

# Water supply

## Water Supply Summary

### How Drinking Water is Obtained?

For the purpose of making this assessment, the city has been divided into two separate communities: the urban community, and the urban fringe community. The urban community includes the Christchurch City Council reticulated supply and several hospitals and schools which have independent supplies within the urban area. The urban fringe community includes supplies on the outskirts of the city. This is mostly made up of school supplies and also includes the Christchurch City Council Kainga and Brooklands supply.

All of the water supplies identified in the assessments source their water from wells into the aquifers, extending under the city and the Canterbury Plains. It is estimated that 1,300 properties or a population of 3,500 are not provided with a reticulated supply within the Council's boundaries. It is assumed that these properties all source their drinking water from private domestic wells.

### Risk Assessment

The potential risks to each of the supplies are similar, as are the sources and methods of abstraction. Contamination can occur at any point in the water supply system, being at the source, during treatment, storage or reticulation. The supplies provide different levels of treatment or mitigation of these risks resulting in differing probabilities of a contamination event occurring. The main risks identified are summarised below:

- Unsecured well heads or access hatches leading to contamination of the source or stored water;
- No residual treatment provided, except for Paparua Prison, leading to increased risk of contamination of water during storage or reticulation;
- Salt water intrusion into aquifers that discharge into the sea;
- Loss of service due to lack of storage or backup electricity;
- Insufficient backflow protection leading to backflow of contaminants into reticulation.

These risks can all be treated in order to reduce the probability of a contamination event occurring. Christchurch City Council has a Public Health Risk Management Plan in place. Operators of other supplies have some preventative measures in place.

Two areas have been identified where contamination risk may present a higher potential threat to the community. There are two school supplies located in an area that is not serviced by a reticulated wastewater system and the soils are not free draining. There is, therefore, a higher risk of contamination of the water supplies from septic tanks in the area. Additional care needs to be taken in the location and operation of these bores to ensure contamination does not occur.

The second higher risk area is where surface or climatic effects have an influence over the characteristics of the groundwater (non-secure groundwater). The Paparua Prison supply and some pump stations in Christchurch's north-west pressure zone are areas where this may occur. Additional water quality testing may be necessary to monitor against any public health risks resulting from this.



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### Quality and Adequacy of Drinking Water

All of the water suppliers have sufficient water to meet their current demand. The Council currently abstracts just over 50 million cubic metres of water a year for its reticulated supply. This represents about half of the water taken annually within the city boundaries. The policies and rules set out in Chapter 4 and 5 of Environment Canterbury's proposed National Resources Regional Plan have been developed to ensure no significant long-term decline in groundwater levels as a result of abstraction, no significant long-term decline in water quality as a result of land-use activities, particularly the Christchurch aquifers source water, and in artesian aquifers, no contamination of groundwater as a result of abstraction. These rules will ensure that the long-term sustainability of the aquifers as a water source is protected. Provided these rules and policies are adhered to, there will be sufficient quantity of high-quality water to meet future demands.

Christchurch is well known for the high quality of its drinking water. As a result, the water does not need to be treated to meet current drinking water standards. Paparua Prison, in the Urban Fringe community, is the only supply which treats its water with a chlorine solution to provide residual treatment. There is no infection incidence data suggesting that any of the sources of drinking water in either the Urban or Urban Fringe Communities have been a cause of water-borne diseases.

The Christchurch City Council water supply is operated by adequately trained staff to ensure compliance with the New Zealand Drinking Water Standards 2000. The training and qualifications of the operators of non-council-operated supplies have not been established. Supplies to schools are generally operated by school caretakers with only a rudimentary understanding of their supply systems. It is believed that preventative maintenance is generally not practised on school supplies. The hospital, airport and prison supplies appear to be operated by personnel knowledgeable in the operation and maintenance of water-supply systems. They have preventative maintenance systems in place.

### Current and Estimated Future Demands

The current total annual consumption from the Christchurch City Water Supply is about 50 million cubic metres per year. The Council has consented approvals with Environment Canterbury to draw in about 75 million cubic metres per annum from the aquifers serving the City. The peak demand for the whole City is about 21,000 cubic metres an hour. Accurate consumption figures are not available for the non-Council-operated supplies.

Future demand for the Council-operated supplies is assessed in detail in the Water Supply Asset Management Plan. The population served by the Christchurch City Water Supply is expected to increase by about 7% in the next 10 years. A large proportion of the peak water demands in Christchurch are for domestic irrigation. For new developments the peak demand will increase proportional to the number of households. Infill housing decreases the irrigable land area and therefore does not increase peak demand. Only a small increase in the total annual consumption is expected because of the demand management methods already in place. (Water Supply Activity Management Plan includes aim to reduce consumption from 420 litres/person/day (2001) to 380 litres/person/day in 2026.)

Future demands are not expected to increase for non-council urban suppliers. Of the urban fringe community, only the Christchurch Airport and Paparua Prison are predicting an increase in demand. The increase is expected to be in the order of 10% to 15%.

The Health (Drinking Water) Amendment Bill proposes greater responsibilities with regard to the quality of water supplied. This may become too onerous for many non-council suppliers and therefore increased demand for the council provided supply may result. If all non-Council water users were to be supplied from the Council system this would increase the aquifer draw-off by about 1.1 million m<sup>3</sup> per annum.

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### Options to Meet the Demands

Demand resulting from population growth can be met in the following ways:

- Construction of additional pumping stations, wells and other infrastructure to increase capacity to help meet peak demands up to the agreed maximum take levels as stipulated in Environment Canterbury consents;
- Implementation of demand management programmes, including public education to encourage efficient water use, water loss reduction programmes, water supply modelling to identify operational changes to increase system efficiencies.

Options to meet demand related to non-secure groundwater sources can be met by:

- Additional water quality testing;
- Introduction of treatment;
- Connection to Council reticulated supply, for non-council supplies;
- Drilling new wells into secure sources.

Options to meet demand related to wells in areas with septic tanks and insufficient drainage:

- Further investigation to establish if there is a public health risk;
- Ensure well heads are secure and operated correctly;
- Abandon existing supply and connect to Council reticulated supply.

Options to meet demand related to the Health (Drinking Water) Amendment Bill and the greater responsibilities with regard to the quality of water supplied:

- Continue to manage own supply ensuring staff are adequately trained and risk management procedures are in place;
- Employing external qualified staff to operate and maintain supply and manage risks;
- Abandon existing supply and connect to Council reticulated supply.

### Christchurch City Council's Role in Meeting the Demands

Most of the responsibility for ensuring water supplies are appropriate rests with the local Medical Officer of Health (Community Public Health Unit of Christchurch District Health Board) who is charged with this responsibility through the Health Act and via administration arrangements with the Ministry of Health.

The Council's role will be to ensure its own public water supply system is managed in an appropriate manner to meet compliance and community needs.

It is expected that any new infrastructure for growth will be ultimately funded by developers and Council may assist in setting up cost-share areas to recover funds from future developments. The Council may also consider assistance with funding of the service where there are significant public health issues. This would be assessed on a case-by-case basis.

The Council may also have a future role to liaise with schemes owners and other agencies, such as Environment Canterbury and Community Public Health, to ensure appropriate water supply arrangements are in place to meet the total community's reasonable needs. This would be assessed on a case-by-case basis.



## Proposals for Meeting the Demands

Pending legislation, the Health (Drinking Water) Amendment Act is likely to require water-supply owners to construct, manage and monitor the supplies in a manner that will ensure acceptable levels of risk are achieved.

The Christchurch City Council, for its own supply, is already implementing plans to meet the future demands. This includes:

- Capital works programmes to provide additional infrastructure for growth;
- Demand management programmes to reduce per capita consumption;
- Development of a Public Health Risk Management Plan;
- A projected increase in the operating budget to cover likely additional water-testing and compliance requirements.

The Council will accept applications to connect to the supply from non-council-operated supplies within the reticulated area, although there may be restrictions on the size of connection that can be made. Non-council supplies outside the city's reticulated area may also apply but permission to connect will be made on a case-by-case basis. Assistance with funding to connect, where there are public health issues, will also be assessed on a case-by-case basis.

