[redacted]

9684

13 June 2018

Hutt City Council
Private Bag 31912
Lower Hutt

Attention: [redacted]

Dear [redacted]

Initial Seismic Assessment Report
Wainuiomata Summer Pool - 99 Main Road, Wainuiomata

We have now completed an Initial Seismic Assessment (ISA) of the buildings at 99 Main Road, Wainuiomata 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 August 2017. The assessment was carried out after reviewing original structural drawings and completing a site visit on 3 May 2019. Drawings were reviewed for building 2 and building 3.

Separate assessments have been undertaken for each of the four buildings

Executive Summary

This building has been rated as Importance Level 2 (IL2) in accordance with NZS1170.5:2004.

The assessed potential earthquake ratings are

Building 1	45%NBS (IL2);'Grade C':	not potentially earthquake prone, but earthquake risk
Building 2	70%NBS (IL2);'Grade B':	neither potentially earthquake prone nor earthquake risk
Building 3	30%NBS (IL2);'Grade D':	potentially earthquake prone
Building 4	35%NBS (IL2);'Grade C':	not potentially earthquake prone, but earthquake risk.

A "Severe Structural Weakness" (SSW) is a structural weakness for which rupture would lead to a catastrophic collapse.

Building 1	No potential SSWs were identified in this building
Building 2	No potential SSWs were identified in this building
Building 3	Potential overturning instability of some block walls and some block partitions were identified as SSWs in this building
Building 4	No potential SSWs were identified in this building

The Initial Seismic Assessment (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). A DSA could find structural aspects of concern that have not been identified from the IEP. Alternatively, a detailed structural assessment may show that structural aspects of potential concern identified in the IEP may have in fact been addressed in the design of the building.

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Introduction

Hutt City Council has engaged [redacted] to carry out an Initial Seismic Assessment (ISA) of the four buildings at 99 Main Road. This ISA is based on the Initial Evaluation Procedure (IEP) as defined in *Technical Guidelines for Engineering Assessments* referenced above.

Earthquake Prone Building (EPB) methodology is used to identify earthquake-prone buildings, and has been produced by the Ministry of Business, Innovation and Employment in accordance with the Building Act 2004. This ISA meets the requirements of an engineering assessment as prescribed in the EPB methodology.

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 2010/11. 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, 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.

[redacted]

- 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 rating and grade should be considered as only providing an indicative indication 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.

Each IEP has been based on 1) a review of drawings, 2) an inspection of the exterior and interior, and 3) preliminary calculations of SSW's. Therefore, each IEP can be considered to be a moderately comprehensive assessment at the ISA level. The ratings tabulated in the executive summary, if ratified by the Territorial Authority, would lead to Building 3 being designated "earthquake prone" and the other three buildings not being designated "earthquake prone".

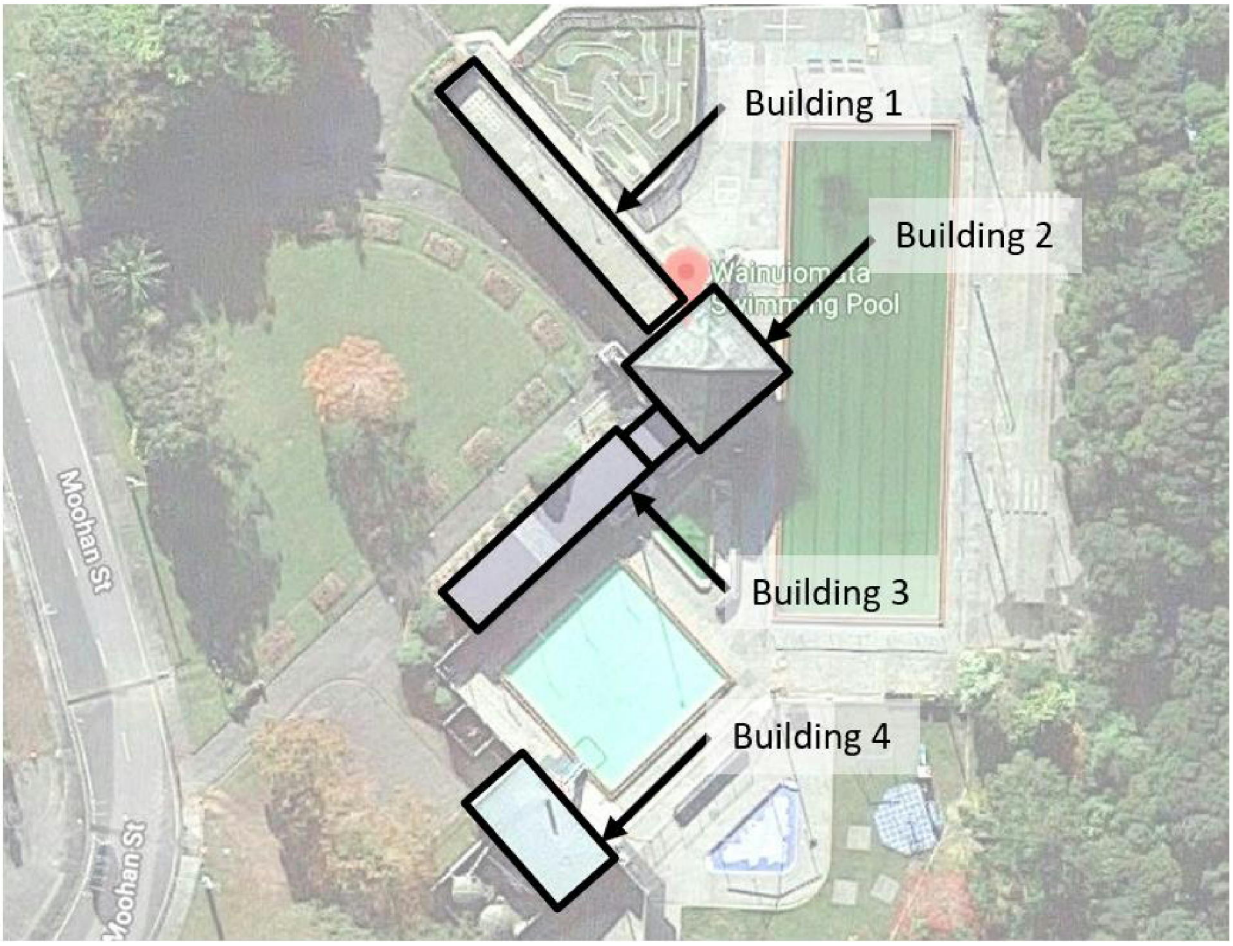
Basis for the Assessment

The information we have used for our IEP assessment includes:

- The buildings were built between 1966 and 1970.
- Buildings 1 and 3 are narrow single storey blockwork structures. Building 1 has a concrete roof and regular transverse walls while Building 3 has a light roof and irregularly spaced internal walls. Building 2 has robust structural steel frames, supporting two storeys of timber framing. It is square and regular and is in contact with to buildings 1 and 3.
- Building 4 is a small light steel frame building.
- Site subsoil class D "Soft soil sites" has been used based on Greater Wellington Regional Council Map There is a moderate potential for liquefaction to affect the foundations.
- The period has been estimated as being less than 0.4 seconds.
- The buildings have an Importance Level 2.
- A ductility capacity of $\mu = 2$ has been adopted for all buildings.
- There is insignificant plan irregularity in each direction except for building 3.
- There is insignificant vertical irregularity in any of the buildings.
- Differing adjustment factors (F) have been adopted for the four buildings:
  Building 1 F = 1.4. Concrete roof diaphragm, transverse walls, tied foundations.
  Building 2 F = 1.5 Ductile structural steel frames. Light, regular structure. Tied together.
  Building 3 F = 1.4 No roof diaphragm observed. Longer block walls may be unstable.
  Building 4 F = 1.1 Transverse frames appear nominal. Ad-hoc plant suspension from structure.

Building Description

The four buildings are located at 99 Main Road, Wainuiomata. Three of the buildings are connected but are considered separate structures in this assessment. The fourth building is a stand-alone structure.



Building 1 – Single Storey Block Work with Concrete Roof/Floor

- Built between 1966 and 1970 font has changed
- The building is approximately 5.2m wide and 2.7m tall to the top of roof slab.
- The building is used as the men's and boy's changing rooms and toilets with two storerooms. It has 4 roller garage door openings and 6 windows at 0.65x2.4m along one side.
- Construction and size appears to be similar to Building 3 except for the heavy pre-cast concrete roof and additional return walls.
- The roof is used as a viewing platform which is accessible from the adjacent two storey balcony and has a steel balustrade around the perimeter.
- The cladding is fixed to the adjacent two storey building but there does not appear to be any structural fixing.

Building 2 – Two Storey Steel Frame

- Built in 1970
- The upstairs is an open plan meeting room with a balcony along two sides.
- The downstairs is a foyer, ticketing booth and toilet.
- 9.7m square floor plan upstairs with a 1 m wide cantilever balcony along two sides, and 8.4m square floor plan downstairs.
- The balcony provides access to the balcony on building 1.
- Two steel portal frames crossing in the centre.
- Upstairs floor level is 3m, eaves height is 5.3m and the apex is at 8.8m.
- Shallow reinforced concrete perimeter foundation wall with strip footings for the ground floor slab, and 1.4m by 1.4m by 0.3m square pads for the portal legs.
- Foundations are shown to be 1.4m deep but noted as 'excavate to solid'.
- Portal legs are 10"x10"x1/2" RHS and the Rafters are10"x5 ¾"x 25lb UB

- The Eaves tie is 5" x 3" x ¼" RHS
- The upstairs flooring is particle board with hard wood fillets on 250x50 joists at 450 crs.
- Joists are supported on 16"x7"x36lb UB bearers at 3.3m crs each way.
- Bearers are supported on 18"x6"x45lb beams around the perimeter forming a steel frame.
- Balusters are 3 ½" by 3 ½" RHS.

Building 3 - Single Storey Block Work with Light Iron Roof

- Built in 1966
- Most of the building is used for the women's changing and toilets, with one end as the spa plant and accessible changing rooms and toilets.
- It is 5m wide by 28.2m long and 2.7m overall height. 141 m2 floor area.
- There are two entries and four toilets positioned midway along the building.
- The longest stretch of wall without return walls is 12.6m.
- The wall with the entries has 5 windows at 0.65x2.4m and 2 windows at 0.65mx1.2m.
- 200mm thick Block walls reinforced with 13mm bars at 1m crs
- 250x200mm perimeter bond beam
- 7"x4"x4 1/2lb RSJ rafters
- 150x50 timber purlins
- There is a partial height cantilever block wall between the toilet cubicles.
- The cladding is fixed to the adjacent two storey building but there does not appear to be any structural fixing.

Building 4 – Single Storey Steel Framing

- Built in 1967. Being used as plant housing and a workshop.
- The floor is at two levels and there is a low height retaining wall between the two levels.
- There are 6 steps between the two levels, and they appear to be higher than typical rises (1.1m).
- Sheet metal roofing on timber LVL purlins on steel trusses. There is no blocking between purlins.
- The steel trusses have SHS top and bottom chords with steel rods for diagonals. They are fully welded and including to RHS end posts. Internal trusses do not have fly bracing.
- Plant suspended from the steel trusses.
- The walls are steel framed almost no internal linings and corrugated metal cladding.
- There is a timber framed internal room with ply lined walls.
- There is a double pedestrian access door on one end. A single pedestrian access door midway along one side.
- At the other end the whole there are four steel frames which appear to provide access for large plant replacement. The four steel frames are fixed to the truss above and floor below. The truss above has fly bracing.
- There are diagonal steel braces in the longitudinal direction, welded to a cleat which is welded to the RHS posts, significantly below the bottom chord of the truss.
- There is a transparent cladding and timber jack framing between the top of the longitudinal steel framed wall and the roofing.

[redacted]

Building 1 IEP Assessment Result

Our IEP assessment of this building indicates the building can achieve 45%NBS (IL2) in each orthogonal direction. The IEP assessment of this building therefore indicates an overall earthquake rating of 45%NBS (IL2), corresponding to a 'Grade C' building as defined by the New Zealand Society for Earthquake Engineering (NZSEE) building grading scheme. This is above 34%NBS, but below 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 that follows. Refer also to the attached IEP assessment and engineering assessment technical summary.

Table 1: IEP Assessment Results

Building 1 IEP Item	Assumption	Justification
Date of Building Design	1966-70	Original drawings
Soil Type	D	Ref: Greater Wellington Regional Council Map – Flex Map Viewer.
Building Importance Level	2	AS/NZS1170.0
Ductility of Structure	2	The Guideline section C6.5 and C6.6.
Plan Irregularity Factor, A	Not Significant	*The Seismic Assessment of Existing Buildings -Technical Guidelines for Engineering Assessments*, August 2017, Part B, Appendix BA, Figure BA.5
Vertical Irregularity Factor, B	Not Significant	*The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, August 2017, Part B, Appendix BA, Figure BA.5
Short Columns Factor, C	No	Short columns were not observed.
Pounding Factor, D	1	Building 1 (1 storey) is in contact with building 2 (2 storeys) at building 1 roof level. Low building heights indicate no pounding issue.
Site Characteristics	Significant	*The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, August 2017, Part B, section B4.2. Settlement not observed. Slip hazard does not exist. Liquefaction hazard is significant.
Factor F	1.4	Single storey, tied foundations, heavy construction with plenty of return walls and a good roof diaphragm.

[redacted]

[redacted]

Building 2 IEP Assessment Result

Our IEP assessment of this building indicates the building can achieve 70%NBS (IL2) in each orthogonal direction. The IEP assessment of this building therefore indicates an overall earthquake rating of 70%NBS (IL2), corresponding to a 'Grade B' building as defined by the New Zealand Society for Earthquake Engineering (NZSEE) building grading scheme. This is above 34%NBS, 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 2 that follows. Refer also to the attached IEP assessment and engineering assessment technical summary.

Table 2: IEP Assessment Results

Building 2; IEP Item	Assumption	Justification
Date of Building Design	1970	Original drawings
Soil Type	D	Ref: Greater Wellington Regional Council Map – Flex Map Viewer.
Building Importance Level	2	AS/NZS1170.0
Ductility of Structure	2	The Guideline section C6.5 and C6.6.
Plan Irregularity Factor, A	Not Significant	*The Seismic Assessment of Existing Buildings -Technical Guidelines for Engineering Assessments*, August 2017, Part B, Appendix BA, Figure BA.5
Vertical Irregularity Factor, B	Not Significant	*The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, August 2017, Part B, Appendix BA, Figure BA.5
Short Columns Factor, C	No	Short columns were not observed.
Pounding Factor, D	1	Buildings 1&3 (1 storey) are in contact with building 2 (1 storeys) at buildings 1&3 roof level. Low building heights indicate no pounding issue.
Site Characteristics	Significant	*The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, August 2017, Part B, section B4.2. Settlement not observed. Slip hazard does not exist. Liquefaction hazard is significant.
Factor F	1.5	Single storey, tied foundations, heavy construction with plenty of return walls and a good roof diaphragm.

[redacted]

[redacted]

Building 3 IEP Assessment Result

Our IEP assessment of this building indicates the building can achieve 45%NBS (IL2) in the longitudinal direction and 30%NBS (IL2) in the transverse direction. The IEP assessment of this building therefore indicates an overall earthquake rating of 30%NBS (IL2), corresponding to a 'Grade D' building as defined by the New Zealand Society for Earthquake Engineering (NZSEE) building grading scheme. This is below 34%NBS, the threshold for a building to be considered earthquake prone.

The key assumptions made during our assessment are shown in Table 3 that follows. Refer also to the attached IEP assessment and engineering assessment technical summary.

Table 3: IEP Assessment Results

Building 3 IEP Item	Assumption	Justification
Date of Building Design	1966	Original drawings
Soil Type	D	Ref: Greater Wellington Regional Council Map – Flex Map Viewer.
Building Importance Level	2	AS/NZS1170.0
Ductility of Structure	2	The Guideline section C6.5 and C6.6.
Plan Irregularity Factor, A	Significant	*Internal transverse walls are not regularly spaced. The Seismic Assessment of Existing Buildings -Technical Guidelines for Engineering Assessments*, August 2017, Part B, Appendix BA, Figure BA.5
Vertical Irregularity Factor, B	Not Significant	*The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, August 2017, Part B, Appendix BA, Figure BA.5
Short Columns Factor, C	No	Short columns were not observed.
Pounding Factor, D	1	Building 3 (1 storey) is in contact with building 2 (2 storeys) at building 3 roof level. Low building heights indicate no pounding issue.
Site Characteristics	Significant	*The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, August 2017, Part B, section B4.2. Settlement not observed. Slip hazard does not exist. Liquefaction hazard is significant.
Factor F	1.4	Single storey, tied foundations, heavy wall construction with some orthogonal walls. Poor roof diaphragm.

[redacted]

[redacted]

Building 4 IEP Assessment Result

Our IEP assessment of this building indicates the building can achieve 45%NBS (IL2) in the longitudinal direction and 35%(IL2) in the transverse direction. The IEP assessment of this building therefore indicates an overall earthquake rating of 35%NBS (IL2), corresponding to a 'Grade C' building as defined by the New Zealand Society for Earthquake Engineering (NZSEE) building grading scheme. This is above 34%NBS, but below the threshold for earthquake risk buildings (67%NBS) as recommended by the NZSEE.

The key assumptions made during our assessment are shown in Table 4 that follows. Refer also to the attached IEP assessment and engineering assessment technical summary.

Table 4: IEP Assessment Results

Building 1 IEP Item	Assumption	Justification
Date of Building Design	1967	Original drawings
Soil Type	D	Ref: Greater Wellington Regional Council Map – Flex Map Viewer.
Building Importance Level	2	AS/NZS1170.0
Ductility of Structure	2	The Guideline section C6.5 and C6.6.
Plan Irregularity Factor, A	Not Significant	*The Seismic Assessment of Existing Buildings -Technical Guidelines for Engineering Assessments*, August 2017, Part B, Appendix BA, Figure BA.5
Vertical Irregularity Factor, B	Not Significant	*The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, August 2017, Part B, Appendix BA, Figure BA.5
Short Columns Factor, C	No	Short columns were not observed.
Pounding Factor, D	1	Building 1 (1 storey) is in contact with building 2 (2 storeys) at building 1 roof level. Low building heights indicate no pounding issue.
Site Characteristics	Significant	*The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, August 2017, Part B, section B4.2. Settlement not observed. Slip hazard does not exist. Liquefaction hazard is significant.
Factor F	1.1	Single storey, tied foundations, heavy construction with plenty of return walls and a good roof diaphragm.

[redacted]

[redacted]

IEP Grades and Relative Risk

Table 5 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 5: Relative Earthquake Risk

Building Grade	Percentage of New Building Strength (*%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

Building 1 has been classified by the IEP as a 'Grade *C*' building and is therefore considered to be a medium life-safety risk.

Building 2 has been classified by the IEP as a 'Grade *B*' building and is therefore considered to be a low or medium life-safety risk.

Building 3 has been classified by the IEP as a 'Grade *D*' building and is therefore considered to be a high life-safety risk.

Building 4 has been classified by the IEP as a 'Grade *C*' building and is therefore considered to be a medium life-safety risk.

NZSEE (which provides authoritative advice to the legislation makers, and should be considered to represent the consensus view of New Zealand structural engineers) classifies buildings achieving greater than 67%NBS as "Low or medium Risk", and having "Acceptable (improvement may be desirable)" building structural performance.

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".

We have 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.

Significant non-structural items were observed in building 4.

[redacted]

[redacted]

Other Issues

Other issues pertaining to the gravity support of the structures have not been identified.

Conclusion

Our ISA assessment for these buildings, carried out using the IEP indicates overall scores of:

Building 1 45%NBS (IL2 50yr), which corresponds to a 'Grade C' building, as defined by the NZSEE building grading scheme. This is *above* the threshold for Earthquake Prone Buildings (34%NBS) and *below* the threshold for Earthquake Risk Buildings (67%NBS) as defined by the NZSEE and the New Zealand Building Code.

Building 2 70%NBS (IL2 50yr), which corresponds to a 'Grade B' building, as defined by 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 and the New Zealand Building Code.

Building 3 30%NBS (IL2 50yr), which corresponds to a 'Grade D' building, as defined by the NZSEE building grading scheme. This is *below* the threshold for Earthquake Prone Buildings (34%NBS) and *below* the threshold for Earthquake Risk Buildings (67%NBS) as defined by the NZSEE and the New Zealand Building Code.

Building 4 35%NBS (IL2 50yr), which corresponds to a 'Grade C' building, as defined by the NZSEE building grading scheme. This is *above* the threshold for Earthquake Prone Buildings (34%NBS) and *below* the threshold for Earthquake Risk Buildings (67%NBS) as defined by the NZSEE and the New Zealand Building Code.

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 Detailed Seismic Assessment (DSA). A DSA would likely focus on issues such as roof diaphragms, the stability of longitudinal block walls and the seismic bracing of non-structural elements.

A DSA would also investigate other potential weaknesses that may not have been considered 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 us if you would like clarification of any aspect of this letter.

Yours faithfully

[redacted]

[redacted]

[redacted]

Appendix 1: IEP Forms

[redacted]

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 1

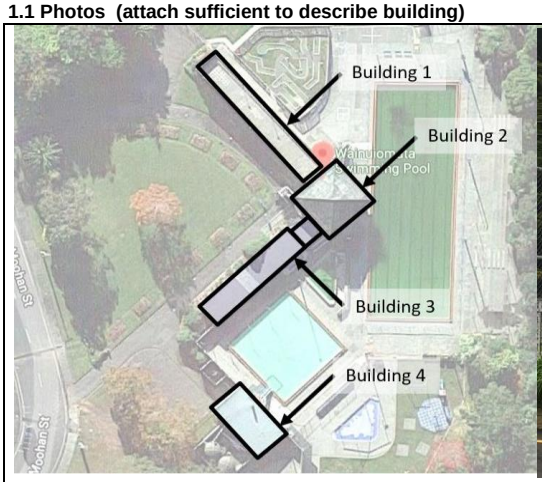
WARNING!! *This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the "The Seismic Assessment of Existing Buildings" Technical Guidelines for Engineering Assessments, July 2017. This spreadsheet must be read in conjunction 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, o r engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.*

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 1**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40026 v 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)

Built between 1966 and 1970
The building appears to be used for storage with 4 roller garage door openings and 6 windows at 0.65x2.4m along one side.
Construction and size appears to be similar to Building 3 except for the heavy pre-cast concrete roof and additional return walls.
The roof is used as a viewing platform which is accessible from the adjacent two storey balcony and has a steel balustrade around the perimeter.
The cladding is fixed to the adjacent two storey building but there does not appear to be any structural fixing.

1.4 Note information sources Tick as appropriate

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

Inspection of interior & exterior 03 May 2019.

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

Page 1a

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 1**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40026 v 1**

Table IEP-1a Additional Photos and Sketches

Add any additional photographs, notes or sketches required below:

Note: print this page separately

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

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 1**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40026 v 1**

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:	Public Buildings	Public Buildings
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: Single storey concrete block masonry	h_n = 2.7	2.7 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):	○	○
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:** 0.06	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 procedureset 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 judge ments 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:	99 Main Road	Job No.:	9684
AKA:	Wainuimata Summer Pool	By:	ULM
Name of building:	Building 1	Date:	3/05/2019
City:	Lower Hutt	Revision No.:	40026 v 1

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: 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.)

	Longitudinal	Transverse
I =	1.33	1.33

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

	Longitudinal	Transverse
R_o =	1	1

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

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

	Longitudinal	Transverse
R =	1.0	1.0

d) Factor G = IR_o/R

	Longitudinal	Transverse
Factor G:	1.33	1.33

2.5 Ductility Scaling Factor, Factor H

a) Available Displacement Ductility Within Existing Structure

Comment: Reinforced concrete block masonry shear walls

	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:		1.57	1.57

(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)

	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
	45%	**45%**

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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

Symmetry.

3.2 Vertical Irregularity

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

Single storey.

3.3 Short Columns

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

Less than 60% of the columns along the wall closest to the pool fit the definition of a 'short column' (The Guidelines, Part B).

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

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

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** 0.7

Greater Wellington Regional Council Flex Map Viewer, moderate liquefaction potential, low slope failure potential.

3.6 Other Factors - *for allowance of all other relevant characterstics of the building* — **Factor F** 1.4

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

Record rationale for choice of Factor F:

The building is single storey but does have a heavy roof which doubles as a balcony. Foundations are probably all cast-insitu and tied together. There is a perimeter ring beam which ties into the internal transverse blockwalls. Liquefaction is unlikely to have a significant impact on structural performance.

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

PAR

Longitudinal **0.98**

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

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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** 1.0

Exterrior inspection would indicate return walls at at less than two times the building width.

3.2 Vertical Irregularity

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

Single storey.

3.3 Short Columns

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

None observed from exterrior inspection.

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

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

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** 0.7

Greater Wellington Regional Council Flex Map Viewer, moderate liquefaction potential, low slope failure potential.

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 1.40

Record rationale for choice of Factor F:

The building is single storey but does have a heavy roof which doubles as a balcony. The roof is simply supported precast concrete with plenty of seating. The concrete roof acts as a diaphragm supporting long block walls out-of plane. The aspect ratio for transverse actions is 2:1 (w:h). Foundations and ring beam are probably all cast-insitu and tied together.

PAR

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

Transverse **0.98**

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

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City:	**Lower Hutt**	**Revision No.:**	**40026 v 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)	**45%**	**45%**
4.2	**Performance Achievement Ratio (PAR)** (from Table IEP - 2)	**0.98**	**0.98**
4.3	**PAR x Baseline *(%NBS)*$_b$**	**45%**	**45%**
4.4	**Percentage New Building Standard *(%NBS)* - Seismic Rating** (Use lower of two values from Step 4.3)		**45%**

Step 5 - Is *%NBS* < 34? **NO**

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

Step 7 - Provisional Grading for Seismic Risk based on IEP

Seismic Grade **C**

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

No further comments.

Relationship between Grade and *%NBS*:

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

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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)	Y

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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Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 1

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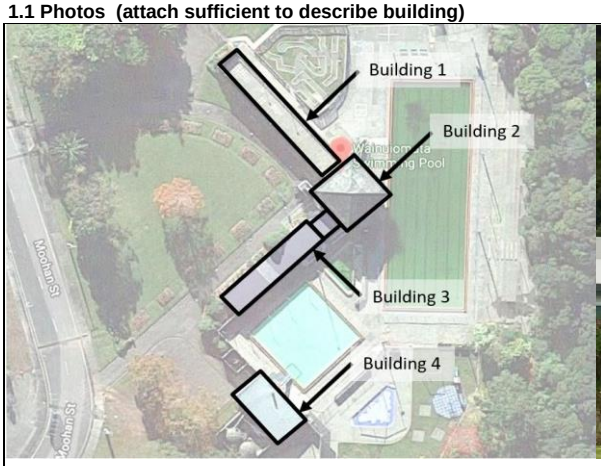
Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 2**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40026 v 1**

Table IEP-1 Initial Evaluation Procedure Step 1

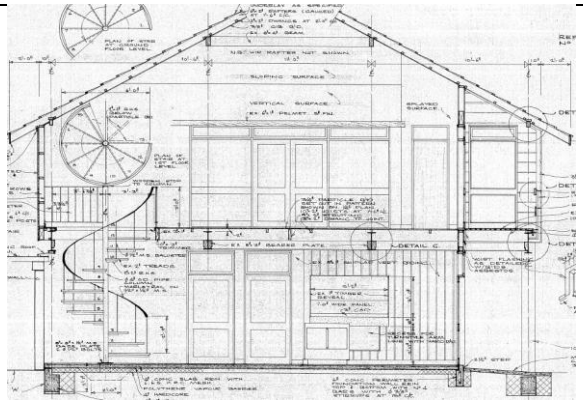
Step 1 - General Information

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)

Built in 1970. The upstairs is an open plan meeting room with a balcony along two sides. The downstairs is a foyer, ticketing booth and toilet.
9.7m square floor plan upstairs with a 1 m wide cantilever balcony along two sides, and 8.4m square floor plan downstairs.
The balcony provides access to the balcony on building 1. Two steel portal frames crossing in the centre.
Upstairs floor level is 3m, eaves height is 5.3m and the apex is at 8.8m.
Shallow reinforced concrete perimeter foundation wall with strip footings for the ground floor slab, and 1.4m by 1.4m by 0.3m square pads for the portal legs.
Foundations are shown to be 1.4m deep but noted as 'excavate to solid'.
Portal legs are 10"x10"x1/2" RHS and the Rafters are10"x5 ¾"x 25lb UB. The Eaves tie is 5" x 3" x ¼" RHS
The upstairs flooring is particle board with hard wood fillets on 250x50 joists at 450 crs. Joists are supported on 16"x7"x36lb UB bearers at 3.3m crs each way.
Bearers are supported on 18"x6"x45lb beams around the perimeter forming a steel frame. Balusters are 3 ½" by 3 ½" RHS.

1.4 Note information sources Tick as appropriate

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

Inspection of interior & exterior 03 february 2019. Part drainage plan shows this building is the "new changing rooms" next to the "new 1970 lounge".

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 1a

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City:	**Lower Hutt**	**Revision No.:**	**40026 v 1**

Table IEP-1a Additional Photos and Sketches

Add any additional photographs, notes or sketches required below:

Note: print this page separately

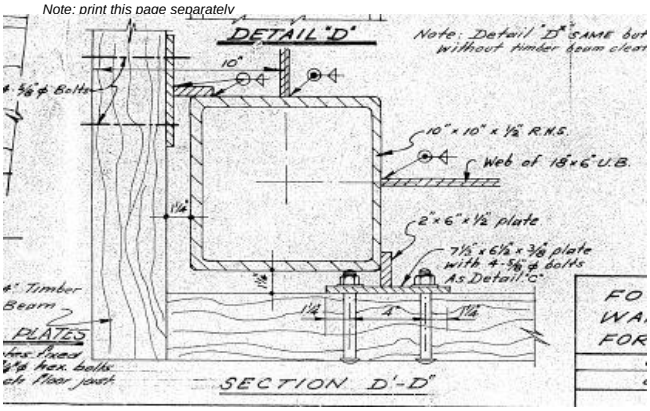

fig 1- Level 1 Beam Cleat

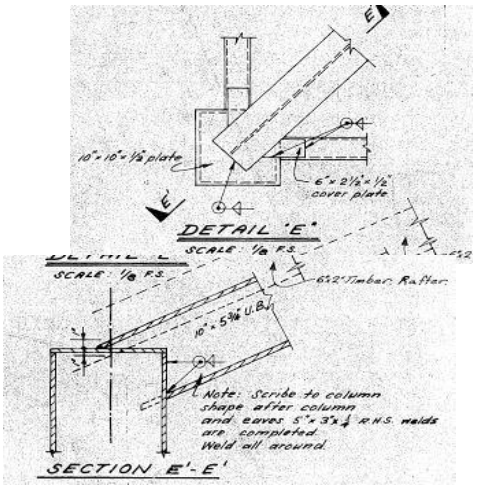

fig 2- Level 2 Portal Knee Connection

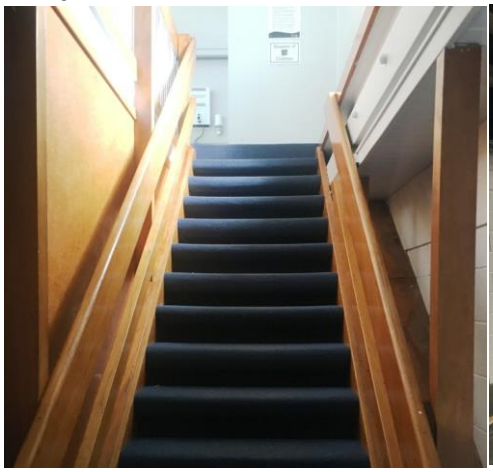

fig 3 - Interrior Stairs

fig 4 - Exterrior Stairs

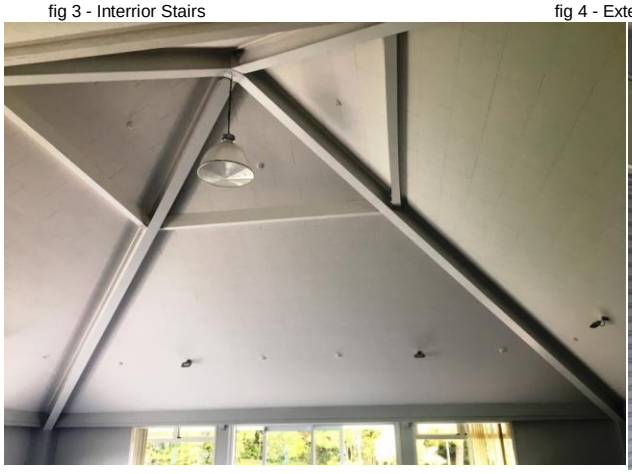

fig 5 - Roof Rafters

fig 6 - Cantilever Deck & SHS Post

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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:	Public Buildings	Public Buildings
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: Two storey steel moment frame and steel portal frame.		
h_n =	5.3	5.3 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):	○	○
Where h_n = height in metres from the base of the structure to the uppermost seismic weight or mass. **T:**	0.49	0.49
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%

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

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City:	Lower Hutt	Revision No.:	40026 v 1

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: 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.)

	Longitudinal	Transverse
I =	1.33	1.33

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

	Longitudinal	Transverse
R_o =	1	1

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

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

	Longitudinal	Transverse
R =	1.0	1.0

d) Factor G = IR_o/R

	Longitudinal	Transverse
Factor G:	1.33	1.33

2.5 Ductility Scaling Factor, Factor H

a) Available Displacement Ductility Within Existing Structure

Comment:

Steel moment frame and portal frame with 200SHS posts/portal legs.

	Longitudinal	Transverse
μ =	2.00	2.00

b) Factor H

		k_μ (Longitudinal)	k_μ (Transverse)
For pre 1976 (maximum of 2)	=	1.70	1.70
For 1976 onwards	=	1	1
Factor H:		1.70	1.70

(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)

	Longitudinal	Transverse
S_p =	0.50	0.50

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

	Longitudinal	Transverse
Factor I:	2.00	2.00

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
	68%	68%

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

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 2**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40026 v 1**

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
Symetrical.

3.2 Vertical Irregularity
Effect on Structural Performance ○ Severe ○ Significant ◉ Insignificant — **Factor B** 1.0
Single storey.

3.3 Short Columns
Effect on Structural Performance ○ Severe ○ Significant ◉ Insignificant — **Factor C** 1.0
None.

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

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

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** 0.7
Greater Wellington Regional Council Flex Map Viewer, moderate liquefaction potential, low slope failure potential.

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:
Foundation for ground floor does not appear to be structurally connected to the foundation for the second storey. Liquefaction may have a significant impact, however the building has been well documented, well maintained, and is of light construction.

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

PAR
Longitudinal **1.05**

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Name of building:	**Building 2**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40026 v 1**

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

Symetrical.

3.2 Vertical Irregularity

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

Single storey.

3.3 Short Columns

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

None.

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

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

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** 0.7

Greater Wellington Regional Council Flex Map Viewer, moderate liquefaction potential, low slope failure potential.

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 1.50

Record rationale for choice of Factor F:

Foundation for ground floor does not appear to be structurally connected to the foundation for the second storey. Liquefaction may have a significant impact, however the building has been well documented, well maintained, and is of light construction.

PAR

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

Transverse **1.05**

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

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
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Name of building:	**Building 2**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40026 v 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)	**68%**	**68%**
4.2	**Performance Achievement Ratio (PAR)** (from Table IEP - 2)	**1.05**	**1.05**
4.3	**PAR x Baseline *(%NBS)*$_b$**	**70%**	**70%**
4.4	**Percentage New Building Standard *(%NBS)* - Seismic Rating** (Use lower of two values from Step 4.3)		**70%**

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)

No further comments.

Relationship between Grade and *%NBS*:

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

Street Number & Name:	99 Main Road	Job No.:	9684
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Name of building:	Building 2	Date:	3/05/2019
City:	Lower Hutt	Revision No.:	40026 v 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	2
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]

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 1

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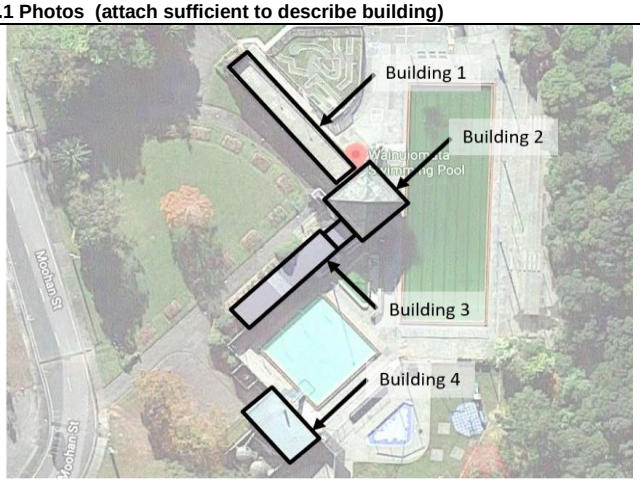
Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 3**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40013 v 1**

Table IEP-1 Initial Evaluation Procedure Step 1

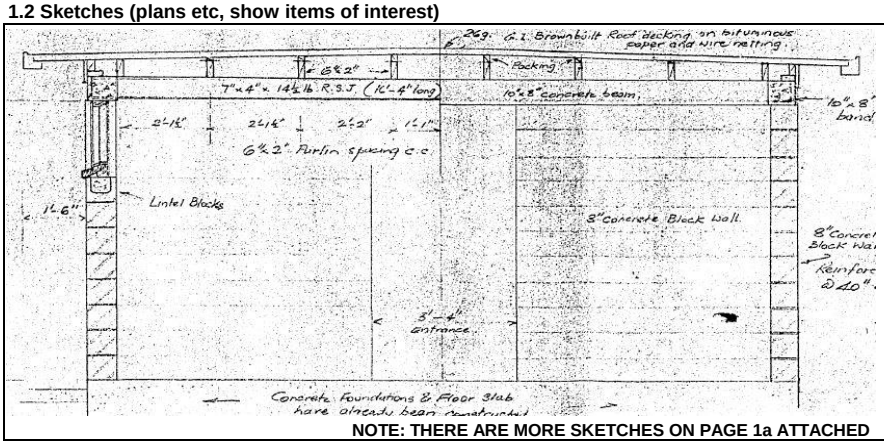
Step 1 - General Information

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)

Built in 1966. Half of the building is used for the women's changing and toilets, half is used for the men's changing and toilets.
It is 5m wide by 28.2m long and 2.7m overall height. 141 m2 floor area.
There are two entries and four toilets positioned midway along the building. The longest stretch of wall without return walls is 12.6m.
The wall with the entries has 5 windows at 0.65x2.4m and 2 windows at 0.65mx1.2m.
200mm thick Block walls reinforced with 13mm bars at 1m crs
250x200mm perimeter bond beam. 7"x4"x4 1/2lb RSJ rafters. 150x50 timber purlins
There is a partial height cantilever block wall between the toilet cubicles.
The cladding is fixed to the adjacent two storey building but there does not appear to be any structural fixing.

1.4 Note information sources Tick as appropriate

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

Inspection of interior & exterior 03 May 2019. Original architectural and structural drawings.

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 1a

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Name of building:	**Building 3**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40013 v 1**

Table IEP-1a Additional Photos and Sketches

Add any additional photographs, notes or sketches required below:

Note: print this page separately

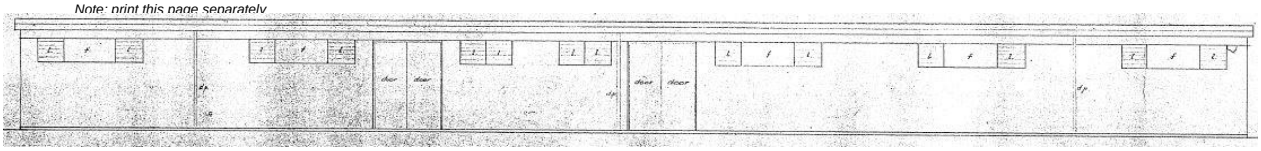

fig 1 - Front Elevation

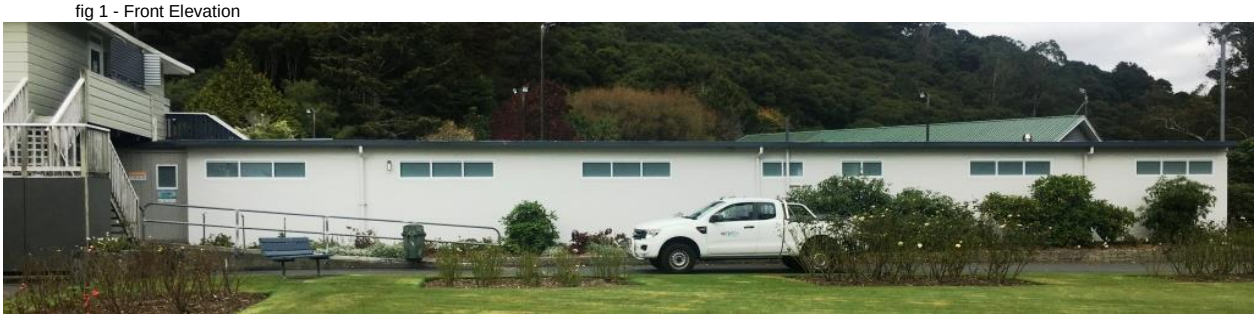

fig 2 - Rear Elevation

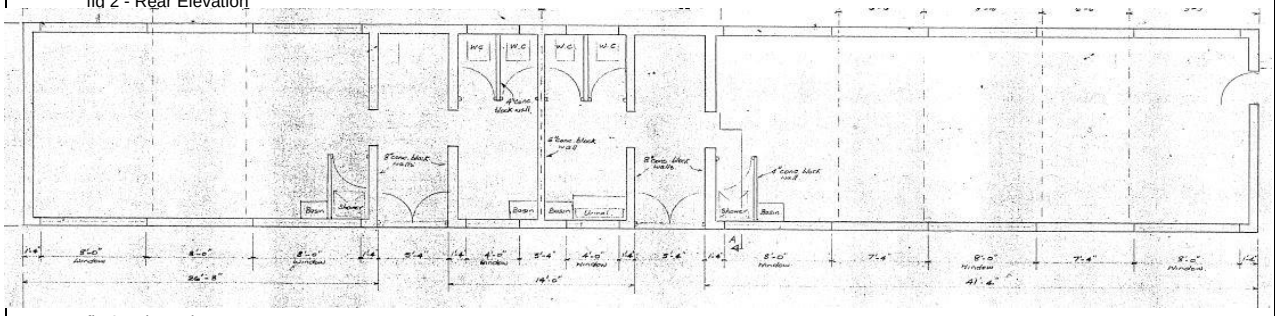

fig 3 - Floor Plan

fig 4 - Connection to Neighbouring Building

fig 5 - Internal Roof Structure

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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:	Public Buildings	Public Buildings
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: Single storey reinforced concrete block masonry.	h_n = 2.7	2.7 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):	○	○
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:** 0.06	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%

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Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 3

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City:	Lower Hutt	Revision No.:	40013 v 1

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: 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

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.)

I =	1.33	1.33

b) Design Risk Factor, R_o

(set to 1.0 if other than 1976-2004, or not known)

R_o =	1	1

c) Return Period Factor, R

(from NZS1170.0:2004 Building Importance Level) *Choose Importance Level*

	Longitudinal	Transverse
	○ 1 ◉ 2 ○ 3 ○ 4	○ 1 ◉ 2 ○ 3 ○ 4
R =	1.0	1.0

d) Factor G = IR_o/R

Factor G:	1.33	1.33

2.5 Ductility Scaling Factor, Factor H

a) Available Displacement Ductility Within Existing Structure

Comment:
Reinforced concrete block masonry shear walls.

μ =	2.00	2.00

b) Factor H

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

(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 ☐ ☐

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

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

	45%	**45%**

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

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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
Symmetry

3.2 Vertical Irregularity
Effect on Structural Performance ○ Severe ○ Significant ◉ Insignificant — **Factor B** 1.0
Single storey.

3.3 Short Columns
Effect on Structural Performance ○ Severe ○ Significant ◉ Insignificant — **Factor C** 1.0
Less than 60% of the columns along the wall closest to the pool fit the definition of a 'short column'.

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 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

b) Factor D2: - Height Difference Effect

Factor D2 For Longitudinal 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

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** 0.7
Greater Wellington Regional Council Flex Map Viewer, moderate liquefaction potential, low slope failure potential.

3.6 Other Factors - *for allowance of all other relevant characterstics of the building* — **Factor F** 1.4

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

Record rationale for choice of Factor F:
The foundations and bond beam are cast in-situ. Therefore, the building appears to be well tied together and liquefaction is unlikely to have a significant impact. The building appears to be well documented and well maintained. There is a cantilever concrete block wall between toilets which is a lifesafety risk but unlikely to cause collapse of the building (i.e. not a CSW).

PAR

3.7 Performance Achievement Ratio (PAR)
(equals **A x B x C x D x E x F**) — **Longitudinal** **0.98**

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

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
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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

Exterrior inspection would indicate return walls at less than two times the building width.

3.2 Vertical Irregularity

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

Single storey.

3.3 Short Columns

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

None present.

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

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

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** 0.7

Greater Wellington Regional Council Flex Map Viewer, moderate liquefaction potential, low slope failure potential.

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 1.40

Record rationale for choice of Factor F:

The foundations and bond beam are cast in-situ. Therefore, the building appears to be well tied together and liquefaction is unlikely to have a significant impact. The building appears to be well documented and well maintained. However, there is almost 13m of block wall without a return wall and this is a severe structural weakness.

PAR

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

Transverse **0.69**

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

Street Number & Name:	99 Main Road	Job No.:	9684
AKA:	Wainuimata Summer Pool	By:	ULM
Name of building:	Building 3	Date:	3/05/2019
City:	Lower Hutt	Revision No.:	40013 v 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)	45%	45%
4.2	**Performance Achievement Ratio (PAR)** (from Table IEP - 2)	0.98	0.69
4.3	**PAR x Baseline *(%NBS)*$_b$**	45%	30%
4.4	**Percentage New Building Standard *(%NBS)* - Seismic Rating** (Use lower of two values from Step 4.3)		30%

Step 5 - Is *%NBS* < 34? YES

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

Step 7 - Provisional Grading for Seismic Risk based on IEP

Seismic Grade D

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

No further comments.

Relationship between Grade and *%NBS*:

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

Street Number & Name:	99 Main Road	Job No.:	9684
AKA:	Wainuimata Summer Pool	By:	ULM
Name of building:	Building 3	Date:	3/05/2019
City:	Lower Hutt	Revision No.:	40013 v 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 [redacted]

Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 1

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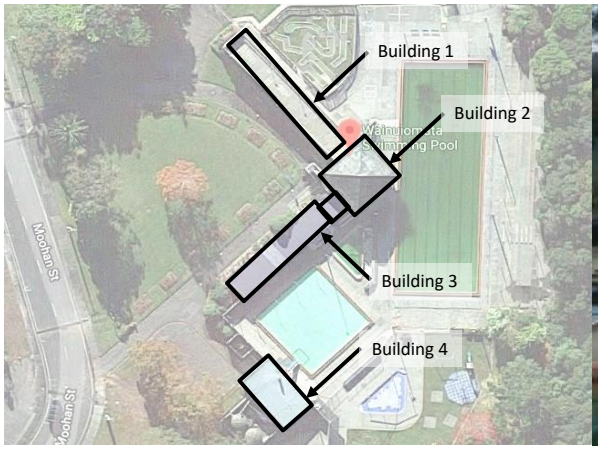
Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 4**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40048 v 1**

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)

Built in 1967. Being used as plant housing and a workshop. The floor is at two levels and there is a low height retaining wall between the two levels. There are 6 steps between the two levels, and they appear to be higher than typical rises (1.1m). Sheet metal roofing on timber LVL purlins on steel trusses. There is no blocking between purlins.The steel trusses have SHS top and bottom chords with steel rods for diagonals. They are fully welded and including to RHS end posts. Internal trusses do not have fly bracing. Plant suspended from the steel trusses. The walls are steel framed almost no internal linings and corrugated metal cladding.There is a timber framed internal room with ply lined walls. There is a double pedestrian access door on one end. A single pedestrian access door midway along one side. At the other end the whole there are four steel frames which appear to provide access for large plant replacement. The four steel frames are fixed to the truss above and floor below. The truss above has fly bracing. There are diagonal steel braces in the longitudinal direction, welded to a cleat which is welded to the RHS posts, significantly below the bottom chord of the truss. There is a transparent cladding and timber jack framing between the top of the longitudinal steel framed wall and the roofing.

1.4 Note information sources Tick as appropriate

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

Inspection of interior & exterior 03 May 2019.

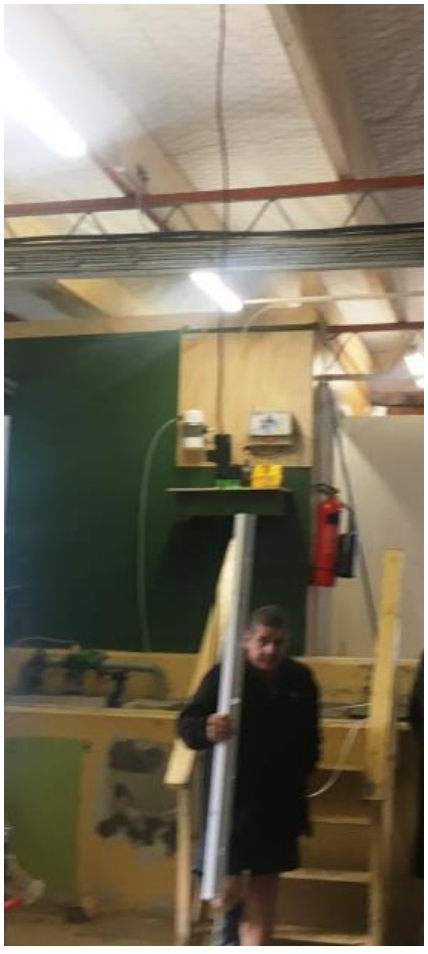
Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 1a

Street Number & Name:	99 Main Road	Job No.:	9684
AKA:	Wainuimata Summer Pool	By:	ULM
Name of building:	Building 4	Date:	3/05/2019
City:	Lower Hutt	Revision No.:	40048 v 1

Table IEP-1a Additional Photos and Sketches

Add any additional photographs, notes or sketches required below:

Note: print this page separately



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

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 4**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40048 v 1**

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:	Public Buildings	Public Buildings
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 = 3.7	3.7 m
Concrete Block Masonry Shear Walls	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):	○	○
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:** 0.06	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%

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Initial Evaluation Procedure (IEP) Assessment - Completed for Hutt City Council Page 3

Street Number & Name:	99 Main Road	Job No.:	9684
AKA:	Wainuimata Summer Pool	By:	ULM
Name of building:	Building 4	Date:	3/05/2019
City:	Lower Hutt	Revision No.:	40048 v 1

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: 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.)

	Longitudinal	Transverse
I =	1.33	1.33

b) Design Risk Factor, R_o

(set to 1.0 if other than 1976-2004, or not known)

	Longitudinal	Transverse
R_o =	1	1

c) Return Period Factor, R

(from NZS1170.0:2004 Building Importance Level) *Choose Importance Level*

	Longitudinal	Transverse
	○ 1 ◉ 2 ○ 3 ○ 4	○ 1 ◉ 2 ○ 3 ○ 4
R =	1.0	1.0

d) Factor G = IR_o/R

	Longitudinal	Transverse
Factor G:	1.33	1.33

2.5 Ductility Scaling Factor, Factor H

a) Available Displacement Ductility Within Existing Structure

Comment:
Steel framing.

	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:		1.57	1.57

(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
	45%	**45%**

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

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 4**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40048 v 1**

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

Symmetry.

3.2 Vertical Irregularity

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

Single storey.

3.3 Short Columns

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

None.

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

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

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** 0.7

Greater Wellington Regional Council Flex Map Viewer, moderate liquefaction potential, low slope failure potential.

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 1.4

Record rationale for choice of Factor F:

Single storey, light weight structure. The foundations and retaining walls are probably cast in-situ and the structure is light steel and timber framing. Therefore, the building appears to be well tied together and liquefaction is unlikely to have a significant impact.

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

PAR

Longitudinal **0.98**

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

Street Number & Name:	**99 Main Road**	**Job No.:**	**9684**
AKA:	**Wainuimata Summer Pool**	**By:**	**ULM**
Name of building:	**Building 4**	**Date:**	**3/05/2019**
City:	**Lower Hutt**	**Revision No.:**	**40048 v 1**

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

The wall nearest the driveway is made up of four removable metal frames with sheet metal cladding. These are able to be detached, presumably to give access to large plant. This potential plan irregularity is allowed for in the F factor below.

3.2 Vertical Irregularity

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

Single storey.

3.3 Short Columns

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

None present.

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

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

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** 0.7

Greater Wellington Regional Council Flex Map Viewer, moderate liquefaction potential, low slope failure potential.

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 1.10

Record rationale for choice of Factor F:

Single storey, light weight structure. The foundations and retaining walls are probably cast in-situ and the structure is light steel and timber framing. Therefore, the building appears to be well tied together and liquefaction is unlikely to have a significant impact. Potential plan irregularity at removable wall if bolts slip or if panels are removed for extended periods.

PAR

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

Transverse **0.77**

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

Street Number & Name:	99 Main Road	Job No.:	9684
AKA:	Wainuimata Summer Pool	By:	ULM
Name of building:	Building 4	Date:	3/05/2019
City:	Lower Hutt	Revision No.:	40048 v 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)	45%	45%
4.2	**Performance Achievement Ratio (PAR)** (from Table IEP - 2)	0.98	0.77
4.3	**PAR x Baseline *(%NBS)*$_b$**	45%	34%
4.4	**Percentage New Building Standard *(%NBS)* - Seismic Rating** (Use lower of two values from Step 4.3)		34%

Step 5 - Is *%NBS* < 34? NO

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

Step 7 - Provisional Grading for Seismic Risk based on IEP

Seismic Grade C

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

Potential Items for further assessment:

1. Plant hanging from the trusses.
2. Biaxial bending in the steel RHS posts.
3. Absence of blocking and fly bracing.
4. Capacity of rthe removable steel frames.
5. Liquefaction desktop study
6. Retaining structures.
7. Jack framing off top of longitudinal walls (in-plane).
8. Portal frame action of the truss and RHS post.

Relationship between Grade and *%NBS*:

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

Street Number & Name:	99 Main Road	Job No.:	9684
AKA:	Wainuimata Summer Pool	By:	ULM
Name of building:	Building 4	Date:	3/05/2019
City:	Lower Hutt	Revision No.:	40048 v 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)	Y

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]