Christchurch City Council

PRK_3739_BLDG_006 EQ2
Akaroa Recreation Ground - Pavilion
28C Rue Lavaud, Akaroa

QUANTITATIVE ASSESSMENT REPORT

DRAFT

- Rev A
- 30 January 2013

Christchurch City Council

PRK_3739_BLDG_006 EQ2
Akaroa Recreation Ground - Pavilion
28C Rue Lavaud, Akaroa

QUANTITATIVE ASSESSMENT REPORT

DRAFT

- Rev A
- 30 January 2013

Sinclair Knight Merz
142 Sherborne Street
Saint Albans
PO Box 21011, Edgeware
Christchurch, New Zealand
Tel: +64 3 940 4900
Fax: +64 3 940 4901
Web: www.skmconsulting.com

Contents

Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
A	30/01/2013	C Paverd	N Calvert	30/01/2013	Draft for Client Approval

Distribution of copies

Revision	Copy no	Quantity	Issued to
A	1	1	Christchurch City Council

Printed:	30 January 2013
Last saved:	30 January 2013 12:09 PM
File name:	ZB01276.040.PRK_3739_BLDG_006 EQ2.Quantitative.A.docx
Author:	Nigel Chan
Project manager:	Nick Calvert
Name of organisation:	Christchurch City Council
Name of project:	Christchurch City Council Structures Panel
Name of document:	ZB01276.040.PRK_3739_BLDG_006 EQ2.Quantitative.A.docx
Document version:	A
Project number:	ZB01276.040

1. Executive Summary

1.1. Background

A Qualitative Assessment was carried out on PRK_3739_BLDG_006 EQ2, the Pavilion building located at 28C Rue Lavaud, Akaroa. The building is constructed from timber framing, a timber trussed and metal clad roof and timber piles. An aerial photograph illustrating these areas is shown below in Figure 1. Detailed descriptions outlining the buildings age and construction type is given in Section 5 of this report.

- **Figure 1 Aerial Photograph of PRK_3739_BLDG_006 EQ2**

This Quantitative report for the building structure is based on the Engineering Advisory Group's "Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings" (draft) July 2011, visual inspections on 11/04/2012, intrusive investigations on 9/01/13, limited drawings of the building and calculations by SKM dated January 2013.

1.2. Key Damage Observed

Key damage observed includes:-

1) Cracking of internal walls and ceiling linings including junctions between linings and different materials.

A more detailed account of the damage can be found in section 5.

1.3. Critical Structural Weaknesses

No critical structural weaknesses for the building were observed during our inspections.

1.4. Indicative Building Strength

As described in the Engineering Advisory Group's "Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings" (draft) July 2011, we have assessed the capacity of the building as a percentage new building standard seismic resistance using the quantitative method. Our assessment included consideration of geotechnical conditions, existing earthquake damage to the building and structural engineering calculations to assess both strength and ductility/resilience.

The assessments were based on the following:

- On-site investigation to assess the extent of existing earthquake damage including limited intrusive investigation.
- Qualitative assessment of critical structural weaknesses (CSWs) based on review of available structural drawings and inspection where drawings were not available.
- No on-site geotechnical investigation has been undertaken. A desktop geotechnical investigation has been undertaken which is based on our knowledge of the site and the absence of liquefaction ejecta on the site.
- Assessment of the strength of the existing structures taking account of the current condition.

Any building that is found to have a seismic capacity less than 33% of the New Building Standard (NBS) is required to be strengthened up to a capacity of at least 67%NBS in order to comply with Christchurch City Council (CCC) policy – Earthquake-prone dangerous & insanitary buildings policy 2010.

The building has been assessed to have a seismic capacity in the order of 45% NBS and is therefore potentially not earthquake prone.

1.5. Recommendations

Based on the findings of this quantitative assessment indicating the building is in the order of 45% NBS, no strengthening is required in order to comply with Christchurch City Council (CCC) policy – Earthquake-prone dangerous & insanitary buildings policy 2010.

It is recommended that:

a) No placard was displayed on the building however we recommend that the current placard status of the building be Green 2.

b) We consider that barriers around the building are not necessary.

2. Introduction

Sinclair Knight Merz were engaged by Christchurch City Council to carry out a Quantitative Assessment of the seismic performance of Akaroa Recreational Ground located at 28C Rue Lavaud, Akaroa. This report should be read in conjunction with the Qualitative report dated 22nd June 2012.

The scope of this quantitative analysis includes the following:

- Analysis of the seismic load carrying capacity of the building compared with current seismic loading requirements or New Buildings Standard (NBS). It should be noted that this analysis considers the building in its damaged state where appropriate.
- Identify any critical structural weaknesses which may exist in the building and include these in the assessed %NBS of the structure.
- Preparation of a summary report outlining the areas of concern in the building as well as identifying strengthening concepts to 67%NBS for any areas which have insufficient capacity if the building is found to be an earthquake prone building.

The recommendations from the Engineering Advisory Group[1] were followed to assess the likely performance of the structures in a seismic event relative to the New Building Standard (NBS). 100% NBS is equivalent to the strength of a building that fully complies with current codes. This includes a recent increase of the Christchurch seismic hazard factor from 0.22 to 0.3[2].

This report should be read in conjunction with the qualitative assessment dated 22nd June 2012. This assessment identified that the seismic capacity of the building was likely to be between 33% and 67% of the New Building Standard (NBS). A quantitative assessment was recommended to confirm the initial assessment findings and to determine a more accurate seismic rating of the building.

At the time of this report an intrusive site investigation had been carried out on 9th January 2013. Limited drawings were made available, and these have been considered in our evaluation of the building. The building description below is based on a review of the available drawings and our visual inspections.

[1] EAG 2011, *Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury - Draft*, p 10
[2] http://www.dbh.govt.nz/seismicity-info

3. Compliance

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

3.1. Canterbury Earthquake Recovery Authority (CERA)

CERA was established on 28 March 2011 to take control of the recovery of Christchurch 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 carry out a full structural survey before the building is re-occupied.

We understand that CERA will 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). It is anticipated that CERA will adopt the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011. This document sets out a methodology for both qualitative and quantitative assessments.

The qualitative assessment is a desk-top and site inspection assessment. It is based on a thorough visual inspection of the building coupled with a review of available documentation such as drawings and specifications. The quantitative assessment involves analytical calculation of the buildings strength and may require non-destructive or destructive material testing, geotechnical testing and intrusive investigation.

It is anticipated that factors determining the extent of evaluation and strengthening level required will include:

- The importance level and occupancy of the building
- The placard status and amount of damage
- The age and structural type of the building

- Consideration of any critical structural weaknesses
- The extent of any earthquake damage

3.2. Building Act

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

3.2.1. 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 any alteration. This effectively means that a building cannot be weakened as a result of an alteration (including partial demolition).

3.2.2. Section 115 – Change of Use

This section requires that the territorial authority (in this case Christchurch City Council (CCC)) be satisfied that the building with a new use complies with the relevant sections of the Building Code 'as near as is reasonably practicable'. Regarding seismic capacity 'as near as reasonably practicable' has previously been interpreted by CCC as achieving a minimum of 67%NBS however where practical achieving 100%NBS is desirable. The New Zealand Society for Earthquake Engineering (NZSEE) recommend a minimum of 67%NBS.

3.2.3. Section 121 – Dangerous Buildings

The definition of dangerous building in the Act was extended by the Canterbury Earthquake (Building Act) Order 2010, and it now defines a building as dangerous if:

- 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
- 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
- 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
- there is a risk that that other property could collapse or otherwise cause injury or death; or
- a territorial authority has not been able to undertake an inspection to determine whether the building is dangerous.

3.2.4. Section 122 – Earthquake Prone Buildings

This section defines a building as earthquake prone 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 ground shaking 33% of the shaking used to design an equivalent new building.

3.2.5. 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.

3.2.6. Section 131 – Earthquake Prone Building Policy

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

3.3. 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 of the 4th September 2010.

The 2010 amendment includes the following:

- A process for identifying, categorising and prioritising Earthquake Prone Buildings, commencing on 1 July 2012;
- A strengthening target level of 67% of a new building for buildings that are Earthquake Prone. Council recognises that it may not be practicable for some repairs to meet that target. The council will work closely with building owners to achieve sensible, safe outcomes;
- A timeframe of 15-30 years for Earthquake Prone Buildings to be strengthened; and,
- 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.

We anticipate that any building with a capacity of less than 33%NBS (including consideration of critical structural weaknesses) will need to be strengthened to a target of 67%NBS of new building standard as recommended by the Policy.

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.

3.4. 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.

After the February Earthquake, on 19 May 2011, Compliance Document B1: Structure was amended to include increased seismic design requirements for Canterbury as follows:

a) Hazard Factor increased from 0.22 to 0.3 (36% increase in the basic seismic design load)
b) Serviceability Return Period Factor increased from 0.25 to 0.33 (80% increase in the serviceability design loads when combined with the Hazard Factor increase)

The increase in the above factors has resulted in a reduction in the level of compliance of an existing building relative to a new building despite the capacity of the existing building not changing.

4. 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 new building standard load requirements have been determined in accordance with the current earthquake loading standard (NZS 1170.5:2004 Structural design actions - Earthquake actions - New Zealand).

The likely capacity of this building has been derived in accordance with the New Zealand Society for Earthquake Engineering (NZSEE) guidelines 'Assessment and Improvement of the Structural Performance of Buildings in Earthquakes' (AISPBE), 2006. These guidelines provide an Initial Evaluation Procedure that assesses a buildings capacity based on a comparison of loading codes from when the building was designed and currently. It is a quick high-level procedure that can be used when undertaking a Qualitative analysis of a building. The guidelines also provide guidance on calculating a modified Ultimate Limit State capacity of the building which is much more accurate and can be used when undertaking a Quantitative analysis.

The New Zealand Society for Earthquake Engineering has proposed a way for classifying earthquake risk for existing buildings in terms of %NBS and this is shown in Figure 2 below.

Description	Grade	Risk	%NBS	Existing Building Structural Performance	Improvement of Structural Performance	
					Legal Requirement	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	B or 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	Unacceptable	Unacceptable

- **Figure 2: 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). It is noted that the current seismic risk in Christchurch results in a 6% risk of exceedance 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

5. Building Details

5.1. Building description

The Pavilion building is located at 28C Rue Lavaud, Akaroa. The building is used as a crèche and sports pavilion. The foundations of the building are constructed from 180dmm diameter driven timber piles with bracing beneath the deck area only. The floor, walls and roof of the building are constructed with timber framing.

The consent documents show the building was constructed in 1993. For the purposes of this assessment the along direction of the building is taken as the long direction (north-east to south-west) while the across direction is taken as the short direction (north-west to south-east).

5.2. Gravity Load Resisting system

Gravity loads are carried through the timber roof truss framing, into the timber load bearing walls, into the timber floor structures and then into the timber piles.

5.3. Seismic Load Resisting system

Lateral loads are carried by the ceiling linings acting as a diaphragm carrying loads to internal and external walls where the gypsum lined wall frames act in shear. The loads are then carried to the floor framing and into driven timber piles. The piles act as cantilevers to resist the horizontal earthquake forces.

The front elevation of the building has very narrow wall elements only which does not provide significant bracing capacity, the building is reliant on the ability of the ceiling to act as a diaphragm and redistribute loads to the other walls.

5.4. Building Damage

SKM undertook an inspection on 11/04/2012. The following areas of damage were observed during the time of inspection:

- Cracking of internal walls and ceiling linings including junctions between linings and different materials. Note that the internal linings appear to be hard board. Refer to photos 2 to 13.

6. Available Information and Assumptions

6.1. Available Information

Following our inspections on the 11th April 2012 and 9th January 2013, SKM carried out a seismic review on the structure. This review was undertaken using the available information which was as follows:

- Floor Plan (C.A. Pilbrow 1992)
- Bracing Plan (Alan Reay consultants 1993)
- Amended Layout Plan (C.A. Pilbrow 1993)
- Plans and elevations of the storeroom addition (C.A. Pilbrow 1994)
- SKM site measurements and inspection findings.

6.2. Survey

The building was not surveyed. A level and verticality survey is not considered necessary due to the absence of visible settlement and leaning.

6.3. Assumptions

The assumptions made in undertaking the assessment include:

- The building was built according to the drawings and according to good practice at the time. We have reviewed the building and from our visual inspection the structure appears to be built in accordance with the drawings.
- The soil on site is class D as described in AS/NZS1170.5:2004, Clause 3.1.3, Soft Soil. This is a conservative assumption based on our experience of soils around the Christchurch region. The ultimate bearing capacity on site is 300kPa, we believe that this assumption is reasonable. There was no evidence of liquefaction ejecta on site, and therefore have taken this site as having a low risk of liquefaction, liquefaction has not been accounted for in the foundation design. The latter two assumptions assume that the ground conditions classify as “good ground”.
- Standard design assumptions for typical office and factory buildings as described in AS/NZS1170.0:2002:
  - 50 year design life, which is the default NZ Building Code design life.
  - Structure importance level 2. This level of importance is described as ‘normal’ with medium or considerable consequence for loss of human life, or considerable economic, social or environmental consequence of failure.
- The building has a short period less than 0.4 seconds.

- Site hazard factor, Z = 0.3, NZBC, Clause B1 Structure, Amendment 11 effective from 1 August 2011
- The following material properties were used in the analyses:
- **Table 2: Material Properties**

Material	Material Property
Gypsum wall lining 1 side (3m stud height)	Shear capacity = 33.6 BUs/m
Gypsum wall lining 2 side (3m stud height)	Shear capacity = 47.6 BUs/m
Friction angle of Soil	φ = 30º
Unit weight of soil	γ = 17kN/m3

The detailed engineering analysis is a post construction evaluation. Since it is not a full design and construction monitoring, it has the following limitations:

- It is not likely to pick up on any concealed construction errors (if they exist)
- Other possible issues that could affect the performance of the building such as corrosion and modifications to the structure will not be identified unless they are visible and have been specifically mentioned in this report.
- The detailed engineering evaluation deals only with the structural aspects of the structure. Other aspects such as building services are not covered.

6.4. The Detailed Engineering Evaluation (DEE) process

The DEE is a procedure written by the Department of Building and Housing's Engineering Advisory Group and grades buildings according to their likely performance in a seismic event. The procedure is not yet recognised by the NZ Building Code but is widely used and recognised by the Christchurch City Council as the preferred method for preliminary seismic investigations of buildings[3].

The procedure of the DEE is as follows:

1) Qualitative assessment procedure
   a. Determine the building's status following any rapid assessment that have been done

[3] http://resources.ccc.govt.nz/files/EarthquakeProneDangerousAndInsanitaryBuildingsPolicy2010.pdf

b. Review any existing documentation that is available. This will give the engineer an understanding of how the building is expected to behave. If no documentation is available, site measurements may be required

c. Review the foundations and any geotechnical information available. This will include determining the zoning of the land and the likely soil behaviour, a site investigation may be required

d. Investigate possible Critical Structural Weaknesses (CSW) or collapse hazards

e. Assess the original and post earthquake strength of the building (this assessment is subsequently superseded by the quantitative assessment)

2) Quantitative procedure

a. Carry out a geotechnical investigation if required by the qualitative assessment

b. Analyse the building according to current building codes and standards. Analysis accounts for damage to the building.

The DEE assessment ranks buildings according to how well they are likely to perform relative to a new building designed to current earthquake standards, as shown in Table 3. The building rank is indicated by the percent of the required New Building Standard (%NBS) strength that the building is considered to have. Earthquake prone buildings are defined as having less than 33 %NBS strength which correlates to an increased risk of approximately 20 times that of 100% NBS[4]. Buildings that are identified to be earthquake prone are required by law to be strengthened within 30 years of the owner being notified that the building is potentially earthquake prone[5]. This timeframe is likely to be adjusted by CERA.

[4] NZSEE 2006, *Assessment and Improvement of the Structural Performance of Buildings in Earthquakes*, p 2-2

[5] http://resources.ccc.govt.nz/files/EarthquakeProneDangerousAndInsanitaryBuildingsPolicy2010.pdf

- **Table 3: DEE Risk classifications**

Description	Grade	Risk	%NBS	Structural performance
Low risk building	A+	Low	> 100	Acceptable. Improvement may be desirable.
	A		100 to 80	
	B		80 to 67	
Moderate risk building	C	Moderate	67 to 33	Acceptable legally. Improvement recommended.
High risk building	D	High	33 to 20	Unacceptable. Improvement required.
	E		< 20	

The DEE method rates buildings based on the plans (if available) and other information known about the building and some more subjective parameters associated with how the building is detailed and so it is possible that %NBS derived from different engineers may differ.

This assessment describes only the likely seismic Ultimate Limit State (ULS) performance of the building. The ULS is the level of earthquake that can be resisted by the building without catastrophic failure. The DEE does also consider Serviceability Limit State (SLS) performance of the building and or the level of earthquake that would start to cause damage to the building but this result is secondary to the ULS performance.

The NZ Building Code describes that the relevant codes for NBS are primarily:

- AS/NZS 1170 parts 0, 1 and 5 Structural Design Actions
- NZS 3101:2006 Concrete Structures Standard
- NZS 3404:1997 Steel Structures Standard
- NZS 2606:1993 Timber Structures Standard
- NZS 4230:1990 Design of Reinforced Concrete Masonry Structures

7. Results and Discussions

7.1. Critical Structural Weaknesses

No critical structural weaknesses for the building were observed during our inspections.

7.2. Analysis Results

The equivalent static force method was used to analyse the seismic capacity of the building. The results of the analysis are reported in the following table as %NBS. The results below are calculated for the building in its damaged state. The building results have been broken down into their seismic resisting elements.

(%NBS = the reliable strength / new building standards)

- **Table 4: DEE Results**

Seismic Resisting Element	Action	Seismic Rating %NBS
Lined walls – Along	Shear	45%
Lined walls – Across	Shear	59%
Subfloor	Shear	100%

7.3. Recommendations

The quantitative assessment carried out on the Akaroa Recreational Ground Pavillion indicates that the building has a seismic capacity between 33% and 67% of NBS and is therefore classed as being in the category of 'Moderate Risk Building'

While not required to comply with current CCC policy we would recommend that the building is strengthening to at least 67% NBS.

8. Conclusion

SKM carried out a quantitative assessment on Akaroa Recreational Ground Pavillion located at 28C Rue Lavaud, Akaroa. This assessment concluded that the building is classified as not Earthquake Prone.

- **Table 5: Quantitative assessment summary**

Description	Grade	Risk	%NBS	Structural performance
Pavillion	C	Moderate	45	Acceptable legally, Improvement recommended.

While not required to comply with current CCC policy, we recommend that the building is strengthened to at least 67% NBS.

It is recommended that:

a) No placard was displayed on the building however we recommend that the current placard status of the building be Green 2.

b) We consider that barriers around the building are not necessary.

9. Limitation Statement

This report has been prepared on behalf of, and for the exclusive use of, SKM's client, and is subject to, and issued in accordance with, the provisions of the contract between SKM and the Client. It is not possible to make a proper assessment of this report without a clear understanding of the terms of engagement under which it has been prepared, including the scope of the instructions and directions given to, and the assumptions made by, SKM. The report may not address issues which would need to be considered for another party if that party's particular circumstances, requirements and experience were known and, further, may make assumptions about matters of which a third party is not aware. No responsibility or liability to any third party is accepted for any loss or damage whatsoever arising out of the use of or reliance on this report by any third party.

Without limiting any of the above, in the event of any liability, SKM's liability, whether under the law of contract, tort, statute, equity or otherwise, is limited in as set out in the terms of the engagement with the Client.

It is not within SKM's scope or responsibility to identify the presence of asbestos, nor the responsibility of SKM to identify possible sources of asbestos. Therefore for any property pre-dating 1989, the presence of asbestos materials should be considered when costing remedial measures or possible demolition.

Should there be any further significant earthquake event, of a magnitude 5 or greater, it will be necessary to conduct a follow-up investigation, as the observations, conclusions and recommendations of this report may no longer apply Earthquake of a lower magnitude may also cause damage, and SKM should be advised immediately if further damage is visible or suspected.

10. Appendix 1 – Photos

	
Photo 1: View of the building looking East	Photo 2: Lining Damage
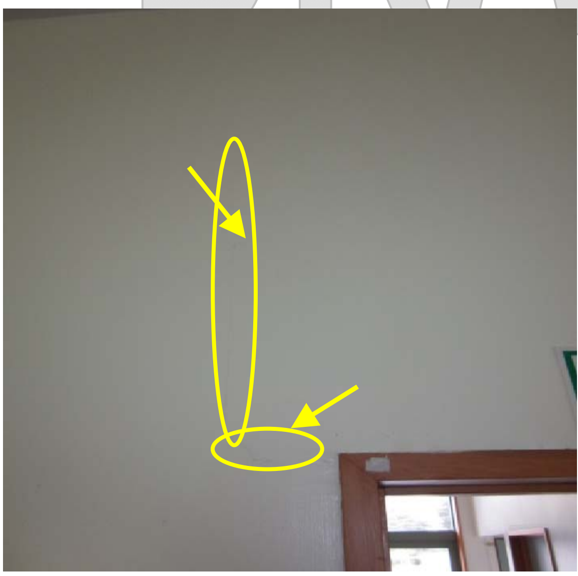	
Photo 3: Lining damage	Photo 4: Lining damage

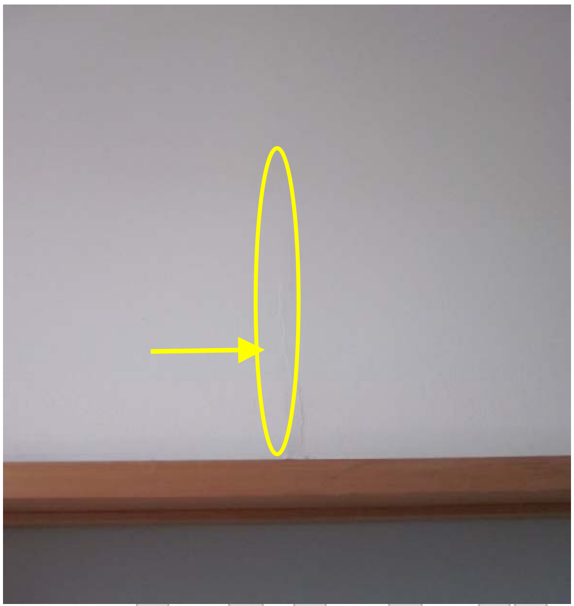

Photo 5: Lining damage

Photo 6: View looking north-west

Photo 7: View within the building looking north-east

Photo 8: Typical view of the building substructure.

	
Photo 9: Movement between kitchen timber enclosure and adjacent wall.	Photo 10: Damage to timber enclosure in kitchen.
	
Photo 11: Lining damage	Photo 12: Lining damage

	
Photo 13: Lining damage	Photo 14:View of subfloor beneath the pavillion

Photo 15:View of exposed timber pile beneath ground level

Photo 16:View of roof framing (1)

Photo 17:View of roof framing (2)

11. Appendix 2 – CERA Standardised Report Form

Location

Building Name: PRK_3739_BLDG_006 EQ2
Building Address: Akaroa Recreation Ground - Pavilion
Unit: No: 28C Street: Rue Lavaud, Akaroa
Legal Description: SEC 2 Survey Office Plan 18642
GPS south: (Degrees / Min / Sec)
GPS east:
Building Unique Identifier (CCC):

Reviewer: **N Calvert**
CPEng No: **242062**
Company: Sinclair Knight Merz
Company project number: ZB01276.040
Company phone number: 03 940 4900
Date of submission: 30-Jan
Inspection Date: 11/04/2012 & 9/1/2013
Revision: A
Is there a full report with this summary? yes

Site

Site slope: flat
Soil type:
Site Class (to NZS1170.5): D
Proximity to waterway (m, if <100m):
Proximity to clifftop (m, if < 100m):
Proximity to cliff base (m,if <100m):

Max retaining height (m): 0
Soil Profile (if available):
If Ground improvement on site, describe: None
Approx site elevation (m): 1.00

Building

No. of storeys above ground: 1 (single storey = 1)
Ground floor split? no
Storeys below ground: 0
Foundation type: timber piles
Building height (m): 7.00
Floor footprint area (approx): 215
Age of Building (years): 21

Ground floor elevation (Absolute) (m): 1.00
Ground floor elevation above ground (m): 0.30
if Foundation type is other, describe:
height from ground to level of uppermost seismic mass (for IEP only) (m): 3.5
Date of design: 1976-1992 (estimated)

Strengthening present? no
If so, when (year)?
And what load level (%g)?
Brief strengthening description:

Use (ground floor): public
Use (upper floors):
Use notes (if required):
Importance level (to NZS1170.5): IL2

Gravity Structure

Gravity System: load bearing walls
Roof: timber truss — truss depth, purlin type and cladding: 100 x 50 truss members. Truss frames at 800 centres, purlines 100 x 50 at 900 centres. Clad with corrugated metal
Floors: timber — joist depth and spacing (mm): bearers 135x90 at 3000 centres, joists 150x50 ar 400 centres.
Beams:
Columns:
Walls:

Lateral load resisting structure

Note: Define along and across in detailed report!

Lateral system along: lightweight timber framed walls — note typical wall length (m): 57
Ductility assumed, μ: 1.25
Period along: 0.40 (0.00) — estimate or calculation? estimated
Total deflection (ULS) (mm): 25 — estimate or calculation? estimated
maximum interstorey deflection (ULS) (mm): 0 — estimate or calculation? estimated

Lateral system across: lightweight timber framed walls — note typical wall length (m): 55
Ductility assumed, μ: 1.25
Period across: 0.40 (0.00) — estimate or calculation? estimated
Total deflection (ULS) (mm): 25 — estimate or calculation? estimated
maximum interstorey deflection (ULS) (mm): 0 — estimate or calculation? estimated

Separations:

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

Non-structural elements

Stairs:
Wall cladding: other light — describe:
Roof Cladding: Metal — describe:
Glazing:
Ceilings: plaster, fixed
Services(list):

Available documentation

Architectural: partial — original designer name/date: C.A.. Pilbrow 1992, 1993, 1994
Structural: partial — original designer name/date: Alan Reay Consultants 1993
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: Good — Describe damage: No visible ground 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: 0% — Describe how damage ratio arrived at: Engineering judgement of level of damage
Describe (summary): Damage insignificant in building capacity

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

Across — Damage ratio: 0%
Describe (summary): Damage insignificant in building capacity

Diaphragms — Damage?: no — Describe:
CSWs: — Damage?: no — Describe:
Pounding: — Damage?: no — Describe:
Non-structural: — Damage?: no — Describe:

Recommendations

Level of repair/strengthening required: minor non-structural — Describe: Cracking to internal linings
Building Consent required: no — Describe: Like for like repair
Interim occupancy recommendations: full occupancy — Describe: No restrictions required

Along — Assessed %NBS before: 45% (%NBS from IEP below)
Assessed %NBS after: 45%
If IEP not used, please detail assessment methodology: Quantitative Assessment calculations

Across — Assessed %NBS before: 59% (%NBS from IEP below)
Assessed %NBS after: 59%