

# Network Environmental Performance Measures and Guide June 2023



## **Te Whakatauākī a Taumata Arowai**

Ko te wai ahau

Ko ahau te wai

He whakaaturanga tātou nō te wai

Ko te ora te wai ko te ora o te tangata

He taonga te wai me tiaki

Ko wai tātou

Ko wai tātou

I am water, water is me

We are reflections of our water

The health of water is the health of the people

Water is a treasure that must be protected

We are water

Water is us

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# 1. Overview

## 1.1 Legislation

The Water Services Act 2021 (the **Act**) requires certain water Network Operators to monitor and report to Taumata Arowai on the environmental performance of their drinking, wastewater, and stormwater networks.<sup>1</sup>

This requirement arises from the Environmental Performance Measures Record Keeping Requirements for Drinking Water Network Operators Notice 2023 which comes into force on 1 July 2023.

This Notice follows on from the Environmental Performance Measures Record Keeping Requirements for Drinking Water Network Operators Notice 2022 which identified the information that need to be collected for the period between 1 July 2022 and 30 June 2023.

More information about these Notices can be found on our [website](#).

See section 1.11 of this document for more details on when these requirements come into force.

This document comes into effect on 1 July 2023, and will remain in effect until such time as it is either amended, superseded, or rescinded.

Abbreviations used in this document are explained in Appendix 1.

A summary of the relevant parts of the Act, used in this document, can be found in Appendix 2.

## 1.2 Goals

The overall goal of monitoring and reporting is to provide transparency about the performance of drinking water, stormwater and wastewater networks, and the Network Operators.

Monitoring and reporting will contribute to the continuous improvement of the quality of water services in Aotearoa New Zealand and their impacts on the environment and public health.

Some examples of things that can be the focus of monitoring and reporting requirements are:

- discharges to air, water, or land
- biosolids and other byproducts from wastewater
- energy use from facilities like treatment plants
- waste introduced by a third party into a wastewater network, such as trade waste.

## 1.3 This document

This document sets out:

- which drinking water Network Operators need to report against the NEPM,
- requirements to keep and maintain records relating to compliance with the NEPM, including explaining when and how affected Network Operators will need to report to Taumata Arowai,
- the second tranche of drinking water NEPM developed by Taumata Arowai under section 145 of the Act.

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<sup>1</sup> Section 140, Water Services Act 2021. Drinking Water Network Operator means, to the extent that they operate a drinking water network or supervise its operation or aspects of its operation:

1. a local authority, council-controlled organisation, or subsidiary of a council-controlled organisation
2. a department
3. the New Zealand Defence Force
4. or any person who operates a network, or any aspect of a network, for, or on behalf of, an organisation specified above

It also provides definitions of key terms and NEPM, to help ensure that Network Operators provide consistent data. Consistent data will help Taumata Arowai to provide the industry and public with standardised performance reports, so we can show fair comparisons between different Network Operators in our annual Network Report.

## 1.4 Acknowledgements

Taumata Arowai acknowledges the significant value and impact of work undertaken by Water New Zealand helping to support the water services sector for many years. In particular, their annual [Network Performance Review](#) (NPR) has sourced data from up to 63 of the 67 local authorities since 2008. Taumata Arowai has considered, and where appropriate, aligned several measures, definitions, and data collection processes used in this guide, with that of the NPR. This is to help maintain continuity and give credit to groundwork by Water New Zealand and its contributors.

Several of the diagrams and guidance material used in this guide have been sourced from Water New Zealand.

## 1.5 Drinking water

From 1 July 2022, certain drinking water Network Operators were required to monitor and report data related to NEPM, in accordance with the *Environmental Performance Measures Record Keeping Requirements for Drinking Water Network Operators Notice 2022*.

From 1 July 2023 additional drinking water NEPM have been added to these requirements, which are included in this document.

All drinking water NEPM and their definitions are detailed in [Section 2](#).

[See section 1.11 for details on reporting periods, and when data must be submitted to Taumata Arowai.](#)

## 1.6 Wastewater and Stormwater

We have not yet published measures and set mandatory requirements to monitor and report on the environmental performance of wastewater and stormwater networks and their operators, but we intend to make these requirements in the near future.

## 1.7 Key terms

In this guide, and associated Reporting Template, unless the context requires otherwise:

- **Act:** means the [Water Services Act 2021](#).
- **Comments Field:** a field in the Reporting Template which allows you to provide supporting context, or reasons why data is not provided, or provide additional information if you feel it is useful to explain your plans and processes.
- **Data Confidence:** see section 1.14 for more guidance on this. When you complete the Reporting Template, select a value from the drop-down boxes to indicate the degrees of confidence around your data.
- **Data Points:** individual data points that Network Operators need to collect and report on, in accordance with [section 146](#) of the Act.
- **Data Source:** where the data is sourced from. Examples include an asset management system or water balance report.
- **Department level:** all networks operated by a single central government department or the New Zealand Defence Force.

Where NEPM are required to be reported at a department level, data should be aggregated and reported for all connections across the department.

- **District:** means the district of a local authority or council-controlled organisation.

Where NEPM are required to be reported at a District level, data only needs to relate to properties connected to the local authority or council-controlled organisation's water network. Data should be aggregated at a district level across all local authority and council-controlled organisation's water networks.

- **Drinking water network:** defined in [section 140](#) of the Act. For guidance purposes here, this means a drinking water supply (operated by a Network Operator), with all the elements comprising a discrete system from treatment to customer(s) within a drinking water supply, including:

- drinking water treatment plant(s)
- distribution system (including storage and piped network).

- **Hinekōrako:** means the online self-service portal Network Operators can use to share information with Taumata Arowai.

- **Network level:** means any water network which is operated by, for, or on behalf of, a Network Operator.

Where NEPM are required to be reported at a network level, data should be aggregated and reported for all connections relating to the network.

- **Network Environmental Performance Measures (NEPM):** provided for in [section 145](#) of the Act. For guidance purposes here, this means measures used to monitor certain key aspects of the environmental performance of networks that Taumata Arowai is interested in.
- **Network Operator:** defined in [section 11](#) and [section 140](#) of the Act. For guidance purposes here, this means an organisation which operates a network under the scope of this document. For further details, see section 1.10 of this document.
- **Network Report:** means the Network Environmental Performance Annual Report prepared by Taumata Arowai under section 147 of the Act.

- **Notes:** *advisory notes have been included throughout this guide to assist with your understanding. They are not a requirement, nor should they be taken as legal advice or an interpretation of legislation but serve solely to assist readers in their understanding.*

- **Reference Code:** corresponds to definitions for each data point.
- **Reporting Template:** an Excel spreadsheet, which will be made available to all Network Operators to complete and return their data.

## 1.8 What does 'Environmental Performance' mean?

The Act does not define 'environmental performance'. However, the following definition has been developed for the purposes of the NEPM.

***Environmental performance** relates to the effects of water services networks (including the operation of infrastructure and associated processes) on the environment.*

*In this context, 'environment' takes its meaning from the definition in the Resource Management Act 1991.*

*Environmental performance consequently includes consideration of a network's effects on:*

- (a) ecosystems*
- (b) natural and physical resources, including their innate mauri and mana*
- (c) people and communities, including the ability of mana whenua to exercise kaitiakitanga, and*
- (d) social, economic, aesthetic, and cultural conditions that affect (a) to (c), including mātauranga Māori and tikanga Māori.*

## 1.9 Why do we report?

The data we receive on NEPM will be summarised into the Network Report, which we will publish each year, in accordance with section 141 and section 147 of the Act.

This report aims to help protect and improve the health of our water, people, and natural environment. It will contain comparisons of how networks across the country are performing, give examples of best practices, and highlight specific risks or concerns around certain performances or practices.

The environmental performance of networks affects local communities, and directly impacts the local environment and public health. It may impact the quality of drinking water and wastewater services, and in turn, the resilience of our freshwater sources.

Environmental performance reporting will also benefit Network Operators, by building a clear comparative picture of how networks are performing. This can be used as an evidence base for decision-making, for example, to guide investment and support resource consent applications.

## 1.10 Who needs to monitor and report?

Certain Network Operators must monitor and report on their network's environmental performance each year.

This includes all drinking water networks that are operated or supervised by:

- local authorities, council-controlled organisations (CCOs), or subsidiaries of CCOs,
- government departments (such as the Department of Conservation or Ministry of Education),
- the New Zealand Defence Force,
- or any person who operates a network, or any aspect of a network, for, or on behalf of, an organisation specified above.

**Note:** *Due to the operating nature of government departments and the New Zealand Defence Force there are some NEPM which they do not need to monitor and report. Details of which NEPM are required by which Network Operators is detailed in section 2.*

The following networks **are excluded** from needing to monitor and report against the NEPM, as they are considered to have minimal environmental impact, and to monitor and report data would be an unnecessary administrative burden:

- any water network that supports a **peak population of less than 100** people (including usual consumer numbers); or
- drinking water networks, where the water is **sourced from rainwater collection tanks only**.

## 1.11 When do you need to monitor and report?

### Data collection period, and reporting timeframe

The annual data collection period typically runs from **1 July** until **30 June** of the following year. This is generally referred to as a 'reporting period' within this document.

Data must be reported to Taumata Arowai by no later than **30 September** of that year, for the preceding reporting period.

- Example: *for the data collection period between 1 July 2023 and 30 June 2024, data is due to us by no later than 30 September 2024.*

### Introduction of requirements

Collecting NEPM data became mandatory for all affected drinking water network operators from 1 July 2022. This is detailed in the *Environmental Performance Measures Record Keeping Requirements for Drinking Water Network Operators Notice 2022*.

Taumata Arowai intends to gradually improve the data being reported over the first three years of this programme, to reflect both the information needs of decision makers and the ability of Network Operators to collect this information.

The additional tranche 2 drinking water data detailed in this document must also be collected from **1 July 2023**.

All data required for reporting on drinking water networks is detailed in [section 2](#).

## 1.12 What do you need to monitor and report?

[Section 2](#) of this guide provides a list of NEPM and definitions for **Drinking water Network Operators** to monitor and report on for the 2023/24 reporting period. In some cases, this builds on those NEPM used for the previous 2022/23 reporting period.

## 1.13 How do you send this information to Taumata Arowai?

At the end of the reporting period, all Network Operators will be sent a Reporting Template, in the form of an Excel spreadsheet, to populate for the reporting period.

The Reporting Template must be completed and returned to us via email by the 30 September for the previous reporting period.

## 1.14 Data confidence

For each measure, you need to indicate your degree of 'data confidence'. This acknowledges that not all techniques for measuring and collecting data are 100% reliable.

This is particularly important if your data is not supported by a formal data recording process, so please provide your best estimate, along with your 'degree of confidence'.

The following table provides guidance in assessing data confidence:



	Highly reliable/ Audited	Reliable/ Verified	Less Reliable	Uncertain	Very uncertain
<b>Processes</b>	Formal process to collect and analyse data. Process is documented and always followed by all staff.	Strong process to collect data. May not be fully documented but usually undertaken by most staff.	Process to collect data established. May not be fully documented but usually undertaken by most staff.	Semi-formal process usually followed. Poor documentation. Process to collect data followed about half the time.	<i>Ad hoc</i> procedures to collect data. Minimal or no process documentation. Process followed occasionally.
<b>Asset Data</b>	Very high level of data confidence. Data is believed to be 95–100% complete and +/- 5% accurate. Regular data audits verify high level of accuracy in data received.	Good level of data confidence. Data is believed to be 80–95% complete and +/- 10% to 15% accurate. Some minor data extrapolation or assumptions have been applied. Occasional data audits verify reasonable level of confidence.	Average level of data confidence. Data is believed to be 50–80% complete and +/- 15 to 20% accurate. Some data extrapolation has been applied based on supported assumptions. Occasional data audits verify reasonable level of confidence.	Not sure of data confidence, or data confidence is good for some data. Most of the dataset is based on extrapolation of incomplete data set with unsupported assumptions.	Very low data confidence. Data based on very large unsupported assumptions, cursory inspection, and analysis. Data may have been developed by extrapolation from small, unverified data sets.

## 2. Drinking Water NEPM and Definitions

Standardised definitions for each of the NEPM and data points helps to collect information consistently, so we can make fair comparisons between drinking water Network Operators in the Network Report.

We understand that these data points might not always allow Network Operators to capture their full performance story, so we encourage them to provide supporting commentary where appropriate.

**Note:** Each of the following NEPM has a reference code associated with it, for guidance purposes:

**Example: D-A1** refers to Drinking water asset information about the number of drinking water networks in your district.

### 2.1 General asset information

#### Drinking water network information

**D-A1 Number of drinking water networks (report at a District-level):** the number of distinct drinking water network supply systems, operated by a drinking water Network Operator.

**Note:** There may be only one, or several networks, within a local authority's district, or operated by a department or the New Zealand Defence Force.

For example, New Plymouth District Council operates four discrete networks, that are geographically dispersed and service separate settlements in Ōkato, New Plymouth, Ōakura and Inglewood.

**Note:** A common water source does not constitute a common network.

For example, Nelson City Council supplies water to Richmond in the Tasman District. Despite sharing a connection to the Roding Dam, networks that are operated by these two councils are considered separate.

**D-A2 Number of drinking water treatment plants (report at a District-level):** a drinking water treatment plant is defined as the location of equipment that directly enables any form of treatment that improves water quality, towards making the water safe to drink. Examples of water treatment plants include a cartridge filter, ultraviolet (UV) unit, a sand filter, a clarifier, or a chlorine dosing system.

Where multiple treatment components are used in a collective process, or located in a common building, compound, or discrete geographic area, these are considered a single treatment plant.

**D-A3 Number of reservoirs (report at a District-level):** the total number of drinking water supply reservoirs, operated by the Network Operator. This excludes raw water storage but includes bulk storage reservoirs and sub-surface suction tanks.

It includes distribution system reservoirs, tanks, treated water tanks, and reservoirs, but does not include bulk raw water storage facilities, or small break-pressure rural tanks.

If one site or location has more than one tank or reservoir, then count each tank or reservoir separately.

**D-A4 Number of pump stations (report at a District-level):** this includes any pump stations used to deliver treated drinking water after the final stage of the water treatment process. It does not include pump stations as part of a treatment plant which only delivers treated water into the water distribution system.

**D-A5 Kilometres of pipe (report at a District-level):** total length of public water mains, excluding private laterals. This includes all trunks, reticulation mains and service-leads up to the meter or point of supply for the supply of potable water.

**Do not** include lengths associated with customer's water services within private property boundaries (as indicated on the figure below), or source works such as bore fields not associated with the reticulated water supply network.

**Do not** count disused pipe lengths, even if they are maintained for possible future use.

**D-A6 Number of drinking abstraction points (report at a Network-level):** total number of physical points where water is abstracted to supply the network. This may include multiple bores, or multiple abstraction points within the same surface water body. May also include multiple different water sources, including groundwater and surface water.

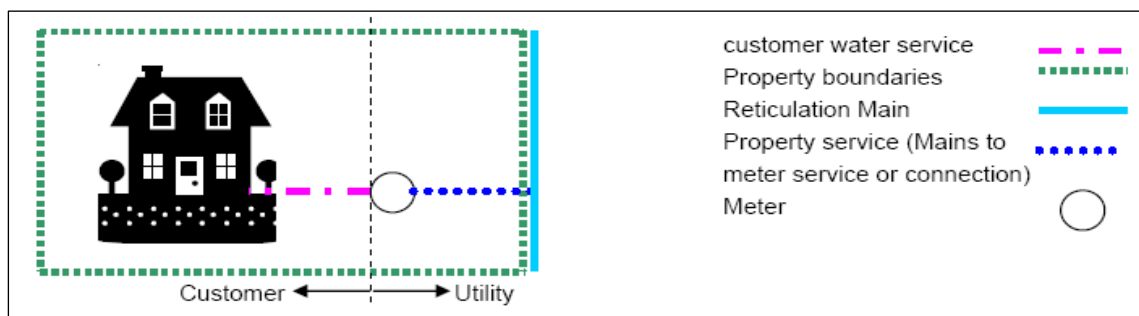
**D-A7 Drinking water source-type (report at a Network-level):** for each abstraction point: select from bore, roof, spring, lake, or river/stream/creek.

## 2.2 Environmental and public health is protected

### Drinking water network connections

**D-EH1 Number of residential connections in the drinking water network (report at a Network-level):** total number of residential connections serviced by a reticulated drinking water network.

Include your method for determining the number of serviced connections in multi-unit buildings in the comments field.



The total number of residential connections provides a proxy for water serviced properties. The total number of connections should be determined by providing the total number of household units:

- connected to the Network Operator's network
- the subject of separate billing for the drinking water supply (fixed and/or consumption).

A single residential building will usually contain a single household unit. Multi-unit buildings should be counted based on the number of separate household units. The approach used to determine this figure is to be specified in the comments field. This may be determined based on the number of household units that are separately billed or rated. For example, a multi-unit apartment building may have only one supply connection but with 100 apartments, each receiving a separate water bill or rates bill will be counted as 100. If a multi-unit complex like a retirement village receives a single bill, but consists of multiple household units, these should be included, where information is available to do so.

A tenanted property which is separately metered and in respect of which the tenant is liable for water usage counts as one property. For example, the owner and tenant of a single rented property are not counted as separate connections.

It includes connections to non-rateable properties, but does not include vacant lots that are connected, or rated but unconnected properties.

**D-EH2 Number of non-residential connections in the drinking water network (report at a Network-level):** total number of non-residential connections serviced by a reticulated drinking water network.

Non-residential is defined as any business or other activity that is not identified as residential.

Where a single non-residential connection services multiple tenancies, but multiple accounts are issued, the number of connections (in this case 1), not the number of accounts, should be recorded.

**D-EH3 Total population served by the drinking water network (report at a Network-level):** the number of consumers served by each drinking water network. This should be consistent with values entered in our database (Hinekōrako), and calculated using the approach outlined [here](#).

## 2.3 Volume of water abstracted

**D-EH4 Water supplied to the drinking water network (report at a Network-level):** total volume of water (m<sup>3</sup>/year) supplied in the area under the Network Operator’s jurisdiction.

'Water Supplied' is illustrated in the standard Water Balance diagram below. The diagram should be read from left to right.

If multiple networks are operated, provide information for each network separately.

Own Sources	System Input	Water Exported			Billed Water Exported to other Systems	Revenue Water
		Water Supplied	Authorised Consumption	Billed Authorised Consumption	Billed Metered Consumption by Registered Customers	
	Billed Unmetered Consumption by Registered Customers					
Water Losses	Unbilled Authorised Consumption		Metered	Non-Revenue Water		
	Apparent Losses		Unmetered			
	Real Losses	Unauthorised Consumption Customer Metering Under-registration Leakage on Mains Leakage and Overflows at Service Reservoirs Leakage on Service Connections up to the street/property boundary				

**D-EH5 Water imported from other suppliers (report at a District-level):** the volume of water (m<sup>3</sup>/year) imported from a separate supplier that is used to supply the drinking water network(s). This is 'Water Imported' in terms of the standard water balance shown above.

**D-EH6 Water exported to other suppliers (report at a District-level):** the volume of water (m<sup>3</sup>/year) provided by the Network Operator that is exported for use to other water networks. This is 'Water Exported' in terms of the standard water balance shown above.

**D-EH7 Non-residential water use (report at a Network-level):** the water consumption (m<sup>3</sup>/year) for non-residential properties, including rural and agricultural uses, and outdoor areas.

If rural schemes include a known number of residential properties, which are not separately metered. An estimate of residential consumption should be subtracted from non-residential water consumption. This water use can be determined by multiplying the number of residential properties in the rural scheme, by the estimated average daily residential water consumption.

If multiple networks are operated, provide information for each network separately.

## 2.4 Resource consent compliance

**D-EH8 Number of resource consents that are held (report at a District-level):** includes all resource consents related to drinking water network operation. Include consents related to water permits, discharge permits (to land, air, or water), coastal permits and land use consents.

**D-EH9 Type(s) of resource consents held for drinking water networks (report at a Network-level):** (e.g. water take consent, discharge consents) for each of the listed consents identified in EH9 above describe whether the consent relates to:

- water permits – take, use, dam, and divert.
- discharge permits – to land, air, and water.
- coastal permits – construction, deposit, disturb, and alter.
- land use consent – build, excavation, and damage to habitat.

**D-EH10 Resource consent reference number(s) (report at a Network-level):** list the resource consent reference number for each of the resource consents listed above.

**D-EH11 Expiry dates for resource consents:** List expiry dates for each of the resource consents listed above.

**D-EH12 Have consent conditions been met for rate of take and volume of abstraction? (new in 2023/24) (report at a Network-level):** yes or no.

**D-EH13 Consented rate of take for each abstraction point (new in 2023/24) (report at a Network-level):** the consented instantaneous rate (L/s) for each abstraction point.

**D-EH14 Maximum daily consented volume (new in 2023/24) (report at a Network-level):** the maximum daily consented take volume (m<sup>3</sup>/day).

**D-EH15 Maximum annual consented volume (new in 2023/24) (report at a Network-level):** the maximum annual consented take volume (m<sup>3</sup>/year).

**D-EH16 If consent conditions have not been met for one or more of the above categories (new in 2023/24):** further information should be provided in the comments field.

## 2.5 Drinking water treatment by-products (new in 2023/24)

**D-EH17 Sludge (new in 2023/24) (report at a Network-level):** the amount of sludge produced (tonnes) from the removal of sediment and algae in the raw water and from coagulation of dissolved minerals and use of coagulation and flocculation chemicals, from the treatment of raw water.

**D-EH18 Backwash water (new in 2023/24) (report at a Network-level):** the amount of water (m<sup>3</sup>) pumped backward through filter media etc as part of the treatment of raw water.

**D-EH19 Screenings (tonnes) (new in 2023/24) (report at a Network-level):** the amount of screenings (tonnes), such as rags, paper, plastics, gravel and metals, removed as part of the treatment of raw water.

**D-EH20 Disposal route (new in 2023/24) (report at a Network-level):** select where by-products (such as sludge and screenings) are disposed to, such as freshwater, marine, land, stockpile, landfill, or other.

## 2.6 Fish passage and screening (new in 2023/24)

**D-EH21 Has an assessment been made for all water-takes whether fish passage is impeded within a natural water body? (new in 2023/24) (report at a Network-level):** yes or no. Please add an explanation in the comments field.

**D-EH22 Have operational or management processes been put in place to prevent fish ingress? (new in 2023/24) (report at a Network-level):** yes or no. Please add an explanation in the comments field, about preventing fish from entering the network infrastructure.

## 2.7 Services are reliable

### Fault attendance and resolution

**D-R1 Median hours to attend an urgent fault (report at a District-level):** the median time from when a Network Operator receives notification of an 'urgent fault' or unplanned service interruption to a drinking water network, to when service personnel reach the site in response (hours).

An 'urgent fault' is one that directly results in a complete loss of service for one or more connections. For example, a complete interruption of supply, or provision of water that is not safe or likely to be unsafe to drink.

This measure only refers to confirmed faults with the network, not all customer complaints. For example, time taken to attend a customer complaint, that is later determined to be on the customer-side of the boundary does not need to be captured.

Extreme events, such as civil defence events may skew overall trends in performance. Any such events should be clearly identified in the comments section.

**D-R2 Median hours to attend a non-urgent fault (report at a District-level):** the median time from when a Network Operator receives notification of a non-urgent fault or unplanned service interruption to a drinking water network, to when service personnel reach the site in response.

A non-urgent fault is any fault that is not considered an urgent fault. Examples include, reduced pressure of supply, or an aesthetic issue with the water supply if it can be confirmed the water is still safe to drink.

**D-R3 Median hours to resolve an urgent fault (report at a District-level):** the median time from when a Network Operator receives notification of an urgent fault or unplanned service interruption (as per D-R1) to the time that service personnel confirm permanent return to service. A permanent resolution/return to service does not necessarily imply asset reinstatement, as this does not impact on the service itself.

This measure only refers to confirmed faults with the network, not all customer complaints. For example, time taken to attend a customer complaint, that is later determined to be on the customer side of the boundary does not need to be captured.

**D-R4 Median hours to resolve a non-urgent fault (report at a District-level):** the median time from when a Network Operator receives notification of a non-urgent fault or unplanned service interruption (as per D-R2) to the time that service personnel confirm permanent return to service. A permanent resolution and/or return to service does not necessarily imply asset reinstatement, as this does not impact on the service itself.

## 2.8 Systems interruptions

A network interruption is any event causing a total loss (cessation or outage) of water supply.

An interruption can affect just one customer, or it can affect many customers, but it is only counted once:

*Example: one break may affect 30 dwellings in a street, but only one interruption is recorded.*

**Do not** count interruptions that occur after the customer's water connection within privately owned pipes, or interruptions caused by meter or water restrictor replacement programmes.

**D-R5 Planned interruptions (report at a District-level):** total number of planned drinking water network interruptions for maintenance or renewal works, excluding water meter or water restrictor replacements.

**D-R6 Third-party incidents (report at a District-level):** the number of unplanned interruptions to service caused by third parties i.e. not the Network Operator or its contractor(s).

**D-R7 Number of unplanned interruptions (new in 2023/24) (report at a District-level):** the total number of unplanned interruptions to the water supply, such as an asset failure in the public reticulated network.

Include comments if this was due to causes other than main breaks or bursts etc.

**D-R8 Number of urban service connections that experience an unplanned interruption for longer than eight hours (new in 2023/24) (report at a District-level):** total number of unplanned interruptions to the water supply which lasted longer than eight hours.

## 2.9 Asset condition

**D-R9 % of pipelines that have received a condition grading (report at a District-level):** the proportion (as a %) of pipelines (both above-ground and underground), by length, that have received a condition grade using a standardised grading structure or methodology.

All pipelines that have received a condition grade should be included, regardless of the mix of attributes being used to assign the grades. For example, not only pipelines assessed using direct inspection methods should be included, but also pipelines that have received a condition grading based on interpolation of age or other factors. Provide information on the approach used to determine the condition grading in the comments field.

**D-R10 % of pipelines in poor or very poor condition (report at a District-level):** the proportion (as a %) of pipelines (both above ground and underground), by length, that have received a poor or very poor condition grade.

This value should be a percentage of all pipelines, not a percentage of pipelines that have received a condition assessment.

The definitions of poor, and very poor condition, should align with the definitions provided in the IPWEA's International Infrastructure Management Manual:

- poor condition – consider renewal
- very poor condition – approaching unserviceable.

If condition grades used do not adhere to these definitions, specify the alternate condition grading approach, or definition in the comments.

For asbestos cement pipelines; further guidance is provided in the definition of poor and very poor condition assets in the Water New Zealand, National Asbestos Cement Pressure Pipe Manual. These categories may also provide guidance for other pipe materials and so are provided here for reference:

- poor condition assets: less than 25% of the life of a new asbestos cement pipe remaining
- very poor: pipe failure due to deterioration can be expected within a few years and some pipe failures may have already occurred.

**D-R12 Average age of water pipelines (report at a District-level):** the weighted average age of all water pipelines within all the Network Operators' drinking water networks. This should be calculated by considering the length and age (in years) of pipelines as follows.

$$\frac{\sum(\text{length of pipeline} \times \text{age of pipeline})}{\sum \text{length of pipeline}}$$

**D-R13 % of above-ground assets that have received a condition grading (report at a District-level):** the % of above-ground assets, of the kinds listed below, that have received a condition grade using a standardised grading structure or methodology:

- drinking water treatment plant buildings, including ancillary buildings
- above ground service reservoirs, including contact tanks within the distribution zone
- pumping stations, including above ground ancillary buildings (such as detached chemical storage sheds).

The individual condition grading of components of each of these assets does not need to be considered.

Provide information on the approach used to determine the condition grading in the comments field.

**D-R14 % of above-ground assets in poor or very poor condition (report at a District-level):** the % of above-ground assets that have received a poor or very poor condition, as per the International Infrastructure Management Manual:

- poor condition – consider renewal
- very poor condition – approaching unserviceable.

If condition grades used do not follow these definitions, specify the alternate condition grading approach or definition in the comments.

Further guidance is provided in the definition of poor and very poor condition assets in the Water New Zealand, visual assessment manual for utility assets. The manual expands on the International Infrastructure Management Manual definitions, provided here for reference:

- poor – either not working or is working poorly because of damage or deterioration. Condition or structure is poor, or structural integrity is in question.
- very poor – needs urgent attention.

The individual condition grading of components of each of these assets do not need to be considered.

This value should be a percentage of all assets, not a percentage of assets that have received a condition assessment.

## 2.10 Water pressure

**D-R15 Average system pressure (report at a Network-level):** methods for calculating the average distribution system pressure are outlined in Appendix E of the Water New Zealand: Water Loss Guidelines February 2010.

If multiple drinking water networks are operated, provide information for each network separately.

**D-R16 Pressure levels of service (report at a District-level):** has a reference level for water pressure been set? A yes or no response is required.

The reference level may have been set to respond to customer levels of service, for backflow prevention, or to meet firefighting requirements.

If yes, provide information in the comments field on the reference level set.

**D-R17 Reference level of pressure (new in 2023/24) (report at a District-level):** if a reference pressure level has been set (kPa), please provide this.

**R18 Number of properties below reference level of pressure (new in 2023/24) (report at a District-level):** the total number of properties which are serviced at less than the reference pressure level.

## 2.11 Water restriction days

**D-R19 Water restriction days (report at a District-level):** the total number of days when water restrictions were in place across the district or department area.

**D-R20 Proportion of affected properties (report at a District-level):** the proportion (as a %) of customers affected by water restrictions (with each individual connection counted as a connected property).

For example, if a water supplier provides water to 4,000 connections, and 1,000 connections had water restrictions, this would be 25% (1,000/4,000).

## 2.12 Sufficient fire-fighting water is available

**D-R21 Have you adopted the Fire and Emergency New Zealand Code of Practice (SNZ PAS 4509:2008)? (report at a District-level):** yes or no.

**D-R22 Fire hydrants tested in the previous five years?** if the answer to D-R21, is yes, what % of key fire hydrants have been inspected in the previous five years? (in accordance with Clause G5 of Appendix G Firefighting Water Supplies Code of Practice SNZ PAS 4509:2008).

## 2.13 Drinking water: resources are used efficiently

### Drinking water network water losses

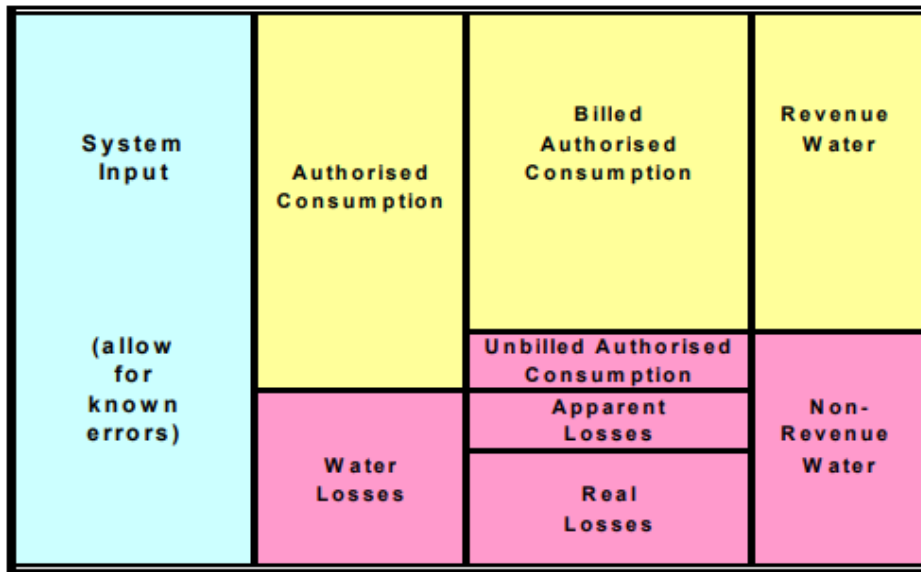
**D-RE1 Estimated total drinking water network water loss (report at a Network-level):** the total drinking water network water losses (m<sup>3</sup>/year) is calculated as the difference between **System Input** and **Authorised Consumption**. This is illustrated in the water balance diagram below.

If multiple networks are operated, please provide information for each network separately.

Further guidance material on water loss can be found on the Water New Zealand website: [https://www.waternz.org.nz/Article?Action=View&Article\\_id=42](https://www.waternz.org.nz/Article?Action=View&Article_id=42)

The following diagram shows a simplified Water Balance Table.





Water enters as **System Input** and becomes either **Authorised Consumption** or **Water Losses**.

**Authorised Consumption** can be billed or unbilled. The unbilled portion becomes part of Non-Revenue Water.

**Water Losses** (which form the remainder of **Non-Revenue Water**) are either:

- **Apparent Losses** – water which is used but is not paid for (theft, customer meter errors), or
- **Real Losses** – leaks, bursts, and overflows from the systems of Water Suppliers.

**Note:** The term ‘Unaccounted for Water’ (UFW) is no longer recommended as the definition of UFW varies widely.

**D-RE2 Current Annual Real Losses (CARL) (report at a Network-level):** if multiple networks are operated, provide information for each network separately.

‘Water losses’ is the total amount of water lost through all types of leaks, bursts, and overflows. This will depend on a several factors, such as frequencies, flow rates, and average duration of individual leaks and overflows. ‘Water losses’ includes all water losses from the pressurised system, and overflows from service reservoirs, up to the point of measurement (or estimation) of customer consumption.

‘Real Losses’ is the difference between the total ‘Water Losses’ and ‘Apparent Losses’.

‘Apparent Losses’ relate to unauthorised consumption (theft or illegal use) plus under-registration of customer meters – that is, where the amount of water being supplied to a connection is unknown because that connection has been missed off the metering programme.

**Note:** When the density of connections is 20/km or more, losses should be reported by litres/connection/day.

**Note:** When the density of connections is less than 20/km, losses should be reported by m<sup>3</sup>/km-mains/day.

**D-RE3 Infrastructure Leakage Index (ILI) (report at a Network-level):** measures how effectively infrastructure activities (speed and quality of repairs, active leakage control and pipe materials management) are being managed at the current operating pressure.

One approach for calculating ILI is outlined in the Water New Zealand [Water Loss Guidelines](#) and [Bench loss calculator](#).

ILI was developed to allow comparisons of leakage management performance between different systems with different infrastructure characteristics (connection density, length of service connections, average pressure etc). ILI should always be interpreted with some measure of pressure, and only used for tracking progress, provided all justifiable pressure reduction is achieved.

ILI is the ratio of Current Annual Real Losses (CARL) to Unavoidable Annual Real Losses (UARL), as follows:

$$\text{Infrastructure Leakage Index} = \frac{\text{Current Annual Real Losses (m}^3\text{/year)}}{\text{Unavoidable Annual Real Losses (m}^3\text{/year)}}$$

If multiple networks are operated, provide information for each network separately.

## 2.14 Use of water resources

**D-RE4 Median residential water consumption (L/day/connection) (report at a Network-level) (\*Council/CCOs only):** if water consumption, based on residential water metering, is not available, provide median water use per connection.

If multiple networks are operated, provide information for each network separately.

**Note:** *In the absence of median values being available, this field can be left blank and a 'mean water use' for each drinking water network will be calculated during our analysis.*

**D-RE5 Do you have a water conservation education programme in place? (report at a District-level):** yes or no.

Describe the education programme (if there is one in place) in the comments field.

**D-RE6 Number of residential connections with water meters (report at a District-level) (\*Council/CCOs only):** the number of residential water meters installed.

If a single meter is installed on a multi-unit complex, this is only counted as one meter.

**D-RE7 Number of non-residential connections with water meters (report at a District-level) (\*Council/CCOs only):** the number of non-residential water meters installed. If a commercial premises maintains multiple sub-meters within the tenancy and these are maintained by the water supplier each meter should be counted.

**D-RE8 Number of abstraction points with water meters installed (new in 2023/24) (report at a District-level):** the number of water abstraction meters that are calibrated.

**D-RE9 How frequently are water abstraction meters calibrated (new in 2023/24)? (report at a District-level):** the frequency of calibration of water abstraction meters (years).

**D-RE10 Number of water abstraction meters connected to telemetry systems (new in 2023/24):** the number of water abstraction meters that are connected to telemetry systems (number).

**D-RE11 Days for which a complete telemetry dataset has been recorded (new in 2023/24) (report at a District-level):** the number of days for which a complete telemetry dataset has been recorded (days).

## 2.15 Energy efficiency

**D-RE12 Grid electricity use (report at a District-level) (\*Council/CCOs only):** the total amount of grid-sourced electricity (kWh) consumed by the drinking water network's pumps, water treatment plants, and other network components.

**Do not** include electricity-use related to fleet vehicles or offices. If they cannot easily be separated, please provide an estimate, and note this in the data confidence field.

**Do not** include electricity generated on-site, for example through solar panels or micro-turbines.

**Do not** include sources of energy other than electricity (including biomass, diesel, and gas). These should be separately reported in the field below.

**D-RE13 Energy use (GJ) (report at a District-level) (\*Council/CCOs only):** the total energy consumed from external sources **other than electricity**, by water system pumps, water treatment plants, and other network components. This could include fuel provided by biomass, diesel, or gas.

**Do not** include energy use related to fleet vehicles or offices.

**D-RE14 Energy generation (report at a District-level) (\*Council/CCOs only):** the total amount of energy which is generated onsite (GJ). This could include energy generated by micro-turbines or through co-location of renewables on site.

Include the source of energy generation in the comments section.

## 2.16 Alternative water use (new in 2023/24)

**Note:** *In some instances, backwash, settled flocculation water, or crossflow water (used to scour/clean membranes etc) may be 'Recycled' where it is safe and appropriate to do so.*

*It is generally not safe to recycle chemical-wash or wastewater.*

**D-RE15 Volume of recycled water supplied to residential customers (report at a District-level):** the total amount (m3) of recycled water supplied to residential customers.

**D-RE16 Volume of recycled water supplied to non-residential customers (report at a District-level):** the total amount (m3) of recycled water supplied to non-residential customers.

**D-RE17 Volume of recycled water supplied to managed aquifer recharge (report at a District-level):** the total amount (m3) of water supplied to supplied to recharge an aquifer(s).

**D-RE18 Volume of urban stormwater reused in network (report at a District-level):** the total amount (m3) of urban stormwater which is reused in the drinking water network.

## 2.17 Services are resilient

### Critical assets

**D-RL1 Have you undertaken an assessment to identify critical drinking water assets? (report at a District-level):** a yes or no response, to show whether you have undertaken a comprehensive assessment to determine critical assets.

The [Infrastructure Asset Grading Guidelines 1999 – Water Assets](#) defines critical water assets as ‘...an asset where failure would have significant consequences, either in the ability of the system to provide services to customers or the effect on the environment’. Critical assets are assets with financial, business, or service level consequences of failure high enough to justify a more rigorous approach to proactive inspection, maintenance, and renewal. This might include pumping stations, trunk mains, pipe-bridges, and service reservoirs.

There are no specific rules for identification of critical assets, so it is a matter of technical assessment and judgement, based on the level of risk arising and the consequences of failure.

More guidance can also be found in the [IPWEA’s International Infrastructure Management Manual](#).

## 2.18 Disaster response planning and preparedness (new in 2023/24)

**D-RL2 Has a disaster response plan been developed?** yes or no.

Provide details about your disaster response plan in the comments field.

**D-RL3 Has a business continuity plan been developed?** yes or no.

Provide details about your business continuity plan in the comments field.

**D-RL4 Date the disaster response plan was last reviewed:** enter the date (DD/MM/YY), or year if not known.

**D-RL5 Date the business continuity plan was last reviewed:** enter the date (DD/MM/YY), or year if not known.

**D-RL6 Date when an exercise of disaster response plan was last conducted:** enter the date (DD/MM/YY), or year if not known.

**RL7 Date when an exercise of business continuity plan was last conducted:** enter the date (DD/MM/YY), or year if not known.

## 2.19 Water security (new in 2023/24)

**D-RL8 Do you have a strategic plan to address future changes in water supply demand?** yes or no.

Provide details about how you will address future changes in water supply demand in the comments field.

## 2.20 Water restrictions (new in 2023/24)

**D-RL9 Number of days that outdoor water use was restricted across each network:** number of days.

**RL10 Number of days that outdoor water use was banned:** number of days.

**D-RL11 Were other restrictions imposed** (e.g. indoor residential water use, commercial use).

Provide details about why water restrictions were imposed in the comments field.

## 2.21 Services are economically sustainable

**Expenditure (for the reporting period) (new in 2023/24)**

**D-ES1 Total capital expenditure:** actual capital spend (in \$000s) relating to drinking water (during the reporting period) split by:

- meeting additional demand, and
- replacing existing assets or improving the level of service.

**D-ES2 Total operating expenditure:** actual operating spend (in \$000s) relating to drinking water during the reporting period.

## 2.22 Forecast expenditure (new in 2023/24)

**D-ES3 Total forecast drinking water capital expenditure for the next reporting period (one year):** forecast capital spend (in \$000s) relating to drinking water.

**D-ES4 Total forecast operational expenditure for the next reporting period (one year):** forecast operating spend (in \$000s) relating to drinking water.

## 2.23 Revenue (new in 2023/24)

**D-ES5 Total revenue relating to drinking water (during the reporting period) (\*Council/CCOs only):** total revenue received (in \$000s) relating to drinking water.

## Appendix 1: Abbreviations

Abbreviation	Description
Act	Water Services Act 2021
AEP	Annual Exceedance Probability - the probability that a given rainfall total accumulated over a given duration will be exceeded in any one year.
ARI	Average Recurrence Interval - the average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration.
CARL	Current Annual Real Loss
CCO	Council-controlled organisation
IPWEA	Institute of Public Works Engineers Australasia, who produce the <i>International Infrastructure Management Manual</i> .
ILI	Infrastructure Leakage Index
NEPM	Network Environmental Performance Measures – provided for in <a href="#">section 145</a> of the Act. For guidance purposes here, this means measures used to monitor certain key aspects of network environmental performance that Taumata Arowai is interested in.
NPR	Network Performance Review report, produced by Water New Zealand
SCADA	Supervisory control and data acquisition - a system of software and hardware that allows organisations to monitor (using real-time data) and control processes; either locally or at remote locations.
tCO <sub>2</sub> e	Tonnes of carbon dioxide (CO <sub>2</sub> ) equivalent
UARL	Unavoidable Annual Real Losses
UFW	Unaccounted for Water

## Appendix 2: Summarised extract of the Water Services Act 2021

**Note:** *The following section is provided solely to assist with your understanding and should not be taken as legal advice or an interpretation of the legislation or your duties under the Act.*

**Section 140** **Defines** which Network Operators may be required to monitor and report on NEPM.

**Section 141** **Why** Taumata Arowai must monitor and report on the environmental performance of Networks and Network Operators, in accordance with the provisions of Part 3, Subpart 8 of the Act.

**Section 142** **How** Taumata Arowai may collect data on the environmental performance of Networks and Network Operators.

**Section 143** **Compliance and Penalties** for Network Operators who fail to provide data on their environmental performance.

**Section 144** **Network register** to publicly demonstrate the environmental performance of Networks and Network Operators.

**Section 145** **NEPM** that relate to Networks and Network Operations (e.g. discharges, waste, energy-use).

**Section 146** **Record keeping requirements** for Network Operators, in relation to NEPM.

**Section 147** **Annual Network Report** on the environmental performance of Networks and Network Operators.

**Section 148** **Reporting** on the environmental performance of Networks and Network Operators is supplementary other public reports produced by Taumata Arowai.