

Date: 8<sup>th</sup> August 2019

To: Charles Horrell

## **Queenstown Lakes Wastewater Overflow Discharges – Final Review**

Dear Charles,

At your request I have read the reviewed the following information provided for the Queenstown Lakes wastewater overflow resource consent application:

- The application – *Queenstown Lakes District Council Wastewater Network Consent (QLDC)*;
- The ecology assessment – *Queenstown Lakes District Council Wastewater Network Consent: Assessment of Ecological Effects* (Ryder Environmental Ltd – Appendix C of the application);
- The public health assessment – *Wastewater overflow discharge consent - Queenstown Lakes District Council: Microbial risk assessment* (NIWA – Appendix D of the application);
- The S.92 response – *RM19.051 QLDC Wastewater Network Consent S92(1) Response* (QLDC – includes wastewater overflow data for the period 2015-2018)
- The QLDC Loop Road discharge prosecution files – *ORC v QLDC [2019] NZDC 832*:
  - Rachel Ozanne’s File Note (ORC);
  - Jason Augspurger’s File Note (ORC);
  - The Summary of Facts; and
  - The Notes of Judge B P Dwyer on Sentencing.
- The QLDC discharge to the Kawarau River prosecution files – *ORC v QLDC [2017] NZDC 28767*:
  - Rachel Ozanne’s File Note (ORC); and
  - The Notes of Judge B P Dwyer on Sentencing.

## **1 Initial assessment – Provided for context**

In this part of the memorandum my preliminary assessment (written on the 17/04/2019 and revised on the 13/05/2019) of the application is provided for context. Included is:

- A review of the water quality and ecology components of the application;
- An assessment of the key limitations of the approaches taken in the application;
- A preliminary assessment of the effects of the overflow discharges against S.107 of the RMA; and
- An outline of the additional data I require to complete a full review.

### **1.1 Review of the ecology assessment (revised)**

The ecological assessment prepared by Ryders Environmental thoroughly describes the risk of wastewater overflows entering surface water bodies when they occur and the sensitivity of receiving environments to overflows. However, without an adequate understanding the frequency, duration and volume of overflows it is not possible to gauge the actual effects of those discharges. For example, the report notes that there is a high probability of overflows from the Dungarvon Street Pump station entering Bullock Creek, and moderate-high risk off effects associated with wastewater discharges. From that, it appears that there is the potential for significant adverse effects in that creek. However, if overflows are only discharged to that system for ten minutes every year at a rate of a few litres per second, then the effects will actually be negligible. The opposite could also be true in a stream with a low risk off effects, but a high frequency of wastewater discharges. In short, without detailed information on the overflows, then there is no way to tell what the effects on water quality and ecology will actually be.

If the applicant was to provide a record of past overflows that reached surface water, I could use that information to gain a better understanding of the potential for adverse effects at each overflow site.

### **1.2 Review of the public health assessment (revised)**

The public health assessment prepared by NIWA represents the best available method of assessing the human health risk posed by wastewater overflows without data on the frequency, duration and volume of overflows in relation to dilution potential of receiving environments. However, it is my opinion that an assessment made without the aforementioned data, does not actually describe the of health risk associated with QLDC overflows. Indeed, the results appear to be applicable anywhere, not just in Queenstown Lakes.

Nevertheless, I acknowledge that it is not practicable to collect the data required for a full Quantitative Microbial Risk Assessment for each of the streams and lakes impacted by overflows. Indeed, the author of the public health assessment, Dr Neale Hudson, states that hydrodynamic models would be needed for all impacted lakes, the development of which would be hugely expensive. Instead, I recommend that the applicant provide a record of overflows to support the

assumption made by Dr Hudson that they only occur occasionally. If those data confirm that overflows are very infrequent, and QLDC can confirm and demonstrate that Dr Hudson's recommendations on the "Wastewater Network Overflow Incident Response Process" have been adopted, then I am comfortable accepting Dr Hudson's conclusion that the risk to human health is low to very low

### **1.3 Section 107 assessment**

As with the ecological assessment, I require a record of overflows as well as their duration and volume/flow rate before I can make a meaningful assessment of the effects of overflow discharges against S.107 of the RMA. However, my preliminary assessment is that the discharge of raw wastewater to freshwater:

- Will result in the production of oil or grease films, scums or foams, or floatable or suspended materials. However, how conspicuous they will be is dependent on the rate of the discharge in relation to the dilution potential of the receiving water body;
- Will cause an objectionable odour;
- Has the potential to render fresh water unsuitable for consumption by farm animals. However, this will depend on the dilution potential of the receiving water body and the presence of farm animals; and
- May cause significant adverse effects on aquatic life (see comments in Section 1.1)

### **1.4 Additional information required to complete my assessment (revised)**

Since my initial assessment I have spoken with the applicant about the availability overflow data and they have advised me that some exists. Thus, the applicant may be able to demonstrate that the effects of overflows on public health and aquatic ecology are no more than minor without a significant S.92 hold or a short-term consent.

Can the applicant please:

- Provide any data they have on past overflows that reached surface water such as frequency and location (the applicant has advised me that the flow and duration data I requested in my initial assessment is unlikely to be available); and
- Confirm and demonstrate that Dr Hudson's recommendations on the "Wastewater Network Overflow Incident Response Process" have been adopted.

### **1.5 Process for collecting requested information (revised)**

If the applicant is able to demonstrate that overflows are rare from the existing data (they have indicated they may be able to) then I am happy to accept that the effects on public health and aquatic ecology will be no more than minor.

If it turns out the existing data is limited or shows that overflows are frequent, the applicant will need to conduct some monitoring/investigations in-order for the effects of the overflows to be assessed with any certainty. Granting a 35-year consent without a reasonable understanding of the nature of wastewater overflows could lead to unforeseen ecological and human health effects,

some of which could be significant (i.e. if it turns out that overflows are frequent and large). As stated in my initial assessment, the application could either go on hold to allow QLDC to collect the required data (unless they can be modelled somehow from influent flow data for their WWTP's), or it might be preferable to grant a short-term consent until such information becomes available. Note – QLDC have already indicated that they will be collecting this information in the future (proposed consent condition 4).

## **2 Final assessment**

In this part of the memorandum I provide a final update to my assessment of the application based on the additional information provided by QLDC in their S.92 response, the QLDC Loop Road discharge prosecution files (provided by ORC after my initial assessment) and the QLDC discharge to the Kawarau River prosecution files (provided by ORC after my initial assessment).

### **2.1 Comments on the wastewater overflow data provided with the S.92 response**

In the S.92 response the applicant provided wastewater overflow data for the period 21/07/2015 – 28/11/2018. My initial assessment of the data was that it appeared to be a reasonably robust record of overflows in the Queenstown Lakes District, and if accurate would be strong evidence that the frequency of overflows reaching surface water is very low. Accordingly, I confirmed with ORC that additional data were not required (Charles Horrell *pers. comm.* 06/06/2019). However, I have since been provided with the QLDC Loop Road discharge prosecution files which cast doubt over the robustness of the overflow data.

As stated in Section 1.5, I am happy to accept that the effects of overflow discharges on public health and aquatic ecology will be no more than minor if the applicant is able to demonstrate from the existing data that overflows are rare, which on the face of it they have. The data provided by QLDC with their S.92 response show that between 21/07/2015 and 28/11/2018 wastewater overflows in the Queenstown Lakes District were frequent, with one occurring roughly every 6 days (207 total). However, they also indicate that despite their high frequency, the wastewater overflows rarely entered surface water. Indeed, only 16 overflow events from QLDC infrastructure were reported as entering a river or lake, which equates to roughly one every 77 days (Table 1). Furthermore, the discharges were spread between surface water bodies, with the Kawarau River (including the Shotover River) receiving two discharges, Lake Wanaka three, Lake Wakatipu (exc. The Frankton Arm) seven and the Frankton Arm six (including the two from the Kawarau River) (Table 1). This means that the maximum time that overflows were discharged to a single water body was less than 19 hours, which is less than 0.06% of the reporting period (Table 1).

**Table 1: Summary of QLDC overflow data for the period 21/07/2015 28/11/2018.**

Catchment	Receiving environment	No# of overflows	Total duration <sup>1</sup> (hours)	Av. duration (hours)	Days between overflows (days)	%age of time discharging	
Lake Wanaka	Lake Wanaka	3	6.5	2.2	409	0.02%	
Lake Wakatipu (exc. Frankton arm)	Lake Wakatipu	5	14.8	3.0	245	0.05%	
	Un-named stream	2	4.1	2.0	613	0.01%	
	Whole lake	7	18.8	2.7	175	0.06%	
Frankton Arm	Frankton Arm	4	6.4	1.6	307	0.02%	
	Kawarau River	Shotover R.	1	4.1	4.1	>1226	0.01%
		Main-stem	1	3.3	3.3	>1226	0.01%
		Whole catchment	2	7.4	3.7	613	0.03%
	Whole arm	6	13.9	2.3	204	0.05%	
<b>Total</b>		<b>16</b>	<b>39.2</b>	<b>2.45</b>	<b>77</b>	<b>0.13%</b>	

<sup>1</sup>Duration = time between QLDC being notified of the overflow and the overflow ceasing. How long overflows had been going before QLDC was notified is not known

Unfortunately, while the data summarised above indicates that the ecological and public health risks associated with the overflow discharges is low, there is not enough certainty around the data records robustness to rely upon it as evidence of an effect level. The main reason for this uncertainty is an obvious inconsistency in the reporting of a single overflow event at Loop Road, Kelvin heights on the 03/08/2017. In the record provided by QLDC it is clearly stated that this overflow did not reach surface water. However, I have since found out that it flowed straight to Lake Wakatipu, which led to QLDC being prosecuted by ORC. While this does not necessarily mean that there are other errors in the record, the fact that such an important overflow event has been recorded incorrectly throws significant doubt over the metadata recorded for all overflows. Accordingly, I do not consider it appropriate to rely on these data when assessing the risks to aquatic life or public health.

## 2.2 Ecological effects

As stated in Section 1.1, it is not possible to gauge the actual ecological effects of the overflows without an adequate understanding of their frequency, duration and volume. Unfortunately, this level of detail is still not available (see Section 2.1) and the ecological effects of the overflows remain largely unknown. Accordingly, it is my opinion that granting a 35-year consent has the potential to lead to long-term significant adverse effects on aquatic life, and a short-term consent should be granted until the nature of the overflows can be better described. This is not to say that significant adverse effects will occur, rather that they can not be discounted.

The potential for significant adverse effects on aquatic life to arise from overflows is certainly demonstrated by the water quality data presented in Rachel Ozanne's File Note for the QLDC

discharge to the Kowarau River prosecution (ORC v QLDC [2017] NZDC 28767). On page 3 of that document it is reported that the ammoniacal nitrogen concentration in the Kowarau River during that overflow was 39 mg/L, which is 36.8 mg/L higher than the NPS-FM national bottom line for ammonia toxicity (annual maximum = 2.2 mg/L). Perhaps more relevant for a sporadic discharge, it is also 22 mg/L higher than the USEPA guideline for acute toxicity which applies as a one-hour average concentration with one allowable exceedance every three years. The overflow in question persisted for “about two days” (The Notes of Judge B P Dwyer on Sentencing) and it is reasonable to assume that it would have caused the average concentration to exceed the USEPA guideline over several hours and resulted in acute toxicity effects on the resident fauna. Thus, it is vital that there is clear evidence that these sorts of discharges do not regularly occur within the same area of waterbody before long-term consent is granted.

### **2.3 Public health effects**

Dr Hudson’s conclusion in the public health assessment that the risk posed to human health from overflows is low to very low assumes that they occur very infrequently. Unfortunately, due to the issues with the overflow data described in Section 2.1, this assumption cannot be confirmed. Without certainty around the frequency, duration and volumes of overflows, the potential for significant human effects cannot be discounted. Nevertheless, I acknowledge that the available data does not indicate a high level of risk and that QLDC have incorporated Dr Hudson’s recommendations into the Incident Response Process to ensure that the risks are managed in accordance with national guidelines. Thus, while it is still my opinion that granting a 35-year consent without a reasonable understanding of the nature of wastewater overflows could lead to ongoing unforeseen human health effects, granting a short term consent that allows QLDC to keep discharging while they better characterise the nature of their overflows is unlikely to result in a significant risk of adverse effects on human health.

### **2.4 Section 107 assessment**

Without robust information on the frequency, duration and volume/flow rate of the overflows, my preliminary assessment of the proposed discharge against S.107 of the RMA stands. Specifically, the discharge:

- Will result in the production of oil or grease films, scums or foams, or floatable or suspended materials. However, how conspicuous they will be is dependent on the rate of the discharge in relation to the dilution potential of the receiving water body;
- Will cause an objectionable odour;
- Has the potential to render fresh water unsuitable for consumption by farm animals. However, this will depend on the dilution potential of the receiving water body and the presence of farm animals; and
- May cause significant adverse effects on aquatic life (see comments in Section 1.1)

## 2.5 Summary

Obvious errors in the wastewater overflow data provided by QLDC for the period 21/07/2015 – 28/11/2018 with their S.92 response means I do not consider it appropriate to rely on these data when assessing the risks to aquatic life or public health. Accordingly, the current effects of QLDC's wastewater overflows on water quality, ecology and human health are still not well understood, and it is my opinion that granting a 35-year consent without a reasonable understanding of the nature of wastewater overflows could lead to unforeseen ecological and human health effects, some of which could be significant. From an ecological and human health perspective it would be more appropriate to grant a short-term consent that allows QLDC to keep discharging while they better characterise the nature of their overflows.

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A handwritten signature in black ink, appearing to read 'm greer', written in a cursive style.