[redacted]

Executive summary

We have now completed an Initial Seismic Assessment (ISA) of Treadwell Street Hall at Treadwell Street, Naenae using the Initial Evaluation Procedure (IEP). The assessment was carried out after completing a site visit and inspection of building consent documentation.

Treadwell Street Hall was designed and built in 1968. Alterations to the building were carried out in 1973 and 2010 including an addition to the north end of the building, and an upgrade to the kitchen. This building is a single-storey steel portal frame structure with blockwork and timber-framed infill walls. The building is currently used as a community hall. This building has been subjected to an Initial Seismic Assessment (ISA).

The building was found to have a potential compliance rating of 67% (IL2) of a new building built to current standards **[67%NBS (IL2)]**.

As the potential performance is greater than 33% NBS ***this building should not be considered as potentially Earthquake Prone.***

Vulnerabilities identified for this building include the following:

- Lateral resistance in the longitudinal direction – lack of bracing above the clerestory windows
- Out-of-plan capacity of masonry infill wall
- Brick veneer wall cladding

A detailed assessment is recommended for this building.

The ISA is considered to provide a relatively quick, high-level and qualitative measure of the building's performance. A more reliable result will be obtained from a Detailed Seismic Assessment (DSA) and is recommended for this building. A DSA could find Critical Structural Weaknesses (CSWs) not identified from the IEP, or it could find potential CSWs have been addressed in the design of the building. A DSA is identified as a low to medium priority for this building.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.4 and the assumptions and qualifications contained throughout the Report.

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1. Introduction

1.1 Purpose of this report

This assessment has been carried out at the request of the building owner, Hutt City Council, as part of their program of seismic assessments of community facilities.

1.2 Assessment Methodology

The IEP procedure was developed in 2006 by the New Zealand Society for Earthquake Engineering (NZSEE) and updated in 2013 to reflect experience with its application and as a result of experience in the Canterbury earthquakes. It is a tool to assign a percentage of New Building Standard (%NBS) score and associated grade to a building as part of an initial seismic assessment of existing buildings.

The IEP enables territorial authorities, building owners and managers to review their building stock as part of an overall risk management process.

Characteristics and limitations of the IEP include:

- An IEP assessment is primarily concerned with life safety. It does not consider the susceptibility of the building to damage, and therefore to economic losses.
- It tends to be somewhat conservative, identifying some buildings as earthquake prone, or having a lower %NBS score, which subsequent detailed investigation may indicate is less than actual performance. However, there will be exceptions, particularly when potential critical structural weaknesses (CSWs) are present that have not been recognised from the level of investigation employed.
- An IEP can be undertaken with variable levels of available information: e.g. exterior only inspection, structural drawings available or not, interior inspection, etc. The more information available, the more representative the IEP result is likely to be. The IEP records the information that has formed the basis of the assessment and consideration of this is important when determining the likely reliability of the result.
- It is an initial, first-stage review. Buildings or specific issues which the IEP process flags as being problematic or as potentially critical structural weaknesses need further detailed investigation and evaluation. A Detailed Seismic Assessment is recommended if the seismic status of a building is critical to any decision making.
- The IEP assumes that buildings have been designed and built in accordance with the building standard and good practice current at the time. In some instances, a building may include design features ahead of its time, leading to better than predicted performance. Conversely, some unidentified design or construction issues not picked up by the IEP process may result in the building performing not as well as predicted.
- It is a largely qualitative process, and should be undertaken or overseen by an experienced engineer. It involves considerable knowledge of the earthquake behaviour of buildings, and judgement as to key attributes and their effect on building performance. Consequently, it is possible that the %NBS derived for a building by independent experienced engineers may differ.
- An IEP may over-penalise some apparently critical features which could have been satisfactorily taken into account in the design.

- An IEP does not take into account the seismic performance of non-structural items such as ceilings, plant, services or general glazing that are not considered to present a significant life safety hazard.

Experience to date is that the IEP is a useful tool to identify potential issues and expected overall performance of a building in an earthquake. However, the process and the associated %NBS and grade should be considered as only indicative of the building's compliance with current code requirements. A detailed investigation and analysis of the building will typically be required to provide a definitive assessment.

An IEP score above 34%NBS should be considered sufficient to classify the building as not potentially earthquake prone. However, if further information comes available reassessment may be required.

Council Policies and Earthquake Prone Buildings (EPB)

The Building Act and its provisions for Earthquake Prone Buildings have been revised in April 2016 and enacted in July 2107. Some of the changes include nationalizing the policies to reduce regional variation and to create a distinction between different building types. The current time frame for assessment of buildings in the HCC area is 5 years based on the new legislation that came into force on 1 July 2017.

1.3 Scope and limitations

This report: has been prepared by [redacted] *for Hutt City Council* and *may only be used and relied on by Hutt City Council for the purpose agreed between* [redacted] *and the Hutt City Council as set out in section 1 of this report.*

[redacted] *otherwise disclaims responsibility to any person other than Hutt City Council arising in connection with this report.* [redacted] *also excludes implied warranties and conditions, to the extent legally permissible.*

The services undertaken by [redacted] *in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. [redacted] *has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

The opinions, conclusions and any recommendations in this report are based on assumptions made by [redacted] *described in this report.* [redacted] *disclaims liability arising from any of the assumptions being incorrect.*

[redacted] *has prepared this report on the basis of information provided by Hutt City Council and others who provided information to* [redacted] *(including Government authorities)], which* [redacted] *has not independently verified or checked beyond the agreed scope of work.* [redacted] *does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. [redacted] *does not accept responsibility arising from, or in connection with, any change to the site conditions.* [redacted] *is also not responsible for updating this report if the site conditions change.*

2. Building History

2.1 Reference Documents

At your request, we have inspected the plans and available building consent records for this building, visited the site, and carried out an assessment for the earthquake risk aspects.

The information we have used for our IEP assessment includes:

- Structural drawings
- Exterior & interior inspection
- GNS Wellington Region Site Subsoil Maps

The building on the site is as identified below:

Figure 1 Building location

2.2 Structural System

The Treadwell Street Hall is a single-storey steel portal frame building, which was designed and built in 1968. The building is currently used as a community hall.

Alterations to the building were carried out in 1973 and 2010. A timber frame box with brick veneer cladding was added at the north end of the building to form two offices in 1973. The kitchen was upgraded and renovated in 2010.

The building has infill timber-framed walls in the North and West elevations, and infill blockwork walls in the South and East elevations. The foundation is comprised of a concrete perimeter foundation wall with internal concrete piles supporting a timber floor. The roof is of lightweight timber frame construction.

Six concrete encased steel portal frames span in the transverse direction to provide lateral resistance in the transverse direction. The steel portal columns can bend in the weak axis to provide lateral resistance in the longitudinal direction above the clerestory windows. Timber and blockwork infill walls provide lateral resistance below the clerestory windows.

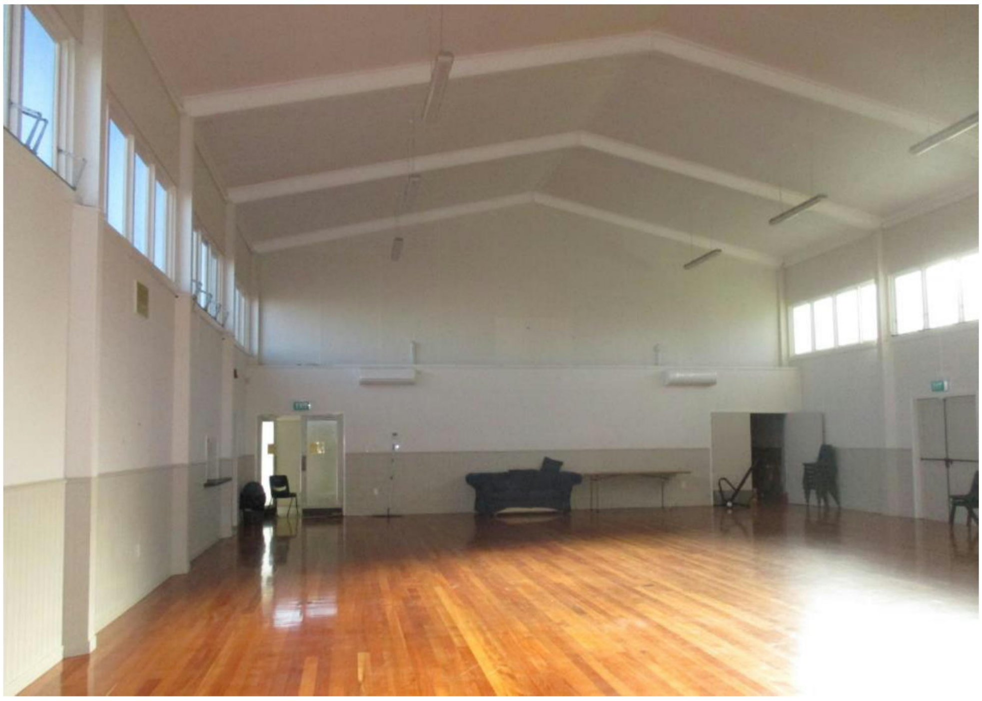


Figure 2 Steel portal frames in Treadwell Street Hall with infill timber and blockwork walls below clerestory windows

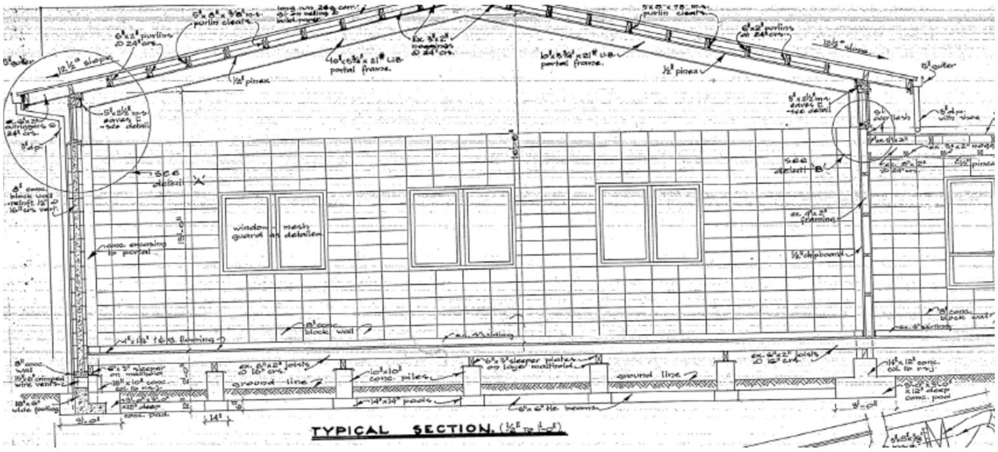


Figure 3 Typical view of the steel portal frames

Generally the interior of the Treadwell Street Hall appears to be in good condition. There were no obvious cracks observed during the inspection.

This system is summarised further in Appendix 1 – structural system

2.3 Vulnerabilities

2.3.1 Load Resistance in the Longitudinal Direction

The steel portals are spanning in the East-West direction to provide lateral load resistance in the transverse direction. When the building is subjected to longitudinal load, the steel columns will bend in the weak axis to provide lateral resistance above the clerestory windows. Timber and blockwork infill walls will provide lateral resistance below the windows.

2.3.2 Out-of-plane Performance of Masonry Infill Wall

There is a reinforced concrete bond beam at the top of the infill blockwork wall spanning between the portal columns, refer to Figure 4 below.

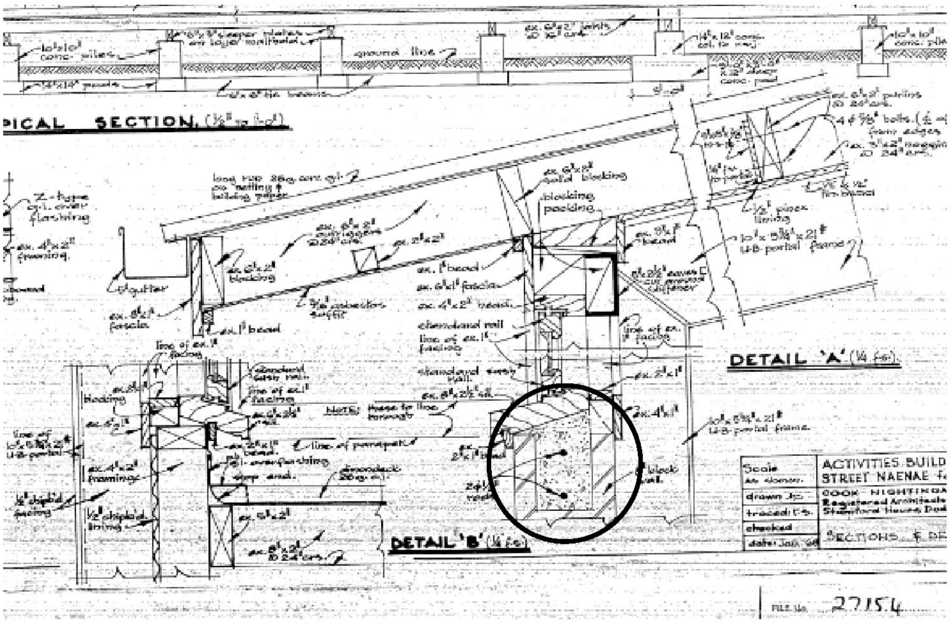


Figure 4 Details of bond beam

The reinforced concrete bond beam currently provides support to the infill blockwork wall panels against out-of-plane seismic loads. The top pf the wall appears to be well detailed and is reinforced with 2-D12 bars. The walls appear to be in good condition with no obvious signs of cracks or damage.

2.3.3 Brick Veneer Wall Cladding

Figure 5 Brick veneer cladding to the north end of the building

A timber frame box with brick veneer cladding was added at the north end of the building to form two offices in 1973.

The brick veneer wall cladding appears to be in good condition, with no obvious signs of cracks or damage. However, there were no drawings available to confirm the brick tie system. It is recommended to carry out further invasive investigation to confirm the types and locations of the brick ties if a DSA is required.

3. Assessment Calculations

3.1 Calculation Summary

The key assumptions made during our assessment are shown in Table 1 Refer also to the attached IEP assessment.

Table 1 – IEP Parameters and Assumptions

IEP Item	Assumption	Justification
Date of building Design	1968	The building was designed in 1968. Alterations to the building were carried out in 1973 and 2010.
Subsoil Type	D	Based on GNS Wellington Region Site Subsoil Maps
Ductility of structure	2.0	The building is a steel portal frame structure with a combination of timber and masonry infill walls, which was designed in 1968.
Plan irregularity factor, A	1.0 (Both dir.)	The building is symmetric in plan.
Vertical irregularity factor, B	1.0 (Both dir.)	No irregularity as the building is a single-storey building.
Short columns factor, C	1.0 (Both dir.)	N/A
Pounding factor, D	1.0 (Both dir.)	Refer to IEP report for further details.
Site characteristic	Insignificant	GNS Wellington Region Liquefaction Map shows that low liquefaction risk for this site.
F factor	2.0 (longitudinal dir.) 2.5 (transverse dir.)	Based on our inspection and review of available documents, the building is a single-storey steel portal frame structure. The lateral load is resisted by portal action in the transverse direction by the bending of the beams and columns. The lateral load is resisted by the steel cantilever columns above the clerestory windows, and by the infill timber and blockwork walls below the windows in the longitudinal direction.

Our IEP assessment of this building indicates it can achieve potential score of **67%NBS** in the longitudinal direction and **95%NBS** in the transverse direction. The IEP assessment of the building therefore indicates an overall score of **67%NBS,** corresponding to **a Grade B** building as defined by the New Zealand Society for Earthquake Engineering building grading scheme.

This is above the threshold for earthquake risk buildings (67%NBS) as recommended by the NZSEE. The key assumptions made during our assessment are shown in Table 1. Refer also to the attached IEP assessment.

3.2 IEP Grades and Relative Risk

Table 1 taken from the NZSEE Guidelines provides the basis of a proposed grading system for existing buildings, as one way of interpreting the %NBS building score. It can be seen that occupants in Earthquake Prone buildings (less than 34%NBS) are exposed to more than 10 times the risk that they would be in a similar new building. For buildings that are Earthquake Risk (less than 67%NBS), but not Earthquake Prone, the risk is at least 5 times greater than that of an equivalent new building. Broad descriptions of the life-safety risk can be assigned to the building grades as shown in Table 2.

Table 2: Relative Earthquake Risk

Building Grade	Percentage of New Building Standard (*%NBS*)	Approx. Risk Relative to a New Building	Life-safety Risk Description
A+	>100	<1	low risk
A	80 to 100	1 to 2 times	low risk
B	67 to 79	2 to 5 times	low or medium risk
C	34 to 66	5 to 10 times	medium risk
D	20 to 33	10 to 25 times	high risk
E	<20	more than 25 times	very high risk

This building has been classified by the IEP as a **Grade B building** and is therefore considered to be a **low or medium risk** structure.

The New Zealand Society for Earthquake Engineering (which provides authoritative advice to the legislation makers, and should be considered to represent the consensus view of New Zealand structural engineers) classifies a buildings achieving greater than 67%NBS as “Low Risk”, and having “Acceptable (improvement may be desirable)” building structural performance.

3.3 Seismic Restraint of Non-Structural Items

During an earthquake, the safety of people can be put at risk due to non-structural items falling on them. These items should be adequately seismically restrained, where possible, to the NZS 4219:2009 “The Seismic Performance of Engineering Systems in Buildings”.

An assessment has not been made of the bracing of the ceilings, in-ceiling ducting, services and plant. We have also not checked whether tall or heavy furniture has been seismically restrained or not. These issues are outside the scope of this initial assessment but could be the subject of another investigation.

4. Recommendations

The completed assessment gives a %NBS of >33 % and therefore, the ***building should not be classed as potentially earthquake prone.***

The ISA is considered to provide a relatively quick, high-level and qualitative measure of the building’s performance. In order to confirm the seismic performance of this building with more reliability you may wish to request a DSA.

A DSA would also investigate other potential weaknesses that may not have been considered in the initial seismic assessment.

We trust this satisfies your requirements at this stage, however please contact the undersigned should you require any further information.

Appendices

Appendix A – Structural System Summary

Table 3 - Assessment Information

Assessment Information	
Consulting Practice	[redacted]
CPEng Responsible, including: • Name • CPEng number • A statement of suitable skills and experience in the seismic assessment of existing buildings[1]	
Documentation reviewed, including: • date/ version of drawings/ calculations[2] • previous seismic assessments	• Original drawings dated 1968 • Drawings of alteration work dated 1973 and 2010
Geotechnical Report(s)	Site subsoil type is based on GNS Wellington Region Site Subsoil Maps
Date(s) Building Inspected and extent of inspection	Date of initial seismic assessment inspection: 28/06/2018
Description of any structural testing undertaken and results summary	N/A
Previous Assessment Reports	N/A
Other Relevant Information	N/A

[1] This should include reference to the engineer's Practice Field being in Structural Engineering, and commentary on experience in seismic assessment and recent relevant training

[2] Or justification of assumptions if no drawings were able to be obtained

Table 4 – Structural System Summary for Treadwell Street Hall

Number of Storeys	1 storey
Gross Floor Area (m^2)	Approx. 490 m^2
Year of Design (approximate)	1968, alterations were carried out in 1973 and 2010.
Current use	Community hall
Importance Level (IL)	IL2 • The building is not designated as post-disaster function
Structural Alterations	Building appears to be designed and built in 1968. Alterations to the building interior were carried out in 1973 and 2010.
Basement	None
Gravity Load Resisting System	Lightweight timber roof supported by steel portal frames
Lateral Load Resisting System	Transverse direction: six concrete encased steel portal frames span in the East-West direction to provide lateral resistance in the transverse direction. Longitudinal direction: the steel columns bend in the weak axis to provide lateral resistance in the longitudinal direction above the clerestory windows. The infill timber and blockwork walls resist the lateral load below the windows.
Wall/Cladding/Roof System	Corrugated metal roof cladding. External wall cladding comprises of brick veneer cladding and block veneer cladding.
Floor System	Timber floor framing supported on internal concrete piles
Foundation System	• shallow concrete pad footing under the steel portal columns tied together with concrete tie beam • reinforced concrete perimeter foundation walls supporting the timber-framed walls and blockwork walls above • internal concrete piles
Geotechnical Considerations	Based on GNS Wellington Region Site Subsoil Maps the subsoil classification for the site is considered to be Class D in accordance with NZS1170.5:2004.

Appendix B Initial Evaluation Form

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council

WARNING!! *This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the "The Seismic Assessment of Existing Buildings" Technical Guidelines for Engineering Assessments, July 2017. This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.*

Street Number & Name:	**25 Treadwell Street**	**Job No.:**	**5137964**
AKA:		**By:**	**RC**
Name of building:	**Treadwell Street Hall**	**Date:**	**2/07/2018**
City:	**Naenae**	**Revision No.:**	**0**

Table IEP-1 Initial Evaluation Procedure Step 1

Step 1 - General Information

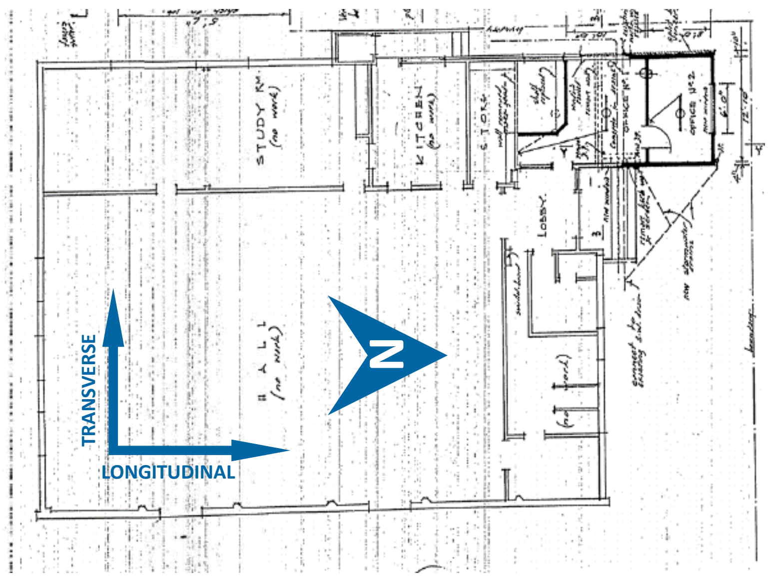
1.1 Photos (attach sufficient to describe building)

North View

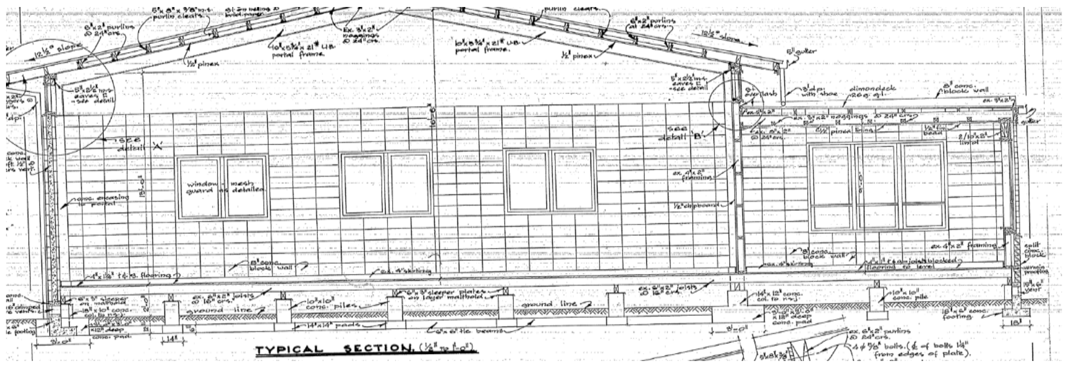
East View

NOTE: THERE ARE MORE PHOTOS ON PAGE 1a ATTACHED

1.2 Sketches (plans etc, show items of interest)



Plan View



Section View

NOTE: THERE ARE MORE SKETCHES ON PAGE 1a ATTACHED

1.3 List relevant features (Note: only 10 lines of text will print in this box. If further text required use Page 1a)

The Treadwell Street Hall is a single-storey building, which was designed and constructed circa 1968. The building foundation is comprised of following items:
1. shallow concrete pad footing tied together with concrete tie beam
2. Reinforced concrete perimeter walls supporting timber-framed walls and blockwork infill walls above
3. Concrete piles on shallow footings to the internal foundation supporting a timber floor
Alterations to the building were carried out in 1973 and 2010. The 1973 alternation included the addition to northern end of the building to form new offices. The 2010 alternation included kitchen upgrade.

Structural features of the building are listed below:
1. Light-weight timber-framed roof structure
2. Concrete encased steel portal frames to provide load resistance in the transverse direction
3. Steel cantilever columns bending in the weak axis to provide load resistance in longitudinal direction above the clerestorey windows.
4. Timber-framed walls and blockwork infill walls provide resistance below the windows.

1.4 Note information sources Tick as appropriate

Visual Inspection of Exterior	☑	**Specifications**	☐
Visual Inspection of Interior	☑	**Geotechnical Reports**	☑
Drawings (note type)	☑	**Other (list)**	☐

Original structural drawings dated 1968; Alteration work structural drawings dated 1973 and 2010.
Site subsoil type is based on GNS Wellington Region Site Subsoil Maps.

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council

Street Number & Name:	**25 Treadwell Street**	**Job No.:**	**5137964**
AKA:		**By:**	**RC**
Name of building:	**Treadwell Street Hall**	**Date:**	**2/07/2018**
City:	**Naenae**	**Revision No.:**	**0**

Table IEP-2 Initial Evaluation Procedure Step 2

Step 2 - Determination of *(%NBS)* $_b$

(Baseline *(%NBS)* for particular building - refer Section B5)

2.1 Determine nominal *(%NBS)* = *(%NBS)* $_{nom}$

	Longitudinal	Transverse
a) Building Strengthening Data		
Tick if building is known to have been strengthened in this direction	☐	☐
If strengthened, enter percentage of code the building has been strengthened to	N/A	N/A
b) Year of Design/Strengthening, Building Type and Seismic Zone		
Pre 1935	○	○
1935-1965	○	○
1965-1976	◉	◉
1976-1984	○	○
1984-1992	○	○
1992-2004	○	○
2004-2011	○	○
Post Aug 2011	○	○
Building Type:	Others	Others
Seismic Zone:	Zone A	Zone A
c) Soil Type		
From NZS1170.5:2004, Cl 3.1.3 :	D Soft Soil	D Soft Soil
From NZS4203:1992, Cl 4.6.2.2 : **(for 1992 to 2004 and only if known)**	**Not applicable**	**Not applicable**
d) Estimate Period, *T*		
Comment: h_n =	6	6 m
A_c =	1.00	1.00 m^2
Moment Resisting Concrete Frames: $T = \max\{0.09h_n^{0.75}, 0.4\}$	○	○
Moment Resisting Steel Frames: $T = \max\{0.14h_n^{0.75}, 0.4\}$	○	◉
Eccentrically Braced Steel Frames: $T = \max\{0.08h_n^{0.75}, 0.4\}$	○	○
All Other Frame Structures: $T = \max\{0.06h_n^{0.75}, 0.4\}$	◉	○
Concrete Shear Walls $T = \max\{0.09h_n^{0.75}/A_c^{0.5}, 0.4\}$	○	○
Masonry Shear Walls: $T \leq 0.4$sec	○	○
User Defined (input Period):	○	○
T:	0.40	0.54

Where h_n = height in metres from the base of the structure to the uppermost seismic weight or mass.

		Longitudinal	Transverse
e) Factor A:	Strengthening factor determined using result from (a) above (set to 1.0 if not strengthened)	**Factor A:** 1.00	1.00
f) Factor B:	Determined from NZSEE Guidelines Figure 3A.1 using results (a) to (e) above	**Factor B:** 0.06	0.06
g) Factor C:	For reinforced concrete buildings designed between 1976-84 Factor C = 1.2, otherwise take as 1.0.	**Factor C:** 1.00	1.00
h) Factor D:	For buildings designed prior to 1935 Factor D = 0.8 except for Wellington and Napier (1931-1935) where Factor D may be taken as 1.0, otherwise take as 1.0.	**Factor D:** 1.00	1.00
(%NBS) $_{nom}$ **= AxBxCxD**		***(%NBS)*** $_{nom}$ 6%	6%

WARNING!! *This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in "The Seismic Assessment of Existing Buildings" Technical Guidelines for Engineering Assessments, July 2017. This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.*

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council

Street Number & Name:	25 Treadwell Street	Job No.:	5137964
AKA:		By:	RC
Name of building:	Treadwell Street Hall	Date:	2/07/2018
City:	Naenae	Revision No.:	0

Table IEP-2 Initial Evaluation Procedure Step 2 continued

2.2 Near Fault Scaling Factor, Factor E
If $T \leq$ 1.5sec, Factor E = 1

			Longitudinal	Transverse
a) **Near Fault Factor, *N(T,D)*** (from NZS1170.5:2004, Cl 3.1.6)		N(T,D):	1	1
b) **Factor E**	= 1/N(T,D)	**Factor E:**	1.00	1.00

2.3 Hazard Scaling Factor, Factor F

a) **Hazard Factor, *Z*, for site**

Location: Hutt Valley-south of Taita Gorge — **Refer right for user-defined locations**

Z =	0.4	(from NZS1170.5:2004, Table 3.3)
Z_{1992} =	1.2	(NZS4203:1992 Zone Factor from accompanying Figure 3.5(b))
Z_{2004} =	0.4	(from NZS1170.5:2004, Table 3.3)

b) **Factor F**

For pre 1992 = $1/Z$
For 1992-2011 = Z_{1992}/Z
For post 2011 = Z_{2004}/Z

	Longitudinal	Transverse
Factor F:	2.50	2.50

2.4 Return Period Scaling Factor, Factor G

a) **Design Importance Level, I**
(Set to 1 if not known. For buildings designed prior to 1965 and known to be designed as a public building set to 1.25. For buildings designed 1965-1976 and known to be designed as a public building set to 1.33 for Zone A or 1.2 for Zone B. For 1976-1984 set I value.)

b) **Design Risk Factor, R_o**
(set to 1.0 if other than 1976-2004, or not known)

c) **Return Period Factor, R**
(from NZS1170.0:2004 Building Importance Level)

Choose Importance Level — Longitudinal: ○ 1 ◉ 2 ○ 3 ○ 4 — Transverse: ○ 1 ◉ 2 ○ 3 ○ 4

d) **Factor G** = IR_o/R

	Longitudinal	Transverse
I =	1	1
R_o =	1	1
R =	1.0	1.0
Factor G:	1.00	1.00

2.5 Ductility Scaling Factor, Factor H

a) **Available Displacement Ductility Within Existing Structure**

Comment:
The structure is a steel portal frame building with a combination of timber frame and masonry infill walls, which was designed in 1968.

		Longitudinal	Transverse
μ =		2.00	2.00
b) **Factor H**		k_μ	k_μ
For pre 1976 (maximum of 2)	=	1.57	1.77
For 1976 onwards	=	1	1
Factor H:		1.57	1.77

(where kμ is NZS1170.5:2004 Inelastic Spectrum Scaling Factor, from accompanying Table 3.3)

2.6 Structural Performance Scaling Factor, Factor I

a) **Structural Performance Factor, S_p**
(from accompanying Figure 3.4)
Tick if light timber-framed construction in this direction

		Longitudinal	Transverse
Tick		☐	☐
S_p =		0.70	0.70
b) **Structural Performance Scaling Factor**	= $1/S_p$ — **Factor I:**	1.43	1.43

Note Factor B values for 1992 to 2004 have been multiplied by 0.67 to account for Sp in this period

	Longitudinal	Transverse
2.7 Baseline *%NBS* for Building, *(%NBS)*$_b$ (equals ***(%NBS)$_{nom}$*** x E x F x G x H x I)	**34%**	**39%**

WARNING!! *This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in "The Seismic Assessment of Existing Buildings" Technical Guidelines for Engineering Assessments, July 2017. This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.*

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council

Street Number & Name:	25 Treadwell Street	Job No.:	5137964
AKA:		By:	RC
Name of building:	Treadwell Street Hall	Date:	2/07/2018
City:	Naenae	Revision No.:	0

Table IEP-3 Initial Evaluation Procedure Step 3

Step 3 - Assessment of Performance Achievement Ratio (PAR)

(Refer Appendix B - Section B3.2)

a) Longitudinal Direction

potential CSWs | **Effect on Structural Performance** **(Choose a value - Do not interpolate)** | **Factors**

3.1 Plan Irregularity

Effect on Structural Performance ○ *Severe* ○ *Significant* ◉ *Insignificant* **Factor A** 1.0

No plan irregularity

3.2 Vertical Irregularity

Effect on Structural Performance ○ *Severe* ○ *Significant* ◉ *Insignificant* **Factor B** 1.0

Single storey building - no vertical irregularity

3.3 Short Columns

Effect on Structural Performance ○ *Severe* ○ *Significant* ◉ *Insignificant* **Factor C** 1.0

N/A

3.4 Pounding Potential

(Estimate D1 and D2 and set D = the lower of the two, or 1.0 if no potential for pounding, or consequences are considered to be minimal)

a) Factor D1: - Pounding Effect

Note:
Values given assume the building has a frame structure. For stiff buildings (eg shear walls), the effect of pounding may be reduced by taking the coefficient to the right of the value applicable to frame buildings.

Factor D1 For Longitudinal Direction: 1.0

Table for Selection of Factor D1	Severe	Significant	Insignificant
Separation	0<Sep<.005H	.005<Sep<.01H	Sep>.01H
Alignment of Floors within 20% of Storey Height	○ 1	○ 1	◉ 1
Alignment of Floors not within 20% of Storey Height	○ 0.4	○ 0.7	○ 0.8

Comment

b) Factor D2: - Height Difference Effect

Factor D2 For Longitudinal Direction: 1.0

Table for Selection of Factor D2	Severe	Significant	Insignificant
	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

Comment

Factor D 1.0

3.5 Site Characteristics - *Stability, landslide threat, liquefaction etc as it affects the structural performance from a life-safety perspective*

Effect on Structural Performance ○ *Severe* ○ *Significant* ◉ *Insignificant* **Factor E** 1.0

GNS Wellington Region Liquefaction Map shows that low liquefaction risk for this site.

3.6 Other Factors - *for allowance of all other relevant characterstics of the building*

For ≤ 3 storeys - Maximum value 2.5
otherwise - Maximum value 1.5.
No minimum.

Factor F 2.0

Record rationale for choice of Factor F:

Single-storey structure with cantilever columns bending in weak axis to provide lateral load resistance above the clerestory windows. Timber and masonry infill walls resist lateral load below the windows. Geometrically regular building with light-weight roof.

3.7 Performance Achievement Ratio (PAR)
(equals **A x B x C x D x E x F**)

PAR
Longitudinal **2.00**

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Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council

Street Number & Name:	25 Treadwell Street	Job No.:	5137964
AKA:		By:	RC
Name of building:	Treadwell Street Hall	Date:	2/07/2018
City:	Naenae	Revision No.:	0

Table IEP-3 Initial Evaluation Procedure Step 3

Step 3 - Assessment of Performance Achievement Ratio (PAR)

(Refer Appendix B - Section B3.2)

b) Transverse Direction

Factors

potential CSWs — **Effect on Structural Performance** **(Choose a value - Do not interpolate)**

3.1 Plan Irregularity

Effect on Structural Performance ○ *Severe* ○ *Significant* ◉ *Insignificant* **Factor A** 1.0

No plan irregularity

3.2 Vertical Irregularity

Effect on Structural Performance ○ *Severe* ○ *Significant* ◉ *Insignificant* **Factor B** 1.0

Single storey building, no vertical irregularity

3.3 Short Columns

Effect on Structural Performance ○ *Severe* ○ *Significant* ◉ *Insignificant* **Factor C** 1.0

N/A

3.4 Pounding Potential

(Estimate D1 and D2 and set D = the lower of the two, or 1.0 if no potential for pounding, or consequences are considered to be minimal)

a) Factor D1: - Pounding Effect

Note:
Values given assume the building has a frame structure. For stiff buildings (eg shear walls), the effect of pounding may be reduced by taking the coefficient to the right of the value applicable to frame buildings.

Factor D1 For Transverse Direction: 1.0

Table for Selection of Factor D1	Severe	Significant	Insignificant
Separation	0<Sep<.005H	.005<Sep<.01H	Sep>.01H
Alignment of Floors within 20% of Storey Height	○ 1	○ 1	◉ 1
Alignment of Floors not within 20% of Storey Height	○ 0.4	○ 0.7	○ 0.8

Comment

b) Factor D2: - Height Difference Effect

Factor D2 For Transverse Direction: 1.0

Table for Selection of Factor D2	Severe	Significant	Insignificant
	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

Comment

Factor D 1.0

3.5 Site Characteristics - *Stability, landslide threat, liquefaction etc as it affects the structural performance from a life-safety perspective*

Effect on Structural Performance ○ *Severe* ○ *Significant* ◉ *Insignificant* **Factor E** 1.0

GNS Wellington Region Liquefaction Map shows that low liquefaction risk for this site.

3.6 Other Factors - *for allowance of all other relevant characterstics of the building*

For ≤ 3 storeys - Maximum value 2.5 otherwise - Maximum value 1.5. No minimum.

Factor F 2.50

Record rationale for choice of Factor F:

Steel portal frame structure in the transverse direction to provide lateral load resistance. Geometrically regular building with light-weight roof. Portal frame knee has been detailed for ductility.

3.7 Performance Achievement Ratio (PAR)
(equals **A x B x C x D x E x F**)

PAR

Transverse **2.50**

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Table IEP-4 Initial Evaluation Procedure Steps 4, 5, 6 and 7

Step 4 - Percentage of New Building Standard *(%NBS)*

	Longitudinal	Transverse
4.1 Assessed Baseline *%NBS (%NBS)*$_b$ (from Table IEP - 1)	34%	39%
4.2 Performance Achievement Ratio (PAR) (from Table IEP - 2)	2.00	2.50
4.3 PAR x Baseline *(%NBS)*$_b$	67%	95%
4.4 Percentage New Building Standard *(%NBS)* - Seismic Rating (Use lower of two values from Step 4.3)		67%

Step 5 - Is *%NBS* < 34?

NO

Step 6 - Potentially Earthquake Risk (is *%NBS* < 67)?

NO

Step 7 - Provisional Grading for Seismic Risk based on IEP

Seismic Grade: B

Additional Comments (items of note affecting IEP based seismic rating)

Relationship between Grade and *%NBS* :

Grade:	A+	A	B	C	D	E
%NBS:	> 100	100 to 80	79 to 67	66 to 34	< 34 to 20	< 20

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Table IEP-5 Initial Evaluation Procedure Step 8

Step 8 - Identification of potential Severe Structural Weaknesses (SSWs) that could result in significant risk to a significant number of occupants

8.1	Number of storeys above ground level	1
8.2	Presence of heavy concrete floors and/or concrete roof? (Y/N)	N

Potential Severe Structural Weaknesses (SSWs):

Note: Options that are greyed out are not applicable and need not be considered.

Occupancy not considered to be significant - no further consideration required

Risk not considered to be significant - no further consideration required

The following potential Severe Structural Weaknesses (SSWs) have been identified in the building that could result in significant risk to a significant number of occupants:

1. None identified
2. Weak or soft storey (except top storey)
3. Brittle columns and/or beam-column joints the deformations of which are not constrained by other structural elements
4. Flat slab buildings with lateral capacity reliant on low ductility slab-to-column connections
5. No identifiable connection between primary structure and diaphragms
6. Ledge and gap stairs

IEP Assessment Confirmed by [redacted]

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Street Number & Name:	25 Treadwell Street	Job No.:	5137964
AKA:		By:	RC
Name of building:	Treadwell Street Hall	Date:	2/07/2018
City:	Naenae	Revision No.:	0

Table IEP-1a Additional Photos and Sketches

Add any additional photographs, notes or sketches required below:

Note: print this page separately

Addition to north end in 1973

Steel portal frames in the building

North and west timber walls

South and east masonry walls

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[redacted]

[redacted]

[redacted]