# Attachment D - Glinks Gully Water Safety Plan risk table

| Stage | Event | No. | Cause | Likelihood | Consequence | Max Risk | Indicators | Preventive measures in place | Correction Actions | What to Check | Risk Managed | Likelihood | Consequence | Residual Risk | Acceptable | Certainty | Additional Measures | Resp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Spring recharge zone | Microbiological contamination | 1.01 | Surface contamination from farming/ag activities in the adjacent area | Unlikely | Catastrophic | High | High raw water E. coli results, Turbidity in raw water, Prolonged heavy rain, extreme weather events, Illness in community | Implementation of Resource Management Planning Rules ie Regional Policy Statement, NES for Sources of Human Drinking-water. Land use consents. Subsequent treatment barriers effective against microbiological contamination. Immediate area around spring is fenced and protected | Abstraction can be turned off and revert to treated water storage. Boil water notice can be issued. Incident response plan. Provision of tankered water | Effectiveness of disinfection barriers, source water monitoring results<br>Land use changes. Weekly applications received from NRC for consents | Yes | Unlikely | Minor | Low | Y | Confident | | WWM PDE |
| | Microbiological contamination | 1.02 | Surface contamination directly around infiltration gallery, ie animals/birds | Almost Certain | Catastrophic | Extreme | Animals and Birds in spring area.<br>Illness in community | Infiltration gallery buried and not directly exposed to contamination<br>Subsequent treatment barriers effective against microbiological contamination.<br>Abstraction area fenced off | Abstraction can be turned off and revert to treated water storage. Boil water notice can be issued. Incident response plan. Provision of tankered water | Effectiveness of disinfection barriers, source water monitoring results<br>Land use changes. Weekly applications received from NRC for consents<br>Signs of animals/birds | Yes | Unlikely | Minor | Low | Y | Confident | | WWM PDE |
| | Chemical Contamination | 1.03 | Surface runoff containing chemical contaminants from agricultural activities. | Unlikely | Moderate | Medium | Taste and or odour, information provided by Regional pollution hotline or public. Source water chemical screen indicates chemicals. Regional Council SoE reporting | Implementation of Resource Management Planning Rules , NES for Sources of Human Drinking-water.<br>Subsequent treatment barriers oxidise some chemicals<br>HSNO control on using and handling chemicals<br>Regional Water Plan, Clean streams accord | Abstraction can be turned off and revert to treated water storage. Incident response plan. Consumers advise water cannot be consumed. | Chemical suite, trends in raw water composition<br>Regional Council HAIL list | Yes | Rare | Minor | Low | Y | Reliable | | WWM PDE |
| | Chemical Contamination | 1.04 | Chemical spill in recharge zone e.g traffic accident on Red Hill Road or Glinks Road above intake | Unlikely | Moderate | Medium | Notification or report to pollution hotline or emergency services call out<br>pH of raw water | Roading set back from abstraction area<br>Attenuation from area directly around spring | Abstraction can be turned off and revert to treated water storage. Incident response plan. Consumers advised water cannot be consumed. Provision of tankered water | Timeliness of Reporting | Yes | Rare | Minor | Low | Y | Confident | Develop notification procedures with NRC and Police and schedule any raw water sampling. | WWM PDE |
| | Chemical Contamination | 1.05 | Use of herbicides or pesticides in recharge zone | Possible | Moderate | Medium | Source water chemical screen indicates chemicals. Regional Council SoE reporting. Weed control or pesticide controls programme operating | Weed control programmes conducted in a manner to minimise run off. HSNO controls on use and certified operators used.<br>Attenuation from area directly around spring | Abstraction can be turned off and revert to treated water storage. Incident response plan. Consumers advised water cannot be consumed. Defer or cease HSNO operation | Consents and approvals. Weekly applications received from NRC for consents | Yes | Unlikely | Minor | Low | Y | Confident | | WWM PDE |
| | Loss of supply | 1.07 | Drought reduces quantity of water that can be abstracted | Unlikely | Catastrophic | High | Water levels and flow rates, weather conditions | Consent conditions prioritise water take. Visual checks. Regional Council monitoring programme provides for early detection.<br>Treated water storage | Initiate water demand and conservation management<br>Tanker supplies of treated water can be brought in during drought periods to overcome limitations of water source. | Catchment rainfall<br>Monitor leakage and high flow rates, send contractor to investigate. | Partially | Unlikely | Moderate | Medium | Y | Reliable | Investigate options of increasing supply during peak through capacity of the raw water supply line or increasing storage | WWM PDE |
| 2. Abstraction | Microbiological contamination | 2.01 | Infiltration gallery failure allowing for contaminated water getting into gallery from shallow depths | Possible | Catastrophic | High | Raw water reservoir level<br>Positive E. Coli results from distribution system | Monthly inspections<br>Asset management and maintenance | Treated water storage. Incident response plan.<br>Consumers advised water cannot be consumed.<br>Provision of tankered water | Raw water turbidity<br>Visual inspection of abstraction area<br>E. coli results | Yes | Unlikely | Minor | Low | Y | Confident | | OEWS WO&M |
| | Loss of supply | 2.02 | Cannot abstract water due consent conditions | Unlikely | Major | Medium | Volume and flow to plants.<br>Expiry date of existing resource consents. | Implementation of Resource Management Planning Rules<br>Current consent up to 100m3 /day | Renew before expiry. | Any changing Regional Council policy | Yes | Unlikely | Minor | Low | Y | Confident | | OEWS WO&M |
| | Loss of supply | 2.03 | Intentional vandalism or accidental damage to gallery | Unlikely | Major | Medium | Raw water reservoir level<br>Volume and flow to plants. Visible damage, threats, reported suspicious activity | Monthly inspections. Site is remote<br>Legal deterrents. Gallery can withstand some damage.<br>Subsequent treatment barriers<br>Treated storage. | Repairs, consumer advisory to conserve water | Raw water turbidity<br>Access to red hill springs | Yes | Unlikely | Minor | Low | Y | Confident | | OEWS WO&M |
| 3. Raw Water Main | Microbiological contamination | 3.01 | Ingress of surface/ground water into raw water line | Possible | Major | High | Raw water reservoir level<br>Turbidity<br>Positive E. Coli results from distribution system<br>Signs of leaks of surface | Land use around raw water main provides some protection (mostly reserve land)<br>Maintenance & repairs<br>Treated water storage. Subsequent treatment barriers | Treated water storage. Incident response plan.<br>Consumers advised water cannot be consumed.<br>Provision of tankered water<br>Plant shut down | Line between gallery and treatment plant | Yes | Unlikely | Minor | Low | Y | Reliable | | OEWS WO&M |
| | Loss of supply | 3.02 | Raw water main failure | Possible | Catastrophic | High | Reduced/no flow to treatment plant<br>Low storage tank levels<br>Condition and type of materials of main<br>Condition assessment of raw main shows materials in poor condition | Maintenance & repairs<br>Treated water storage | Incident response plan. Provision of tankered water | Line between gallery and treatment plant<br>Records of rising main failures and repairs | Yes | Unlikely | Minor | Low | Y | Reliable | | OEWS WO&M |
| 4. Pretreatment | Particles not removed | 4.01 | Pressure Multi Media Sand Filter - insufficient filtration of suspended solids, particles (15 micron) | Likely | Moderate | High | Pressure differential<br>Flows<br>Clogging of next filters in series<br>Treated water turbidity | Treated water back wash when filter pressure differential reaches set point or weekly backwash<br>Subsequent treatment includes filtration barrier<br>Trained operators | Plant shut down<br>Repairs, consumer advisory to conserve water | Maintenance records<br>Pressure differential weekly<br>NTU weekly | Yes | Unlikely | Minor | Low | Y | Confident | | OEWS WO&M |
| | Particles not removed | 4.02 | Jumbo Filter - insufficient filtration of suspended solids, particles (5 micron) | Likely | Major | High | Pressure differential<br>Flows<br>Clogging of next filters in series<br>Treated water turbidity | Previous filtration<br>Treated water storage<br>Subsequent treatment includes filtration barrier<br>Trained operators. Spare cartridges onsite | Replace filter cartridge<br>Repairs, consumer advisory to conserve water | Maintenance records<br>Pressure differential weekly<br>NTU weekly | Yes | Unlikely | Minor | Low | Y | Confident | | OEWS WO&M |
| | Particles not removed | 4.03 | Filterite Filter - insufficient filtration of suspended solids, particles (1 nominal/1 absolute) | Likely | Major | High | Pressure differential<br>Flows<br>Clogging of next filters in series<br>Treated water turbidity | Previous filtration<br>Treated water storage<br>Subsequent treatment includes filtration barrier<br>Trained operators<br>Spare cartridges onsite | Replace filter cartridge<br>Repairs, consumer advisory to conserve water | Maintenance records<br>Pressure differential weekly<br>NTU weekly | Yes | Unlikely | Minor | Low | Y | Confident | Investigate options of installing inline turbidity monitoring equipment | OEWS WO&M |
| n | Inadequate disinfection | 5.01 | Inadequate contact time | Possible | Major | High | Calculation of retention time determines contact time is inadequate<br>FAC levels. E. Coli or elevated coliforms trends in verification testing | Contact time provided by reservoir and mains<br>Groundwater source lower microbiological risk<br>Pretreatment controls chlorine demand | Chlorine dose point is set to 0.8 mg/L | Contact time. Microbiological quality, Flow rates, Post treatment FAC and pH weekly | Yes | Unlikely | Minor | Low | Y | Unsure | | OEWS WO&M |
| | Inadequate disinfection | 5.02 | Sodium hypochlorite supply exhausted | Possible | Catastrophic | High | Illness in community.<br>FAC is less than 0.2 mg/L or E. coli detected in water in the distribution system. | Supply agreement with IXOM<br>Maintain 3 months chemical supply on-site<br>Groundwater source lower microbiological risk<br>Pretreatment controls chlorine demand | Abstraction can be turned off and revert to treated water storage. Incident response plan. Consumers advised water cannot be consumed. Provision of tankered water | Post treatment FAC - 2x weekly<br>Containers onsite/turnover | Yes | Rare | Moderate | Low | Y | Confident | | OEWS WO&M |

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| 5. Glinks Treatment Plant - Chlorinatio | Inadequate disinfection | 5.03 | Dosing system failure | Likely | Catastrophic | Extreme | FAC is less than 0.2mg/L or E. coli detected in water in the distribution system. | Operator visits plant at least 2x week<br>Groundwater source lower microbiological risk<br>Pretreatment controls chlorine demand<br>Supervised & trained operators | Repair and return to service<br>All staff trained in dosing operation.<br>Revert to treated water storage. Incident response plan.<br>Consumers advised water cannot be consumed.<br>Provision of tankered water | Operation of chlorine dosing pump<br>Post treatment FAC - 2x weekly<br>Containers onsite/turnover | Yes | Unlikely | Minor | Low | Y | Confident | Investigate option of installing inline chlorine monitoring equipment | OEWS WO&M |
| | Inadequate disinfection | 5.04 | Automated chlorine dose rate incorrect | Likely | Catastrophic | Extreme | FAC is less than 0.2 mg/L or higher or E. coli detected in water leaving the WTP | Chlorine dose rate is flow paced<br>Operator visits plant at least 2x week | If FAC sampling indicates incorrect FAC level, adjust dose rate as required | Post treatment FAC | Yes | Unlikely | Minor | Low | Y | Confident | Update Operations and Maintenance manuals to reflect actual FAC target values. | OEWS WO&M |
| | Inadequate disinfection | 5.05 | Lack of chlorine due to dosing line failure or leak. | Possible | Catastrophic | High | FAC is less than 0.2mg/L or E. coli detected in water leaving the WTP<br>Strong chlorine smell at treatment plant | Maintenance<br>Operator visits plant at least 2x week | Repair chlorine dosing line<br>Revert to treated water storage. Incident response plan.<br>Consumers advised water cannot be consumed.<br>Provision of tankered water | Post treatment FAC | Yes | Unlikely | Minor | Low | Y | Confident | | OEWS WO&M |
| | Over Chlorination | 5.06 | Dosing system failure. | Possible | Moderate | Medium | FAC level exceeds 2 mg/L.<br>Odour and taste complaints | Maintenance<br>Operator visits plant at least 2x week | Advise consumers if high chlorine FAC is delivered to the distribution zone | Post treatment FAC<br>Operation of chlorine dosing pump<br>FAC alarms, on-line data and in distribution zone | Yes | Unlikely | Minor | Low | Y | Confident | | OEWS WO&M |
| | Over Chlorination | 5.07 | Chlorine dose rate incorrect | Possible | Moderate | Medium | FAC is more than 1.6 mg/L in water leaving the WTP<br>Odour and taste complaints | Maintenance<br>Operator visits plant at least 2x week | Advise consumers if high chlorine FAC is delivered to the distribution zone | Post treatment FAC<br>Operation of chlorine dosing pump<br>FAC in reticulation system downstream of plant | Yes | Unlikely | Minor | Low | Y | Confident | Test for Disinfection by-products after moderate to heavy rainfall at the end of the reticulation network | OEWS WO&M |
| 6. Glinks Treatment Plant - UV | Inadequate disinfection | 6.01 | UV intensity insufficient due to build-up of deposits on sleeve | Likely | Catastrophic | Extreme | E. coli detected in water leaving the plant or illness in the community.<br>Visible build-up of deposits on sleeve and sensor lens | Routine cleaning and maintenance schedule for lamp sleeves and UV sensor.<br>Regular replacement of UV lamp. UVI reference sensor checked regularly and calibrated annually | Clean UV sleeves, Undertake cleaning and maintenance<br>Change lamps, isolate faulty lamp<br>Incident Response plan. Increase chlorine dosing in reservoir | UV Intensity weekly<br>UV hours weekly | Yes | Unlikely | Moderate | Medium | Y | Confident | | OEWS WO&M |
| | Inadequate disinfection | 6.02 | Flow rate through UV unit too rapid for effective treatment | Likely | Catastrophic | Extreme | Flow rate through plant greater than UV unit maximum | Restricted to 75L/min | Slow plant flow rate to that which is optimal for UV units<br>Recalculate dose rates and change flow settings | Flow rates<br>Maintenance records of flow rate controller | Yes | Rare | Moderate | Low | Y | Confident | | OEWS WO&M |
| | Inadequate disinfection | 6.03 | Excessive turbidity/colour in water decreasing the effectiveness of the UV treatment (UVT too low) | Likely | Catastrophic | Extreme | High turbidity levels detected in raw water<br>E. coli detected in water or illness in the community | Water receives filtration. Setpoints within validation conditions and are controlled by the supplier<br>Regular replacement and maintenance of filters | Clean filters<br>Replace filter cartridge | NTU, UVT<br>Filter maintenance schedule | Yes | Unlikely | Minor | Low | Y | Confident | Develop a system of internal checking of important procedures such as calibration | OEWS WO&M |
| | Inadequate disinfection | 6.04 | Power failure resulting in UV unit being unable to work | Possible | Catastrophic | High | Alarms | Alarm to indicate power failure<br>Regular maintenance of UV power supply | Replace faulty equipment<br>Close the supply until power is restored and arrange for another supply of water<br>Consider manual dosing of chlorine | Power supply maintenance schedule<br>Maintenance log and schedule for equipment | Yes | Possible | Minor | Medium | Y | Confident | Investigate agreement for priority allocation of generators | OEWS WO&M |
| 7. Storage | Micro contamination | 7.01 | Leakage through reservoir roof or other parts of structure or access by birds or vermin. | Likely | Moderate | High | Visual evidence of leakage<br>E. coli in water leaving reservoirs | Reservoir is covered and all entry hatches are locked against unauthorised access<br>Regular inspection of reservoirs is carried out. Asset condition assessment<br>Chlorine residual | Repair any reservoir leaks or bird and vermin access points without delay. Take out of service. Install replacement liners where feasible | Post reservoir FAC<br>Leakage from reservoir<br>Access points for birds and vermin<br>Evidence of birds or vermin inside reservoir | Yes | Unlikely | Minor | Low | Y | Confident | Review measures for protecting reservoirs from foreign matter | OEWS WO&M |
| | Micro/chem contamination | 7.02 | Vandalism or unauthorised entry to the storage reservoir | Possible | Moderate | Medium | E. coli in water leaving reservoir<br>Reports from the public<br>Evidence of damage or tampering with reservoir | Reservoir is a large concrete structure with all entry hatches locked against unauthorised access<br>Reservoir is located on land with restricted access.<br>Chlorine residual<br>Operator site visits | Inspect reservoir in response to reports of suspicious activity | Post reservoir FAC<br>Access hatches | Yes | Unlikely | Minor | Low | Y | Confident | Improve documentation and audit process for contractors working on reservoirs or other treated water services | OEWS WO&M |
| | Microbiological contamination | 7.03 | Sediment accumulation within reservoir | Likely | Moderate | High | Visible suspended matter in water in distribution system<br>Visible sludge in bottom of reservoir<br>Complaints from consumers | Source has low sediment load and turbidity below 1 NTU<br>Regular inspection of reservoir is carried out and cleaning undertaken if required | Isolate and clean reservoir as required | Post reservoir FAC<br>Check accumulation of sediment in reservoir every 5 years | Yes | Unlikely | Minor | Low | Y | Reliable | Implement regular reservoir cleaning/scouring at a five year interval | OEWS WO&M |
| | Loss of supply | 7.04 | Failure of reservoirs | Unlikely | Catastrophic | High | Complaints from consumers about loss of supply or pressure<br>Obvious signs of leakage or failure at reservoir site | Asset condition assessments. Reservoirs are constructed of concrete and steel. | Isolate damaged or failing reservoir and supply directly from treatment plant or use other reservoirs | Visual assessment.<br>Structural integrity of reservoir | Yes | Rare | Minor | Low | Y | Confident | Installation of seismic valves storage reservoirs | OEWS WO&M |
| | Loss of supply | 7.05 | Insufficient storage for peak demand | Possible | Catastrophic | High | Loss of water or pressure in reticulation<br>Frequent low reservoir level | Planning controls on new development and connections<br>Treated water storage provides 228m3<br>Designed to achieve 2 days peak flow storage | Introduce conservation and efficiency measures | Reservoir level | Yes | Likely | Minor | Medium | Y | Confident | | OEWS WO&M |
| 8. Reticulation | Loss of water | 8.01 | Pump failure | Possible | Major | High | Frequent low reservoir level | Asset management, certified maintenance staff. | Incident management plan. Demand restrictions imposed | Reservoir level | Yes | Unlikely | Moderate | Medium | Y | Confident | Pumping- upgrade to duty and standy arrangement for pumping. Hold spares allowing for repair/replace <24hrs | OEWS WO&M |
| | Micro/Chem contamination | 8.02 | Inadequate controls on maintenance and construction work | Likely | Major | High | Complaints from consumers about taste or odour. E. coli present in reticulation system | Maintenance and replacement work is undertaken by trained qualified and experienced contractors. Specialist contractors used when required. Council audit of contractors | Implement a boil water notice as outlined in the contingency plan if the quality of the water supplied cannot be assured | Sanitation procedures and sanitation practices of contractors. | Yes | Unlikely | Minor | Low | Y | Reliable | Review repairs for hygiene practice | OEWS WO&M |
| | Micro/Chem contamination | 8.03 | Backflow from consumer connections. | Likely | Moderate | High | Contaminants identified in the reticulation system. Taste or odour complaints from consumers. | Implementation of bylaw. Maintain pressure in the supply | Implement a boil water notice as outlined in the contingency plan if there is evidence of a backflow event | Land-use and building use changes | Yes | Unlikely | Minor | Low | Y | Unsure | Improve backflow protection programme. Check pressures during high demand | OEWS WO&M |
| | Loss of water | 8.04 | Unidentified leakage or illegal connections | Likely | Minor | Medium | Water loss | Known breaks and leaks repaired as a priority. Illegal connections identified | Repair leaks as priority. Disconnect or legitimise illegal connections | Suspicions of illegal connections | Yes | Unlikely | Insignificant | Low | Y | Unsure | | OEWS WO&M |

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| | Inadequate Supply of Water | 8.05 | Poor quality workmanship or inappropriate materials used for reticulation pipes and fittings | Likely | Moderate | High | Contaminants identified in the reticulation system. Taste and odour complaints from consumers | Materials used in reticulation to meet standard specifications. Asset management and pipe replacement programme. GIS management of network and materials | Redo work that has been poorly undertaken. Replace any materials that do not meet minimum specifications. Initiate incident management plan | Quality of work undertaken. Types of material used | Yes | Unlikely | Minor | Low | Y | Confident | | OEWS WO&M |
| | Sediment/biofilm formation | 8.06 | Silt build up or biofilm within reticulation pipes | Likely | Minor | Medium | Reduced flows in reticulation. Complaints from consumer about quality of water. Low FAC readings in network. Reticulation NTU | Flushing undertaken in response to complaints. Regular dead end mains flushing | Undertake flushing as required | Dirty water complaints | Yes | Unlikely | Minor | Low | Y | Unsure | | OEWS WO&M |
| 9. Other | Operator error mismanagement | 9.01 | Inadequate training, professional development and up-skilling of operators | Likely | Major | High | Staff not provided with adequate ongoing training. Poor operation of plant. Plant compliance failure. Loss of supply. | Experienced staff employed. Operators have or are completing the National Cert or Dip in Drinking Water Treatment. Appropriately experienced and qualified engineering personnel. Active preventive maintenance programme in place | Review documentation. Provide in-house training where abilities are in deficit. Standard Operating Procedures, O&M manuals available for staff | Documentation. Operator abilities, knowledge and training qualifications | Yes | Possible | Moderate | Medium | Y | Reliable | Create an O&M Manual for the Glinks Gully Water Supply Develop a quality assurance system for monitoring and instrument calibration | OEWS WO&M |
| | Op's error mismanagement | 9.02 | Inadequate supply planning and management | Likely | Major | High | Lowering levels of service. Consents not renewed. Capital costs uncontrolled. Failing infrastructure strategy. 3rd party audits e.g OAG. Reduction in funding | Relevant statutory obligations ie LGA, RMA, Council policies. Sub regional three waters strategy. Infrastructure planning team | Apply contingencies for changes in legislation or other key planning considerations | New Legislation, regulations or Standards. Residential and industrial growth/connections | Yes | Unlikely | Moderate | Medium | Y | Reliable | | OEWS WO&M |
| | Sampling Failure | 9.03 | Inadequate sampling programme or sample collection error. | Likely | Moderate | High | DWSNZ compliance failure due to days of week, days between samples, insufficient samples, information gaps, positive results or sampling error | Sampling programme prepared and checked against standards. IANZ accredited laboratory | Review sampling programme | Sampling programme against DWSNZ | Yes | Unlikely | Minor | Low | Y | Unsure | | OEWS WO&M |
| | Unidentified Op's Failure | 9.04 | Insufficient monitoring and alarming of key operational data | Almost Certain | Major | Extreme | Contamination identified in supply. Operational near miss identified. Inadequate information collected to provide confidence in supply operation | Operators validate treatment plant equipment weekly and calibrate equipment as required | Undertake manual grab sampling if required. Initiate incident management plan. | Manual readings | Partially | Unlikely | Moderate | Medium | Y | Confident | Review calibration procedure for all monitoring equipment | OEWS WO&M |
| | Failure from poor maintenance | 9.05 | Supply equipment fails due to inadequate asset information and inadequate maintenance planning | Almost Certain | Moderate | High | Unexpected plant equipment failure. | Annual check and servicing of the chlorine dosing equipment with overhaul every two years Subcontractor agreements Active preventive maintenance programme in place | Attend to failure as a priority Plan to renew or improve assets as required | Condition and forward planning for asset renewal asset register and maintenance programme | Yes | Unlikely | Moderate | Medium | Y | Confident | | OEWS WO&M |
| | Failing DWSNZ | 9.06 | Treatment processes of the water supply are not sufficient to comply with the requirements of the DWSNZ | Almost Certain | Major | Extreme | Insufficient treatment processes at the treatment plant to comply with the DWSNZ | Target Section 10 DWSNZ. Chlorination. E.coli and FAC monitoring | Implement boil water notice if safety of supply cannot be guaranteed | DWSNZ compliance data | Yes | Unlikely | Moderate | Medium | Y | Confident | | OEWS WO&M |
| | Failure to Provide Safe Water | 9.07 | Inadequate data collection, reporting and control systems | Likely | Moderate | High | Information about how the supply is operating is not available. Manual collection and recording of data. IT failure | Target Section 10 DWSNZ. Chlorination. E.coli and FAC monitoring | Undertake manual grab sampling if required | Trends and alarms of Cl2, UVT, pH and turbidity manual monitoring | Yes | Possible | Minor | Medium | Y | Confident | Install SCADA telemetry system as well as alarm | OEWS WO&M |
| | Micro/Chem contamination | 9.08 | Vandalism to plant equipment | Possible | Major | High | Obvious signs of damage to treatment or storage equipment Reduced/no flow to treatment plant or distribution system | Controls and treatment plant are in robust concrete block buildings. Supply equipment is visited and checked regularly. Legal deterrents, ie prosecution | Implement boil water notice if safety of supply cannot be guaranteed. Activate incident management plan. Provision of tankered water | Condition of treatment buildings and equipment | Yes | Rare | Moderate | Low | Y | Confident | Establish security policy | OEWS WO&M |
| | Loss of Supply | 9.09 | Power fault or outage | Possible | Catastrophic | High | Notification from Power Company of planned outages Pressure loss | Maintenance inspection of internal wiring | Introduce conservation and efficiency measures Provision of tankered water | Bring in emergency generator | Partially | Unlikely | Moderate | Medium | Y | Confident | Install on-site electricity generator interface | OEWS WO&M |
| | Total Plant Failure | 9.10 | Catastrophic natural disaster or failure including earthquake and flooding | Rare | Catastrophic | High | Major natural disaster occurs. Intense sustained weather. Slips, flooding. Total plant failure is evident. Warnings from Govt agencies incl Met Office, Niwa, Civil Defence, Regional Council or Police. | Prior warning from Govt agencies incl Met Office, Niwa, Civil Defence, Regional Council or Police. Robust secure plant structures and buildings. Emergency response plan | Implement all measures necessary to ensure plant continues to operate in a natural disaster | Prior warnings issued by Govt agencies incl Met Office, Niwa, Civil Defence, Regional Council or Police | Partially | Rare | Major | Medium | Y | Unsure | | OEWS WO&M |