
Post-implementation review of the Hurunui/Kaikōura Earthquakes Recovery (Unreinforced Masonry Buildings) Order 2017 and Securing Fund

INDEPENDENT REVIEW REPORT

SEPTEMBER 2020

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**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI

New Zealand Government



Acknowledgement

MBIE acknowledges and pays tribute to the people injured and killed in earthquakes by falling masonry in New Zealand, also their whanau, family and friends.

MBIE also acknowledges the contributions of GNS Science (Geological and Nuclear Sciences), QuakeCoRE, the New Zealand Society for Earthquake Engineering (NZSEE) and the Structural Engineering Society New Zealand (SESOC) in providing advice to Government about the seismic forecast and possible risks to people and property following the Kaikōura earthquake.

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Executive Summary

This report presents the post-implementation review of the *Hurunui/Kaikōura Earthquakes Recovery (Unreinforced Masonry Buildings) Order 2017 (URM Order) and URM Securing Fund (Fund)*. The summary timeline of events is shown in Figure 1.

The intent of the URM Order was to manage life-safety risk by requiring building owners to secure the street-facing parts of buildings that were most likely to kill or injure people who were nearby should an earthquake occur during the period of increased regional seismic activity associated with the Kaikōura earthquake.

The purpose of the post-implementation review is to inform the Ministry of Business, Innovation and Employment (MBIE) about the effectiveness of the regulatory design and the implementation of the URM Order and Fund, and to identify useful insights for future regulatory design. The review covers the period 1 January 2017 to 30 June 2019.

The URM Order and Fund improved our safety in busy streets

The review found that the URM Order and its Fund effectively contributed to protecting life-safety and preventing injury of the New Zealand public in the event of an earthquake.

The URM Order was effective as a regulatory intervention, because it was clear about what it was trying to achieve and how this would happen. The key engineering societies effectively lobbied for the intervention and so fully supported its intent. Affected territorial authorities (Hutt City Council, Wellington City Council, Marlborough District Council, and Hurunui District Council) were given the tools they needed to enforce the order. In addition, the tight timeframes and the removal of building and resource consent requirements motivated owners to action.

Execution of the URM Order was initially at arm's length with few results, but by adopting a practice of getting alongside the building owners, the two city and two district councils achieved enduring public safety benefits and largely within regulated timeframe.

The key features that made the policy effective were:

- › The clear timeframes, escalation paths and definitions that signalled the urgency and priority of the policy objectives.
- › Consideration of how the policy would interact with the *Building Act 2004*, the *Resource Management Act 1991*, and the *Building (Earthquake-prone Buildings) Amendment Act 2016*. Design included using the regulatory and enforcement powers in the *Building Act*, removing the need for building and resource consents for securing work if certain criteria were met, and the earthquake-prone building information requirements in legislation.
- › Building in lessons from the Canterbury earthquakes, which included using similar emergency legislation and processes. This enabled the policy to be responsive to changes in the operating environment, such as the addition of the six-month extension.
- › Involving affected territorial authorities and listening to seismic and engineering expertise in the development of the policy as much as possible given the time pressure, the availability of resources, and post-earthquake recovery activities.
- › Removing the need for a building consent for the affected buildings had the additional benefit of making the securing work more affordable because it removed the need to comply with other aspects of the building code.

While participants in this review consistently said that both the URM Order and Fund were needed, the mix of legislative requirements and a financial incentive were insufficient alone.

This is shown in the slow initial uptake of the Fund, which MBIE then adapted to reduce barriers. The people-centred, rather than arm's length approach to regulation, adopted by the territorial authorities, was critical to the securing initiative succeeding as well as it did.

The dangerous street-facing unreinforced masonry building elements of 118 buildings were addressed: 114 buildings were secured and/or strengthened (112 on time and 2 soon after); four more buildings were demolished, while one building has not been secured. The Fund paid the owners of 104 buildings \$3.08 million in subsidies, which offset one third of the total \$9.77 million spent by building owners on engineering design and securing construction work.

Best long-term balance of public life-safety against owners' costs

The Government effectively used seismic science and engineering advice to protect its people.

The URM Order was set up because seismic modelling showed a heightened risk of a substantial aftershock in the 18 months following the Kaikōura earthquake on 14 November 2016, and because there was a political will, and the technical means to address the buildings that presented the highest risks to life-safety.

Seismic experts are confident that they provided the best advice available to the Government and that updated modelling would result in the same advice in a future similar scenario.

The approach taken was one of securing the street-facing elements of buildings where there was higher risk of harm, ie those streets with high pedestrian and vehicular traffic. The securing work done to address public safety during the 18 months of heightened seismic risk continues to protect life-safety in the event of a future earthquake.

Securing the facades of historical buildings has safeguarded them from losing their most iconic features in an earthquake until strengthening is completed. The URM Order was not used as an excuse to get rid of tracts of old buildings; only four buildings were demolished in total.

Engineers and local authorities initially underestimated the amount of assistance that some building owners would need. Owners of buildings with a body corporate arrangement found decision-making difficult and time-consuming.

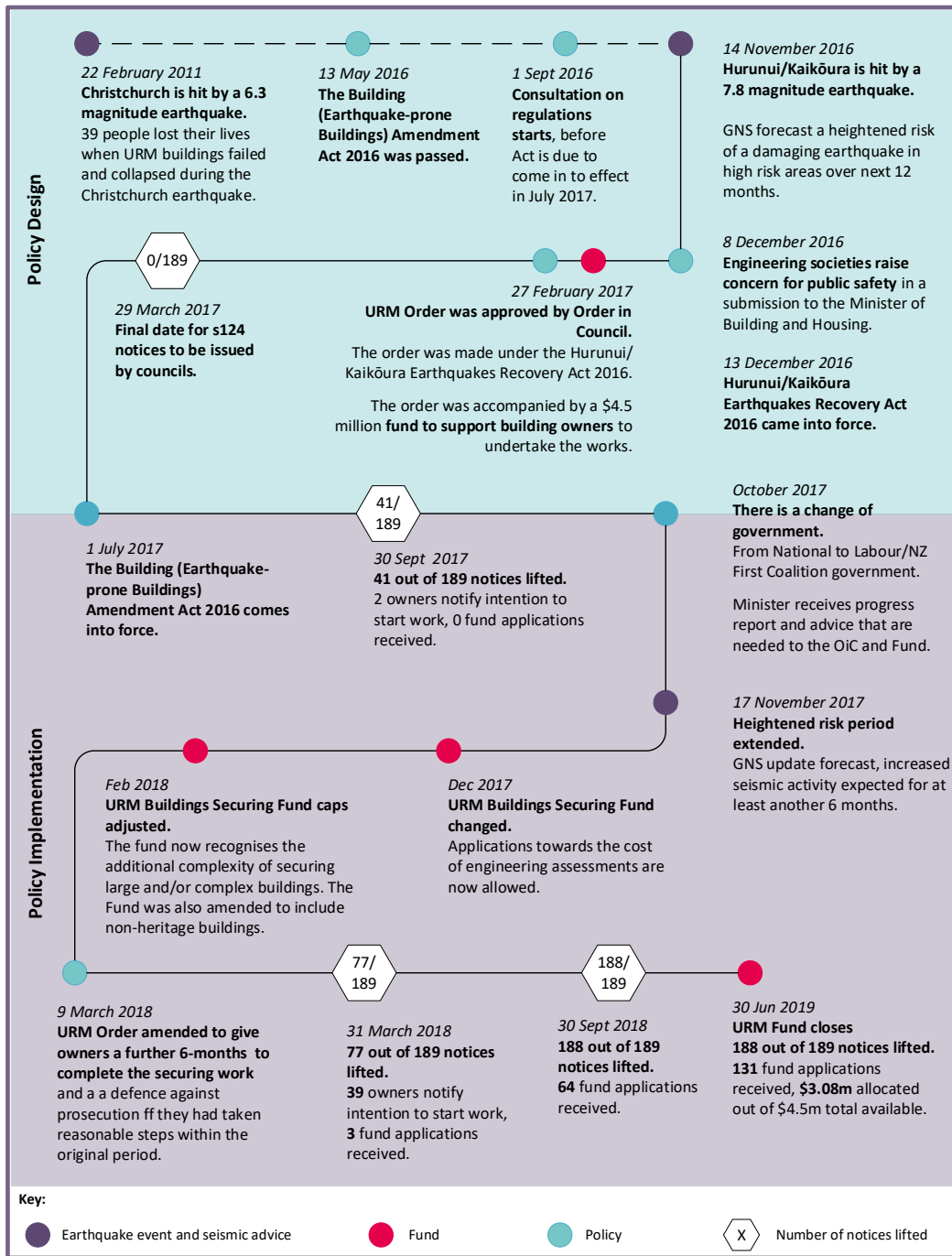
While the securing work was completed earlier to manage heightened risk to life-safety, it would be more cost effective and efficient for some cases to have undertaken the securing work as part of planned earthquake strengthening works.

Insights for future regulatory design

The removal of the need for building consent for the buildings notified under the URM Order would have benefited from greater consideration of how that change would affect the roles of other stakeholders in the building system, particularly engineers. Such consideration could have led to actions, such as establishing an independent review panel to check engineering calculations and so moderating liability concerns of some engineering companies.

The URM regulatory intervention was set up with a monitoring and evaluation plan that contained milestone targets at policy and operational levels. However, the regular reporting and monitoring was not done against the milestone targets meaning that early warning signs may have been missed. The regular engagement between MBIE, councils and engineers meant that issues were identified however identification of issues is likely to have been more effective if had it been coupled with monitoring against milestone targets.

Figure 1: Summary Timeline of Events



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1. Review purpose, approach and scope

This report presents the findings from the post-implementation review of the regulatory response to reduce the risk of death and injury from building masonry falling in an earthquake during the period of heightened seismic activity following a major earthquake in New Zealand.

The *Hurunui/Kaikōura Earthquakes Recovery (Unreinforced Masonry Buildings) Order 2017* (URM Order) and URM Securing Fund (Fund) formed the core of the regulatory response of the Ministry of Business, Innovation and Employment (MBIE).¹

1.1 Post-implementation review purpose

As the steward of the building regulatory system, MBIE commissioned an independent post-implementation review of the effectiveness of the regulatory design and implementation of the URM Order and Fund. The review covers the period 1 January 2017 to 30 June 2019 and includes the changes made to the URM Order and the Fund during this period.

MBIE building system regulators are the primary audience of this report. MBIE will use the findings from the review to inform how it develops and implements regulatory interventions.

While the focus of the review is on the lessons for MBIE building system regulators, the review also presents the benefits to the four territorial authorities (Hutt City Council, Wellington City Council, Marlborough District Council, and Hurunui District Council) and to engineers.

The regulatory impact statement for the proposal for the URM Order stated that the order will be subject to a post-implementation review. The requirement for the post-implementation review of the URM Order was not carried forward when requirements were reset.²

1.2 Approach and evidence base

The review was commissioned by MBIE and carried out by external reviewers, the institutions and primary roles of the reviewers were:

- › Kestrel Group, who organised the workshop for engineering and seismic professionals and provided technical input into the review
- › University of Auckland, who reviewed and analysed the Fund administrative data
- › MartinJenkins, who reviewed the intervention from a policy perspective.

The findings and recommendations in this report are based on the following evidence sources:

- › interviews with people from Hutt City Council, Wellington City Council, and Hurunui District Council during January and February 2019
- › a workshop with engineering and seismic professionals in February 2019
- › desktop review of documents provided by MBIE and documents in the public domain
- › debrief report to Wellington City Council 30 April 2019.³
- › statistical and financial analysis of anonymised administrative data
- › online property and rating valuation maps.

1 [Securing unreinforced masonry building parapets and facades](#)

2 Cabinet Office [March 2017 \(CO \(17\) 3\)](#) and [June 2020 \(CO \(20\) 2\)](#)

3 [Bach, K. \(2019\) Unreinforced masonry buildings programme: Debrief report to Wellington City Council. Falcon Consulting Limited.](#)

1.3 Review questions

The review was framed around the following 10 review questions and grouped under four themes.

Results of remedial action on unreinforced masonry buildings (addressed in Section 4)

1. How many buildings were:
 - › issued a notice to secure
 - › determined to need securing
 - › secured/strengthened (with breakdowns)
 - › subject to enforcement action by the territorial authority?
2. What were the total costs to building owners for securing, and how much central and local government funding was provided?

Policy Review (addressed in Section 5)

3. In what situations did the securing fund cover up to half of the required qualifying work (working within the capped amounts), and were there any common factors in the exceptions?
4. How simple was the application process for the URM Securing Fund managed by MBIE?
5. What improvements to the URM Securing Fund could be applied to other fund facilities?
6. What were the enablers, challenges and constraints to, and unanticipated impacts of, achievement or non-achievement of securing of buildings under the order (consider heightened seismic risk and awareness, regulation, enforcement, education, guidance, financial support)?

Technical Lessons (addressed in Section 6)

7. What lessons were learned by the seismic and engineering experts about their seismic risk analysis, technical guidance and training?
8. What were the 'on the ground' experiences and lessons learned with the URM Order work, including the trade-offs between interim securing and remediation to meet 34 per cent of the new building standard?

Summative Review (addressed in Section 7)

9. As a regulatory response to a temporary period of heightened seismic risk, how effective was the order in council?
10. How is the approach taken to balancing life-safety of the public against costs to building owners seen in retrospect?⁴

⁴ Analysis of the dollar value of costs and benefits was outside the scope of this review.

2. Context for the regulation

This section sets out the regulatory landscape at the time that the magnitude 7.8 earthquake struck the north-east of the South Island of New Zealand. The URM Order was intended to manage life-safety risk during the subsequent period of increased regional seismic activity.

In an earthquake, parts of masonry can break away from an unreinforced masonry building and parapets or other parts of the facade (or the entire facade) can collapse. The potential for harm to life increases significantly for unreinforced masonry buildings that are located on streets with high numbers of pedestrians and vehicles.

Restrictions on the use of unreinforced masonry in new buildings were first introduced in the mid 1930's following the estimated magnitude 7.8 Murchison earthquake in June 1929 and the magnitude 7.8 Napier earthquake and magnitude 7.3 aftershock in 1931.⁵

2.1 Unreinforced masonry buildings causes fatalities on 22 February 2011

On 22 February 2011 the Canterbury region of New Zealand, including the city of Christchurch, suffered a magnitude 6.3⁶ earthquake in which 185 people died and many were injured.

Falling debris from unreinforced masonry buildings caused the death of 39 of those 185 victims. A further 110 people were injured by falling masonry. Figure 2 shows the footpath covered in fallen masonry from the parapet and facade of a two-storey city building.

Figure 2: Collapse of the facade of a two-storey building in Christchurch, February 2011.



Photograph by Win Clark, image supplied by MBIE.

⁵ [New Zealand Society for Earthquake Engineering, 1985. Earthquake Risk buildings: Recommendations and Guidelines for Classifying, Interim Securing and Strengthening.](#)

⁶ Richter Magnitude (ML) is the initial magnitude assigned to an earthquake with routine GeoNet processing.

2.2 *Building (Earthquake-prone Buildings) Amendment Act 2016* assent gained on 13 May 2016

In response to recommendations from the Canterbury Earthquakes Royal Commission,⁷ the *Building (Earthquake-prone Buildings) Amendment Act 2016*⁸ made significant changes to the way that earthquake-prone buildings are managed. It would come into effect on 1 July 2017.

The intent was to improve the performance of the country's existing building stock while recognising the need to balance the protection of people from harm in an earthquake with the costs of strengthening or removing buildings and the impact on New Zealand's built heritage.

2.3 Kaikōura earthquake on 14 November 2016 left the wider region exposed to aftershocks

On 14 November 2016 NZDT,⁹ a magnitude 7.8 earthquake struck 15 km north-east of Culverden, North Canterbury, in the South Island of New Zealand.¹⁰ There were two fatalities. The earthquake was the most powerful in the North Canterbury area in over 150 years and the faulting mechanisms were very complex.

Extensive damage to essential connections and basic infrastructure in the Kaikōura region occurred with numerous major slips isolating Kaikōura from the north and south. Across the Cook Strait in the capital city of Wellington, damage to buildings was reported with the taller buildings more affected by the particular ground-shaking pattern of this seismic event.

GNS Science (a Crown-research institute), in collaboration with QuakeCoRE (a Centre of Research Excellence), estimated the increased risk to unreinforced masonry buildings in Wellington using a combination of GeoNet (a collaboration between the Earthquake Commission and GNS Science) aftershock forecast, fragility models from QuakeCoRE researchers and the RiskScape (a GNS and NIWA programme) risk modelling tool.¹¹

In November 2016, the forecast for the next 12 months was for an increased risk of aftershock earthquakes in the area from the upper east of the South Island to Lower Hutt City (branded as Hutt City), north of Wellington City in the North Island.

The New Zealand Society for Earthquake Engineering and the Structural Engineering Society New Zealand presented a submission (unpublished) to the Minister for Building and Housing in December 2016.

The submission:

- › expressed concern about the risk to public safety from street-facing unreinforced masonry building parapets and facades as there was a heightened probability of seismic activity over the next 12 months
- › asked the Government to intervene to make sure that street-facing unreinforced masonry building parapets and facades in the high-risk areas identified by GNS Science were secured urgently
- › proposed a financial incentive to encourage unreinforced masonry owners to prioritise the securing work for street-facing parapets and facades in areas of high pedestrian and vehicular traffic.

The submission prompted the Minister to ask MBIE officials to develop the URM Order and Fund.

7 [Canterbury Earthquakes Royal Commission Reports](#)

8 [Building \(Earthquake-prone Buildings\) Amendment Act 2016](#)

9 NZDT is New Zealand daylight savings time – the quake occurred in the New Zealand summer.

10 [Map of New Zealand showing territorial authority boundaries and seismic risk areas](#)

11 [QuakeCoRE-GEER-EERI Earthquake Reconnaissance Report: M7.8 Kaikōura, New Zealand Earthquake on November 14, 2016](#)

In November 2017, one year after the Kaikōura earthquake, GNS Science advised that the ongoing seismic activity was consistent with the forecast and that they expected that the heightened risk period would extend for at least another six months beyond the end of 2017. The updated forecast (5 September to 5 December 2017) is shown visually in Figure 3.

The probability of a significant earthquake was two to four times the base rate (yellow) in the South Island towns of Amberley and Blenheim. The probability remained somewhat elevated (1.2-1.4 times base rate coloured blue and lavender) in the North Island city of Wellington, with Lower Hutt City (branded as Hutt City) pretty much back to its normal seismic risk level (violet). The red area centred on Kaikōura still had 10-15 times higher probability of an earthquake than would be the case before the Kaikōura earthquake.

Figure 3: Relative probability of significant aftershocks in the upper east of the South Island to Lower Hutt City in the North Island for the period 5 September to 5 December 2017

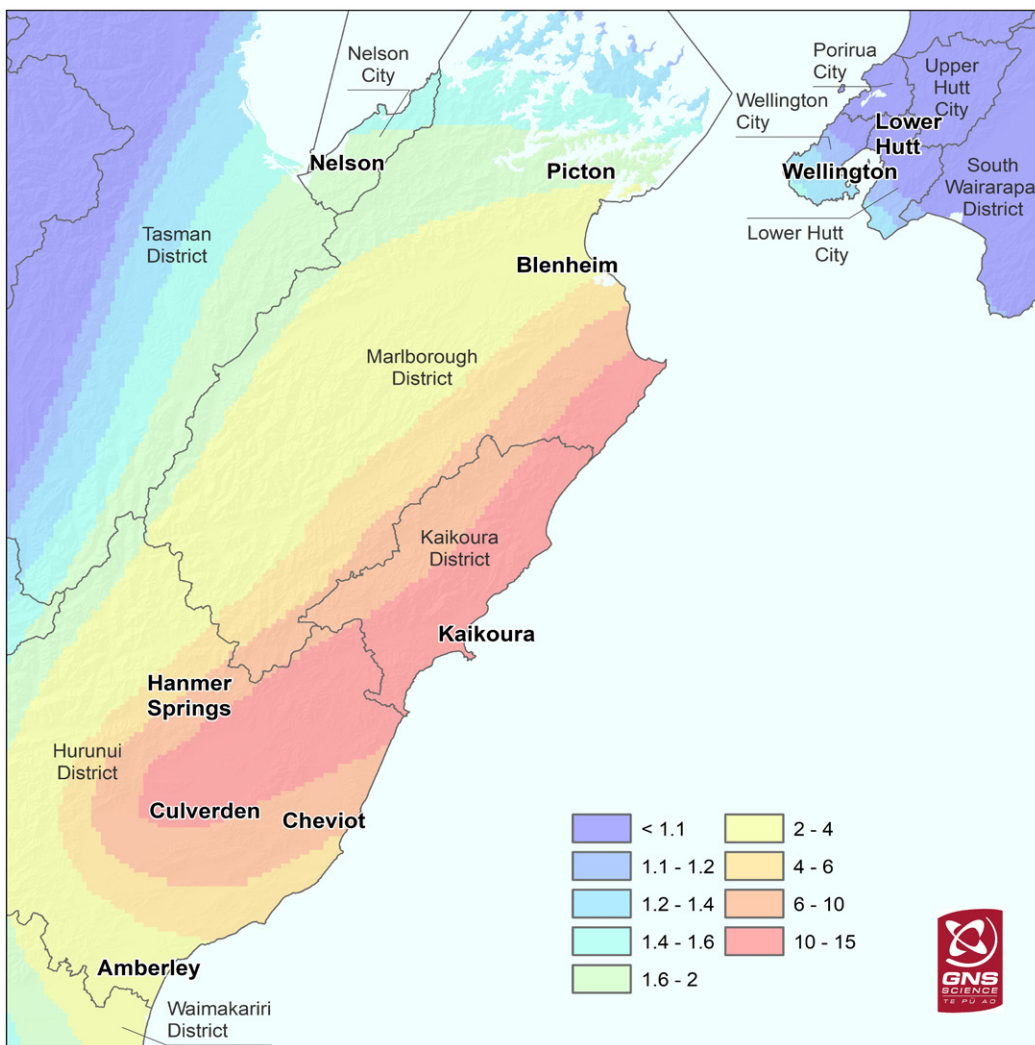


Image supplied by GNS Science.

3. Action on dangerous street-facing unreinforced masonry buildings

Section 3 describes the URM Order in Council and the URM Securing Fund.

On 25 January 2017, two months into the heightened seismic risk period, the outline of the URM Order and Fund were made public.¹² At that time, four territorial authorities and MBIE estimated that there would be about 300 buildings affected on about 40 streets:

- › The Hutt City Council estimate was 50 buildings
- › The Wellington City Council estimate was 250 buildings
- › The Marlborough and Hurunui districts estimate was 10 buildings across both districts.

Later estimates were that about 200 buildings would need securing¹³ on 37 streets.¹⁴

3.1 URM Order intent was to manage life-safety risk

The required securing work would make these buildings safer for the public and would give building owners more time to complete any extra strengthening work needed.¹⁵

The URM Order applied to owners of unreinforced masonry buildings located on certain streets that had high pedestrian and/or vehicular traffic. The URM Order required territorial authorities to manage the securing timeframes for buildings with street-facing URM elements.

The URM Order amended the *Building Act* in the following ways:

- › introduced a new class of dangerous buildings under the *Building Act* (buildings with dangerous street-facing unreinforced masonry parapets and facades on listed streets)
- › enabled affected territorial authorities to access the enforcement powers under the *Building Act* for the URM Order¹⁶
- › required territorial authorities to issue notices, under section 124 of the *Building Act* (s124 notices) to owners of affected buildings by 29 March 2017, requiring owners to carry out securing work on the buildings by a date in March 2018
- › required affected building owners to complete the securing work within 12 months after being notified by the territorial authority
- › removed the need for a building consent for the securing work, as long as certain criteria were met.

The URM Order modified the Resource Management Act by removing the requirement for a resource consent to carry out URM securing work, provided certain conditions were met.

12 [Aftershock risk prompts initiative for facades and parapets](#)

13 Cabinet paper: [Improving the unreinforced masonry securing initiative](#)

14 [Final list of streets](#)

15 [Building.govt.nz information posted 23 March 2017](#)

16 Existing enforcement powers apply where building owners do not meet requirements. Section 128A of the Building Act makes it a criminal offence, with a maximum fine of \$200,000 if the building owner fails to comply with a requirement to carry out work on their building following the issue of a notice under section 124(2)(c) of the Building Act.

3.2 Timeline eased to address practical constraints

The October 2017 MBIE briefing for the incoming Minister¹⁷ following the general election provided background on the URM Order.

Owners of buildings affected by the URM Order were reporting difficulties in finding an engineer to do the assessment and design work.

The November 2017 forecast was for the seismic risk to be high for at least six more months.

In December 2017, Cabinet agreed to amend the URM Order in response to practical constraints and the continued heightened seismic risk. The amendment was to strike a balance between the need to get securing work done during the current period of heightened earthquake risk, and the practical constraints that have delayed some projects, such as affordability and sector capacity.¹⁸

The March 2018 amendment provided,¹⁹ in certain cases (where design work had started and structural work could be finished in time), an extension of six months on top of the initial 12 months for the work to be completed.

3.3 The URM Fund recognised the short timeframe

The Fund was established to provide an incentive for affected building owners to complete the required building work within the 12 months, with provision of an extension of six months added in March 2018 if certain conditions had been met.

The Fund comprised \$3.0 million from central government and \$1.5 million from the four affected territorial authorities, which were Hutt City Council, Wellington City Council, Hurunui District Council and Marlborough District Council.

The national earthquake-prone buildings management system commenced on 1 July 2017.²⁰ The timeframe under the national system provided 7.5 years in these locations for securing of the street-facing parts that might fall (typically parapets, facades and verandas). Because of the heightened seismic risk, it was in the public interest to have the work done in a much shorter timeframe.

Building owners could apply for funding for up to half of the costs of the work involved in securing the parapet (\$10,000) and/or facade (\$15,000) once the s124 notice was lifted.

In response to feedback six months after the Fund was implemented, the eligibility criteria were simplified and part-funding of engineering assessments were introduced.

From December 2017, building owners could apply for reimbursement on payment of engineering assessment and on lifting of the s124 notice.

If a building was proven secure, and the s124 notice has been lifted with no remediation work required, building owners could apply for 50 per cent of the costs up to a maximum of \$1,500. These buildings that did not require securing were classed as category 'A' buildings.

If a building was shown to need remediation work, building owners could apply for 50 per cent of the engineering assessment costs, with this first milestone payment amount being deducted from the maximum funding cap.

17 [Briefing for the Incoming Minister for Building and Construction 26 October 2017](#)

18 [Cabinet paper: Hurunui/Kaikōura Earthquakes Recovery \(Unreinforced Masonry Buildings\) Amendment Order 2018](#)

19 [Hurunui/Kaikōura Earthquakes Recovery \(Unreinforced Masonry Buildings\) Amendment Order 2018](#)

20 [New System for managing earthquake-prone buildings](#)

In February 2018, as the number of buildings needing securing work was fewer than expected, the funding cap for securing large/complex buildings was increased from the original maximum of \$25,000 to \$65,000 and in some cases, \$130,000. The four categories of buildings and their maximum funding caps were amended to:

- › Category 'A': no remedial work required – up to \$1,500 for engineering assessment
- › Category 'B': one- or two-storey buildings requiring remedial work – maximum \$25,000
- › Category 'C': three-or-more-storey buildings requiring remedial work – maximum \$65,000
- › Category 'D': two storeys and two listed streets – up to \$25,000 per listed street, maximum \$50,000 or three or more storeys and two listed streets – up to \$65,000 per listed street, maximum \$130,000.

The definition of work that qualified for the Fund was updated to include the removal of unreinforced masonry elements from non-heritage buildings. Building owners who qualified for an extension under the URM Order were given extra time to apply for funding.

3.4 Monitoring and reporting on the URM Order

A monitoring and evaluation plan was drafted for the URM Order implementation. The plan consisted of measures, and set targets for tracking:

- › the 12-month goal of improved seismic performance of affected buildings (building owners secure street-facing unreinforced masonry elements to acceptable standards within 12 months)
- › short-term results including building owners' intent to, and ability to, complete the work in the 12-month timeframe
- › outputs from the process.

A spreadsheet was developed to collect the data from the territorial authorities and to consolidate the data in one place. Territorial authorities agreed to update and return the spreadsheet fortnightly. In practice, fortnightly was not appropriate for Hurunui and Marlborough district councils as they had only two properties each. MBIE agreed that the two district councils would provide updates only when there was new data to report.

In addition to the data collected through the spreadsheet, territorial authorities were asked to provide written reports to MBIE, as soon as reasonably possible, on any risks or issues that might delay the securing of unreinforced masonry buildings, including an assessment of the significance of the risk and any planned actions.²¹

MBIE produced monthly internal reports, and reported to the Minister for Building and Construction on how the Fund was tracking and overall progress towards the 12-month target.

21 A stocktake of progress was held at six months.

4. Results of remedial action

Section 4 describes the results in terms of number of notices issued, number of buildings determined to need securing and the number of notices lifted as well as enforcement action taken. This section then reports the total costs to building owners for securing, and the amount of central and local government funding provided.

Overall implementation of the URM Order was successful. Most notices were lifted within the imposed deadline of September 2018. The URM order and its Fund facilitated securing of the dangerous elements of 118 buildings, protecting the life and safety of the New Zealand public. The total cost was under \$10 million and building owners received \$3.08 million in subsidies.

The intolerable life-safety risks identified in late 2017 had been mitigated to a tolerable level.²²

4.1 Territorial authorities issued 189 s124 notices

Territorial authorities issued 189 s124 notices within the required timeframe

The four territorial authorities identified 189 buildings as having street-facing facades and/or parapets that could require securing under the URM Order.

The building owners of those buildings received s124 notices during March 2017 with an option to challenge their notice. Wellington City Council issued its notices in batches between 15 and 29 March 2017. Each of the other three territorial authorities issued their s124 notices on a single day (see Table 1).

The majority (113) of buildings were in Wellington, and included 86 buildings that had an earlier earthquake-prone building notice issued between 2009 and 2015. Two of the 72 buildings in Hutt City had earlier earthquake-prone building notices that were issued in 2008. Hurunui and Marlborough districts issued s124 notices for two buildings each.

Of the 189 buildings, the majority (115) of them were listed heritage buildings on the District Plans of the respective territorial authority.

Table 1: Number of s124 notices issued, heritage status and date of issue

Council	Number of buildings with notices	Number with heritage designation	Dates that notices were issued
Hutt City	72	45	10 March 2017
Wellington City	113	68	15-29 March 2017
Marlborough District	2	0	17 March 2017
Hurunui District	2	2	24 March 2017
Total	189	115	10-29 March 2017

²² The national earthquake-prone building management system would now pick up buildings that remained earthquake-prone after the street-facing unreinforced masonry elements had been secured or removed.

The buildings were mainly low-rise, with 45 being single-storey and 104 being two-storey. There were 26 three- and 13 four-storey buildings in central Wellington and one three-storey building in Marlborough (see Table 2).

Table 2: Characteristics of building height in each district

Council	Number of storeys				Number of buildings
	one	two	three	four	
Hutt City	22	50	0	0	72
Wellington City	22	52	26	13	113
Marlborough District	0	1	1	0	2
Hurunui District	1	1	0	0	2
Total	45	104	27	13	189

4.2 Parapets and facades on 119 buildings needed securing

In response to receiving their s124 notice, 76 building owners supplied drawings, inspection and testing reports to challenge the notice, and the territorial authorities reviewed their records for three further buildings where the notice was not challenged by the building owner.

119 buildings had dangerous elements that needed to be secured, or the building demolished

Following the challenge process, 119 buildings had dangerous street-facing unreinforced masonry parapets and/or facades. The breakdown of buildings not needing and needing securing work is shown in Table 3. Two well-known public buildings in Wellington – the St James Theatre and the Town Hall are included as needing securing.

Table 3: Number and proportion of notices revoked on reassessment

Council	Securing not needed (number)	Securing needed (number)	Notices issued (number)
Hutt City	47	25	72
Wellington City	21	91	113
Marlborough District	1	1	2
Hurunui District	0	2	2
Total	70	119	189

Over one-third (70/189) of the buildings came off the list as a result of better information

The majority of building owners were successful in their challenge. The most common reasons for a territorial authority revoking a notice were that there were no unreinforced masonry elements present, the building was not substantially constructed of unreinforced masonry, or the building had been designed or had been strengthened to above 33 per cent of the new building standard. Table 4 shows the four main themes identified in administrative records.

Most (45) of the revoked s124 notices related to buildings in the suburb of Petone, the first European settlement in the Wellington region. Petone became a borough in 1888, and merged with Lower Hutt City (now branded as Hutt City) in 1989. Some property records were lost as a

result of a fire²³ which made it harder to identify buildings when issuing s124 notices.

Hutt City Council staff profiled the properties by reviewing remaining property files, walking the streets to inspect buildings from the outside, using Google Street View and seeking advice from structural engineers. In some cases, it was difficult to determine whether street-facing facades and parapets contained unreinforced masonry that was less than 34 per cent of the new building standard. In several cases, additional invasive testing was required. This involved drilling into the structure to see whether the material was brick, wood or reinforced concrete.

Of the 72 s124 notices issued by Hutt City Council, 47 (65 per cent) buildings did not meet the requirements for a notice when re-assessed. Hutt City Council updated property records and revoked 44 notices within 12 months of being issued; Hutt City Council revoked three further notices in the following six months.

Of the 113 notices issued by Wellington City Council, 21 (19 per cent) were re-assessed and the notices were revoked. Wellington City Council had been actively identifying earthquake-prone buildings and issuing s124 notices since 2006 and so had progressively updated its records.

Marlborough District Council lifted one of its two notices as re-assessment of records found the building to be sufficiently secure. Hurunui District Council did not need to revoke either of the two s124 notices it issued.

There were nine cases where the challenge was not, or was only partly successful; the owners of these buildings went on to secure the unreinforced masonry elements.

Table 4: Reasons notices were revoked for buildings that did not need seismic work

Council	No URM front-facing elements	Property file reviewed	Historical securing evidence	Other	Securing not needed (number)
Hutt City	35	3	8	1	47
Wellington City	15	0	2	5	22
Marlborough District	0	0	0	1	1
Hurunui District	0	0	0	0	0
Total	50	3	10	7	70

4.3 Notices have been lifted from 118 of the 119 buildings

Securing or demolition work completed for 97 per cent of buildings in 18 months as required

The building owners of 116 buildings with street-facing unreinforced masonry parts met their September 2019 deadlines.^{24,25} Of the 116 buildings, 112 buildings were secured and four were demolished. The owners of a further two buildings finished the required work in October, soon after their respective September 2018 deadlines (see Table 5).

23 [A fire, on 3 January 1985 destroyed or damaged hundreds of early Petone Borough records dating back to the 1880s](#)

24 [Hutt City Council 12 September 2018 Lower Hutt safer after quake-risk buildings brought up to spec](#)

25 [Wellington City Council 1 October 2018 Wellington’s unreinforced masonry buildings secured](#)

Table 5: Number of notices lifted (or not) where work was needed

Council	Buildings needing work	Secured before deadline	Demolished before deadline	Secured soon after deadline	Notice not lifted
Hutt City	25	25	0	0	0
Wellington City	91	86	4	1	0
Marlborough District	1	1	0	0	0
Hurunui District	2	0	0	1	1
Total (count)	119	112	4	2	1
Total (per cent)	100%	94%	3%	2%	1%

4.4 Limited enforcement action applies to one building

Hurunui District Council placed a cordon around the one privately-owned building in Amberley.

4.5 Building owners receive subsidies for costs incurred

A total of \$9.77 million was spent by owners of 104 buildings for assessments and securing

Of the 119 buildings that needed securing, 103 were eligible for an engineering and a securing subsidy. The owners of 98 of the 103 eligible buildings received a subsidy from the Fund for engineering and securing work. Three owners of private buildings elected not to apply for funding. One city council did not apply for funding for two buildings it owned.

The owners of six buildings with unreinforced masonry elements were eligible for an engineering subsidy only. The six included the four buildings that were demolished and the two that were secured just after their deadline. The owners of two demolished buildings and owners of two that were late to secure their buildings received the subsidy for engineering assessments only. The owners of two buildings demolished their buildings and did not make an application for funding for an engineering assessment.

Nine buildings with unreinforced masonry elements were not eligible for any subsidy because the building owner has received a building consent for work that had commenced already.

One building, in Hurunui, was not eligible for any subsidy because the building owner did not get an engineering report or secure the building in the timeframe set in the s124 notice.

On further assessment, 70 buildings that were issued with s124 notices were determined not to meet the criteria under the URM Order. The owners of these buildings were entitled to apply for up to half of the costs for the engineering assessment. Owners of 11 buildings received a subsidy from the Fund for engineering assessments.

A total of \$9.77 million was spent by 104 building owners (before the subsidy) on engineering assessment only, or engineering assessment and securing of parapets and facades. The costs to the owners for demolition, or for remediation where the owner finished late or chose not to make a claim is unknown.

Payments from the Fund totalled \$3.08 million to 104 building owners

The Fund provided \$3.08 million in support to building owners. This is two-thirds of the full amount available in the fund. As expected, most of the allocated funding went to owners of buildings in Wellington where the larger and more complex buildings were located.

Central government funding was two-thirds (\$2.11 million). In the 2017/2018 year, \$161,000 was paid, and a further \$1.95m was allocated by 30 June 2019, by which time, all active claims had been processed.

Local government contributed one-third (\$1.08 million) of the payments to building owners.

MBIE returned the central government underspend from the Fund to the Crown.

The under-spend is a consequence of a higher number of buildings (70) that did not need securing work. Some of the owners of buildings that were found not to need securing work received up to 50 per cent of their costs for the engineering assessment.

Government increased the caps for three- and four-story buildings when it was clear that some buildings did not have dangerous unreinforced masonry parts and so would not need securing work. This adjustment to the funding caps meant that more building owners would receive up to 50 per cent of their applicable costs from the Fund.

5. Policy review

Section 5 of the post-implementation review considers the effectiveness of the Fund, and the implementation of the response from the perspectives of design, implementation, engineering and technical, monitoring, reporting and engagement. The findings present the perspectives shared in interviews with spokespeople from three of the territorial authorities (Wellington City, Lower Hutt City and Hurunui District) and by engineering and seismic professionals.

In summary, the regulatory intervention was an effective urgent response during a temporary period of heightened regional seismic risk.

5.1 URM Securing Fund

The Fund, set aside under the URM Order, was comprised of a \$3 million contribution from the central government (Crown) and \$1.5 million from the four affected territorial authorities. Hence, \$4.5 million was available towards covering the cost of securing of facades and parapets. The Fund was structured to cover up to half the cost of securing work with maximum capped amounts that were determined by the number of stories and the number of street frontages of the building.

With respect to the Fund, the review asked:

- › In what situations did the Fund cover up to half of the required qualifying work?
- › Were there any common factors in the exceptions (to covering up to half costs)?
- › How was the application process for the Fund experienced by the building owners?
- › What aspects of and learning from the Fund could be applied to other fund facilities?

The system to capture and process Fund applications was tested and finalised by June 2017. However, it was not until March 2018, 12 months after s124 notices were issued, that MBIE began receiving applications with the first payments processed by MBIE in April 2018.²⁶

The Fund covered up to half of allowable costs incurred for 59 per cent of buildings

Out of 104 buildings that received a subsidy from the Fund, 61 buildings (59 per cent) presented invoices for up to the capped amounts and so received a 50 per cent subsidy.

Where costs presented were up to two times the cap, owners spent an average of \$30,000 to secure one- and two-storey buildings and spend an average \$80,000 to secure a three- or four-storey building. The \$25,000 subsidy cap was well positioned for buildings in Hutt City.

Overall, the Fund reimbursed one-third of all the allowable costs incurred by building owners.

Further data and analysis of the cost per lineal metre is presented in Appendix 1.

Securing costs for larger more complex buildings were more likely to exceed the cap

Predictably, the per-linear metre cost of securing facades and parapets was lowest for one-storey buildings and increased with building height.

²⁶ Wellington City Council managed the fund for its one and two-story buildings, with 12 building owners having successfully applied for funding through the Wellington City Council by the end of March 2018.

The owners of 43 buildings (41 per cent) received less than half their costs for qualifying work because their costs for qualifying work exceeded twice the capped amount. Costs that exceeded more than twice the capped amount more commonly occurred for larger buildings which needed more expensive securing solutions. The cap for these buildings was increased from the initial setting in response to actual costs. For those that exceeded the maximum funding cap, average remedial costs were \$80,000 for one-storey buildings to over \$250,000 for three- and four-storey buildings.

Experience of the Fund managed by MBIE varied by type of building owner

The territorial authorities noted that some building owners they had worked with to remediate buildings became confused when they had to engage with MBIE to access the Fund. Building owners had grown to know their Council and some then gained the impression that their Council had walked away when they needed support for accessing funding.

The centralised Fund administration model worked well for commercial property owners. For the Jackson Street programme in Petone, Hutt City there was no issue with the application process because a project management company completed application forms on behalf of the smaller building owners, and owners of larger, multi-tenanted buildings were easily able to complete the application process.

Wellington City Council chose to administer a portion the Fund for small-building owners, who tended to need more support, and contracted a project management company to work with these owners. This fit well with the case management model that Wellington was using and enabled them to be more flexible and responsive to the needs of owners of smaller buildings.

The Fund was able to accommodate the change in administration model. It also easily accommodated changes to simplify the Fund's criteria and funding amounts.

Co-funding was a critical part of the success of the Fund

The co-funding approach by MBIE and the four territorial authorities was seen as a good design feature because it meant that both central and local government had a vested interest in getting results. The co-funding approach showed the public that public safety in a heightened seismic risk period is the concern of both central and local government.

General feedback was that the Fund was a critical part of the success of the URM Order. On its own, the URM Order would not have been enough to make people take action within the required time, and so the intended public safety improvements would not have been achieved.

Both territorial authorities and engineers expressed the view that having a financial incentive like the Fund for other public good initiatives would be a good thing.

Greater focus on building owners would be beneficial when designing other similar fund facilities

The Fund was designed around categories of buildings and their location (busy pedestrian or traffic routes) rather than types of building owners. A focus at the design stage on types of owners could have improved decisions on how the Fund was administered and designed. For example, the subsidy payment for an engineering assessment could have been included as part of the initial design of the fund, in recognition of the cash flow constraints facing some owners.

The costs that could be covered by the Fund were defined narrowly. A consideration for future funds is to have a broader definition of costs to reflect the other direct costs that owners face in implementing a policy directive. This broader definition could help encourage owners to take action faster. In the case of the Fund, the definition could have been extended to include demolition, having to move tenants out of the building to enable work to be done, and loss of income.

5.2 Enablers, challenges and constraints of the URM Order

The policy design was based on the best information available at the time. With respect to the achievement of securing buildings under the URM Order, the review asked:

- › What were the enablers, challenges and constraints?

The following section sets out the key enablers, challenges, and constraints.

Enabled by local government end to end service

Wellington City and Hutt City Councils initially took a 'light touch' regulatory approach to implementing the URM Order, which consisted of identifying and issuing notices and waiting for building owners to provide information that would enable the notices to be lifted. The general regulatory and enforcement responsibilities for building consent authorities under the *Building Act* were available under the URM Order, and so the territorial authorities maintained their established role and processes.

As time passed, and there was slow response from building owners, territorial authorities saw that there was a large risk of owners not meeting the statutory timeframes and that the council's approach needed to change so that the public safety outcomes would be achieved.

Both city councils shifted to a case management model and intensified their engagement with building owners with direct follow-up, often by phone or face-to-face. This meant that staff got to know the buildings and their owners better.

Owners of smaller buildings found it really challenging to comply with the s124 notice because many of them lacked construction/project management experience and did not fully appreciate what was needed or how to comply, especially within tight timeframes. Added to this were other issues such as language and financial barriers. Owners of larger, usually multi-tenanted, commercial buildings were able to organise the work and to comply more efficiently.

In the case of Hutt City, a community group called the Jackson Street Programme enlisted a national property and engineering consultancy firm to present a full-service solution for property owners on Jackson Street. The service included project management, design, engaging with Council, and applying for funding. The majority of the smaller property owners were located on Jackson Street and accepted the proposal.

Similarly, Wellington City Council contracted a construction project-management company to work with smaller property owners navigate the process and successfully remediate their unreinforced masonry building by the deadline.

The territorial authorities interviewed for this review praised the regular engagement with MBIE and the willingness of MBIE staff to listen. The close working relationship between territorial authority and MBIE was one of the key factors in making the project successful. It enabled the policy to be responsive to new information and issues during the project.

Enabled by centrally set timeframes that forced local action

It was important to have clear timeframes to indicate the urgency of the work, and having these stated in legislation meant that they could be enforced. The centrally set timeframes helped local government remain firm on dates at the local level.

The one-month period for issuing s124 notices was particularly challenging for Hutt City Council because of resourcing and information constraints. The Hutt City Council had one dedicated person and a fire had destroyed or damaged many older property records.

The initial 12-month deadline was very challenging, as it took owners three to four months to get the engineering assessment completed. However, the progress contrasts with the

territorial authorities' experience of very slow progress, or in some cases no progress at all, for buildings that had long-standing earthquake-prone notices issued through the local policy.

Wellington City Council reported that they worked 'around the clock' to make sure that building owners met the strict URM Order deadlines. By making this extra effort, the building owners could be eligible for money for securing cost from the Fund.

Challenged by existing earthquake work and multiple ownership of buildings

The territorial authorities were already under pressure responding to the Kaikōura earthquake. Work included targeted damaged assessments, particularly in Wellington City, and supporting communities to recover from the damage caused by the earthquake. Hurunui District Council also found the timeline challenging because they had significant post-earthquake damage to address.

The territorial authorities were also under pressure to set up and implement, in parallel, the start of the new national system for managing earthquake-prone buildings that would take effect from 1 July 2017. All four territorial authorities manage buildings in the 'high' seismic risk area of New Zealand and so would have to identify their potentially priority earthquake-prone buildings by 1 January 2020.

The restructuring of teams within MBIE at the time the URM Order was being prepared and implemented was disruptive and presented extra challenges during an already stressful time.²⁷

Wellington City Council staff commented that the high number of targeted damage assessments required for multi-storey concrete buildings following the November 2016 earthquake made it particularly challenging for them to attend to the URM Order early on.

The territorial authorities diverted resources from other projects to focus on the unreinforced masonry building work. Hutt City Council had up to two full-time staff members and Wellington City Council had up to eight people during the peak periods. Hutt City Council commented that smaller territorial authorities are likely to have struggled without additional resources. Hurunui District had to divert policy resource towards the URM Order work.

Buildings with multiple owners, managed by a body corporate faced longer decision-making processes due the need to convene formal meetings with owners. In addition, there were financial constraints for many individual unit owner-occupiers, as they had no building-related income to offset securing costs.

One of the two Hurunui district buildings that required securing work was a community facility belonging to the Council. The 12-month timeframe was challenging because it did not allow for consultation with the community to determine the future use of the building. This information was needed to determine the approach and costs for the securing work, and as a result, the Council completed the securing work but not in time to qualify for funding.

Constrained by limited consultation opportunity,

The short timeframe and the recovery activity following the Kaikōura earthquake in November 2016 and the URM Order being in force on 28 February 2017 meant that consultation on the policy was limited.

While engineers provided input, they were not involved in the drafting of the URM Order. Territorial authorities had limited engagement. The final list of streets was not retested with territorial authorities before it was included in the final order. Based on the criteria applied by MBIE, a street with buildings that Wellington City Council considered to be of particular concern

27 Also noted in [Smith, M.C. \(2019\) Towards a resilient city](#)

was not included in the list of streets affected by the URM Order. Buildings on this street will be remediated through the national earthquake-prone building management system on the longer timeframe.

Building owners were slow to start and needed more support than anticipated

Engineers (and territorial authorities) reported that many building owners were initially slow to respond to the s124 notices. In particular, the review identified the following reasons that contributed to the delays:

- › early perception that the deadline was a long way out
- › initial scepticism that the order would be enforced, as earthquake strengthening deadlines set in the past had not been enforced – owners only took real action when they realised the penalty of not acting would be enforced
- › underestimating how much time it would take to organise and undertake the work
- › building owners' decisions to work in isolation which meant that some owners were unable share knowledge and resources; precinct approaches, for example, the Jackson Street community group, were more cost-effective and efficient,
- › subsequent difficulties finding an available chartered professional engineer.

5.3 Unintended impacts of design and implementation

Policy is designed to achieve a purpose – to have an anticipated impact. With respect to the achievement of securing buildings under the URM Order, the review also asked:

- › What were the unanticipated impacts?

Two unanticipated impacts, one counterproductive and one of ongoing benefit are presented.

Removing building consent meant fewer engineers took up securing initially

The URM Order removed the need for a building consent, with the intention that this would speed up the process while still being safe, because of the requirement for engineers to certify the work.

The unintended consequence was that it reduced the pool of engineers willing to do the work. Liability concerns, particularly from larger companies, arose due to the lack of council review and oversight that normally occurs during a building consent process. One of the specific areas of concern was because this work involved weatherproofing considerations, an area that engineers do not normally take responsibility for and typically have no professional indemnity insurance cover for.

Engineers and council officers are better prepared to manage earthquake-prone buildings, in particular to assist the owners

The territorial authorities commented that although the URM Order created extra pressure, the experience gave them a useful head start in developing familiarity with, and processes for, the new earthquake-prone buildings system.

Engineers reported that smaller building owners needed more support than they had originally anticipated, and that the cost at normal professional rates was too expensive for these owners to bear. In order to achieve the life-safety outcome, some engineers absorbed costs as a public good.

Both Hutt City and Wellington City Councils reported that their information on buildings is richer and their relationship with owners of masonry buildings is stronger as a result of the securing project. They also noted that the case management approach was successful, and they will both be adapting this for management of earthquake-prone buildings.

Hutt City Council indicated that they would be re-using some of the definitions and processes from the URM Order work for the management of earthquake-prone buildings more widely.

Wellington City Council noted that the requirement to reissue notices under the *Building (Earthquake-prone Buildings) Amendment Act 2016* on the back of the URM Order work was helpful, as owners were already aware of the need to take action to repair their buildings.

6. Technical review

Section 6 summarises the February 2019 workshop attended by engineering and seismic professionals who were involved in formulating and implementing the policy.

With respect to the implementation of the URM Order, the workshop considered:

- › the lessons learned by the seismic and engineering experts about their seismic risk analysis, technical guidance and training
- › the 'on the ground' experiences and lessons learned with the URM Order work, including the trade-offs between interim securing and remediation to meet 34 per cent of the new building standard.

To distinguish the roles: post-earthquake, seismic risk analysis was carried out by GNS Science (and QuakeCoRE) researchers; while engineering assessments for the building owners and designs for securing solution are done by structural engineers. The building owner, or in some cases a collection of building owners, may also commission a professional engineer to manage seismic engineering work on buildings.

6.1 Lessons related to practice

Seismic risk analysis and advice would be unchanged in a similar future scenario

The seismologists that provided seismic forecasts are confident in their modelling results and would provide the same type of information and advice after a similar event in the future.

The assessment used modelling based on information from past earthquakes, including the Canterbury earthquakes. The assessment included the potential aftershock behaviour for the Kaikōura earthquake and the likelihood that a cascading sequence of earthquakes could occur in the Cook Strait and lower North Island. GNS Science sought advice from international experts to make sure that the risk assessment and forecast were robust.

The characteristics of every earthquake are different, and the forecast therefore provides a 'best estimate' view of anticipated seismic activity within a wide uncertainty band.

Information on the risk posed by unreinforced masonry facades drew from extensive work following study of the unreinforced masonry buildings that failed during the Canterbury earthquakes, including by the Canterbury Earthquakes Royal Commission.

The Kaikōura earthquake was unusual in that the wave frequency damaged taller buildings mainly with very few unreinforced masonry buildings being damaged in Wellington.

Another unusual characteristic of the Kaikōura earthquake was how the actual aftershock sequence differed from the forecast, surprising New Zealand and international experts. The large and potentially damaging aftershocks (magnitude greater than 6.0) of the Kaikōura earthquake all occurred in a 14-hour period following the initial quake, followed by a slow-slip event occurring 600 km north off the east coast of the North Island.

GNS Science advises that the subsequent addition of data from the Kaikōura earthquake has not greatly changed the forecasts from the model. The data from Kaikōura is within the distribution of observed earthquake behaviour, and an aftershock and cascading hazard model following another large earthquake in New Zealand is likely to produce similar results to the one produced in the immediate aftermath of the Kaikōura main shock of 14 November 2016.

Technical guidance is a good starter for engineers but may not meet building owners needs

The MBIE technical guide (see Figure 4) clearly signalled to engineers that securing for public safety reasons was a priority over full strengthening, and accordingly short-term solutions in anticipation of longer-term earthquake strengthening work was acceptable in this case.

Those signals were missed by many owners who were confused and did not understand what they needed to do. Some understandably were overwhelmed by the guide’s technical content.

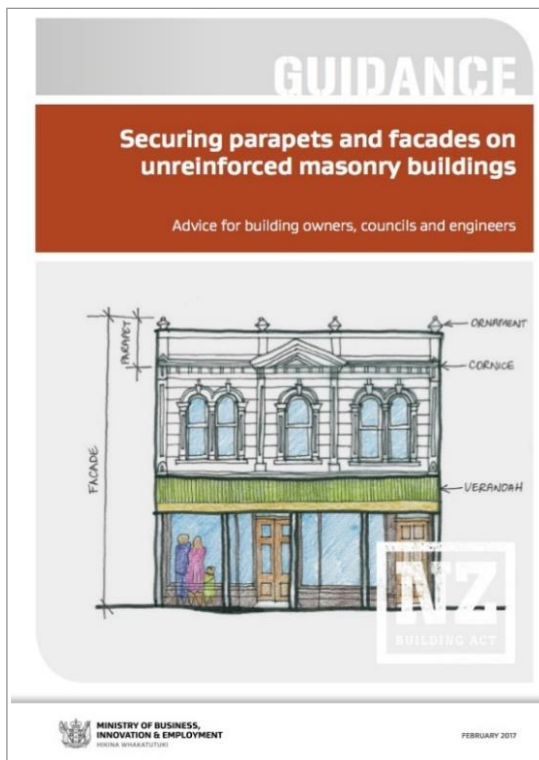
Targeted information for owners and engineers could work better. Separate documents would have had the added benefit of making changes and updates easier to manage.

The resource was valuable to engineers in that it summarised a lot of engineering practice on securing in one place and engineers were able to increase their output by ‘cutting and pasting’ standard details from the guide.

While it provided a good starting base, more support was needed because the guide did not answer all of the questions that engineers had. The common concern raised was *‘what if the structure behind the facade does not meet 34 per cent of the new building standard?’*

The document was still open to interpretation. There were occasions where advice from engineers was inconsistent. Since then, Engineering New Zealand has since developed a programme that provides independent facilitation to help resolve uncertainty arising from differing seismic assessments, in complex or historical situations.²⁸

Figure 4: Cover of the technical guidance booklet published by MBIE²⁹



28 <https://www.engineeringnz.org/our-work/reconciling-differing-seismic-assessments/>

29 <https://www.building.govt.nz/building-code-compliance/b-stability/b1-structure/securing-parapets-facades-unreinforced-masonry-buildings/>

More training and technical support for engineers is necessary

MBIE ran URM seminars for engineers, architects, council staff and building owners; the first in Wellington on Monday 28 February 2017, the second in Blenheim on Thursday 9 March 2017 and the third in Amberley in the week commencing Monday 13 March 2017.

In the future, it would be also good to have a person at MBIE that engineers could call to get more advice or have their technical questions answered.

The Hurunui District Council spokesperson commented that having MBIE staff come to Amberley in the Hurunui district to deliver a seminar was more useful than providing the technical guide on its own, particularly given the local post-earthquake pressures at the time.

The New Zealand Society for Earthquake Engineering ran meetings to collect and share technical information throughout the earthquake response and recovery. The meetings were face-to-face and so the engineers who attended were largely from the Wellington region.

6.2 On the ground learning***URM work with reduced building consent oversight raised the liability risk for engineers***

The removal of the building consent requirement reduced the level of oversight from the building consent authority for the remedial building work. This meant that many engineers chose not to participate due to perceived increased in liability exposure. In addition to risks posed by not having their calculations and details reviewed by the territorial authority, securing work involved the building envelope and potential weather-tightness issues, for which engineers typically do not have insurance coverage. This was particularly the case for the larger firms where they had a more formalised risk assessment when considering potential jobs.

In response to concerns about liability risk from engineers, the Hutt City and Wellington City Councils provided limited oversight by reviewing the engineering calculations done by the design engineer. Other options for managing this risk could have been to establish an independent review panel or pool of engineers to review securing designs.

'Price gouging' reported but wide-spread practice not supported by analysis

Wellington City Council staff noted that the URM securing work added to an already busy construction regional market and costs of materials and services, in particular for scaffolding, seemed to have increased significantly. Other anecdotal evidence suggested that as the securing deadline approached, and the number of outstanding s124 notices remained high, building contractors inflated their remedial charges.

When we investigated this using the securing fund data, we found no significant correlation.³⁰ It is possible that there was some increase in charging by a small number of contractors, but there is no statistical evidence that this practice was widespread.

Working collectively at a precinct level in future is worth doing

In hindsight, and had there been funding available, it would have been more efficient for both the Council and building owners if a structural engineer, or group of engineers, had been engaged to investigate all the potential buildings on behalf of both parties at the outset. Wellington City Council, in particular reflected that a precinct (or city block) approach would have greatly reduced the cost of assessments where notices were revoked.

³⁰ Date notice lifted X total cost: $r = .062$; X total cost per linear metre: $r = .066$

Trade-offs between interim securing and strengthening

The trade-off between public safety and the higher cost of securing the facade elements only, rather than taking longer to strengthen the whole buildings, was seen to be justified by both territorial authorities and engineers.

Engineers commented that some building owners had planned to carry out seismic upgrading for the entire building within the wider prescribed timeframe and the URM Order constrained their business plans and timelines. Some building owners considered that carrying out the securing work as a separate project, in a shorter timeframe, as not economical or practical.

The 86 owners of Wellington buildings affected by the URM Order had been, that had been issued with s124 notices between two and eight years prior to the 2016 earthquake, had taken little or no action under the local scheme.

Once the street-facing unreinforced masonry elements of the buildings on the listed streets were secured, the buildings presented a reduced risk to life-safety in the event of an earthquake. The owners that applied to the Fund received a subsidy of up to 50 per cent of allowable costs and support from their territorial authority or contracted project-management company to navigate the process.

The time, cost and support trade-offs were viewed positively against the backdrop of the national earthquake-prone building management system introduced on 1 July 2017.³¹

MBIE Chief Engineer Mike Stannard says, “This was a great example of the engineering profession reacting quickly by suggesting an initiative to government in the public interest. Everyone worked together to get legislation passed and the project was implemented in an extraordinarily short timeframe.” March 2017³²

31 Explanatory note:

As a result of the URM Order, street-facing unreinforced masonry parts have been secured and so the building no longer meets the criteria of a priority building with parts that may fall on to a busy route. The building may still meet the criteria of a priority earthquake-prone building if it is on an emergency (strategic) route or is an education, hospital or emergency use building.

In the absence of the URM Order, these buildings would have been identified by the territorial authority as potentially earthquake-prone with street-facing unreinforced masonry parts on high traffic (busy) routes by 1 January 2020. The owners would have one year to supply an engineering assessment to the territorial authority and a further 7.5 years to secure the dangerous elements that may fall onto passers-by.

Depending on the construction of the remainder of the building, the building may be a potentially earthquake-prone building in a high seismic risk area. The territorial authority would need to identify the building using the EPB methodology and request an engineering assessment from the building owner by 1 July 2022, and if determined to be earthquake-prone, building owners would have up to 15 years to complete strengthening of the whole building from the date of their earthquake-prone building notice.

32 [Codewords, March 2017](#)

7. Overall effectiveness and balance achieved

Section 7 presents a summative account of the URM Order and Fund focussing on the effectiveness of the regulatory design and implementation of the URM Order and Fund.

7.1 Generally effective in an urgent seismic setting

With respect to the URM Order and Fund overall, the review considered:

- › the effectiveness of the URM Order as a regulatory response to a temporary period of heightened seismic risk.

The URM regulatory intervention was an effective urgent response during a temporary period of heightened regional seismic risk

The URM Order was effective as a regulatory intervention, because it was clear about what it was trying to achieve and how this would happen. The seismic engineering societies effectively lobbied for the intervention and so fully supported its intent. Affected territorial authorities were given the tools they needed to enforce the order. In addition, the tight timeframes and the removal of building and resource consent requirements motivated owners to action.

The key features that made the policy effective were:

- › The clear timeframes, escalation paths and definitions that signalled the urgency and priority of the policy objectives.
- › Consideration of how the policy would interact with the *Building Act 2004*, the *Resource Management Act 1991*, and the *Building (Earthquake-prone Buildings) Amendment Act 2016*. Design included using the regulatory and enforcement powers in the *Building Act*, removing the need for building and resource consents for securing work if certain criteria were met, and the earthquake-prone building information requirements in legislation.
- › Building in lessons from the Canterbury earthquakes, which included using similar emergency legislation and processes. This enabled the policy to be responsive to changes in the operating environment, such as the addition of the six-month extension.
- › Involving affected territorial authorities and listening to seismic and engineering expertise in the development of the policy as much as possible given the time pressure, the availability of resources, and post-earthquake recovery activities.
- › Removing the need for a building consent for the affected buildings, which had the additional benefit of making the securing work more affordable because it removed the need to comply with other aspects of the building code.

Adapting the regulatory settings and adopting case management were critical to success

The flexibility and responsiveness to the challenges experienced by territorial authorities and building owners was important. MBIE's willingness to extend the initial 12-month deadline helped to encourage the remaining owners to comply. The extra six months was a reasonable and sufficient period for building owners to complete projects that were in progress, balancing life-safety and practical considerations.

Response by building owners was slow to start but once information was gathered in the six-month stocktake about the issues facing owners and engineers, the territorial authorities and

MBIE were able to adapt and make changes to make sure the end goal was achieved.³³

Participants in this review consistently said that both the URM Order and Fund were needed.

The mix of legislative requirements and a financial incentive were insufficient alone and that is shown in the slow initial uptake of the Fund. The case management approach adopted by territorial authorities was critical to the securing initiative to succeed as well as it did.

7.2 Public life-safety was in balance with owners' costs

With respect to the URM Order and Fund overall, the review considered:

- › the balance achieved through the approach taken to life-safety of the public against costs to building owners.

The URM Order and Fund resulted a reduction in the risk of harm from falling masonry in the event of an earthquake, and in retrospect was the appropriate action to take in the wider context

The URM Order was set up because seismic modelling showed a heightened risk of a substantial aftershock in the 18 months following the Kaikōura sequence of earthquakes on 14 November 2016, and because there was a political will and the technical means to address the buildings that presented the highest risks to life-safety.

Seismic experts are confident in retrospect that they provided the best advice available at the time to the Government and that updated modelling would result in the same advice in a future similar scenario.

The approach taken was one of securing the street-facing elements of buildings where there was higher risk of harm, ie those streets with high pedestrian and vehicular traffic. This approach means that the securing work done to address public safety during the 18 months of heightened seismic risk continues to protect life-safety in the event of a future earthquake.

Building owners spent about \$10 million to mitigate the risks to life-safety of their buildings. Owners could apply for a subsidy to have an engineering assessment and to secure or demolish street-facing facades and parapets that were well below current standards.

Historical buildings have been safeguarded from losing their most iconic features in an earthquake while strengthening work is planned and completed. The URM Order was not used as an excuse to get rid of tracts of old buildings; only four buildings were demolished in total.

33 See also: [Smith, M.C. \(2019\) Towards a resilient city. Pacific Conference on Earthquake Engineering and Annual NZSEE Conference.](#)

8. Lessons for future regulation

Regulatory stewardship includes the use of reviews to improve current and future design. MBIE will use the findings from this review to inform how it develops and implements regulatory interventions.

This section sets out five lessons identified during the review that would be valuable to future design of regulatory policies and funds.

8.1 Design using upfront consideration of challenges

Take a people-focused approach to the design of a regulatory intervention to identify and address barriers and enablers and then tailor policy and its implementation to the needs of different types of owners.

Greater understanding and analysis of the different types of building owners would have benefited the design of the policy and led to smoother implementation. By taking a more people-focused approach to the design of aspects of the URM Order could have identified the need for a more 'hands on' approach, to better set up for success.

The URM Order and Fund focused on identifying buildings and streets, with building owners seen as one homogenous group, as a result there were implementation issues as the different challenges associated with different types of owners surfaced.

Owners of smaller buildings needed intensive support. Unlike commercial owners of larger buildings small building owners lacked the knowledge, capacity and capability to manage the securing work on their own. There were also language and financial barriers that had not been fully understood at the start of the implementation phase.

Buildings with multiple owners and community-owned facilities experienced challenges as they tried to make decisions together, in a timely fashion. For example, the community facility owned by Hurunui District Council had the same strengthening timeframes as other buildings. Hurunui District Council's priority was responding to and recovering from the earthquake first and then consulting with its community on the future of the community facility.

In most cases the Wellington building owners had received an s124 earthquake-prone building notices years earlier but had not had the parapets and facades of their buildings secured. Hutt City had successfully prosecuted the owner of one building with a long-standing s124 notice.

In response to the different needs of building owners, the two city councils adopted a case management approach and provided project management support where needed, and this is a practice that they expect to take forward.

The Wellington and Hutt city councils spokespeople commented during the review that they followed their established practice in executing their regulatory duties as set out in the 2017 URM Order. Six months into the work, both realised that this approach would not be enough. Their perspective was that the design of the policy had not focused enough on the different types of owners and the barriers they would face in satisfying their changed legislative requirements.

8.2 Design to manage consequences of changed settings

Gather information on potential second order effects of changes in established policy settings by talking directly with those in implementation roles

By making the decision to remove the need for building consent for work completed under the URM Order, some larger engineering firms would not enter the pool of experienced engineers.

If the potential effect of this setting change was recognised in the design stage, the unintended impact of engineering firms being unwilling to bear the potential risk could have been managed. If for example an independent peer-review panel was set up by or for engineers to check work and so manage risk, the barrier of engineer availability would have been relieved.

8.3 Allow for change when developing policy and legislative instruments at pace

It is pragmatic to build in flexibility to enable policy and legislative instruments

By building in flexibility, policy and legislative instruments can be responsive to new information and address issues quickly, particularly in an emergency context. The use of the emergency legislation and Order in Council tools were effective in doing this.

It is also pragmatic to use existing policy and system infrastructure, for example, the regulatory and enforcement provisions within the *Building Act*. The use of the stable and accepted elements will help building owners, engineers and officials maintain their bearings.

8.4 Monitor against milestones and check assumptions

Follow the monitoring and evaluation plan so that management reporting focuses on the core objectives and outcomes of the policy so that issues are identified and resolved early

This review found that there was constant engagement and support provided by MBIE and between all parties. Data was collected as required and the results were included in the monthly internal reports. The reporting by MBIE focused on the activity and management of the Fund.

The data received in the fortnightly reports from territorial authorities did not appear to be assessed against the targets set in the monitoring and evaluation plan. As a result, emerging issues of building owner response and engineering capacity were potentially identified and addressed later than needed.

Appendix 1: Analysis of costs

Appendix 1 includes tables and figures that provide information about total costs and distributions of costs for securing unreinforced masonry elements broken down by the number or storeys of a building and by the city.³⁴

Costs for securing the URM elements showed general themes, but there were outliers.

Table 6 shows the total paid out and the total cost to owners of buildings in Wellington and Hutt City.³⁵

Table 6: Breakdown of total pay-out and cost by number of storeys where the pay-out was within the capped amount for Hutt and Wellington City buildings

Number of storeys	Total paid out by the Fund	Within cap	
		Total cost to the building owner	Number of buildings with s124 notice
Wellington City			
1	\$82,607	\$136,415	6
2	\$238,610	\$544,434	15
3	\$534,313	\$1,161,099	14
4	\$326,956	\$653,913	8
Hutt City			
1	\$70,612	\$141,489	4
2	\$185,981	\$382,889	12
Total number of buildings where costs were analysed			59

³⁴ Note that the frontage length of a property frontage varied between Hutt City and Wellington City.

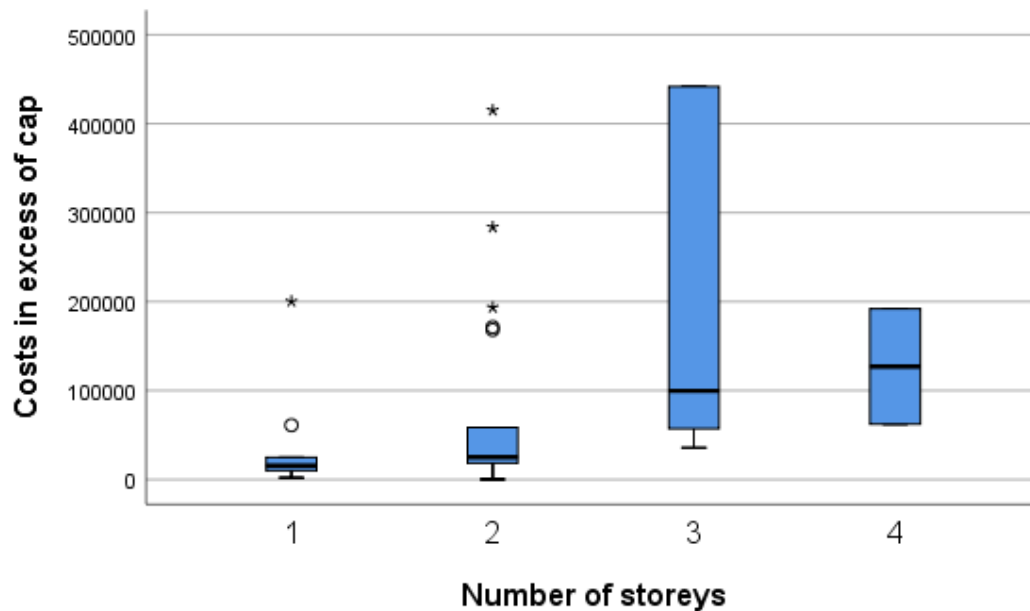
³⁵ Data for Hurunui and Marlborough district councils are not shown to protect the commercial interests of the small number of affected property owners in these districts.

Not all buildings were secured for twice the capped amount. The total payments and total costs where these exceeded the cap is presented in Table 7 with the median and distribution shown in Figure 5. Interestingly there were one- and two-storey buildings with outliers and extreme outliers.

Table 7: Breakdown of total pay-out and cost by number of storeys where the pay-out exceeded the capped amount for Hutt and Wellington City buildings

Number of storeys	Total paid out by the Fund	Exceed cap	
		Total cost to the building owner	Number of buildings with s124 notice
Wellington City			
1	\$225,000	\$736,700	9
2	\$400,000	\$2,221,688	15
3	\$585,000	\$2,844,651	8
4	\$130,000	\$513,904	2
Hutt City			
1	\$50,000	\$120,460	2
2	\$175,000	\$509,125	7
Total number of buildings where costs were analysed			43

Figure 5: Distribution of costs for buildings that exceeded the capped amounts



Predictably, the cost per linear metre of securing was the lowest for one-storey buildings and where street frontages were shorter.

Detailed analysis of the cost of securing buildings in Wellington identified the average cost per linear metre of buildings found that the cost ranged from \$3,941 for one-storey buildings to \$6,839 for four-storey buildings. Costs ranged from \$3,104 for one-, to \$4,373 for two-storey buildings in Hutt City.

For Hutt City and Wellington City Council, online property and rating valuation maps were accessed to collect facade lengths of a sample of 53 buildings (error is +/- 0.5 metre).

- › Costs increased with the increased number of storeys and length of facade
- › The \$25,000 subsidy cap was well positioned for buildings in Hutt City.
- › There was greater variation in costs among the three and four-storey buildings than among the one and two-storey buildings.

The average costs of securing per linear metre for Hutt City are shown in Table 8.

Table 8: Average cost of securing per linear metre in Hutt City

Hutt City Council		
Number of storeys	1	2
Average total cost per linear metre	\$3,104	\$4,373
Average length of facades	16	12
Average cost per building	\$50,000	\$52,000
Number of cases	6	19

The average costs for of securing per linear metre Wellington City are shown in Table 9. The analysis includes all 29 three- and four-storey buildings in Wellington and 14 one- and two-storey buildings.

Table 9: Average cost of securing per linear metre in Wellington City

Wellington City Council				
Number of storeys	1	2	3	4
Average total cost per linear metre	\$3,941	\$5,155	\$7,383	\$6,839
Average length of facades	20	12	20	20
Average cost per building	\$79,000	\$62,000	\$148,000	\$137,000
Number of buildings	4	10	20	9

For Wellington, the variation in remedial cost per linear meter for engineering assessment and design is shown in the box and whisker plots in Figure 5, and a key for interpreting box and whisker plots is shown in Figure 6.³⁶

Figure 6: Total remedial cost per linear metre (engineering assessment and design) in Wellington City

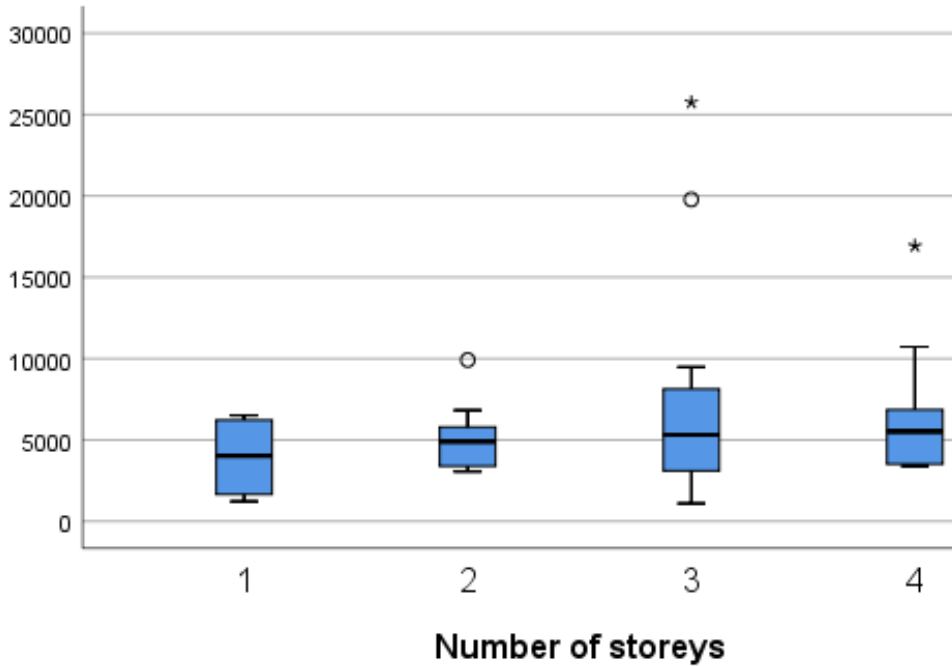
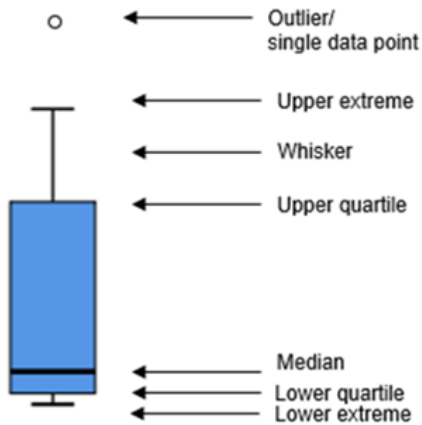


Figure 7: Key for interpreting box and whisker plots



³⁶ Note that extreme outliers are shown as a star ‘*’.

