Christchurch City Council

Fendalton Library & Service Centre BU 0450-001 EQ2

Detailed Engineering Evaluation

Quantitative Assessment Report

Christchurch City Council

Fendalton Library & Service Centre

Quantitative Assessment Report

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Summary

Fendalton Library & Service Centre
BU 0450-001 EQ2

Detailed Engineering Evaluation
Quantitative Report - Summary
Final

Background

This is a summary of the quantitative report for the building structure, and is based on the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011.

A quantitative assessment that was issued in November 2011 rated the Fendalton Library and Service Centre building as earthquake prone and Christchurch City Council chose to close the building. Following the closure a strengthening scheme to improve the building to 100%NBS was designed, consented and constructed. The building was reopened to the public following this strengthening work on 2 April 2012.

Damage Observed

Structural damage in the Canterbury earthquake sequence was limited to cracking in the ground floor concrete slab. These have now been repaired.

Critical Structural Weaknesses

No critical structural weaknesses were identified in this building.

Building Strength

The building's earthquake resistance was assessed to be 27% of Building Code requirements for new buildings (27%NBS) based on the building being an Importance Level 2 structure. This was a result of deficiencies in the horizontal steel roof level bracing. Other components in the building were assessed to be in excess of 100%NBS. The deficient bracing components have now been replaced with new bracing. The building is now rated at 100%NBS (IL2) as a consequence of this work.

Contents

1 Introduction

A quantitative assessment [7] that was issued in November 2011 rated the Fendalton Library and Service Centre building as earthquake prone and Christchurch City Council chose to close the building. Following the closure a strengthening scheme was designed, consented and constructed. The building was reopened to the public on April 2012 following the completion of the strengthening work.

In this report the seismic rating of the building structure is updated to reflect the improvement works that have been undertaken. Copies of fire safety and accessibility reports produced during the improvement work are also included.

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 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 Background Information

4.1 Original Documentation

Copies of the following construction drawings were provided by CCC:

- 1999 record drawings from Christchurch City Council.
- 1999 record drawings by Ian Krause Architects Limited.

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

Copies of the design calculations were not provided.

4.2 Building Description

The Fendalton Library and Service Centre building is located on the corner of Clyde Road and Jeffreys Road. For the purposes of this report we refer to the direction parallel to Clyde Road as the north to south direction and the direction parallel to Jeffreys Road as the east to west direction.

The original building was constructed in 1999. It is a single storey steel portal frame and precast perimeter concrete wall building. The building has overall plan dimensions of 38 metres (north-south) and 64 metres (east-west), and a 2090 m^2 floor area.

4.2.1 Gravity load resisting system

The building has nine 610UB steel portal frames spanning in the north-south direction. These frames are supported near to their midpoints by a 6-bay 410UB steel frame spanning the length of the building in the east-west direction. These frames support steel purlins, metal roofing and suspended ceilings. The external columns are partially encased in precast concrete cladding, the remainder of these and the internal columns are clad with timber framing and gib board.

The steel frame columns are supported on shallow foundation pads. The east-west frame has a foundation beam which provides moment restraint to the column bases.

There is an 8.2m x 9.9m roof-level plant deck comprising a “Unispan” concrete floor slab supported on precast concrete walls.

Around the entire perimeter of the building are multi-component precast concrete walls comprising columns, 150mm thick wall panels with openings for windows and doors and wall capping panels. The wall panels are reinforced with YD12 bars at 400mm centres and YD16 trimmers. The wall panels are fixed to the columns with bolted connections to cast-in inserts, and with “Reid bars” and associated couplers located in ducts cast into the panels. The bases of the panels are connected to the building foundation with starters anchored with grout into ducts cast in the panels.

4.2.2 Seismic Load Resisting System

Loads and the existing structural layout have been assessed by referring to the 1999 record drawings from Christchurch City Council, and the 1999 record drawings by Ian Krause Architects Limited.

Seismic forces in the east-west and north-south directions are generated by the response of the roof and external concrete wall panel masses. The load path in the north-south direction is from the wall panels and purlins directly into the transverse portal frames. In the east-west direction the load is transferred into the central 'spine' portal frame through a set of diagonal steel roof plane bracing members located between grids B to C, and K to L, with a nominal amount of load being transferred into the precast concrete wall panels located along grid lines 1 and 8/9.

The roof bracing comprises tubular CHS sections which were designed to take axial forces as both *struts* (compression) and *ties* (tension).

In-plane shear within the wall panels is transferred into the floor slab thickening through threaded rods. The panels have window openings forming deep beams / column frames that resist the in-plane shears.

4.3 Survey

4.3.1 Post 22 February 2011 Rapid Assessment

A structural assessment of the building was undertaken on 5 March 2011 by Opus International Consultants. The site was posted with a Green (G1) placard indicating that there were no apparent structural or safety hazards found at time of inspection.

A further inspection was undertaken by Opus International Consultants on 26 March 2011[2]. This inspection included external and internal visual inspections of all structural elements above foundation level, and of areas of damage to structural and non-structural elements.

The following damage was observed:

1. Movement between adjoining precast wall panels with isolated instances of concrete spalling at the joints and some cracking visible to the foundation slab ring beam.
2. Diagonal cracks/ buckling within the GIB wall lining, particularly at partition corners.
3. Opening up of the floor slab construction joints.

An investigation was recommended to determine the adequacy of the current restraints used for the ceiling ventilation and lighting system, as inspected libraries of similar age and build in the worst affected areas of the city suffered substantially greater amounts of damage to those particular elements.

[2] Letter report to CCC titled "Fendalton Service Centre and Library, Ref: BU 0450-001 EQ2, Post Earthquake Structural Assessment", dated 26 March 2011.

4.3.2 Further Inspections

Further inspections for damage were undertaken during the strengthening design and construction phases between November 2011 and February 2012.

5 Structural Damage

The following damage has been noted:

5.1 Surrounding Buildings

Surrounding buildings have minor damage.

5.2 Residual Displacements

There were no residual displacements in the building structure resulting from earthquake loading.

5.3 Foundations

There was no evidence of ground settlements or lateral displacements, or of damage to the building's foundations.

5.4 Primary Structure

There was extensive cracking in the ground floor slab with widths up to 13 mm. Investigations concluded that the cracks were probably initiated by thermal and shrinkage strains shortly after construction, but were widened in the earthquake (see report in Appendix 2). The mesh slab reinforcing was fractured at the large cracks, potentially reducing the horizontal tie force required for stability of the steel portal frames.

Fine cracking (<0.2mm) occurred in a number of the external concrete panels. These were assessed to be of no structural significance.

No damage was observed in the steel frames and bracing.

5.5 Non Structural Elements

Non-structural damage was limited to cracks in Gib-board partition linings.

6 Detailed Seismic Assessment (original building)

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 Critical Structural Weaknesses

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 a building. No CSWs were identified in this building.

6.2 Seismic Forces

The following criteria from the earthquake loadings NZS 1170.5 [3] were used to determine the site loading spectrum:

Table 2: Seismic force criteria

Parameter	Value	Comments
$C_h(T)$	3.0	Class D soil, T_1 < 0.5secs
Z	0.3	Increased seismic hazard factor for Christchurch
R	1.0	Importance level 2, normal building
N(T,D)	1.0	

6.3 Material Properties

The following material properties were used in the analyses:

Table 3: Adopted material properties

Material	Nominal Strength
Structural steel	f_y = 300MPa
Reinforcing steel	f_y = 460MPa
Concrete	f'_c = 30MPa

6.4 Analysis

The force-based equivalent static force method of NZS 1170.5 was used to analyse the forces in the structure. A three-dimensional model of the structure was created using Autodesk Robot Structural Analysis Professional 2011 software. From this the response period of the building, as well as the forces to be resisted by the seismic load resisting systems, were deduced.

The forces in the various components were calculated in accordance with the following ductility criteria:

Table 4: Displacement ductility factors

Component	Ductility Factor μ
Roof plane steel bracing	1.25 (NZS 3404 [4] category 3, nominally ductile)
Bolted connections within steel bracing	1.0 (NZS 3404 [4], category 4, elastic)
Steel frames (transverse portal and longitudinal spine)	1.25 (NZS 3404 [4], category 3, nominally ductile)
Wall panels in-plane flexure and shear	1.25 (NZS 3101 [5], category 3, nominally ductile)
Wall panel connections to steel frames	1.0 (NZS 3404 [4], category 4, elastic)

The capacities of the components to withstand these forces were assessed in accordance with the Steel Design (NZS 3404) and Concrete Design (NZS 3101) standards.

6.5 Analysis Results

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

Table 5: Summary of seismic performance – original building

Component	Failure Mode or description of limiting criteria based on elastic capacity of critical element.	% NBS based on calculated capacity
Bolted connections in roof bracing	Shear strength	36%
Roof bracing	Compressive (buckling) strength	27%
Longitudinal "spine" frame	Flexural strength	>100%
Transverse portal frames	Flexural strength	>100%
Wall panels in plane (in-plane forces)	Flexural and shear strength	>100%
Wall panel fixings	Anchorage strength	>100%

7 Summary of Geotechnical Appraisal

7.1 General

Site soil data was available from six shallow (1m to 2m deep) boreholes. These indicate 1m to 2m depth of sandy silts and sands over gravels. One scala penetrometer sounding is available, indicating the silts and sands to be dense to loose (25mm to 50mm per blow).

7.2 Liquefaction Potential

The building is located in an area that is generally classified as Geotechnical Technical Category 2 (minor to moderate land damage from liquefaction is possible in future significant earthquakes).

There is a layer of granular material on the site that could potentially be liquefaction-prone. However the layer is relatively thin (approx. 1m) and is likely to be above the water table. There were no significant surface expressions of liquefaction following the Darfield and Christchurch earthquakes. Extensive liquefaction is therefore not considered to be a risk. It is possible that minor settlement due to densification of loose soils has contributed to the damage sustained, especially the opening of the floor slab construction joints.

8 Structural Repairs and Improvements

8.1 Repairs

The large crack in the ground floor slab was repaired by grouting tie bars across the crack. The specification for this work is included in Appendix 3.

8.2 Structural Improvements

The roof bracing was improved to 100%NBS by replacing the substandard braces with new braces. These braces were designed in accordance with the requirements of the Steel Design standard (NZS 3404), and HERA report R4-142:2009 (Eccentric cleats in compression). The details of this work are shown in the drawings in Appendix 3. Also included are the Design (PS1) and Construction Review (PS4) Producer Statements.

This work was completed in March 2012. As a consequence the earthquake resistance of whole building now rates at 100%NBS (IL2).

8.3 Fire and Accessibility Compliance

Copies of the Fire and Accessibility compliance reports that were prepared in conjunction with the structural improvements are included in Appendix 4.

9 Conclusions

With the exception of cracking of the concrete floor slab, the Fendalton Library and Service Centre building sustained only superficial damage in the Canterbury earthquake sequence. However a

quantitative assessment concluded that the structure's earthquake resistance was approximately 27% of New Building Standard as a result of deficiencies in the strength of horizontal bracing elements in the roof plane. Other structural components were assessed to be in excess of 100%NBS.

The deficient bracing components have now been replaced with new bracing, and the floor slab cracks have been repaired. The building is now rated at 100%NBS (IL2) as a consequence of these improvements.

10 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.

[7] Opus International Consultants, Fendalton Library Quantitative Assessment Report, December 2011.

Appendix 1 – Floor Slab Damage Report

Fendalton Library: Floor Slab Cracking

1 Background

Opening up of construction joints in the Fendalton Library concrete floor slab was noted following the February 2011 earthquake[1]. This movement was evident from relative displacements the carpet edges (see Photo 1). Christchurch City Council has advised that gaps of this size in the carpet were not present prior to the September 2010 earthquake, and that any such gaps would have been rectified as a health and safety (potential trip hazard) matter.

Photo 1: 25 March 2011

Photo 2: 29 November 2011

Photo 3: 29 November 2011

The cracking has been investigated further by exposing the cracks and cutting out a section of the slab (see Photos 2 and 3). A plan showing the locations and sizes of cracks is shown on the attached drawing. Cracks have opened at construction joints and only some of the sawcuts. The largest crack is located at or adjacent to a saw cut crack control joint running east-west between grid lines 4 and 5 (shown offset from the correct location on the drawing), near to the centre of the building. The horizontal displacement across this joint is approximately 10-13mm, with a maximum vertical displacement of 5mm.

The floor is 125mm thick concrete slab on grade, reinforced with 665 mesh. According to the drawings it has formed construction joints at 6m spacings running in the north-south direction, and saw cuts at 6m spacings running in the east-west direction. The mesh is continuous through the joints but with every second bar cut. The slab was laid onto a polythene damp proof course (dpc) and AP40 hardfill. Areas of the north, east and west of the floor have in-floor heating with a polystyrene insulation layer. Inspections to date indicate the slab was constructed in accordance with the design drawings.

[1] Letter report to CCC titled "Fendalton Service Centre and Library, Ref: BU 0450-001 EQ2, Post Earthquake Structural Assessment", dated 26 March 2011.

The mesh reinforcing has fractured at the crack large crack. The evidence from the exposed area of dpc is that it has not been ruptured.

The site was inspected by a geotechnical engineer and there are no signs of liquefaction, ground settlement or lateral spreading.

2 Cause of Cracking

Likely cause of the cracking is as follows:

1. The crack had initiated prior to the February earthquake due to shrinkage strains in the concrete.

2. The earthquake resulted in increased horizontal thrust forces at the base of the portal frames and forces from the response of the slab mass, causing the slab to slide and the crack to widen. Coincident vertical accelerations may have contributed by reducing the friction restraint under the slab.

3 Effect of Cracking

Besides providing a wearing surface, the slab is also required to act as a tie to restrain horizontal thrusts from the portal frames since there are no tie-beams provided. This relies on the mesh reinforcement to remain unfractured. As a consequence of the large crack and fractured mesh, the floor is no longer able to reliably perform that function. There is residual restraint from friction between the floor slab and ground, but this is not a reliable system, particularly in earthquake conditions.

There is no evidence that the cracks have resulted in movement of the portal foundations sufficient to affect the performance of the portal frames. It is probable that the steel frames have sufficient ductility to absorb the maximum displacement they could have been subjected to, without loss of strength, however this should be checked. (Note that it is appropriate to analyse the frame performance anyway, to confirm the qualitative structural assessment[2] results).

The crack widths on the areas of slab containing the in-floor heating are in the range 1mm to 4mm, which is in the range of expected shrinkage-induced crack widths. It is understood that the heating system is operating satisfactorily. No further investigation of this matter appears to be justified.

4 Recommended Remedial Work

The following remedial work is recommended:

[2] *Fendalton Library and Service Centre Building, Detailed Engineering Evaluation, Stage One Qualitative Report*, prepared by Opus International Consultants for Christchurch City Council, September 2011.

1. Fill the large (10mm) crack with shrinkage compensated grout Seal off medium size cracks (>2mm) by towelling in a cement mortar. Smaller cracks may be left unsealed.

2. Grind and level off uneven and spalled areas of the slab surface with a high-bond fairing screed.

3. Provide continuity of reinforcing across the 10mm crack by grouting reinforcing bars into slots cut into the floor slab.

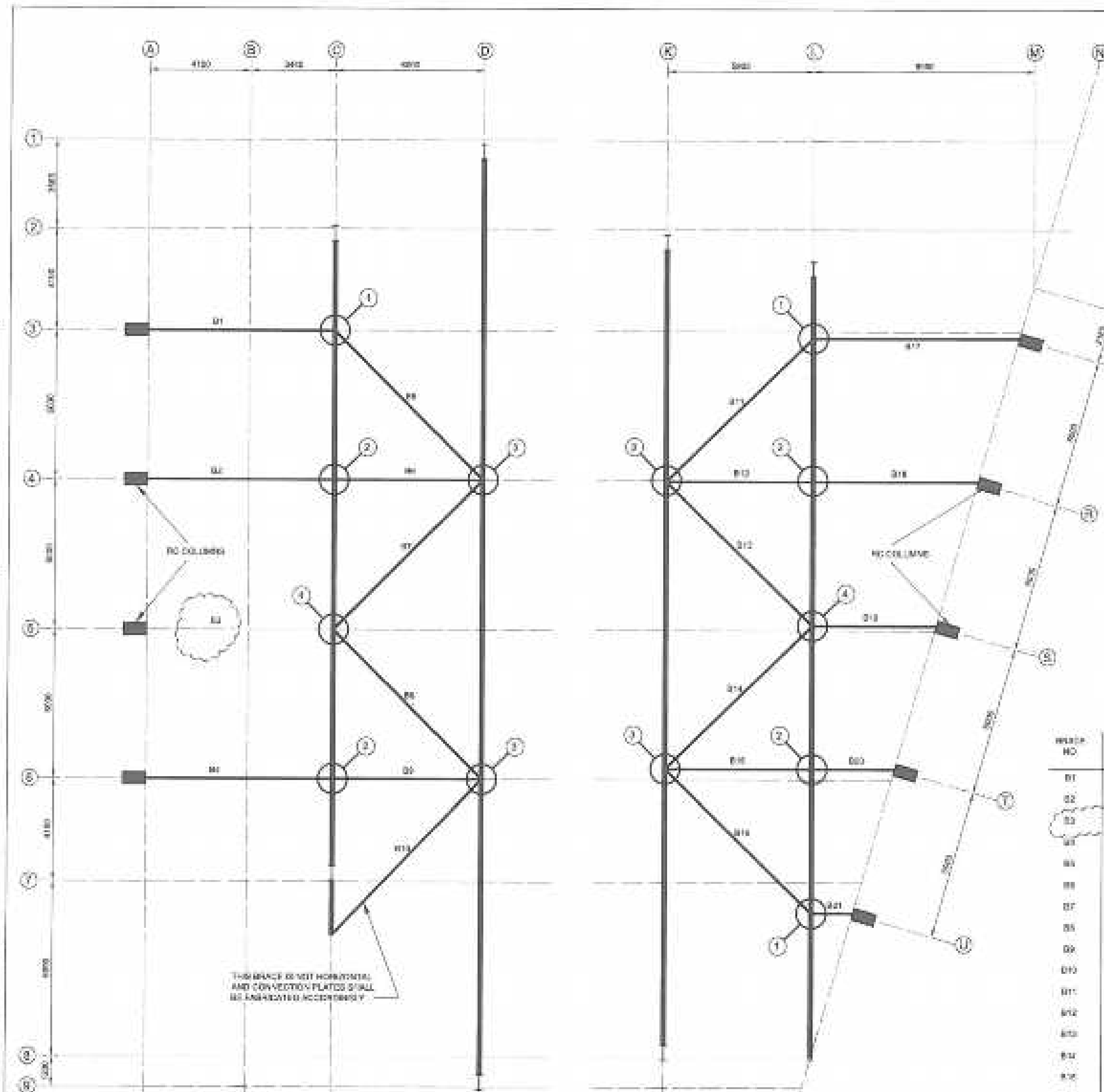
5 Conclusions and Recommendations

It appears that the February 2011 earthquake caused an existing saw-cut shrinkage control joint to increase in width.

The crack does have structural implications as it degrades the ability of the floor to resist horizontal thrust from the portal frames and remedial work to restore the strength of the floor is recommended in addition to filling and making good the cracks.

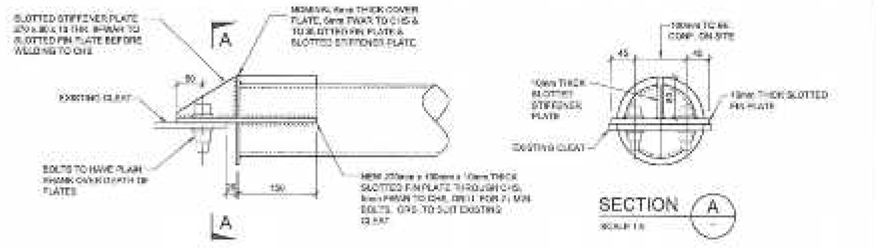
Robert Davey
Principal Structural Engineer CPEng
Opus International Consultants

Appendix 2 – Repair and Improvement Drawings



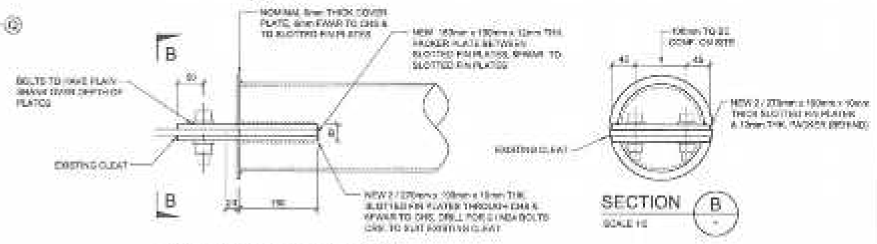
STEEL LAYOUT LOCALLY TO HORIZONTAL BRACING MEMBERS

NTS



CONNECTION DETAIL FOR 139.7 CHS MEMBERS

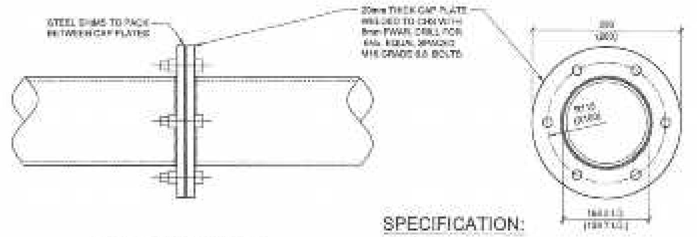
SCALE 1:5



CONNECTION DETAIL FOR 168.3 CHS MEMBERS

SCALE 1:5

BRACE NO	REQUIRED MEMBER TO ENSURE A +100% NBS RATING IS ACHIEVED
B1	139.7 x 5.0 CHS
B2	139.7 x 5.0 CHS
B3	
B4	139.7 x 5.0 CHS
B5	139.7 x 5.0 CHS
B6	139.7 x 5.0 CHS
B7	168.3 x 6.4 CHS
B8	168.3 x 6.4 CHS
B9	139.7 x 5.0 CHS
B10	139.7 x 5.0 CHS
B11	139.7 x 5.0 CHS
B12	139.7 x 5.0 CHS
B13	168.3 x 6.4 CHS
B14	168.3 x 6.4 CHS
B15	139.7 x 5.0 CHS
B16	139.7 x 5.0 CHS
B17	139.7 x 5.0 CHS
B18	139.7 x 5.0 CHS
B19	ONLY BOLT CHANGE REQUIRED
B20	ONLY BOLT CHANGE REQUIRED
B21	ONLY BOLT CHANGE REQUIRED



SPLICE DETAIL FOR 168.3 CHS MEMBERS

SCALE 1:5

NOTE:

ALL BOLT HOLE LOCATIONS AND LENGTHS BETWEEN BRACING CONNECTIONS MUST BE CHECKED ON SITE BEFORE FABRICATION OF NEW BRACING MEMBERS. EXISTING CONNECTION CLEATS WILL NEED TO BE RE-DRILLED TO ALLOW FOR GRADE 8.8 NEW BOLTS.

CONSTRUCTION SEQUENCE

MEMBERS MUST BE REMOVED AND REPLACED SEQUENTIALLY ONE AT A TIME. END BAY MEMBERS MUST BE REMOVED AND REPLACED FIRST (B1 TO B4 AND B17 TO B18) TO ENSURE TOP OF CABLE POSTS ARE SECURED BEFORE REPLACING INTERNAL DIAGONAL BRACING MEMBERS.

INDICATES LOCATION AND TYPE OF BRACE CONNECTION STRENGTHENING.
- FOR TYPES 1, 2, 3, AND 4 DETAILS REFER TO SHEET 4
- FOR TYPE 4 DETAILS REFER TO SHEET 2

SPECIFICATION:

GENERAL

1. WORKMANSHIP AND MATERIALS GENERALLY SHALL BE IN ACCORDANCE WITH THE RELEVANT NEW ZEALAND STANDARDS, THE N.Z. BUILDING CODE, AND MANUFACTURERS WRITTEN RECOMMENDATIONS EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CHECK AND VERIFY EXISTING FEATURES, ALL DIMENSIONS AND LEVELS ON SITE BEFORE COMMENCING CONSTRUCTION AND OFF SITE FABRICATION WORKS.
3. EXISTING STRUCTURE SHOWN ON THESE DRAWINGS IS INDICATIVE ONLY. ENGINEER TO BE NOTIFIED IF ANY VARIATIONS TO EXISTING STRUCTURE ARE ENCOUNTERED.

STEEL BRACING

1. ALL STRUCTURAL STEEL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH NZS 3404.
2. ALL STRUCTURAL STEEL WELDING SHALL COMPLY WITH AS/NZS 1554 CLASS G.P. ALL WELDS TO BE 6mm MINIMUM CONTINUOUS FILLET WELDS UNLESS NOTED OTHERWISE.
3. ALL STEEL [illegible] UNLESS NOTED OTHERWISE.
4. ALL BOLTS GRADE 8.8 AND SNUG TIGHT UNLESS NOTED OTHERWISE.
5. ALL [illegible] TO BE 6mm FILLET WELDS.
6. ALL STEELWORK SHALL BE SHOP PRIMED WITH ALKYD PAINT TO [illegible] DRY FILM THICKNESS OF [illegible]
7. REINSTATE LININGS, INCLUDING PAINTING, TO A VISUALLY ACCEPTABLE CONDITION. THIS INCLUDES REINSTATING INTERNAL WALLS WHERE APPLICABLE.

CONSTRUCTION

Rev	Amendment	Approved	Date
R1	SPLICE DETAIL ADDED & AS NOTED	R.A.D.	[illegible]
R2	CONNECTION DETAILS REVISED	R.A.D.	[illegible]
R3	BRACE STRENGTHENING LOCATIONS SHOWN AND [illegible]		
	[illegible]	R.A.D.	[illegible]

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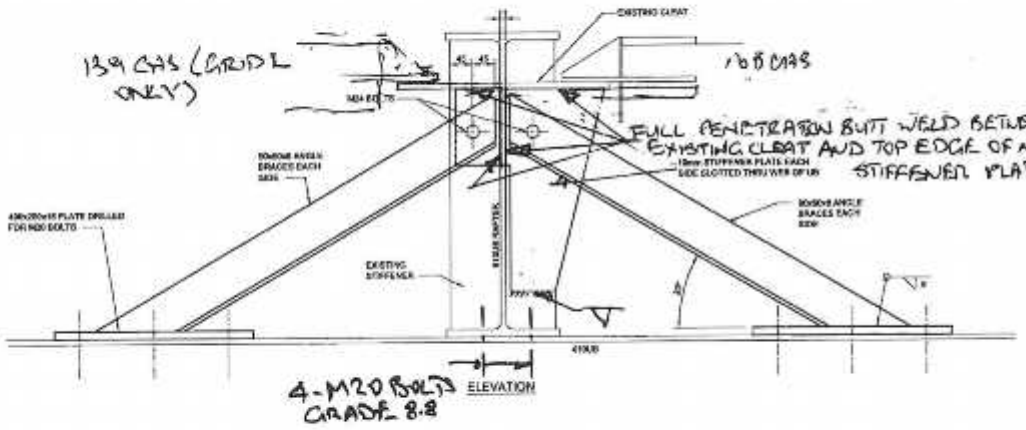
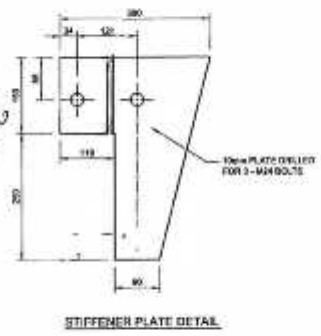
FENDALTON LIBRARY
EARTHQUAKE STRENGTHENING

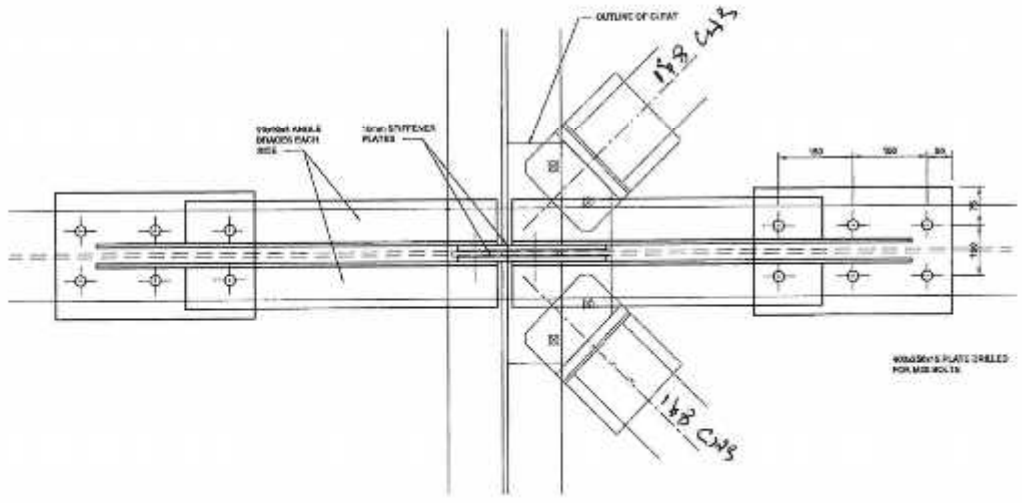
BRACING AND BOLT REMEDIAL DETAILS

STJ	STJ	R.A.DAVEY	
EQUOCC 27	AS SHOWN (A1)	6/1366/232/7502	1	R3

REFER TO SHEET 1 FOR SPECIFICATION AND NOTES







TYPE 4 BRACE CONNECTION STRENGTHENING

CONSTRUCTION

23	SHEET REDRAWN STIFFNER PLATE REVISED	RAD	3/12

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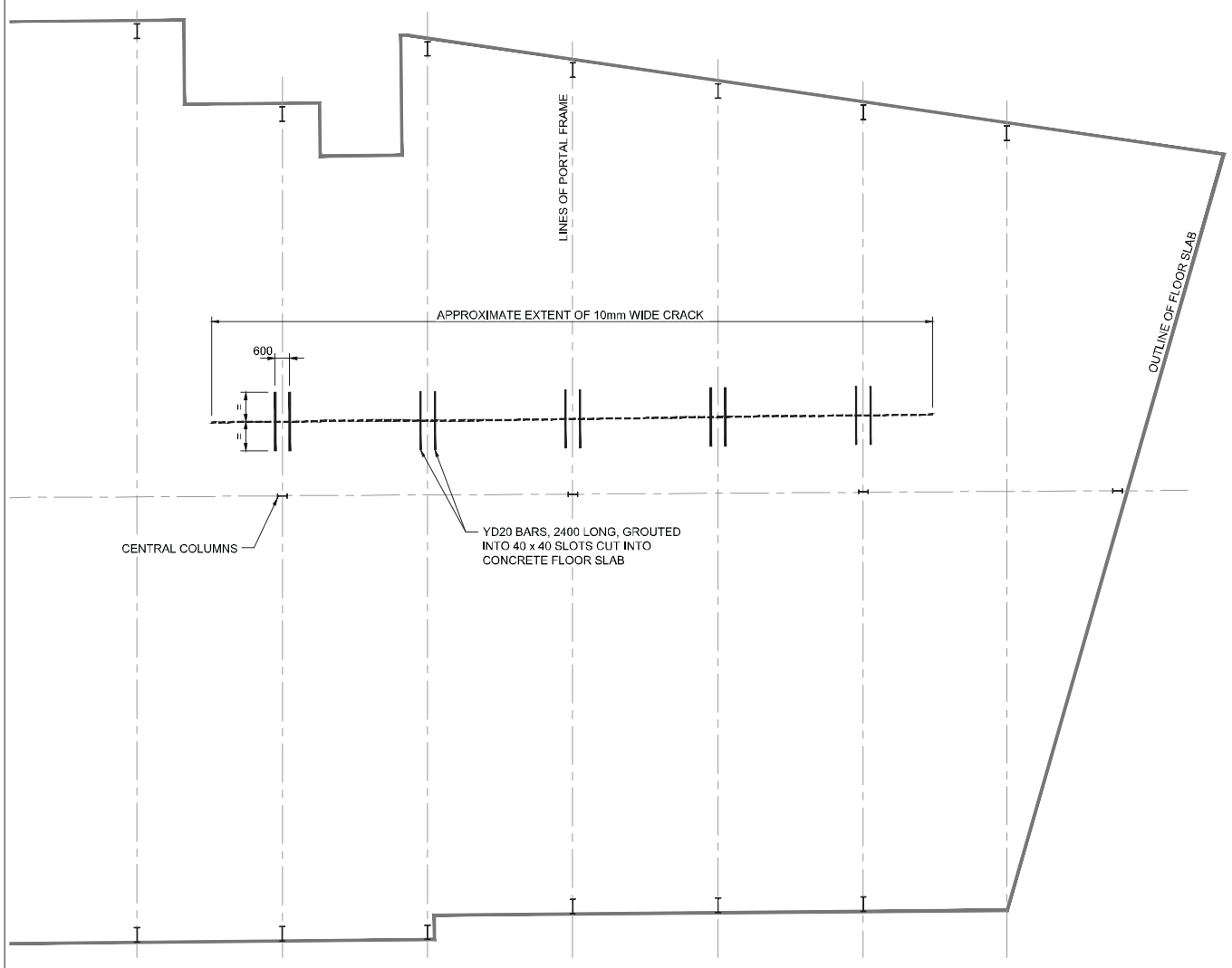
BRACE CONNECTION STRENGTHENING - TYPES 4

LT	RADAKEY	RADAKEY	12/12/12
DESIGNED		1:5 (A1)	6/1366/232/7502

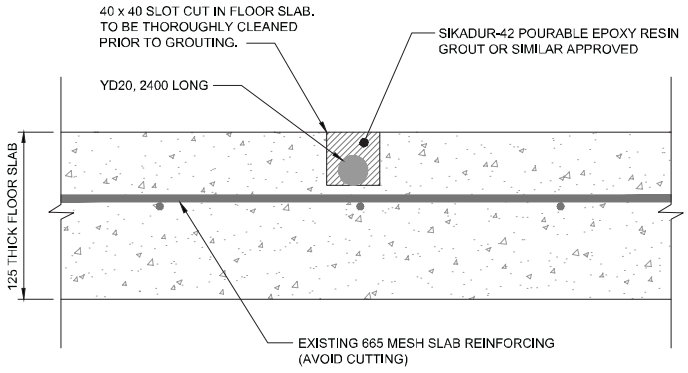
2 R:3



GROUND FLOOR PLAN
SCALE 1:100

NOTES

1. FILL THE LARGE (10mm) CRACK WITH SHRINKAGE COMPENSATED GROUT (SIKAGROUT-212 OR SIMILAR APPROVED). SEAL OFF MEDIUM SIZE CRACKS (>2mm) BY TROWELLING IN A CEMENT MORTAR. SMALLER CRACKS MAY BE LEFT UNSEALED.
2. LEVEL OFF UNEVEN AND SPALLED AREAS OF THE SLAB SURFACE BY EITHER GRINDING OR TREATING WITH A HIGH-BOND FAIRING SCREED.
3. ALL GROUTING SHALL COMPLY WITH MANUFACTURER'S SPECIFICATIONS.



SECTIONAL DETAIL THROUGH FLOOR SLAB
SCALE 1:2

CONSTRUCTION

1:100 @ A1 / 1:200 @ A3 0 1 2 3 4 5 6 7 8 9 10 m

1:2 @ A1 / 1:4 @ A3 0 20 40 60 80 100 120 140 160 180 200 mm

Revision	Amendment	Approved	Revision Date
R1	DRAWING SHEET NUMBER CHANGED	R.A.D.	29/2/2012

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Wellington Office
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Wellington 6144, New Zealand
+ 64 4 471 7000

Drawn	Designed	Approved	Revision Date
I.T.	R.A.DAVEY	R.A.DAVEY	16/12/2011

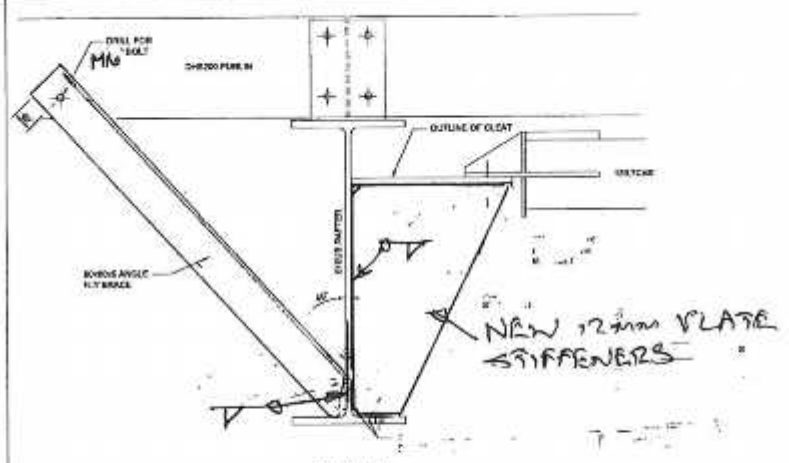
Project No.	Scale
6QUCCC.27	AS SHOWN (A1)

Project:
CHRISTCHURCH CITY COUNCIL
FENDALTON LIBRARY
EARTHQUAKE STRENGTHENING

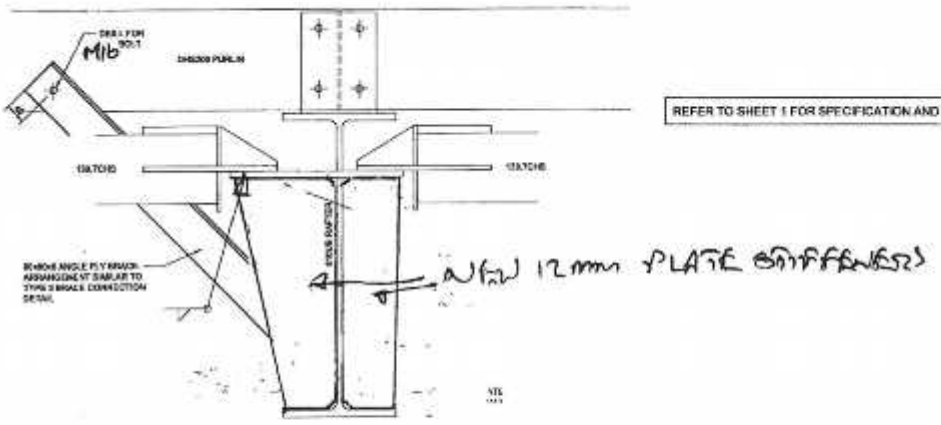
Sheet:
REMEDIAL WORK TO FLOOR SLAB CRACKS

Drawing No.	Sheet No.	Revision
6/1366/232/7502	3	R1

Original Sheet Size A1 [841x594] Plot Date 29/02/12 @ 08:42 g:\locale\thorities\christchurch cc\dwgs\fendalton library\6_1366_232_7502_3.dwg

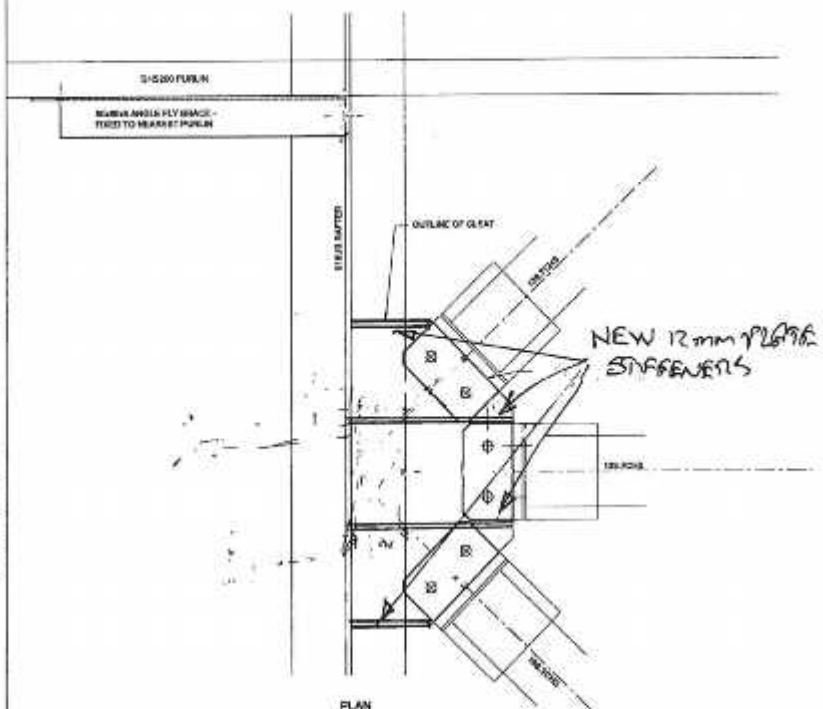


ELEVATION



ELEVATION

REFER TO SHEET 1 FOR SPECIFICATION AND NOTES



PLAN

TYPE 3 BRACE CONNECTION STRENGTHENING

PLAN

TYPE 1 BRACE CONNECTION STRENGTHENING
TYPE 2 CONNECTION SIMILAR

CONSTRUCTION

R1	STIFFENER DETAILING 3/12 REVISED		

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EARTHQUAKE STRENGTHENING

BRACE CONNECTION STRENGTHENING - TYPES 1, 2 & 3

60UCOC.07	1:5 (A1)	6/1366/232/7502	4 R1

Appendix 3 – Fire and Accessibility Compliance Reports

FENDALTON LIBRARY

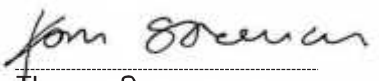
FIRE ENGINEERING REPORT
EARTHQUAKE REINSTATEMENT

Issue A – February 2012

Fendalton Library and Service Centre, Christchurch

FIRE ENGINEERING REPORT
EARTHQUAKE RE-INSTATEMENT

Prepared By



Thomas Spencer
Fire Engineer

Reviewed By

Michael Dunn
Principal Fire Engineer

Opus International Consultants Limited
Christchurch Office
Opus House
20 Moorhouse Avenue,
PO Box 1482
Christchurch, New Zealand

Telephone: +64 9 363 5400
Facsimile: +64 9 365 7858

Date: February 2012
Reference: 6-QUCCC.27
Status: Issue A - Consent

File Location: g:\projects\local authorities\6-quccc.27_fendalton library\4 specifications and reports\fire report\fendalton library fire report 1-2-2011.docx

TABLE OF CONTENTS

Issue Register

Issue	Date	File Name	Comments
A	7 February 2012	Fendalton Library Fire report 1-2-2012	Consent

1 Summary

Opus International Consultants (Opus) have prepared this report for the Christchurch City Council to support a building consent application for the proposed earthquake reinstatement of the Fendalton Library and Service Centre, Jeffreys Road, Christchurch.

The works comprise of some minor structural strengthening, and structural repairs. There are no partition changes intended as part of this work.

The entire building is presently sprinkled (Type 6 system). The sprinklers were installed as a property protection measure.

The drawing on which this report is based is attached in Appendix A.

2 Legislation / Regulations

2.1 Alterations to Existing Buildings 112 (1)

When an existing building is altered, the Building Consent Authority is only able to issue a building consent under Section 112 (1) of the Building Act (2004) if they are satisfied that after the alteration the building will:

(a) comply, as nearly as is reasonably practicable, with the provisions of the building code that relate to-

i) means of escape from fire; and

ii) access and facilities for person with disabilities (if this is a requirement in terms of section 118);and

(b) Continue to comply with the other provisions of the building code to at least the same extent as before the alteration.

3 Scope of Report

To identify the limitations, deficiencies and corrective actions necessary for the proposed alterations to comply with clauses C2, C3 and C4 of the NZBC. The following items are considered:

(a) Earthquake Reinstatement of the library.

4 Building Characterisation

The following is a summary of the building characteristics.

Item	Description
Building Name	Fendalton Public Library
Building Location	4 Jeffreys Road, Christchurch
Building Uses	Public library, administration services, meeting rooms, offices
Description	Entire building is single level
Floor Area	Ground 2010 m^2 (approximately)
Escape Height	0 m
Building Interfaces	Mechanical HVAC Shutdown

Item	Description
Special features	Sprinklers installed throughout
Fire Separation	The entire building forms one firecell
Fire Safety Precautions	The following known features are provided : • Type 6 sprinkler system and manual call points throughout • Emergency lighting in various locations
Boundary Condition	N/A.
Fire Brigade Access and Facilities	Vehicular access is provided to front of building via Jeffries and Clyde Roads

5 Building Description

The Fendalton Library and Service centre is located at 4 Jeffreys Road, Christchurch. The building is single level and includes a public library, as well as the associated administration areas. The building also houses service staff for the Christchurch City council and there is a police area beside . There are no proposed alterations to the existing basement car park.

6 Existing Fire Safety Features

The following fire safety precautions are known to be installed in the building:

(b) Automatic sprinkler system with manual call points throughout (Type 6).

(c) Emergency lighting in escape routes and illuminated exit signage throughout the building (Type 16).

(d) There is (Type 9) shutdown of HVAC plant.

(e) Hand held fire extinguishers and fire hose reels.

7 C/AS1: Part 2: Occupant Numbers and Purpose Groups

7.1 Table 2.1 – Purpose Groups

Space	Purpose Group	FHC
Public library, meeting rooms	CL	2
Administration areas	WL	2
Support areas	IA	2
Police Office	WL	2

Support areas include communications room, toilets and corridors.

7.2 Table 2.2 – WL/CL - Occupant Numbers

Level	Space	Area (m^2)	Densities (p/m^2)	Calculated Occupant Load	Proposed Occupant Load
G	Meeting Rooms 1 to 4	184	0.5	92	92
G	Meeting room 5	50	0.5	25	25
G	Offices/administration areas	400	0.1	41	41
G	Library	1350	0.15	203	203

Level	Space	Area (m^2)	Densities (p/m^2)	Calculated Occupant Load	Proposed Occupant Load
G	Police	30	0.1	3	3
G	Loading dock	60	0.1	6	6
M	Mezzanine plant deck	-	-	-	-
Total Ground Floor		2010		370	370
Total Occupancy					**370**

It is unlikely that all meeting rooms will be occupied simultaneously. We have conservatively assumed that all meeting rooms are occupied whilst the library is fully occupied.

8 C/AS1: Part 3: Means of Escape

8.1 Table 3.1: Number of Escape Routes from a Floor Level

Space	Routes Required	Routes Provided
Ground Floor	2	3
Plant deck	1	1

Code compliance is achieved.

8.2 Table 3.2: Widths of Escape Routes

Type	Widths Required	Widths Provided
Entire Occupancy	2,590	4,000
Library	1,421	3,000

Code Compliance is achieved.

The plant deck is accessed by an external ladder. This area is only accessed by maintenance staff. Given that this is existing (noting that it has a rectangular safety hoop and was originally installed to D1/AS1), and is used for maintenance access only we consider it reasonable to accept the construction as it is.

8.3 Table 3.3: Length of Open and Protected Paths

Space	Type	Purpose Group	Max. Allow. Length (m)	Max Actual Length (m)
Meeting Rooms 1 to 4	DEOP	CS	36	8
Meeting Rooms 1 to 4	TOP	CS	90	38
Meeting room 5	DEOP	CS	36	11
Meeting room 5	TOP	CS	90	64
Offices/administration areas	DEOP	WL	48	12
Offices/administration areas	TOP	WL	120	68
Library	DEOP	CL	36	11

Space	Type	Purpose Group	Max. Allow. Length (m)	Max Actual Length (m)
Library	TOP	CL	90	80
Police	DEOP	WL	48	16
Loading dock	DEOP	IA	48	8
Mezzanine plant deck	DEOP	IA	48	27

(1) Allowable total open path (TOP) and dead end open path (DEOP) travel distances have been increased by 100 % in accordance with Clause 3.5 of C/AS1 as a Type 6 sprinkler system with manual call points is installed throughout.

(2) Travel lengths on the plant deck mezzanine (note that the deck is open to the outside) have included the 1.5 travel allowance factor on the deck and for the ladder have included a travel allowance factor of 3.

Code compliance is achieved.

8.4 Features of Escape Routes

8.4.1 Locking Devices

The automatic sliding entrance doors need to operate failsafe on power failure.

Doors on escape routes need to be able to be easily opened on the inside without the need of a key. Any security doors on egress routes need to be provided with “In Emergency Push to Release switches” installed adjacent to the security door.

8.4.2 Directions of Door Opening

Doors on escape routes shall be hung to open in egress direction where occupant number is over 20 in an open path. The meeting rooms are not intended to have any more occupants than 20. The direction of door openings comply with the requirements of C/AS1 as indicated on the attached drawings SK 001 FE (this layout was as originally consented in 1999).

8.4.3 Exit Signage

Exit signs shall be provided and comply with F8/AS1. The locations of existing and recommended Exit signage locations are shown on attached drawings SK 001 FE.

9 C/AS1: Part 4: Requirements for Firecells

9.1 Table 4.1/1 Purpose Group WL/CL for between 101 and 500 occupants in a Firecell

For a ground level WL/CL firecell with an occupant load less than 1000, the following precautions are required:

(a) Fire resistance rating of F0.

(b) Type 3f automatic fire alarm system with heat detectors and manual call points.

(c) Type 16 - Visibility in escape routes over final Exits and throughout those parts of escape routes that exceed the initial 20 metres of travel in accordance with F6/AS1.

(d) Type 18c

(e) – Fire Hydrant System. This feature is only required when hose runs from the fire service appliance to any point in the building is greater than 75.0 m.

9.2 Proposed Fire Safety Precautions

The following fire safety precautions are proposed throughout the Fendalton Library and service centre building.

(a) Reinstate sprinkler coverage to NZS 4541:1996. (This is the standard that the sprinkler system was installed to). If more than 18 heads are to be altered the fire protection contractor needs to provide an FPIS certificate, otherwise the fire protection contractor is to provide a producer statement stating that the sprinkler system has been reinstated to NZS 4541.

(b) Reinstate manual call point and sounder coverage to NZS 4512. Note that less than 40% of the building is being altered so a compatibility of sound needs to be retained throughout and sounder levels only need to comply with the standard, i.e. it is not intended to upgrade the sounders throughout. It is not intended to modify the existing fire alarm panel. At completion the fire protection contractor is to provide a producer statement stating that the alterations comply with the standard.

(c) Maintain the existing Type 9 shutdown feature for HVAC plant that was originally installed.

(d) The existing fire hose reel and fire extinguisher coverage is to be retained and maintained in accordance with NZS 4503.

(e) Review emergency lighting and extend the emergency lighting coverage where necessary to meet the requirements of F6/AS1.

(f) Alter and extend the emergency egress signage to meet the requirements of F8/AS1.

10 C/AS1: Part 5: Fire Resistance Ratings

10.1 'F' Ratings

The building forms one firecell. As the building is sprinkled throughout there is no limitation in fire cell area. There are proposed to be no partitioning changes to the building as part of the Earthquake reinstatement work.

There is a plant deck above the roof (unloading bay areas where gas fired heating is provided). This plant is located outside above the deck. The deck is of concrete construction and the deck and it's supporting structure (concrete tilt slab) and the floor and supporting structure is likely to provide the minimum required F15 rating (for a mezzanine level that is sprinkled).Given that the construction is existing we consider it reasonable to accept it as it is.

10.2 Evaluation of 'S' Rating

Calculations of the 'S' ratings is not a requirement of Section 112 of the Building Act 2004, noting that the building is not undergoing a Change of Use or any of the external walls are being altered.

11 C/AS1: Part 6: Control of Internal Fire and Smoke Spread

11.1 F' Ratings

The building forms one firecell.

11.2 Foamed Plastics

Any exposed foamed plastics need to be encapsulated to meet with the flame barrier requirements of C/AS1 6.20.13

11.3 Surface Finishes of Walls and Ceilings

Where alterations are carried out, the surface finishes of ceilings and walls in all occupied spaces are required to comply with the following indices:

In respect to internal surface finishes the following Table C/AS1 6.2 applies to new work for ceilings and should apply to other areas in future refurbishments. Because the building is sprinkled only ceiling surface finish requirements need to apply.

Space	SFI	SDI	FI
Public areas	not >2	not >5	-
Corridors	not >7	not >5	-
All other areas	not >5	not >10	-
	or not >9	or not >8	-
Flexible fabrics	-	-	12

12 C/AS1: Part 7: Control of External Fire Spread

No changes to the external walls of the building are proposed and therefore consideration of external fire spread is not required under Section 112 of the Building Act 2004. Note that in any case the external are greater than 1 metre from any external boundaries.

13 C/AS1: Part 8: Fire Fighting

There are no proposed changes to the existing fire service access as part of these alterations therefore the existing building complies.

14 Conclusion

In order to ensure that the earthquake re-instatement of the Fendalton Library and Service Centre at 4 Jeffrey's Road, complies with C/AS1 the following work needs to be undertaken.

1. Reinstate sprinkler coverage to NZS 4541:1996. (This is the standard that the sprinkler system was installed to). If more than 18 heads are to be altered the fire protection contractor needs to provide an FPIS certificate, otherwise the fire protection contractor is to provide a producer statement stating that the sprinkler system has been reinstated to NZS 4541.
2. Reinstate manual call point and sounder coverage to NZS 4512. Note that less than 40% of the building is being altered so a compatibility of sound needs to be retained throughout and sounder levels only need to comply with the standard, i.e. it is not intended to upgrade the sounders throughout. It is not intended to modify the existing fire alarm panel. At completion the fire protection contractor is to provide a producer statement stating that the alterations comply with the standard.

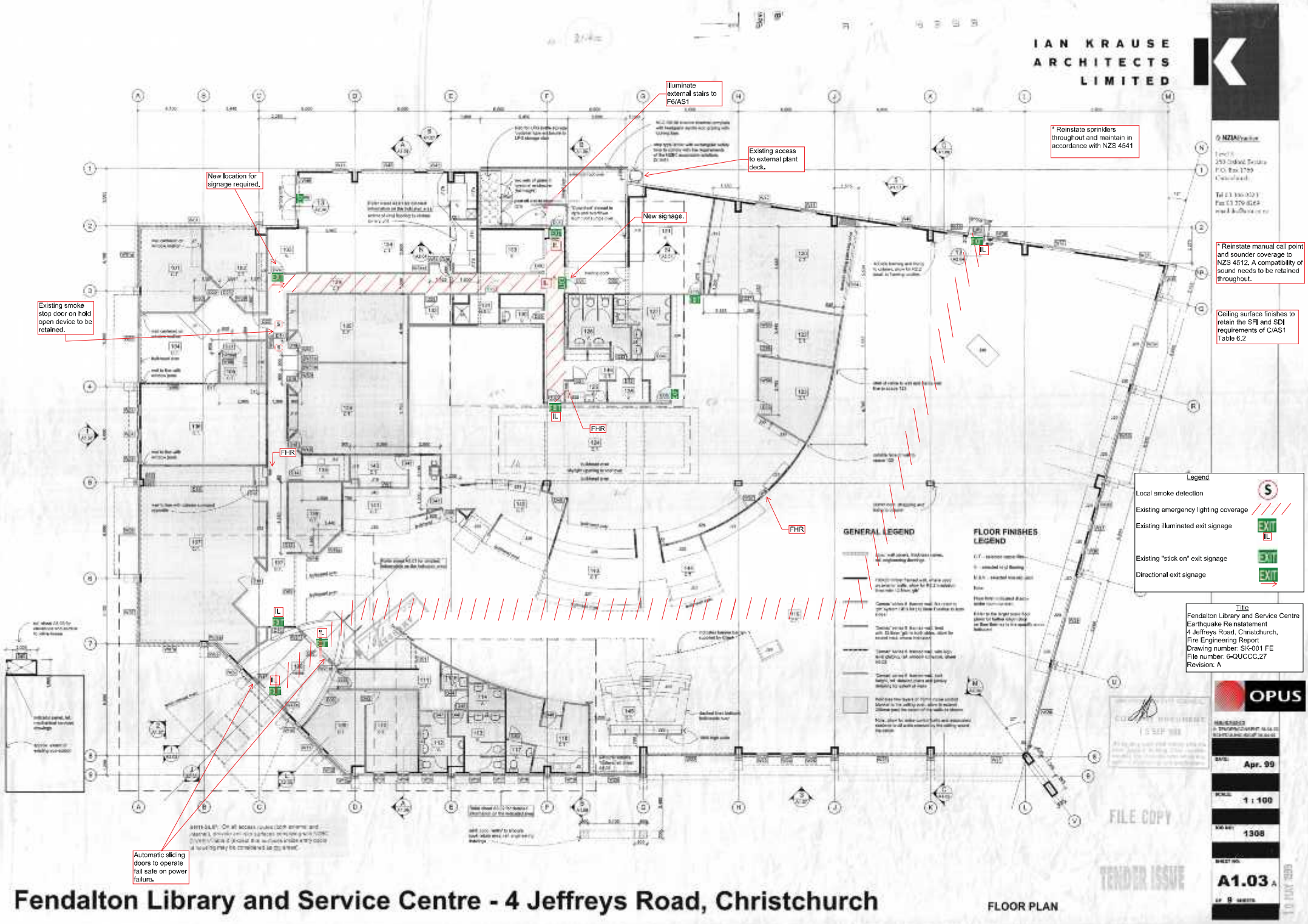
3. Maintain the existing Type 9 shutdown feature for HVAC plant that was originally installed.
4. The existing fire hose reel and fire extinguisher coverage is to be retained and maintained in accordance with NZS 4503.
5. Review emergency lighting and extend the emergency lighting coverage where necessary to meet the requirements of F6/AS1. Refer to drawing attached that covers the emergency lighting coverage.
6. The automatic sliding entrance doors need to operate failsafe on power failure.
7. Egress Doors need to be able to be opened from the inside without the need of a key. Where there are security doors on egress routes the existing "In Emergency Push to Release" switches located adjacent to the doors that allow the security locks to release in an emergency are to be retained.
8. Any exposed foamed plastics need to be encapsulated to meet with the flame barrier requirements of C/AS1 6.20.13.
9. Alter and extend the emergency egress signage to meet the requirements of F8/AS1.

Provided that the above is carried out we consider that the earthquake remedial work for the Fendalton library and service centre will meet with the requirements of section 112 "Means of Escape" under the building code.

15 Appendix A – Drawings

The following drawings are included as part of this report.

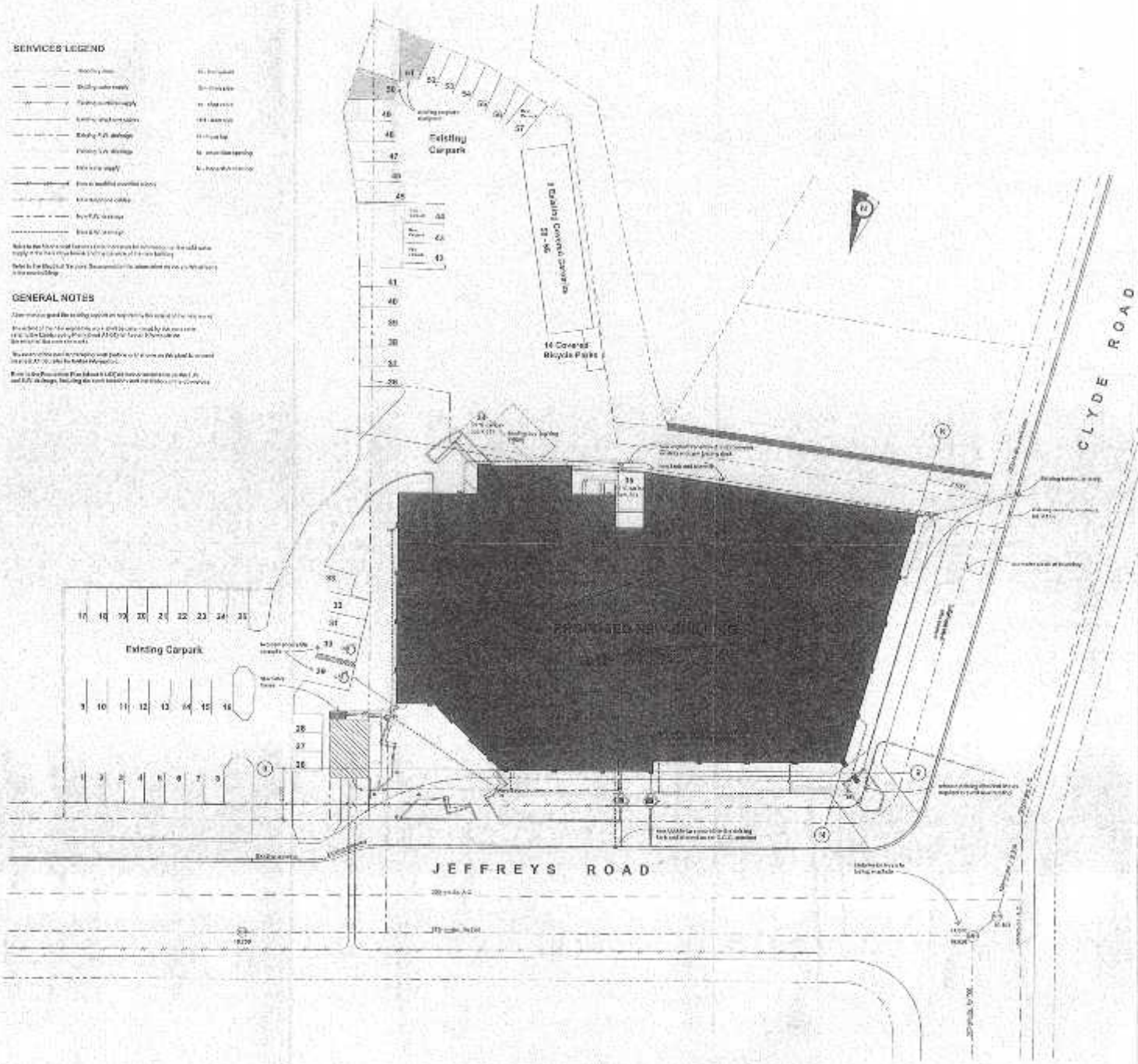
Drawing Title	Drawing Number	Sheet Number	Revision
	—		—
Ground Floor Plan - Fire Safety Design	SK-001FE	-	A
Site Plan (Ian Krause Architects Ltd)	1308	A1.01	Aug 99


IAN KRAUSE ARCHITECTS LIMITED
Illuminate external stairs to F6/AS1
Existing access to external plant deck.
New location for signage required.
New signage.
* Reinstate sprinklers throughout and maintain in accordance with NZS 4541
* Reinstate manual call point and sounder coverage to NZS 4512. A compatibility of sound needs to be retained throughout.
Ceiling surface finishes to retain the SFI and SDI requirements of C/AS1 Table 6.2
Existing smoke stop door on hold open device to be retained.
FHR
FHR
FHR
IL
IL
IL
IL
Automatic sliding doors to operate fail safe on power failure.
GENERAL LEGEND
FLOOR FINISHES LEGEND
Legend
Local smoke detection
Existing emergency lighting coverage
Existing illuminated exit signage
Existing "stick on" exit signage
Directional exit signage
Title
Fendalton Library and Service Centre
Earthquake Reinstatement
4 Jeffreys Road, Christchurch,
Fire Engineering Report
Drawing number: SK-001 FE
File number: 6-QUCCC.27
Revision: A
OPUS
Apr. 99
1 : 100
1308
A1.03 A
FILE COPY
TENDER ISSUE
Fendalton Library and Service Centre - 4 Jeffreys Road, Christchurch
FLOOR PLAN

IAN KRAUSE
ARCHITECTS
LIMITED

SERVICES LEGEND

GENERAL NOTES



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Aug. 99

1 : 250

1308

A1.01

Fendalton Library and Service Centre - 4 Jeffreys Road, Christchurch

SITE PLAN

Accessible Facilities Report Template

Applicant Information Sheet and Report Template

CCC Use Only:	Project No: 6-QUCCC.27	TRIM Ref:

Project Address: *4 Jeffrey's Road, Christchurch*
(include Level and Unit No)

If you have not used this template previously or need to reacquaint yourself on how to use this template please refer to the notes section on the last two pages for guidance notes.

All proposed features (including upgrade actions) must be shown on the plans and specifications.

COMPLETE SECTIONS 1-17 FOR BOTH NEW AND EXISTING BUILDINGS

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
1. CAR PARKS (NZBC D1.3.5 & D1/AS1/10 (AS 2890.1), NZS 4121 SECTIONS 5 & F3)			
☐ **NOT APPLICABLE (specify reason why):**			
Provided at the ratio of 1 for up to 20, 2 for up to 50, plus 1 more for every additional 50 parks (or part thereof)(NZS 4121). Although this differs from our Proposed City Plan, our Planners will accept this Standard.	*Drawing Sheet A1.01*	*Compliant*	*No upgrade required* –
Identified by the symbol of access (on ground or post)	*Refer to accompanying photo schedule*	*Compliant*	*No upgrade required*
Location of accessible car park is either visible from a vehicle at the entrance to the car park area, or is sign posted from the entrance to the parking area.	*Drawing Sheet A1.01*	*Compliant*	*No upgrade required*
Min. 3500mm width (NZS 4121). Min. 3200mm width (AS2890.1 Fig. 2.2) but 3500mm if beside an obstruction (D1/AS1/10.1.1 Comment)	*Drawing Sheet A1.01*	*Compliant*	*No upgrade required*
Located on an accessible route, as close as possible to the building accessible entry	*Drawing Sheet A1.01*	*Compliant*	*No upgrade required*
Located on a surface with a max. 1:50 slope		*Compliant*	*No upgrade required*
Located to avoid conflict between vehicles and people, and provided with direct access to an accessible route without having to pass behind parked cars	*Drawing Sheet A1.01*	*Compliant*	*No upgrade required*

Christchurch City Council

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
2. RAMPS & FOOTPATHS (NZBC D1, D1/AS1/2.3, 3.0 & 6.0, NZS 4121 SECTION 6)			
☐ **NOT APPLICABLE (specify reason why):**			
Where the footpath surface is more than 25mm above adjacent ground, either a 75mm high kerb or a low barrier rail is required.		*Compliant*	*No upgrade required*
Accessible routes have a cross fall of no more than 1:50.		*Compliant*	*No upgrade required*
Footpaths and ramps have a min. 1200mm clear width (1000mm between handrails)		*Compliant*	*No upgrade required*
Footpaths and ramps have non slip surface (refer D1/AS1 Table 2)		*Compliant*	*No upgrade required*
Portable ramps are not permitted.		*N/A*	*No upgrade required*
Ramps have a max. gradient of 1:12 (preferably 1:14)		*N/A*	*No upgrade required*
Ramps have landings top and bottom, extending 1200mm beyond any doorway or door swing. Landings may have a maximum gradient, in the direction of travel, of 1:50		*N/A*	*No upgrade required*
All ramps have an upstand or a low rail to prevent wheel-chair wheel from running off edge		*N/A*	*No upgrade required*
Ramps steeper than 1:20 have handrails both sides, continuing for 300mm beyond head and foot of ramp, plus an intermediate safety rail where not against a wall or barrier (NZS 4121 Fig. 12)		*N/A*	*No upgrade required*
Height of handrails is between 840mm and 1000mm vertically above "plane" surface of ramp		*N/A*	*No upgrade required*
Handrail diameter is between 32mm and 50mm (or to Fig. 26(b) D1/AS1)		*N/A*	*No upgrade required*
Handrails have clearance between 45mm and 60mm from wall		*N/A*	*No upgrade required*
Handrails have projecting ends (NZS 4121 Fig. 13)		*N/A*	*No upgrade required*
Ramp landings (and rest areas) allow 1200mm space clear of door swings		*N/A*	*No upgrade required*
Max. rise between landings is 750mm		*N/A*	*No upgrade required*
3. KERB RAMPS (D1/AS1/3.4, NZS 4121 SECTION 13) **AND STEP RAMPS** (NZS 4121 SECTION 6)			
☒ **NOT APPLICABLE (specify reason why):** *There are no changes in level on the access route requireing a kerb ramp*			
Footpath portion of kerb ramp has gradient no steeper than 1:8, and no longer than 1500mm			
Road/gutter segment of kerb ramp has gradient no steeper than 1:20			
Kerb ramp has no lip at common surface (gutter channel)			
Kerb ramp has contrasting colour and texture to adjacent footpath, gutter or road.			
Step ramps replace isolated steps, and are no steeper than 1:8, max. 190mm high, and max. 1520mm long, with min. 1200mm long landing. (NZS 4121 Fig. 16)			

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
4. MAIN ENTRANCE AND ALL ACCESSIBLE ROUTES, INCL. CORRIDORS, DOORWAYS & DOORS (NZBC D1.3.4(f), D1 AS1/7.0, FIG.27, NZS 4121 SECTION 7)			
☐ **NOT APPLICABLE (specify reason why):**			
The main entrance is on the accessible route	*Drawing Sheet A1.01*	*Compliant*	*No upgrade required*
If the main entrance is not accessible, it has signage indicating location of accessible entrance.		*N/A*	*No upgrade required*
Preferably there are no thresholds in doorways. If they cannot be avoided, they are max. 20mm high, or 56mm high if a 1:8 max. ramp is provided both sides (NZS 4121 Fig. 17)	*Refer to accompanying photo schedule*	*Compliant*	*No upgrade required*
There are accessible routes extending from the accessible entry to all spaces that are required to be accessible, 1200mm min. width		*Compliant*	*No upgrade required*
If existing corridors are less than 1200mm wide, doorways off it are made wider to compensate.	*N/A*	*Compliant*	*No upgrade required*
Doorways have 760mm min. clear opening (unless from narrow corridors where wider clear openings are required)		*Compliant*	*No upgrade required*
Double doors have at least one leaf which provides 760mm min. clear opening.		*Compliant*	*No upgrade required*
Doors are colour-contrasted with their surroundings	*Refer to accompanying photo schedule*	*Compliant*	*No upgrade required*
Doors with dual swing have visibility glazing panels		*N/A*	*No upgrade required*
Doors with full height glazing have manifestation markings 700 -1000mm above floor.		*Compliant - although sidelights, borrowed lights and some exterior glazing do not have transoms or manifestatins*	*OPUS recommends manifestations to all full height glazing internal and external where compliant transoms do not exist.*
Clear space between successive doors is 1200mm min. (Fig. 27 D1/AS1)		*Compliant*	*No upgrade required*
Where doors open towards wheelchair, an unobstructed wall space not less than 300mm wide is required at side of door adjacent to door handle	*Drawing Sheet A1.03 Refer to accompanying photo schedule*	*Non-Compliant - D.16 measures 285mm*	*No upgrade required -not feasible to relocate wall*
Forces required to open non-fire doors are within limits		*Compliant*	*No upgrade required*
5. PUBLIC FACILITIES (NZBC G5.3.4, NZS 4121 SECTION 11)			
☐ **NOT APPLICABLE (specify reason why):**			
Where public counters or desks are provided in reception areas, bars, shops and supermarkets, at least one is accessible, for both the public and for the staff using it.	*Refer to accompanying photo schedule*	*Non-Compliant*	*Modification of existing counter required for compliance*
Accessible portion of counter has top of work surface 775mm max. above floor, with 675mm min. height clearance under for a depth of 540mm.	*Refer to accompanying photo schedule*	*Non-Compliant*	*Modification of existing counter required for compliance*
Public telephones comply with NZS 4121 Section 11.2		*N/A*	*No upgrade required*

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
6. LIFTS (NZBC D1.3.4 (c), D2.3.5, D2/AS1/71, NZS 4121 SECTION 9)			
☒ **NOT APPLICABLE (specify reason why):** *Not applicable - single storey building*			
Lifts are required as follows: • In all buildings with four or more floors • In a three floor building when the total gross floor area of the two upper floors is 500m² or more and the design occupancy exceeds 50 persons • In a two floor building when the gross floor area of upper floor is 400m² or more and the design occupancy exceeds 40 persons • Notwithstanding any of the above, a lift is required if an upper floor is used for: a place of assembly for 250 or more persons, public reception area for a bank, central and local government offices and facilities (including libraries), medical and dental rooms, health care centres • Notwithstanding any of the above, lifts are not required in two or three storey hotels and motels provided that the accessible accommodation units, reception office, restaurant, bars and other communal facilities are on the ground floor (NZS 4121 clause 14.4.1)			
At least one lift is on the accessible route			
Lobbies have 1800mm min. unobstructed depth in front of lift doors			
Car floor has 1400mm x 1400mm min. internal dimensions			
Doors have 900mm min. clear opening			
Doors are readily distinguishable from their surroundings			
Doors remain open for at least 5 seconds before starting to close			
Car has handrails on walls to NZBC D1/6.0 or NZS 4121 Fig. 26			
All controls are located between 900mm and 1350mm above the floor			
All controls have tactile features			
Lift indicators are provided as NZS 4121:2001 clause 9.2.5			
7. STAIRS (NZBC D1.3.4(g)(h)(i), D1/AS1/4.0, 4.2, 4.4, 4.5, NZS 4121 SECTION 8)			
☒ **NOT APPLICABLE (specify reason why):** *Not applicable*			
All multi-storeyed buildings that are required to be accessible have at least one accessible stair.			
Stair treads 310mm min.; Risers 180mm max. (of uniform height over each flight)			
Stair has 900mm min. width between handrails			

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
Landings have 900mm min. depth (1200mm recommended)			
Max. total rise of 2500mm between landings			
No open risers, no winders, no spiral stairs			
Nosings are rounded, and colour contrasted with rest of tread			
Colour-contrasted change of floor surface texture are provided at head and foot of stair. (NZS 4121 Fig. 22)			
8. STAIR HANDRAILS (NZBC D1.3.4(i), D1/AS1/6.0, NZS 4121 SECTION 8.6)			
☒ **NOT APPLICABLE (specify reason why):** *Not applicable*			
Are provided on both sides of the stair			
Have no obstruction to the passage of the hand along the rail			
Are continuous around landings (except at doorways)			
Extend 610mm min beyond the foot of the stair and 300mm min beyond the head of the stair			
At the same slope as the pitch line			
Between 900mm and 1000mm above pitch line			
Profiles are to D1/AS1 Fig. 26(b)			
Have no projecting ends, and have domed buttons 150mm from the ends (NZS 4121 Fig. 23)			
9. TOILET FACILITIES (NZBC D1.3.2 (c) & G1.1 & 1.3.4 G1/AS1, NZS 4121 SECTION 10)			
☐ **NOT APPLICABLE (specify reason why):**			
Accessible toilets are on the accessible route	*Drawing Sheet A1.03*	*Compliant*	*No upgrade required*
Route to accessible toilets does not traverse different tenancies	*Drawing Sheet A1.03*	*Compliant*	*No upgrade required*
Minimum dimensions of space are 1900mm x 1600mm, and the layout of fittings is correct		*Compliant*	*No upgrade required*
In certain large buildings having more than 300 occupants, accessible toilets are evenly distributed		*Compliant*	*No upgrade required*
If doors are hinged, they swing outwards unless the space is sufficiently large (sliding doors are also acceptable)	*Drawing Sheet A1.03*	*Compliant*	*No upgrade required*
Door has 760mm min. clear opening (with 1200mm clear space in any lobby between door swing arcs)		*Compliant*	*No upgrade required*
If hinged, the door has a grab rail on inner face	*Refer to accompanying photo schedule*	*Compliant*	*No upgrade required*
Indicator bolt is of sufficient size so as to be usable by person with limited hand movement	*Refer to accompanying photo schedule*	*Compliant*	*No upgrade required*

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
Horizontal leg of grab rail beside WC pan is fixed 700mm above floor		*Compliant*	*No upgrade required*
Vertical leg of grab rail is fixed between 150mm and 250mm from front of WC pan		*Compliant*	*No upgrade required*
Top of WC pan seat is 460mm above floor		*Compliant*	*No upgrade required*
Front edge of WC pan is 700mm - 750mm from wall behind it		*Compliant*	*No upgrade required*
Toilet paper holder is located in the correct zone		*Compliant*	*No upgrade required*
Washbasin has 675mm min. underside clearance from floor, and is located 300mm min. from the front of the WC pan		*Compliant*	*No upgrade required*
Taps on washbasin have capstan or lever handles (hot tap to left of cold tap)		*Compliant*	*No upgrade required*
Any nappy-changing tables do not intrude into the wheelchair manoeuvring space		*Compliant*	*No upgrade required*
10. SHOWERS (NZBC G1.3.4, G1/AS1/TABLE 9, NZS 4121 SECTION 10)			
☐ **NOT APPLICABLE (specify reason why):**			
If the building requires showers, at least one is accessible. If the building use does not require showers, but has two or more showers, at least one is accessible (BIA News No.131)	*Refer to accompanying photo schedule*	*Compliant - building does provide a shower but is not required to.*	*No upgrade required*
Minimum internal dimensions of combined toilet/shower space are 2100mm x 1900mm		*Compliant*	*No upgrade required*
Accessible shower is on an accessible route	*Drawing Sheet A1.03*	*Compliant*	*No upgrade required*
If doors are hinged, they swing outwards unless the space is sufficiently large (sliding doors are also acceptable)		*Compliant*	*No upgrade required*
Shower door has 760mm min. clear opening		*Compliant*	*No upgrade required*
Shower has self draining floor with no lip or upstand		*Compliant*	*No upgrade required*
Floor covering is of impervious, non-slip material		*Compliant*	*No upgrade required*
Grab rail is of correct shape, size and position		*Compliant*	*No upgrade required*
Mixing valve is lever-operated, and is fixed 1100mm above floor		*Compliant*	*No upgrade required*
Hand-held shower rose on flexible hose		*Compliant*	*No upgrade required*
Shower head can be fixed to slide rail between 1000mm and 1900 mm above floor. Slider rail is to be as strong as a grab rail		*Compliant*	*No upgrade required*
Shower seat is 800mm min. length x 450mm, in correct position		*Compliant*	*OPUS recommends replacement of shower seat with new compliant seat*
Clothes-hanging device is located between 1200mm and 1350mm above the floor		*Compliant*	*No upgrade required*

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
11. DOOR & WINDOW CONTROLS AND LIGHT SWITCHES (NZBC D1.3.4(f), G9/AS1, NZS 4121 Sections 4,7, C5)			
☐ **NOT APPLICABLE (specify reason why):**			
Doors can be opened with one hand		*Compliant*	*No upgrade required*
Door handles are fixed between 900mm and 1200mm (1000mm optimum) above floor		*Compliant*	*No upgrade required*
Door handles are lever action, with end returned towards door (knob handles are not permitted)		*Compliant*	*No upgrade required*
Door closers have minimum tension required to bring door to closed position		*Compliant*	*No upgrade required*
Electronic access units are located as NZS 4121 clause 4.11.5		*Compliant*	*No upgrade required*
Window locking and opening controls are located between 900mm and 1200mm above the floor		*N/A*	*No upgrade required*
Light switches throughout building are horizontally aligned with door handles		*Compliant*	*No upgrade required*
Socket outlets are located 500 -1200mm above the floor		*Non-Compliant - skirting socket outlets typically mounted 300mm AFFL*	*Not feasable to relocate all skirting socket outlets due to costs*
12. VISIBILITY FACTORS (NZBC F2, G7 AND G8, NZS 4121 215, D1/AS1/1.5.4 & 1.8)			
☐ **NOT APPLICABLE (specify reason why):**			
All signs, information boards and all elements of accessible routes are well illuminated		*Compliant*	*No upgrade required*
Check D1/AS1 1.5 "Obstructions"		*Compliant*	*No upgrade required*
13. ALERTING DEVICES (F7/AS1/2.1, NZS 4121 CLAUSES 4.12 & 4.13)			
☒ **NOT APPLICABLE (specify reason why):** *Not applicable*			
Alerting devices (where required) have both audible and visual signal (see 'ACCESSIBLE ACCOMMODATION' section 16)			
14. PLACES OF ASSEMBLY, ENTERTAINMENT & RECREATION (D1/AS1/8.0, G5.3.5, NZS 4121 Sections 12, H)			
☒ **NOT APPLICABLE (specify reason why):** *Not applicable*			
Where a sound amplification system is installed, it has a listening system for people with hearing aids			
Two wheelchair spaces are provided for up to 250 seats, plus one for every additional 250			
Wheelchair spaces are located amongst other seating, and evenly distributed where possible			
An accessible route is provided to podium or stage area, including to all back-stage areas (portable ramps are not permitted)			
Swimming pools have unaided access into the water (preferably by a ramp at max. 1:12 slope)			
Sports tracks and fields are accessible			

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
15. SIGNS (BUILDING ACT CL. 47A(5), NZBC G5.3.5, 5.3.6 & F8.3.4, F8/AS1/5.0, NZS SECTIONS 3.6 & 4.8)			
☐ **NOT APPLICABLE (specify reason why):**			
Signs are positioned on walls, doors, etc, between 1400mm and 1700mm above the floor		*Compliant*	*No upgrade required*
International symbol of access is displayed outside the building or so as to be visible from outside it.		*Non-Compliant*	*Fit new sign to exterior of main entrance*
Access symbol on main information board(s) identifies location of lift, accessible routes, toilets, rooms with listening aids, etc.		*Non-Compliant*	*New signage required*
Accessible toilets / showers are identified with an access symbol on entrance door.		*Compliant*	*No upgrade required*
All symbols have correct proportional layout, lettering and colour contrast with background.		*Compliant*	*No upgrade required*
Identify facilities: • accessible car park spaces • accessible entrance • services available in building • accessible routes, lifts and / or stairs • toilet / shower facilities • rooms with listening aids		*Compliant*	*No upgrade required*
16. ACCESSIBLE ACCOMMODATION UNITS (NZS 4121 SECTION 14, D1/AS1/9.0, G3.1(c), G9/AS1)			
☒ **NOT APPLICABLE (specify reason why):** *Not applicable*			
In hotels, motels, hostels, halls of residence, holiday cabins, groups of pensioner flats, boarding houses, guest houses, old peoples homes, and other buildings providing accommodation for the public, accessible units (including kitchen, bedroom, shower/toilet arrangement, laundry and all other accessible features and route requirements) are provided as follows: Total guest units: 1-10 / 11-25 Accessible units required: 1 / 2 For every additional 25 guest units, 1 accessible unit is required.			
An accessible car park is available at the main accessible entrance to assist those booking in/out			
Reception counters are accessible (see 'PUBLIC FACILITIES' on page 3)			
In hotel or motel complexes, an accessible telephone and toilet is available in public areas for guests, casual patrons and staff			
Bedrooms, sitting and dining areas, kitchens and laundries have 1500mm dia. wheelchair turning circle			
If the unit has kitchen and/or laundry facilities, these are fully accessible (refer to NZS 4121 Section 14 for detailed requirements)			

Required Feature	Reference where found on drawings / specification, e.g. sheet 3, detail 2. (all buildings)	Current Situation (existing buildings only)	Upgrade action proposed under Sections 112 or 115 of the Building Act. (existing buildings only)
If a building has common laundry facilities, at least one of these is accessible (BIA News No.67 Pg. 2, 3)			
Socket outlets are fixed between 500mm and 1200mm above the floor, at least 500mm from internal corners of rooms, and within a 500mm horizontal dimension from the front edge of any bench or fixed unit			
Telephone, television and radio controls, wardrobe rails, curtain pull cords, are easily reachable			
At least one room light has a bedside switch			
Where an ablution block contains communal toilet/shower facilities, there is also one or more all-gender accessible toilet/shower(s) provided			
17. OTHER FACILITIES USED BY PEOPLE WITH DISABILITIES (in order for persons with disabilities to carry out *'...normal activities and processes in that building'* as Building Act 2004 section 118(1)(b))			
☒ **NOT APPLICABLE (specify reason why):** *Not applicable*			
Fitting rooms in clothes shops (or the like) having 1500mm dia turning circle, clothes hooks at 1350mm max. above floor (or two adjoining rooms of a similar overall size, with a drawable curtain between)			

COMPLETE IN FULL FOR ALL EXISTING BUILDINGS

Report Prepared by: *Stephen Parkes*

Contact Details: **Phone:** [Day]: *03 363 5497* **Mobile:** **Email:** *Stephen.parkes@opus.co.nz*

Has a site visit been carried out? ☒ Yes ☐ No **Date of Visit:** *3/01/2012*

Has the building previously been upgraded?

☒ No

☐ Unknown

☐ Yes - provide details, e.g. project number(s):

I declare that this report is a true and accurate reflection of the accessible features currently in the building.

Signed: **Dated:** *01/02/2012*

Signature of: *Stephen Parkes* ☐ **Owner** / ☒ **Agent** [on behalf of and with the consent of the owner]

[print name]

The following pages are guidance notes and do not need to be submitted to Council with your application.

Accessibility Photo Report
Non-Compliant Items

Read in conjunction with the Christchurch City Council Accessible Facilities Report Form B-065 accompanying this document.

A non-invasive visual inspection was carried out.

1. Particulars:

Report carried out by: Stephen Parkes

Date of Report: 3rd February 2012

Date of visit: 31st January 2012

2. Property:

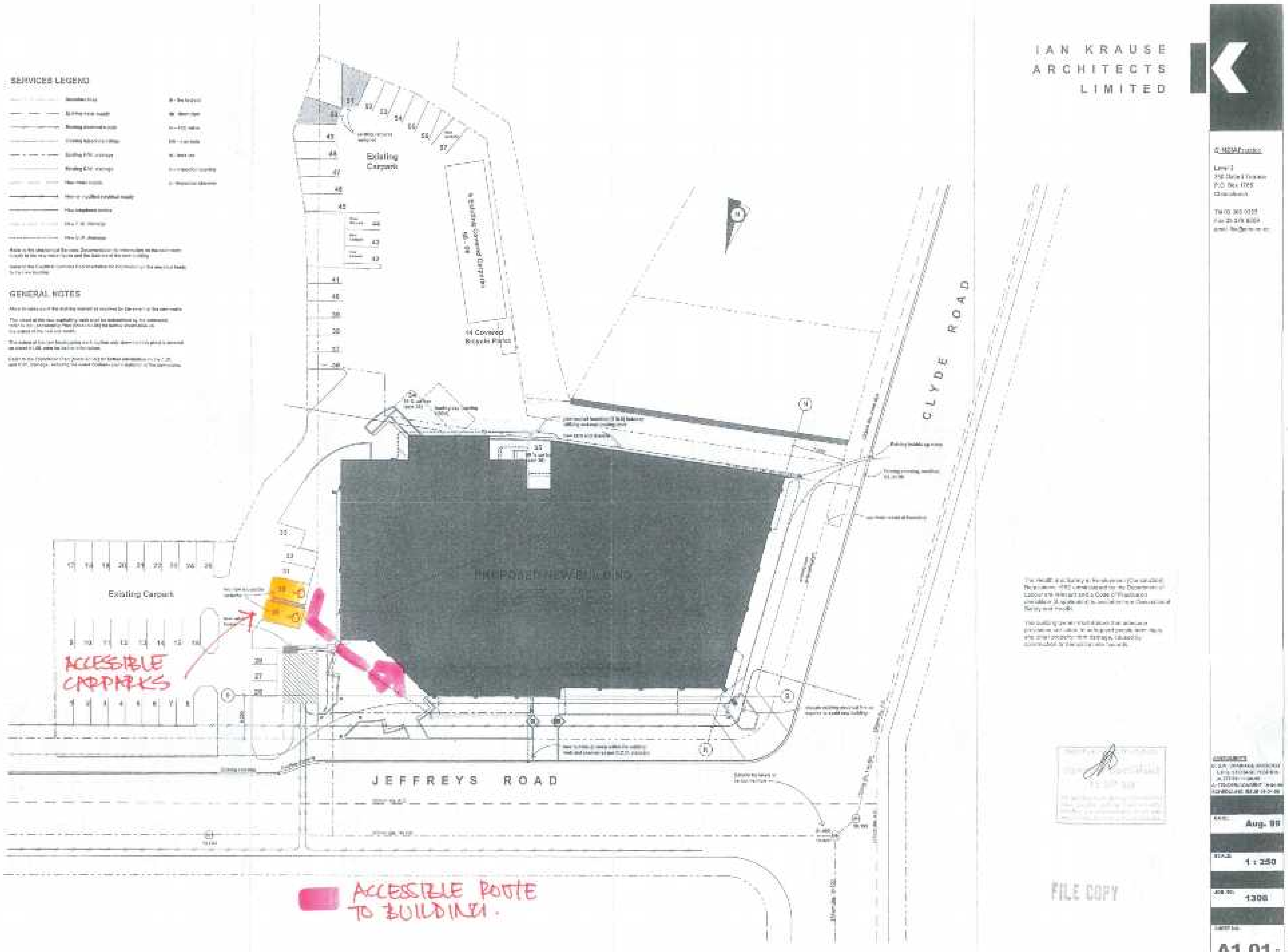
Street Address: 4 Jeffrey's Road, Christchurch

3. Report:

Space	Photo	Current Situation	Upgrade Action
4. Main Entrance and all Accessible Routes Including Corridors, Doorways and Doors			
Corridor D.16		Non-Compliant – where door opens towards wheelchair wall space is not less than 300mm wide at side of door adjacent to handle. Currently measures 285mm	No upgrade required -not feasible to relocate wall
Glazing		Compliant	OPUS recommends manifestations to all full height glazing internal and external where compliant transoms do not exist.

5. Public Facilities			
Main counter		Non-Compliant – public counter is not accessible for staff or public using it	Modification of existing counter required to provide accessible portion.
10. Showers			
Accessible Shower		Compliant – Building is not required to provide accessible shower facilities Shower seat is too small	OPUS recommends replacing the existing shower seat with new compliant seat
11. Door and Window Controls and Light Switches			
Socket Outlets		Non-Compliant – Low level socket outlets measure 300mm AFFL	No Action – not feasible to relocate all low level socket outlets due to costs
13. Alerting Devices			
Refer to the Fire Report			

15. Signs			
Accessible Shower		Compliant – Building is not required to provide accessible shower facilities Non-compliant signage to door	OPUS recommends new unisex accessible shower symbols to door



Fendalton Library and Service Centre - 4 Jeffreys Road, Christchurch

SITE PLAN

COMPLIANT SHOWER - BUILDING IS NOT REQ TO PROVIDE ACCESSIBLE SHOWER FACILITIES.

CORRIDOR D.16

RECEPTION COUNTER.

ACCESSIBLE TOILET.

ACCESSIBLE ROUTE WITHIN BUILDING.

IAN KRAUSE ARCHITECTS LIMITED

GENERAL LEGEND

FLOOR FINISHES LEGEND

DATE Apr. 99

SCALE 1 : 100

1308

A1.03 A

Fendalton Library and Service Centre - 4 Jeffreys Road, Christchurch

FLOOR PLAN

IPENZ ENGINEERS NEW ZEALAND | NEW ZEALAND INSTITUTE OF ARCHITECTS INCORPORATED | ACENZ

Building Code Clause(s) B1 and B2

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance notes on the use of this form are printed on the reverse side)*

ISSUED BY: Opus International Consultants
(Design Firm)

TO: Christchurch City Council
(Owner/Developer)

TO BE SUPPLIED TO: Christchurch City Council
(Building Consent Authority)

IN RESPECT OF: Earthquake Repairs and Strengthening to Fendalton Services Centre and Library
(Description of Building Work)

AT: 4 Jeffreys Road, Fendalton, Christchurch
(Address)

..... **LOT** ..... **DP** ..... **SO** .....

We have been engaged by the owner/developer referred to above to provide structural design and construction observation services in respect of the requirements of
(Extent of Engagement)
Clause(s) B1 and B2 of the Building Code for

◉ All or ○ Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☑ Compliance Documents issued by Department of Building & Housing NZS 1170.5, NZS 3404
(verification method / acceptable solution)
..... or

☐ Alternative solution as per the attached schedule Name .....

The proposed building work covered by this producer statement is described on the drawings titled Fendalton Library Earthquake Strengthening and numbered 6/1366/232/7502 Sheets 1 to 3;

together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

(i) Site verification of the following design assumptions .....

(ii) All proprietary products meeting their performance specification requirements;

I **believe on reasonable grounds** the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code.

I, Robert Davey am: ☑ CPEng 17912 #
(Name of Design Professional)

☐ Reg Arch ..... #

I am a Member of : ☑ IPENZ ☐ NZIA and hold the following qualifications: BE, MSc, FIPENZ, MNZSEE

The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ ◉YES ○NO

SIGNED BY Robert Davey ON BEHALF OF Opus International Consultants
(Design Firm)

Date 28/2/12 *(signature)*

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1992. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Institution of Professional Engineers New Zealand, Association of Consulting Engineers New Zealand in consultation with the Building Officials Institute of New Zealand. The original suite of producer statements has been revised at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

PS1 Design	Intended for use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;
PS2 Design Review	Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;
PS3 Construction	Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2003[1] or Schedules E1/E2 of NZIA's SCC 2007 [2]
PS4 Construction Review	Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate. This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACENZ, IPENZ and NZIA to interpret the Producer Statement.

Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence-based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as the Institution of Professional Engineers New Zealand (IPENZ)or the New Zealand Institute of Architects (NZIA), provides additional assurance of the designer's standing within the profession. If the design firm is a member of the Association of Consulting Engineers New Zealand (ACENZ), this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

*** Professional Indemnity Insurance**

As part of membership requirements, ACENZ requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to $500,000.

Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-CM5)[3] (OL1-OL4)[2]. The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

Refer Also:

1 *Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2003*

2 *NZIA Standard Conditions of Contract SCC 2007 (1st edition)*

3 *Guideline on the Briefing & Engagement for Consulting Engineering Services (ACENZ/IPENZ 2004)*

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Building Code Clause(s) B1 and B2

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on the reverse side)

ISSUED BY: Opus International Consultants
(Construction Review Firm)

TO: Christchurch City Council (CCC)
(Owner/Developer)

TO BE SUPPLIED TO: Christchurch City Council
(Building Consent Authority)

IN RESPECT OF: Earthquake Repairs and Strengthening to Fendalton Service Centre and Library
(Description of Building Work)

AT: 4 Jeffreys Road, Fendalton, Christchurch
(Address)

LOT 1 **DP** 81683 **SO** .....

Opus has been engaged by CCC
(Construction Review Firm)

to provide ○ CM1 ○ CM2 ○ CM3 ◉ CM4 ○ CM5 *(Engineering Categories)* or ○ OL1 ○ OL2 ○ OL3 ○ OL4 *(Architectural Categories)*

observation ○ or other .....
(Extent of Engagement)
services

in respect of clause(s) B1 and B2 of the Building Code for the building work described in documents relating to Building Consent No. ABA 1011303 and those relating to Building Consent Amendment(s) Nos. ..... issued during the course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions / variation(s) No. Drawing Nos. 6/1366/232/7502 Sheets 1R3, 2R3, 3R1, 4R1 (copies attached) or by the attached Schedule ☐ have been issued during the course of the works.

On the basis of ○ this ◉ these review(s) and information supplied by the contractor during the course of the works, I **believe on reasonable grounds** that ◉ All ○ Part only of the building works have been completed in accordance with the relevant requirements of the Building Consents and Building Consent Amendments identified above, with respect to Clause(s) B1 and B2 of the Building Regulations.

I, Robert Davey *(Name of Construction Review Professional)* am: ☑ CPEng No. 17912

☐ Reg Arch No. .....

I am a Member of : ☑ IPENZ ☐ NZIA and hold the following qualifications: BE, MSc

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.

The Construction Review Firm is a member of ACENZ : ◉ YES ○ NO

SIGNED BY Robert Davey ON BEHALF OF Opus

Date : 19/04/12 Signature : .....

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Construction Review Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form to accompany **Forms 6 or 8 of the Building (Form) Regulations** 2004 for the issue of a Code Compliance Certificate.

GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1992. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Institution of Professional Engineers New Zealand, Association of Consulting Engineers New Zealand in consultation with the Building Officials Institute of New Zealand. The original suite of producer statements has been revised as at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

PS1 Design	Intended for the use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;
PS2 Design Review	Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;
PS3 Construction	Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2003[1] ; or Schedules E1/E2 of NZIA's SCC 2007 [2]
PS 4 Construction Review	Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate. This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACENZ, IPENZ and NZIA to interpret the Producer Statement.

Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence-based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as the Institution of Professional Engineers New Zealand (IPENZ)or the New Zealand Institute of Architects (NZIA) provides additional assurance of the designer's standing within the profession. If the design firm is a member of the Association of Consulting Engineers New Zealand (ACENZ), this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

*** Professional Indemnity Insurance**

As part of membership requirements, ACENZ requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to $500,000.

Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-5)[3] (OL1-OL4)[2]. The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

Refer Also:

1 *Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2003*

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Building Code Clause(s) C/AS1

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on the reverse side)

ISSUED BY: Opus International Consultants Ltd.
(Construction Review Firm)

TO: Christchurch City Council
(Owner/Developer)

TO BE SUPPLIED TO: Christchurch City Council
(Building Consent Authority)

IN RESPECT OF: Fendalton Library and Service Centre
(Description of Building Work)

AT: 4 Jeffreys Road, Christchurch
(Address)

..... **LOT** ..... **DP** ..... **SO** .....

Opus International Consultants Ltd. has been engaged by The Ministry of Education
(Construction Review Firm)

to provide ◉ CM1 ○ CM2 ○ CM3 ○ CM4 ○ CM5 *(Engineering Categories)* or ○ OL1 ○ OL2 ○ OL3 ○ OL4 *(Architectural Categories)*

observation ○ or other Fire Engineering services
(Extent of Engagement)

in respect of clause(s) C/AS1 of the Building Code for the building work described in documents relating to Building Consent No. Fire report dated February 2011 and those relating to Building Consent Amendment(s) Nos. N/A issued during the course of the works. We have sighted these Building Consents and the conditions of attached to them.

Authorised instructions / variation(s) No. N/A (copies attached)

or by the attached Schedule ☐ have been issued during the course of the works.

On the basis of ◉ this ○ these review(s) and information supplied by the contractor during the course of the works, **I believe on reasonable grounds** that ◉ All ○ Part only of the building works have been completed in accordance with the relevant requirements of the Building Consents and Building Consent Amendments identified above, with respect to Clause(s) C/AS1 of the Building Regulations.

I, Michael Dunn am: ☑ CPEng No. 141524
(Name of Construction Review Professional)

☐ Reg Arch No. .....

I am a Member of : ☑ IPENZ ☐ NZIA and hold the following qualifications: ME Fire, CPEng

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.

The Construction Review Firm is a member of ACENZ : ◉ YES ○ NO

SIGNED BY Michael Dunn ON BEHALF OF Opus International Consultant Ltd.

Date : 14.8.2012 Signature : 

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Construction Review Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

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Appendix 4 – CERA DEE Spreadsheet

Detailed Engineering Evaluation Summary Data V1.11

Location

Building Name:	Fendalton Library and service Centre	Reviewer:	Robert Davey
Unit No: Street		CPEng No:	17912
Building Address:	4 Jefferys Road	Company:	Opus
Legal Description:		Company project number:	6QUCCC.27
		Company phone number:	3635400
Degrees Min Sec			
GPS south:		Date of submission:	29-Nov-12
GPS east:		Inspection Date:	Mar-11
		Revision:	Final
Building Unique Identifier (CCC):	BU 0450-001 EQ2	Is there a full report with this summary?	yes

Site

Site slope:	flat	Max retaining height (m):	
Soil type:	silty sand	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):	21.80

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	21.80
Ground floor split?	no		Ground floor elevation above ground (m):	0.20
Storeys below ground				
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	4.00		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):	2090			
Age of Building (years):			Date of design:	1992-2004
Strengthening present?	yes		If so, when (year)?	2012
			And what load level (%g)?	100%
Use (ground floor):	public		Brief strengthening description:	Strengthened roof braces
Use (upper floors):				
Use notes (if required):				
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	frame system		
Roof:	steel framed	rafter type, purlin type and cladding	610UB rafter, Steel purlins, steel cladding
Floors:	concrete flat slab	slab thickness (mm)	125
Beams:	steel non-composite	beam and connector type	410UB, welded
Columns:	structural steel	typical dimensions (mm x mm)	610UB
Walls:	non-load bearing	0	

Lateral load resisting structure

Lateral system along:	welded and bolted steel moment frame	**Note: Define along and across in detailed report!**		
Ductility assumed, μ:	1.25		note typical bay length (m)	
Period along:	0.50	0.00	estimate or calculation?	calculated
Total deflection (ULS) (mm):	45		estimate or calculation?	calculated
maximum interstorey deflection (ULS) (mm):	45		estimate or calculation?	calculated
Lateral system across:	welded and bolted steel moment frame			
Ductility assumed, μ:	1.25		note typical bay length (m)	
Period across:	0.50	0.00	estimate or calculation?	calculated
Total deflection (ULS) (mm):	40		estimate or calculation?	calculated
maximum interstorey deflection (ULS) (mm):	40		estimate or calculation?	calculated

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:	precast panels	thickness and fixing type	150 thick, bolted connections
Roof Cladding:	Metal	describe	
Glazing:	aluminium frames		
Ceilings:	light tiles		
Services(list):			

Available documentation

Architectural	full	original designer name/date	Ian Krause 1999
Structural	full	original designer name/date	City Design 1999/Opus 2012
Mechanical		original designer name/date	
Electrical		original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site: (refer DEE Table 4-2)

Site performance:	No damage	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:	-270%	Describe how damage ratio arrived at:	Building was strengthening in 2012
Along Describe (summary):			
Across Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
Across Describe (summary):			
Diaphragms Damage?:		Describe:	
CSWs: Damage?:	no	Describe:	
Pounding: Damage?:		Describe:	
Non-structural: Damage?:	yes	Describe:	Minor cracking

Recommendations

Level of repair/strengthening required:	significant structural		Describe:	Has been completed (see report)
Building Consent required:	yes		Describe:	
Interim occupancy recommendations:	full occupancy		Describe:	
Along Assessed %NBS before e'quakes:	27%	##### %NBS from IEP below	If IEP not used, please detail assessment methodology:	DSA
Along Assessed %NBS after e'quakes:	100%			
Across Assessed %NBS before e'quakes:	100%	##### %NBS from IEP below		
Across Assessed %NBS after e'quakes:	100%			

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