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Aldwin Courts

Quantitative Engineering Evaluation

Functional Location ID: PRO 0811

Address: 55 Aldwins Road, Phillipstown

Reference: 237698

Prepared for:

Christchurch City Council

Revision: 5

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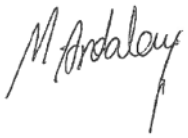
Author Signature on behalf of Aurecon		Approver Signature on behalf of Aurecon	
Name	Manoochehr Ardalany	Name	David Elliott
Title	Structural Engineer	Title	Structural Engineer

Contents

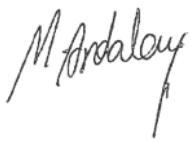
Appendices

Executive Summary - Block A

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Block A building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Block A			
Building Location ID	PRO 0811 B001			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	3
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	~144	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Corrugated metal roof, block veneer, timber frame walls, concrete strip footings and slab on grade floor.				

Quantitative L5 Report Results Summary		
Building Occupied	Y	Aldwin Courts Block A is currently in use.
Suitable for Continued Occupancy	Y	Aldwin Courts Block A is suitable for continued occupation.
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report.
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.
Levels Survey Results	Y	Levels are not within the recommended 0.5% grade.
Building %NBS From Analysis	83%	Based on an analysis of capacity and demand for the bracing and firewall.

Approval			
Author Signature		**Approver Signature**	
Name	Manoochehr Ardalany	**Name**	David Elliott
Title	Structural Engineer	**Title**	Senior Structural Engineer

Executive Summary - Block B

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Block B building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Block B			
Building Location ID	PRO 0811 B002			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	3
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	~165	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Corrugated metal roof, block veneer, timber frame walls, concrete strip footings and slab on grade floor.				
Quantitative L5 Report Results Summary					
Building Occupied	Y	Aldwin Courts Block B is currently in use.			
Suitable for Continued Occupancy	Y	Aldwin Courts Block B building is suitable for continued occupancy.			
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report.			
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses were found.			
Levels Survey Results	Y	Levels are not within the recommended 0.5% grade.			
Building %NBS From Analysis	73%	Based on an analysis of capacity and demand for the bracing and firewall.			
Approval					
Author Signature			**Approver Signature**		
Name	Manoochehr Ardalany		**Name**	David Elliott	
Title	Structural Engineer		**Title**	Senior Structural Engineer	

Executive Summary - Block C

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Block C building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Block C			
Building Location ID	PRO 0811 B003			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	2
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	~138	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Corrugated metal roof, block veneer, timber frame walls, concrete strip footings and slab on grade floor.				
Quantitative L5 Report Results Summary					
Building Occupied	Y	Aldwin Courts Block C is currently in use.			
Suitable for Continued Occupancy	Y	Aldwin Courts Block C is suitable for continued occupation.			
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report.			
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.			
Levels Survey Results	Y	Levels are not within the recommended 0.5% grade.			
Building %NBS From Analysis	80%	Based on an analysis of capacity and demand for the bracing and firewall.			
Approval					
Author Signature			**Approver Signature**		
Name	Manoochehr Ardalany		**Name**	David Elliott	
Title	Structural Engineer		**Title**	Senior Structural Engineer	

Executive Summary - Block D

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Block D building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Block D			
Building Location ID	PRO 0811 B004			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	3
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	~144	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Corrugated metal roof, block veneer, timber frame walls, concrete strip footings and slab on grade floor.				
Quantitative L5 Report Results Summary					
Building Occupied	Y	Aldwin Courts Block D is currently in use.			
Suitable for Continued Occupancy	Y	Aldwin Courts Block D building is suitable for continued occupancy.			
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report.			
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.			
Levels Survey Results	Y	Levels are not within the recommended 0.5% grade.			
Building %NBS From Analysis	83%	Based on an analysis of capacity and demand for the bracing and firewall.			
Approval					
Author Signature		**Approver Signature**			
Name	Manoochehr Ardalany	**Name**	David Elliott		
Title	Structural Engineer	**Title**	Senior Structural Engineer		

Executive Summary - Block E

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Block E building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Block E			
Building Location ID	PRO 0811 B005			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	3
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	~144	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Corrugated metal roof, block veneer, timber frame walls, concrete strip footings and slab on grade floor.				

Qualitative L5 Report Results Summary		
Building Occupied	Y	Aldwin Courts Block E is currently in use.
Suitable for Continued Occupancy	Y	Aldwin Courts Block E is suitable for continued occupation.
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report.
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.
Levels Survey Results	Y	Floor levels are acceptable.
Building %NBS From Analysis	78%	Based on an analysis of capacity and demand for the bracing and firewall.

Approval			
Author Signature		**Approver Signature**	
Name	Manoochehr Ardalany	**Name**	David Elliott
Title	Structural Engineer	**Title**	Senior Structural Engineer

Executive Summary - Block F

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Block F building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Block F			
Building Location ID	PRO 0811 B006			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	3
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	~144	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Corrugated metal roof, block veneer, timber frame walls, concrete strip footings and slab on grade floor.				
Qualitative L5 Report Results Summary					
Building Occupied	Y	Aldwin Courts Block F is currently in use.			
Suitable for Continued Occupancy	Y	Aldwin Courts Block F is suitable for continued occupation.			
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report.			
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.			
Levels Survey Results	Y	Floor levels are acceptable.			
Building %NBS From Analysis	83%	Based on an analysis of capacity and demand for the bracing and firewall.			
Approval					
Author Signature		**Approver Signature**			
Name	Manoochehr Ardalany	**Name**	David Elliott		
Title	Structural Engineer	**Title**	Senior Structural Engineer		

Executive Summary - Block G

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Block G building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Block G			
Building Location ID	PRO 0811 B007			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	3
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	~144	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Corrugated metal roof, block veneer, timber frame walls, concrete strip footings and slab on grade floor.				

Qualitative L5 Report Results Summary		
Building Occupied	Y	Aldwin Courts Block G is currently in use.
Suitable for Continued Occupancy	Y	Aldwin Courts Block G is suitable for continued occupation.
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report.
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.
Levels Survey Results	Y	Levels are not within the recommended 0.5% grade.
Building %NBS From Analysis	83%	Based on an analysis of capacity and demand for the bracing and firewall.

Approval			
Author Signature		**Approver Signature**	
Name	Manoochehr Ardalany	**Name**	David Elliott
Title	Structural Engineer	**Title**	Senior Structural Engineer

Executive Summary - Carport J

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Carport J and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts- Carport J			
Building Location ID	PRO 0811 B008			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	-
Soil Technical Category	N/A	**Importance Level**	1	**Approximate Year Built**	1976
Foot Print (m²)	60	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Metal sheet roof on timber joists and beams, lightly reinforced concrete masonry wall with strip footing, steel pipe corner posts and slab on grade floor.				
Qualitative L5 Report Results Summary					
Building Occupied	Y	Aldwin Courts Carport J is currently in use.			
Suitable for Continued Occupancy	Y	Aldwin Courts Carport J is suitable for continued use.			
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report.			
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.			
Levels Survey Results	N	Floor levels are acceptable.			
Building %NBS From Analysis	100%	Strengthening is carried out by OPUS- Refer to OPUS strengthening.			
Approval					
Author Signature			**Approver Signature**		
Name	Manoochehr Ardalany		**Name**	David Elliott	
Title	Structural Engineer		**Title**	Senior Structural Engineer	

Executive Summary- Carport K

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Carport K building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts- Carports K			
Building Location ID	PRO 0811 B009			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	-
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	60	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Metal sheet roof on timber joists and beams, lightly reinforced concrete masonry wall with strip footing, steel pipe corner posts and slab on grade floor.				

Quantitative L5 Report Results Summary		
Building Occupied	Y	Aldwin Courts Carport K is currently in use.
Suitable for Continued Occupancy	Y	Aldwin Courts Carport K is suitable for continued use.
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.
Levels Survey Results	N	Floor levels are acceptable.
Building %NBS From Analysis	37%	Based on analysis of the masonry wall out-of-plane capacity.

Approval			
Author Signature		**Approver Signature**	
Name	Manoochehr Ardalany	**Name**	David Elliott
Title	Structural Engineer	**Title**	Senior Structural Engineer

Executive Summary - Carport L

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Carport L building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Carport L			
Building Location ID	PRO 0811 B010			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	-
Soil Technical Category	N/A	**Importance Level**	2	**Approximate Year Built**	1976
Foot Print (m²)	60	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Metal sheet roof on timber joists and beams, lightly reinforced concrete masonry wall with strip footing, steel pipe corner posts and slab on grade floor.				
Qualitative L5 Report Results Summary					
Building Occupied	Y	Aldwin Courts Carport L is currently in use.			
Suitable for Continued Occupancy	Y	Aldwin Courts Carport L is suitable for continued use.			
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report			
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.			
Levels Survey Results	N	Floor levels are acceptable.			
Building %NBS From Analysis	37%	Based on analysis of the masonry wall out-of-plane capacity.			
Approval					
Author Signature			**Approver Signature**		
Name	Manoochehr Ardalany		**Name**	David Elliott	
Title	Structural Engineer		**Title**	Senior Structural Engineer	

Executive Summary - Carport M

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Carport M building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Carport M			
Building Location ID	PRO 0811 B011			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	-
Soil Technical Category	N/A	**Importance Level**	1	**Approximate Year Built**	1976
Foot Print (m²)	45	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Metal sheet roof on timber joists and beams, lightly reinforced concrete masonry wall with strip footing, steel pipe corner posts and slab on grade floor.				
Quantitative L5 Report Results Summary					
Building Occupied	Y	Aldwin Courts Carport M is currently in use.			
Suitable for Continued Occupancy	Y	Aldwin Courts Carport M is suitable for continued use.			
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report			
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.			
Levels Survey Results	N	Floor levels are acceptable.			
Building %NBS From Analysis	100%	Strengthening is carried out by OPUS- Refer to OPUS strengthening report.			
Approval					
Author Signature			**Approver Signature**		
Name	Manoochehr Ardalany		**Name**	David Elliott	
Title	Structural Engineer		**Title**	Senior Structural Engineer	

Executive Summary- Carport O

This is a summary of the Quantitative Engineering Evaluation for the Aldwin Courts Carport O building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

Building Details	**Name**	Aldwin Courts Carport O			
Building Location ID	PRO 0811 B012			**Multiple Building Site**	Y
Building Address	55 Aldwins Road, Phillipstown			**No. of residential units**	-
Soil Technical Category	N/A	**Importance Level**	1	**Approximate Year Built**	1976
Foot Print (m²)	60	**Storeys above ground**	1	**Storeys below ground**	0
Type of Construction	Metal sheet roof on timber joists and beams, lightly reinforced concrete masonry wall with strip footing, steel pipe corner posts and slab on grade floor.				
Qualitative L5 Report Results Summary					
Building Occupied	Y	Aldwin Courts Carport O is currently in use.			
Suitable for Continued Occupancy	Y	Aldwin Courts Carport O is suitable for continued use.			
Key Damage Summary	Y	Refer to summary of building damage in Section 3.1 of this report			
Critical Structural Weaknesses (CSW)	N	No critical structural weaknesses found.			
Levels Survey Results	N	Floor levels are acceptable.			
Building %NBS From Analysis	100%	Strengthening is carried out by OPUS- Refer to OPUS strengthening report.			
Approval					
Author Signature			**Approver Signature**		
Name	Manoochehr Ardalany		**Name**	David Elliott	
Title	Structural Engineer		**Title**	Senior Structural Engineer	

1 Introduction

1.1 General

On 14 August 2013 Aurecon engineers visited the Aldwin Courts to carry out a quantitative building damage assessment on behalf of Christchurch City Council. Detailed visual inspections were carried out to assess the damage caused by the earthquakes on 4 September 2010, 22 February 2011, 13 June 2011, 23 December 2011 and related aftershocks.

The scope of work included:

- Assessment of the nature and extent of the building damage;
- Visual assessment of the building strength particularly with respect to safety of occupants if the building is currently occupied; and
- Assessment of requirements for detailed engineering evaluation including geotechnical investigation, level survey and any areas where linings and floor coverings need removal to expose structural damage.

On 11 September 2015 we were informed by the council that the following repair and strengthening works are completed for residential blocks and carports:

- All units reroofed with lightweight metal roofing.
- Internal cosmetic repairs completed.
- Masonry wall veneers have been repaired and painted.
- Perimeter foundation cracks have been repaired.
- Concrete slab cracks have been repaired.
- Stand-alone Carports have been strengthened to 100% NBS based on an Opus design solution.
- Masonry walls have been repaired.
- Concrete slab cracks have been repaired.
- Grout injection under the intertenancy fire wall of Unit 4 and Unit 5 is undertaken.

Aurecon has not revisited Aldwin courts to review the strengthening work and this report is based on information provided by Christchurch City Council. Strengthening work on carports were completed by OPUS and we have updated our previous DEE report (report dated 1 November 2013) in accordance with information provided by the council. In addition, Structural performance factor (Sp) of 0.5 has been recommended in new version of NZSEE (NZSEE 2013) for seismic assessment of timber framed building. We have updated our calculations to include this new information which reflect good performance of the buildings.

This report outlines the updated results of our Quantitative Assessment of damage to Aldwin Courts and is based on the Detailed Engineering Evaluation Procedure document issued by the Structural Advisory Group on 19 July 2011.

2 Description of the Building

2.1 Building Age and Configuration

Built in 1976 the Aldwin Courts housing development consists of seven residential buildings (each containing multiple units) with five carports. Refer to Figure 1 for a plan arrangement of Aldwin Courts.

2.1.1 Buildings

The buildings are single storey timber frame buildings with plasterboard lining on the interior and a lightly reinforced masonry veneer on the exterior. Reinforced masonry firewalls with gable roofs are located between units and connected into the roof diaphragm. The high-pitched roofs supported by timber purlins and rafters have been replaced with light weight roofs.

All of the Aldwin Courts buildings are similar in construction methodology and materials but differ in layout, as shown in Figure 1. A number of the buildings are connected onto carports through the exterior masonry veneer.

2.1.2 Carports

The carports consist of lightly reinforced masonry walls (D12 @ 2000 mm c/c) with recently upgraded light weight steel sheeting roofing and steel tube posts.

Carports K and L are attached to Blocks C and E (respectively) while the other carports are all independent structures. For carports K and L, a portion of the carport roof is supported by the masonry veneer of the Residential Blocks C and E.

2.2 Building Designations

The labels of the buildings with their unit numbers are presented in Table 1. In addition, the locations of buildings are shown in Figure 1.

Table 1: Building Type and Designation

Label	Units	Type
Block A	1, 2 & 3	Single storey
Block B	4, 5 & 6	Single storey
Block C	7 & 8	Single storey
Block D	9,10 &11	Single storey
Block E	12,12a & 14	Single storey
Block F	15,16 & 17	Single storey
Block G	18, 19 & 20	Single storey
Carport J	-	Separate carport
Carport K	-	Attached carport
Carport L	-	Attached carport
Carport M	-	Separate carport
Carport O	-	Separate carport

Figure 1. Plan View of Aldwin Courts (55 Aldwins Road, Phillipstown)

2.3 Building Structural Systems Vertical and Horizontal

2.3.1 Buildings

The single storey buildings of Aldwin Courts are regular structures. The light weight metal roofs are supported on timber trusses that transfer loads to the external timber walls. These timber walls (lined with plasterboard and tied into masonry veneers) take the horizontal earthquake induced forces in the along and across directions.

2.3.2 Carports

The vertical loads in the carports have a simple load path whereby they transfer directly to lightly reinforced masonry walls and steel posts. Lateral loads are taken in the along and across directions through in-plane shear and out-of-plane moment of the masonry walls. Strengthening of the separate carports (by OPUS) may have introduced a new load path for the seismic induced forces for separate carports.

2.4 Reference Building Type

The buildings in Aldwin Courts are basic structures with timber framed walls that are lined with plasterboard. This type of building has typically performed well under seismic loading.

2.5 Building Foundation System and Soil Conditions

The Aldwin Courts foundations consist of concrete strip footings and concrete slab on grade floor. Aldwin Courts is classified as TC2 based on Canterbury Geotechnical Database, which means “minor to moderate damage from liquefaction is possible in future significant earthquakes”. However a significant amount of liquefied silt (sand boils) was observed in and around Blocks A, B and C during the first visit of the site in 2013. In addition, aerial photos taken soon after the 13th June 2011 earthquake show liquefaction in the area. A deep geotechnical investigation is required to indicate the categorisation of soil type.

2.6 Available Structural Documentation and Inspection Priorities

Structural and architectural drawings were available for Aldwin Courts. The generic building type for Aldwin Courts is a timber-framed building constructed in the 1970s. This type of structure has performed reasonably well during the Canterbury Earthquakes. To confirm drawings, inspections were undertaken in 2013 to understand the construction of the buildings and identify any likely critical areas. Potential damage such as cracking to the block walls and concrete floor slabs was also inspected.

2.7 Available Survey Information

A floor level survey of each building was previously undertaken to establish the level of unevenness across the floors. All levels were measured on top of the existing floor coverings which may have introduced a margin of error.

The Ministry of Business, Innovation and Employment (MBIE) published the guideline “Repairing and rebuilding houses affected by the Canterbury earthquakes” in 2012, which recommends some form of re-levelling or rebuilding of the floor for the following scenarios.

1. If the slope is greater than 0.5% for any two points more than 2 m apart; or
2. If the variation in level over the floor plan is greater than 50 mm; or
3. If there is significant cracking of the floor.

It is important to note that these figures are recommendations and are only intended to be applied to residential buildings. The levels and slopes of the carport slabs were visually inspected and found to be fit for purpose.

The floor levels for a number of buildings of Aldwin Courts were found to be outside of the recommended margins. While a summary of the critical results from the floor level survey is presented in Table 2, a complete level survey can be found in Appendix A.

Table 2: Summary of Critical Slopes

Block	Residential Unit	Maximum Variation in Level Over The Floor (mm)	Maximum Slope Measured (%)
A	1	28	0.72
A	2	32	0.90
A	3	40	0.75
B	4	50	0.80
B	6	40	0.96
C	8	32	0.90
D	10	36	0.70
D	11	48	0.75
G	18	32	0.60
G	20	34	0.60

Note: Table 2 shows the residential units with the maximum floor slope variation.

3 Structural investigation

3.1 Summary of Building Damage

Most units of Aldwin Courts were occupied at the time when the damage assessment was carried out. A damage assessment was performed on 14 August 2013 at the Aldwin Courts and the following damage was observed. Repair of the damage are discussed in section 7 of this report.

Table 3: Damage Summary

Building	Damage Observed
Block A	• Cracks in the area around openings (i.e. windows and door frames) • Cracks in the window frame • Cracks in the ceiling • Cracks in the mortar joints • Liquefied silt inside the building (unit 2) • Cracks in the concrete slab on grade • Cracks in the plasterboard walls • Cracks in the mortar joints around the windows • Cracks in the foundation
Block B	• Cracks in the area around openings (i.e. windows and door frames) • Cracks in the plasterboard walls • Cracked glass window panels • Considerable amount of liquefied silt inside units 4 and 5 Note: The liquefaction inside units 4 and 5 has caused damage to and deterioration of plasterboard linings.
Block C	• Cracks in the area around openings (i.e. windows and door frames) • Cracks in the plasterboard walls • Cracks across the ceiling • Step cracks in the masonry veneers

	• Cracks in the perimeter concrete foundation • Cracks in the mortar joints of the masonry veneer • Cracks in the concrete slab on grade
Block D	• Cracks in the area around openings (i.e. windows and door frames) • Cracks in the plasterboard walls • Cracks in the concrete slab on grade • Step cracks in masonry veneers • Cracked glass panels in door • Cracks in the ceiling
Block E	• Concrete roof tiles have been displaced and become unattached. A number were missing and some had fallen to the ground. • Cracks in the area around openings (i.e. windows and door frames) • Cracks in the plasterboard walls • Cracks in the perimeter concrete foundation • Cracks in the mortar joints of the masonry veneer • Step cracks in the masonry veneers
Block F	• Cracks in the area around openings (i.e. windows and door frames) • Cracks in the plasterboard walls • Cracks in the door frames • Cracks in the perimeter concrete foundation • Crack in the concrete slab on grade • Step cracks in the masonry veneers • Cracks in the mortar joint of the block veneer
Block G	• Cracks in the ceiling • Cracks in the area around openings (i.e. windows and door frames) • Large crack in concrete slab • Cracks in the door frames • Cracks in the plasterboard walls • Step cracks in masonry veneer • Cracks in the mortar joint of the masonry veneer
Carport J	• Step cracks in the masonry walls • Cracks in the concrete floor • Rotation of roof timber joints under the roof • Mortar between standalone carport masonry wall and length of masonry wall connected onto Block buildings has come out • Split in timber at connection point between timber post attached onto masonry wall and timber beam
Carports K, L, M and O	• Step cracks in the masonry walls • Cracks in the concrete floor • Rotation of roof timber joints under the roof • Mortar between standalone carport masonry wall and length of masonry wall connected onto Block buildings has come out

3.2 Record of Intrusive Investigation

The concrete masonry walls of the carports were scanned using a Hilti rebar scanner and this confirmed the presence of reinforcement shown on the as-built drawings. Due to the generic nature of the Aldwin Courts, a significant amount of structural information can be inferred from the building form and construction materials. Because of this, and as there are a good number of structural drawings, no other intrusive investigations were carried out for the buildings at Aldwin Courts.

3.3 Damage Discussion

Moderate damage of the buildings was observed at Aldwin Courts. This is expected due to the regular shape and density of the walls in the building. Apart from liquefaction, the main damage noted in the buildings was minor to moderate cracking in the plasterboard walls and ceilings, and in the mortar joints of the masonry veneers. Some damage and separation of the concrete roof tiles was observed with a few tiles having fallen off the roof. The carport walls have moderate to severe cracks due to in-plane and out-of-plane earthquake induced forces.

We note that as a part of repair/strengthening works carried out by council a portion of above damage has been rectified and are discussed in chapter 1 and chapter 7.

4 Building Review Summary

4.1 Building Review Statement

The finishes of Aldwin Courts obstructed the viewing in some parts of the structure. Nevertheless, a damage assessment was undertaken assuming that the damage to the finishes of the building would indicate a commensurate level of displacement damage on the building's structure.

As no original calculations were available, assumptions had to be made in order to complete calculations using current NZ standards and NZSEE guidelines as referenced in Appendix A.

4.2 Critical Structural Weaknesses

No specific Critical Structural Weaknesses (CSW) were identified as a part of the building quantitative assessment.

5 Building Strength

(Refer to Appendix C for background information)

5.1 General

The Aldwin Courts buildings consist of a timber truss roof on timber framed walls which are lined with plasterboard. They are intrinsically ductile and have stood up well in the recent seismic events. This is evidenced by the low level of damage described in Section 3.1 above.

5.2 Existing Building Strength

We consider that the damage to the building has not resulted in any measurable reduction in the strength of the building and so our strength assessment is based on the pre-earthquake condition of the building. Selected assessment seismic parameters are presented in Table 4.

Table 4: Seismic Assessment Parameters

Seismic Parameter	Parameter	Comment/Reference
Site Soil Class	D	NZS 1170.5:2004, Clause 3.1.3, Deep or Soft Soil
Site Hazard Factor, Z	0.30	DBH Info Sheet on Seismicity Changes (Effective 19 May 2011)
Return period Factor, R_u	1.0	NZS 1170.5:2004, Table 3.5

Ductility Factor, μ	1.25	Lightly reinforced masonry walls
Ductility Factor μ	2.00	Timber framed walls lined with plasterboard
Structural performance factor S_p	0.93	As per NZS 1170.5 for ductility 1.25
Structural performance factor S_p	0.70	As per NZS 1170.5 for ductility 2
Structural performance factor S_p	0.50	As per NZSEE (2013) for timber framed buildings*

The seismic demand for Aldwin Courts has been calculated based on the current code requirements of NZS 1170.5 (Structural Design Actions 1170.5:2004). The capacity of the existing walls in the buildings were calculated from the assumed strengths of the existing materials and the number and length of walls present for both the along and across directions. Some assumptions as presented in Appendix B were made to calculate the capacity of the building. These values were compared with the calculated seismic demand for derivation of %NBS values. The %NBS results are summarized in Table 5.

As a part of the strength assessment, we have assumed that the masonry veneers are properly tied to the timber frame walls. This assumption is based on the construction specifications provided by Christchurch City Council and observations made on-site using a Hilti rebar scanner. Accordingly for the buildings no out-of-plane strength analysis was carried out and the strength of the buildings was limited to the in-plane strength of the timber framed walls (lined with plasterboard) in the along and across directions.

Table 5: Building Strength Summary

Building	Direction	%NBS Original	%NBS after strengthening with Sp = 0.7	%NBS after strengthening with Sp = 0.5	Note
Block A	Along	44	59	83	-
	Across	48	85	100	-
Firewall of Block A	Out of plane	41	85	-	-
Block B	Along	39	52	73	-
	Across	37	63	88	-
Firewall of Block B	Out of plane	41	85	-	-
Block C	Along	66	90	100	-
	Across	37	57	80	-
Firewall of Block C	Out of plane	41	85	-	-
Block D	Along	44	59	83	-
	Across	48	85	100	-
Firewall of Block D	Out of plane	41	85	85	-
Block E	Along	43	56	78	-
	Across	37	81	100	-
Firewall of Block E	Out of plane	41	85	-	-
Block F	Along	44	59	83	-
	Across	48	85	100	-
Firewall of Block F	Out of plane	41	85	-	-
Block G	Along	44	59	83	-
	Across	48	85	100	-

Building	Direction	%NBS Original	%NBS after strengthening with Sp = 0.7	%NBS after strengthening with Sp = 0.5	Note
Firewall of Block G	Out of plane	41	85	-	-
Carport J	Out of plane	26	100	-	Strengthening as per OPUS design works
Carport K	Out of plane	37	37	-	Limited by capacity of timber diaphragm
Carport L	Out of plane	26	37	-	Limited by capacity of timber diaphragm
Carport M	Out of plane	26	100	-	Strengthening as per OPUS design works
Carport O	Out of plane	36	100	-	Strengthening as per OPUS design works

Notes:

- As a part of the strengthening works, roofs are replaced with lightweight material and the new weight of the roof has been included in the calculations (refer to Appendix A for assumptios0.
- NZSEE (2013) has recommended Sp=0.5 to account for good performance of timber framed buildings during earthquake. We have included %NBS values for this upgrade in Table 5.

6 Results Discussion

This quantitative analysis was undertaken using the assumed approximate bracing capacity of the timber walls in accordance with the New Zealand Society of Earthquake Engineering (NZSEE) guidelines for the Assessment and Improvement of the Structural Performance of Buildings in Earthquakes and NZS 4230:2004, Design of Reinforced Concrete Masonry Structures.

The buildings had timber walls evenly distributed in both directions which provides a strength between 73% NBS to 100% NBS. The separate carports are strengthened to 100%. There remain two attached carparks (Carport K and L) which are lightly reinforced with the %NBS of 37% which will need to be strengthened to 67% NBS or 100% NBS if possible.

7 Conclusions and Recommendations

As noted within the report, moderate levels of visible damage were observed in previous damage assessment for the buildings and no critical structural weaknesses were identified as a part of strength assessment. Therefore, it is considered that Aldwin Courts is suitable for continued occupancy.

We note that following repair/strengthening works are completed for the buildings:

- Crack repair for internal wall and ceiling fibrous plaster linings;
- Heavy roof tiles of the buildings are replaced with modern light weight roof;
- Cracks in the concrete floor of the units are epoxy injected;
- Some of the joints have been repaired by grout injection;
- A number of external concrete pathways slabs are replaced;
- Plasterboard walls and internal linings for Unit 4 and Unit 5 are replaced;
- Grout injection under the fire wall between Unit 4 and Unit 5 has been completed;
- Some old conservatory are removed from the buildings; and
- Separate carports have been strengthened to 100% NBS by a design works by OPUS.

We understand that no strengthening works are completed for the attached carports (carports K and L). We recommend strengthening of these carport to 67% NBS or 100% NBS if possible. In addition,

as no releveling has completed for the buildings and as per our previous report we recommend releveling of the units 1,2,3,4,5 and 6. Releveling of other units are not recommended because the level differences are limited to small areas and are still within tolerable limits for the buildings.

8 Explanatory Statement

The inspections of the building discussed in this report have been undertaken to assess structural earthquake damage. No analysis has been undertaken to assess the strength of the building or to determine whether or not it complies with the relevant building codes, except to the extent that Aurecon expressly indicates otherwise in the report. Aurecon has not made any assessment of structural stability or building safety in connection with future aftershocks or earthquakes – which have the potential to damage the building and to jeopardise the safety of those either inside or adjacent to the building, except to the extent that Aurecon expressly indicates otherwise in the report.

This report is necessarily limited by the restricted ability to carry out inspections due to potential structural instabilities/safety considerations, and the time available to carry out such inspections. The report does not address defects that are not reasonably discoverable on visual inspection, including defects in inaccessible places and latent defects. Where site inspections were made, they were restricted to external inspections and, where practicable, limited internal visual inspections.

To carry out the structural review, existing building drawings were obtained from the Christchurch City Council records. We have assumed that the building has been constructed in accordance with the drawings.

While this report may assist the client in assessing whether the building should be strengthened, that decision is the sole responsibility of the client.

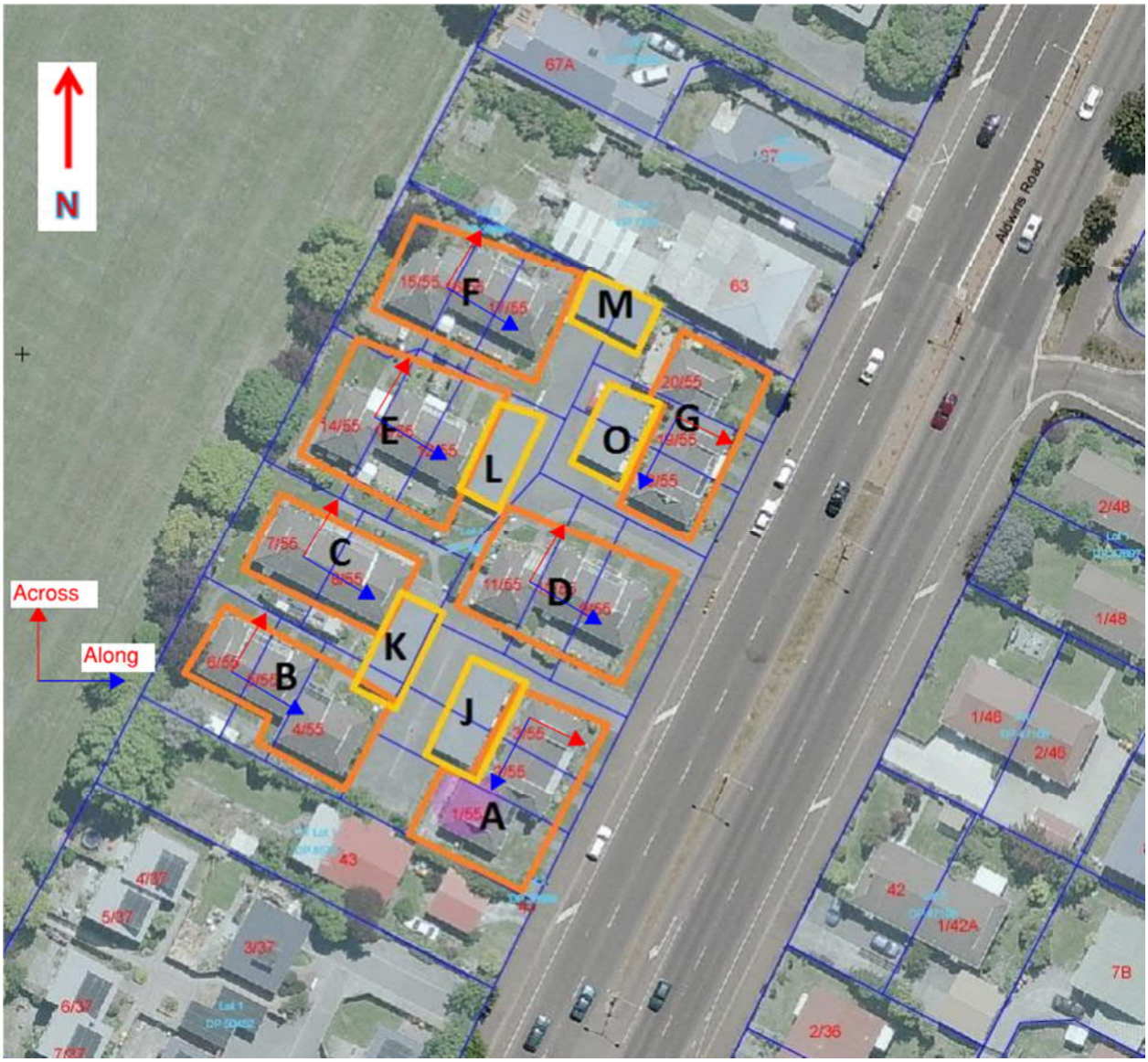
This review has been prepared by Aurecon at the request of its client and is exclusively for the client's use. It is not possible to make a proper assessment of this review without a clear understanding of the terms of engagement under which it has been prepared, including the scope of the instructions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

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

Appendices

Appendix A

Site Map, Photos, Levels Survey Results and assumptions



Aerial photograph of Aldwin Courts Showing along and across for buildings

14 August 2013 – Aldwin Courts Site Photographs

Aldwin Courts (prior to repair/strengthening)	
Building elevation (typical).	
Cracks in the ceiling (typical).	

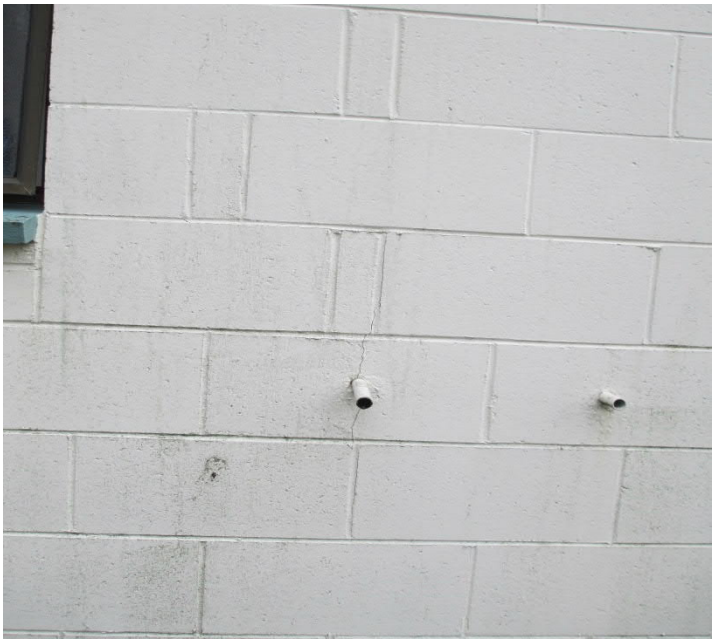
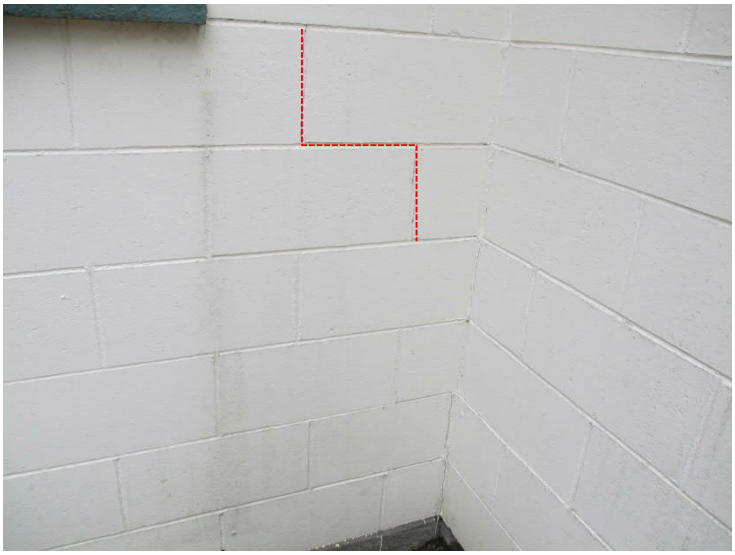
Liquefied silt inside the building (unit 2).	
Liquefied silt inside the building (unit 2).	
Liquefied silt inside the building (unit 2).	

Cracks in the concrete floor (unit 2).	
Cracks in the plasterboard wall (unit2).	
Liquefied silt inside the building (unit 4).	

Liquefied silt inside the building (unit 4).	
Liquefied silt inside the building. Silt has penetrated inside the timber walls (unit 4).	
Damage to the plasterboard and timber walls (unit 4).	

Damage to the plasterboard and timber walls (unit 4).	
Damage to the plasterboard and timber walls (unit 4).	
Damage to the concrete tiles of the roof (unit 4).	

Liquefied silt inside the building (unit 5).	
Damage to the plasterboard walls (unit 5).	
Void under fire wall due to liquefaction (unit 5).	

Crack in the block walls (typical).	
Step cracks in the brick veneer (typical).	
Cracks in the ceiling (typical).	

Cracks in the plasterboard walls (typical).	
Cracks in the plasterboard walls (typical).	
Cracks in the concrete floor (typical).	

Separation and cracks in the corner of the masonry wall (unit 11).	
Step cracks in the masonry wall (typical)	
Concrete roof tile that has become dislodged and fallen off the roof (unit 12).	

Movement of the roof tiles (unit 12).	
Cracks in the plasterboard wall (typical).	
Cracks in the mortar cover of the foundation (typical).	

Cracks in the plasterboard wall (typical).	
Cracks in the ceiling (typical).	

Carports (prior to repair/strengthening)	
Carport 1. Front elevation of typical standalone carport.	
Carport 2. Shared wall in attached carport.	
Carport 3. View of carport masonry wall strengthened by timber posts for out-of-plane movements.	

Carport 4. Typical cracks in the concrete slab of the carport.	
Carport 5. Step cracks in the carport masonry wall.	
Carport 6. Step cracks in the carport masonry wall.	

Carport 7. Separation and movement of the carport timber beam.	
Carport 8. Step cracks in the carport masonry wall.	

Aldwin Courts Site Photographs

Aldwin Courts (After strengthening)	
General photos of the units	
General photos of the carports	
General photo of the repair woks	

Assumptions

- External blocks are properly connected to internal timber walls.
- Fire wall between units are reinforced solid blocks.
- Diaphragm of the units are properly connected to the intertenancy fire wall.
- Weight of new light weight roof = 0.3kPa
- Ductility 2 for out of plane of reinforced fire walls between units.
- Attached carports (Carports K and L) have timber diaphragm with nailing 2.50mm @250mm.
- The roof of attached carports (Carports K and L) are properly attached to the building blocks and can transfer earthquake induced loads to the buildings.

Appendix B
References

1. Engineering Advisory Group (EAG): Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury: July 2011

2. Ministry of Business, Innovation and Employment (MBIE) “Repairing and rebuilding houses affected by the Canterbury earthquakes”, December 2012

3. New Zealand Society for Earthquake Engineering (NZSEE), “Assessment and Improvement of the Structural Performance of Buildings in Earthquakes”, April 2012

4. Standards New Zealand, “AS/NZS 1170 Part 0, Structural Design Actions: General Principles”, 2002

5. Standards New Zealand, “AS/NZS 1170 Part 1, Structural Design Actions: Permanent, imposed and other actions”, 2002

6. Standards New Zealand, “NZS 1170 Part 5, Structural Design Actions: Earthquake Actions – New Zealand”, 2004

7. Standards New Zealand, “NZS 3101 Part 1, The Design of Concrete Structures”, 2006

8. Standards New Zealand, “NZS 4230, Design of Reinforced Concrete Masonry Structures”, 2004

Appendix C
Strength Assessment Explanation

New building standard (NBS)

New building standard (NBS) is the term used with reference to the earthquake standard that would apply to a new building of similar type and use if the building was designed to meet the latest design Codes of Practice. If the strength of a building is less than this level, then its strength is expressed as a percentage of NBS.

Earthquake Prone Buildings

A building can be considered to be earthquake prone if its strength is less than one third of the strength to which an equivalent new building would be designed, that is, less than 33%NBS (as defined by the New Zealand Building Act). If the building strength exceeds 33%NBS but is less than 67%NBS the building is considered at risk.

Christchurch City Council Earthquake Prone Building Policy 2010

The Christchurch City Council (CCC) already had in place an Earthquake Prone Building Policy (EPB Policy) requiring all earthquake-prone buildings to be strengthened within a timeframe varying from 15 to 30 years. The level to which the buildings were required to be strengthened was 33%NBS.

As a result of the 4 September 2010 Canterbury earthquake the CCC raised the level that a building was required to be strengthened to from 33% to 67% NBS but qualified this as a target level and noted that the actual strengthening level for each building will be determined in conjunction with the owners on a building-by-building basis. Factors that will be taken into account by the Council in determining the strengthening level include the cost of strengthening, the use to which the building is put, the level of danger posed by the building, and the extent of damage and repair involved.

Irrespective of strengthening level, the threshold level that triggers a requirement to strengthen is 33%NBS.

As part of any building consent application fire and disabled access provisions will need to be assessed.

Christchurch Seismicity

The level of seismicity within the current New Zealand loading code (AS/NZS 1170) is related to the seismic zone factor. The zone factor varies depending on the location of the building within NZ. Prior to the 22nd February 2011 earthquake the zone factor for Christchurch was 0.22. Following the earthquake the seismic zone factor (level of seismicity) in the Christchurch and surrounding areas has been increased to 0.3. This is a 36% increase.

For this assessment, the building's earthquake resistance is compared with the current New Zealand Building Code requirements for a new building constructed on the site. This is expressed as a percentage of new building standard (%NBS). The new building standard load requirements have been determined in accordance with the current earthquake loading standard (NZS 1170.5:2004 Structural design actions - Earthquake actions - New Zealand).

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

provide guidance on calculating a modified Ultimate Limit State capacity of the building which is much more accurate and can be used when undertaking a Quantitative analysis.

The New Zealand Society for Earthquake Engineering has proposed a way for classifying earthquake risk for existing buildings in terms of %NBS and this is shown in Figure C1 below.

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

Figure C1: NZSEE Risk Classifications Extracted from table 2.2 of the NZSEE 2006 AISPBE Guidelines

Table C1 below compares the percentage NBS to the relative risk of the building failing in a seismic event with a 10% probability of exceedance in 50 years (i.e. 0.2% in the next year). It is noted that the current seismic risk in Christchurch results in a 6% probability of exceedance in the next year.

Table C1: Relative Risk of Building Failure In A

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

Appendix D
Background and Legal Framework

Background

Aurecon has been engaged by the Christchurch City Council (CCC) to undertake a detailed engineering evaluation of the building

This report is a Qualitative Assessment of 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 qualitative assessment involves inspections of the building and a desktop review of existing structural and geotechnical information, including existing drawings and calculations, if available.

The purpose of the assessment is to determine the likely building performance and damage patterns, to identify any potential critical structural weaknesses or collapse hazards, and to make an initial assessment of the likely building strength in terms of percentage of new building standard (%NBS).

At the time of this report, no intrusive site investigation, detailed analysis, or modelling of the building structure had been carried out. Construction drawings were made available, and these have been considered in our evaluation of the building. The building description below is based on a review of the drawings and our visual inspections.

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.

Canterbury Earthquake Recovery Authority (CERA)

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

Section 38 – Works

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

Section 51 – Requiring Structural Survey

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

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

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

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

- The importance level and occupancy of the building
- The placard status and amount of damage
- The age and structural type of the building
- Consideration of any critical structural weaknesses
- The extent of any earthquake damage

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

Section 115 – Change of Use

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

Section 121 – Dangerous Buildings

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

- in the ordinary course of events (excluding the occurrence of an earthquake), the building is likely to cause injury or death or damage to other property; or
- in the event of fire, injury or death to any persons in the building or on other property is likely because of fire hazard or the occupancy of the building; or
- there is a risk that the building could collapse or otherwise cause injury or death as a result of earthquake shaking that is less than a 'moderate earthquake' (refer to Section 122 below); or
- there is a risk that that other property could collapse or otherwise cause injury or death; or
- a territorial authority has not been able to undertake an inspection to determine whether the building is dangerous.

Section 122 – Earthquake Prone Buildings

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

earthquake is defined by the building regulations as one that would generate ground shaking 33% of the shaking used to design an equivalent new building.

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.

Christchurch City Council Policy

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

The 2010 amendment includes the following:

- A process for identifying, categorising and prioritising Earthquake Prone Buildings, commencing on 1 July 2012;
- A strengthening target level of 67% of a new building for buildings that are Earthquake Prone;
- A timeframe of 15-30 years for Earthquake Prone Buildings to be strengthened; and,
- Repair works for buildings damaged by earthquakes will be required to comply with the above.

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

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

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

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

Building Code

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

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

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

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

Appendix E
Standard Reporting Spread Sheets

Aldwin Courts Block A (Flats 1,2,3)	PRO 0811 B001
Aldwin Courts Block B (Flats 4,5,6)	PRO 0811 B002
Aldwin Courts Block C (Flats 7,8)	PRO 0811 B003
Aldwin Courts Block D (Flats 9,10,11)	PRO 0811 B004
Aldwin Courts Block E (Flats 12,13,14)	PRO 0811 B005
Aldwin Courts Block F (Flats 15,16,17)	PRO 0811 B006
Aldwin Courts Block G (Flats 18,19,20)	PRO 0811 B007
Aldwin Courts Block J (Carport)	PRO 0811 B008
Aldwin Courts Block K (Carport)	PRO 0811 B009
Aldwin Courts Block L (Carport)	PRO 0811 B010
Aldwin Courts Block M (Carport)	PRO 0811 B011
Aldwin Courts Block O (Carport)	PRO 0811 B012

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Block A - Aldwins Courts			Reviewer:	David Elliott
	Unit	No:	Street	CPEng No:	202002
Building Address:	Block A (Units 1, 2 & 3)	55	Aldwins Road	Company:	Aurecon
Legal Description:	FLATS 1, 2 & 3 DP 40879 ON LOTS 1 3 DP 38888			Company project number:	237698
				Company phone number:	03 371 0761
	Degrees	Min	Sec		
GPS south:	43	32	25.76	Date of submission:	16/12/2015
GPS east:	172	40	0.57	Inspection Date:	13/08/2013
				Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 001			Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.60		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	multi-unit residential		Brief strengthening description:	
Use (upper floors):	multi-unit residential			
Use notes (if required):				
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber truss	truss depth, purlin type and cladding	timber purlins, 1.675m truss depth
Floors:	concrete flat slab	slab thickness (mm)	100mm slab with 665 mesh - moistop -
Beams:			
Columns:			
Walls:			

Lateral load resisting structure

Lateral system along:	lightweight timber framed walls	**Note: Define along and across in detailed report!**	note typical wall length (m)	
Ductility assumed, μ:	2.00			
Period along:	0.40	0.00	estimate or calculation?	estimated
Total deflection (ULS) (mm):			estimate or calculation?	estimated
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	estimated
Lateral system across:	lightweight timber framed walls		note typical wall length (m)	
Ductility assumed, μ:	2.00			
Period across:	0.40	0.00	estimate or calculation?	estimated
Total deflection (ULS) (mm):			estimate or calculation?	estimated
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	estimated

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:	brick or tile	describe (note cavity if exists)	Cavity between brick veneer and timber framing
Roof Cladding:	Metal	describe	
Glazing:			
Ceilings:	plaster, fixed		
Services(list):			

Available documentation

Architectural	partial	original designer name/date	Enterprise Homes Ltd/1974
Structural	partial	original designer name/date	Enterprise Homes Ltd/1974
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:

(refer DEE Table 4-2)	Site performance:		Describe damage: Tenant has moved out of unit 2 due to damage.
	Settlement:	25-100mm	notes (if applicable):
	Differential settlement:	none observed	notes (if applicable):
	Liquefaction:	more than 10 m³/100m²	notes (if applicable): Considerable liquefaction on-site.
	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:	moderate to substantial (1 in 5)	notes (if applicable): Cracks in walls and base slab. Segments of plaster have

Building:

	Current Placard Status:	green		
Along	Damage ratio:	-20%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	-20%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	Carpet removed due to liquefaction damage. Cracks in w

Recommendations

	Level of repair/strengthening required:	minor structural		Describe:	Relevel the building, rest of damage is repaired
	Building Consent required:	no		Describe:	
	Interim occupancy recommendations:	full occupancy		Describe:	
Along	Assessed %NBS before e'quakes:	83%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Based on calculations
	Assessed %NBS after e'quakes:	83%			
Across	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below		
	Assessed %NBS after e'quakes:	100%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final $(\%NBS)_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor — Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor — Building Importance level (from above): 2
Return Period Scaling factor from Table 3.1, **Factor C**:

	along	across
2.5 Ductility Scaling Factor — Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or $=k_\mu$, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00
2.6 Structural Performance Scaling Factor: Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!
2.7 Baseline %NBS, $(NBS\%)_b$ = $(\%NBS)_{nom}$ x A x B x C x D x E — **$\%NBS_b$:**	**#DIV/0!**	**#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1
3.2. Vertical irregularity, Factor B: 1
3.3. Short columns, Factor C: 1
3.4. Pounding potential — Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0
3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

	Along	Across
3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum		
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: — Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR)	**0.00**	**0.00**
4.3 PAR x (%NBS)b: — PAR x Baselline %NBS:	**#DIV/0!**	**#DIV/0!**
4.4 Percentage New Building Standard (%NBS), (before)		**#DIV/0!**

Official Use only:
Accepted By
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Block B - Aldwins Courts				Reviewer:	David Elliott
	Unit	No:	Street		CPEng No:	202002
Building Address:	Block B (Units 4, 5 and 6)	55	Aldwins Road		Company:	Aurecon
Legal Description:	FLATS 4, 5 & 6 DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698
					Company phone number:	03 371 0761
	Degrees	Min	Sec			
GPS south:	43	32	25.34		Date of submission:	16/12/2015
GPS east:	172	39	59.07		Inspection Date:	13/08/2013
					Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 002				Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.60		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	multi-unit residential		Brief strengthening description:	
Use (upper floors):	multi-unit residential			
Use notes (if required):				
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber truss	truss depth, purlin type and cladding	timber purlins, 1.675m truss depth
Floors:	concrete flat slab	slab thickness (mm)	100mm slab with 665 mesh - moistop -
Beams:			
Columns:			
Walls:			

Lateral load resisting structure

Lateral system along:	lightweight timber framed walls	**Note: Define along and across in detailed report!**	note typical wall length (m)	
Ductility assumed, μ:	2.00			
Period along:	0.40	0.00	estimate or calculation?	estimated
Total deflection (ULS) (mm):			estimate or calculation?	
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	
Lateral system across:	lightweight timber framed walls		note typical wall length (m)	
Ductility assumed, μ:	2.00			
Period across:	0.40	0.00	estimate or calculation?	estimated
Total deflection (ULS) (mm):			estimate or calculation?	
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:	brick or tile	describe (note cavity if exists)	Cavity between brick veneer and timber framing
Roof Cladding:	Metal	describe	
Glazing:			
Ceilings:	plaster, fixed		
Services(list):			

Available documentation

Architectural	partial	original designer name/date	Enterprise Homes Ltd/1974
Structural	partial	original designer name/date	Enterprise Homes Ltd/1974
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site: (refer DEE Table 4-2)	Site performance:	Moderate	Describe damage:	Tenants have moved out of Units 4 & 5 due to d
	Settlement:	25-100mm	notes (if applicable):	
	Differential settlement:	none observed	notes (if applicable):	
	Liquefaction:	more than 10 m³/100m²	notes (if applicable):	Considerable liquefaction on-site. This has led to
	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:	slight	notes (if applicable):	Cracks in walls, cracks in glass panels.

Building:

	Current Placard Status:	green		
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	Large amounts of liquefaction cover floors of un

Recommendations

	Level of repair/strengthening required:	minor non-structural		Describe:	Relevel the building. Majoirity of the damage is reapired by Council.
	Building Consent required:	no		Describe:	
	Interim occupancy recommendations:	full occupancy		Describe:	
Along	Assessed %NBS before e'quakes:	73%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	73%			
Across	Assessed %NBS before e'quakes:	88%	#### %NBS from IEP below		
	Assessed %NBS after e'quakes:	88%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 2
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E — **%NBS$_b$:** **#DIV/0!** **#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum

	Along	Across
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR) **0.00** **0.00**

4.3 PAR x (%NBS)b: PAR x Baselline %NBS: **#DIV/0!** **#DIV/0!**

4.4 Percentage New Building Standard (%NBS), (before) **#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Block C - Aldwins Courts				Reviewer:	David Elliott
	Unit	No:	Street		CPEng No:	202002
Building Address:	Block C (Units 7 & 8)	55	Aldwins Road		Company:	Aurecon
	FLATS 7 & 8					
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698
					Company phone number:	03 371 0761
	Degrees	Min	Sec			
GPS south:	43	32	24.92		Date of submission:	16/12/2015
GPS east:	172	39	59.54		Inspection Date:	13/08/2013
					Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 003				Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.60		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	multi-unit residential		Brief strengthening description:	
Use (upper floors):	multi-unit residential			
Use notes (if required):				
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber truss	truss depth, purlin type and cladding	timber purlins, 1.675m truss depth
Floors:	concrete flat slab	slab thickness (mm)	100mm slab with 665 mesh - moistop -
Beams:			
Columns:			
Walls:			

Lateral load resisting structure

Lateral system along:	lightweight timber framed walls		**Note: Define along and across in detailed report!**	note typical wall length (m)	
Ductility assumed, μ:	2.00				
Period along:	0.40	0.00		estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	
Lateral system across:	lightweight timber framed walls			note typical wall length (m)	
Ductility assumed, μ:	2.00				
Period across:	0.40	0.00		estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:	brick or tile	describe (note cavity if exists)	Cavity between brick veneer and timber framing
Roof Cladding:	Metal	describe	
Glazing:			
Ceilings:	plaster, fixed		
Services(list):			

Available documentation

Architectural	partial	original designer name/date	Enterprise Homes Ltd/1974
Structural	partial	original designer name/date	Enterprise Homes Ltd/1974
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:
(refer DEE Table 4-2)

Site performance:		Describe damage:	
Settlement:	25-100mm	notes (if applicable):	
Differential settlement:	none observed	notes (if applicable):	
Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	Wall cracks in plaster, step cracks in masonry, c

Building:

Current Placard Status:	green			
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	

Recommendations

Level of repair/strengthening required:				Describe:	Damage is repaired by council.
Building Consent required:	no			Describe:	
Interim occupancy recommendations:	full occupancy			Describe:	
Along	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	100%			
Across	Assessed %NBS before e'quakes:	80%	#### %NBS from IEP below		
	Assessed %NBS after e'quakes:	80%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 2
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E — **%NBS$_b$:** **#DIV/0!** **#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum

	Along	Across
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR) **0.00** **0.00**

4.3 PAR x (%NBS)b: PAR x Baselline %NBS: **#DIV/0!** **#DIV/0!**

4.4 Percentage New Building Standard (%NBS), (before) **#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Block D - Aldwins Courts				Reviewer:	David Elliott
	Unit	No:	Street		CPEng No:	202002
Building Address:	Block D (Units 9, 10 & 11)	55	Aldwins Road		Company:	Aurecon
	FLATS 9, 10 & 11					
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698
					Company phone number:	03 371 0761
	Degrees	Min	Sec			
GPS south:	43	32	25.05		Date of submission:	16/12/2015
GPS east:	172	40	0.85		Inspection Date:	13/08/2013
					Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 004				Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.60		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	multi-unit residential		Brief strengthening description:	
Use (upper floors):	multi-unit residential			
Use notes (if required):				
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber truss	truss depth, purlin type and cladding	timber purlins, 1.675m truss depth
Floors:	concrete flat slab	slab thickness (mm)	100mm slab with 665 mesh - moistop -
Beams:			
Columns:			
Walls:			

Lateral load resisting structure

Lateral system along:	lightweight timber framed walls		**Note: Define along and across in detailed report!**	note typical wall length (m)	
Ductility assumed, μ:	2.00				
Period along:	0.40	0.00		estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	
Lateral system across:	lightweight timber framed walls			note typical wall length (m)	
Ductility assumed, μ:	2.00				
Period across:	0.40	0.00		estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:	brick or tile	describe (note cavity if exists)	Cavity between brick veneer and timber framing
Roof Cladding:	Metal	describe	
Glazing:			
Ceilings:	plaster, fixed		
Services(list):			

Available documentation

Architectural	partial	original designer name/date	Enterprise Homes Ltd/1974
Structural	partial	original designer name/date	Enterprise Homes Ltd/1974
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:
(refer DEE Table 4-2)

Site performance:		Describe damage:	
Settlement:	25-100mm	notes (if applicable):	
Differential settlement:	none observed	notes (if applicable):	
Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	Cracks in walls and base slab, step cracks in ma

Building:

Current Placard Status:	green			
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	

Recommendations

Level of repair/strengthening required:				Describe:	Damage is repaired by council.
Building Consent required:	no			Describe:	
Interim occupancy recommendations:	full occupancy			Describe:	
Along	Assessed %NBS before e'quakes:	83%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	83%			
Across	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below		
	Assessed %NBS after e'quakes:	100%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 2
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E — **%NBS$_b$:** **#DIV/0!** **#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum

	Along	Across
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR) **0.00** **0.00**

4.3 PAR x (%NBS)b: PAR x Baselline %NBS: **#DIV/0!** **#DIV/0!**

4.4 Percentage New Building Standard (%NBS), (before) **#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Block E - Aldwins Courts				Reviewer:	David Elliott
	Unit	No:	Street		CPEng No:	202002
Building Address:	Block E (Units 12, 12a & 14)	55	Aldwins Road		Company:	Aurecon
	FLATS 12, 12a & 14					
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698
					Company phone number:	03 371 0761
	Degrees	Min	Sec			
GPS south:	43	32	24.43		Date of submission:	15/12/2016
GPS east:	172	39	59.99		Inspection Date:	13/08/2013
					Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 005				Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.60		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	multi-unit residential		Brief strengthening description:	
Use (upper floors):	multi-unit residential			
Use notes (if required):				
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber truss	truss depth, purlin type and cladding	timber purlins, 1.675m truss depth
Floors:	concrete flat slab	slab thickness (mm)	100mm slab with 665 mesh - moistop -
Beams:			
Columns:			
Walls:			

Lateral load resisting structure

Lateral system along:	lightweight timber framed walls		**Note: Define along and across in detailed report!**	note typical wall length (m)
Ductility assumed, μ:	2.00			
Period along:	0.40	0.00		estimate or calculation? estimated
Total deflection (ULS) (mm):				estimate or calculation?
maximum interstorey deflection (ULS) (mm):				estimate or calculation?
Lateral system across:	lightweight timber framed walls			note typical wall length (m)
Ductility assumed, μ:	2.00			
Period across:	0.40	0.00		estimate or calculation? estimated
Total deflection (ULS) (mm):				estimate or calculation?
maximum interstorey deflection (ULS) (mm):				estimate or calculation?

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:	brick or tile	describe (note cavity if exists)	Cavity between brick veneer and timber framing
Roof Cladding:	Metal	describe	
Glazing:			
Ceilings:	plaster, fixed		
Services(list):			

Available documentation

Architectural	partial	original designer name/date	Enterprise Homes Ltd/1974
Structural	partial	original designer name/date	Enterprise Homes Ltd/1974
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:
(refer DEE Table 4-2)

Site performance:		Describe damage:	
Settlement:	25-100mm	notes (if applicable):	
Differential settlement:	none observed	notes (if applicable):	
Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	Cracks in walls, step cracks in masonry.

Building:

	Current Placard Status:	green		
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	Roof tiles unsecured, a few have fallen off.

Recommendations

	Level of repair/strengthening required:	none	Describe:	Damage is repaired by the council.
	Building Consent required:	no	Describe:	
	Interim occupancy recommendations:	full occupancy	Describe:	
Along	Assessed %NBS before e'quakes:	78%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology: Quantitative
	Assessed %NBS after e'quakes:	78%		
Across	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below	
	Assessed %NBS after e'quakes:	100%		

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 2
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E — **%NBS$_b$:** **#DIV/0!** **#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum

	Along	Across
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR) **0.00** **0.00**

4.3 PAR x (%NBS)b: PAR x Baselline %NBS: **#DIV/0!** **#DIV/0!**

4.4 Percentage New Building Standard (%NBS), (before) **#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Block F - Aldwins Courts				Reviewer:	David Elliott
	Unit	No:	Street		CPEng No:	202002
Building Address:	Block F (Units 15, 16 & 17)	55	Aldwins Road		Company:	Aurecon
	FLATS 15, 16 & 17					
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698
					Company phone number:	03 371 0761
	Degrees	Min	Sec			
GPS south:	43	32	23.91		Date of submission:	15/10/2015
GPS east:	172	40	0.32		Inspection Date:	13/08/2013
					Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 006				Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.60		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	multi-unit residential		Brief strengthening description:	
Use (upper floors):	multi-unit residential			
Use notes (if required):				
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber truss	truss depth, purlin type and cladding	timber purlins, 1.675m truss depth
Floors:	concrete flat slab	slab thickness (mm)	100mm slab with 665 mesh - moistop -
Beams:			
Columns:			
Walls:			

Lateral load resisting structure

Lateral system along:	lightweight timber framed walls		**Note: Define along and across in detailed report!**	note typical wall length (m)
Ductility assumed, μ:	2.00			
Period along:	0.40	0.00		estimate or calculation? estimated
Total deflection (ULS) (mm):				estimate or calculation?
maximum interstorey deflection (ULS) (mm):				estimate or calculation?
Lateral system across:	lightweight timber framed walls			note typical wall length (m)
Ductility assumed, μ:	2.00			
Period across:	0.40	0.00		estimate or calculation? estimated
Total deflection (ULS) (mm):				estimate or calculation?
maximum interstorey deflection (ULS) (mm):				estimate or calculation?

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:	brick or tile	describe (note cavity if exists)	Cavity between brick veneer and timber framing
Roof Cladding:	Metal	describe	
Glazing:			
Ceilings:	plaster, fixed		
Services(list):			

Available documentation

Architectural	partial	original designer name/date	Enterprise Homes Ltd/1974
Structural	partial	original designer name/date	Enterprise Homes Ltd/1974
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:
(refer DEE Table 4-2)

Site performance:		Describe damage:	
Settlement:	0-25mm	notes (if applicable):	
Differential settlement:	none observed	notes (if applicable):	
Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	Cracks in walls, step cracks in masonry.

Building:

	Current Placard Status:	green		
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	no	Describe:	

Recommendations

Level of repair/strengthening required:	none		Describe:	Damage is repaired by council
Building Consent required:	no		Describe:	
Interim occupancy recommendations:	full occupancy		Describe:	
Along: Assessed %NBS before e'quakes:	83%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
Assessed %NBS after e'quakes:	83%			
Across: Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below		
Assessed %NBS after e'quakes:	100%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 2
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E — **%NBS$_b$:** **#DIV/0!** **#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum

	Along	Across
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR) **0.00** **0.00**

4.3 PAR x (%NBS)b: PAR x Baselline %NBS: **#DIV/0!** **#DIV/0!**

4.4 Percentage New Building Standard (%NBS), (before) **#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Block G - Aldwins Courts				Reviewer:	David Elliott
	Unit	No:	Street		CPEng No:	202002
Building Address:	Block G (Units 18, 19 & 20)	55	Aldwins Road		Company:	Aurecon
	FLATS 18, 19 & 20					
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698
					Company phone number:	03 371 0761
	Degrees	Min	Sec			
GPS south:	43	32	24.51		Date of submission:	16/12/2015
GPS east:	172	40	1.46		Inspection Date:	13/08/2013
					Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 007				Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.60		height from ground to level of uppermost seismic mass (for IEP only) (m):	
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	multi-unit residential		Brief strengthening description:	
Use (upper floors):	multi-unit residential			
Use notes (if required):				
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber truss	truss depth, purlin type and cladding	timber purlins, 1.675m truss depth
Floors:	concrete flat slab	slab thickness (mm)	100mm slab with 665 mesh - moistop -
Beams:			
Columns:			
Walls:			

Lateral load resisting structure

Lateral system along:	lightweight timber framed walls		**Note: Define along and across in detailed report!**	note typical wall length (m)	
Ductility assumed, μ:	2.00				
Period along:	0.40	0.00		estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	
Lateral system across:	lightweight timber framed walls			note typical wall length (m)	
Ductility assumed, μ:	2.00				
Period across:	0.40	0.00		estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:	brick or tile	describe (note cavity if exists)	Cavity between brick veneer and timber framing
Roof Cladding:	Metal	describe	
Glazing:			
Ceilings:	plaster, fixed		
Services(list):			

Available documentation

Architectural	partial	original designer name/date	Enterprise Homes Ltd/1974
Structural	partial	original designer name/date	Enterprise Homes Ltd/1974
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:
(refer DEE Table 4-2)

Site performance:		Describe damage:	
Settlement:	25-100mm	notes (if applicable):	
Differential settlement:	none observed	notes (if applicable):	
Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	Cracks in roof & walls, cracks in base slab, step

Building:

Current Placard Status:	green			
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	

Recommendations

Level of repair/strengthening required:	none		Describe:	Damage is repaired by council
Building Consent required:	no		Describe:	minor repairs
Interim occupancy recommendations:	full occupancy		Describe:	
Along	Assessed %NBS before e'quakes:	83%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology: Quantitative
	Assessed %NBS after e'quakes:	83%		
Across	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below	
	Assessed %NBS after e'quakes:	100%		

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 2
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E — **%NBS$_b$:** **#DIV/0!** **#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum

	Along	Across
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR) **0.00** **0.00**

4.3 PAR x (%NBS)b: PAR x Baselline %NBS: **#DIV/0!** **#DIV/0!**

4.4 Percentage New Building Standard (%NBS), (before) **#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Carport J - Aldwins Courts			Reviewer:	David Elliott
	Unit	No:	Street	CPEng No:	202002
Building Address:	Carport J	55	Aldwins Road	Company:	Aurecon
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888			Company project number:	237698
				Company phone number:	03 371 0761
	Degrees	Min	Sec		
GPS south:	43	32	25.55	Date of submission:	16/12/2015
GPS east:	172	40	0.29	Inspection Date:	13/08/2013
				Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 008			Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.00	height from ground to level of uppermost seismic mass (for IEP only) (m):		
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	other (specify)		Brief strengthening description:	
Use (upper floors):				
Use notes (if required):	Carport (4 No. car spaces)			
Importance level (to NZS1170.5):	IL1			

Gravity Structure

Gravity System:	frame system		
Roof:	timber framed	rafter type, purlin type and cladding	
Floors:	concrete flat slab	slab thickness (mm)	100
Beams:			
Columns:	other (note)	typical dimensions (mm x mm)	50 mm OD pipe posts
Walls:	partially filled concrete masonry	thickness (mm)	200

Lateral load resisting structure

Lateral system along:	partially filled CMU		**Note: Define along and across in detailed report!**	note total length of wall at ground (m):	12
Ductility assumed, μ:	1.25				
Period along:	0.40	####	enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	
				note total length of wall at ground (m):	
Lateral system across:	partially filled CMU				Out-of-plane (12 m length, 200 mm thick)
Ductility assumed, μ:	1.25				
Period across:	0.40	####	enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	

Separations:

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

Non-structural elements

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

Available documentation

Architectural	none	original designer name/date	
Structural	partial	original designer name/date	Enterprise Homes Ltd/1976
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site: (refer DEE Table 4-2)

Site performance:		Describe damage:	Cracks in concrete floor slab, step cracks in mas
Settlement:	0-25mm	notes (if applicable):	
Differential settlement:	none observed	notes (if applicable):	
Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	

Building:

	Current Placard Status:	green			
Along	Damage ratio:	0%		Describe how damage ratio arrived at:	
	Describe (summary):				
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$		
	Describe (summary):				
Diaphragms	Damage?:	no		Describe:	
CSWs:	Damage?:	no		Describe:	
Pounding:	Damage?:	no		Describe:	
Non-structural:	Damage?:	yes		Describe:	

Recommendations

	Level of repair/strengthening required:	minor structural		Describe:	Damage is repaired by council and the carport is strengthened by OPUS.
	Building Consent required:	no		Describe:	
	Interim occupancy recommendations:	full occupancy		Describe:	
Along	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	100%			
Across	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below		
	Assessed %NBS after e'quakes:	100%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 1
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E

%NBS$_b$:	**#DIV/0!**	**#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

	Along	Across
3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum		
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR)	**0.00**	**0.00**
4.3 PAR x (%NBS)b: — PAR x Baselline %NBS:	**#DIV/0!**	**#DIV/0!**
4.4 Percentage New Building Standard (%NBS), (before)		**#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Carport K - Aldwins Courts				Reviewer:	David Elliott
	Unit	No:	Street		CPEng No:	202002
Building Address:	Carport K - Aldwins Courts		55	Aldwins Road	Company:	Aurecon
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698
					Company phone number:	03 371 0761
	Degrees	Min	Sec			
GPS south:	43	32	25.31		Date of submission:	16/10/2015
GPS east:	172	39	59.84		Inspection Date:	13/08/2013
					Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 009				Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.00	height from ground to level of uppermost seismic mass (for IEP only) (m):		
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	other (specify)		Brief strengthening description:	
Use (upper floors):				
Use notes (if required):	Carport (4 No. car spaces)			
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	frame system		
Roof:	timber framed	rafter type, purlin type and cladding	
Floors:	concrete flat slab	slab thickness (mm)	100
Beams:			
Columns:	other (note)	typical dimensions (mm x mm)	50 mm OD pipe posts
Walls:	partially filled concrete masonry	thickness (mm)	200

Lateral load resisting structure

Lateral system along:	partially filled CMU	**Note: Define along and across in detailed report!**		note total length of wall at ground (m):	12
Ductility assumed, μ:	1.25				
Period along:	0.40	####	enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	
				note total length of wall at ground (m):	
Lateral system across:	partially filled CMU				Out-of-plane (12 m length, 200 mm thick)
Ductility assumed, μ:	1.25				
Period across:	0.40	####	enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	

Separations:

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

Non-structural elements

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

Available documentation

Architectural	none	original designer name/date	
Structural	partial	original designer name/date	Enterprise Homes Ltd/1976
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:	Site performance:		Describe damage:	Cracks in concrete floor slab, step cracks in mas
(refer DEE Table 4-2)				
	Settlement:	0-25mm	notes (if applicable):	
	Differential settlement:	none observed	notes (if applicable):	
	Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	

Building:

	Current Placard Status:	green		
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	yes	Describe:	Mortar between masonry wall connected to Bloc
Non-structural:	Damage?:	yes	Describe:	

Recommendations

	Level of repair/strengthening required:	minor structural		Describe:	Need to be strengthened to 67% NBS or 100% NBS.
	Building Consent required:	yes		Describe:	
	Interim occupancy recommendations:	full occupancy		Describe:	
Along	Assessed %NBS before e'quakes:	53%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	53%			
Across	Assessed %NBS before e'quakes:	37%	#### %NBS from IEP below		
	Assessed %NBS after e'quakes:	37%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor — Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor — Building Importance level (from above): 1
Return Period Scaling factor from Table 3.1, **Factor C**:

	along	across
2.5 Ductility Scaling Factor — Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00
2.6 Structural Performance Scaling Factor: — Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!
2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E — **%NBS$_b$:**	**#DIV/0!**	**#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential — Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

	Along	Across
3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum		
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR)	**0.00**	**0.00**
4.3 PAR x (%NBS)b: — PAR x Baselline %NBS:	**#DIV/0!**	**#DIV/0!**
4.4 Percentage New Building Standard (%NBS), (before)		**#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Carport L - Aldwins Courts				Reviewer:	David Elliott	
	Unit	No:	Street		CPEng No:	202001	
Building Address:	Carport L - Aldwins Courts	55	Aldwins Road		Company:	Aurecon	
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698	
					Company phone number:	03 371 0761	
	Degrees	Min	Sec				
GPS south:	43	32	24.54		Date of submission:	26/08/2014	
GPS east:	172	40	0.44		Inspection Date:	13/08/2013	
					Revision:	3	
Building Unique Identifier (CCC):	PRO 0811 BLDG 010				Is there a full report with this summary?	yes	

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.00	height from ground to level of uppermost seismic mass (for IEP only) (m):		
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	other (specify)		Brief strengthening description:	
Use (upper floors):				
Use notes (if required):	Carport (4 No. car spaces)			
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	frame system		
Roof:	timber framed	rafter type, purlin type and cladding	
Floors:	concrete flat slab	slab thickness (mm)	100
Beams:			
Columns:	other (note)	typical dimensions (mm x mm)	50 mm OD pipe posts
Walls:	partially filled concrete masonry	thickness (mm)	200

Lateral load resisting structure

Lateral system along:	partially filled CMU	**Note: Define along and across in detailed report!**	note total length of wall at ground (m):	12
Ductility assumed, μ:	1.25			
Period along:	0.40	##### enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):			estimate or calculation?	
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	
			note total length of wall at ground (m):	
Lateral system across:	partially filled CMU			Out-of-plane (12 m length, 200 mm thick)
Ductility assumed, μ:	1.25			
Period across:	0.40	##### enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):			estimate or calculation?	
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	

Separations:

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

Non-structural elements

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

Available documentation

Architectural	none	original designer name/date	
Structural	partial	original designer name/date	Enterprise Homes Ltd/1976
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:

(refer DEE Table 4-2)	Site performance:		Describe damage: Cracks in concrete floor slab, step cracks in mas
	Settlement:	0-25mm	notes (if applicable):
	Differential settlement:	none observed	notes (if applicable):
	Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):

Building:

	Current Placard Status:	green		
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	yes	Describe:	Mortar between masonry wall connected to Block
Non-structural:	Damage?:	yes	Describe:	

Recommendations

				Need strengthening to 67% NBS or 100%
	Level of repair/strengthening required:	minor structural	Describe:	NBS.
	Building Consent required:	yes	Describe:	
	Interim occupancy recommendations:	full occupancy	Describe:	
Along	Assessed %NBS before e'quakes:	53%	##### %NBS from IEP below	If IEP not used, please detail assessment methodology: Quantitative
	Assessed %NBS after e'quakes:	53%		
Across	Assessed %NBS before e'quakes:	37%	##### %NBS from IEP below	
	Assessed %NBS after e'quakes:	37%		

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final $(\%NBS)_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor

Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 1
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or $=k_\mu$, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, $(NBS\%)_b$ = $(\%NBS)_{nom}$ x A x B x C x D x E	**$\%NBS_b$:**	**#DIV/0!**	**#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A:		1
3.2. Vertical irregularity, Factor B:		1
3.3. Short columns, Factor C:		1
3.4. Pounding potential	Pounding effect D1, from Table to right	
	Height Difference effect D2, from Table to right	
	Therefore, Factor D:	0
3.5. Site Characteristics		1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

		Along	Across
3.6. Other factors, Factor F	For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum		
	Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR)	**0.00**	**0.00**
4.3 PAR x (%NBS)b: PAR x Baselline %NBS:	**#DIV/0!**	**#DIV/0!**
4.4 Percentage New Building Standard (%NBS), (before)		**#DIV/0!**

Official Use only:

Accepted By
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Carport M - Aldwins Courts			Reviewer:	David Elliott
	Unit	No:	Street	CPEng No:	202002
Building Address:	Carport M - Aldwins Courts	55	Aldwins Road	Company:	Aurecon
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888			Company project number:	237698
				Company phone number:	03 371 0761
	Degrees	Min	Sec		
GPS south:	43	32	23.96	Date of submission:	16/12/2015
GPS east:	172	40	1.12	Inspection Date:	13/08/2013
				Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 011			Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.00	height from ground to level of uppermost seismic mass (for IEP only) (m):		
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	other (specify)		Brief strengthening description:	
Use (upper floors):				
Use notes (if required):	Carport (3 No. car spaces)			
Importance level (to NZS1170.5):	IL1			

Gravity Structure

Gravity System:	frame system		
Roof:	timber framed	rafter type, purlin type and cladding	
Floors:	concrete flat slab	slab thickness (mm)	100
Beams:			
Columns:	other (note)	typical dimensions (mm x mm)	50 mm OD pipe posts
Walls:	partially filled concrete masonry	thickness (mm)	200

Lateral load resisting structure

Lateral system along:	partially filled CMU		**Note: Define along and across in detailed report!**	note total length of wall at ground (m):	9
Ductility assumed, μ:	1.25				
Period along:	0.40	####	enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	
				note total length of wall at ground (m):	
Lateral system across:	partially filled CMU				Out-of-plane (9 m length, 200 mm thick)
Ductility assumed, μ:	1.25				
Period across:	0.40	####	enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	

Separations:

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

Non-structural elements

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

Available documentation

Architectural	none	original designer name/date	
Structural	partial	original designer name/date	Enterprise Homes Ltd/1976
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site: (refer DEE Table 4-2)	Site performance:		Describe damage:	Cracks in concrete floor slab, step cracks in mas
	Settlement:	0-25mm	notes (if applicable):	
	Differential settlement:	none observed	notes (if applicable):	
	Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	

Building:

	Current Placard Status:	green		
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	

Recommendations

	Level of repair/strengthening required:	none		Describe:	Damage is repaired by council and carpark is strengthned by OPUS
	Building Consent required:	no		Describe:	minor repairs
	Interim occupancy recommendations:	full occupancy		Describe:	
Along	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	100%			
Across	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below		
	Assessed %NBS after e'quakes:	100%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 1
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E

%NBS$_b$:	**#DIV/0!**	**#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

	Along	Across
3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum		
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR)	**0.00**	**0.00**
4.3 PAR x (%NBS)b: — PAR x Baselline %NBS:	**#DIV/0!**	**#DIV/0!**
4.4 Percentage New Building Standard (%NBS), (before)		**#DIV/0!**

Official Use only:
Accepted By:
Date:

Detailed Engineering Evaluation Summary Data V1.14

Location

Building Name:	Carport O - Aldwins Courts				Reviewer:	David Elliott
	Unit	No:	Street		CPEng No:	202002
Building Address:	Carport O - Aldwins Courts		55	Aldwins Road	Company:	Aurecon
Legal Description:	DP 40879 ON LOTS 1 3 DP 38888				Company project number:	237698
					Company phone number:	03 371 0761
	Degrees	Min	Sec			
GPS south:	43	32	24.40		Date of submission:	16/12/2015
GPS east:	172	40	1.10		Inspection Date:	13/08/2013
					Revision:	3
Building Unique Identifier (CCC):	PRO 0811 BLDG 011				Is there a full report with this summary?	yes

Site

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

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	
Building height (m):	2.00	height from ground to level of uppermost seismic mass (for IEP only) (m):		
Floor footprint area (approx):				
Age of Building (years):	37		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	other (specify)		Brief strengthening description:	
Use (upper floors):				
Use notes (if required):	Carport (4 No. car spaces)			
Importance level (to NZS1170.5):	IL1			

Gravity Structure

Gravity System:	frame system		
Roof:	timber framed	rafter type, purlin type and cladding	
Floors:	concrete flat slab	slab thickness (mm)	100
Beams:			
Columns:	other (note)	typical dimensions (mm x mm)	50 mm OD pipe posts
Walls:	partially filled concrete masonry	thickness (mm)	200

Lateral load resisting structure

Lateral system along:	partially filled CMU	**Note: Define along and across in detailed report!**		note total length of wall at ground (m):	12
Ductility assumed, μ:	1.25				
Period along:	0.40	####	enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	
				note total length of wall at ground (m):	
Lateral system across:	partially filled CMU				Out-of-plane (12 m length, 200 mm thick)
Ductility assumed, μ:	1.25				
Period across:	0.40	####	enter height above at H31	estimate or calculation?	estimated
Total deflection (ULS) (mm):				estimate or calculation?	
maximum interstorey deflection (ULS) (mm):				estimate or calculation?	

Separations:

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

Non-structural elements

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

Available documentation

Architectural	none	original designer name/date	
Structural	partial	original designer name/date	Enterprise Homes Ltd/1976
Mechanical	none	original designer name/date	
Electrical	none	original designer name/date	
Geotech report	none	original designer name/date	

Damage

Site:	Site performance:		Describe damage:	Cracks in concrete floor slab, step cracks in mas
(refer DEE Table 4-2)				
	Settlement:	0-25mm	notes (if applicable):	
	Differential settlement:	none observed	notes (if applicable):	
	Liquefaction:	more than 10 m³/100m²	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:	slight	notes (if applicable):	

Building:

	Current Placard Status:	green		
Along	Damage ratio:	0%	Describe how damage ratio arrived at:	
	Describe (summary):			
Across	Damage ratio:	0%	$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$	
	Describe (summary):			
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	

Recommendations

	Level of repair/strengthening required:	none		Describe:	Damage is repaired by council and the carpors are strengthened by OPUS.
	Building Consent required:	no		Describe:	
	Interim occupancy recommendations:	full occupancy		Describe:	
Along	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative
	Assessed %NBS after e'quakes:	100%			
Across	Assessed %NBS before e'quakes:	100%	#### %NBS from IEP below		
	Assessed %NBS after e'quakes:	100%			

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1965-1976 — h_n from above: m

Seismic Zone, if designed between 1965 and 1992: — not required for this age of building / not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:		

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0
Note 2: for RC buildings designed between 1976-1984, use 1.2
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0)

	along	across
Final (%NBS)$_{nom}$:	**0%**	**0%**

2.2 Near Fault Scaling Factor — Near Fault scaling factor, from NZS1170.5, cl 3.1.6:

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	#DIV/0!	#DIV/0!

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3:
Z_{1992}, from NZS4203:1992
Hazard scaling factor, **Factor B:** #DIV/0!

2.4 Return Period Scaling Factor

Building Importance level (from above): 1
Return Period Scaling factor from Table 3.1, **Factor C**:

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)		
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:		
Ductiity Scaling Factor, **Factor D**:	0.00	0.00

2.6 Structural Performance Scaling Factor:

Sp:		
Structural Performance Scaling Factor **Factor E**:	#DIV/0!	#DIV/0!

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E

%NBS$_b$:	**#DIV/0!**	**#DIV/0!**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 1

3.4. Pounding potential
Pounding effect D1, from Table to right
Height Difference effect D2, from Table to right
Therefore, Factor D: 0

3.5. Site Characteristics 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

	Along	Across
3.6. Other factors, Factor F — For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum		
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any: Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR)	**0.00**	**0.00**
4.3 PAR x (%NBS)b: — PAR x Baselline %NBS:	**#DIV/0!**	**#DIV/0!**
4.4 Percentage New Building Standard (%NBS), (before)		**#DIV/0!**

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