



CHRISTCHURCH CATHEDRAL
DAMAGE ASSESSMENT REPORT
PREPARED FOR
CHURCH PROPERTY TRUSTEES
14 MARCH 2016

Holmes
Consulting
Group LP

Christchurch

EXECUTIVE SUMMARY

Telephone

Holmes Consulting Group has been engaged by Church Property Trustees to complete a further review of the Cathedral. The purpose of the review has been to update the damage assessment of the building following the February 29th 2016 aftershock.

+64 3 366 3366

Facsimile

A rapid external visual survey has been completed on site. This confirmed additional structural damage has occurred as a result of the recent aftershock.

+64 3 379 2169

Internet Address

The building remains in a severely damaged state. There is no one section of the remaining building that is undamaged and which could be considered a stable element in its own right. Collapse of all or part of the nave, transept or apse could occur should another aftershock of significant duration occur.

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Our evaluation of the building capacity is that it has significantly less than 33%NBS in its current form. For example, the building would now be unlikely to survive an earthquake of the strength and duration of the September 2010 Darfield earthquake, without partial or even full collapse, even though it caused relatively little damage at the time.

Unit Five

295 Blenheim Road

PO Box 6718

Upper Riccarton

Christchurch 8442

New Zealand

Offices in

Auckland

Hamilton

Wellington

Queenstown

San Francisco



INTRODUCTION

Holmes Consulting Group LP has been engaged by Church Property Trustees to complete a visual post earthquake damage assessment of the Christchurch Anglican Cathedral.

The cathedral has suffered structural damage as a result of the series of earthquakes that have been occurring in Christchurch since December 26th 2010. The building sustained further damage during the recent February 29th 2016 aftershock.

This report summarises the findings of a visual post earthquake damage assessment undertaken by Holmes Consulting Group on March 4th 2016.

SCOPE OF WORK

The scope of work for this project included the following:

1. Visit the site to perform an external visual survey of the building.
2. Review the damage observations against prior records to assess any change in condition.
3. Report on our findings and recommendations.

LIMITATIONS

Findings presented as a part of this project are for the sole use of Church Property Trustees in its evaluation of the subject property. The findings are not intended for use by other parties, and may not contain sufficient information for the purposes of other parties or other uses. Our professional services are performed using a degree of care and skill normally exercised, under similar circumstances, by reputable consultants practicing in this field at this time. No other warranty, expressed or implied, is made as to the professional advice presented in this report.

OBSERVED DAMAGE

The site was revisited on the morning of March 4th 2016 by Stuart Oliver of Holmes Consulting Group.

This visit was not a complete damage evaluation. Instead, a general walk around and a review of key indicators was completed for comparison to earlier records. The interior of the building was not accessed although photos of the interior have been provided for our review.



Review of available GeoNet strong motion data which indicates that the Christchurch CBD experienced moderate ground motions during the February 29th aftershock, albeit the duration of significant shaking was short (i.e. < 10 sec).

This review has confirmed that the building has sustained new damage as a result of the recent aftershock as detailed below:

1. Increase of earthquake damage to the badly damaged south aisle walls. Additional spalling of masonry piers was observed and ashlar cracking damage has increased (refer Figures 1 & 2)



Figure 1: Exterior of south aisle wall, March 4th 2016



Figure 2: Interior of south aisle wall, March 4th 2016

2. Damage to the transept arches has noticeably increased. Additional spalling of ashlar has occurred (refer Figure 3 below).
3. Cracking to the north wall of the apse and related buttress have noticeably increased. Figures 4 and 5 below illustrate the state of damage to the effected building elements.



Figure 3: Interior of west transept arch, March 4th 2016



Figure 4: Exterior of apse north wall, March 4th 2016

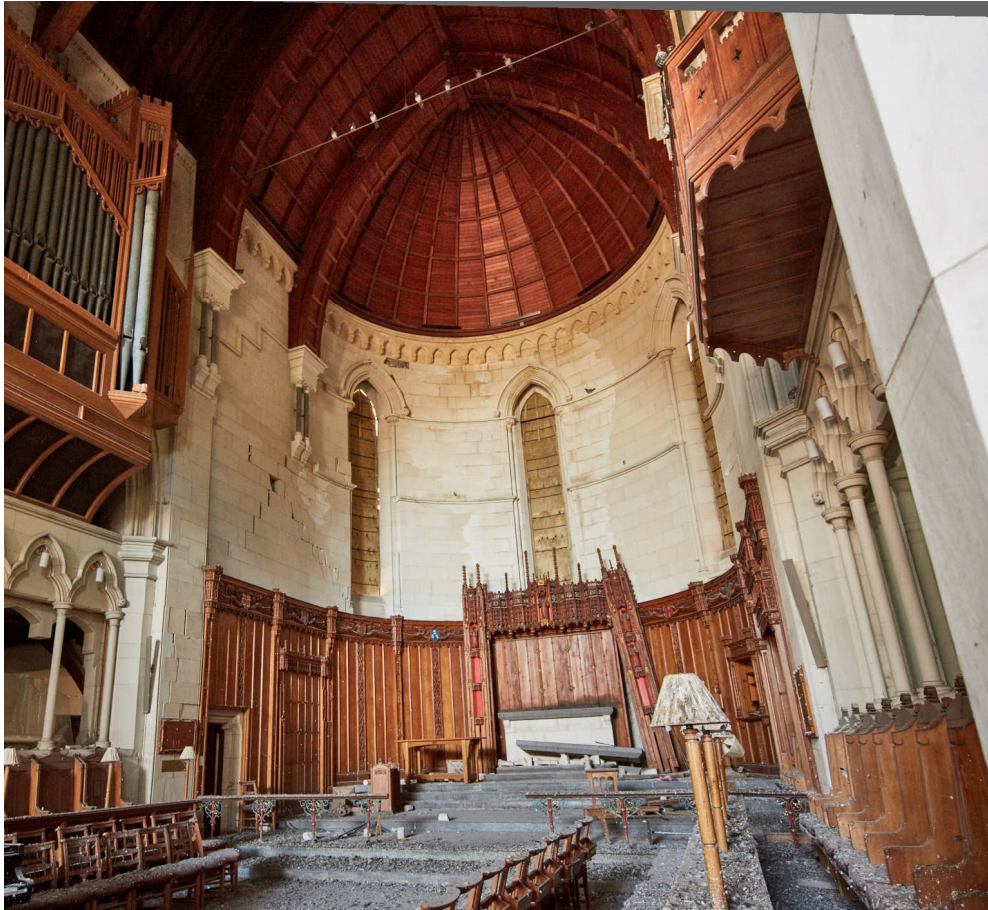


Figure 5: Interior of apse north wall, March 4th 2016



CONCLUSIONS & RECOMMENDATIONS

Our conclusions and recommendations are as follows:

1. Additional structural damage has occurred as a result of the February 29th 2016 aftershock. Damage observed included general increase of crack widths, structural offsets and additional spalling.
2. The building remains in a severely damaged state. There is no one section of the remaining building that is undamaged and which could be considered a stable element in its own right. Collapse of all or part of the nave, transept or apse could occur should another aftershock of significant duration occur.
3. Updated laser scanning of selected portions of the structure could be considered. This would provide a more accurate reference point from which future building damage could be assessed.
4. Our evaluation of the building capacity is that it continues to be significantly less than 33%NBS in its current form. For example, the building would now be unlikely to survive an earthquake of the strength and duration of the September 2010 Darfield earthquake, without partial or even full collapse, even though it caused relatively little damage at the time.

Report Prepared by:

Stuart Oliver
TECHNICAL DIRECTOR