



Drinking Water Acceptable Solution for Mixed-use Rural Water Supplies

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This Drinking Water Acceptable Solution for Mixed-use Rural Water Supplies is issued under section 50 of the Water Services Act 2021.

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1. Introduction

1.1. Purpose

Drinking water Acceptable Solutions are regulatory instruments made under the Water Services Act 2021 (**the Act**).¹ They offer practical ways for drinking water suppliers to provide safe drinking water that are proportionate to the scale, complexity, and risk profile of the relevant type of supply.

A drinking water supplier that chooses to adopt and comply with an Acceptable Solution must, for the purposes of the Act, be treated as having complied with the legislative requirements to which the Acceptable Solution relates (other than the duties to provide safe drinking water that complies with Drinking Water Standards under sections [21](#) and [22](#)).²

Drinking water suppliers who comply with the entirety of this Acceptable Solution will be deemed to comply with the requirements arising under the following sections of the Act:

- Duty to take all reasonably practicable steps to supply aesthetically acceptable drinking water (section [24](#)).
- Duty to protect against risk of backflow (section [27](#)).
- Duty to have a drinking water safety plan (section [30](#)).
- Duty to prepare and implement a source water risk management plan (section [43\(1\)](#)).
- Duty to comply with the [Drinking Water Quality Assurance Rules](#) (section [49\(3\)](#)).

A drinking water supplier who complies with this Acceptable Solution does **not** need to prepare a drinking water safety plan (including a source water risk management plan) or provide a copy to Taumata Arowai.

Drinking water suppliers adopting this Acceptable Solution must also comply with their other obligations under the Act and any other relevant legislation.

¹ Section 50 of the Act provides that Taumata Arowai may, by notice, issue a drinking water Acceptable Solution for use in establishing compliance with the legislative requirements.

² Water Services Act, section 51(1).

1.2. Scope

The scope of this Acceptable Solution is limited to drinking water supplies that meet the criteria specified below.

1.2.1. Eligible drinking water supplies

- a) An eligible drinking water supply is a mixed-use rural supply when the following criteria are met:
 - i. A drinking water supplier (as defined in section [8](#) of **the Act**) provides water via a network to consumers' properties; and
 - ii. Not less than 50% of water supplied is intended for agricultural or horticultural purposes, for example stock water and irrigation, and not more than 50% is used for domestic purposes, including drinking water.³
- b) A mixed-use rural drinking water supplier must ensure all water intended for drinking, is treated by an end point treatment system⁴. The supplier is responsible for ensuring these treatment systems are installed, operated, and maintained according to this Acceptable Solution.
- c) There is no upper or lower limit to the total population served by the mixed-use rural water supply. However, Section 1.2.2 applies a population limit per end-point treatment system.⁵

1.2.2. Building and base population limits for end-point treatment systems

- a) Each end-point treatment system must only provide drinking water to three or fewer buildings within the boundaries of one property.
- b) The base population for a single building served by an end-point treatment system must not exceed 500 people.
- c) The base population for two or three buildings served by a single end-point treatment system must not exceed 100 people.
 - i. Due to the lack of a chlorination requirement in this Acceptable Solution, the base population limit for multiple buildings supplied by an end-point treatment system via a limited pipe network, is more restrictive than for a single building.

1.2.3. Allowed exceedance of base population limits

- a) The population supplied by each end point treatment system may exceed its base population limit:

³ The water supplier is responsible for estimating this ratio of use over the course of a year, and this should be reassessed on an annual basis.

⁴ Refer to section [28](#).

⁵ For a mixed-use rural water supply where the base population is less than 25 people, the [Drinking Water Quality Assurance Rules](#) – Very Small Community module offers an alternative compliance pathway.

- i. For a total of no more than 60 days in any 12-month period; and
- ii. Is subject to the water supply having the capacity to supply treated water for these periods; and
- iii. Is subject to additional monitoring requirements as stated in the table below.

Number of buildings downstream of end point treatment system		
Criteria Description	One building	Two or three buildings
Base population limit	500 people	100 people
Monitoring and testing conditions when the population exceeds the base population limit	MR6 (see table in Section 4)	MR7 (see table in Section 4)

1.3. Commencement

The commencement date of this Acceptable Solution is 14 November 2022.

2. Mixed-use rural drinking water requirements

This Acceptable Solution may be adopted by a drinking water supplier where all the following requirements (except those specifically identified as recommendations) are met:

2.1. General use criteria

- a) All end-point treatment systems are designed, configured, and installed according to this Acceptable Solution.
- b) Water provided for flushing toilets and outdoor use may be untreated but must be marked as non-potable in accordance with the Building Code.⁶
- c) Backflow prevention devices must be installed on all connections to the mixed-use rural water supply.
 - i. The location of the device must be after the point of supply and before any untreated storage tanks or the treatment system.
 - ii. The minimum requirement is for non-testable double check valves.

⁶ Clause G12.3.4, [Schedule 1](#) of the Building Regulations 1992.

- iii. A testable backflow prevention device must be installed if there is a medium or high backflow risk. Testable backflow prevention devices must be inspected and tested annually.
- d) If the source of the mixed-use rural water supply is a spring or bore, the spring or bore water and the system used to collect this water must comply with the following sections and requirements in the Drinking Water Acceptable Solution for Spring and Bore Drinking Water Supplies:
 - i. Section 2.4. Bore and spring water collection system requirements.

2.2. Prerequisite monitoring requirements

- a) Before this Acceptable Solution can be adopted, the drinking water supplier must test the source water for a range of parameters to ensure the safety of the water but also to determine the suitability for cartridge filtration and UV disinfection. Samples must be collected and analysed according to condition MR1 in Section 4.
- b) The pre-requisite source water monitoring must meet the following requirements:
 - i. Results from source water monitoring must not exceed the limits that manufacturers indicate for use of their equipment (including, but not limited to, the limits in the table below).
 - ii. If a chemical determinand from source water monitoring exceeds a MAV or testing indicates that the source water is unsuitable for cartridge filtration and/or UV disinfection, the drinking water acceptable solution cannot be used without additional pre-treatment as discussed in Section 2.3.
 - iii. Samples must represent a range of different environmental conditions such as heavy rainfall and dry periods to ensure that treatment is suitable when water quality is most likely to be at its worst.⁷
 - iv. Source water testing must include at least three (3) samples for the parameters in the following table:

⁷ The supplier is responsible for determining the range of environmental conditions during which samples are taken.

Parameter⁸	Limit
Iron	Must not be at a level which compromises the effectiveness of the UV disinfection unit based on the manufacturer's specifications/guidelines.
Manganese	Must not be at a level which compromises the effectiveness of the UV disinfection unit based on the manufacturer's specifications/guidelines. Must be below the MAV.
Nitrate, Arsenic, and Boron	Must be below the MAV.
Silica	Must be at a level which is suitable for cartridge filtration with or without additional pre-treatment and meet the manufacturer's specifications/guidelines. ⁹
Hardness	Must not be at a level which compromises the effectiveness of the UV disinfection unit based on the manufacturer's specifications/guidelines.
UV transmittance	Must not be at a level which compromises the effectiveness of the UV disinfection unit based on the manufacturer's specifications/guidelines.
<i>E. coli</i> and total coliforms	Presence of <i>E. coli</i> and total coliforms indicates that the source water has some microbiological contaminants in it which must be controlled by the treatment system.
Turbidity	Must be at a level that can be treated by cartridge filtration with or without additional pre-treatment to meet the specifications/guidelines of the UV disinfection unit's manufacturer. ¹⁰

2.3. Pre-treatment requirements

- a) A drinking water supplier may install pre-treatment (headworks, back-washable filters, aeration, etc) to make the source water suitable for cartridge filtration and UV disinfection, or to reduce a chemical determinand to below its respective MAV.

⁸ Unless changes have occurred, which could reasonably be expected to have changed the source water quality, results from samples taken within the last 5 years may be used. Note: The supplier is still responsible for ensuring a range of environmental conditions are represented when samples were taken.

⁹ High levels of silica can decrease the lifespan of cartridge filters.

¹⁰ High turbidity can decrease the lifespan of cartridge filters.

- b) If pre-treatment is installed, the water supplier is responsible for ensuring that water leaving the pre-treatment system(s) is suitable for the end-point treatment in Section 2.6.

2.4. Untreated water storage requirements

- a) Inlets, overflows, and any other small gaps in tanks must be screened to be secure from contamination by vermin, birds, faecal material, or other material.
- b) Lids on all storage tanks are secured to prevent contamination by vermin, birds, faecal material, or other material.

2.5. Untreated water storage recommendations

- a) Where beneficial to reduce turbidity of raw water, a calmed bottom inlet and floating outtake are installed for untreated water storage tanks.
- b) The quantity of untreated water storage is sufficient to support the ordinary drinking water needs of consumers served by the supply for an identified period of time. A minimum of 96 hours average demand of untreated storage is recommended.¹¹

2.6. End-point treatment system requirements

- a) Each component of the end-point treatment system must be installed:
 - i. To meet the peak instantaneous demand for treated drinking water.
 - ii. In accordance with the manufacturer's instructions and requirements.
- b) The end-point treatment system and all associated pipework and associated fixtures must comply with the Building Act 2004 and the Building Code if relevant.
- c) The design and construction of the water treatment system must prevent backflow, being the unplanned reversal of flow of water or mixtures of water and contaminants into the water supply system.
- d) Each UV disinfection unit must be validated to at least one of the following standards:
 - i. Ultraviolet Disinfection Guidance Manual (USEPA 2006b).
 - ii. DVGW Technical Standard W294 (DVGW 2006).
 - iii. öNORM M 5873-1: 2020 01 01.¹²
 - iv. NSF/ANSI 55 Class A (NSF, ANSI n.d.).
- e) Where a UV disinfection unit has been installed before 17 October 2022 and written evidence is available from the manufacturer (e.g., manufacturer's website, instruction manual, etc) that the unit delivers a minimum UV reduction equivalent dose of 40mJ/cm² then the unit is not required to meet the UV validation requirements set out above at 2.6(d).
- f) Each end-point treatment system must (as a minimum):
 - i. Have two stage cartridge filtration with 20 micron and 5 micron or less, nominal pore sizes.

¹¹ This recommended minimum may not be appropriate for areas that are subject to droughts.

¹² UV reactors installed before 1 January 2020 can be certified to öNORM M5873 (Osterreichisches Normungsinstitut 2001).

- ii. Have a UV disinfection unit that delivers a minimum reduction equivalent dose of 40 mJ/cm² as measured by a UVI or UV dose sensor.
- iii. Monitor UV dose continuously and generate a local onsite alarm if the UV dose is below 40 mJ/cm² or outside the limits specified by the manufacturer.
- iv. Have flow control to ensure water flow is within the specification of the UV unit and be designed to shutdown automatically on a low UVI or UV dose.
- v. Have a lamp status indicator if a UV disinfection unit contains more than one lamp.
- vi. If applicable, not allow flow of water during a UV disinfection unit's lamp warm-up period until the required UVI or UV dose is achieved (an automatic control valve or start/stop of the pump must be used to control flow during the warm-up period).
- vii. Have an air release valve(s) to allow air to be removed from the system on start up.
- viii. Have manual isolation valves fitted upstream and downstream of the treatment system to allow for maintenance.
- ix. Be sized to ensure flow rates comply with clause G12.3.7(a) (Water supplies) of the Building Code and are adequate for the correct functioning of fixtures and appliances within the building.¹³

2.7. Alternative source for water supply

- a) Treated water from a water carrier registered with Taumata Arowai can supplement the mixed-use rural water supply and can be delivered to a treated water storage tank (if there is one) or an untreated water storage tank.
- b) Rainwater collected from roof surfaces that is used to supplement a mixed-use rural water supply must be delivered into an untreated water storage tank so that all drinking water provided to the building(s) served by the supply passes through the end-point treatment system. Rainwater collected by roof surfaces and the system used to collect this water must comply with the following sections and requirements in the Drinking Water Acceptable Solution for Roof Water Supplies:
 - i. Section 2.2. Roof water collection system requirements.¹⁴
 - ii. RF3 in Section 4. Monitoring and testing.
- c) Surface water not tested in accordance with Section 2.2 by the drinking water supplier (excluding rainwater collected from roof surface) or water from a water carrier that is not registered with Taumata Arowai cannot be used to supplement the mixed-use rural water supply.
- d) Surface water or water from an unregistered water carrier cannot be used to supplement the roof supply.

¹³ Probable instantaneous flow rates for dwellings can be found in AS/NZS 3500.1:2021.

¹⁴ Note that there are also recommendations for roof water collection systems in Section 2.3 of the Drinking Water Acceptable Solution for Roof Water Supplies.

2.8. Treated water tank requirements

If a treated water tank is included as part of the drinking water supply:

- a) It must be secure against the ingress of rainwater and surface water.
- b) Inlets, lids, overflows, and any other small gaps in tanks must be secure from contamination by vermin, birds, animals, faecal material, or other material.

3. Operation and maintenance

- a) The operation and maintenance of the mixed-use rural water supply, including all treatment systems under this Acceptable Solution, is the responsibility of the drinking water supplier.
- b) The drinking water supplier must provide information about the drinking water supply to the consumers at the properties connected to it and communicate whether the consumers are required to maintain or test the end-point treatment system. This must include a process to ensure all new consumers are informed of any maintenance or testing requirements.
- c) The drinking water supplier must keep and maintain documentation that supports the ongoing operation and maintenance of the whole of the mixed-use rural water supply. This must include (but is not limited to):
 - i. A description of the drinking water supply and key components.
 - ii. A supply diagram that shows the components of the supply system, including sources, backflow devices, valves, pumps, treatment components, connections, and bypasses.
 - iii. Incident and emergency response procedures.a)
 - iv. Key contacts, including details for operators, manufacturers, suppliers, regulators, property owners, and consumers.
 - v. Maintenance and inspection schedules and associated procedures that meet the drinking water supplier's and/or manufacturer's requirements for equipment used in the supply (e.g., end-point treatment system equipment, any additional pre-treatment systems for example iron and manganese removal, etc).
 - vi. Schedule and procedures for inspecting the headworks, untreated and treated storage tanks (e.g., storage tanks are intact to prevent access of vermin or ingress of contaminants) and associated infrastructure.
 - vii. Good hygienic practices, including prohibition of people working on a water system who are experiencing any gastrointestinal illness, protection of work sites, materials, and tools from contamination, and minimising the entry of contamination into the water supply during any activity.

- d) The drinking water supplier must ensure maintenance and inspections (see Sections 3(c)(v) and 3(c)(vi)) are undertaken at a suitable frequency to ensure the water supply is providing safe drinking water.
- e) All activities undertaken according to the maintenance and inspection schedules must be recorded and the documents retained for at least five (5) years to demonstrate the activities have been completed.
- f) Operations and maintenance documentation must be consistent with any operation or maintenance requirements provided by the manufacturers of any equipment used as part of the drinking water supply.

4. Monitoring and testing

- a) The drinking water supplier must undertake water quality testing and keep records in accordance with the conditions in the following table (the drinking water supplier may choose to carry out additional testing and associated record-keeping):

Mixed-use rural supply monitoring requirements

Condition	Requirement
MR1	<p>All water samples that are used to demonstrate compliance with this Acceptable Solution must be:</p> <ol style="list-style-type: none"> 1. Analysed by a laboratory accredited by IANZ for the type of analysis being undertaken. 2. Collected according to any instructions and specifications provided by the laboratory.
MR2	<p>Drinking water suppliers must take all reasonably practicable steps to ensure that samples to be tested for <i>E. coli</i>, total coliforms, or other microbiological contaminants are delivered to a laboratory within 24 hours of the sample being collected, and where practical at a water temperature that is no higher than the water temperature at the time of sampling but above zero degrees Celsius.</p>

MR3	<p>Water samples must be collected downstream of any pre-treatment system(s) but before end-point treatment and monitored for the following determinands:</p> <p>a) once every 3 months for:</p> <ul style="list-style-type: none"> i. Nitrate ii. pH iii. UV Transmittance (@ 254 nm) iv. Turbidity v. <i>E. coli</i> and total coliforms <p>b) and once every 12 months for:</p> <ul style="list-style-type: none"> i. Arsenic ii. Boron iii. Silica iv. Hardness v. Iron vi. Manganese.
MR4	<p>If a monitoring result for a chemical determinand (see MR3) exceeds 50% of the MAV in the Water Services (Drinking Water Standards for New Zealand) Regulations 2022, additional monitoring must be undertaken on a monthly basis until four (4) consecutive results are less than 50% of the MAV.</p>
MR5	<p>Water samples must be collected from treated water leaving at least one end-point treatment system once every 3 months for:</p> <ul style="list-style-type: none"> • Turbidity • <i>E. coli</i> and total coliforms. <p>The drinking water supplier is responsible for determining the sampling schedule and locations to be sampled from (e.g., rotating the properties to be sampled from). Samples must be geographically representative of the supply.</p> <p>Turbidity results must not exceed the limits specified by the manufacturer of the UV disinfection unit of the end-point treatment system being sampled from. If the limit specified for the UV disinfection unit is exceeded, the drinking water supplier must investigate and remedy the cause of the elevated turbidity.</p>

MR6	<p>For end point treatment systems serving one building:</p> <p>Samples for <i>E. coli</i> and total coliforms must be taken from treated water leaving the end-point treatment system in the week prior, or otherwise as soon as reasonably practicable, to the population exceeding 500 people and twice each week (with at least three (3) days between samples) until the population no longer exceeds 500 people.</p>
MR7	<p>For end point treatment systems serving two or three buildings:</p> <p>Samples for <i>E. coli</i> and total coliforms must be taken from treated water leaving the end-point treatment system in the week prior, or otherwise as soon as reasonably practicable, to the population exceeding 100 people and twice each week (with at least three (3) days between samples) until the population no longer exceeds 100 people.</p>
MR8	<p>For mixed-use rural supplies which use surface water sources as their primary source:</p> <p>Each month between October and May (inclusive), the water and area within 50 metres of a surface water intake, must be visually inspected for the presence of benthic cyanobacteria mats and planktonic cyanobacterial growth. If there is evidence of cyanobacterial growth, steps must be taken to evaluate the cyanotoxin risk to consumers. If there is a risk of supplying water with cyanotoxins that exceed MAVs, then the drinking water supplier must follow their incident and emergency management procedures as required in Section 5.</p>

5. Incident and emergency management

- a) The drinking water supplier must have documented incident and emergency management procedures to ensure the supply of a sufficient quantity of safe drinking water.
- b) The drinking water supplier must have a plan to undertake a managed response according to their procedures. The plan must:

- i. Outline reasonably anticipated incidents or emergencies (e.g., *E. coli* detection, total coliform detection, power failure, interruption to supply, consumer complaint/illness, sample exceeds a MAV in the Water Services (Drinking Water Standards for New Zealand) Regulations 2022, cyanobacteria present in source, etc.).
- c) For the incidents or emergencies identified in 5(b)(i), confirm how the drinking water supplier intends to:
 - i. Take immediate action to ensure that the health of water consumers is protected and remedy the situation.
 - ii. How water consumers will be communicated with and when it is appropriate to issue boil water notices or do not drink notices.
 - iii. Investigate the source or cause of the incident and address it as soon as possible.
 - iv. Notify Taumata Arowai that the drinking water is or may be unsafe.
 - v. Identify and implement measures required to ensure that the problem does not reoccur.
 - vi. Outline what additional laboratory testing will be undertaken for each incident and emergency and if necessary, detail alternative drinking water sources (e.g., bottled water, water carrier, etc).
- d) Suppliers must review incident and emergency response plans after every major incident and update the plans based on learnings from the review.
- e) All incidents and emergencies must be recorded, and records retained for five (5) years to demonstrate the activities have been completed.

6. Training

- a) People who maintain or operate the mixed-use rural water supply must be competent to undertake the tasks necessary to ensure the system provides safe drinking water.
- b) The person responsible for the mixed-use rural water supply must have a good understanding of:
 - i. the emergency and incident management procedures
 - ii. how to comply with this Acceptable Solution.

7. Definitions

Term	Definition
Act	The Water Services Act 2021 .
Building Code	Schedule 1 of the Building Regulations 1992 . The Building Code is contained in regulations under the Building Act 2004.
benthic cyanobacteria mat	A collective mass of cyanobacteria that forms on the bottom surface of a water body.
calmed bottom inlet	An inlet to a storage tank that delivers water to the bottom of the tank through a U-bend or similar feature, minimising any disturbance of sediment at the bottom of the tank.
cyanobacteria	A major group of micro-organisms capable of photosynthesis, sometimes referred to as blue-green algae.
cyanotoxin	A toxin produced by cyanobacteria.
determinand	A substance or characteristic that is determined or estimated in drinking water.
domestic dwelling	<p>As defined in section 10(2) of the Act:</p> <p>Domestic dwelling means a building that is used as a single household unit, whether it is—</p> <ul style="list-style-type: none"> (a) tenanted on a long- or short-term basis; or (b) occupied permanently or temporarily (for example, a holiday home) <p>'Household unit' has the meaning given to it by section 7 of the Building Act 2004.¹⁵</p> <p>Examples of a 'domestic dwelling' in the Act include a single property with tenants on a lease, or a single holiday house that is rented to tourists on a short-term basis.</p> <p>Examples that are not 'domestic dwelling' in the Act include a multi-dwelling building (for example, multiple separate apartments contained in a single building), or a marae, wharekai (dining hall), or community hall, or a café building.</p>

¹⁵ 'Household unit' is defined (section 7 Building Act 2004) as a building or group of buildings, or part of a building or group of buildings, that is—

- (a) used, or intended to be used, only or mainly for residential purposes; and
- (b) occupied, or intended to be occupied, exclusively as the home or residence of not more than 1 household; but
- (c) does not include a hostel, boardinghouse, or other specialised accommodation

domestic self-supply	Means a stand-alone domestic dwelling that has its own supply of drinking water. As defined in section 10 of the Act.
Drinking Water Quality Assurance Rules	The Drinking Water Quality Assurance Rules 2022 , made by Taumata Arowai under section 49 of the Act.
drinking water supplier	As defined in section 8 of the Act: Unless the context otherwise requires, drinking water supplier— <ul style="list-style-type: none"> (a) means a person who supplies drinking water through a drinking water supply; and (b) includes a person who ought reasonably to know that the water they are supplying is or will be used as drinking water; and (c) includes the owner and the operator of a drinking water supply; and (d) includes a person described in paragraph (a), (b), or (c) who supplies drinking water to another drinking water supplier; but (e) does not include a domestic self-supplier.
drinking water supply	As defined in section 9 of the Act: Unless the context otherwise requires, drinking water supply— <ul style="list-style-type: none"> (a) means the infrastructure and processes used to abstract, store, treat, transmit, or transport drinking water for supply to consumers or another drinking water supplier; and (b) includes— <ul style="list-style-type: none"> a. the point of supply; and b. any end-point treatment device; and c. any backflow prevention device; but (c) does not include a temporary drinking water supply provided for under sections 33 or 34 of the Act or a domestic self-supply.
end-point treatment	Treatment of drinking water at the final point of the supply at which the consumer can consume, use, or collect drinking water.
floating outtake	An outlet from a storage tank through a flexible pipe attached to a float, allowing water to be drawn from the top of the tank.
headworks	The infrastructure located near to the extraction point for source water. For groundwater, the headworks will be the bore, the bore head and the pump infrastructure required to extract the water.
maximum acceptable value or MAV	The maximum acceptable value of a determinand that is permitted in drinking water. The full range of MAVs for relevant determinands is set out in the Water Services (Drinking Water Standards for New Zealand) Regulations 2022 .

networked supply	A drinking water supply that provides drinking water via a distribution system at a pressure and volume to meet consumer demand, or at a restricted flow and volume. These supplies may include storage facilities within the network to buffer demand. As defined in the Drinking Water Quality Assurance Rules.
operations and maintenance manual	A hardcopy or electronic document that outlines how to operate and maintain the drinking water supply under this drinking water acceptable solution.
planktonic cyanobacteria	Cyanobacteria which are freely floating in a body of water.
roof water	The rainwater collected from the roof of a building or structure.
surface water	A body of water that is open to atmosphere, whether running (streams and rivers) or quiescent (lakes, reservoirs, impoundments and ponds). Surface water does not include spring or bore water.
Taumata Arowai	The New Zealand water services regulator, established under the Taumata Arowai—the Water Services Regulator Act 2020.
total base population	Total base population of the mixed-use rural water supply is the population that is normally supplied drinking water by all end-point treatment systems regardless of any seasonal or temporary increases.
treatment system	A treatment system that complies with this drinking water acceptable solution.
UV	Ultraviolet light.
UVI	The intensity of UV radiation, usually measured in mW/cm ² .
Water Services (Drinking Water Standards for New Zealand) Regulations 2022	The Water Services (Drinking Water Standards for New Zealand) Regulations 2022 made under section 47 of the Water Services Act 2021.