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Date: 21 July 2020

Novare Project No. 3048

Mark Roach
Horner Art Limited
8A Horner Street
Newtown
Wellington

Dear Mark,

INITIAL SEISMIC ASSESSMENT OF 8A HORNER STREET

We have now completed an Initial Seismic Assessment (ISA) of 8A Horner Street, Wellington using the Initial Evaluation Procedure (IEP) as described in Part B of the guideline document, The Seismic Assessment of Existing Buildings – Technical Guidelines for Engineering Assessments, dated July 2017. The assessment was carried out after completing a site visit on July 16, 2020, as well as a high-level review of the original structural drawings where available.

1 Executive Summary

8A Horner Street has an overall potential earthquake rating of ***75%NBS (IL2)***, which corresponds to a **Grade B** building when considered as an Importance Level 2 (IL2) building. This is above the threshold for earthquake-prone buildings (*34%NBS)* and above the threshold for earthquake-risk buildings (*67%NBS)*.

The ISA is considered to provide a relatively quick, high-level and qualitative measure of the building's seismic performance. A more reliable result will be obtained by a Detailed Seismic Assessment (DSA). A DSA could find structural weaknesses not identified from the IEP.

2 Introduction

2.1 Background to the IEP and its Limitations

The IEP procedure was developed in 2006 by the New Zealand Society for Earthquake Engineering (NZSEE) and updated in 2017 to reflect experience with its application and also as a result of experience from the Canterbury earthquakes of 2010/2011. It is a tool to assign a percentage of New Building Standard (%NBS) rating and associated grade to a building as part of an Initial Seismic Assessment of existing buildings.

The IEP enables 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 (<33%NBS), or having a lower *%NBS* score, which subsequent detailed investigation may indicate is less than the actual performance. However, there will be exceptions, particularly when potential critical structural weaknesses are present that have not been recognized from the level of investigation employed in the IEP.

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- 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 standards 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 behavior 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 item such as ceilings, plant, services or general glazing that are not considered to present a significant life safety hazard.

Experience to date is that an 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* rating and grade should be considered as only providing an indicative indication of the building's compliance with current code requirements. A detailed investigation an analysis of the building will typically be required to provide a definitive assessment.

2.2 Basis for the Assessment

The information we have used for our IEP assessment includes:

- A site visit was performed on 16/07/2020, which included an inspection of the exterior of the entire complex and viewing of the interior of unit 1 (8A Horner Street).
- A high-level review of the available documentation for the address. This included structural and architectural drawings (including later alterations of the mezzanine).
- Assessment of the geotechnical conditions was based on GNS science subsoil class map of Wellington and has been considered to be soil class C.
- Preliminary calculations of torsional effects and out-of-plane checks for concrete masonry walls.

2.3 Building Description

8 Horner Street, Wellington is a two-storey concrete masonry warehouse structure designed in 1987. The is rectangular in shape and has 3 units separated by 200mm concrete masonry walls.

8A Horner street is unit 1 and is located to the east of the complex. The unit is considered to be a light industrial warehouse and is currently used as a painting studio with storage in the mezzanine area.

The building is comprised of concrete masonry walls on 3 sides, with two concrete masonry walls running full length internally as inter-tenancy walls. The 1st floor and mezzanine are both constructed out of lightweight timber flooring system with GIB partition walls. The roof structure is constructed of lightweight steel purlins and steel cross bracing.

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In the transverse direction, lateral loads are resisted by four 22-meter-long concrete masonry walls. In the longitudinal direction, lateral loads are resisted by one 30-meter-long concrete masonry wall to the north of the complex.

The building has a slab-on-grade foundation, and the soil class has been estimated as Class C (shallow soil) based on GNS science subsoil class map of Wellington.

3 IEP Assessment Results

Our IEP assessment for 8A Horner Street indicates the building can achieve ***>100%NBS (IL2)*** in the longitudinal direction and ***75%NBS (IL2)*** in the transverse direction. The IEP assessment of this building therefore indicates an overall earthquake rating of ***75%NBS (IL2)***, corresponding to a 'Grade B' building as defined by the NZSEE building grading scheme. This is above *34%NBS* (one of the tests the TA will apply to determine the building's earthquake-prone building status), and 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 below. Refer also to the attached IEP assessment.

Table 1: IEP Assessment Results for 8A Horner Street

IEP Item	Assumption	Justification
Date of Building Design	Post-1981	Latest available drawings for the facility are dated 1987
Subsoil Type	Class C	There is existing hand-auger and borehole data for nearby sites. Soil class potentially either Class B or C, have conservatively assumed Class C.
Building Importance Level	IL2	Building is a normal structure that does not come under the occupancy and use categories for Importance Levels 1,3 or 4.
Ductility of Structure	$\mu = 2.0$	Ductility selected due to the detailing provided in the original drawings and the recommendations by MBIE for this type of structure.
Plan Irregularity Factor, A	1.0	Building is regular in plan.
Vertical Irregularity Factor, B	1.0	Building is two-storey and has no vertical irregularity.
Short Columns Factor, C	1.0	All piers are the full height of the structure. The structure mostly consists of concrete masonry walls.
Pounding Factor, D	1.0	Height difference between buildings is within 20%.
Site Characteristics Factor, E	1.0	Site characteristics are unlikely to affect life-safety.
Other Factors, F	1.2	Potential features around torsion of the structure and support conditions at the top of the masonry walls. History of good performance for well detailed two-storey concrete masonry walled industrial buildings.

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4 IEP Grades and Relative Risk

Table 2 taken from the Technical Guidelines referred to earlier provides the basis for a proposed grading system for existing buildings, as one way of interpreting the *%NBS* earthquake rating.

Table 2: Relative Earthquake Risk

Percentage of New Building Standard *(%NBS)*	Alpha rating	Approx. risk relative to a new building	Life-safety risk description
>100	A+	Less than or comparable to	Low risk
80-100	A	1-2 times greater	Low risk
67-79	B	2-5 times greater	Low to Medium risk
34-66	C	5-10 times greater	Medium risk
20 to <34	D	10-25 times greater	High risk
<20	E	25 times greater	Very high risk

8A Horner Street has been classified by the IEP as Grade B, **Low to Medium** risk to life-safety.

The NZSEE (Which provides authoritative advice to the legislation makers, and should be considered to represent the consensus view of New Zealand structural engineers) classifies a building achieving greater than *67%NBS* as "low or medium risk" and having "acceptable (improvement may be desirable)" building structural performance.

5 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, as specified by 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 or contents. We have also not checked whether or not tall or heavy furniture has been seismically restrained. These issues are outside the scope of this initial assessment but could be the subjects of another investigation.

During the exterior inspection it was noted that there appears to be approximately 1.5 meters worth of retained soil without any visual clues to how the seismic earth pressures are resisted. It may or may not be loading the wall of this assessed building. There appears to be a moisture barrier installed to avoid the reinforced concrete blockwork from absorbing water, however, if there are any additional seismic soil actions, these may impose some additional stresses to the rear-wall out-of-plane for earthquake induced soil pressures. Earth retaining methods may have been engineered during the neighbour's development, we strongly recommend that this is confirmed.

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6 Conclusion

Our ISA assessment for 8A Horner street indicates that the building has an overall score of ***75%NBS (IL2)***, which corresponds to a **Grade B** building, as defined in the NZSEE building grading scheme. This is **above** the threshold for earthquake-prone buildings (*34%NBS)* and **above** the threshold for earthquake-risk buildings (*67%NBS)* as defined by the NZSEE.

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. This would also investigate other potential structural issues that may not have been identified in the Initial Seismic Assessment.

There appears to be approximately 1.5 meters worth of soil retained at the rear of the property without any visual clues to how the seismic earth pressures are resisted. Earth retaining methods may have been engineered during the neighbour's development. We recommend that this is confirmed as it may impose some additional stresses to the rear-wall out-of-plane for earthquake induced soil pressures.

Based on preliminary calculations undertaken, if a DSA is undertaken, there will likely be a focus of the following items:

- Torsional features due to the shape of the structure.
- Ability of the reinforced concrete blockwork walls to act out-of-plane.
- Potential limitations in the roof bracing connections.

A DSA would also investigate other potential structural issues that may not have been identified in the Initial Seismic Assessment.

We trust this letter and Initial Seismic Assessment meets your current requirements. We would be pleased to discuss further with you any issues raised in this report.

Please do not hesitate to contact me if you would like clarification of any aspect of this letter.

Yours faithfully,

Ian MacDonald

CPEng. No: 1014568

Encl: IEP Assessment (8A Horner Street).

Initial Evaluation Procedure (IEP) Assessment - Completed for HORNER ART LTD Page 1

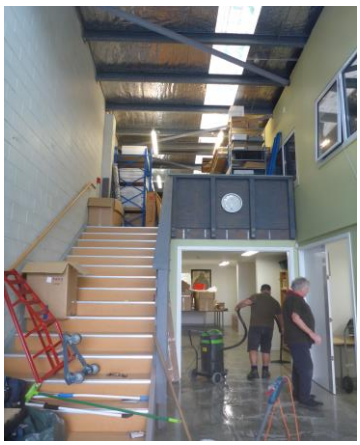
WARNING!! *This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the "The Seismic Assessment of Existing Buildings" Technical Guidelines for Engineering Assessments, July 2017. This spreadsheet must be read in conjunction 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:	**8A HORNER STREET**	**Job No.:**	**3048**
AKA:		**By:**	**AC**
Name of building:		**Date:**	**21/07/2020**
City:	**WELLINGTON**	**Revision No.:**	**1**

Table IEP-1 Initial Evaluation Procedure Step 1

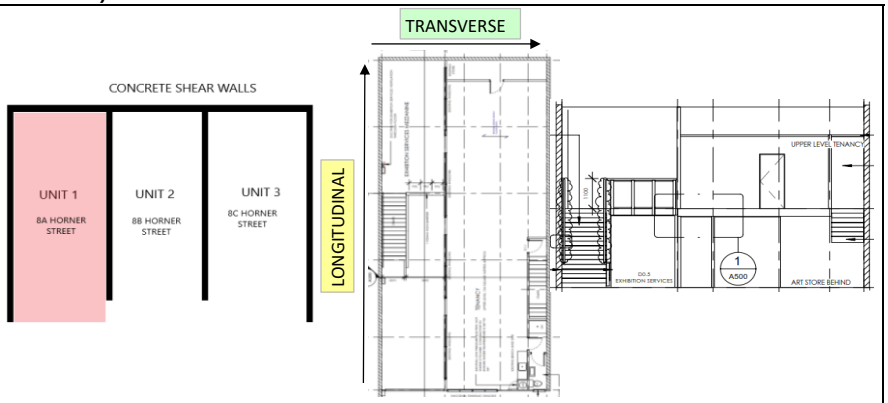
Step 1 - General Information

1.1 Photos (attach sufficient to describe building)


NOTE: THERE ARE MORE PHOTOS ON PAGE 1a ATTACHED

1.2 Sketches (plans etc, show items of interest)



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)

Designed in 1987. Overall floor area of ~ 226m^2 for the ground floor and approximatly ~174m^2 for the upper floor area. It is a single bay of a 3 bay complex seperated by concrete masonry walls. The complex has a total floor area of ~ 694m^2.

The building comprised of multiple concrete masonry walls along 3 sides of the perimeter and between each of the units. There are concrete piers supporting the masonry concrete walls along the eastern side of the complex. The roof consisted of steel purlins supporting a lightweight roof. The walls and floors within each unit are lightweight timber.

In the tranverse direction lateral loads are carried a single reinforced concrete blockwork wall to the north of the complex. The longitudinal direction lateral loads are resisted by 4 reinforced concrete blockwork walls which seperate each unit.

1.4 Note information sources Tick as appropriate

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

Structural & Architectural drawings (Original and fitout undertaken at unit 8A Horner Street (2012). Only inspected unit 1 internally during inspection.

Initial Evaluation Procedure (IEP) Assessment - Completed for HORNER ART LTD

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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:	**Not applicable**	**Not applicable**
Seismic Zone:	Zone A	Zone A
c) Soil Type		
From NZS1170.5:2004, Cl 3.1.3 :	C Shallow Soil	C Shallow 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 = 6.5	6 m
Reinforced concrete blockwork walls in both directions	A_c = 23.43	7.60 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):	○	○
Where h_n = height in metres from the base of the structure to the uppermost seismic weight or mass.	**T:** 0.40	0.40
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:** 0.25	0.25
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)*$_{nom}$** 25%	25%

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Initial Evaluation Procedure (IEP) Assessment - Completed for HORNER ART LTD Page 3

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Table IEP-2 Initial Evaluation Procedure Step 2 continued

2.2 Near Fault Scaling Factor, Factor E

If $T \leq 1.5$sec, 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: Wellington — **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.)

	Longitudinal	Transverse
I =	1	1

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

	Longitudinal	Transverse
	Category 4	Category 4
R_o =	1	1

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

Choose Importance Level ○ 1 ◉ 2 ○ 3 ○ 4

	Longitudinal	Transverse
R =	1.0	1.0

d) Factor G = IR_o/R

	Longitudinal	Transverse
Factor G:	1.00	1.00

2.5 Ductility Scaling Factor, Factor H

a) Available Displacement Ductility Within Existing Structure

Comment:

MBIE recommends ductility = 3, However we believe ductility = 2 is more appropriate due to the less than current building code lap lengths.

	Longitudinal	Transverse
μ =	2.00	2.00

b) Factor H

		k_μ (Longitudinal)	k_μ (Transverse)
For pre 1976 (maximum of 2)	=	1.57	1.57
For 1976 onwards	=	1	1
Factor H:		1.00	1.00

(where k_μ 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
S_p =	0.70	0.70

b) Structural Performance Scaling Factor = $1/S_p$

	Longitudinal	Transverse
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

2.7 Baseline *%NBS* for Building, *(%NBS)*$_b$

(equals $(\%NBS)_{nom}$ x E x F x G x H x I)

	Longitudinal	Transverse
	91%	**91%**

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Initial Evaluation Procedure (IEP) Assessment - Completed for HORNER ART LTD

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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

Based on preliminary calculations, it was determined the torsional effect is likely mitigated by the 4 transverse walls.

3.2 Vertical Irregularity

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

Building is two-storey and has no vertical irregularity. Most mass is associated with the walls. Lightweight roof and floor.

3.3 Short Columns

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

No short columns. All piers for concrete masonry walls are the full height of the structure

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

Floors align, height difference <1 storey

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

No adjacent buildings.

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

Unlikely to affect life safety performance

3.6 Other Factors - *for allowance of all other relevant characterstics of the building* **Factor F** 1.5

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

Record rationale for choice of Factor F:

Factor of 1.5 has been chosen as the reinforced concrete blockwork walls have a potential limitation in their out-of-plane capacity based on preliminary calculations.

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

PAR

Longitudinal **1.50**

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Initial Evaluation Procedure (IEP) Assessment - Completed for HORNER ART LTD

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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** 0.7

Based on preliminary calculations, it was determined the torsional effect is mitigated by the 4 transverse walls.

3.2 Vertical Irregularity

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

Building is two-storey and has no vertical irregularity. Most mass is associated with the walls. Lightweight roof and floor.

3.3 Short Columns

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

No short columns

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 0<Sep<.005H	Significant .005<Sep<.01H	Insignificant Sep>.01H
Separation			
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

Floors align, height difference <1 storey

b) Factor D2: - Height Difference Effect

Factor D2 For Transverse Direction: 1.0

Table for Selection of Factor D2	Severe 0<Sep<.005H	Significant .005<Sep<.01H	Insignificant 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

No adjacent buildings.

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

Some seismic soil pressures may be present due to backfilled soil which could be loading the wall out-of-plane. However, we expect the backfill to be self supporting because it is part of a new development.

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 1.20

Record rationale for choice of Factor F:

Factor of 1.2 selected based on preliminary calculations which indicate a potential limitation in the out-of-plane strength of the reiforced concrete blockwork wall as the wall is only supported at each end out-of-plane at roof level. There is also the feature due to torsion with the centre of rotation positioned at the centre of the rear wall which could increase wall stresses

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

PAR

Transverse **0.84**

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Initial Evaluation Procedure (IEP) Assessment - Completed for HORNER ART LTD Page 6

Street Number & Name:	8A HORNER STREET	Job No.:	3048
AKA:		By:	AC
Name of building:		Date:	21/07/2020
City:	WELLINGTON	Revision No.:	1

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)	91%	91%
4.2	**Performance Achievement Ratio (PAR)** (from Table IEP - 2)	1.50	0.84
4.3	**PAR x Baseline *(%NBS)*$_b$**	>100%	75%
4.4	**Percentage New Building Standard *(%NBS)* - Seismic Rating** (Use lower of two values from Step 4.3)		75%

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)

Seismic rating for this building should be considered to be indicative only. The rating of the building is strongly influenced by the era of design (1987). Based on preliminary numbers, we estimate the building is likely to be above 67%NBS(IL2), which is in alignment with the outcome of the IEP document.

Based on preliminary calculations undertaken, if a DSA is undertaken, there will likely be a focus of the following items:

- Torsional features due to the shape of the structure.
- Ability of the reinforced concrete blockwork walls to act out-of-plane. This includes the rear-walls ability to support additional out-of-plane loading from seismic soil pressure in the event that a soil retaining structure was not installed when the soil was backfilled against the structure.
- Potential limitations in the roof bracing connections.

A DSA would also investigate other potential structural issues that may not have been identified in the Initial Seismic Assessment.

Relationship between Grade and *%NBS*:

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Initial Evaluation Procedure (IEP) Assessment - Completed for HORNER ART LTD

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City:	WELLINGTON	Revision No.:	1

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  **Signature**

Ian MacDonald **Name**

1014568 **CPEng. No**

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Initial Evaluation Procedure (IEP) Assessment - Completed for HORNER ART LTD Page 1a

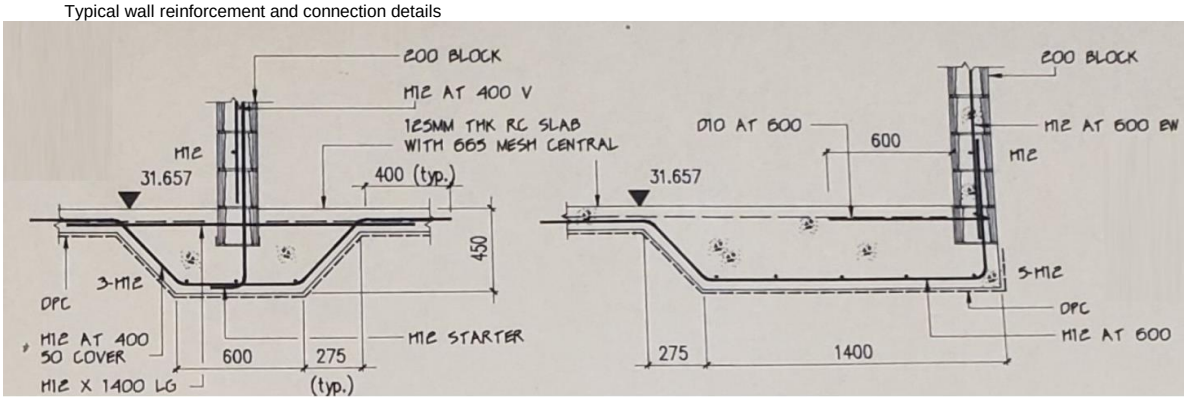
Street Number & Name:	**8A HORNER STREET**	**Job No.:**	**3048**
AKA:		**By:**	**AC**
Name of building:		**Date:**	**21/07/2020**
City:	**WELLINGTON**	**Revision No.:**	**1**

Table IEP-1a Additional Photos and Sketches

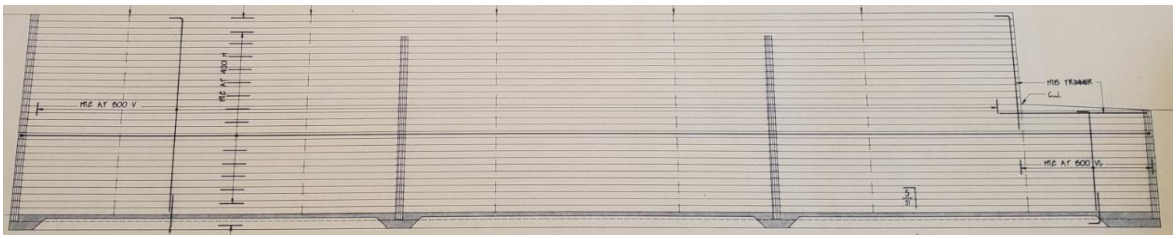
Add any additional photographs, notes or sketches required below:

Note: print this page separately

Typical wall reinforcement and connection details



There is a step-down to the 1st floor at unit 3



Backfill at the development behind 8 Horner Street appears to be loading directly against the masonry wall boundary.

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DISCLOSURE STATEMENT

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