# Risk and Health & Safety Working Party Tuesday 16 April 2019 at 8.30am





Item

# **Risk and Health & Safety Working Party Agenda**

Meeting to be held in the Whale Bay Room 36 Water Street, Whangārei on Tuesday 16 April 2019, commencing at 8.30am

Please note: working parties and working groups carry NO formal decision-making delegations from council. The purpose of the working party/group is to carry out preparatory work and discussions prior to taking matters to the full council for formal consideration and decision-making. Working party/group meetings are open to the public to attend (unless there are specific grounds under LGOIMA for the public to be excluded).

#### MEMBERSHIP OF THE RISK AND HEALTH AND SAFETY WORKING PARTY

Chairman, Councillor Paul Dimery

Page

Councillor Rick Stolwerk Councillor Bill Shepherd Councillor Joce Yeoman

				- 0 -
1.0	APO	LOGIES		
	NRC	Chief Executive		
2.0	DECI	ARATIONS OF CONFLIC	CTS OF INTEREST	
3.0	REPO	DRTS		
	3.1	Review of Risk Regist	er	3
		Dave Tams – Group N	Nanager Corporate Excellence	
	3.2	<b>Council Elections</b>		
		Jonathan Gibbard – G	Group Manager Strategy Governance and Engagement	
	3.3	State of Economy and	d Financial Impact	
		Dave Tams – Group N	Nanager Corporate Excellence	
	3.4	Awanui		
		Bruce Howse – Group	Manager Environmental Services	
		Joe Camuso – Rivers 8	& Natural Hazards Manager	
	3.5	Seismic Assessment	of Water Street Offices	
		Phil Heatley – Strateg	ic Project Manager	
		Attachment 1 Seis	mic Assessment of Water Street Offices	5
		Attachment 2 RSE	ng Seismic Assessment (May 2018)	10
		Attachment 3 Rich	pardson Stevens Letter of Comfort (May 2013)	39
4.0	BUSI	NESS WITH THE PUBLIC	C EXCLUDED	40
	4.1	Briefing to Working F	Party	

ID: A1183133

Colin Dall – Group Manager Regulatory Services

#### Risk Register (A823361)

			Communication method			Inherent Risk		Mitigation Strategies or Controls			Residual Risk			Agreed actions to bring the risk		Staff	
D Risk Description	Risk Owner	Interested Parties	with interested parties	Organisational Original Risk	Likelihood - Refer to Table 1	Consequence	Risk - Refer to	Likelihood and Consequence	Control Effectiveness	Likelihood	Consequence	Risk - Refer to Table 3	Trend	to a stable position	Add itional Comments (if any)	Responsible	Review Date
					North 10 12010 1		Table 3	Level One - Governance				1 362116 3					
Sustainable Solvents Ltd site in Ruskaka - site clean up costs and further enforcement costs, with no chance of ost recovery from offender.	Colin Dall	Councillors, ELT, public, WorkSafe, EPA, MfE, WDC, landowner and onsite operators	Mediation, meetings, email correspondence	Operational, reputational, financial	5	5	25	Reputation - showing that we have taken appropriate action for our responsibilities	moderate	4	5	20	Й		19/07/18 - New risk added - further details to be provided. 09/08/18 - Emailed Colin & Tess requesting update.		
2 Maori land & impact on rating incom	Dave Tams	Council lars, ELT, public	Quarterly reporting to council from FNDC	Operational, strategic, political	5	4	20			5	4	20	<b>↑</b>		This is an ongoing and National issue that is a result of national policy and national policy disconnect. Northland Forward Together, Kokin Ngathi has identified this as a major issue, but has of yet, been unable to find a solution to mitigating / encouraging payment of rates.	Sim on Crabb	There is no risk mitigation in place for this risk (email advice received from Simon 07/06/18). This risk requires
High dependence on non-rating income (increase due to market volatility)	Dave Tams	Coundilors, CEO and GMs, Finance Department	Memo,emails, face-to-face, meetings	Operational, strategic	5	4	20	Mitigate by management, via monthly management account reviews, and investment reviews with CEO and adjusting expenditure levels if need be. In addition, adjustments to general rates and or expenditure items can be made during the annual planning process if we become aware of lower than anticipated income streams (e.g., Marsden Markimeh Hollangs Ltd dividend Ref. Jul Council. Councils Investment performance is also seen by the Full Council. Councils investment performance is also seen by the Investment Subcommittee and any internal sudit reports and the annual external audit report is also reviewed by the Audit Working Party.	Good	5	4		$\leftrightarrow$		09/08 - Emaile d Dave and Simon enquiring as to whether this risk has been reported to council in line with our policy	Simon Crabb	
Treaty settlement risk - taking on costs, this includes Kaipara Moana and the Te Oneroa-a-Tohe Beach Board	Jonathan Gibbard	Council lors, Staff, lwi/Hapu	Implemented settlements, TOR, Statutory Committee. Working Party - Kaipara Moor (Council). Appropriate training on inclusion of settlement mechanism (staff). Verbal and written.	Operational, political, strategic	5	4	20	Mitigated through proactive council involvement in treaty settlement processes - the next being for Kaipara harbour. Council will be strongly advocating to the crown that any future settlement provides for the ongoing financial implications. Participation in cross-council initiative to better inform central Government about true and actual cost of treaty settlement impliemntations. Active meetings with settlement groups - co-govt.	Moderate	5	3	15	÷		While we will put councils views forward at the end of the day it's the crown's decision which council will need to implement. The reality is that there will inevitably have additional cost for council - it's a mater of degrees. Following the first meeting of Beach Board, the actual risk profile has increased. 14/12/17 WP comments "Following tendy discussions with Mana Whashahonorche there could be increased risk." 28/05/18 WP Meeting A1064343 - biggest risk is NRC has no control over external process. 09/08/2018 - Emailed Bachel asking if and when this risk was reported to ownch. New Manager to help		Discussed at 08 May 2018 meeting (A1064343) In negotiations and participatin output
5 Climate risk - floods - lead agency rol and effective leadership	Bruce Howse	River committees, Tas, NZTA,		Operational, political, strategic	3	5	15	Flood and coastal hazard risk assessments have been undertaken along with revised RPS, and additional work is proposed. Need regional leadership to determine long term planning of risk and management response.	Moderate	3	3	9	÷	N/A	Coastal hazard maps released and over 10,000 property owners written to. We are planning for better resilience for Kaltalia area and other communities. 19/07/18 Consultation & engagement process commenced with TAs.	Joseph Camuso	Discussed by steff 28/03/20:
6 Risk of cyber security attack causing disruption to Council systems and possible loss of data	Dave Tams	Staff, ELT, Councillors, public	eXpress, Meetings, emails	Operational	3	5	15	Managed firewall which is constantly updated and monitored, de áktop anti virus, phriendly phishing education campaign, data copied to DR site with appropriate RPO/RTO	medium	2	3	6	И		26/07/18 - We are providing the best level of protection with our current level of investment. We have invested our primary protection in a managed firevall (first line of defence) that is outsourced to NorthCloud, who maintain the level protection current for us. They are continuously manitoring threats and ensuring the levels of protection are as high as possible. We continue to run a staff education compagin for phishing emails. Our ability to recover from a disaster (recovery points and times) matches the level of disruption (by system) agreed by the ELT through a system critically assessment.		Cyber insurance
<ul> <li>Governance risk, including:         <ul> <li>Instability risk at council level</li> <li>Lack of expertise on investments, management and risk</li> </ul> </li> </ul>		Councillors, CEO, GMs, Finance Department, Deloittes, Jonathon Ericson		Political, strategic, operational	3	4	12	<ol> <li>Mitigated by continuity of senior staff, Long Term Planning which traverse the election cycle and a number of long standing councillors. New councillor induction will also seek to mitigate this risk. 2.</li> <li>Mitigated by external consularn tadvice as and when required e.g. Delaintes (Bikk) and Lonathan Ericon Lineutment. Feau extent from the council of the c</li></ol>	Moderate	2	2	4		Ongoing upskilling of council. Ongoing use of external advisors	LTP adopted 06/2018. Now helfwey through triennium. Under control	Kyla Carlier	
Inability to deliver on councillor expectations (starts to lift Q1/2)	Jonathan Gibbard	Councillors, CEO, GMs	Meetings, workshops, agenda	Political	3	4	12	Mittigated through regular and ongoing liaison between senior staff and councillors to ensure staff have a clear understanding of councillor a spectations and are able to provide effective and timely advise to assist, support and guide councillor decision making. LTP and AP processes are robust and established to ensure that staff and councillors have a clear understanding of deliverables and that	Good	1	2	2		comprehensive recording of	No mitigation measure will ever completely mitigate this challenge. However, LTP signed off indicating councillor expectations in terms of strategic direction have been met. Development of strategic directions document aligns council and staff expectations	Kyla Carlier	Re-visit post election
9 Inability to collect rates (Det)	Dave Tams	Councillors, CEO and GMs, Finance Department	Memo,emails, face-to-face, meetings	Operational, political, strategic	2	5	10	Contracts in place with TA's for rates collection. Legal strategy in place to mitigate the impact of the Rogan case which would require NRC to collect its own rates.	Moderate	1	5	5	Й		Court of Appeal found in NRC's favour. Prior rates were validated under 35 of the Judicure Amendment Act. Rogen has applied to the Supreme Court to appeal the decision. Legal dovice is that his is deemed to be low risk of a successful appeal. 09,05/18 WP Minutes A1068343 - legal advice is that only approx 30% of applications to the Supreme Court progress to a hearing, 09/08 - Emailed Deve to provide updated assessment given Supreme Court decision.	Dave Tams	Discussed by staff 28/03/20: & 08/05/18
Maritime operation risk - ships grounding/collision, major shipping incident and failure of new systems	Tony Phipps	Council, Northport, Refining NZ, NorthTugz, DOC, DHB, Maritime NZ. For full list see Tier 2		Operational, political	2	5	10	Mitigated by approved safety management systems, Quality systems, and qualified personnel.	Good	1	5	5	↔	Continued management of safety systems. Improved disaster response systems.	National level SMS developments and monitoring organia.	Jim Lyle	Due next Risk & HS WP
Non compliance with Health and Safety at Work Act 2015	Dave Tams	contingency also. CEO and GMs	Memo, e mails, face-to-face, annual due diligence report, H&S Committee Meeting Minutes	Operational and political	2	5	10	Ensure effective and robust processes and procedures in place to prevent harm. Staff are resourced with training and are competent. Task Safety Plans are completed identifying and documenting risk with applicable mitigating actions to control. Briefings are being undertaken on the changes to the legislation. A volunteer coordinator has been appointed to assist in this area. Significant additional work.	Moderate	1	5	5		Continue to work and develop sound process and procedures.	ACCaccreditation for tertiary status achieved July 2016. Psychologically as fe workplace stuff	Tracey Warboys	
<ol> <li>Physical information assets lost as a result of natural disaster, flood etc</li> </ol>	Dave Tams	Staff, ELT, Councillors, public	express, policies		2	5	10	Digitisation of paper records, spill kit, disaster management policy for records	strong	2	1	2	÷				
3 Contract management risk	Bruce Howse	CEO, GMs, Staff, Contractors	face-to-face, emails, written, manuals	Operational Operational, strategic, political	3	3	9	Contract Management Project charter and pilan in pilace. IRIS is being setup to be used as the Contract Management system and we have policies and procedures in pilace. New system will enable much better tracking, reporting and management of contracts.	Moderate	3	2	6	÷		With the loss of specialist knowledge in July 2018 (Kym Ace) and upcoming works programme, the inherent & residual risks are elevated. IRIS system developed and ready to go live. 23/07/18). Emailed Simon to obtain update on who is taking responsibility for this risk now that Kym has left and, what are the next steps. Dave advised he will handle this. Charlotte leading TechOne potentially have solution		

Page 1 of 2

#### Risk Register (A823361)

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ID	Risk Description	Risk Owner	Interested Parties	with interested parties	Organisational Original Risk	Likelihood - Refer to Table 1	Consequence	Risk - Refer to Table 3	Likelihood and Consequence	Control Effectiveness	Likelihood	Consequence	Risk - Refer to Table 3	Trend	to a stable position	Add itional Comments (if any)	R es po nsi ble	Review Date
		Level One - Governance																
	Unlimited lia bility for major maritime disaster - caused by NRC fault	Tony Phipps	Council and Council's insurer	Direct, emails, written.	Operational, political, strategic	1	5	5	Mitigated by approved safety management systems, quality systems, and qualified personnel.	Good	1	5	5		Parliament via LG.	Tried to amend during MTA update with limited success. 14/12/17 CEO advised written to Minister regarding this issue. 09/05/18 WP meeting see Minus 41064435. Puther report back from AON required following outcome of the Navigator Working Group. AON to update ELT. Navigator's report on hazards	Jim Lyle	Discussed at 08 May 2018 meeting (A1064343) Risk and H&S Working Party
15	Building fire - NRC building (no plan)	Dave Tams	CEO, GMs, Staff, Public, Contractors	Induction both verbal and electronic, signage, memos, intranet, instructions at public meetings	Reputational, Financial, Operational	1	5	5	Evacuation plans need to be robust, staff trained and drills occur for all regions (twice yearly). Opus and Waipapa NRC is a leaseholder and the obligation rests with the landlord. However, NRCstill provides instructions in the event of an evacuation. Regions hold current evacuation plans and have the necessary resources i.e. trained evacuation wardens, means of raising alarm, appropriate sprinklers, fire hoses, and smoke alarms in place.	Good	1	5	5	$\leftrightarrow$	Business continuity plan		Tracey Warboys for H&S legislative requirements. BCP - Kim Abbott?	
	Risk of essuming liability unknowingly through documentation & therefore- negating ability to claim on insurance	<del>Dave Toma</del>	Councillors, ELT, public		Operational, strategic, political				ELT briefed by insurers, Aon, and a legal opinion shared. Aon advise low-risk due-to-LGA, but obtaining another opinion.				٥			28/03/18 - staffte seek advice on this issue & report back to WP 28/03 Mathew Wilson (Associate Director) Aon engaged and will present to WP. 08/05/18 WP meeting AON presented refer to (A106443) for summary of discussion. 19/07/18 - Meeting to be arranged between Chair of Risk & H&S.WP. Dave and Jules for further background discussions occur before risk is assessed.	<del>Dave Tams</del>	Discussed at 08 May 2018- meeting (A1064343)
	Niagara - Maritime risk FURTHER INFORMATION TO BE PROVIDED Kensington Development and other	TBC						0					0			19/07/18 - Dave to contact Auckland Regional Council for further information and report back to Risk & H&S WP 19/07/18 - Dave to contact Auckland Regional Council for further information and		
19	developments Non core business - conference centres, helicopters							0					0			report back to Risk & H&S WP 19/07/18 - Dave to contact Auckland Regional Council for further information and report back to Risk & H&S WP		
	Note: Level one risks were reviewed in full by the Risk & H&S WP on 19 July 2018																	

TITLE:	Seismic Assessment of Water Street Offices
ID:	
From:	Phil Heatley, Strategic Projects Manager

#### Executive summary/Whakarapopototanga

This report brings to the Working Party's attention the civil engineer's May 2018 seismic assessment of council's offices at 36 Water Street.

The building(s) are not considered earthquake prone when used as standard commercial offices or as a 'Level 2 complying building(s)'. However, where there is a post-seismic disaster event effecting Northland, a Civil Defence 'Emergency Coordination Centre' would need to be elsewhere within a Level 4 complying building.

Earthquake risk in Northland is low with no active faults mapped and generally regarded as tectonically stable.

However, It is recommended that Civil Defence secure an agreement with an outside agency for a 'Emergency Coordination Centre', off site but within Whangarei, for use in the unlikely case of such a seismic event. Furthermore, the Property Team will ensure that when any new council offices are being constructed consideration is given to the opportunity and the costs of building to Level 4 standard so they could be used as post-seismic response facilities, if required.

#### Recommended actions

- 1. That the seismic performance level of the Water Street building(s) be placed on the operational risk register noting that they are defined as:
  - i. Complying for the purposes of office space (non-earthquake prone Level 2 building); and
  - ii. Non-complying for use by Civil Defence undertaking post-seismic event functions.
- 2. That when any new council offices are being constructed, consideration be given to the opportunity and the costs of building to the Level 4 standard making them available for post-seismic Civil Defence functions.
- 3. That council's Civil Defence team secure an agreement with an outside agency for a 'Emergency Coordination Centre' for post-seismic event response, off site but within Whangarei.

#### Background/Tuhinga

The June 2018 Telfer Young valuation of Council offices at 36 Water Street is as follows, separated into the floors that were occupied by council and IAG Insurance at that time.

Floor Ground to 3	Value of improvements Land value (apportioned)	\$3,840,000 \$1,460,000
Floor 4	Value of improvements Land value (apportioned)	\$500,000 \$190,000
TOTAL		\$5,990,000

The council offices essentially comprise of two buildings, one being two-storey and the other fourstorey. With the Canterbury Earthquakes in mind, and consequent amendments to the building code, council has visited the seismic performance of the Water Street offices a number of times over recent years.

#### For perspective:

"Earthquake risk in Northland is low with no active faults mapped and generally regarded as tectonically stable. There is a proven risk of small earthquakes that have caused slight damage in Northland. However, the risk is lower than the rest of New Zealand

There is an estimated mean return period of 1000 years for an earthquake of VI on the Modified Mercalli (MM) scale of intensities and 7000 years for an earthquake of VII on the MM scale in Whangarei, compared with nine and 42 years respectively for Wellington. Intensities of VI or greater are those which may start to cause damage to some buildings. A review of natural hazards information for Northland Region. Institute of Geological & Nuclear Sciences Limited, May 2004.

#### Council consideration of seismic performance in 2014

Council received several engineer's reports on the seismic performance of Water Street between 2011 and 2014. This led to some building strengthening work.

On 25 August, 2014 council's Economic Development Working Party (EDWP) considered the cost of further strengthening work, upgrading the building to at least 67% New Building Standard (NBS). Engineers Richardson Stevens Ltd provided council with a schedule of work required to strengthen the building to at least 67% NBS. ARCO Group Ltd provided an estimate of \$1,100,000 + GST to complete the necessary work.

At the meeting the EDWP were also privy to a 'Letter of Comfort' (attached) from Richardson Stevens stating that:

"...while the building does not comply with NBS there is no reason to suspect that it would suffer catastrophic failure in the event of an earthquake. The risk to life safety from its continued use is statistically much less than other everyday risks which we accept for instance driving motor vehicles. Grant Stevens, 22<sup>nd</sup> May 2013

The EDWP agreed that further strengthening work not be undertaken at that time.

#### Council consideration in 2019

In May 2018, the Strategic Project Manager engaged civil engineer's RS Eng Ltd to undertake a seismic assessment of council's offices at 36 Water Street in order to get a more definitive opinion on the structure before office renovations were undertaken. Previous reports did not quantify the performance of the two buildings (two-storey and four-storey) under seismic load when taken together.

The 2018 seismic assessment report is attached. Please note that 36 Water Street as standard commercial office space is defined as a Level 2 Building as per the Building Code. Should it be considered for use in a post-earthquake disaster situation it would be defined as a Level 4 Building. This is relevant due to council's Civil Defence function.

#### **Building Code level of importance**

Clause A3 of the Building Code defines the significance of a building by its importance level (IL), which is related to the consequences of failure. There are five levels of importance, considered by the importance of the building to society:

- · Level 1: Structures presenting a low degree of hazard to life or property, such as walkways, outbuildings, fences and walls.
- Level 2: Normal structures and structures not covered by other categories, such as timber-framed houses, car parking buildings or office buildings.
- Level 3: Structures that may contain crowds, have contents of high value to the community or pose a risk to large numbers of people in close proximity, such as conference centres, stadiums and airport terminals.
- Level 4: Buildings that must be operational immediately after an earthquake or other disastrous event, such as emergency shelters and hospital operating theatres, triage centres and other critical post-disaster infrastructure.
- Level 5: Structures whose failure poses a catastrophic risk to a large area or a large number of people, such as dams, nuclear
  facilities or biological containment centres.

The required level of seismic performance increases with each level of importance. In general, important structures, such as hospitals, communications centres and those that provide occupation for many people, are designed for a greater level of earthquake shaking than ordinary commercial structures.

#### Water Street complying as standard commercial office space

From the 2018 seismic assessment of the building as standard offices - a 'Level 2 importance' - both the four-storey (40% NBS) and two-storey (60% NBS) score above the 34% NBS required by regulations. Therefore, they are deemed not earthquake prone from the authority's perspective, that being Whangarei District Council.

Council can voluntarily upgrade to 67% NBS for Level 2 normal office purposes. In February 2019 a definitive report was received on what seismic strengthening would be required to bring the four-storey building above 67% for normal office purpose. The engineer stated that the on the four-storey building:

"...the lower two levels were designed in 1985 and later in 1986 the upper two levels. Unfortunately the lower tweo levels are not as well reinforced and detailed as the upper two levels. **RSEng, 15**<sup>th</sup> **February 2019**.

A contemporary estimate to upgrade the four-storey building was calculated from design specifications within the February 2019 report by ARCO Group. For budgetary purposes, they suggest a range of

between 2.5m and 3.0m with an actual estimate of 2,768,700 + GST. This updates the 2014 estimate to upgrade the four-storey building at 1,100,000 + GST.

The Strategic Projects Manager was advised that the internal renovations planned in 2018 did not provide a 'particular' opportunity to upgrade the building to a higher seismic performance standard as much of seismic strengthening work would be external. Hence no seismic strengthening was undertaken.

For the same reason, further renovations planned for 2019 will not provide a 'particular' opportunity to improve building performance albeit there is some structural work anticipated at the Water Street entrance, none in the vicinity of the four-storey building.

#### Water Street non-complying for a post-earthquake Civil Defence role

Both buildings are below the score for a 'Level 4 importance' with the four-storey at 22% NBS and the two-storey at 33% NBS. Above 67% NBS at Level 4 is required for Civil Defence post-seismic event functions.

Even if council decided to voluntarily upgrade for normal office purposes, the RS Eng Ltd is of the view that it would be cost prohibitive to go the further step to upgrade any part of the building to a point that Civil Defence could operate in a post-seismic disaster event. Even if council spent the lesser amount estimated at \$230,000 + GSTon the two-storey for a Civil Defence 'Emergency Coordination Centre', the four storey could fall onto it. In practical terms, the four-storey would need work as well and the cost is estimated at \$2,768,700 + GST.

In Section 8.0 Civil Defence Option within the report, RS Eng Ltd express the following view.

"...it would be uneconomic and unrealistic to strengthen to that level and consideration be given to siting Civil Defence response elsewhere". RSEng, 10<sup>th</sup> May 2018.

The Strategic Projects Manager understands that Civil Defence can have normal day to day offices at Water Street alongside other teams, and operate out of the offices during most disaster events. However, where there is a post-seismic disaster event effecting Northland, a Civil Defence 'Emergency Coordination Centre' would need to be elsewhere in Whangarei or Northland and within a Level 4 complying building.

The Property Team intends to ensure that when any new council offices are being constructed, consideration be given to the opportunity and the costs of them being built to Level 4 standard so they can be used as post-seismic event facilities. The extra engineering cost is likely to be considerable so the location and likelihood of the building being useful would need to be considered.

However, it is recommended that Civil Defence secure an agreement with an outside agency for a 'Emergency Coordination Centre', off site but within Whangarei, for use in the case of such a seismic event.

#### Attachments/Ngā tapirihanga

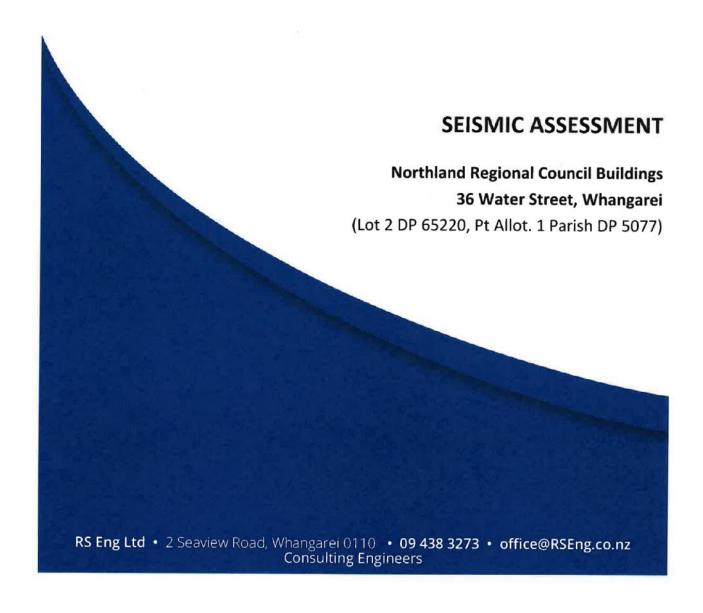
Attachment 1: 2018 Seismic Assessment of 36 Water Street, Whangarei

## Attachment 2: 2013 Engineer's Letter of Comfort

## Authorised by Group Manager

Name:	Phil Heatley
Title:	Strategic Projects Manager
Date:	04 April 2019







# SEISMIC ASSESSMENT

# Northland Regional Council Buildings 36 Water Street, Whangarei

(Lot 2 DP 65220, Pt Allot.1 Parish DP 5077)

Report prepared for:

Northland Regional Council

Report prepared by:

Gary Wood

Report reviewed by:

Rachel Wright

Report reference:

15829

Date:

10 May 2018



ssue	Details	Date
1	Seismic Assessment: Northland Regional Council Buildings: 36 Water St	10 May 2018



RS Eng Ltd • 2 Seaview Road, Whangarei 0110 • 09 438 3273 • office@RSEng.co.nz

# Contents

1.0	Introduction	1
2.0	Previous Seismic Assessments	2
3.0	Scanning and Intrusive Investigations	3
4.0	Site Subsoil Class	3
5.0	Displacement Based Review Considerations 5.1 Column Stirrup Spacing 5.2 Pounding 5.3 Precast Façade Panels 5.4 Hazard Factor, Z	4 4 4 5
6.0	Displacement Based Analysis Results	5
7.0	Seismic Restraint of Non-Structural Items	8
8.0	Civil Defence Option	8
9.0	Strengthening of the buildings	8
10.0	Summary	9
11.0	Limitations	9

# **Appendices**

A Assessment Summary Report

B Photos



File: 15829 10 May 2018 Issue: 1

#### SEISMIC ASSESSMENT

# Northland Regional Council Buildings 36 Water Street, Whangarei

(Lot 2 DP 65220, Pt Allot.1 Parish DP 5077)

#### 1.0 Introduction

On behalf of Northland Regional Council, a seismic assessment has been carried out on the existing four storey and two storey buildings at 36 Water Street, Whangarei. These buildings have been subject of earlier seismic assessments and concept strengthening designs. This review has been requested following changes to the seismic assessment process to confirm the %NBS rating. The displacement based assessment method has been adopted as new design procedures have been released by the Concrete NZ – Learned Society.

The Building (Earthquake-prone Buildings) Amendment Act 2016 states that all commercial buildings for Auckland and Northland obtain a seismic evaluation by 1 July 2032. If the building is deemed to be under 34%NBS (New Building Standard) and therefore classified as "earthquake prone" then strengthening works are to be carried out within a further 35 years. Many organisations including recommendations by New Zealand Society for Earthquake Engineering (NZSEE) would like to achieve a higher value of at least 67%NBS.

There are two buildings to be reviewed on the site; a four storey and a two storey, which are connected at an acute angle with a 60mm seismic gap. The four storey building is a reinforced concrete framed building, with beams and columns supporting unispan concrete floors. The roof level is also a unispan concrete floor. The foundation consists of pad footings with foundation tie beams. The building has 1.9m high precast concrete façade panels between the glazing.

The two storey building is a similarly detailed reinforced concrete framed building with beams and columns supporting the first floor concrete floor. The roof is metal clad supported on steel beams. There are steel portals to the side and front of the building forming a lean-to-structure. The foundation consists of pad footings with foundation tie beams.



RS Eng Ltd • 2 Seaview Road, Whangarei 0110 • 09 438 3273 • office@RSEng.co.nz

#### 2.0 Previous Seismic Assessments

Previous seismic assessments have been carried out for the two buildings with differing levels of investigations as summarised below:

- 13 December 2011: ISA (Initial Seismic Assessment) report. This is the first report undertaken on these buildings. All the building plans were not available, and the assessment assumed that the lower two levels of the four storey building (1985) were detailed similar to the upper two levels (1986 plans). It is typical in a design that the lower levels are at least as well reinforced as the upper levels and often have more detailing with the increased demand. From this initial review, using the rudimentary IEP (Initial Evaluation Procedure) the score given was about 67% NBS (IL2).
- 7 May 2013: Seismic Evaluation: Columns report. As a result of the technical investigation into the failure of the CTV building in Christchurch, MBIE (Ministry of Business, Innovation and Employments) requested that all Councils identify potential buildings with non-ductile columns. As part of this process Aurecon noted that at least some columns of the 34 Water Street building were non-ductile in nature. This assessment was to verify this result. As part of this process more plans were discovered (1985) and an anomaly was encountered, that the lower two levels of the four storey building were detailed with far less reinforcing than the upper two levels. Scanning of the columns was then carried out to confirm this scenario. From these findings with a conservative period for the building (T=0.4 seconds) an initial estimate of 26% NBS (IL2) was given for both buildings with the recommendation of more detailed analysis using 3D modelling to confirm the building period.
- 19 June 2013: Seismic assessment with 3D modelling. The 3D modelling yielded a score of 57%NBS (IL2) for the four storey building and a score of 34%NBS (IL2) for the two storey building due to an unrestrained Water Street frontage column. This was based on capacity design principles and NZSEE (New Zealand Society for Earthquake Engineering) guidelines of the time. A structural ductility factor, μ of 1.5 with a period, T of 0.76 seconds was used for the four storey building. A structural ductility factor, μ of 2.0 with a period, T of 0.4 seconds was used for the two storey building. Later in 2014 the strengthening work was carried out for the two storey column and the rating was increased for this building to 58%NBS (IL2).
- 24 June 2014: Seismic strengthening report. A preliminary strengthening design concept
  to at least 67%NBS (IL2) was prepared for the four storey building only. During this
  assessment process, the reinforcing at two locations (Level 1 and Level 3) of an external
  column was exposed to determine the stirrup spacing at the beam column joint, as no

15829 - 10 May 2018 - Seismic Review: Northland Regional Council: 36 Water Street, Whangarei

design plans of this detailing has been located. The preliminary concept for the strengthening consisted of a system of braces in one bay on each four external faces of the building. Piling was required to develop the tension and compression forces. The option of using BRB (Buckling Restrained Braces) was investigated to improve the resilience of the building. A preliminary construction costing for this work was given from Arco Group with a figure of \$1,108,891. This figure can now not be relied upon. A new strengthening design is proposed.

This 2018 assessment is a displacement based approach utilising recent guidelines and tools from the ConcreteNZ Learned Society. It is similar to the Simple Lateral Mechanism Analysis (SLaMA) specified to be used as part of a detailed seismic assessment (DSE) for existing buildings as outlined in the Technical Guidelines for Engineering Assessments (EQ-Assess). A paper on "Drift Capacity of Lightly Reinforced Soft Storey Structures" has also referred to.

#### 3.0 Scanning and Intrusive Investigations

Scanning of several columns was initially carried out using a profoscope in 2012 and later a specialised company conducted testing in 2013 with a more sophisticated apparatus which confirmed the results. The results of the four storey building showed stirrup spacing from 108mm to 205mm with an average of about 160mm for the lower two levels and an average of about 85mm for the upper two levels. The columns scanned showed 8 vertical bars rather than the 6 detailed on the plans. The results of the two storey building showed stirrup spacing from 138mm to 209mm with an average of about 158mm.

The beam column joint detailing is not shown on the plans, therefore two intrusive inspections were done on an external column at Levels 1 and 3, with an external scan at Level 2 of the four storey building. The results revealed column stirrups as far apart as 420mm at Level 1, 330mm at Level 2 and 180mm at Level 3.

In summary the results of the scanning and intrusive testing indicated a general lack of confinement reinforcing in the columns.

#### 4.0 Site Subsoil Class

The site is relatively level about 50m away from the Waiarohia stream bank. Two hand auger boreholes were carried out. A site subsoil class classification as outlined in NZS 1170.5 a site subsoil class D will be used in the review, based on the testing results and local knowledge.

15829 - 10 May 2018 - Seismic Review: Northland Regional Council: 36 Water Street, Whangarei

3

#### 5.0 Displacement Based Review Considerations

This displacement based assessment process reviews the ability of a building to accommodate horizontal displacement under earthquake conditions. The strengths of the beams and columns are assessed giving a likely sway mechanism based on the expected weakest members. The equivalent displacement capacity is compared to the spectual displacement at the effective period to give a %NBS score. Several items must be considered.

#### 5.1 Column Stirrup Spacing

The measured column stirrup spacing of 420mm far exceeds today's requirement of h/3 = 133mm, or h/4 = 100mm for a ductile designed beam column joint. Excessive seismic drift could cause the longitudinal reinforcing to buckle and cracking at the beam column joint. Studies in relation to the CTV building in Christchurch suggest the interstorey drift reached prior to failure was in the order of 1.5%. A paper on "Drift Capacity of Lightly Reinforced Soft Storey Structures" presented at the Ninth Pacific Conference on Earthquake Engineering in April 2011, also reviewed the column stirrup spacing. Experimental tests were taken on 300mm x 300mm reinforced columns with stirrups at 300mm centres. This is similar to the four storey building with the 400mm x 400mm reinforced columns and a 420mm spacing. The worst result was 1.01% drift at the maximum load. Therefore, from this result the recommended maximum target drift is 1.0%.

In our view the lack of confinement steel in the beam column joint constitutes a critical structural weakness that requires remediation.

#### 5.2 Pounding

Another consideration is the potential of the two buildings to pound together. The 1985 plans show a 60mm seismic gap between the two buildings. This appears to have been constructed correctly from a review of the gap on site. With a 1.0% drift limit the deflection for the 3.6m and 4.32m interstorey heights gives a total of 79mm suggesting the seismic gap is inadequate. Therefore, to limit drifts to 60mm the maximum allowable drift is  $60/76 \times 1.0 = 0.76\%$ . The upper floor level of the two storey building is at the same level of the first floor level of the four storey building; which is preferable rather than a floor pounding a column.

#### 5.3 Precast Façade Panels

From a review of the 1986 Worley Consultants Ltd calculations the façade panels have been designed with a 20mm sliding tolerance and a 10mm clearance at the corners between the panels. There are unfortunately no plans available to confirm these details. A plan of the panel layout has however been located from Busck Prestressed Concrete Ltd with a note showing the 20mm gap

15829 - 10 May 2018 - Seismic Review: Northland Regional Council: 36 Water Street, Whangarei

4

reduced to 16mm. Some of the lower panel gaps have been measured on site and they appear to be about 15mm. If 15mm is used, then the maximum interstorey drift permitted is 15/1900 = 0.79% for the four storey building and 15/2500 = 0.60% for the two storey building with the higher panels. This limit is set to prevent panel damage which could cause a falling hazard and to prevent the potential of a strut mechanism developing and the columns hinging above the panel causing a short column effect.

The panel fixings are subject to a review for potential brittle failure when the strengthening design is undertaken.

#### 5.4 Hazard Factor, Z

An amendment to NZS 1170.5:2004 Structural Design Actions on September 2016 reduced the hazard factor, Z for Northland from 0.13 to 0.10. This has not yet been cited into the Building Code, but if the lower value is adopted then the %NBS result is increased.

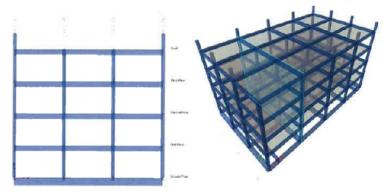
#### 6.0 Displacement Based Analysis Results

The four storey and two storey buildings have been assessed in both directions using the displacement based assessment method. This is still a rudimentary method, however allows non-linear approximation of the beam and column strengths and deformation properties. These are then limited by estimations on the criteria outlined in section 5.

The results are as follows:

#### Four Storey Building: Grid 2-4

Pounding could occur with more than 0.75% drift. Measured column stirrup spacing as far as 420mm. Panel drift limit is 0.79% (15mm/1900mm).



Result: Target Drift 0.75%: T = 1.7s, 40%NBS (IL2), site subsoil D, Z=0.13 Target Drift 0.75%: T = 1.7s, 52%NBS (IL2), site subsoil D, Z=0.10

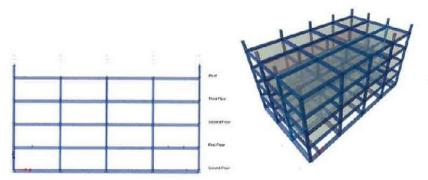
15829 - 10 May 2018 - Seismic Review: Northland Regional Council: 36 Water Street, Whangarei

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5

#### Four Storey Building: Grid B-C

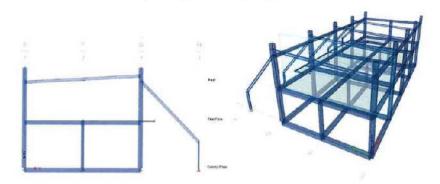
Pounding could occur with more than 0.75% drift. Measured column stirrup spacing as far as 420mm. Panel drift limit is 0.79% (15mm/1900mm).



Result: Target Drift 0.75%: T = 2.4s, 32%NBS (IL2), site subsoil D, Z=0.13 Target Drift 0.75%: T = 2.4s, 41%NBS (IL2), site subsoil D, Z=0.10

### Two Storey Building: Grid 7-9

Pounding could occur with more than 0.75% drift. Panel limit is 0.60% drift (15mm/2500mm panel)

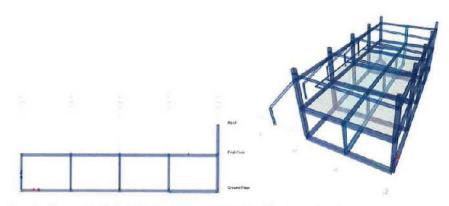


Result: Target Drift 0.60%: T = 0.6s, 46%NBS (IL2), site subsoil D, Z=0.13 Target Drift 0.60%: T = 0.6s, 60%NBS (IL2), site subsoil D, Z=0.10

#### Two Storey Building: Grid F

Pounding could occur with more than 0.75% drift. Panel limit is 0.60% drift (15mm/2500mm panel)

18



Result: Target Drift 0.60%: T = 0.6s, 46%NBS (IL2), site subsoil D, Z=0.13 Target Drift 0.60%: T = 0.6s, 60%NBS (IL2), site subsoil D, Z=0.10

From these results using the site subsoil D with the soon to be adopted zone factor, Z = 0.10, the four storey building score is 40% NBS (IL2) and the two storey building score is 60% NBS (IL2). A broad description of the life-safety risk can be assigned to the building grades as shown in Table 1.

Table 1: Relative Earthquake Risk

Building Grade	A STORY OF THE STO	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
В	67 to 79	2 to 5 times	low or medium risk
С	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

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

#### 7.0 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".

This assessment is being carried out as a separate report.

#### 8.0 Civil Defence Option

This report and results have been based on an importance level 2 building (IL2). If the building is to be used in a post disaster function for Civil Defence, then the building will need to be designed as an importance level 4 building (IL4) with 1.8 times the seismic load, which reduces the %NBS value. For the four storey building the score is 22%NBS (IL4), and for the two storey building the score is 33%NBS (IL4). To achieve a level of 67%NBS (IL4) far more extensive strengthening will be required. It is our view that it may be uneconomic and unrealistic to strengthen to that level and consideration be given to siting Civil Defence response elsewhere.

#### 9.0 Strengthening of the buildings

For the two storey building with a score of 60% NBS (IL2), it is expected that strengthening work to achieve a minimum of 67%NBS (IL2) should not be extensive. The drift was limited due to the precast panels. If steel braces were installed in both directions, then a score of over 67%NBS can be achieved. The option of strengthening the columns could also be reviewed.

The four storey building has lower score of 40% NBS (IL2) and more extensive strengthening will be required. To limit the deflections, steel braces remain the most viable solution. The preliminary strengthening 24 June 2014 report "Seismic Strengthening 4 Storey Building", utilised steel buckling restrained braces (BRB's) on one bay, full height, on each four sides of the building. Offset piling was required at the bases to support the column reactions. To reduce the size of the piling, two bays per side of the building rather than one may be advantageous.

Limiting the drifts with the bracing effectively unloads the beam column joint and therefore the lack of confinement steel is not as critical.

The preliminary strengthening options for both buildings will be reviewed as part of the next stage.

#### 10.0 Summary

A seismic assessment of the two buildings at 36 Water Street, Whangarei has been carried out. This has included a displacement based method approach. The scores are as follows:

For the f<u>our storey building</u> the limiting drift was the existing 60mm seismic gap between the two buildings. The score is <u>40% NBS (IL2)</u>. The likely strengthening solution will include diagonal steel braces taken full height of the building in one or two bays on each side of the building, with piling offset at ground level.

For the two storey building the limiting drift was the precast panel gap. The score is <u>60% NBS (IL2)</u>. The likely strengthening solution will include a diagonal steel brace in each direction or the columns strengthened.

These scores exceed the minimum of 34% NBS to not be classified as earthquake prone; however, to achieve a level of 67% NBS or greater then strengthening work will be required. In our view the lack of confinement steel in the beam column joint constitutes a critical structural weakness that requires remediation. If one or both of the buildings are to be used for post disaster Civil Defence then far more extensive strengthening will be required. It is recommended that the post disaster Civil defence function be considered being located elsewhere.

#### 11.0 Limitations

This report has been prepared solely for the benefit of Northland Regional Council. Recommendations and opinions in this report are based on data obtained as previously stated.

The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

Prepared by:

Gary Wood

Chartered Professional Engineer

NZCE(Civil), BE(Hons)(Civil), CPEng, CMEngNZ

**RS Eng Ltd** 

Reviewed by:

Rachel Wright

Chartered Professional Engineer BE(Civil), CPEng, IntPE(NZ), CMEngNZ

15829 – 10 May 2018 – Seismic Review: Northland Regional Council: 36 Water Street, Whangarei

# Appendix A

**Assessment Summary Reports** 

1. Building Information	
Building Name/ Description	Four Storey: Northland Regional Council Building
Street Address	36 Water Street
Territorial Authority	Whangarei District Council
No. of Storeys	4
Area of Typical Floor (approx.)	507 m2
Year of Design (approx.)	1985 initial two stories, 1986 with added top two stories.
NZ Standards designed to	NZS 4203: 0.064g
Structural System including Foundations	Reinforced concrete columns and beams (frame).
Does the building comprise a shared structural form or shares structural elements with any other adjacent titles?	No
Key features of ground profile and identified geohazards	Approximately 50m away from the Waiarohia Stream.
Previous strengthening and/ or significant alteration	Central lower columns strengthened in 1986 as part of upper level works
Heritage Issues/Status	Not known
Other Relevant Information	

2. Assessment Informa	ation
Consulting Practice	RS Eng Ltd
CPEng Responsible, including:  Name CPEng number A statement of suitable skills and experience in the seismic assessment of existing buildings	
Documentation reviewed, including:  date/version of drawings/calculations previous seismic assessments	Worley Consultants Limited 1985 and 1986 plans, calculations Previous seismic assessments by Richardson Stevens Consultants (1996) Ltd
Geotechnical Report(s)	No
Date(s) Building Inspected and extent of inspection	Various
Description of any structural testing undertaken and results summary	Scanning of columns with profoscope and later carried out by a specialised firm. Intrusive investigation of two external columns. Stirrups as far apart as 420mm measured.
Previous Assessment Reports	13 December 2011, 7 May 2013, 19 June 2013, 24 June 2014
Other Relevant Information	

2 Summany of Engineer	ing Assessment Methodology and Key Parameters Used
5. Summary of Engineer	ing Assessment Methodology and Key Parameters Used
Occupancy Type(s) and Importance Level	Offices, Importance Level 2 (IL2) building
Site Subsoil Class	D
For an ISA:	
<ul> <li>Summary of how Part</li> <li>B was applied, including:</li> <li>Key parameters such as μ, S<sub>p</sub> and F factors</li> <li>Any supplementary</li> </ul>	
specific calculations  For a DSA:	
Summary of how Part C was applied, including:	
<ul> <li>the analysis methodology(s) used from C2</li> <li>other sections of Part C applied</li> </ul>	An initial displacement based review has been carried out utilising a Concrete NZ Learned Society speadsheet.
Other Relevant Information	

4. Assessment Outcomes		
Assessment Status (Draft or Final)	Final	
Assessed %NBS Rating	40% NBS (IL2) at present	
Seismic Grade and Relative Risk (from Table A3.1)	С	
For an ISA:		
Describe the Potential Critical Structural Weaknesses		
Does the result reflect the building's expected behaviour, or is more information/ analysis required?		
If the results of this ISA are being used for earthquake prone decision purposes, and elements rating <34%NBS have been identified:	Engineering Statement of Structural Weaknesses and Location	Mode of Failure and Physical Consequence Statement(s)
For a DSA:		
Comment on the nature of Secondary Structural and Non-structural elements/ parts identified and assessed	The stairs are steel framed and are expected to have some ductility. This can be reviewed as part of the strengthening design. Non-structural elements are being reviewed as a separate report. The seismic gap between the façade precast panels has been critical in the review. The drift has been reduced accordingly.	
Describe the Governing Critical Structural Weakness	Potential of pounding between buildings.  Narrow gaps between the panels. Stirrup spacing on columns too wide. Drift limited.	
If the results of this DSA are being used for earthquake prone decision purposes, and elements rating <34%NBS have been	Engineering Statement of Structural Weaknesses and Location	Mode of Failure and Physical Consequence Statement(s)

identified (including Parts)	
Recommendations (optional for EPB purposes)	To achieve a score of over 67%NBS then strengthening works will be required. These could be braces to reduce the deflections.

1. Building Information		
Building Name/ Description	Two Storey: Northland Regional Council Building	
Street Address	36 Water Street	
Territorial Authority	Whangarei District Council	
No. of Storeys	2	
Area of Typical Floor (approx.)	254 m2	
Year of Design (approx.)	1985	
NZ Standards designed to	NZS 4203: 0.064g	
Structural System including Foundations	Reinforced concrete columns and beams (frame).	
Does the building comprise a shared structural form or shares structural elements with any other adjacent titles?	No	
Key features of ground profile and identified geohazards	Approximately 50m away from the Waiarohia Stream.	
Previous strengthening and/ or significant alteration	Central column at Water St frontage strengthened with a roof restraint	
Heritage Issues/ Status	Not known	
Other Relevant Information	*	

2. Assessment Information	
Consulting Practice	RS Eng Ltd
CPEng Responsible, including:  Name CPEng number A statement of suitable skills and experience in the seismic assessment of existing buildings	
Documentation reviewed, including:  date/version of drawings/ calculations previous seismic assessments	Worley Consultants Limited 1985 plans, calculations Previous seismic assessments by Richardson Stevens Consultants (1996) Ltd
Geotechnical Report(s)	No
Date(s) Building Inspected and extent of inspection	Various
Description of any structural testing undertaken and results summary	Scanning of columns with a profoscope and later carried out by a specialist firm. Stirrups found typically at 160mm spacing.
Previous Assessment Reports	13 December 2011, 7 May 2013, 19 June 2013
Other Relevant Information	

3. Summary of Engineer	ing Assessment Methodology and Key Parameters Used	
Occupancy Type(s) and Importance Level	Offices, Importance Level 2 (IL2) building	
Site Subsoil Class	D	
For an ISA:		
<ul> <li>Summary of how Part B was applied, including:</li> <li>Key parameters such as μ, Sp and F factors</li> <li>Any supplementary specific calculations</li> </ul>		
For a DSA:		
Summary of how Part C was applied, including: • the analysis methodology(s) used from C2 • other sections of Part C applied	An initial displacement based review has been carried out utilising a Concrete NZ Learned Society speadsheet.	
Other Relevant Information		

<sup>15829 – 10</sup> May 2018 – Seismic Review: Northland Regional Council – 36 Water Street, Whangarei

4. Assessment Outcomes		
Assessment Status (Draft or Final)	Final	
Assessed %NBS Rating	60% NBS (IL2) at present	
Seismic Grade and Relative Risk (from Table A3.1)	С	
For an ISA:		
Describe the Potential Critical Structural Weaknesses		
Does the result reflect the building's expected behaviour, or is more information/ analysis required?		
If the results of this ISA are being used for earthquake prone decision purposes, and elements rating <34%NBS have been identified:	Engineering Statement of Structural Weaknesses and Location	Mode of Failure and Physical Consequence Statement(s)
For a DSA:		
Comment on the nature of Secondary Structural and Non-structural elements/ parts identified and assessed	The stairs are steel framed and are expected to have some ductility. They will be reviewed as part of the strengthening design. Non-structural elements are being reviewed as a separate report. The gaps between the façade panel has caused the available drift to be limited.	
Describe the Governing Critical Structural Weakness	Potential of pounding between buildings. Gaps between the panels too small. Stirrup spacing on columns too wide. Drift limited.	
If the results of this DSA are being used for earthquake prone decision purposes, and elements rating <34%NBS have been	Engineering Statement of Structural Weaknesses and Location	Mode of Failure and Physical Consequence Statement(s)

identified (including Parts)	
Recommendations (optional for EPB purposes)	To achieve a score of over 67%NBS then strengthening works will be required. These could be braces to reduce the deflections or strengthening of the columns.

ITEM: 3.5 Attachment 2

Appendix B

**Photos** 





15829 – 10 May 2018 – Seismic Review: Northland Regional Council – 36 Water Street, Whangarei





15829 – 10 May 2018 – Seismic Review: Northland Regional Council – 36 Water Street, Whangarei





15829 – 10 May 2018 – Seismic Review: Northland Regional Council – 36 Water Street, Whangarei



15829 – 10 May 2018 – Seismic Review: Northland Regional Council – 36 Water Street, Whangarei



File: 11063

22 May 2013

The Manager Northland Regional Council Private Bag 9021 WHANGAREI 0148

Attention: Mr Malcolm Nicholson

Dear Malcolm

Seismic Capacity of Council Office Buildings Water Street Whangarei

Further to our reporting of 7 May 2013 we write to give some perspective on risk to life safety arising from working in the building. Our investigation and report noted that between the time of design and today there have been changes to the ductility detailing requirements with the result that the original 1985 design achieves a low percentage of New Building Standard (NBS) with respect to seismic capacity. The minimum percentage of NBS capacity arrived at is based on the assessment of ductility achieved. Originally the building was designed to be <u>fully ductile</u> which would imply a ductility factor of 3 plus. Since the columns reinforcement does not meet NBS our analysis has conservatively used a ductility factor of 1.25 which is the code value for <u>nominal</u> ductility. In fact the building will probably achieve somewhere between these values and if it were considered to have <u>limited ductility</u> then the capacity achieved would be 42% of NBS.

When considering the life safety risks to your building and occupants arising from an earthquake, it is useful to look at how similar buildings fared in the Christchurch earthquake. The Structural Engineering Society SESOC has issued an interim design guide following investigation into the performance of conventional structural systems in Christchurch. This guide notes that Moment Resisting Frame (MRF) Building designed in the 1980 "performed as expected "and "Capacity design principles appeared to work well with damage concentrated in beam hinges as expected". There were no collapses of MRF buildings but many have experienced irreparable damage. It is of note that the earthquakes experienced were up to a 1 in 2,500 year event while the building code specifies a design level of 1 in 500 year event for most buildings. It is also relevant that the detailing provisions for minimum bar size and spacing are applicable New Zealand wide although Northland is recognized as having lower seismicity. This lower seismicity is recognized in the severity of the code prescribed earthquakes but not the detailing provisions.

To summarise, while the building does not comply with New Building Standard there is no reason to suspect that it would suffer catastrophic failure in the event of an earthquake. The risk to life safety from its continued use is statistically much less than other everyday risks which we accept for instance driving motor vehicles.

Yours sincerely

**Grant Stevens** 

Richardson Stevens Consultants (1996) Ltd

2 Seaview Rd, Whangarei 0110, Ph 09 438 3273, Fax 09 438 5734, email engineers@richardsonstevens.co.nz



## TITLE: Business with the Public Excluded

#### **Executive Summary**

The purpose of this report is to recommend that the public be excluded from the proceedings of this meeting to consider the confidential matters detailed below for the reasons given.

#### Recommendations

- 1. That the public be excluded from the proceedings of this meeting to consider confidential matters.
- 2. That the general subject of the matters to be considered whilst the public is excluded, the reasons for passing this resolution in relation to this matter, and the specific grounds under the Local Government Official Information and Meetings Act 1987 for the passing of this resolution, are as follows:

Reasons/Grounds
The public conduct of the proceedings would be likely to result in disclosure of information, the making available of the information would be likely to prejudice the maintenance of the law, including the prevention, investigation, and detection of offences, and the right to a fair trial s6(a) and the withholding of which is necessary to protect the privacy of natural persons, including that of deceased natural persons s7(2)(a).

#### **Considerations**

#### 1. Options

Not applicable. This is an administrative procedure.

#### 2. Significance and Engagement

This is a procedural matter required by law. Hence when assessed against council policy is deemed to be of low significance.

### 3. Policy and Legislative Compliance

The report complies with the provisions to exclude the public from the whole or any part of the proceedings of any meeting as detailed in sections 47 and 48 of the Local Government Official Information Act 1987.

### 4. Other Considerations

Being a purely administrative matter; Community Views, Māori Impact Statement, Financial Implications, and Implementation Issues are not applicable.