

water

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Water quality

Dr Jan Wright's recommendations

Smart metering the water crisis

A passion for water play

water
NEW ZEALAND



The New Zealand Water & Wastes Association Waiora Aotearoa

An experiment in floodproofing

It's a somewhat novel approach to flood prevention – making threatened buildings waterproof. **Hugh de Lacy** explains a Christchurch experiment.

It may not be the solution for the earthquake-induced flooding problems in Christchurch City's Flockton Basin, but spraying a waterproof membrane over buildings, and plugging apertures such as doors and air-vents, seems to ensure that at least floodwaters don't get inside.

The 2011 quakes made the 600-home inner-city suburb highly prone to flooding through a combination of vertical tectonic movement, liquefaction-induced settlement, lateral spreading and river channel capacity changes.

Essentially, the ground dropped, the water table rose, and hundreds of homes were flooded in the heavy rains of March and April last year.

Worse, there was no simple solution to prevent the same thing happening every time Christchurch received heavy rain – something that fortunately hasn't happened since.

The Christchurch City Council (CCC) trialled a range of responses to the ongoing threat, one of which was to make the individual houses flood-proof by coating them in a waterproof membrane and blocking off the doorways and the air-vents in the foundations.

Seepage inevitably accumulating under the floorboards would be pumped out to keep the space round the foundations relatively dry.

The spray-on membrane at the heart of the strategy is called Blue Barrier Liquid Wrap 2300, a product of Australian

company Australasian Building Envelope Protection, or ABEP, which has a Napier-based New Zealand subsidiary, ABEP (NZ).

The liquid wrap is simply sprayed on the outer surface of the building to be protected, making it impermeable to water.

In setting up the test on a single house site, the CCC called in water barrier company Hydro Response, based in Rangiora, which has a range of five products designed for various water exclusion scenarios.

Hydro Response, launched by managing director Clay Griffin a couple of years before the quakes, has since been mostly involved in holding back the water round the city's bridges so that engineers can assess the quake damage and, later, so that contractors can effect repairs.

More recently, Hydro Response has supplied water barriers and expertise to combat the flooding that occurred in Whanganui in June this year.

In the Flockton Basin trial, carried out in collaboration with the CCC's Flooding Taskforce, ABEP first sprayed a red-zoned weatherboard house, which was awaiting demolition, with its bright blue membrane, and Hydro Response surrounded it with 80 metres of its Swedish-manufactured Geodesign barrier, which can exclude water up to 2.4m deep, plus an American-made water-filled tube barrier and a self-inflating barrier from Canada..

Griffin and Hydro Response then blocked off the foundation ventilation apertures with slabs of wood sealed in place and fitted with plastic tubes with removable lids.

The company also deployed its British-made Floodgate barrier system across the doorways, two of them side-by-side at the wide rear porch, and one at the narrower front porch.

With the systems in place, they opened the fire hydrants and filled the space between the Geodesign barrier and the house with water to a depth of a metre – and waited to see how it would work.

In fact, it worked well with no water at all getting into the house, and the inevitable seepage into the underfloor area being easily controlled by a small pump.

The experiment supported the scenario of the

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householder, faced with a flood threat, going round the house fitting caps to the foundation vents, and then setting up the Floodgates to keep water from the doors.

They could then flee the scene, confident that when the water receded they could immediately take up residence again with no water damage.

This scenario assumed the householder would have the Floodgate doorway barriers permanently on hand – possibly owning them.

The CCC's general manager for the infrastructure rebuild, John Mackie, says the level of property protection provided by the trial was "viable," but "there is not a great deal of enthusiasm for it from the communities affected, as it still leaves them with access problems and nuisance flooding of land and outbuildings".

Accordingly, "it does not form part of the recovery programme for flood mitigation," Mackie says.

The cost might also prove a deterrent in Flockton-like situations: it could cost up to \$20,000 to flood-proof a single house-sized building in this way.

This would include applying the membrane, and the \$3000-\$4000 needed for the barriers, depending on the number of doorways and other apertures.

Water barrier use expands

In November last year, the CCC announced that its \$48 million answer to the basin's flooding problems would instead comprise a new pump station and bypass system, requiring the outright or partial purchase of several of the 580 homes it will protect.

The bypass, made feasible by the widening of the Dudley Creek channel and the installation of a new pumping station at Tay Street, will be 700 metres long and gravity-fed.

Griffin's launch of his Hydro Response systems was nicely timed for a role in the Christchurch earthquake recovery, but the application of his water barrier products has spread throughout both main islands, and gone from clearing water round bridge foundations for inspections to holding back floodwaters.

In the latter role, the company's systems were used extensively in the Whanganui floods, where the river



Main image : Flood trial house Christchurch

Above: WIPP barrier trials Horizon Regional Council Whanganui.

overflowed its eastern embankments, putting the area from the Dublin Street to the Victoria Avenue bridges under water.

An increasing number of local authorities have bought and stockpiled Hydro Response's water barriers to limit flood damage, exclude water from bridge piles and allow stream beds to be dredged.

And in Wellington, the Building Research Association of New Zealand (BRANZ) is presently carrying out trials on small-scaled houses on various foundations which are surrounded with Geodesign barriers filled with water.

The houses are fitted with sensors to measure the performance of internal building materials, as part of a project looking at post-flood events and their effects on building structures.

Hydro Response is also expanding its Australian operations, and Griffin will be opening an office there before the end of this year. **WNZ**



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