

VACUUM CLEANING – SEWER STYLE

A new vacuum wastewater system is being installed in parts of Christchurch to replace the existing gravity system badly damaged by the Canterbury earthquakes. Ross Miller reports.

The new system uses air pressure to transport wastewater through the pipes from houses to the wastewater treatment plant. Christchurch is the first South Island location to use this technology. A new system it may be, but contractors still have to dig up the road to install it like the good old days.

Work began in April 2013 and by the end of October, over 3,500 metres of wastewater pipe has been laid in the road carriageway and 72 wastewater tanks installed in the roadside berms. This means over half the entire project is now complete.

The second stage of the programme involves connecting individual property lateral pipes to a wastewater tank. This can only be done once the new pump station on the corner of Golf Links Road and New Brighton Road is up and running in the first few months of 2014.

The initial catchment in Shirley involves approximately 750 houses, with 7km of vacuum main in streets as well as lateral connections to individual households.

HERE FOR THE LONG TERM

The main reason for replacing compromised infrastructure with this system is to provide long-term resilience in the overall wastewater system. The gravity system relies on pipelines laid at a gradient to support the flow of wastewater downhill. While this system has performed well in some areas, and can be repaired, the vacuum system for eastern suburbs was decided on due to a combination of badly damaged pipes and a risk of liquefaction.

“The vacuum system will offer the greatest resilience”

The vacuum system will offer the greatest resilience in the event of further large earthquakes, and it can be laid at depths of only 1-1.5 metres, making it eminently suitable, especially in the Shirley area due to its the high water table and running sand.

Wastewater from a series of collection chambers that serve

up to four properties will be gathered at the new pump station once it is commissioned, which will interface with the existing gravity system and, subsequently, the Bromley treatment facility.

Residents will not notice any difference to their wastewater system and there is no additional cost for residents affected. However, streets involved will now have the small underground collection chambers, which are usually sited in grass berms. Residents will be able to see collection chamber cast lids on the grass berm and small vent stacks which sit against property boundaries.

“a series of collection chambers that serve up to four properties”

Emergency repairs and the use of pumps have kept the eastern suburbs going in the interim. About 31 percent, or 528km, of Christchurch's 1,700km of sewer pipe was damaged in the earthquakes and around 100 sewer pumping stations needed repair or replacing. Pipes cracked, broke away at their joints or collapsed completely, letting debris into the system or blocking it.

In some streets the slope changed, meaning wastewater no longer flowed in the right direction. The areas being targeted by the vacuum system were among the worst affected by earthquakes.

PHASING OUT THE PORTALOO

Some of these streets needed portaloos and chemical toilets immediately after the earthquakes. Across Christchurch, around 3,000 portaloos adorned the footpaths and 30,000 chemical toilets were distributed.

However, all that is changing as the new system progresses, and repairs are completed in other areas.

“All chemical disposal tanks are scheduled for removal by June 2014,” says Christchurch City Council Water & Wastewater Treatment Manager James Feary. “Currently, there are two portaloos still in use in the red zone. The Ministry of Civil Defence owns 960 of the portaloos brought into Christchurch,



Burton Hawkin of Tru-Line Drainage Ltd, a subcontractor of McConnell Dowell, installing a manhole as part of the vacuum system in Golf Links Road. A partly installed collection chamber is in the background.

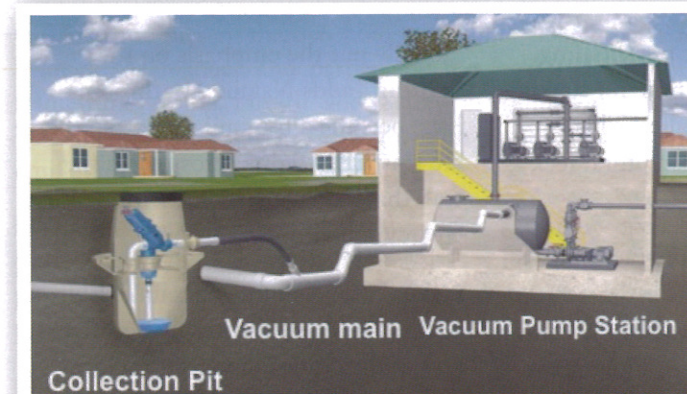


McConnell Dowell workers in the final stages of installing a vacuum main in the Shirley wastewater catchment.

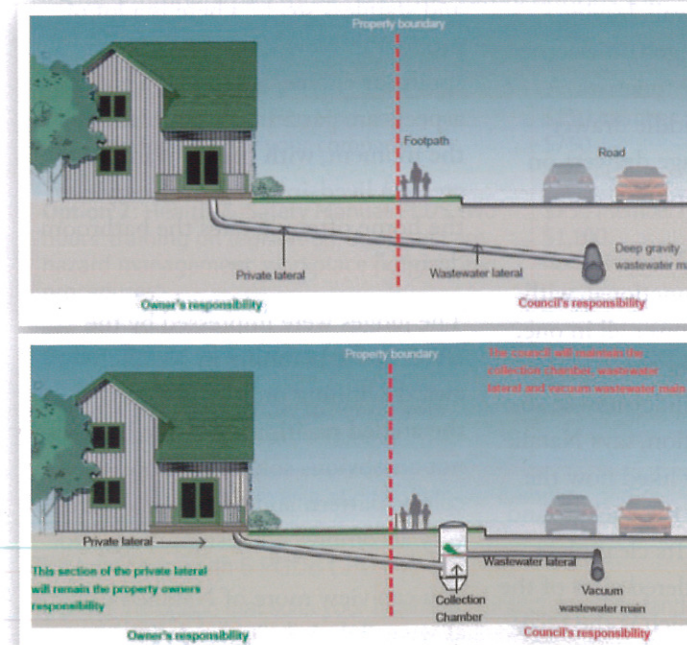
and at this stage they intend to retain ownership. Three hundred are being stored in Christchurch to enable a rapid response should another civil defence emergency occur. The rest are being loaned to councils across New Zealand on the understanding that, if there is an emergency anywhere in the country, the Ministry is able to recall the toilets for response.”

The other 2,000 portaloos were hired from around the South Island and cost about \$1 million a month. Christchurch City Council Water & Waste Manager Mark Christison says the cost to rent, clean and service the portable toilets peaked at around \$1.75 million a month.

The 960 portaloos cost \$3.7 million to purchase and transport, while chemical toilets and disposal tanks cost the city \$9.6 million.



How a vacuum wastewater system works.



Comparing the existing and new wastewater systems.

PIPE PLAY

It's not unusual for young boys to proclaim they want to be a firefighter or a pilot, but the early-age desire to be a plumber is less common.

Unless, of course, there is the attraction of big diggers and other machinery. In the Christchurch suburb of Shirley, Kidsfirst kindergarten children are missing McConnell Dowell and its sub-contracted crew from Gas Services and Plumbing after they moved on to the next section of the installation of the new vacuum sewage system.

The eastern suburbs have had to live with much disruption this year. Roads have been closed to all but residential traffic, and footpaths and parking have sometimes been restricted as post-earthquake infrastructure is rebuilt. Consequently, workers were delighted when the children brought them afternoon-tea muffins. In turn, they gave the children the experience of 'working' on a stationary digger.

Head teacher Janette Bowen asked McConnell Dowell if there were any pipe offcuts the kindergarten could have, as 'pipe play' had been so popular. “Our sandpit has turned into a sewer construction site and we are now digging trenches and arguing about the few pipes we have,” she said.

Gas Services and Plumbing foreman Jason 'Rambo' Gould and two McConnell Dowell staff made a special lunchtime visit to Kidsfirst to donate a pile of off-cuts and supervise some sandpit projects. ■



Jason 'Rambo' Gould helps out in the sandpit.