

# Managing Real water losses



The recent National Performance Review (NPR) by Water New Zealand shows that managing water loss continues to be a significant issue for a number of water suppliers. By **Richard Taylor**, from Thomas Consultants.

**T**he NPR covered 49 water suppliers providing water to 90 percent of the population. Across these 49 water suppliers, median water loss was 241.5 litres of water per service connection, every day. Collectively this amounted to over 100,000 ML of water lost in 2015/16, or enough water to fill over 40,000 Olympic size swimming pools.

Water loss is not always economically inefficient. In areas where water is plentiful, tolerating some level of water loss will make sense.

However there are many who have room for improvement. Twenty percent of authorities participating in the NPR have yet to undertake an assessment of their water loss efficiency. Of those who have determined their infrastructure leakage index (an internationally

recognised water loss benchmark allowing comparison between different systems) six of the 26 have high or very high leakage rates. For those water suppliers wanting to calculate, report and manage real water losses Water New Zealand's technical resources library ([www.waternz.org.nz](http://www.waternz.org.nz)) includes two very useful documents. The main features of these two documents are summarised below.

Benchmarking of Water Losses in New Zealand Manual (and Benchloss Software) was initially developed in 2002 as a Water New Zealand project by the Water Services Managers Group and updated in 2008.

The manual and software are used to calculate and report on real water losses from water supply networks using the International Water Association methodology and recommended performance indicators.

## IWA WATER BALANCE DIAGRAM

Own Sources	System Input (allow for bulk meters)	Water Exported			Billed Water Exported to other Systems	Revenue Water
		Water Supplied	Authorised Consumption	Bill Authorised Consumption	Billed Metered Consumption by Registered Customers	
	Billed Unmetered Consumption by Registered Customers					
Water Losses	Unbilled Authorised Consumption		Metered			
			Unmetered			
Water Imported		Water Losses	Apparent Losses	Unauthorised Consumption	Non-Revenue Water	
			Real Losses	Customer Metering Under-registration		
				<ul style="list-style-type: none"> <li>Leakage on Mains</li> <li>Leakage and Overflows at Service Reservoirs</li> <li>Leakage on Service Connections up to the street/property boundary</li> </ul>		

The objectives of the software and the manual are to:

- Introduce standard terminology for components of the annual water balance calculation;
- encourage water suppliers to calculate components of Non-Revenue Water, Apparent Losses and Real Losses using the standard annual water balance; and
- promote Performance Indicators suitable for national and international benchmarking of performance in managing water losses from public water supply transmission and distribution systems.



The recommended performance indicators for real water losses from a water supply network are:

- Litres/connection/day for urban areas – defined as having a connection density greater than 20 connections/kilometre water main;
- m<sup>3</sup>/km main/day for rural areas;
- Infrastructure Leakage Index (or ILI). This is a non-dimensional ratio between the volume of ‘Current Annual Real Losses’ (or CARL) divided by a calculated volume of ‘Unavoidable Annual Real Losses’ (or UARL) for the system. The latter uses a quantitative formula based on number of service connections, length of water mains, and average system pressure.

In 2013 the Department of Internal Affairs (DIA) introduced non-financial performance measures. Performance Measure 2 (maintenance of the water supply network) is calculated as real losses, expressed as a percentage of total annual system input. The use of percentages for reporting real water losses is not recommended by the IWA as it is considered misleading.

This is because it relates to the level of real losses to consumption, which can vary depending on water use by customers (including councils).

For example, if water consumption is relatively low due to successful water efficiency and conservation measures, the percentage of real losses may appear high when in fact this is not the case. Despite submissions to the DIA at the time highlighting the above, the measure was adopted as it considered percentages to be more readily understood by the general public compared with technical measures.

The NZ Water Loss Guidelines, published in 2010, are aimed at providing all water suppliers with the means to first assess their water losses (ie, a recap of the water balance and performance indicators), then develop an effective water loss strategy for any distribution system, large or small. They provide a basis for planning the ‘next steps’ in managing water losses, starting from any level.

The recommended approach to water loss management, as outlined in Section 7 of the Guidelines is as follows:

- First, estimate the level of losses in a network using the calculation methods available (water balance and/or minimum night flow measurements).
- Second, having established the level of water losses occurring, it is recommended that leakage targets be set for the system based on guidelines given in the document, and that budgets for installing monitoring equipment and active leakage control are prepared for approval.
- Third, that the remaining actions outlined in Section 7 of the Guidelines need to be implemented at an appropriate scale in order for set targets to be achieved within an agreed time frame to reduce and then to maintain water losses at an acceptable level. A description of what is considered to be a basic and an advanced level of implementation of the various actions is included in Table 7.1 in the Guidelines. It is noted that this requires ongoing commitment and dedication, and not only of water supply operational staff. It also requires adequate budgets for key ongoing activities.

In summary, there is a need for many Councils to address water loss management. The Benchmarking Manual and software provide the basis for defining, calculating and reporting real water losses.

The Guidelines are intended to be a toolbox for those wanting to make progress. Several additional resources are also available via the Water New Zealand website.

Increasingly water suppliers are faced with inadequate treated water supplies, and leakage assessment and reduction must be considered as the first step in providing for future demand. [WNZ](#)

