Christchurch City Council

Avonhead Park Cemetery Sextons Buildings PRK 0217 BLDG 001 EQ2

Detailed Engineering Evaluation

Quantitative Assessment Report

Christchurch City Council

Avonhead Park Cemetery Sextons Buildings

Quantitative Assessment Report

Prepared By

Thanigasalam Yogeswaran
Structural Engineer, MIEAust, RPEQ

Reviewed By

Simon Biggs
Senior Structural Engineer, MIEAust

Approved By

Paul Campbell
Principal Structural Engineer
CPEng 197688

Opus International Consultants Ltd
Christchurch Office
20 Moorhouse Avenue
PO Box 1482, Christchurch Mail Centre, Christchurch 8140
New Zealand

Telephone: +64 3 363 5400
Facsimile: +64 3 365 7858

Date: November 2012
Reference: 6-QUCC1.60
Status: Final

Summary

Avonhead Park Cemetery Sextons Buildings
PRK 0217-BLDG-001 EQ2

Detailed Engineering Evaluation
Quantitative Report - SUMMARY
Final

Background
This is a summary of the quantitative report for the Avonhead Park Cemetery Sextons Buildings, and is based on the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011, visual inspections on 27 July 2012, measured-up sketch drawings and calculations.

Key Damage Observed
No major damage was identified. There is a minor crack in south side external wall above the door opening.

Critical Structural Weaknesses
No critical structural weaknesses have been identified.

Indicative Building Strength
The Sextons Buildings are comprised of the original building and a later extension that is not connected to the original except by the roof framing. Based on the information available, and from undertaking a quantitative assessment, the original building's seismic capacity has been assessed to be 68%NBS across and 87%NBS along.

For the extension the capacity is greater than 100%NBS across and 83%NBS along. The Sextons Buildings are therefore not classed as earthquake prone buildings under the NZSEE classification system.

Recommendations
We recommend that only minor cracks in the masonry wall need be repaired.

Contents

1 Introduction

Opus International Consultants Limited has been engaged by Christchurch City Council (CCC) to undertake a detailed seismic assessment of the Avonhead Park Cemetery Sextons Buildings, located at 140 Hawthornden Road, Avonhead, following the Canterbury Earthquake Sequence since September 2010.

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

The seismic assessment and reporting have been undertaken based on the quantitative procedures detailed in the Detailed Engineering Evaluation Procedure (DEEP) document (draft) issued by the Structural Engineering Society (SESOC) on 19 July 2011.

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 Christchurch at present.

2.1 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 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 responsible 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	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 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 Building Description

4.1 General

The Avonhead Park Cemetery Sextons Buildings are single storey masonry block wall and timber framed roof structures with steel sheet roofing, comprised of the original building and a later extension that is not connected to the original except through the roof framing.

The original building is approximately 11.4m long in the north-south direction and 6.4m wide in the east-west direction. The apex of the roof is approximately 5.8m from the ground and the block wall height is 2.4m. This building consists of a staff room, garage and ablution. A particle board ceiling is installed in the ablution area only. The original building was built in 1980.

An amenity extension was built in 2006 on the east side of the original building. The extension is 8m long in the north-south direction and 4m wide in the east-west direction. The extension has external fully grouted reinforced block walls to a height of 2.6m. The adjacent walls of the two buildings are detailed on the drawings as 10mm apart with the joint filled with sealant.

4.2 Gravity Load Resisting System

The roof is a timber trussed and framed roof, clad in steel sheet roofing. The roof is also lined with plywood sarking in the extension building only.

The ground floor is a slab-on-grade with a stiffening perimeter beam.

4.3 Seismic Load Resisting System

Seismic loads in both principal directions are resisted by fully grouted block walls acting in and out-of-plane. The roof in the extension building is expected to provide an adequate flexible diaphragm to distribute the seismic induced lateral loads to the walls. The diagonal timber roof braces in the original building will also assist in distributing the roof lateral loads to block walls.

5 Survey

Copies of the structural drawings obtained from CCC records have been referred to as part of the assessment.

The existing drawings and survey photos have been used to confirm the structural systems, investigate potential critical structural weaknesses (CSW) wherever possible, and identify details which required particular attention.

6 Damage Assessment

The building structure does not appear to have suffered major damage as a result of the recent earthquake events.

There is a minor crack at the door opening in the south side external wall.

7 General Observations

Overall the building has performed well under seismic conditions which would be expected for a single-storey reinforced masonry structure. The building has sustained only minor damage.

Due to the non-intrusive nature of the original survey, many connection details could not be fully ascertained.

8 Detailed Seismic Assessment

8.1 Critical Structural Weaknesses

As outlined in the Critical Structural Weakness and Collapse Hazards draft briefing document, issued by the Structural Engineering Society (SESOC) on 7 May 2011, the term 'Critical Structural Weakness' (CSW) refers to a component of a building that could contribute to increased levels of damage or cause premature collapse of the building.

We have not identified any critical structural weaknesses with this building.

8.2 Seismic Coefficient Parameters

The seismic design parameters based on current design requirements from NZS1170.5:2004 and the NZBC clause B1 for this building 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 R_u = 1.0 from Table 3.5, NZS 1170.5:2004, for an Importance Level 2 structure with a 50 year design life;
- μ_{max} = 2.0 for wall bracing elements

8.3 Detailed Seismic Assessment Results

A summary of the structural performance of the building is shown in the following table.

Table 2: Summary of Seismic Performance

Structural Element/System	Failure mode and description of limiting criteria	% NBS based on calculated capacity
Walls in the north-south direction i.e. across the original building	Bracing capacity of wall across the original building	68%
Walls in the east-west direction i.e. along the original building	Bracing capacity of wall along the original building	87%
Walls in the north-south direction i.e. across the extension	Bracing capacity of wall across the extension	>100%
Walls in the east-west direction i.e. along the extension	Bracing capacity of wall along the extension	83%

8.4 Discussion of Results

The original building has a calculated capacity of 68%NBS, as limited by the bracing capacity of the walls in the north-south directions (across). The extension has a calculated capacity of 83%NBS, as limited by the bracing capacity of the walls in the east-west direction (along).

As the buildings have capacities of greater than 67%NBS, they are defined as low earthquake risk buildings under the NZSEE classification system.

We note that the extension building blockwork is not connected to the existing building but separated by a 10mm gap and filled around with sealant. Estimates of seismic deflection indicate that pounding is unlikely and no damage from pounding is evident.

Strengthening work is not required unless deemed necessary to increase the capacity to 100%NBS. Minor damage repairs will be required.

8.5 Limitations and Assumptions in Results

The observed level of damage suffered by the buildings was deemed low enough to not affect their capacity. Therefore the analysis and assessment of the buildings was based on them being in an undamaged state. There may have been damage to the buildings that was unable to be observed during assessments that could cause the capacity of the buildings to be reduced; therefore the current capacity of the buildings 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:

- Simplifications made in the analysis, including boundary conditions such as foundation fixity;
- Assessments of material strengths based on limited drawings, specifications and site inspections;
- The normal variation in material properties which change from batch to batch;
- Approximations made in the assessment of the capacity of each element, especially when considering the post-yield behaviour.

9 Geotechnical

Due to a lack of observed ground damage, no geotechnical assessment has been undertaken for this site. The site parameters used for the structural analysis have been taken as site subsoil class D, based on geotechnical advice.

10 Remedial Options

No remedial strengthening works are required.

11 Conclusions

The building has a seismic capacity of greater than 33%NBS and is therefore not classified as earthquake prone in accordance with the Building Act 2004.

12 Recommendations

We recommend that only minor cracks in the masonry wall need be repaired.

13 Limitations

(a) This report is based on an inspection of the structure with a focus on the damage sustained from the 22 February 2011 Canterbury Earthquake and aftershocks only. Some non-structural damage is mentioned but this is not intended to be a comprehensive list of non-structural items.

(b) 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.

(c) This report is prepared for the CCC to assist with assessing remedial works required for council buildings and facilities. It is not intended for any other party or purpose.

14 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, *Practice Note – Design of Conventional Structural Systems Following Canterbury Earthquakes*, Structural Engineering Society of New Zealand, 21 December 2011.

Appendix A – Photographs

Photo 1: View of the building from north

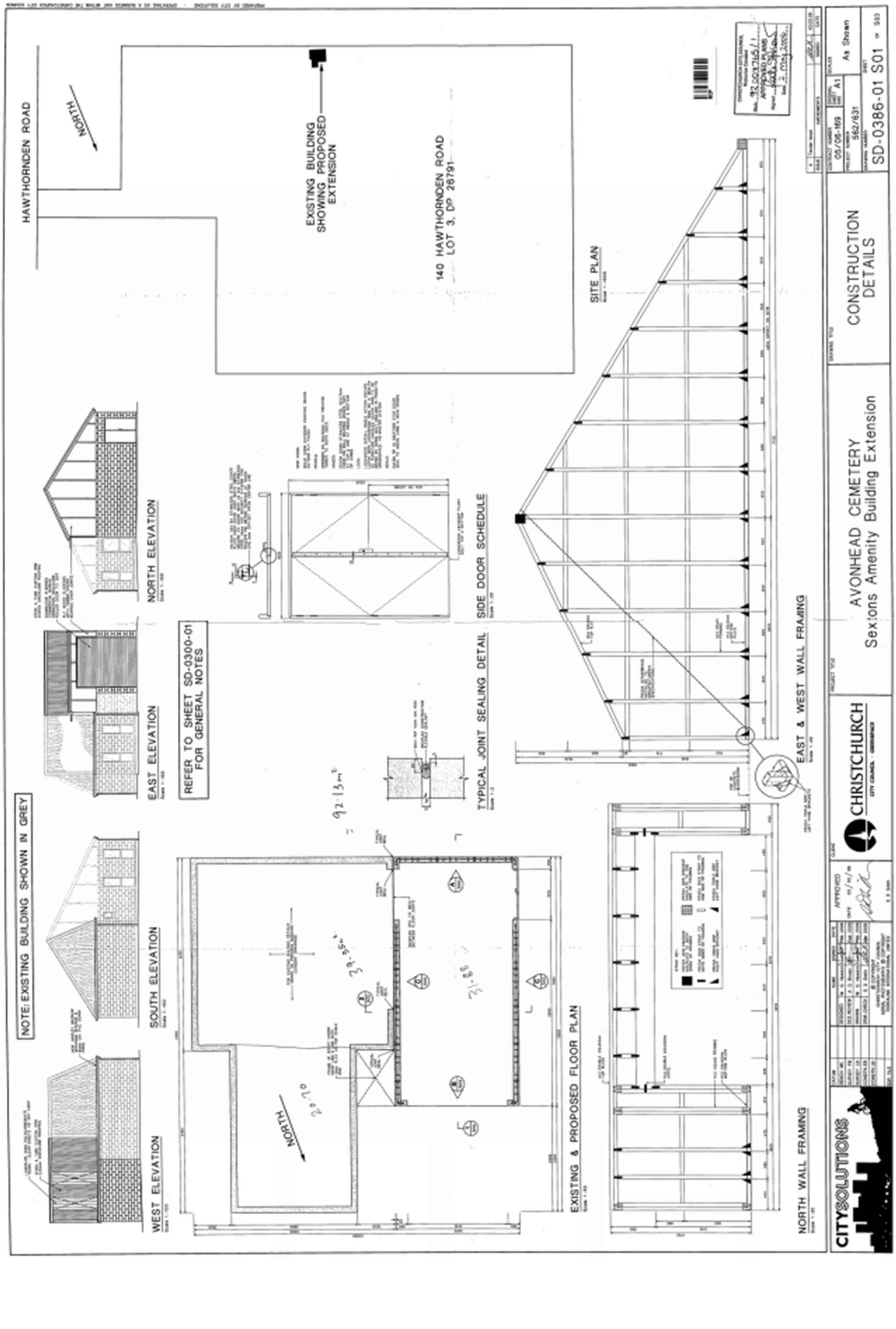
Photo 2: View of the building from west

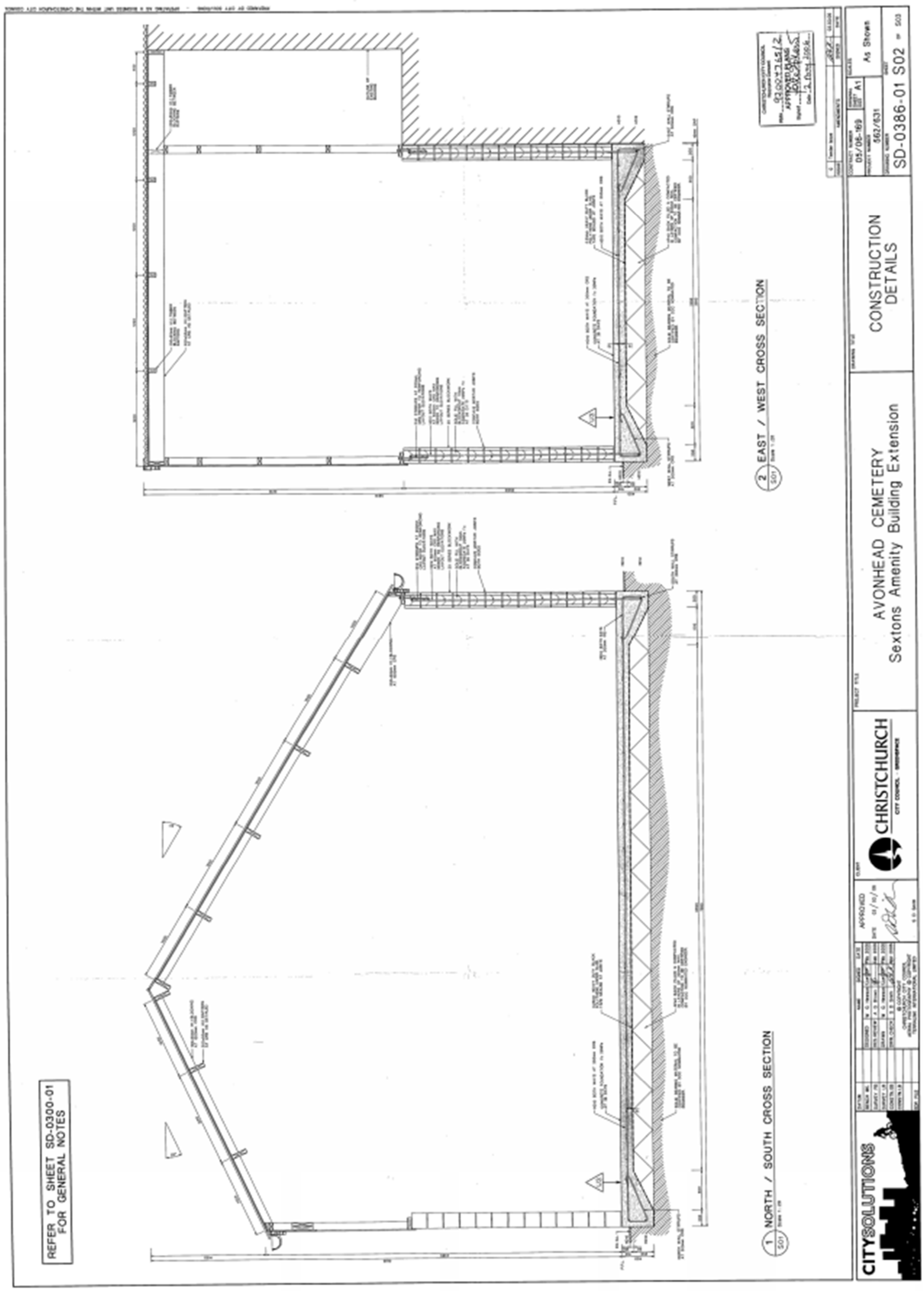
Photo 3: Ceiling diaphragm in extension

Photo 4: Roof frames and cross bracing of original building

Photo 5: Crack in the south side wall above the door opening

Appendix B – Existing Drawings


HAWTHORNDEN ROAD
NORTH
EXISTING BUILDING SHOWING PROPOSED EXTENSION
140 HAWTHORNDEN ROAD LOT 3, DP 26791
SITE PLAN
NOTE: EXISTING BUILDING SHOWN IN GREY
WEST ELEVATION
SOUTH ELEVATION
EAST ELEVATION
NORTH ELEVATION
REFER TO SHEET SD-0300-01 FOR GENERAL NOTES
TYPICAL JOINT SEALING DETAIL
SIDE DOOR SCHEDULE
EAST & WEST WALL FRAMING
EXISTING & PROPOSED FLOOR PLAN
NORTH WALL FRAMING
CITYSOLUTIONS
CHRISTCHURCH
AVONHEAD CEMETERY
Sextons Amenity Building Extension
CONSTRUCTION DETAILS
As Shown
SD-0386-01 S01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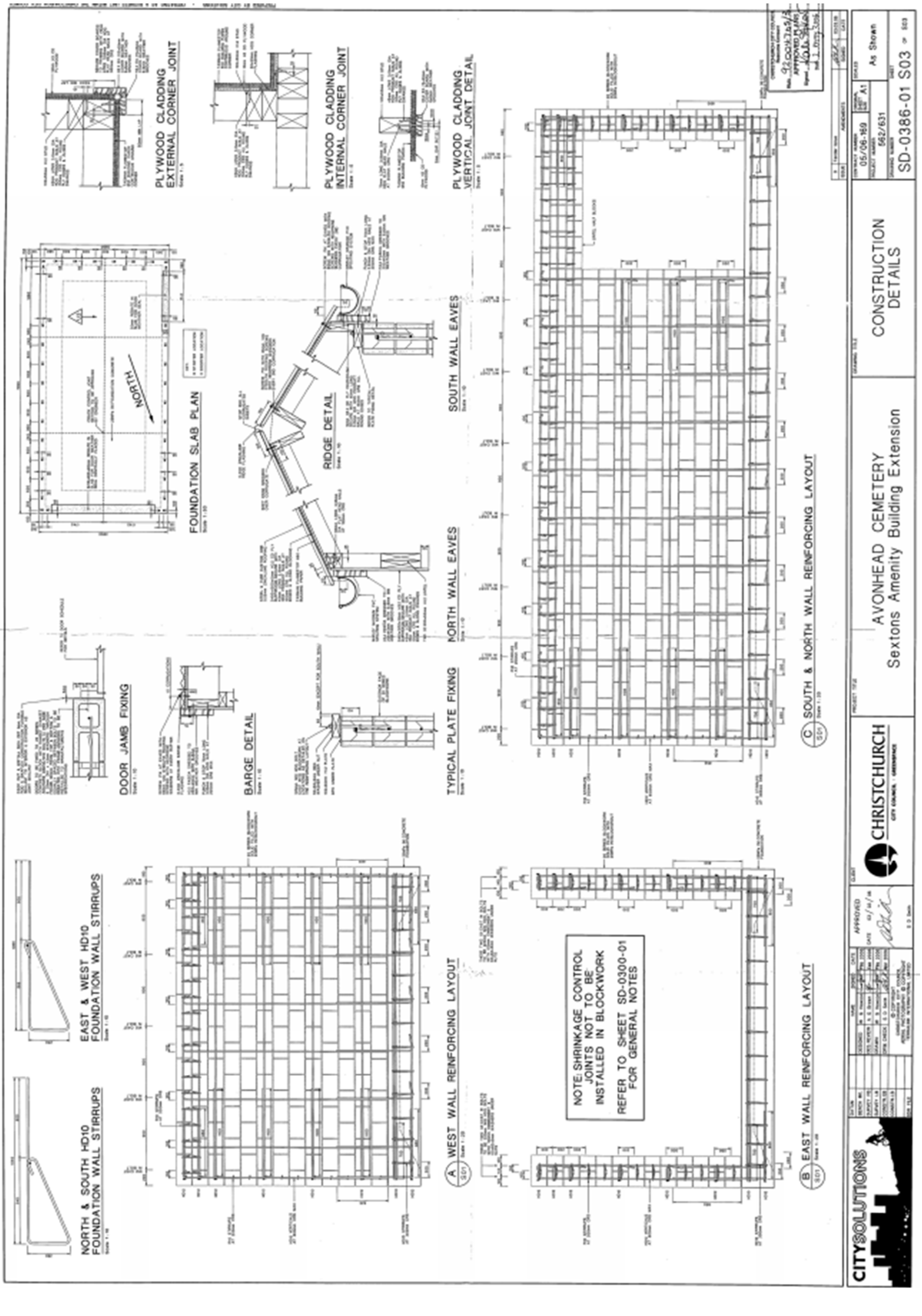
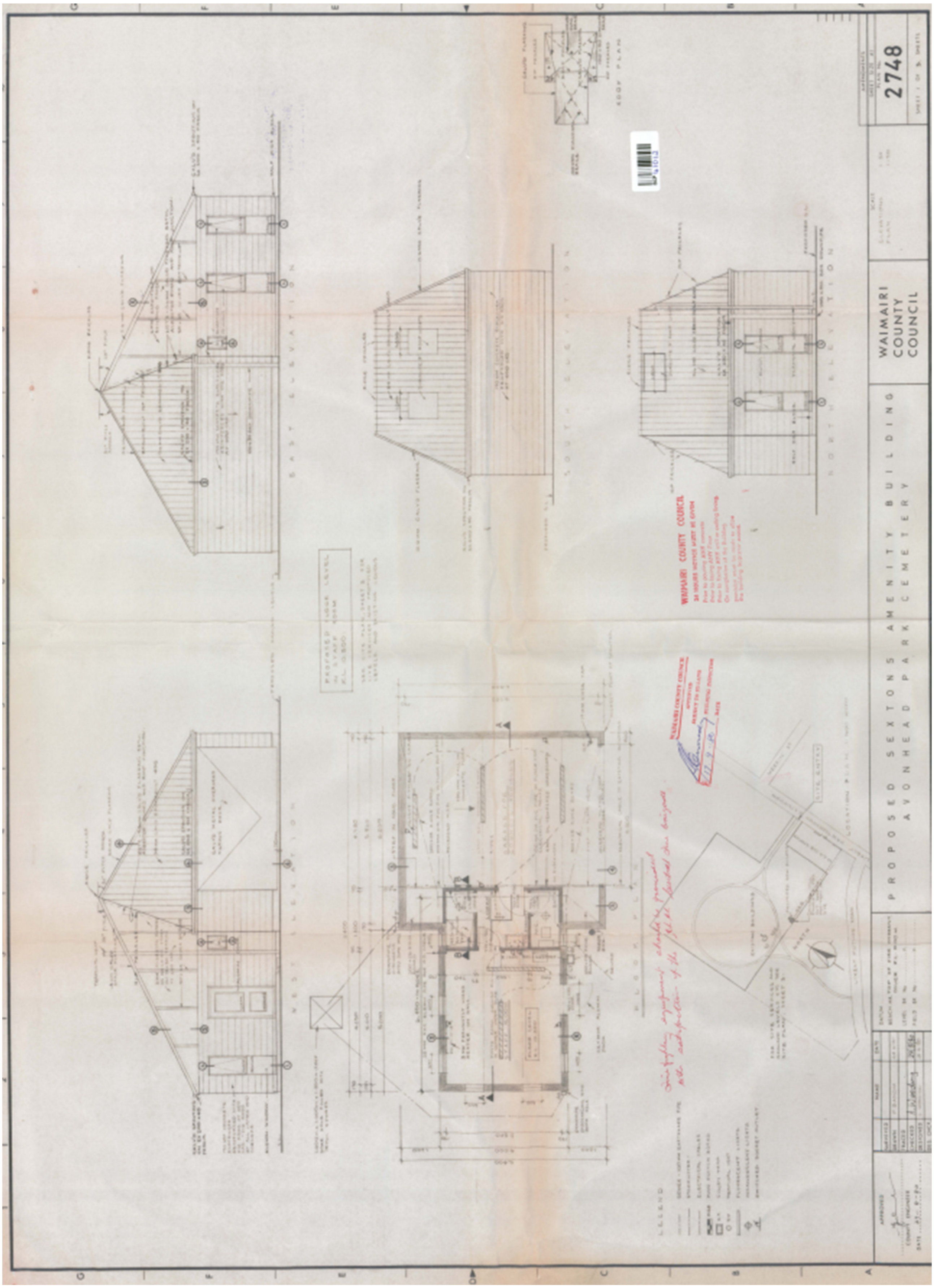
2 EAST / WEST CROSS SECTION
CITYSOLUTIONS
CHRISTCHURCH
AVONHEAD CEMETERY
Sextons Amenity Building Extension
CONSTRUCTION DETAILS
As Shown
SD-0386-01 S02


PLYWOOD CLADDING EXTERNAL CORNER JOINT
PLYWOOD CLADDING INTERNAL CORNER JOINT
PLYWOOD CLADDING VERTICAL JOINT DETAIL
FOUNDATION SLAB PLAN
NORTH
RIDGE DETAIL
SOUTH WALL EAVES
NORTH WALL EAVES
DOOR JAMB FIXING
BARGE DETAIL
TYPICAL PLATE FIXING
SOUTH & NORTH WALL REINFORCING LAYOUT
NORTH & SOUTH HD10 FOUNDATION WALL STIRRUPS
EAST & WEST HD10 FOUNDATION WALL STIRRUPS
WEST WALL REINFORCING LAYOUT
EAST WALL REINFORCING LAYOUT
NOTE: SHRINKAGE CONTROL JOINTS NOT TO BE INSTALLED IN BLOCKWORK
REFER TO SHEET SD-0300-01 FOR GENERAL NOTES
CITYSOLUTIONS
CHRISTCHURCH
AVONHEAD CEMETERY
Sextons Amenity Building Extension
CONSTRUCTION DETAILS
As Shown
05/06/99
SD-0386-01 S03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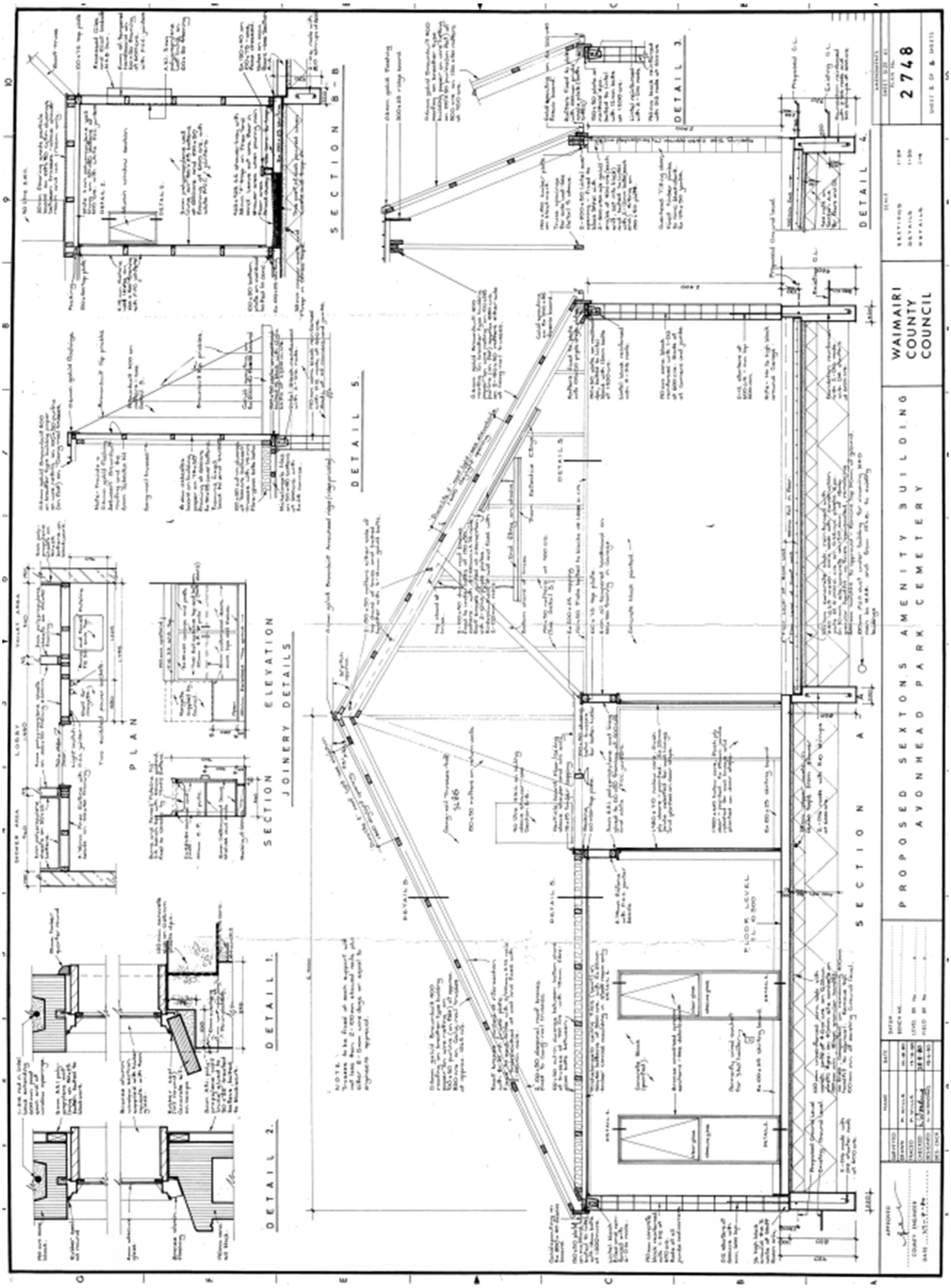
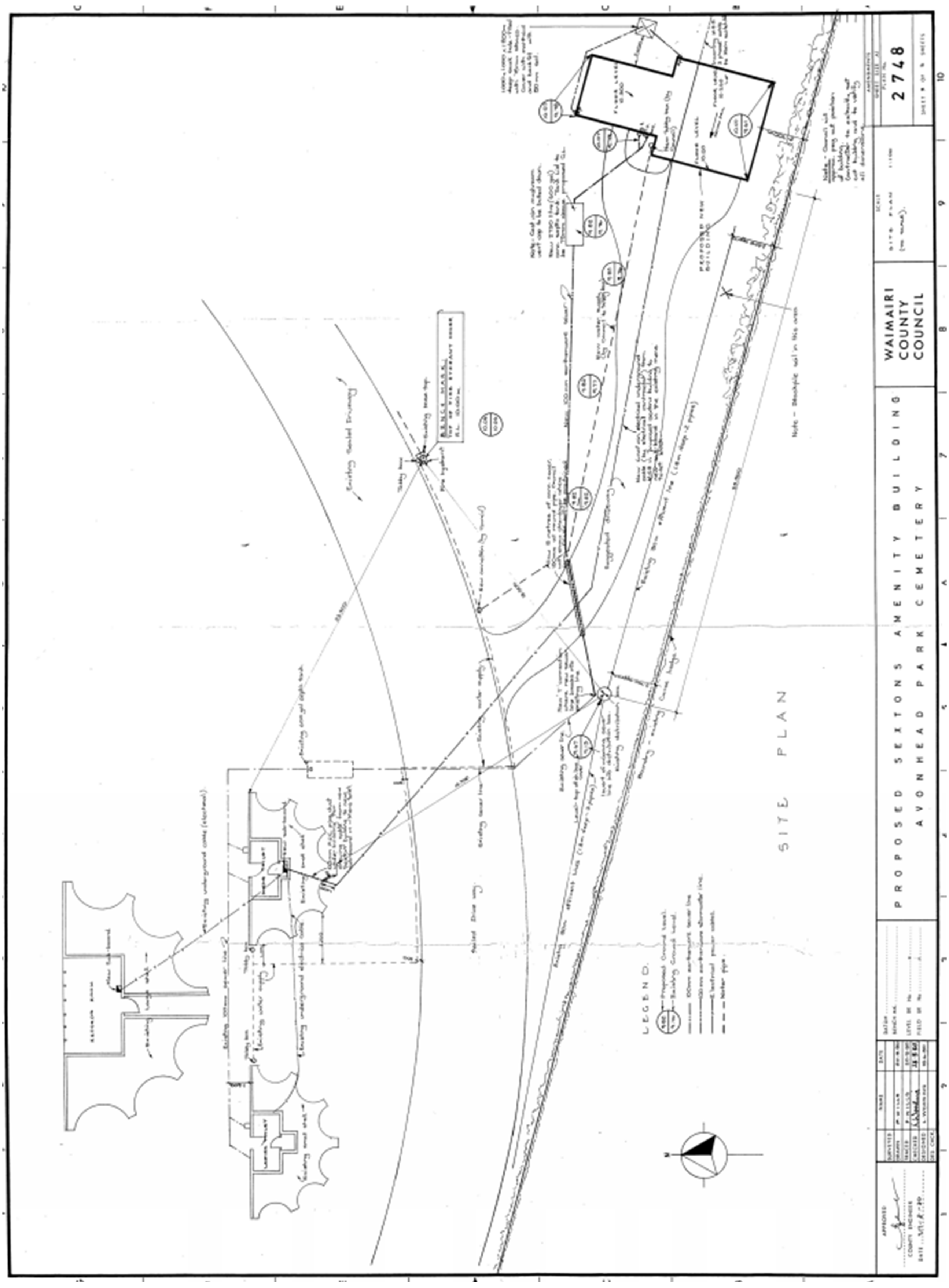
AVONHEAD PARK CEMETERY
WAIMAIRI COUNTY COUNCIL
2748


WAIMAIRI COUNTY COUNCIL
PROPOSED SEXTONS AMENITY BUILDING
AVONHEAD PARK CEMETERY
2748
SECTION A
SECTION B - B
DETAIL 1
DETAIL 2
DETAIL 3
DETAIL 4
DETAIL 5
PLAN
SECTION
ELEVATION
JOINERY DETAILS


PROPOSED SEXTONS AMENITY BUILDING
AVONHEAD PARK CEMETERY
WAIMAIRI COUNTY COUNCIL
SITE PLAN
LEGEND
2748

Appendix C – CERA DEE Data Sheet

Detailed Engineering Evaluation Summary Data V1.11

Location

Building Name:	Avonhead Park Sextons Building	Reviewer:	Paul Campbell
	Unit No: Street	CPEng No:	197688
Building Address:	140 Hawthornden Road, Avonhead	Company:	Opus International Consultants Ltd
Legal Description:		Company project number:	6-QUCC1.60
		Company phone number:	03 363 5400
	Degrees / Min / Sec		
GPS south:	43 / 30 / 34.56	Date of submission:	29-Nov-12
GPS east:	172 / 32 / 52.70	Inspection Date:	27/07/2012
		Revision:	Final
Building Unique Identifier (CCC):	PRK 0217-BLDG-001 EQ2	Is there a full report with this summary?	yes

Site

Site slope:		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):	2.30
Storeys below ground	0		
Foundation type:	other (describe)	if Foundation type is other, describe:	slab on ground
Building height (m):	5.80	height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):	92		
Age of Building (years):	32	Date of design:	1976-1992
Strengthening present?	no	If so, when (year)?	1980
		And what load level (%g)?	
Use (ground floor):	other (specify)	Brief strengthening description:	
Use (upper floors):			
Use notes (if required):			
Importance level (to NZS1170.5):	IL2		

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber framed	rafter type, purlin type and cladding	timber rafter and brownbuilt roofing
Floors:	concrete flat slab	slab thickness (mm)	100
Beams:			
Columns:			
Walls:			

Lateral load resisting structure

Note: Define along and across in detailed report!

Lateral system along:	other (note)		describe system	
Ductility assumed, μ:	2.00			
Period along:	0.40	0.00	estimate or calculation?	estimated
Total deflection (ULS) (mm):			estimate or calculation?	estimated
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	estimated
Lateral system across:	other (note)		describe system	
Ductility assumed, μ:	2.00			
Period across:	0.40	0.00	estimate or calculation?	estimated
Total deflection (ULS) (mm):			estimate or calculation?	estimated
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	estimated

Separations:

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

Non-structural elements

Stairs:		
Wall cladding:		
Roof Cladding:		
Glazing:	timber frames	
Ceilings:		
Services(list):		

Available documentation

Architectural	full	original designer name/date	County Engineer - 27/08/1980
Structural	full	original designer name/date	County Engineer - 27/08/1980
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:		notes (if applicable):	
Differential settlement:		notes (if applicable):	
Liquefaction:		notes (if applicable):	
Lateral Spread:		notes (if applicable):	
Differential lateral spread:		notes (if applicable):	
Ground cracks:		notes (if applicable):	
Damage to area:		notes (if applicable):	

Building:

	Current Placard Status:	green		
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%		
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	minor wall cracks

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

Recommendations

	Level of repair/strengthening required:	minor non-structural	Describe:	Repair minor cracks in wall
	Building Consent required:	no	Describe:	
	Interim occupancy recommendations:	full occupancy	Describe:	
Along	Assessed %NBS before e'quakes:	83% ##### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	83%		
Across	Assessed %NBS before e'quakes:	68% ##### %NBS from IEP below		
	Assessed %NBS after e'quakes:	68%		

Opus International Consultants Ltd
20 Moorhouse Avenue
PO Box 1482, Christchurch Mail Centre,
Christchurch 8140
New Zealand

t: +64 3 363 5400
f: +64 3 365 7858
w: www.opus.co.nz