

Wastewater Summary

Methods used to dispose of wastewater

For the purpose of making the assessment, the city has been broken up into two separate communities: the urban community and the urban fringe community. The urban community includes the Council-provided collection and disposal schemes for the city and Belfast. The urban fringe community includes the areas bordering the Christchurch metropolitan area and within the city boundaries but not served by the reticulated network.

Wastewater from Christchurch City is treated at the Christchurch Wastewater Treatment Plant (CWTP) and the treated effluent is discharged into the Avon-Heathcote Estuary. The Christchurch City Council plans to replace the estuary discharge with an ocean outfall by 2009.

Wastewater from the Belfast township is treated through oxidation ponds and the effluent is discharged into Otukaikino Creek, a tributary of the Waimakariri River. From the end of 2006, the discharge will be pumped to the CWTP.

The urban fringe area uses stand-alone schemes for wastewater treatment and disposal. These schemes consist mostly of single-chamber septic tanks with gravity disposal trenches. It is estimated that there are 800 to 1,300 such properties within the Christchurch boundary.

Risk assessment

The discharge of effluent from the Christchurch Wastewater Treatment Plant contributes to the health risk for users of the estuary. The risk zone is assessed as being small and centred around the point of discharge.

Wet weather overflows into the Avon and Heathcote Rivers significantly increase the levels of contaminants in the rivers during this time and for a period afterwards, presenting a public health risk to users of the rivers. A significant mitigating factor is the prevalence of low-contact water-related activities discouraged by the poor weather or high river flow conditions coinciding with the sewer overflows.

Effluent from the Belfast Oxidation Ponds is of an inconsistent quality and presents a public health risk to users of the receiving stream.

The main risks associated with septic tanks are summarised below:

- Treatment plant or disposal field poorly designed leading to a low level of treatment;
- Treatment plant or disposal field poorly maintained leading to uneven distribution of effluent;
- Shallow groundwater leading to contamination of groundwater;
- Poor quality or hydraulically limited soils leading to surface ponding or shallow groundwater contamination.

The higher risk area is Marshlands owing to its shallow groundwater and peaty soils.

There is a potential health risk for properties on night soil collection because of the untreated wastewater being held on-site for up to a week.

Wastewater collection and treatment

Quality and quantity of discharged wastewater

The Christchurch wastewater system collects about 55 million cubic metres of wastewater each year, transporting it through a series of sewers and pump stations to the treatment plant at Bromley. The advanced secondary treatment process produces a high-quality effluent which is discharged into the Avon-Heathcote Estuary. There are also 12 consented locations where diluted untreated effluent is discharged, during periods of high rainfall, into the Avon and Heathcote Rivers.

About 0.4 million cubic metres of wastewater annually are collected from the Belfast area, treated in oxidation ponds and discharged into a tributary of the Waimakariri River. The effluent from the Belfast Treatment Plant is of an inconsistent quality and has occasionally failed to comply with resource consent conditions.

There are about 800 to 1,300 domestic septic tank systems in operation on the fringe areas of Christchurch. These systems consist mainly of single chamber septic tanks with gravity disposal trenches. The estimated volume of effluent associated with this number of tanks is 500-800 cubic metres a day. The effluent quality of these systems is highly variable and dependent on design, construction and maintenance standards adopted by the owners.

There are currently 11 properties in the northeast fringe area served by a night soil collection. Untreated effluent is kept in a holding tank, emptied out and taken to the Christchurch Wastewater Treatment Plant. Four of these properties are being connected to the city reticulation, five collected on a weekly basis and two only occasionally.

While the Christchurch and Belfast wastewater collection and treatment systems are operated by appropriately trained and qualified staff, it is assumed the domestic tank systems are operated by property owners with limited knowledge of wastewater treatment systems.

Current and estimated future demands

Future demand for the Council-operated supplies are assessed in detail in the Wastewater Asset Management Plan. Wastewater flows are projected to increase as a result of:

- Increased population (about 7% in the next 10 years);
- Intensification of development in fringe areas meaning septic tank effluent disposal fields are less acceptable from a public health perspective;
- Increases in inflow and infiltration into the system. This has been estimated to increase by 10% over the next 40 years as the collection network ages;
- The connection of Belfast to the Christchurch Wastewater Treatment Plant (additional 0.4 million cubic metres in 2007).

Upgrades to the CWTP have been designed to provide sufficient system capacity for future planned demands up to the year 2050, as are reticulation upgrades.

Demands are also projected to increase as a result of environmental concerns relating to the wet weather overflows into the Heathcote and Avon Rivers, the discharge of treated effluent in to the estuary and the discharge of Belfast's effluent in to the Otukaikino Creek.

There is also demand to get properties served by night soil collection on to alternative methods of wastewater collection, treatment and disposal.

Options to meet the demands

Options to meet demand resulting from population growth:

- Construction of additional pumping stations and pipelines to increase capacity to help meet peak demands (major sewer upgrade project);
- Inflow and infiltration reduction programmes (ongoing maintenance programme);
- Increase capacity of treatment plant (CWTP upgrade project);
- Wastewater system modelling to identify operational changes to increase system efficiencies, monitor effectiveness of capital works and rehabilitation programmes, assist with pipe sizing and capacities required.

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- Investigate alternative systems such as storage or decentralised treatment systems, to help cater for peak flows and cater for growth above the current CWTP upgrade.

Options to meet demand related to environmental issues:

- Inflow and infiltration reduction programmes;
- Capital works to reduce wet weather overflows;
- Diversion of Belfast's wastewater flow from the Otukaikino Creek;
- Construction of ocean outfall to replace the current estuary discharge.

Options to meet demand related to night soil collection:

- Investigate options to get properties off night cart collection;
- Investigate reticulated septic tank options (STEP/STEG systems);
- Extend city reticulation to service the properties.

Christchurch City Council's role in meeting the demands

In general, the Christchurch City Council will play the role of facilitator in meeting the demands for wastewater services. It is expected that any new infrastructure for growth will ultimately be funded by developers, the Council possibly assisting 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.

Proposals for meeting the demands

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

- Upgrade of CWTP to increase capacity and effluent quality.
- A major sewer upgrade programme for new sewers to cater for projected growth and pipeline rehabilitation; some of these works are also aimed at reducing the wet weather overflows to the rivers;
- Construction of an ocean outfall to divert all treated wastewater from the estuary and discharge offshore through a three kilometre pipeline;
- Construction of a pipeline to take wastewater from Belfast to the CWTP;
- Inflow and Infiltration reduction programmes;
- Capital works to reduce wet weather overflows;
- Diversion of Belfast's wastewater flow from the Otukaikino Creek;
- Construction of ocean outfall to replace estuary discharge.

The Christchurch City Council also proposes to investigate options to get the remaining properties off night cart collection.

Wastewater collection and treatment

