



Spencer Park Garage
Qualitative Engineering Evaluation

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Christchurch City
Council

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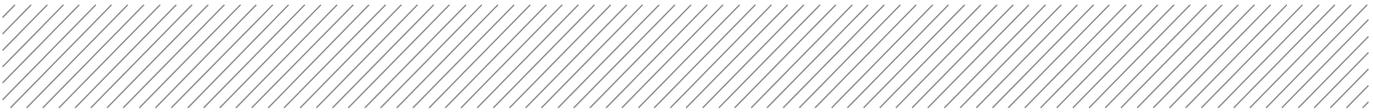
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Executive Summary

This is a summary of the Qualitative Engineering Evaluation for the Spencer Park Garage 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	Spencer Park Garage			
Building Location ID	RK 0157 BLDG 001			Multiple Building Site	Y
Building Address	Spencer Park, 100 Heyders Road			No. of residential units	0
Soil Technical Category	NA	Importance Level	1	Approximate Year Built	1962
Foot Print (m²)	60	Storeys above ground	1	Storeys below ground	0
Type of Construction	Light roof, light timber framed walls, dirt floor.				

Qualitative L4 Report Results Summary

Building Occupied	Y	The Spencer Park Garage is currently in use.
Suitable for Continued Occupancy	Y	The Spencer Park Garage is suitable for continued occupation.
Key Damage Summary	Y	Refer to summary of building damage section 3.1 of report.
Critical Structural Weaknesses (CSW)	N	There were no critical structural weaknesses found.
Levels Survey Results	N	The building has an earth floor.
Building %NBS From Analysis	100%	Based on an analysis of bracing capacity and demand.

Qualitative L4 Report Recommendations

Geotechnical Survey Required	N	Geotechnical survey not required due to lack of observed ground damage on site.
Proceed to L5 Quantitative DEE	N	A Quantitative DEE is not requested for this structure.

Approval

Author Signature		Approver Signature	
Name	Luis Castillo	Name	Lee Howard
Title	Senior Structural Engineer	Title	Senior Structural Engineer



1 Introduction

1.1 General

On 2 April 2012 Aurecon engineers visited the Spencer Park Garage to carry out a qualitative 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 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.
- 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.

This report outlines the results of our Qualitative Assessment of damage to the Spencer Park Garage and is based on the Detailed Engineering Evaluation Procedure document issued by the Structural Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

2 Description of the Building

2.1 Building Age and Configuration

Spencer Park Garage was built circa 1960 and is a timber framed single story building divided into two bays with an earth floor. It appears that there have been some more recent internal additions as evidenced by the lighter colour of the timber framing for some of the internal partitions and the plywood (see appendix A for photographs). The approximate floor area of the building is 60 square metres. It is an importance level 1 structure in accordance with NZS 1170 Part 0:2002.

2.2 Building Structural Systems Vertical and Horizontal

Spencer Park Garage is a very simple structure. Its light weight profiled steel roof is supported on timber rafters on timber frames that transfer loads to the load bearing walls. Load bearing walls are supported by timber posts concreted into the ground. Lateral loads are resisted by lined timber framed walls with diagonal timber bracing in each direction. External walls are clad with profiled steel or corrugated iron and internal walls are clad with plywood on one side. No plans were available for this structure.

2.3 Reference Building Type



Spencer Park Garage is a timber framed shed typical of its age and style. It was not subject to specific engineering design; rather it was constructed to a reliable formula known to achieve the performance objectives of the time it was built.

2.4 Building Foundation System and Soil Conditions

The Spencer Park Garage foundations, as discussed above, consist of timber posts concreted into the ground. The land around Spencer Park has not been assigned a Technical Category zone by CERA. The nearest zoned land is Technical Category 3 (TC3) and is situated approximately 300m from the building. The site itself however shows no evidence of liquefaction from past earthquakes.

2.5 Available Structural Documentation and Inspection Priorities

No structural or architectural drawings were available for the Spencer Park Garage. Inspection priorities related to a review of potential damage to foundations and consideration of wall bracing adequacy.

2.6 Available Survey Information

No levels or verticality survey information was available at the time of this report. These are not expected to be required for this building given the type of construction and the earth floor.

3 Structural Investigation

3.1 Summary of Building Damage

The Spencer Park Garage was in use at the time the damage assessment was carried out. The Spencer Park Garage has performed well and no damage was observed to the building.

3.2 Record of Intrusive Investigation

No intrusive investigation was carried out for Spencer Park Garage as critical areas could be visually inspected.

3.3 Damage Discussion

There was no damage observed to the Spencer Park Garage as a result of seismic actions. This is expected as buildings of this nature are flexible and have high inherent ductility. Furthermore, the lack of linings on this building allows the building to move without causing damage.

4 Building Review Summary

4.1 Building Review Statement

As noted above no intrusive investigations were carried out for the Spencer Park Garage. Because of the lack of linings the majority of the structural system can be visually assessed by an external and internal inspection.

4.2 Critical Structural Weaknesses

No specific critical structural weaknesses were identified as part of the building qualitative assessment.

5 Building Strength (Refer to Appendix C for background information)

5.1 General

The Spencer Park Garage, as discussed above, is a typical example of a timber framed shed. It is of a type of building that, due to its light weight, flexibility and natural ductility, has typically performed well; the Spencer Park Garage is not an exception to this and has performed well.

5.2 Initial %NBS Assessment

The Spencer Park Garage has not been subject to specific engineering design and the initial evaluation procedure or IEP is not an appropriate method of assessment for this building. Nevertheless an estimate of lateral load capacity can be made by adopting assumed values for strengths of existing materials and calculating the capacity of existing walls.

Selected assessment seismic parameters are tabulated in the Table below.

Table 1: Parameters used in the Seismic Assessment

Seismic Parameter	Quantity	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	0.5	NZS 1170.5:2004, Table 3.5
Ductility Factor in Transverse Direction, μ	3	Lined lightweight timber framed walls
Ductility Factor in Longitudinal Direction, μ	3	Lightweight timber framed walls

The seismic demand for the Spencer Park Garage has been calculated based on the current code requirements. The capacity of the existing walls in the building was calculated from assumed strengths



of existing materials and the number and length of walls present for both the north – south and east – west directions. The seismic demand was then compared with the building capacity in these directions. The building was found to have a sufficient number and length of walls in both the north – south and east – west directions to achieve a capacity greater than 100% NBS.

5.3 Results Discussion

Analysis shows that the Spencer Park Garage is capable of achieving seismic performance in line with the current code requirements. This is expected as lightweight single story construction like that of the Spencer Park Garage produces a low seismic demand which when combined with a sufficient length of well distributed walls providing seismic resistance produces a structure with good seismic performance and relatively good torsional stability.

6 Conclusions and Recommendations

The building itself has suffered no obvious damage as a result of the earthquakes.

The land below the Spencer Park Garage has not been assigned a Technical Category zone by CERA. Although there is no evidence of liquefaction at the site the nearest zoned land is TC3 and approximately 300m from the building. However a **levels survey has not been recommended for this site** due to the nature of the construction of the building.

As there is no evidence of damage to the land surrounding the site at 100 Heyders Road, a **geotechnical investigation is not thought to be required at this point.**

The building is currently occupied and in use and in our opinion the Spencer Park Garage **is considered suitable for continued occupation.**

7 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.

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Appendices



Appendix A

Photos and Site Map

2 April 2012 – Spencer Park Garage site photographs

<p>General view of the spencer park site.</p>	
<p>Location of the Spencer Park Garage.</p>	
<p>Building northern elevation.</p>	

Building northern elevation.



Building internal view.



Appendix B

References

- Standards New Zealand, "AS/NZS 1170 Parts 0,1 and 5 and commentaries"
- Standards New Zealand, "NZS 3604:2011: Timber Framed Structures"
- Standards New Zealand, "NZS 4229:1999, Concrete Masonry Buildings Not Requiring Specific Design"
- Standards New Zealand, "NZS 3404:1997, Steel Structures Standard"
- Standards New Zealand, "NZS 3101:2006, Concrete Structures Standard"
- New Zealand Society for Earthquake Engineering (NZSEE), "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes June 2006"
- Engineering Advisory Group, "Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-Residential Buildings in Canterbury. Part 2 Evaluation Procedure. Revision 5, 19 July 2011"

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 Sheet

Location

Building Name: Garages Unit: 100 No. Street: Heylers Rd Reviewer: Simon Manning
 Building Address: Spencer Park Company: Aurecon CP/Eng No: 132053
 Legal Description: 100 Heylers Rd Company project number: 228997 Company phone number: 03 375 0781
 GPS south: 43 23 53.37 Degrees Min. Sec. Date of submission: 02/06/2013
 GPS east: 172 42 20.24 Inspection Date: 2/04/2012
 Building Unique Identifier (CCP): PRK 0157 BLDG 001 Is there a full report with this summary? Yes

Site

Site slope: flat Max retaining height (m): 0
 Soil type: mixed Soil Profile (if available):
 Site Class (to NZS1170.5): D If Ground improvement on site, describe:
 Proximity to waterway (m, if <100m):
 Proximity to cliff top (m, if <100m):
 Proximity to cliff base (m, if <100m):
 Approx site elevation (m): 1.00

Building

No. of storeys above ground: 1 single storey = 1 Ground floor elevation (Absolute) (m): 2.00
 Ground floor split? no Ground floor elevation above ground (m): 0.00
 Storeys below ground: 0
 Foundation type: timber piles if Foundation type is other, describe: timber posts in ground
 Building height (m): 3.00 height from ground to level of uppermost seismic mass (for IEP only) (m):
 Floor footprint area (approx): 60 Date of design: 1935-1965
 Age of Building (years): 50
 Strengthening present? no If so, when (year)?
 Use (ground floor): other (specify) And what load level (%q)?
 Use (upper floors): Parking and storage Brief strengthening description:
 Use notes (if required):
 Importance level (to NZS1170.5): IL1

Gravity Structure

Gravity System: load bearing walls rafter type, purlin type and cladding:
 Roof: timber framed describe system: Earth
 Floors: other (note) type:
 Beams: timber typical dimensions (mm x mm):
 Columns: load bearing walls
 Walls: non-load bearing

Lateral load resisting structure

Lateral system along: lightweight timber framed walls Note: Define along and across in detailed report!
 Ductility assumed, μ : 3.00 0.00 note typical wall length (m):
 Period along: 0.40 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 : 3.00 0.00 estimate or calculation? estimated
 Period across: 0.40 estimate or calculation? estimated
 Total deflection (ULS) (mm): estimate or calculation? estimated
 maximum interstorey deflection (ULS) (mm): estimate or calculation? estimated

Separations:

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

Non-structural elements

Stairs: profiled metal describe:
 Wall cladding: metal describe:
 Roof Cladding: metal describe:
 Glazing: other (specify) describe:
 Ceilings: strapped or direct fixed describe:
 Services (list): None describe:
Ply wood

Available documentation

Architectural: none original designer name/date:
 Structural: none original designer name/date:
 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: None
 Settlement: none observed notes (if applicable):
 Differential settlement: none observed notes (if applicable):
 Liquefaction: none apparent notes (if applicable):
 Lateral Spread: none apparent notes (if applicable):
 Differential lateral spread: none apparent notes (if applicable):
 Ground cracks: none apparent notes (if applicable):
 Damage to area: none apparent notes (if applicable):

Building:

Current Placard Status:
 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:
 Building Consent required: no Describe:
 Interim occupancy recommendations: full occupancy Describe:
 Along Assessed %NBS before: 100% ##### %NBS from IEP below If IEP not used, please detail assessment methodology:
 Assessed %NBS after: 100%
 Across Assessed %NBS before: 100% ##### %NBS from IEP below
 Assessed %NBS after: 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): 1935-1965 h_b from above: m
 Seismic Zone, if designed between 1965 and 1992: 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 buildings designed prior to 1935 use 0.8, except in Wellington (1.0)
 Final (%NBS)_{nom}: 0% 0%
 2.2 Near Fault Scaling Factor: Near Fault scaling factor, from NZS1170.5, cl 3.1.6: 1.00
 along across
 Near Fault scaling factor (1/N(T,D), Factor A): 1 1
 2.3 Hazard Scaling Factor: Hazard factor Z for site from AS1170.5, Table 3.3:
 Z₁₉₆₅, from NZS4203:1992: #DIV/0!
 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: Assessed ductility (less than max in Table 3.2): 1.00 1.00
 Ductility scaling factor: = 1 from 1976 onwards, or = μ_{ki} , if pre-1976, from Table 3.3:
 Ductility Scaling Factor, Factor D: 0.00 0.00
 2.6 Structural Performance Scaling Factor: Sp: 1.000 1.000
 Structural Performance Scaling Factor Factor E: 1 1
 2.7 Baseline %NBS, (NBS%)_b = (%NBS)_{nom} x A x B x C x D x E %NBS: #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: 1.0
 Height Difference effect D2, from Table to right: 1.0
 Therefore, Factor D: 1
 3.5. Site Characteristics: 1
 3.6. Other factors, Factor F: For ≤ 3 storeys, max value = 2.5, otherwise max value = 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 Baseline %NBS: #DIV/0! #DIV/0!
 4.4 Percentage New Building Standard (%NBS), (before) #DIV/0!

Separation	Table for selection of D1		
	Severe	Significant	Insignificant/none
0 < sep < 0.05H	0.7	0.8	1
0.05 < sep < 0.1H	0.4	0.7	0.8
sep > 0.1H	0.7	0.9	1
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

Separation	Table for Selection of D2		
	Severe	Significant	Insignificant/none
0 < sep < 0.05H	0.4	0.7	1
0.05 < sep < 0.1H	0.7	0.9	1
sep > 0.1H	1	1	1



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