
Beacon Pathway Submission to the Christchurch City Three Year Plan 2013-16 (draft)

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What is Beacon?

Beacon Pathway Incorporated aims to transform New Zealand's homes and neighbourhoods to be high performing, adaptable, resilient and affordable. Beacon has extensive experience in demonstration projects, a sound base of robust research and a collaborative approach to creating change. A number of Beacon's tools, developed through earlier research and projects, have the potential to contribute to the redevelopment of Christchurch.

In the post Canterbury rebuild, Beacon has been active in:

- **demonstrating the opportunity to rebuild and repair Christchurch housing to a higher level of performance with two projects.**
 - Build Back Smarter. Beacon (with support from Council along with CAfE, EECA, Fletcher Building and the Ministry for Science and Innovation) initiated a project to demonstrate that performance upgrades can and should be included alongside earthquake repairs. Upgrades include: insulation in walls, ceiling and underfloor, efficient space and water heating, energy efficient lighting, double glazed windows, rainwater collection and re-use. Build Back Smarter has effectively demonstrated that such improvements can be carried out at same time as repairs and they do not delay the repair process. A systems model has been developed, and presented to representatives from CCC, insurers/ PMOs, CERA, MBIE, CDHB, community and industry. We are now working with key government agencies and industry to see this model adopted.
 - The High Performance House at HIVE. Beacon has project managed the design, construction and demonstration of an innovative show home at the HIVE Home Innovation Village. The house showcases a new technology, Warmframe, which allows speedy accurate offsite construction and very high performance, and is a collaborative project from five industry partners (NZ Steel, Fletcher Aluminium, Frametek-RFS, InsulPro and Resene). It was awarded 8 stars by Homestar (one of only two 8 star houses in NZ) and five stars by Lifemark.
- **advocating for wall insulation at time of repair.** Beacon strongly advocated alongside EECA, Council and MBIE for EQC to change their repair policy and allow homeowners to retrofit wall insulation at time of repair. Beacon prepared a fact bank on wall insulation and provided evidence to support wall insulation retrofit.

- **initiating projects which will deliver to meet 21st century housing needs in Christchurch.** Beacon, along with Council and MBIE, facilitated the scoping of the ‘Breathe – a New Urban Village’ project, contributed to the technical working group and assisted in securing industry funding for stage 2 of the competition.
- **actively participating in the Canterbury Sustainable Homes Working party.** Beacon has been working with this group to advocate for regulatory interventions in the Land Use Recovery Plan which will result in more resilient housing which meets future needs.

Beacon’s Members include: Christchurch City Council, EECA, New Zealand Steel, Fletcher Aluminium, Certified Builders, Resene and InsulPro Manufacturing.

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- Beacon wishes to speak in support of its Three Year Plan submission to the Christchurch City Council hearing panel.

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Beacon's Perspective on the Christchurch City Three Year Plan 2013-16 (draft)

Beacon congratulates the Christchurch City Council on developing its draft Three Year Plan (2013-16), the Council's work programme for the next three years to continue the rebuild and development of Christchurch. Beacon acknowledges the scale of the task ahead, but also recognises that this is likely to be New Zealand's only opportunity to create a truly 21st century city. While many of the big decisions have already been made, achieving the vision set out in already agreed plans will require a step change in how these activities are delivered by the Council and other parties, as well as in the types of activities delivered.

1.1 Step change needed to achieve vision - there are smarter way of doing things than just fixing up the existing

A 21st century Christchurch cannot be delivered by just the fixing of existing infrastructure and delivering business as usual. Climate change strategies, a move to a low carbon future, improved community resilience and other aspects of 21st century sustainability must be drawn through the Three Year Plan work programmes. This needs to include not only a demand management approach to the management of natural resources but also opportunities for diversity of supply - water, energy and localised waste management.

Achieving Christchurch's vision will require strong leadership, innovation and a focus on working collaboratively across communities, industry and central government, backed by a range of innovative strategic and policy approaches, actions and delivery (including exemplar projects) the likes of which have not been seen in New Zealand before.

A key component of achieving this vision is improving Christchurch's housing stock and developing high performing neighbourhoods.

1.2 Quality, well-designed homes and neighbourhoods underpin Christchurch's pathway to a more liveable city

Beacon supports the realisation of a quality compact city with intensification around transport hubs. This will require an urban design framework with a strong emphasis on resilience, low impact design, demand management and diversity of infrastructure supply. In Beacon's view, quality, sustainable and affordable housing and neighbourhoods are fundamental to a world class city.

Council has a key role in building strong, resilient communities where residents feel a sense of belonging to their neighbourhoods and take pride in their region. Beacon believes Council must work closely with communities to ensure the design and function of local places (dwellings, neighbourhoods and connecting infrastructure such as roads and parks) meets the needs of local communities.

Beacon proposes its Neighbourhood Sustainability Framework and Assessment Kit as a robust evidence-based tool for Christchurch City Council to use in developing more sustainable neighbourhoods. See Appendix One: Beacon Resources.

The draft Three Year Plan (p.17) clearly articulates the housing issues facing the city

Adequate and affordable housing is a pre-existing challenge that is now a major recovery issue for the city. The Red Zone areas have resulted in some people being left with little equity to rebuild or purchase new or even existing homes...

Although there is a clear need to provide considerable land for housing there are inherent risks of an over-supply of new residential land, which may in turn undermine intensification objectives in the Greater Christchurch Urban Development Strategy (UDS). Sustainable growth goals of greater urban housing densities may not be so easily realised in the residential recovery, given that some displaced communities are not likely to immediately see some parts of the city as viable or affordable living options. A further challenge therefore is how to foster the opportunities that brownfield development may provide, including in the central city, to support housing displacement, allow for future growth, and to cater for labour force needs.

Beacon has identified a number of areas where Christchurch City Council could successfully encourage the upgrade of existing housing stock to be better performing:

- Employment of two Eco Design Advisors to provide independent, whole of house advice on retrofit options available to people. We consider this to be a high priority and urgent action as homeowners in Christchurch are in desperate need of high quality independent advice on how to improve the performance of their homes.
- Development of a Home Demonstration Centre, in conjunction with Community Energy Action and CPIT, which provides advice on retrofit opportunities available to people
- Implement a programme to financially assist people to retrofit their home through the provisions of loans similar to Auckland Council's Retrofit your Home programme

In addition to improving existing homes, new high performing homes and neighbourhoods need to be built, not more of the same poor performing new build homes and developments. To do this, Council needs to encourage medium density development in the CBD rather than the current unsustainable growth on the urban fringe.

Breathe – the New Urban Village project is a fabulous initiative to stimulate development of inner city homes and neighbourhoods. Beacon encourages Council to have courage to work with a number of the finalists (whose proposals demonstrate good design with a good measure of economic success) to facilitate their development on Council-owned land within the CBD.

Houses currently being built in the suburbs and on periphery of the city are often poorly orientated to the sun and will place an unnecessarily high burden on the region's infrastructure (roads, water and wastewater systems). Where it is necessary to build on the urban fringe, Council must take steps to facilitate the development of more sustainable housing by:

- Ensuring all subdivisions orientate sites for maximum solar gain.
- Incentivising developers to remove covenants which:
 - restrict the use of off-site house manufacture and limiting the re-use of modern houses from within the red zone
 - require minimum house sizes which effectively block many red zone homeowners from being able to afford to rebuild in many parts of Christchurch. We refer you to the research that has been done on this significant problem by the Canterbury Sustainable Homes Working Party attached at Appendix Two: Covenants affecting affordability.
- Incentivising developers to include rainwater capture/re-use, lowering the demand on Christchurch's already stressed water infrastructure and making better use of what nature provides.
- Aligning Council infrastructure policies and practices to better support on site supplementary water supply systems. While the Council clearly articulates water conservation as an activity of water supply ("educate the community to minimise water use and encourage better utilisation"), there is often a lack of support for water savings devices such as rainwater tanks at the time of implementation. We refer you to the value case for supplementary rainwater supply developed by the Canterbury Sustainable Homes Working Party attached at Appendix Three: Regulating for supplementary water supply in Christchurch.

1.3 Council is a key player determining Christchurch's housing outcomes

Beacon's research shows that councils that want to successfully promote more sustainable homes can make it easier for homeowners to build and retrofit more sustainable homes. In partnership with councils, Beacon has developed a Resource Manual to support improved housing outcomes (see Appendix One: Beacon Resources) and has expertise in this area. In particular:

- Council can take a leadership role in providing demonstrations of high performing neighbourhoods and homes.
- Infrastructure is a major cost to Council. Council must focus on demand management, resilience, and creating an enabling environment for innovative solutions including localised and diverse networks for all infrastructure – roading, waters, energy. Involving communities in such design and decision making can also help to change behaviour.
- Council strategies, policies and plans particularly influence the design of neighbourhood and need to take full account of climate change, reducing reliance on fossil fuels and other aspects of resilience and sustainability such as demand management, local sourcing and local initiatives.

1.4 Importance of demonstration projects

While there is an awareness within the community that the opportunity to have a home that is warm, dry and more energy efficient is not to be passed up, at times residents struggle to see where they can make positive decisions for their homes during the repair process. This has resulted in early repairs being completed that have reinstated the home as cold, unhealthy and energy/water inefficient as it was prior to the quakes.

There is a need for simple advice and exemplars of best-practice neighbourhoods, retrofit options and high performing new homes. These are needed as quickly as possible. Beacon congratulates Christchurch City Council for its involvement in a number of projects including those listed below, however more is needed.

- Breathe - a design competition leading to an exemplar inner city medium density neighbourhood development
- Build Back Smarter – examples of how to improve the performance of homes as part of the repair of earthquake damage
- Development of a high performing exemplar house on the HIVE site.

Beacon recommends that a one-stop-shop / sustainability hub (a Home Demonstration Centre) be developed on a high profile, central city site, where people can speak face to face with independent experts and actually see and touch examples of best practice. The provision of free, independent whole of house advice early in the rebuild process, and linking with existing funding opportunities such as EECA's Warm Up New Zealand programme and Community Energy Action's services would go a long way towards making the decision to improve the home an easier one.

The local community has clearly identified the desire to embrace healthy, sustainable and smart living choices, such as through the 'Share an Idea' engagement process. Collaboration in this project is one way the Council can show their commitment to realising these choices in people's homes. The project is proactive, independent and designed to meet the needs of the homeowner where they are at in terms of taking on new information and making decisions.

A Home Demonstration Centre will deliver on a number of Christchurch's community outcomes e.g. "Christchurch has a range and choice of housing". It will also assist the Council in delivering on a number of its projects, policies, strategies and plan such as the Climate Change Strategy, Build Back Smarter, Waterwise, Waste Management Plan and Sustainable Energy Strategy. It would also support/smooth building consent processes.

The concept of a Home Demonstration Centre is being developed by CPIT and CEA with support from a number of organisations including Beacon Pathway, CanCERN and Healthy Christchurch. To support a Home Demonstration Centre, Beacon requests that the Council:

- Provide advice to the team developing the project about Council processes, sustainable home design and related Council programmes and activities.
- Employ and fund two Eco Design Advisors to work within Council and at the Home Demonstration Centre. We see this as a high and urgent priority even if the Council decides not to go ahead with the Home Demonstration Centre.
- Support the operation of the Centre by encouraging synergies with community and industry educational activities undertaken by the Council.
- Provide \$25,000 for the promotion of the Eco Design Advisory service and production of related materials

Beacon has considerable resources which could contribute to advice on high performance retrofit and repair, which are available free on Beacon's website. See Appendix One: Beacon Resources for more information.

Beacon Pathway's Comments on the Christchurch City Three Year Plan 2013-16 (draft)

The below comments are made on the content of the draft Three Year Plan Plan. It is difficult to make specific comment on the funding of projects given the aggregated nature of most funding.

2.1 Volume One

Water Supply / Stormwater and Flood Protection and Coastal Works / Sewerage Collection, Treatment and Disposal Activities

Beacon congratulates the Christchurch Council on clearly identifying water conservation as one of its water activities – *“encouraging the community to minimise water use and encourage better utilisation.”*

Beacon supports projects to manage demand for services, create a more resilient, localised and diverse network, and where appropriate, maintain the network. An enabling environment allowing people to have a supplementary water supply with rainwater tanks and aggressive promotion of demand management and good neighbourhood design is also required. Beacon has done extensive work on the benefits to local government of demand management – including cost benefits and value analysis. We draw your attention to the value case for supplementary rainwater supply prepared by the Canterbury Sustainable Homes Working Party attached at Appendix Three: Regulating for supplementary water supply in Christchurch. Beacon has also done work in this area and draws Christchurch City Council's attention to the report *Slowing The Flow – A Comprehensive Demand Management Framework for Reticulated Water Supply* and *Water Demand Management: An Economic Framework to Value*

(www.beaconpathway.co.nz/further-research/article/reports_and_presentations_water) as sources of information on best practice demand management approaches and their benefits.

The latest estimate of the overall earthquake response and recovery costs has identified an increase of \$1billion in the cost of repairing sewer and stormwater pipes (page 3, Summary document). Beacon supports initiatives to reduce demand for wastewater services and identify to users that there is a cost associated with their use. Local servicing options and distributed systems must be considered, particularly for areas not currently served by centralised infrastructure. In rural and peri-urban areas, greywater systems should also be supported more strongly as a method to sit alongside more conventional on-site wastewater disposal systems. Beacon has worked with Kapiti Coast District Council which requires rainwater and/or greywater systems in new urban development. Beacon draws Council's attention to the report: *Barriers to Water Demand Management: Health, Infrastructure and Maintenance* (www.beaconpathway.co.nz/further-research/article/reports_and_presentations_water)

Regulatory Services

The Three Year Plan clearly identifies the Council's role in provision of advice on consenting process; however, it also needs to be providing advice on opportunities for more sustainable design – from subdivision layout to sustainable building design. Beacon submits that the Council employ two Eco Design Advisors to provide information to the public regarding sustainable design options, both through Council and through the proposed Home Demonstration Centre.

Refuse Minimisation and Disposal

Beacon supports Christchurch Council initiatives to reduce solid waste; in particular, user pays to signal the cost of waste creation and disposal. The highest costs to the economy, environment and homeowners are during the operation of the home and better design can reduce the amount of waste generated and energy required to run a home e.g. through better solar orientation, design to increase the ease of activities such as recycling and composting.

In addition, construction waste is a major contributor to landfill. The building of an average three bedroom house sends five tonnes of new material waste to landfill. Good construction management can cut this to two tonnes without significant cost to the builder/developer. Beacon supports the work previously done with the housing sector around Target Sustainability and construction waste and supports the continuation of actions by the Council to see better utilisation of construction wastes and diversion from landfill.

Community Support

Beacon supports Council's role in building strong and resilient communities so that Christchurch residents feel a sense of belonging to their neighbourhoods and take pride in their region. Council and communities must work together to ensure the design and function of local places (dwellings, neighbourhoods and connecting infrastructure such as roads and parks) meets

the needs of local communities. The Council also has the opportunity to be an enabler of quality and affordable housing, creating exemplar, mixed-use, medium density developments as part of the redevelopment of council-owned facilities.

Quality and affordable housing has many long-term benefits for residents and communities. Improving the performance of buildings can benefit the health, productivity and resource efficiency of building occupants, as well as generating community-wide benefits such as savings in infrastructure investment and improvements to air and water quality and the natural environment.

Christchurch City Council has an important role to play in supporting a range of housing options, especially for people who can't afford to buy outright. Beacon also draws the Council's attention to innovative shared equity schemes such as those pursued by organisations such as the New Zealand Housing Foundation. In the face of declining home ownership, these 'third sector' partnerships show great promise in delivering new models of ownership. Affordability must also take into account ongoing running costs (e.g. energy, water, maintenance, and transport costs).

City Planning and Development

It is critical that all planning undertaken by the Council (including policy/strategy and spatial) take account of climate change and other sustainability issues facing the city. Beacon supports the strong emphasis the city is placing on spatial planning. This planning must ensure that transport infrastructure supports, not undermines, neighbourhood development.

Housing and neighbourhoods should be a key part of spatial initiatives. There are opportunities for sustainable housing (new and retrofit) and neighbourhood pilot examples within these projects – for example medium density housing within the CBD which is well-designed for flexible use over its lifetime (e.g. for construction workers, students and families).

2.3 Volume Two

Beacon supports user charges to signal the cost of services and as a demand management tool. However, an analysis of the positive externalities from a good or service must be undertaken as in some cases the benefits arising may be such that the service or good should be rates funded. Beacon supports fixed and volumetric charging for water and wastewater service as a demand management tool and to identify the cost associated with its use (see Appendix One: Beacon Resources).

Appendix One: Beacon Resources

Neighbourhoods

Neighbourhood Sustainability Framework and Assessment Kit

Beacon's Neighbourhood research team has developed a framework and tools to measure the sustainability of New Zealand neighbourhoods - *The Neighbourhood Sustainability Framework and Assessment Kit*.

This research indicates that the neighbourhood scale presents opportunities for:

- House retrofit
- New design and construction awareness/desirability
- Distributed reticulation systems – electricity and water
- Improved stormwater management
- Improved connectivity and mixed use
- Reduced transport costs

The Kit is available free to help planners, designers, neighbourhood managers and developers identify, discuss and prioritise changes to improve the sustainability of both new and existing neighbourhoods.

Download from

www.beaconpathway.co.nz/neighbourhoods/article/the_neighbourhood_sustainability_framework

The value of neighbourhoods

Beacon's research has identified that low density non-mixed use (e.g. neighbourhood that are almost entirely residential) generate net costs rather than net benefits for a city. As a corollary, mixed use, medium density neighbourhoods are of value to cities. Research which awarded monetary values to different neighbourhoods showed that a sustainable neighbourhood is worth \$1,362 per household compared to a negative value of \$595 per household for NZ's least sustainable neighbourhoods.

Find out more at

[www.beaconpathway.co.nz/images/uploads/Final_Report_NH3112\(2\)_Valuing_neighbourhoods.pdf](http://www.beaconpathway.co.nz/images/uploads/Final_Report_NH3112(2)_Valuing_neighbourhoods.pdf)

Homes

HSS High Standard of Sustainability®

New Zealand homes can and should perform better. Homes that perform well have benefits that go beyond direct financial savings; they benefit the whole economy, local council budgets, and, most importantly, families.

A sustainable home is the sum of its parts. Beacon's focus is on whole-of-house sustainability - encompassing energy, water, indoor environment, waste and material/product selection. This focus is reflected in our work on a set of performance benchmarks to achieve a sustainable home - the HSS High Standard of Sustainability®.

See

www.beaconpathway.co.nz/being-homesmart/article/beacons_hss_high_standard_of_sustainability

Policy Options for Sustainable Homes – A resource manual for local government

Beacon Pathway has conducted research into the council-induced barriers to building and renovating homes to a high standard of sustainability. The research found that policy and regulatory barriers to sustainable building choices exist in:

- administering the Building Act and Building Code;
- inflexible conventional infrastructure standards (particularly for water); and
- District Plan provisions that provide no allowance for sustainable designs such as passive solar orientation or features such as rainwater tanks (e.g. traditional development controls for height, yards, and height-in-relation-to-boundary).

Beacon research has shown that councils throughout New Zealand have developed a range of initiatives to encourage people to make more sustainable choices in their homes and neighbourhoods, and are seeing some good results. The resource manual of policy options for councils provides an overview of the range of tools available to councils, and gives detailed examples of policies and practices already in place in New Zealand.

Download the Manual from

www.beaconpathway.co.nz/further-research/article/a_resource_manual_for_local_government

National Value Case

Beacon's National Value Case for Sustainable Housing Innovations showed that there were clear national benefits to encouraging housing improvements on a wider scale. In particular, it showed the economic value to New Zealand of:

- A direct private economic gain to households of 1% GDP (\$2 billion in 2007 \$ terms).
- Savings in household energy consumption of 22PJ/year with reduction of CO2 emissions of 3600kt/year.
- Direct water savings of 130 million m³/year.

Renovation and job creation

Beacon research, supplied to the Job Summit, established the value to the nation of large-scale home renovation by illustrating that housing is a critical part of urban infrastructure and that renovation is a viable source of job creation. Large scale renovation is BIG on job creation

showed that for every 1,000 houses retrofitted to perform to Beacon's HSS®, a total of 392 full time equivalent jobs are required.

See www.beaconpathway.co.nz/further-research/article/large_scale_renovation_creates_jobs

Water demand management

Beacon's water research has demonstrated the value of a demand management approach and provided a framework for councils considering instituting it. *Slowing the Flow: A Demand Management Framework* is a guide to the development of water demand management strategies and policies for all those working in reticulated water supply.

Beacon's research has also developed a comprehensive approach to valuing council implementation of water demand management. A case study of Tauranga City Council's demand management measures showed that the Council delayed the implementation of the next major water supply infrastructure by approximately 10 years with a net benefit to the community of \$53.3 million in 2009 terms.

See www.beaconpathway.co.nz/further-research/article/reports_and_presentations_water

Expertise

Beacon Pathway has considerable expertise in the sustainability of New Zealand homes and neighbourhoods and has worked extensively with local councils. We welcome the opportunity to further discuss how we can assist Christchurch City Council.

Appendix Two: Covenants affecting affordability

Research undertaken as part of the Canterbury Sustainable Homes Working Party was published in an article in Build magazine in June 2012.

COVENANTS AFFECTING AFFORDABILITY

Although there is demand for affordable housing, it's getting harder to find a site to build a modest home. In Christchurch, for example, restrictions by developers on house size are leaving some red zone residents unable to afford replacement housing.

By Lois Easton, Beacon Pathway, Tricia Austin, The University of Auckland, and David Hattam, Selwyn District Council

As a result of the Canterbury earthquakes, over 10,000 dwellings are being demolished, with 5,100 homeowners from the red zone areas alone potentially seeking new land to build their replacement home on.

Many affected homeowners are from the lower property value eastern suburbs of Christchurch or lower property value areas such as Kaiapoi. Alongside the lower property values, many of the affected households are on low or fixed incomes, meaning that affordability of replacement housing is a critical issue.

Older houses more modest

A range of factors affect the affordability of housing, many of them canvassed in the Productivity Commission's *Housing Affordability Inquiry, March 2012 Report*. However, a fundamental factor not considered in any detail by the Commission is dwelling size.

The Department of Building and Housing advises that the average cost per square metre of new house construction in Christchurch is between \$1618/m² and \$1778/m². Based on their estimates, a house of 150 m² will cost an average estimated \$266,700 to build, and a 200 m² house will cost \$323,600 to build.

The floor area of most houses in the worst-affected areas of Christchurch is considerably smaller than many of today's new homes. Many households are receiving payouts for their homes and land around \$300,000.

Inevitably, affected homeowners will be looking to rebuild on land they can afford, with a more modest dwelling size than usually found in many new subdivisions today. With an average cost of \$160,000 for a section in Rolleston and using one of the cheaper home builders, it would be possible to build a smaller – for example, 110 m² – house in Rolleston, with a \$300,000 payout.

Developers imposing larger houses

New house sizes have increased substantially over the past few decades, increasing by 50% in the last 25 years from 134 m² to 209 m².

There is a range of reasons for this, but a significant contributor is the increasingly common use by land developers of minimum house size covenants on lots created during subdivision.

Research recently undertaken by David Hattam of Selwyn District Council and John Raven of Lincoln University looked at the prevalence of restrictive covenants in the Canterbury township of Rolleston. They found that 75% of new house sites created in the township had a restrictive



Affordability and covenants are issues as homeowners in Christchurch with damaged modest older houses look to new subdivisions to rebuild.

covenant requiring a minimum house size of at least 160 m², with a typical requirement being 180 m², and 25% of sections had a requirement of a minimum house size of 200 m².

Even for the 25% of sections where there were no explicit size controls, almost all required house designs to be approved by the developer – with houses greater than 180 m² predominating in these subdivisions. Only 3% of sections created since 1990 had no minimum size covenants.

Affordable options not possible

Terraced houses and medium-density development are often proposed as a mechanism to provide for more affordable housing and better housing choice – with smaller sites and smaller footprints available for development. In Christchurch, Hattam and Raven noted that what has resulted instead are 200 m² 2-storey houses with very small gardens because developers have squeezed the same sized house on a smaller section.

Just as significantly, where small lots of around 350 m² were created, the minimum house size was often 160 m², showing that reducing section size does not necessarily provide new housing choices.

An alternative response for addressing housing construction costs is to design more flexible housing, starting with a relatively small central unit, enabling the owner to add additional rooms if needed and as resources allow. While this might be beneficial to households in Christchurch, it would also be impossible if a covenant required a minimum dwelling size.

It's worth noting that the cost of raw land is typically less than 20% of the cost of a section, so reductions in section size – without reductions in house size – do not result in significant increases in affordability. For instance, in Rolleston, the cost of a half-size 350 m² section is usually only around \$20,000 less than that of a full-size section.

Covenants are a nationwide issue

Some researchers have recognised the use of restrictive covenants by developers as a widespread problem across New Zealand. It hasn't been dealt with because:

- regulation of covenants has been considered too difficult by many councils since they are imposed after the council has signed off the titles
- under the Resource Management Act, there is no mechanism available for councils to address this issue
- conditions on a subdivision consent could specify no covenants, but this would have to be put on a consent notice at the time of issue of title and the covenants would be put on at the same time.
- developers can put in place agreements with land purchasers – a group builder, for example – separate to the title.

Local planning legislation needed to over-ride covenants

As with many affordability issues, the problem is a well recognised one overseas. In Australia and the United States, most states and territories have addressed this issue specifically in local planning legislation.

In New South Wales, for example, the Environmental Planning and Assessment Act 1979 specifically enables environmental planning instruments to over-ride restrictive covenants. This is the kind of mechanism needed by, but not currently available to New Zealand local governments working under the Resource Management Act.

The best way to provide houses that are more affordable is to make them cheaper to build, and the easiest way to do this is to make them smaller. The prevalent development paradigm denies people the choice to build a house that would suit their needs.

Action needed in Christchurch

The government has acted to free up land, ostensibly to make sure that houses are provided for the people of Christchurch. Yet the developers of that land continue to impose covenants that allow only very large houses to be built, which will not address the needs of many of the people displaced from their homes.

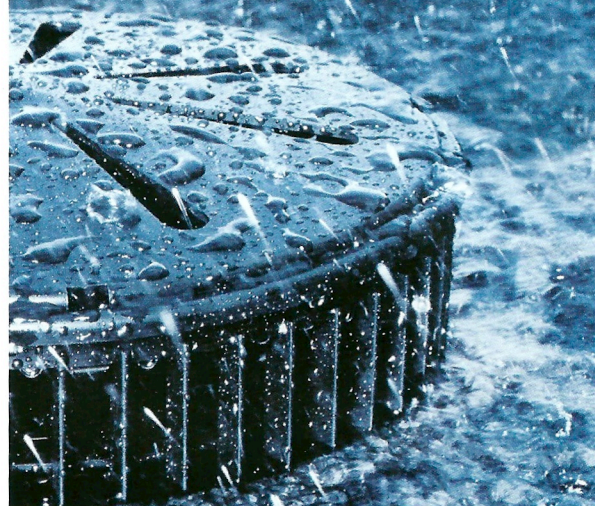
While reforming the Resource Management Act to enable district plans to over-ride covenants might be something for the long term, the rebuild of Christchurch may require more immediate action. Special powers enabling the district plan to over-ride residential covenants could enable local Cantabrians to remain living in the region, without destroying the residential amenity that no doubt covenants were put in place to protect. ■

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Appendix Three: Regulating for supplementary water supply in Christchurch

This is a piece of research undertaken for the Canterbury Sustainable Homes Working Party.

Canterbury Sustainable Homes Working Party – Regulation

Regulating for supplementary water supply (rainwater tanks) in new and rebuilt homes in greater Christchurch

Goal

The goal is to have greater resilience, reduced water demand in summer and mitigation of storm water runoff during rain events through the installation of rainwater tanks in all new homes and rebuilds following the earthquakes in greater Christchurch.

Method

The preferred method is through using s27¹ of the CER Act 2011 to instigate Plan Changes in the CCC, SDC and WDC District Plans.

Plan change 75 for the Kapiti Coast District Plan provides guidance for this process.²

Rationale

The Canterbury earthquakes disrupted the reticulated supply of water through damage to reservoirs, pumping stations and pipes. Some residents were without water for many weeks, and were reliant on bottled water, tanker supplies or neighbour's private wells

While more than eighty percent of the Christchurch water supply was restored within two weeks of the February earthquake, boil-water notices remained in place citywide until April 2011, due to the risk of cross-contamination from broken pipe works. Shortly after the 22 February earthquake, chlorine was introduced to the water supply to address potential contamination issues, and remained until December 2011.

Experience in Christchurch suggests that current UN-based recommendations of 3 litres of water per person per day, to meet water needs in a disaster situation, may fall well below the actual needs of an urban population. The CDEM Wellington Emergency Preparedness guide (December 2010) suggests 3 litres per person to meet daily drinking needs, and more for cooking, hygiene and pet care³.

In Christchurch City in summer 2011/12 level 3 restrictions were imposed because of the reduced storage in the water supply system.

If more homes had rainwater tanks they would have had access to an emergency supply, particularly for non-potable purposes such as clothes washing or garden watering, and there would have been reduced demand on the Councils' supplies.

Significant construction cost savings (up to 50%) can be realised by installing the rainwater tank and dual plumbing systems in new 'greenfield' developments (and new homes) compared to retrofitting existing 'brownfield' areas⁴ (or retrofitting in existing homes).

Ministry of Health guidelines indicate that only about five litres per person per day (l/p/d) needs to be biologically and chemically safe. Average domestic water use is about 300-350 l/p/d – all of which is currently cleaned to a potable standard. Clothes and cars are washed, toilets flushed and gardens watered with high quality drinking water. Using rainwater for some of these activities would reduce the demand on potable water.

¹ S27 (1) The Minister may, by public notice, suspend, amend, or revoke the whole or any part of the following, so far as they relate to any area within greater Christchurch: (a) an RMA document

² <http://www.kapiticoast.govt.nz/Documents/Downloads/District%20Plan%20Changes/Plan-change-75-Commissioners-Report.pdf>

³ Moore, R.M. and Abbott, S 2011. *Benefits of Rainwater Tanks in the Event of Damage to Centralised Water Supplies in the Wellington Region*. Report to the Institute of Geological & Nuclear Sciences Ltd. (Contract No: C05X0907)

⁴ Kettle, D. March 2010. Barriers to Water Demand Management: health, infrastructure and maintenance. Report WA7060/6 for Beacon Pathway Limited.

Putting in place legislation requiring rainwater tanks homes being built or rebuilt will incorporate resilience for the future.

- This is already signalled in the Christchurch City Council's Water Supply Strategy as Action 12, scheduled for 2014/15⁵.
- In the Waimakariri District Council Water Conservation Strategy⁶ rainwater collection and reuse is recognised as a way to reduce peak water demand, but regulatory measures will be reviewed in the 2013 review of the strategy.
- Selwyn District Council has no specific reference to domestic rainwater collection in their five-water strategy.

Definition

Rainwater harvesting involves the collection, storage and distribution of rainwater from the roof, for use inside and outside the home. Rainwater collected from the roof via gutters and pipes flows through screening devices to remove dirt and debris, and is then stored in tanks outside the house for use in the garden, toilet and laundry. The reticulated supply would still be used for drinking, cooking and other potable purposes.

Each rain tank can save a home about 50% in terms of their water usage when rainwater is re-used for the laundry use and toilet.⁷



Benefits

- An invaluable alternative water supply when a disaster damages the reticulated system
- Reduces the demand for water from the main water supply
 - Reduces the extraction from groundwater
 - Reduces householders dependence on mains water
 - Offers more resilience when water restrictions are in place
- Reduces costs in the delivery of reticulated water supply, e.g. pipe size, reservoirs, energy costs
 - Avoids oversizing of water supply network and associated costs inefficiencies
 - Can delay capital works
 - Reduced energy costs in embodied energy of infrastructure, operational costs of treatment and pumping,
 - Lower households water bills (if water is charged for by volume)
- Reduced storm water runoff
 - Prevents the impact of storm water run-off on the local environment
 - Reduces peak flow in storm water system
- Education and awareness
 - On site systems give timely feedback to the householder on water consumption increasing awareness about the limits of water availability and cost of infrastructure/maintenance⁸
 - Householders have increased control over their water source
 - Rain tanks are part of a broader societal shift towards more eco-friendly behaviour and tanks facilitate a transition to more sustainable values and behaviours.

⁵ Action 12 in <http://resources.ccc.govt.nz/files/WaterSupplyStrategy2009Full.pdf>

⁶ http://www.waimakariri.govt.nz/Libraries/Public_Documents/Water_Conervation_Strategy_-_June_2010_-_Final.sflb.ashx

⁷ <http://www.waitakere.govt.nz/AbtCnl/to/pdf/brochure-rainwatertanksintheurbanarea.pdf>

⁸ Presentation - Sustainable water supply for Auckland – Craig Brown Consulting – 5 February 2010
www.thesustainabilitysociety.org.nz/docs/Forum-20-Brown.ppt

If the councils introduced a volumetric charge on domestic water supply the financial benefits would be higher.

Costs

- Costs vary with the amount of rainwater to be stored and its intended uses.
- Tank prices plus the cost of installation and additional fittings

Rainwater tanks as a water efficiency mechanism are frequently cited as being high cost for the benefits compared with other technology – these calculations need to be checked that operational costs and life cycle benefits are included; benefits to storm water/wastewater systems are accounted for; and assumptions on treatment standards/equipment are realistic and practical.

Barriers

Some health regulators believe that health risks are manageable for rainwater use as a non-potable water use. In New Zealand, at present, some health authorities believe that if water tanks are properly installed, labelled and maintained, they are safe to use for non-potable use - flushing toilets, laundry and garden use⁹.

Regulatory Mechanisms

- The Resource Management Act 1991 (RMA)
 - Regional Policy Statement (RPS) - identify that District Plans of Territorial Authorities should make provision for the mandatory inclusion of rain tanks as a 'rule'. A Section 32 cost benefit analysis and public notification would be required with a public consultation process under the RMA.
 - Regional Plans – the Canterbury Land and Water Plan (replacing the NRRP)
 - District Plan - Plan Change to include policies and a rule around the requirement for rainwater tanks. This process would require a Section 32 cost-benefit analysis to be undertaken.
- The Local Government Act 2002
 - A territorial authority must, from time to time, assess the provision within its district of water services and other sanitary services. An assessment may be included in the territorial authority's long-term plan, but, if it is not, the territorial authority must adopt the assessment using the special consultative procedure
 - If this assessment signals the need for water conservation to avoid or push out further infrastructure development then such measures can be considered under the Long Term Plan (LTP) and considerably shorten the public consultation process required for inclusion in the District Plan.
 - A council can pass a bylaw requiring a supplementary water supply for new houses

The preferred method is through using s27¹⁰ of the CER Act 2011 to instigate Plan Changes in the CCC, SDC and WDC District Plans.

⁹ Kettle, D. March 2010. Barriers to Water Demand Management: health, infrastructure and maintenance. Report WA7060/6 for Beacon Pathway Limited.

¹⁰ S27 (1) The Minister may, by public notice, suspend, amend, or revoke the whole or any part of the following, so far as they relate to any area within greater Christchurch: (a) an RMA document

Appendix 1: Key regulatory processes to influence uptake of rain tanks¹¹

Process	Scale of Influence	Likely Timeline	Priority	Likelihood of success
District Plan Changes	Local	2-3 years but would benefit from RPS or other policy work to set the scene	High	Success would require education and good consultation
Regional Policy Statement	Canterbury Region	Would take several years to be given effect to and filter through to implementation	Medium	Medium to high, needs good collaboration with ECan
Regional Plans – NRRP and Land and Water Regional Plan	Canterbury Region	Planning process just beginning	Low	Medium to high, needs good collaboration with ECan
Building Code	National	12+ months	Low	High but entirely dependent on involvement in code review and degree of interaction with DBH.
Bylaw	Local	6 month process	Medium	Medium – needs support from council to recognise a problem and begin bylaw-making process.

Appendix 2: Rainwater tanks as part of integrated water management

The increasing cost and decreasing availability of water supply will require a more efficient and conservation-oriented supply and management approach if New Zealand is to achieve widespread household sustainability. Rainwater tanks need to be considered as part of a larger water management system:

- **Reduce** water use: demand management
 - Cheapest, but not sufficient in context of increasing population
 - Cost savings (energy and infrastructure)
 - Delays upgrading and renewing water supply and wastewater collection/treatment infrastructure
- **Reuse** water with minimal treatment, locally
 - Greywater recycling
 - Reduces base wastewater flow
 - Wastewater concentration increases
 - On-site wastewater irrigation
- **Rainwater:** a new source without knock-on infrastructure upgrades
 - Integrated Urban Water Management
- **Recycle:** collect and highly process water before using it again
 - Effectively it is another product

The benefits of an integrated water management system are:

- savings in operational (including electricity) and capital costs required for water supply and wastewater treatment
- increased awareness for consumers of water consumption
- increased provision of indirect use values through the reduction of water taken from ecosystems

¹¹ Adapted from Lawton M., Birchfield D. and Kettle, D. (2007) - Making policy and regulation rain tanks friendly. Report PR 205 for Beacon Pathway Limited.
http://www.beaconpathway.co.nz/images/uploads/Final_Report_PR205_Making_PolicyRegulations_Raintank_Friendly.pdf

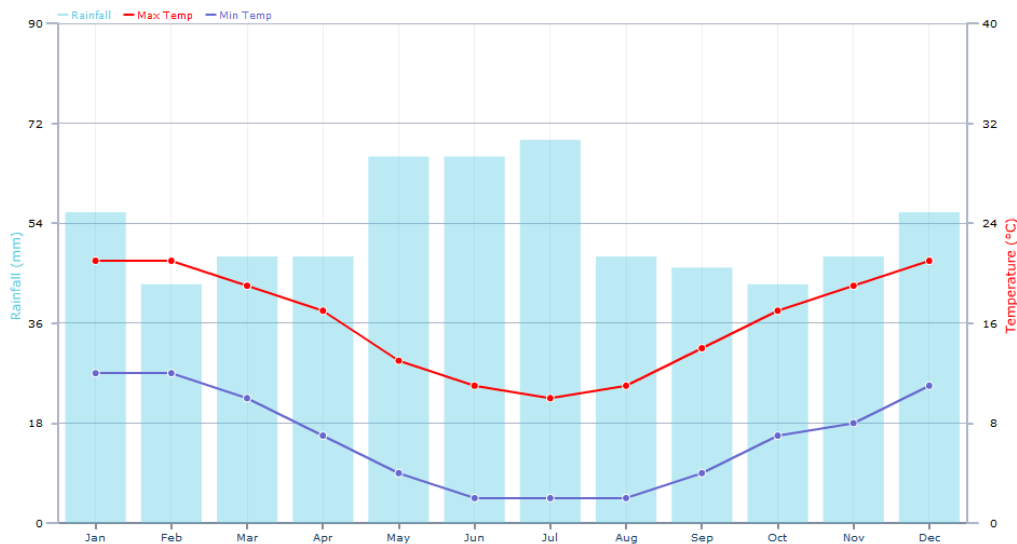
- reduced emissions of greenhouse gases.

Appendix 3: Example - Kapiti Coast District Council

Kapiti Coast District Council (KCDC) has introduced the mandatory requirement for rain tanks for water conservation as a rule in their District Plan. They did this through their Long Term Council Community Plan (LTCCP), a Section 32 analysis, and a Plan Change notification and consultation process. The rule is triggered when there is an application for land use change or sub-division. In making their case for a plan change the council primarily considered resiliency of their system, especially in the light of climate shocks and water use efficiency, using non-potable water where appropriate. Current water supply can meet potable and hygiene requirements but cannot always supply outdoor needs.

Appendix 4 : Rainfall and tank sizing

Figure 1: Christchurch Rainfall



Total rainfall per year (average) = 637mm

Rainfall varies across the city – wetter in the west, dryer in the east.

Volume available from a 200m² roof

= 200 m² x 0.637m

= 127.4 m³

= 127,400 litres

Less 20% ≈ 100,000 litres

In Christchurch the water abstraction rate for public supply averages between 430 and 450 l/p/d, with a median of 435 l/p/d. The daily peak in winter is mid-morning, whereas in summer it is in the evening because of garden watering.

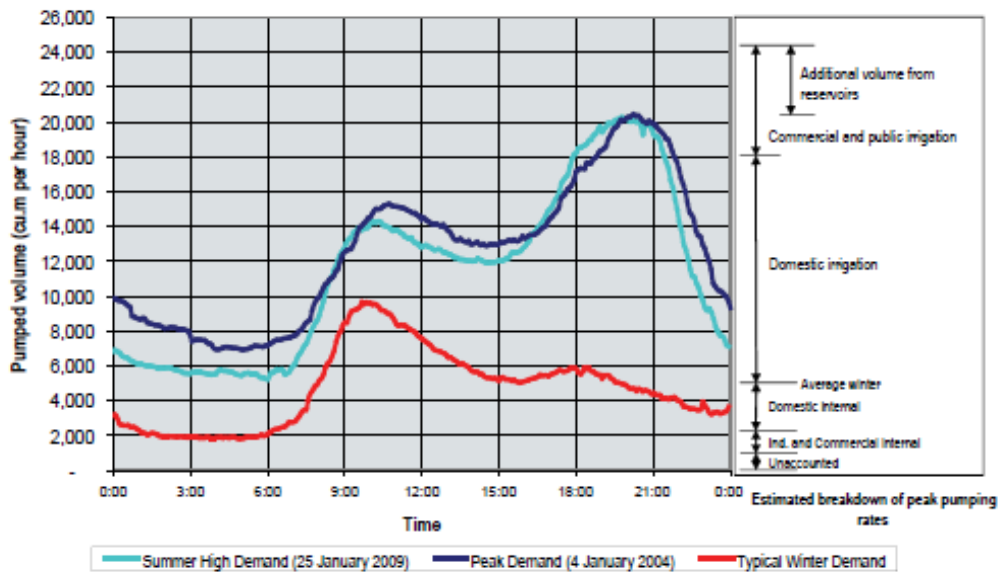


Table 2: Tank sizing

1 Main Building area			
Building width (metres)		10	
Building depth (metres)		8	
Rain Collection Area 1 (square metres)			80
2 Extension/conservatory/porch/garage/shed etc			
width (metres)			
Depth (metres)			
Rain Collection Area 2 (square metres)			0
3 Calculate the area of any remaining useful roofs as a figure			
In square metres and enter directly in the yellow box to the right			
4 TOTAL of collectable roof areas (square metres)			80
5 Rainfall per year in your area (mms)			1251
6 Collectable rainwater per annum (In litres - discounted by 20% to account for water loss) (YIELD)			80,064
7 Use of water in the building			
<i>Washing machine and toilet flushing are the main usage for rain water in domestic systems. Add an allowance for daily garden use.</i>			
Number of people in the house		5	people
Number of clothes washing cycles per day (50 litres each)		1.25	63
Number of toilet flushes per day (4.42 flushes per person, average 3 litres each)		22	66
Outdoor use per day (min 5 litres per person per day)			35
<i>or adjust till F39 = F29 more or less</i>			
8 Amount of water you require every day			164
Amount of water you require every year (DEMAND)			59,787
9 How many days drought protection do you need? Enter a number in the box to the right, typically 28			28
10 Capacity of water storage in litres required for drought protection			4,586
The lesser of YIELD (6) or DEMAND (8) per annum			59,787
Therefore, volume of rainwater storage required (litres)			4,586