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 Erin Melissa Moogan

18 October 2019

MEREDITH CONNELL

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Statement of Evidence of Erin Melissa Moogan

1 Introduction

Qualification and experience

1.1 My full name is Erin Melissa Moogan. I have held the position of Infrastructure Maintenance and Operations Manager at Queenstown Lakes District Council (**QLDC**) since 2015. I have 13 years experience managing infrastructure maintenance and service contracts across a range of disciplines including three waters, roading, solid waste and public transport.

1.2 I hold degrees in both law and public policy. I have worked as both a client and a contractor starting my career with a private law firm before moving into infrastructure contract and project management with the Queensland Government's Department of Transport and Main Roads. During this time I spent six years working on a range of different project and contract types including government funded air services, public transport, school transport, regional airport upgrades, reviews of rail rolling stock and bus hub upgrades.

1.3 In 2012 I accepted a position with Cubic Corporation. Cubic is an industry-leading transport solutions company best know for developing London's "Oyster Card" and the cities associated smart card infrastructure. As their Queensland Contracts Manager I managed Cubic's $AUD225 million contract with the Queensland Government to build, operate and maintain the South East Queensland go card ticketing system.

1.4 In December 2013 I commenced working for QLDC. I was initially employed as part of a temporary team established to undertake a review of commercial activities across the business. My main focus area was on the way we procure and manage our infrastructure contracts. This included building our current operational contract model from the ground up.

1.5 In early 2015 I moved into my current role managing QLDC's Infrastructure Maintenance and Operations. In this role I lead the team responsible for infrastructure operations and am QLDC's operational contracts lead. One of my key tasks is ensuring that our three waters network is delivered, operated and maintained in line with best practice through best practice contract development, procurement and management of our specialist contract teams.

1.6 I have been on the board of the Institute of Public Works Engineering New Zealand since 2017 (IPWEA). IPWEA is the peak association for professionals who deliver public works and engineering services to communities in New Zealand. The national board comprises 12 members who advise industry and government on matters relevant to public asset management.

1.7 I also chair the national Roading Infrastructure Management Committee and am a member of the International Association of Commercial and Contract Managers.

Purpose and scope of evidence

1.8 I have been involved in QLDC's application to discharge wastewater overflows from its network to land or water since August 2019, when I took over Mr Simon Mason's role in this project when he went on sabbatical. My role and involvement in the project (and Mr Mason's previously) has been to support the project team by advising on:

(a) the contractual framework that supports our three waters network operations;

(b) what preventative maintenance is undertaken by QLDC to minimise the occurrence of overflow events;

(c) the way QLDC develops and delivers its three waters renewals and minor capital improvements program;

(d) the current performance of the network in regard to overflow frequency and cause;

(e) how QLDC currently responds to overflow events in a way that minimises their volume and duration and therefore minimises adverse effects on public health and the environment.

1.9 The purpose of my evidence is to explain how QLDC drives wastewater network performance, responds to overflow events and ensures that its wastewater contractors comply with their contractual requirements to minimise the adverse effects of overflows on the environment. My evidence is set out as follows:

(a) QLDC's three waters contract model;

(b) smarter investment;

(c) wastewater renewals program;

(d) overflow results;

(e) response procedure;

(f) response to the submissions received relevant to my evidence; and

(g) response to matters raised in the ORC's Planners' s 42A Report relevant to my evidence.

2 Executive summary

2.1 The evidence to follow outlines the robustness of QLDC's wastewater management model and demonstrates our commitment to continuous improvement, innovation and network investment. Our model of contract management ensures we are actively drawing on the expertise and technology available to the industry. This model has been specifically developed to focus the attention of QLDC'S infrastructure team and our network operators on minimising wastewater overflows to the furthest extent possible.

2.2 QLDC has driven significant improvement in the management of our wastewater assets and this has resulted in a significant decline in overflows to our lakes and waterways. We apply district-wide best management practice for responding to, managing and mitigating the public health and environmental effects of discharges from the wastewater network.

2.3 Despite the low number of overflows reaching, or at risk of reaching, water their extremely short duration and that they are to waterways with extremely high dilution properties QLDC continues to drive an investment program in our three waters infrastructure that is beyond anything delivered by QLDC before.

3 QLDC Three Waters contract model

3.1 QLDC is responsible for the operation and maintenance of the reticulated wastewater network which predominately services the urban areas of the District.

3.2 The Maintenance and Operations team that I manage is responsible for the delivery of wastewater services. I am directly accountable to the General Manager Property and Infrastructure.

3.3 QLDC enters into contracts with network maintenance partners. Under this model QLDC retains ultimate responsibility for network performances, with day to day responsibility for its operation and maintenance resting with our contractors. This enables QLDC to draw on the specialist knowledge, expertise and proprietary equipment of our network operators while maintaining structured oversight to ensure that any overflow events are responded to appropriately.

3.4 QLDC currently has two network maintenance partners who operate and maintain our waste wastewater networks:

(a) Veolia Water Services (ANZ) Pty Limited (trading as Veolia Water) holds our district-wide operations and maintenance contract. This contract expires in 2021, but is eligible for a possible further two year extension. The contract covers the full scope of services associated with the operation and maintenance of the three waters services, including but not limited to preventative maintenance, reactive maintenance, and treatment plant operation. The contract covers the entirety of the district's wastewater network, with the exception described below.

(b) Fulton Hogan Limited holds our contract for wastewater services in the greater Lake Hayes area as part of a Design, Build and Operate contract for this scheme. The contract with Fulton Hogan expires in 2022. The requirements of this contract are similar to that of the Veolia Water contract in that it covers the full scope of operation and maintenance of the three waters network, but is limited to a small geographic area.

Contract review

3.5 One of my first tasks with QLDC was to manage the review of our three waters operations and then to redevelop our district wide contract model.

3.6 This included reducing the number of Key Performance Indicators (KPIs) in the contract so that it was very clear what is important and to ensure critical information on our network performance is not hidden amongst less critical information.

3.7 Our new three waters contract is streamlined to have only 11 KPIs. One of these is specifically around the number of waste water overflows to a water receiving environment. It is also what we term "A Gateway KPI". This means that breach of this KPI has financial penalties, reduction of contract term and potential contract termination tied to it.

3.8 Another key aspect of our contractual arrangements is that the performance of both QLDC and the contractor are measured under the contract KPIs. This means that inaction by QLDC can also put the contract into failure and ensures that the contractor is incentivised to keep QLDC on track with its responsibilities under the contract.

3.9 Any failure by QLDC to actively invest in our wastewater network will quickly show up in the KPIs and be brought to the attention of the contract governance group "Core Group" who review and sign off on scoring of all KPIs.

3.10 Two additional "Added Value" measures were also developed around bringing innovation to our network operations and developing smarter ways of doing things. To be eligible for any future contract extensions the contractor must be able to demonstrate, to an external reviewer, that they have unequivocally achieved this during the prior term of the contract.

3.11 As stated in paragraph 3.4(b) the greater Lake Hayes wastewater network is operated by Fulton Hogan under a legacy design, build and operate contract. This contract does not contain the same terms and conditions as the current district wide maintenance contract, however it deals with a much smaller area of the district, with newer infrastructure much of which is located away from a waterbody. At its expiry in 2022, ongoing operations and maintenance of the greater Lake Hayes wastewater network will be incorporated into the district wide operations and maintenance contract.

4 Smarter investment

4.1 One of the key successes of the district wide contract model is that it has strongly incentivised our contractor to invest in smarter plant and technology. Examples of this investment are:

(a) **Sewer Line Rapid Assessment Tool (SL-RAT)**

The Veolia contract was the first contract in the country to use this technology. The SL-RAT sends an acoustic transmission through the sewer pipeline. The unit is able to measure the dissipation of sound energy through the free airspace, then generating a picture of where blockages are located.

As part of the jetting program for Arrowtown, 4,500 metres of foul sewer was being cleaned on a monthly basis, as it is was a main line into a pump station and had a history of fat build-up. The SL-RAT was used along this whole line and was able to reduce the cleaning down

to about 50 metres, saving costs and time that could be used elsewhere on the network.

(b) **Second jetting truck unit**

A proactive network jetting programme is key to keeping our pipes clear and preventing blockages. A second jetting truck was purchased by Veolia to increase our proactive maintenance capacity and to ensure that when one vehicle is being serviced a second is always available to respond to a blockage event.

(c) **Purchase of contract dedicated CCTV inspection unit**

CCTV units allow cameras mounted on a robotic platform to take video images of the inside of our wastewater pipes. This process provides us with a better understanding of the performance of our network and is a key input into our forward planning and renewals programmes. A dedicated CCTV inspection unit also allows for the CCTV unit to inspect the pipe network surrounding any overflow point to check for any further defects in the area.

(d) **Introduction of trenchless technology**

The contractor has invested in trenchless technology including pipe bursting and slip lining which allows for renewal of waste water pipes via small excavations at either end rather than having to uncover and reinstate the full length of pipe. This allows us to achieve 20-30% savings and therefore deliver a greater volume of renewals projects each year. There is also much less disruption to traffic and the community meaning renewal works can be delivered throughout the year.

(e) **Development of Spiral Wound Pipe Relining**

Veolia have invested in the development of new pipe technology after it was identified through our forward planning programme that we have a number of pipes that will require renewal over the next 5-10 years but which cannot be taken out of service to complete the replacement.

This new technology utilises a spiral exterior pipe and robotic equipment to wind a new ultra thin, but more resilient, pipe through the existing structure. Due to the thin diameter of the pipe and its interior surface properties this allows the pipe to be renewed without any reduction in transmission capacity and without needing to take the pipe out of service.

4.2 The above are just some examples of the $3 million worth of wastewater plant and equipment that have been incentivised through the contract structure QLDC now has in place.

5 Wastewater renewals program

5.1 Data is critical to determining if maintenance and renewal effort is being deployed efficiently. QLDC gauges the residual life of its buried assets through a number of different approaches, depending on the nature of the asset. For gravity sewers a programme of closed circuit television (CCTV) inspections allows the internal condition of the pipe to be assessed. For pressurized pipes the remaining useful life of the asset is determined from the pipe material and age. This information is then considered in conjunction with other problem indicators such as the number of reported breakages.

5.2 Because reticulation assets are long-lived, hydraulic models of the wastewater network are used to ensure that the replacement pipe is sized correctly to meet the needs of current and future generations.

5.3 QLDC has made significant strides post 2015 in the capture and analysis of data about our wastewater assets —their condition, location and performance—and in better understanding our largest risks and in avoiding critical failures within our wastewater infrastructure.

5.4 Our 2019/2020 wastewater renewals program currently forecasts well over a million dollars of wastewater upgrades across 23 projects. This is in addition to the significant Ten Year Plan Program outlined in Mr Hansby's and Mr Baker's evidence. The technology and data improvements that have been made are also seeing us spending this money in a smarter way.

5.5 The advancements we were already making in this area were recognised through our CouncilMARK assessment in 2016. CouncilMARK provides an independent assessment system that assesses how councils are performing. Under the criteria for delivering what is important, one of the strengths recognised was the improvements being made to managing key infrastructure, especially with respect to the three waters infrastructure.

5.6 QLDC has also changed its approach to defects in the network identified through preventative maintenance or blockage events. QLDC would historically put such areas of the network on a more regular maintenance program to try and minimise overflow risk. These sections of the network are now immediately replaced.

5.7 Money previously spent on attempting to manage areas of the network with problems is instead spent on addressing other risk areas including annual jetting of all pipes around our lake fronts as well as twice yearly jetting of all pipes in the Queenstown CBD.

6 Overflow results

6.1 The community has clearly voiced its desire for QLDC to focus on reducing overflows rather than pursing a network discharge consent. What we hope to make clear to the community is that we take the protection of our lakes and waterways very seriously. Reducing overflows to water receiving environments is already receiving significant focus and investment and will be subject to even greater transparency and scrutiny under the proposed conditions of consent.

6.2 In the 2013-14 financial year, prior to QLDC making its step change in the way it manages its wastewater network, there were nineteen wastewater overflows to a water receiving environment. Last financial year there were four. The year before that there were two. I think that these results clearly evidence that we have already set ourselves the target of eliminating these types of overflows wherever possible and that we are working very hard to achieve this. But as outlined in Mr Glasner's evidence, completely eliminating overflow events is not possible. For this reason, the rigour with which QLDC and its wastewater contractors respond to overflows is key to minimising the duration, volume of overflow and the environmental and public health effects.

7 Response procedure

7.1 QLDC has a comprehensive Wastewater Overflow Response Procedure. This document sets out the procedures that must be followed in the event of a wastewater overflow from the QLDC wastewater network. The procedure applies to both the district wide Veolia contract and the Lake Hayes Fulton Hogan contract. This procedure is a district-wide best management practice for responding to, managing and mitigating the public health and environmental effects of discharges from the wastewater network.

7.2 The procedure is appended in its entirety in **Appendix One** of my evidence, however, key elements include:

(a) **Responsibilities**

Network contractors are responsible for the physical response to the overflow, which includes overflow assessment, commencing escalation processes, managing its immediate impacts, communication with affected parties, restoring the wastewater service, undertaking sampling, erecting warning signage, and cleaning the area affected.

QLDC remains responsible for the adequacy of the response. QLDC is responsible for advising the Otago Regional Council, Public Health South and Kāi Tahu in the event the overflow reaches, or is at risk of reaching, a body of water and for liaison with the broader community.

(b) **Response timeframes**

The network contractors are required to provide 24-hour emergency response 365 days/year to minimise or eliminate overflows.

The procedure requires following overflow response timeframes:

- Time from notification of a wastewater overflow to having personnel on site – one hour.

- Time from notification to restoration of service (ie overflow ceased) – four hours.

(c) **Incident escalation**

If the overflow poses a risk to people or property or has reached, or is at risk of reaching a water body, the contractor will advise QLDC, ideally within 30 minutes of the onsite assessment being completed. An "Incident" will be declared by QLDC and an Incident Controller appointed.

(d) **Protection of water body receiving environments**

Whilst preventing the flow of wastewater to water body receiving environments is a priority, this may be difficult to achieve in some circumstances. The procedure recognises these practicalities so where it is not possible to prevent wastewater reaching freshwater, measures are put in place to minimise discharge of wastewater to water, and to minimise the entry of solid debris into the water body. In these cases, the contractor is required to take actions such as use of a vacuum tanker to recover material, bunding, placing strainers in the overflow path, and/or nets and booms to prevent the spread of material in the body of water.

(e) **Erection of 'No Swim' signage**

Wherever discharge of sewage to a water body occurs, or is likely, suitable 'No Swim' signage must be put in place as soon as possible following the overflow. Signs must be erected at locations where access to water potentially affected by the discharge is likely. Contractors aim to place signs to warn all persons entering an area that they may be able to contact contaminated water.

(f) **Sampling**

Water samples should be collected in response to an overflow event that reaches water to guide the public health response, and in particular the duration of the response.

(g) **Harm remediation and clean-up**

Any environmental harm caused by an overflow must be cleaned up and may require remediation. Clean up must not involve the potentially harmful activities of hosing down of gross solids and other pollutants into stormwater drains or waterways or unnecessary use of disinfectants. In undertaking clean-up activities, the following are major considerations;

- The nature of the immediate environment and any applicable environmental values of the receiving waters, and
- The potential for the clean-up water to be contained and removed so that discharge to receiving waters is avoided.

Records must be kept of all actions undertaken to manage the response and minimise environmental harm.

(h) **Response audits**

This procedure will be audited biannually on a representative sample of QLDC notifiable wastewater overflow events.

8 Submissions

Spill proofing the wastewater network

8.1 Submissions have sought that QLDC be required to achieve a 'spill proof' network. For the reasons set out in Mr Glasner's evidence this is not achievable. Given the risk of overflows occurring, it is important for QLDC to have robust response measures in place that aim to minimise the volume and duration of an overflow. I have addressed QLDC's response procedures in paragraph 7.2 above and the Overflow Response Procedure attached in **Appendix One** of my statement of evidence.

Causes of overflows and storage capacity around overflow points

8.2 It seems to me that a number of submitters may have misunderstood the intent of the consent being sought and have assumed that the overflows are predictable and occurring from designated or engineered overflow points. The nature of the overflows means that they are not predictable, and do not usually occur from designated overflow points. Because they result from external factors or root ingress it is not possible to include storage on every pipeline.

8.3 QLDC does provide emergency storage at every new wastewater pump station. However, a number of the pump stations in the network were constructed prior to this requirement. As explained in the evidence of Mr Hansby and Mr Baker, although QLDC is looking to improve emergency storage provisions at some existing low-lying sites, this will not remove the risk of overflows from the reticulated wastewater network. Accordingly, as explained above, it is important that QLDC continues to have robust response procedures in place to minimise the adverse effects of overflows on the environment.

Financial incentives

8.4 Submitters have raised concerns that the granting of this consent will remove the financial incentive to improve the wastewater infrastructure. By this I understand that the submitters mean avoiding the cost of enforcement action by ORC in relation to overflows. There is also significant cost involved in responding to overflow events in the way described in my evidence, so there will always be a financial incentive to reduce the number of overflows. That said, QLDC considers that investing in its network to reduce the risk of overflows is a better use of funds, in terms of reducing adverse effects on the environment, than paying enforcement related fines.

Drinking water supply

8.5 Submitters have also raised concerns about the effect of wastewater overflows on the safety of the drinking water supply. As explained in QLDC's second s 92 response dated 13 September 2019, measures are in place to ensure that the

New Zealand Drinking Water Standards continue to be met in the event of wastewater overflows in proximity to drinking water supply takes. These measures are independent of and additional to the requirements under the RMA.

8.6 These measures require that the intake is isolated until the risk of contamination has passed. The nature of a wastewater overflow is that it is typically for short duration, and as such will not have a long term effect on the safety of the drinking water supply. This allows these events to be managed by drawing on the stored volumes within the water reservoir.

9 Section 42A Report

Concern about a perceived error located in overflow data

9.1 The section 42A report identifies an overflow in the vicinity of Loop Road that was classified in the data as an overflow to land instead of an overflow to water. QLDC collects data for different purposes. I can confirm that our corporate reporting data records this overflow as having been to water. The Otago Regional Council would also be aware that we reported this to them in 2017 as an overflow to water.

9.2 The data provided in the first s 92 response comes from our asset management system. This database contains all planned maintenance, response maintenance and renewal activities completed on our networks as recorded by the network maintenance contractor. From an asset management perspective this was not recorded as an overflow to water as the visual assessment completed by the response team, and the sampling data taken, did not show evidence of wastewater having entered the water.

9.3 As our reporting requirements vary between external organisations an audit of all overflow data is completed on a monthly basis and any necessary adjustments made to reporting records. As a result of this audit the corporate reporting record was amended in 2017 to reflect that Loop Road was to water. I have reviewed the data and can confirm there was one other record which we reported as an overflow to land as opposed to an overflow to water, being 19 Richards Park Lane, FERNHILL on 15 July 2018.

Uncertainty around effects due to time taken for an overflow to be reported

9.4 As stated at the beginning of my evidence QLDC wastewater networks service urban areas of the district. This means wastewater assets are generally located in the road reserve of built up areas and in highly frequented parks/reserves in the district. As such it is reasonable to infer that all but very small overflow events will not go undetected by the public for any prolonged period of time. QLDC staff and contractors are also highly attuned to signs of network failure and are also required to utilise the RFS system to log issues.

10 Conclusions

10.1 In the past 5 years QLDC has significantly reduced the number of wastewater overflows from its network. This has been achieved through a number of measures including:

(a) Ensuring our operational contracts focus on what is important;

(b) bringing innovation to our network operations and developing smarter ways of doing things; and

(c) Investing in capture and analysis of data about our wastewater assets (ie condition, location and performance) and in better understanding our largest risks.

10.2 Overflows to water receiving environments are already receiving significant focus and investment and will be subject to even greater transparency and scrutiny under the proposed conditions of consent.

10.3 As the complete elimination of all overflow events is unlikely the rigour with which QLDC and its wastewater contractors respond to overflows is key. QLDC has a comprehensive Wastewater Overflow Response Procedure which clearly sets out the procedures that must be followed in the event of a wastewater overflow. QLDC will continue to work with its three waters contractors to ensure that responses to the occurrence of overflows are executed swiftly, and potential for negative environmental effects are well understood, and appropriate reporting and action is taken accordingly.

Because of the short duration of the overflows in question, the high dilution factor of our waterways and the fact that these overflows have already been occurring, we consider that granting of this consent will have limited environmental impact and can only serve to provide a greater level of scrutiny and accountability to both the regional council and our community.

Erin Melissa Moogan
18 October 2019

Appendix One: QLDC Wastewater Overflow Response Procedure

Wastewater Overflow Response Procedure

Status - Final						
Rev	**Author**	**Description**	**Reviewer**	**Approved for Issue**		
				Name	**Signature**	**Date**
1a	Martin Smith	Hawea Intake image added	Erin Moogan			17.10.19

Contents

1 Purpose

This document sets out the procedures that must be followed in the event of a wastewater overflow from the Queenstown Lakes District Council (QLDC) wastewater network. This procedure is a District-wide best management practice for responding to, managing and mitigating the public health and environmental effects of discharges from the wastewater network.

This three-phase overflow response procedure covers:

- Incident Notification, Assessment and Escalation
- Primary Response
- Secondary Response.

The owner of this document is the QLDC Maintenance and Operations Manager, on behalf of the QLDC General Manager Property and Infrastructure.

This document shall be reviewed annually but may be revised more frequently in response to new information or based on knowledge obtained from an actual overflow event.

2 Network Overflows

The Queenstown Lakes District is serviced by an extensive wastewater network. While the goal of effective wastewater system management is to convey, treat and dispose of wastewater, overflows occasionally occur. Overflows can occur within a wastewater network for a variety of reasons but are predominantly caused by a flow restriction or system disruption. Causes of wastewater overflows include:

- Blockages resulting from tree root ingress, fat and grease build up, and foreign debris entering the network
- Breakage or similar failure of the conveyance pipe
- Infrastructure failure due to historic poor construction or infrastructure age
- Pump station failure, such as blockage, mechanical failure or power failure, which prevents the pump station from conveying the wastewater
- Illegal connections or illegal discharges to the network
- Exceedance of design capacity of the network as a consequence of an exceptional weather event (and generally exacerbated by one or more of the factors identified above).

Overflows typically manifest from the nearest manhole upstream of the blockage, or at the location of the damage. Overflows can occur to land, to a waterbody or to both. Wastewater overflows can result in a range of potentially negative public health, environmental and aesthetic effects.

Due to the nature of causative factors, very few overflows can be predicted in advance and avoided. The large majority of wastewater overflows from the network will be to land, with low potential for wide-scale environmental impact. The largest proportion of overflows from the QLDC network are overflows from drainage lines connecting private properties to the wastewater network. The volume of material discharged from private connections during these events is typically small relative to overflows from the broader network.

This procedure recognises that overflows from some locations may be larger (because of their location), and their effects may be more serious (due to proximity to raw water intakes for potable water supplies, potential to impact on popular recreational areas, or potential for adverse environmental consequences). These factors are recognised in this procedure and the response effort is scaled or adjusted to mitigate public health and environmental effects.

3 Roles and Responsibilities

Several organisations have responsibilities for the management of wastewater overflow events in the Queenstown Lakes District:

- QLDC
- Network Contractors engaged by QLDC to respond to wastewater overflow events
- Otago Regional Council, and
- Public Health South.

This document ensures that each agency is engaged at the right stage of the response, is provided with appropriate information, and is aware of their role in the overall response. This minimises the potential for duplication of effort, or of insufficient response effort.

QLDC contracts out the operation and maintenance of the three waters network across several service providers. QLDC's expectation is that the response to a wastewater overflow anywhere in Queenstown Lakes District will be consistent and in accordance with this document.

Network Contractors are responsible for the physical response to the overflow, which includes, overflow assessment, commencing escalation processes, managing its immediate impacts, communication with affected parties, restoring the wastewater service, undertaking sampling, erecting warning signage, and cleaning the area affected. The Contractor is also responsible for producing the overflow incident report.

QLDC remains responsible for the adequacy of the response. QLDC is responsible for advising the Otago Regional Council, Public Health South and Kāi Tahu in the event the overflow reaches, or is at risk of reaching, a body of water and for liaison with the broader community. The contact details for QLDC persons and other relevant organisations are appended.

Further, the Council is responsible for the management of the asset which includes, planning and implementing upgrades to meet growth demand in the community, response to specific overflow events, and for renewal of existing assets to minimise age-related failures.

This document does not replace Standard Operating Procedures (SOPs), Safe Work Method Statements or other activity specific procedures required by legislation or specified in a Contract for Service.

4 Response Requirements

4.1 Contractor Response Procedure

The Network Contractors are required to provide 24-hour emergency response 365 days/year to minimise or eliminate overflows. When responding to a wastewater overflow, the fault and incident response teams must comply with this procedure and the relevant QLDC SOPs.

Overflow response teams require access to appropriate equipment and the information required to manage wastewater overflows. These include:

- Access to plans and capacities of the network and pump stations, for example, the volume of wastewater stored in a rising main and the estimated time taken for that main to empty, pump station cycles etc
- Emergency notification phone numbers and contact details
- Appropriate screening equipment to remove floatable and coarse solids
- Backup wastewater pumps
- Tanker trucks that can pump or vacuum wastewater and sludge
- Public warning signs and emergency tape to mark affected areas and minimise public access

- Sampling equipment
- Health and safety equipment to protect contractors and employees.

The following relevant QLDC Wastewater Standard Operating Procedures are appended:

- WW03 Reactive repair or unblock
- WW05 Response to sewage overflows to receiving waters.

4.2 Response Timeframes

The cause of the overflow must be addressed as soon as practicable. The following response timeframes should be met:

- Time from notification of a wastewater overflow to having personnel on site – one (1) hour
- Time from notification to restoration of service – four (4) hours.

4.3 Incident Controller

Most wastewater overflows involve discharge onto land. Provided the public is unable to access these overflows, and the wastewater does not enter a stream or lake, the incident is unlikely to present an immediate public health risk. It will generally be appropriate for these incidents to be managed by the contractor's response team.

However, where the incident has, or is likely to result in waterbody contamination, a higher level of risk exists, and other agencies will need to be involved in the response. Additional technical support, supervision and incident control and management may be required at incidents with a greater potential for health or environmental risk to ensure that the response is appropriate, and to manage communications between the parties.

The role and functions of the Incident Controller include:

- Ensuring that appropriate on-site health and safety provisions and site controls are established and maintained throughout the incident
- Providing technical support and direction to the response team
- Point of contact for all communications, including neighbour and public communications
- Initiating and coordinating public health and environmental monitoring
- In consultation with QLDC, Public Health South and Otago Regional Council, ensuring that all appropriate public health warnings are made, and that warning signage is in place
- Auditing the clean-up process, and
- Preparation of the overflow incident report.

The QLDC *Fault and Incident Management Process* is appended; showing the role of the Incident Controller and Incident Management Team in the overall response.

4.4 Response phase 1 – Incident Notification, Assessment and Escalation

Logging the call - a wastewater overflow event is most likely to be notified via a member of the public advising the QLDC call centre, the overflow being observed directly by a Contractor or QLDC team member, or by a network alarm. All overflow events including those observed by a contractor or QLDC will be logged with the QLDC call centre. The call centre will establish a record of the caller, time, description of the overflow and the address where it has occurred.

Deployment of the immediate response team to site – this will typically be deployment of a one or two-person maintenance crew.

Identify the area affected and nature of the incident - is the overflow to, close to, or is there a risk of it entering a stream, river, wetland, lake, pond or stormwater drain? Is the overflow to land? If the overflow has entered water, or could enter water, what is downstream? For example, are there nearby water intakes or swimming areas? If the overflow is to land is it in an area that could present a public health risk? For example, playgrounds, playing fields, malls, dwellings.

Assessment - assess the likely cause of the overflow and anticipated time to repair, the nature of the response required, the resources needed to respond to the incident and whether an Incident Controller should be deployed.

This assessment is intended to comprise a relatively quick appraisal of the situation and should be completed within a few minutes of arriving on site.

Deploy secondary response team – on completion of the assessment the response team must call back to their base to confirm the nature of the incident and deploy the secondary response team.

Incident Escalation – on confirmation that the overflow poses a risk to people or property or has reached, or is at risk of reaching a water body, the Contractor will advise the QLDC, ideally within 30 minutes of the onsite assessment being completed. An Incident will be declared by QLDC and an Incident Controller appointed.

QLDC will then complete the following notifications:

Firstly - notify Public Health South of the incident, location and potential risks

Secondly - for incidents involving overflow to water, or risk of overflow to water notify the Otago Regional Council's 24-hour pollution hotline

Thirdly - where the threat level of the incident is significant the QLDC General Manager Property & Infrastructure will be informed of the incident, location and potential risks

Fourthly - for incidents involving overflow to water, or risk of overflow to water notify Kāi Tahu representatives.

4.5 Response phase 2 – Primary Response

Having completed the initial incident assessment, the response team shall commence the primary response to the incident as outlined below:

Implement Health and Safety Procedures

All parties attending overflows (response team, QLDC, ORC and Public Health South representatives) and members of the public can be exposed to a variety of hazards. Protecting the health and safety of these people must be the priority during an incident response.

All parties attending an overflow shall have in place detailed health and safety plans. No action should be taken in any overflow response which endangers workers or the public.

Assess and implement discharge containment

A best endeavours approach should be made to containing the sewage overflow utilising the resources available. Actions to contain an overflow are discussed in more detail below.

Commence Repairs – having either installed preliminary containment or established that preliminary containment is not feasible for, or best use of, the resources on hand, commence repair of the overflow where possible.

4.6 Response phase 3 – Secondary Response

The Secondary Response phase commences on arrival of the Secondary Response Team.

Installation of Containment

An objective of the response shall be to ensure that risks to public health are minimised, followed by minimising adverse effects on the wider environment. Reasonable and practicable steps to contain the overflow must be undertaken to minimise pollution of the environment. Containment aims to minimise loss of overflow so that as much of the wastewater as possible is returned to the wastewater system when operations are restored.

Implementing the repair

Stopping the overflow and restoring normal wastewater conveyance service should be achieved as soon as practicable and in accordance with response timeframes.

A wide range of measures may be required, including undertaking the containment and repair phases in parallel to achieve efficient response. In some cases, it may be appropriate to complete temporary repairs to stop the overflow followed by permanent remedial works.

In all cases repair details should be recorded in the contractor and QLDC asset management system.

Harm remediation and clean-up

Any environmental harm caused by an overflow must be cleaned up and may require remediation.

Clean up must not involve the potentially harmful activities of hosing down of gross solids and other pollutants into stormwater drains or waterways or unnecessary use of disinfectants.

In undertaking clean-up activities, the following should be major considerations;

- The nature of the immediate environment and any applicable environmental values of the receiving waters, and
- The potential for the clean-up water to be contained and removed so that discharge to receiving waters is avoided.

Records must be kept of all actions undertaken to manage the response and minimise environmental harm.

5 Overflows to Water Body Receiving Environments

5.1 Protection of Water Body Receiving Environments

Whilst preventing the flow of wastewater to water body receiving environments should be the priority of a response, this may be difficult to achieve. Where this is not possible measures shall be put in place to minimise discharge of wastewater to water, and to minimise the entry of solid debris into the water body. In the event the overflow reaches a water body, the Contractor shall implement steps to minimise the effect of the overflow through actions such as use of a vacuum tanker to recover material, bunding, placing strainers in the overflow path, and/or nets and booms to prevent the spread of material in the body of water.

5.2 Erection of ‘No Swim’ Signage

Wherever discharge of sewage to a water body receiving environment occurs, or is likely, suitable ‘No Swim’ signage shall be put in place as soon as possible following the overflow. Signs should be erected at locations where access to water potentially affected by the discharge is likely. In streams draining

urban areas, signs could be erected at walkways, along paths and on bridge crossings downstream of the discharge point. Contractors should aim to warn all persons entering an area where they may be able to contact contaminated water.

Key recreational water use areas may require additional warning activities. These sites include but are not restricted to:

- Queenstown Bay
- Frankton Arm
- Lake Hayes
- Roy's Bay
- Bremner Bay, and
- Scott's Beach.

In these areas, multiple signs may be required along the lake foreshore. Signs might also be erected at entries to vehicle carparks and at walkways leading to the lake foreshore. Where appropriate, social media may also be used to provide additional public health warnings.

The signage shall remain in place until samples in the affected area and downstream of the discharge are less than 260 *E. coli per* 100 mL (refer below).

5.3 Sampling Requirements

Water samples should be collected in response to an overflow event to guide the public health response, and in particular the duration of the response.

Effective sampling requires developing and establishing an appropriate monitoring plan, which needs to consider the timing and frequency of sample collection, the spatial extent of potentially contaminated water, and the selection of water quality variables.

The spatial distribution of sampling points should be selected to provide an understanding of the extent of contamination. Determining the spatial extent should have regard for the discharge environment.

Appropriate care is required when sampling in waterbodies and extra precaution is required where sewage contamination is present. Utilising tools such as a pole sampler will make sample collection from the bank easier and reduce the risk of sample contamination.

Sample collection, storage and transport

Staff who are likely to collect water samples should receive suitable training including:

- How to label bottles and associated paperwork (field sheets and chain of custody documents)
- how sample bottles and caps are handled and stored during sample collection
- how to safely collect water samples using an extendable pole
- how to store samples to maintain integrity
- maximum sample storage times.

Stream sampling shall be undertaken in accordance with industry best practice protocols including:

- Collect an upstream sample to serve as a control
- Collect samples in a downstream direction at several points, choosing locations where human contact is possible/likely (bridge crossings, along footpaths, in open spaces etc)
- Note the location of sample collection (use GPS where possible)
- If the stream subsequently discharges into a lake, consideration can be given to using floatable objects (eg oranges or tennis balls) as "drogues" – highly visible, buoyant and disposable objects that can be used to identify and track the direction and fate of waters discharged into a lake

- The timing of sample collection will depend on the results derived from analysis of samples:
    - Assuming the discharge of sewage to the stream is stopped shortly after discovery (say within three hours), then
    - it would be reasonable to collect a second set of samples four hours after the first set
    - An additional set of samples could be collected eight hours after the first set
    - 24 hours after collection of the first samples, an additional set of samples should be collected
    - Samples should be submitted to a laboratory for analysis within 24 hours of collection; the time intervals suggested above should be adjusted to ensure the samples are delivered within the required timeframes
    - Laboratory results should not be anticipated until at least 24 hours after submission to the laboratory.

Lake sampling

Movement of the contaminant plume will be less predictable in a lake, where advection (movement) and dispersion (dilution and vertical and lateral movement) will be determined by wind speed and direction, currents within the lake, density differences between the inflowing aerial and lake waters. Water sampling should focus on recreational users (who will have contact with surface waters).

- If samples are being collected a short time after the discharge into the lake, consideration should be given to using low-cost markers to indicate the direction of plume movement. If there is an obvious difference in appearance of the plume, this could also be used to track the movement
- If conditions are very calm, and the plume is diffusing away from the discharge point, focus on the shoreline within a 50 m radius of the discharge point
- If the current and wind is moving the plume along the shore, collect samples:
    - approximately 50m from the upwind or up-current side of the discharge as controls
    - approximately 50m and 100m distance downwind or down-current of the discharge point
- If the contaminated water is being driven quickly by the wind or lake currents, consider collecting further samples downwind of the discharge
- The timing of sample collection could be as indicated above for stream sampling
- All sample locations should be recorded using GPS or similar
- Similar sample storage and transport times will apply.

Impacts on raw water abstracted for potable supply are discussed in section 6.

Sample collection times

There is a minimum 24-hour period between receipt of the water sample at a laboratory and receipt of results. Samples should be collected at regular intervals from the time that the unplanned discharge commences. Sample collection times should have regard for transport times and laboratory hours of operation. It is likely that samples are submitted to the laboratory in multiple batches within each day, to ensure that sample storage times are respected, and to ensure that results are received within short time frames. This will allow signs to be erected where public health risks are likely to exist or will allow the response team to remove signs as infection risks recede.

Water quality variables

E. coli is the preferred freshwater Faecal Indicator Bacteria (FIB) indicator. The single-sample threshold concentrations provided in the Ministry for the Environment (MfE) and Ministry of Health (MoH) "Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas" (updated June 2003) may also be used to assess health risk and determine the sampling frequency.

Box 2:
Surveillance, alert and action levels for freshwater

Acceptable/Green Mode: No single sample greater than *260 E. coli/100 mL*.

- Continue routine (e.g. weekly) monitoring.

Alert/Amber Mode: Single sample greater than *260 E. coli/100 mL*.

- Increase sampling to daily (initial samples will be used to confirm if a problem exists).
- Consult the CAC to assist in identifying possible location of sources of faecal contamination.
- Undertake a sanitary survey, and report on sources of contamination.

Action/Red Mode: Single sample greater than *550 E. coli/100 mL*.

- Increase sampling to daily (initial samples will be used to confirm if a problem exists).
- Consult the CAC to assist in identifying possible location of sources of faecal contamination.
- Undertake a sanitary survey, and report on sources of contamination.
- Erect warning signs.
- Inform public through the media that a public health problem exists.

CAC = Catchment Assessment Checklist

Extract from the MfE/MoH Microbiological Guidelines for Freshwaters
(page E9, Part II: Guidelines for Recreational Water Quality, June 2003)

Supporting water quality variables

A multivariable water quality sonde (eg EXO2 sonde from YSI Inc) is useful for field survey work and typically able to measure temperature, electrical conductivity, pH, dissolved oxygen concentration, turbidity and fDOM (fluorescent dissolved organic matter). While the microbiological sample is being collected, the sonde can be deployed to collect data. Water quality variables such as temperature, turbidity, fDOM and electrical conductivity may allow the plume of contaminated water to be measured directly. The sonde collects data automatically at high frequency, allowing rapid measurement of the contamination in the water body over time. Access to a device of this nature is not essential, but measurement of dissolved oxygen concentration is useful to demonstrate the extent of ecological effect.

If a sonde is used, care must be taken that the device is properly calibrated

Reporting

Results should be tabulated and may be presented graphically.

The table of results must include:

- the location of sample collection
- the date and time of collection

- the date and time of sample receipt at the laboratory (to demonstrate that sample storage periods were not excessive), and
- the results for the water quality variables requested (eg *E. coli* concentrations, electrical conductivity etc).

6 Overflows in Vicinity of a Raw Water Intake

Details of the lake raw water intakes in Queenstown, Wanaka and Hawea, and the wastewater network assets within close proximity of each of these raw water intake pump stations are appended. Unplanned discharges from these nearby wastewater assets may create a source of potential contamination of the raw intake water (prior to treatment of the raw water in accordance with each QLDC Water Treatment Plant *Water Safety Plan* and the *Drinking-Water Standards for New Zealand 2005 (Revised 2018)*).

A generic action list is provided to assist with development of a site-specific response plan in the event of a wastewater overflow in the vicinity of a raw water intake.

6.1 Intake Protection Response Requirements

The potential for significant public health risk following contamination of a potable water supply system deems it essential to undertake the following actions as immediate response to a wastewater overflow within the vicinity of a raw water intake.

Shut down of intake pump station

On confirmation that an overflow has reached, or is at risk of reaching, a water body a QLDC representative will be appointed Incident Controller and will assess the potential risk of an overflow on any nearby intake and instruct the shutdown of the intake pump station as required. This assessment will form part of the Incident Controller's initial briefing to the QLDC and Public Health South.

Preventing the entry of contaminated water into the water treatment plant (WTP) is critical. If in doubt the intake should be shut down as a precautionary measure. Shut down of a water pump station must be done locally by the operator (rather than via the SCADA); isolation and lock out tags should be used where pump mode switches are turned off. Subsequent monitoring of reservoir levels will be required via SCADA.

Additional measures will be identified by the Incident Controller after consultation with QLDC, Public Health South and the ORC.

Restarting of raw water intake pump stations

Restarting a raw water intake pump station will be undertaken in accordance with the instructions of the QLDC Chief Engineer, referencing the WTP Water Safety Plan, and in compliance with the Health Act 1956 (as amended by the Health (Drinking Water) Amendment Act 2007) and the Drinking-Water Standards of New Zealand 2005 (revised 2018).

The QLDC Chief Engineer will take into consideration the advice of the Incident Controller, the QLDC 3 Waters Contract Manager, the Drinking Water Assessor, and/or the afterhours Duty Medical Officer of Health.

6.2 Site Specific Details

The geographic location of each of the Lake Wakatipu, Wanaka and Hawea raw water intakes are appended including descriptions of the wastewater infrastructure within the vicinity of each of these intakes.

The District raw water aquifer bore sources are also listed.

7 Report Requirements

7.1 Overflows to Land

In the event of a dry weather wastewater overflow to land the following information is to be provided to QLDC:

- Time and date overflow reported
- Time on site
- Time of service restoration
- Photographic record of event
- Estimated volume of overflow
- Location of overflow, and
- the cause of the overflow, if this can be determined.

The above information shall be uploaded, by the Contractor, into the QLDC TechOne software system as part of closing out the Request for Service (RFS) ticket.

7.2 Overflows to a Receiving Water Body

In the event of a wastewater overflow to a receiving water body the following information is to be provided to QLDC:

- Time and date overflow reported
- Time on site
- Time of service restoration
- Photographic record of event
- Estimated volume of overflow
- Location of overflow and where the overflow reached the water body (topographical map to be included)
- Details of physical repairs/response works
- Details of the physical clean up
- Sampling locations and results
- The cause of the overflow, if this can be determined, and
- the details of any communication with affected parties or stakeholders.

The above information shall be uploaded, by the Contractor, into the QLDC TechOne software system as part of closing out the Request for Service (RFS) ticket. A written report should also be prepared in PDF format including version control information. The document is to be suitable for distribution to the ORC, and the wider public (if requested). The document is to be provided to QLDC within five (5) working days of the overflow occurring, and will be passed on to the ORC, Public Health South and the QLDC General Manager Property & Infrastructure by the QLDC 3 Waters Contract Manager within one (1) working day of receipt from the contractor.

8 Auditing

This procedure will be audited biannually on a representative sample of QLDC notifiable wastewater overflow events. The audit will review compliance with:

- response times
- Adequacy of information collected
- Adequacy of corrective actions eg bunding, containment, removal of contaminants, sample collection, storage and delivery to laboratories
- Effectiveness of the response; was the desired outcome achieved?
- Continuous improvement opportunities identified to improve future response, and
- Feedback from other agencies.

The QLDC Environmental Manager is responsible for undertaking these audits with the support of the 3 Waters Contracts Manager.

9 Investigate cause and implement improvements

The cause of an overflow must be investigated. The results from these investigations, overflow reports, post-incident discussions and audits will contribute to forward work plans at QLDC.

Where emergency works are necessary, existing capital programmes will be re-prioritised in accordance with the QLDC corporate risk framework.

Appendix

1 QLDC SOP WW03 Reactive Repair or Unblock of Wastewater Main

QUEENSTOWN LAKES DISTRICT COUNCIL

QLDC

Standard Operating Procedure

Reactive Repair or Unblock of Wastewater Main

SOP WW03

Table of Contents

Status – Preliminary						
Rev	Author	Description	Reviewer	Approved for Issue		
				Name	Signature	Date
A	Martin Smith		Simon Mason			30.04.19
B	Martin Smith					11.10.19

Important Notes:

1. Use the Job Safety Analysis and Pre-Start Safety Inspection sheet in conjunction with this SOP
2. Assess task Hazards, implement necessary controls and complete Pre-Start Safety Inspection sheet before starting work
3. Ensure that all Health and Safety requirements are in place and specific reference is made to the HSEQ SOPs, including those for the opening of manholes, Confined Space Entry, working with asbestos cement pipes and fittings and Environmental Best Management Practices
4. Sewer unblocking is required where the sewer is blocked or partially blocked. The aim of all sewer unblocking is both to minimise the spill of sewage into the surrounding environment and restore service as quickly as possible
5. Where a DWO is deemed to exist, the overriding obligation is to contain insofar as is possible, this may include requesting assistance. After this has been done unblocking may be pursued
6. Notify the Otago Regional Council and/or Public Health South of overflows to water courses
7. It is the Contractor's responsibility to unblock the sewer by whatever means necessary without unnecessary damage to pipes or property. Fat blockages and isolated root intrusions shall be cleared manhole to manhole to achieve a 90% bore
8. All work shall be carried out in accordance with all relevant Health and Safety and Environmental legislation and guidelines

1. Purpose

This procedure details the process required for repairs to damaged sewers and clearing of sewer blockages.

2. Key Definitions

Access Authority Approval (AAA)	A document that details the approvals obtained for access to each site
Blockage	A build-up of fat, rags, silt, tree roots and debris causing an interruption to the flow in a sewer
Critical Care account	Consumers that provide service and value to the community such as schools, day-care centres and retirement villages
Dry Weather Overflow (DWO)	Where wastewater (sewage) has leaked from the wastewater system during fine weather in response to an incident of complete asset failure which is causing considerable water loss, property damage or a health and safety issue that has to be repaired immediately
Corridor Access Request (CAR)	A Corridor Access Request is required where: • Any activity that will alter or cause to alter the surface of any part of the road reserve, including but not limited to excavating, drilling, resurfacing • The placement of any pipe, duct, pole, cabinet or other structure below, on or above the road reserve
Hazard	Is a substance, material, process or practice that has the ability to cause harm or adverse health effects to individuals or to organisations as property or equipment losses
High-pressure water jet	A truck-mounted pump used to pressurise water stored in a tank on the truck. This pressurised water is delivered through a hose to clean sewer lines and manholes
Job Safety and Workplace Environmental Plan (JSWEP)	A Council document that describes the plans for each job to protect employee and public safety and environmental quality
Key account	A customer that is a significant user of water which is critical for their operations. Their needs must be understood before water is shut off
Otago Regional Council	(ORC)
Permit to Work (PTW)	A permit to work is required or a spotter if working near high voltage and/or high-pressure gas lines
Personal Protective Equipment (PPE)	Clothing and equipment designed to protect personnel in the workplace
Point of Supply	Defines the boundary between QLDC's network (and hence responsibility) and the private network
Public Health South (PHS)	Southern District Health Board
QLDC Incident Management Plan	Council response plan to be followed by staff and contractors when an asset has failed, and an Incident is declared

Reticulation sewer	A pipeline, generally 100mm to 600mm diameter, that collects sewage from individual properties and conveys it to branch sewers or to a point of treatment
Service connection	Wastewater connection pipe and fittings between the public sewer main and the customer point of supply
Spill	A spill is an overflow due to an obstruction in the network (caused by a broken pipe, foreign matter such as grit/gravel, or tree roots), which overflows onto adjacent land but is contained without any wider environmental contamination or risk to public health
Standard Operating Procedure (SOP)	A document that details the procedures required for a particular activity
Traffic Management Plans (TMP)	Approved traffic and pedestrian management plans
Wastewater manhole	A structure that allows human and machine access to an underground pipeline
Wet Weather Overflow (WWO)	WWOs are most commonly caused by high flow resulting from heavy rain. Inflow and infiltration of stormwater results in excess flow, which can exceed the design capacity of sewer pipelines and pump stations

3. Responsibilities

In this SOP, responsibilities are as follows:

The Manager responsible for overseeing the maintenance staff shall:	The Supervisor shall:	The Field Crew shall:
• Regularly review this SOP	• Ensure workers follow this SOP	• Follow this SOP
• Maintain staff SOP training records	• Train workers in this SOP	• Only perform tasks for which they are trained and competent
• Ensure workers follow this SOP		• Report any issues immediately with respect to implementing this SOP

4. Work planning and Pre-start assessment

Are you familiar with the work and the connection onto our networks?	Have you been trained in all tasks that you will be performing?	Have you got the necessary resources, plant and equipment to carry out the job safely?	Have you got all the necessary Personal Protective Equipment (PPE) to do the job safely?	Is someone from your company always in control and in charge of the activity

If NO, Don't start until all are YES

4.1 Work planning and resources

The following are required for planning unblocking or repairs to a damaged or blocked sewer:

- Review GIS for affected properties
- Determine extent and nature of affected customers. Are there Critical Care or Key accounts such as hospitals, day-care centres, schools, or retirement homes within the isolation zone?
- Undertake the following assessments:
  - Preliminary scoping and site assessment (refer Figure 1)
  - Traffic management requirements (refer Figure 2)
  - Plan to implement the environmental management measures with reference to the QLDC BMPs (silt control) (refer Figure 3)
  - Tree and historic considerations (arborist or archaeologist required) (refer Figure 4)
  - Escalations and customer management (refer Figure 5)
  - Locating services during reactive works (refer Figure 6)
  - Excavations deeper than 1.5m (refer Figure 7)
  - Handling of heavy pipes and fittings (refer Figure 8)
  - Working around machinery (refer Figure 9)
- Immediately notify the Otago Regional Council and/or Public Health South when a sewer blockage has resulted in a DWO (spill) to stormwater drains, a watercourse or any other environmental area
- Where possible consult all affected customers to establish an appropriate date and time to work on assets located on their property. If work is an emergency and property owner is not contactable notify Supervisor
- Apply for a Corridor Access Request (CAR) and ensure all necessary traffic and pedestrian management is in place (TMP level according to road classification). If work is urgent then retrospectively apply for CAR
- Ensure resources are mobilised to contain, divert and/or unblock the wastewater system and protect the environment

The following resources are required for all reactive repair and unblocking works:

- Ensure that all health and safety requirements are in place in accordance with the Health and Safety Management Plan
- Ready GIS access to up-to-date plans of the reticulation system. The GIS viewer shall show the current dialysis patient list along with other Critical Care and Key account information
- Ready access to all equipment, materials and labour necessary for the safe and efficient execution of the works. This may include equipment for testing the water course for ammonia, containment of the wastewater overflow, systems for diverting wastewater flows and equipment for unblocking or repairing the wastewater network
- QLDC Incident Management Plan

Figure 1 Scoping and initial site assessment

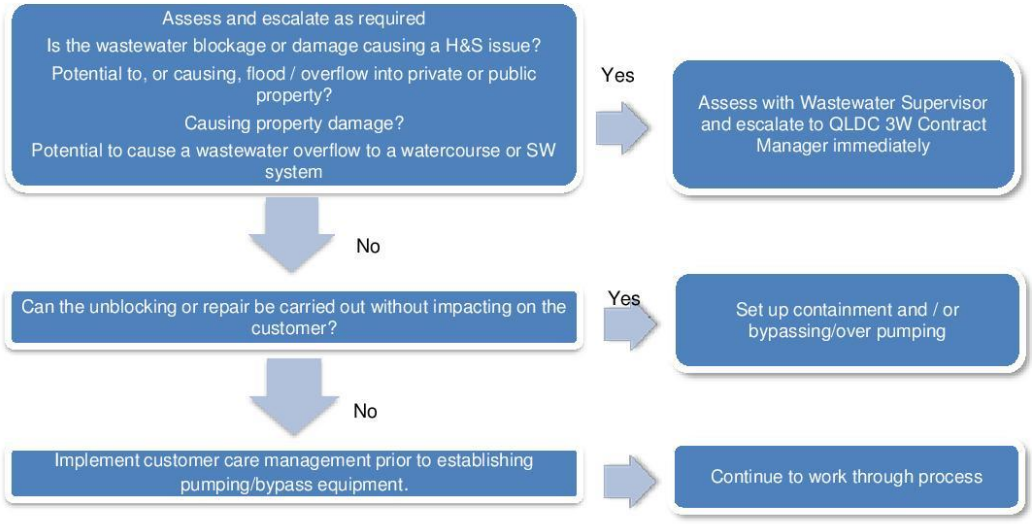


Figure 2 Traffic Management

Figure 3 Environmental and sediment management

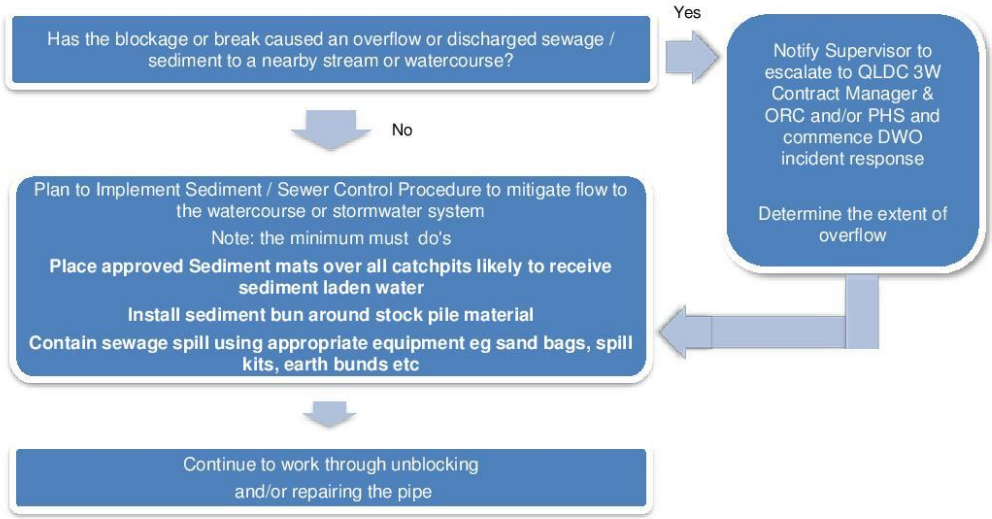


Figure 4 Tree and Historic considerations

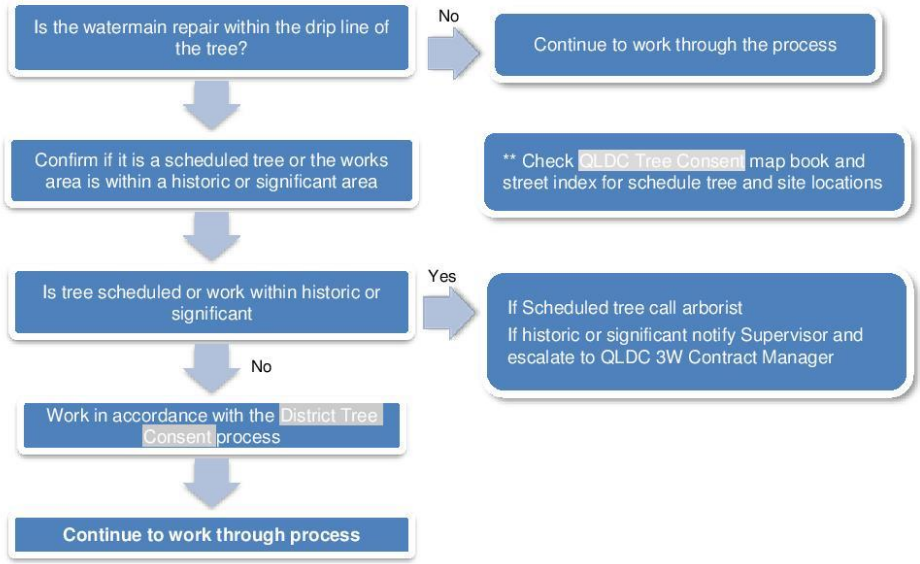


Figure 5 Escalations and customer management

(Also refer to QLDC Incident Management Plan)

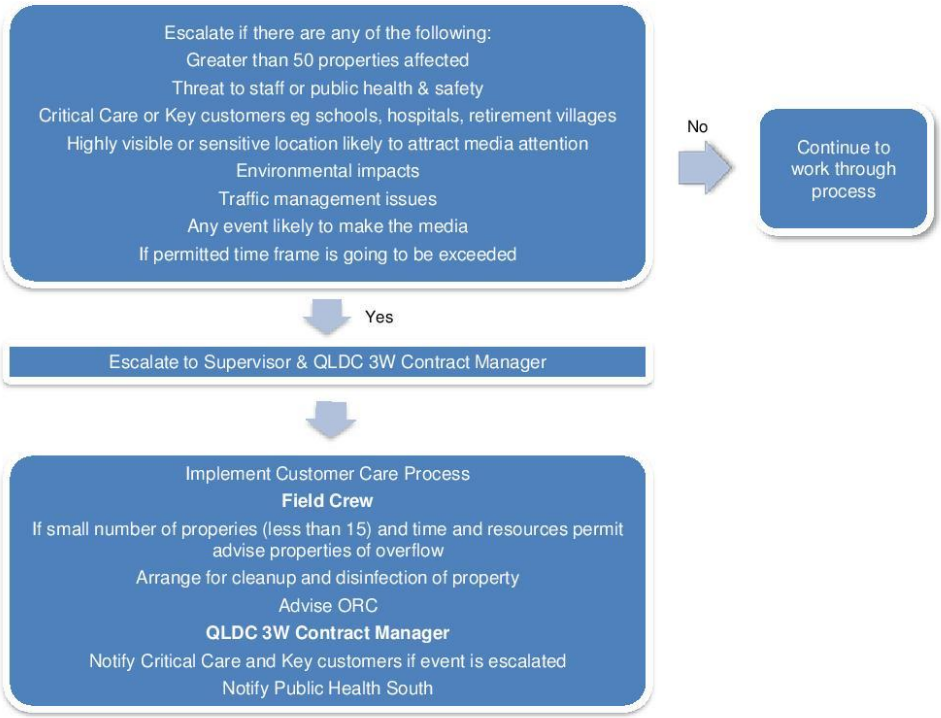
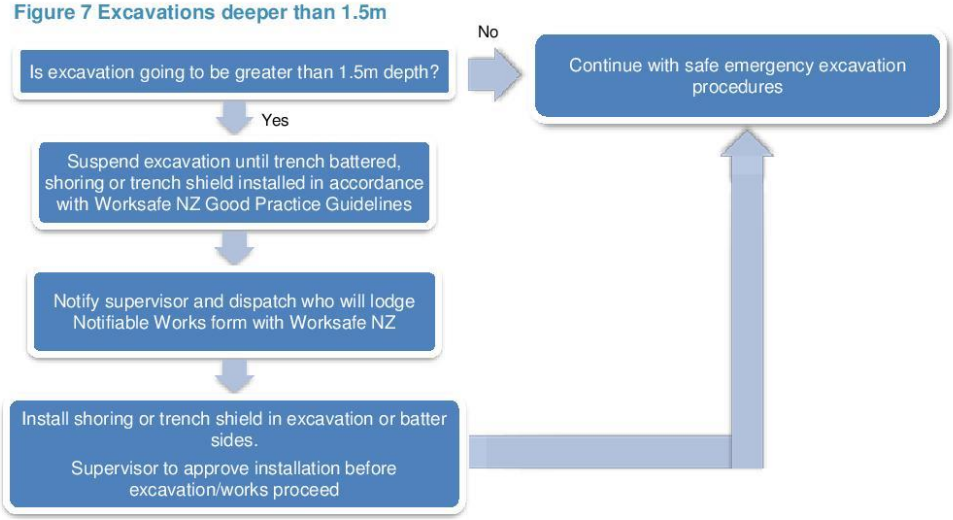


Figure 6 Locating services in emergency excavation

Refer to QLDC SOP WW02 Emergency Excavation Guidelines – Wastewater

Figure 7 Excavations deeper than 1.5m



Note: minimum of two (2) staff required when hydraulic excavation technique being used ie spotter required

Figure 8 Handling of heavy pipe and fittings

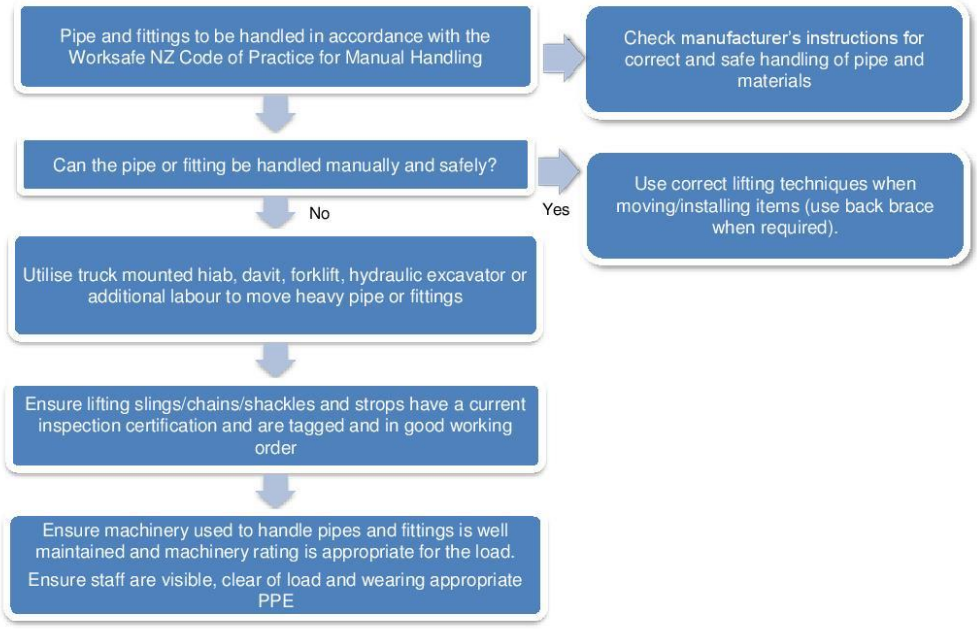
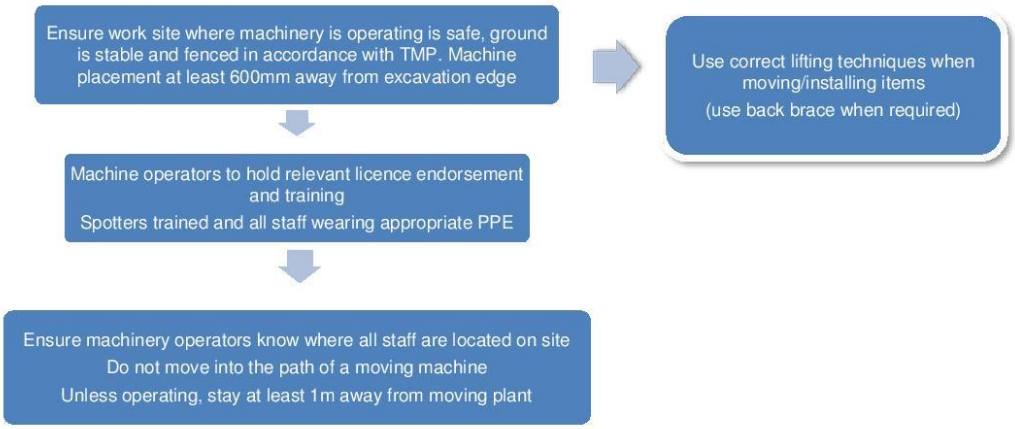


Figure 9 Working around machinery



4.2 Pre-start assessments

4.2.1 Health and safety

Upon arrival on site, immediately assess personal and public health and safety and make the site safe.

Escalate to Supervisor if the defect or works are creating a health and safety issue that requires urgent repair (ie affecting traffic, pedestrians, or there is a potential to flood or damage inside a private or public property).

Identify all hazards and complete the Pre-start work form. Put in place controls to eliminate, isolate or minimise the hazards and refer to the JSWEP for additional information.

Establish traffic and pedestrian management and isolate the area of works with cones, barricades and work vehicles equipped with flashing lights.

If excavation is required carry out or arrange for all underground services to be located.

If working within the drip line of a tree arrange for an Arborist to attend.

Ensure environmental management procedures are implemented (refer to BMPs).

Arrange for underground services to be located.

Before isolating the wastewater asset and beginning modifications, review and confirm on site the items listed in Figures 1 through to 9 and action as appropriate throughout the works.

4.2.2 Customer management

The management of customers during a sewer blockage or repair is important as the unblocking and repair work may create a public health and safety risk to people.

When the public is likely to be affected or exposed to contamination ensure the following actions take place:

- Escalate to Supervisor and QLDC 3W Contract Manager
- Set up barriers and appropriate signage to keep people away from the contaminated site
- Contact property owner/tenant and confirm immediate isolation and disinfection requirements for the contaminated area

- Arrange for eduction and cleaning equipment for the clean-up of affected private and public property
- If the loss of service is likely to be greater than four (4) hours or sewage has entered a building escalate to Supervisor and QLDC 3W Contract Manager
- If overflow has entered a watercourse or stormwater drainage system notify the ORC.

If customer's wastewater connections are affected by the repair works then alternative arrangements such as bypassing, sucker trucks or portaloos need to be provided for the duration of the works. These temporary arrangements are to be agreed, in person, with the affected customers before works commence.

When public and private property owners are likely to be affected due to access and operational requirements ensure the following actions take place:

- Advise Supervisor and/or QLDC 3W Contract Manager if Critical Care and/or Key customers will be affected
- Provide written notifications to affected property owners three (3) days in advance when access to wastewater manholes on private property is required
- Ensure access for public and property owners is maintained during the works and that manhole covers are isolated or covers replaced when staff not present
- Set up barriers and appropriate signage to keep people away from the work site
- Upon completion, ensure that all manhole covers are replaced, debris removed, and area washed down and disinfected when required. Leave site clean and tidy and notify property owners that works are complete.

4.3 Sediment Control

Sediment control must be implemented as soon as possible to minimise the amount of sediment leaving a site. The Maintenance Contractor is to make sure controls are appropriate for the scale of works and ensure the site is clean and tidy before leaving.

4.3.1 Escalation to QLDC duty / on-call person and ORC

If a large volume of sediment has entered a waterway prior to attending the site and implementing sediment control, escalate to the QLDC duty / on-call person and the ORC.

If clean-up is restricted due to access or time constraints (ie late night and residential area, cars parked over sediment) the Contractor must:

- Undertake as much clean-up as possible within the restrictions
- Escalate to the QLDC duty / on-call person
- Contact the ORC to inform them of the situation, the state of the clean-up at the time and further actions that will be undertaken
- Return to site the following day to assess and undertake further clean up if possible. Close out the incident with the ORC.

Should clean-up continue to be restricted, escalate to the QLDC duty / on-call person, and inform the ORC that all practicable steps have been undertaken and confirm they are satisfied with the response.

All calls and times to ORC must be logged in the HANSEN record. Take photo's where possible.

4.3.2 Otago Regional Council awareness of pollution events

The ORC have officers who do site checks and are aware of pollution events. Members of the public will alert Council to sediment/pollution events.

4.4 Job management system

Update the job management system throughout the works – particularly when service is disrupted and restored and when there are any delays to expected disruption and restore times.

5. Procedure for clearing sewer blockages and repairing damaged sewer pipe

5.1 Containment of the wastewater spill

Where a Dry Weather Overflow spill has occurred as a result of a blockage or damage, implement basic containment (eg sandbags) as the first priority after health and safety.

Protect stormwater systems by blocking stormwater grates or other points of entry.

Remove all visible material from all sewage spills and disinfect the area with an approved treatment chemical.

Dispose of all contaminated materials used for containment in a safe and approved manner.

If circumstances dictate that there will be some delay before the pipe or manhole can be unblocked and/or a repair can be carried out, consider reducing the impact by diverting or temporarily over-pumping the wastewater flow to minimise the adverse effects.

In some situations, containment is not feasible (eg where there is a high rate of discharge from the reticulation, in remote locations, or where site access limitations exist). A *best endeavours* approach to containment is required to minimise potential adverse public health or environmental effects.

5.2 Isolation of wastewater asset to be modified

Where a sewer pipe or manhole/chamber in the live network is to be repaired or modified, make suitable arrangements to isolate the wastewater flows from the asset before work begins. Isolation options are as follows:

- "Plug and release"

  The sewer line is plugged at upstream manhole(s) to enable repair of the wastewater pipe. This option may only be possible if there is enough storage volume in the network; a large storage volume will allow more time for "on-line" modification works

- Temporary bypass of flows

  Plug the upstream manhole and install a temporary bypass pump with the outlet pipe conveying the wastewater to the closest suitable downstream manhole

- Vacuum truck removal of wastewater stored within wastewater reticulation

  If the above two options are not suitable then consider using vacuum trucks to convey the wastewater from above the section of pipe being repaired to a suitable downstream manhole. The need for vacuum trucks should be approved by the Supervisor and QLDC 3W Contract Manager.

5.3 Confined Space Entry

If Confined Space Entry is required at any stage of these works, only personnel that are suitably trained in accordance with the Council's procedures shall participate in the confined space procedure.

5.4 Locate blockage and determine if pipe repair or replacement is required

- Attend the site and locate the full and empty manholes. Work upstream, from the empty manhole closest to the blockage or from the affected property, or from the most easily accessible location (ie in the roadway, where it is easiest to get the drainage rods or jet machine near)
- Install a silt trap (basket) in the downstream manhole while using drainage rods or water jet machine to capture any debris dislodged from the sewer. Dispose of the dislodged debris at an approved location
- Water for the jet machine is available from Council hydrants using a metered hydrant stand with backflow prevention
- Jet machine clearing of blocked reticulation sewers is allowed for all pipe types, however, pressure shall not exceed 120bar (1750 psi) in Vitreous Clay pipes. If excessive silt/debris or any pipe pieces are retrieved by the jet machine, **stop jetting** and inform the Supervisor and the QLDC 3W Contract Manager and wait for further instruction. If the dislodged debris includes **broken pieces of sewer pipe**, **stop jetting** and arrange for a CCTV survey to locate the position and depth of the broken sewer pipe/connection
- Jet machine cleaning of blocked reticulation sewers shall be from the downstream manhole pulling the debris, silt and fat back towards the manhole from which you are working
- Continue moving the jet machine hose backwards and forwards until the sewer blockage is cleared ensuring that the blockage is cleared by using the jet machine from manhole to manhole
- Use the jet machine counter to pinpoint the location of the problem for reporting to Council
- Blockages in manhole drop-pipes shall be treated in the same manner as detailed above
- Before using a cutter on lines other than Vitreous Clay, contact the Drainage Supervisor for approval. Undertake a CCTV survey to check for protruding services before using a hydraulic cutting machine. Using the appropriately sized cutter head (starting from a smaller cutter and increasing in size to a full-sized cutter), and working from the nearest manhole downstream of the blockage, insert the jet machine hose upstream to the blockage and commence clearing the blockage
- If the blockage is not cleared within one (1) hour of arriving on site, and sewage is overflowing or a sewer overflow is imminent, then arrange for bypass pumping of sewage from a suitable upstream point to alleviate the overflow or use of vacuum trucks to take wastewater away
- Sewer blow-back at lateral connections can occur while jetting shallow sewers or when jetting 'downstream' when access dictates (where the nozzle propulsion jets point up the sewer lateral). This may result in fittings in properties (in particular toilets) gurgling or being subject to rises and falls in water levels, in the worst-case sewage may come out of these fittings. If operating a high-pressure water jet in a known shallow sewer area, reduce water pressures from the jet machine and move the jet hose/nozzle more slowly within the sewer. Using the jet truck in a downstream direction is not recommended
- If blow-back occurs, immediately inform the Supervisor and the QLDC 3W Contract Manager and make all efforts to attend to the immediate needs of the property owner or occupier who has experienced property damage or have suffered other inconveniences as a result of this "blow back"
- Before leaving the site, wash down the manhole from which the machine operated.

5.5 Root cutting, protruding lateral connections, other utilities

- During routine sewer cleaning, it is possible to encounter partial blockages caused by fats, solids, tree roots and other buried utilities that may have been thrust through the wastewater network without causing a full blockage
- Before using a cutter on lines, other than Vitreous Clay, contact the Drainage Supervisor for approval. Undertake a CCTV survey to check for protruding service connections and buried utilities before using a hydraulic cutting machine. Using the appropriately sized cutter head (starting from a smaller cutter and increasing in size to a full-sized cutter), and working from the nearest manhole downstream of the blockage, insert the jet machine hose upstream to the blockage and begin clearing/root cutting the blockage
- When other buried utilities are identified as having damaged the wastewater pipe, advise the Supervisor, take photographs and if possible, arrange for the relocation of the buried utility that has damaged the sewer and arrange for the repair of the sewer pipe.

5.6 Replacing or repairing the pipe

Locate blockage and if pipe repair or replacement is required:

- The blocked sewer may require eduction or by-pass pumping until the blockage is cleared. Implement sewage flow management before repairing the sewer
- After checking for the presence of other buried services, excavate down to the broken sewer. If the ground is unstable or deeper than 1.5m notify the Supervisor and arrange for benching or shoring to be installed. Dispose of contaminated excavated material offsite. Holes deeper than 1.5m need to be notified to WorkSafe NZ
- Once exposed, repair the damaged sewer pipe using the appropriate method and materials. The method and materials will be based on the extent or length of repair, the structural condition of the existing pipe, the method of pipe jointing, the pipe material and diameter
- Any dewatering required must be to a vacuum truck so as not to contaminate the stormwater system. In exceptional circumstances, dewatering can be carried out by alternative methods as agreed with Council
- All employees shall comply with the *Health and Safety at Work (Asbestos) Regulations 2016*, when working with or coming into contact with asbestos cement "AC" pipes.
  Refer also to QLDC SOP W01 for Asbestos Cement Pipe Handling
- The pipe replacement and connection fittings must be materials approved by Council. Place bedding around the repaired sewer and backfill and reinstate in accordance with the QLDC specifications. Private property to be reinstated to match original condition with agreement from property owner
- If repair or excavation must be left overnight, make it safe to pedestrians and traffic users by barricading or covering with road plates.

5.7 House connection blockages

- If the field personnel find that the blockage is within the customer's lateral / property, plunge or jet the lateral connection
- After unblocking the customer's connection, issue a standard advice notice, advising the customer of the visit, the purpose and the result of the work or investigation, the nature of the fault and the customer's obligations and responsibilities

- If the field personnel determine that the blockage is private, they shall notify the property owner, who will then be responsible for all further repair work. Regardless of whether the fault is private or public the field crew are responsible for cleaning up the overflow and disinfecting the property
- If the field personnel determine that the blockage is actually within the network reticulation sewer then they shall follow the procedures as detailed above. Notes should be made regarding this situation on the Job Management System, and advice past to the Dispatcher so the appropriate machinery (jet machine) can be despatched to the works site.

5.8 Customer Care

If the job takes longer than planned, notify the Council Contact Centre and the QLDC 3W Contract Manager by phone and provide a new completion time and date. Affected property owners and tenants shall also be informed.

If unblocking/repair is likely to over-run the four (4) hour KPI for service restored, advise Supervisor and Dispatch. Dispatch will notify the Contact Centre and Critical Care and Key customers as required.

Upon completion of the works leave a calling card with contact details so the customer can contact the Contractor with any queries or complaints.

5.9 Reinstatement

Carry out all backfill and reinstatement in accordance with Council's Code of Practice for Working in the Road.

6. References

The following documents provide further guidance on correct operations and maintenance procedures and materials:

- QLDC Three Waters Maintenance Contract
- QLDC Code of Practice for Land Development and Subdivision; including Working in the Road and Water Reticulation Disinfection
- QLDC Approved Materials for wastewater construction and repair
- QLDC Water Bylaw
- QLDC Incident Management Plan
- QLDC Best Management Practices (BMPs)
- Resource Consent and Guidelines for street trees in the Queenstown-Lakes District
- WorkSafe NZ (OSH, Department of Labour) – Code of Practice for Manual Handling (June 2001)
- WorkSafe NZ (OSH, Department of Labour) – Guide for Safety with Underground Services (October 2002)
- WorkSafe NZ - Good Practice Guidelines - Excavation Safety (July 2016)

7. Flowchart

Are you familiar with the work and the connection onto Council's networks?

Have you been trained in all tasks that you will be performing?

Have you got the necessary resources, plant and equipment to carry out the job safely?

Have you got all the necessary Personal Protective Equipment (PPE) to do the job safely?

Is someone from your company always in control and in charge of the activity?

If NO, Don't start until all are YES

Standard Operating Procedure (SOP)

Reactive unblock or repair of wastewater network

Service request received

Assess incident level

1. Time of day eg peak periods
2. Extent of DWO / property damage
3. Public health risks (notify Public Health South)
4. Risk of discharge entering a stream, wetland, lake, pond or stormwater drain (notify ORC)
5. Safe access and utilities locations
6. Critical Care and dialysis customers, key accounts, schools, day-cares, medical centres, hairdressers or other commercial customers affected / requiring notification
7. Traffic and pedestrian management
8. Silt and wastewater flow control

Refer to JSWEP

On site

- Initial job scoping
- Health & Safety assessment
- Make site safe
- Traffic and pedestrian management
- Notify Critical Care and Key account customers in person
- Mobilise additional resources for containment and clean-up
- **Complete prestart form**

Refer to BMPs

Is it possible to control the spill eg containment, shut down pumps, divert overflow?

No → Escalate to QLDC 3W Contract Manager and notify ORC

Yes

Implement at source containment using sand bags, plastic sheets, pipe plugs → Protect stormwater systems by blocking stormwater grates or other points of entry

Attempt to unblock pipe using rodding or jetting equipment, unblock sewer from downstream manhole / rodding eye / access chamber → Capture solids removed with basket / screen at downstream manhole

Determine likely cause of blockage from material being recovered during unblocking process → If blockage is suspected to be third party damage; use CCTV to confirm

Was sewer able to be returned to service following unblocking efforts?

No → Blockage possibly caused by tree roots, wedged obstruction, or pipe collapse → Arrange for flow management such as vacuum truck or bypass pumping until the repair can be completed

Yes

Continue with clean up, removing contaminated water, solids and other debris → CCTV pipeline to identify the cause of fault and its location

Where contamination of a watercourse or the stormwater system has occurred, contain, flush and erect signage as directed by the QLDC 3W Contract Manager → Repair fault eg root cut, dig up and repair pipe / install patch liner if possible and put sewer back into service

Disinfect contaminated land and property applying disinfectant chemicals. Ensure controls prevent chemicals from entering watercourses

2 QLDC SOP WW05 Response to Sewage Overflows to Receiving Waters

QUEENSTOWN LAKES DISTRICT COUNCIL

QLDC

Standard Operating Procedure

Response to Sewer Overflows to Receiving Waters

SOP WW05

Table of Contents

Status – Preliminary						
Rev	**Author**	**Description**	**Reviewer**	**Approved for Issue**		
				Name	**Signature**	**Date**
A	Martin Smith		Simon Mason			16.05.19
B	Martin Smith					11.10.19

Important Notes:

1. Use the Job Safety Analysis and Pre-Start Safety Inspection sheet in conjunction with this SOP
2. Assess task Hazards, implement necessary controls and complete Pre-Start Safety Inspection sheet before starting work
3. Assess Incident level and Escalate as required
4. Establish extent of contamination ASAP
5. Notify ORC and/or Public Health South of overflows to water courses
6. Where a DWO exists, the overriding obligation is to contain insofar as is possible, this may include requesting assistance. After this has been done unblocking may be pursued
7. Sewer unblocking is required where the sewer is blocked or partially blocked. The aim of all sewer unblocking is both to minimise the spill of sewage into the surrounding environment and to restore service as quickly as possible
8. Ensure that all Health and Safety requirements are in place and specific reference is made to the HSEQ SOPs, including those for the opening of manholes, Confined Space Entry, working with asbestos cement pipes and fittings, and Environmental Best Management Practices

1. Purpose

This procedure details the process required for responding to sewer overflows into receiving waters.

2. Key Definitions

Access Authority Approval (AAA)	A document that details the approvals obtained for access to each site
Blockage	A build-up of fat, rags, silt, tree roots and debris causing an interruption to the flow in a sewer
Confined Space Entry (CSE)	Refer to QLDC Standard Operating Procedures
Control Cabinet	A metal cabinet containing the electrical instrumentation to operate and monitor the pump station's operation
Corridor Access Request (CAR)	A Corridor Access Request is required where: • Any activity that will alter or cause to alter the surface of any part of the road reserve, including but not limited to excavating, drilling, resurfacing • The placement of any pipe, duct, pole, cabinet or other structure below, on or above the road reserve
Critical Care account	Consumers that provide service and value to the community such as schools, day-care centres and retirement villages
Dry Weather Sewer Overflow (DWO)	Where wastewater (sewage) has leaked from the wastewater system during fine weather in response to an incident of complete asset failure which is causing considerable water loss, property damage or a health and safety issue that has to be repaired immediately
Hazard	Is a substance, material, process or practice that has the ability to cause harm or adverse health effects to individuals or to organisations as property or equipment losses
High-pressure water jet	A truck-mounted pump used to pressurise water stored in a tank on the truck. This pressurised water is delivered through a hose to clean sewer lines and manholes
Job Safety and Workplace Environmental Plan (JSWEP)	A Council document that describes the plans for each job to protect employee and public safety and environmental quality
Key account	A customer that is a significant user of water which is critical for their operations. Their needs must be understood before water is shut off
Otago Regional Council	ORC
Permit to Work (PTW)	A permit to work is required or a spotter if working near high voltage and/or high-pressure gas lines
Personal Protective Equipment (PPE)	Clothing and equipment designed to protect personnel in the workplace
Point of Supply	Defines the boundary between Council's network (and hence responsibility) and the private network
Public Health South (PHS)	Southland District Health Board
QLDC Incident Management Plan	Council response plan to be followed by staff and contractors when an asset has failed, and an Incident is declared

Reticulation sewer	A pipeline, generally 100mm to 600mm diameter, that collects sewage from individual properties and conveys it to branch sewers or to a point of treatment
Service connection	Wastewater connection pipe and fittings between the public sewer main and the customer point of supply
Spill	A spill is an overflow due to an obstruction in the network (caused by a broken pipe, foreign matter such as grit/gravel, or tree roots), which overflows onto adjacent land but is contained without any wider environmental contamination or risk to public health
Standard Operating Procedure (SOP)	A document that details the procedures required for a particular activity
Traffic Management Plans (TMP)	Approved traffic and pedestrian management plans
Wastewater manhole	A structure that allows human and machine access to an underground pipeline
Water bodies	Includes streams, wetlands, ponds/lakes, groundwater aquifers, bathing beaches, harbours and estuaries
Wet Weather Overflow (WWO)	WWOs are most commonly caused by high flow resulting from heavy rain. Inflow and infiltration of stormwater results in excess flow, which can exceed the design capacity of sewer pipelines and pump stations

3. Responsibilities

In this SOP, responsibilities are as follows:

The Manager responsible for overseeing the maintenance staff shall:	The Supervisor shall:	The Field Crew shall:
• Regularly review this SOP	• Ensure workers follow this SOP	• Follow this SOP
• Maintain staff SOP training records	• Train workers in this SOP	• Only perform tasks for which they are trained and competent
• Ensure workers follow this SOP		• Report any issues immediately with respect to implementing this SOP

4. Work planning and Pre-start assessment

Are you familiar with the work and the connection onto our networks?	Have you been trained in all tasks that you will be performing?	Have you got the necessary resources, plant and equipment to carry out the job safely?	Have you got all the necessary Personal Protective Equipment (PPE) to do the job safely?	Is someone from your company always in control and in charge of the activity?
If NO, Don't start until all are YES				

4.1 Work planning and resources

The following are required for wastewater overflow management:

- Determination of the level of incident and escalation as required
- Review GIS for affected wastewater and stormwater systems. The GIS viewer shall show the current dialysis patient list along with other Critical Care and Key account information
- Determine extent and nature of affected customers. Are there Critical Care or Key accounts such as hospitals, day-care centres, schools, or retirement homes within the isolation zone?
- Ensure resources are mobilised to contain, divert and/or unblock the wastewater system and protect the environment
- Undertake the following assessments:
    - Preliminary site assessment (refer Figure 1)
    - Traffic management requirements (refer Figure 2)
    - Plan to implement the environmental management measures with reference to the QLDC BMPs (silt control) (refer Figure 3)
    - Tree and historic considerations (arborist or archaeologist required) (refer Figure 4)
    - Escalations and customer management (refer Figure 5)
    - Locating services during reactive works (refer Figure 6)
    - Excavations deeper than 1.5m (refer Figure 7)
    - Work around machinery (refer Figure 8)
- Immediately notify the Otago Regional Council and/or Public Health South when a sewer blockage has resulted in a DWO (spill) to stormwater drains, a watercourse or any other environmental area
- Where possible consult all affected customers to establish an appropriate date and time to work on assets located on their property. If work is an emergency and property owner is not contactable notify Supervisor
- Ensure that all health and safety requirements are in place in accordance with the Health and Safety Management Plan
- Ready access to all equipment, materials and labour necessary for the safe and efficient execution of the works. This may include equipment for testing the water course for ammonia, containment of the wastewater overflow, systems for diverting wastewater flows and equipment for unblocking or repairing the wastewater network
- QLDC Incident Management Plan

Figure 1 Scoping and initial site assessment

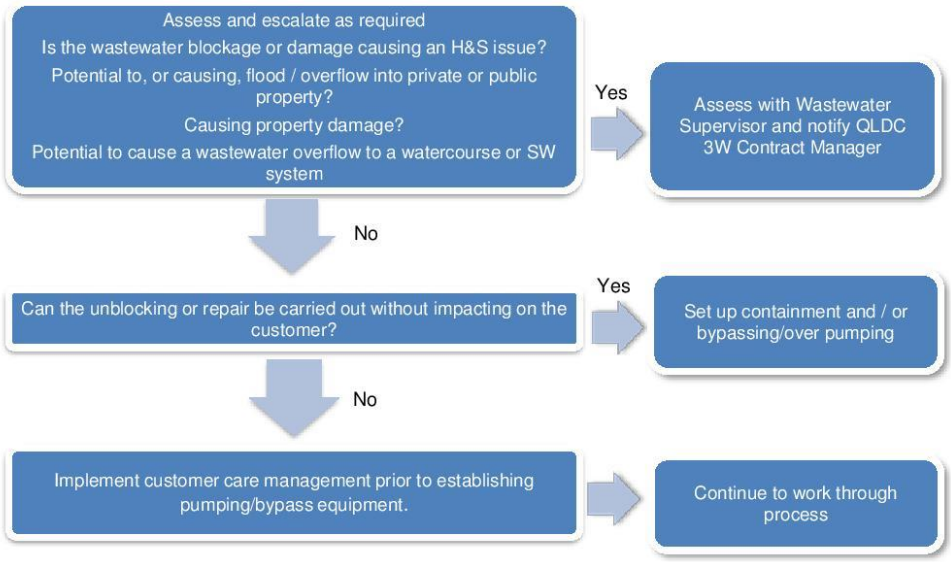


Figure 2 Traffic Management

Figure 3 Environmental and sediment management

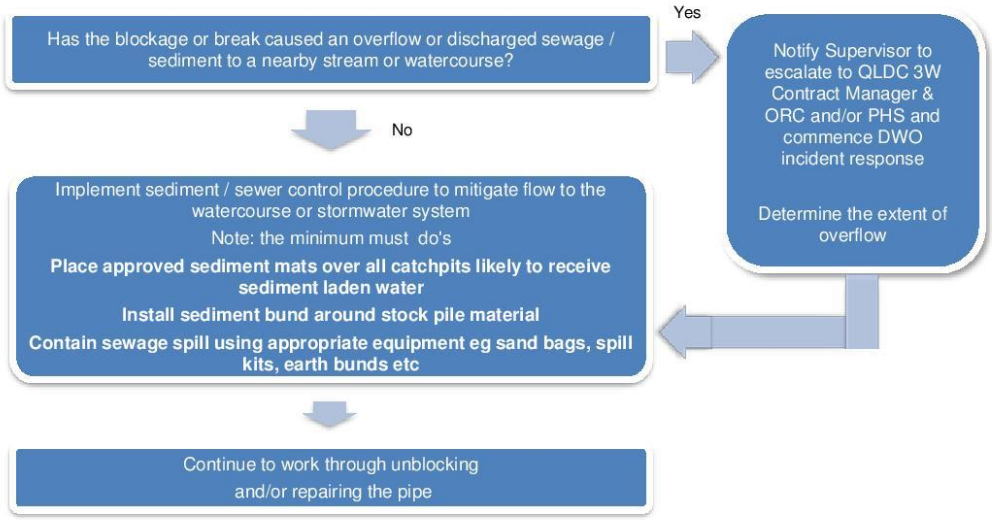


Figure 4 Tree and Historic Considerations

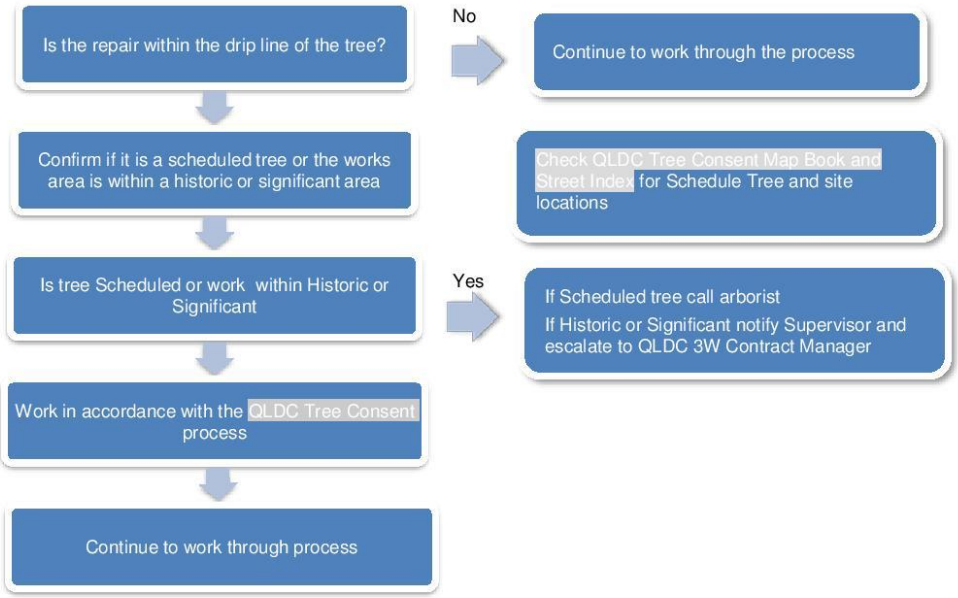


Figure 5 Escalations and customer management

(Also refer to QLDC Incident Management Plan)

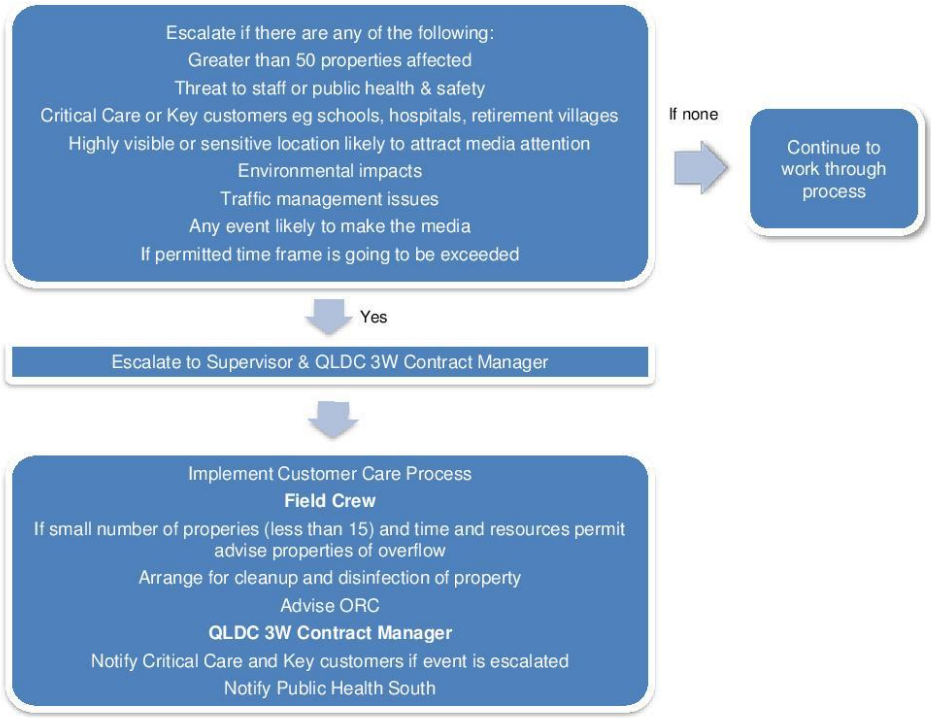
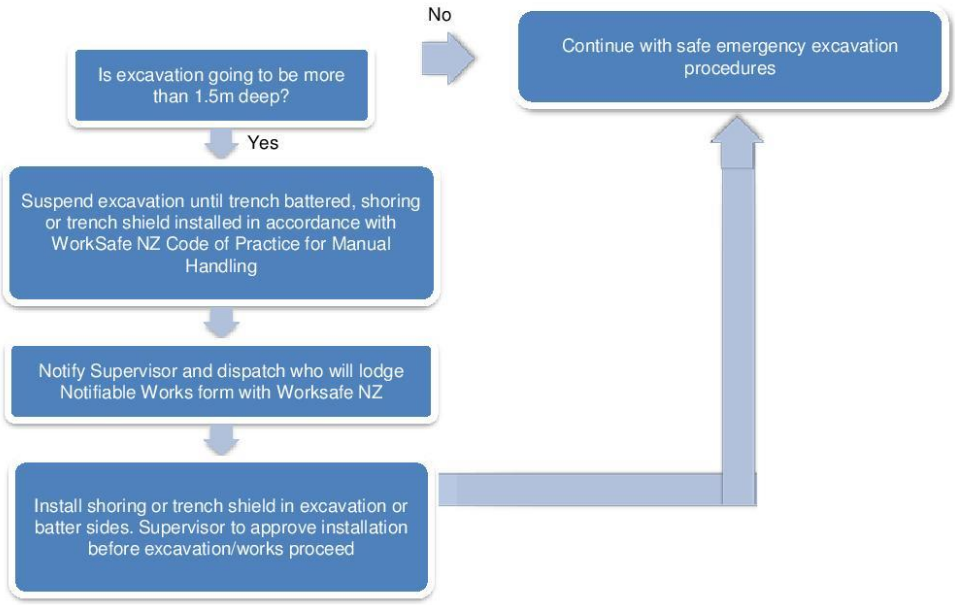


Figure 6 Locating services during reactive works

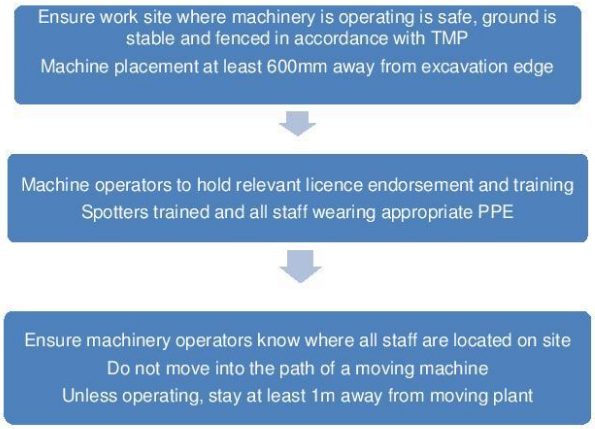
Refer *QLDC SOP WW02 Emergency excavation guidelines – wastewater*

Figure 7 Excavations deeper than 1.5m



Note: Minimum of two (2) staff required when hydraulic excavation technique being used ie spotter required

Figure 8 Working around machinery



4.2 Pre-start assessments

4.2.1 Health and safety

Upon arrival on site, immediately assess personal and public health and safety and make the site safe. Escalate to Supervisor if the defect or works are creating a health and safety issue that requires urgent repair (ie affecting traffic, pedestrians, or there is a potential to flood or damage inside a private or public property).

Identify all hazards and complete the Pre-start work form. Put in place controls to eliminate, isolate or minimise the hazards and refer to the JSWEP for additional information.

Establish traffic and pedestrian management and isolate the area of works with cones, barricades and work vehicles equipped with flashing lights.

If excavation is required carry out or arrange for all underground services to be located.

If working within the drip line of a tree arrange for an Arborist to attend.

Ensure environmental management procedures are implemented (refer to BMPs).

Before isolating the wastewater asset and beginning modifications, review and confirm on site the items listed in Figures 1 to 8 and action as appropriate throughout the works.

4.2.2 Customer management

The management of customers during a sewer overflow or repair is important as the overflow may create a public health and safety risk to people who may be exposed to contamination.

When the public is likely to be affected or exposed to the contamination ensure the following actions take place:

- Escalate to Supervisor and QLDC 3W Contract Manager
- Set up barriers and appropriate signage to keep people away from the contaminated site
- Contact property owner/tenant and confirm immediate isolation and disinfection requirements for the contaminated area
- Arrange for eduction and cleaning equipment for the clean-up of private and public property affected
- If the loss of service is likely to be greater than four (4) hours or sewage has entered a building escalate to Supervisor and QLDC 3W Contract Manager
- If overflow has entered a watercourse or stormwater drainage system notify the ORC and/or Public Health South.

4.3 Sediment control

Sediment control must be implemented as soon as possible to minimise the amount of sediment leaving a site. The Maintenance Contractor is to make sure controls are appropriate for the scale of works and ensure the site is clean and tidy before leaving.

4.3.1 Escalation to Council on-call duty person and Otago Regional Council

If a large volume of sediment has entered a waterway prior to attending the site and implementing sediment control, escalate to the Council on-call duty person and the ORC.

If clean-up is restricted due to access or time constraints (ie late night and residential area, cars parked over sediment) the Contractor must:

- Undertake as much clean-up as possible within the restrictions

- Escalate to the Council on-call duty person
- Notify the ORC to inform them of the situation, the state of the clean-up at the time and further actions that will be undertaken
- Return to site the following day to assess and undertake further clean up if possible. Close out the incident with the ORC.

Should clean-up continue to be restricted, escalate to the Council on-call duty person, and inform the ORC that all practicable steps have been undertaken and confirm they are satisfied with the response.

All calls and times to the ORC must be logged in the HANSEN record.

Take photos where possible.

4.3.2 Otago Regional Council awareness of pollution events

The Otago Regional Council have officers who do site checks. Members of the public will alert Council to sediment and/or pollution events.

4.4 Job management system

Update the job management system throughout the works – particularly when service is disrupted and restored and when there are any delays to expected disruption and restore times.

5. Procedure for responding to sewer overflows to receiving waters

5.1 Containment of the wastewater spill

- Where a Dry Weather Wastewater Overflow spill has occurred as a result of the blockage or damage, implement basic containment (eg sandbags) as the first priority after health and safety
- Protect stormwater systems by blocking stormwater grates or other points of entry
- Remove all visible material from all sewage spills and disinfect the area with an approved treatment chemical
- Dispose of all contaminated materials used for containment in a safe and approved manner
- If circumstances dictate that there will be some delay before the pipe or manhole can be unblocked and/or a repair can be carried out, consider reducing the impact by diverting or temporarily over-pumping the wastewater flow to minimise the adverse effects
- In some situations, containment is not feasible (eg where there is a high rate of discharge from the reticulation, in remote locations, or where site access limitations exist). A 'best endeavours' approach to containment is required to minimise potential adverse public health or environmental effects.

5.2 Isolation of wastewater asset to be modified

Where a sewer pipe or manhole/chamber in the live network is to be repaired or modified, make suitable arrangements to isolate the wastewater flows from the asset before work begins. Isolation options are as follows:

- "Plug and release"
  The sewer line is plugged at upstream manhole(s) to enable repair of the wastewater pipe. This option may only be possible if there is enough storage volume in the network; a large storage volume will allow more time for "on-line" modification works

- Temporary bypass of flows
  Plug the upstream manhole and install a temporary bypass pump with the outlet pipe conveying the wastewater to the closest suitable downstream manhole
- Vacuum truck removal of wastewater stored within wastewater reticulation
  If the above two options are not suitable then consider using vacuum trucks to convey the wastewater from above the section of pipe being repaired to a suitable downstream manhole. The need for vacuum trucks should be approved by the Supervisor and QLDC 3W Contract Manager.

5.3 Confined Space Entry

If Confined Space Entry is required at any stage of these works, only personnel that are suitably trained in accordance with the *QLDC 3W Network Access Procedure* and in accordance with AS/NZS 2865 shall participate in the confined space procedure.

5.4 Locate blockage and determine if pipe repair or replacement is required

- Attend the site and locate the full and empty manholes. Work upstream, from the empty manhole closest to the blockage or from the affected property, or from the most easily accessible location (ie in the roadway, where it is easiest to get the drainage rods or jet machine near)
- Install a silt trap (basket) in the downstream manhole while using drainage rods or water jet machine to capture any debris dislodged from the sewer. Dispose of the dislodged debris at an approved location
- Water for the jet machine is available from Council hydrants using a metred hydrant stand with backflow prevention
- Jet machine clearing of blocked reticulation sewers is allowed for all pipe types, however, pressure shall not exceed 120bar (1750 psi) in Vitreous Clay pipes. If excessive silt/debris or any pipe pieces are retrieved by the jet machine, **stop jetting** and inform the Supervisor and the QLDC 3W Contract Manager and wait for further instruction. If the dislodged debris includes **broken pieces of sewer pipe**, **stop jetting** and arrange for a CCTV survey to locate the position and depth of the broken sewer pipe/connection
- Jet machine cleaning of blocked reticulation sewers shall be from the downstream manhole pulling the debris, silt and fat back towards the manhole from which you are working
- Continue moving the jet machine hose backwards and forwards until the sewer blockage is cleared ensuring that the blockage is cleared by using the jet machine from manhole to manhole
- Use the jet machine counter to pinpoint the location of the problem for reporting to QLDC
- Blockages in manhole drop-pipes shall be treated in the same manner as detailed above
- Before using a cutter on lines other than Vitreous Clay, contact the Drainage Supervisor for approval. Undertake a CCTV survey to check for protruding services before using a hydraulic cutting machine. Using the appropriately sized cutter head (starting from a smaller cutter and increasing in size to a full sized cutter), and working from the nearest manhole downstream of the blockage, insert the jet machine hose upstream to the blockage and commence clearing the blockage
- If the blockage is not cleared within one (1) hour of arriving on site, and sewage is overflowing or a sewer overflow is imminent, then arrange for bypass pumping of sewage from a suitable upstream point to alleviate the overflow or use of vacuum trucks to take wastewater away
- Sewer blow-back at lateral connections can occur while jetting shallow sewers or when jetting 'downstream' when access dictates (where the nozzle propulsion jets point up the sewer lateral). This may result in fittings in properties (in particular toilets) gurgling or being subject to rises and

falls in water levels, in the worst-case sewage may come out of these fittings. If operating a high-pressure water jet in a known shallow sewer area, reduce water pressures from the jet machine and move the jet hose/nozzle more slowly within the sewer. Using the jet truck in a downstream direction is not recommended

- If blow-back occurs, immediately inform the Supervisor and the QLDC 3W Contract Manager and make all efforts to attend to the immediate needs of the property owner or occupier who has experienced property damage or have suffered other inconveniences as a result of this "blow back"
- Before leaving the site, wash down the manhole from which the machine operated.

5.5 Cleaning contaminated water bodies

Begin cleaning the contaminated water body(ies) after containing the overflow and repairing the pipe. Clean-up may involve the following methods:

- Pumping / vacuum recovery of contaminated water
- Vacuum recovery of sludge
- Rake/spade/sweep to recover solids and debris and then bagging material for appropriate disposal; or
- Areas with prolonged exposure may require excavation, regrading and redressing.
- Affected areas should only be washed down where washdown water can be captured by the containment system. Collect all washdown water for disposal at an appropriate facility or discharge back into the wastewater network
- Disinfection is to be used where a public health risk exists. Disinfectants can adversely affect aquatic life and should only be used with appropriate controls to ensure contamination of a waterbody does not occur as a result of the application or subsequent rainfall
- Where significant contamination of a waterbody has occurred, the response crew shall recover dead and distressed fish that have become trapped behind containment barriers. Transfer live fish to a fish bin using a scoop net before release to an uncontaminated water course. Dispose of dead fish at an appropriate waste disposal facility
- Where the stormwater system has been contaminated or where residual material remains in a watercourse following clean-up, flush using reticulated water supply. Flushing should not be used as a clean-up method and should only be utilised after the clean-up has been completed. Before commencing any flushing, agreement should be reached with the Otago Regional Council staff that this action is appropriate

5.6 Customer Care

If the job takes longer than planned, notify the Council Contact Centre and the QLDC 3W Contract Manager by phone and provide a new completion time and date. Affected property owners and tenants shall also be informed.

If unblocking/repair is likely to over-run the four (4) hour KPI for service restored, advise Supervisor and Dispatch. Dispatch will notify the Contact Centre and key customers as required.

Upon completion of the works leave a calling card with contact details so the customer can contact the Contractor with any queries or complaints.

5.7 Reinstatement

Carry out all backfill and reinstatement in accordance with Council's Code of Practice for Working in the Road.

6. References

The following documents provide further guidance on correct operations and maintenance procedures and materials:

- QLDC Three Waters Maintenance Contract
- QLDC Code of Practice for Land Development and Subdivision; including Working in the Road
- QLDC Approved Materials for wastewater construction and repair
- QLDC Water Bylaw
- QLDC Incident Management Plan
- QLDC Best Management Practices (BMPs)
- WorkSafe NZ (OSH, Department of Labour) – Code of Practice for Manual Handling (June 2001)

7. Flowchart

Are you familiar with the work and the connection onto Council's networks?	Have you been trained in all tasks that you will be performing?	Have you got the necessary resources, plant and equipment to carry out the job safely?	Have you got all the necessary Personal Protective Equipment (PPE) to do the job safely?	Is someone from your company always in control and in charge of the activity?

If NO, Don't start until all are YES

Service request received

Standard Operating Procedure (SOP)

Response to sewer overflows to receiving waters

Planning assessment

1. DWO / contamination of property and/or damage possible?
2. Safe access (refer manhole opening procedure) and locate utilities
3. Is there a risk to public health? Notify QLDC 3W Contract Manager and advise Public Health South
4. Traffic and pedestrian management
5. Is there a risk of discharge enetering a waterway or stromwater susyem? Notify QLDC 3W Contract Manager and ORC
6. Choose method of unbocking/repairing based on pipe flows, condition, access etc
7. Historic site or significant trees

On site

- Initial job scoping
- Health & Safety assessment
- Make site safe
- **Complete Pre-start form**

Refer to relevant guideline / SOP

Refer to JSWEP

Is it possible to contain the spill and prevent overflow to receiving waters?

No

Yes

Determine Incident Level and escalate as set out in the QLDC IMP

- Set up traffic and pedestrian management
- Establish extent of contamination (visual inspection and test for ammonia, record time)
- Notify Critical Care/Dialysis/Key account customers in person
- Mobilise additional resources for containment and clean-up

At source containment

Protect stromwater systems by blocking stormwater grates or other points of entry

Create temporary storage using weirs, bunds, or by excavating detention area

Diversion

By-pass pump from ponding area or upstream sewer to downstream sewer

Remove overflow from ponding area using vacuum truck. Discharge to sewer

Stop or divert upstream discharges where feasible

Containment in a water body

Form temporary instream containment by placing sandbags or inflatable bunds if required

Pump from upstream to downstream sewer and flush

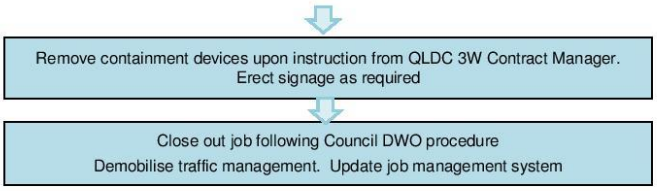
Implement at-source containment using sandbags, plastic sheets, pipe plugs

Unblock sewer from downstream manhole/rodding eye/access chamber using rodding or jetting equipment

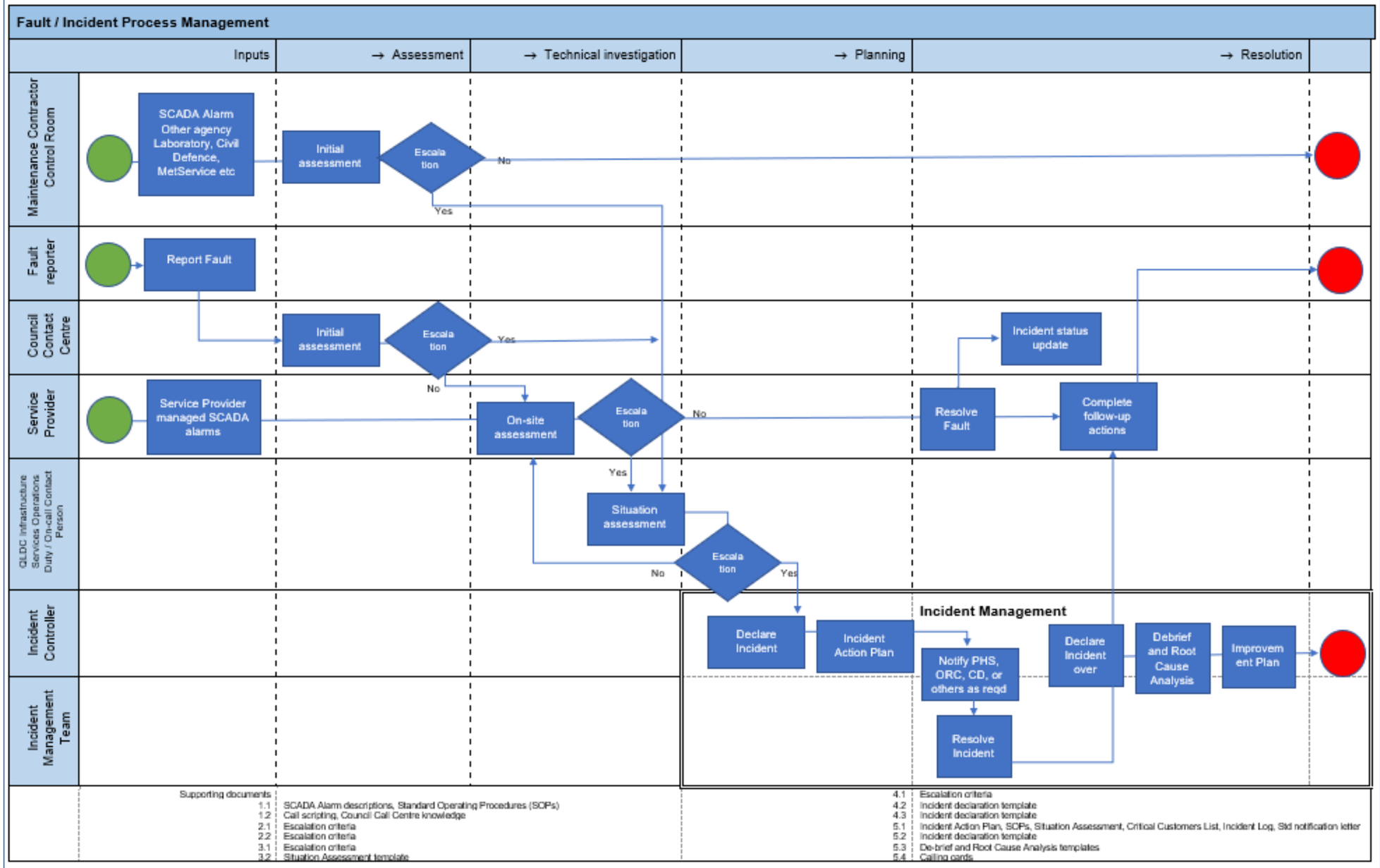
Clean-up, removing contaminated water, solids and other debris

Disinfect contaminated land and property with approved disinfectant chemicals. Ensure controls prevent chemicals from entering watercourses

Continued …


Remove containment devices upon instruction from QLDC 3W Contract Manager.
Erect signage as required
Close out job following Council DWO procedure
Demobilise traffic management. Update job management system

3 QLDC Fault and Incident Process Management

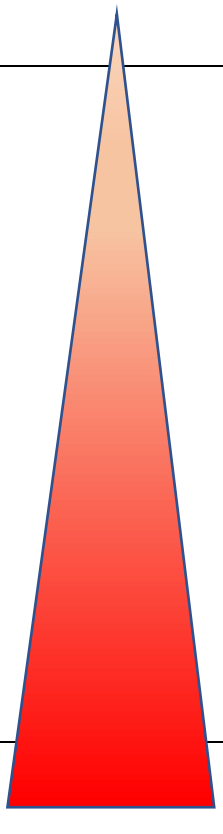
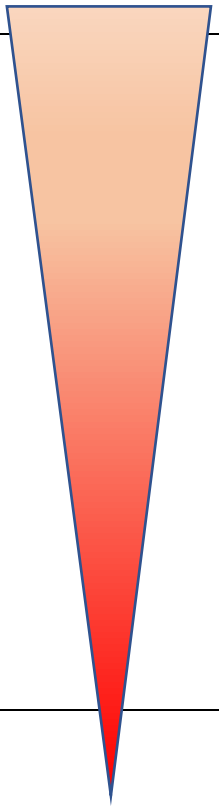


4 QLDC Risk Threat Level and Ownership

The QLDC Risk Management Policy sets out the risk level ownership as follows:

Risk Threat Level	*RMF Policy Risk Level*	*Risk Ownership*
5 Extreme	VH- Very High	Chief Executive or sub-delegate
4 Significant	H- High	General Managers (T2) or sub-delegate
3 Major	M- Moderate	General Managers or Tier 3 Managers
2 Moderate	L- Low	Tier 3 / Tier 4 Managers
1 Minor	i- insignificant	Tier 3 / Tier 4 Managers

The Level 1 and 2 risk category ownership is delegated through the Council maintenance contractor Service Level Agreements (incorporating Standard Operating Procedures and KPIs).

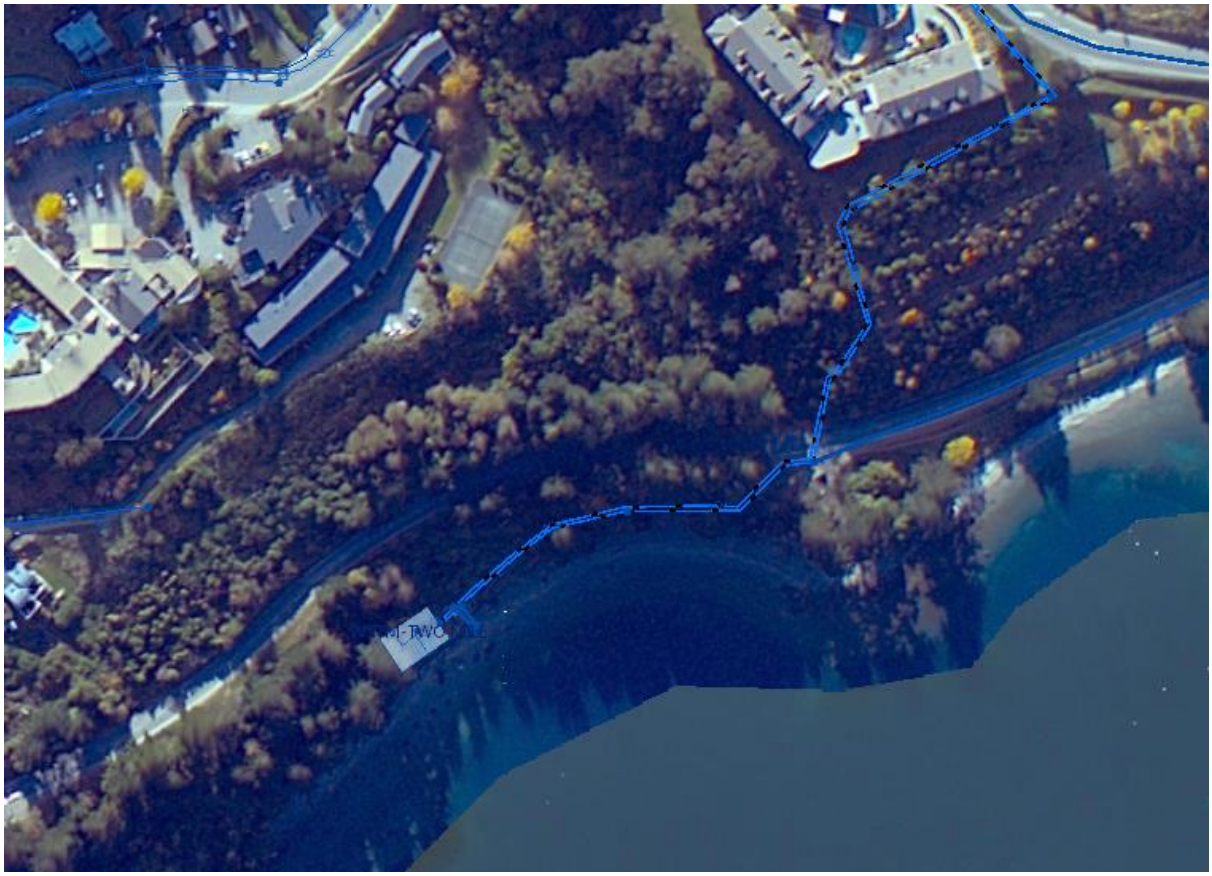
Risk Category Threat Level	Consequence	Occurrences	QLDC Escalation Level	Service Provider Escalation Level
Level 1 **Minor** Fault (BAU)	Low consequence	High frequency of occurrences	**First respondent**	Contractor Representative with appropriate level of delegated authority
Level 2 **Moderate** Minor Incident Localised			Business hours: **Normal structure** After hours: **Rostered Council Duty / On-call Contact Person**	
Level 3 **Major** Significant Single Hub			**Tier 3 Manager** Incident Controller or GM Infrastructure	
Level 4 **Significant** Major Incident Multiple Hubs Major facility/asset Regional			**T2 - General Manager Infrastructure** Management Coordination Group	
Level 5 **Extreme** CD Emergency Regional/National	Extreme consequences	Rare frequency of occurrences	**Chief Executive** Executive Management Team CD Emergency	

5 QLDC Wastewater Threat Level Examples

Threat Level	Incident Controller	Wastewater Treatment	Trunk network	Local networks	Declaration	Informed
Level 1 BAU Minor **f**ault	***1st Responders:*** ***Service Provider Shift Engineers*** ***Maintenance staff*** ***Duty Operators***	*Loss of comms single site* *Fault –redundant capacity available* *Process alarm - adequate redundant equipment available*	*Single site alarms/loss comms* *Individual complaints* *Wet weather overflow* *Local odour* *Noise*	*Loss of service up to 4 hours* *Minor impact localised failure only* *No property damage* *Local customer impact*	*1st Responder*	*Council Duty / On-call Contact Person* *QLDC Contract Manager – 3 Waters*
Level 2 Minor incident	***A/hrs:*** ***Council Duty / On-call Contact Person*** ***Bus hrs:*** ***Tier 4 Manager*** ***QLDC Contract Manager – 3 Waters***	*Multiple sites loss of comms* *Potential loss of target redundancy levels for process and operations (n-1 target threatened)* *Imminent Consent Breach* *Security alarm*	*Multiple sites loss of comms* *Consent breach* *Security alarm* *Dry weather overflow* *Multiple wet weather overflows, widespread public health; property damage* *Multiple public complaints (odour/noise)* *Local power outage*	*Uncontained overflows for greater than 20 minutes* *Pump at pump station not pumping for greater than 3 hours* *Minor property damage less than $1,000* *Minor public impact* *Loss of service between 4 and 8 hours* *Minor property damage of less than $500*	*Council Duty / On-call Contact Person* *QLDC Contract Manager – 3 Waters*	*QLDC Maintenance & Operations Manager*
Level 3 Significant incident	***Tier 3 Manager*** ***QLDC Maintenance & Operations Manager***	*Confirmed loss of target redundancy levels for process and operations (short term n-1 target breech)* *Confirmed Consent breach* *Security Breach*	*Widespread power outage multiple sites* *Security Breach* *Extended duration high volume Dry weather overflow >4hrs <24hrs* *Dry weather overflow sensitive environment; public health risk; property damage* *Widespread power outage*	*More extensive failure of services extending between 8 hours and 24 hours* *A critical pump station failure or 3 to 6 pump stations* *Less than 500 properties affected* *Possible health and safety issues* *Property damage between $1,000 and $10,000*	*QLDC Maintenance & Operations Manager*	*GM Infrastructure*
Level 4 Major Incident	***Tier 2 Manager*** ***GM Infrastructure*** ***Management Coordination Team***	*Sustained loss of target redundancy levels for critical process and operation (long term n-1 target breach)* *Sustained Consent breech with immediate impacts on local community*	*Loss of single critical asset resulting in significant loss of system capacity* *Large scale extended duration >24hrs dry weather overflow sensitive environment; public health risk; property damage*	*Major failure level of service extending beyond 24 hours and having extensive impact* *More than 500 properties or public areas affected* *Significant health and safety issues* *Property damage greater than $10,000*	*GM Infrastructure*	*Chief Executive*
Level 5 Extreme catastrophe Civil Defence State of Emergency	***Chief Executive*** ***Executive Management Team***	*Civil Defence emergency declared*	*Widespread loss of multiple assets resulting in significant loss of capacity for extended duration*	*Extensive and prolonged failure of services leading to a Civil Defence emergency*	*Civil Defence/* *Executive Management Team*	*Chief Executive*

6 QLDC Raw Water Intakes Site Specific Details

a) Lake Wakatipu - Two Mile Intake



Two Mile water intake is on the southern (lake side) of the Glenorchy - Queenstown Road, approximately 400m west of the Fernhill roundabout.

Average daily volume pumped:	7,000 m^3 – 12,000 m^3
Associated storage (Fernhill No 1 Reservoir):	8,600 m^3
Hours of available reservoir storage:	10-12 hours

Wastewater pump stations within close proximity:

Sunshine Bay WWPS (situated upstream of the intake)

- Average time between pump cycles (peak flow): 20 minutes
- Emergency wastewater storage: 200 m^3
- Hours of available emergency storage: approx 20 hours (via manual operation).

Wastewater network within close proximity:

Wastewater pumped from Sunshine Bay WWPS is conveyed along a 200 mm rising main where it combines with a 150 mm line at a manhole halfway towards Queenstown on the Glenorchy Road. Any overflow from this manhole or any other manhole nearby is likely to end up draining into the lake, near to the Two Mile raw water intake. Wastewater from this manhole on the Glenorchy Road gravitates towards Queenstown along the Lake Esplanade sewer to Marine Parade WWPS.

b) **Lake Wakatipu - Kelvin Heights Intake**

The Kelvin Heights intake is located on Pumping Station Road off Peninsula Road, Queenstown on the Frankton Arm lake front. The Kelvin Heights water intake is approximately level with no. 269 Peninsula Road.

Average daily volume pumped:	4,000 m^3 – 8,000 m^3
Associated storage (Kelvin Heights Reservoir):	1,000 m^3
Hours of available reservoir storage:	4-6 hours

Wastewater pump stations within close proximity:

Bay View WWPS (situated upstream of the intake); any overflow from the WWPS will discharge direct to Lake Wakatipu. Average time between pump cycles (peak flow): 4 hours

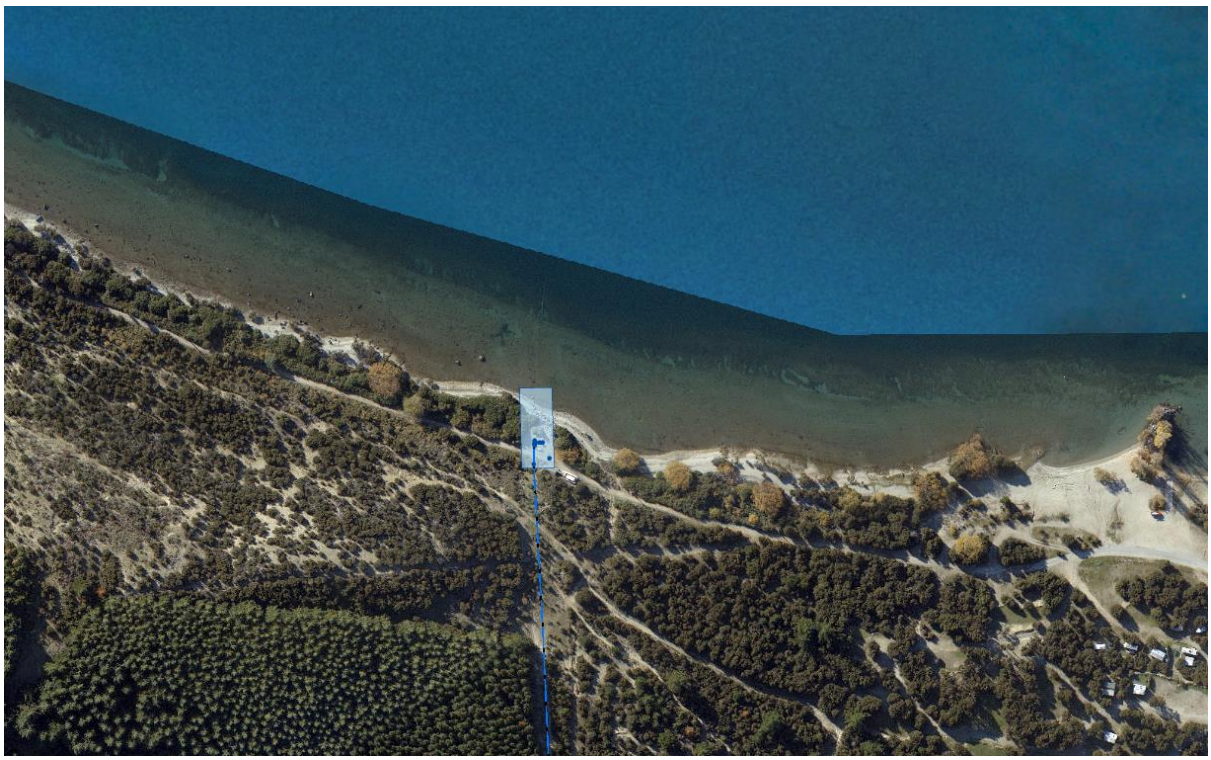
- Average daily wastewater volume pumped: 200 m^3 – 500 m^3
- Hours of available emergency wastewater storage: 3 hours (via manual operation)

Willow Place WWPS is located downstream of the Kelvin Heights intake. Any overflow from this pump station is likely to flow towards the Lake outlet of the Kawarau River and away from the Kelvin Heights intake.

Wastewater network within close proximity:

The 225 mm PVC rising main from Bay View WWPS to the high point along Peninsula Road runs for 1,010 m (the first 600 m of has been u-lined reducing the internal diameter to approximately 195 mm). From the high point of IL 327.0 m and a manhole behind 359 Peninsula Road the line becomes gravity fed to Willow Place WWPS. The route of this sewer main follows the Kelvin Heights track with a number of manholes positioned along it. The Kelvin Heights intake is located approximately halfway along this section of gravity sewer main and within metres of this line; wastewater overflow from this section of gravity main is likely to contaminate lake water beside the Kelvin Heights intake.

c) Lake Wanaka - Beacon Point Intake



The Beacon Point intake is located on the Lake Outlet Road off Aubrey Road. Access to the intake is obtained through the campground. Beacon Point intake is situated on the lake front close to the outlet of the Clutha River.

Average daily volume pumped:	2,000 m3 – 12,000 m3
Associated storage (Western Reservoir):	3,500 m3
Hours of available reservoir storage:	7 hours

Wastewater pump stations within close proximity:

None.

Wastewater network within close proximity:

Septic tanks from Lake Outlet Campground. These septic tanks are the closest potential source of wastewater contamination to Beacon Point intake; the campground is located downstream of the intake. There is minimal risk of a wastewater overflow occurring within close proximity to this lake intake.

d) **Lake Wanaka - Western Wanaka Intake**

The Western Wanaka intake is accessed off the Wanaka - Mount Aspiring Road and is located on the lake shore within the Rippon Vineyard Estate.

Average daily volume pumped:	1,000 m^3 – 2,500 m^3
Associated storage (Western Reservoir):	1,040 m^3
Hours of available reservoir storage:	6 – 10 hours

Wastewater pump stations and network within close proximity:

Edgewater Resort WWPS (situated upstream of the intake). Any overflow from the WWPS will discharge into a pond with an outlet to Lake Wanaka.

- Average time between pump cycles (peak flow): 1.5 hrs
- Average daily wastewater volume pumped: 50 m^3 – 100 m^3
- Emergency storage: 15 m^3
- Hours of available emergency wastewater storage: 6 hours

e) Hawea Intake

The Lake Hawea intake is located on Accessway Road, above the outlet to the Hawea River, on the dam and road into Hawea township.

Average daily volume pumped:	200 m^3 – 1,500 m^3
Associated storage (Hawea Reservoir):	1,000 m^3
Hours of available reservoir storage:	14 - 20 hours max.

Wastewater pump stations within close proximity:

None

Wastewater network within close proximity:

A sewer main runs down the hill from Capell Avenue to Domain Road; the likelihood of any overflow from this sewer contaminating the lake water at the point of the intake is low given that the outlet from the lake is adjacent to the intake.

f) QLDC Aquifers

The QLDC network also includes five (5) water pump stations where underground aquifers are pumped via bores:

- Arthurs Point
- Glenorchy
- Arrowtown
- Hawea, and
- Shotover Country.

Bore pumps extracting raw water from aquifers for domestic consumption are operated in accordance with the respective Water Safety Plan, taking into consideration the raw water quality influent parameters, and in compliance with the Health Act 1956 (as amended by the Health (Drinking Water) Amendment Act 2007) and the Drinking-Water Standards of New Zealand 2005 (revised 2018).

7 Wastewater Overflow Notification and Contact Details

The QLDC points of contact and escalation hierarchy:

Threat Level Priority	Name	QLDC role	Contact Number
1	Andrew Strahan (office hours)	Contract Manager 3 Waters	021 667 200
1	Infrastructure On-Call Person (between 5pm and 8am, and weekends)		03 450 1744
2	Erin Moogan	Maintenance & Operations Manager	027 485 9311
3	Ulrich Glasner	Chief Engineer	027 222 4813
4	Peter Hansby	General Manager Property & Infrastructure	027 202 9348

Additional key contacts:

Name/Title/Description	Organisation	Contact Number
Susan Moore Drinking Water Assessor	Public Health South	0274 521 368
Duty Medical Officer of Health (via Dunedin Hospital)	Southern District Health Board (Public Health South after hours point of contact)	(03) 474 0999
Pollution Control Hotline	Otago Regional Council	0800 800 033
Kāi Tahu	Aukaha Te Ao Marama	An email notification to info@aukaha.co.nz An email notification to office@tami.maori.nz and call to 03 9311242