BBS/13

Redcliffs 1: Build Back Smarter Case Study

A report prepared by Beacon Pathway Incorporated
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About This Report

Title

Redcliffs 1: Build Back Smarter Case Study

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Abstract

The Build Back Smarter Project aims to develop evidence that residential performance upgrades at the point of earthquake repair is able and worthwhile to be implemented as part of the Canterbury earthquakes recovery process. Using the case studies of ten homes, the project is exploring and demonstrating what is possible as part of the repairs. This report documents the third completed case study – the upgrade of a house known in the project as Mt Pleasant 1.

Reference

Easton, L. (March 2014). Redcliffs 1: Build Back Smarter Case Study. Report BBS/13 for Beacon Pathway Incorporated.

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1 Introduction

Over the past 2 ½ years Beacon Pathway Inc has been undertaking research into how energy and water efficiency and indoor environment quality improvements can be incorporated into earthquake repairs from the 2010 and 2011 Canterbury earthquakes. The research has involved the use of case studies to explore and demonstrate what is possible as part of the repairs. This report documents the sixth completed case study – a house known in the project as "Redcliffs 1".

2 Redcliffs 1

Figure 1: Redcliffs 1

Redcliffs 1 is a 1950s brick and tile home with a basement underneath. The house consists of four bedrooms, a living room, sun room, conservatory, kitchen and bathroom upstairs with a laundry and garage downstairs. The house has had some modernisation, with downlights installed in the bathroom, insulation installed in parts of the house and a relatively new electric hot water cylinder. A sunporch, conservatory and the dug out basement have all been added after the original construction of the home. The external cladding of the house is variable –

brick cladding for much of the original part of the house, stucco over fibre cement on the sun porch, stucco over concrete block for the basement and weatherboard below the bay window. The house has a suspended timber floor above the basement – about 80% of the house, and an uninsulated concrete slab for the remainder. There are a range of window types in the house – original wooden windows in about 75% of the house and aluminium single glazed windows in the rest. The majority of house had lath and plaster wall linings and ceilings, with unisulated concrete walls in the basement. Heating in the home was with a heat pump and portable electric heaters. An old chip burner remained in the kitchen. The house has large areas of glazing towards the southeast views across the harbour.

The house is a rental property, which has been owned by the homeowner for 13 years. Due to the extensive damage in the earthquakes, the tenants moved out.

2.1 Earthquake damage

The house suffered from significant damage to the roof, windows and cladding during the earthquakes. The house was regarded as unlivable post earthquakes, but only temporary measures were used to weatherproof it. As a result the interior of the house – the insulation, wiring, all the fixtures, walls and ceilings suffered extensive water damage with mould spreading throughout.

Ground movement caused uneven settlement of ring foundation and piles of the older part of the home, as well as damage to sewer and stormwater drains. Most interior lath and plaster ceiling and wall linings were badly cracked.

Figure 2: Cladding damage to Redcliffs 1

Figure 3: Roof and window damage to Redcliffs 1 with temporary weatherproofing

Figure 4: Internal water damage to Redcliffs 1 – damage was extensive throughout the house

The house was insured by IAG and the Project Management Office (PMO) was Hawkins.

In terms of the scope of the earthquake repairs:

- Foundation repairs
- Lath and plaster ceiling linings were replaced throughout
- Lath and plaster wall linings replaced throughout
- Doors and windows were eased and adjusted throughout
- Sewer and stormwater drainage was checked and minor repairs were made
- Full interior and exterior redecoration.

2.2 House performance assessment and retrofit

The house was assessed using Beacon's House Assessment and Prioritised Plan tool. The pre-retrofit condition and proposed performance interventions are outlined in Table 1 below.

Table 1: Pre-retrofit condition and interventions

Mt Pleasant 1	Pre-retrofit condition	Interventions	Cost (excl GST)
Thermal	Good levels of ceiling insulation		
	No wall insulation or building wrap in upper storey. Solid concrete walls in lower storey	Install R 2.8 wall insulation in upper storey with building wrap inserts	$1880
	Bulk underfloor insulation for most of the upper storey but no insulation above the garage. No vapour barrier	Install R1.6 underfloor insulation under uninsulated part of the house. Install vapour barrier	$1016 $475
	Draughty front door	Install draught stopper	$23
	Very large area of southeast and southwest facing glass- draughty windows, and single glazing, insufficient curtains.	Recommendation to homeowner to install draught stopping and better curtains.	
Hot water	180L electric hot water cylinder –no hot water cylinder wrap.	Add split system heat pump to hot water system. Install hot water cylinder wrap	$4070 $118

Mt Pleasant 1	Pre-retrofit condition	Interventions	Cost (excl GST)
	No pipe lagging	and pipe lagging	
Heating	Heat pump in main living area. Portable electric heaters used in bedrooms. Heated towel rail	Homeowners decided to install wood burner Timer for heated towel rail.	$150
Lighting	5 downlights in bathroom – a mix of halogen and incandescent bulbs throughout.	Recommendation to replace with LED/ IC-F rated downlights.	
Ventilation	Bathroom extract fan in main bathroom – ducted to ceiling. Kitchen rangehood installed -ducted to ceiling	New bathroom extract fan part of earthquake repairs. New rangehood part of earthquake repairs	
Water	High flow kitchen and bathroom taps. Full flush toilet	Recommendations for tap aerators New dual flush toilet part of eathquake repairs	
Total BBS Retrofit Cost before EECA subsidy			**$7732**

Prior to completion, the Redcliffs 1 earthquake repairs turned into a rebuild.

2.2.1 Homestar™ assessment

Prior to the repair and retrofit, the house was assessed by a Homestar™ Homecoach using the simplified online tool. The house was assessed as being 2 Star. A post retrofit assessment was not completed as the house turned into a rebuild

Appendix One: Homestar™ Homecoach rep-upgrade report

Homestar™ report

Homecoach assessed

Your Homestar rating

2

Analysis

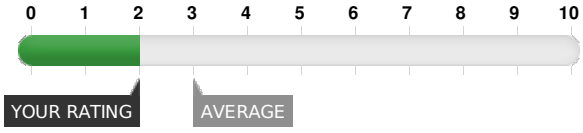
Congratulations, on completing the Homestar™ rating.

This house has achieved a rating of 2 stars under the Homestar Residential Rating Scheme.

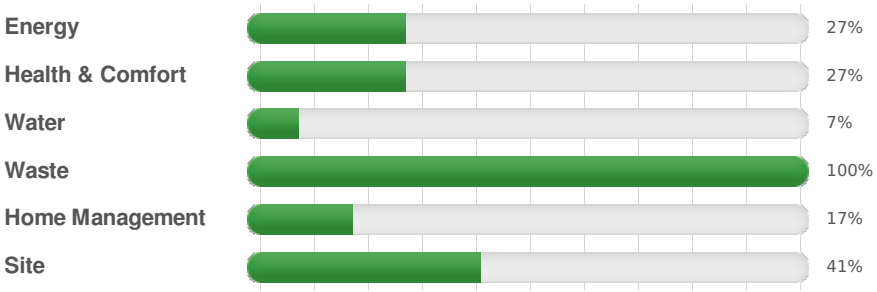
It is possible for this home to achieve a higher star rating, except that it is currently being held back by a mandatory minimum performance level in the core issue of overall warmth and comfort (specifically the ability for the house to achieve healthy winter-time temperatures without using excessive energy). To gain a higher star rating address this core issue first, and then reassess the house once the changes have been made.

A small part of the rating tool rewards non-permanent fixtures of the home such as fridges, freezers, dishwashers, compost facilities etc. If these are removed (for instance when the house changes occupancy) this could affect the star rating of the house.

Compare your rating
The average score for your type of house (Detached State house/mass housing 1950–1960) is 3



Your house has been identified as a type of state or mass housing built in the 1950's. Typically, houses from this era have 'good bones', good orientation and good levels of access to renovation areas which means you have a high chance of success in renovating these houses to perform well. Cavities both in the ceiling and under the floor give relatively easy access to add better insulation and resolve dampness issues. In some cases, the small room sizes of this housing type mean that you may need to choose your heating options quite carefully. Often the pitch of the roof in this type of house makes it easier to install solar hot water systems, and the main living areas are well-orientated to the sun, providing good opportunity to maximise the amount of warmth coming in from the sun.



Recommendation information

Use the recommendations in this report to prepare a plan for your whole house. This will guide you through the process of making your home cosy, warm, healthy, cheaper to run and with a higher rating. Some recommendations involve simple actions you can take at little or no cost. Others involve investments that will pay for themselves through lower running costs or other benefits like making your home more comfortable.

The recommendations are provided in order of priority for improving your overall health and comfort in the home, but you can re-prioritise based on the potential to improve your star rating, the operational cost savings, or whether the recommendation will be kinder on the environment – simply click on the headings to change the order.

Costs and improvement potential