Making our water supply more resilient

17 August 2015

What is the issue?

The Wellington metropolitan area has a significant coastline and sits on the interface of the Australian and Pacific tectonic plates. It has a high risk of earthquakes and is subject to inclement weather, creating many natural hazards such as ground movements and floods. Climate change also brings about changes in weather patterns, frequency and severity of water-related hazards, including droughts. These natural hazards can affect the area's water supply network and its supporting infrastructure such as power, roading and telecommunication.

Water is likely to be available sooner in Upper Hutt and Wainuiomata because they are closer to water sources, and in Lower Hutt because access to the Hutt aquifer system is likely to be available. Porirua and Wellington cities are expected to be the worst affected areas.

The area in particular is threatened by a movement of the Wellington Fault which has about a one in ten chance of moving in the next 100 years causing a major (magnitude 7.5 or greater) earthquake.

A major earthquake would severely damage water supply pipelines and treatment plants and result in a water supply shortage for the Wellington metropolitan region. Widespread damage of the reticulation network is likely and could take many weeks to repair.

Fixing the major supply pipes to reservoirs is expected to take up to 70 days. Only after these major supply lines are fixed can repairs start on the pipes that supply water to homes and businesses.

The risk of fires will be high following an earthquake because gas mains could rupture and broken power lines could cause sparks. It's very unlikely that there will be any pressurised water available to fight fires.

Water is likely to be available sooner in Upper Hutt and Wainuiomata because they are closer to water sources, and in Lower Hutt because access to the Hutt aquifer system is likely to be available. Porirua and Wellington cities are expected to be the worst affected areas.

The Civil Defence and Emergency Management Act 2002 requires councils to reduce the impact of hazards and vulnerabilities on their water supply networks and to ensure the networks continue to function after an event, although that may be at a reduced level. Our analysis has shown that we need to do more to enable us to comply with the Act as a lifelines utility.

We have been working on addressing aspects of this problem since the first seismic assessments were done in 1993.

We've strengthened pipes and reservoirs, installed valves designed to close quickly in an earthquake, and designed and carried out other network improvements. However we currently do not have a whole of system view on resilience that captures both the bulk water and reticulation networks and the interdependencies with other utilities.

What does Wellington Water want to achieve?

We want to make sure that communities have access to a water supply within a reasonable timeframe after a natural or man-made disaster or operational failure, with priority given to critical services such as hospitals and emergency service providers.

This requires that councils agree on how water will be delivered to the community (called a 'level of service') following a major earthquake and to identify the investment required to achieve this level of service within an agreed timeframe.

How will we achieve this?

Wellington Water will be working on understanding the current level of resilience in the water supply networks. We have looked at what is being done overseas for the supply of emergency water. Next we will assess options for how we deliver water to our communities.

This assessment of options will require us to understand what improvements would need to be made to the networks to deliver water under various scenarios and the costs to carry out these improvements. We will use the worst case scenario of a Wellington Fault earthquake.

We will be working with councils to reach agreement on a level of service that is affordable and achievable within an agreed timeframe. A level of service would include a number of factors, including:

- **o** How much water could or should be provided each day to residents and how far they may have to walk to get it
- **o** Target times for reinstatement of a reticulated supply to residents and to businesses
- **o** How to supply critical users such as hospitals, medical centres and emergency management facilities, and how much to supply them
- **o** The target time to fully recover from an event i.e. return to normal

We have already looked at a number of options for storing water nearer to urban population centres, particularly for Wellington and Porirua, as well as other pipeline strengthening.

We will then help councils to decide on a target for how they deliver water to communities based on what is affordable and achievable for them by the end of 2016.

Our intention is that an agreed programme of works will be included in councils' 2018-28 long term plans.

What does this mean for our community?

Developing a comprehensive plan with councils on how we would supply water, and when we aim to get things back to normal, would be beneficial for planning, investment and the wider community.

The long-run objective is to improve the resilience of the network so that a water supply can be delivered to the community post an event to a level of service agreed by the community.

We'll be working with councils on target timeframes to get the water supply up and running after a major event