location	Area	Detail	Reasoning
RS04B	Shotover	Main channel approximately 100 m upstream of discharge channel	Provide indication of Shotover River water quality upstream of discharge
RS06B	Shotover	Main channel approximately 150 m downstream of the discharge channel	Provide indication of Shotover River water quality downstream of discharge

Monitoring location	Area	Detail	Reasoning
RS09	Shotover	Main channel approximately 300 m downstream of the discharge channel	Provide indication of Shotover River water quality downstream of discharge
RS10	Kawarau	River downstream of Shotover confluence	Kawarau River downstream of Shotover confluence, provides indication of mixed water quality downstream of wastewater discharges.
RS11	Kawarau	River upstream of the Shotover confluence	Kawarau River down gradient of disposal field, potential to be influenced by groundwater/wastewater discharges at end of delta.
RS15	Discharge channel	Sample from treated wastewater discharge channel before flowing into River	
RS16	Shotover	River location where treated wastewater is discharging into	
Post UV	WWTP	Treated wastewater before it enters discharge channel	Confirming effectiveness of treatment

2.3.3 Frequency

Surface water samples and field measurements will be collected on a weekly basis. This frequency is subject to change following the monitoring programme review as outlined in section 3.

2.4 Groundwater monitoring

2.4.1 Groundwater level monitoring

Groundwater level monitoring will be undertaken to understand the groundwater response to rainfall events and to changes in river flows. Groundwater levels will be measured monthly in all monitoring wells.

In addition, the manual groundwater levels will be supplemented in selected monitoring wells with continuous water level monitoring using pressure transducers (with data logging capabilities). Pressure transducers will be set to record to groundwater levels at a frequency of 15 minutes.

Pressure transducer (loggers) records will be converted to a groundwater depth using manual measurements of static water level when the loggers are installed and removed.

2.4.2 Groundwater sampling

Groundwater sampling shall be undertaken by a suitably trained professional. Samples shall be collected using low-flow purging or passive sampling methods. Field parameters (pH, temperature, electrical conductivity, oxidation-reduction potential and dissolved oxygen) shall be monitored during purging. Groundwater samples should be collected after the measured parameters have stabilised.

Samples shall be collected in laboratory provided bottles and analysed for the parameters listed in Table 3

2.4.3 Locations

Groundwater samples are to be collected from the monitoring wells listed in Table 2 and shown in Figure 1.

Table 2 Groundwater monitoring locations

Groundwater monitoring well	Location
BH02	Up gradient of discharge channel
BH03	Down gradient of discharge channel
BH04	Down gradient, adjacent to historic discharge channel
BH06	Down gradient, within former river channel

2.4.4 Frequency

Groundwater samples and field measurements shall be collected on a monthly basis. This frequency is subject to change following the monitoring programme review as outlined in section 3.

2.5 Water quality monitoring

Water quality monitoring, both laboratory analysis and field measurements, of surface water and groundwater are detailed in Table 3.

Field measurements of pH and temperature must be collected using a calibrated YSI or similar water quality meter to calculate the free ammonia concentration from the ammoniacal nitrogen concentration.

Clarity (surface water only) is to be measured using a clarity tube or similar.

Table 3 Water quality suite

	Parameter	SW	GW	Comments
Field measurements	Temperature (ºC)	√	√	
	pH (pH units)	√	√	
	Electrical conductivity (EC) (µS/cm)	√	√	
	Oxidation Reduction Potential (ORP) (± mV) or Dissolved Oxygen (DO) (mg/L)	√	√	
	Clarity (cm)	√	-	Measured with clarity tube or similar
Laboratory Analysis	cBOD (mg/L)	√	-	
	Nitrate Nitrogen (g/m^3)	√	√	
	Nitrite Nitrogen (g/m^3)	√	√	
	Ammoniacal Nitrogen (g/m^3)	√	√	
	Total Kjeldahl Nitrogen (TKN) (g/m^3)	√	√	
	Total Nitrogen (TN) (g/m^3)	√	√	
	Dissolved reactive phosphorus (DRP) (g/m^3)	√	√	
	Total phosphorus (TP) (g/m^3)	√	√	
	E. coli (cfu or MPN/100mL)	√	√	

2.6 Ecological monitoring

Ecological monitoring will be undertaken in the Shotover River, where the discharge of treated wastewater has the potential impact upon ecology and habitat.

2.6.1 Shotover River

Monitoring locations within the Shotover River will include:

1. Upstream of the treated wastewater discharge from the historical channel. Monitoring locations RS004 and RS004B provide representative near bank and main channel environments for survey of background ecological conditions.
2. Near field monitoring, within the immediate area of treated wastewater. Location RS016 is immediately adjacent to the discharge, providing a representative near field environment.
3. Following mixing with main channel flow. Location RS006B, located immediately downstream of the near bank channel and main channel confluence.
4. Downstream of the confluence with of the Shotover River with the Kawarau River. Location RS010 provides a location representative of the Shotover River water mixing with Kawarau River water.

Monitoring locations are to be adjusted to accommodate channel movement and encountered hydrological conditions, to ensure locations adequately reflect the purpose of monitoring upstream, mixing environment and downstream conditions after mixing of treated wastewater and Shotover River water.

2.6.2 Ecological Surveys

Ecological monitoring will be undertaken twice a year in low flow conditions in summer and winter/early spring. The latter monitoring is only required if a period of greater than four weeks of stable low flow conditions occurs. Monitoring will not be undertaken sooner than four weeks after a high flow (flushing/bed moving) event, e.g., flows greater than three times the median flow.

Ecological surveys at each of the monitoring locations identified for the Shotover River is to include the following:

1. Periphyton monitoring using the periphyton cover measurements method (section 4) in the National Environmental Monitoring Standards (NEMS) for Periphyton (Ministry for the Environment, 2022b).
2. Deposited sediment monitoring, at the same time and instream points as the periphyton monitoring, using Sediment Assessment Method 2 (Instream visual assessment) in (Clapcott et al., 2011). Periphyton and sediment monitoring will be undertaken prior to macroinvertebrate sample collection.
3. Macroinvertebrate sample collection using the semi-quantitative kick-net sampling method and sample processing using Protocol P2 (200+ fixed count with scan for missed taxa) in the National Environmental Monitoring Standards (NEMS) for Macroinvertebrates (Ministry for the Environment, 2022a). Three replicate samples will be collected at each monitoring location from a mix of run and riffle habitats in proportion to the habitats available at the monitoring location, aiming for consistency between monitoring locations. The total area sampled for each replicate will be 0.9 to 1 m^2. Biotic indices will be calculated and reported in accordance with the NEMS for Macroinvertebrates, including Macroinvertebrate Community Index (MCI) and Quantitative MCI (QMCI).

The ecological monitoring will be undertaken by a suitably qualified and experienced freshwater ecologist.

3. Review

It is recommended that the monitoring data is reviewed after 2 months of monitoring to ensure that the monitoring program is fit for purpose. The review may recommend changes to any of the following:

– Field or laboratory analysis parameters

– Locations
– Frequency of sampling

Any changes to the monitoring programme shall be updated in this REMP and reissued.

Paper Size ISO A4
Scale: 1:9,000

0 0.1 0.2 0.3

Kilometers
Map Projection: Transverse Mercator
Horizontal Datum: NZGD 2000
Grid: NZGD 2000 New Zealand Transverse Mercator

N

GHD

Queenstown Lakes District Council
REMP Short Term consent

Project No. **12645246**
Revision No. **0**
Date **29/04/2025**

Monitoring Locations

FIGURE 1

\\ghdnet.internal\ghd\NZ\Christchurch\Projects\51\12645246\GIS\Maps\Working\12645246_WORKING\12645246_WORKING.aprx - 12645246_REMP_STC_Fig1_MonitoringLoc_Rev0
Print date: 29 Apr 2025 - 12:13

Data source: NZ - Imagery: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors. Created by: nrama

ghd.com

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Appendix G: GHD Surface Water and Groundwater Assessment

Appendix H: Policy Assessment

Policy Assessment

Otago Regional Policy Statement 2019
Objective 1.1 Otago's resources are used sustainably to promote economic, social, and cultural wellbeing for its people and communities
Objective 1.2 Recognise and provide for the integrated management of natural and physical resources to support the wellbeing of people and communities in Otago
Objective 2.1 The principles of Te Tiriti o Waitangi are taken into account in resource management processes and decisions
Objective 2.2 Kāi Tahu values, interests and customary resources are recognised and provided for
Objective 3.1 The values (including intrinsic values) of ecosystems and natural resources are recognised and maintained, or enhanced where degraded
Objective 3.2 Otago's significant and highly-valued natural resources are identified and protected, or enhanced where degraded
Objective 4.3 Infrastructure is managed and developed in a sustainable way
Objective 5.1 Public access to areas of value to the community is maintained or enhanced
Objective 5.4 Adverse effects of using and enjoying Otago's natural and physical resources are minimised

Policy	Assessment
Policy 1.1.1 Economic wellbeing Provide for the economic wellbeing of Otago's people and communities by enabling the resilient and sustainable use and development of natural and physical resources.	Development of resilient wastewater infrastructure is critical for the economic wellbeing of the Queenstown community, and providing for the operation of the WWTP treated wastewater discharge is consistent with this policy.
Policy 1.1.2 Social and cultural wellbeing and health and safety Provide for the social and cultural wellbeing and health and safety of Otago's people and communities when undertaking the subdivision, use, development and protection of natural and physical resources by all of the following: a) Recognising and providing for Kāi Tahu values; b) Taking into account the values of other cultures; c) Taking into account the diverse needs of Otago's people and communities; d) Avoiding significant adverse effects of activities on human health; e) Promoting community resilience and the need to secure resources for the reasonable needs for human wellbeing; f) Promoting good quality and accessible infrastructure and public services.	Kāi Tahu values are recognised but the discharge method direct to surface water does not provide for their protection. The values of the wider public, and the needs of the community are provided for through the level of treatment, ensuring that the adverse effects of the discharge are minimised and the natural and physical resources of the Kimi-ākau/Shotover River and Delta remain suitable for recreational use. The WWTP infrastructure requires the use of the natural and physical resources of the area for its operation. It also plays a significant role in safeguarding the social, economic and cultural wellbeing of the community, and the community's health and safety by collecting, treating and safely disposing of community wastewater and safeguarding public health and safety. The discharge is generally consistent with this policy apart from not being able to provide for Kāi Tahu values with the short-term discharge.
Policy 1.2.1 Integrated resource management Achieve integrated management of Otago's natural and physical resources, by all of the following: a) Coordinating the management of interconnected natural and physical resources;	The effects of the treated wastewater discharge on the wider environment including downstream communities have been assessed in Section 5. The conclusion being that the effects on ecosystems and cumulative effects on water quality after

b) Taking into account the impacts of management of one natural or physical resource on the values of another, or on the environment; c) Recognising that the value and function of a natural or physical resource may extend beyond the immediate, or directly adjacent, area of interest; d) Ensuring that resource management approaches across administrative boundaries are consistent and complementary; e) Ensuring that effects of activities on the whole of a natural or physical resource are considered when that resource is managed as subunits. f) Managing adverse effects of activities to give effect to the objectives and policies of the Regional Policy Statement. g) Promoting healthy ecosystems and ecosystem services; h) Promoting methods that reduce or negate the risk of exceeding sustainable resource limits.	reasonable mixing will be less than minor. Overall the discharge will not prevent the implementation of this policy.
Policy 2.1.2 Treaty principles Ensure that local authorities exercise their functions and powers, by: a) Recognising Kāi Tahu's status as a Treaty partner; and b) Involving Kāi Tahu in resource management processes implementation; c) Taking into account Kāi Tahu values in resource management decision-making processes and implementation; d) Recognising and providing for the relationship of Kāi Tahu's culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taoka;	The applicant recognises the special relationship of tangata whenua with the fresh water environment and has been working with rūnaka in relation to development of a long-term solution for the discharge of treated wastewater. The cultural values of the Kimi-ākau/Shotover River and Kawarau River are well known and acknowledged, and they are a key consideration in the long-term disposal options being developed. In particular, the applicant understands and acknowledges the adverse effects of the discharge of wastewater to water on Māori cultural and spiritual values. These values are well documented in district and regional

e) Ensuring Kāi Tahu have the ability to: i. Identify their relationship with their ancestral lands, water, sites, wāhi tapu, and other taoka; ii. Determine how best to express that relationship; f) Having particular regard to the exercise of kaitiakitaka; g) Ensuring that district and regional plans: i. Give effect to the Ngāi Tahu Claims Settlement Act 1998; ii. Recognise and provide for statutory acknowledgement areas in Schedule 2; iii. Provide for other areas in Otago that are recognised as significant to Kāi Tahu; h) Taking into account iwi management plans.	plans, and the Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku Iwi Management Plans, which have been taken into account in preparing this application. The application is consistent with this policy in regard to involving rūnaka in decision-making for the long-term options, recognising and acknowledging their relationship with the fresh water environment, and taking account of the provisions of the relevant statutory plans and iwi management plan for the area.
Policy 2.2.1 Kāi Tahu wellbeing Manage the natural environment to support Kāi Tahu wellbeing by all of the following: a) Recognising and providing for their customary uses and cultural values in Schedules 1A and B; and, b) Safeguarding the life-supporting capacity of natural resources.	This is partly addressed in response to Policy 2.1.2 above. From a biophysical perspective, the life-supporting capacity of the rivers will be maintained which is in part consistent with the policy, though not entirely when considering the customary uses and cultural values which cannot be entirely provided for through a surface water discharge.
Policy 2.2.2 Recognising sites of cultural significance Recognise and provide for the protection of wāhi tūpuna, by all of the following: a) Avoiding significant adverse effects on those values that contribute to the identified wāhi tūpuna being significant; b) Avoiding, remedying, or mitigating other adverse effects on the identified wāhi tūpuna;	This is partly addressed in response to Policy 2.1.2 above. The wāhi tūpuna are recognised but cannot be provided for entirely through this short-term discharge due to the effect on the mauri of the Kimi-ākau/Shotover River. However, other adverse effects on water quality and ecosystems will be mitigated through the high level of treatment available at the WWTP, corresponding limits on the discharge and available mixing.

c) Managing the identified wāhi tūpuna sites in a culturally appropriate manner.	Engagement with rūnaka is ongoing to establish what further mitigation could be implemented in the short-term.
Policy 3.1.1 Fresh water Safeguard the life-supporting capacity of fresh water and manage fresh water to: a) Maintain good quality water and enhance water quality where it is degraded, including for: i. Important recreation values, including contact recreation; and, ii. Existing drinking and stock water supplies; b) Maintain or enhance aquatic: i. Ecosystem health; ii. Indigenous habitats; and, iii. Indigenous species and their migratory patterns. c) Avoid aquifer compaction and seawater intrusion; d) Maintain or enhance, as far as practicable: i. Natural functioning of rivers, lakes, and wetlands, their riparian margins, and aquifers; ii. Coastal values supported by fresh water; iii. The habitat of trout and salmon unless detrimental to indigenous biological diversity; and iv. Amenity and landscape values of rivers, lakes, and wetlands; e) Control the adverse effects of pest species, prevent their introduction and reduce their spread; f) Avoid, remedy or mitigate the adverse effects of natural hazards, including flooding and erosion; and,	The assessment of effects in section 5 concludes that the adverse effects on fresh water quality and ecosystems, as well as amenity values, will be less than minor. The receiving water will meet the contact recreation standards. The discharge is consistent with this policy.

g) Avoid, remedy or mitigate adverse effects on existing infrastructure that is reliant on fresh water.	
Policy 3.1.6 Air quality Manage air quality to achieve the following: a) Maintain good ambient air quality that supports human health, or enhance air quality where it has been degraded; b) Maintain or enhance amenity values.	The assessment in section 5 concludes that while that odours at the outfall may be detectable up to 50 m from the discharge outfall, they are unlikely to be considered offensive or objectionable and therefore will maintain amenity values and be consistent with this policy.
Policy 3.1.9 Ecosystems and indigenous biological diversity Manage ecosystems and indigenous biological diversity in terrestrial, freshwater and marine environments to: a) Maintain or enhance: i. Ecosystem health and indigenous biological diversity including habitats of indigenous fauna; ii. Biological diversity where the presence of exotic flora and fauna supports indigenous biological diversity; b) Maintain or enhance as far as practicable: i. Areas of predominantly indigenous vegetation; ii. Habitats of trout and salmon unless detrimental to indigenous biological diversity; iii. Areas buffering or linking ecosystems; c) Recognise and provide for: i. Hydrological services, including the services provided by tall tussock grassland; ii. Natural resources and processes that support indigenous biological diversity;	As assessed in section 5, the freshwater and terrestrial ecosystems of the Kimi-ākau/Shotover River and Kawarau River will be maintained. The discharge is consistent with this policy.

d) Control the adverse effects of pest species, prevent their introduction and reduce their spread.	
Policy 3.1.11 Natural features, landscapes, and seascapes Recognise the values of natural features, landscapes and seascapes are derived from the biophysical, sensory and associative attributes in Schedule 3.	The natural character and outstanding landscape values of the Kimi-ākau/Shotover River and Kawarau River have been recognised in section 3 and 5. The activity is consistent with this policy.
Policy 3.2.4 Managing outstanding natural features, landscapes and seascapes Protect, enhance or restore outstanding natural features, landscapes and seascapes, by all of the following: a) In the coastal environment, avoiding adverse effects on the values (even if those values are not themselves outstanding) that contribute to the natural feature, landscape or seascape being outstanding; b) Beyond the coastal environment, maintaining the values (even if those values are not themselves outstanding) that contribute to the natural feature, landscape or seascape being outstanding; c) Avoiding, remedying or mitigating other adverse effects; d) Encouraging enhancement of those areas and values that contribute to the significance of the natural feature, landscape or seascape.	The natural character and outstanding landscape values of the Kimi-ākau/Shotover River and Kawarau River will continue to be protected and effects of the discharge will be avoided, remedied or mitigated following reasonable mixing within the receiving environment. The activity is consistent with this policy.
Policy 3.2.14 Managing outstanding freshwater bodies Protect outstanding freshwater bodies by all of the following: a) Maintaining the values that contribute to the water body being outstanding;	The values of the Kimi-ākau/Shotover River and Kawarau River that contribute to it being outstanding are covered in section 3 of the AEE. The assessment in section 5 has demonstrated that these values will be maintained and effects on them avoided or mitigated. The proposal is consistent with this policy.

b) Avoiding, remedying or mitigating other adverse effects on the water body; c) Controlling the adverse effects of pest species, preventing their introduction and reducing their spread; d) Encouraging enhancement of those values that contribute to the water body being outstanding.	
Policy 4.3.1 Managing infrastructure activities Recognise and provide for infrastructure by all of the following: a) Protecting and providing for the functional needs of lifeline utilities and essential or emergency services; b) Increasing the ability of communities to respond and adapt to emergencies, and disruptive or natural hazard events; c) Improving efficiency of natural and physical resource use; d) Minimising adverse effects on existing land uses, and natural and physical resources; e) Managing other activities to ensure the functional needs of infrastructure are not compromised.	The discharge of treated wastewater from the Shotover WWTP (a lifeline utility) to surface water is an interim measure only. Continuing the current discharge activity is essential for the ongoing wellbeing of the Queenstown community over the term of the consent sought, and in the absence of a viable alternative over that period before a new disposal method can be commissioned. The proposal is consistent with this policy.
Policy 4.3.3 Functional needs of infrastructure that has national or regional significance Provide for the functional needs of infrastructure that has regional or national significance, including safety.	The Shotover WWTP and discharge play a significant role in safeguarding the social, economic and cultural wellbeing of the community, and the community's health and safety by collecting, treating and safely disposing of community wastewater and safeguarding public health and safety. As the only viable option for treated wastewater disposal for this short-term period relies on discharge to surface water, and the Shotover WWTP is located on the delta, the discharge has a

	functional need to be into the Kimi-ākau/Shotover River. The proposal is consistent with this policy.
Policy 4.3.4 Adverse effects of nationally and regionally significant infrastructure Manage adverse effects of infrastructure that has national or regional significance, by: a) Giving preference to avoiding its location in all of the following: i. Areas of significant indigenous vegetation and significant habitats of indigenous fauna in the coastal environment; ii. Outstanding natural character in the coastal environment; iii. Outstanding natural features and natural landscapes, including seascapes, in the coastal environment; iv. Areas of significant indigenous vegetation and significant habitats of indigenous fauna beyond the coastal environment; v. Outstanding natural character in areas beyond the coastal environment; vi. Outstanding natural features and landscapes beyond the coastal environment; vii. Outstanding water bodies or wetlands; viii. Places or areas containing historic heritage of regional or national significance; b) Where it is not practicable to avoid locating in the areas listed in a) above because of the functional needs of that infrastructure: i. Avoid adverse effects on the values that contribute to the significant or outstanding nature of a) i-iii;	The Shotover WWTP is located on the Shotover delta so the location of the discharge for which consent is being sought cannot practicably avoid this area. The assessment of effects in section 5 of the AEE has demonstrated that adverse effects on the outstanding natural character and landscapes and outstanding water body of the Kawarau River as a result of the discharge of treated wastewater will be avoided. The activity is consistent with this policy.

ii. Avoid significant adverse effects on natural character and natural landscapes in all other areas of the coastal environment iii. Avoid, remedy or mitigate, as necessary, adverse effects in order to maintain the outstanding or significant nature of a) iv-viii; c) Avoid, remedy or mitigate, as necessary, adverse effects on highly valued natural features, landscapes and seascapes. in order to maintain their high values; d) Avoiding, remedying or mitigating other adverse effects; e) Considering offsetting for residual adverse effects on indigenous biological diversity.	
Policy 5.1.1 Public access Maintain or enhance public access to the natural environment, including to the coast, lakes, rivers and their margins and where possible areas of cultural or historic significance, unless restricting access is necessary for one or more of the following: a) Protecting public health and safety; b) Protecting the natural heritage and ecosystem values of sensitive natural areas or habitats; c) Protecting identified sites and values associated with historic heritage or cultural significance to Kāi Tahu; d) Ensuring a level of security consistent with the operational requirements of a lawfully established activity.	Public access to the Shotover delta and riverbed areas in the vicinity will be maintained with the exception of fencing necessary to protect public health and safety by preventing access to the discharge channel and warning signage in the immediate vicinity of the discharge in the riverbed. No further access restrictions are necessary to protect any sites, features or values. The proposal is consistent with this policy.
Policy 5.4.1 Offensive or objectionable discharges Manage offensive or objectionable discharges to land, water and air by: a) Avoiding significant adverse effects of those discharges;	The assessment in section 5 of the AEE concludes that while that odours at the outfall may be detectable up to 50 m from the discharge outfall, they are unlikely to be considered offensive or objectionable. The discharge of treated wastewater is to water, and the assessment in section 5

b) Avoiding significant adverse effects of discharges of human or animal waste directly, or in close proximity, to water or mahika kai sites; c) Avoiding, remedying or mitigating other adverse effects of those discharges.	concludes that there will not be any significant adverse effects as a result of the discharge. Effects on Māori cultural and spiritual values of the short-term discharge are likely to be high, but further consultation is underway to evaluate whether there is any further mitigation that can be implemented to further remedy these effects. The proposal is generally consistent with this policy.

Proposed Otago Regional Policy Statement 2021	
Integrated Management	
Objectives	
Objective IM-O1- Long term vision (mō tatou, ā, mō kā uri ā muri ake nei) The management of natural and physical resources, by and for the people of Otago, in partnership with Kāi Tahu, achieves a healthy and resilient natural environment, including the ecosystem services it provides and supports the well-being of present and future generations.	
Objective IM-O2 – Ki uta ki tai The management of natural and physical resources embraces ki uta ki tai, recognising that the environment is an interconnected system which depends on its connections to flourish and must be managed as an interdependent whole.	
Objective IM-O3 – Sustainable impact Otago's communities provide for their social, economic, and cultural well-being in ways that support or restore environmental integrity, form, functioning, and resilience, so that the life-supporting capacities of air, water, soil, and ecosystems are sustainably managed, for future generations.	
Policy	**Assessment**
IM-P1 – Integrated approach to decision-making	When considering this proposal across all provisions in the PORPS, there is a conflict primarily with those that

Giving effect to the integrated package of objectives and policies in this RPS and other relevant statutory provisions requires decision-makers to: (1) consider all provisions relevant to an issue or decision and apply them purposively according to the terms in which they are expressed and (2) if after (1) there is an irreconcilable conflict between any of the relevant RPS and/or statutory provisions which apply to an activity, only consider the activity if: (a) the activity is necessary to give effect to a relevant policy or statutory provision and not merely desirable, and (b) all options for the activity have been considered and evaluated, and (c) if possible, the chosen option will not breach any other relevant policy or statutory provision, and (d) if (c) is not possible, any breach is only to the extent required to give effect to the policy or statutory provision providing for the activity, and (3) if 2(d) applies, evaluate all relevant factors in a structured analysis to decide which of the conflicting policies or statutory provisions should prevail, or the extent to which any relevant policy or statutory provision should prevail, and (4) in the analysis under (1), (2) or the structured analysis under (3), assess the nature of the activity against the values inherent in the relevant policies or statutory provisions in the particular circumstances.	relate to protection of Māori cultural and spiritual values as the discharge of treated wastewater to water is culturally offensive and does not protect those values. However, the proposal is necessary to give effect to those provisions relating to the functional need of regionally significant infrastructure to be located in areas that may not be the most desirable, and the need to provide for the social, economic, and cultural wellbeing of the community, and providing for the community's health needs by collecting, treating and safely disposing of community wastewater. A number of alternative options were evaluated when QLDC were considering options to address the failure of the DAD disposal field. These have been addressed in Section 1 and 8.1.3.3 of the AEE. The discharge to surface water was the best practicable option at the present time. This short-term consent is required to provide this critical service for the community while a long-term option that can better recognise tangata whenua values is consented, designed and implemented. The proposal is consistent with this policy.
<u>IM-P3 – Providing for mana whenua cultural values in achieving integrated management</u> Recognise and provide for the relationship of Kāi Tahu with natural resources by: (1) enabling mana whenua to exercise rakatirataka and kaitiakitaka,	Kāi Tahu values have been recognised in the application, and further engagement is underway for this application to consider whether further mitigation or monitoring can be implemented to mitigate some of the rūnaka concerns.

(2) facilitating active participation of mana whenua in resource management processes and decision making, (3) incorporating mātauraka Māori in processes and decision-making, and (4) ensuring resource management provides for the connections of Kāi Tahu to wāhi tūpuna, wai māori (including awa [rivers] and roto [lakes] and wai tai (including te takutai moana [coastal marine area]) and mahika kai and habitats of taoka species.	Ka rūnaka are involved through representation from Aukaha and TAMI in the decision-making process and optioneering for a long-term solution that will give better recognition to their cultural and spiritual beliefs, values and uses. The proposal is consistent in part with this policy.
IM-P13 – Managing cumulative effects In resource management decision-making, recognise and manage the impact of cumulative effects on the form, functioning and resilience of Otago's environment (including resilience to climate change) and the opportunities available for future generations.	The cumulative effects of the discharge on the receiving environment have been considered in section 5 of the AEE and are no greater than that already consented to occur under the existing discharge consents. The proposal is consistent with this policy.
Air	
Objectives	
AIR-O2 – Discharges to air The localised adverse effects of discharges to air do not compromise human health, amenity values, manawhenua values and the life-supporting capacity of ecosystems.	
Policy	**Assessment**
AIR-P3 – Providing for discharges to air Provide for discharges to air that do not adversely affect human health, amenity values, mana whenua values and the life supporting capacity of ecosystems.	The assessment in section 5 of the AEE demonstrates that the discharge will not adversely affect these values. The proposal is consistent with this policy.
AIR-P4 – Managing certain discharges Manage the adverse effects of discharges to air by: (1) avoiding noxious or dangerous effects,	As per the assessment of effects in Section 5 of the AEE, odour effects from the discharge of treated wastewater to water have been assessed as being unlikely to cause offensive or

(2) ensuring discharges to air do not cause offensive or objectionable effects, (3) avoiding, remedying or mitigating other adverse effects from discharges to air, including but not limited to discharges arising from: (a) outdoor burning of organic material, (b) agrichemical and fertiliser applications, (c) primary production activities, (d) activities that produce dust, and (e) industrial and trade activities. (4) locating new sensitive activities to avoid potential reverse sensitivity effects from existing consented or permitted discharges to air, unless these can be appropriately managed.	objectionable effects at off-site receptors. The proposal is consistent with this policy.
AIR-P6 – Impacts on mana whenua values Ensure that discharges to air do not adversely affect mana whenua values by having particular regard to values and areas of significance to mana whenua, including wāhi tūpuna, wāhi tapu and wāhi taoka.	An initial assessment against Kāi Tahu values is provided in the AEE, and engagement with ka rūnaka regarding this application is ongoing. As the discharge to air is unlikely to cause offensive or objectionable effects at off-site receptors, including wāhi tūpuna, wāhi tapu and wāhi taoka, the proposal is consistent with this policy.
Land and Freshwater	
Objectives	
LF-WAI-O1 – Te Mana o te Wai Otago's water bodies and their health and well-being are protected, and restored where they are degraded, so that the mauri of those water bodies is protected, and the management of land and water recognises and reflects that: (1) water is the foundation and source of all life – na te wai ko te hauora o ngā mea katoa,	

(2) there is an integral kinship relationship between water and Kāi Tahu whānui, and this relationship endures through time, connecting past, present and future, (3) each water body has a unique whakapapa and characteristics, (4) fresh water, land, and coastal water have a connectedness that supports and perpetuates life, (4A) protecting the health and well-being of water protects the wider environment, (5) Kāi Tahu exercise rakatirataka, manaakitaka and their kaitiakitaka duty of care and attention over wai and all the life it supports, and (6) all people and communities have a responsibility to exercise stewardship, care, and respect in the management of fresh water.
LF-FW-O1A - Visions set for each FMU and rohe In each FMU and rohe in Otago and within the timeframes specified in the *freshwater* visions in LF-VM-O2 to LF-VM-O6: (1) healthy freshwater and estuarine ecosystems support healthy populations of indigenous species (including non-diadromous galaxiids and Canterbury mudfish) and mahika kai that are safe for consumption, (2) the interconnection of land, freshwater (including springs, groundwater, ephemeral water bodies, wetlands, rivers, and lakes) and coastal water is recognised, (3) fish passage within and between catchments is provided for except where it is desirable to prevent the passage of some fish species in order to protect desired fish species, their life stages, or their habitats, (4) the form, function and character of water bodies reflects their natural characteristics and natural behaviours to the extent reasonably practicable, (5) the ongoing relationship of Kāi Tahu with wāhi tūpuna, including access to and use of water bodies, is sustained, (6) the health of the water supports the health of people and their connections with water bodies, (7) sustainable land and water management practices: (a) support food and fibre production and the continued social, economic, and cultural well-being of Otago's people and communities, and (b) improve the resilience of communities to the effects of climate change, and (c) ensure communities are appropriately serviced by community water supplies, and other three waters infrastructure, (8) direct discharges of wastewater to water bodies are phased out to the extent reasonably practicable, and

(9) freshwater is managed as part of New Zealand's integrated response to climate change and renewable electricity generation activities are provided for.
LF-VM-O2 – Clutha Mata-au FMU vision In the Clutha Mata-au FMU, and in addition to the matters in LF-FW-O1A: (1) management of the FMU recognises that: (a) the Clutha Mata-au is a single connected system ki uta ki tai, and (b) the source of the wai is pure, coming directly from Tāwhirimātea to the top of the mauka and into the awa, (1A) sustainable abstraction occurs from lakes, river main stems or groundwater in preference to tributaries, to the extent reasonably practicable, (6) the national significance of the ongoing operation, maintenance and upgrading of the Clutha hydroelectricity generation scheme, including its generation capacity, storage and operational flexibility and its contribution to climate change mitigation and protected, and potential further development of the scheme in Lake Hāwea, on the Hāwea River, and on the Clutha River/Mata-au mainstem, upstream of Roxburgh (within existing consented upper operating levels as at the date this Regional Policy Statement is made operative) is provided for. within this modified catchment, is recognised, provided for. (6A) water bodies support a range of outdoor recreation opportunities, (7) in the Upper Lakes rohe, the high quality waters of the lakes and their tributaries are protected, and if degraded are improved recognising the significance of the purity of these waters to Kāi Tahu and to the wider community, (7A) in the Lower Clutha rohe, opportunities to restore the natural form and function of water bodies are promoted wherever practicable, and (8) the outcomes sought are to be achieved within the following timeframes: (a) by 2030 in the Upper Lakes rohe, (b) by 2045 in the Dunstan and Roxburgh rohe, and (c) by 2050 in the Manuherekia and Lower Clutha rohe.
LF-FW- Fresh water In Otago's water bodies and their catchments: (5) The significant and outstanding values of Otago's outstanding water bodies are identified and protected.

LF-FW-O10 – Natural Character The natural character of wetlands, lakes and rivers and their margins is preserved and protected from inappropriate subdivision, use and development.	
Policy	**Assessment**
LF-WAI-P1 – Prioritisation In all decision-making affecting fresh water in Otago, prioritise: (1) first, the health and well-being of water bodies and freshwater ecosystems (te hauora o te wai) and the exercise of mana whenua to uphold this, (2) second, the health needs of people, (te hauora o te tangata) interacting with water through: (a) ingestion (such as drinking of water and consuming resources harvested from the water body); (b) immersive activities (such as harvesting resources and primary contact); (c) personal hygiene activities (such as food preparation, utensil washing, oral hygiene, showering and flushing the toilet; and (3) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.	The health and wellbeing of the Kimi-ākau/Shotover River and Kawarau River from a biophysical perspective will be maintained following the discharge of treated wastewater, however, the mauri will be diminished. The Shotover WWTP also plays a significant role in safeguarding the social, economic, and cultural wellbeing of the community, and providing for the community's health needs by collecting, treating and safely disposing of community wastewater. This short-term consent is required to provide this critical service for the community while a long-term option that can better recognise tangata whenua values is implemented. The proposal is generally consistent with this policy.
LF-WAI-P2 – Mana whakahaere Recognise and give practical effect to Kāi Tahu rakatirataka in respect of fresh water by: (1) facilitating partnership with, and the active involvement of, mana whenua in freshwater management and decision-making processes, (2) sustaining the environmental, social, cultural and economic relationships of Kāi Tahu with water bodies,	The applicant recognises the special relationship of tangata whenua with the fresh water environment and has been working with rūnaka in relation to development of a long-term solution for the discharge of treated wastewater. The cultural values of the Kimi-ākau/Shotover River and Kawarau River are well known and acknowledged, and are

(3) providing for a range of customary uses, including mahika kai, specific to each water body, (4) incorporating mātauraka into decision making, management and monitoring processes, and (5) managing wai and its connections with whenua in a holistic and interconnected way – ki uta ki tai.	a key consideration in the long-term disposal options being developed. In particular, the applicant understands and acknowledges the adverse effects of the discharge of wastewater to water on Māori cultural and spiritual values. These values are well documented in district and regional plans, and the Kāi Tahu ki Otago and Ngāi Tahu ki Murihiku Iwi Management Plans, which have been taken into account in preparing this application. The application is consistent with part of this policy in regard to involving rūnaka in decision-making for the long-term options, recognising and acknowledging their relationship with the fresh water environment, and taking account of the provisions of the relevant statutory plans and iwi management plan for the area.
<u>LF-WAI-P3 – Integrated management/ki uta ki tai</u> Manage the use of fresh water and land, using an integrated approach that is consistent with tikaka and kawa, that: (1) sustains and, to the greatest extent practicable, restores or improves: (a) the natural connections and interactions between water bodies (large and small, surface and ground, fresh and coastal, permanently flowing, intermittent and ephemeral), (b) the natural connections and interactions between land and water, from the mountains to the sea, (c) the habitats of mahika kai and indigenous species, including taoka species associated with the water bodies,	The assessment in section 5 of the AEE has considered the cumulative effects of the discharge within the wider catchment and the effects on water quality including the habitats of indigenous species and mahika kai. Because this discharge to surface water was previously occurring up until 2019, there is a history of monitoring and confidence that the effects on water quality and ecosystems will be less than minor. Therefore, a precautionary approach is not required. The proposal is consistent with this policy.

(4) manages the effects of the use and development of land to maintain or enhance the health and wellbeing of freshwater, coastal water and associated ecosystems, (5) encourages the coordination and sequencing of regional or urban growth to ensure it is sustainable, (6) has regard to foreseeable climate change risks, and the potential effects of climate change on water bodies, including on their natural functioning, (7) has regard to cumulative effects, and (8) applies a precautionary approach where there is limited available information or uncertainty about potential adverse effects, in accordance with IM-P6.	
LF-WAI-P4 – Giving effect to Te Mana o te Wai All persons exercising functions and powers under this RPS and all persons who use, develop or protect resources to which this RPS applies must recognise that LF-WAI-O1, LF-WAI-P1, LF-WAI-P2 and LF-WAI-P3 are fundamental to upholding Te Mana o te Wai, and must be given effect to when making decisions affecting fresh water, including when interpreting and applying the provisions of the LF chapter.	The objective and policies referenced in this policy (LF-WAI-P4) have been considered above in relation to the discharge of treated wastewater from the Shotover WWTP. The proposal is consistent with this policy, however it is not entirely consistent with policies referenced.
LF-FW-P6A – Transitions over time Provide for ambitious and reasonable transitions in the use of land and water to achieve the long-term visions by: (1) recognising that changes to practices and activities will need to occur over time; and (2) managing the adverse impacts of implementing these changes on people and communities, including by phasing implementation of new	The provision of time for transitions in the use of land and water is reflected in the request for a short-term consent (through to 31 December 2030) to enable a more sustainable long-term solution for the disposal of treated wastewater to be implemented. The proposal is consistent with this policy.

requirements and building on actions undertaken by catchment and other community groups, and (3) enabling innovation and the development of new practices.	
LF-FW-P7 – Fresh water Environmental outcomes, attribute states (including target attribute states), environmental flows and levels, and limits ensure that: (1) the health and well-being of water bodies and freshwater ecosystems is maintained or, if degraded, improved, (2) the habitats of indigenous species with life stages dependent on water bodies are protected and sustained, (2A) the habitats of trout and salmon are protected insofar as this is consistent with (2), (2B) fish passage is provided for, except where it is desirable to prevent the passage of some fish species in order to protect desired fish species, their life stages, or their habitats, (3) specified rivers and lakes are suitable for primary contact within the following timeframes: (a) by 2030, 90% of rivers and 98% of lakes, and (b) by 2040, 95% of rivers and 100% of lakes, and (4) resources harvested from water bodies including mahika kai and drinking water are safe for human consumption.	Overall, the health and wellbeing of the Kimi-ākau/Shotover River and Kawarau River is excellent and will be maintained following the discharge of treated wastewater. Instream habitats of indigenous and sports fishery species will be protected and sustained. The public health risk assessment in section 5 of the AEE demonstrates that the rivers will remain suitable for contact recreation following reasonable mixing and remain safe for human consumption as drinking water following standard treatment. The proposal is generally consistent with this policy.
LF-FW-P11 – Otago's outstanding water bodies Otago's outstanding water bodies are: (1) the Kawarau River and tributaries described in the Water Conservation (Kawarau) Order 1997,	The application recognises the outstanding values of the Kimi-ākau/Shotover River and Kawarau River as outlined in the Kawarau Water Conservation Order. The proposal is consistent with this policy.

(2) Lake Wanaka and the outflow and tributaries described in the Lake Wanaka Preservation Act 1973, and (4) any other water bodies identified in accordance with APP1.	
LF-FW-P13 – Preserving natural character and instream values Preserve the natural character and instream values of lakes and rivers and the natural character of their beds and margins by: (1) avoiding the loss of values or extent of a river, unless: (a) there is a functional need for the activity in that location, and (b) the effects of the activity are managed by applying the effects management hierarchy (in relation to natural inland wetlands and rivers), (2) not granting resource consent for activities in (1) unless the consent authority is satisfied that: (a) the application demonstrates how each step of the effects management hierarchy (in relation to natural inland wetlands and rivers) will be applied to the loss of values or extent of the river, and (b) any consent is granted subject to conditions that apply the effects management hierarchy (in relation to natural inland wetlands and rivers) in respect of any loss of values or extent of the river, (c) if aquatic offsetting or aquatic compensation is applied, the applicant has complied with principles 1 to 6 in Appendix 6 and 7 of the NPSFM, and has had to regard to the remaining principles in Appendix 6 and 7 of the NPSFM, as appropriate, and (d) if aquatic offsetting or aquatic compensation is applied, any consent granted is subject to conditions that will ensure that the offspring or compensation will be maintained and managed over time to achieve the conservation outcomes,	Despite the functional need for the Shotover WWTP discharge to be located on the Shotover delta, there will be no loss of river values or extent as a result of the discharge and the form and function of the river will be sustained. The natural character and instream values of the Kimi-ākau/Shotover River and Kawarau River will continue to be protected and effects of the discharge (other than on Māori cultural and spiritual values) will be avoided, remedied or mitigated following reasonable mixing within the receiving environment. The restrictions in the Kawarau Water Conservation Order have been recognised and the discharge will meet the standards after reasonable mixing. The activity is generally consistent with this policy.

(3) establishing environmental flow and level regimes and water quality standards that support the health and well-being of the water body, (4) to the extent practicable, sustaining the form and function of a water body that reflects its natural behaviours, (5) recognising and implementing the restrictions in Water Conservation Orders, (6) preventing the impounding or control of the level of Lake Wanaka, (7) preventing modification that would permanently reduce the braided character of a river, (8) controlling the use of water and land that would adversely affect the natural character of the water body, and (9) maintaining or enhancing the values of riparian margins to support habitat and biodiversity, reduce contaminant loss to water bodies and support natural flow behaviour.	
<u>LF-FW-P16 – Discharges containing animal effluent, sewage, greywater and industrial and trade waste</u> Minimise the adverse effects of direct and indirect discharges of wastewater, animal effluent, sewage, greywater and industrial and trade waste to fresh water by: (1) phasing out existing discharges of wastewater, sewage or industrial and trade wastewater directly to fresh water to the extent practicable, (2) requiring: (a) new discharges of wastewater, sewage or industrial and trade waste to be to land, unless:	The Shotover WWTP treats sewage from the Queenstown community and is not a "new" discharge. The discharge has been to fresh water on the delta either directly to surface water (up until 2019), or into land and groundwater via the DAD disposal field (until recently). This short-term consent is sought to provide time to consent, design and construct a new more sustainable disposal system, recognising the preference to transition to land where practicable. The potential effects and practicality of alternative discharge options is provided in section 1 and 8.1.3.3 of the AEE. This evaluation demonstrated the effects associated with a continued

(i) the adverse effects associated with a discharge to land are demonstrably greater than a discharge to fresh water, or (ii) the adverse effects associated with a discharge to water are significantly less than, and replace, an existing discharge(s), or (iii) the discharge is to a constructed water body from which there is no discharge of water or contaminants. (b) discharges of animal effluent from land-based primary production to be to land, (c) that all discharges containing sewage or industrial and trade waste are discharged into a reticulated wastewater system, where one is made available by its owner, unless alternative treatment and disposal methods will result in improved outcomes for fresh water, (d) implementation of methods to progressively reduce the frequency and volume of wet weather overflows and minimise the likelihood of dry weather overflows occurring from reticulated wastewater systems, (e) on-site wastewater systems and animal effluent systems to be designed and operated in accordance with best practice standards, (f) that any discharges do not prevent water bodies from meeting any applicable water quality standards set for FMUs and/or rohe, (3) to the greatest extent practicable, requiring the reticulation of wastewater in urban areas, and (4) promoting source control as a method for reducing contaminants in discharges.	use of land disposal, particularly the risk to aircraft safety from an increase in waterfowl habitat on the delta, was substantially greater than the discharge to surface water for this interim 5 year period. The assessment of effects in section 5 has demonstrated that, with the level of treatment provided by the WWTP processes, adverse effects will be minimised and not prevent the water bodies from meeting the applicable water quality standards in the Kimi-ākau/Shotover River after reasonable mixing. The proposal is consistent with this policy.
Energy, infrastructure and transport	
Objectives	
EIT-INF-O4 – Provision of infrastructure	

Effective, efficient, safe and resilient infrastructure, nationally significant infrastructure and regionally significant infrastructure enables the people and communities to provide for their social and cultural wellbeing, their health and safety, and supports sustainable economic development and growth in the region.	
Policy	**Assessment**
EIT-INF-P10 Decision making on the allocation or use of natural and physical resources must take into account the functional needs and operational needs of nationally significant infrastructure and regionally significant infrastructure.	The Shotover WWTP and discharge play a significant role in safeguarding the social, economic and cultural wellbeing of the community, and the community's health and safety by collecting, treating and safely disposing of community wastewater and safeguarding public health and safety. As the only viable option for treated wastewater disposal for this short-term period relies on discharge to surface water, and the Shotover WWTP is located on the delta, the discharge has a functional need to be into the Kimi-ākau/Shotover River. The proposal is consistent with this policy.

Regional Plan Water for Otago
Chapter 5 Natural and human use values of lakes and rivers
Objectives
Objective 5.3.1 To maintain or enhance the natural and human use values, identified in Schedules 1A, 1B and 1C, that are supported by Otago's lakes and rivers.
Objective 5.3.2 To maintain or enhance the spiritual and cultural beliefs, values and uses of significance to Kai Tahu, identified in Schedule 1D, as these relate to Otago's lakes and rivers.
Objective 5.3.3 To protect the natural character of Otago's lakes and rivers and their margins from inappropriate subdivision, use or development.
Objective 5.3.4 To maintain or enhance the amenity values associated with Otago's lakes and rivers and their margins.
Objective 5.3.5 To maintain or enhance public access to and along the margins of Otago's lakes and rivers.
Objective 5.3.6 To provide for the sustainable use and development of Otago's water bodies, and the beds and margins of Otago's lakes and rivers.
Objective 5.3.8 To avoid the exacerbation of any natural hazard or the creation of a hazard associated with Otago's lakes and rivers.

Policy	Assessment
Policy 5.4.2 In the management of any activity involving surface water, groundwater or the bed or margin of any lake or river, to give priority to avoiding, in preference to remedying or mitigating: (1) Adverse effects on: (a) Natural values identified in Schedule 1A; (b) Water supply values identified in Schedule 1B; (c) Registered historic places identified in Schedule 1C, or archaeological sites in, on, under or over the bed or margin of a lake or river; (d) Spiritual and cultural beliefs, values and uses of significance to Kai Tahu identified in Schedule 1D; (e) The natural character of any lake or river, or its margins; (f) Amenity values supported by any water body; and (2) Causing or exacerbating flooding, erosion, land instability, sedimentation or property damage.	Adverse effects on the values in (a), (b), (c), (e) and (f) have been assessed as being avoided in section 5 of the AEE. Both the Kimi-ākau/Shotover River and the Kawarau River have been identified in Schedule 1D as providing a range of cultural values and uses. There are no specific identified sites of significance to iwi identified within or adjoining the site, although it is acknowledged that the wider area includes high value sites that may not be mapped. Appropriate treatment and monitoring is proposed and Kāi Tahu are involved in the decision process for the long-term solution. However, the nature of this discharge being treated wastewater means that adverse effects on cultural values are not avoided. Further engagement is underway to discuss any additional mitigation or monitoring of this short-term discharge that is desired by ka rūnaka to further mitigate the effects where possible. The proposed works are not expected to have any significant or lasting adverse effect in relation to flooding, erosion, land instability, sedimentation or property damage. The proposal is not entirely consistent with this policy.
Policy 5.4.3 In the management of any activity involving surface water, groundwater or the bed or margin of any lake or river, to give priority to avoiding adverse effects on:	There are a range of other existing lawful uses on the lower Kimi-ākau/Shotover River, however the level of treatment and reasonable mixing available and localised nature of the discharge means that

(a) Existing lawful uses; and (b) Existing lawful priorities for the use, of lakes and rivers and their margins.	there is unlikely to be any adverse effect on these other uses. The proposal is consistent with this policy.
Policy 5.4.4 To recognise Kai Tahu's interests in Otago's lakes and rivers by promoting opportunities for their involvement in resource consent processing.	There are no specific sites of significance to iwi identified within or adjoining the site, although it is acknowledged that the wider area includes high value sites that may not be mapped and tangata whenua place significant cultural and spiritual value on fresh water as a whole, with the Kimi-ākau/Shotover River and Kawarau Rivers being recognised as wāhi tūpuna. Appropriate treatment and monitoring is proposed and Kāi Tahu are involved in the decision process for the long-term solution. Further engagement is underway to discuss any additional mitigation or monitoring of this short-term discharge that is desired by rūnaka. The proposal is consistent with this policy insofar as Kāi Tahu interests are recognised and their involvement in the decision-making is encouraged.
Policy 5.4.5 To recognise the Water Conservation (Kawarau) Order 1997 by: (a) Preserving, as far as possible, the waters set out in Schedule 1 of the Water Conservation Order in their natural state; (b) Protecting the outstanding characteristics of waters set out in Schedule 2 of the Water Conservation Order; and	The values attributed to the Kimi-ākau/Shotover River and Kawarau River in the Kawarau Water Conservation Order have been recognised and will be maintained and protected following the discharge as assessed in section 5 of the AEE. The proposal is consistent with this policy.

(c) Sustaining the outstanding amenity and intrinsic values set out in Schedules 1 and 2 of the Water Conservation Order.	
Policy 5.4.6 Legal public access to and along the margins of lakes and rivers will only be restricted where necessary: (a) To protect areas of significant indigenous vegetation and/or significant habitats of indigenous fauna; (b) To protect Kai Tahu spiritual and cultural beliefs, values and uses; (c) To protect the health or safety of people and communities; (d) To ensure a level of security consistent with the purposes of a resource consent; or (e) In other exceptional circumstances sufficient to justify the restriction notwithstanding the national importance of maintaining that access.	As per Section 5 of the AEE, the public will be excluded from the discharge channel and signage will be placed on the Kimi-ākau/Shotover Riverbanks to advise them of the discharge to ensure their safety. Effects on public access will be limited to the immediate area around the discharge, while the bulk of the riverbed will remain open to the public. The proposal is consistent with this policy.
Policy 5.4.8 To have particular regard to the following features of lakes and rivers, and their margins, when considering adverse effects on their natural character: (a) The topography, including the setting and bed form of the lake or river;	The natural flow characteristics of the river will be maintained, and any adverse effects on water clarity will be highly localised to the immediate mixing zone, and minimised to the extent practicable. Ecology is expected to be adequately managed via the discharge quality achieved at the WWTP and available mixing in the receiving environment. The proposal is consistent with this policy.

(b) The natural flow characteristics of the river; (c) The natural water level of the lake and its fluctuation; (d) The natural water colour and clarity in the lake or river; (e) The ecology of the lake or river and its margins; and (f) The extent of use or development within the catchment, including the extent to which that use and development has influenced matters (a) to (e) above.	
Policy 5.4.9 To have particular regard to the following qualities or characteristics of lakes and rivers, and their margins, when considering adverse effects on amenity values: (a) Aesthetic values associated with the lake or river; and (b) Recreational opportunities provided by the lake or river, or its margins.	Amenity values attributed to the Kimi-ākau/Shotover River will be maintained and recreational opportunities, e.g. jet boating, kayaking and hiking, will continue to be enabled, with only localised disruption immediately around the outfall and mixing zone which is located on a minor braid at the river's edge. The proposal is consistent with this policy.
Chapter 7: Water Quality	
Objective 7.A.1 To maintain water quality in Otago lakes, rivers, wetlands, and groundwater, but enhance water quality where it is degraded.	
Objective 7.A.2 To enable the discharge of water or contaminants to water or land, in a way that maintains water quality and supports natural and human use values, including Kāi Tahu values.	

Objective 7.A.3 To have individuals and communities manage their discharges to reduce adverse effects, including cumulative effects, on water quality.	
Policy	**Assessment**
Policy 7.B.2 Avoid objectionable discharges of water or contaminants to maintain the natural and human use values, including Kāi Tahu values, of Otago lakes, rivers, wetlands, groundwater and open drains and water races that join them.	Beyond the reasonable mixing zone, the discharge will result in less than minor objectionable adverse effects on the natural and human use values of the Kimi-ākau/Shotover River, aside from Kāi Tahu values whereby the discharge is objectionable to Kāi Tahu. The proposal is therefore not entirely consistent with this policy.
Policy 7.B.3 Allow discharges of water or contaminants to Otago lakes, rivers, wetlands and groundwater that have minor effects or that are short-term discharges with short-term adverse effects.	The discharge will be a short-term activity in respect of the scale of the infrastructure and its design horizon. The effects assessment has also demonstrated that there will be no more than minor effects on water quality within the receiving environment. The proposal is consistent with this policy.
Policy 7.B.6 When assessing any consent to discharge contaminants to water, consider the need for and the extent of any zone for physical mixing, within which water will not meet the characteristics and limits described in Schedule 15, by taking account of: (a) The sensitivity of the receiving environment; and (b) The natural and human use values, including Kāi Tahu values; and (c) The natural character of the water body; and (d) The amenity values supported by the water body; and	The extent of physical mixing has been discussed in Section 5 of the AEE including the sensitivity of the receiving environment. The values in (b), (c) and (d) have been identified in section 3 and taken into account when assessing the extent of mixing required in section 5 whilst also recognising the nature of the naturally high in sediment braided Kimi-ākau/Shotover River and the quality and volume of the discharge. An assessment against the water quality standards in Schedule 15 has been provided. The proposal is consistent with this policy.

(e) The physical processes acting on the area of discharge; and (f) The particular discharge, including contaminant type, concentration and volume; and (g) The provision of cost-effective community infrastructure; and (h) Good Quality Water as described in Schedule 15.	
Policy 7.C.1 When considering applications for resource consents to discharge contaminants to water, to have regard to opportunities to enhance the existing water quality of the receiving water body at any location for which the existing water quality can be considered degraded in terms of its capacity to support its natural and human use values.	The Kimi-ākau/Shotover River is not considered to be a degraded waterbody. The background and upstream water quality meets the 'A' grade attribute standards within the NPSFM. In addition, compared to the previous discharge of treated effluent to the Kimi-ākau/Shotover River, the recent MLE clarifier and treatment system results in a substantially better quality discharge than previously occurred prior to 2017, with further improvements expected by the end of 2025. The proposal is consistent with this policy.
Policy 7.C.2 When considering applications for resource consents to discharge contaminants to water, or onto or into land in circumstances which may result in any contaminant entering water, to have regard to: (a) The nature of the discharge and the sensitivity of the receiving environment to adverse effects; (b) The financial implications, and the effects on the environment of the proposed method of discharge when compared with alternative means; and	The nature of the discharge and the sensitivity of the receiving environment have been considered in the application. A detailed assessment of alternative options has been undertaken with the current discharge being the most practical, feasible and fast to implement in order to mitigate adverse effects of the failed DAD disposal field discharge. The short-term duration proposed takes account of the financial implications of designing, consenting and implementing a new disposal method. The technical constraints of the alternative discharge options are clear.

(c) The current state of technical knowledge and the likelihood that the proposed method of discharge can be successfully applied.	The proposed short-term continuation of the emergency discharge to water, given the sensitivity of the receiving environment and the financial and technical constraints, is appropriate. The proposal is consistent with this policy.
Policy 7.C.3 When considering any resource consent to discharge a contaminant to water, to have regard to any relevant standards and guidelines in imposing conditions on the discharge consent.	The relevant water quality standards in Schedule 15 have been considered and the assessment against those standards as well as the relevant NPSFM attribute limits concludes that for all but ammonia, those standards will be met, before or within the initial mixing zone in low flow conditions. Ammonia may slightly higher than NPSFM 'A' band standards until further mixing is achieved in the Kawarau River, under low flow conditions. Appropriate limits on the discharge are proposed to ensure the relevant standards and guidelines continue to be achieved. The proposal is consistent with this policy.
Policy 7.C.4 The duration of any new resource consent for an existing discharge of contaminants will take account of the anticipated adverse effects of the discharge on any natural and human use value supported by an affected water body, and: (a) Will be up to 35 years where the discharge will meet the water quality standard required to support that value for the duration of the resource consent; (b) Will be no more than 15 years where the discharge does not meet the water quality standard required to support that value but will progressively meet that standard within the duration of the resource consent;	This consent represents a new resource consent for an existing discharge where the water quality standards that recognise the natural and human use values of the Kimi-ākau/Shotover River are being met in the receiving environment. A proposed duration of less than 5 years is needed to provide a short-term solution while a long-term solution is being consented, designed and implemented. The proposal is consistent with this policy.

(c) Will be no more than 5 years where the discharge does not meet the water quality standard required to support that value; and (d) No resource consent, subsequent to one issued under (c), will be issued if the discharge still does not meet the water quality standard required to support that value.	
<u>Policy 7.C.12</u> Reduce the adverse effects of discharges of human sewage from existing reticulated wastewater systems, including extensions to those systems, by: (a) Preferring discharges to land over discharges to water, unless adverse effects associated with a discharge to land are greater than a discharge to water; and (b) Requiring systems to be operated, maintained and monitored in accordance with recognised industry standards; and (c) Promoting the progressive upgrading of existing systems; and (d) Requiring the implementation of appropriate: (i) Measures to progressively reduce the frequency and volume of wet weather overflows; and (ii) Measures to minimise the likelihood of dry weather overflows occurring; and (iii) Contingency measures to minimise the effects of discharges of wastewater as a result of system failure or overloading of the system; and	The adverse effects of the discharge from the existing Shotover WWTP have been assessed in Section 5 of the AEE. At the present time and up to the end of 2030, the effects of a discharge to land are considered to be greater than a discharge to water. This is particularly the case in terms of large numbers of waterfowl increasing the risk of birdstrike on aircraft at the adjacent airport, and amenity effects over a much broader area of widely used recreational space on the delta. An enhanced operations and maintenance manual is being prepared to ensure that the operation of the plant can achieve the discharge standards at all times. A draft monitoring programme has been provided for both the discharge quality and receiving environment. The second MLE clarifier is almost complete which will further improve the quality of the discharge. Additional contingency measures are being implemented in the form of calamity storage for occasions where there may be process upsets, or treatment issues. This will be in place once capacity is available in Ponds 2 and 3 following the MLE2 completion. The proposal is consistent with these parts of this policy.

(e) Recognising and providing for the relationship of Kāi Tahu with the water body, and having particular regard to any adverse effects on Kāi Tahu cultural and spiritual beliefs, values, and uses.	Kāi Tahu values are recognised and it is acknowledged that the discharge of treated effluent to surface water is an affront to Kāi Tahu values. Ka rūnaka are involved through representation from Aukaha and TAMI in the decision-making process and optioneering for a long-term solution that will give better recognition to their cultural and spiritual beliefs, values and uses. This consent is being sought for the shortest feasible timeframe to ensure the move to a more suitable discharge system is not delayed.
Chapter 8 The beds and margins of lakes and rivers	
Objective	
Objective 8.3.1 To maintain: (a) The stability and function of existing structures located in, on, under or over the bed or margin of any lake or river; (b) The stability of the bed and bank of any lake or river; and (c) The flood and sediment carrying capacity of any lake or river.	
Objective 8.3.2 To minimise reduction in water clarity caused by bed disturbance.	
Policy	**Assessment**
Policy 8.4.1 When managing activities in, on, under or over the bed or margin of any lake or river, to give priority to avoiding changes	The outfall protection works/rip rap are not expected to have a detrimental impact on the natural flow and sediment processes of the Kimi-ākau/Shotover River, for the reasons provided in Section 5 of the AEE. It is expected that any adverse effects arising from sedimentation during the placement of the riprap will be temporary

in the nature of flow and sediment processes in those water bodies, where those changes will cause adverse effects: (a) On the stability and function of existing structures located in, on, under or over the bed or margin of any lake or river; (b) Arising from associated erosion or sedimentation of the bed or margin of any lake or river, or land instability; or (c) Arising from any reduction in the flood carrying capacity of any lake or river.	and can be adequately managed through conditions of consent. The proposal is consistent with this policy.
Policy 8.6.1 In managing the disturbance of the bed or margin of any lake or river, to have regard to any adverse effect on: (a) The spawning requirements of indigenous fauna, and trout or salmon; (b) Bed and bank stability; (c) Water quality; (d) Amenity values caused by any reduction in water clarity; and (e) Downstream users	Provided works within the wetted bed are kept to a minimum, and with the use of best practice erosion and sediment control measures where appropriate, adverse effects on indigenous aquatic species or salmonids and water quality and clarity are not expected. Adverse effects on indigenous breeding birds can be avoided by timing works on the riverbed outside of the breeding season, or ensuring a bird survey is undertaken prior to works occurring, and significant effects on bed and bank stability are not considered likely. The proposal is consistent with this policy.

Regional Plan: Air for Otago
Objectives
Objective 6.1.1

To maintain ambient air quality in parts of Otago that have high air quality and enhance ambient air quality in places where it has been degraded.	
Objective 6.1.2 To avoid adverse localised effects of contaminant discharges into air on: a) Human health; b) Cultural, heritage and amenity values; c) Ecosystems and the plants and animals within them; and d) The life-supporting capacity of the air.	
Policy	**Assessment**
Policy 7.1.1 To recognise and provide for the relationship Kai Tahu has with the air resource, through procedures that enable Kai Tahu to participate in management of the air resource.	Kāi Tahu continue to be involved in the decision-making process for a long term solution for the WWTP, and engagement is underway with ka rūnaka to discuss appropriate mitigation and monitoring in association with the short-term discharge. Further assessment against cultural values is provided in Section 5 and 8 of the AEE. The proposal is consistent with this policy.
Policy 8.2.3 In the consideration of any application to discharge contaminants into air, Council will have: a) Particular regard to avoiding adverse effects including cumulative effects on: I. Values of significance to Kai Tahu; II. The health and functioning of ecosystems, plants and animals; III. Cultural, heritage and amenity values; and	As per the assessment of effects in Section 6 of the AEE, odour effects from the discharge of treated wastewater to water have been assessed as being unlikely to cause offensive or objectionable effects at off-site receptors. An assessment against Kai Tahu values is provided in Section 5 and 8 of the AEE, and engagement with ka rūnaka regarding this application is ongoing. The proposal is consistent with this policy.

IV. Human health. b) Regard to any existing discharge from the site, into air, and its effects.	
<u>Policy 8.2.4</u> The duration of any permit issued to discharge contaminants into air will be determined having regard to: a) The mass and nature of the discharge b) The nature and sensitivity of the receiving environment; and c) Any existing discharge from the site, into air, and its effects.	Changes have been sought to RM13.215.01 to authorise the discharge of contaminants (odour) to air associated with the discharge of treated wastewater to water. RM13.215.01 expires on 18 March 2044. In accordance with RMA s127, no change to the consent expiry has been sought. The proposal is consistent with this policy.
<u>Policy 11.1.1</u> To avoid or mitigate any adverse effects on human health or amenity values arising from the discharge of offensive or objectionable odour through the use of: a) Good management practices (including the use of codes of practice) and process technology that has an inherently low odour potential to ensure the amount of odorous contaminants generated by a process or activity is minimised; b) Appropriate control technologies to reduce the emission of odorous contaminants; c) Site planning mechanisms and other land use management techniques to reduce the potential for adverse off site effects; and d) Tools and techniques that provide an objective assessment of odour, such as olfactometry, odour dose response assessments and community surveys.	Based on information provided in the AEE, it is expected that odours at the outfall may only be detectable up to 50 m from the discharge outfall, and are unlikely to be considered offensive or objectionable. In addition to the above, the Shotover WWTP is in the process of undergoing significant upgrades in line with best practice approaches to wastewater treatment, with a second MLE reactor and another secondary clarifier, among other upgrades, to be commissioned by the end of the year. These will further reduce the already low anticipated odour effects on amenity values. Finally, the applicant will continue to adhere to mitigation measures required under conditions of RM13.215.01. Specifically, adherence and updates (where appropriate) to the existing Odour Management Plan that governs all air discharges from the WWTP in line with the 'best practicable options'. The proposal is consistent with this policy.