Christchurch City Council

Hornby OSCAR Early Learning Centre PRO 3052

Detailed Engineering Evaluation

Quantitative Assessment Report

Christchurch City Council

Hornby OSCAR

Early Learning Centre

Quantitative Assessment Report

250 Waterloo Road,

Hornby

Christchurch

Prepared By

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Date: March 2013
Reference: 6-QC107.00
Status: Final

Summary

Hornby OSCAR Early Learning Centre
PRO 3052

Detailed Engineering Evaluation
Quantitative Report - Summary
Final

Background
This is a summary of the quantitative report for the Hornby OSCAR Early Learning Centre, and is based on the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011, visual inspections and measurements taken in November 2012 by Opus International Consultants and calculations.

Key Damage Observed
Some minor cracking between individual plasterboard sheets that form the wall linings was noted during our inspection of 19 December 2012 together with some horizontal cracking at the wall/ceiling junction.

However, the building generally appears to be in a good condition.

Critical Structural Weaknesses
No critical structural weaknesses have been identified.

Indicative Building Strength
Based on the information available, and from undertaking a quantitative assessment, the structure's original capacity has been assessed as 86%NBS. The building is therefore classified as a low earthquake risk.

This result is based on the building being classified as a "normal" Importance Level 2 (IL2) structure in accordance with AS/NZS1170 and assuming a normal occupancy level of 150 people or less.

Recommendations
The building is not potentially earthquake prone and strengthening work is not required.

Cosmetic work is required to infill the gaps noted between plasterboard sheets and repair the ceiling/wall junctions. It may be prudent at this time to verify if sufficient fixings between the plasterboard linings and timber panels have been provided and install additional fixings if required.

Contents

1 Introduction

Opus International Consultants Limited has been engaged by Christchurch City Council to undertake a detailed seismic assessment of the Hornby OSCAR Early Learning Centre located at 250 Waterloo Road, Hornby, Christchurch, following the Canterbury Earthquake Sequence since September 2010.

The purpose of the assessment is to determine if the building is classed as being earthquake prone in accordance with the Building Act 2004.

The seismic assessment and reporting have been undertaken based on the qualitative and quantitative procedures detailed in the Detailed Engineering Evaluation Procedure (DEEP) document (draft) issued by the Structural Engineering Society (SESOC) [3] [4].

2 Compliance

This section contains a brief summary of the requirements of the various statutes and authorities that control activities in relation to buildings in Canterbury at present.

2.1 Canterbury Earthquake Recovery Authority (CERA)

CERA was established on 28 March 2011 to take control of the recovery of Canterbury using powers established by the Canterbury Earthquake Recovery Act enacted on 18 April 2011. This act gives the Chief Executive Officer of CERA wide powers in relation to building safety, demolition and repair. Two relevant sections are:

Section 38 – Works

This section outlines a process in which the chief executive can give notice that a building is to be demolished and if the owner does not carry out the demolition, the chief executive can commission the demolition and recover the costs from the owner or by placing a charge on the owners' land.

Section 51 – Requiring Structural Survey

This section enables the chief executive to require a building owner, insurer or mortgagee to carry out a full structural survey before the building is re-occupied.

We understand that CERA require a detailed engineering evaluation to be carried out for all buildings (other than those exempt from the Earthquake Prone Building definition in the Building Act). CERA have adopted the Detailed Engineering Evaluation Procedure (DEEP) document (draft) issued by the Structural Engineering Society (SESOC) on 19 July 2011. This document sets out a methodology for both initial qualitative and detailed quantitative assessments.

It is anticipated that a number of factors, including the following, will determine the extent of evaluation and strengthening level required:

1. The importance level and occupancy of the building.

2. The placard status and amount of damage.
3. The age and structural type of the building.
4. Consideration of any critical structural weaknesses.

Christchurch City Council requires any building with a capacity of less than 34% of New Building Standard (including consideration of critical structural weaknesses) to be strengthened to a target of 67% as required under the CCC Earthquake Prone Building Policy.

2.2 Building Act

Several sections of the Building Act are relevant when considering structural requirements:

Section 112 - Alterations

This section requires that an existing building complies with the relevant sections of the Building Code to at least the extent that it did prior to the alteration. This effectively means that a building cannot be weakened as a result of an alteration (including partial demolition).

The Earthquake Prone Building policy for the territorial authority shall apply as outlined in Section 2.3 of this report.

Section 115 – Change of Use

This section requires that the territorial authority is satisfied that the building with a new use complies with the relevant sections of the Building Code 'as near as is reasonably practicable'.

This is typically interpreted by territorial authorities as being 67% of the strength of an equivalent new building or as near as practicable. This is also the minimum level recommended by the New Zealand Society for Earthquake Engineering (NZSEE).

Section 121 – Dangerous Buildings

This section was extended by the Canterbury Earthquake (Building Act) Order 2010, and defines a building as dangerous if:

1. In the ordinary course of events (excluding the occurrence of an earthquake), the building is likely to cause injury or death or damage to other property; or
2. In the event of fire, injury or death to any persons in the building or on other property is likely because of fire hazard or the occupancy of the building; or
3. There is a risk that the building could collapse or otherwise cause injury or death as a result of earthquake shaking that is less than a 'moderate earthquake' (refer to Section 122 below); or
4. There is a risk that other property could collapse or otherwise cause injury or death; or

5. A territorial authority has not been able to undertake an inspection to determine whether the building is dangerous.

Section 122 – Earthquake Prone Buildings

This section defines a building as earthquake prone (EPB) if its ultimate capacity would be exceeded in a 'moderate earthquake' and it would be likely to collapse causing injury or death, or damage to other property.

A moderate earthquake is defined by the building regulations as one that would generate loads 33% of those used to design an equivalent new building.

Section 124 – Powers of Territorial Authorities

This section gives the territorial authority the power to require strengthening work within specified timeframes or to close and prevent occupancy to any building defined as dangerous or earthquake prone.

Section 131 – Earthquake Prone Building Policy

This section requires the territorial authority to adopt a specific policy for earthquake prone, dangerous and insanitary buildings.

2.3 Christchurch City Council Policy

Christchurch City Council adopted their Earthquake Prone, Dangerous and Insanitary Building Policy in 2006. This policy was amended immediately following the Darfield Earthquake on 4 September 2010.

The 2010 amendment includes the following:

1. A process for identifying, categorising and prioritising Earthquake Prone Buildings, commencing on 1 July 2012;

2. A strengthening target level of 67% of a new building for buildings that are Earthquake Prone;

3. A timeframe of 15-30 years for Earthquake Prone Buildings to be strengthened; and,

4. Repair works for buildings damaged by earthquakes will be required to comply with the above.

The council has stated their willingness to consider retrofit proposals on a case by case basis, considering the economic impact of such a retrofit.

If strengthening works are undertaken, a building consent will be required. A requirement of the consent will require upgrade of the building to comply 'as near as is reasonably practicable' with:

- The accessibility requirements of the Building Code.

- The fire requirements of the Building Code. This is likely to require a fire report to be submitted with the building consent application.

Where an application for a change of use of a building is made to Council, the building will be required to be strengthened to 67% of New Building Standard or as near as is reasonably practicable.

2.4 Building Code

The Building Code outlines performance standards for buildings and the Building Act requires that all new buildings comply with this code. Compliance Documents published by The Department of Building and Housing can be used to demonstrate compliance with the Building Code.

On 19 May 2011, Compliance Document B1: Structure was amended to include increased seismic design requirements for Canterbury as follows:

- increase in the basic seismic design load for the Canterbury earthquake region (Z factor increased to 0.3 equating to an increase of 36 – 47% depending on location within the region);
- Increased serviceability requirements.

2.5 Institution of Professional Engineers New Zealand (IPENZ) Code of Ethics

One of the core ethical values of professional engineers in New Zealand is the protection of life and safeguarding of people. The IPENZ Code of Ethics requires that:

Members shall recognise the need to protect life and to safeguard people, and in their engineering activities shall act to address this need.

1.1 Giving Priority to the safety and well-being of the community and having regard to this principle in assessing obligations to clients, employers and colleagues.

1.2 Ensuring that reasonable steps are taken to minimise the risk of loss of life, injury or suffering which may result from your engineering activities, either directly or indirectly.

All recommendations on building occupancy and access must be made with these fundamental obligations in mind.

3 Earthquake Resistance Standards

For this assessment, the building's earthquake resistance is compared with the current New Zealand Building Code requirements for a new building constructed on the site. This is expressed as a percentage of new building standard (%NBS). The loadings are in accordance with the current earthquake loading standard NZS1170.5 [1].

A generally accepted classification of earthquake risk for existing buildings in terms of %NBS that has been proposed by the NZSEE 2006 [2] is presented in Figure 1 below.

Description	Grade	Risk	%NBS	Existing Building Structural Performance	Improvement of Structural Performance: Legal Requirement	Improvement of Structural Performance: NZSEE Recommendation
Low Risk Building	A or B	Low	Above 67	Acceptable (improvement may be desirable)	The Building Act sets no required level of structural improvement (unless change in use) This is for each TA to decide. Improvement is not limited to 34%NBS.	100%NBS desirable. Improvement should achieve at least 67%NBS
Moderate Risk Building	C	Moderate	34 to 66	Acceptable legally. Improvement recommended		Not recommended. Acceptable only in exceptional circumstances
High Risk Building	D or E	High	33 or lower	Unacceptable (Improvement required under Act)	Unacceptable	Unacceptable

Figure 1: NZSEE Risk Classifications Extracted from table 2.2 of the NZSEE 2006 AISPBE Guidelines

Table 1 below compares the percentage NBS to the relative risk of the building failing in a seismic event with a 10% risk of exceedance in 50 years (i.e. 0.2% in the next year).

Table 1: %NBS compared to relative risk of failure

Percentage of New Building Standard (%NBS)	Relative Risk (Approximate)
>100	<1 time
80-100	1-2 times
67-80	2-5 times
33-67	5-10 times
20-33	10-25 times
<20	>25 times

3.1 Minimum and Recommended Standards

Based on governing policy and recent observations, Opus makes the following general recommendations:

3.1.1 Occupancy

The Canterbury Earthquake Order[1] in Council 16 September 2010, modified the meaning of "dangerous building" to include buildings that were identified as being EPB's. As a result of this, we would expect such a building would be issued with a Section 124 notice, by the Territorial Authority, or CERA acting on their behalf, once they are made aware of our assessment. Based on information received from CERA to date and from the DBH guidance document dated 12 June 2012 [6], this notice is likely to prohibit occupancy of the building (or parts thereof), until its seismic capacity is improved to the point that it is no longer considered an EPB.

3.1.2 Cordoning

Where there is an overhead falling hazard, or potential collapse hazard of the building, the areas of concern should be cordoned off in accordance with current CERA/territorial authority guidelines.

3.1.3 Strengthening

Industry guidelines (NZSEE 2006 [2]) strongly recommend that every effort be made to achieve improvement to at least 67%NBS. A strengthening solution to anything less than 67%NBS would not provide an adequate reduction to the level of risk.

It should be noted that full compliance with the current building code requires building strength of 100%NBS.

3.1.4 Our Ethical Obligation

In accordance with the IPENZ code of ethics, we have a duty of care to the public. This obligation requires us to identify and inform CERA of potentially dangerous buildings; this would include earthquake prone buildings.

[1] This Order only applies to buildings within the Christchurch City, Selwyn District and Waimakariri District Councils authority

4 General Observations

4.1 Building Description

The Hornby OSCAR Early Learning Centre is a free standing timber framed structure located at 250 Waterloo Road in Hornby, Christchurch. The building is positioned towards the Northern end of the Hornby Primary School and site and is orientated roughly in a North-Easterly direction, with the front elevation facing Hei Hei Road.

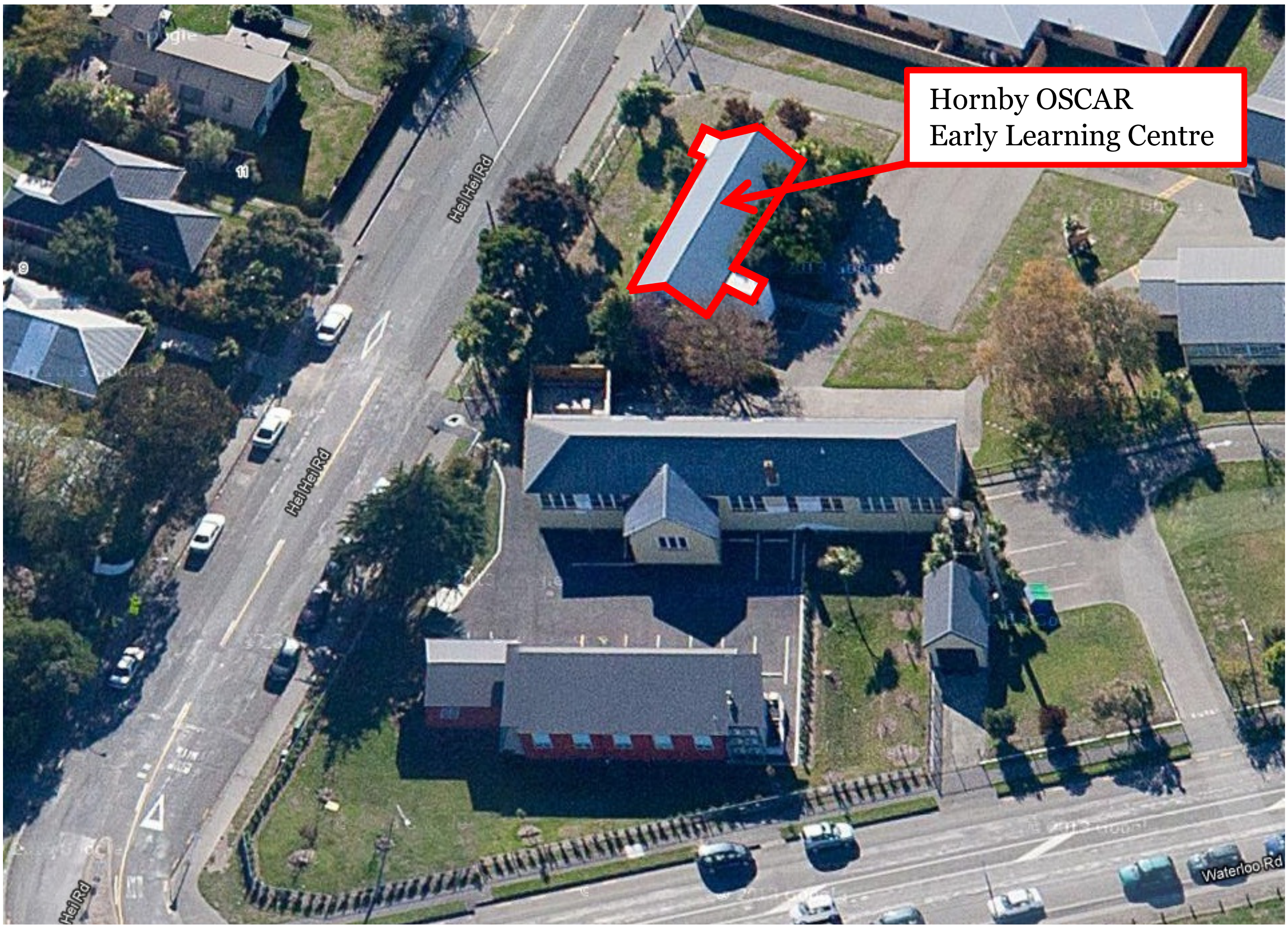

Figure 2: Site aerial photo. ***Source: Google Earth***

The building is a free standing single storey structure, approximately 19m long by 6m wide and is situated well away from any boundaries or adjacent buildings on a level site.

The perimeter walls are constructed from timber studwork panels finished with "Hardiplank" fibre cement boarding externally and plasterboard linings internally. The roof is finished with light weight metal sheeting and consists of a traditional duo-pitch with a central ridge line and gable elevations at each end.

A suspended timber ground floor is situated approximately 450mm above the external ground level with the eaves at 2.9m above ground. The total height of the building is approximately 4.8m at the roof apex.

The building has been previously moved from another site and has been in its current location since 1999. The original date of construction is not known but the building is thought to date from the 1970s or early 1980s.

4.2 Gravity Load Resisting System

The roof and ceiling are of traditional construction and consist of timber rafters and ceiling joists supported by a series of timber roof trusses that span the full width of the building between the perimeter walls.

All of the perimeter walls and the internal dividing partitions are constructed from timber studwork frames, lined with plasterboard and built directly off the suspended timber floor.

The ground floor is of suspended timber construction and consists of floor boards supported on joists and bearers built off a series of timber pile foundations.

4.3 Seismic Load Resisting System

Lateral resistance for the structure in both directions is provided primarily by the plasterboard lined internal partitions and perimeter walls acting as braced panels.

The ceiling throughout the building is lined with plasterboard and appears to act as a flexible diaphragm. It is noted that the large central room space is less than 12m by 6m and complies with the dimensional limits of NZS3604 for diaphragms.

At roof level a layer of sarking consisting of 25mm thick tongue and groove boarding laid diagonally to the main roof slope has been provided.

Lateral resistance at sub-floor level is provided by a total of 15 anchor piles distributed evenly beneath the footprint of the building.

4.4 Survey

A non-intrusive visual inspection was undertaken by Opus on 19 November 2012 to confirm the structural systems, and to identify details which may require particular attention.

Due to a lack of observed ground damage, a geotechnical assessment has not been completed for this site.

4.5 Original Documentation

Drawings dating from 1998 have been obtained relating to the relocation of the building. These drawings indicate that the original structure has been split into two portions with the larger section forming the current OSCAR building and remainder being added to the Hornby Primary school hall as an extension. The drawings contain full details of the new foundations provided at this time.

No copies of the original structural drawings or design calculations are available for this building and its date of construction is unknown.

5 Structural Damage

Some minor cracking was noted at various locations between plasterboard sheets forming the internal wall linings together with some horizontal cracking at the junction between the wall and ceiling linings.

However, the building generally appears to be in a good condition.

6 Detailed Seismic Assessment

The detailed seismic assessment has been based on the NZSEE 2006 [2] guidelines for the "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes" together with the "Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury, Part 2 Evaluation Procedure" [3] draft document prepared by the Engineering Advisory Group on 19 July 2011, and the SESOC guidelines "Practice Note – Design of Conventional Structural Systems Following Canterbury Earthquakes" [5] issued on 21 December 2011.

6.1 Seismic Coefficient Parameters

The seismic design parameters based on current design requirements from NZS1170.5:2004 and the NZBC clause B1 for this structure are:

» Site soil class D, clause 3.1.3 NZS 1170.5:2004
» Site hazard factor, Z=0.3, B1/VM1 clause 2.2.14B
» Return period factor Ru = 1.0 from Table 3.5, NZS 1170.5:2004, for an Importance Level 2 structure with a 50 year design life.

6.2 Quantitative Assessment Methodology

As previously noted, the lined timber studwork wall panels act as the main lateral load resisting elements of the building.

As such we have assessed the seismic capacity of the building using NZS3604:2011, Timber Framed Buildings.

It has been assumed that all the wall panels are lined with standard 10mm thick plasterboard. A reduced capacity of 70% of the Bracing Unit values published by Winstone Wallboard has been used throughout in order to allow for uncertainty relating to the fixing of the wall linings back to the timber panels.

Where anchor piles have been indicated on the available foundation drawings it has been assumed that they have been installed to meet the requirements of NZS3604:2011.

6.3 Assessment

A summary of the structural performance of the building is shown in the following table. Note that the values given represent the worst performing elements in the building, as these effectively define the building's capacity. Other elements within the building may have significantly greater capacity when compared with the governing.

Table 2: Summary of Seismic Performance

Structural Element/System	Description/discussion	% NBS based on calculated capacity
Transverse direction	Bracing capacity of the timber framed walls (lined with 10mm standard plasterboard)	86%
	Sub-Floor Bracing Capacity (Anchor piles)	100%
Longitudinal direction	Bracing capacity of the timber framed walls (lined with 10mm standard plasterboard)	100%
	Sub-Floor Bracing Capacity (Anchor piles)	100%

6.4 Discussion of Results

The building has a calculated seismic capacity of 86% NBS and is not classed as potentially earthquake prone. The seismic capacity is governed by the ability of both the internal partitions and perimeter walls to act as braced panels in conjunction with the plasterboard linings.

6.5 Limitations and Assumptions in Results

The observed level of damage suffered by the building was deemed low enough to not affect the capacity. Therefore the analysis and assessment of the building was based on it being in an undamaged state. There may have been damage to the building that was unable to be observed that could cause the capacity of the building to be reduced; therefore the current capacity of the building may be lower than that stated.

The results have been reported as a %NBS and the stated value is that obtained from our analysis and assessment. Despite the use of best national and international practice in this analysis and assessment, this value contains uncertainty due to the many assumptions and simplifications which are made during the assessment. These include:

a. Simplifications made in the analysis, including boundary conditions such as foundation fixity.
b. Assessments of material strengths based on limited drawings, specifications and site inspections
c. The normal variation in material properties which change from batch to batch.
d. Approximations made in the assessment of the capacity of each element.

7 Conclusions and Recommendations

The building has an assessed seismic capacity of 86%NBS as an Importance Level 2 Structure and is therefore considered to be a low risk building.

Cosmetic work is required to infill the gaps noted between plasterboard sheets and repair the ceiling junctions with the wall linings. It may be prudent to verify if sufficient fixings between the plasterboard linings and timber panels have been provided.

8 Limitations

- This report is based on an inspection of the structure with a focus on the damage sustained from the Canterbury Earthquake Sequence since September 2010 and aftershocks only.
- 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 the time.
- This report is prepared for the CCC to assist with assessing remedial works required for council structures and facilities. It is not intended for any other party or purpose.

9 References

[1] NZS 1170.5: 2004, Structural design actions, Part 5 Earthquake actions, Standards New Zealand.

[2] NZSEE (2006), Assessment and improvement of the structural performance of buildings in earthquakes, New Zealand Society for Earthquake Engineering.

[3] Engineering Advisory Group, Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury, Part 2 Evaluation Procedure, Draft Prepared by the Engineering Advisory Group, Revision 5, 19 July 2011.

[4] Engineering Advisory Group, *Guidance on Detailed Engineering Evaluation of Non-residential buildings, Part 3 Technical Guidance*, Draft Prepared by the Engineering Advisory Group, 13 December 2011.

[5] SESOC (2011), Practice Note – Design of Conventional Structural Systems Following Canterbury Earthquakes, Structural Engineering Society of New Zealand, 21 December 2011.

[6] DBH (2012), Guidance for engineers assessing the seismic performance of non-residential and multi-unit residential buildings in greater Christchurch, Department of Building and Housing, June 2012.

Appendix 1 - Photographs

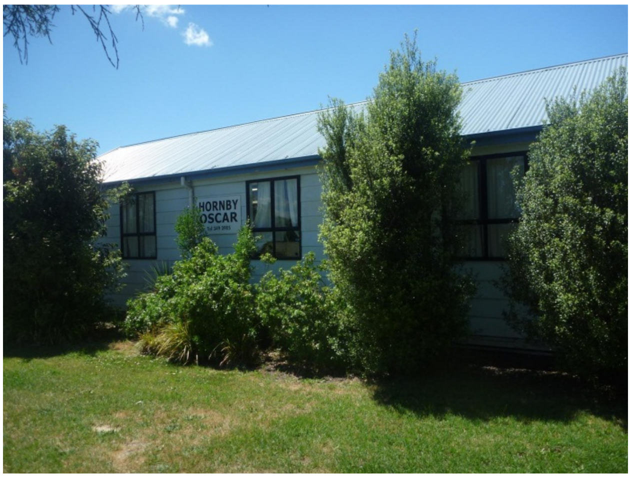

Photo 1: Front (West Elevation)

Photo 2: Left Flank (South Elevation)

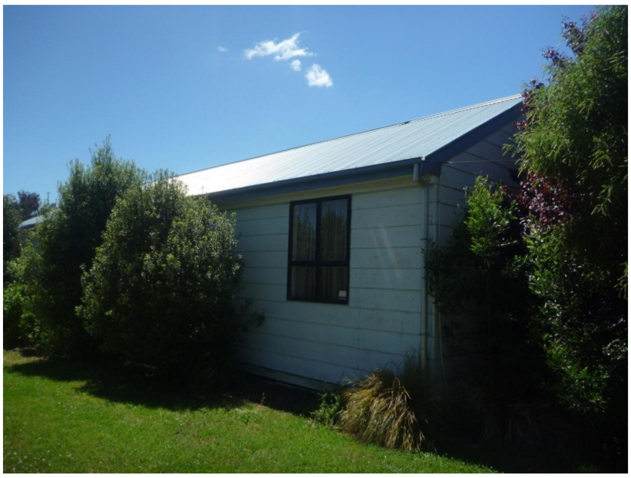

Photo 3: South West Corner

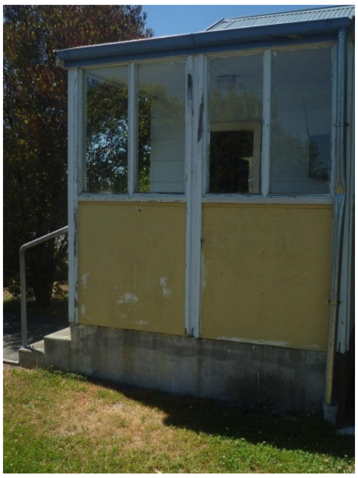

Photo 4: Porch at North West Corner

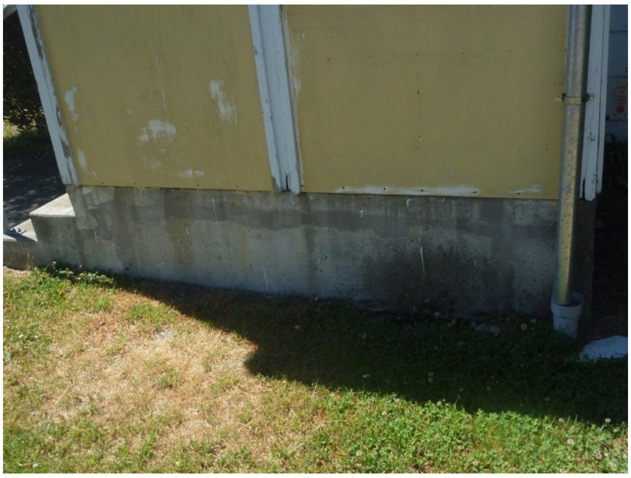

Photo 5: Slab/Foundation to Porch

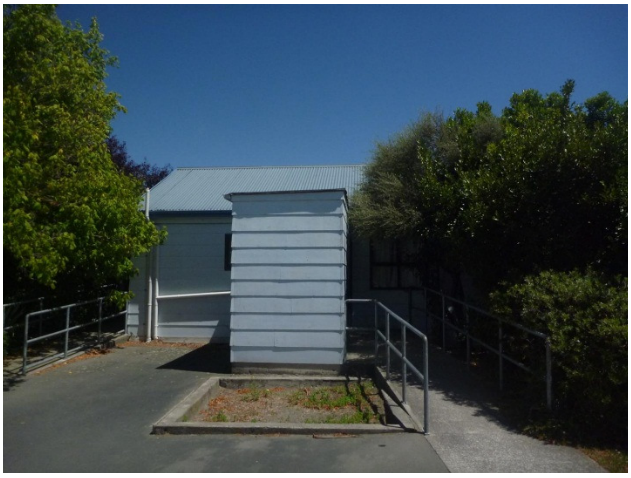

Photo 6: Timber addition (East Elevation)

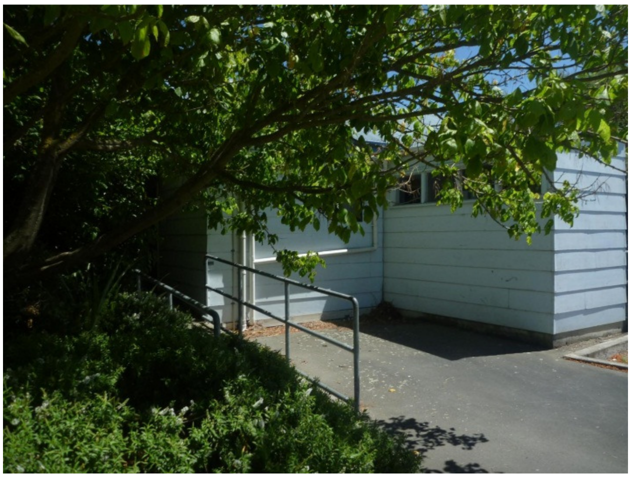

Photo 7: South East Corner

Photo 8: Subfloor

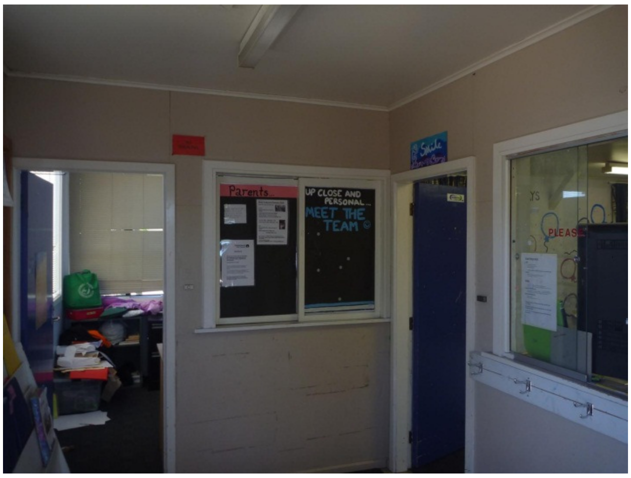

Photo 9: Entrance Lobby

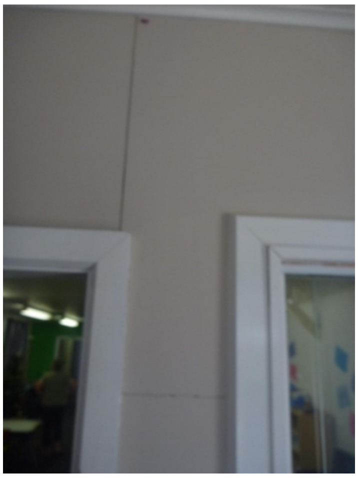

Photo 10: Plasterboard crack at door head

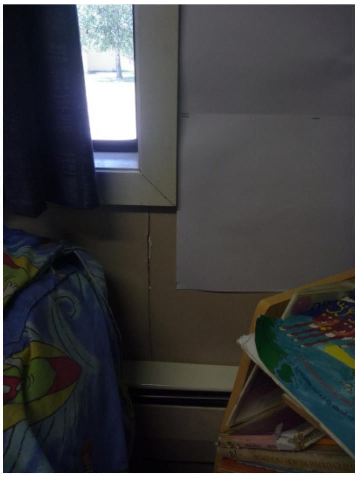

Photo 11: Plasterboard crack at spandrel

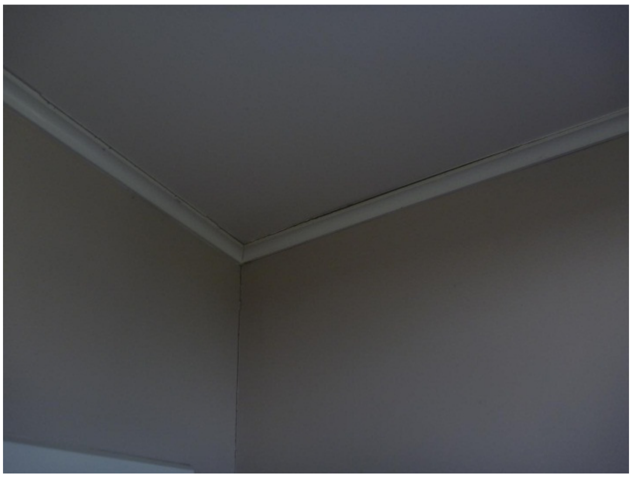

Photo 12: Movement at wall/ceiling junction

Appendix 2 – CERA DEE Spreadsheet

Detailed Engineering Evaluation Summary Data V1.11

Location

Building Name:	Hornby OSCAR Early Learning Centre	Reviewer:	Dave Dekker
Building Address:	Unit: No: 250 Street: Waterloo Road	CPEng No:	1003026
Legal Description:		Company:	Opus International
		Company project number:	6-QC107.00
		Company phone number:	03 363 5400
GPS south:	Degrees 43, Min 32, Sec 17.50	Date of submission:	19/03/2013
GPS east:	Degrees 172, Min 31, Sec 21.00	Inspection Date:	19-Nov-12
		Revision:	Final
Building Unique Identifier (CCC):	PRO 3052	Is there a full report with this summary?	yes

Site

Site slope:	flat	Max retaining height (m):	
Soil type:		Soil Profile (if available):	
Site Class (to NZS1170.5):	D		
Proximity to waterway (m, if <100m):		If Ground improvement on site, describe:	
Proximity to clifftop (m, if < 100m):			
Proximity to cliff base (m,if <100m):		Approx site elevation (m):	

Building

No. of storeys above ground:	1 (single storey = 1)	Ground floor elevation (Absolute) (m):	
Ground floor split?	no	Ground floor elevation above ground (m):	0.50
Storeys below ground	0		
Foundation type:	timber piles	if Foundation type is other, describe:	
Building height (m):	5.00	height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):	115		
Age of Building (years):	30	Date of design:	1976-1992
Strengthening present?	no	If so, when (year)?	
		And what load level (%g)?	
Use (ground floor):	educational	Brief strengthening description:	
Use (upper floors):			
Use notes (if required):	Building relocated to site 2001		
Importance level (to NZS1170.5):	IL2		

Gravity Structure

Gravity System:	frame system		
Roof:	timber truss	truss depth, purlin type and cladding	
Floors:	timber	joist depth and spacing (mm)	
Beams:	none	overall depth x width (mm x mm)	
Columns:			
Walls:			

Lateral load resisting structure

Note: Define along and across in detailed report!

Lateral system along:	lightweight timber framed walls		Assessed to NZS3604
Ductility assumed, μ:		note typical wall length (m)	
Period along:	0.00	estimate or calculation?	
Total deflection (ULS) (mm):		estimate or calculation?	
maximum interstorey deflection (ULS) (mm):		estimate or calculation?	
Lateral system across:	lightweight timber framed walls		Assessed to NZS3604
Ductility assumed, μ:		note typical wall length (m)	
Period across:	0.00	estimate or calculation?	
Total deflection (ULS) (mm):		estimate or calculation?	
maximum interstorey deflection (ULS) (mm):		estimate or calculation?	

Separations:

north (mm):		leave blank if not relevant
east (mm):		
south (mm):		
west (mm):		

Non-structural elements

Stairs:			None
Wall cladding:	brick or tile	describe (note cavity if exists)	Hardiplank externally
Roof Cladding:	Metal	describe	metal sheet
Glazing:	aluminium frames		
Ceilings:	plaster, fixed		Gypsum plasterboard
Services(list):			

Available documentation

Architectural	partial	original designer name/date	unknown/1998 (relocated)
Structural	partial	original designer name/date	unknown/1998 (relocated)
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:
(refer DEE Table 4-2)

Site performance:		Describe damage:	
Settlement:	none observed	notes (if applicable):	
Differential settlement:	none observed	notes (if applicable):	
Liquefaction:	none apparent	notes (if applicable):	
Lateral Spread:	none apparent	notes (if applicable):	
Differential lateral spread:	none apparent	notes (if applicable):	
Ground cracks:	none apparent	notes (if applicable):	
Damage to area:	none apparent	notes (if applicable):	

Building:

	Current Placard Status:	green		
Along	Damage ratio:		Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	#DIV/0!		
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	no	Describe:	

$$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$$

Recommendations

	Level of repair/strengthening required:	minor non-structural	Describe:	minor cracks b'ween GIB sheets
	Building Consent required:	no	Describe:	
	Interim occupancy recommendations:	full occupancy	Describe:	
Along	Assessed %NBS before e'quakes:	##### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	85%		
Across	Assessed %NBS before e'quakes:	##### %NBS from IEP below		
	Assessed %NBS after e'quakes:	100%		

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