Under	The Resource Management Act 1991
In the matter	of an application for resource consent to discharge wastewater overflows from Queenstown Lakes District Council's wastewater network

Statement of Evidence of Ulrich Wilhelm Glasner

18 October 2019

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Statement of Evidence of Ulrich Glasner

1 Introduction

Qualification and experience

1.1 My full name is Ulrich Wilhelm Glasner. I have held the position of Chief Engineer at Queenstown Lakes District Council (**QLDC**) since July 2013. Between 2008 and 2013 I was employed as the Utilities Asset Manager at Western Bay of Plenty District Council. Prior to 2008, I worked in a number of consultant and management roles in infrastructure and transportation in both New Zealand and Germany.

1.2 I hold an Engineering degree (Diplom Ingenieur) from the University of Applied Sciences – Wiesbaden. This qualification is equivalent to a Bachelor of Engineering as confirmed by the New Zealand Qualification Authority. I am a Chartered Professional Engineer (CPEng) and a member of Engineering New Zealand, Institute of Public Works Engineering Australasia, and Water New Zealand.

1.3 In my previous role as Utilities Asset Manager at Western Bay of Plenty District Council I was responsible for managing three waters infrastructure, preparing, updating, implementing and monitoring asset management plans for the district's water supply, wastewater, stormwater and solid waste assets. My key responsibilities included:

(a) Undertaking infrastructure needs assessments, planning for the renewal and replacement of three waters assets, determining timing for upgrades, costings and funding strategy.

(b) Preparing a detailed 10-year capital works programme for all three waters infrastructure in the district, including a wastewater community scheme in Maketu and upgrades to the Waihi Beach, Katikati and Te Puke wastewater treatment plants.

(c) Developing, reviewing and implementing a detailed three-year plan infrastructure improvement programme.

1.4 I have 30 years' experience in civil engineering. This experience includes investigations, issues and options studies, and the design and construction of several wastewater and stormwater pump stations, reticulation, and collection systems. I have managed the design of stormwater and wastewater systems in New Zealand and Germany.

1.5 As QLDC's Chief Engineer, I am accountable for all technical engineering solutions required to maintain agreed infrastructure levels of service. Key tasks associated with my role include:

(a) Leading the development and implementation of infrastructure solutions;

(b) Developing the technical aspects of the infrastructure capital works programme;

(c) Leading engineering engagement in developing annual plans, ten year plans, network masterplans, and other key strategic planning documents;

(d) Ongoing technical support for network management;

(e) Managing the performance and development of the engineering team, and appropriately allocating resources to programmes and projects; an

(f) Leading infrastructure-related engagement with private developers.

Purpose and scope of evidence

1.6 My role in relation to this consent is to provide technical information relevant to the project. My involvement in the project commenced substantively after QLDC lodged the application. I reviewed the application following lodgement. I was satisfied that the application addressed technical wastewater system matters appropriately and that it correctly explained why wastewater overflow discharges are random and inevitable. In my view, the random and unavoidable nature of these discharges is an essential component of understanding the reasons for this application.

1.7 The purpose of my evidence is to provide a factual technical description of wastewater networks generally, provide a technical overview of the existing QLDC network (including where key assets are located and how it functions), explain why overflows cannot be entirely eliminated and how the risk of overflows can be reduced.

1.8 My evidence is set out as follows:

(a) Overview of the QLDC wastewater network (“the network”), including high-level network statistics and key roles and responsibilities;

(b) Types of wastewater overflows and the main reasons for their occurrence;

(c) Consideration of the submissions received relevant to my evidence; and

(d) Response to matters raised in the ORC’s Planner’s s 42A Report, relevant to my evidence.

2 Executive summary

2.1 QLDC cannot entirely avoid overflows due to obstructions from fats, foreign objects and intrusions from tree and plant roots because these occur as a result of actions that are outside QLDC’s control. These are the predominant causes of wastewater overflows in the district rather than capacity issues in the network.

2.2 Public education and awareness is the key to reducing fats and foreign objects from entering the wastewater network and to ensuring that the types of trees that could damage the wastewater network are not planted close to pipework.

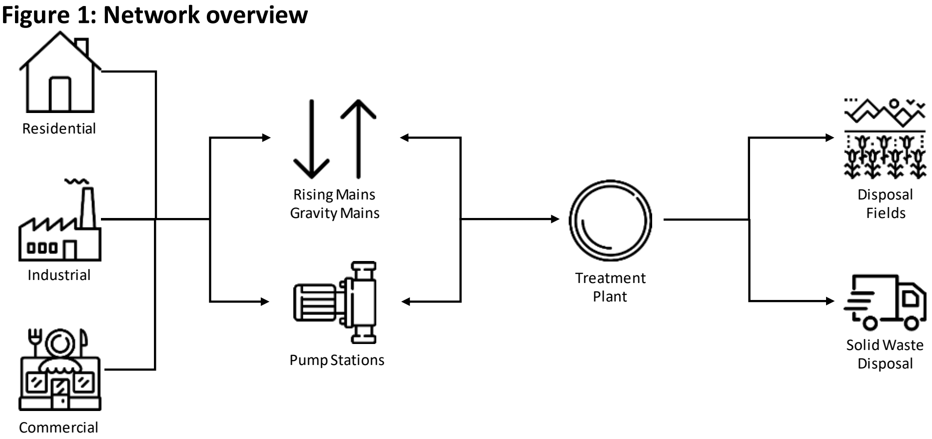
3 Wastewater networks in general

3.1 Wastewater is comprised of toilet wastes, household grey water (i.e. from kitchens, bathrooms, and laundries), and liquid wastes produced by commercial and industrial businesses (trade waste).

3.2 Conventional wastewater systems generally collect and convey a community's wastewater from the property boundary of each property to a pump station via a gravity main in which the wastewater flows downhill under gravity. From the pump station wastewater is pumped via a rising main to a wastewater treatment plant where the influent is treated before it is discharged back into the natural environment (refer **Figure 1**). The treatment process is designed to ensure harmful bacterial, viral, and parasitic germs are removed from the wastewater so that there are no detrimental effects to public health or the environment.

3.3 In some cases, wastewater is collected from a private property and conveyed via a pressure main (i.e. a pipeline that carries a fluid at a pressure greater than atmospheric pressure) to a pump station or directly to a wastewater treatment plant.

Figure 1: Network overview



4 The Queenstown Lakes District wastewater network

Wastewater network overview

4.1 The Queenstown Lakes District covers 9,357 square kilometres, spanning from Makarora in the north to Kingston in the south, Glenorchy in the east to Hāwea Flat in the west.

4.2 QLDC's wastewater network collects, conveys, and treats wastewater originating from residential, commercial, and industrial activities across the district. Typically the district's wastewater flows under gravity towards lakes and rivers because lakes and rivers are generally at low points within the district.

4.3 Pump stations located at these natural low points are used to lift the wastewater to a point whereby it can again flow under gravity to the final treatment location, or to be pumped via a rising main directly to the treatment facility.

4.4 QLDC's network is divided into five treatment and collection schemes, and manages approximately 4,650,000 cubic meters of wastewater annually. Approximately 74% of the district's population is connected to a QLDC-run wastewater scheme. The district's remaining population is serviced by septic tanks, package treatment plants,[1] and private community wastewater schemes. The five QLDC wastewater networks (or schemes) in the district are:

(a) Project Shotover which services Arrowtown, Arthurs Point, Millbrook, Lake Hayes, Lake Hayes Estate, Shotover Country, Frankton, Kelvin Heights, Hanley Farms, Queenstown, Sunshine Bay and Fernhill;

(b) Project Pure which services Wanaka and Albert Town;

(c) Luggate was serviced with a package plant but this has very recently been decommissioned and wastewater is now being piped through to Project Pure.

(d) Hāwea is serviced by a pond based plant which will be decommissioned when Hāwea is connected to Project Pure in 2022; and

(e) Cardrona is serviced by a small package plant and will be decommissioned when a new wastewater treatment plant is built by Mount Cardrona Station and vested into council in 2021.

4.5 In terms of communities within the district that are not currently serviced by a QLDC owned or managed system:

(a) Kingston is currently not serviced by a QLDC wastewater network but QLDC expects connections from the existing community to a new wastewater treatment plant to be constructed by QLDC in the next five years.

(b) Glenorchy is currently not serviced by a QLDC wastewater network but QLDC currently anticipates that a community wastewater scheme will required in the next long term plan timeframe.

(c) QLDC does not currently intend to build a community wastewater scheme in Makarora or Gibbston.

(d) There are various private wastewater schemes in the district which are managed and operated by private entities e.g. Jacks Point, Glenorchy, Cardrona.

(e) In general, all rural areas are serviced on-site by septic tanks.

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1 A package wastewater treatment plant is a flexible system designed for replacing existing septic or new on site systems in municipal, private development and industrial process applications. There are various suppliers of these kind of plants on the marked.

4.6 The major components of the QLDC owned and managed wastewater network are summarised in **Table 1** below.

Table 1: Major network components

Component	Description	Network statistics
Gravity main	Uses the energy resulting from a difference in elevation to convey wastewater. Manholes are located at intervals along the main.	381.4 km
Rising main	Wastewater is conveyed against gravity using energy created by pump stations.	74.5 km
Pump station	Consist of a wet well, two or more pumps, electrical control system, connected to a SCADA (supervisory control and data acquisition) system, pumps via a rising main directly to a wastewater treatment plant or a receiving gravity network.	65 pump stations
Manhole	Access points into a gravity main	7620
Treatment plant	Receives wastewater from a reticulated network and treats the wastewater to the required resource consent condition before discharging.	5 plants
Disposal field	After the wastewater is treated it is discharged to a disposal field, which is a land based system.	
Engineered Overflow Point	Structures designed to direct untreated overflows to when there are network problems	8

Responsibility for wastewater

4.7 Where properties are within an area in which QLDC owns or manages the wastewater network QLDC is responsible for the network from the boundary of the private property through to the wastewater treatment plant and discharge point.

4.8 Private property owners are responsible for their wastewater pipe located within their property's boundaries.

4.9 Otago Regional Council (ORC) and Public Health South (PHS) have interests in any treated or untreated wastewater once it has exited the network:

(a) ORC is responsible for the managing the region's land, air, and water resources.

(b) PHS is the Southern District Health Board's public health service, and provides a range of health promotion, prevention, protection, and improvement services.

5 Wastewater overflows

5.1 Overflows can occur due to obstructions, breakages, mechanical malfunctions, or insufficient capacity in the network. The next sections of my evidence will discuss each of these reasons in further detail, explain the policies and standards that QLDC has in place to minimise any resulting overflows and the reasons why such overflows cannot be completely eliminated.

Network obstructions and breakages

5.2 Obstructions within the network are generally caused by fats, foreign objects, pipe breakages, dipped pipes and or tree and plant roots:

5.3 **Fats, Oil, and Grease (FOG)**: FOGs solidify within drains, either in isolation of, or in combination with, foreign objects or tree roots. FOGs are one of the main causes for overflows in the network.

5.4 **Foreign objects (personal items)**: Sanitary items and wet wipes are common examples of personal items that could cause blockages in pump stations when pump impellers get blocked. Impellers are the rotating part of a centrifugal pump designed to move a fluid by rotation. Impellers are not able to chop up these types of foreign objects and instead they can cause a blockage of the pump.

5.5 **Foreign objects (building materials)**: By-products of residential and commercial construction activity, such as timber, asphalt, concrete can enter the network through exposed drains and manholes. These objects can be too wide for pipes or too heavy to flow under gravity and can obstruct the pipes.

5.6 **Tree and plant roots:** Roots can penetrate pipework through joints and restricting flow and can trap FOGs and foreign objects.

5.7 **Dipped or broken pipes**: When pipes are broken or dipped fats and foreign objects can become trapped these parts creating blockages.

5.8 Obstructions in the network will restrict the flow of wastewater, resulting in a build-up of pressure which is eventually released via an uncontrolled overflow. Overflows due to blockages typically exit the network from manholes, gully traps and pump station sites upstream of the blockage. **Figure 2** is a simplified diagram that illustrates how the various components of the wastewater network relate to each other and how obstructions can enter the network.

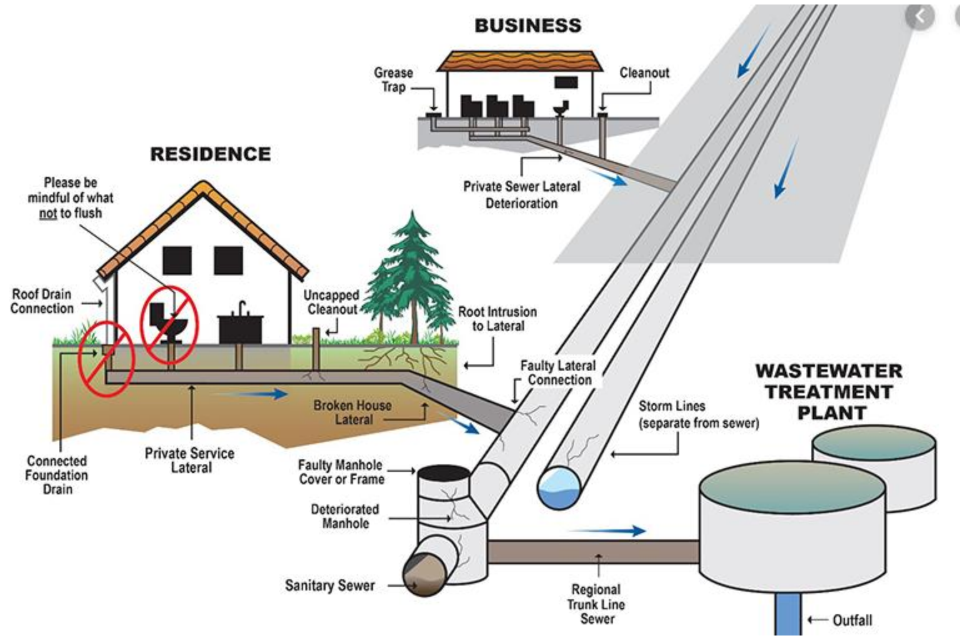

Figure 2: Components of a separated wastewater and stormwater network

5.9 QLDC does not know if or where a third party will put FOGs or foreign objects into the wastewater network, or where fats might congeal or objects might become trapped and cause blockages. Blockages within the network are inherently unpredictable and cannot be reliably modelled. We do, however, use Average Dry Weather Flow (**ADWF**) modelling as a proxy, as we can assume that an ADWF overflow that is not due to known capacity issues will be as a result of a blockage. As explained in Mr Baker's evidence, the current network model also shows that there are no capacity issues for wet weather flows.

5.10 Breakages within the network (e.g. a pipe or pump station failing) can occur due to the degradation of an asset or the environment surrounding an asset, root penetrations, or anthropological events (e.g. a civil contractor may break through a pipeline). Breakages as a result of third party actions are unpredictable. Breakages as a as a result of degradation are also unpredictable as where this occurs depends on what the asset is constructed from, workmanship during construction, where the asset is located, and how well utilised the asset is.

QLDC response – obstructions and breakages

5.11 There is very little QLDC can do to prevent overflows that occur due to network obstructions, particularly those caused by FOGs or foreign objects. These obstructions are driven by individual, commercial, and industrial behaviours beyond QLDC's control.

5.12 Key actions within QLDC's control include using pressurised mains instead of gravity mains where possible (this reduces the number of manholes within the network) and to construct or remediate pipelines with materials that are more resilient to root intrusions (thereby reducing the opportunity for foreign objects to become lodged). Beyond this investment activity, QLDC can only support public education and awareness activities in order to reduce FOGs and foreign objects from entering the network.

5.13 QLDC has commenced a public education campaign to raise general awareness of how individual behaviour can impact the performance of our network. Examples of materials produced to date are attached as Appendix E to the AEE submitted with the application.

5.14 In 2014, QLDC enacted the Trade Waste Bylaw to provide a means of setting controls and limits on harmful material that trade premises discharge into the network. QLDC has adopted an 'education and awareness' approach to managing trade waste. Key actions include:

(a) **Trade engagement**: To date we have focussed on hospitality providers as the main producers of FOGs. Other high FOG producers such as mechanical garages and carwash operators will be the next targeted engagement area.

(b) **Trade waste and compliance officer**: This dedicated role was established within the Operations and Maintenance team in May 2016 with an objective of implementing the Trade Waste Bylaw using educational strategies to change behaviour and promote positive outcomes.

(c) **Trade waste management system**: Businesses have been asked to register their discharges via this system introduced in 2019. The aims of the registration are to identify any trade activities that may present a risk to the environment and to respond by recommending a range of actions and interventions the operator can implement to reduce the risk.

5.15 By February 2021, QLDC anticipates enacting a more encompassing and integrated tradewaste bylaw that will also address foreign objects entering the network as a result of trade activity (particularly construction). QLDC expects that active monitoring of all registered business will commence once this bylaw takes effect.

5.16 In relation to breakages, QLDC undertakes regular CCTV inspections of pipes, which feeds into QLDC's existing knowledge of the asset (e.g. pipe age, pipe material and gradient) and provides information on asset performance, which provides the base for the future investment programme.

Mechanical malfunctions

5.17 Overflows can occur at pump stations as a result of power outages and pump failures if there is not enough emergency storage or no emergency generator is available.

5.18 QLDC has redundancy in its pump station design to minimise the risk of overflows from mechanical malfunctions. Generally, QLDC's pump stations have between 5 and 9 hours' emergency storage available. Pump stations are alarmed and when pumps are failing or levels sensors are triggered QLDC's wastewater contractors are automatically paged so that malfunctions can be remedied quickly before emergency storage reaches capacity. QLDC either has an emergency generator installed for each pump station or a portable generator can be connected in power outages. QLDC keeps a supply of spare pumps so that malfunctioning pumps can be quickly replaced.

Insufficient capacity

5.19 There are currently no untreated overflows due to insufficient capacity in the district's wastewater network.[2]

5.20 The district has the fastest growing population in New Zealand. Between 2013 and 2018 the resident population increased by 34 percent, from 28,224 to 38,304 people. Current growth projects suggest that by 2048 the resident population will have increased to 74,400.

5.21 In addition to rapid resident growth, the district experiences a disproportionately high relative international tourist load compared to the rest of New Zealand. On a peak population day, the district has 34 international visitors to one local resident. Over the next ten years the number of international visitors to the district is expected to nearly triple.

5.22 As the District's population grows, and demands on the district's sewerage network increases, significant expenditure will be required to retain the existing level of service. As Messrs Hansby and Baker have indicated, $105M has been budgeted to secure these outcomes under the QLDC Ten Year Plan (**TYP**).

5.23 In addition to demand growth, network capacity can also be affected by stormwater inflow and infiltration in the sewer network:

(a) Inflow and infiltration (or I & I) are terms used to describe the ways that groundwater and stormwater enter into dedicated wastewater or sanitary sewer systems;

(b) Inflow is stormwater that enters into sanitary sewer systems at points of direct connection to the systems. Various sources contribute to inflow, including drains, roof drains, downspouts, outdoor basement stairwells, drains from driveways, groundwater/basement sump pumps, and even streams; and

(c) Infiltration is groundwater that enters sanitary sewer systems through cracks and/or leaks in the sanitary sewer pipes. Cracks or leaks in sanitary sewer pipes or manholes may be caused by age related deterioration, loose joints, installation or maintenance errors, damage or root intrusion.

5.24 QLDC has separated wastewater and stormwater networks does not currently have any overflows related to inflow and infiltration from either stormwater or groundwater entering the sewer network. Inflow and infiltration rates tend to worsen with age as assets begin to fail, providing more opportunities for water to enter the network through pipes, manholes and pump stations, which reduces capacity for wastewater in the network.

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2 *2019 Interim Performance Report – volume 1 and 2* (April 2019). Morphum Environmental Ltd for QLDC.

6 Network investment

6.1 Between 2018-2028, investment in QLDC's wastewater infrastructure will account for approximately ten percent of QLDC's total planned capital expenditure.

6.2 Network design improvements can both mitigate the effects of untreated overflows as well as reduce the likelihood of their occurrence:

(a) Mitigating the effects of untreated overflows focusses predominantly on reducing the volume of wastewater flowing through assets in high-value recreational areas or near bodies of water.

(b) Reducing the likelihood of uncontrolled overflows involves investing in network remediation, renewal, and expansion.

6.3 Capital investment in the network includes major developments as well as an ongoing programme of asset renewal and replacements. As detailed in Mr Baker's evidence, a range and combination of factors are considered when prioritising an asset for investment:

(a) **Capacity**: network modelling demonstrates when an asset's capacity will be exceeded and under what conditions the exceedance will occur;

(b) **Age and material type:** asset management data gives us information around asset age and material, which gives an indication when an asset need to be replaced;

(c) **Known issues**: the RFS (Request for Service) system provides information on failures in pipes in the past. This is a helpful tool to guide renewals work. It gives an indication on how often and under which circumstances blockages occur;

(d) **Proximity to water**: moving pipes and pump stations away from high recreational waterways; and

(e) **Proximity to planting**: planting above or around an asset will increase the risk of root intrusion, particularly where the asset is of earthenware, concrete, or cement construction.

6.4 Even if designing a new network could prevent overflows (which I do not consider it could or would be desirable), it would not be feasible to attempt to replace the entire wastewater network at once. The wastewater system needs to operate continuously to manage the District's sewage. In my view, it is best from a technical perspective to upgrade the wastewater network over time (as proposed by QLDC in its Infrastructure Assets Management Strategy and TYP) to accommodate growth and reduce overflow events. QLDC has adopted a staged and phased approach to capital improvements across the network. Targeted investment in the network will ensure QLDC addresses high-risk areas of the network, while enabling behavioural change to be effected through ongoing education and awareness initiatives.

6.5 Further detail on network master planning and major investment decision-making is provided in the evidence of Mr Baker.

6.6 Further detail on the ongoing asset renewal and replacement programme is provided in the evidence of Ms Moogan.

7 Effect of planned network upgrades

7.1 QLDC is actively working to identify assets within its wastewater network that are vulnerable to increased demands, growth, degradation, or natural disaster.

7.2 A number of different information sources and activities inform our understanding of vulnerabilities within the wastewater network. QLDC responds to these vulnerabilities through preventative or corrective maintenance, contingency planning, and/or capital investment. This process is discussed in the evidence of Mr Baker.

7.3 As Chief Engineer, I am involved in validating the findings of network assessments, setting acceptable standards for network design and performance, prioritising investment needs, and assessing possible investment options.

7.4 Mr Hansby's evidence describes key wastewater projects that are planned under the TYP. In my view these investments will reduce the likelihood and consequence of an untreated wastewater overflow event by moving our assets away from high-amenity areas, creating additional storage and redundancy within the network, and using modern design materials that are more resilient to degradation and natural disaster.

7.5 As described in Mr Baker's and Ms Moogan's evidence, the work that QLDC does in inspecting and maintaining individual wastewater assets assists to reduce overflows and their effects on the environment. However, in my view, reducing the volume of wastewater near waterbodies is the most effective way to minimise the potential magnitude of any overflows, reduce the risk of an overflow reaching water and minimising the potential for harm to public health or the environment.

7.6 I consider that the wastewater network projects included in the TYP will improve the resilience of the network and reduce the risk of overflows by moving wastewater away from the district's waterbodies and high value recreational areas. I also consider that QLDC's TYP programme correctly prioritises investment in the projects that will have the most benefit in terms of improving the resilience of the network. For example, Mr Hansby's evidence explains the significant benefits of the Recreation Ground pumping station project in more detail. In my view it is appropriate that QLDC prioritises its investment in such a project that will move significant volumes of wastewater away from waterbodies .

8 Submissions

Scope of downstream effects

8.1 A number of submitters (including some from Cromwell or Alexandra) have raised concerns about the downstream effects of wastewater in the Kawarau river. Mr Olsen's ecological explains the effects of dilution in large lakes and rivers, which means that there will be nearly no effect on water quality from

Frankton down the Kawarau River. This is supported by QLDC having monitored water supply lake intakes very closely in the past and, as far as I am aware, QLDC has never recorded a an adverse effect on water quality after a wastewater overflow.

Compliance with international best practice

8.2 Submitters have expressed their view that QLDC should only be granted a network discharge consent if it can demonstrate that the current state of its wastewater network (and any improvements required by proposed consent conditions) are in accordance with international best practice.

8.3 For the reasons explained above, I do not consider that a fully sealed system would be international best practice because of the risk to human health posed by backflows into gully traps or houses.

8.4 In my view QLDC is already demonstrating international best practice by having separate stormwater and wastewater systems. I am aware, for example, that in the United Kingdom there are approximately 31,000 combined sewer overflows that are designed to discharge when the system becomes overloaded during periods of intense rainfall. However, environmental groups in the United Kingdom are concerned that those points are now being used to regularly dispose of wastewater even in times of low rainfall or none at all.[3] This would indicate that those systems do not have sufficient capacity.

8.5 This is not the case for QLDC where currently there are no overflows due to capacity issues and there is planned investment to ensure that QLDC's wastewater network continues to accommodated projected growth. There are places where QLDC's wastewater and stormwater systems are designed to overlap, however, as set out in para 5.23 and 5.24 in my evidence this is not causing problems with inflow and infiltration.

Effect of new developments on network capacity.

8.6 Some submitters are of the view that QLDC should not be granting resource consents for new developments if the wastewater system cannot cope and is experiencing overflows. Overflows are not caused by new developments but by foreign objects entering the network. QLDC requires developers to model the effect of any proposed development on the wastewater network. If an upgrade is required (beyond that programmed in the TYP) then the developer will be required to provide this via the resource consent or engineering approval conditions. QLDC requires such infrastructure to be constructed with sufficient capacity to allow for the upper limits of subdivision and development to allow for future connections. QLDC enters into infrastructure funding agreements with developers to ensure that capacity is available before developments come online.[4]

[3] Surfers Against Sewage, Wheal Kitty Workshops, St Agnes, Cornwall, TR5 0RD, Registered in England & Wales No. 2920815, Registered Charity in England & Wales No. 1145877

[4] Refer to QLDC Land Development and Subdivision Code of Practice section 5.3.3.

Containment structures

8.7 A number of submitters have sought that QLDC be required to build containment structures around all potential overflow points to prevent wastewater from reaching water bodies. As explained above, these overflows occur as a result of blockages and breakages and can occur anywhere in the network. In my view, given the unpredictable nature of overflow locations, it would not be feasible to build containment structures around every potential overflow point as this would effectively require containment around the whole of the network. That said, proposed condition 13 of the consent requires QLDC to undertake a review of its current wastewater network (excluding wastewater treatment plants) to identify where measures to prevent or minimise overflows reaching water could be practicably implemented and report to ORC on the outcome of that review.

Discharges from future wastewater schemes

8.8 Submitters have also sought that overflows from future wastewater schemes not be authorised by this consent. All new wastewater schemes are modelled to ensure that they will have sufficient capacity to provide for wastewater for future planned development. New schemes are also made from new and modern materials, which further reduces the risk of overflows occurring. However, even in the newest wastewater schemes there is still the potential for overflows as a result of blockages or breakages from third party action. Against that background it is desirable that future wastewater schemes are automatically subject the overarching network discharge consent and the level of scrutiny that that will entail.

9 Section 42A Report

Uncertainty of effects does not necessarily mean significant adverse effects

9.1 The s 42A report appears to assume that because there is inherent uncertainty in the volume, duration and frequency of discharges that there is potential for significant adverse effects. Whether or not the consent is granted does not determine whether overflows will occur or give rise to potential significant adverse effects in and of itself.

9.2 As explained above, these wastewater overflows are already occurring from the QLDC wastewater network (an indeed all wastewater networks) and will inevitably continue to happen largely due to factors outside QLDC’s control. While there are uncertainties about the effects of each individual overflow, overall the effects of wastewater overflows in the District are known because they are already occurring.

Alternatives under section 105 of the RMA

9.3 In regards to the assessment of alternatives under s 105 of the RMA, there are essentially three alternative options:

(a) QLDC could not operate a reticulated network. This would mean that all properties in the district would need to manage their own wastewater on site. This option is not suitable for urban areas where there is insufficient land for dispersal fields. Onsite solutions such as septic tanks can also fail and cause wastewater overflows particularly as they degrade or if they are not properly maintained.

(b) QLDC could operate a completely sealed system without “fuses”. QLDC cannot prevent blockages as these are mostly caused by third parties putting objects in the wastewater network that should not be there. As explained, above a closed system is undesirable because wastewater builds up behind blockages and will ultimately overflow in houses or on private property through gully traps creating a public health risk.

(c) QLDC could continue with the status quo (i.e. no network discharge consent and continued prosecutions from ORC). As explained above this would not prevent overflows from occurring because the causes of overflows are largely outside of QLDC’s control.

9.4 In summary, there are no real alternatives to a wastewater network discharge consent because (a) is unfeasible (b) is unsafe and unsanitary and (c) would not result in better environmental outcomes.

9.5 A further alternative method is to attempt to contain wastewater overflows from every potential overflow point in the network so as to prevent wastewater reaching water. I have explained why I do not consider that that is a viable option in paragraph 8.3 of my evidence.

Scale of discharges authorised by the consent

9.6 Some submitters have raised concerns with the scale of the consent application and hold the view that it is only appropriate to authorise small scale discharges. In my view it is not possible to propose a meaningful condition to restrict discharges to a specified volume or number per year as this would be at odds with the random and unpredictable nature of discharges and their causes.

10 Conclusions

10.1 The QLDC owned and managed wastewater network serves approximately 74% of the district’s population and handles a vast volume of wastewater each year.

10.2 A wastewater overflow occurs when untreated wastewater exits the wastewater network. Uncontrolled overflows can occur due to obstructions, breakages, mechanical malfunctions, or insufficient capacity in the network. There is very little QLDC can do to prevent overflows that occur due to network obstructions, particularly those caused by fats, oils, grease or other foreign objects because obstructions are driven by third party behaviours beyond QLDC’s control.

10.3 Obstructions in the network will restrict the flow of wastewater, resulting in a build-up of pressure which is eventually released via an uncontrolled overflow. Overflows due to blockages typically exit the network from manholes, gully traps and pump station sites upstream of the blockage. If the network was completely sealed with no “fuses” then wastewater would eventually flow up through gully traps, sinks and toilets.

10.4 The district has the fastest growing population in New Zealand yet there are currently no untreated overflows due to insufficient capacity and QLDC does not have any issues in regards of overflows related to inflow and infiltration from stormwater and or groundwater into the sewer network. In my view this evidences best practice wastewater network management.

10.5 Further, QLDC is actively working to identify assets within its wastewater network that are vulnerable to increased demands, growth, degradation, or natural disaster. I consider that proposed TYP projects will improve the resilience of the network and reduce the risk of overflows by moving wastewater away from the district's waterbodies and high value recreational areas. I also consider that QLDC's TYP programme correctly prioritises investment in the projects that will have the most benefit in terms of improving the resilience of the network.

Ulrich Wilhelm Glasner
18 October 2019