

BEFORE THE CHRISTCHURCH CITY COUNCIL

IN THE MATTER of the Resource Management Act
1991

AND

IN THE MATTER of an application by Fern Fitzgerald
Limited to demolish a Group 2
heritage listed building located at 187
Fitzgerald Avenue, Christchurch and
to carry out associated earthworks

(RMA/2023/325)

**STATEMENT OF EVIDENCE OF ALEX KEITH LOYE
ON BEHALF OF FERN FITZGERALD LIMITED**

Dated 29 August 2023

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Introduction

1. My name is Alex Keith Loye. I am a structural engineer with Tetrad Consulting Limited. I am based in Christchurch.
2. I am a chartered structural engineer with a BE(Hons), CPeng 1018605.
3. My experience includes the structural design of residential and commercial buildings and the seismic assessment of existing buildings. I have been involved in the assessment of existing timber and brick masonry structures which have required structural strengthening and repair works. Recent examples in Canterbury include the Cooperage buildings in the Waterloo Business Park and the remaining 'Duncan Building' at 141 High street.
4. My evidence relates to an application by Fern Fitzgerald Limited (**FFL**) for resource consent to demolish the building at 187 Fitzgerald Ave (**187**). I have previously prepared a report in respect of the building at 187 Fitzgerald Ave (Structural Report dated 19 January 2023). I understand this report was annexed to the application for demolition consent.
5. Tetrad has since been asked by FFL to provide this evidence. To prepare this evidence (and the earlier report) I:
 - Undertook a site visit on 12.01.23 to undertake a visual inspection of the building;
 - Reviewed an earthquake repair and upgrade plan from Centraus Consulting dated 04.08.21;
 - Reviewed a 'Make Safe Plan' from Miyamoto dated 02.04.12; and
 - Undertaken a further site visit on 24.08.23
6. In this evidence I cover:
 - (a) What structural repairs I consider are required to reinstate 187 to a working condition; and
 - (b) How the condition of 187 today relates to damage sustained during the Canterbury Earthquake sequence of 2010/2011.
7. Relevant to this evidence then, my expertise includes identifying the repairs needed to a building to ensure it is safe and compliant with regulatory building requirements. I have read the Code of Conduct for Expert Witnesses in the

Environment Court Practice Note (2023). I have complied with the Code in preparing my evidence and agree to further comply with it in providing my evidence at the hearing. Except where I am relying on evidence of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Repairs needed

The standard to which 187 needs to be restored

8. The Structural Report I drafted in January 2023 still accurately records the repairs I consider are needed to restore 187 to working condition. By “working condition” I mean a structural condition that enables the safe use of the building by occupants (structurally sound and compliant with the Building Act Requirements) and is fit for purpose for the building owner (the structure has sufficient robustness for the building use and is maintainable for long-term use).
9. For the end-use I have assumed that the building would be used as a commercial premises, however whether I assume residential or commercial end-use does not have a discernible impact on my recommendations.

Structural condition of the existing building

10. I describe the state of the existing building in my January 2023 report. In summary, the building is currently in a very poor condition with limited structure remaining that is in a useable condition. I do not repeat the full analysis but attach a table summarising my findings:

Photo Reference	Element	Condition / Comments
1 - 3	External Windows and doors	All glass panels are damaged or missing which has allowed water ingress into the building and rotting to occur in all joinery elements on the North, South and West elevations.
1 - 3	Weatherboard cladding	Cracking, rotting, blistering and paint damage to an estimated 90% of the weatherboard area on the North and West external elevations and 50% on the South elevation. Water ingress into the framing behind appears to be occurring in some locations, however the internal wall framing could not be sufficiently viewed at the time of inspection.
11	Roof cladding	Flashing and ridging distortion and sheeting corrosion present on the roof cladding which has caused internal water ingress to the building. A full inspection of the roof was unable to be completed, however the small areas noted all had consistent levels of damage.
5, 8	Internal ceilings	Loose lath and plaster, areas of missing ceilings and fire damage to the ceiling on both floor levels. Water ingress at a couple of locations was also sighted with damp linings.
7, 10	Internal wall linings	Loose lath and plaster, missing wall panels on both levels.

9	Stairs	Loose stair baluster posts and stair treads.
7	Suspended timber floors	Missing flooring, water damage, rot damage in various locations on both floor levels.
11	External parapet detailing	Timber rot, blistering and paint damage to all remaining parapets and fascia's (some are not in place) on the Northern and Western elevations. Partial damage on the southern elevation. No significant damage noted on the Eastern elevation.
12	Foundations	The existing foundation system is a perimeter concrete rubble foundation with cracking and settlement visually sighted. A full level was not undertaken. Subfloor bearer and joist framing is showing signs of rot damage (there is a minimal subfloor cavity present) and is sagging in a number of locations.

11. The existing building is constructed from lightweight timber framing and its lateral bracing system is comprised of lath and plaster walls linings, let-in timber diagonal bracing and weatherboard external cladding. Although we have not undertaken a seismic assessment of the building we would estimate the building to have a seismic strength of less than 10% NBS (New Building Standard).

Structural repair scheme

12. My January 2023 report sets out my recommendations for reinstatement. I discussed these under the headings "Superstructure" and "Substructure" and presented repair options in Appendix B and Section 3.2 of the structural report

Estimated extent of material replacement

13. Based on our visual assessment we estimate a minimum of 50% of the building materials will require replacement or major repair. These materials include but are not limited to external cladding, internal linings, roofing, joinery, floor and wall framing repair.

Strengthening

14. As noted in section 4 of the structural report, the existing structure – even in a repaired state - is unlikely to fully comply with current building code requirements in relation to commercial floor loading, fire stability and seismic stability. Although the building code requires the building to have a minimum seismic strength of 33% NBS, I would recommend the building is strengthened to 67% NBS. This increased building strength is recommended because:
- With the extent of works required to achieve the minimum seismic strength the additional cost to achieve a higher seismic capacity is likely to be low when compared to the increased life safety for the building occupants.

- Based on my experience a minimum seismic strength of 67%NBS simplifies obtaining insurance and tenants for the property.
- A 67% NBS capacity is also recommended by the NZSEE (New Zealand Society for Earthquake Engineering)

The effect of the Canterbury Earthquakes

15. I have been asked to consider the extent to which the current condition of 187 reflects or relates to damage sustained by the building during the earthquakes. I did not author a condition report immediately following the earthquakes and neither did anyone else (as far as I am aware). In this part of my evidence, then, I am making reasonable assumptions based on my expertise and observations of 187 specifically, as well as other buildings in the Christchurch area.
16. With the extent of damage to the existing 187 building and with our visual inspections being undertaken in 2023 only, a detailed schedule of the earthquake damage to the building cannot be provided. However, some of the damage to the building is consistent with the earthquake damage experienced by buildings of a similar typology in Canterbury. Furthermore the 'Make it safe' report from Miyamoto was undertaken in 2012 which captures some of the earthquake damage.
17. The 'Make it Safe' report from Miyamoto discusses:
 - The report was prepared in response to a Section 38 limited safety notice placed on the building.
 - Earthquake structural damage to the property was identified which includes dislodged windows, internal wall lining damage and foundation settlement.
 - Additional damage was noted due to the collapse of the internal and external brick fireplaces. A floor level and photograph survey were undertaken as part of the Miyamoto site walkover inspection.
 - Recommendations to 'make the building safe' included the removal of dislodged windows, installation of new internal plywood bracing linings, realignment of wall framing and weatherproofing the building to prevent further water ingress damage.

18. Based on the Miyamoto report (including the photographs in it) and my experience with similar buildings in Canterbury, I consider it likely the building at 187 building was directly impacted by the Canterbury earthquakes in the following way:
 - Damaged internal wall linings from lateral seismic movement which impacts the bracing elements of the building.
 - Internal brick chimney structures collapsed causing damage to the internal suspended floors and roof structures.
 - Foundation settlement resulting in perimeter foundation beam cracking and damage to the ground floor timber structure.
19. Recommendations for the repair of these elements is discussed my structural report.
20. In my opinion, the direct damage caused by the earthquake has then resulted in the further deterioration which is seen in the building's condition today.

Alex Loye

29 August 2023