New Zealand
Heritage Properties Ltd
Investing In Our Heritage

Invercargill Central Redevelopment

Addendum to Woods, Cropper, Mearns, Mitchell, McStay and Cawte 2018. Heritage Impact Assessment of Block II, Town of Invercargill

Report Prepared for Bonisch Consultants

Author: Dr Naomi Woods and Dr Dawn Cropper
Reviewed by: Dr Hayden Cawte

Submitted: January 2019

New Zealand
Heritage Properties Ltd
Investing In Our Heritage

Invercargill Central Redevelopment

Addendum to Woods, Cropper, Mearns, Mitchell, McStay and Cawte 2018. Heritage Impact Assessment of Block II, Town of Invercargill

Report Prepared by:
New Zealand Heritage Properties Ltd
Salisbury House | 106 Bond Street | Dunedin
T 03 477 3933 | F 03 477 3928 | E info@heritageproperties.co.nz
www.heritageproperties.co.nz

Project Details

Archaeological Site No.	**E46/45, E46/67, E46/68, E46/69, E46/70, E46/71, E46/72, E46/73, E46/74, E46/75, E46/76, E46/77, E46/78, E46/79, E46/80, E46/81, E46/82, E46/83 and E46/84**
Site Address	For address and legal description refer to Table 3-1
Client	Bonisch Consultants
Client Contact	Boyd Wilson
Client Address	19 The Crescent, PO Box 1262, Invercargill 9840
Report Authors	Dr Naomi Woods and Dr Dawn Cropper
Report Reviewer	Dr Hayden Cawte
Report Submitted	January 2019
Report Submitted To	Bonisch Consultants

Ownership and Disclaimer

Cover Photo: Anon. c.1900. *Esk Street, Invercargill.* Te Papa.

Abbreviations

Abbreviation	Definition
ANZ	Australia and New Zealand Banking Group
BNSW	Bank of New South Wales
BNZ	Bank of New Zealand
CBD	Central Business District
ICC	Invercargill City Council
ICOMOS	International Council on Monuments and Sites
HIA	Heritage Impact Assessment
HNZPT	Heritage New Zealand Pouhere Taonga
NZAA	New Zealand Archaeological Association
NZHP	New Zealand Heritage Properties Ltd.
RMA	Resource Management Act (1991)
SoRDS	Southland Regional Development Strategy

Table of Contents

List of Figures

1 Introduction

In 2018, New Zealand Heritage Properties Ltd (NZHP) completed a Heritage Impact Assessment (HIA) for the Invercargill Central redevelopment project covering Block II, Town of Invercargill. The report (Woods et al., 2018), considered the effects of the initial design plans proposed by HWCP Management Ltd on the heritage assets within the block.

The report recommended that the proposed development should proceed, subject to appropriate mitigation measures, including the retention of four heritage façades (the Southland Times, Coxhead's Building, Thompson's Building and Fairweather's Building), protection of the retained façades and Bank of New South Wales during the demolition and construction process, detailed recording of heritage buildings to be demolished, salvage of heritage fabric for reuse, dissemination of information gathered during the archaeological investigations to the public upon completion, strengthening of surviving heritage resources (the Bank of new South Wales) and the *in situ* preservation of archaeological remains where possible.

NZHP has been commissioned to complete this addendum report by Bonisch Consultants on behalf of the HWCP Management Ltd, in light of revisions to the development plans following feedback received during resource consent notification proceedings. The previous report (Woods et al., 2018) outlines the key background, legislation, methodology, building history and heritage values and as such these will not be covered again here. This addendum considers only the effects of the revised development plans upon heritage values, on the basis of the feedback received, as well as the completed architectural plans, including the merits of the project, and provides recommendations for the effective mitigation of those effects. This report considers all effects for the project here to avoid referencing the effects across two reports. Thus, some effects are not changed; however, are included again verbatim for ease of reference.

1.1 Project Background

HWCP are proposing to re-invigorate Invercargill's inner city by redeveloping a key city block. HWCP was established in 2017 with the aim of advancing the key transformational projects in the Southland Regional Development Strategy (SoRDS) Action Plan (SoRDS, 2015). The company is a joint venture between HWR Property Limited and Invercargill City Property Limited. HWR is a part of H W Richardson Group Limited, a privately-owned national transport company, and Invercargill City Property Limited is part of Hodco, an investment enterprise owned by the Invercargill City Council (ICC).

HWCP propose to revitalise the block bounded by Tay, Dee, Esk and Kelvin Streets, providing Invercargill's residents with an innovative retail, commercial and residential development. Despite its prominent location at the corner of Invercargill's two main thoroughfares, Tay and Dee Streets, the block has seen a gradual decline in occupancy rates with a concomitant deterioration of its heritage buildings. The Invercargill Central redevelopment will extend across the entire city block, with the exception of the Kelvin Hotel and Reading Cinema and will see the construction of an innovative building that will incorporate a new HWR head office tower that contains offices and apartments, a second office precinct, a medical centre, an upscale food court/restaurant space, a shopping centre with a major anchor retail tenant, public space and covered parking for 850-900 vehicles. Not only will this development bring in hundreds of jobs into Invercargill in the short term, but it aims to bring an additional 1500 people into the CBD on a daily basis, which will in turn provide economic benefit to the surrounding community.

The location of the Invercargill Central redevelopment is key to its success, being at the heart of Invercargill's central business district; however, this area is also the longest continuously occupied area of the city with many important heritage and archaeological resources. Heritage New Zealand Pouhere Taonga (HNZPT) has recognised the significance of four buildings within the block, including the former Bank of New South Wales (Category 1), the Southland Times (Category 2), the Lewis & Co Building (Category 2), and the Newburgh Building (Category

2). The ICC has recognised a further 16 buildings in the District Plan as having local heritage significance. Both the listed and scheduled buildings are included in the District Plan Heritage Register, which affords them protection to varying degrees under the Heritage Rules. In addition, there are 20 archaeological sites within the block, which are protected under Heritage New Zealand Pouhere Taonga Act 2014.

Buchan Group are the architects behind the design, and they have considered the block's heritage in their design. The redevelopment will showcase the preeminent heritage building on the block, the former Bank of New South Wales, and seeks to retain the façades of three heritage buildings including one Category 2 building, the Southland Times (67 Esk Street), and two buildings of local significance, Coxhead's Building (31-35 Esk Street) and Cambridge Arcade (59-61 Esk Street). All other structures within the project area will be demolished.

New Zealand Heritage Properties (NZHP) has been engaged by Bonisch Consultants on behalf of HWCP to assess the impacts of the finalised redevelopment plans on heritage and archaeological resources following the resource consent notification process. Over the course of this assessment, NZHP have worked closely with HWCP to ensure that the connection with the past is not lost with the redevelopment. The loss of almost an entire inner-city block that has been occupied since Invercargill was established will have unavoidable and extreme impacts on the Invercargill townscape. Exhaustive research has been undertaken on all affected properties and standardised methods used to identify and assess the archaeological and heritage significance of each building and site as part of a previous HIA (Woods et al., 2018). These heritage significance assessments have then been used to inform the magnitude of the effects of the updated development plans on each site and the block as a whole, and recommendations made for ways to minimise and mitigate the loss of cultural heritage. The following sections are taken directly from Woods et al (2018) and have been included here as they are relevant for assessing the effects of the updated plans.

1.1.1 Seismic Assessments[1]

BMC have evaluated all buildings within the project area to determine their seismic rating, and the rating for each building is provided in Figure 1-1. BMC (pers. com. 2018) have provided the following explanation of the New Build Standard and the implications for the heritage buildings in the project area.

> The seismic rating of a building is expressed as percentage of New Build Standard (%NBS) for the appropriate building importance level (IL2). This is defined as the degree to which the building structure complies with the earthquake strength requirements of a new Building Code compliant building of similar size and form in the same location. Note for buildings that were built in NZ prior 1932, there was no requirement to take account of any earthquake loading. Today the requirement is significant and updated regularly as new earthquake events add to the empirical data for a given location. Many of the Invercargill CBD block buildings were constructed pre-1932.
>
> An 'earthquake prone' building is considered to be one which in the event of a moderate earthquake (considered to be an earthquake that is 33% of a design or Code Ultimate Limit State (ULS) event), would reach capacity of the primary structural elements resisting the earthquake load and as a result has the potential to collapse in part or wholly, causing injury or fatality.
>
> The NZ Society of Earthquake Engineers (NZSEE) is considered to be the learned society relating to building earthquake matters and is a primary contributor to related building standards and regulations. The following table from NZSEE publications sets the bands of building ratings that are typically used in describing the seismic life safety risk of a building that has been seismically assessed.

[1] Taken from Woods et al (2018)

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

The majority of the buildings on Block II fall into the medium to high risk categories and are less than 33% of NBS (Figure 1-1). Only two of the assessed buildings (the MLC building and the Southland Times Press Hall) are classed as Grade A structures, while another two (Kingsland's shop and MacDonald's Building) are Grade B, and four modern buildings (ANZ, Hannahs, Cart's and Allot and Eunson's Building) are Grade C. The remaining structures fall into Grade D or E and as such would require significant seismic strengthening if they were to be retained. In many cases, the required strengthening would result in significant loss of heritage features, fabric and value and thus would negate the value of retention.

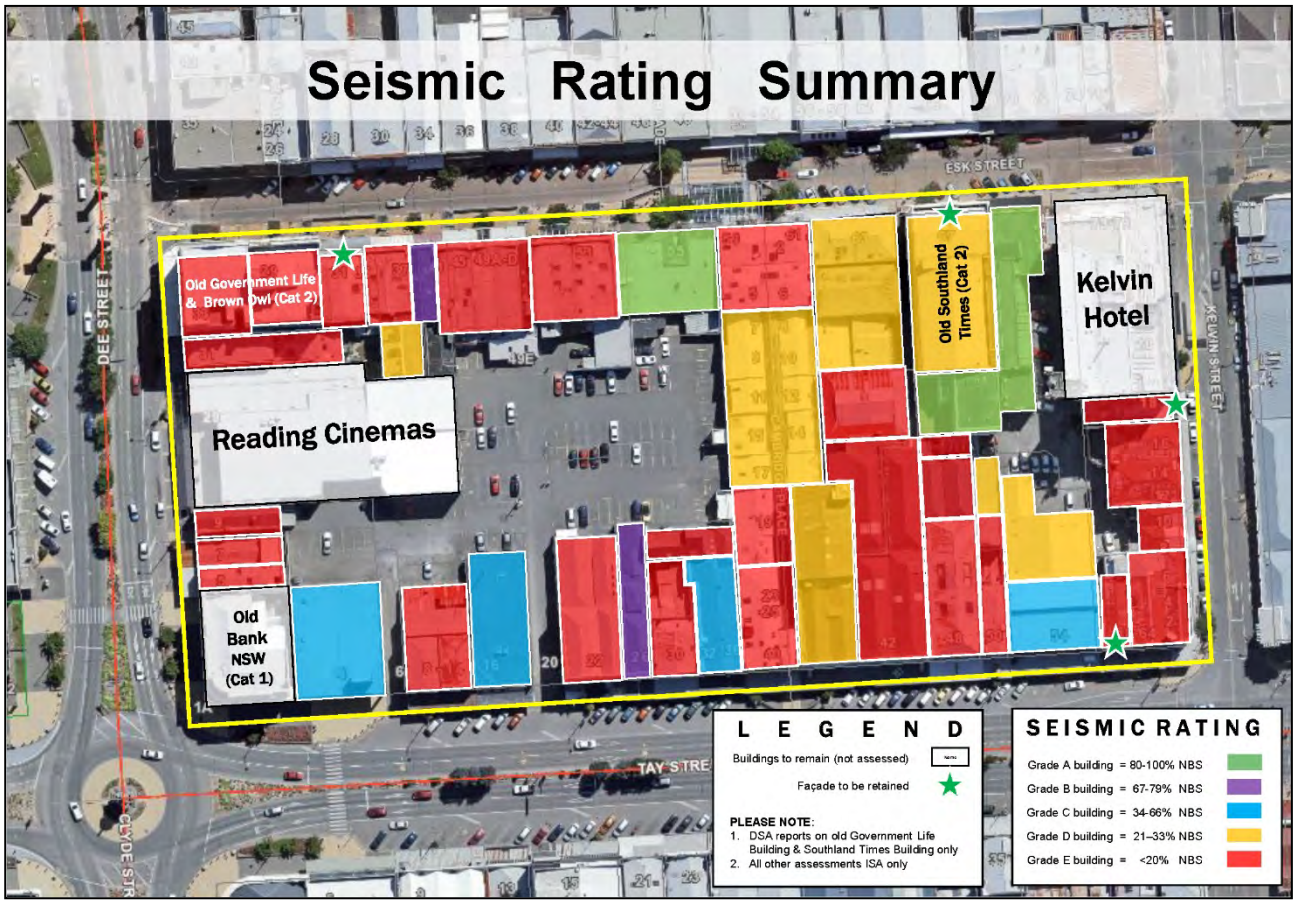


Figure 1-1. Seismic rating summary (BMC, 2018).

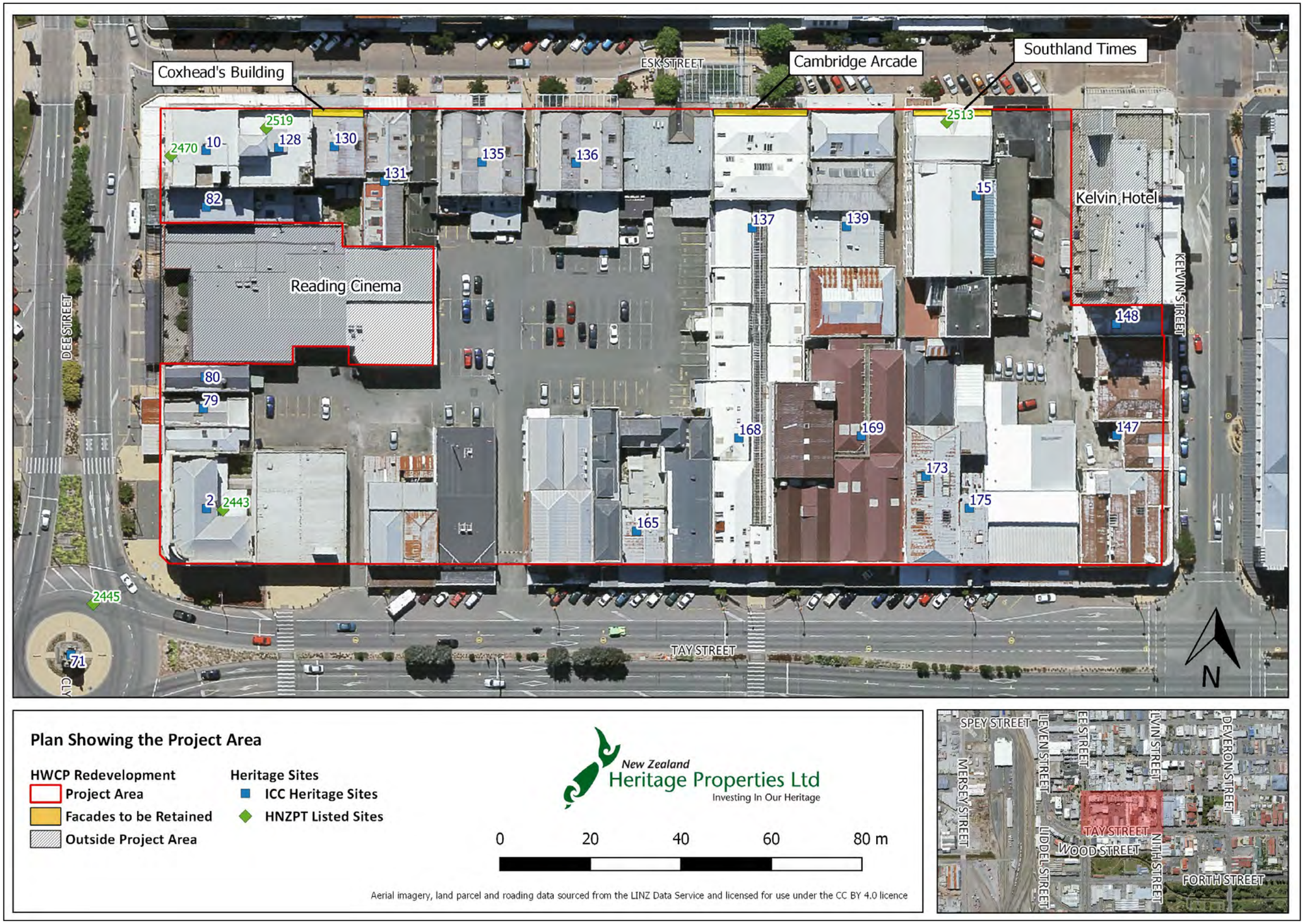


Figure 1-2. Location of project area with facades to be retained and heritage sites.

1.1.2 The Construction Phase[2]

Plans for the construction phase have yet to be finalised; however, the process is expected to follow the same staging plan as the demolition phase. Each site will be cleared of all archaeology prior to the construction phase and the protection measures for the retained heritage assets described above will continue to be implemented throughout this phase of works. The design statement prepared by Buchan Group can be found in Appendix A.

[2] Taken from Woods et al (2018)

2 Methodology

In creating this addendum report, only the assessment of effects in light of the presence of finalised plans was required. Accordingly, no site history or reassessment of heritage values was undertaken, instead, values and background was drawn from the 2018 HIA (Woods et al., 2018).

In understanding the effects, mitigation options are considered and proposed. The extent of this mitigation is in light of the effect to heritage values. Determining the level of mitigation required when identified heritage values are high or significant and the loss or effect of a proposed development is complete, is notoriously difficult. Assigning monetary value to a largely intangible asset is also notoriously difficult.

Non-physical heritage elements can more easily be mitigated within a new development by ensuring connection to space and place, people and history. Where loss of physical elements is absolute and that loss cannot be accommodated or mitigated within the same site, ie. the retention of physical heritage elements at that site, then offsite measures are considered.

3 Assessment of Effects

HWCP propose to redevelop a central inner-city block to create a central retail and commercial hub that has been identified as a key requirement for Invercargill. The proposed redevelopment will see significant changes to Block II and the loss of heritage and archaeological resources. Within the project area, there are four buildings listed with HNZPT as well as 16 buildings and street furniture (verandah posts) identified on the district plan as having heritage significance. In addition, 16 of the buildings within the project area were constructed prior to 1900, and the entire block, apart from Town Section 9, shows evidence of having been occupied during the nineteenth century; thus, these properties and buildings are considered archaeological sites and are protected under the Heritage New Zealand Pouhere Taonga Act 2014. Table 3-1 below summarises the intentions for each building within the project area, the status of those activities based on the ICC District Plan Heritage Rules and under the Heritage New Zealand Pouhere Taonga Act 2014. The distribution of heritage and archaeological buildings is presented in Figure 3-1.

The following section considers the effects of the proposed redevelopment on built heritage using the methods outlined in Section 3.3 of Woods et al (2018). The assessment of effects considers the level of significance (as defined for each item in Section 6 of Woods et al (2018)) and the magnitude of the impacts against the heritage values to provide a determination of the significance of effects. The effects on heritage values may be adverse, neutral, or beneficial, with demolition of a structure constituting a major adverse effect and façade retention being a moderate adverse effect. The proposed actions are evaluated according to the district plan rules, identifying whether the actions are non-complying, discretionary, restricted discretionary, or permitted (for clarification of these activities, please refer to Section 2.1 of Woods et al (2018)). The effects are then considered against best practice recommendations, the importance of the buildings or structures, their condition, potential for alternative use, and the benefits of the redevelopment.

The ICC District Plan includes all HNZPT Category 1 and 2 listed heritage items on Appendix II.2 of the Heritage register, buildings of local significance are included on Appendix II.3, and significant street furniture is included on Appendix II.4. The proposed redevelopment seeks to retain the façade of the Southland Times Building (Category 2) as well as the façades of the Cambridge Arcade and Coxhead's Building (Appendix II.3). The remaining listed and scheduled heritage buildings and all street furniture will be removed. Additionally, Rule 3.8.10 outlines the matters that must be considered in applications to the Council under Rules 3.8.6 to 3.8.9 to the council. The ICC also exercise discretion for applications to alter facades of locally significant buildings.

An archaeological authority is required to demolish any pre-1900 building and to undertake earthworks that may encounter subsurface archaeology. As such, the partial demolition of a structure does not trigger requirements under the Heritage New Zealand Pouhere Taonga Act 2014. Typical conditions of an archaeological authority include recording of pre-1900 buildings that will be demolished, archaeological monitoring during building demolition and earthworks, recording archaeological features, artefact and faunal analysis, and the preparation of a detailed report on the results of all work. It is important to note that archaeological recording is a requirement of the authority and does not constitute mitigation.

The following assessment of effects is divided into five sections that consider the proposed activities against the rules of the District Plan and the Heritage New Zealand Pouhere Taonga Act 2014. The activities include full demolition of a heritage building (including listed and scheduled buildings), façade alterations to listed and scheduled buildings, removal of street furniture, indirect effects on existing heritage structures, and potential effects on built and subsurface archaeology. Mitigative measures that may help to minimise the impacts of the proposed development are proposed in Section 3.1.

Table 3-1. Summary of buildings within the project area and intended activities.

Historical Background					Heritage and Archaeological Protection		Proposed Activity and Status under the District Plan		Assessment of Effects on Heritage Values			Assessment of Effects on Archaeology	
Arch Site	Building Name	Street Address	Date Completed	Architect	Heritage Protection Status	HNZPT Act 2014	Proposed Activity	District Plan Rule (activity)	Significance	Magnitude of Impact	Assessment of Effects	Effect on Built Archaeology	Effect on Subsurface Archaeology
E46/67	Smith's	31 Dee Street	1875	Angus Kerr	ICC DP	Building & subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	Demolition of a pre-1900 building	yes
	Newburgh	33 Dee Street	1929	Benjamin Ager	HNZPT List (Category 2), ICC DP	Subsurface	demolition	3.8.9 (non-complying)	Medium	Major adverse	Moderate-large	-	
	Lewis & Co.	29 Esk Street	1914	Edmund Anscombe & Henry McDowell Smith	HNZPT List (Category 2), ICC DP	Subsurface	demolition	3.8.9 (non-complying)	High	Major adverse	Large-very large	-	
E46/68	Coxhead's	31-35 Esk Street	1875	F W Burwell	ICC DP	Building & subsurface	façade altered	3.8.8 (restricted discretionary)	Medium	Moderate adverse	Moderate	Partial demolition of a pre-1900 building	
	Martin, Maitland & Co.'s	37 Esk Street	1877	F W Burwell	ICC DP	Building & subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	Demolition of a pre-1900 building	yes
	MacDonald's	41 Esk Street	1873	Angus Kerr	n/a	Building & subsurface	demolition	n/a (permitted)	Low	-	-	Demolition of a pre-1900 building	
E46/69	Temple Chambers	45-49 Esk Street	1881	Angus Kerr	ICC DP	Building & subsurface	Demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	Demolition of a pre-1900 building	yes
E46/70	NZIC	51-53 Esk Street	1884	Edmund R Wilson	ICC DP	Building & subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	Demolition of a pre-1900 building	yes
E46/71	MLC	55 Esk Street	1983	Mitchell & Mitchell and Partners	n/a	Subsurface	demolition	n/a (permitted)	Low	-	-	-	yes
E46/72	Cambridge Buildings	40 Tay Street	1872	Unknown	ICC DP	Building & subsurface	Demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	Demolition of a pre-1900 building	yes
	Cambridge Arcade	59-61 Esk Street	1934	A C Ford	ICC DP	Subsurface	façade altered	3.8.8 (restricted discretionary)	Medium	Moderate adverse	Moderate	-	
E46/73	Nichol's	63 Esk Street	1929	A C Ford	ICC DP	Subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	-	yes
NA - TS 9	Southland Times	67 Esk Street	1909	Charles H Roberts	HNZPT List (Category 2), ICC DP	-	partial demolition	3.8.9 (non-complying)	Medium	Moderate adverse	Moderate	-	-
E46/74	Southland Times Press Hall	69 Esk Street	1981	L F Simpson	n/a	Subsurface	demolition	n/a (permitted)	Low	-	-	-	yes
	Allot and Eunson	54 Tay Street	1958	A G A Milne	n/a	Subsurface	demolition	n/a (permitted)	Low	-	-	-	
E46/75	Kelvin Hotel	20 Kelvin Street	1965	A G A Milne	n/a	Subsurface	retention	n/a (permitted)	n/a	-	-	-	yes
	Thompson’s	18 Kelvin Street	1913-1929	Unknown	ICC DP	Subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	-	
E46/76	Hotel Cecil	1-16 Kelvin Street, 60-64 Tay Street	1899	Unknown	ICC DP	Building & subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	Demolition of a pre-1900 building	yes
	Fairweather's	58 Tay Street	1884	Unknown	ICC DP	Building & subsurface	demolition	3.8.6 (discretionary)	Medium	Major adverse	Moderate	Demolition of a pre-1900 building	
E46/77	MacPac	48 Tay Street	1910	Edmund R Wilson	ICC DP	Subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	-	yes
	Zookeeper's Café	50 Tay Street	1916	Edmund R Wilson	ICC DP	Subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	-	
E46/78	Herbert Haynes & Co.	42 Tay Street	1885	Angus Kerr	n/a	Building & subsurface	demolition	n/a (permitted)	Low	-	-	Demolition of a pre-1900 building	
E46/79	Annie Ibbotson's	30 Tay Street	1933	C J Brodrick	ICC DP	Subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	-	yes
	Carter's	36 Tay Street	1973	n/a	n/a	Subsurface	demolition	n/a (permitted)	Low	-	-	-	yes
E46/80	Peters'	22 Tay Street	1881	McKenzie, Ridley & Co.	n/a	Building & subsurface	demolition	n/a (permitted)	Low	-	-	Demolition of a pre-1900 building	yes
	Kingsland's Shop	26 Tay Street	1887	Unknown	n/a	Building & subsurface	demolition	n/a (permitted)	Low	-	-	Demolition of a pre-1900 building	
E46/81	Hannahs	16-18 Tay Street	1969	L F Simpson	n/a	Subsurface	demolition	n/a (permitted)	Low	-	-	-	yes
E46/82	Watson's	8-14 Tay Street	1877	Unknown	n/a	Building & subsurface	demolition	n/a (permitted)	Low	-	-	Demolition of a pre-1900 building	yes
E46/83	ANZ	4 Tay Street	1969	Sargent and Smith and Partners	n/a	Subsurface	demolition	n/a (permitted)	Low	-	-	-	yes
E46/84	Lumsden's	9 Dee Street	1872	Unknown	ICC DP	Building & subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	Demolition of a pre-1900 building	yes
	Barham's	7 Dee Street	1873	Unknown	ICC DP	Building & subsurface	demolition	3.8.6 (discretionary)	Low	Major adverse	Moderate	Demolition of a pre-1900 building	
	Ott's	5 Dee Street	1875	Angus Kerr	n/a	Building & subsurface	demolition	n/a (permitted)	Low	-	-	Demolition of a pre-1900 building	
	BNSW	1 Dee Street	1904	C J Brodrick	HNZPT List (Category 1), ICC DP	Subsurface	no alteration	NA	High	-	-	-	no

Figure 3-1. Plan showing listed, scheduled, and pre-1900 buildings.

3.1 Full Demolition of Heritage Buildings

The current plans for the inner-city redevelopment propose to demolish two Category 2 listed buildings, the Lewis & Co Building and Newburgh Building, and 14 buildings that have been identified as having local significance. According to the District Plan, the demolition of a building on Appendix II.2 is a non-complying activity (Rule 3.8.9), and the demolition of a building on Appendix II.3 is a discretionary activity (Rule 3.8.6).

According to the ICOMOS NZ charter, the setting of a place is a vital component of its cultural heritage value, and where possible the nature and character of the setting (in this case the streetscape) should be maintained during redevelopment if at all possible (ICOMOS, 2010). Block II, like the wider CBD of Invercargill, is presently characterised by buildings in a variety of period styles, most of which are between one and three-storeys tall except for larger anchor buildings on the corners. When considering designs for the proposed redevelopment this character should be taken into account and retained where possible to ensure the new buildings sit well within the broader townscape and add to, rather than contrast, the setting.

3.1.1 Demolition of a Listed Building

The proposed inner-city redevelopment will see the complete demolition of two Category 2 listed buildings, the Lewis & Co Building and the Newburgh Building, that are collectively referred to as the Government Life Building. NZHP has assessed the Lewis & Co Building to have high overall significance and the Newburgh Building to have moderate significance. Using the criteria outlined in Section 3.3 of Woods et al (2018), the physical loss of these heritage buildings constitutes a major adverse effect; therefore, the overall level of significance of effects on the heritage values is determined to be large (Table 3-2).

Table 3-2. The significance of effects on the Lewis & Co and Newburgh Buildings.

Heritage Value	Magnitude of Impact				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate-Large	Large-Very Large	Very Large
High (Lewis & Co)	Neutral	Slight	Moderate-Slight	Moderate-Large	Large-Very Large
Medium (Newburgh)	Neutral	Neutral-Slight	Slight	Moderate	Moderate-Large
Low	Neutral	Neutral-Slight	Neutral-Slight	Slight	Slight-Moderate
Negligible	Neutral	Neutral	Neutral-Slight	Neutral-Slight	Slight

Category 2 listed buildings are automatically included in Appendix II.2 of the District plan, and the demolition of any building listed in Appendix II.2 is a **non-complying activity** (Rule 3.8.9). Applications to council must address the matters listed in Rule 3.8.10. As such, there must be significant justification for the demolition of the building, and merits of the development alone are not enough to warrant the demolition of listed buildings.

The importance of these buildings has been recognised by HNZPT, and the previous research undertaken by NZHP has confirmed that these buildings are architecturally significant, representing two rare examples of early Commercial style architecture in Invercargill. The Lewis & Co Building is considered to have greater heritage significance than previously identified based on its architectural, cultural, historical, and technological values; thus, it is considered to have high overall significance, while the Newburgh Building is considered to have a medium level of significance.

Currently, only the ground floor of the buildings is occupied, and the first through fourth floors have been vacant from at least the 1990s. When buildings are vacant, even for a short period, they suffer and become vulnerable to decay, which poses a threat to the building itself but also has a detrimental effect on the amenity value of the neighbourhood. This certainly is the case for the Lewis & Co Building and the Newburgh Building where there has been considerable water ingress and a pigeon infestation.

A detailed seismic assessment was undertaken of the two buildings. The Newburgh Building was determined to have a capacity of 10 to 15% of the New Building Standard (NBS) (BMC, 2018a), and of particular concern, BMC (2018a) identified that "the building has exceeded its life expectancy and is likely to rapidly deteriorate" based on

the assessment of the concrete strength (found to be low) and spalling identified throughout the building. At least one mullion in the Newburgh Building has failed due to environmental effects and the low concrete strength, and the spandrel beams and other structural elements will also fail in time without remedy. The seismic assessment concludes that the building cannot be "repaired or strengthened without the loss of most of the heritage fabric and values of the building" (BMC 2018). As such, the value of strengthening the building would be lost if heritage fabric could not be retained. The Lewis & Co Building was found to have a capacity of 10 to 20%NBS, largely due to the out-of-plane eastern unreinforced masonry wall and the parapet (BMC 2018a). The capacity of the east wall could be increased to 40 to 50% NBS by introducing diaphragm action.

BMC have identified that the Newburgh Building and Lewis & Co Building are structurally connected by a party wall between them (BMC, pers. com. 2018). Demolition of the Newburgh Building is considered the most practical approach due to the condition and low seismic capacity. Retention of the Lewis & Co Building would:

- require significant temporary works and be very difficult to practically achieve.
- have an uncertain outcome. During demolition, a point could be reached where the retention may need to be abandoned.
- require the demolition to occur from State Highway 6 (Dee Street) and Esk Street. This would effectively close both streets for the duration of the demolition. This could be up to four weeks of disruptions during the demolition process.
- increase the risk of an element falling on to the adjacent cinema.
- require all demolition traffic and rubble removal to use State Highway 6 or Esk Street creating further significant disruption.

While there are actions that could be taken to strengthen this building, there are constraints around the demolition of the Newburgh Building that will also necessitate the demolition of the Lewis & Co Building. Despite the significance of these two buildings, their condition is such that it warrants their demolition. The condition has negated further investigations for adaptive reuse of the building, and no alternative strategies have been explored to date.

The architectural design has respected the significance and function of these two listed buildings, and the proposed new building (HWR Tower) will have a similar mass and impact on the streetscape (Figure 3-2 and Figure 3-3), following the design guidelines. The ground floor is intended to be prime fashion retail, which is an important consideration and creates a historical link with Lewis & Co, which operated from this location from at least 1872. The upper levels will include office accommodation with penthouse apartments on the top floor.

Figure 3-2. Artist's impression of the proposed HWR Tower that will replace the Newburgh and Lewis & Co Buildings (image courtesy of Buchan Group, December 2018).

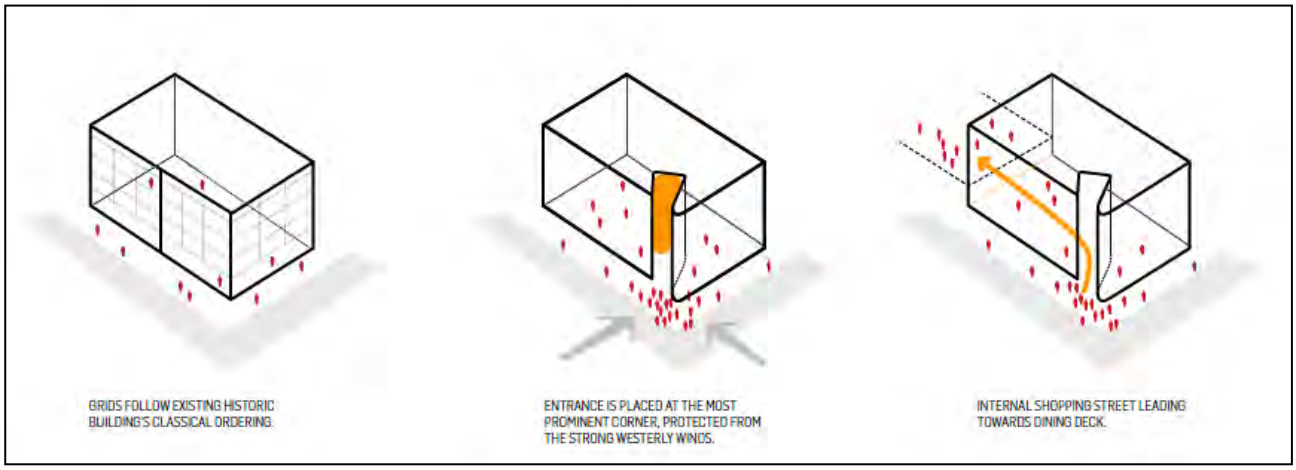


Figure 3-3. Consideration of proposed building that will replace the Newburgh and Lewis & Co Buildings (image courtesy of Buchan Group, December 2018).

Recommendations: The proposed demolition of the Lewis & Co Building (29 Esk Street) and the Newburgh Building (33 Dee Street) constitutes a non-complying activity under Rule 3.8.9 and will have a major adverse effect on the heritage values. The poor condition of the Newburgh Building means that strengthening and adaptive re-use is not feasible without the loss of heritage fabric, and without this fabric, the connection to its heritage values are all but lost. The demolition of the Newburgh Building also necessitates the loss of the adjacent Lewis & Co Building, where adaptive re-use may have been better-suited. On the balance of this evidence, the significant loss of heritage can be mitigated with measures outlined in Section 4 including the recording of each building to a Level III standard, prior to demolition, as per the Heritage New Zealand guidelines for the recording of built structures

(HNZPT, 2018). Therefore, NZHP recommends that demolition of these buildings be consented subject to mitigation measures.

3.1.2 Demolition of a Scheduled Building

The inner-city redevelopment proposes to demolish 14 buildings that are scheduled on Appendix II.3 of the District Plan as buildings of local significance, which will result in the physical loss of these locally significant heritage buildings and constitutes a major adverse effect. On an individual basis, all but one of the buildings identified for demolition have been assessed by NZHP to have a low overall level of significance, due to the fact that they are significant only on a local level. As such, the overall level of significance of effects on the heritage value for each building is determined to be moderate (please refer to Table 3-1). The exception is Fairweather's Building (58 Tay Street) which was assessed as having a medium level of significance based on the integrity of the façade and its key contributing role to the character of the north Tay Street streetscape; therefore, the significance of effects for this activity are deemed to be slight to moderate for all buildings apart from Fairweather's Building, where the redevelopment will have moderate to large effect (Table 3-3).

Table 3-3. The significance of effects of the partial demolition of buildings scheduled on Appendix II.3.

Heritage Value	Magnitude of Impact				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate-Large	Large-Very Large	Very Large
High	Neutral	Slight	Moderate-Slight	Moderate-Large	Large-Very Large
Medium (Fairweather's)	Neutral	Neutral-Slight	Slight	Moderate	Moderate-Large
Low	Neutral	Neutral-Slight	Neutral-Slight	Slight	Slight-Moderate
Negligible	Neutral	Neutral	Neutral-Slight	Neutral-Slight	Slight

The demolition of a scheduled building is a discretionary activity under Rule 3.8.6 of the district plan, and it requires the matters listed in Rule 3.8.10 to be addressed. As with any heritage building, there must be significant justification for its demolition, and merits of the development alone are not enough to warrant the demolition of scheduled buildings. The importance of the buildings, their condition, potential for alternative use, and the benefits of the redevelopment are considered against the proposal to demolish these buildings.

On an individual basis, these buildings have been recognised previously as items of local significance, and this is supported by the findings in Woods et al (2018) with one exception. Fairweather's Building is identified as having moderate overall significance, as its Neoclassical façade is largely intact and seen as a key contributor to the heritage character of the Tay Street streetscape. This building also has ties to Invercargill's first boot manufacturer Charles Fairweather who occupied this site from 1862 into the twentieth century and as such acts as a tangible link to Invercargill's early commercial history.

The condition of the buildings has been evaluated by BMC (Figure 1-1), and all heritage buildings are classed either Grade E (<20%NBS) or Grade D (21-33%NBS) and are considered to have a high to very high life-safety risk. Based on the evidence provided by BMC, any adaptive reuse of these buildings would necessitate strengthening measures. Consideration of adaptive reuse has not been undertaken, as even if the buildings were strengthened, they would not provide the appropriate space required by this type of redevelopment, leading to the application to demolish these buildings. Many of the buildings being considered for demolition are only partially occupied, or in some case entirely vacant, and are rapidly falling into disrepair. At least three of the buildings have portions that have been sealed for several decades, for example Smith's Building that has had no access to the first floor since the construction of the Newburgh Building in the 1920s, suggesting many have been unfit for purpose for a prolonged period. The demolition of these structures will clear valuable central city space for modern replacements that are more suitable for contemporary use and generally healthier places to live and work.

The scheduled buildings that will be demolished are distributed across the project area and will provide significant space for the construction of the various precincts. Buchan has carefully considered the loss of these heritage

buildings and their design respects the scale and mass of those buildings that will be lost to make way for the development and references that of the buildings on the surrounding streets.

Recommendations: The proposed redevelopment seeks to demolish 14 buildings that are scheduled on Appendix II.3 of the District Plan, which is a is a discretionary activity under Rule 3.8.6. An evaluation of the heritage values of these buildings has shown that 13 have low and one has medium heritage value. Based on this values assessment and the magnitude of the impact, the overall significance of effects is considered slight to moderate for all buildings apart from Fairweather's Building, where the redevelopment will have moderate to large effect. The buildings of local significance within Block II that are scheduled for demolition currently show a low rate of occupancy and are suffering from neglect (particularly the first floors). Some buildings have areas that have been sealed off for several decades, indicating they have been unfit for purpose for a prolonged period. The condition of the buildings indicates that each would require seismic strengthening to bring it up to acceptable building code. The heritage assessment survey identified that some heritage fabric remains in the first floors; although, the ground floors were nearly devoid of any original fabric. On the basis of all evidence, the loss of heritage in this category can be mitigated. NZHP recommends that the demolition of these buildings be consented with mitigative measures such as those presented in Section 4.

3.2 Façade Alterations and Partial Demolition

The inner-city redevelopment plans to incorporate the façades of three historic buildings into the new design, including one Category 2 building, the Southland Times (67 Esk Street), and two buildings of local significance: Coxhead's Building (31-35 Esk Street) and Cambridge Arcade (59-61 Esk Street). As these buildings will be partially demolished and alterations will be undertaken on their façades, these works trigger Rule 3.8.8 (alterations to a building on Appendix II.2) and Rule 3.8.4 (alteration to the façade of a building on Appendix II.3).

- **Rule 3.8.4** - in relation to buildings listed in Appendix II:3 Sites of Local Significance the following activities are restricted discretionary activities: (A) Any alteration or addition to the façade. (B) Any signage attached to the façade.
- **Rule 3.8.8** - Any alteration, addition and/or the attaching of any signage to any building, structure or place listed in Appendix II.2 Sites Registered by Heritage New Zealand Pouhere Taonga is a discretionary activity.

Rule 3.8.4 has specific matters over which the council has discretion, and Rule 3.8.10 documents that matters that must be considered in applications to the council.

ICC City Centre Design Guidelines promote the retention of façades to ensure the character of the area is maintained. Gray (1998) advocated for the retention of much of the original ornamentation as possible, replacement where it has been removed and for the use of sympathetic materials that match the original fabric. Colour schemes should consist of a base colour with two or three accent colours and should be appropriate to the era of construction. It is also recommended that verandahs be utilised but should not obscure windows or other architectural detail, and where possible, verandah posts should be used in keeping with the building's style (Gray 1998).

Retention of a building's façade as a purely aesthetic feature that does not relate to the structure behind it, also known as facadism (Curl, 2006), is one way to reduce the loss of heritage value. Those with interests in heritage tend to view this approach negatively and as an option chosen by developers as an afterthought (Bargery, 2005); and HNZPT have previously stated that facadism is not consistent with best practice (NZHPT, 2007). In many cases, the rest of the building is not fit for purpose and the retention of the façade is the best possible outcome, and it is undoubtedly a more positive outcome than the total loss of a heritage building. The main argument against this approach is that the façade becomes separated from and unrelated to what is behind it, an issue which is amplified if the new structure is of a totally different scale to its predecessor. Some schools of architecture view this as a positive, arguing that it makes a statement that the place is connected to the past but not restricted by it (Schumacher, 2010). It is also often the case that the façades chosen for retention are those viewed as most

aesthetically pleasing, while some that may be more representative of plainer vernacular architecture that better characterises an area are removed (the celebration of the "exceptional" rather than the everyday), leaving an inaccurate depiction of the street or area's past. This approach has been applied in Invercargill previously with mixed results, as identified by Farminer and Miller (2016) in their review of the city's built heritage. At 33 Leven Street, the façade of a Victorian building (Macaulay's Building) has been incorporated into the side of a large functionalist structure, currently occupied by Spotlight. The form of the newer building has not taken the façade into consideration other than its retention, and it appears marooned in a characterless sea of blank wall. The main entrance to the building have been moved to a different elevation, robbing the façade of its original purpose as the public focal point of the structure, and the windows and doors have been blocked. A more successful execution of this approach is represented by the buildings at 40-42 Esk Street, behind which are modern structures much better suited to their contemporary retail use than their predecessors, but that fit seamlessly with the retained façades, so much so that most passers-by are likely unaware they have been modernised at all.

The question that naturally follows is which buildings or façades deserve to be retained? As mentioned above, preference is generally given to those deemed to have the highest aesthetic value, and this would seem to align well with the ICC District Plan as its heritage provisions are entirely based upon the aesthetic qualities of buildings. There are strong arguments for this approach, chiefly that the retention of more "ordinary" façades and buildings reduces the value of heritage façades, and instead that only those possessing high levels of architectural skill should be considered for protection (Bargery, 2005). Invercargill has an incredibly strong architectural history, with many local architects going on to be influential on national and international scales, and as a result the heritage building stock is of a relatively high quality. Block II contains examples of the work of most of the best-known local architects (Burwell, C J Brodrick, A C Ford and L F Simpson), as well as some that are nationally significant (Edmund Anscombe and Henry McDowell Smith), so there is a plethora of choices if the main driver of heritage value and retention is architectural merit and representativeness. Those buildings or façades chosen for retention will inform future generations' ideas about Invercargill's past, and as such should be those that are most valued by residents in the present, regardless of the reasoning behind this value. As discussed in the previous section, those buildings currently selected for façade retention do fulfil this brief, however careful consideration must be given to how the retained façades are treated and incorporated into the new development.

3.2.1 Partial Demolition of a Listed Building (Façade Retention)

The proposed redevelopment includes the partial demolition of the Southland Times, a Category 2 building listed with HNZPT, with retention and modification of the façade. The partial demolition of a listed building constitutes a moderate adverse effect and will see the physical loss of the building apart from its façade. The Southland Times is considered to have moderate heritage value; thus, based on the magnitude of the impact and the level of significance, the overall significance of effects is considered to be moderate (Table 3-4).

Table 3-4. The significance of effects of the partial demolition of the Southland Times.

Heritage Value	Magnitude of Impact				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate-Large	Large-Very Large	Very Large
High	Neutral	Slight	Moderate-Slight	Moderate-Large	Large-Very Large
Medium	Neutral	Neutral-Slight	Slight	Moderate	Moderate-Large
Low	Neutral	Neutral-Slight	Neutral-Slight	Slight	Slight-Moderate
Negligible	Neutral	Neutral	Neutral-Slight	Neutral-Slight	Slight

Category 2 listed buildings are automatically included in Appendix II.2 of the District plan. While the façade will be retained, the majority of the building is to be demolished; thus, the proposed activity will fall under Rule 3.8.9 of the District Plan, and is considered a non-complying activity that requires the matters listed in Rule 3.8.10 to be addressed. The importance of the building, its condition, potential for alternative use, and the benefits of the redevelopment are considered against the proposal to retain the façade and demolish the remainder of the building.

The Southland Times is a Category 2 building listed with HNZPT, recognised for its architectural, historic and social value. The research conducted as part of Woods et al (2018) confirms the previous significance assessment, noting the well-preserved façade is an excellent example of early twentieth century Revival architecture. The 2018 assessment survey undertaken by NZHP identified that there is almost no original heritage fabric visible within the building due to numerous extensive alterations. The Southland Times relocated to their new premises at the end of 2015, and since this time much of the building has sat vacant, and even over this short time, neglect has begun to set in with overflowing buckets catching the drips off the leaking roof.

A detailed seismic assessment was undertaken by BMC (2018b), which identified that the building had been strengthened in 1986, but still is only considered to have a capacity of 20% NBS as the result of inadequate diaphragm connections. Strengthening work could be undertaken without the loss of heritage fabric to improve the capacity of the building, which would include remedying the inadequate diaphragm fixings, installation of framing to the effected parapets and the wall structure below the roof, installation of internal timber framing and wall ties into the second floor (BMC 2018b). The seismic assessment also identified the potential for retaining only the façade, which would require temporary support before being incorporated into the new design. With the proposed design advocating for façade retention only, BMC have developed specific instructions for the support of this façade to ensure its protection during the demolition and construction phase (please refer to Section 1.1.2).

Adaptive re-use of the building has been considered in the proposed redevelopment, but has been assessed as impractical. Firstly, much of the heritage fabric has already been lost from the interior of the building; as such, the benefit of retaining this space must be weighed against the costs of retention and strengthening and the benefits of the redevelopment. The raised floor level of the Southland Times in comparison with the remainder of the new build has also been identified as an issue in maintaining accessibility across the redevelopment, and its current height of three steps above grade has contributed to its vacancy. The costs of undertaking the work necessary for adaptive re-use of the 1908 building have also been considered and are prohibitive (See Appendix B for details).

The redevelopment seeks to retain the façade of the Southland Times and remove the remainder of the building, with the area behind the façade becoming part of the general retail space. The design will see the creation of a new central entryway at ground level, which references the original central doorway that was removed in 1948 and replaced by a window. Additionally, the double sash windows on the east side of the building will be altered to create a door, requiring the removal of the detail in the blind arch above window. The west doorway and the fanlight above will also be replaced. The design calls for the removal of the existing solid verandah over the doorway and the installation of a full width glass and steel replacement in line with the capitals of the columns flanking the doors and windows. The proposed design also sees the exposed brickwork redecorated in white and grey tones in order to highlight the façade, and new lighting will be installed to make it even more of a streetscape feature. The painting of the façade will reduce the heritage value as the building has always had an exposed brick façade; however, the use of paint rather than concrete render is a reversible treatment and as such the original appearance can be reinstated in the future if required, and NZHP supports this approach. The third floor was initially proposed to be open, resulting in a disconnect with the original function of the building and as such NZHP recommended that this aspect of the design be reconsidered. The design team took these recommendations into consideration and have now altered the design so that the new build will extend to the full height of the façade with retail space on the ground floor and commercial space on the floors above, thus retaining the building as a recognisable form.

The latest proposed changes to the Southland Times façade are in keeping with best practice for façade retention as advocated by HNZPT (2007b), and follow the ICC City Centre Design Guidelines (Gray, 1998). The ICOMOS NZ charter (2010) advocates for minimum intervention; as such, the proposed alterations to the building have the potential to have adverse cumulative effects on the heritage values of this façade. The design team have chosen their approach to highlight the Southland Times façade as a treasured heritage asset and contrast it against the surrounding modern buildings to emphasise the area's past whilst also embracing the present and future potential of Invercargill Central. The buildings on either side of the Southland Times have been designed to reference similar

datums and the building to the east reflects the mass of the old police station to provide a connection to the historic streetscape. The building to the west has been designed to mirror that on the east side in order to frame the retained Southland Times façade and highlight this heritage asset.

Figure 3-4. Artist's impression of the proposed alterations to the Southland Times Building (image courtesy of Buchan Group, December 2018).

Detailed plans will be developed prior to demolition to ensure the façade is supported during demolition. Typical examples are provided in Section 1.1.2.

Recommendations: The partial demolition of the Southland Times Building (67 Esk Street) and alterations to the façade constitutes a non-complying activity under the rules of the district plan and will have a moderate adverse effect on the heritage values. Retaining the façade will be beneficial to the redevelopment in that it will maintain part of a key historic building that has considerable architectural, cultural, and historic values. This façade will also provide architectural balance with that of Cambridge Arcade (59-61 Esk Street) and Coxhead's Building (31-35 Esk Street), which will also be retained on the Esk Street side of the block. NZHP supports the retention of the Southland Times façade; however, we recommend the alterations follow best practice standards of façade retention. According to guidelines developed by HNZPT for successful façade retention, a façade should retain original elements and detailing, the design should include at least one-room depth of the original structure, modifications above floor level should be avoided, and views to the sky should be avoided (NZHPT, 2007). NZHP has included recommendations to this effect and after discussion with the design team, they have since considered these recommendations including avoiding "views to the sky". Consideration has also been given to the mass of the buildings to either side of the Southland Times. The mass of the building to the east reflects that of the former police station rather than the current building so that the Esk Street frontage reflects the historic streetscape, while the mass of the building to the west has been increased to match to better frame the Southland Times façade. The design of the two neighbouring buildings uses similar datums to the Southland Times façade to provide a degree of continuation in this section of the streetscape. NZHP supports this design. NZHP recommends that the physical loss of the remaining parts of the building be offset by mitigative measures, as discussed in Section 4.

3.2.2 Partial Demolition of a Scheduled Building (Façade Retention)

The proposed redevelopment of Block II will incorporate the facades of two buildings scheduled on Appendix II.3 of the Heritage Register, including Coxhead's Building (31-35 Esk Street) and Cambridge Arcade (59-61 Esk Street). The overall significance of these buildings is considered to be moderate, and the partial demolition and retention of the façade constitutes a moderate adverse effect. Based on the assessment of the buildings' significance and the magnitude of the impacts, the overall significance of effects is considered to be moderate (Table 3-5).

The alterations to the façades of buildings scheduled on Appendix II.3 of the Heritage Registers is a restricted discretionary activity under Rule 3.8.4, and the rule includes the matters over which the council have discretion. The following discussion includes consideration of the effects on the façade and the design guidelines. Other matters are considered in the following section, which provides specific mitigative measures.

Table 3-5. The significance of effects of the partial demolition of the Coxhead's Building (31-35 Esk Street) and Cambridge Arcade (59-61 Esk Street).

Heritage Value	Magnitude of Impact				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate-Large	Large-Very Large	Very Large
High	Neutral	Slight	Moderate-Slight	Moderate-Large	Large-Very Large
Medium (Coxhead's & Fairweather's)	Neutral	Neutral-Slight	Slight	Moderate	Moderate-Large
Low (Thompson's)	Neutral	Neutral-Slight	Neutral-Slight	Slight	Slight-Moderate
Negligible	Neutral	Neutral	Neutral-Slight	Neutral-Slight	Slight

The façades chosen for retention include a range of styles and scales that provide a relatively representative sample of the present streetscape. Like all of the scheduled buildings in Block II, the significance of these two buildings has been identified previously warranting their inclusion on the Heritage Register. The research undertaken as part of Woods et al 2018 report, has identified that Coxhead's Building has moderate to high architectural value and moderate historic values, and in particular, the building is associated with nationally renowned photographers, Coxhead Brothers and Thomas Muir. Coxhead's Building at 35 Esk Street is one of the best surviving examples on Block II of Invercargill's best-known architect F W Burwell's distinctive and influential Italianate inspired style, and as such is a wise choice for retention. The Esk Street façade of the Cambridge Arcade is an excellent representation of Art Deco architecture with Edwardian Revivalist elements that became incredibly popular for new buildings and updates to older structures in the CBD in the 1920s to 1940s, and has ties to prominent Invercargill architect A C Ford.

The heritage assessment survey identified that none of the scheduled buildings intended for partial demolition are occupied to their full potential. The first floors of Coxhead's Building and the Cambridge Arcade are vacant, as are many of the shops on the ground floor of the Arcade. A seismic assessment of the buildings by BMC found them to be less than 20% NBS (Figure 1-1). Thus, they are considered to have a very high life-safety risk and strengthening of these buildings would be required had there been plans to retain the entire buildings (BMC pers. com. 2018).

The façade of Coxhead's Building is an excellent representation of Burwell's architecture, and it is appropriate for it to be included in the redevelopment of the block. Burwell is a highly regarded Southland architect and had a great degree of influence on Invercargill's architecture and architects. The façade will sit beside the HWR Tower in much the same way that the building abuts that Lewis & Co Building, and the buildings to the east will sit at the same height providing continuity of context as recommended by Gray (1998). At ground level, the shopfront windows will be removed, and new windows will be setback from the façade. The layout of the new structure behind the façade will align with existing datums to ensure it integrates with the façade. Behind the façade, functioning space of at least one room depth will be constructed on both levels to avoid "views to the sky" and maintain the building's purpose. The existing suspended verandah will be removed and replaced with a glass and steel verandah that will sit beneath the ground floor architrave. The first-floor façade will only see minor alterations, and will be painted according to the City Centre Design Guidelines. The proposed colour scheme of white and grey is intended to highlight the façade and match the other retained built heritage features, drawing attention to the area's history. The use of paint is a reversible treatment and the proposed grey and white tones are similar to the current neutral palette, so will minimise the impacts to the heritage values.

The Cambridge Arcade façade is one of this block's best and most iconic examples of the Art Deco architecture that is so prevalent around Invercargill, and is the work of well-known local architect A C Ford. The façade also

incorporates elements of the previous Revivalist façade that was damaged in a fire. Similar treatment will be applied to the retained façade as with the Southland Times and Coxhead's Buildings in line with the ICC Design Guidelines. The buildings either side of the retained façade have been designed to reference the same height datums at the Arcade frontage, which reflects both the present and historic streetscapes. This means that the Cambridge Arcade façade will remain in a context which is familiar to the current population and reflective of the setting in which the 1930s building was designed. The ground floor of the Arcade façade will require alterations to make it suitable for modern retail tenants. The shop fronts either side of the Arcade entrance have been previously modified and as such retain minimal heritage fabric; however, the central entrance remains as built and consideration should be given to retaining as much of the original fabric as possible. This includes the distinctive shape of the entranceway, the floor tiles, metal gates and decorative moulding on the interior of the entranceway (particularly on the east side). These details should at least be referenced in the new design in order to retain as much of the Arcade's character and sense of history as possible.

The retention of these two façades brings balance to the buildings and references their historic character. Existing verandahs on each building will be replaced with glass and steel canopies to allow for better visibility of the retained and repaired façades, and extraneous fittings will be removed. Careful attention has been given to maintaining the grids of the historic building so that key element heights are replicated in the new build.

Detailed plans will be developed prior to demolition to ensure the façade is supported during demolition. Typical examples are provided in Section 1.1.2.

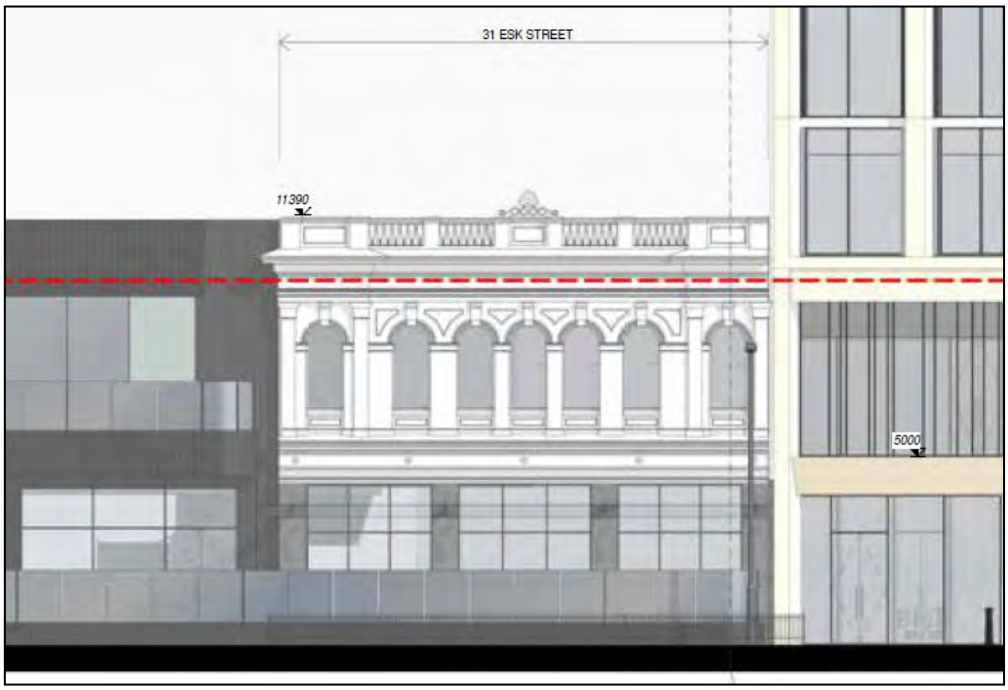


Figure 3-5. Artist's impression of the Coxhead's Building as it will appear in the redevelopment (image courtesy of Buchan Group, January 2019).

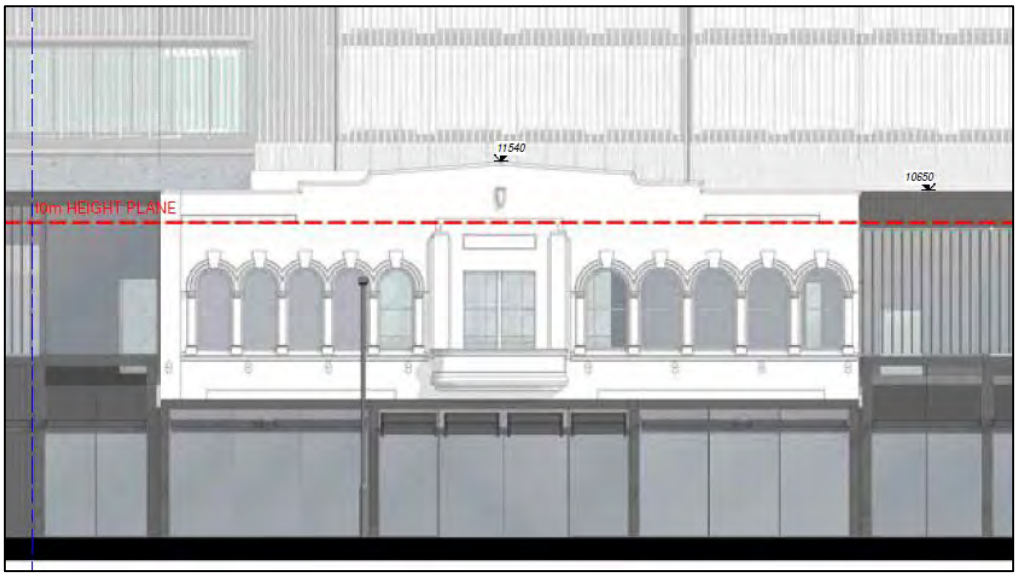


Figure 3-6. Artist's impression of the Cambridge Arcade facade as it will appear in the redevelopment (image courtesy of Buchan Group, December 2018).

Retaining three representative façades (two scheduled and one listed) on Esk Street has numerous benefits over keeping single examples on each frontage of Block II as previously proposed and assessed for effects in Woods et al. 2018. Having the three on the same street allows for members of the public to see them together and visualise the progression of Invercargill's architectural heritage more easily. Having one or two examples of retained façades on each side of Block II would act as a physical memorial to the heritage buildings that are currently present throughout this block; however, the associations and impact of the façades would be diminished. It is also more likely that dispersed façades would end up getting lost within the broader design, whereas having the retained heritage façades inter-visible means it is near impossible to ignore their contribution to the design and new streetscape.

Esk Street is the obvious choice for the locations of the retained façades, given previous recognition of its high quality heritage character and recent upgrades to the street itself to encourage pedestrianism. Farminer and Millar (2016), in their review of Invercargill's built heritage, reaffirmed previous descriptions of the stretch of Esk Street between Dee and Kelvin Streets as a key heritage streetscape group and as one of the city's 'crown jewels' thanks to its collection of well-preserved commercial heritage façades. Particular note was made in this report of the developments that have occurred on the north side of this street that sympathetically incorporated heritage features and frontages, and encouragement given to look here for inspiration during future developments elsewhere in the central city. Upgrades to this section of Esk Street, completed in 2015, included installation of seating, covered areas, planting boxes and paving designed to encourage people to spend more time in the area (Woolf, 2015). This, combined with the heritage buildings and façades on the north side of the street, make this the ideal frontage to concentrate the retention and celebration of Block II's heritage architecture. The three other streets that border Block II are main thoroughfares and, while Tay and Dee Street are both also recognised for their built heritage stock, are not areas in which people tend to linger. Retaining single façades on each of these other frontages runs the risk of preserving heritage simply for the sake of it, whereas focusing efforts on Esk Street will ensure that the preserved façades are appreciated and interacted with as much as possible.

Recommendations: The partial demolition and retention of the façades of two buildings scheduled on Appendix II.3 of the Heritage Register is a restricted discretionary activity under Rule 3.8.4 of the District Plan, and the overall significance of effects has been assessed as moderate. NZHP supports the retention of the façades for Coxhead's Building and the Cambridge Arcade; however, as the final design develops, it is important that alterations of these façades are kept to a minimum and that respect is given to the original ornamentation and materials as recommended in the ICOMOS NZ Charter (2010) and by HNZPT (2007). NZHP has recommended that sash windows are used for all first-floor windows and that connection to the building interior be maintained

through these windows (i.e., none are blocked or show the sky). In addition, the existing glass should be retained where possible. The design team has adopted these recommendations and will align the new internal layout to datums on the façades to ensure that each structure continues to function as a recognisable building. The buildings that have been selected for façade retention represent key architectural styles represented in the block today and are excellent examples to retain for posterity; moreover, there are significant important historical links to Coxhead Brothers photography and Frederick Burwell, the "architect of Invercargill", as well as to A C Ford, the architect responsible for Invercargill's Art Deco aesthetic. The retention of these façades along Esk Street rather than distributed around the block will allow for the public to better appreciate the range of heritage building styles characteristic of the city by being able to observe them together, and the partial pedestrianisation of Esk Street means people will be encouraged to spend more time interacting with the retained façades than if they were preserved on one of the other streets. While the façades of these buildings will be retained, the remaining portions of these buildings will be demolished. As such, it is important that this physical loss be offset by mitigative measures, as discussed in Section 4..

3.3 Removal of Street Furniture

The proposed redevelopment seeks to removal all verandah posts from the project area, and this is a discretionary activity under the district plan. The assessment survey found that Block II has a high proportion of verandah posts in comparison with other inner-city blocks, many of which are cast iron posts with wrought iron corner braces. The heritage assessment identified the verandah posts to have a medium level of significance, and their removal constitutes a major adverse effect; as such, the significance of effects of their removal is deemed to be moderate to large (Table 3-6).

Table 3-6. The significance of effects of the removal of verandah posts and brackets across Block II.

Heritage Value	Magnitude of Impact				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate-Large	Large-Very Large	Very Large
High	Neutral	Slight	Moderate-Slight	Moderate-Large	Large-Very Large
Medium	Neutral	Neutral-Slight	Slight	Moderate	Moderate-Large
Low	Neutral	Neutral-Slight	Neutral-Slight	Slight	Slight-Moderate
Negligible	Neutral	Neutral	Neutral-Slight	Neutral-Slight	Slight

The posts and brackets are Class 2 heritage items in the ICC District Plan (Appendix II.4), meaning that their preservation is encouraged, particularly within heritage precincts. Any alteration, addition, removal and/or demolition of these items is a discretionary activity under Rule 3.8.7, and applications to council for the removal of the street furniture must address the matters listed in Rule 3.8.10.

The verandah posts represent an important connection to the character of the street; however, it is important to recognise that many buildings were constructed without verandahs and had them added at a later date; and like other parts of the buildings, they have been altered on numerous occasions to reflect changing styles. The condition of the verandah posts is generally good; although, most have not been maintained for some time and need repainting. Numerous posts have been removed in favour of suspended verandahs, but those that do remain are highly regarded by many members of the public. During the heritage assessment surveys, it was the fate of the verandah posts that was most commonly questioned, rather than if the buildings were being kept.

The ICC City Centre Design Guidelines identify verandahs as a key design element that should provide effective continuous shelter to all areas within the precinct. Gray (1998) recommends that all existing verandahs be preserved and restored, and that any new buildings have verandahs fitted that complement the neighbouring historic buildings. Many of the historic buildings in Block II did not originally have verandahs, and there is only one surviving pre-1900 verandah with posts in the project area (Herbert Haynes & Co installed its verandah in 1893); however, they were an important historic addition that provided essential shelter from the elements. For example, the verandah surrounding Fairweather's Building and the Hotel Cecil was added in 1913, but it has become a significant piece of the heritage fabric of the block. Consideration could be given to salvaging the verandah and

posts in front of Fairweather's Building, and glazed panels could be used that are etched to reference the existing patterns (Figure 3-7) on the new building at this location.

The redevelopment will see the removal of all verandah posts and brackets, and new verandahs will be installed along the streetscapes. Glazed verandahs will be used for all historic façades to allow for greater connection to the historic façade above, while cantilevered structures will be used on other parts of the redevelopment. One benefit of removing the posts is that the footpath will have less obstructions, making the space more accessible. Retention of the verandah posts has not been considered during the redevelopment design. It is the relationship between the verandahs and their buildings that provides context to the posts and keeping the verandah posts when the buildings behind them have been demolished would create a disconnect.

Figure 3-7. Decoration on the underside of the Fairweather's Building verandah.

Recommendations: The removal of the verandah posts is a discretionary activity under Rule 3.8.7 and is considered to constitute a moderate to large adverse effect. This action will see an important piece of heritage fabric lost from Block II. Considering that most of the buildings in the block will be demolished, retaining the verandah posts is not in keeping with the redevelopment. To mitigate for this significant loss of fabric, NZHP has recommended that the design of the verandah for the building to replace Fairweather's Building (58 Tay Street) be reconsidered to include a reinterpretation of the historic verandah, and that some verandah posts be repurposed throughout the development and/or retained for reuse elsewhere in the city.

3.4 Effects on Existing Heritage Structures

The Bank of New South Wales has a Category 1 heritage listing and there is also a heritage covenant and conservation plan associated with it; this building is regarded as having high overall heritage significance. The building has been strengthened and much of the interior has been restored by the Troopers Memorial Corner Charitable Trust. The proposed inner-city redevelopment will see this architectural jewel framed and highlighted by the surrounding buildings. HWCP are in the process of purchasing this building; however, there are no plans to alter this building as part of this resource consent application.

Care must be taken to ensure that works for the proposed redevelopment do not adversely affect it during demolition, earthworks, or construction. A vibration plan will be established for the project, and mitigative measures are proposed in Section 4.

The proposed building that surrounds the Bank of New South Wales is taller, which can be considered as non-compliant with the design guidelines; however, it is the architect's aim is to embrace this building and highlight it by creating a sharp contrast with the new build.

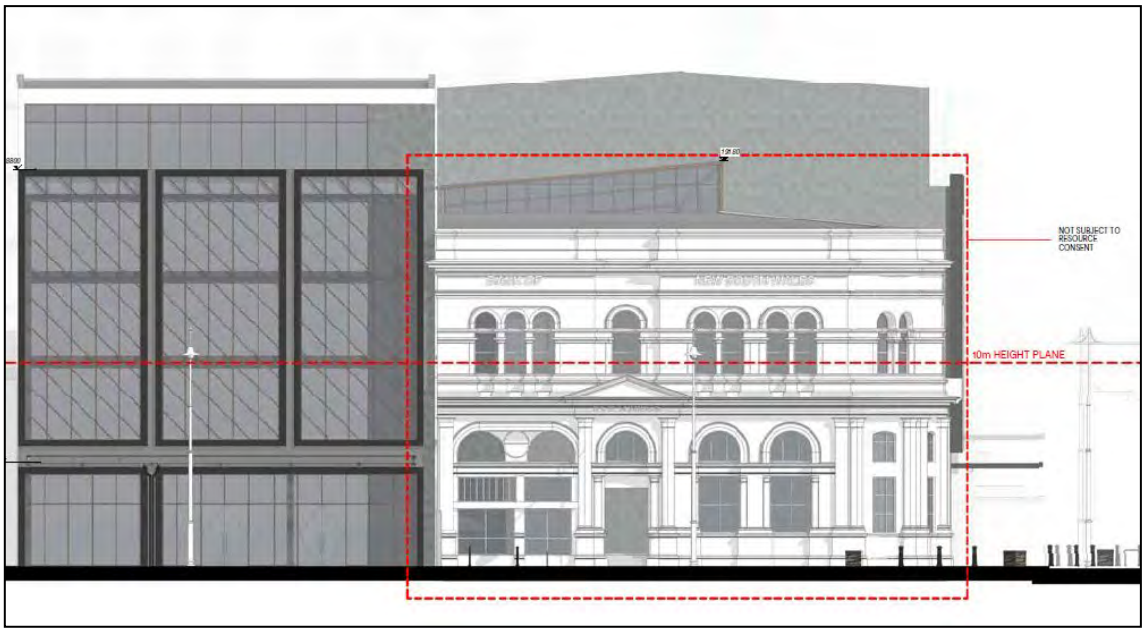


Figure 3-8. Artist's impression of the proposed development around the Bank of New South Wales on Dee Street (image courtesy of Buchan Group, January 2019).

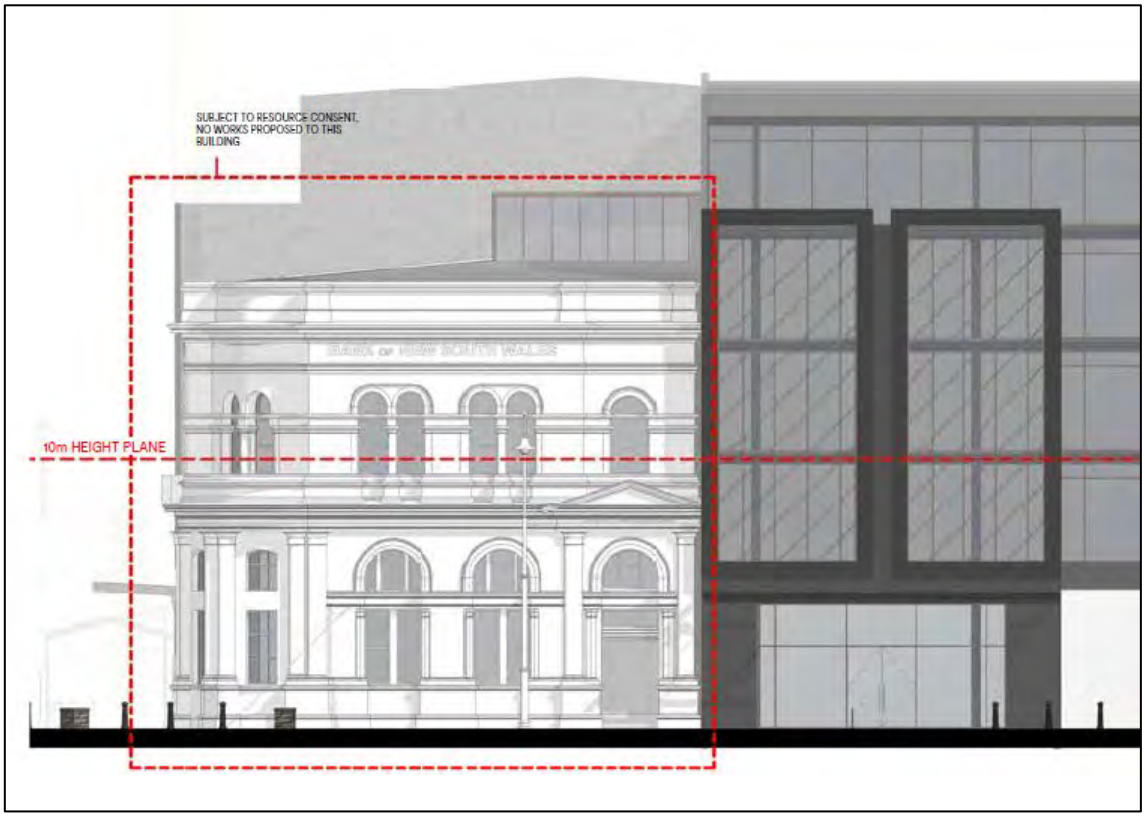


Figure 3-9. Artist's impression of the proposed development around the Bank of New South Wales on Tay Street (image courtesy of Buchan Group, January 2019).

Recommendations: NZHP supports the retention of the Bank of New South Wales and the use of the buildings either side to contrast against, frame and highlight the high quality and value of this structure. Measures should be

put in place to minimise potential damage to the building during works in the surrounding area, including the implementation of a vibration plan.

3.5 Effects on Archaeology

While the redevelopment of Block II will see the reinvigoration of Invercargill's CBD, it will result in the physical loss of both built and subsurface archaeology. Archaeological sites are protected under the Heritage New Zealand Pouhere Taonga Act 2014, which defines an archaeological site as any place, building or structure (or part thereof) that was associated with human activity prior to 1900 and provides evidence relating to the history of New Zealand. According to Section 42, an archaeological authority (i.e., consent) is required to modify any archaeological site, apart from work on a building unless it will be demolished completely.

Block II has been continually reinvented over the course of Invercargill's history and was the location of some of the earliest built structures, including John Kelly's home, William Lind's accommodation house, and James McAndrew's store. Since the early days, Block II has been at the core of the town, later the city, of Invercargill, and as such, the canvas tents gave way to timber structures, which were replaced by brick structures, and many of these have been replaced by concrete structures. As the result of this assessment, 18 archaeological sites have been registered within the project area. The results of the historical research detailed in Woods et al (2018) demonstrates that Block II was intensively occupied throughout Invercargill's documented European history, and there is also potential that Māori utilised this area previously. The archaeological sites defined through this research generally correspond with the historic town sections; although, some town sections have been combined or divided based on records of ownership and occupation. TS 9 is the only historic property where definitive evidence of nineteenth century occupation could not be found. Excavations at this site are likely to encounter archaeological remains, as it is very rare that an inner-city town section would not have been utilised prior to the turn of the century, even if its use was opportunistic or not formally recognised.

Additionally, there are two previously recorded archaeological sites within Block II (wells) and an archaeological site (kerbstones) along the Dee Street footpath. The two wells were recorded as the result of previous earthworks within the block. The site record forms suggest that E46/32 is beneath the footprint of the cinema and will not be affected by the proposed work. The location of E46/45 suggests it is within TS 18, which NZHP have recorded as site E46/80. The location of this site will be confirmed once site works begin and will be incorporated into the appropriate site as defined by this assessment. Historic kerbstones are preserved along Dee Street and have been recorded as site E46/39. The NZAA site record form notes that a contract for the installation of the kerbstones was granted to C. McKinnon on 17 September 1863, which appears to refer to a contract awarded by the government who paid for kerbing along Dee Street up to Spey Street. No reference was able to be found for stone kerbs on Dee Street until much later and it is likely this refers to the first contract for timber kerbing (Woods, 2018). Newspaper reports from 1877 describe preparations being made for the laying of Oreti stone kerbs along the east side of Dee Street by Henry Humphrey and the asphalting of the footpaths which are described as being five feet wide as far north as Spey Street (Southland Times, 1877b, 1877a). In the 1990s the ICC renewed the foot paths on Dee Street as part of a wider inner-city redevelopment. While plans from the ICC could not be obtained, anecdotal evidence from contractors working with NZHP on another Invercargill site suggests the kerbstones and channelling on this section of Dee Street were pulled up and reinstated in the 1990s. Comments were also made about the depth of the setts (300-400mm), and the current footpath is noticeably wider than the five feet described in historical accounts, further suggesting that significant disturbance has occurred to this feature (Woods, 2018). Despite this, the kerbstones are a valued heritage asset and there is a possibility that other features or deposits relating to nineteenth century kerbing and road formation survive beneath the surface. As such, the kerbstones should not be disturbed during the site works.

There are 16 nineteenth century buildings within the project area, and 15 of these buildings are proposed to be demolished, while one building will see partial demolition with its façade being retained (Coxhead's Building, 31-35 Esk Street). The archaeological status of each building is listed in Table 3-1 and Figure 3-10 provides an

overview of the site extents and distribution of nineteenth century buildings. The archaeological requirements under Heritage New Zealand Pouhere Taonga Act 2014 require that any nineteenth century building that will be demolished completely be recorded; as such, the partial demolition of Coxhead's Building. Building recording is carried out according to the standards outlined in *Investigation and Recording of Buildings and Standing Structures* (Heritage New Zealand Pouhere Taonga, 2018), which identifies three levels of building recording, which prescribes a greater level of recording with increased heritage and archaeological significance.

The nineteenth century buildings that are proposed to be demolished were constructed from the 1870s onwards and represent a significant assemblage that can provide considerable information. Whilst these buildings have been heavily modified, demolition will remove the remaining connection with the original occupation of these sections and the early Invercargill townscape. The demolition of the pre-1900 buildings is balanced with the merits of the development, and the loss of these structures can be outweighed by the detailed recording of the remaining features. The investigation of pre-1900 buildings provides the opportunity to explore how New Zealanders constructed their buildings, what materials they used, how they organised their space (form and function), how they expressed themselves (style), and what changes were made over time. This dataset will be a foundation for understanding nineteenth century commercial architecture in Invercargill, and it will provide the opportunity to explore changes in construction methods and materials through time, identity of construction professionals and architects, and variation related to function.

The proposed redevelopment will require substantial earthworks during the demolition phase and construction phase, which will affect every archaeological site in the project area apart from E46/66 and E46/32. These sites are currently beneath the Reading Cinema, which will not be affected by the proposed work. The proposed work will see the broad scale loss of subsurface archaeology across the block. The demolition, site clearance, installation and/or updating of services and construction of the new buildings will involve extensive earthworks that will have a major adverse effect on the subsurface archaeology. Given the scale of some of the buildings, these earthworks will be of a magnitude that will result in the complete removal of archaeological features and deposits.

A range of archaeological features are expected to be encountered that represent a mixture of residential, commercial, and industrial occupations, as well as the former police reserve. Features that may be affected include structural features (e.g., foundations, posts, postholes, etc.), surfaces (e.g., cobbled floors, paths, etc.), pit features (e.g., rubbish pits, latrines, etc.), and services (e.g., drainage features). As the block has been continuously evolving, there is potential that past construction activity has affected the archaeological deposits. A prime example is the excavation of the basement for the Lewis & Co Building, which would have destroyed all archaeology. Similarly, there are historic accounts of archaeological materials being found during the construction of the Newburgh Building. All deposits and features encountered are required to be recorded to best practice by a qualified archaeologist.

Due to the large scope of the archaeological works, a management plan will be required as stipulated in Section 3.4 of *Guide A: Application for a General Archaeological Authority*. A management plan is required for all complex projects that may involve numerous subcontractors and for all projects that require the demolition of a pre-1900 building.

Recommendations: The redevelopment of Block II will have a major adverse effect on its archaeological resources. NZHP recommends that the client apply for an archaeological authority to disturb the archaeological sites listed in Table 3-7. Please note that E46/66 and E46/32 will not be affected by the redevelopment and impacts to the kerbstones in Dee Street (E46/39) must be avoided during the site works.

Based on the archaeological significance of the sites and the overall heritage significance, NZHP recommends that the 15 pre-1900 buildings scheduled for demolished be recorded to a Level III standard by a qualified archaeologist (pre-1900 portions only). HNZPT (2018) identifies the requirements of Level III recording to include the following.

- Measured drawings of selective elevations (internal and external), cross-sections, floor plans, roof plans and ceiling plans.
- Written records, including annotation of measured drawings.
- Photography of selective contextual views, elevations, spaces, fixtures and other features.
- Selective sampling of relevant materials.

NZHP also recommends that the demolition of the buildings be monitored by an archaeologist so as to identify any hidden features. All earthworks that may affect an archaeological site must be monitored (stand-over monitoring) and any features and deposits be recorded by an approved archaeologist according to best practice standards. Due to the large scale of the archaeological work required as part of the redevelopment of Block II, an archaeological management plan, reviewed by HNZPT, will need to be in place prior to works commencing.

Consideration should also be given to the long-term storage of the artefact assemblage in a public repository. The large scale of the project, comprising one of the most significant inner-city blocks of Invercargill, will provide the foundation for all future archaeological studies in Invercargill. Moreover, by capturing the archaeology of an entire city block representing the earliest European occupation of Invercargill and continuous commercial, industrial and residential occupation through to the present day will mark this assemblage as being nationally significant.

As this project will result in the loss of almost an entire city block's worth of archaeology, all features encountered should be recorded in full, even when this requires deeper or more extensive excavations than required for the development. Due to the large scale of the project, a sampling strategy for the artefacts analysed must be adopted. NZHP recommends that only artefacts from secure contexts be analysed. A full report on the results of the archaeological monitoring, buildings recording, and artefact analysis will be required.

Table 3-7. Summary of archaeological sites to be affected by the proposed redevelopment.

ArchSite	Legal Description	Brief Summary	Building Name	Street Address	Date Completed	Architect	HNZPT Act 2014	Effect on Built Archaeology	Level of Recording	Effect on Subsurface Archaeology
E46/67 (TS 1-2 North)	Lot 4 DP 3298, PT Sec 2 Blk II Town of Invercargill SO 171(DP748), PT Sec 3 Blk II Town of Invercargill SO 171(DP748), PT Sec 1 Blk II Town of Invercargill SO 171(DP748) PT Sec 2 Blk II Town of Invercargill SO 171, PT Sec 1 Blk II Town of Invercargill SO 171	This site has been the location of commercial occupation since at least as early as 1862, and the site extent is based upon the shared history of the modern land parcels. The site is currently occupied by Smith's Building (31 Dee Street), the Newburgh Building (33 Dee Street) and the Lewis & Co. Building (29 Esk Street). Smith's Building was built in 1875 to a design by Angus Kerr for John Smith as an extension to his commercial premises that was located on the corner of Esk and Dee Streets. Most of this building was demolished in 1928 but this small portion remains extant. The Lewis & Co. Building was completed in 1914, was designed by Edmund Anscombe and Henry McDowell Smith and was one of the Fletcher Brothers' (now Fletchers Construction) first major projects. It was built using steel beams and reinforced concrete and was one of the first and only buildings of this architectural style in Invercargill. The Brown Owl tearooms on the third floor was the first restaurant in New Zealand to receive a licence to serve alcohol in 1944. The Newburgh Building was built in 1928 for Thomas Newburgh and was designed by Christchurch architect Benjamin Ager. The Lewis & Co. and Newburgh Buildings are both Category II Historic Places (No. 2519 and 2470 respectively).	Smith's	31 Dee Street	1875	Angus Kerr	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
			Newburgh	33 Dee Street	1929	Benjamin Ager	Subsurface	-	-	
			Lewis & Co.	29 Esk Street	1914	Edmund Anscombe & Henry McDowell Smith	Subsurface	-	-	
E46/68 (TS 3 North)	Lot 1 DP 3298, Lot 2 DP 3298, Lot 3 DP 3298, PT Sec 3 Blk II Town of Invercargill SO 171, PT Sec 3 Blk II Town of Invercargill SO 171	This site has been the location of commercial occupation since the early 1870s. The three extant structures were the first to be built on the site. MacDonald's Building (41 Esk Street) was constructed in 1873 for solicitor Thomas MacDonald to a design by Angus Kerr. Martin, Maitland & Co's Building was constructed in 1877 for the general agents and was designed by Frederick W. Burwell. Coxhead's Building was constructed in 1875 for photographers the Coxhead Brothers and was also designed by F. W. Burwell in an ornate Neoclassical style. Significant occupants include the Southland Times in Martin, Maitland & Co's Building (1878-1909) and photographers Coxhead Brothers (1875-1880) and Thomas Muir (1893) in Coxhead's Building.	Coxhead's	31-35 Esk Street	1875	F W Burwell	Building & subsurface	Partial demolition of a pre-1900 building	-	yes
			Martin, Maitland & Co.'s	37 Esk Street	1877	F W Burwell	Building & subsurface	Demolition of a pre-1900 building	Level 3	
			MacDonald's	41 Esk Street	1873	Angus Kerr	Building & subsurface	Demolition of a pre-1900 building	Level 3	
E46/69 (TS 4)	Lot 1 DP 6653, Lot 2 DP 6653, Lot 3 DP 6653	This site has been occupied since at least as early as the 1870s when it was occupied by a 15-roomed house that became the Melbourne Dining Rooms and boarding house. This timber building was replaced with the extant structure, known as the Temple Chambers, in 1881. Occupants of the Temple Chambers have included booksellers, dining rooms, a grain broker and bone dust merchant and drapery firm Brown, Ewing & Co.	Temple Chambers	45-49 Esk Street	1881	Angus Kerr	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
E46/70 (TS 5)	Lot 1 DP 10282, Lot 1 DP 6653, Lot 2 DP 6653, Lot 3 DP 6653, Lot 2 DP 5659	This has been the location of commercial occupation since at least as early as 1862 when James Grieve had a grocery and tea shop, known as the Murihiku Store, on site. The extant building (the New Zealand Insurance Company Building) was constructed in 1883/1884 for the South British Insurance Company but extensively remodelled in 1934 for the New Zealand Insurance Company to a design by notable local architect Allan C. Ford.	NZIC	51-53 Esk Street	1884	Edmund R Wilson	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
E46/71 (TS 6)	Lot 1 DP 5659, Lot 2 DP 5659	This site has been occupied since at least as early as the 1870s when there was a domestic dwelling on site. This dwelling was used as a boarding house from the early 1880s until 1898 when it was replaced with a three-storey brick and concrete commercial building for textile and clothing manufacturers Ross & Glendining. This warehouse was extended in 1905 and then demolished in 1983 and replaced with the extant MLC Building.	MLC	55 Esk Street	1983	Mitchell & Mitchell and Partners	Subsurface	-	-	yes
E46/72 (TS 7, 16)	Pt Sec 16Blk II TN OF Invercargill, Sec 7 Blk II TN OF Invercargill, Pt Sec 8 Blk II TN OF Invercargill	This site has been the location of commercial occupation since at least as early as 1863 when the two town sections were used as a coach house, stables and blacksmith by John Gethin Hughes. Shops were erected on the south end of the site in 1872 and components of this building survive today as part of the Cambridge Buildings at 40 Tay Street. A brick shop and bonded warehouse was present at the north end of the site from the 1880s until 1905 when it was replaced with an Arcade. This arcade was extensively damaged by a fire in 1930 and was rebuilt in 1934 to a design by notable local architect Allan C. Ford. At this time the Arcade was extended to the south and the buildings at the south end of the site were incorporated into it. The Cambridge Arcade and Buildings have remained relatively unchanged since this date.	Cambridge Buildings	40 Tay Street	1872	Unknown	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
			Cambridge Arcade	59-61 Esk Street	1934	A C Ford	Subsurface	-	-	
E46/73 (TS 8)	Pt Sec 8 Blk II TN OF Invercargill	This has been the location of commercial occupation since at least as early as 1863 when merchants Calder, Blacklock and Co. erected a brick store and auction room on site. This building was demolished in the 1920s and replaced with the extant Nichol's Building.	Nichol's	63 Esk Street	1929	A C Ford	Subsurface	-	-	yes
NA - TS 9	Lot 1 DP 326508	While there is no formal record of nineteenth century occupation, it is highly likely that archaeological remains will be identified on this property.	Southland Times	67 Esk Street	1909	Charles H Roberts	-	-	-	-
E46/74 (TS 10, 13)	Lot 1 DP 326508, Sec 24 Blk II TN OF Invercargill, Lot 2 DP 7637	This site was the location of a Police Reserve from 1863 into the twentieth century. Police Barracks and a Police Station were located on the north end of the site from 1863 until the mid-twentieth century and a variety of associated buildings were located on site including a sergeant's house, men's' quarters and stables. A Law Courts building was erected on the south portion of the site in 1873. These buildings were gradually demolished throughout the twentieth century and replaced with the extant commercial structures.	Southland Times Press Hall	69 Esk Street	1981	L F Simpson	Subsurface	-	-	yes
			Allot and Eunson	54 Tay Street	1958	A G A Milne	Subsurface	-	-	
E46/75 (TS 11)	Lot 3 DP 2682, Lot 2 DP 2682, PT Lot 1 DP 2682	This has been the location of commercial occupation since at least as early as 1862 when Dalgety, Rattray & Co. built a corrugated iron warehouse and offices on site. This warehouse became a local landmark and was occupied by a variety of auctioneers, merchants and second-hand dealers before it was destroyed by fire in 1910. There has also been a building at the south end of the site since at least the 1880s, however it is unclear if any components of this survive as the construction date and details for the extant building at 18 Kelvin Street are unknown. Most of the site is currently occupied by the multi-storied Kelvin Hotel, constructed in the 1960s. The site extent is based upon the shared ownership and occupancy of this area throughout the nineteenth century.	Kelvin Hotel	20 Kelvin Street	1965	A G A Milne	Subsurface	-	-	yes
			Thompson's	18 Kelvin Street	1913-1929	Unknown	Subsurface	-	-	
E46/76 (TS 12)	Sec 12 Blk II TN OF Invercargill	This site has been occupied continuously since at least as early as 1862 when Robert McKay had a cottage on site and subdivided the property. A hotel has been located on the southeast corner since 1862 under a variety of proprietors and names including the Provincial, Scandinavian and Supreme Court Hotel and finally the Hotel Cecil. The Hotel Cecil building (constructed 1899) still stands and is occupied by multiple small shops on the ground floor. The first floor was converted into a radio station for Foveaux Radio in 1981 but has been vacant for several years. A two-storey brick shop sits on the southwest corner and was built in 1884 for Invercargill's first boot manufacturer Charles Fairweather and replaced an earlier timber structure, also built for Fairweather in 1862. Fairweather occupied the site from 1862 to 1910. The first floor of this building was incorporated into the neighbouring Hotel Cecil during the 1981 alterations.	Hotel Cecil	1-16 Kelvin Street, 60-64 Tay Street	1899	Unknown	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
			Fairweather's	58 Tay Street	1884	Unknown	Building & subsurface	Demolition of a pre-1900 building	Level 3	
E46/77 (TS 14)	Lot 3 DP 4286, Lot 1 DP 4286, Lot 1 DP 15444, Pt Sec 14 Blk II TN OF Invercargill	This site has been occupied continuously since 1857 when Roderick McRae built a hut here. Since then it has been the site of timber bank and brick commercial buildings. The extant structures were built for H & J Smith in 1910 and 1916.	MacPac	48 Tay Street	1910	Edmund R Wilson	Subsurface	-	-	yes
			Zookeeper's Café	50 Tay Street	1916	Edmund R Wilson	Subsurface	-	-	

ArchSite	Legal Description	Brief Summary	Building Name	Street Address	Date Completed	Architect	HNZPT Act 2014	Effect on Built Archaeology	Level of Recording	Effect on Subsurface Archaeology
E46/78 (TS 15)	Pt Sec 14 Blk II TN OF Invercargill, Pt Sec 15 Blk II TN OF Invercargill	This has been the location of commercial occupation since 1857 when John Blacklock opened a drapery business on the property. A succession of drapers continued to occupy the site well into the twentieth century, including Robert Duncan Yule, Herbert Haynes and the DIC. A chemist (George Bailey) also occupied part of the site from 1874 to 1885. The extant buildings were constructed in 1884 for Herbert Haynes & Co, were extended in 1899 and remodeled in 1934 to match the neighbouring Cambridge Buildings and Arcade. Numerous twentieth century alterations were also undertaken on this structure.	Herbert Haynes & Co.	42 Tay Street	1885	Angus Kerr	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
E46/79 (TS 17)	Lot 2 DP 2359, Pt Sec 17 Blk II TN OF Invercargill, Pt Lot 2 DP 2359, Lot 1 DP2663	This site has been occupied by commercial premises at least as early as 1862 by which time there was a butcher's and a draper's here. Throughout the nineteenth century numerous other businesses have occupied the site, including bootmakers, merchants, photographers, fancy goods retailers and two hotels (the Garrick Club and the London). A large fire in 1875 destroyed all buildings on site. The front portions of the two extant buildings were demolished and replaced during the mid-twentieth century, however portions at the rear are known to be older and some may be pre-1900. J. Kingsland & Co. had a boot factory at the north end of the site from 1907 to the 1930s; this building was demolished in 1998. The on-screen site extent is based on the shared early ownership history of the modern properties.	Annie Ibbotson's	30 Tay Street	1933	C J Brodrick	Subsurface	-	-	yes
			Carter's	36 Tay Street	1973	n/a	Subsurface	-	-	
E46/80 (TS 18)	Sec 18 Blk II TN OF Invercargill	This site has been the location of commercial occupation since at least as early as 1862 when chemist George Clark, watchmaker Isaac broad and clothiers Mair and Garven occupied shops here. Subsequent nineteenth century occupants included photographers, aerated water manufacturers, plumbers and bootmakers. A fire in 1871 destroyed all buildings on site except for an aerated water factory and stables belonging to William Moffett. The two extant buildings were constructed in 1881 and 1887 for draper Peter Peters and John Kingsland respectively. Peter's Building was extended to the east in 1892. Kingsland extended his premises in 1907 but fire broke out in 1915 and gutted the building. It was rebuilt the following year, but the external walls appear to have survived the fire. Both buildings have undergone extensive renovations throughout the twentieth and twenty-first centuries and a structure that connected the rear of Peter's Building to Kingsland's former factory was demolished in the 1990s. the site extent is based on the shared early ownership history of the modern properties.	Peters'	22 Tay Street	1881	McKenzie, Ridley & Co.	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
			Kingsland's Shop	26 Tay Street	1887	Unknown	Building & subsurface	Demolition of a pre-1900 building	Level 3	
E46/81 (TS 19)	Lot 1 DP 303305, Lot 2 DP 303305, Pt Sec 19 Blk II TN OF Invercargill	This site has been the location of commercial occupation at least as early as 1869 when grocers Frederick and Hunter had a shop here. Subsequent nineteenth century occupants include furniture retailers, butchers, hairdressers, clothiers and drapers. A fire in 1871 destroyed all buildings on site and reports of the event suggest that people were living above and behind the commercial premises. The site is now occupied by a single shoe shop (Hannah's) that was constructed in 1969 and an asphalt car park.	Hannahs	16-18 Tay Street	1969	L F Simpson	Subsurface	-	-	yes
E46/82 (TS 20)	Lot 1 DP 14147, Lot 2 DP 14147, Lot 3 DP 14147	This site has been the location of commercial occupation since at least as early as 1863 when merchants Calder, Blacklock & Co. had a shop here. This building was taken over by the Bank of Otago but was destroyed by fire in 1871. In 1876 ironmonger and carpenter Abram Watson erected the extant building, consisting of three shops on the ground floor and apartments or offices on the first floor. Occupants of Watson's building included hairdressers, bootmakers, public baths and engineers. A right of way extends along the west boundary of the site and has remained unchanged since 1859. A building was also erected at the north end of the site at an unknown date that held a plumbing works then a tannery and fellmongery. This rear building was demolished in 1996 and part of the Reading Cinema complex now extends into the north of this site. Watson's Building has undergone extensive renovations on numerous occasions since its construction and is now almost unrecognisable. The site extent is based on the shared early ownership history of the modern properties.	Watson's	8-14 Tay Street	1877	Unknown	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
E46/83 (TS 21)	Lot 1 DP 4801, Lot 2 DP 4801	This site has been the location of commercial occupation since 1857 when John Jones constructed Invercargill's first store here. In 1862 the Bank of New Zealand erected a timber bank building on site, which was replaced with a brick structure in 1883 by the Bank of Australasia. The brick bank was demolished in 1974 and replaced with the extant ANZ Building (now a car park). John Kingsland extended his boot warehouse into the north of this site in 1882 and this building was replaced in 1906 and its replacement demolished in 1992. Part of the 1992 Reading Cinema Complex extends on to the north end of this site. The site extent is based on the shared early ownership history of the properties.	ANZ	4 Tay Street	1969	Sargent and Smith and Partners	Subsurface	-	-	yes
E46/84 (TS 22)	Pt Sec 22 Blk II TN OF Invercargill, Lot 2 DP5189, Lot 3 DP5189, Lot 4 DP5189, Lot 5 DP5189	This site has been occupied continuously since 1856 when James MacAndrew erected a house and store here. In 1863 the Bank of New South Wales purchased Town Section 22 and subdivided the property. Three small commercial buildings (still present) were erected on the Dee Street frontage during the 1870s for George Ott (5 Dee Street), William Barham (7 Dee Street) and George Lumsden (9 Dee Street). A fourth building was also constructed for Kenneth Rose at the north of the site in the 1870s but was demolished in 1992. The Bank of New South Wales constructed a bank on the corner of Dee and Tay Street in 1875 and was replaced with the extant building in 1904. Part of the 91992) Reading Cinema complex extends into the north of the site.	Lumsden's	9 Dee Street	1872	Unknown	Building & subsurface	Demolition of a pre-1900 building	Level 3	yes
			Barham's	7 Dee Street	1873	Unknown	Building & subsurface	Demolition of a pre-1900 building	Level 3	
			Ott's	5 Dee Street	1875	Angus Kerr	Building & subsurface	Demolition of a pre-1900 building	Level 3	
			BNSW	1 Dee Street	1904	C J Brodrick	Subsurface	-	-	no
E46/45 (TS 18)	Pt Sec 18, Blk II TN OF Invercargill	An unlined well, 1.5m in diameter. The depth of current water at the time of recording was 6m. It was assumed that this well was associated with the nineteenth century bootmakers, W. Mitchell. The location of the site on the site record form places it in Pt Sec 18, Blk II TN OF Invercargill in the carpark behind Kingsland's Shop, which is part of E46/80. Once confirmed on the ground, this site will be incorporated into the broader archaeological site for TS 18.								yes
E46/39	Dee Street Road Reserve	Kerbstones along Dee Street made from Waikawa or Mokomoko source stone. Some stones are 1m long, and all are hand-dressed. It is believed that these kerbstones were laid in the early 1860s.	-	-	-	-	The kerbstones must not be disturbed by the project.			

Plan showing Archaeological Site Extents and Pre-1900 Buildings

Archaeological Site Boundaries
- ArchSite
- Potential ArchSite

Pre-1900 Buildings
- Scheduled for Demolition
- Facade Retained

Previously Recorded Sites
- ArchSite
- ICC DP
- HNZPT List

New Zealand Heritage Properties Ltd
Investing In Our Heritage

0 25 50 75 100 m

Figure 3-10. Plan showing the ArchSite boundaries and pre-1900 buildings scheduled for demolition and facade retention.

4 Mitigation Measures

There are numerous ways to approach redevelopment projects such as this, ranging from the repair and re-use of the existing buildings to complete demolition and creation of a 'clean slate'. The condition, quality and form of the existing building stock is rarely suitable for the former, as is the case with Block II Invercargill, where many buildings have fallen into disrepair or do not meet modern building standards. At the other extreme, total demolition destroys all heritage values and runs the risk of a result that is out of place in the local townscape and holds no cultural value to residents. While it is not possible to reach a perfect middle ground that will please all interested parties, options that seek to mitigate or limit the loss of heritage values must be considered as, for many people and communities, their sense of identity is linked to their sense of place, which in turn is heavily influenced by the built environment that they live or have lived in. Undertaking large scale urban redevelopments such as the proposed project are a vital part of a city's life-cycle and growth. However, a redevelopment that does not incorporate at least some ties to the past, or incorporates them poorly and inconsistently, can lead to a result that is not valued by the community and therefore lacks an impetus for long-term engagement or maintenance.

4.1 Considerations for Redevelopment Design

Rule 3.8.10 (H) of the District Plan asks for consideration for why alternative less adverse options have not been considered for the redevelopment. This matter is required to be addressed for the demolition of a building on Appendix II.2 (Rule 3.8.9) or Appendix II.3 (3.8.6), alteration of the façade of a building on Appendix II.2 (Rule 3.8.8), or removal of street furniture listed on Appendix II.4 (Rule 3.8.7).

At the beginning of this project, the inner-city redevelopment proposed to demolish all buildings in the project area to create a clean slate from which to work. Through extensive consultation with HNZPT, Buchan Group and HWCP, the design of Invercargill Central evolved and now incorporates three heritage façades on Esk Street: the Southland Times, Coxhead's Building and Cambridge Arcade. The design also generally follows the lines and mass of the historic buildings, including several key structures that have previously been demolished, to provide a sympathetic overall design.

4.2 Mitigation of the Effects of Demolition and Rebuild

The demolition of the majority of a city block and the rebuild will undoubtedly have temporary adverse effects on the buildings remaining within the block (Bank of New South Wales, Reading Cinema, and the Kelvin Hotel), as well as on the surrounding streets and businesses. From a heritage perspective, the greatest concern is that effects on the Bank of New South Wales and the retained façades. Screening mechanisms and mitigation of the effects on earthworks must be addressed under Rules 3.8.4 (D-E) and 3.8.10 (F) of the District Plan.

Bonisch Consultants has considered this impact and have developed a demolition plan that will see incremental demolition in localised areas of the project. The benefit of having such a large project area, is that buildings can be demolished inwards, reducing the effects on the surrounding areas. A vibration management plan will be in place to monitor any effects of vibrations during the earthworks and construction on the surrounding buildings. The selected construction methods will also mitigate vibrations; for example, screw piles or bored piles will be used over driven piles, where required.

The stability of retained façades is an important consideration during the rebuild, and BMC have established protocols as discussed in Section 1.1.2. Where possible, the partial demolition should not occur until necessary so that the façades will not need to be propped for long periods of time.

Hoardings are an acceptable solution that will minimise the temporary effects of the build on the remaining heritage assets on the block, and this will also reduce the overall visual impact of the rebuild on the surrounding community. As the hoardings will be in place for a considerable length of time, consideration should be given to their design and quality. B Class hoardings would offer a better solution for the inner-city redevelopment, providing a greater

degree of protection for the public and contractors working on the site. Hoardings also provide an opportunity to share with the public the story of the redevelopment and the history of key buildings and identities. The public want to know what is going on behind closed doors, and our experience in the Christchurch rebuild has shown that windows in the hoardings also have the benefit of drawing people to the area. Such hoardings will allow the public to engage with the redevelopment and history and the block will maintain active pedestrian traffic, which will significantly reduce the effects on the surrounding businesses and heritage.

4.3 Building Recording

Rule 3.8.10 (I) of the District Plan requires the creation and maintenance of a record of heritage features affected by the demolition of alteration of a building on Appendix II.2, the demolition of a building on Appendix II.3, and the removal of street furniture listed on Appendix II.4. The same is also asked where there will be alterations to a façade of a building of local interest identified on Appendix II.3 under Rule 3.8.4 (I).

As several of the buildings proposed for demolition on Appendix II.3 are also pre-1900, buildings recording will be a requirement triggered under the Heritage New Zealand Pouhere Taonga Act 2014. For these buildings, this level of recording would meet the requirements under the District Plan. NZHP recommends buildings recording by a qualified archaeologist be undertaken for HNZPT listed buildings that will be demolished (Newburgh Building and Lewis & Co Building) under the requirements of the District Plan, to a Level III standard. Similarly, this requirement should be made for those buildings that will be partially demolished and will have alterations to their façades (Coxhead's, Southland Times and Cambridge Arcade) and for buildings of local significance that will be demolished (Thompson's, Fairweather's, Nichol's, Zookeepers, and MacPac). The level of recording should be commensurate with significance assessment and follow the standards for building recording under the HNZPT guidelines (2018). The verandah posts should also be recorded prior to their removal. The information collated through this recording should be publicly available. This data will prove invaluable to the local community for education and should be widely distributed through interpretation panels, exhibitions and/or publications.

4.4 Reuse of Building Material

When historic buildings cannot be adapted or moved, potential remains to reuse and recycle building materials. Historic buildings and structures contain a rich assemblage of building materials, and the District Plan respects this valuable resource. Rule 3.8.10 (D) of the District Plan identifies that the potential for reuse and/or recycling of materials or heritage features be addressed. This rule applies to the demolition of alteration of a building on Appendix II.2, demolition of a building on Appendix II.3, and removal of street furniture listed on Appendix II.4. The council also asks, under Rule 3.8.4 (H), that this matter be considered where there will be alterations to a façade of a building of local interest identified on Appendix II.3.

Materials that have been salvaged prior to demolition have the potential to be re-used in the new design or could be made available to other heritage building owners. Building materials are also a good candidate for reuse, including brick, timber, timber flooring, windows, doors, architraves and ceiling linings. Brick and timber are the easiest materials to reuse and incorporate into the new build because of their versatility, and even when materials are no longer structurally sound, they can be re-used (e.g., using bricks for paving, timber for linings and finishes, etc.). Historic bricks have a wonderful patina that simply cannot be replicated and are tangible pieces of the past that can be easily introduced into the new build. Similarly, historic timber is also a good candidate for reuse and recycling and bring a warmth that new timbers cannot replicate. The design team have taken these recommendations into consideration and plan to use bricks salvaged from the demolished heritage buildings for panels and low level interventions in the food precinct.

Consideration should be given to the incorporation of historic materials into the new design. In the case of Block II, one of the most obvious and practical candidates for reuse are the cast iron verandah posts found in front of numerous buildings. These posts are a treasured part of the streetscape and are listed as heritage items on the ICC District plans, so consideration of their reuse must be undertaken. Potential ways the posts could be incorporated

into the development include lighting in public areas and/or thoroughfares, or simply as decorative elements. The prism lights used in the footpath outside of the Lewis & Co Building are unique materials that would be valuable to retain and re-use in the redevelopment (e.g., as an installation) that would provide an important link to this innovative part of the Lewis & Co Building.

Historic building owners are often challenged to find appropriate materials when altering or restoring their buildings. Many of the profiles of architraves, skirting boards, and cornices are no longer made, and additional cost is required to have new materials milled to match existing profiles. Salvaged building materials can remedy this issue and are a valuable resource for a city full of historic buildings in need of repair. Many of the buildings have pressed metal ceilings, which could be re-used if they were removed with care (i.e., punching nails through or cutting nails rather than pulling the panels down). There are excellent examples of pressed metal ceilings in the two adjacent buildings on Tay Street designed by E R Wilson (MacPac, 48 Tay Street and Zookeepers, 50 Tay Street). There may also be market for some of the fixtures that reflect alterations from the mid-century to 1970s (e.g., the glass pendent lights on the first and second floors of the Southland Times).

Consideration should also be given to salvaging modern building materials. Several of the ground floor shops have been recently re-fitted, and these materials may be able to be recycled.

4.5 Public Interpretation

NZHP recommends that the information gathered during the historical research, archaeological investigations and that collected during the recording of the post-1900 buildings is disseminated to the public upon completion of the project and, if possible, incorporated into the redevelopment. This could be done through installation of interpretive panels, displays of archaeological material and/or interactive installations in public areas such as the food court or courtyards. Doing this will maintain Block II's strong links to Invercargill's past and engage locals and visitors with the city's history. This will be especially fitting as this is the area in which the first settlers established their homes and businesses and will emphasise the site's status as the heart of Invercargill. Placing interpretation panels close to the locations of demolished heritage buildings will allow the public to engage with the site's history and act as reminders of Block II's integral role in the development of Invercargill.

Examples of such interpretation panels are abundant in urban areas around New Zealand and are a popular choice for councils and developers who want to show how much an area or site has changed or how successfully a building has been preserved. At 19 Don Street in Invercargill large interpretation panels were installed when a nineteenth century commercial building was demolished, and the site converted to a car park. These panels contain historic photographs of the buildings that once stood there and a brief description of the site's history that inform passing members of the public who are generally curious as to what once filled the now conspicuous gap in the streetscape. Other areas, for example the gold rush settlement of St Bathans in Central Otago, have erected panels with historical photographs in the spot from which they were originally taken, allowing visitors to compare the historic and contemporary landscapes and often including indications of landscape features or built structures that have survived so the viewer can easily orientate themselves. Around Dunedin, many historic buildings have panels close to their façades with historic photographs showing what the building looked like in the past and brief histories. The data and photographs for these installations can be taken from heritage impact or archaeological assessments, so there are minimal additional costs involved, and generally the panels require minimal maintenance.

4.6 *In Situ* Preservation of Archaeological Material

One of the most tangible ways to maintain a site's links to past occupation and incorporate these into the new design is through the preservation of historical or archaeological features *in situ*. This generally works best for features such as cellars, wells or tiled or cobbled floor surfaces, that are not required to be removed for foundations or services and can be easily identified and viewed by the public. A transparent covering placed over one of these features allows visitors to the new development to engage with the site's history and can easily become a focal

point of a public area. Some floor surfaces may not even require protection and can be directly incorporated into the new floor, depending on accessibility and relative floor levels.

Examples of this approach include a timber causeway at the Wall Street Mall and the cellar of the Captain Cook Hotel in Dunedin, and the preserved remains of Te Aro pa in Wellington. Te Aro pa is a particularly high-quality example of this approach. During the redevelopment of the site on Taranaki Street in 2005 remains of three ponga structures were encountered. Instead of removing the features, the ground floor lobby of the new building was re-designed around them, with the excavated features encased beneath glass and accompanied by interpretation panels and sympathetic décor. At Wall Street, an image of the causeway is currently located beneath a Perspex covering in a sunken seating area close to food providers and strengthens the links of the site to the early European occupation of Dunedin. This example also highlights the dangers of the approach, as the image of the walkway has faded dramatically over time and the Perspex scratched by foot traffic, making viewing difficult. The current set up is, however, only intended as a temporary solution until conservation work is complete on the actual causeway, at which time it will be installed and the installation finalised. During the redevelopment of the Captain Cook Hotel in Dunedin, this approach was used to preserve and display the historic beer cellar, with a glass window installed just inside the main entrance and the cellar illuminated to allow patrons a glimpse of the oldest part of the building.

Incorporating extant archaeological and historic features is dependent on what is identified, their location, and the flexibility of the design team. While most of these features will only be identified as the earthworks for the rebuild begin, one known feature are the pavement lights in the footpath above the Lewis & Co basement on Esk Street. The basement of this building to the edge the Esk Street footpath, and prism glass set into the footpath in order to bring daylight into this area. In turn, when electric lights were on in the evening, the footpath would have glowed. The pavement lights are currently covered, but they could be exposed in the footpath or this feature could be incorporated into the new entryway of the HWR Tower.

5 Conclusions and Recommendations

The redevelopment of the inner-city block bounded by Tay, Dee, Esk, and Kelvin Streets proposed by HWCP aims to bring life back to Invercargill's CBD. As is discussed throughout Woods et al (2018), this inner-city block lacks vibrancy and it has low occupancy rates, with almost none of the first floors being occupied throughout the block. The Invercargill Central redevelopment will bring people back into the city, and this will benefit local business, provide a sense of community pride, and will be a much-needed gathering place.

While this project is anticipated have tremendous benefits, both in the short and long term, it will have a significant effect on heritage and archaeology. Woods et al (2018) has provided well defined criteria for assessing the heritage values of the buildings and sites within the block, and measures for determining the magnitude of the impact. While the quantity of buildings to be demolished is considerable, the individual heritage values of those buildings varies with greater numbers having low heritage value compared with those of high values. The contextual values (the value as a group) is however, considered moderate to high. The redevelopment does retain the preeminent heritage building on the block, the Category 1 listed Bank of New South Wales, and it will incorporate three additional heritage façades into the design which acts to maintain contextual value as a proportion of the original. That is to say, the façades chosen for retention represent the whole block rather than having selected just the buildings with individual high values.

The design calls for the demolition of all other buildings, and as such many heritage and archaeological buildings will be lost. In considering the overall values and significance of effect, against the merits of the project and quality of the design NZHP recommends that the project should proceed and consent should be given, subject to appropriate mitigation measures.

A summary of the assessment of effects on heritage and archaeological values is provided below, followed by a recap of the suggested mitigative measures.

Summary of Assessment of Effects and Recommendations

1. **Demolition of a Listed Building (Appendix II.2).** The proposed demolition of the Lewis & Co Building (29 Esk Street) and the Newburgh Building (33 Dee Street) constitutes a non-complying activity under Rule 3.8.9 and will have a major adverse effect on the heritage values. The poor condition of the Newburgh Building means that strengthening and adaptive re-use is not feasible without the loss of heritage fabric, and without this fabric, the connection to its heritage values are all but lost. The demolition of the Newburgh Building also necessitates the loss of the adjacent Lewis & Co Building, where adaptive re-use may have been better-suited. On the balance of this evidence, the significant loss of heritage can be mitigated with measures outlined in Section 4 including the recording of each building to a Level III standard, prior to demolition, as per the Heritage New Zealand guidelines for the recording of built structures (HNZPT, 2018). Therefore, NZHP recommends that demolition of these buildings be consented subject to mitigation measures.

   Demolition of a Scheduled Building (Appendix II.3). The proposed redevelopment seeks to demolish 14 buildings that are scheduled on Appendix II.3 of the District Plan, which is a is a discretionary activity under Rule 3.8.6. An evaluation of the heritage values of these buildings has shown that 13 have low and one has medium heritage value. Based on this values assessment and the magnitude of the impact, the overall significance of effects is considered slight to moderate for all buildings apart from Fairweather's Building, where the redevelopment will have a moderate effect. The buildings of local significance within Block II that are scheduled for demolition currently show a low rate of occupancy and are suffering from neglect (particularly the first floors). Some buildings have areas that have been sealed off for several decades, indicating they have been unfit for purpose for a prolonged period. The condition of the buildings indicates that each would require seismic strengthening to bring it up to acceptable building code. The heritage assessment survey identified that some heritage fabric remains in the first floors; although, the

ground floors were nearly devoid of any original fabric. On the basis of all evidence, the loss of heritage in this category can be mitigated. NZHP recommends that the demolition of these buildings be consented with mitigative measures, as discussed in Section 4.

2. **Partial Demolition of a Listed Building (Appendix II.2).** The partial demolition of the Southland Times Building (67 Esk Street) and alterations to the façade constitutes a non-complying activity under the rules of the district plan and will have a moderate adverse effect on the heritage values. Retaining the façade will be beneficial to the redevelopment in that it will maintain part of a key historic building that has considerable architectural, cultural, and historic values. This façade will also provide architectural balance with Coxhead's Building (31-35 Esk Street), which will also be retained at the west end of Esk Street, and the Cambridge Arcade (59-61 Esk Street) in the centre of this side of the block. NZHP supports the retention of the Southland Times façade; however, we recommend the alterations follow best practice standards of façade retention. According to guidelines developed by HNZPT for successful façade retention, a façade should retain original elements and detailing, the design should include at least one-room depth of the original structure, modifications above floor level should be avoided, and views to the sky should be avoided (NZHPT, 2007). NZHP has included recommendations to this effect and after discussion with the design team, they have since considered these recommendations including avoiding "views to the sky". Consideration has also been given to the mass of the building to the east of the Southland Times. This reflects the former police station so that the Esk Street frontage reflects the historical streetscape, while the building to the west has been designed to mirror this structure in order to frame the retained façade and highlight it as a heritage asset. NZHP supports this design. NZHP recommends that the physical loss of the remaining parts of the building be offset by mitigative measures, as discussed in Section 4.

3. **Façade Alteration of Scheduled Buildings (Appendix II.3).** The partial demolition and retention of the façades of two buildings scheduled on Appendix II.3 of the Heritage Register is a restricted discretionary activity under Rule 3.8.4 of the District Plan, and the overall significance of effects has been assessed as moderate. NZHP supports the retention of the façades for Coxhead's Building and the Cambridge Arcade; however, as the final design develops, it is important that alterations of these façades are kept to a minimum and that respect is given to the original ornamentation and materials as recommended in the ICOMOS NZ Charter (2010) and by HNZPT (2007). NZHP has recommended that sash windows are used for all first-floor windows and that connection to the building interior be maintained through these windows (i.e., none are blocked or show the sky). In addition, the existing glass should be retained where possible. The design team has adopted these recommendations and will align the new internal layout to datums on the façades to ensure that each structure continues to function as a recognisable building. The buildings that have been selected for façade retention represent key architectural styles represented in the block today and are excellent examples to retain for posterity; moreover, there are significant important historical links to Coxhead Brothers photography and Frederick Burwell, the "architect of Invercargill", as well as to A C Ford, the architect responsible for Invercargill's Art Deco aesthetic. The retention of these façades along Esk Street rather than distributed around the block will allow for the public to better appreciate the range of heritage building styles characteristic of the city by being able to observe them together, and the partial pedestrianisation of Esk Street means people will be encouraged to spend more time interacting with the retained façades than if they were preserved on one of the other streets. While the façades of these buildings will be retained, the remaining portions of these buildings will be demolished. As such, it is important that this physical loss be offset by mitigative measures, as discussed in Section 4.

4. **Removal of Street Furniture (Appendix II.4)**. The removal of the verandah posts is a discretionary activity under Rule 3.8.7 and is considered to constitute a moderate to large adverse effect. This action will see an important piece of heritage fabric lost from Block II. Considering that most of the buildings in the block will be demolished, retaining the verandah posts is not in keeping with the redevelopment. To

mitigate for this significant loss of fabric, NZHP has recommended that the design of the verandah for the building to replace Fairweather's Building (58 Tay Street) be reconsidered to include a reinterpretation of the historic verandah, and that some verandah posts be repurposed throughout the development and/or retained for reuse elsewhere in the city.

5. **Effects on Existing Heritage Structures**. NZHP supports the retention of the Bank of New South Wales and the use of the buildings on either side of the Bank of New South Wales to contrast against, frame and highlight the high quality and value of this structure. Measures should be put in place to minimise potential damage to the building during works in the surrounding area, including the implementation of a vibration plan.

6. **Effects on Archaeology.** The redevelopment of Block II will have a major adverse effect on its archaeological resources, including the demolition of 14 pre-1900 buildings, partial demolition of one pre-1900 building, and impacts to subsurface archaeological features across the block. As such, NZHP makes the following recommendations:
    - The client apply for an archaeological authority from Heritage New Zealand Pouhere Taonga to disturb the archaeological sites listed in Table 3-7 (apart from E46/39). Please note that E46/66 and E46/32 will not be affected by the redevelopment and impacts to the kerbstones in Dee Street (E46/39) must be avoided.
    - The 14 pre-1900 buildings scheduled for demolition be recorded to a Level III standard by a qualified archaeologist (pre-1900 portions only).
    - Demolition of the buildings be monitored by an archaeologist.
    - All earthworks that may affect an archaeological site must be monitored (stand-over monitoring) and any features and deposits be recorded by an approved archaeologist according to best practice standards.
    - All archaeological features be recorded in full, even when this requires deeper or more extensive excavations than required for the development.
    - An archaeological management plan be developed for the redevelopment, subject to approval by HNZPT.
    - Consideration should also be given to the long-term storage of the artefact assemblage in a public repository.
    - A full report on the results of the archaeological monitoring, buildings recording, and artefact analysis will be required.

Summary of Mitigative Measures

1. **Consideration of Alternative Less Adverse Options.** At the beginning of this project, the inner-city redevelopment proposed to demolish all buildings in the project area to create a clean slate from which to work. Through extensive consultation with HNZPT, Buchan Group and HWCP, the design of the redevelopment has evolved and now incorporates four heritage façades, the Southland Times, Coxhead's Building and the Cambridge Arcade. The design also follows the lines and mass of the historic buildings, to provide a sympathetic overall design.

2. **Mitigation of the Effects of Demolition and Rebuild.** From a heritage perspective, greatest consideration should be given to the effects that demolition and rebuild activity might have on the remaining heritage assets, the Bank of New South Wales and the retained façades, and how secondary impacts will be minimised. Screening mechanisms and mitigation of the effects on earthworks must be addressed under Rules 3.8.4 (D-E) and 3.8.10 (F) of the District Plan. Mitigation will include operation under a vibration plan, adherence to proposed methods of façade retention and stabilisation, and the installation of hoardings. NZHP recommends that B Class hoardings be used that are customised to share with the public the story of the redevelopment and the history of key buildings and identities.

3. **Building Recording.** NZHP recommends that buildings on Appendix II.2 and II.3 scheduled for demolition or façade alteration be recorded under Rules 3.8.10 (I) and 3.8.4 (I) of the District Plan, apart from those pre-1900 buildings that will be demolished and will trigger this requirement under the Heritage New Zealand Pouhere Taonga Act 2014. The level of recording be commensurate with the significance assessment and follow the HNZPT standards for building recording (Heritage New Zealand, 2018).

4. **Reuse of Building Material.** Rule 3.8.10 (D) of the District Plan identifies that the potential for reuse and/or recycling of materials or heritage features be addressed. NZHP recommends that building materials be salvaged for reuse in the redevelopment or made available to other heritage building owners. The design team have taken these recommendations into consideration and plan to use bricks salvaged from the demolished heritage buildings for panels and low level interventions in the food precinct.

5. **Public Interpretation.** NZHP recommends that the information gathered during the historical research, archaeological investigations and that collected during the recording of the post-1900 buildings is disseminated to the public upon completion of the project and, if possible, incorporated into the redevelopment. Consideration should be given to installation of interpretive panels, displays of archaeological material and/or interactive installations in public areas such as the food court or courtyards.

6. **Strengthening of Existing Heritage Resources.** The former Bank of New South Wales is protected by a heritage covenant and its inclusion in the redevelopment will also secure its restoration in accordance with its conservation plan as well as ensuring ongoing maintenance. As HWCP do not yet own this building, there are no current plans to alter or adapt it, but in the future, consideration must be given to the requirements of the covenant. As per that covenant, an updated conservation or maintenance plan could be considered and/or requested by Heritage New Zealand.

7. ***In Situ* Preservation of Archaeological Materials.** One of the most tangible ways to maintain a site's links to past occupation and incorporate these into the new design is through the preservation of historical or archaeological features in situ. Incorporating extant archaeological and historic features is dependent on what is identified, their location, and the flexibility of the design team.

6 References

Bargery, R. (2005). The Ethics of Facadism: Pragmatism versus Idealism. Retrieved June 19, 2018, from http://www.buildingconservation.com/articles/facadism/facadism.htm

BMC. (2018a). Detailed Seismic Assessment Report. Government Life Building, 33 Dee St, Invercargil, 9810 [DRAFT]. Christchurch: Unpublished Report Prepared by BMC.

BMC. (2018b). Detailed Seismic Assessment Report. Southland Times Building, 67 Esk Street, Invercargill, 9810. Christchurch: Unpublished Report Prepared by BMC.

Curl, J. S. (2006). Facadism. Retrieved June 19, 2018, from http://www.oxfordreference.com.ezproxy.otago.ac.nz/view/10.1093/acref/9780198606789.001.0001/acref-9780198606789-e-5556

Farminer, A., & Miller, R. (2016). Invercargill City: Central City Area Heritage Buildings re-Assessment 2016. Origin Consultants.

Heritage New Zealand. (2014). *Investigation and Recording of Buildings and Standing Structures*. Wellington: Heritage New Zealand Pouhere Taonga.

Heritage New Zealand Pouhere Taonga. (2018). Investigation and Recording of Buildings and Standing Structures. Wellington: Heritage New Zealand Pouhere Taonga.

ICOMOS. (2010). ICOMOS New Zealand Charter for the Conservation of Places of Cultural Heritage Value. ICOMOS.

NZHPT. (2007). *Sustainable Management of Historic Heritage Guidance, Information Sheet 2* . Wellington: New Zealand Historic Places Trust Pouhere Taonga.

Schumacher, T. (2010). "Facadism" Returns, or the Advent of the "Duck-orated Shed." *Journal of Architectural Education*, *63*(2), 128–137.

SoRDS. (2015). *Action Plan 2015-2025*. Invercargill: Southland Regional Development Strategy.

Southland Times. (1877a). Page 2 Advertisements Column 3. Issue 2836, 20 July 1877. Retrieved from https://paperspast.natlib.govt.nz/newspapers/ST18770720.2.14.3

Southland Times. (1877b). Southland Times. Issue 2773, 17 May 1877. Retrieved from https://paperspast.natlib.govt.nz/newspapers/ST18770517.2.9

Woods, N. (2018). Dee Street Kerbing, Archaeological Assessment for Site No. E46/39. New Zealand Heritage Properties Limited.

Woods, N., Cropper, D., Mearns, L., Mitchell, P., McStay, A., & Cawte, H. (2018). Invercargill Central Development: A Heritage Imapct and Archaeological Assessment of Block II, Town of Invercargill. New Zealand Heritage Properties Limited.

Woolf, A. (2015). Invercargill's Esk St upgrade complete, but not everyone is happy. Retrieved January 23, 2019, from https://www.stuff.co.nz/southland-times/news/73883621/null

Appendix A Development Plans

BUCHAN

Master Planning. Architecture.
Interior Design. Brand Experience.

Invercargill Central / RESOURCE CONSENT AMENDMENT
Design Statement **29 JANUARY 2019**

PROJECT SUMMARY

PREPARED FOR
HWCP

PROJECT NAME
INVERCARGILL CENTRAL

REVISION
00 31 JULY 2018
0A 18 SEPT 2018
0B 15 OCT 2018

AMENDMENTS
00 29 JAN 2019

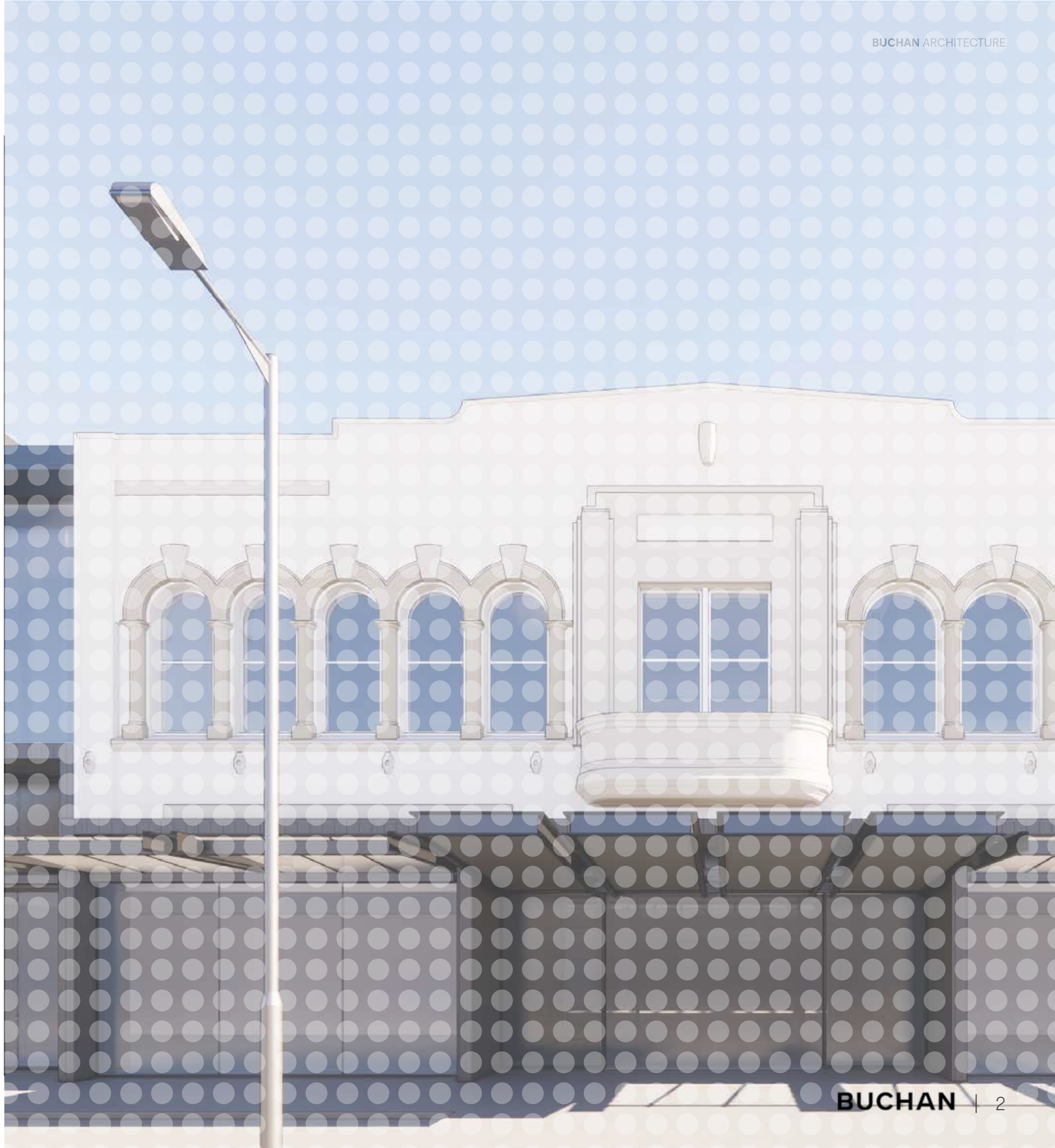
PREPARED & APPROVED BY
JAMES BURGESS
SENIOR ASSOCIATE & ARCHITECT

ON BEHALF OF
THE BUCHAN GROUP PTY LIMITED.

CONTACT
BUCHAN
144 Kilmore Street
Level 2
Christchurch

T +64 3 377 2973
E james.burgess@buchangroup.co.nz

Auckland **CHRISTCHURCH**
Brisbane Gold Coast
Melbourne Sydney
Perth London
Shanghai Dubai



CONTENTS

SUMMARY OF CHANGES

DESCRIPTION OF REVISIONS TO DESIGN FROM 15 OCT SUBMISSION

The submitted amendments and adjustments are limited to following key matters subsequent to the October submission:

- Massing adjustments - primarily to the car parking mass; with minor amendments to scale of commercial activities.
- Internal programme adjustments and refinement of leasing strategy
- Heritage review altering priority of heritage and cultural values leading to alteration of retention strategy.

There is and will continue to be design development of facade typologies and detail as the project contiunues - these developments will continue to be in keeping with the facade ordering strategies proposed to date.

OVER ARCHING DESIGN PRINCIPLES

The overarching design principles established within the 15 October submission continue to be relevant and remain current and should be referred to in addition to this submission.

Specifically being the following key philophies outlined within the 15 OCT submission:

- ACTIVATING THE STREET EDGE
- PROVISION OF A GATEWAY ENTRANCE
- STRENGTHENING OF EXISTING PEDESTRIAN ROUTES
- THE CREATION OF CENTRAL WEATHER PROTECTED PIAZZA
- A CLEAR PHASING STRATEGY OPERATION AND DELIVERY
- RESPECT OF EXISTING URBAN GRAIN AND FACADE ORDERING
- RESPECT OF EXISTING HERITAGE AND BUILD EDGE DATUMS
- RESPECT OF CANOPY HEIGHTS & STREET EDGE

MASSING ADJUSTMENT

Through design development; it was determined by the Design Team to be more appropriate to centralise the massing upon Tay Street and limit build over the eastern anchor retailer. This will relieve the façade wall length – whilst increasing resulting in marginal increase of one floor (3.1m) to the centre of the development.

This massing has resulted in a slightly reduced car park count from circa. 950 parks to circa. 850 parks.

In addition to the car park adjustment; market and tenant interest has resulted in the increase in mass of the Civic Precinct in the South East of the Development - framing the Bank of New South Wales. An additional floor of development has been added - to mitigate this additional mass; the top floor has been set back from the street edge. Maintaining a similar building mass heirachy between the Bank of New South Wales and it's neighbours.

The increased height of the car park mass will not impact Esk Street; due to the narrow nature of the street the car park will not be visible even from the northern footpath.

ADJUSTMENT TO INTERNAL PROGRAMME

Through leasing strategy development; the brief evolved to include an additional food destination. This revised programme freed space within the development to include for two additional laneways.

The Food Central destination has been located upon the Tay Street façade – providing a gateway activity and active frontage to the Tay Street edge. This additional food court will connect through an internal north south pedestrian laneway to Esk Street.

An additional internal street has been created behind Esk Street – whilst covered with a skylight the floor will be surfaced and treated as an internal lane with a variety of shopfront typologies within the base build to continue to narrate the nature of Esk Street being a series of individualised unique tenancies.

ADJUSTMENT TO CARPARK FACADE STRATEGY
'THE SOUTHERN LIGHTS'

Aspirationally; there is a desire to announce arrival to the
As Tay Street is a significant road corridor the desire has been to utilise this as a platform and backdrop to create active artificially lit facade reflecting the 'Southern Lights' pattern. This dynamic facade will not be a backdrop (as originally proposed) - but a beacon of arrival to Invercargill Central.

ADJUSTMENT TO TAY STREET FACADE (GROUND & FIRST)

The Design Team has evolved it's thinking in regards to glass fritting to level 01 (reflecting heritage stock) and are now impllementing contemporary facade to 10m datum across the Tay Street edge - utiliising a mix of glazing, steel, masonry and Swiss Pearl panelling.

HERITAGE REVIEW

Following feedback from Heritage New Zealand within the notified Resource Consent; The design team reassessed the submission and interpretation of Heritage Merit.

Within our original dialogue with Heritage New Zealand the design team believed it would be an appropriate approach to maintain heritage aspects to all four facades. This approach resulted in the proposed retention of the Thompsons Building (18 Kelvin Street) and the Fairweather Building (58 Tay Street). Upon reflection; neither building carried significant Heritage building stock merit or cultural connection to the Southland people.

It became apparent to the Design Team and applicant that the Cambridge Arcade façade was of greater Heritage and Cultural merit to retain than other buildings upon the site. The Design Team reviewed with this in mind to ensure a retention of building stock and city legibility of retained placemarks.

As such a revised masterplan was developed to incorporate the Cambridge Arcade façade into the Esk Street façade treatment. This recognisable façade will need ground floor alteration to make appropriate for a Retail street frontage and to reinstate an ordering of the façade to the level 01 façade – which had been lost over time through retail refurbishments.

DRAWING UPDATES

The drawing updates are largely limited to the above three key adjustments. The changes have been scheduled per sheet and description of changes narrated.

SUMMARY OF CHANGES

DESCRIPTION OF REVISIONS TO DESIGN FROM 15 OCT SUBMISSION

DOES IT INCREASE THE SCALE OR INTENSITY OF THE ACTIVITY

The primary change to scale of the development is to reduce the overall wall length of car park facade upon Tay Street.

Minor adjustments have occurred to overall development programme increasing the density to the Civic Precinct by a floor - This does not change the overall bulk and street scene of the any of the street edges.

DOES IT EXACERBATE OR MITIGATE THE IMPACTS OF THE ACTIVITY

As the mass has been consolidated centrally - then the overall massing of the development has been reduced and thus mitigated the effects of the activity.

SUMMARY OF CHANGES

DESCRIPTION OF REVISIONS TO DESIGN FROM 15 OCT SUBMISSION

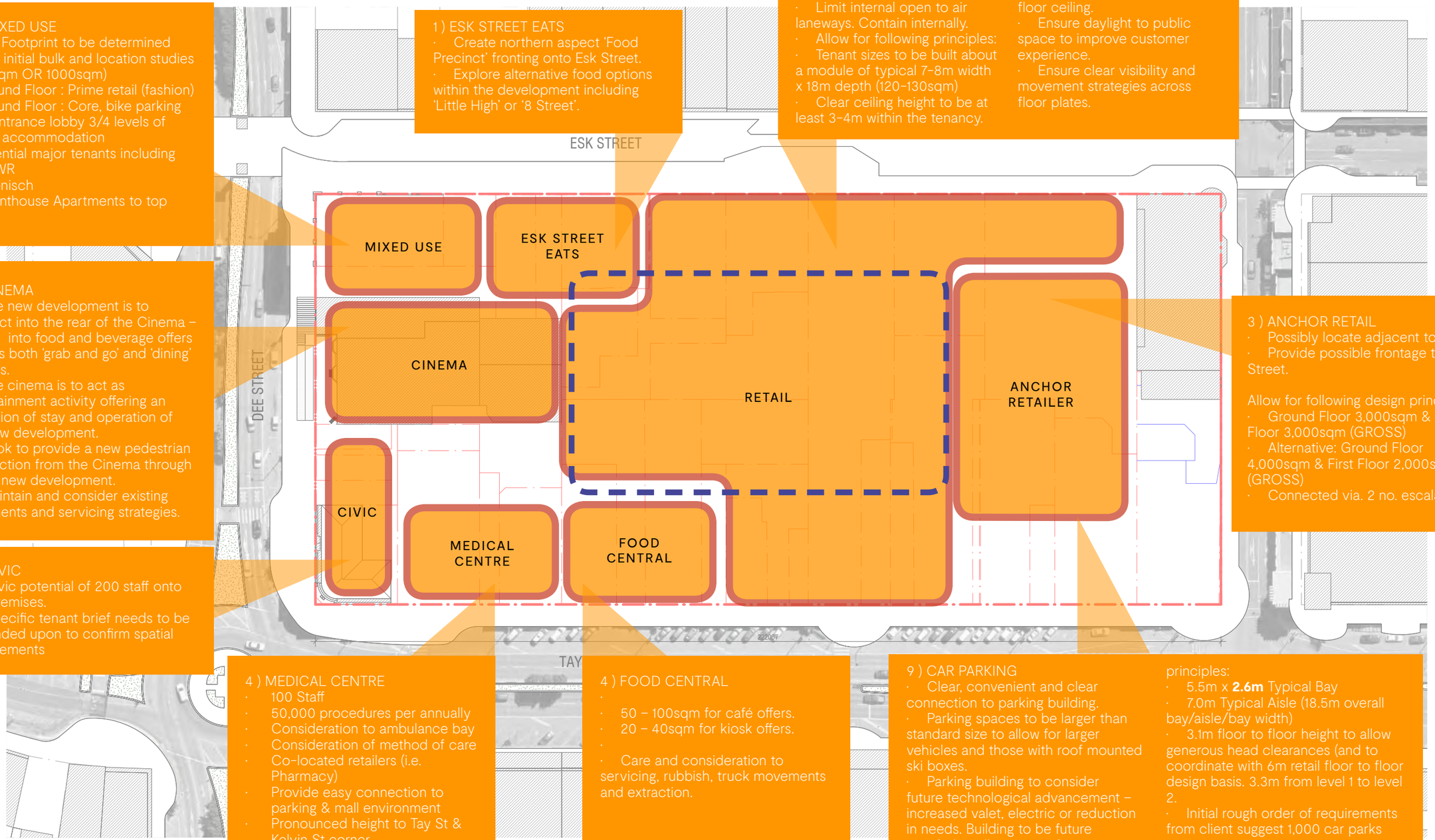
OLD DRAWING NUMBER	NEW DRAWING NUMBER	DESCRIPTION
1100	9100	Tay street entrance relocated. Enlarged medical centre footprint, Civic building footprint decreased (typical all floors). Food court relocated closer to Esk street frontage. Introduction of dining lane running north-south and food court by Tay street entrance with stair to piazza level. Removal of stair from Esk street to HWR building level 1. Commercial activity noted for building at corner of Tay and Kelvin(typical all floors)
1101	9101	Addition of voids to create double height space at ground floor. Car park shift south to Tay street boundary. Increased floor area of Commercial Activity at corner of Tay and Kelvin street.
1102	9102	Carpark cutback to not protrude over Anchor Retailer (typical all floor). Introduction of roof over Esk internal lane and dining lane concourse. Childcare facilities added above Anchor Retailer. Increased floor area of Commercial Activity at corner of Tay and Kelvin street.
1103	9103	Carpark cutback. Increased floor area of Commercial Activity at corner of Tay and Kelvin street.
1104	9104	Additional level of carparking. Additional level to medical centre.
1105	9105	Minimal to no change
1106	9106	Minimal to no change
1651	7010	Reconfigured layout resulting in a reduction in carparks from 171 to 134
1652	7011	Reconfigured layout resulting in a reduction in carparks from 191 to 175
1653	7012	Reconfigured layout resulting in a reduction in carparks from 297 to 183. Carpark cut back to not protrude over anchor retailer.
1654	7013	Reconfigured layout resulting in a reduction in carparks from 303 to 183. Carpark cut back to not protrude over anchor retailer.
	7014	Additional level of car parking - 186 carparks. Overall reduction of carparks from 962 to 859.
2000	9200	Refer to enlarged elevation summary
2005	9205	Refer to enlarged elevation summary
2006	9206	Refer to enlarged elevation summary
2007	9207	Refer to enlarged elevation summary
2010	9210	Three storeys at street frontage with height datum aligning with retained Southland times building façade. Removal on screens at level 1, replaced with fibre cement boards (or similar). Glass curtain walling at level 2.
2011	9211	Retaining of Cambridge arcade façade, adjacent facades height increased to match. General façade and material changes. Introduction of dining balconies directly off food tenancy's overlooking Esk street. Large roof cantilever decreased.
2012	9212	General façade and material changes. HWR facade refined, pitched roof at level 6, removal of stairs from Esk street to level 1. Facade raised in line with 31 Esk Street.
2020	9220	HWR facade refined, pitched roof added at level 6
2021	9221	Civic building façade height increased in height 1 metre to 18.800 metres.
2030	9230	Removal of civic building entrance. Medical Centre increased in width to align with retained troopers building façade. Level 4 added to medical centre 4.66m increase in height.
2031	9231	Carpark screen replaced with vertical fin screening on the Tay street boundary, extra lavel added to carpark. 4.8m increase in height to top of carpark screen. Screen beginning at 6 metre datum. General façade and material changes.
2032	9232	Amended to show a consistant 2 level datum at 12.8m above ground level. 6 storey massing remains unchanged. Removal of retained façade at number 58 Tay street. General façade and material changes. Carpark not visable due to being cutback so to not protrude over anchor retailer.
2040	9240	General façade and material changes. Overall massing remains unchanged.
2041	9241	Removal of retained façade at number 18 Kelvin street. Minimal to no change
3000	9300	All changes described in elevations summary
3001	9301	All changes described in elevations summary
3002	9302	All changes described in elevations summary
7000	9700	Little or no additional shadowing
7001	9701	Little or no additional shadowing
7002	9702	Little or no additional shadowing
7003	9703	Little or no additional shadowing
7004	9704	Little or no additional shadowing
7005	9705	Little or no additional shadowing

AMENDED ORDERING

8) MIXED USE
- Site Footprint to be determined within initial bulk and location studies (700sqm OR 1000sqm)
- Ground Floor : Prime retail (fashion)
- Ground Floor : Core, bike parking and entrance lobby 3/4 levels of office accommodation
- Potential major tenants including
  - HWR
  - Bonisch
  - Penthouse Apartments to top floor.

1) ESK STREET EATS
- Create northern aspect 'Food Precinct' fronting onto Esk Street.
- Explore alternative food options within the development including 'Little High' or '8 Street'.

2) GENERAL RETAIL
- Provide a strong Esk Street retail frontage.
- Limit internal open to air laneways. Contain internally.
- Allow for following principles:
- Tenant sizes to be built about a module of typical 7-8m width x 18m depth (120-130sqm)
- Clear ceiling height to be at least 3-4m within the tenancy.
- Allow floor to floor within mall (as basis of design) 6m ground to first with a lower first floor ceiling.
- Ensure daylight to public space to improve customer experience.
- Ensure clear visibility and movement strategies across floor plates.



7) CINEMA
- The new development is to connect into the rear of the Cinema – joining into food and beverage offers to suits both 'grab and go' and 'dining' options.
- The cinema is to act as entertainment activity offering an extension of stay and operation of the new development.
- Look to provide a new pedestrian connection from the Cinema through to the new development.
- Maintain and consider existing easements and servicing strategies.

3) ANCHOR RETAIL
- Possibly locate adjacent to H&J's
- Provide possible frontage to Esk Street.

Allow for following design principles:
- Ground Floor 3,000sqm & First Floor 3,000sqm (GROSS)
- Alternative: Ground Floor 4,000sqm & First Floor 2,000sqm (GROSS)
- Connected via. 2 no. escalators.

6) CIVIC
- Civic potential of 200 staff onto the premises.
- Specific tenant brief needs to be expanded upon to confirm spatial requirements

4) MEDICAL CENTRE
- 100 Staff
- 50,000 procedures per annually
- Consideration to ambulance bay
- Consideration of method of care
- Co-located retailers (i.e. Pharmacy)
- Provide easy connection to parking & mall environment
- Pronounced height to Tay St & Kelvin St corner

4) FOOD CENTRAL
-
- 50 – 100sqm for café offers.
- 20 – 40sqm for kiosk offers.
-
- Care and consideration to servicing, rubbish, truck movements and extraction.

9) CAR PARKING
- Clear, convenient and clear connection to parking building.
- Parking spaces to be larger than standard size to allow for larger vehicles and those with roof mounted ski boxes.
- Parking building to consider future technological advancement – increased valet, electric or reduction in needs. Building to be future proofed to allow re-configuration or conversion.
- Entrance and Exit to be tidal.
- Space planning to follow following principles:
- 5.5m x **2.6m** Typical Bay
- 7.0m Typical Aisle (18.5m overall bay/aisle/bay width)
- 3.1m floor to floor height to allow generous head clearances (and to coordinate with 6m retail floor to floor design basis. 3.3m from level 1 to level 2.
- Initial rough order of requirements from client suggest 1,000 car parks

NOTE:
THIS IS NOT A RETAIL PLAN.
ORDERING STRATEGY ONLY FOR ZONES/ PRECINCTS.

HERITAGE CONTEXT

HERITAGE REVIEW

Following feedback from Heritage New Zealand within the notified Resource Consent; The design team reassessed the submission and interpretation of Heritage Merit.

Within our original dialogue with Heritage New Zealand the design team believed it would be an appropriate approach to maintain heritage aspects to all four facades. This approach resulted in the proposed retention of the Thompsons Building (18 Kelvin Street) and the Fairweather Building (58 Tay Street). Upon reflection; neither building carried significant Heritage building stock merit or cultural connection to the Southland people.

In the Design Team's opinion; The Cambridge Arcade façade was of greater Heritage and Cultural merit to retain than other buildings upon the site. The building and arcade has formed a key mid-block pedestrian link and it's retention - and repurposing into a modern retail mall with connections through to Tay Street will allow this function to remain - and thus keep a degree of continuity of streetscape legibility to the Central Business District.

As such a revised masterplan was developed to incorporate the Cambridge Arcade façade into the Esk Street façade treatment. This façade will need ground floor alteration to make appropriate for a Retail street frontage and to reinstate an ordering of the façade to the level 01 façade – which had been lost over time through retail refurbishments.

(59-61 ESK STREET) CAMBRIDGE ARCADE
(40 TAY STREET) CAMBRIDGE BUILDINGS

The internal arcade environment of the Cambridge Building isn't suitable for modern retail environment proposed for the centre.

That being said; the Arcade does form a cultural connection (similar to the Southland Times) as such the masterplan intends to align the new entrance to the retail entrance to that of Cambridge Arcade. Creating a sense of memory and acknowledgement of the history of place.
In addition; following consultation with Heritage New Zealand; The Cambridge Building are proposed for facade retention.

REVISED BUILDINGS PROPOSED FOR RETENTION

(18 KELVIN STREET) THOMPSONS
(58 TAY STREET) FAIRWEATHERS

Within the October submission; the Design Team had proposed that these buildings could be retained - further design development has led the Design Team to view these buildings to have limited merit when sitting in isolcation from adjacent heritage stock. These buildings are not of significant merit in themselves - in the view of the Design Team. As such the buildings are proposed for demolition.

HERITAGE CONTEXT

SOUTHLAND TIMES REFURBISHMENT STUDY

As part of the initial studies of the site; A retention of the Southland Times – in the entirety of the 1908 build was considered.

To achieve a rounded assessment of repurposing the Southland Times building; not only was an assessment of the costs associated with restoring the building to a compliant 100% NBS rating – but an architectural redesign would be required with an assessment of required building services works involved in upgrading to a modern compliant building.

From an architectural point of view; The Southland Times has not been designed to suits the needs of modern retailing needs. Primarily this is due to the limited entrance into the Southland Times building through existing entrance upon the western edge. As such; the façade would require adjustment to introduce further retail frontage - which requires significant modification to the ground floor entrance ways. We note that the original Southland Times entrance was Centrally located - suggesting the proposed adjustments to the facade are appropriate moves.

Moving into the development – this existing entrance leads directly to a stair core not the shop floor – not having this direct connection isn't desirable outcome for a retailer – but sits well with it's original purpose of office functions to upper levels – with a limited customer services area – however this lack of flexibility in floor plate arrangement has limited it's desirability to the market since the departure of the Southland Times.

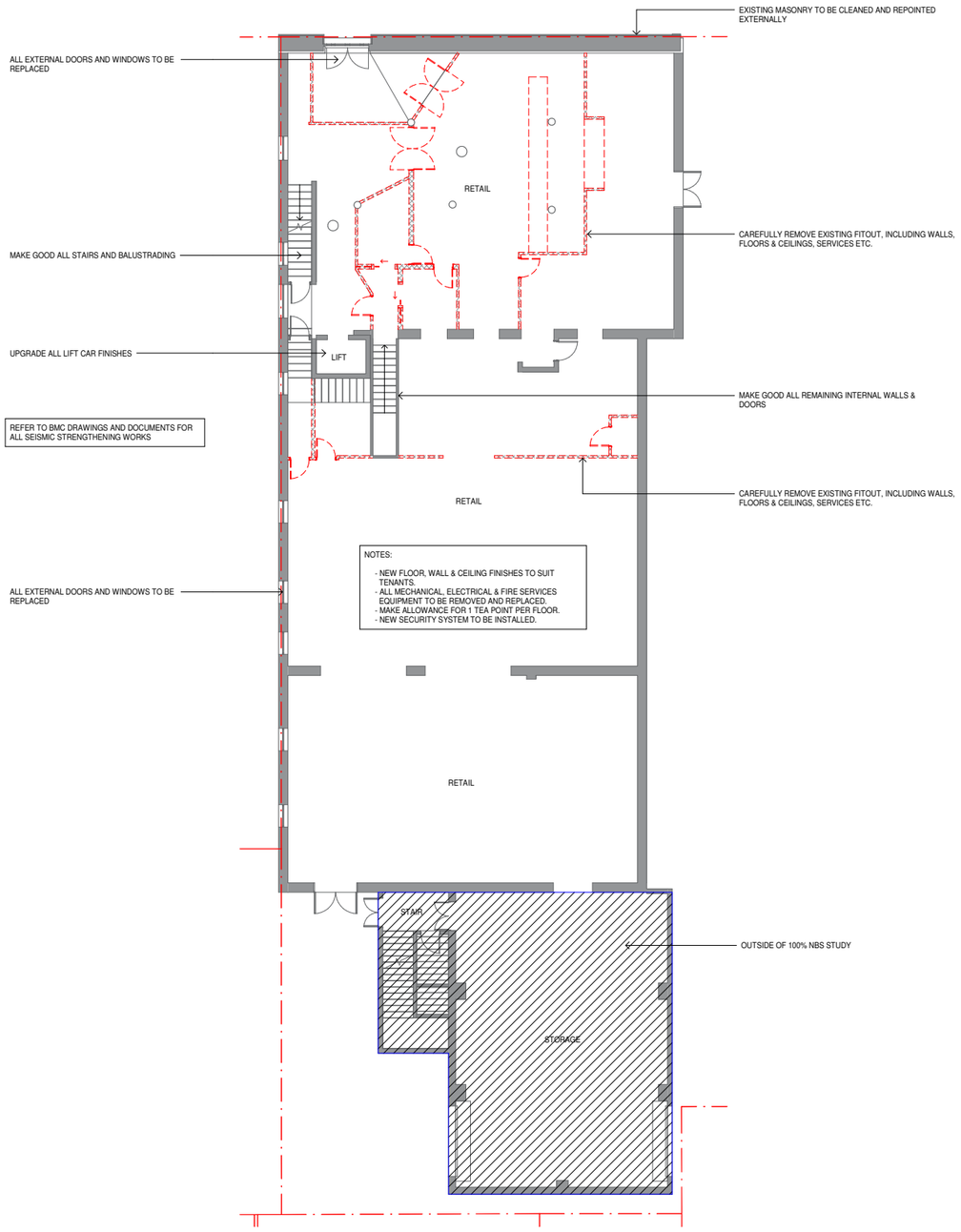
The floor plates internally are fragmented in three blocks leading back from the façade edge with limited spatial qualities of merit. Upon the ground floor – this would result in limited function of retail past the first structural bay - if it was financially viable to do so. Alternative uses would need to be considered of secondary commercial nature. The floor plan of first and second floor accommodation for office or other commercial use would be fragmented not suitable for the needs of a modern commercial office occupier.

Without addressing these issues; mentioned prior – to bring the Southland Times back to condition appropriate to be brought to market the following scope was established which includes the following high level requirements:

- Complete strip out of existing fitout including walls, floor and ceiling finishes, services etc
- Introduction of all Seismic Strengthening works as outlined in BMC's report
- Cleaning and re-pointing of existing masonry externally.
- Upgrading of existing windows & doors.
- Making good to existing stairs and balustrades, remaining interior walls and doors
- New floor, wall and ceiling finishes to suit tenantable spaces
- 1 Tea point per floor
- Replacement of Mechanical, Electrical and Fire Services
- Upgrading of lift car finishes
- Installation of a security system

Further to the constraints facing the building itself; Retaining the 1908 build of the Southland Times significantly reduces planning flexibility for the balance of the development site. The building sits in board of site boundaries – and has a significant depth. This compromises the potential locations of the proposed major anchor tenant floor plates – or rotational and effective car parking fields. Keeping the 1908 build of the Southland Times would require a reversion to planning strategy focussed on activating the external edges of development rather than knitting together a mixed use retail led development through internal networks and negate the potential of larger space activities being brought to the site.

After assessment – including input from Structural and Commercial lens; this was not identified as a viable alternative for refurbishment.



HERITAGE CONTEXT

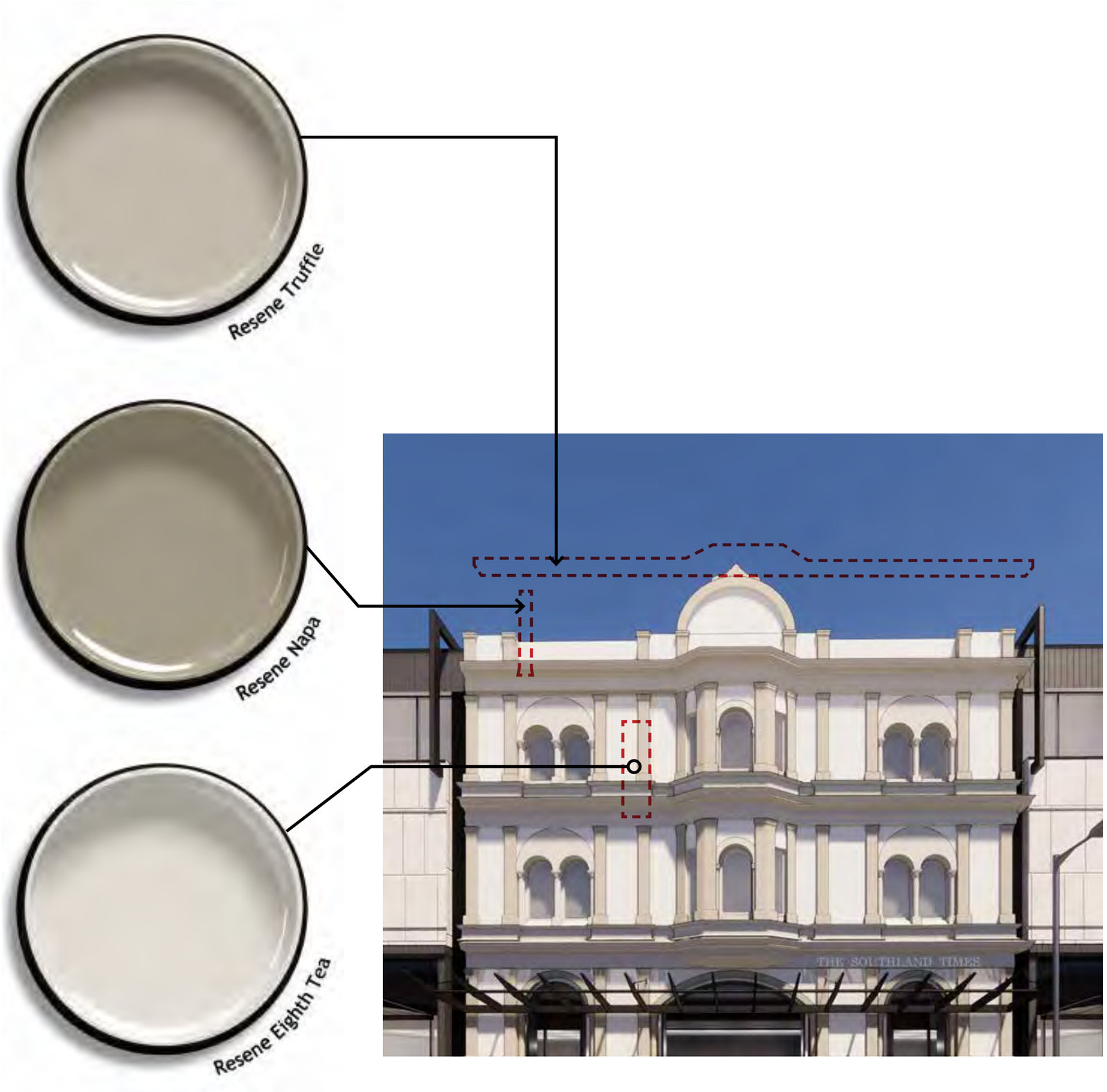
SOUTHLAND TIMES FAÇADE RETENTION

The planning of the development has been arranged to provide entrance to the Anchor Retailer through the ground floor of Southland Times Façade – This in itself will achieve a long term appropriate outcome for the façade. The mass of the façade sits appropriately with the mass of the two storey retailer proposed behind – thus allowing for long term upper level activation. As a destination; the Southland Times façade will become a significant and recognisable place maker for the Invercargill Central development.

The primary move upon the Southland Times façade proposed is to open entrance ways within the ground floor through combining existing openings and returning these through the granite tile podium to the street front. These interventions will cause significant disturbance to the existing façade – however as an outcome will look appropriate and in keeping with the existing arrangement of the façade.

To the upper floors; it is proposed to paint the exposed brickwork – this will remedy issues with the existing brick work and pointing. The new façade will be transformational for the façade – a pristine façade with it's heritage elements in tact – suitable for future repurpose as a gateway to a shopping destination. The colours proposed for the façade are tones of white and neutrals from the Resene Colour Swatch library including the following:

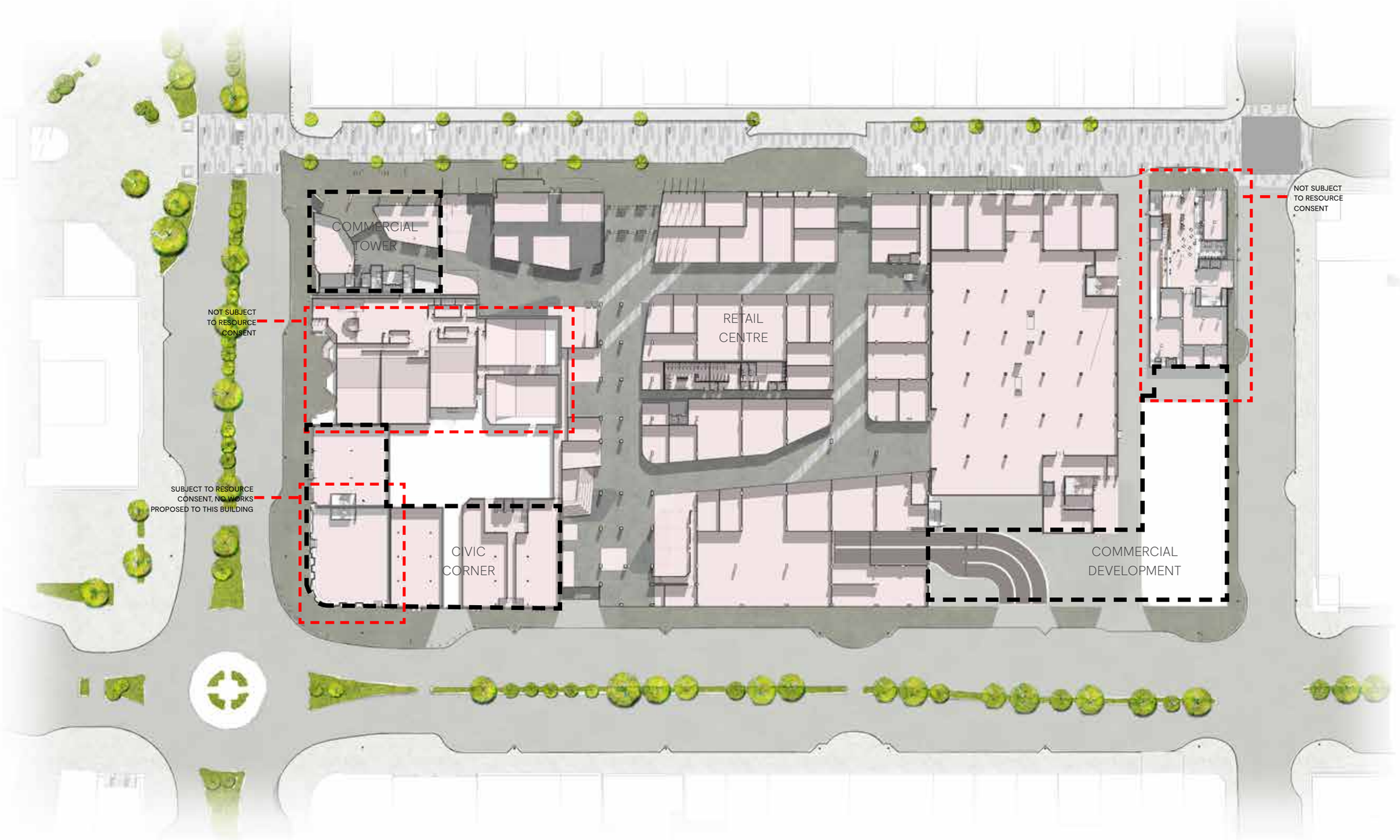
Area	Colour Code	Description
Painted Body	Resene Eighth Tea	Exposed Brick Work and Areas of replaced panel works.
Accent no.01	Truffle	Lateral Banding
Accent no.02	Napa	Cornices / Details



Invercargill Central / Amended Submission

ILLUSTRATIVE MASTERPLAN

LEVEL 00



ILLUSTRATIVE MASTERPLAN

LEVEL 01

ILLUSTRATIVE MASTERPLAN

LEVEL 02

ILLUSTRATIVE ELEVATIONS

ESK STREET

ESK STREET
NOT TO SCALE

MATERIAL

In redeveloping a central business district block – to create a series of recognisable destinations, to avoid over scaled massing and along with the creation of varied urban grain requires the utilisation of a broad palette of materials.

The palette was derived from exploring material selections within the existing block – the traditional brick construction with painted façade, capital details, canopy and veranda design. The response was to select materials with richness, textures and depth over a variety of scales which would echo that of the nature of what Esk and Tay Street in a contemporary manner.

The food precinct draws from local context with repurposed brick from the existing buildings used in low level interventions and panels. The entrance is framed by a glass pavilion building and countered by dark ceramic tile curved form leading pedestrians into the food precinct. Above which at the second storey datum height is a soaring roof blade announcing entrance and identifying the food precinct destination.

The fashion precinct entrance is found through the retained 'Cambridge Arcade' facade. The HWR building utilises a podium of dark ceramic tile with the upper level clad in terracotta panel. Glazing separating the two forms.

ILLUSTRATIVE ELEVATIONS

TAY STREET

TAY STREET

NOT TO SCALE

ILLUSTRATIVE ELEVATIONS

DEE STREET & KELVIN STREET

DEE STREET

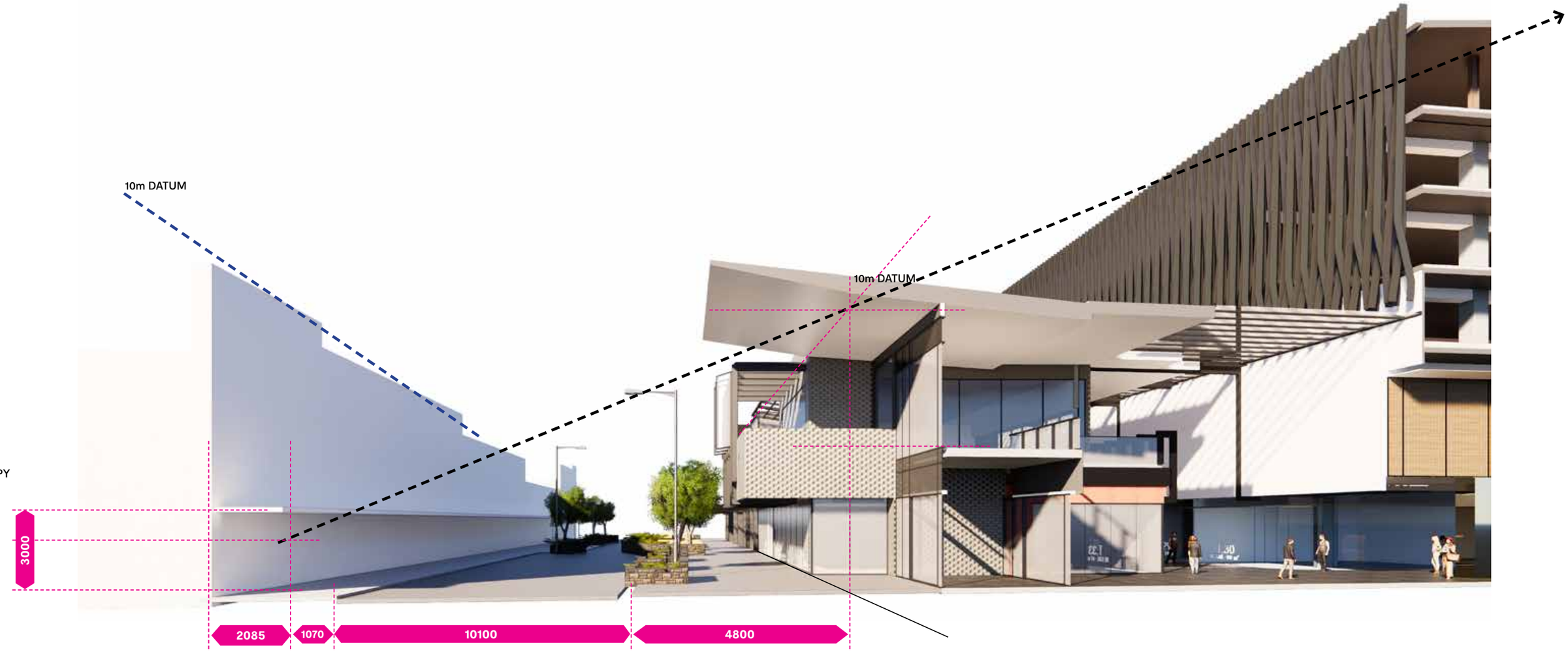
NOT TO SCALE

KELVIN STREET

NOT TO SCALE

STREET SCENE ADJUSTMENT

ESK STREET



SECTION THROUGH ESK STREET ENTRANCE

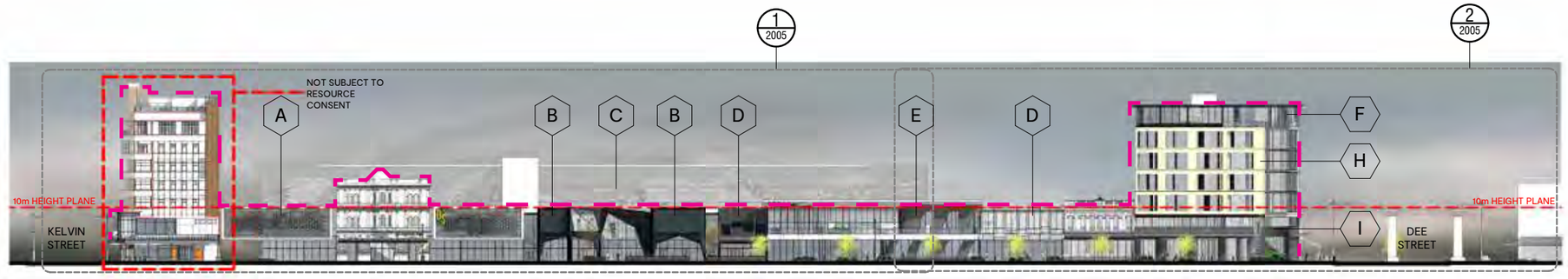
ESK STREET STREET SCENE

A key design principle of the massing arrangement was to set the car park back from the Esk Street edge – to visually obstruct views from the street to this mass.

The illustrative section demonstrates how – the building mass edge still achieves this

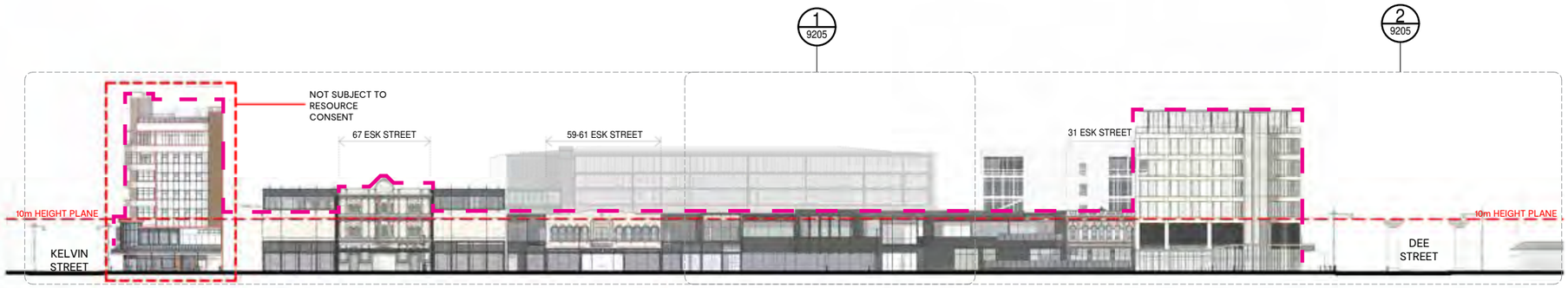
MASS ADJUSTMENT

ESK STREET



1 1110 OVERALL ESK STREET ELEVATION - NORTH

1 : 500



1 OVERALL ESK STREET ELEVATION - NORTH

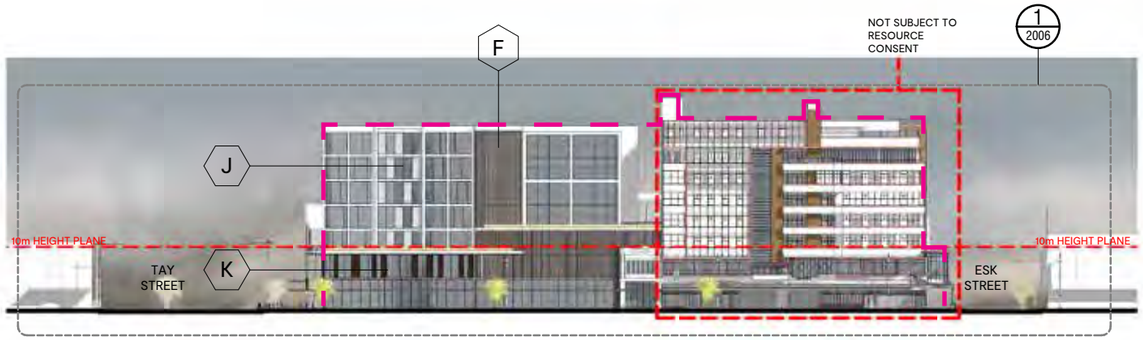
1 : 500

MASS ADJUSTMENT - ESK STREET

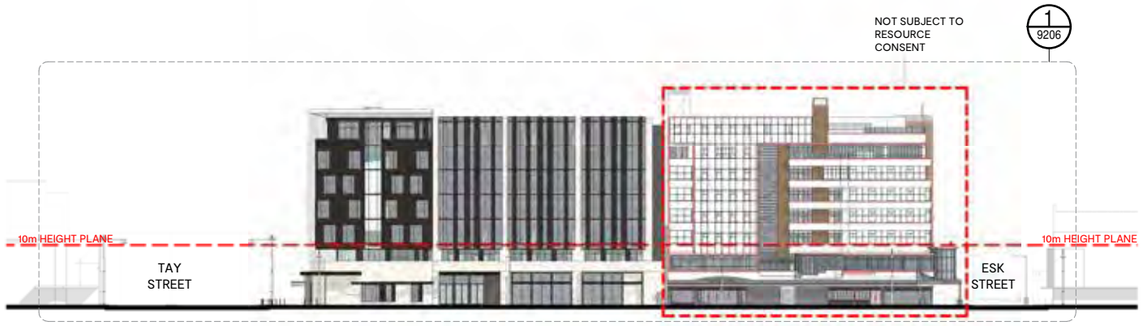
There has been limited adjustment to massing across the Esk Street edge. Limited to minor adjustments to frame the Southland Times with an increase in mass adjacent on either side - complementing the mass of the Southland Times.

MASS ADJUSTMENT

KELVIN STREET



4 1110 OVERALL KELVIN STREET ELEVATION - EAST
1 : 500



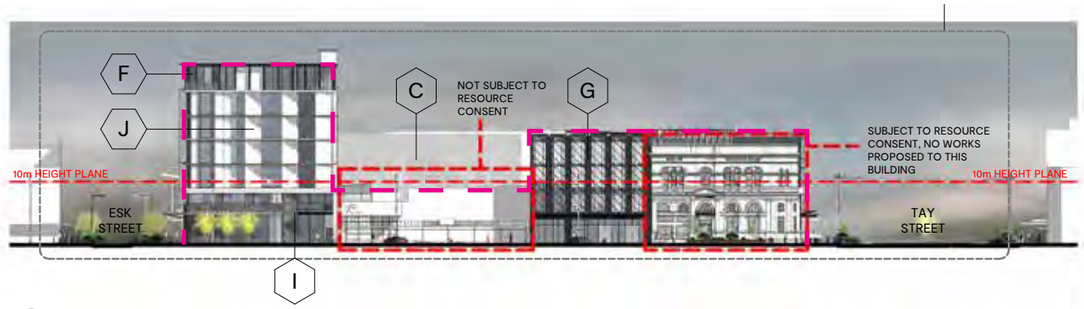
4 OVERALL KELVIN STREET ELEVATION - EAST
1 : 500

MASS ADJUSTMENT - KELVIN STREET

Minor adjustments to Kelvin Street limited to the deletion of the Thompsons Building – which did not sit comfortably within the streetscape.

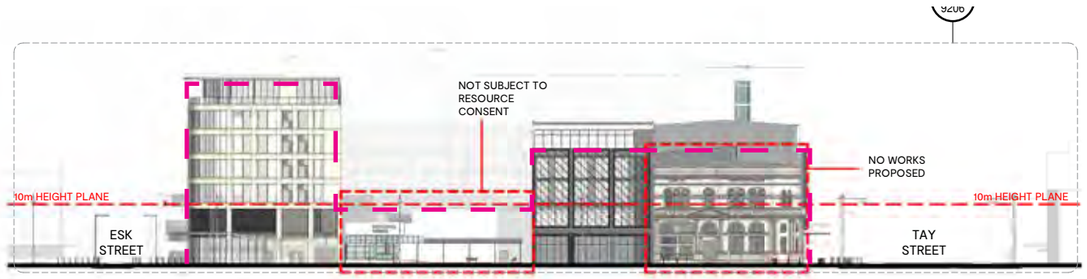
MASS ADJUSTMENT

DEE STREET



2 / 1110 OVERALL DEE STREET ELEVATION - WEST

1 : 500



2 OVERALL DEE STREET ELEVATION - WEST

1 : 500

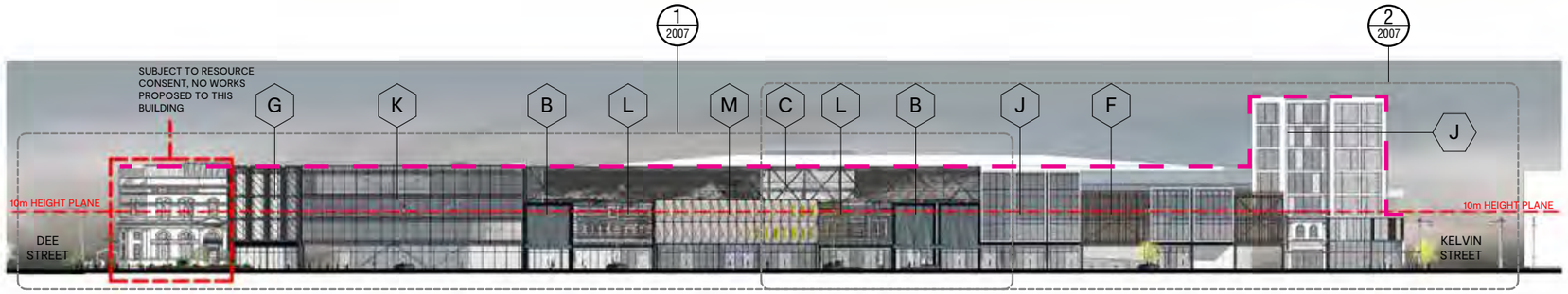
MASS ADJUSTMENT - DEE STREET

Minor massing increase adjacent to the Bank of New South Wales.

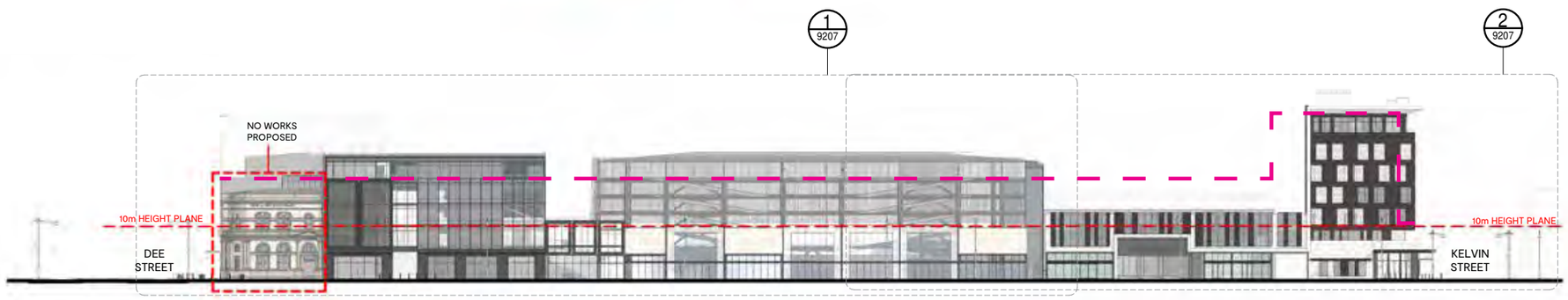
HWR Building remains consistent mass to earlier submissions.

MASS ADJUSTMENT

TAY STREET



TAY STREET - NOTIFIED SUBMISSION (OCT 2018)



TAY STREET - REVISED SUBMISSION (JAN 2019)

MASS ADJUSTMENT - TAY STREET

Through design development; it was determined by the Design Team to be more appropriate to centralise the massing upon Tay Street and limit build over the eastern anchor retailer. This will relieve the façade wall length – whilst increasing resulting in marginal increase of one floor (3.1m) to the centre of the development.

This massing has resulted in a slightly reduced car park count from circa. 950 parks to circa. 850 parks.

SECTIONAL PERSPECTIVE

ESK STREET

SECTIONAL PERSPECTIVE

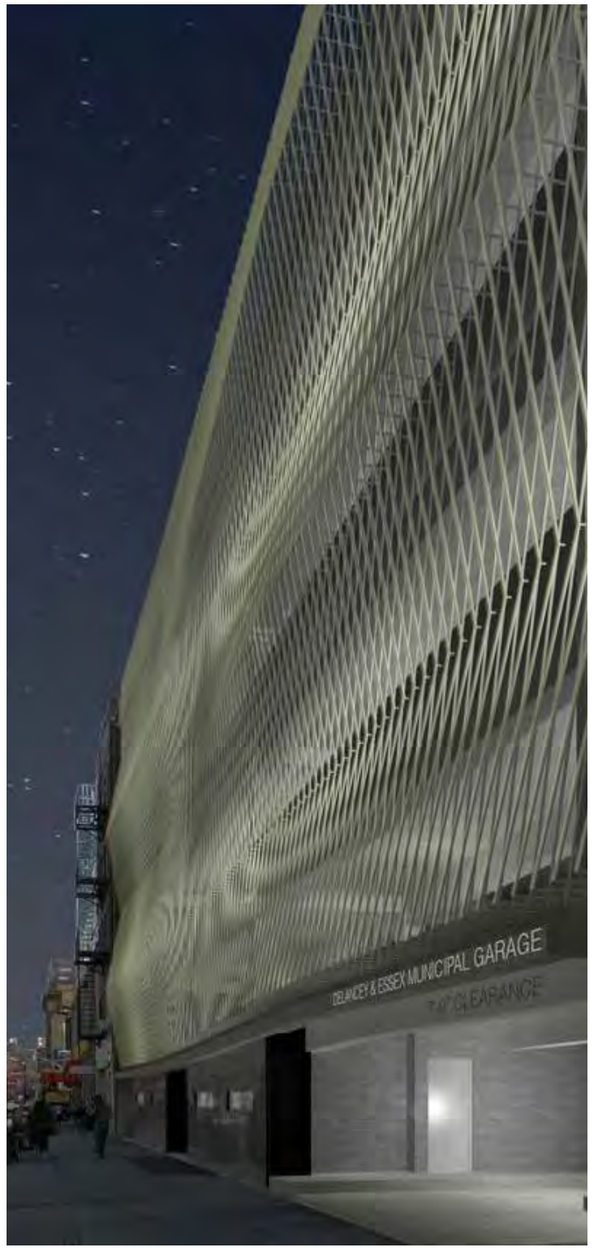
RETAIL ENTRANCE

SECTIONAL PERSPECTIVE

CIVIC SQUARE TO FOOD CENTRAL

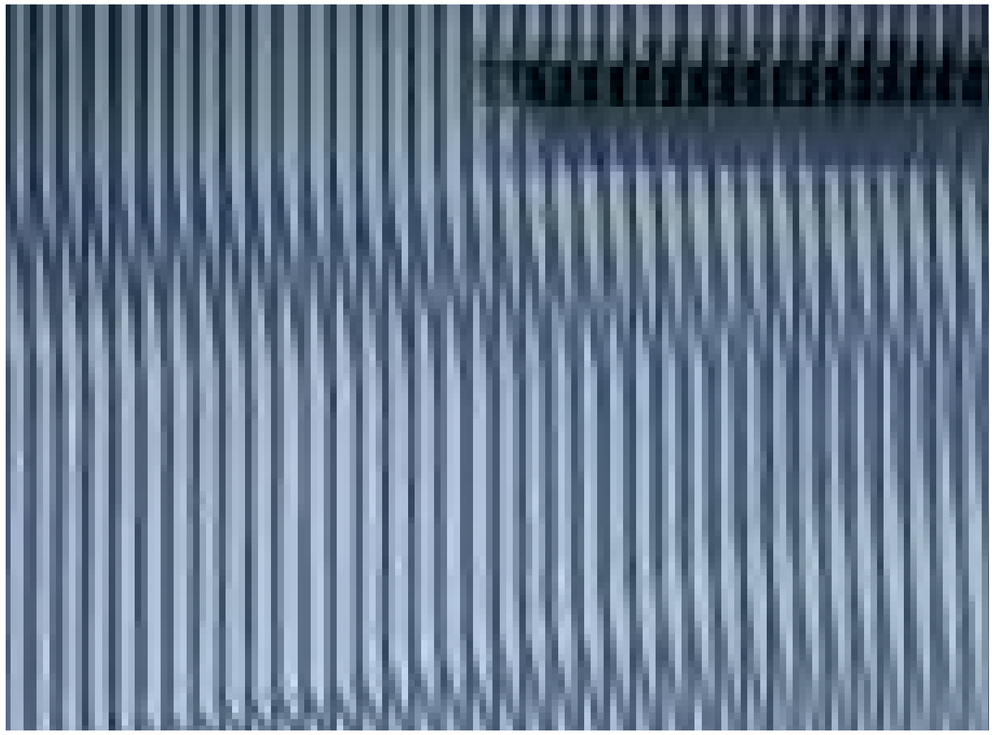
CAR PARK SCREEN

THE SOUTHERN LIGHTS



CAR PARK SCREEN

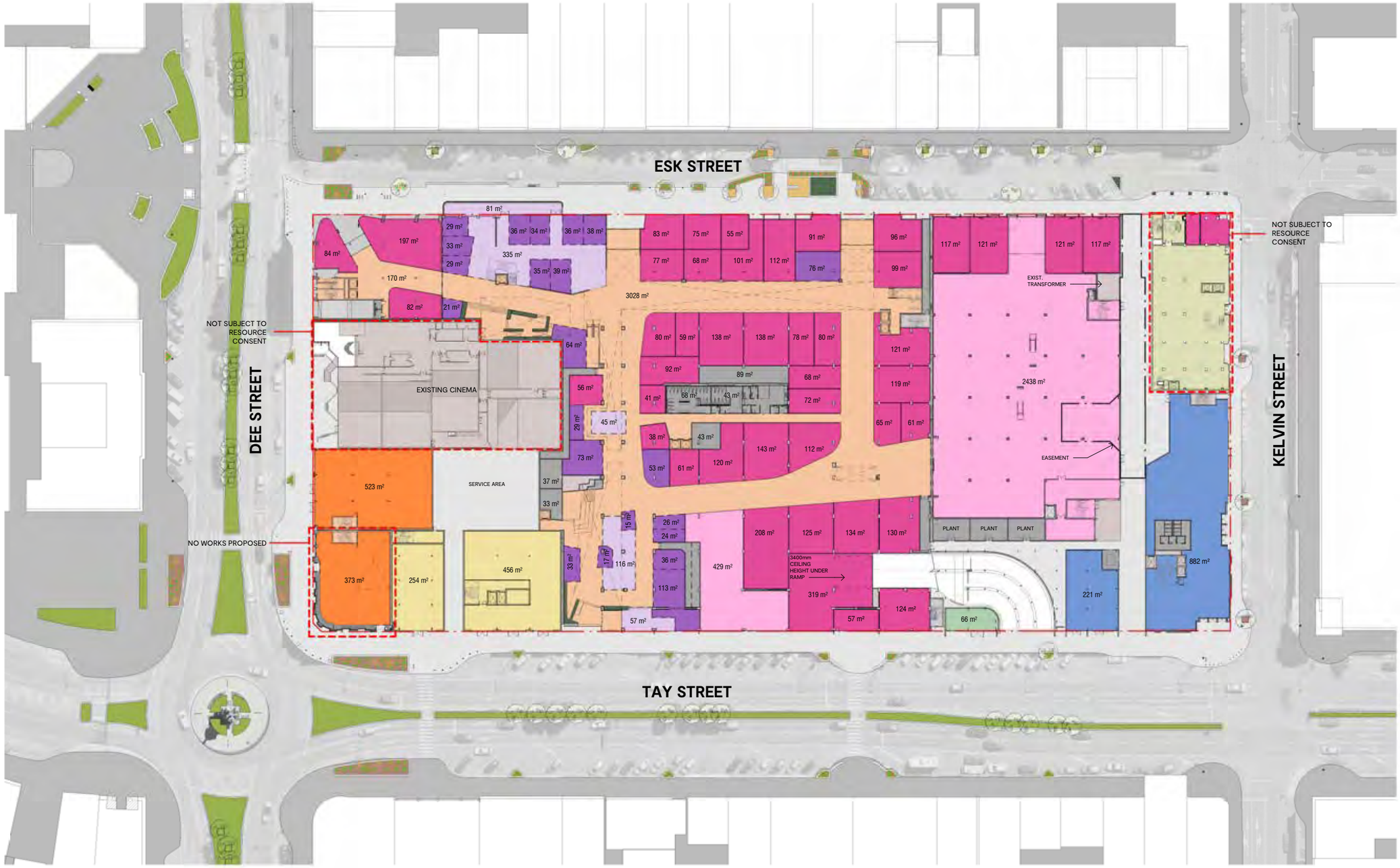
THE SOUTHERN LIGHTS



CAR PARK SCREEN

THE SOUTHERN LIGHTS

Appendix / Plans



CAR PARK	COMMERCIAL ACTIVITY	HOTEL FACILITIES & AMENITIES	MAJOR & MINI MAJOR
BIKE STORE	F&B	CIVIC	PIAZZA
CHILDCARE	RETAIL	OFFICE	RESIDENTIAL
CIRCULATION	F&B SEATING	MEDICAL CENTRE	AMENITIES

GROUND FLOOR MASTERPLAN

A
9100

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN
BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1100

CAR PARK	COMMERCIAL ACTIVITY	HOTEL FACILITIES & AMENITIES	MAJOR & MINI MAJOR
BIKE STORE	F&B	CIVIC	PIAZZA
CHILDCARE	RETAIL	OFFICE	RESIDENTIAL
CIRCULATION	F&B SEATING	MEDICAL CENTRE	AMENITIES

LEVEL 1 MASTERPLAN

A
9101

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1101

CAR PARK	COMMERCIAL ACTIVITY	HOTEL FACILITIES & AMENITIES	MAJOR & MINI MAJOR
BIKE STORE	F&B	CIVIC	PIAZZA
CHILDCARE	RETAIL	OFFICE	RESIDENTIAL
CIRCULATION	F&B SEATING	MEDICAL CENTRE	AMENITIES

LEVEL 2 MASTERPLAN

A
9102

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

issue	date	revision	inits
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1102

CAR PARK
BIKE STORE
CHILDCARE
CIRCULATION
COMMERCIAL ACTIVITY
F&B
RETAIL
F&B SEATING
HOTEL FACILITIES & AMENITIES
CIVIC
OFFICE
MEDICAL CENTRE
MAJOR & MINI MAJOR
PIAZZA
RESIDENTIAL
AMENITIES

LEVEL 3 MASTERPLAN

A
9103

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1103

CAR PARK
BIKE STORE
CHILDCARE
CIRCULATION
COMMERCIAL ACTIVITY
F&B
RETAIL
F&B SEATING
HOTEL FACILITIES & AMENITIES
CIVIC
OFFICE
MEDICAL CENTRE
MAJOR & MINI MAJOR
PIAZZA
RESIDENTIAL
AMENITIES

LEVEL 4 MASTERPLAN

A
9104

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1104

CAR PARK	COMMERCIAL ACTIVITY	HOTEL FACILITIES & AMENITIES	MAJOR & MINI MAJOR
BIKE STORE	F&B	CIVIC	PIAZZA
CHILDCARE	RETAIL	OFFICE	RESIDENTIAL
CIRCULATION	F&B SEATING	MEDICAL CENTRE	AMENITIES

LEVEL 5 MASTERPLAN

A
9105

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1105

CAR PARK	COMMERCIAL ACTIVITY	HOTEL FACILITIES & AMENITIES	MAJOR & MINI MAJOR
BIKE STORE	F&B	CIVIC	PIAZZA
CHILDCARE	RETAIL	OFFICE	RESIDENTIAL
CIRCULATION	F&B SEATING	MEDICAL CENTRE	AMENITIES

LEVEL 6 MASTERPLAN

A
9106

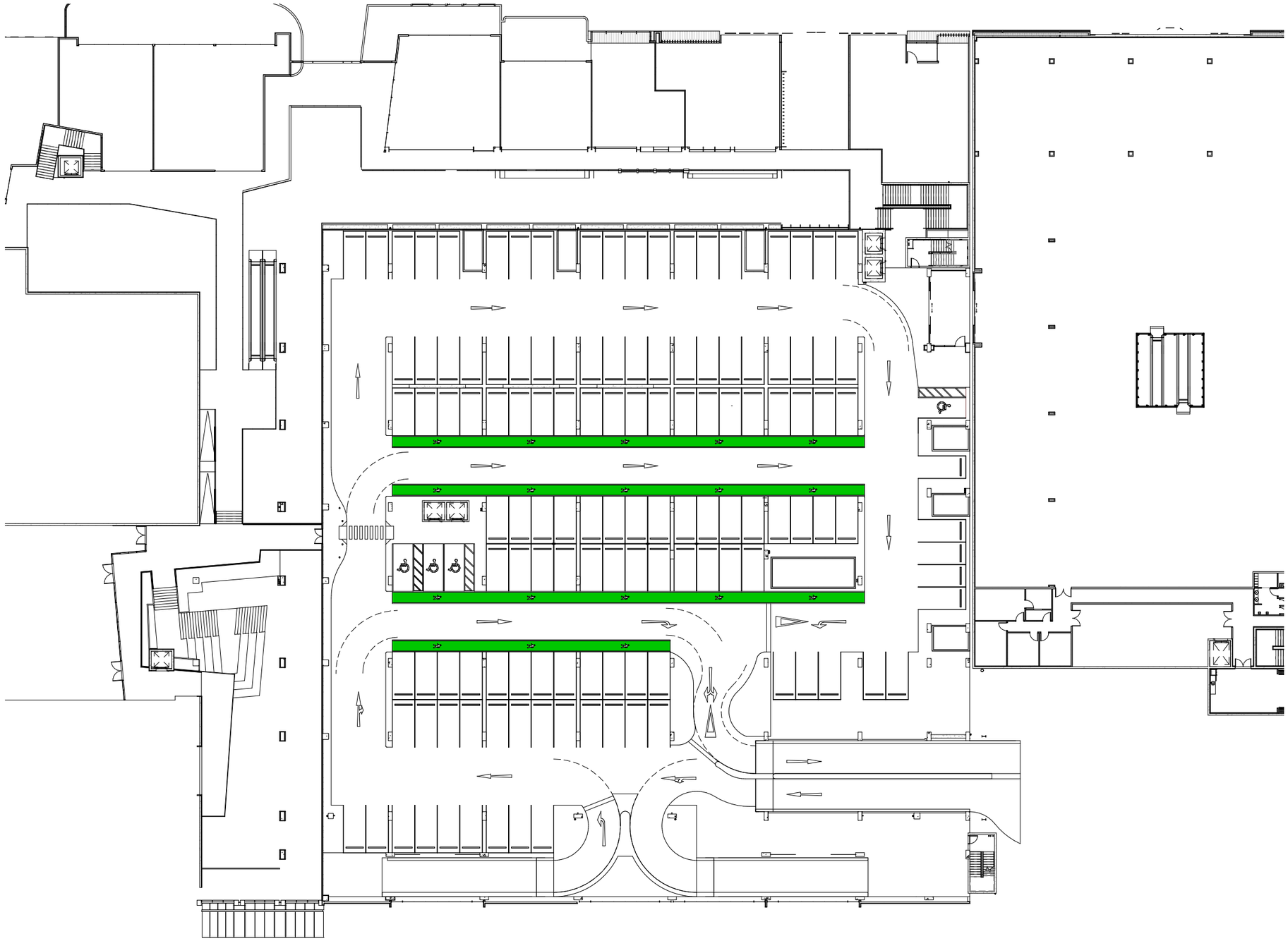
INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1106



PARKING SCHEDULE
Z3.L1
Z3.L1: 134
Z3.L2
Z3.L2: 175
Z3.L3
Z3.L3: 182
Z3.L4
Z3.L4: 182
Z3.L5
Z3.L5: 186
TOTAL: 859

Z3.LEVEL 1

A
7010

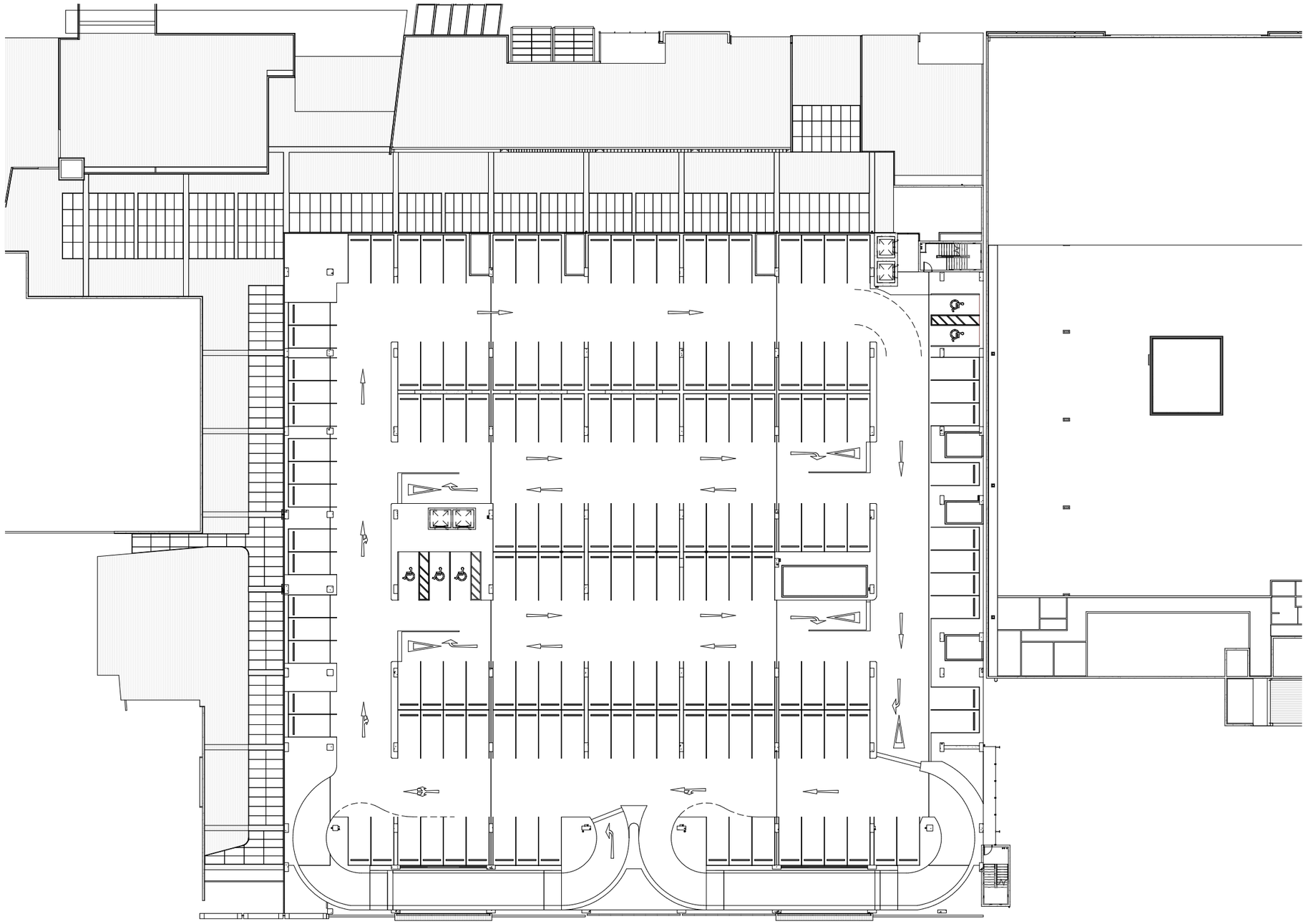
INVERCARGILL MASTERPLAN
BUCHAN

917077
DATE

BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1651



PARKING SCHEDULE
Z3.L1
Z3.L1: 134
Z3.L2
Z3.L2: 175
Z3.L3
Z3.L3: 182
Z3.L4
Z3.L4: 182
Z3.L5
Z3.L5: 186
TOTAL: 859

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1652

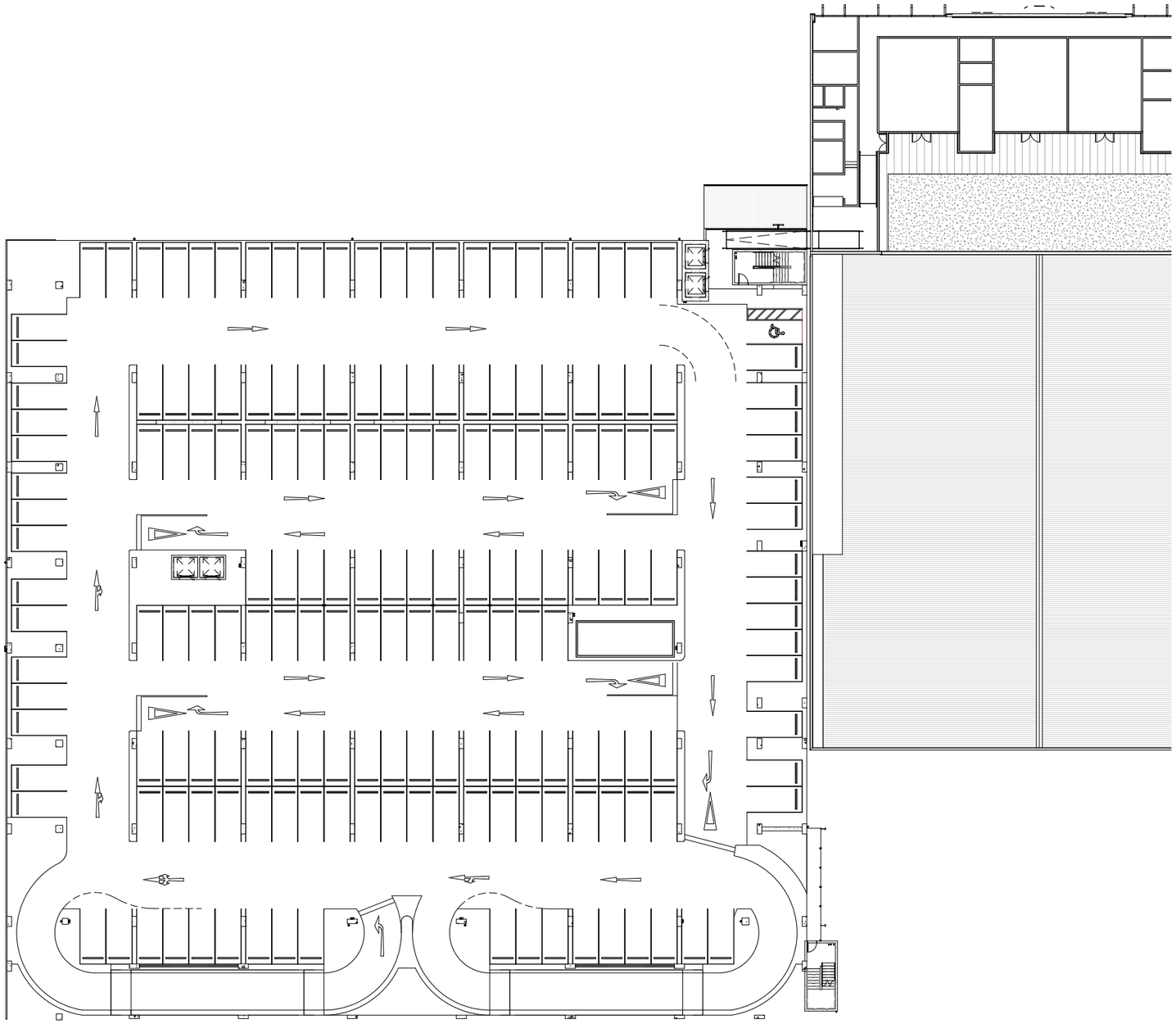
Z3.LEVEL 2

A
7011

INVERCARGILL MASTERPLAN
BUCHAN

917077
DATE

BUCHAN



PARKING SCHEDULE
Z3.L1
Z3.L1: 134
Z3.L2
Z3.L2: 175
Z3.L3
Z3.L3: 182
Z3.L4
Z3.L4: 182
Z3.L5
Z3.L5: 186
TOTAL: 859

Z3.LEVEL 3

A
7012

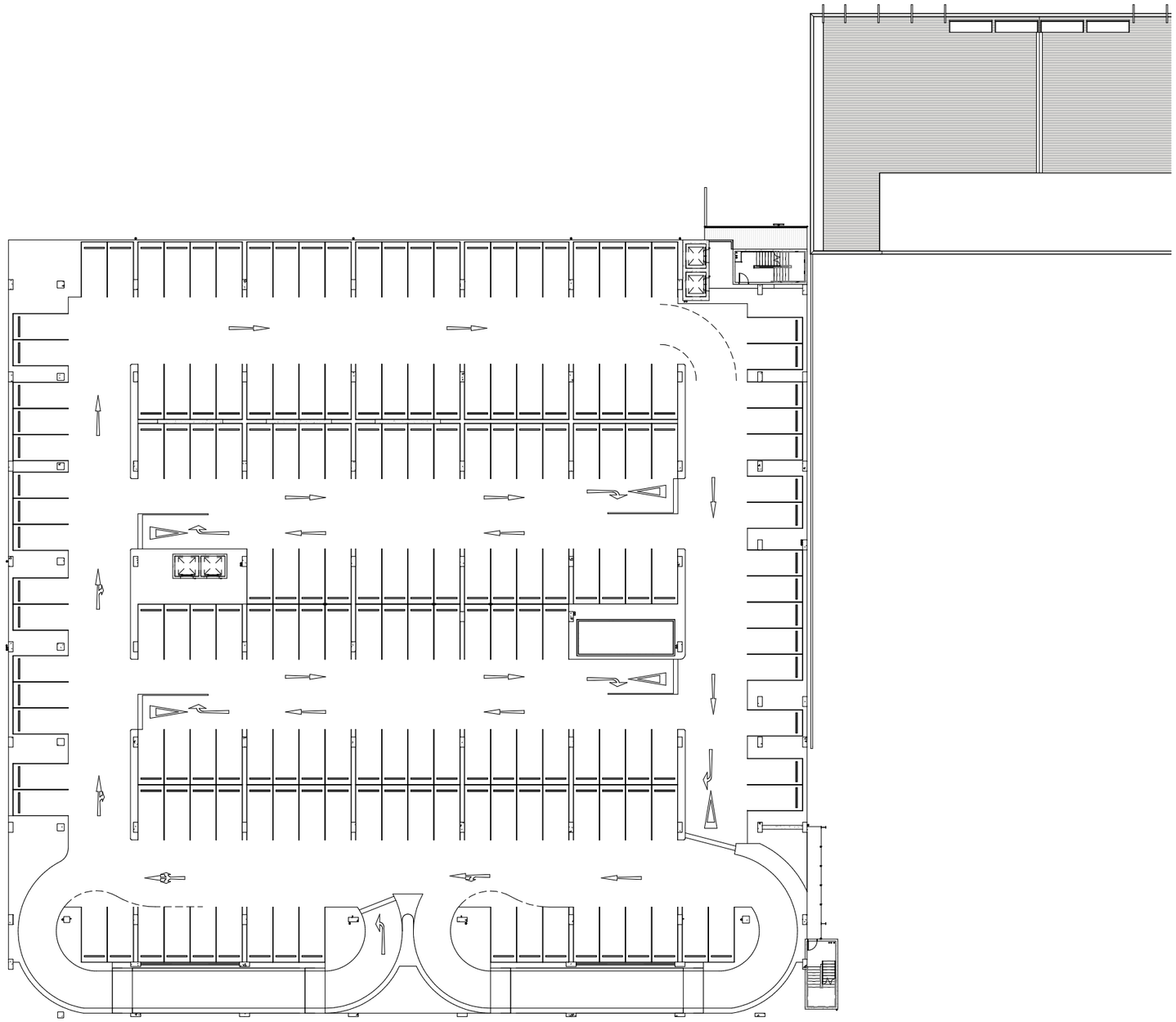
INVERCARGILL MASTERPLAN
BUCHAN

917077
DATE

BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1653



PARKING SCHEDULE
Z3.L1
Z3.L1: 134
Z3.L2
Z3.L2: 175
Z3.L3
Z3.L3: 182
Z3.L4
Z3.L4: 182
Z3.L5
Z3.L5: 186
TOTAL: 859

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 1654

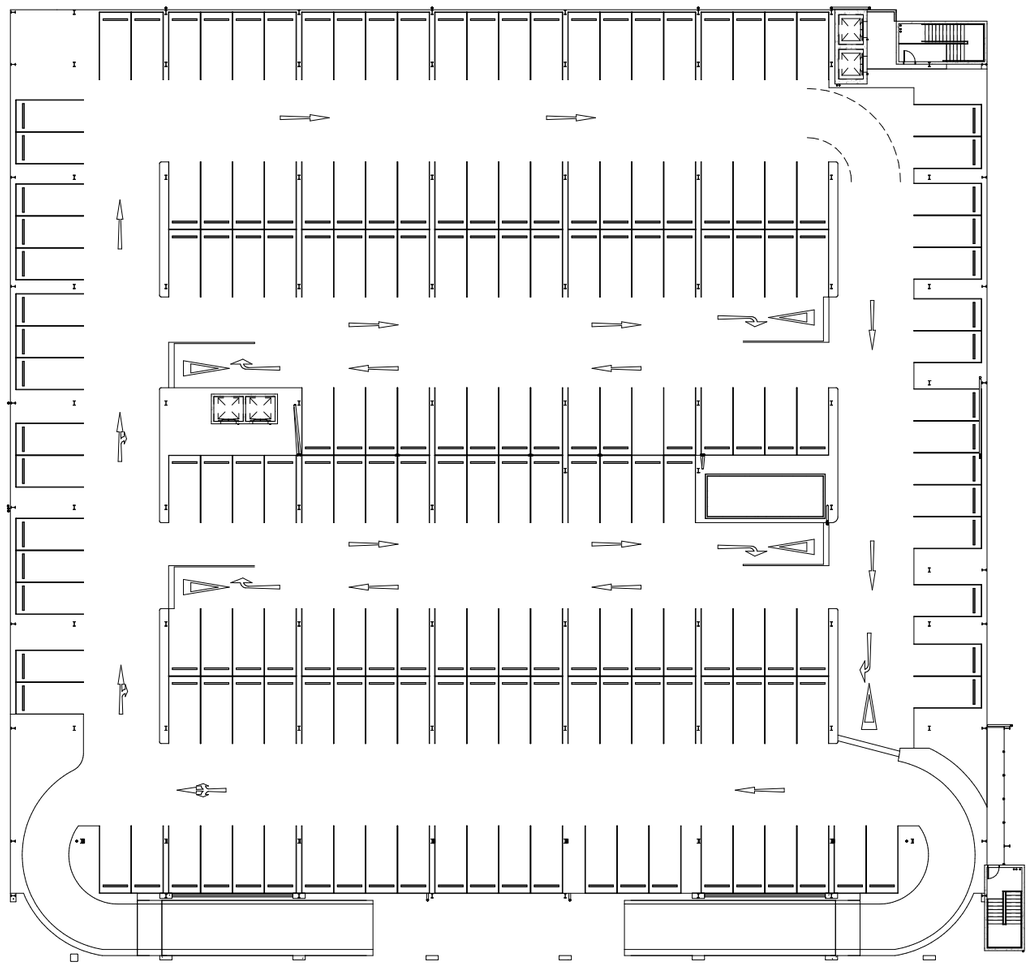
Z3.LEVEL 4

A
7013

INVERCARGILL MASTERPLAN
BUCHAN

917077
DATE

BUCHAN



PARKING SCHEDULE
Z3.L1
Z3.L1: 134
Z3.L2
Z3.L2: 175
Z3.L3
Z3.L3: 182
Z3.L4
Z3.L4: 182
Z3.L5
Z3.L5: 186
TOTAL: 859

Z3.LEVEL 5

A
7014

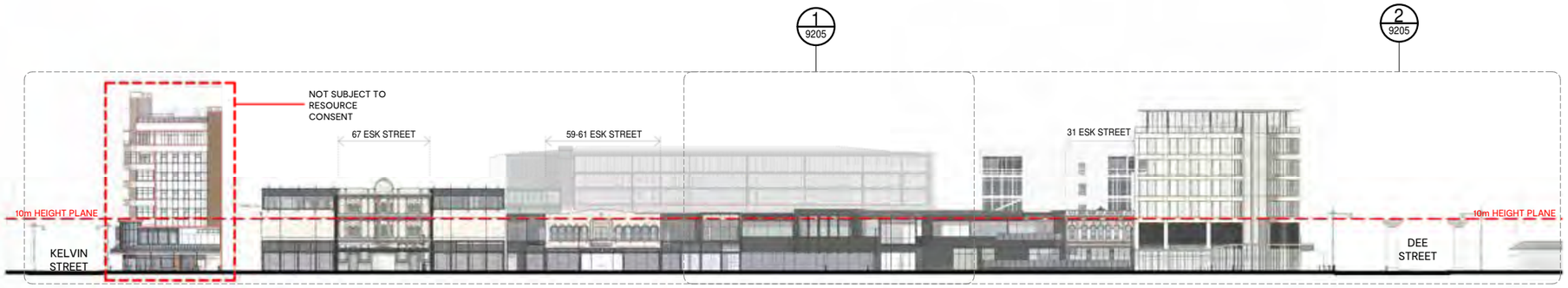
INVERCARGILL MASTERPLAN
BUCHAN

917077
DATE

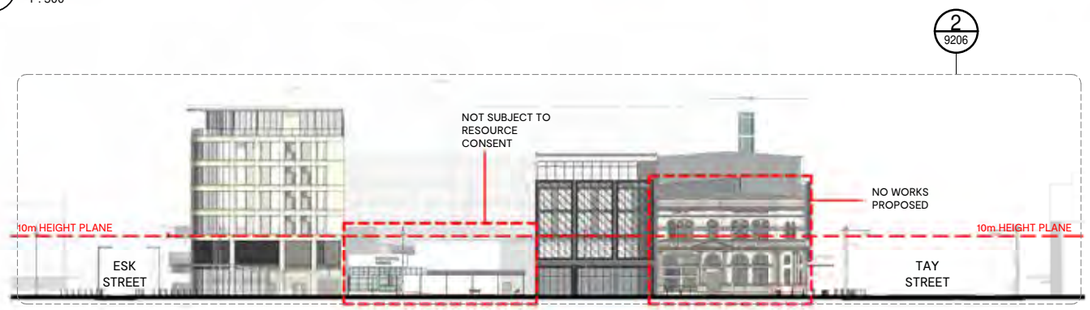
BUCHAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

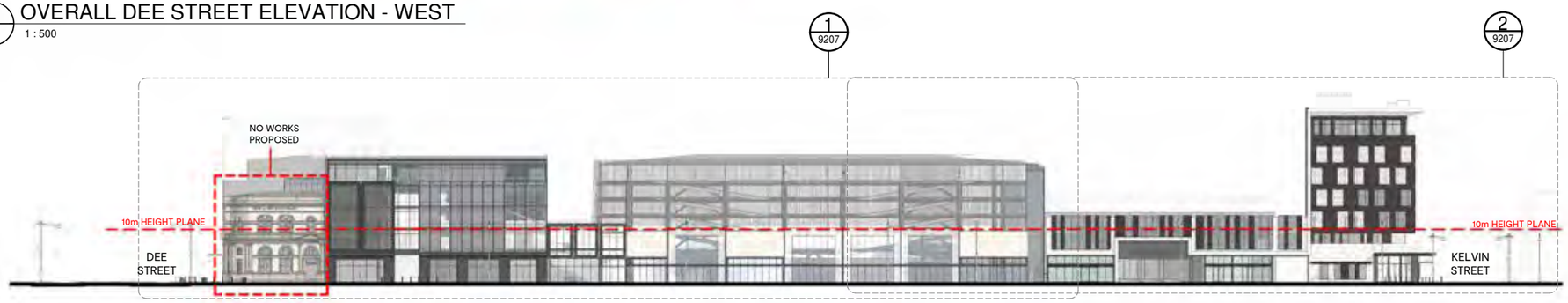
Appendix / Elevations



1 OVERALL ESK STREET ELEVATION - NORTH
1 : 500

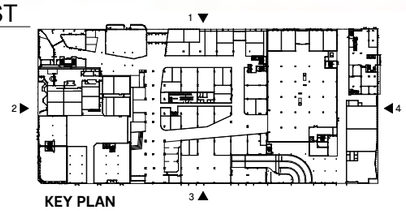


2 OVERALL DEE STREET ELEVATION - WEST
1 : 500



3 OVERALL TAY STREET ELEVATION - SOUTH
1 : 500

4 OVERALL KELVIN STREET ELEVATION - EAST
1 : 500



KEY PLAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2000

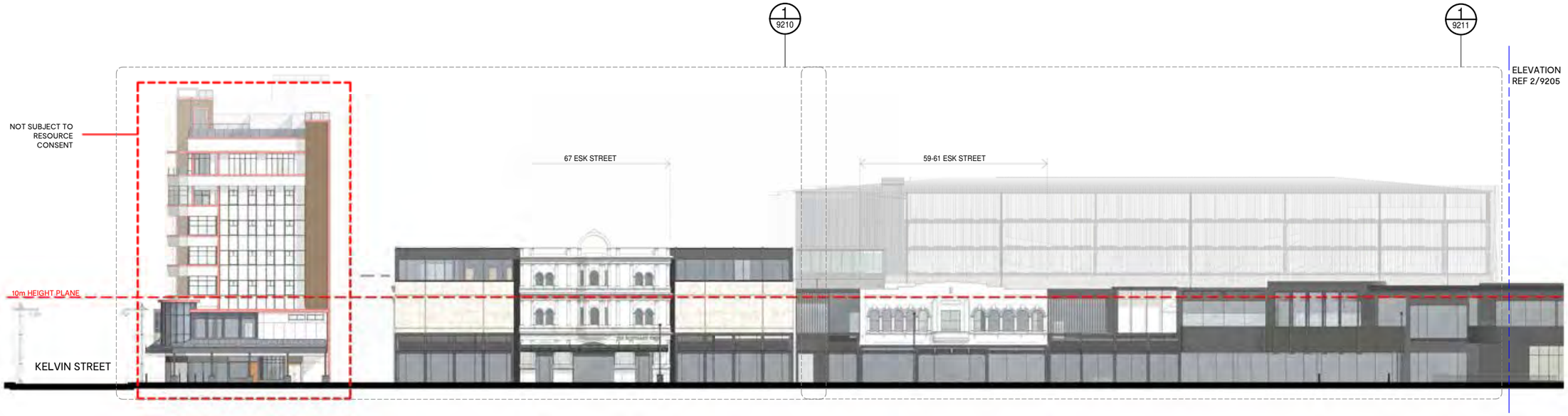
OVERALL PROPOSED ELEVATIONS

A
9200

INVERCARGILL MASTERPLAN
BUCHAN

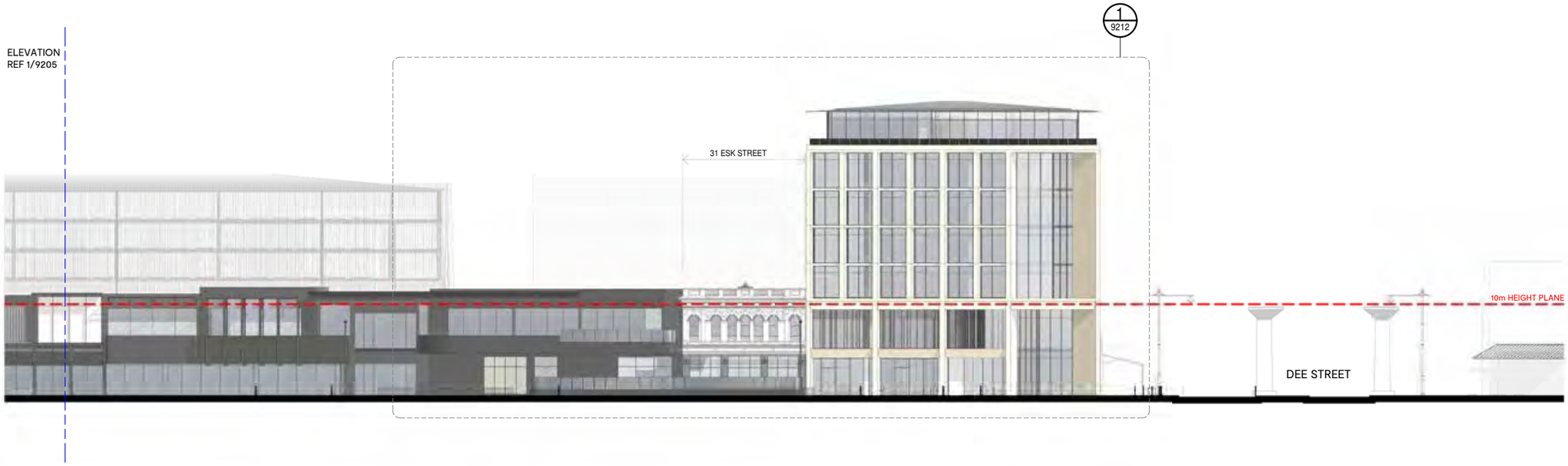
917077
MAY 2018

BUCHAN



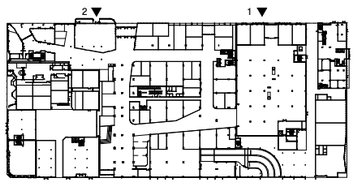
1 9200 ELEVATION - NORTH - ESK STREET 1

1 : 250



2 9200 ELEVATION - NORTH - ESK STREET 2

1 : 250



KEY PLAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2005

ELEVATIONS - NORTH

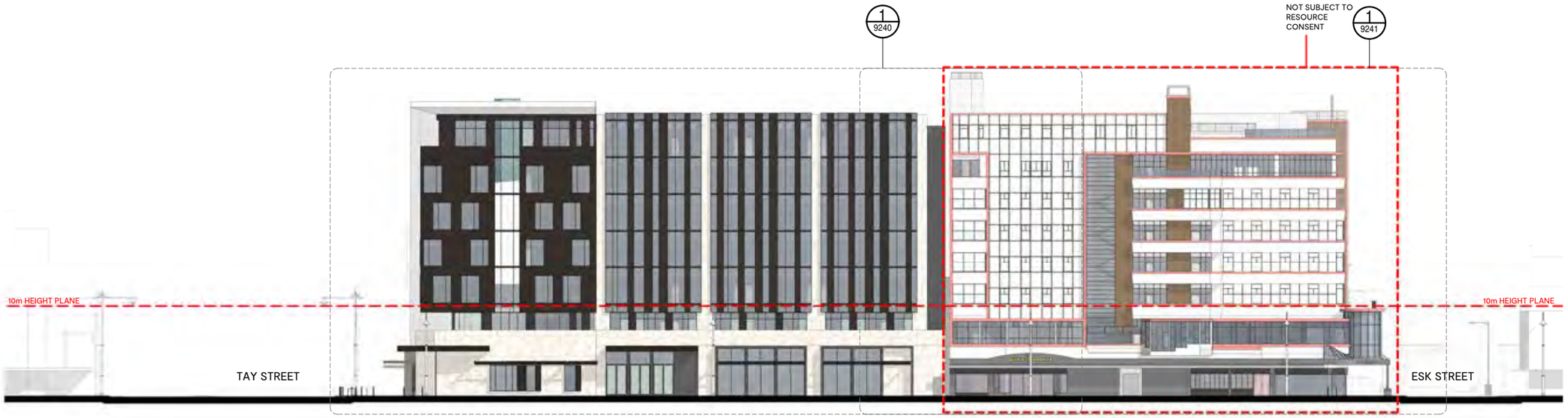
A
9205

INVERCARGILL MASTERPLAN

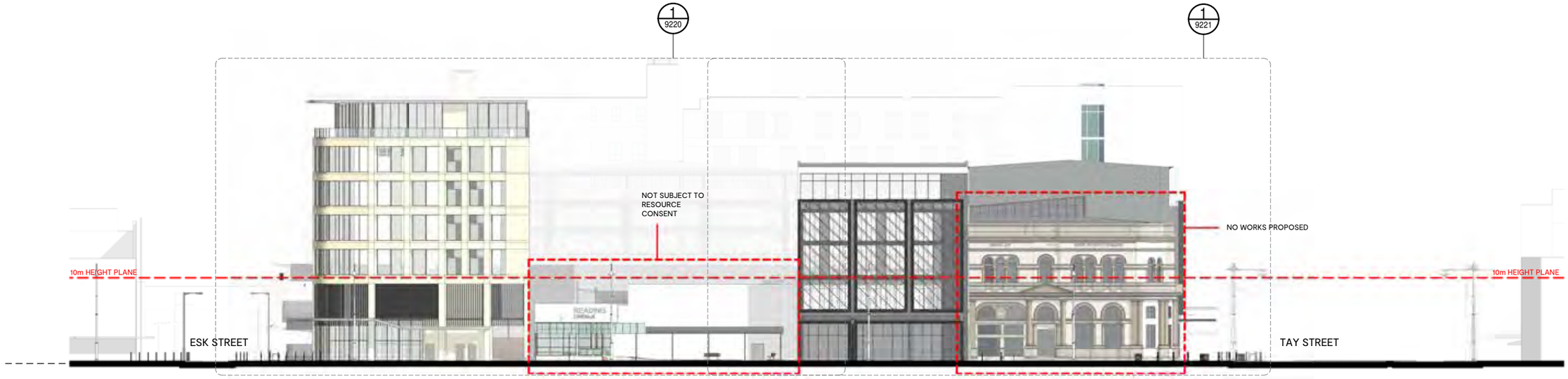
BUCHAN

917077
MAY 2018

BUCHAN



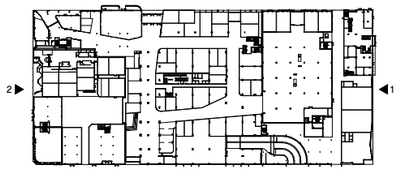
1 9200 ELEVATION - EAST - KELVIN STREET
1 : 250



2 9200 ELEVATION - WEST - DEE STREET
1 : 250

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2006



KEY PLAN

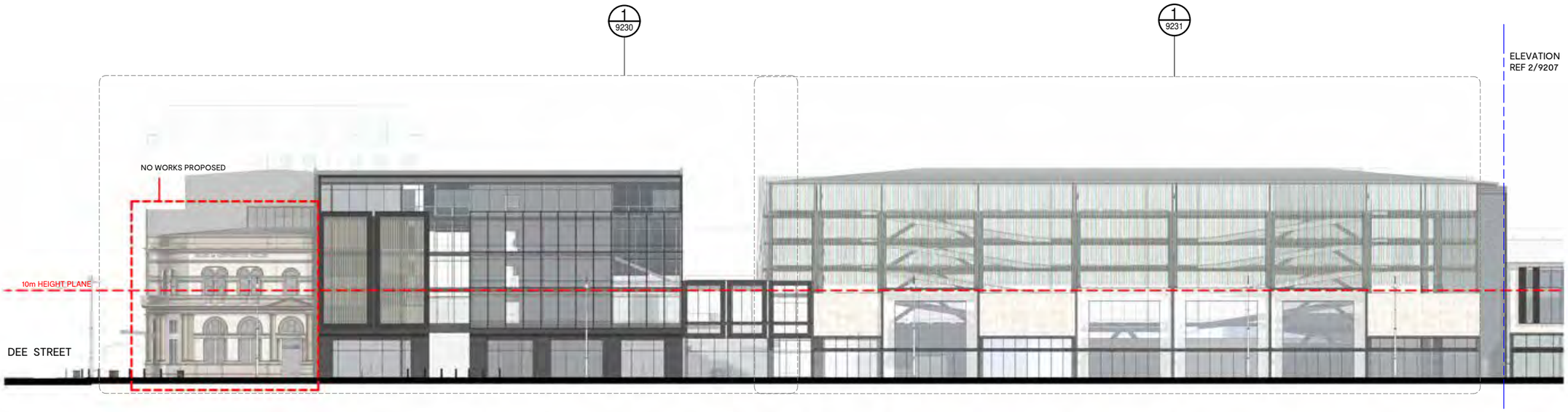
ELEVATIONS - EAST & WEST

A
9206

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

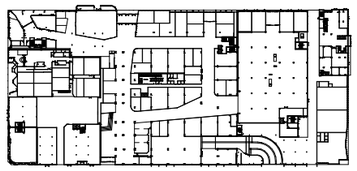


1 9200 ELEVATION - SOUTH - TAY STREET 1
1 : 250

2 9200 ELEVATION - SOUTH - TAY STREET 2
1 : 250

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2007



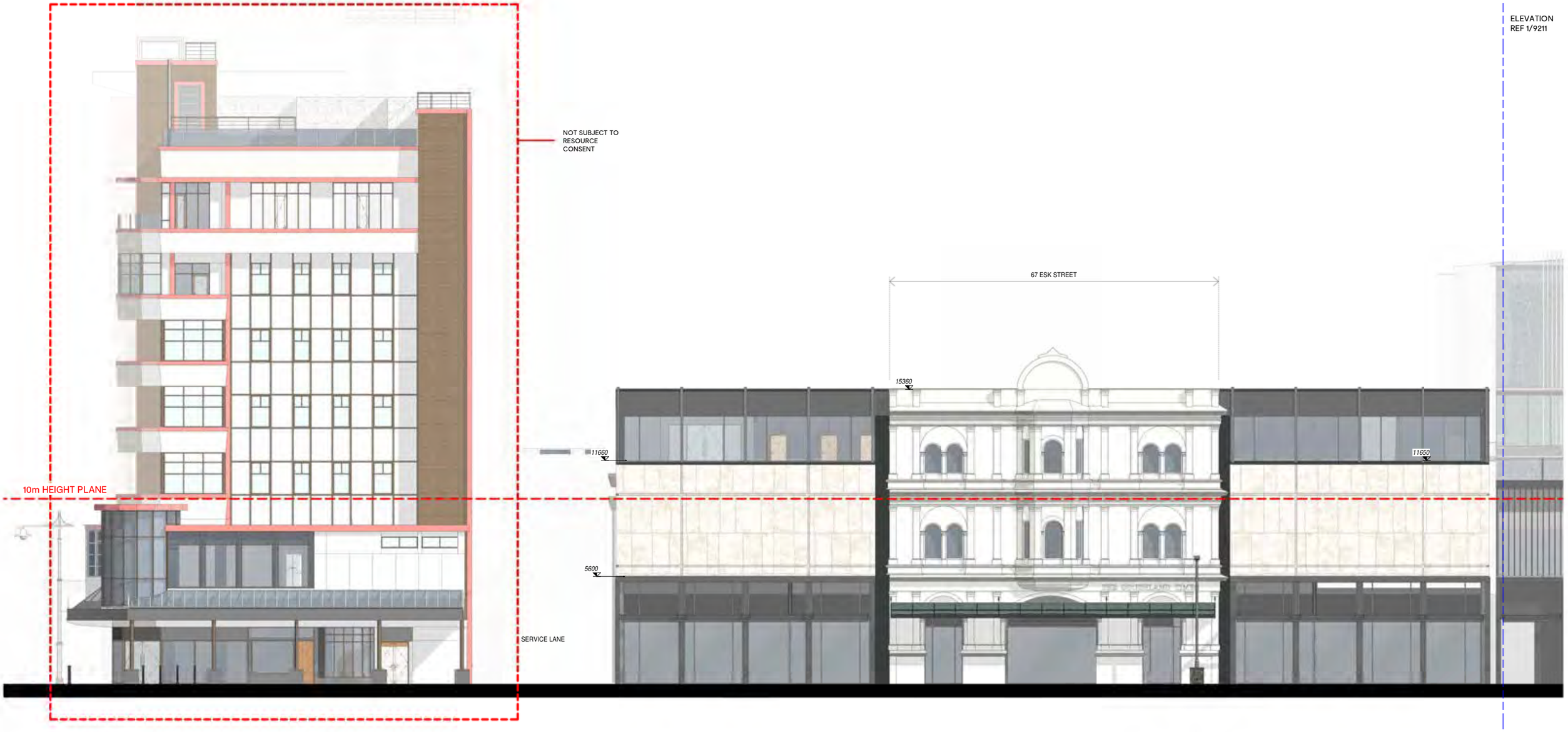
ELEVATIONS - SOUTH

A
9207

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

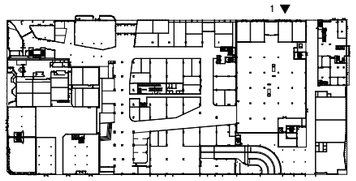


1 / 9205 ELEVATION - NORTH - ESK STREET 1 - Callout 1

1 : 100

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2010



KEY PLAN

STRIP ELEVATIONS - NORTH 1

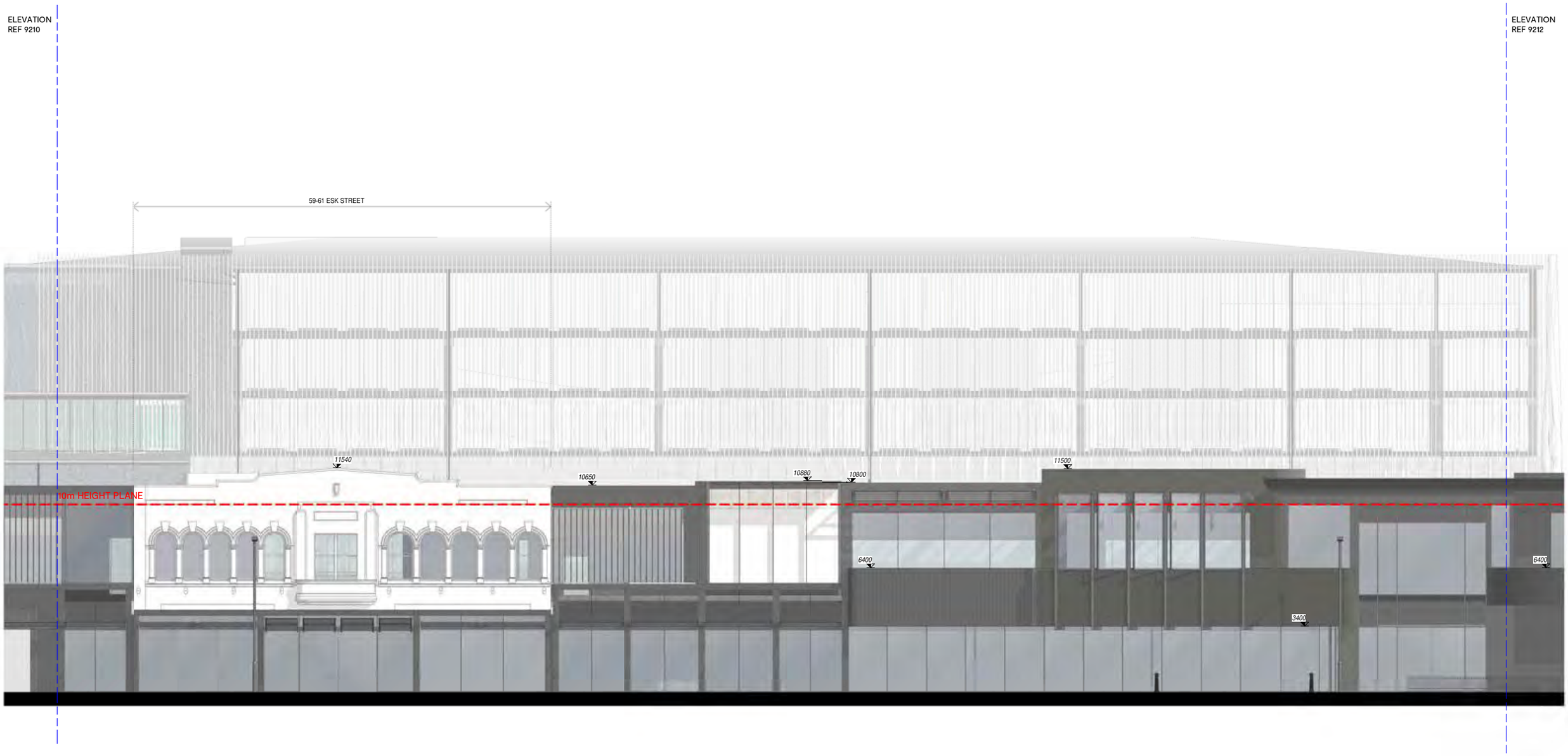
A
9210

INVERCARGILL MASTERPLAN

BUCHAN

917077
MAY 2018

BUCHAN

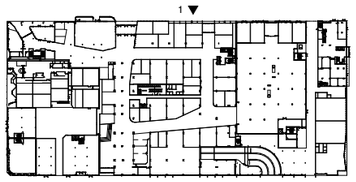


1 9205 ELEVATION - NORTH - ESK STREET 1 - Callout 2

1 : 100

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2011



KEY PLAN

STRIP ELEVATIONS - NORTH 2

A
9211

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

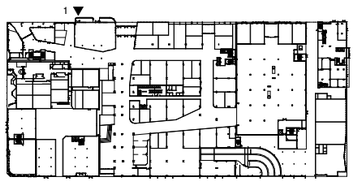
BUCHAN

1 9205 ELEVATION - NORTH - ESK STREET 2 - Callout 1

1 : 100

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2012



KEY PLAN

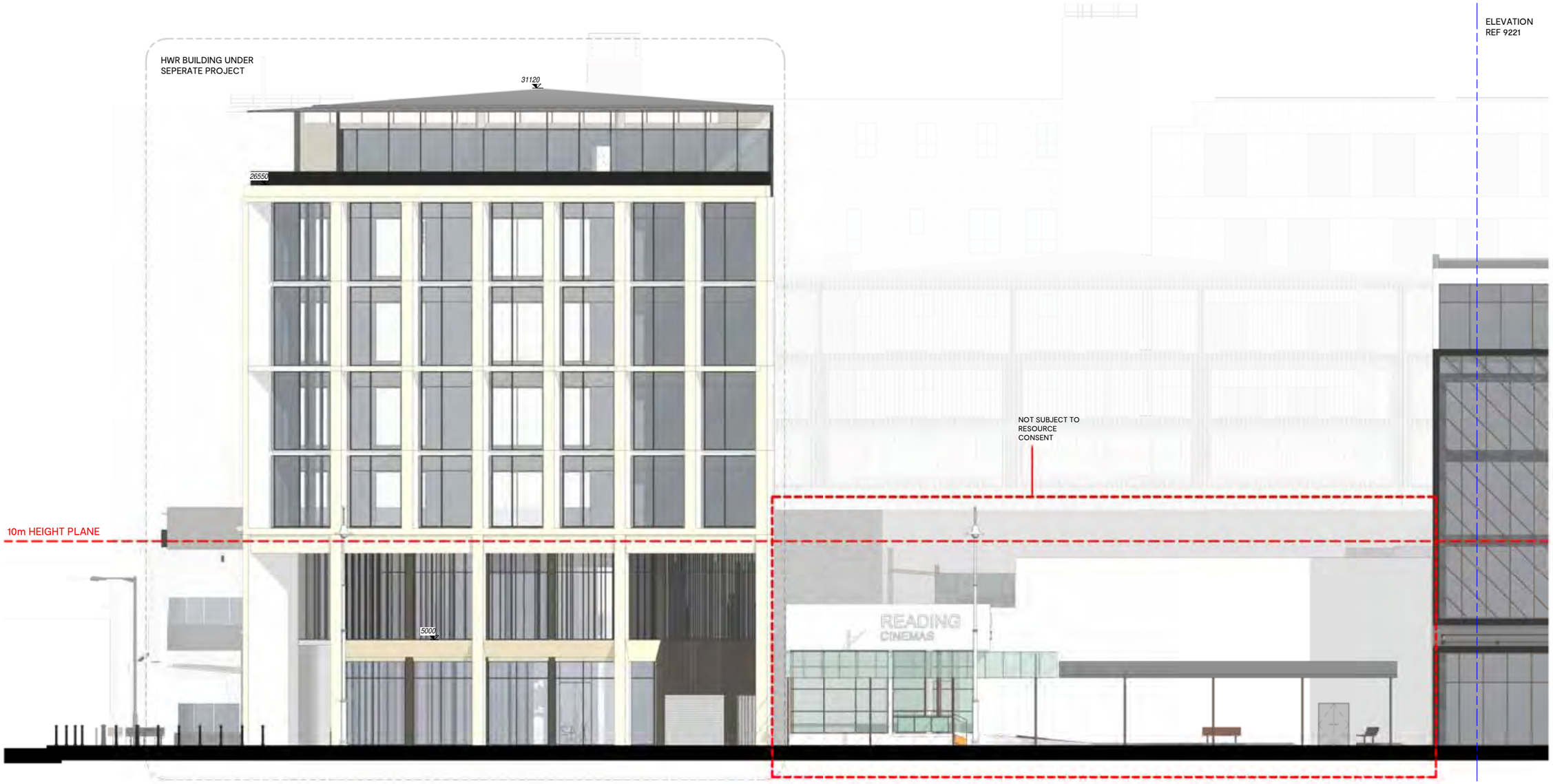
STRIP ELEVATIONS - NORTH 3

A
9212

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

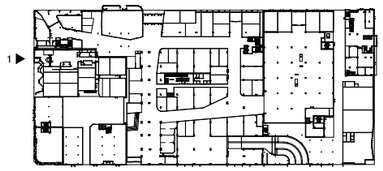


1 9206 ELEVATION - WEST - DEE STREET - Callout 1

1 : 100

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2020



KEY PLAN

STRIP ELEVATIONS - WEST 1

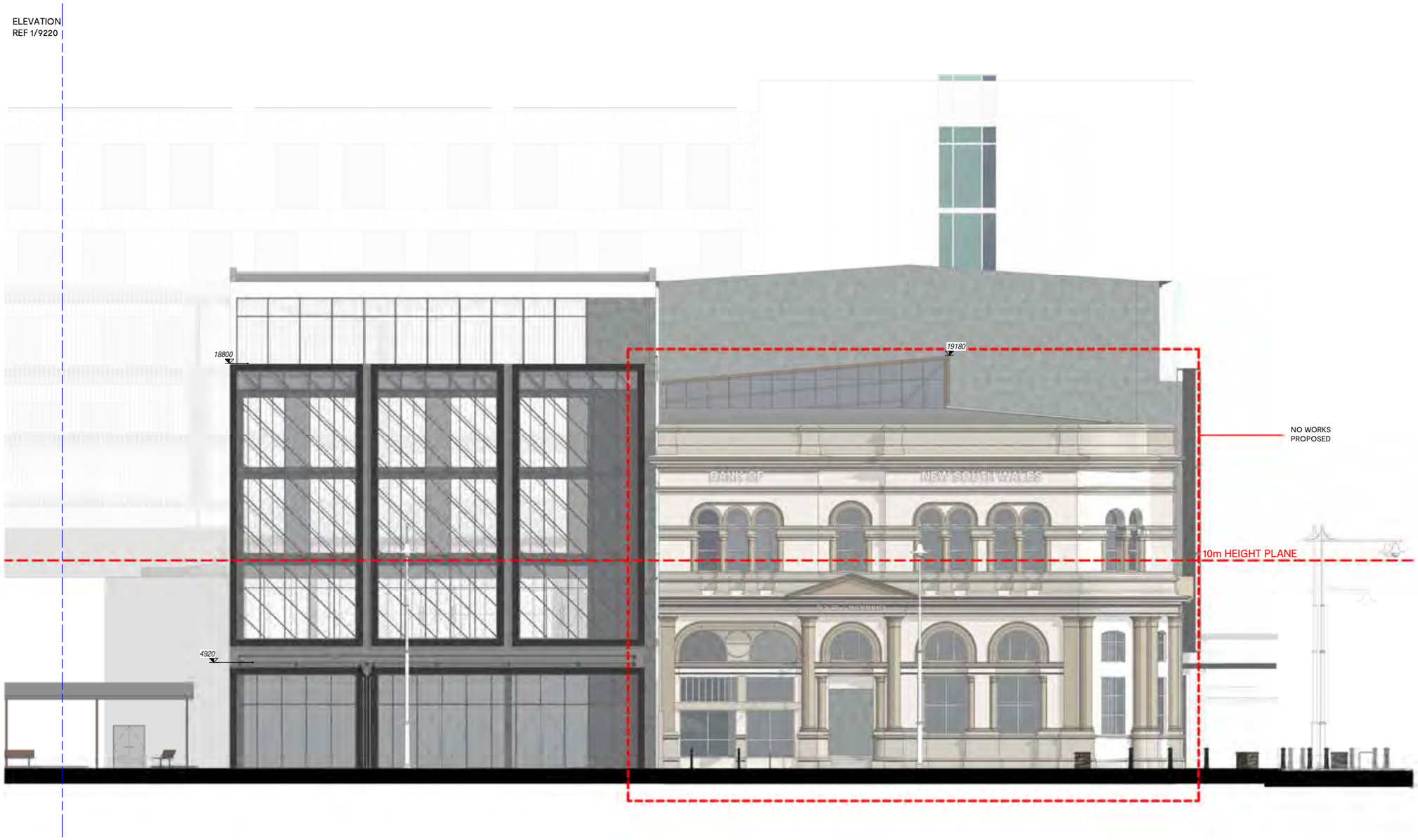
A
9220

INVERCARGILL MASTERPLAN

BUCHAN

917077
MAY 2018

BUCHAN

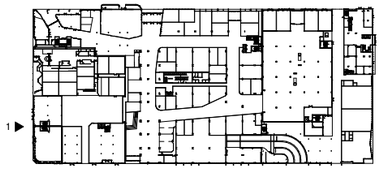


1 / 9206 ELEVATION - WEST - DEE STREET - Callout 2

1 : 100

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2021



KEY PLAN

STRIP ELEVATIONS - WEST 2

A
9221

INVERCARGILL MASTERPLAN

BUCHAN

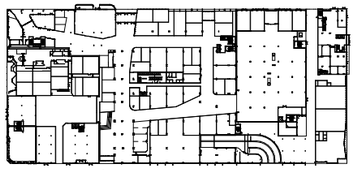
917077
MAY 2018

BUCHAN

1 / 9207 ELEVATION - SOUTH - TAY STREET 1 - Callout 1
1 : 100

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2030



KEY PLAN [1]

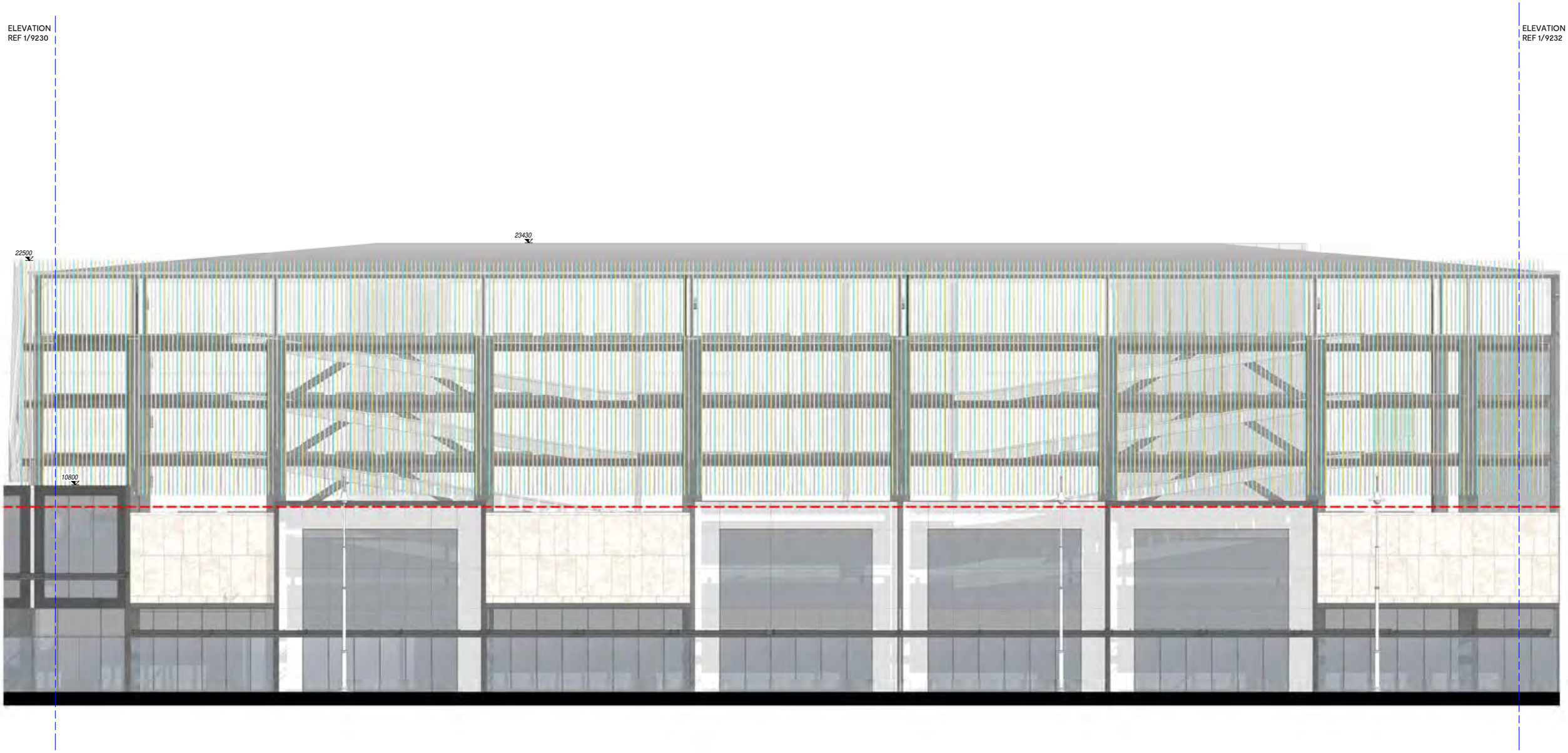
STRIP ELEVATIONS - SOUTH 1

A
9230

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

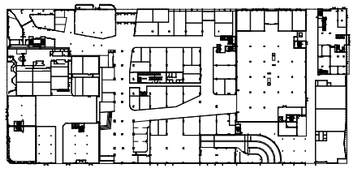


1 / 9207 ELEVATION - SOUTH - TAY STREET 1 - Callout 2

1 : 100

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2031



KEY PLAN

1 ▲

STRIP ELEVATIONS - SOUTH 2

A
9231

INVERCARGILL MASTERPLAN

BUCHAN

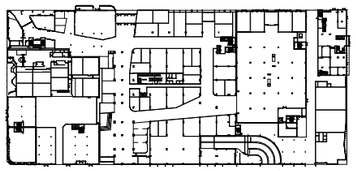
917077
MAY 2018

BUCHAN

1 / 9207 ELEVATION - SOUTH - TAY STREET 2 - Callout 1
1 : 100

issue	date	revision	inits
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2032



KEY PLAN

STRIP ELEVATIONS - SOUTH 3

A
9232

INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

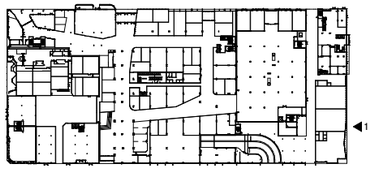
BUCHAN

1 / 9206 ELEVATION - EAST - KELVIN STREET - Callout 1

1 : 100

issue	date	revision	inits
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2040



KEY PLAN

STRIP ELEVATIONS - EAST 1

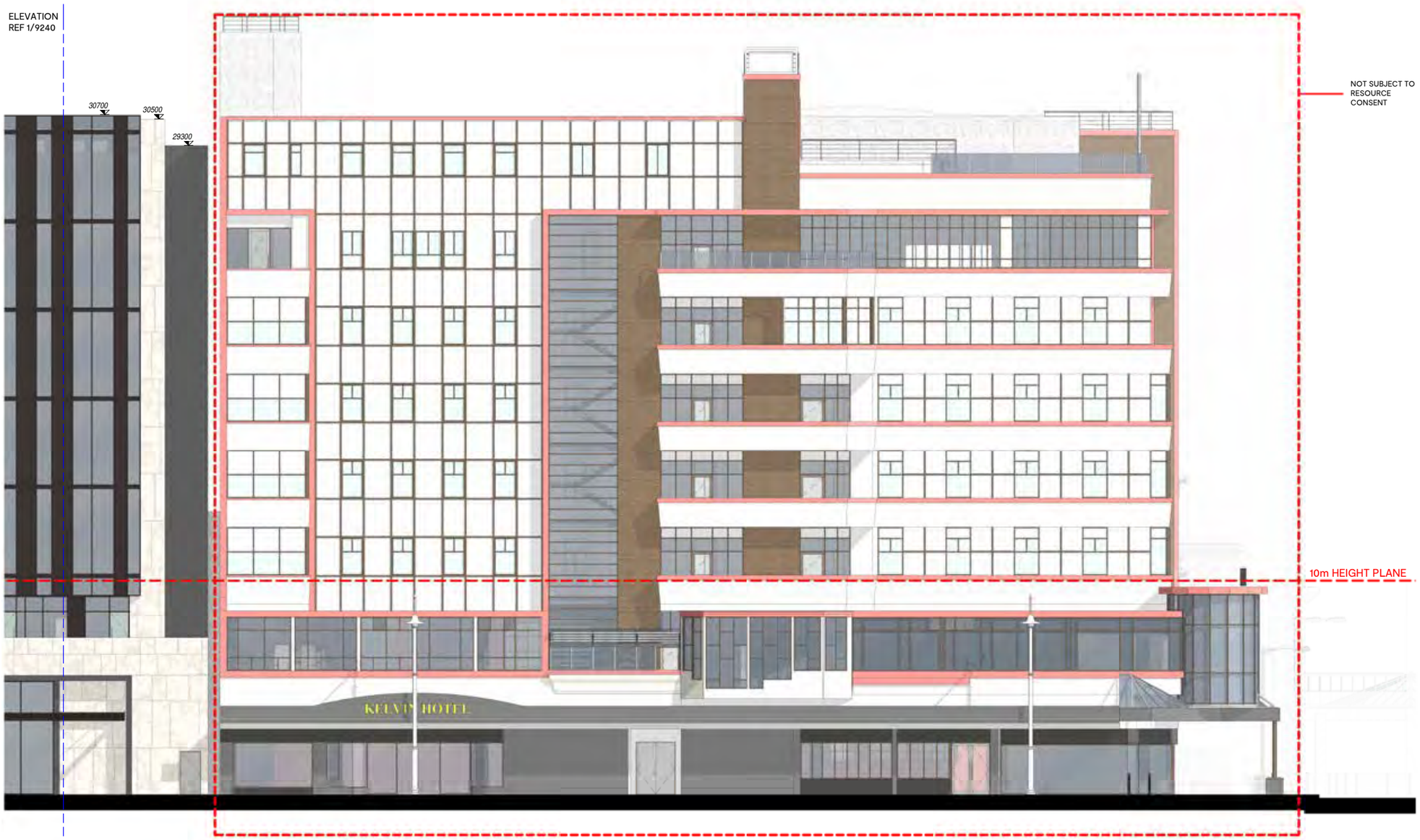
A
9240

INVERCARGILL MASTERPLAN

BUCHAN

917077
MAY 2018

BUCHAN

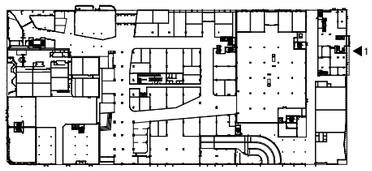


1 / 9206 ELEVATION - EAST - KELVIN STREET - Callout 2

1 : 100

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 2041



KEY PLAN

STRIP ELEVATIONS - EAST 2

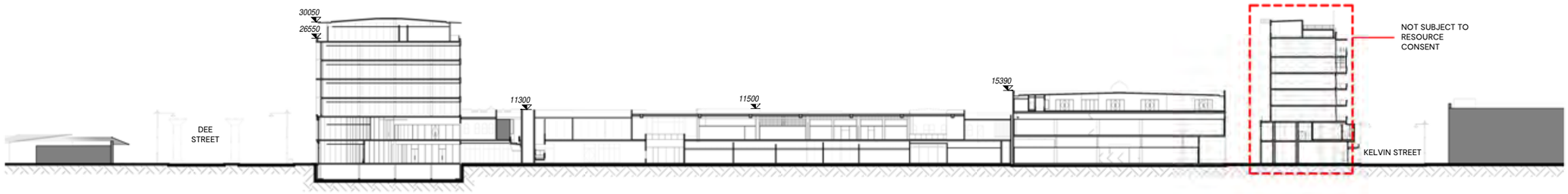
A
9241

INVERCARGILL MASTERPLAN
BUCHAN

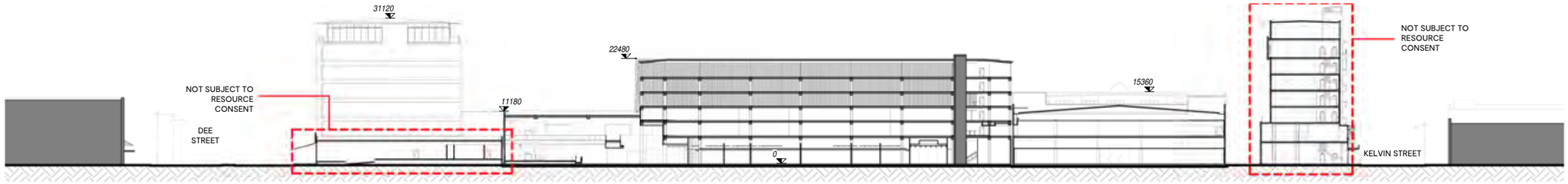
917077
MAY 2018

BUCHAN

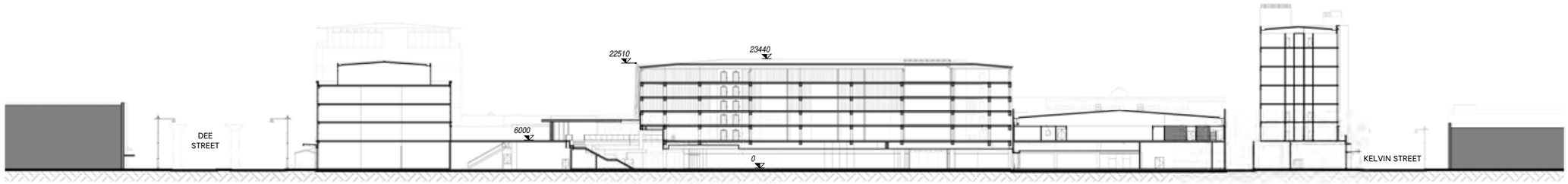
Appendix / Sections



1 LONG SECTION 1
1 : 500



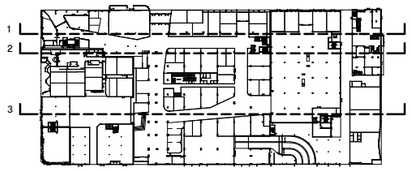
2 LONG SECTION 2
1 : 500



3 LONG SECTION 3
1 : 500

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 3000



KEY PLAN

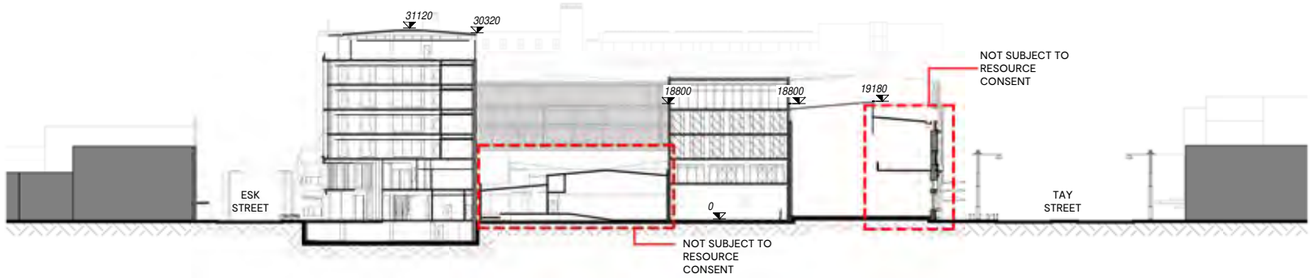
SECTIONS

A
9300

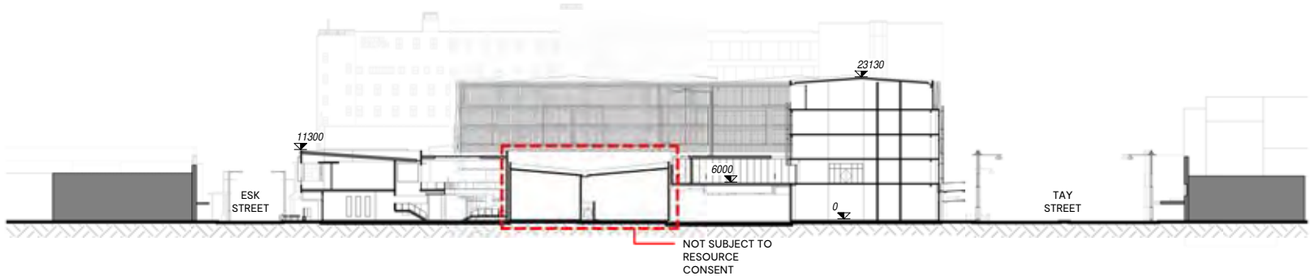
INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

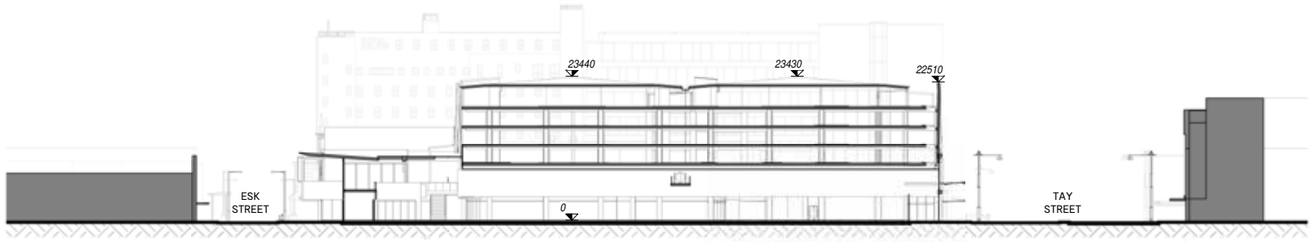
BUCHAN



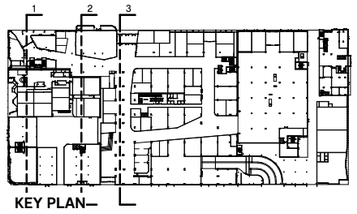
1 TRANSVERSE SECTION 1
1 : 500



2 TRANSVERSE SECTION 2
1 : 500



3 TRANSVERSE SECTION 3
1 : 500



issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 3001

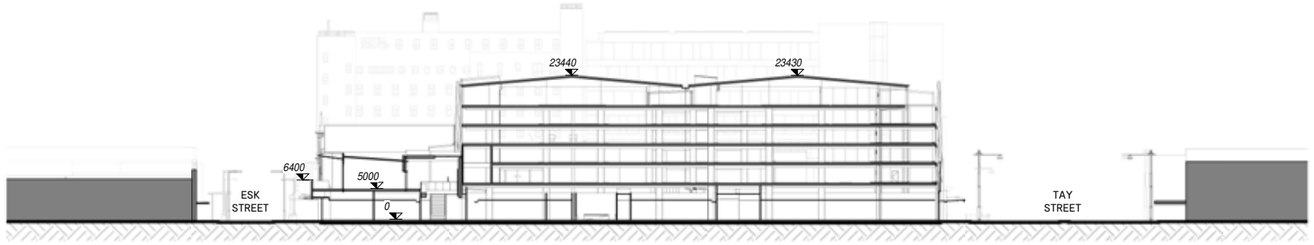
SECTIONS

A
9301

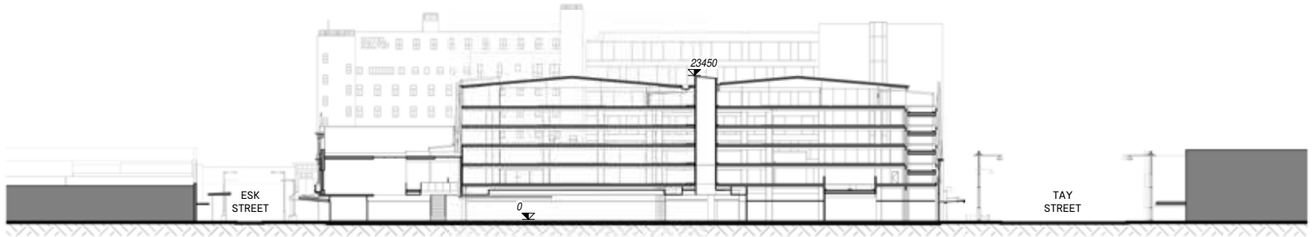
INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

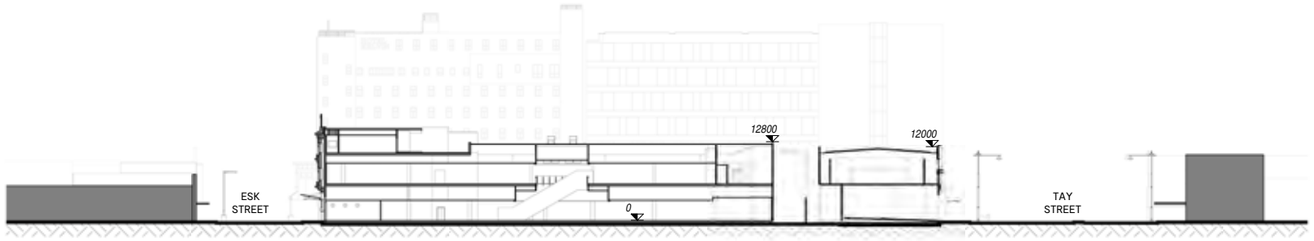
BUCHAN



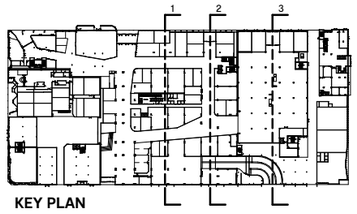
1 TRANSVERSE SECTION 4
1 : 500



2 TRANSVERSE SECTION 5
1 : 500



3 TRANSVERSE SECTION 6
1 : 500



KEY PLAN

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 3002

SECTIONS

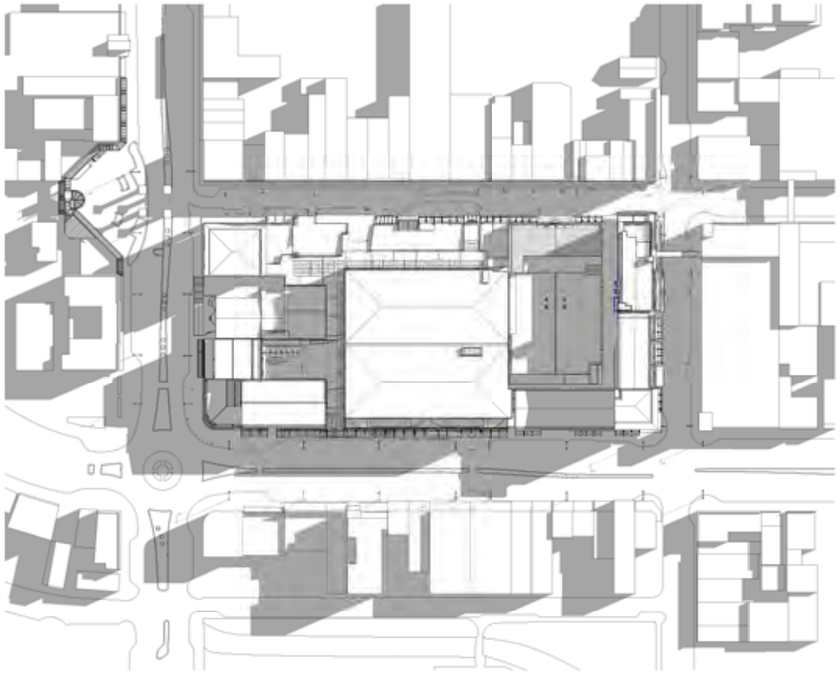
A
9302

INVERCARGILL MASTERPLAN
BUCHAN

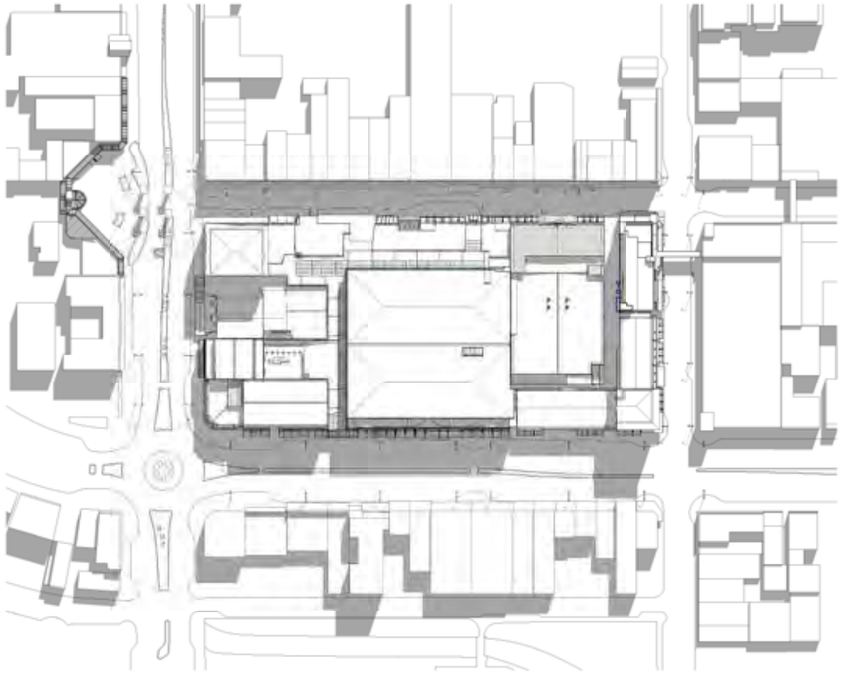
917077
MAY 2018

BUCHAN

Appendix / Shadow Studies



1 MARCH 21 - 9am PROPOSED



2 MARCH 21 - 12pm PROPOSED

3 MARCH 21 - 9am EXISTING

4 MARCH 21 - 12pm EXISTING

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 7000

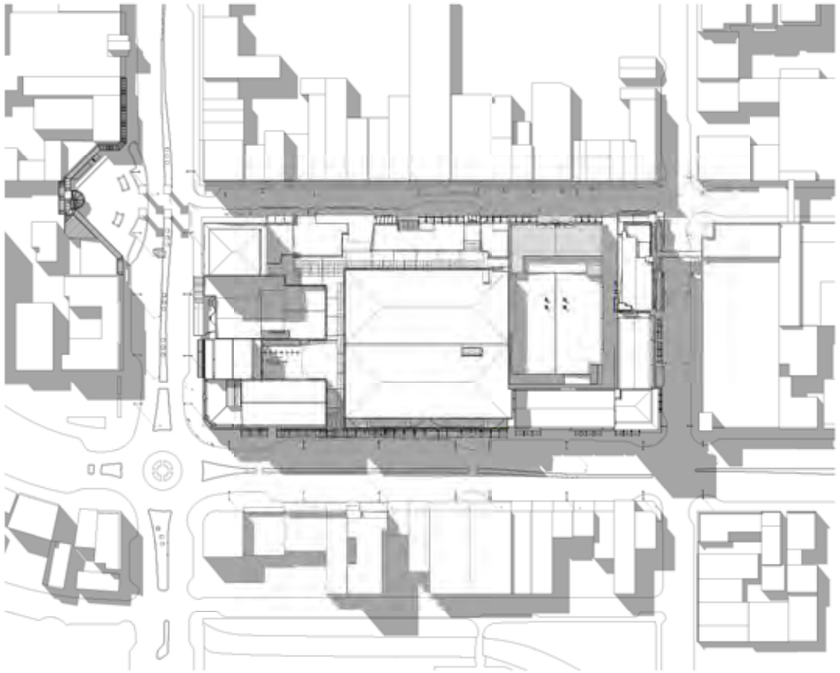
SHADOW STUDIES - MARCH

A
9700

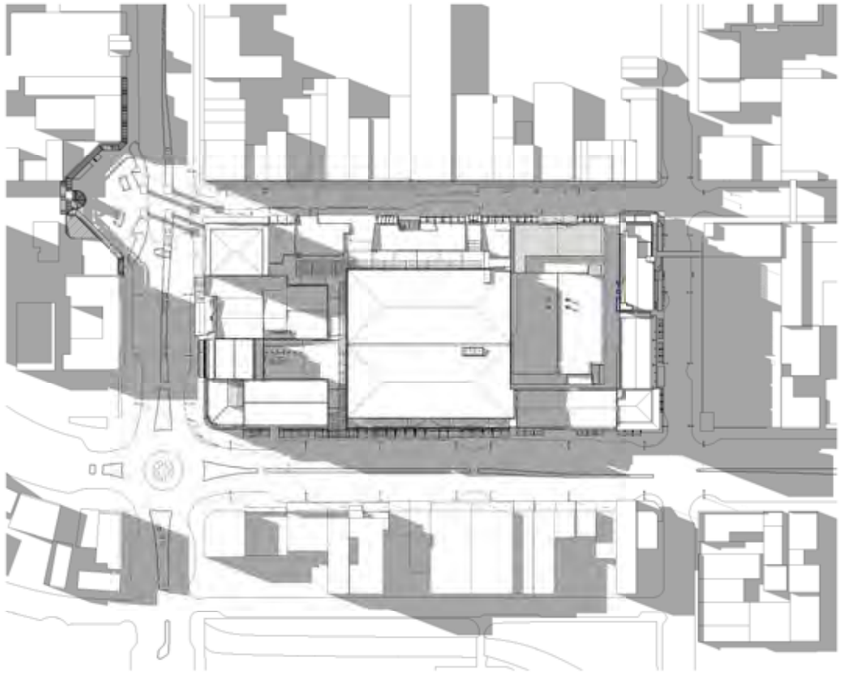
INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN



1 MARCH 21 - 3pm PROPOSED



2 MARCH 21 - 5pm PROPOSED

3 MARCH 21 - 3pm EXISTING

4 MARCH 21 - 5pm EXISTING

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 7001

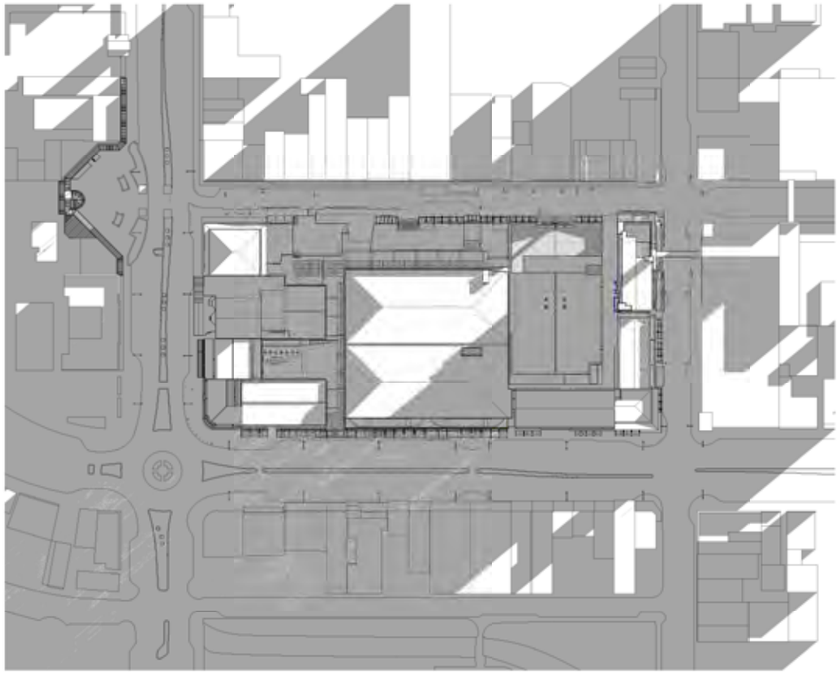
SHADOW STUDIES - MARCH

A
9701

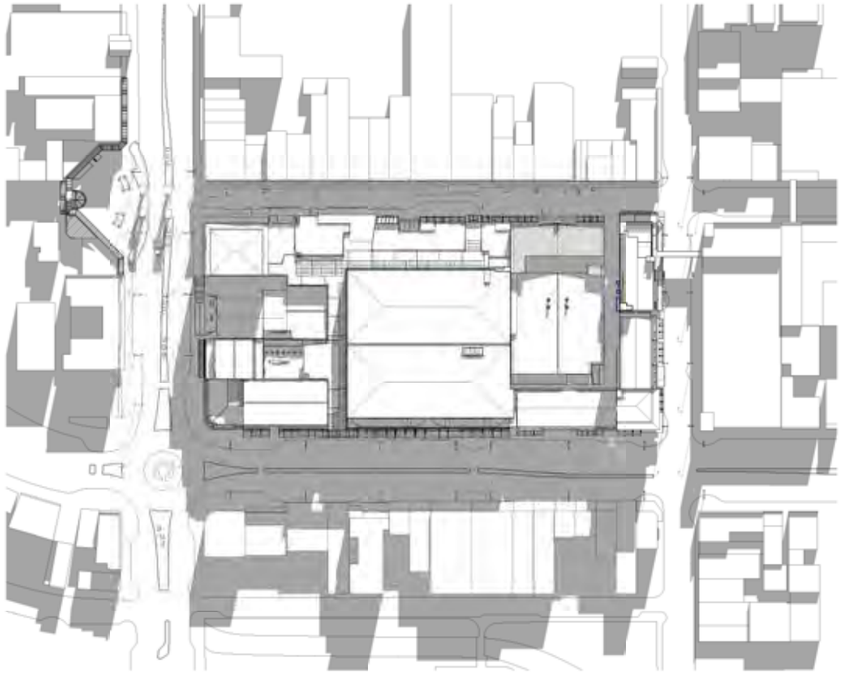
INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN



1 JUNE 22 - 9am PROPOSED



2 JUNE 22 - 12pm PROPOSED

3 JUNE 22 - 9am EXISTING

4 JUNE 22 - 12pm EXISTING

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 7002

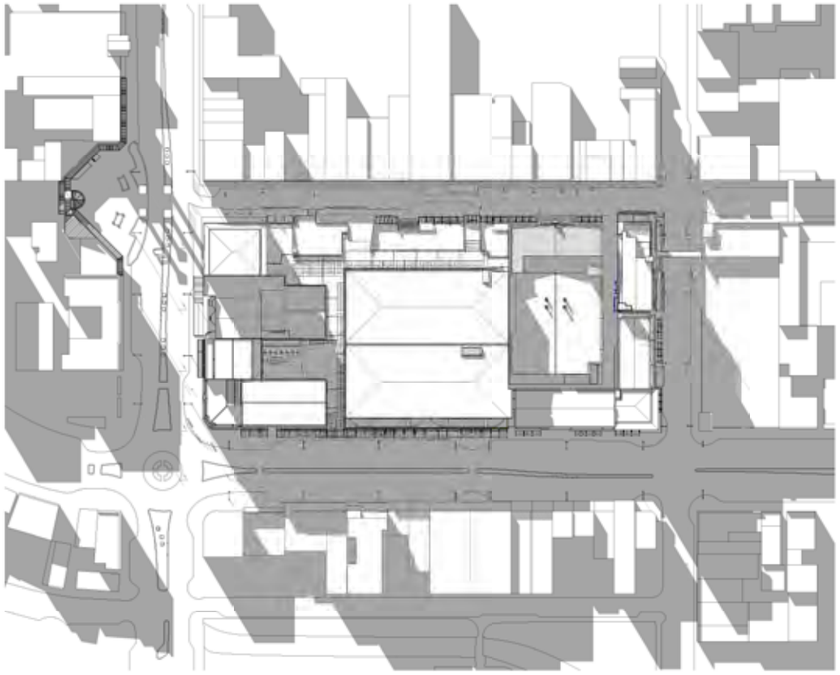
SHADOW STUDIES - JUNE

A
9702

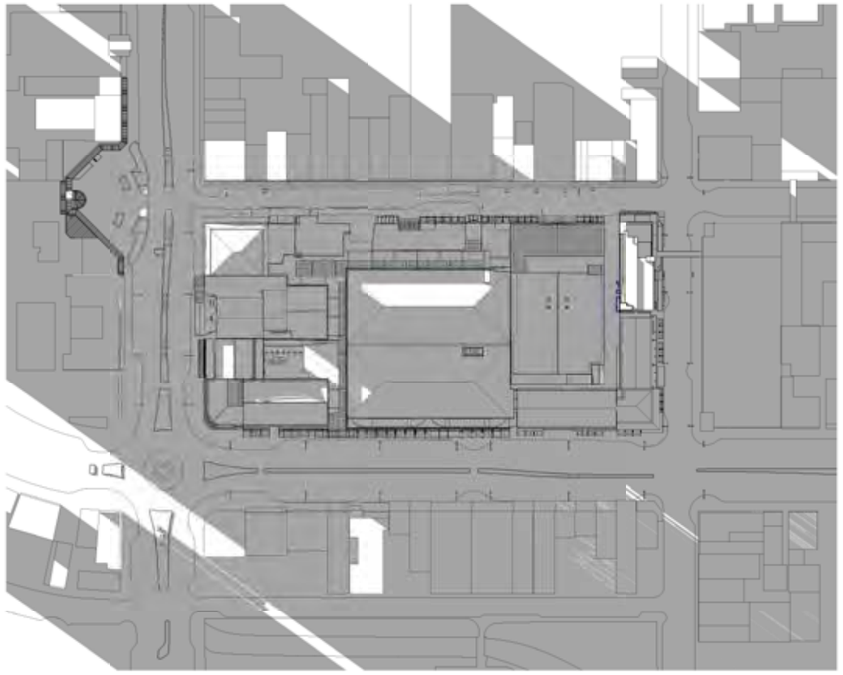
INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN



1 JUNE 22 - 3pm PROPOSED



2 JUNE 22 - 5pm PROPOSED

3 JUNE 22 - 3pm EXISTING

4 JUNE 22 - 5pm EXISTING

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 7003

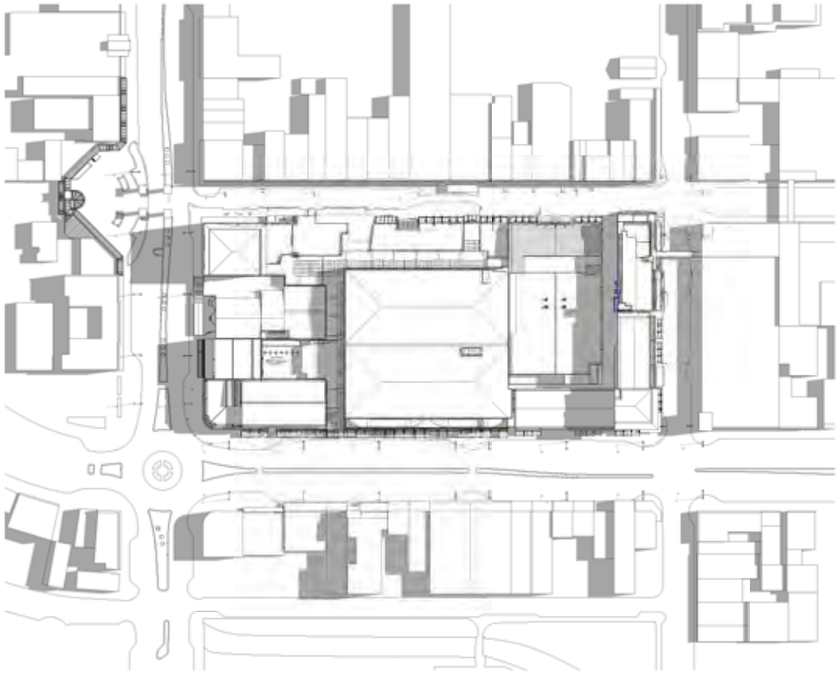
SHADOW STUDIES - JUNE

A
9703

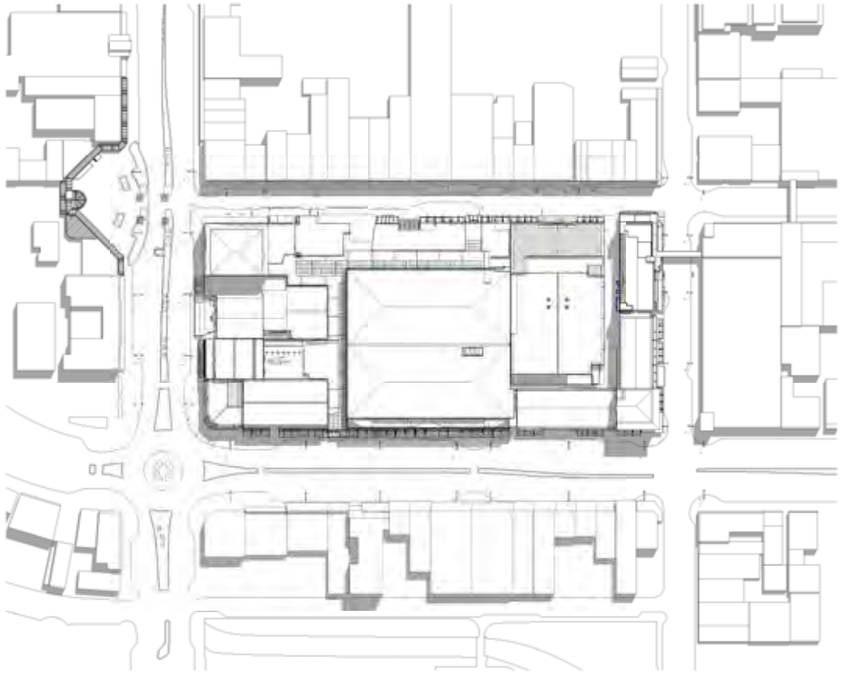
INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN

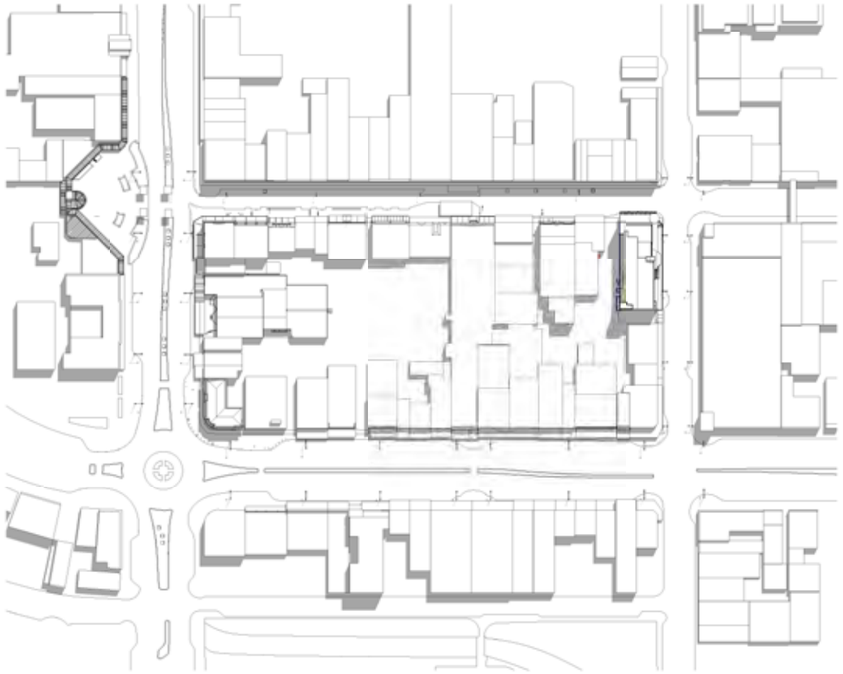


1 DECEMBER 22 - 9am PROPOSED



2 DECEMBER 22 - 12pm PROPOSED

3 DECEMBER 22 - 9am EXISTING



4 DECEMBER 22 - 12pm EXISTING

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 7004

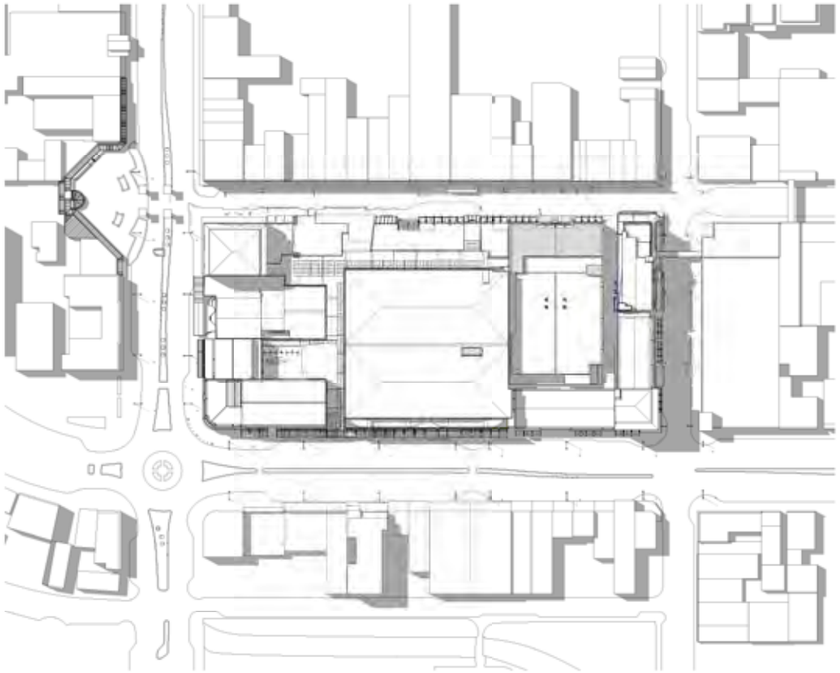
SHADOW STUDIES - DECEMBER

A
9704

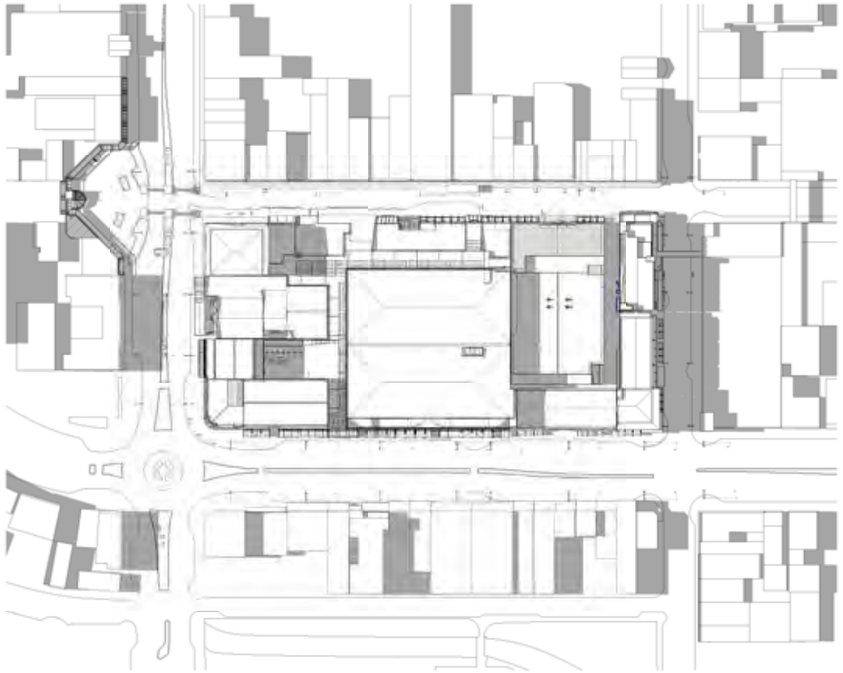
INVERCARGILL MASTERPLAN
BUCHAN

917077
MAY 2018

BUCHAN



1 DECEMBER 22 - 3pm PROPOSED



2 DECEMBER 22 - 5pm PROPOSED

3 DECEMBER 22 - 3pm EXISTING

4 DECEMBER 22 - 5pm EXISTING

issue	date	revision	ints
A	29/01/19	ISSUE FOR AMENDED RESOURCE CONSENT	TH

NOTE: PREVIOUSLY SHEET 7005

SHADOW STUDIES - DECEMBER

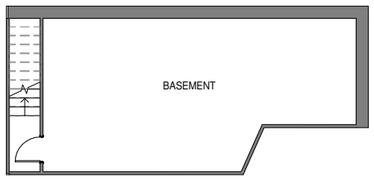
A
9705

INVERCARGILL MASTERPLAN
BUCHAN

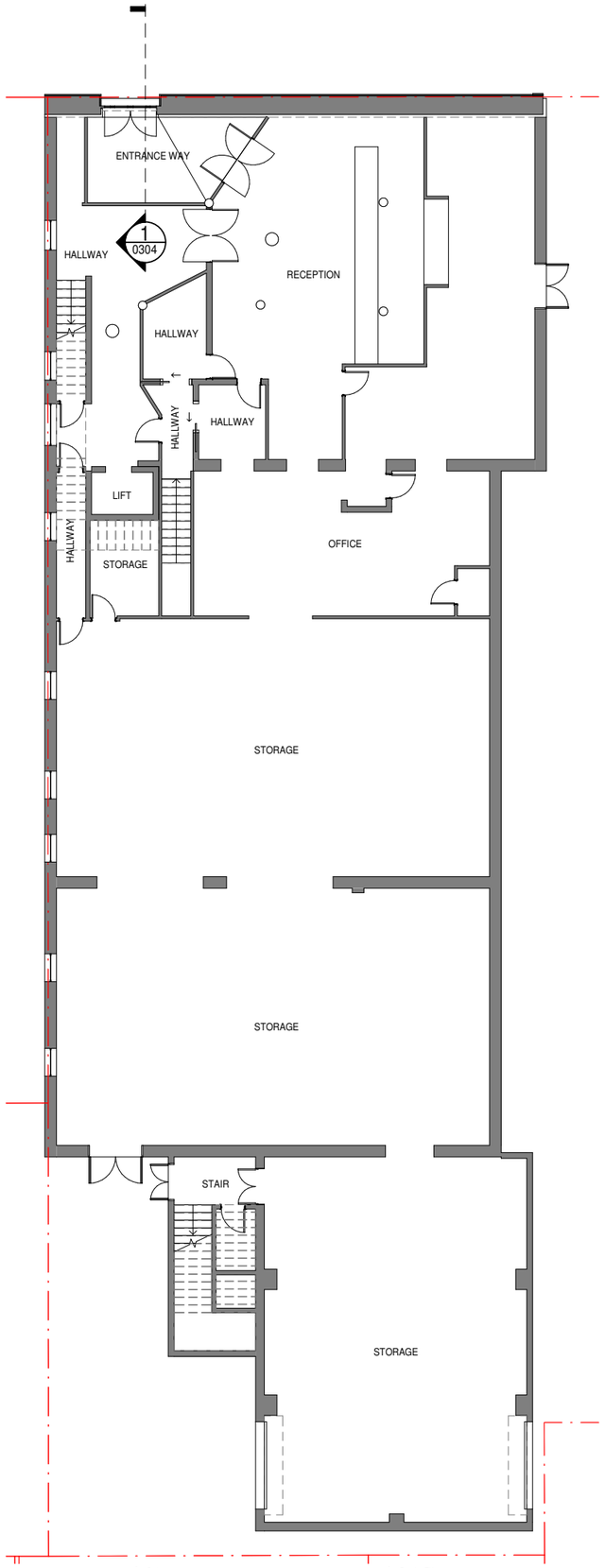
917077
MAY 2018

BUCHAN

Appendix / Southland Times – Retention Strategy



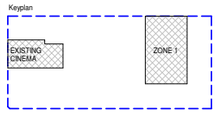
1 ST EXISTING - BASEMENT
1 : 100



2 ST EXISTING GROUND FLOOR PLAN
1 : 100

Rev.	Date	Description	Iss.	Appr.

Keyplan



File
C:\TBG - Revit Projects\917077 - AR-PD - INVERCARGILL - ZONE 1 - ANCHOR - 2019_bhunting.rvt

HWCP

Project
INVERCARGILL CENTRAL - ZONE 1
TAY STREET & DEE STREET CORNER
INVERCARGILL

Project Number
917077

Status
INFORMATION

Date Plotted 28-Jan-19 4:01:23 PM

Date Issued

Scale 1 : 100 @A1

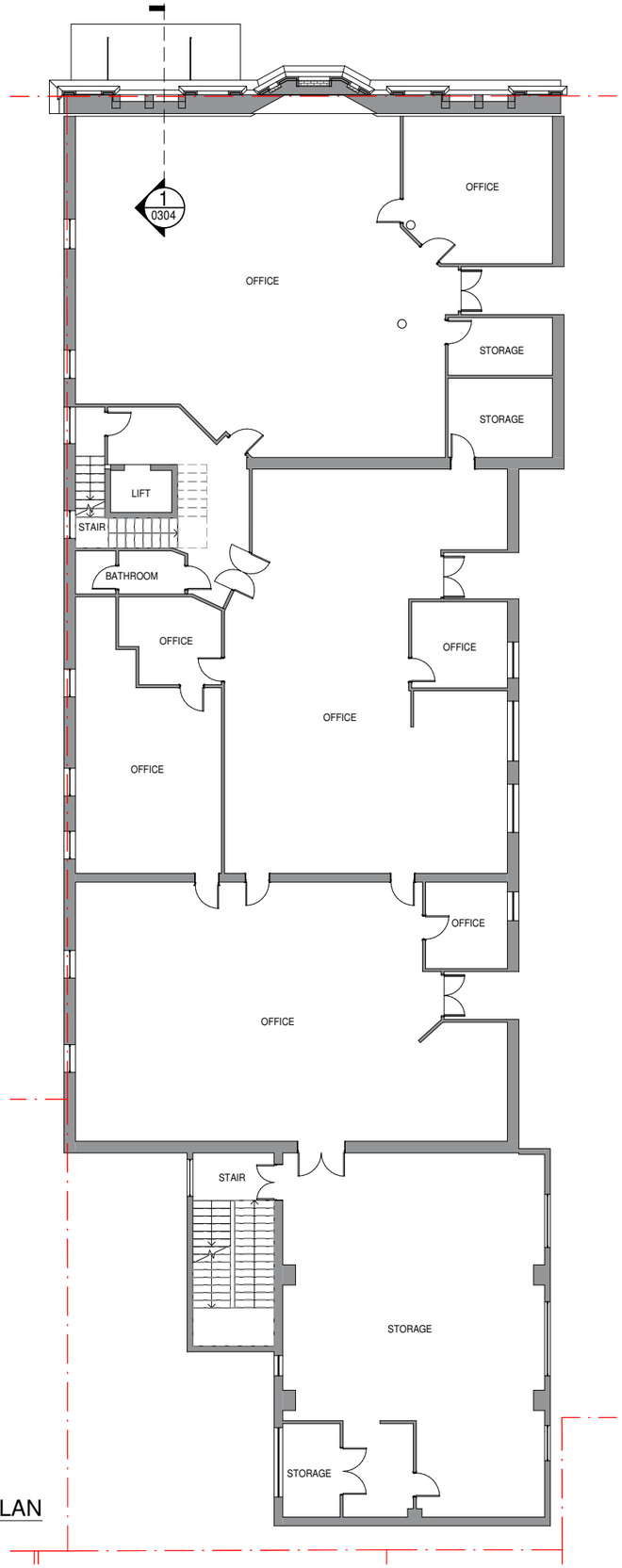
Drawing Title
ZONE 1
SOUTHLAND TIMES EXISTING BUILDING STUDY - EXISTING PLANS

Drawing Number
Z1-PD-0300

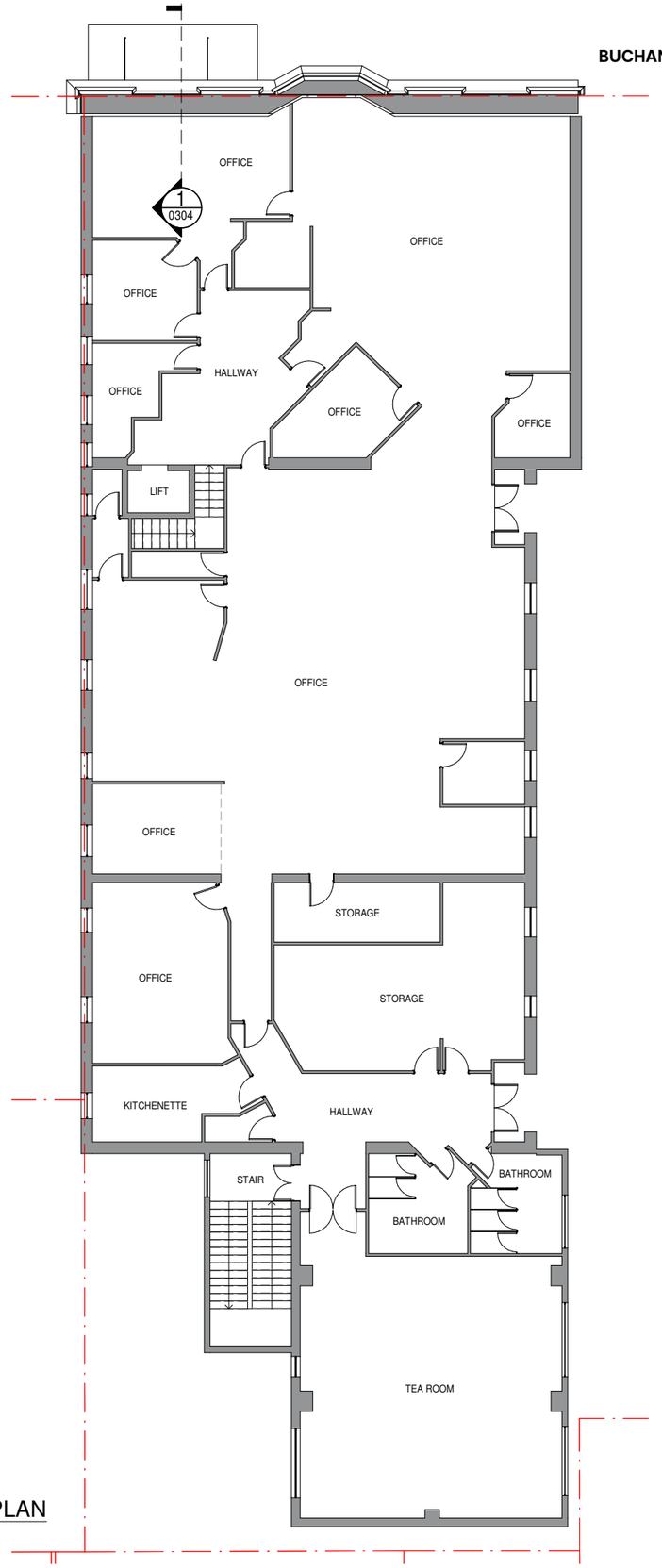
Revision

BUCHAN

Christchurch Studio
+ 64 3 377 2973 / **buchangroup.co.nz**



1 ST EXISTING LEVEL 1 PLAN
1 : 100

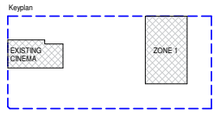


2 ST EXISTING LEVEL 2 PLAN
1 : 100

Rev.	Date	Description	Iss.	Appr.

INVERCARGILL CENTRAL

Keyplan



File
C:\TBG - Revit Projects\917077 - AR-PD - INVERCARGILL - ZONE 1 - ANCHOR - 2019_bhunting.rvt

HWCP

Project
INVERCARGILL CENTRAL - ZONE 1
TAY STREET & DEE STREET CORNER
INVERCARGILL

Project Number
917077

Status
INFORMATION

Date Plotted 28-Jan-19 4:01:24 PM

Date Issued

Scale 1 : 100 @A1

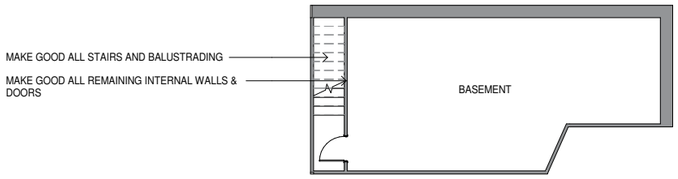
Drawing Title
ZONE 1
SOUTHLAND TIMES EXISTING BUILDING
STUDY - EXISTING PLANS

Drawing Number
Z1-PD-0301

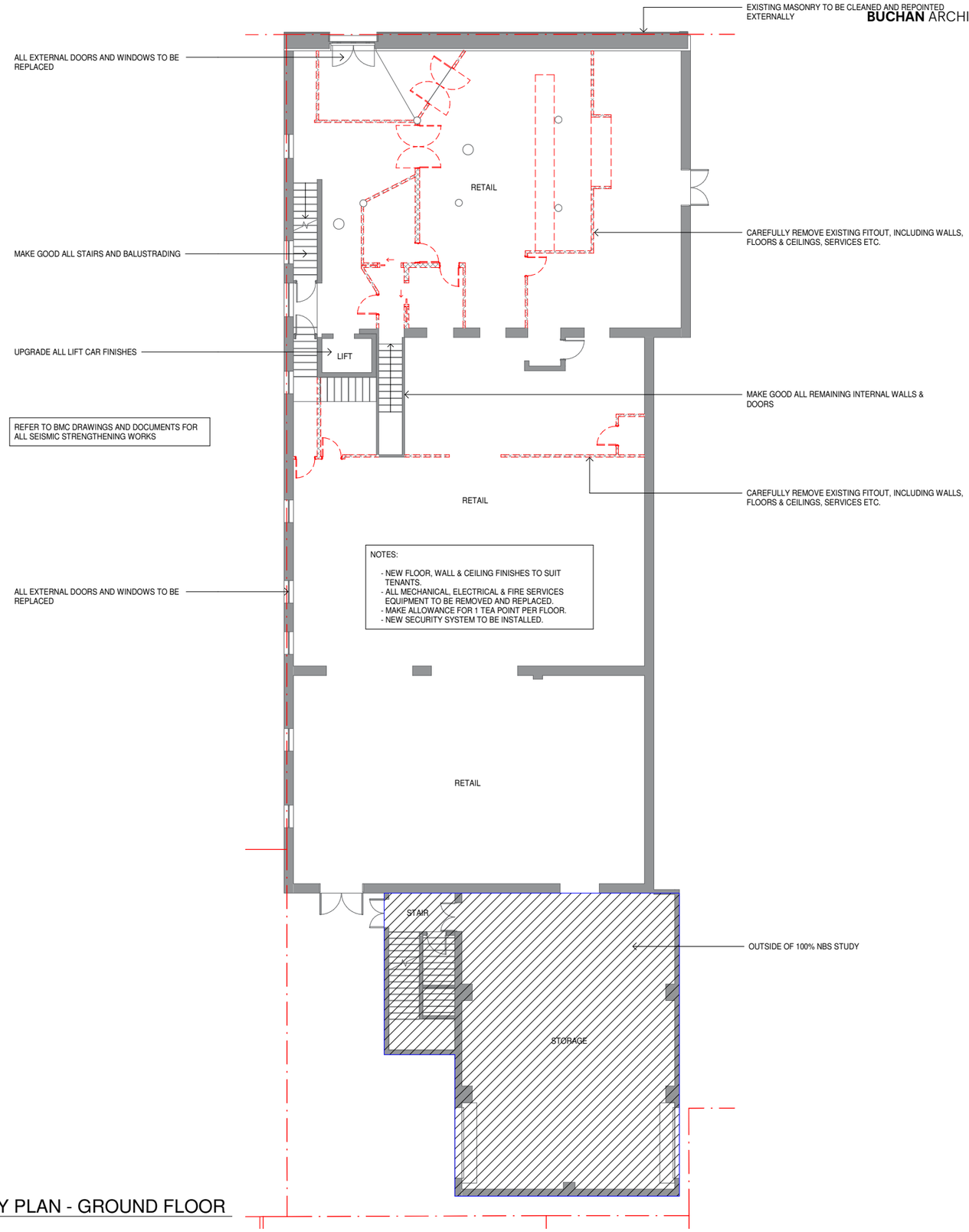
Revision

BUCHAN

Christchurch Studio
+ 64 3 377 2973 / buchangroup.co.nz



1 ST BUILDING STUDY PLAN - BASEMENT
1 : 100

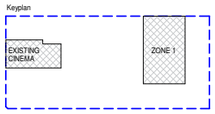


2 ST BUILDING STUDY PLAN - GROUND FLOOR
1 : 100

Rev.	Date	Description	Iss.	Appr.

INVERCARGILL CENTRAL

Keyplan



File
C:\TBG - Revit Projects\917077 - AR-PD - INVERCARGILL - ZONE 1 - ANCHOR - 2019_bhunting.rvt

HWCP

Project
INVERCARGILL CENTRAL - ZONE 1
TAY STREET & DEE STREET CORNER
INVERCARGILL

Project Number
917077

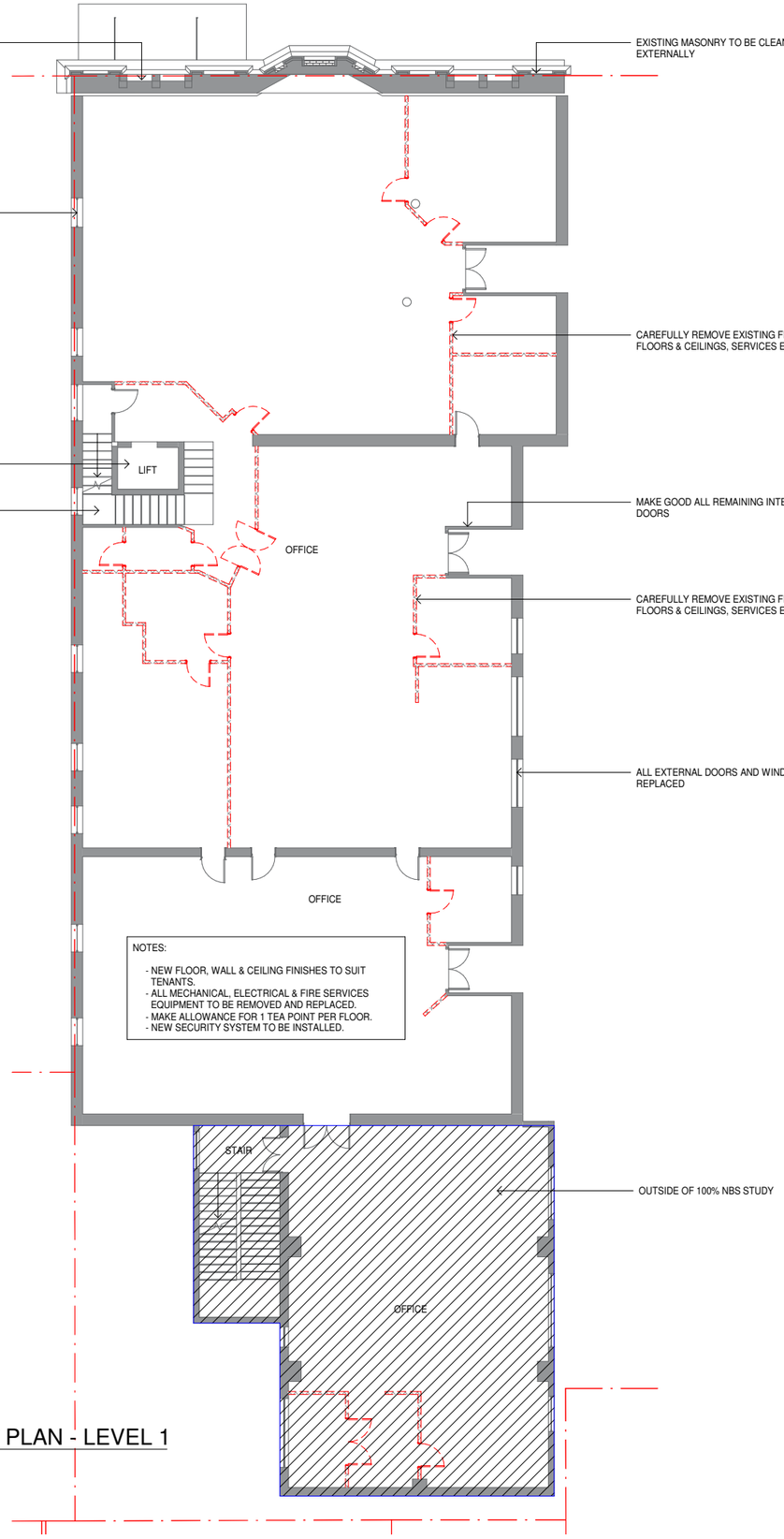
Status
INFORMATION
Date Plotted 28-Jan-19 4:01:25 PM
Date Issued
Scale 1 : 100 @A1

Drawing Title
ZONE 1
SOUTHLAND TIMES EXISTING BUILDING STUDY - STUDY PLANS

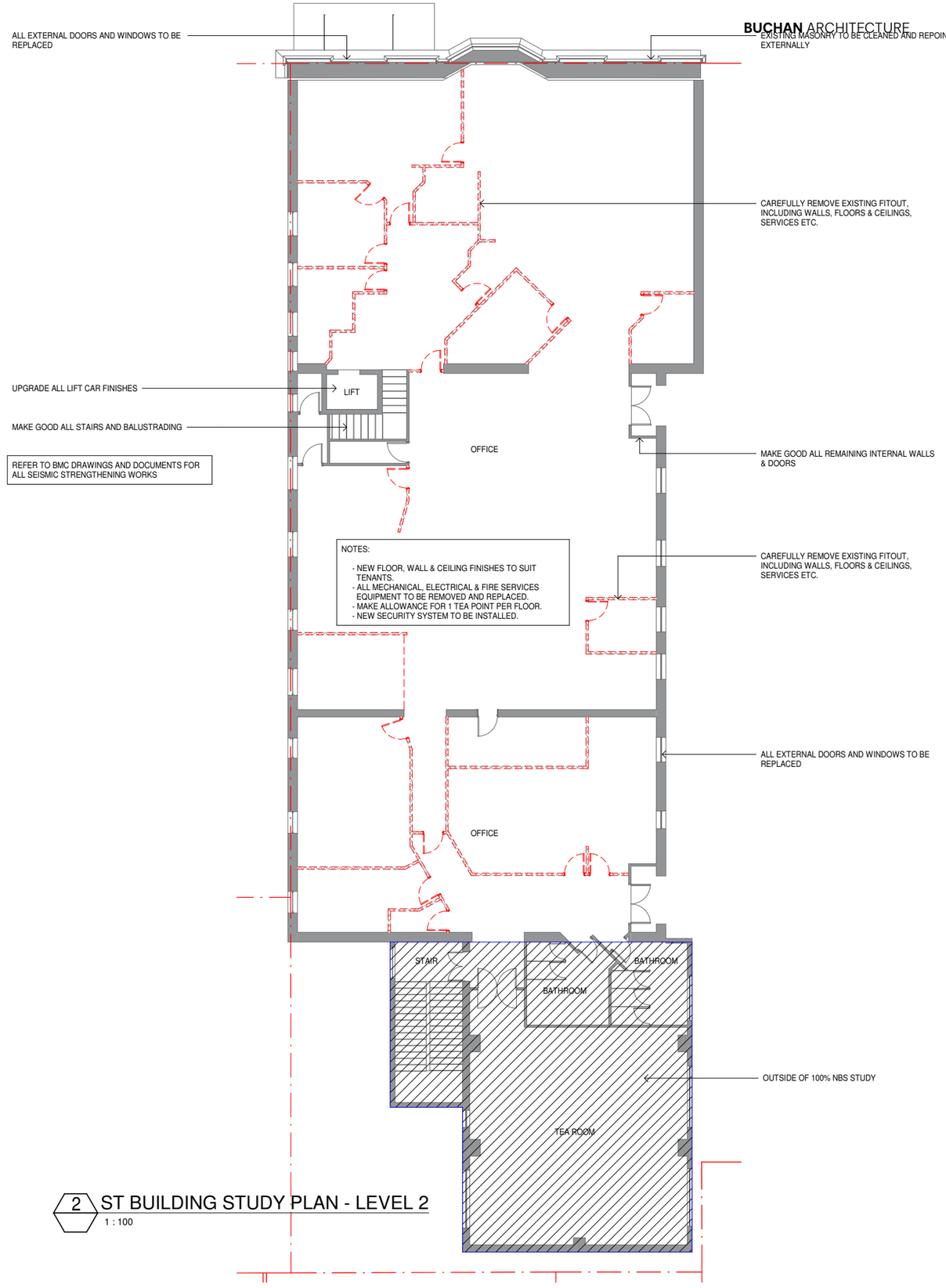
Drawing Number
Z1-PD-0302

Revision

BUCHAN
Christchurch Studio
+ 64 3 377 2973 / buchangroup.co.nz



1 ST BUILDING STUDY PLAN - LEVEL 1
1 : 100

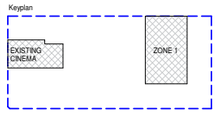


2 ST BUILDING STUDY PLAN - LEVEL 2
1 : 100

Rev.	Date	Description	Iss.	Appr.

INVERCARGILL CENTRAL

Keyplan



File
C:\TBG - Revit Projects\917077 - AR-PD - INVERCARGILL - ZONE 1 - ANCHOR - 2019_bhunting.rvt

HWCP

Project
INVERCARGILL CENTRAL - ZONE 1
TAY STREET & DEE STREET CORNER
INVERCARGILL

Project Number
917077

Status
INFORMATION

Date Plotted 28-Jan-19 4:01:26 PM

Date Issued

Scale 1 : 100 @A1

Drawing Title
ZONE 1
SOUTHLAND TIMES EXISTING BUILDING
STUDY - STUDY PLANS

Drawing Number
Z1-PD-0303

Revision

BUCHAN
Christchurch Studio
+ 64 3 377 2973 / buchangroup.co.nz

BUCHAN

Appendix B Feasibility Studies

Government Life Building, 33 Dee St, Invercargill, 9810

DETAILED SEISMIC ASSESSMENT REPORT

Christchurch Office: Level 3, 335 Lincoln Road, Addington, Christchurch, 8024 +64 3 338 3351 www.bmconsult.co.nz

Wanaka Office: Level 3, 99 Ardmore Street, Wanaka, 9305 +64 443 4531

Queenstown Office: Suite 7, Level One, 34 Grant Road, Frankton, Queenstown +64 441 3351

Table of Contents:

Revision	Date	Description/Reason for Issue		
A	23/02/2018	Draft issued to client for information only		
		Prepared by	Reviewed by	Approved by
	Name	Charlotte Corston	Andrew Marriott	Graham McDougall
	Signature	BE(Hons), EngNZ	BE(Civil), CMEngNZ, CPEng, IntPE(NZ), M.ICOMOS	BE, CMEngNZ, CPEng, IntPE(NZ)

1.0 Executive Summary

The following report covers the detailed seismic assessment of the Government Life building at the corner of Dee and Esk Streets in Invercargill. The building consists of two distinct structural systems, described as West and East and was constructed circa 1929. The Government Life West section of the building is five storeys high (with no basement) and is approximately 16 m long and 17 m wide giving an approximate footprint of 275 m² at ground floor level. The construction largely comprises steel encased concrete internal columns and reinforced concrete walls with reinforced gravity concrete beams supporting concrete floors.

The Government Life East section of the building is five storeys high (including a basement) with a similar ground floor area to the West section. The overall footprint of the building is therefore approximately 550 m². The basement of Government Life East has a floor area approximately the same as the ground floor. URM parapets cantilever approximately 3m above roof level to a height similar to the fifth floor of Government Life West. The construction consists of largely URM walls with timber floors and steel gravity frames.

For the purposes of this evaluation, the above described building has been assessed as a two monolithic structures of Importance Level 2 (IL2). This assessment has been carried out in accordance with the guidelines as prescribed in 'The Seismic Assessment of Existing Buildings, Technical Guidelines for Engineering Assessments' (July 2017), issued by MBIE et al, referred to as SAEB from herein.

The West section of the building is considered to have a capacity of 10-15% of New Building Standard. The capacity of the building is limited by concrete wall spandrels and a 200PFC corner column at ground floor

Loading Direction	%NBS (IL2)
N-S	10-15%
E-W	10-15% (estimated)

The East section of the building is considered to have a capacity of 10-20% of New Building Standard. The capacity of the building is limited by URM walls and the parapets

Loading Direction	%NBS (IL2)
N-S	10-20%
E-W	10-20%

BMC notes that the governing elements of the structure are weak poorly detailed concrete spandrels on the West building and URM wall elements on the East building. It was also noted that there is no connection between the walls and timber floor diaphragms on the East building

Geotechnical input indicates bearing capacity in the very soft to firm alluvial silt underlying the site is expected to be significantly lower than "good ground. Some areas of the site are expected to liquefy below the water table under ULS loading, but not at SLS loading.

Due to the age (and condition) of the building being in the order of 90 years, we have core drilled a significant number of concrete samples from structural elements and had them tested for strength, chlorides and carbonation by Opus Laboratories in Christchurch and Wellington. In summary the results were: -

- Concrete strengths are very low and vary from 6.5MPa to 20MPa.
- Chloride concentrations are somewhat elevated above normal levels. The chloride concentrations are likely to be from the use of poorly washed marine aggregate within the concrete mix.
- Variable carbonation through the cores, reflects the quality of the workmanship. The maximum carbonation depths likely exceed typical cover depths, indicating depassivation of at least some fraction of the reinforcing steel and hence a current vulnerability to corrosion.

In summary the Government Life Building is earthquake prone and in terms of structural strength and condition is in our opinion not able to be repaired or strengthened without the loss of most of the heritage fabric and values of the building. The ornate cornices and column treatments to the façade all appear to have been formed in reinforced concrete, plastered and painted. The building has not been occupied above ground floor for approximately 35 years and has significant structural and non-structural damage caused by lack of maintenance.

2.0 Introduction

2.1 Objective

Batchelar McDougall Consulting (BMC) Ltd has been engaged by HWCP Management Ltd to carry out a detailed structural assessment (DSA) for the Government Life Building at 33 Dee Street, Invercargill. The assessment has been undertaken in accordance with the Ministry of Business, Innovation and Employment's (MBIE) Technical Guidelines for Engineering Assessments titled 'The Seismic Assessment of Existing Buildings' (SAEB) and dated July 2017.

2.2 Scope of Work

BMC have been engaged to carry out the following scope of works:

- Review available drawings for the building to determine the nature of the design, primary structural characteristics, and adequacy of the lateral load resisting systems.
- Walk around the building to familiarise ourselves with the structure, visually assess its condition, observe important structural and seismic characteristics, and note obvious deficiencies.
- Undertaken intrusive investigations to determine floor slab thicknesses, element sizes and scan concrete elements for reinforcement provisions.
- Engage OPUS Laboratories to undertake concrete core compression testing and chloride and carbonation testing.
- Carry out a DSA to determine the likely seismic performance of the building
- Identify concept strengthening strategy (if appropriate) or justify demolition
- Provide a DSA report documenting our findings and recommendations

2.3 Information used for the assessment

The information used for this assessment is summarised in bullet point format as follows:

- Photos of some of the original drawings of variable quality by B J Ager dated 1929
- Alteration drawings by Barham & Barham Architects dated 1966
- Alteration drawings by Gray Hesselin & Baxter Architects dated 1982
- Structural drawings of prior strengthening by G M Designs: McMillan Consulting Engineers Ltd dated 2002
- Visual survey undertaken and indicators of defects present at the time (including opening up of some hidden critical areas)
- Test results for core samples taken from the building

2.4 Inspection

A team of BMC Engineers visited the site on 27rd November 2017, 11th December 2017 and again on the 15th December 2017. During these visits BMC engineers undertook a damage assessment and undertook a limited site measure to provide information not found in limited drawings.

2.5 Limitations

Findings presented as a part of this report are for the sole use of HWCP Management Ltd in its evaluation of the subject property. The findings are not intended for use by other parties, and may not contain sufficient information for the purposes of other parties or other uses.

This assessment has been restricted to structural aspects only. Waterproofing elements, electrical and mechanical equipment, fire protection and safety systems, service connections, water supplies and sanitary fittings have not been reviewed, and secondary elements such as windows and fittings have not generally been reviewed.

Limited documentation was provided to BMC therefore assumptions have been made based on site observations and era of construction.

Assumptions have been made as to the likely connections used, based on the observed area of construction. Further invasive investigations would be required to observe all of these hidden connections.

Our professional services are performed using a degree of care and skill normally exercised, under similar circumstances, by reputable consultants practicing in this field at this time. No other warranty, expressed or implied, is made as to the professional advice presented in this report.

BMC have commissioned GeoSolve to provide a Desktop Study for the entire CBD redevelopment block, refer to Section 7.0 of this report for recommendations and the Geotechnical Report that we have obtained.

Assessment on earthquake only loads. No other load cases have been considered.

3.0 Statutory Requirements

3.1 Building Act incorporating The Building (Earthquake-prone Buildings) Amendment Act 2016

3.1.1 Earthquake Prone Building Policy - Section 133

The Building (Earthquake-prone Buildings) Amendment Act was passed into law by Parliament on the 10th of May 2016 and came into effect on 1 July 2017 (now embedded in the Building Act). Some of the significant changes from the previous requirements are outlined below.

3.1.1.1 Definition of 'Earthquake-prone'

The Building Act changes the definition of 'Earthquake-prone Building' by:

- Clarifying that an Earthquake-prone Building can be one that poses a risk to people on adjoining properties and not just those within the building itself;
- Excluding from the definition of Earthquake-prone Building certain residential housing, farm buildings, retaining walls, wharves, bridges, tunnels and monuments;
- Included in the definition of Earthquake-prone Building are hostels, boarding houses and residential housing that is more than two stories and contains three or more household units.

3.1.1.2 Seismic Risk

Different locations are assigned different 'seismic risk' as shown in Figure 1. The new regulations identify three different categories defined by the seismic hazard factor (Z) in the New Zealand Loadings Code (NZS 1170):

- High seismic risk – Z greater than or equal to 0.30
- Medium seismic risk – Z between 0.15 and 0.30
- Low seismic risk – Z lower than 0.15

The seismic risk relates to timeframes for strengthening and identification of potentially Earthquake-prone buildings.The Government Life Building is in a medium Seismic Risk Area.

3.1.2 Priority Buildings

Priority buildings are defined as buildings that:

- Are generally used for health or emergency services or used as educational facilities.
- Contain unreinforced masonry that could fall on to busy thoroughfares in an earthquake – such as parapets.
- The Territorial Authority has identified as having the potential to impede strategic transport routes after an earthquake.

Priority buildings have shorter timeframes for identification and strengthening of Earthquake-prone Buildings. The Government Life Building is classed as a priority building as it comprises unreinforced masonry parapets which may potentially fall onto busy thoroughfares in an earthquake.

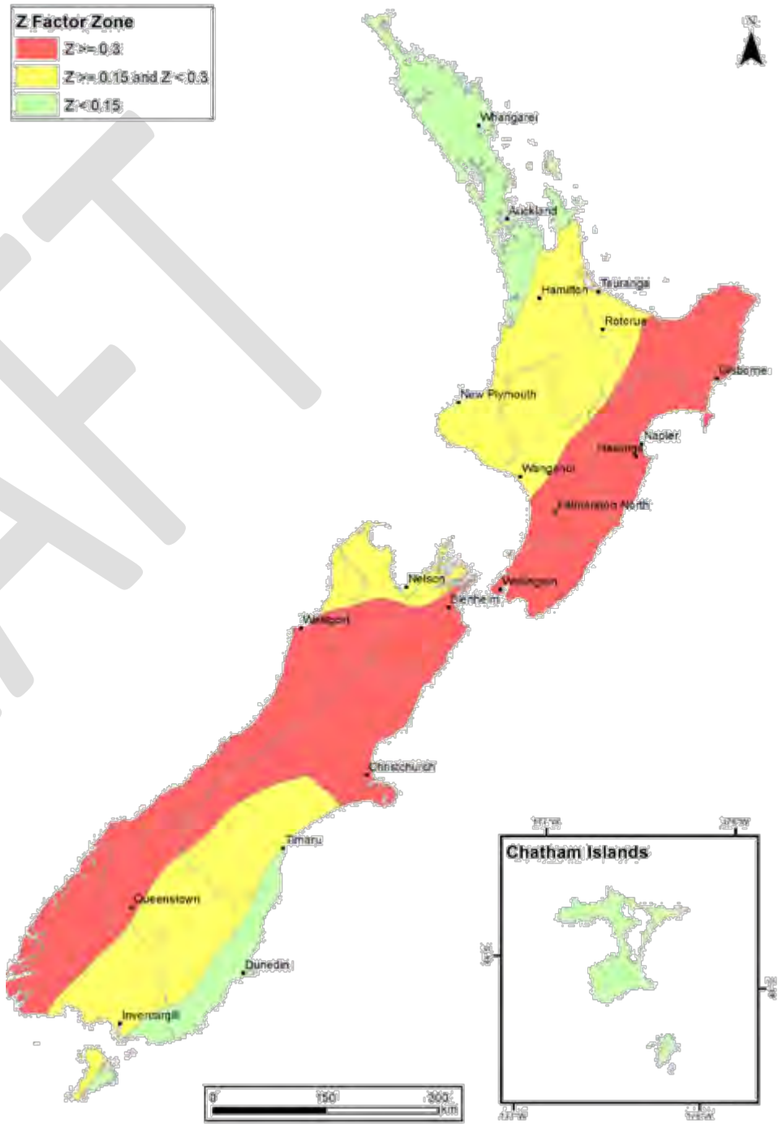


Figure 1 - Three seismic risk areas in map format (map produced by GNS Science)

3.1.2.1 Timeframes for Identifying Earthquake-prone Buildings

The Building Act contains maximum timeframes for Territorial Authorities to assess and identify potentially Earthquake-prone Buildings as outlined below.

High seismic risk areas:

- High Priority buildings 2.5 years
- All other buildings 5 years

Medium seismic risk areas:

- High Priority buildings 5 years
- All other buildings 10 years

Low seismic risk areas:

- All buildings 15 years

The timeframes set out above and in Figure 2 commenced on 1st July 2017.

Seismic risk area	TAs must identify potentially earthquake-prone buildings within:		Owners must strengthen or demolish earthquake-prone buildings within:	
	Priority	Other	Priority	Other
High	2 ½ years	5 years	7 ½ years	15 years
Medium	5 years	10 years	12 ½ years	25 years
Low	n/a	15 years	n/a	35 years

Figure 2 - Time frames for the identification and remediation of earthquake-prone buildings

Following identification by the Territorial Authorities, building owners are required to provide an engineering assessment of the building within twelve months. Upon receipt of the engineering assessment the Territorial Authority decides whether the building should be classified as Earthquake-prone. The ICC must issue an Earthquake-prone Building notice when it determines that a building or part of a building is earthquake-prone.

The Government Life Building will be required to be demolished or strengthened in 12.5 yearsaccording to the building act.

3.1.2.2 Timeframes for Strengthening Earthquake-prone Buildings

The amended Act contains maximum timeframes for strengthening Earthquake-prone Buildings after notice has been issued by the Territorial Authority as outlined below.

- High seismic risk areas 15 years
- Medium seismic risk areas 25 years
- Low seismic risk areas: 35 years

3.1.3 Building Alterations (Section 112)

Under the Building Act:

- Alterations to Earthquake-prone Buildings may be allowed even if after those alterations the building will not comply with the provisions of the Building Code that relate to means of escape from fire and disabled access. The Territorial Authority must be satisfied that the proposed alteration would contribute towards making the building no longer Earthquake-prone and that carrying out other upgrades would be unduly onerous on the owner;
- The Territorial Authority will be able to require the owner to carry out strengthening works in addition to other alterations where the alterations are 'substantial alterations'. The definition of 'substantial alterations' is more than 25% of the ratable value.

3.1.4 Change of Use (Section 115)

This section requires that the territorial authority is satisfied that the building with a new use complies with the relevant sections of the Building Code 'as near as is reasonably practicable'.

This is typically interpreted by territorial authorities as being 100% of the strength of an equivalent new building or as near as practicable.

3.1.5 Heritage Status

The building is listed by Heritage New Zealand Pouhere Taonga as a Historic Place Category 2. It is also listed in the Proposed Invercargill City District Plan as part of the heritage record. Section 3.8 of the District Plan sets out the planning requirements for repairs and maintenance of the building which is a permitted activity, demolition, however is a non-complying activity.

3.2 Building Code

The Building Code outlines performance standards for buildings and the Building Act requires that all new buildings comply with this code. Compliance Documents published by The Department of Building and Housing can be used to demonstrate compliance with the Building Code.

4.0 The Site

4.1 Site Location

The Government Life building is situated at the corner of Esk Street and Dee Street, Invercargill (refer Figure 3). The site has two street frontages, (Dee Street, SH6) to the West and (Esk Street) to the North. The East and South sides of the building are directly adjacent to other buildings.

4.2 Site Description

The site is rectangular in shape and is approximately 35 m long and 17 m wide, thereby occupying a footprint of approximately 550 m². The site is flat and sits approximately 10 m above sea level.

The site is developed by a five storey, category two heritage building. The building comprises numerous retail stores at the ground floor while the upper floors have remained unoccupied over the last 35 years. Ground floor occupancies can be accessed from the street and access to upper floors is solely through the back of the corner convenience store. Numerous retail and commercial style buildings of similar construction are located on the same block bounded by Esk Street, Kelvin St, Dee St (SH6) and Tay St (SH1).

The site can be accessed from both Esk Street and Dee Street.

4.3 Surrounding Land Use

The site is located within the Invercargill central business district (CBD). The vast majority of the surrounding buildings are a mixture of single and double storey unreinforced masonry (URM) retail and commercial buildings.

Immediately behind the building (to the South) is a single storey URM building currently occupied by a Reading Cinemas. Directly to the East are a series of single storey URM retail stores. Esk Street to the North of the building is a largely pedestrian street.

Figure 3 - Google maps satellite image of the site

Figure 4 – View of site from the south on SH6

5.0 Building Description

The Government Life Building is a five-storey building holding a prime location on the Esk and Dee St corners and was constructed circa 1929. The structure comprises two distinct areas; Government Life West and Government Life East as shown in Figure 5.

5.1 Building Form

The Government Life West section of the building is five storeys high (with no basement) and is approximately 16 m long and 17 m wide giving an approximate footprint of 275 m² at ground floor level. The construction largely comprises steel encased concrete and reinforced concrete walls, with reinforced concrete gravity beams supporting concrete floors.

The Government Life East section of the building is five storeys high (including a basement) with a similar ground floor area to the West section. The overall floor area of the building is therefore approximately 550 m². The basement of Government Life East has a floor area approximately the same as the ground floor. URM parapets, approximately 3m high project above roof level at a height similar to the fifth floor of Government Life West. The construction consists of largely URM with timber floors and gravity steel frames.

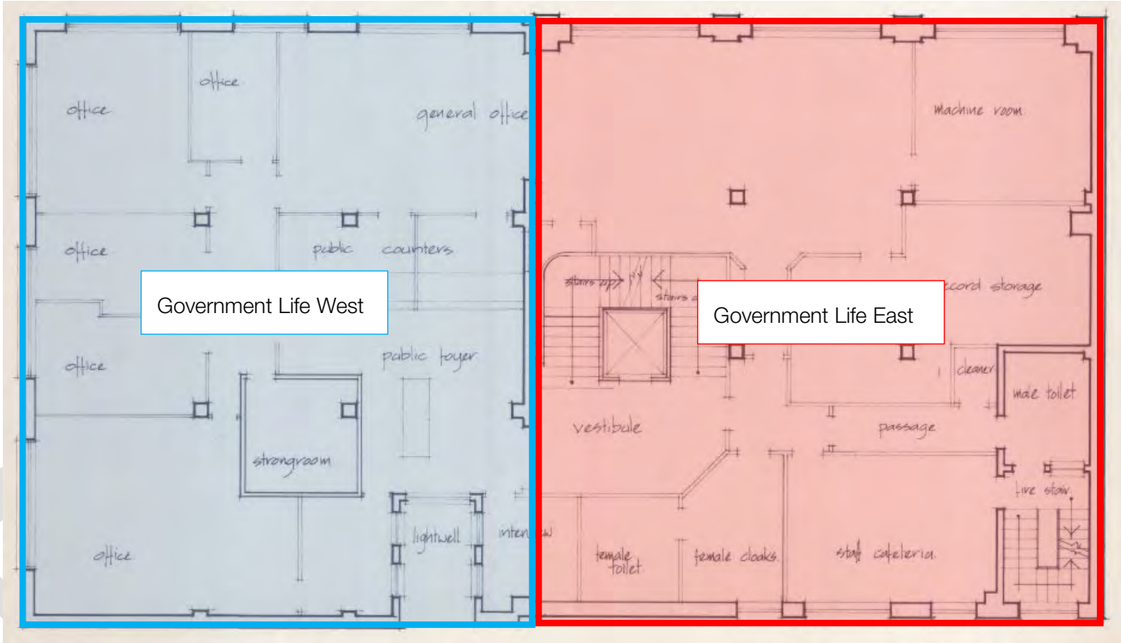


Figure 5 – Government Life building general arrangement plan

5.2 Secondary Features

The secondary building structural systems are described in the following section of the report but some of the key features are described as follows.

5.2.1 Stairs

The building incorporates two stairwells. One of timber construction located centrally within the structure. This stair wraps around a steel framed lift void. The second is the main fire egress stair comprising and concrete stair and landing supported on URM walls and located at the far South East corner of the structure.

5.2.2 Fire Escape

An external fire escape is located on the West side of the building. The fire escapes are constructed from steel members. These were deemed unsafe onsite and hence are no longer in use.

5.2.3 Fifth Floor Safe

A safe comprising 170 mm thick reinforced concrete walls is located in the East section of the West building. The safe walls land on the 330 mm thick reinforced concrete floor. Observations of the supporting structure revealed no additional beams or supporting structure beneath the concrete safe walls.

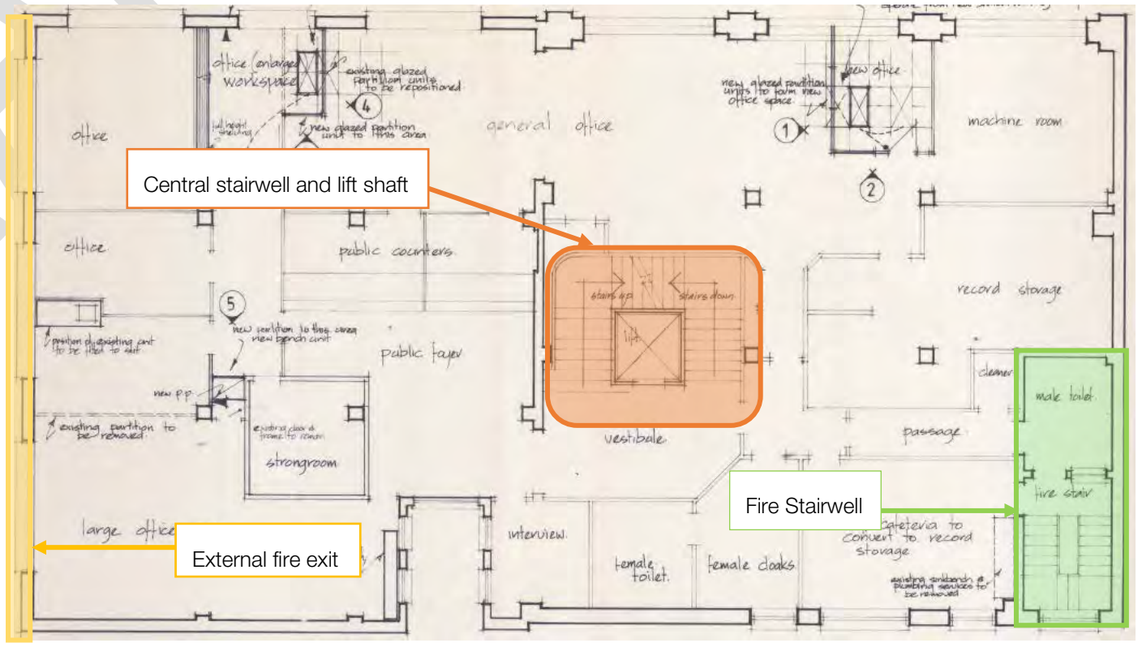


Figure 6 - Location of secondary features

6.0 The Structure

6.1 Gravity load resisting system

6.1.1 Government Life West

Roof Level

→ URM parapet
→ Steel portal frames

Fifth Floor

→ 330 mm thick insitu reinforced concrete floor
→ Reinforced concrete beams along length of building in both directions
→ Insitu reinforced concrete walls and steel CHS posts supporting roof structure

First, Second, Third and Fourth Floor

→ 150 mm thick insitu reinforced concrete floor
→ 250 mm wide by 450 mm deep reinforced concrete beams across building
→ 300 mm wide by 330 mm deep reinforced concrete beams along building
→ Reinforced concrete wall and concrete encased steel columns to interior and reinforced concrete columns to external walls
→ 200mm wide by 1390 mm deep reinforced concrete spandrels to west and north elevations
→ 700 mm wide by 700 mm deep concrete encased steel beam across the shop fronts

Ground Floor

→ Steel posts/columns and SHS strut bracing

6.1.2 Government Life East

Roof Level

→ URM parapets
→ Steel beams with timber purlin roof structure

Ground, First, Second, Third and Fourth Floor

→ 350 mm by 50 mm timber joists at 400 mm centres
→ 360 mm by 152 mm steel I beams across building
→ 250 mm by 130 mm steel I beams along building
→ 225 mm by 175 mm steel I columns and URM walls

Basement

→ Insitu reinforced concrete columns and concrete masonry walls

6.1.3 Foundations

Due to the lack of documentation, assumptions have been made in regards to the foundation system. The foundation system is assumed to comprise reinforced concrete strip footing beneath columns and walls.

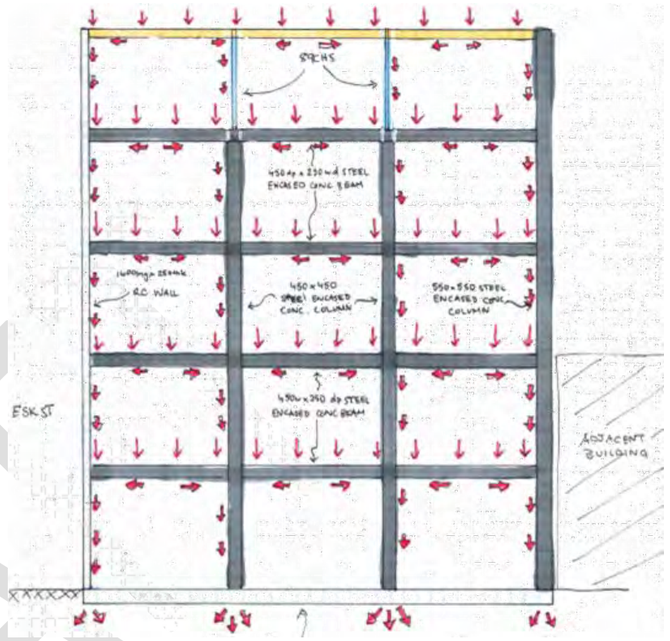


Figure 7 – Government Life West typical gravity load path

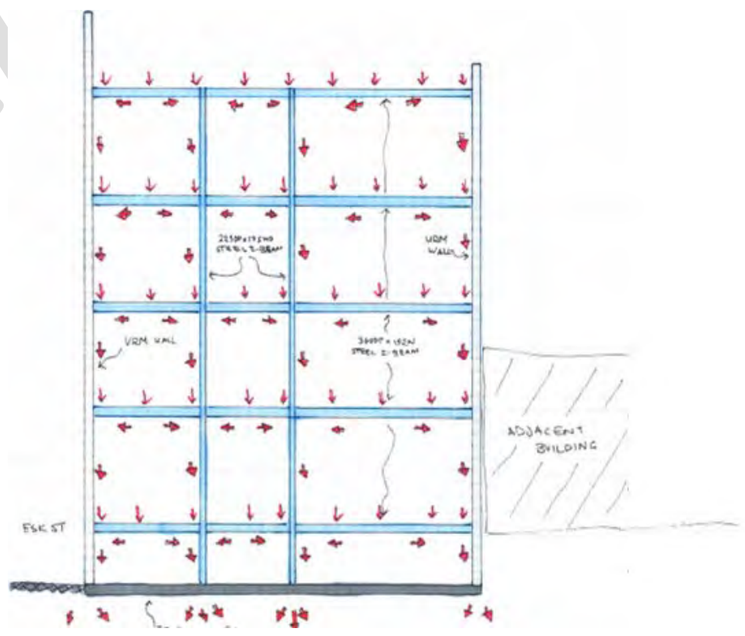


Figure 8 – Government Life East typical gravity load path

6.2 Lateral load resisting system

6.2.1 Government Life West

6.2.1.1 Transverse direction

Roof Level

→ Plasterboard ceiling diaphragms
→ Steel portal frames
→ Insitu reinforced concrete walls

Fifth Floor

→ Rigid diaphragm formed by 330 mm thick insitu reinforced concrete floor
→ Moment frames comprising concrete encased steel beams/columns and reinforced concrete walls
→ Spine shear wall comprising URM

First, Second, Third and Fourth Floor

→ Rigid diaphragm formed by 150 mm thick insitu reinforced concrete floor
→ Moment frames comprising concrete encased steel beams/columns and reinforced concrete walls
→ Spine shear wall comprising URM

Ground Floor

→ Rigid diaphragm formed by 150 mm thick insitu reinforced concrete floor
→ Steel posts/columns and SHS strut bracing

6.2.1.2 Longitudinal direction

The longitudinal lateral load resisting system is similar to the transverse lateral load resisting system other than there are only concrete encased steel frames and reinforced concrete shear walls. The URM shear wall provides insignificant lateral resistance in the longitudinal direction

6.2.2 Government Life East

This section of the building lacks a resilient lateral load path due to the lack of flexible diaphragm action to support the URM walls.

The lateral load resisting system comprises timber flexible diaphragms without sufficient ties spanning to the URM shear walls with steel gravity support frames. Following the first mode of failure some lateral resistance will be provided by the steel frames. Lateral load is distributed on a tributary width basis at each floor level as there is no diaphragm action. The URM walls out-of-plane are required to span between walls or frames, but are limited by their fixing capacities.

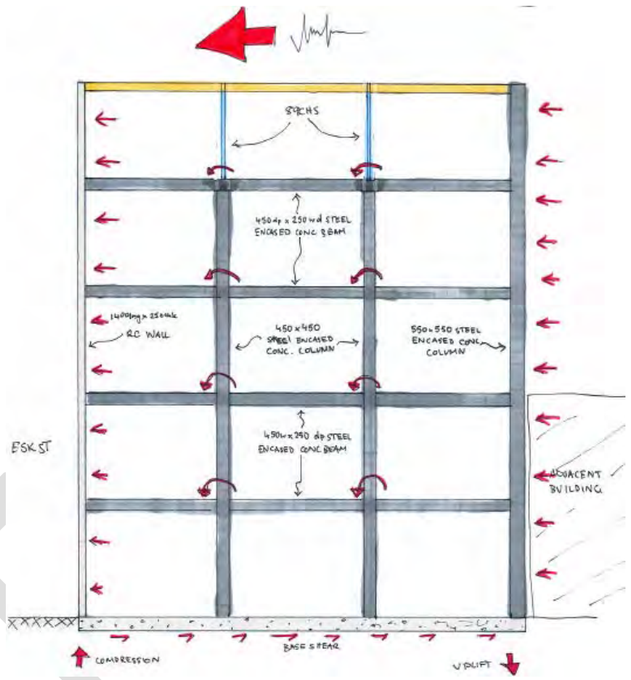


Figure 9 – Government Life West typical transverse lateral load path

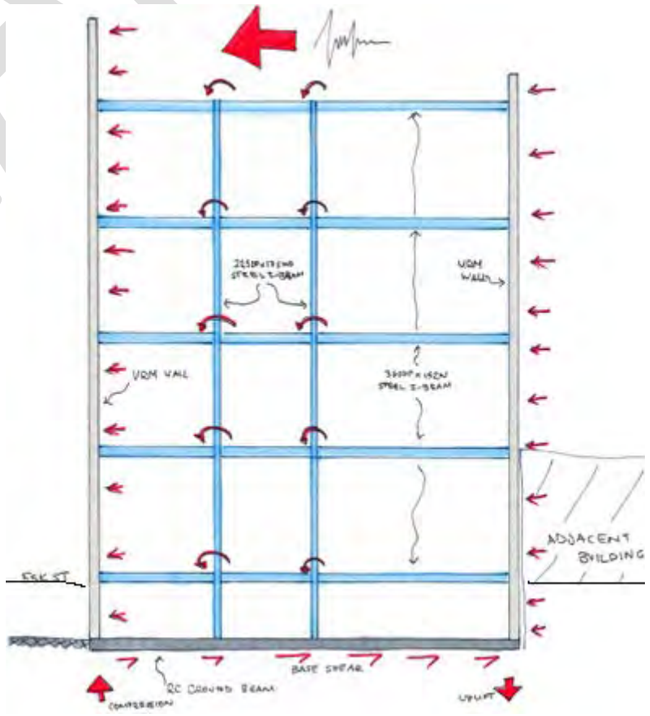


Figure 10 – Government Life East typical transverse lateral load path following first mode of failure

7.0 Geotechnical Considerations

A geotechnical desktop study was carried out by GeoSolve Ltd during February 2018 (reference: 171019), see Appendix D.

The report was written for the Invercargill CBD Project involving both the Government Life Building and the Southland Times Building. A desktop study was deemed sufficient to assist with the structural assessment undertaken by Batchelar McDougall Consulting Ltd.

No site specific investigations have been undertaken for the purpose of this report. GeoSolve have completed a review of shallow and deep site investigations in close proximity to the sites in central Invercargill to infer the underlying geological model. Class D soil type with 'susceptibility to liquefaction' at ULS seismic events have been used in the analysis.

7.1 Ground Conditions

The subsurface soils underneath the Government Life Building are inferred to comprise:

- Uncontrolled fill/ engineered fill, overlying;
- Alluvial silt, overlying;
- Alluvial sand, overlying;
- Alluvial gravel.

The groundwater level was observed between 1.4 m and 3.3 m bgl in the area. Further site specific investigations would be required to confirm the groundwater levels.

7.2 Liquefaction Assessment

The liquefaction analysis from surrounding sites indicates there is typically no potential for liquefaction or lateral spreading under SLS seismic loading, however minor liquefaction is predicted under ULS loading at some sites in the area i.e. loose sand lenses overlying or within the alluvial gravel unit have the potential to liquefy below the water table under ULS seismic loading.

7.3 Foundations

It is understood the Government Life Building's foundations are likely to comprise strip footings bearing upon alluvial silt. Bearing capacity within the very soft to firm alluvial silt underlying the site is expected to be significantly lower than "good ground". The basement foundation is expected to bear on the underlying alluvial gravel or a thin layer of alluvial silt overlying alluvial gravel.

Strip footings (500 mm wide by 500 mm deep) within the alluvial silt are expected to have a geotechnical ultimate bearing capacity of 120 kPa. Footings (400 mm wide by 400 mm deep) upon the alluvial gravel have an expected higher geotechnical ultimate bearing capacity of 300 kPa, see Figure 11 and Figure 12. Note low bearing for wider footings.

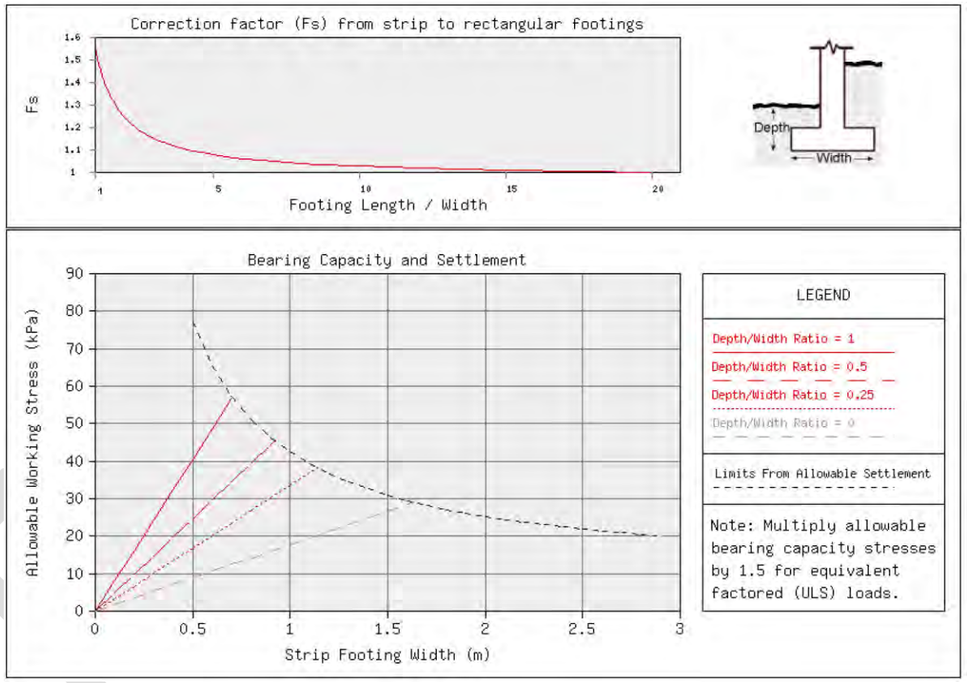


Figure 11 – Typical bearing for shallow footings on alluvial silt (excerpt from GeoSolve report)

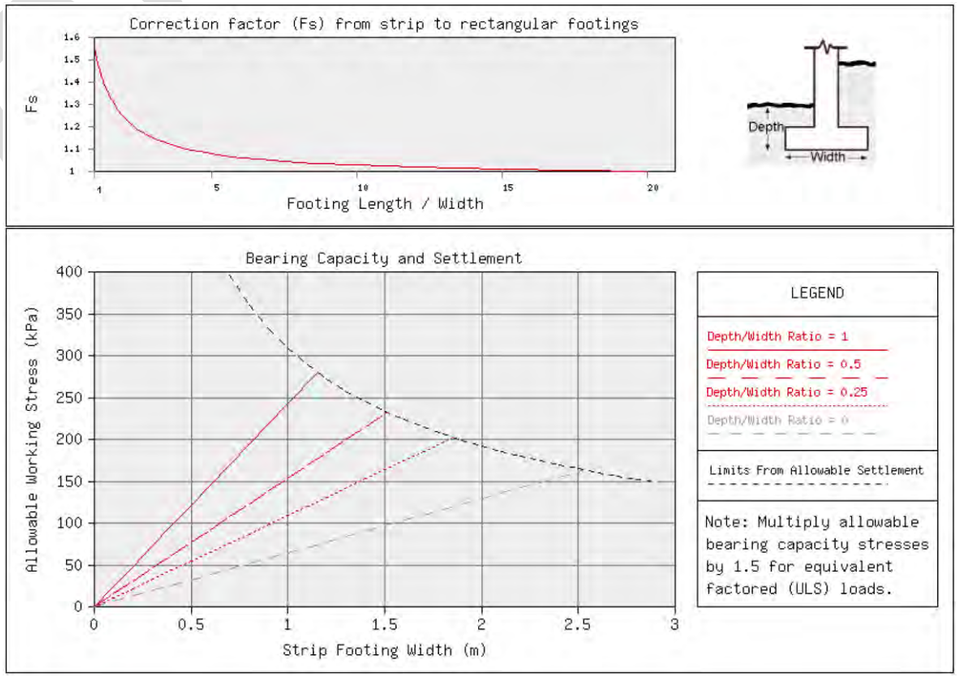


Figure 12 - Recommended bearing for shallow footings on alluvial gravel (excerpt from GeoSolve report)

8.0 Seismic Assessment Parameters

8.1 Material Properties

The following structural and geotechnical material properties have been used to carry out this seismic assessment. No structural specification for the original construction has been made available to BMC, so parameters have typically been taken from industry guidance and testing, see references below:

Material	Element	Property	Assigned Value	Notes/comments/assumptions
Concrete	Steel encased concrete columns	28 day compressive strength, f'c	6.5 MPa	OPUS Concrete compression test report, ref CH3667, dated 08/01/2018
	Reinforced concrete beams	28 day compressive strength, f'c	8.5 MPa	
	Wall elements	28 day compressive strength, f'c	16 MPa	
	Spandrel elements	28 day compressive strength, f'c	20 MPa	
	Floor elements	28 day compressive strength, f'c	12 MPa	
	All concrete members	Modulus of elasticity	13-20 GPa	NZS 3101: Part 1:2006 clause 5.2.3
Steel Reinforcement	R bars	Lower characteristic yield strength	227 MPa	SAEB Part C Appendix C5-19 table C5C.1
		Probable yield strength	272 MPa	SAEB Part C Section 5 C5.4.3.2
	All reinforcing steel	Modulus of elasticity	200 GPa	SAEB Part C Section 5 C5.5.4.3.3
Structural Steel	Existing frame members	Lower characteristic yield strength	210 MPa	SAEB Part C Appendix C6-10 table C6B.10
		Probable yield strength	231 MPa	SAEB Part C Section 6 table C6.2
	Strengthening frame members	Lower characteristic yield strength	230 MPa	SAEB Part C Appendix C6-10 table C6B.10
		Probable yield strength	264 MPa	SAEB Part C Section 6 table C6.2
	All structural steel	Modulus of elasticity	205 GPa	NZS 3404: Part 1:1997

8.1.1 Importance Level

For the purposes of consideration of loading, the structure been classified as Importance Level 2 (IL2) in accordance with AS/NZS 1170.0:2002.

8.1.2 Design Working Life

The Government Life building has been assumed to have been constructed with a Design working life of 50 years. Together with the Importance Level assigned above, this has been used to determine the annual probability of exceedance for ultimate limit states, including earthquake loads, in accordance with NZS 1170.0:2002, table 3.3.

8.2 Seismic Loading

The seismic loads used in this assessment are based on the provisions of the current loadings standard NZS1170.5:2004.

Seismic Parameter	Values	Notes/References/Comments
Soil category:	D	NZS1170.5.2004 Table 3.1
Hazard factor Z:	0.17	NZS1170.5.2004 Clause 3.1.4
Return period factor Ru:	1.0	NZS1170.5:2004 Clause 3.1.5
Near-fault factor N(T,D):	1.0	NZS1170.5:2004 Clause 3.1.6

Please note: The performance of the building under 'Serviceability' (SLS) seismic loads has not been addressed. A review of GNS Strong Motion Data for Invercargill (earliest record 1994) shows a Peak Ground Acceleraton (PGA) of 0.03g (20 mm displacement) in the 2009 Milford Quake which is less than the expected ULS event.

Recent research under a ULS Alpine Fault event the expected strong motion shaking duration in Invercargill is approximately 45 seconds.

8.2.1 Seismic Weight

The seismic weight has been calculated in accordance with NZS 1170.5:2004 clause 4.2 based on a load combination of dead plus seismic live load.

Building Area	Seismic Weight (kN)	Area of ground floor footprint (m2)	Equivalent area load (kPa)
Government Life West	10,000	270	37
Government Life East	6,900	270	25

9.0 Seismic Assessment Procedure

9.1 Analysis Procedure overview

9.1.1 Government Life West

The structural analysis was completed in accordance with C5 of the SAEB technical guidelines, section C5.8 Global capacity of Dual Frame-Wall Concrete Buildings.

9.1.1.1 Modelling assumptions

The following assumptions have been made when modelling the building:

1. The rigid diaphragm at each floor has adequate strength to transfer these loads
2. The steel encased concrete frames and masonry wall elements are in good condition (i.e. no cracking). This assumption is not entirely valid with some cracking and spalling evident.
3. The soils which the walls are founded on have adequate bearing capacity to resist over turning. This assumption would need to verified by a site specific Geotechnical Engineering assessment of soil bearing capacity.

9.1.1.2 Primary transverse system

The primary transverse system of the existing Government Life West building consists of three concrete frames and one URM wall. Loads are distributed at each floor through rigid diaphragm action provided by the reinforced concrete floors. The concrete frames comprise a mixture steel encased concrete beams/ columns and reinforced concrete beams, columns and walls. Additional reinforced concrete wall elements, such as window mullions, have been excluded from the system as the lateral load capacity they provide is insignificant. The seismic weight and rigid diaphragm associated with this building section is outlined in yellow, in Figure 13.

Two separate two-dimensional (2D) SAP2000 computer models were constructed to investigate the behaviour of each frame type in the transverse lateral load resisting system. The lateral seismic forces are assumed to be distributed over the building height in accordance with Section 6 of NZS 1170.5:2004 and the corresponding internal forces and building displacements are determined using a linear elastic static analysis. Computer model extracts of the 2D frame models' displacements are provided adjacently in Figure 14.

Torsional Analysis

For buildings with rigid diaphragms it is necessary to consider the torsional amplification effect arising from the demand and resistance eccentricities and the location of the centre of strength. Method A: Elastic torsion response from the SAEB technical guidelines Section C2F.2 was used to assess the rigid reinforced concrete diaphragm. This method uses the elastic force-based procedure and linear analysis techniques, therefore only the consideration of accidental torsion is required.

The torsional assessment determined the proportion of load required to be resisted by each frame line. This assessment determined the demand on the SAP2000 frame model.

Component examination was carried out to determine the capacity of specific elements. These checks outlined critical structural weaknesses in the building. These checks were undertaken using in-house BMC spreadsheets and the assumed component detailing is outlined in Appendix A and the following sections summarise these results.

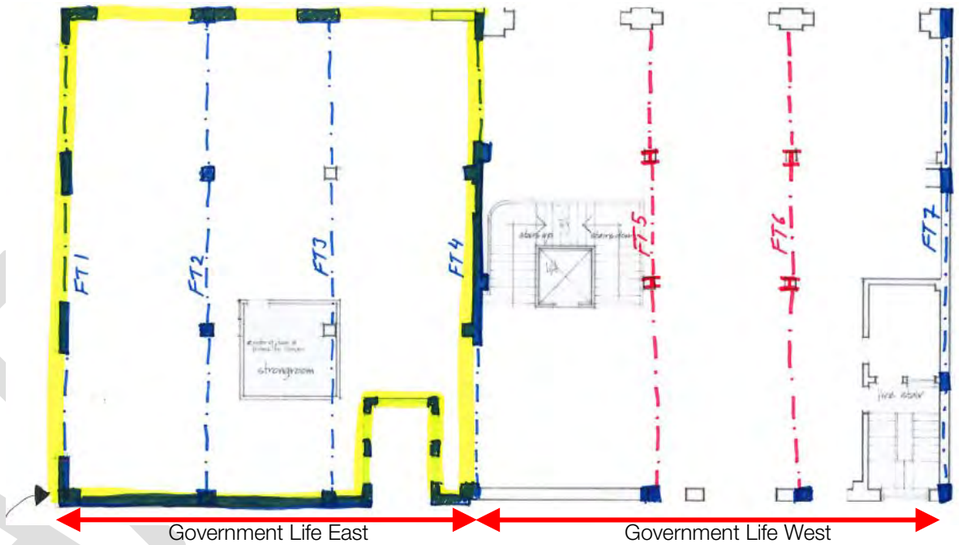


Figure 13 - Transverse lateral load resisting system

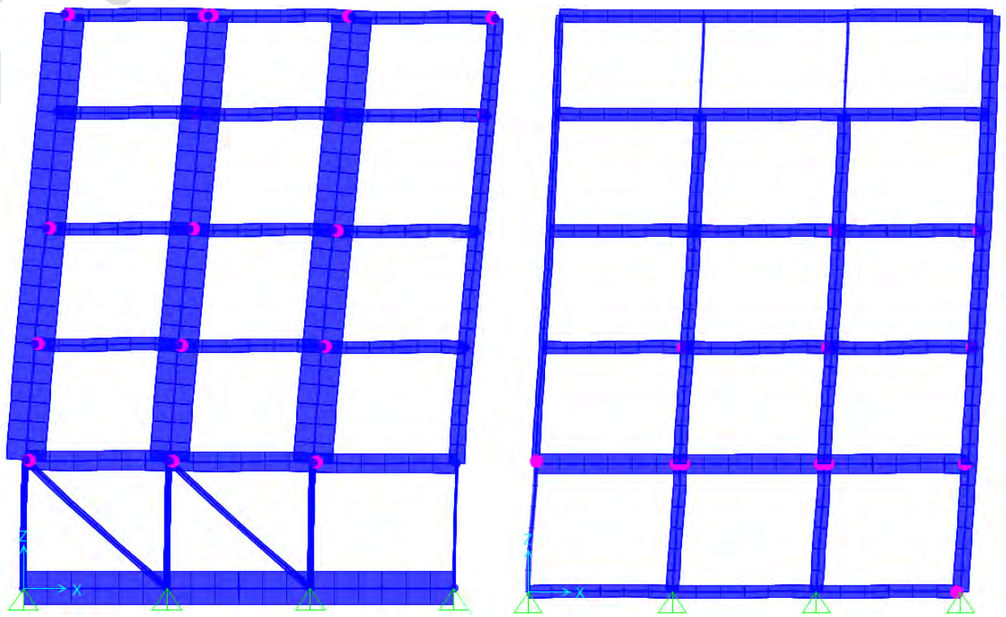


Figure 14 - SAP2000 pushover computer analysis (External frame left, internal frame right)

External Dee Street Frame

The frame along Dee St, Figure 15, comprises reinforced concrete wall, column and spandrel sections and a steel encased concrete beam above ground floor. Below ground floor the frame is constructed of steel columns and struts. The strength of this external frame under earthquake loading is limited by the flexural capacity of the reinforced concrete spandrels and the axial capacity of the out-of-plane 200PFC post at ground floor. Based on these specific component checks the frame capacity is 10-15%

Internal Frames

These frames comprise concrete encased steel columns, reinforced concrete beams and one reinforced concrete wall section acting out-of-plane at the north end of the frame above ground floor. Below ground floor there is a steel column as the wall section stops at first floor. The strength of the internal frame under earthquake loading is limited by the concrete encased steel columns and the reinforced concrete beams and column. Each of these elements has a similar relative capacity. The capacity of these internal frames in 25-30%.

Unreinforced Masonry Spine Wall

The URM spine was wall was assessed as 350 mm thick and approximately 8.5 m long. This was the stiffest lateral load resisting element in the building and hence following torsional analysis attracts the largest lateral load. The demand on this element was derived from the torsional analysis in addition to half the seismic weight of the URM section of the building. The capacity of the masonry wall was determined using the method outlined in SAEB, Section C8. The wall here will be able to perform to a capacity within the range of 15-25 %NBS.

9.1.2 Government Life East

The structural analysis of the Government Life East building assessed the areas deemed critical structural weaknesses. Due to the capacity values of these elements no further global analysis was undertaken. Structural elements were investigated according to section C8 of the technical guidelines.

Eastern External Unreinforced Masonry Wall

The eastern most wall is constructed of URM bounded by insitu concrete columns. The URM is required to span between three floors (between the 1st and 4th floor). This section of the wall was determined to be the most critical out-of-plane. The capacity of this wall over the full 3 storeys is approximately 10-20 %NBS.

Diaphragm action could be introduced as a remedial strategy. Diaphragm action would be introduced by providing fixity between the timber floors and URM wall. This would increase the capacity of the URM wall to 40-50 %NBS.

The in-plane capacity of the URM wall was assessed and determined to meet 60-70 %NBS. This capacity was determined under the assumption that this wall was required to support 50% of the seismic weight of the URM section of the building.

Parapet

The cantilever URM parapet above roof level was analysed also according to section C8 of the technical guidelines as a vertical spanning cantilever wall. The maximum height parapet cantilevers 3.0 m. The out-of-plane capacity of this parapet was calculated at approximately 15-20%NBS.

Figure 15 - External Dee Street Elevation

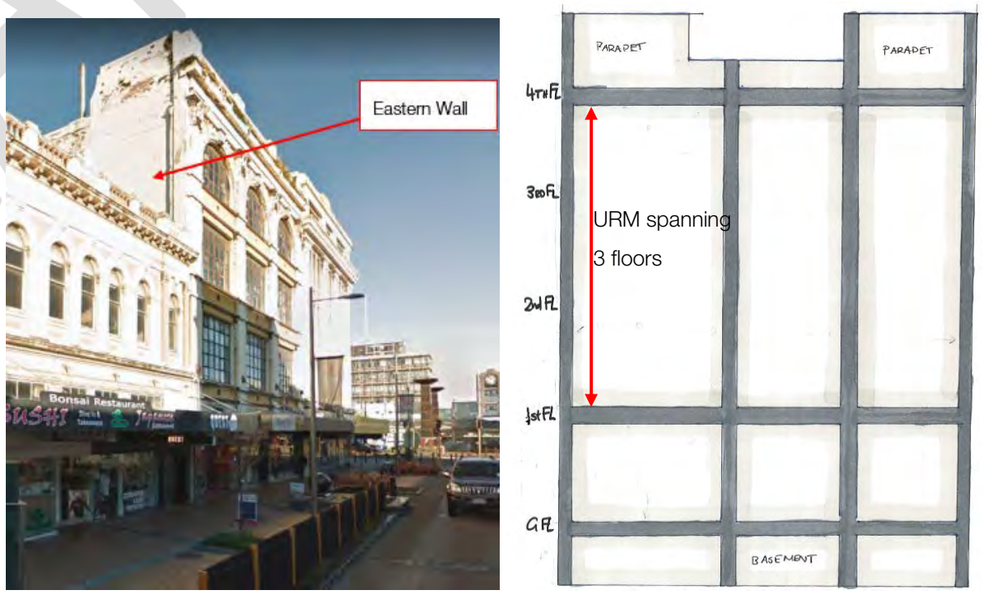


Figure 16 - Location of eastern URM wall (left), sketch of approximate configuration of eastern URM wall (right)

10.0 Quantitative Results Summary

A summary of the results from the quantitative assessment is provided in the table below. These ratings represent an estimate of the original seismic load resistance of the building prior to any earthquakes/damage.

Building area	Loading direction		Specific review element	%NBS Upper Bound	%NBS Lower Bound	Notes/Description of limiting criteria
Government Life West	Transverse	In-plane	Reinforced concrete external wall sections	15-20%	15-20%	Flexural capacity based on μ=1 loads.
			550mm² reinforced concrete column	15-20%	15-20%	Flexural capacity based on μ=1 loads.
			450mm² steel encased concrete column	25-30%	100%	Flexural capacity based on μ=1 loads.
			Central URM spine wall	15-25%	15-25%	Shear capacity based on demand determined from torsional analysis
			350 mm deep x 300 mm wide internal reinforced concrete beam	25-30%	70-75%	Flexural capacity based on μ=1 loads.
			Wall spandrel	10-15%	5-10%	Flexural capacity based on μ=1 loads.
		Out-of-plane	200 Pfc steel column at ground	10-15%	10-15%	Axial capacity based on μ=1 loads.
			Steel Brace – 200SHS9	40-45%	45-50%	Axial capacity based on μ=1 loads.
Government Life East	Longitudinal	Out-of-plane	Eastern URM wall	10-20%	40-45%	Capacity based on vertical spanning wall SAEB C8.8.5
			3.0 m high parapet	10-20%	10-20%	Capacity based on cantilever wall section SAEB C8
		In-plane	Eastern URM wall	60-70%	60-70%	Capacity based on cantilever wall section SAEB C8
	Transverse	Out-of-plane	South URM wall	15-20%	40-45%	Capacity based on vertical spanning wall SAEB C8.8.5

11.0 Building Condition Assessment

11.1 Site Visits and Overview

BMC carried out site assessments of the building on 11th December 2017 and 15th December 2017. This involved obtaining a photographic and written record of the structural systems of the building along with areas of damage or decay. The observations made were visual only (i.e. non-intrusive) and limited to obtaining representative samples of the concrete for strength, carbonation and chloride testing.

The first site visit on 11th December 2017 BMC involved inspection of the following areas of the building:

- Basement
- Levels 1-4 (site measure of level 2)
- Exterior where accessible.
- Roof and parapets
- Site measure of critical wall and floor thicknesses.
- Opening up of spalled concrete areas to determine the cause of the damage

The second site visit on the 15th December 2017 involved inspection of the following areas of the building:

- Ground Floor
- Site measure of basement
- Lift Shaft

The site observations described below relate to structural damage only i.e. damage to structural elements which form part of either the lateral or gravity load resisting systems or both. Cosmetic damage i.e. damage that only affects the appearance of something is purposefully not described here.

Concrete samples were obtained from various areas and elements of the building and sent to Opus Laboratories in Christchurch and Wellington for testing. The results of the testing are attached in Appendix B and Appendix C.

It is believed that the basement and levels 1 through 4 of the building have been unoccupied for approximately 35 years. The building does not appear to have been maintained to a good standard during the period it has not been occupied and currently suffers from moisture ingress through the roof and exterior walls. We bought to the attention of HWCP Management Ltd the fact that the fire escape at the Southwest corner of the building was likely to collapse if it was used. The fire escape was immediately isolated from use from off the veranda to Dee Street and signage placed inside to building prevent use.

The building was tested for the prescence of asbestos which was identified in two specific and isolated locations.

Figure 17 - Spalling concrete adjacent to window in light well area.

Figure 18 - Spalling to window mullion on West wall

Figure 19 - Severe spalling to window mullion on West wall

Figure 20 - Cracking extends all the way through the window mullion

11.2 Site Observations

Structurally the main observation was the porosity of the concrete to the exterior walls allowing moisture into the building. This moisture combined with the presence of poorly washed marine aggregate leading to elevated chloride concentrations, and weak concrete strengths, has led to the concrete spalling in a significant number of areas particularly on the West and South elevations being the predominant wind directions during wet weather. The spalling of the concrete is caused by the reinforcing rusting and expanding by up to five times the size of the original steel. This generates forces within the concrete, leading to it cracking towards the surface generally in the shortest distance possible.

Figure 19 through Figure 21 show that some parts of the structure have failed due to corrosion of the reinforcing reaching a point where the mullion in this case has failed. Temporary stabilisation of this particular mullion has been undertaken to prevent it or debris from falling onto SH6 below.

The parapets to Government Life East appear to be unreinforced brick masonry covered in plaster which is spalling off in some areas as shown in Figure 24.

The roof is leaking in a number of areas, leading to degradation of the structure as shown in Figure 26.

Figure 21 - Close up photo of severe cracking to mullion

Figure 22 - SW corner column showing cracking to least exposed corner of the column

Figure 23 - Crack extends back to main column reinforcing which is rusting

Figure 24 - East parapet wall showing brick below plaster surface

Figure 25 - Spalling plaster over brick substrate

Figure 26 - Roof leaks causing structural damage to beam support.

11.3 Building Condition Discussion

The Government Life building is 90 years old and is exhibiting signs that the concrete structure has exceeded its lifespan. This is manifested in the spalling of the concrete on the exposed West and South walls of the building. It is also backed up by the results of the concrete testing undertaken on the wall elements that are damaged but also the interior concrete element strengths. New structures are normally designed using the current material codes for a durability of 50 years. The concrete code, NZS 3101: Part 2:2006, C3.3 states "Durability is indirectly defined as the ability to withstand the expected wear and deterioration throughout the intended life of the structure without the need for undue maintenance. The expected wear and deterioration may include the influences of weathering chemical attack and abrasion." Clearly with the spalling that is evident within the building, the building has exceeded its life expectancy and is likely to rapidly deteriorate within a short time frame.

Some of the concrete samples were tested for carbonation and chloride ion contamination and the results are attached in Appendix C. In summary the results were: -

- Chloride concentrations are somewhat elevated above normal levels.
- The chloride concentrations are likely to be from the use of poorly washed marine aggregate within the concrete mix.
- Variable carbonation through the cores, reflects the quality of the workmanship. The maximum carbonation depths likely exceed typical cover depths, indicating depassivation of at least some fraction of the reinforcing steel and hence a current vulnerability to corrosion

The mullion in figures 19-21 above has clearly failed due to the effects of the environment and the age of the concrete. This effect is also noted in the spandrel beams and other structural elements and will eventually, given time lead to widespread damage and potentially localised collapse of these elements.

. It is clear from figure 18 and figure 23 that the vertical bars have minimal cover of approximately 20mm which exacerbates the issues as there is very little concrete outside the bar to resist the forces due to rusting.

The water ingress into the roof and walls on level 4 are degrading the structural elements and will lead to loss of support to the roof structure.

12.0 Conclusions

The Government Life Building at the corner of Dee and Esk streets was constructed in 1929 in two distinct halves which we have called the West and East sections. The West section was built using mainly concrete construction with concrete floor diaphragms. Whilst the East building is URM with timber floors that have no diaphragm connections. Both sections have cantilever URM parapets above roof level.

The West section of the building is considered to have a capacity of 10-15% of New Building Standard. The capacity of the building is limited by concrete wall spandrels and a 200pfc corner column at ground floor

Loading Direction	%NBS (IL2)
N-S	10-15%
E-W	10-15% (estimated)

The East section of the building is considered to have a capacity of 10-20% of New Building Standard. The capacity of the building is limited by URM walls and the parapets.

Loading Direction	%NBS (IL2)
N-S	10-20%
E-W	10-20%

BMC notes that the governing elements of the structure are weak poorly detailed concrete spandrels on the West building and URM wall elements on the East building. It was also noted that there is no connection between the walls and timber floor diaphragms on the East building

Geotechnical input indicates bearing capacity in the very soft to firm alluvial silt underlying the site is expected to be significantly lower than "good ground. Some areas of the site are expected to liquefy below the water table under ULS loading, but not at SLS loading.

Our intrusive investigations of the concrete and testing for strength, chlorides and carbonation by Opus Laboratories have found concrete strengths are very low and vary from 6.5MPa to 20MPa. Chloride concentrations are somewhat elevated above normal levels. The chloride concentrations are likely to be from the use of poorly washed marine aggregate within the concrete mix. Variable carbonation through the cores, reflects the quality of the workmanship. The maximum carbonation depths likely exceed typical cover depths, indicating depassivation of at least some fraction of the reinforcing steel and hence a current vulnerability to corrosion.

The Government Life Building is earthquake prone and in terms of structural strength and condition is in our opinion not able to be repaired or strengthened without the loss of most of the heritage fabric and values of the building. The building has not been occupied above ground floor for approximately 35 years and has significant structural and non-structural damage caused by lack of maintenance.

Appendix A – Detailing Assumptions

- Typical floor slab
  - Depth = 150 mm
  - Reinforcing = 16 mm ϕ bars @ 178 mm cnrs
- Typical transverse beam
  - Depth = 350 mm
  - Width = 300 mm
  - Reinforcing = 5x22 mm ϕ bars top and bottom
- Typical internal steel encased concrete column
  - 450 mm wide x 450 mm deep
  - 200UC steel column encased
- Typical external column along south elevation
  - 550 mm wide x 550 mm deep
  - 8x22 mm ϕ bars
- Typical external wall section along Esk St/ Dee St
  - 250 mm thick reinforced concrete
  - 10x16 mm ϕ bars
- Only steel encased concrete beam between ground floor and first floor along Dee St elevation
  - 700 mm wide x 700 mm deep
  - 200UC steel beam encased
- Spandrels along Esk St/ Dee St elevations
  - Thickness spandrel = 200 mm
  - Total height spandrel = 1390 mm
  - Reinforcing = 8x12 mm ϕ bars and 2x6 mm ϕ bars
- Rear wall is RC columns with cavity brick infill
  - 2 layer brick with cavity

Figure 27 - Typical transverse beam section

Figure 28 - Typical external column reinforcing

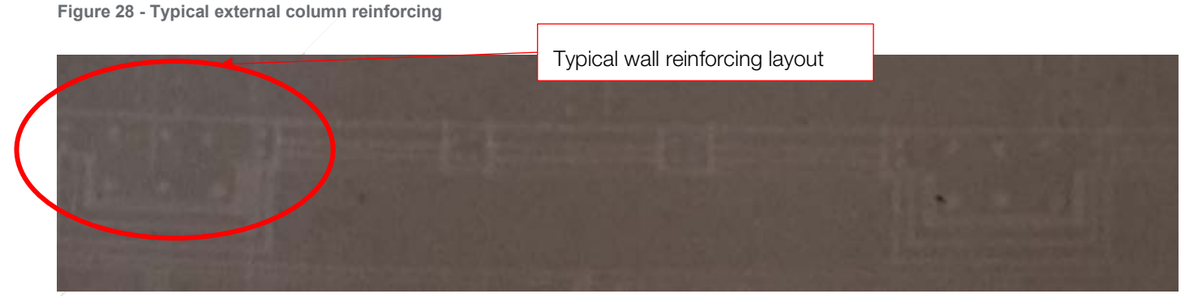


Figure 29 - Typical external wall section along Esk St/ Dee St

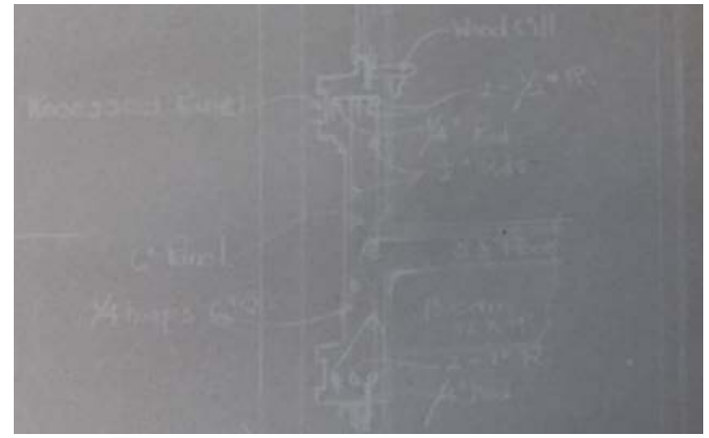


Figure 30 - Typical spandrel reinforcing layout

Appendix B – Concrete Compression Test Report

CONCRETE COMPRESSION TEST REPORT

OPUS

Project:	**Concrete Quality Assurance**
Location:	**Old Govt Life & Southland Times**
Client:	**Batchelar McDougall Consulting**
Contractor:	**Batchelar McDougall Consulting et al**
Sampled by :	**Batchelar McDougall Sub-Contractor**
Date sampled :	**23 December 2017**
Sampling method :	**Rotary Core Drill of Various Diameter's**
Sample Conditioning:	**Tested as Received**
Source :	**Corner Esk & Dee Street, Invercargill**
Grade :	**Circa 1928**
Date received:	**8 January 2018**

Project No:	**6-JBMCL.16/6LC**
Lab Ref No:	**CH3667**
Client Ref No:	**29 Esk Street**

Test Results

Lab reference no		40/1	40/2	40/3	40/4
Client reference no		**Level 2 Column**	**Level 2 Beam**	**Level 2 Floor**	**Level 3 Floor**
Date made		1928	1928	1928	1928
Date tested		2018	2018	2018	2018
Age of material	(years)	**90**	**90**	**90**	**90**
Average diameter	(mm)	94.2	94.4	68.6	68.6
Length	(mm)	185.0	120.0	123.5	115.5
Mass of cylinder in air	(g)	3019	1954	1094	1037
Design strength	(MPa)	-	-		
Density	(kg/m³)	**2400**	**2390**	**2430**	**2470**
Height diameter ratio		1.96	1.27	1.80	1.68
Compressive strength	(MPa)	**7.0**	**9.5**	**12.5**	**12.5**
Adjusted compressive stress	(MPa)	-	*8.5	*12.0	*12.0
Number of ends capped		Two	Two	Two	Two
Defects prior to capping		Irregularities	Irregularities	Irregularities	Irregularities

Comments

Test Methods	Notes
Compression, NZS 3112 : 1986, Pt 2 Section 6	*H/D outside 2:1, 'D' factor applied
Density, NZS 3112 : 1986, Pt 3 Section 5	
Capping NZS 3112 : 1986, Pt 2 Section 4 (amendment No 2 2000)	

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

Date reported : 22 January 2018

IANZ Approved Signatory

Designation : Laboratory Manager
Date : 22 January 2018

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Opus International Consultants Ltd
Christchurch Laboratory
Quality Management Systems Certified to ISO 9001

52C Hayton Rd, Wigram
PO Box 1482, Christchurch Mail Centre,
Christchurch 8140, New Zealand

Telephone +64 3 343 0739
Facsimile
Website www.opus.co.nz

CONCRETE COMPRESSION TEST REPORT

OPUS

Project:	**Concrete Quality Assurance**
Location:	**Old Govt Life & Southland Times**
Client:	**Batchelar McDougall Consulting**
Contractor:	**Batchelar McDougall Consulting et al**
Sampled by :	**Batchelar McDougall Sub-Contractor**
Date sampled :	**23 December 2017**
Sampling method :	**Rotary Core Drill of Various Diameter's**
Sample Conditioning:	**Tested as Received**
Source :	**Corner Esk & Dee Street, Invercargill**
Grade :	**Circa 1928**
Date received:	**8 January 2018**

Project No:	**6-JBMCL.16/6LC**
Lab Ref No:	**CH3667**
Client Ref No:	**29 Esk Street**

Test Results

Lab reference no		40/5	40/6	40/7	40/8
Client reference no		**Level 3 Spandrel**	**Level 4 Spandrel**	**Level 1 Column**	**Level 1 Spandrel**
Date made		1928	1928	1928	1928
Date tested		2018	2018	2018	2018
Age of material	(years)	**90**	**90**	**90**	**90**
Average diameter	(mm)	94.3	93.7	94.3	94.0
Length	(mm)	131.5	185.0	186.5	186.5
Mass of cylinder in air	(g)	2111	3093	2976	3093
Design strength	(MPa)	-	-		
Density	(kg/m³)	**2320**	**2410**	**2370**	**2400**
Height diameter ratio		1.40	1.98	1.98	1.98
Compressive strength	(MPa)	**20.5**	**21.5**	**6.5**	**27.5**
Adjusted compressive stress	(MPa)	*18.5	-	-	-
Number of ends capped		Two	Two	Two	Two
Defects prior to capping		Irregularities	Irregularities	Irregularities	Irregularities

Comments

Test Methods	Notes
Compression, NZS 3112 : 1986, Pt 2 Section 6	*H/D outside 2:1, 'D' factor applied
Density, NZS 3112 : 1986, Pt 3 Section 5	
Capping NZS 3112 : 1986, Pt 2 Section 4 (amendment No 2 2000)	

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

Date reported : 22 January 2018

IANZ Approved Signatory

Designation : Laboratory Manager
Date : 22 January 2018

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Opus International Consultants Ltd
Christchurch Laboratory
Quality Management Systems Certified to ISO 9001

52C Hayton Rd, Wigram
PO Box 1482, Christchurch Mail Centre,
Christchurch 8140, New Zealand

Telephone +64 3 343 0739
Facsimile
Website www.opus.co.nz

CONCRETE COMPRESSION TEST REPORT

OPUS

Project:	**Concrete Quality Assurance**
Location:	**Old Govt Life & Southland Times**
Client:	**Batchelar McDougall Consulting**
Contractor:	**Batchelar McDougall Consulting et al**
Sampled by :	**Batchelar McDougall Sub-Contractor**
Date sampled :	**23 December 2017**
Sampling method :	**Rotary Core Drill of Various Diameter's**
Sample Conditioning:	**Tested as Received**
Source :	**Corner Esk & Dee Street, Invercargill**
Grade :	**Circa 1928**
Date received:	**8 January 2018**

Project No:	**6-JBMCL.16/6LC**
Lab Ref No:	**CH3667**
Client Ref No:	**29 Esk Street**

Test Results

Lab reference no		40/9	40/10	40/11	
Client reference no		**Level 1 Beam**	**Level 1 Sth Wall**	**Lev 1 Light Well**	
Date made		1928	1928	1928	
Date tested		2018	2018	2018	
Age of material	(years)	**90**	**90**	**90**	
Average diameter	(mm)	94.4	94.1	68.4	
Length	(mm)	187.5	133.0	129.5	
Mass of cylinder in air	(g)	2660	2132	1156	
Design strength	(MPa)	-	-		
Density	(kg/m³)	**2430**	**2410**	**2440**	
Height diameter ratio		1.99	1.41	1.89	
Compressive strength	(MPa)	**12.5**	**17.5**	**26.5**	
Adjusted compressive stress	(MPa)	-	*16.0	*26.0	-
Number of ends capped		Two	Two	Two	
Defects prior to capping		Irregularities	Irregularities	Irregularities	

Comments

Test Methods	Notes
Compression, NZS 3112 : 1986, Pt 2 Section 6	*H/D outside 2:1, 'D' factor applied
Density, NZS 3112 : 1986, Pt 3 Section 5	
Capping NZS 3112 : 1986, Pt 2 Section 4 (amendment No 2 2000)	

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

Date reported : 22 January 2018

IANZ Approved Signatory

Designation : Laboratory Manager
Date : 22 January 2018

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Opus International Consultants Ltd
Christchurch Laboratory
Quality Management Systems Certified to ISO 9001

52C Hayton Rd, Wigram
PO Box 1482, Christchurch Mail Centre,
Christchurch 8140, New Zealand

Telephone +64 3 343 0739
Facsimile
Website www.opus.co.nz

Appendix C – Durability Analysis of Cores

2 February 2018

Opus International Consultants Ltd

P +64 4 587 0600

Opus Research
33 The Esplanade, Petone
PO Box 30 845, Lower Hutt 5040
New Zealand

Charlotte Corston
Batchelar McDougall Consulting
PO Box 9440
Tower Junction
Christchurch 8149

Ref: 6-MBMCL.16 / 6CL

Durability Analysis of Concrete Cores – Government Life / Southland Times Building

Dear Charlotte

This letter summarises the results of the analyses undertaken on your behalf of four concrete cores[1] supplied by Geoff Jones from our Christchurch laboratory for the purpose of determining the depth of the carbonation front and possible presence of chloride ion contamination.

All of the cores had a nominal diameter of 100 mm and had been cut through the full depth of the sampled element. Both ends of the each concrete core were rendered with a solid plaster finish of varying thickness and overpainted with a membrane-forming coating. The orientation of the cores was not indicated but could be inferred by the presence of a thin skim coat of gypsum plaster beneath the paint on one face, which was assumed to correspond to the interior end of the core. One core was observed to intersect a single ¼″ diameter reinforcing bar, which had a total depth of cover from the exterior face of 30 mm, including ca. 10 mm of plaster.

1. Methodology

The as-received cores were initially prepared for testing by slicing each specimen longitudinally in half using a water-cooled diamond saw.

The presence of any carbonation through the concrete was determined by spraying phenolphthalein indicator solution on the freshly-cut surface of one half of the specimens after thorough rinsing with water remove any residual contamination from the cutting process. This procedure is based upon RILEM Recommendation CPC-18.[2] The measured depth below the surface of the core that remains colourless on application of the phenolphthalein reagent, rather than becoming stained a magenta colour, indicates the region of concrete with a pH of less than 9.0 – 9.3. This region is assumed to correspond to the total depletion of $Ca(OH)_2$ in the concrete through reaction with atmospheric CO_2; any reinforcement that lies within this zone is potentially vulnerable to corrosion.

To measure any potential chloride contamination present within the concrete, a 15 mm thick slice concrete was removed from the other longitudinal slice of each specimen for analysis. Because a determination of the chloride profile (i.e. the variation in concentration with depth from the surface exposed to the external environment) was not required to determine the origin or rate of accumulation of

[1] Opus Research sample registry # 4-18/030, received 23 January 2018.

[2] RILEM Recommendation CPC-18. 1998. 'Measurement of hardened concrete carbonation depth'. *Materials & Structures* 21 no 6, pp 453 – 455, November 1998.

any contamination present,[3] the slice was generally cut from the concrete immediately below any plaster finish on the externally-exposed face of the core. This potentially represents a worst-case location since the chloride ingress through the concrete from environmental sources is likely to be at a maximum at this depth and will concentration will also be superimposed on any cast-in contamination present.

The resulting slices were dried, crushed to a fine powder and analysed by x-ray fluorescence spectroscopy (XRF) to express the total chloride content as a percentage of the dry weight of concrete.

Reinforcement corrosion induced by carbonation or chloride ion contamination is recognised by NZS 3101 *'Concrete Structures'* as the durability-related deterioration mechanism most likely to control the service life of a concrete structure under typical NZ conditions.[4]

2. Results

Table 1 summarises the results from the carbonation testing and chloride ion analyses obtained. The carbonation results are also illustrated photographically by Figure 1.

Table 1. Summary of durability analysis of supplied cores.

Specimen Label	**Maximum Carbonation Depth[&]**		**Chloride Analysis** (%w/w by mass of concrete)
	From External Face (mm)	**From Internal Face** (mm)	
Core A *Level 2 Spandrel West Esk Street*	45	75	0.011
Core B *Level 2 Spandrel West Esk Street*	18	74	0.127
Core C *Level 2 Spandrel South Dee Street*	10	34	0.019
Core D *Level 2 Spandrel South Dee Street*	2	55	0.055

[&] Carbonation measurement includes the plaster thickness; this was typically a single 10 mm thick flanking coat plus a 2 – 3 mm skim coat of either cementitious material or gypsum, depending on the orientation of the face. However the reveals at the spandrel panel margins intersected by Cores C & D had been much more heavily plastered to fair the surface, as depicted by the annotated dotted yellow lines in Figure 1.

[3] Charlotte Corston, *personal communication*. Email to Geoff Jones dated 17 January 2018.

[4] Standards New Zealand. NZS 3101:2006. *Concrete Structures Standard. Part 1: The Design of Concrete Structures & Part 2: Commentary*. Wellington, New Zealand.

These results reveal:

- Chloride concentrations through the cores that are somewhat more elevated than would ordinarily be expected from routine background contributions from appropriate mix constituents.
- No obvious relationship between the measured chloride concentration in individual cores; the erratic pattern observed suggests the origin of the contamination is through incorporation of a poorly-washed marine aggregate as an integral component of the mix, rather than the result of environmental exposure. This is consistent with the presence of abundant bivalve fragments observed within the concrete matrix. Because of the nature of this contamination there are likely to be 'hotspots' of elevated chloride concentration, posing a high risk of reinforcement corrosion, which are somewhat randomly distributed through the concrete amongst comparatively benign areas.
- The mean contamination measured in the individual cores ranges from 0.011% to 0.127 % chloride by mass of concrete. The significance of this range is briefly discussed in the following section.
- Variable carbonation through the cores (Figure 1), which likely reflects differences in the quality of consolidation and local internal relative humidity due to micro-exposure environment. The maximum carbonation depths likely exceed typical cover depths, indicating depassivation of at least some fraction of the reinforcing steel and hence a current vulnerability to corrosion.

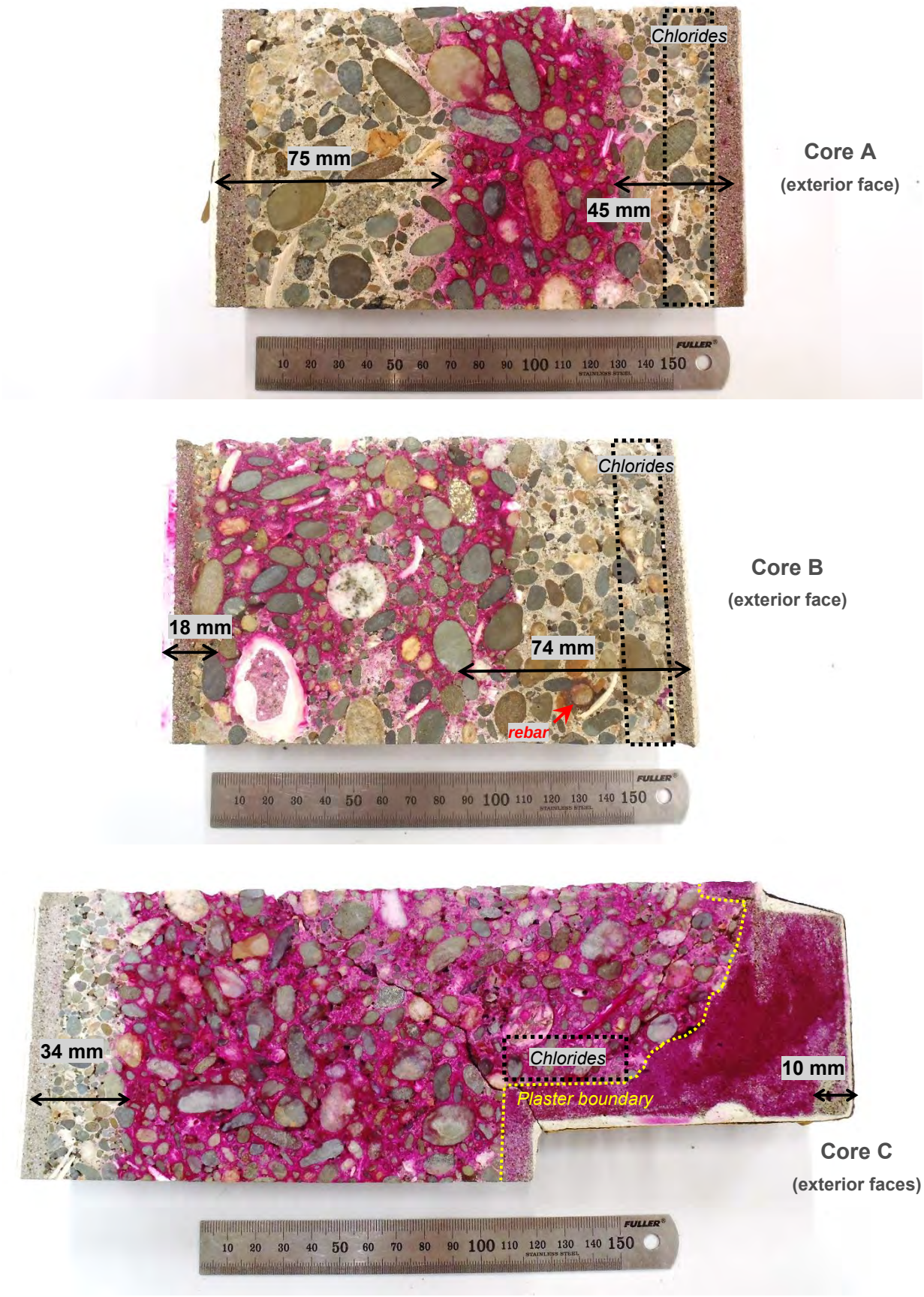


Figure 1. Longitudinal slices through the cores, photographed following application of the phenolphthalein reagent. The arrowed lines indicate the approximate maximum carbonation depth from each exposed end of the core. The approximate position from which the chloride sample was removed from the matching longitudinal slice is also indicated.

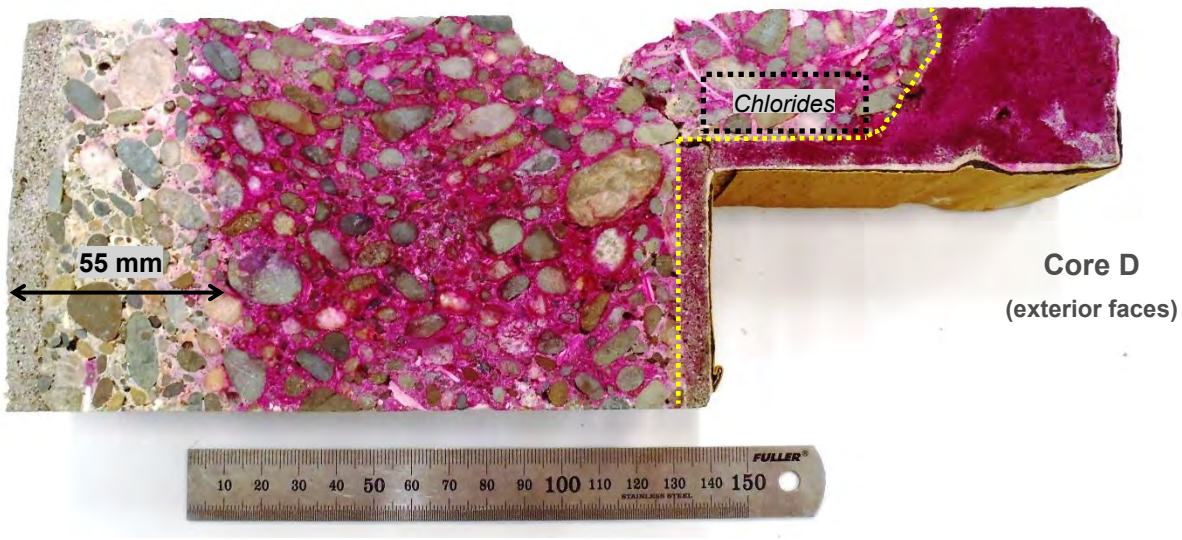


Figure 1 (continued).

3. Interpretation of Risk

The cast-in chloride contamination within the concrete is generally at levels that would be considered tolerable, particular where the concrete remains dry. However in combination with the advanced carbonation, the susceptibility to corrosion may be higher than the conventional risk thresholds would ordinarily suggest: In particular it is generally accepted that the corrosion risk is controlled by both the chloride and hydroxide ion concentrations within the pore fluid of concrete, with mild steel reinforcement vulnerable under conditions where $[Cl^-]/[OH^-] > 0.6$.[5]

Due to the absence of a convenient measurement technique and the fact that hydroxide ion concentration is, to a first approximation, constant in uncarbonated concrete, corrosion risk thresholds are ordinarily formulated in terms of chlorides values alone. By definition however, carbonated concrete is depleted of hydroxide ions, thus increasing the $[Cl^-]/[OH^-]$ ratio and hence the intrinsic corrosion risk at any given level of chloride contamination. The situation is rarely encountered except where chlorides are cast-in, since environments conducive to environmental ingress are seldom also favourable for carbonation. Additionally, the carbonation reaction has the unfortunate property of decomposing the C_3A (tri-calcium aluminate) phase in cement that ordinarily immobilises a certain fraction of the chloride ions, thus liberating them to participate in corrosion reactions. Carbonation may also result in a redistribution of the chloride ions in response to concentration gradients as the C_3A reacts.

Because of this synergistic coupling between carbonation and cast-in chlorides, the current and future reinforcement corrosion risk for the sampled concrete is potentially moderate to high where the carbonation has reached the reinforcement, particularly if the environment is not protected and dry (Figure 2). Because of the nature of cast-in contamination, the corrosion risk is likely to somewhat variable across the structure, with localised hotspots reflecting the inhomogeneity of chloride distribution in the source aggregate.

[5] Broomfield, J.P. 2007. *Corrosion of Steel in Concrete: Understanding, Investigation & Repair*. 2nd Edition. Taylor & Francis, United Kingdom.

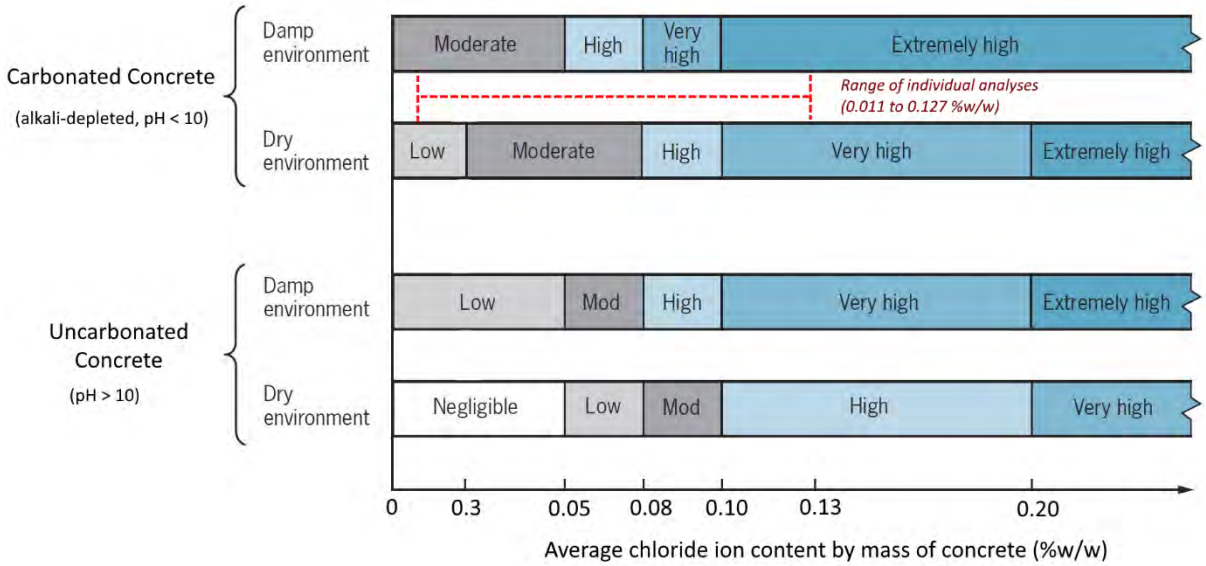


Figure 2. Comparison of chloride contamination measured in cores with estimated risk of reinforcement corrosion under differing environmental conditions for typical quality older structural concrete.[6]

I trust this information is helpful to your condition assessment. Please contact me if you have any queries regarding the contents of this report, or if we can assist you further in the future.

Kind Regards

Neil Lee

Neil Lee
Concrete Technologist

[6] Figure adapted from BRE Digest 444 Part 2 *Corrosion of Steel in Concrete: Investigation & Repair.* Building Research Establishment, Watford Junction, United Kingdom.

Appendix D – GeoSolve geotechnical report

Geotechnical Desktop Study

Invercargill CBD Project – Stage 1, Old Government Life/Arbuckles Building and old Southland Times Building

Invercargill

Report prepared for:

Batchelar McDougall Consulting

Report prepared by:

GeoSolve Limited

Distribution:

Batchelar McDougall Consulting

GeoSolve Limited (File)

February 2018

GeoSolve Ref: 171019

GEOTECHNICAL WATER RESOURCES PAVEMENTS

Table of Contents

1 Introduction

1.1 General

This report presents the results of a geotechnical desktop study carried out by GeoSolve Ltd in order to determine likely subsoil conditions and provide geotechnical inputs for a structural assessment of two buildings (the Old Southland Times building and the Old Government Life/Arbuckles building) in the Invercargill CBD.

Photo 1 – Old Southland Times Building, Looking southwest from Esk St (source - *maps.google.co.nz*)

Photo 2 – Old Government Life/Arbuckles Building, Looking southeast from corner of Esk St and Dee Street (source - *maps.google.co.nz*)

The desktop study was carried out for Batchelar McDougall Consulting in accordance with GeoSolve Ltd's proposal dated 23 December 2017, which outlines the scope of work and conditions of engagement.

1.2 Scope of Works

We understand that the two existing buildings above are to be structurally assessed by Batchelar McDougall Consulting and to assist the assessment a geotechnical desktop study is required, outlining:

- The likely ground conditions below the site;
- Preliminary seismic soil classification;
- Preliminary assessments of the likely bearing capacity of the existing building foundations at the sites and liquefaction and settlement susceptibility;
- Recommendations for likely foundations for any new development in this area for 3-4 story construction.

2 Site Description

2.1 General

The subject properties are located in central Invercargill as shown in Figure 1 below.

Figure 1: Site location plan, showing the location of the two buildings in red (Old Govt Life and Old Southland Times buildings) being assessed.

The buildings are accessed from Esk St and Dee St.

2.2 Topography and Surface Drainage

The building sites are situated on horizontal ground with an established drainage system in the area that is expected to control surface flows.

3 Geotechnical Investigations

No site specific investigations have been undertaken for the purpose of this report. GeoSolve have completed a review of shallow and deep site investigations in close proximity to the sites in central Invercargill to infer the underlying geological model.

4 Subsurface Conditions

4.1 Geological Setting

The site is expected to be underlain by shallow surface fill, which in turn overlies alluvial deposits with Tertiary-age marine sediments at depth. The alluvial deposits comprise Quaternary outwash gravels developed during former glaciation, which occurred inland. More recent silty/sandy floodplain or mudflat deposits overlie these gravels. The alluvial deposits merge with marine deposits at depth in the vicinity of Invercargill.

No active faults have any been reported in the vicinity of Invercargill. Strong earthquakes are common in Fiordland near the current tectonic plate boundary and consequently some moderate ground shaking can be expected to occur in Invercargill during such events. The nearest trace of any mapped active fault is the Hillfoot Fault, approximately 60 km to the north of the site.

Significant seismic risk exists in this region from potentially strong ground shaking, likely to be associated with a rupture of the Alpine Fault, located along the West Coast of the South Island. There is a high probability that an earthquake with an expected magnitude of over 8 will occur along the Alpine Fault within the next 50 years.

4.2 Stratigraphy

Subsurface soils beneath the two buildings being assessed are inferred to comprise:

- Uncontrolled fill/engineered fill, overlying;
- Alluvial silt, overlying;
- Alluvial sand, overlying;
- Alluvial gravel.

Uncontrolled fill was observed to underlie each lot where GeoSolve have completed investigations in the area. Uncontrolled fill was observed to comprise clayey SILT with some gravel and sand, sandy GRAVEL with minor silt, gravelly SILT with wood, ash and bricks and SAND. Engineered fill platforms may have been constructed under the existing building foundations.

The fill is predominately underlain by alluvial silt comprising very soft to firm, SILT with nil to some sand content and clayey SILT. The base of the alluvial silt was observed between 1.5-3 m bgl in the area.

In discrete locations an alluvial sand layer was observed to underlie the alluvial silt to between 2 and 4 m bgl. Alluvial sand was observed to comprise silty SAND with some fine gravel, and SAND with trace silt.

Alluvial gravel was observed to underlie the alluvial silt or sand in all cases. Alluvial gravel has been observed within 8 Boreholes and depths have been inferred from 24 Heavy Dynamic Probe (DPH) tests completed in the Invercargill CBD area. The depth to the top of the alluvial gravel in the area is inferred to be between 2 and 4 m bgl. Alluvial gravel was observed to predominately comprise medium dense to dense, sandy GRAVEL and silty GRAVEL with thin SAND lenses.

4.3 Groundwater

Groundwater was observed between 1.4 and 3.3 m bgl in the area. Investigations completed in closest proximity to the buildings being assessed indicate a water level of 3-3.3 m and 1.4-1.7 m at 16-24 Don Street (~150 m N of the site) and 65 Don St (~180 m NE of the site) respectively.

It is recommended that piezometers are installed on site to confirm the groundwater levels.

5 Liquefaction Analysis

5.1 Design Earthquakes

Two earthquakes scenarios have been assessed in accordance with NZS1170 – Structural Design Actions[1] for an Importance Level 2 structure with a 50-year design life.

Peak horizontal ground accelerations and effective magnitudes were calculated using the procedure from the NZTA Bridge Manual[2]. Table 5.1 summarises the scenarios considered.

The site has been assessed as subsoil category *Class D – Deep soil* site in accordance with NZS1170 – Structural Design Actions.

Table 5.1 – Earthquake accelerations and effective magnitudes for liquefaction assessment

Scenario	Performance Requirements	Annual Probability of Exceedance	Peak Horizontal Ground Acceleration (PGA)	Effective Magnitude
Serviceability Limit State (SLS)	*Avoid damage that would prevent the structure being used as originally intended without repair*	1/25	0.05 g	6.2
Ultimate Limit State (ULS)	*Avoid collapse of the structural system*	1/500	0.2 g	6

5.2 Liquefaction Summary

The liquefaction analysis from surrounding sites indicates there is typically no potential for liquefaction or lateral spreading under SLS seismic loading, however minor liquefaction is predicted under ULS loading at some sites in the area.

Typical liquefaction analysis from the surrounding area indicate the following:

- No liquefaction or cyclic softening is predicted for the SLS design earthquake;
- Minor liquefaction is predicted for the ULS design earthquake. Loose sand lenses overlying or within the alluvial gravel unit have the potential to liquefy below the water table under ULS seismic loading;
- CPT and DPH testing in the surrounding area predict liquefaction induced free field settlement of between 0-50 mm in an ULS seismic event.
- ULS settlement should be confirmed with site specific deep investigations comprising boreholes, DPHs and CPTs.

[1] NZS1170-5 (2004) Structural Design Actions, Part 5: Earthquake Actions – New Zealand.
[2] NZTA Bridge Manual (2014). SP/M/022, third edition amendment 1, Effective from September 2014.

6 Engineering Considerations

6.1 General

Data presented as part of this report is preliminary in nature and is only to be used to assist in the structural assessment of the old Government Life/Arbuckles and the old Southland Times buildings. No site specific investigations have been completed as part of this assessment.

6.2 Geotechnical Parameters

Table 6.1 provides a summary of the typical geotechnical design parameters for the soil materials expected to be encountered underlying the existing buildings.

Table 6.1 – Recommended geotechnical design parameters

Unit	Thickness (m)	Bulk Density γ (kN/m^3)	Effective Cohesion c´ (kPa)	Effective Friction ϕ' (deg)	Elastic Modulus **E** (kPa)	Poissons Ratio ν
Uncontrolled Fill	0-1	16	N/A	N/A	N/A	N/A
Alluvial Silt (very soft to firm SILT with some sand and clayey SILT)	0.3-1.7	18	0	28-30	1-5,000	0.3
Alluvial Sand (loose to medium dense silty SAND with some gravel and SAND with trace silt)	0.5-2.5	18	0	31-32	3-10,000	0.3
Alluvial Gravel (medium dense to dense, sandy GRAVEL)	Not proven	19	0	35	20-30,000	0.3

6.3 Groundwater Issues

The groundwater table at the sites is expected to be within the alluvial sand/gravel unit. No artesian groundwater pressures are expected at the site.

During periods of heavy rainfall the existing stormwater system is expected to control surface flows across the site and drain appropriately.

6.4 Foundations

6.4.1 General

It is understood the old Southland Times and Government Life/Arbuckles building's foundations are likely to comprise of strip footings bearing upon alluvial silt. Bearing capacity within the very soft to firm alluvial silt underlying the site is expected to be significantly lower than "good ground".

It is however understood the Government Life/Arbuckles building has a basement which may result in the foundation loads being transferred to the underlying alluvial gravel or a thin layer of alluvial silt overlying alluvial gravel, this is unlikely to be the case for the old Southland Times building, where the foundation is understood to be constructed close to road level.

6.4.2 Shallow Foundations

Figure 2 below summarises typical working stresses for shallow footings, which bear upon alluvial silt. It should be noted the foundation working stresses presented on Figure 2 are governed by bearing capacity in the case of narrow footings and settlement in the case of wide footings.

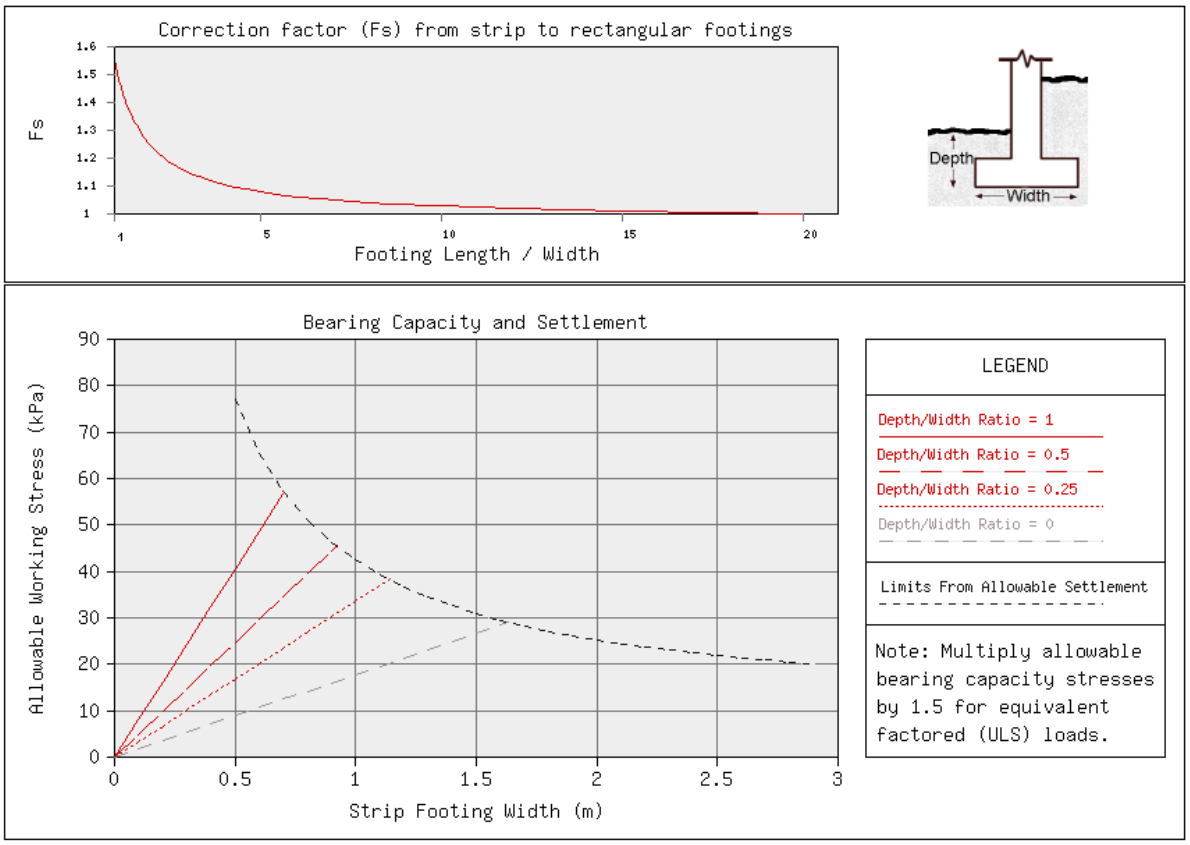


Figure 2: Typical Bearing for Shallow Footings on Alluvial Silt

From Figure 2 it can be seen an allowable working stress of approximately 40 kPa is recommended for a 500 mm wide by 500 mm deep strip footing founded within alluvial silt. This corresponds to a factored (ULS) bearing capacity of approximately 60 kPa and an

ultimate geotechnical bearing capacity of 120 kPa. Note the low allowable bearing for larger footings.

Figure 3 summarises the recommended working stresses for shallow footings, which bear upon alluvial gravel. It should be noted the foundation working stresses presented on Figure 3 are governed by bearing capacity in the case of narrow footings and settlement in the case of wide footings.

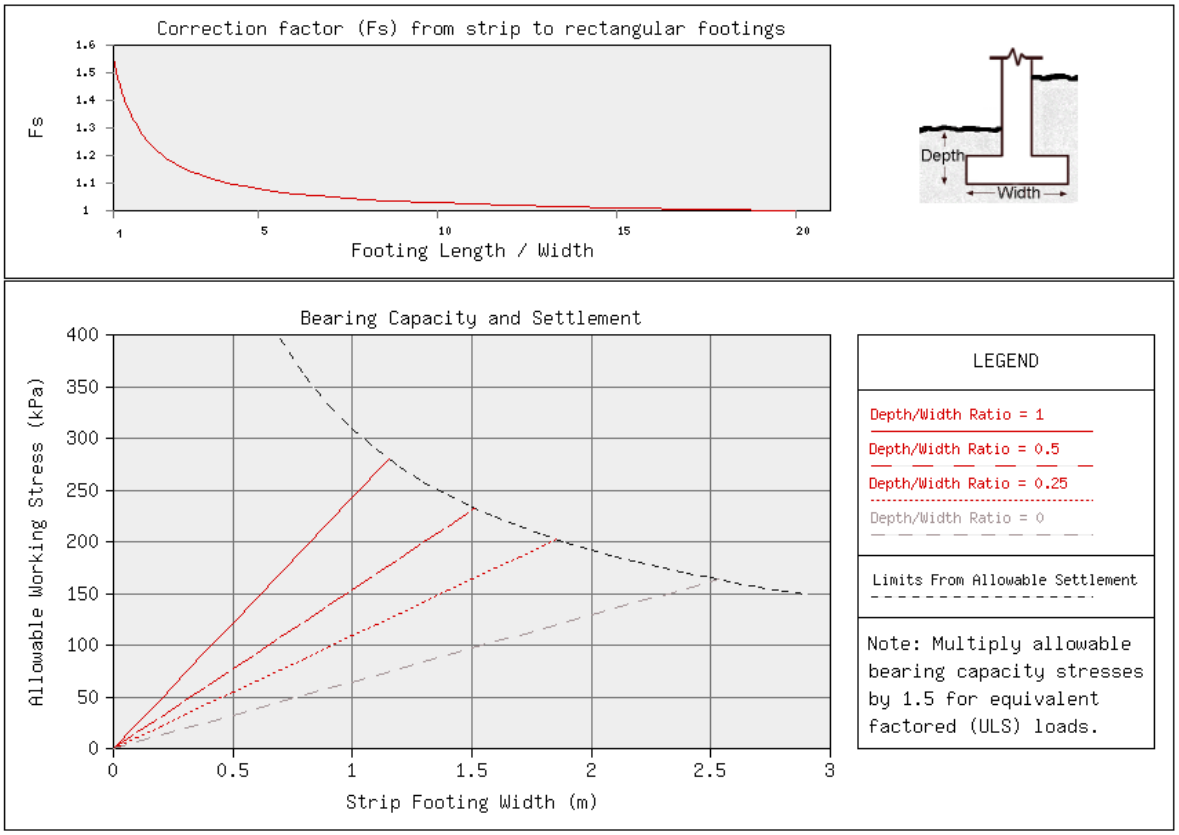


Figure 3: Recommended Bearing for Shallow Footings on Alluvial Gravel

From Figure 3 it can be seen an allowable working stress of approximately 100 kPa is recommended for a 400 mm wide by 400 mm deep strip footing founded within alluvial gravel. This corresponds to a factored (ULS) bearing capacity of approximately 150 kPa and an ultimate geotechnical bearing capacity of 300 kPa.

Minor liquefaction induced settlement could have some effect on an existing building with a shallow foundation; nearby testing estimates liquefaction induced settlement of 0-50 mm in a ULS seismic event.

In future construction the effects of liquefaction below the site is expected to be negligible as foundations are recommended to be constructed on piles bearing upon the non-liquefiable alluvial gravel unit below the site.

6.4.3 Foundations for 3 to 4 Storey Buildings

It is recommended that foundations for future multi-story development in this area are constructed on piles bearing within the underlying alluvial gravel. This has been observed between 2 and 4 m bgl at surrounding sites.

Screw piles, bored or driven piles can be considered for future construction. The recently constructed ICC building at 16-24 Don St, 150 m to the north, has 7 m long 800 mm diameter cased bored reinforced concrete piles supporting the structural loads. The foundation slab is supported on shorter, smaller diameter piles.

Bored and Franki pile rigs are available in Invercargill, whereas screw pile rigs will need to be established from Canterbury.

6.4.3.1 Bored Piles/ Franki Piles

Both traditional bored concrete reinforced piles and Franki piles are considered suitable for future construction.

The alluvial gravel below the two sites being assessed is estimated to be between 2 and 4 m bgl. However, a loose sand layer has been observed in discrete locations in the area surrounding the sites.

Piles should be installed a minimum of 3 pile diameters into the medium dense to dense gravel unit interpreted to underlie the sites to ensure that full end bearing is achieved.

Casing is likely to be required to support the pile bore during construction, due to the loose soils and relatively shallow groundwater.

6.4.3.2 Driven Timber Piles

A cost effective and relatively straightforward option may be to drive timber piles onto the gravels. The timber piles should be driven with a piling hammer to achieve a set determined using appropriate pile driving formula (e.g. wave equation analysis or Hiley formula). However the vibration effects of driven piles on nearby structures will have to be considered.

Trial piles should be carried out in advance of the main piling works to confirm pile depths.

Driven timber piles are more likely to be suitable to support minor structural loading or floor slabs.

6.4.3.3 Screw Piles

A screw pile consists of a steel circular hollow section with a helix welded tip and is installed by screwing it tip first into the ground. This piling method is advantageous as minimal vibration and noise is caused during construction, and it can be designed for both tension and compression forces. The design of screw pile is specialist and typically undertaken by the contractor who will be installing the piles. This design will require sonic boreholes to confirm design parameters and suitability of the installation and is a requirement of screw piling contractors.

6.5 Site Subsoil Category

For detailed design purposes it is recommended the magnitude of seismic acceleration be estimated in accordance with the recommendations provided in NZS 1170.5:2004.

Existing nearby drilling data suggests the site is Class D (deep soil site) in accordance with NZS 1170.5:2004 seismic provisions. A deep borehole contacting to bedrock would be required confirm whether Class C or D is appropriate.

6.6 Neighbouring Structures

The construction contractor should take the appropriate measures to control the construction noise, in accordance with Invercargill City Council requirements.

It is expected that conventional earthmoving equipment, such as hydraulic excavators, rollers and trucks as well as heavy piling equipment will be required during future building construction.

During fill compaction and pile driving/augering care should be taken to ensure that neighbouring properties are not adversely affected by ground vibrations, especially if fill and piles are being constructed in close proximity to neighbouring structures.

With regards to occupied properties in the wider area, the construction contractor should take appropriate measures to control the construction noise and vibration and ensure Invercargill City Council requirements are met.

7 Conclusions and Recommendations

- Data held on the GeoSolve database infers the geological model underlying the site areas comprise uncontrolled fill overlying alluvial silt, overlying discrete layers of alluvial sand, overlying alluvial gravel to moderate depth;
- The old Southland Times and Government Life building foundations are expected to comprise shallow strip footings, however the Government Life building does have a basement which decreases the thickness of alluvial silt underlying the foundations. Due to the basement that has been previously constructed the Government life building may be constructed upon alluvial gravel or a comparatively thin layer of alluvial silt overlying the alluvial gravel. This would have to be confirmed with site specific investigations;
- Shallow footings bearing upon alluvial silt are expected to provide an allowable bearing capacity of 40 kPa for a 500 mm wide and 500 mm deep footing. This is significantly below NZS 3604's definition of "good ground";
- Minor liquefaction induced settlement is predicted from testing completed on nearby sites in the Invercargill CBD. Between 0-50 mm of liquefaction induced settlement is predicted at nearby sites with the groundwater level predominately being within the alluvial sand and gravel underlying the area. Discrete lenses of loose alluvial sand are predicted to liquefy in a ULS seismic event;
- From existing nearby drilling the seismic soil classification for the site is considered likely to be Class D, however a deep borehole contacting to bedrock would be required to confirm whether class C or D is appropriate for design;
- Piles are recommended for future multi-level building foundation construction. Pile options are outlined in section 6.4 of this report. During the recent construction on

the ICC Building (16-24 Don St), 7 m long 800 mm diameter cased, bored concrete piles were installed.

- A risk of seismic activity has been identified for the region as a whole and appropriate allowance should be made for seismic loading during detailed design of the proposed building and foundations.

8 Applicability

This report has been prepared for the benefit of Batchelar McDougall Consulting with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

It is important that we be contacted if there is any variation in subsoil conditions from those described in this report.

It is understood that site specific investigations will be undertaken for future building foundation design.

Report prepared by:

.....

Mike Plunket

Geotechnical Engineer

Reviewed for GeoSolve Ltd by:

.....

Fraser Wilson

Senior Engineering Geologist

Reviewed for GeoSolve Ltd by:

.....

Colin Macdiarmid

Senior Geotechnical Engineer

Southland Times Building, 67 Esk St, Invercargill, 9810

DETAILED SEISMIC ASSESSMENT REPORT

Table of Contents:

Revision	Date	Description/Reason for Issue		
A	23/02/2018	Formal DSA Issue		
		Prepared by	Reviewed by	Approved by
	Name	Warren Holt	Andrew Marriott	Graham McDougall
	Signature			
	Post Nominals	BEng(Hons),CMEngNZ, CPENG, IntPE(NZ), MIStructE(UK), CEng(UK)	BE(Civil), CMEngNZ, CPEng, IntPE(NZ), M.ICOMOS	Director, BE, CMEngNZ, CPEng, IntPE(NZ)

1.0 Executive Summary

The following report covers the detailed seismic assessment of the building at 67 Esk Street, Invercargill. The essentially free standing three storey building (with a relatively small basement), constructed circa 1908, is 37.3 m long and 17.25-15.6 m wide. The construction consists of URM walls of varying widths supporting steel roof trusses and timber joist floors with internal steel beams and column gravity supports. There are some reinforced concrete veirendeel frames trimming 'new' openings to the URM walls (generally internal). Reinforced concrete foundations of an undetermined nature support the perimeter and load bearing walls. The building layout and configuration is shown in section 5.0.

BMC have been commissioned by HWCP Management Ltd to advise them on the current condition and strength of the building. We have visited the building to view its current condition, take selected samples of building fabric, identify the structural systems within the building and carry out an analysis of these elements to determine their capacity with respect to the current Ultimate Limit State (ULS) demand.

For the purposes of this evaluation, the above described building has been assessed as a single monolithic structure of Importance Level 2. This assessment has been carried out in accordance with the guidelines as prescribed in 'The Seismic Assessment of Existing Buildings, Technical Guidelines for Engineering Assessments' (July 2017) issued by MIBE et al, referred to as SAEB from herein.

The building has previously been strengthened in 1986 and BMC has reviewed these works as part of the assessment. The building is considered to have a capacity of 20% of New Building Standard. The capacity of the building is limited by inadequate diaphragm connections to some primary structure bracing walls (specifically @ 1st floor level).

Loading Direction	%NBS (IL 2)
N-S	20-25%
E-W	20%

BMC notes that the governing elements of the structure are the diaphragm connections into the URM bracing walls particularly where the joists run parallel to the wall where the 1984-6 strengthening works provided anchors at only 1.2m centres. The Out of Plane capacity of the parapets and second floor walls and their connections into the buildings diaphragms are also of concern with a capacity of 33%NBS.

Geotechnical input indicates the supporting high level soils to be less than "Good Ground" with an allowable bearing capacity of 120kPa (Good Ground = 150kPa). Little conclusive evidence of the foundation depth and width is available however there is no evidence of cracking / settlement indicating that this is a problem. The water table depth is approximately at 1.5m below ground level and it is noted that there is likely to be some liquefaction under a ULS event.

Structural works could be undertaken to increase the capacity of the building to raise the %NBS capacity as follows:-

- The installation of adequate fixings between the diaphragms and the walls to the required demands for tension and shear (particularly on the first floor and fixings of joists parallel to the walls.
- The installation of steel tie backs framing to the tops of the effected parapets into the roof structure and to the wall structure below roof level (to prevent uplift of the parapet).
- The installation of internal timber framing and wall ties into the second floor walls to be fixed back to the diaphragms at the top and bottom of the wall (to improve the out-of-plane capacity).

In summary the Southland Times building is considered earthquake prone and in terms of structural strengthening and condition, in our opinion, it is feasible that this can be strengthened without loss to the heritage fabric. The potential lifespan of the now 110 year old building is limited and we feel that given the rate of development of analytical techniques for URM buildings and their inherent instability under Seismic lateral loading it may have to undergo periodic reassessment as the guidance develops. In addition, in the case of a significant seismic event even if strengthened some of the structural integrity of the critical wall elements may well be damaged beyond economical repair and therefore require demolition of the building.

It is also possible to retain the Façade (arguably the primary feature of the Cat 2 Heritage status) as part of any masterplan design and / or new build behind. This would require a significant temporary support structure during the demolition and rebuild.

2.0 Introduction

2.1 Objective

Batchelar McDougall Consulting (BMC) Ltd has been engaged by HWCP Management Ltd to carry out a Detailed Structural Assessment (DSA) for the Southland Times Building at 67 Esk Street, Invercargill. The assessment has been undertaken in accordance with the Ministry of Business, Innovation and Employment's (MBIE) Technical Guidelines for Engineering Assessments titled 'The Seismic Assessment of Existing Buildings' (SAEB) and dated July 2017.

Note: Preparation of concept strengthening strategy is also provided in this report.

2.2 Scope of Work

BMC have been engaged to carry out the following scope of works:

- Review available drawings for the building to determine the nature of the design, primary structural characteristics, and adequacy of the lateral load resisting systems.
- Inspection of the building to familiarise ourselves with the structure, visually assess its condition, observe important structural and seismic characteristics, and note obvious deficiencies.
- Undertake intrusive investigations to determine; floor constructions, existing strengthening provisions and wall thickness at various locations and levels.
- Engage OPUS Laboratories to undertake brick compression testing.
- Carry out a DSA to determine the likely seismic performance of the building (including the 1986 strengthening works).
- Provide concept information on strengthening works required to provide >67%NBS capacity.
- Provide a DSA report documenting our findings and recommendations

2.3 Information used for the assessment

The information used for this assessment is summarised in bullet point format as follows:

- Engineering alteration / strengthening drawings prepared by E R Garden & Partners Ltd 1981-1986
- Alteration drawings prepared by L. F. Simpson
- Visual survey undertaken & indicators of defects present at the time of inspection (including opening up of some hidden critical areas).

2.4 Inspection

A team of BMC Engineers visited the site on 27th November 2017, 11th December 2017 and 15th December 2017. During these visits BMC engineers undertook a structural assessment and undertook a site measure to provide information not found in drawings.

2.5 Limitations

Findings presented as a part of this report are for the sole use of HWCP Management Ltd in its evaluation of the subject property. The findings are not intended for use by other parties, and may not contain sufficient information for the purposes of other parties or other uses.

The scope of this evaluation is limited to the assessment of the potential performance of the building in an earthquake only. No assessment has been made of other load cases such as wind, snow and gravity (although it is likely that floor live load capacity of 3.0kPa for office/retail currently required is less than the original design value and therefore is adequate). The assessment is made in the context that the building may potentially be affected by the Earthquake Prone Building (EPB) provisions of the Building Act (2004) (Incorporating the Building (Earthquake Pro ne Building) Amendment Act 2016).

This assessment has been restricted to structural aspects only. Waterproofing elements, electrical and mechanical equipment, fire protection and safety systems, service connections, water supplies and sanitary fittings have not been reviewed, and secondary elements such as windows and fittings have not generally been reviewed.

Limited documentation was provided to BMC therefore assumptions have been made based on site observations and era of construction.

Assumptions have been made as to the likely connections used, based on the observed area of construction. Further invasive investigations would be required to observe all of these hidden connections and therefore some allowance or contingency is required if strengthening is considered.

Our professional services are performed using a degree of care and skill normally exercised, under similar circumstances, by reputable consultants practicing in this field at this time. No other warranty, expressed or implied, is made as to the professional advice presented in this report.

BMC have commissioned Geosolve Ltd to provide a "Desktop" study for the entire CBD redevelopment block. Refer to Section 7 of this report for recommendations and Geotechnical Reports that we may have obtained.

Assessment of earthquake loadings only, no other load cases have been assessed.

3.0 Statutory Requirements

3.1 Building Act incorporating The Building (Earthquake-prone Buildings) Amendment Act 2016

3.1.1 Earthquake Prone Building Policy - Section 133

The Building (Earthquake-prone Buildings) Amendment Act was passed into law by Parliament on the 10th of May 2016 and came into effect on 1 July 2017 (now embedded in the Building Act).

Some of the significant changes from the previous requirements are outlined below.

3.1.1.1 Definition of 'Earthquake-prone'

The Building Act changes the definition of 'Earthquake-prone Building' by:

- Clarifying that an Earthquake-prone Building can be one that poses a risk to people on adjoining properties and not just those within the building itself;
- Excluding from the definition of Earthquake-prone Building certain residential housing, farm buildings, retaining walls, wharves, bridges, tunnels and monuments;
- Included in the definition of Earthquake-prone Building are hostels, boarding houses and residential housing that is more than two stories and contains three or more household units.

3.1.1.2 Seismic Risk

Different locations are assigned different 'seismic risk' as shown in Figure 1. The new regulations identify three different categories defined by the seismic hazard factor (Z) in the New Zealand Loadings Code (NZS 1170):

- High seismic risk – Z greater than or equal to 0.30
- Medium seismic risk – Z between 0.15 and 0.30
- Low seismic risk – Z lower than 0.15

The seismic risk relates to timeframes for strengthening and identification of potentially Earthquake-prone buildings. The Southland Times Building is in a medium Seismic Risk Area.

3.1.1.3 Priority Buildings

Priority buildings are defined as buildings that:

- Are generally used for health or emergency services or used as educational facilities.
- Contain unreinforced masonry that could fall on to busy thoroughfares in an earthquake – such as parapets.
- The Territorial Authority has identified as having the potential to impede strategic transport routes after an earthquake.

Priority buildings have shorter timeframes for identification and strengthening of Earthquake-prone Buildings. The Southland Times Building is classed as a priority building as it comprises unreinforced masonry parapets which may potentially collapse onto a busy street frontage.

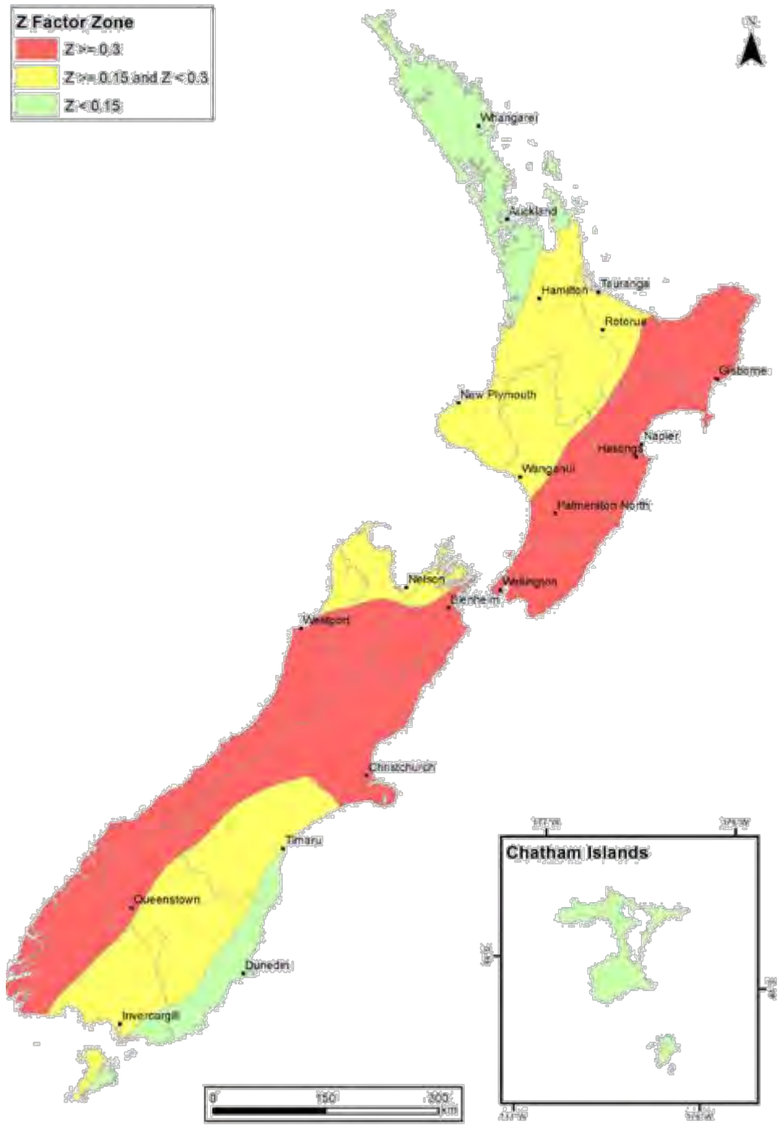


Figure 1 - Three seismic risk areas in map format (map produced by GNS Science)

3.1.1.4 Timeframes for Identifying Earthquake-prone Buildings

The amended Bill contains maximum timeframes for Territorial Authorities to assess and identify potentially Earthquake-prone Buildings as outlined below.

Seismic risk area	TAs must identify potentially earthquake-prone buildings within:		Owners must strengthen or demolish earthquake-prone buildings within:	
	Priority	Other	Priority	Other
High	2 ½ years	5 years	7 ½ years	15 years
Medium	5 years	10 years	12 ½ years	25 years
Low	n/a	15 years	n/a	35 years

Figure 2 - Time frames for the identification and remediation of earthquake-prone buildings

The above timescales commenced on the 1st July 2017.

The Southland Times building will be required to be demolished or strengthened within 12, 5 years. The ICC must issue an Earthquake-prone Building notice when it determines/confirms that a building or part of a building is earthquake-prone.

3.1.2 Building Alterations – Section 112

Under the Building Act:

- Alterations to Earthquake-prone Buildings may be allowed even if after those alterations to the building will not comply with the provisions of the Building Code that relate to means of escape from fire and disabled access. The Territorial Authority must be satisfied that the proposed alteration would contribute towards making the building no longer Earthquake-prone and that carrying out other upgrades would be unduly onerous on the owner;
- The Territorial Authority will be able to require the owner to carry out strengthening works in addition to other alterations where the alterations are ‘substantial alterations’. The definition of ‘substantial alterations’ is more than 25% of the ratable value.

3.1.3 Change of Use – Section 115

This section requires that the territorial authority is satisfied that the building with a new use complies with the relevant sections of the Building Code ‘as near as is reasonably practicable’.

This is typically interpreted by territorial authorities as being 100% of the strength of an equivalent new building or as near as practicable.

4.0 The Site

4.1 Site Location

The Southland Times building is situated on Esk Street adjacent to the Kelvin Hotel at the corner of Esk Street and Kelvin Street, Invercargill (refer Figure 3). The site has one street frontage, (Esk Street) to the North. The East side of the building is isolated from the adjacent buildings and the East and South sides are directly linked to more recent extensions of the building as a whole which are not part of the heritage listing and are to be demolished as part of the proposed development works in the area. Beyond these extensions these elements are isolated from the adjacent buildings.

4.2 Site Description

The site is rectangular in shape and is approximately 37.3 m long and 17.25-15.6 m wide, thereby occupying and area approximately 602 m². The site is flat and sits approximately 10 m above sea level.

The site is developed by a three storey (with a part basement), category two heritage building. The building is currently vacant, originally housing the Southland Times newspaper offices (including the printing presses in the RC (non heritage) part of the complex).

The site can be accessed from both Esk Street, a pedestrian alleyway to the West and an access driveway between its East extension and the Kelvin Hotel.

4.3 Surrounding Land Use

The site is located within the Invercargill central business district (CBD). The vast majority of the surrounding buildings are a mixture of single and multi-storey unreinforced masonry (URM) retail and commercial buildings.

Immediately behind the building (to the South) is a three storey concrete building which was an office extension to the Southland Times building and is currently unoccupied. Similarly directly to the East is the other extension element which is partly two storey office element to Esk Street and then to the rear a single storey (but a double storey height) printing press room. To the West across a pedestrian access are a series of single and double storey URM buildings which are a mixture of retail stores, offices and storage facilities. Esk Street to the North of the building is a largely pedestrian street.

Figure 3 – ICC aerial image of the site. The buildings in 'green' are planned to remain, those in red (Category 2 heritage buildings) are to be demolished as part of the redevelopment plan.

Figure 4 – View of site from the North elevation on Esk Street

5.0 Building Description

The Southland Times Building is a three storey plus part basement building on the Esk Street and was constructed circa 1908. The structure shows evidence of being a two part construction with changes in width and roof forms between the front and rear elements as shown in Figure 5.

5.1 Building Form

The Southland Times Front (North) section of the building is three storeys high (with no basement) and is approximately 12.15 m deep (N-S) and 17.25 m wide (E-W) giving an approximate footprint of 210 m² at ground floor level. The construction largely comprises URM concrete brickwork walls with steel roof trusses.

The Southland Times Rear (South) section of the building is three storeys high (plus a small basement) and is approximately 25.15m deep (N-S) and 15.6m wide (E-W) giving an approximate footprint of 392m2 to ground floor level. The basement of Southland Times Rear is approximately 5m deep (N-S) and 11m wide (E-W) and is located to the North East corner of the rear section at its interface with the front section.

The roof comprised URM parapets throughout and is located at a height similar to both sections eaves. The construction consists of largely URM with timber floors. The overall floor area of the building is therefore approximately 602 m².

The 1954 rear office extension and the 1981 East office and print room extensions are to be removed as they are not part of the Heritage Listing leaving the remaining original structure as a freestanding structure as the basis of this assessment.

5.2 Secondary Features

The secondary building structural systems are described in the following section of the report but some of the key features are described as follows.

5.2.1 Stairswells

The building incorporates a stairwell of concrete construction located centrally within the structure at the rear elements interface with the front element. This stair wraps around a URM lift shaft

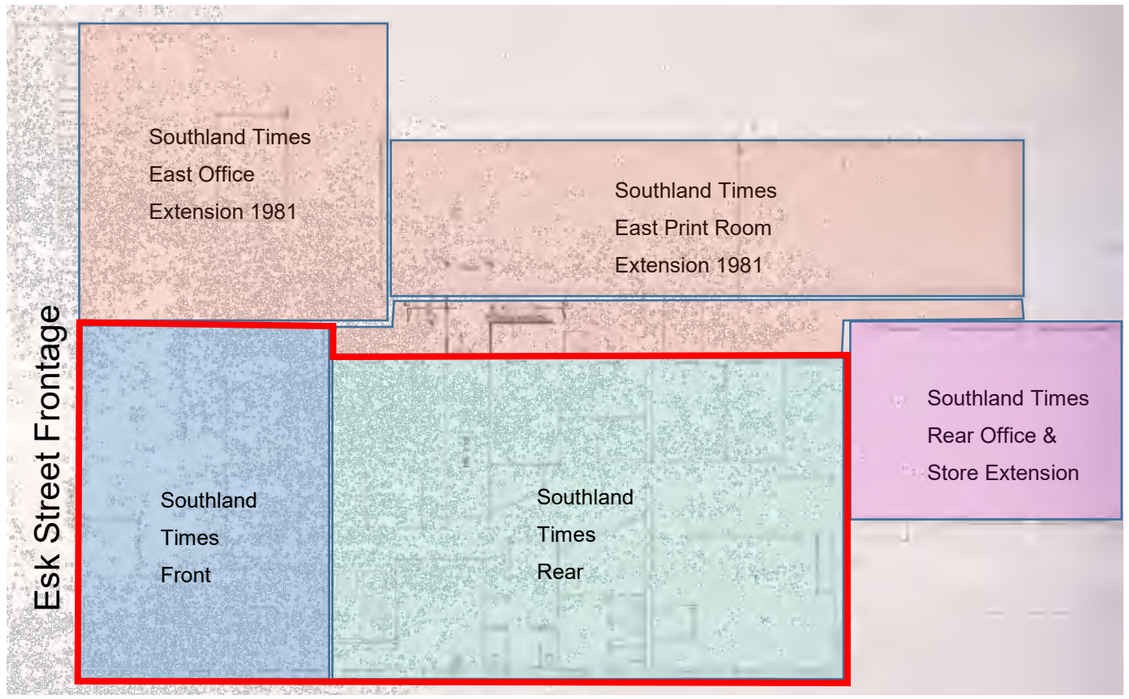


Figure 5 – Government Life building general arrangement plan (NTS). Heritage Category 2 listing building extents in red

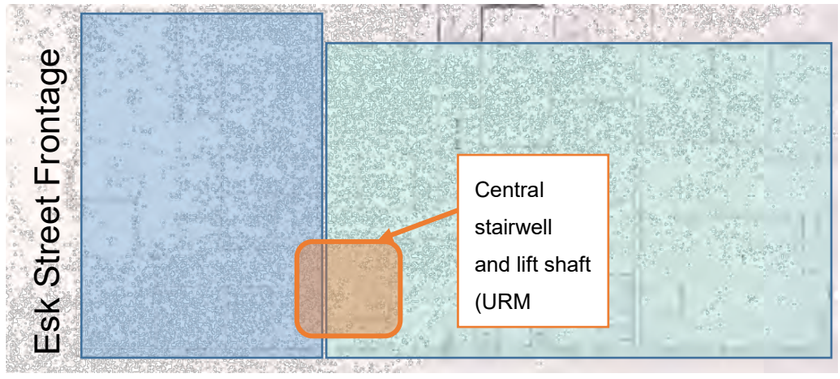


Figure 6 - Location of secondary features (NTS).

6.0 The Structure

6.1 Gravity load resisting system

The structural systems to both the front and rear elements are of an identical nature with only the plan size, roof orientation and façade embellishments forming the differences between the two

6.1.1 Southland Times General

Roof Level

- → URM parapets 350mm thick at the façade and 240mm elsewhere.
- → Steel angle trusses flat soffit to front elevation and raised tie to the rear.

Second Floor

- → 300 x 50 mm deep @ 400mm crs timber joist floor with timber straight boarding and wet plaster ceiling.
- → 350mm thick URM external walls (solid – no cavity).
- → 470mm thick URM internal walls (solid – no cavity).
- → Inset Reinforced concrete wall opening frames to internal walls.
- → Some localised steel strongback reinforcement to walls.

First Floor

- → 300 x 50 mm deep @ 400mm crs timber joist floor with timber straight boarding and wet plaster ceiling.
- → 350mm thick URM external walls (solid – no cavity).
- → 470mm thick URM internal walls (solid – no cavity).
- → Inset Reinforced concrete wall opening frames to internal walls.
- → Steel UB floor beams.

Ground Floor

- → 100mm thick reinforced ground bearing slab with a concrete metal decking suspended slab over the basement area
- → 500mm thick façade, 470mm West and Rear and 350mm thick East URM external walls (solid – no cavity).
- → 470mm thick URM internal walls (solid – no cavity).
- → Inset Reinforced concrete wall opening frames to internal walls
- → Localised steel strongback reinforcement to walls
- → Steel SHS posts/columns and UB floor beams

Basement

- → Profiled metal decking with insitu reinforced concrete topping
- → concrete Brickwork URM walls
- → Insitu concrete floor slab

6.1.2 Foundations

Due to the lack of documentation assumptions have been made in regards to the foundation system. The foundation system is assumed to comprise reinforced concrete strip footing beneath columns and walls.

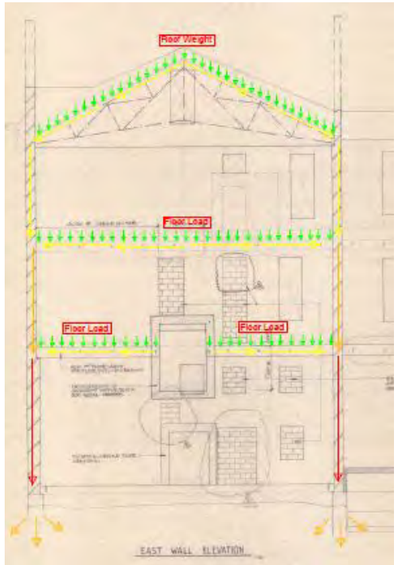


Figure 7 – Southland Times West elevation gravity load path.

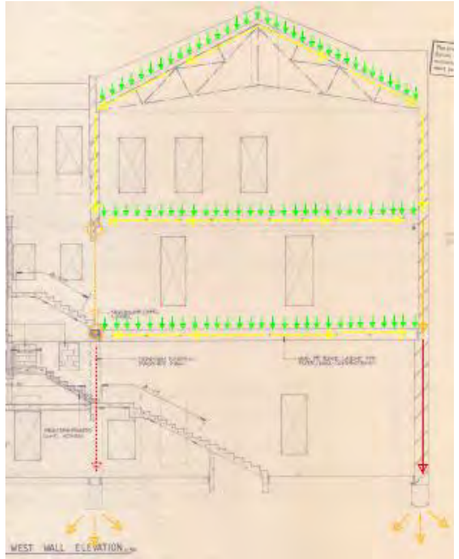


Figure 8 – Southland Times East elevation typical gravity load path.

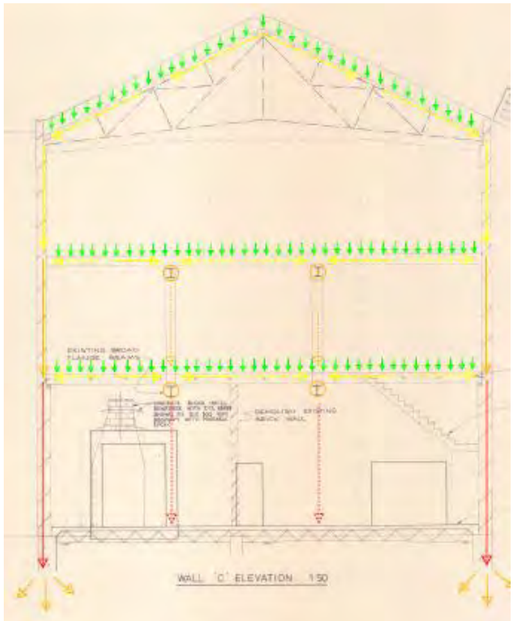


Figure 9 – Southland Times internal wall C gravity load path

6.2 Lateral load resisting system

6.2.1 Southland Times General

6.2.1.1 Transverse direction

Roof Level

- → Steel angle hips, valleys and cross bracing
- → Plasterboard ceiling diaphragms
- → URM parapets 350mm thick front and 240mm sides and rear and gable walls Out of Plane (OOP)

Second Floor

- → Flexible timber diaphragm formed by flooring and plaster / GIB ceiling
- → Reinforced Concrete moment frames inset locally into the URM walls to openings
- → 350mm thick external and 470mm thick internal Shear walls comprising URM
- → Side walls OOP with localised strongback reinforcement.

First Floor

- → Flexible timber diaphragm formed by flooring and plaster / GIB ceiling
- → Reinforced Concrete moment frames inset locally into the URM walls to openings
- → 350mm thick external and 470mm thick internal Shear walls comprising URM
- → Side walls OOP.

Ground Floor

- → Reinforced Concrete moment frames inset locally into the URM walls to openings
- → 500mm façade, 470mm thick West and Rear and 350mm thick East thick external and 470mm internal Shear walls comprising URM
- → Side walls OOP

6.2.1.2 Longitudinal direction

The longitudinal lateral load resisting system is similar to the transverse lateral load resisting system other than there are only reinforced concrete moment frames inset into the rear elements East side wall. The URM shear walls provide significant lateral resistance in the longitudinal direction.

The roof plane steel bracing (part of the 1986 strengthening works) provides Out-of-plane support to end walls and the roof seismic mass, transferring loads to the longitudinal side walls.

Floor diaphragms at 1st and 2nd floors similarly transfer OOP loads to longitudinal side walls.

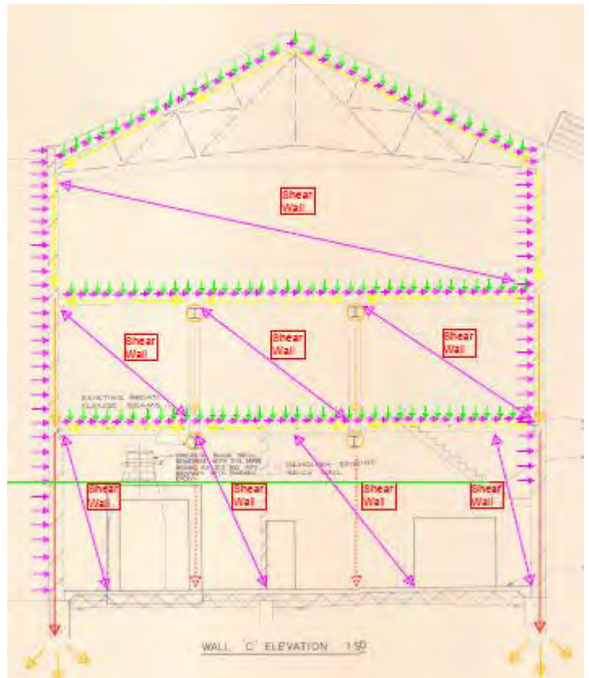


Figure 10 – Southland Times Internal cross wall C typical transverse lateral load path

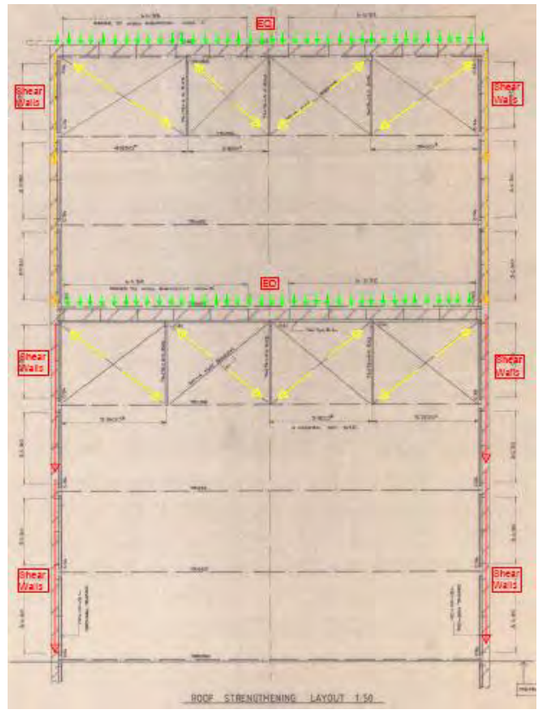


Figure 11 – Southland Times rear element roof bracing longitudinal lateral load path

7.0 Geotechnical Considerations

A geotechnical desktop study was carried out by GeoSolve Ltd during February 2018 (reference: 171019 – see Appendix B).

The report was written for the Invercargill CBD Project involving both the Government Life Building and the Southland Times Building. A desktop study was deemed sufficient to assist with the structural assessment undertaken by Batchelar McDougall Consulting Ltd.

No site specific investigations have been undertaken for the purpose of this report. GeoSolve have completed a review of shallow and deep site investigations in close proximity to the sites in central Invercargill to infer the underlying geological model. Class D soil type with susceptibility to liquefaction at ULS seismic events have been used in the analysis.

7.1 Ground Conditions

The subsurface soils underneath the Government Life Building are inferred to comprise:

- Uncontrolled fill/ engineered fill, overlying;
- Alluvial silt, overlying;
- Alluvial sand, overlying;
- Alluvial gravel.

The groundwater level was observed between 1.4 m and 3.3 m b.g.l in the area. Further site specific investigations would be required to confirm the groundwater levels.

7.2 Liquefaction Assessment

The liquefaction analysis from surrounding sites indicates there is typically no potential for liquefaction or lateral spreading under SLS seismic loading, however minor liquefaction is predicted under ULS loading at some sites in the area i.e. loose sand lenses overlying or within the alluvial gravel unit have the potential to liquefy below the water table under ULS seismic loading.

7.3 Foundations

It is understood the Southland Times Building's foundations are likely to comprise strip footings bearing upon alluvial silt. Bearing capacity within the very soft to firm alluvial silt underlying the site is expected to be significantly lower than "good ground". The basement foundation is expected to bear on the underlying alluvial gravel or a thin layer of alluvial silt overlying alluvial gravel.

Strip footings (500 mm wide by 500 mm deep) within the alluvial silt are expected to have a geotechnical ultimate bearing capacity of 120 kPa. Footings (400 mm wide by 400 mm deep) upon the alluvial gravel are expected to have a higher geotechnical ultimate bearing capacity of 300 kPa. Figure and Figure outline these bearing capacities. Note low allowable bearing for larger footings.

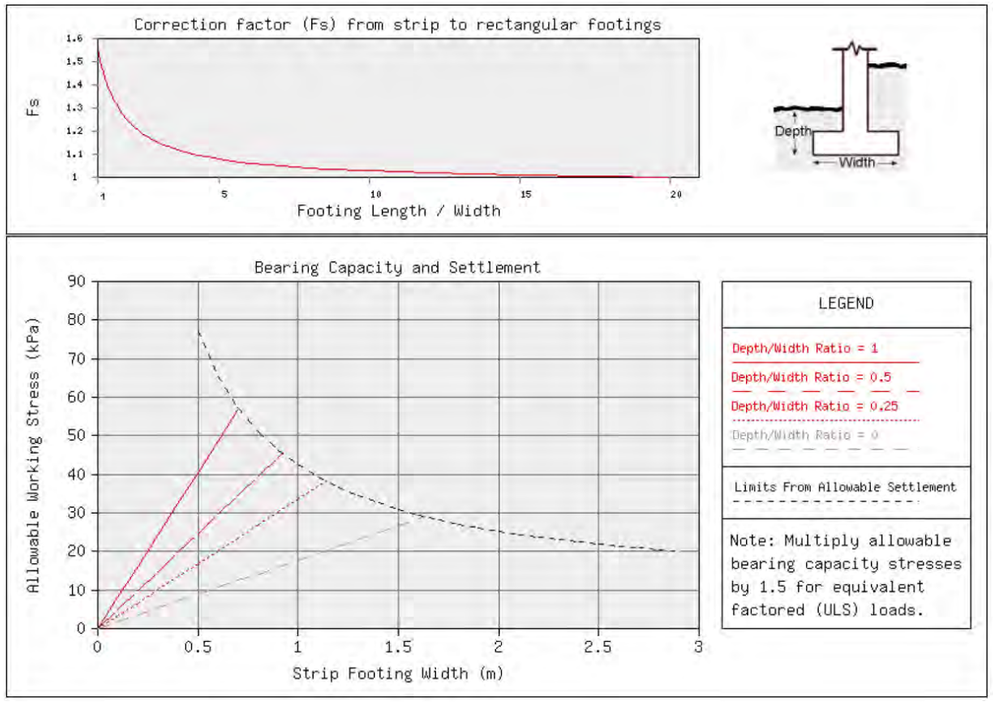


Figure 12 – Typical bearing for shallow footings on alluvial silt (extract from Geosolve Report).

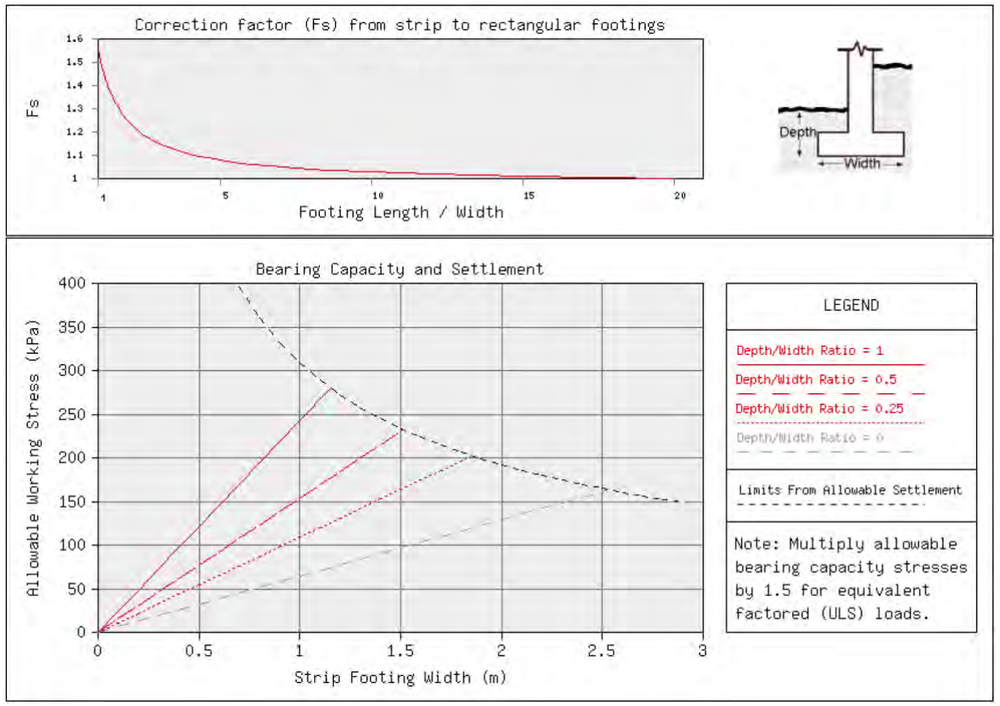


Figure 13- Recommended bearing for shallow footings on alluvial gravel (extract from Geosolve Report).

8.0 Seismic Assessment Parameters

8.1 Material Properties

The following structural and geotechnical material properties have been used to carry out this seismic assessment. No structural specification for the original construction has been made available to BMC, so parameters have typically been taken from industry guidance and testing, see references below:

Material	Element	Property	Assigned Value	Notes/comments/assumptions
Unreinforced Masonry –	Concrete Bricks	compressive strength, f'b	14 MPa	OPUS Concrete compression test report, ref CH3687, and dated 22/01/2018.
	Mortar	compressive strength, f'j	1.5 MPa	SAEB Part C Section C8.7.2 table C8.4.
	Wall elements	Cohesion C	0.3 MPa	SAEB Part C Section C8.7.2 table C8.4.
	Spandrel elements	Coefficient of friction μf	0.3	SAEB Part C Section C8.7.2 table C8.4.
	All concrete members	Modulus of elasticity	1.64 GPa	NZS 3101: Part 1:2006 clause 5.2.3
Concrete	Frame members	probable compressive strength, f'cm	40 MPa	SAEB Part C Section C5.4.2.2-table C5.3.
	All concrete members	Modulus of elasticity	13-20 GPa	NZS 3101: Part 1:2006 clause 5.2.3
Steel Reinforcement	D bars	Lower characteristic yield strength	275 MPa	SAEB Part C Appendix C5-22 table C5C.4
		Probable yield strength	340 MPa	SAEB Part C Section 5 C5.4.3.2
	HD bars	Lower characteristic yield strength	410 MPa	SAEB Part C Appendix C5-22 table C5C.4
		Probable yield strength	465 MPa	SAEB Part C Section 5 C5.4.3.2
	All reinforcing steel	Modulus of elasticity	200 GPa	SAEB Part C Section 5 C5.5.4.3.3
Structural Steel	Existing frame members	Lower characteristic yield strength	210 MPa	SAEB Part C Appendix C6-10 table C6B.10
		Probable yield strength	231 MPa	SAEB Part C Section 6 table C6.2
	Strengthening frame members	Lower characteristic yield strength	276 MPa	SAEB Part C Appendix C6-10 table C6B.10
		Probable yield strength	317 MPa	SAEB Part C Section 6 table C6.2
	All structural steel	Modulus of elasticity	205 GPa	NZS 3404:Part 1:1997

8.1.1 Importance Level

For the purposes of consideration of loading, the structure been classified as Importance Level 2 in accordance with AS/NZS 1170.0:2002.

8.1.2 Design Working Life

The Southland Times building has been assumed to have been constructed with a **Design working life of 50 years**. Together with the Importance Level assigned above, this has been used to determine the annual probability of exceedance for ultimate limit states, including earthquake loads, in accordance with NZS 1170.0:2002, table 3.3.

8.2 Seismic Loading

The seismic loads used in this assessment are based on the provisions of the current loadings standard NZS1170.5:2004.

Seismic Parameter	Values	Notes/References/Comments
Soil category:	D	NZS1170.5.2004 Table 3.1
Hazard factor Z:	0.17	NZS1170.5.2004 Clause 3.1.4
Return period factor Ru:	1.0	NZS1170.5:2004 Clause 3.1.5
Near-fault factor N(T,D):	1.0	NZS1170.5:2004 Clause 3.1.6
CdT	Varies	Modified by SAEB C8 Guidance Documents

8.2.1 Seismic Weight

The seismic weight has been calculated in accordance with NZS 1170.5:2004 clause 4.2 based on a load combination of dead plus seismic live load.

Building Area	Seismic Weight (kN)	Area of ground floor footprint (m2)	Equivalent area load (kPa)
Southland Times (Cat 2 Heritage building only - see figure 5)	14078	602	23.4

Please Note: The performance of the building under 'Serviceability' (SLS) seismic loads has not been addressed.

A review of the GNS strong motion data for Invercargill (earliest record 1994) shows a Peak ground Acceleration (PGA) of 0.03g and 20mm displacement in the 2009 Milford Quake, that is significantly less than the expected ULS event. Recent research has suggested under a ULS Alpine Fault event the expected strong motion shaking is to be approximately 45 seconds in duration.

9.0 Seismic Assessment Procedures

9.1 Analysis Techniques

The URM wall elements have been analysed using the procedures within the NZSEE Guidance document "The Seismic Assessment of Existing Buildings" July 2017 Section C8 - Unreinforced Masonry Buildings. This follows a step by step assessment procedure of the elements determined, through testing and experience, to the most critical elements in the building. The URM element assessment is essentially a linear elastic analysis technique. There are potentially elements within the structure which may form part of the primary structure which may be analysed using the Nonlinear Static Pushover Analysis which is a form of nonlinear analysis if the linear elastic elements are found to be deficient in their initial assessment. However we have not needed to resort to these techniques for these elements as they have found to be >100%NBS under linear elastic techniques.

A short description of analysis techniques is provided below.

Please note that the SAEB C8 – URM assessment process is cited in the Building Act as the approved procedure to be used in a Detailed Seismic Assessment.

9.1.1 Elastic analysis techniques

Elastic analysis techniques rely on linear-elastic assumptions and maintains the use of linear stress-strain and force-displacement relationships. Implicit material non-linearity (e.g. cracked section) and geometric nonlinearity may be included. Includes equivalent static analysis and modal response spectrum dynamic analysis. Under the equivalent static method, the lateral seismic forces are assumed to be distributed over the building height in accordance with Section 6 of NZS 1170.5:2004 and the corresponding internal forces and building displacements are determined using a linear elastic static analysis. In URM element analysis the lateral load distribution method of NZS1170.5:2004 is ignored for a tributary height distribution of the load as specified in SAEB C8.

9.1.2 Nonlinear analysis techniques

Nonlinear structural analysis techniques incorporate material nonlinearity (strength, stiffness and hysteretic behaviour) or plastic response of building materials after initial elastic capacity is exceeded (that is it bends or yields). This analysis technique may be used for the inset reinforced concrete frames, however these elements were found to be >100%NBS under an elastic analysis.

Typically brick buildings do not exhibit this behaviour.

9.2 Analysis Procedure overview

9.2.1 Southland Times

The structural analysis was generally completed in accordance with C8 of the technical guidelines, section C8.5.2 Illustrates the Assessment process. Steps 1 (Gather Documentation), Step 2 (Decide on level of assessment based on building complexity), Step 3 (On-site Investigations) and Step 4 (Assess material properties) have been completed.

9.2.1.1 Step 5 – Identify potential structural weaknesses and rank in order of vulnerability

The assessed vulnerabilities would rank the structural weaknesses as follows:-

1. Parapet, ornamentation, façade collapse under Out of Plane actions.
2. Wall / diaphragm connections (for both in-plane shear and out-of-plane tension loads).
3. Out–of-Plane Instability of face loaded URM walls second floor to ground floor for each wall.
4. Timber Diaphragm strength and stability.
5. In-plane capacity of URM walls.
6. In-plane capacity of reinforced concrete frames embedded in URM walls.

9.2.1.2 Step 6 – Assess member / element capacities

- Timber Diaphragm strength and stability Section - C8.8.3 – This will utilise the depth and width of the various diaphragms using their joist span direction, the inspected decking and ceiling construction type, condition and fixings to determine their deflection under the loading from self-weight and the out of plane wall loads. It is considered from this assessment that the diaphragms are deemed as being flexible and thus the in-plane wall demands will be derived from tributary width loads independent of any torsional effects due to the relative stiffness's of the other bracing walls in the building. Assessment has found these to all be >100%NBS capacity.
- Wall / diaphragm connections - Section C8.8.4 - The diaphragm reactions derived from the diaphragm strength assessment above will determine the shear loading to the diaphragm fixings both original and as part of the strengthening works of 1986. This includes the bearing capacity of embedded timber joists where they are built into the wall construction (second floor) in the loaded direction and manufacturer's data from equivalent anchors / connections identified from archive drawing and verified by site inspections. Critical shear capacity under diaphragm end shears is 19%NBS. Out of plane wall assessment reactions to the restraining floor and ceiling diaphragms were checked against the available capacity of the fixings as verified above and any frictional resistance to the joists ignored to cater for the potential of vertical seismic loadings. Critical Pull-out capacity under OOP forces is 61%NBS.
- Out–of-Plane Instability of face loaded URM walls and parapets – Section C8.8.5. The capacity of parapets with a base only restraint and the walls restrained by floors /ceiling diaphragms to their top and bottom are assessed under the virtual work based assessment recommendations utilising their head and base support conditions. The degree of horizontal deformation by the diaphragm as assessed above is utilised to determine the elements capacities. Axial loading has a positive effect on the capacities and as this

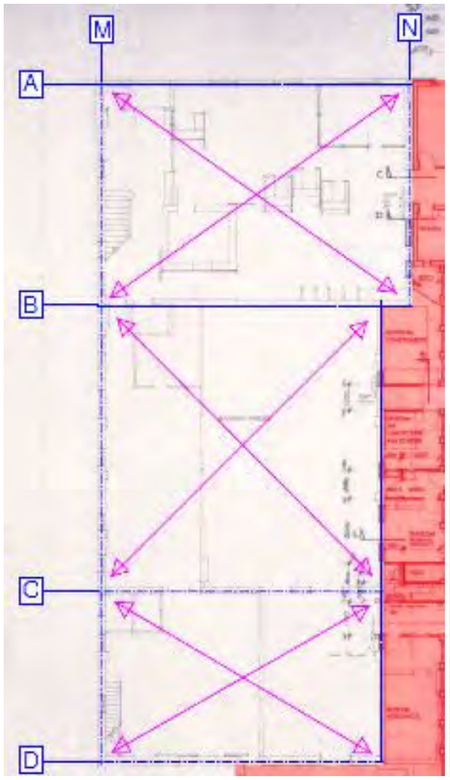


Figure 14 – Southland Times Bracing lines of Primary Lateral Structure and floor diaphragm extents plan

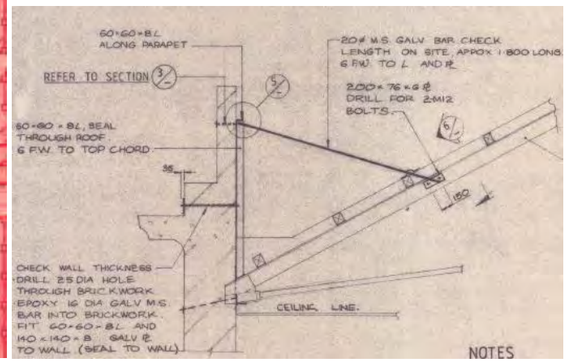


Figure 15: Façade parapet current restraint system

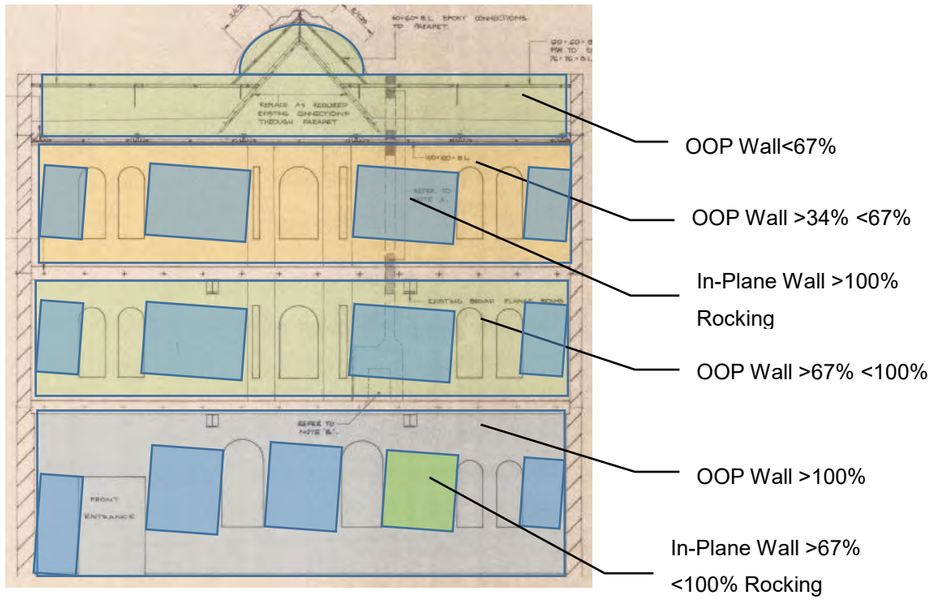


Figure 16 – Sketch of Front elevation URM element Outputs and Out of Plane Capacities

increases towards ground level the wall capacities are found to increase accordingly toward ground level. Capacities were found to be limited to 33%NBS to the critical parapets and second floor walls. The façade parapet has received a strengthening restraint as part of the 1987 work which is deemed, by inspection, to raise its capapcity to >67%NBS. See figure 2 for the strengthening provision detail

- In-plane capacity of URM walls. – Section C8.8.6 – In-plane wall capacities are derived by assessing the critical capacity for each wall and spandrel element (horizontal element of the wall above or below an opening) within the wall at each level. Given the deep spandrels the wall pier / panels were found to have failure mode either by rocking or bed joint sliding with a limiting capacity of 76%NBS. The modes of failure from each element are derived to determine the critical loading condition.
- In-plane capacity of reinforced concrete frames embedded in URM walls – Section C5.6 – The concrete frames constitute a flexible lateral load resisting system within the wall and as such the deformation compatibility between the stiff URM structure and the frame needs to be considered. Hence the mobilised capacity of the inbuilt frame is limited to that mobilised at the deformation limit of the URM wall. It is feasible to remove the URM wall elements from the assessment, due to their short lengths, as long as this does not present a life safety hazard due to the masonry element failing then the full capacity of the frame can be used using a simple lateral mechanism analysis or a nonlinear static pushover analysis.

9.2.1.3 Step 7 – Analyse the Structure to determine relationship between member / element actions and global capacity

The primary lateral load resisting structures, diaphragms and shear bracing walls were assessed as a series of various contributing elements to determine the global capacity of the whole wall length at each level and bracing line. The rocking failure of slender piers is unlikely to cause a life safety hazard in an isolated case and if this occurs the elements capacity at the point of rocking will be isolated and the loading increased to the other elements until a global capacity is determined.

9.2.1.4 Step 8 – Assess global capacity

This is determined from the results of the various structural weaknesses assessments and the point at which the critical member / element of the primary lateral load resisting system reaches its determined capacity.

9.2.1.5 Step 9 Determine demands and %NBS

The demands arise from the seismic load of the building under the elastic loading, i.e. no ductility, the seismic load is modified by a Kr factor dependent upon the mode of failure of the element under consideration. In this case the Kr for the shear walls will be taken as = 3 (all in accordance with SEAB C8).

The demands are compared to the global element capacities and the %NBS rating determined for each element and then globally as the rating of the critical structural weakness (CSW) which cause a significant life safety hazard.

9.2.1.6 Modelling assumptions

The following assumptions have been made when modelling the building:

1. The diaphragms at each floor are considered as being flexible with sufficient internal capacity to transfer the imposed loads.
2. The reinforced concrete frames and masonry wall elements are in good condition (i.e. no cracking). This assumption is not entirely valid with some isolated minor cracking evident but it is assumed no yielding of reinforcement has occurred.
3. The soils which the walls are founded on have adequate bearing capacity to resist over turning. This assumption would need to be verified by a site specific Geotechnical Engineering assessment of soil bearing capacity but at this stage it is considered a reasonable assumption.

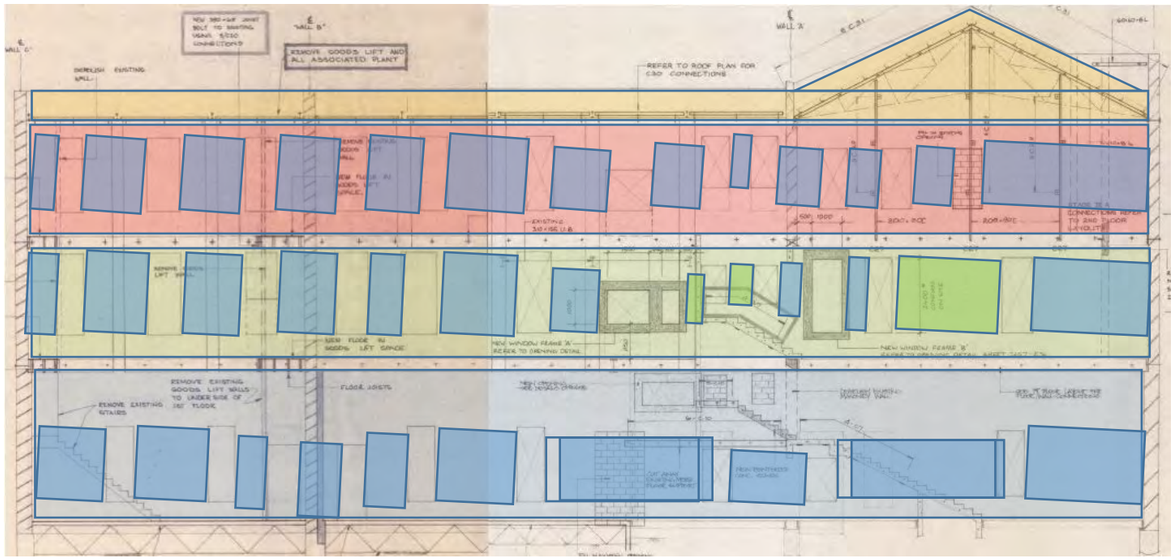


Figure 17 - Sketch of Side elevation URM element Outputs and Out of Plane Capacities (for key of shading see figure 15 above).

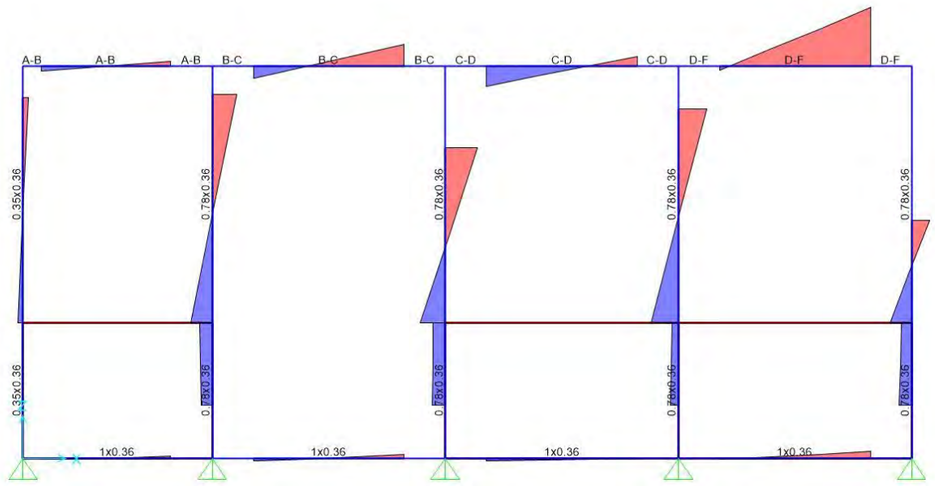


Figure 18 – SAP2000 output of Wall B ground floor RC bracing frame G+E Moment demands.

10.0 Quantitative Results Summary

A summary of the results from the quantitative assessment is provided in the table below.

Building area	Loading direction	Specific review element	%NBS	Notes/Description of limiting criteria
Southland Times	Transverse (E-W)	Side walls – Parapet OOP	40% >100%	URM Wall - Rocking Stability * Connections - N/A
		Side walls – Second Floor OOP	33% 62%	URM Wall - Rocking Stability * Connections Floor - Anchor Pull-out
		Side walls – First Floor OOP	72% 64%	URM Wall - Rocking Stability * Connections Floor – Anchor Pull-out
		Side Walls – Ground Floor OOP	>100%	URM Wall – Stability – N/A *
		Roof Diaphragm - Front	>100% 64%	GIB Sheathing - Deformation - N/A Connections – Anchor Shear
		Second Floor Diaphragm - Front	>100% 34%	Timber Boarding - Deformation - N/A Connections – Anchor Shear
		First Floor Diaphragm - Front	>100% 31%	Timber Boarding - Deformation - N/A Connections – Anchor Shear
		Roof Diaphragm - Rear	>100% 49%	GIB Sheathing - Deformation - N/A Connections Ceiling - Anchor Shear
		Second Floor Diaphragm - Rear	>100% 22%	Timber Boarding - Deformation - N/A Connections Floor - Anchor Shear
		First Floor Diaphragm - Rear	>100% 19%	Timber Boarding - Deformation - N/A Connections Floor - Anchor Shear
		In-plane Façade A – Second Floor	>100%	URM Wall - N/A
		In-plane Façade A - First Floor	>100%	URM Wall - N/A
		In-plane Façade A – Ground Floor	76%	URM Wall - URM Rocking
		In-plane Internal Wall B – Second Floor	>100%	URM with RC Frame - N/A
		In-plane Internal Wall B – First	>100%	URM with RC Frame - N/A
		In-plane Internal Wall B - Ground	>100%	RC Frame - N/A
		In-plane Internal Wall C - Second	>100%	URM with RC Frame - N/A
		In-plane Internal Wall C– First	>100%	URM with RC Frame - N/A
		In-plane Internal Wall C - Ground	93%	URM with RC Frame - URM Sliding
		In-plane Rear Wall D - Second	>100%	URM – N/A
		In-plane Rear Wall D– First	>100	URM – N/A
		In-plane Rear Wall D - Ground	>100	URM with RC Frame - N/A

Building area	Loading direction	Specific review element	%NBS	Notes/Description of limiting criteria
Southland Times	Longitudinal (N-S)	Facade Wall – Parapet OOP	>67% >100%	URM Wall - Rocking Stability * Connections - N/A
		Facade Wall – Second Floor OOP	43% 80%	URM Wall - Rocking Stability * Connections Floor - Anchor Pull-out
		Facade Wall – First Floor OOP	81% 61%	URM Wall - Rocking Stability * Connections Floor - Anchor Pull-out
		Facade Wall – Ground Floor OOP	>100%	URM Wall – Stability – N/A *
		Internal Walls – Second Floor OOP	>100%	URM Wall – Stability – N/A *
		Internal Walls – First Floor OOP	>100%	URM Wall – Stability – N/A *
		Internal Walls – Ground Floor OOP	>100%	URM Wall – Stability – N/A *
		Rear Wall – Parapet OOP	55% 97%	URM Wall - Rocking Stability * Connections Ceiling- Anchor Pull-out
		Rear Wall – Second Floor OOP	33% 92%	URM Wall - Rocking Stability * Connections Floor - Anchor Pull-out
		Rear Wall – First Floor OOP	72% 64%	URM Wall - Rocking Stability * Connections Floor - Anchor Pull-out
		Rear Wall – Ground Floor OOP	>100%	URM Wall – Stability – N/A *
		Roof Diaphragm - Front	>100% 48%	GIB Sheathing - Deformation - N/A Connections – Anchor Shear
		Second Floor Diaphragm - Front	>100% 100%	Timber Boarding - Deformation - N/A Connections – N/A Embedded Joists
		First Floor Diaphragm - Front	>100% 32%	Timber Boarding - Deformation - N/A Connections – Anchor Shear
		Roof Diaphragm - Rear	>100% 55%	GIB Sheathing - Deformation - N/A Connections – Anchor Shear
		Second Floor Diaphragm - Rear	>100% >100%	Timber Boarding - Deformation - N/A Connections – N/A Embedded Joists
		First Floor Diaphragm - Rear	>100% 22%	Timber Boarding - Deformation - N/A Connections – Anchor Shear
		In-plane Wall West M – Second Floor	>100%	URM with minor masonry infill – N/A
		In-plane Wall West M – First Floor	83%	URM with minor RC Frame – URM Rocking
		In-plane Wall West M – Ground Floor	>100%	URM with minor masonry infill – N/A
		In-plane Wall East N Front – Second Floor	86%	URM with RC Frame – URM Rocking

		In-plane Wall East N Front – First Floor	>100%	URM with minor RC Frame – N/A
		In-plane Wall East N Front – Ground Floor	>100%	URM with minor RC Frame – N/A
		In-plane Wall East N Rear – Second Floor	97%	URM with RC Frame – URM Rocking
		In-plane Wall East N Rear – First Floor	>100%	URM with RC Frame – N/A
		In-plane Wall East N Rear– Ground Floor	>100%	URM – N/A

* The capacity is determined assuming that the connections are adequate to restrain the walls.

11.0 Building Condition Assessment

11.1 Site Visits and Overview

BMC carried out site assessments of the building on 11th December 2017 and 15th December 2017. This involved obtaining a photographic and written record of the structural systems of the building along with areas of damage or decay. The observations made were visual only (i.e. non-intrusive) other than opening up of the floor structure to the North East and South West corners of the first and second floor and obtaining representative samples of the concrete bricks for strength.

The first site visit on 11th December 2017 BMC involved inspection of the following areas of the building:

- Basement
- Levels 1-3 (site measure of level 1, 2 and part 3)
- Site measure of critical wall thicknesses.
- Opening up of spalled concrete areas to determine the cause of the damage

The second site visit on the 15th December 2017 involved inspection of the following areas of the building:

- Level 3 (conclude site measure of level 3)
- Roof and gables (front element only accessible)
- Exterior elevations.

The site observations described below relate to structural damage only i.e. damage to structural elements which form part of either the lateral or gravity load resisting systems or both. Cosmetic damage i.e. damage that only affects the appearance of something is purposefully not described here.

Figure 19 – Concrete Masonry Brickwork with RC window infill and RC stairs tied into West side wall.

Figure 20 – Ground Floor North West corner evidence of efflorescence to the brickwork internal leaf.

Concrete brick samples were obtained from the areas shown on the plan in Appendix A and sent to Opus Laboratories in Christchurch for testing. The results of the testing are attached in appendix A.

It is believed that the basement and levels 1 through 3 of the building have been unoccupied for approximately two years. The building has been maintained to a good standard during the period it has not been occupied and currently does not appear to suffer from significant moisture ingress through the roof and exterior walls.

Figure 21 – North Elevation Façade exhibit cracks to the cornice and parapet cladding.

Figure 22 – North and East Elevation ties into floor diaphragm at first floor. Façade tie local to trimming joist only, minimal transfer path. East elevation fixings every second joist

Figure 23 – East Gable front element strengthening girt has no effect on outwards movement as no fixing to wall and only at one location.

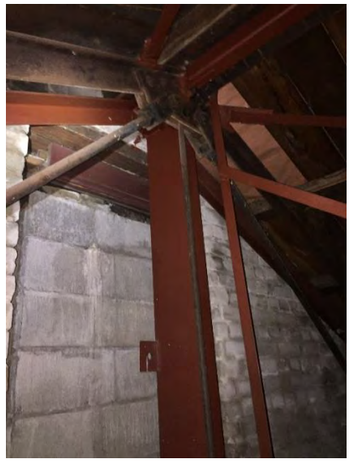


Figure 24 – West Gable front element strengthening girt has no effect on outwards movement as no fixing to wall and only at one location.

11.2 Site Observations

Structurally the main observation was the number of penetrations to the internal shear walls as a result of the historic refurbishments which have removed areas of URM shear walls and replaced them with reinforced concrete frames. The nature of the strengthening works to the 1986 refurbishments have in locations, been found to be below the level of provision typically used in today's seismic strengthening regimes and this may well be the result of more robust assessment procedures which have increased the seismic demands for strengthening works.

Figure 25 – South Elevation inset RC frame

Figure 26 – Internal Grid B RC wall/frame

11.3 Building Condition Discussion

The Southland Times building is 110 years old and was strengthened and refurbished in 1984-6. It has minimal signs of deterioration that would affect its structural capacity although its age and construction technique is such that there are inherent capacity issues to the higher storey walls and parapets. New structures are normally designed using the current material codes for a durability of 50 years so the building has far exceeded its normal lifespan.

The façade remains the buildings primary feature of architectural merit. It is feasible that this element could be retained in any redevelopment of the remaining building footprint. A steel grillage would be fixed to the inner face of the wall with ties back to any new structure behind. The inner face of the masonry wall could then be stabilised by a spray concrete reinforced wall incorporating resin anchor dowels into the current wall construction if required.

The temporary stabilisation works during demolition and construction and subsequent additional load imposed on any new construction behind would impose considerable cost (over and above that for total demolition).

12.0 Seismic Concept Remedial Strategy

12.1 Primary Structure

The primary structure comprises the URM in-plane walls and the roof and ceiling diaphragms and as this is the case in both the transverse and longitudinal directions all the walls are considered primary elements although dependent upon the load direction they will switch from primary to secondary elements.

The findings of the assessment have determined that it is the wall to diaphragm connections that are deficient throughout the building which are limiting the buildings overall capacity initially.

The remedial action is to install additional fixings to the interface and detail to ensure the diaphragm can adequately transfer its load into the in-plane walls, which is currently not being provided by the original or the strengthening provisions.

Typical details for this work are shown in figures 27-28 adjacent.

12.2 Secondary Structure

The secondary structure elements requiring strengthening are the URM parapets and the upper storey URM walls under out of plane loading.

The URM parapet could be either reduced in height until its capacity is deemed adequate or install parapet tie backs along the back of all parapets. This will vary depending on the height of the parapet but will typically consist of a PFC strongback with a CHS tube strut to the roof line and fixed through the roofing to the steel trusses below. Vertical strapping will also be required at strut locations to tie the parapet down to the wall below the parapet base to resist uplift forces. All elements will require Chemical anchor fixings into the brickwork with the anchors fixed through to 50mm from the outer face of the brickwork wall in order to restrain or mobilise the full wall section.

The URM walls to the second floor will require an internal timber framework with 150x45 hySPAN studs @400mm crs to span from floor to ceiling and, adequately fixed to the same, with wall tie fixings into the URM wall picking up each wythe at regular vertical centres, as determined by detailed design, to each stud.

Typical details for this work are shown in figures 29 adjacent.

12.3 Façade Retention

The potential retention of the Esk Street façade can be engineered, if considered necessary / appropriate as discussed in section 11.3.

A concept of the steel grillage system to enable its retention is shown in Figure 30.

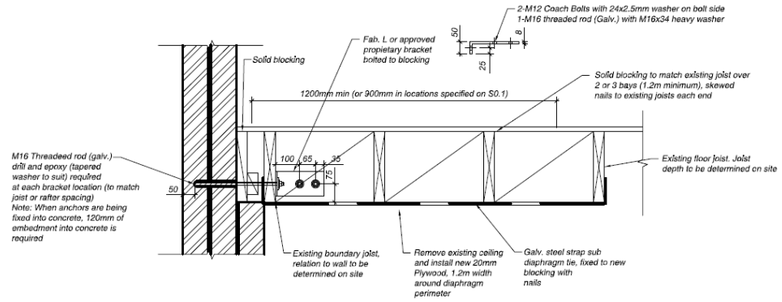


Figure 27 – Diaphragm to Wall typical remedial detail - Joist Parallel

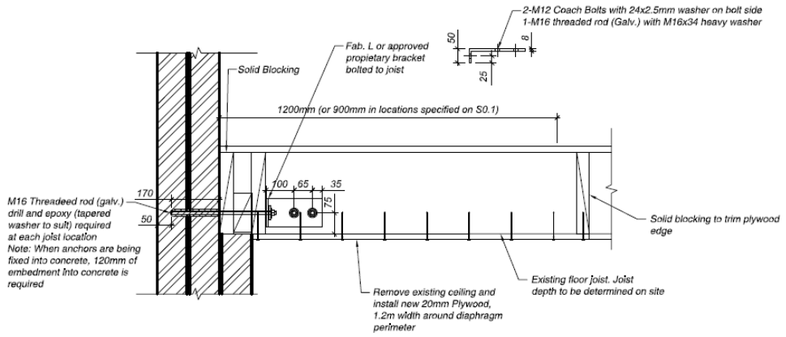


Figure 28 – Diaphragm to Wall typical remedial detail - Joist Perpendicular

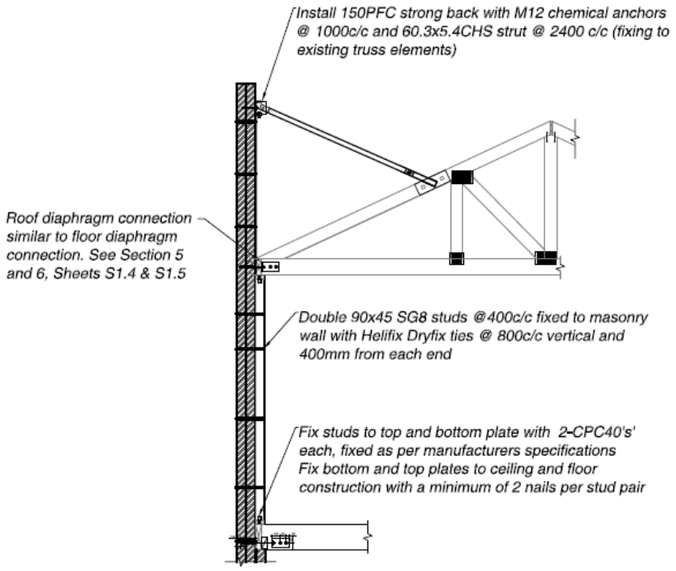


Figure 29 – Parapet Tie back and URM Out of plane restraint typical remedial detail

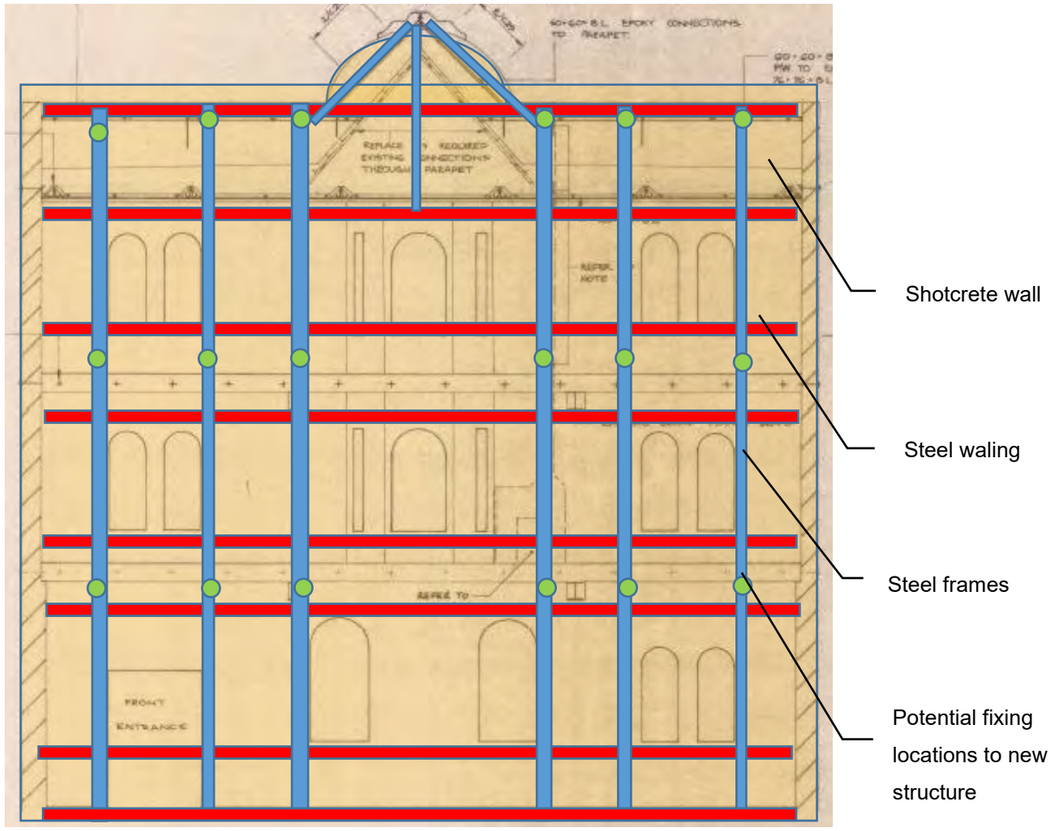


Figure 30 – Heritage Façade retention system Concept Sketch

13.0 Conclusions

The Southland Times building is currently 110 years old, it is three stories high with a small additional basement area and is constructed in unreinforced concrete masonry with timber floors and steel truss and purlin roofs in two intersecting roof forms (herein designated the front and rear elements). The building is essentially rectangular in plan with gables to the rear elevation and the front element side elevations. The façade to the North elevation is of particular architectural merit and the building has been awarded a category 2 heritage building status for this and its part in the development of Invercargill and Southland regional history.

The building is of a form of construction which is inherently at risk under seismic loads such that its construction methods no longer meet the building code guidance for new buildings. The building has had a number of extensions during its lifespan and a refurbishment in 1984-6 which included removal of some areas of the URM bracing walls with reinforced concrete frames being installed in their stead and installation of some strengthening works.

The building itself has shown no evidence of structural distress or defects which would cause a reduction in the assessed element capacities. Some of these capacities however are<33%NBS.

There are a number of issues with regards the diaphragm / wall connections being inadequate, URM parapets and upper walls being of a low seismic capacity under out of plane loads all of which have placed the buildings rating within the “Earthquake Prone” Building Classification (‘Grade D’ building).

There are established seismic strengthening details that can be adapted to raise the buildings capacity to the level required to satisfy the recommended strengthening requirements (>67%NBS).

The building form and large size is particular to its former use and its use as a standalone building in the current office and commercial market is limited evidenced by the fact it has been untenanted for the last 18 months despite significant marketing. It is also acknowledged that given the rate of development of assessment analysis techniques and research unto URM buildings its retention in the future it may become more and more onerous for its owners. It is possible the building façade can be retained and the remaining structure demolished for a new development on the site more suitable for the market and using more modern construction techniques to provide a more resilient structure.

14.0 Recommended Next Steps

Consideration of the following options needs to be explored by the relevant parties:-

Option 1 - Strengthen of the Heritage building and integration into the new development.
Option 2 - Demolition of the building in total.
Option 3 - Retention of the façade for incorporation into the master plan design and specific building to be constructed behind. Significant cost for option 3 would likely be incurred and specific funding from Government or Heritage NZ could be sought in this case.

A - Appendix A – Concrete Brick Compression Testing

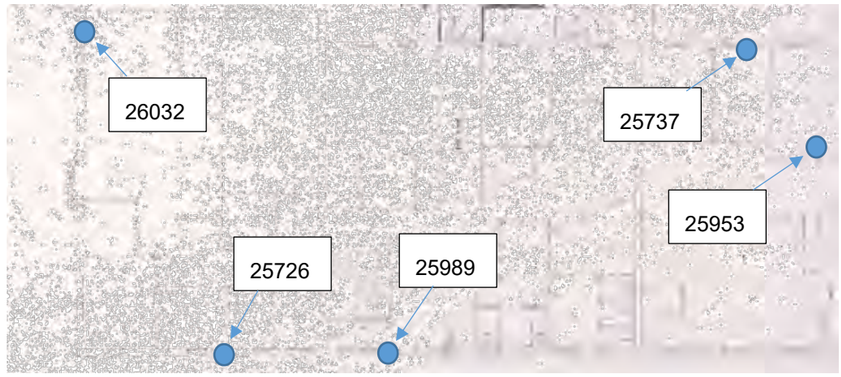


Figure 31 Location of Concrete Brick samples taken for compression testing (indicative only).

RECYCLED BRICK COMPRESSIVE STRENGTH TEST REPORT

OPUS

Project :	**Quality Assurance Testing**
Location :	**67 Esk Street, Invercargill**
Client :	**Batchelar McDougall Consulting Limited**
Contractor :	**Batchelar McDougall Consulting Limited**
Sampled by :	**Andrew Marriott**
Date sampled :	**22 January 2018**
Sampling method :	**Random Selection**
Sample description :	**Recycled Limestone Brick**
Sample condition :	**Air Dry as Received**

Project No :	**6-JBMCL.16/6LC**
Lab Ref No :	**CH3687**
Client Ref No :	**Job 1711-2266**

Test Results

Compressive Strength

Brick:	Ground Sth Wall Load Bay	Ground West Wall Storage	First Floor West Wall Office	First Floor Northwall Office	Ground East Wall Loading
Available Area (mm²):	25953	25989	25726	26032	25737
Capping Material:	12mm Fibreboard				
Face's Capped:	Yes	Yes	Yes	Yes	Yes
Cavities Filled:	Fujirock Compound				
Density (kg/m³):	2012	1905	1832	1935	1867.0
Load (kN):	349.6	427.0	289.1	454.6	**274.0**
Stress (MPa):	**13.5**	**16.4**	**11.2**	**17.5**	**10.6**
Average Stress (MPa):			**13.8**		
Standard Deviation:			**3.0**		
Test Methods:	AS 3700:2001 Determination of Compressive Strength of Masonry Units				

Date tested : 24 January 2018
Date reported : 25 January 2018

This report may only be reproduced in full

Approved

Designation : *Laboratory Manager*
Date : 25 January 2018

CSF 2004 (13/09/2006)

Page 1 of 1

Opus International Consultants Limited
Christchurch Laboratory
Quality Management Systems Certified to ISO 9001

52C Hayton Road
Wigram, Christchurch 8042,
New Zealand

Telephone +64 3 343 0739
Facsimile +64 3 343 0737
Website www.opus.co.nz

B – Appendix B - Geotechnical Desktop Study

By Geosolve Limited Ref: 171019 - February 2018

Geotechnical Desktop Study

Invercargill CBD Project – Stage 1, Old Government Life/Arbuckles Building and old Southland Times Building

Invercargill

Report prepared for:

Batchelar McDougall Consulting

Report prepared by:

GeoSolve Limited

Distribution:

Batchelar McDougall Consulting

GeoSolve Limited (File)

February 2018

GeoSolve Ref: 171019

GEOTECHNICAL WATER RESOURCES PAVEMENTS

Table of Contents

1 Introduction

1.1 General

This report presents the results of a geotechnical desktop study carried out by GeoSolve Ltd in order to determine likely subsoil conditions and provide geotechnical inputs for a structural assessment of two buildings (the Old Southland Times building and the Old Government Life/Arbuckles building) in the Invercargill CBD.

Photo 1 – Old Southland Times Building, Looking southwest from Esk St (source - *maps.google.co.nz*)

Photo 2 – Old Government Life/Arbuckles Building, Looking southeast from corner of Esk St and Dee Street (source - *maps.google.co.nz*)

The desktop study was carried out for Batchelar McDougall Consulting in accordance with GeoSolve Ltd's proposal dated 23 December 2017, which outlines the scope of work and conditions of engagement.

1.2 Scope of Works

We understand that the two existing buildings above are to be structurally assessed by Batchelar McDougall Consulting and to assist the assessment a geotechnical desktop study is required, outlining:

- The likely ground conditions below the site;
- Preliminary seismic soil classification;
- Preliminary assessments of the likely bearing capacity of the existing building foundations at the sites and liquefaction and settlement susceptibility;
- Recommendations for likely foundations for any new development in this area for 3-4 story construction.

2 Site Description

2.1 General

The subject properties are located in central Invercargill as shown in Figure 1 below.

Figure 1: Site location plan, showing the location of the two buildings in red (Old Govt Life and Old Southland Times buildings) being assessed.

The buildings are accessed from Esk St and Dee St.

2.2 Topography and Surface Drainage

The building sites are situated on horizontal ground with an established drainage system in the area that is expected to control surface flows.

3 Geotechnical Investigations

No site specific investigations have been undertaken for the purpose of this report. GeoSolve have completed a review of shallow and deep site investigations in close proximity to the sites in central Invercargill to infer the underlying geological model.

4 Subsurface Conditions

4.1 Geological Setting

The site is expected to be underlain by shallow surface fill, which in turn overlies alluvial deposits with Tertiary-age marine sediments at depth. The alluvial deposits comprise Quaternary outwash gravels developed during former glaciation, which occurred inland. More recent silty/sandy floodplain or mudflat deposits overlie these gravels. The alluvial deposits merge with marine deposits at depth in the vicinity of Invercargill.

No active faults have any been reported in the vicinity of Invercargill. Strong earthquakes are common in Fiordland near the current tectonic plate boundary and consequently some moderate ground shaking can be expected to occur in Invercargill during such events. The nearest trace of any mapped active fault is the Hillfoot Fault, approximately 60 km to the north of the site.

Significant seismic risk exists in this region from potentially strong ground shaking, likely to be associated with a rupture of the Alpine Fault, located along the West Coast of the South Island. There is a high probability that an earthquake with an expected magnitude of over 8 will occur along the Alpine Fault within the next 50 years.

4.2 Stratigraphy

Subsurface soils beneath the two buildings being assessed are inferred to comprise:

- Uncontrolled fill/engineered fill, overlying;
- Alluvial silt, overlying;
- Alluvial sand, overlying;
- Alluvial gravel.

Uncontrolled fill was observed to underlie each lot where GeoSolve have completed investigations in the area. Uncontrolled fill was observed to comprise clayey SILT with some gravel and sand, sandy GRAVEL with minor silt, gravelly SILT with wood, ash and bricks and SAND. Engineered fill platforms may have been constructed under the existing building foundations.

The fill is predominately underlain by alluvial silt comprising very soft to firm, SILT with nil to some sand content and clayey SILT. The base of the alluvial silt was observed between 1.5-3 m bgl in the area.

In discrete locations an alluvial sand layer was observed to underlie the alluvial silt to between 2 and 4 m bgl. Alluvial sand was observed to comprise silty SAND with some fine gravel, and SAND with trace silt.

Alluvial gravel was observed to underlie the alluvial silt or sand in all cases. Alluvial gravel has been observed within 8 Boreholes and depths have been inferred from 24 Heavy Dynamic Probe (DPH) tests completed in the Invercargill CBD area. The depth to the top of the alluvial gravel in the area is inferred to be between 2 and 4 m bgl. Alluvial gravel was observed to predominately comprise medium dense to dense, sandy GRAVEL and silty GRAVEL with thin SAND lenses.

4.3 Groundwater

Groundwater was observed between 1.4 and 3.3 m bgl in the area. Investigations completed in closest proximity to the buildings being assessed indicate a water level of 3-3.3 m and 1.4-1.7 m at 16-24 Don Street (~150 m N of the site) and 65 Don St (~180 m NE of the site) respectively.

It is recommended that piezometers are installed on site to confirm the groundwater levels.

5 Liquefaction Analysis

5.1 Design Earthquakes

Two earthquakes scenarios have been assessed in accordance with NZS1170 – Structural Design Actions[1] for an Importance Level 2 structure with a 50-year design life.

Peak horizontal ground accelerations and effective magnitudes were calculated using the procedure from the NZTA Bridge Manual[2]. Table 5.1 summarises the scenarios considered.

The site has been assessed as subsoil category *Class D – Deep soil* site in accordance with NZS1170 – Structural Design Actions.

Table 5.1 – Earthquake accelerations and effective magnitudes for liquefaction assessment

Scenario	Performance Requirements	Annual Probability of Exceedance	Peak Horizontal Ground Acceleration (PGA)	Effective Magnitude
Serviceability Limit State (SLS)	*Avoid damage that would prevent the structure being used as originally intended without repair*	1/25	0.05 g	6.2
Ultimate Limit State (ULS)	*Avoid collapse of the structural system*	1/500	0.2 g	6

5.2 Liquefaction Summary

The liquefaction analysis from surrounding sites indicates there is typically no potential for liquefaction or lateral spreading under SLS seismic loading, however minor liquefaction is predicted under ULS loading at some sites in the area.

Typical liquefaction analysis from the surrounding area indicate the following:

- No liquefaction or cyclic softening is predicted for the SLS design earthquake;
- Minor liquefaction is predicted for the ULS design earthquake. Loose sand lenses overlying or within the alluvial gravel unit have the potential to liquefy below the water table under ULS seismic loading;
- CPT and DPH testing in the surrounding area predict liquefaction induced free field settlement of between 0-50 mm in an ULS seismic event.
- ULS settlement should be confirmed with site specific deep investigations comprising boreholes, DPHs and CPTs.

[1] NZS1170-5 (2004) Structural Design Actions, Part 5: Earthquake Actions – New Zealand.
[2] NZTA Bridge Manual (2014). SP/M/022, third edition amendment 1, Effective from September 2014.

6 Engineering Considerations

6.1 General

Data presented as part of this report is preliminary in nature and is only to be used to assist in the structural assessment of the old Government Life/Arbuckles and the old Southland Times buildings. No site specific investigations have been completed as part of this assessment.

6.2 Geotechnical Parameters

Table 6.1 provides a summary of the typical geotechnical design parameters for the soil materials expected to be encountered underlying the existing buildings.

Table 6.1 – Recommended geotechnical design parameters

Unit	Thickness (m)	Bulk Density γ (kN/m^3)	Effective Cohesion c´ (kPa)	Effective Friction ϕ' (deg)	Elastic Modulus **E** (kPa)	Poissons Ratio ν
Uncontrolled Fill	0-1	16	N/A	N/A	N/A	N/A
Alluvial Silt (very soft to firm SILT with some sand and clayey SILT)	0.3-1.7	18	0	28-30	1-5,000	0.3
Alluvial Sand (loose to medium dense silty SAND with some gravel and SAND with trace silt)	0.5-2.5	18	0	31-32	3-10,000	0.3
Alluvial Gravel (medium dense to dense, sandy GRAVEL)	Not proven	19	0	35	20-30,000	0.3

6.3 Groundwater Issues

The groundwater table at the sites is expected to be within the alluvial sand/gravel unit. No artesian groundwater pressures are expected at the site.

During periods of heavy rainfall the existing stormwater system is expected to control surface flows across the site and drain appropriately.

6.4 Foundations

6.4.1 General

It is understood the old Southland Times and Government Life/Arbuckles building's foundations are likely to comprise of strip footings bearing upon alluvial silt. Bearing capacity within the very soft to firm alluvial silt underlying the site is expected to be significantly lower than "good ground".

It is however understood the Government Life/Arbuckles building has a basement which may result in the foundation loads being transferred to the underlying alluvial gravel or a thin layer of alluvial silt overlying alluvial gravel, this is unlikely to be the case for the old Southland Times building, where the foundation is understood to be constructed close to road level.

6.4.2 Shallow Foundations

Figure 2 below summarises typical working stresses for shallow footings, which bear upon alluvial silt. It should be noted the foundation working stresses presented on Figure 2 are governed by bearing capacity in the case of narrow footings and settlement in the case of wide footings.

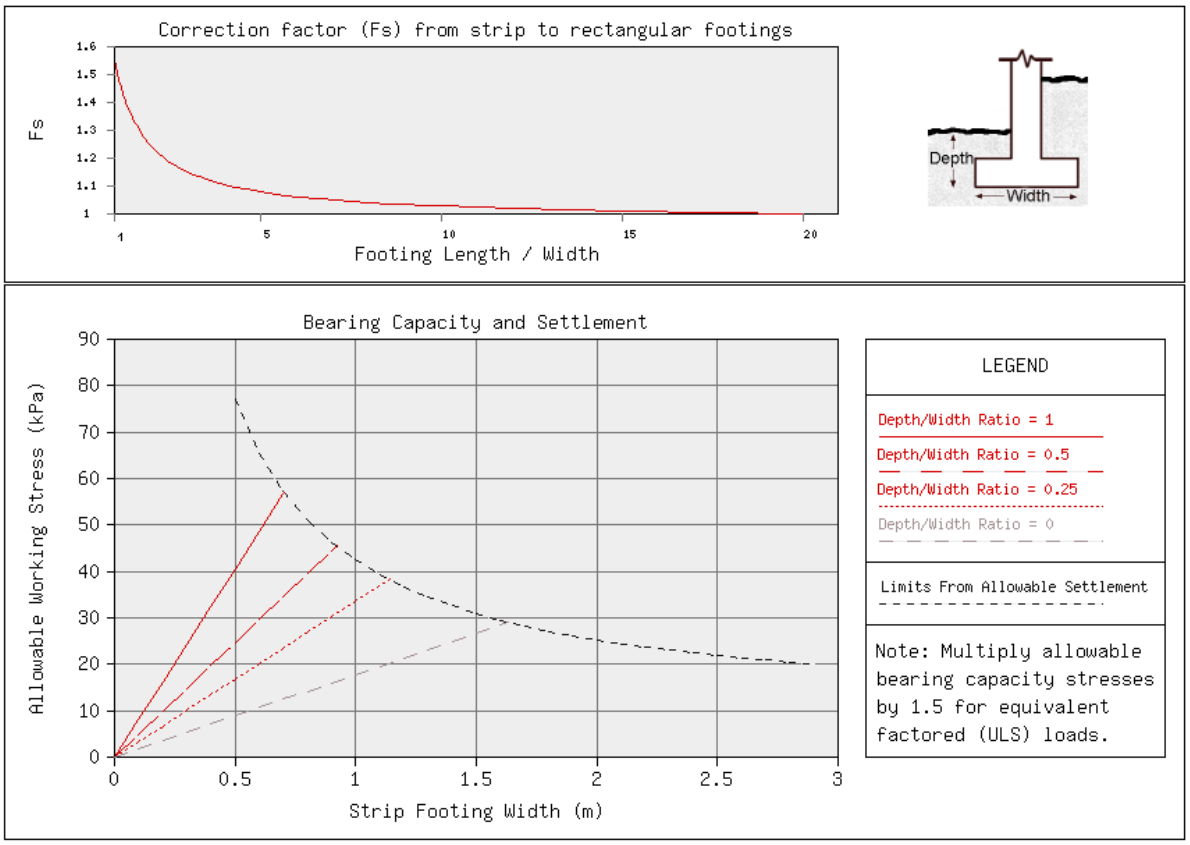


Figure 2: Typical Bearing for Shallow Footings on Alluvial Silt

From Figure 2 it can be seen an allowable working stress of approximately 40 kPa is recommended for a 500 mm wide by 500 mm deep strip footing founded within alluvial silt. This corresponds to a factored (ULS) bearing capacity of approximately 60 kPa and an

ultimate geotechnical bearing capacity of 120 kPa. Note the low allowable bearing for larger footings.

Figure 3 summarises the recommended working stresses for shallow footings, which bear upon alluvial gravel. It should be noted the foundation working stresses presented on Figure 3 are governed by bearing capacity in the case of narrow footings and settlement in the case of wide footings.

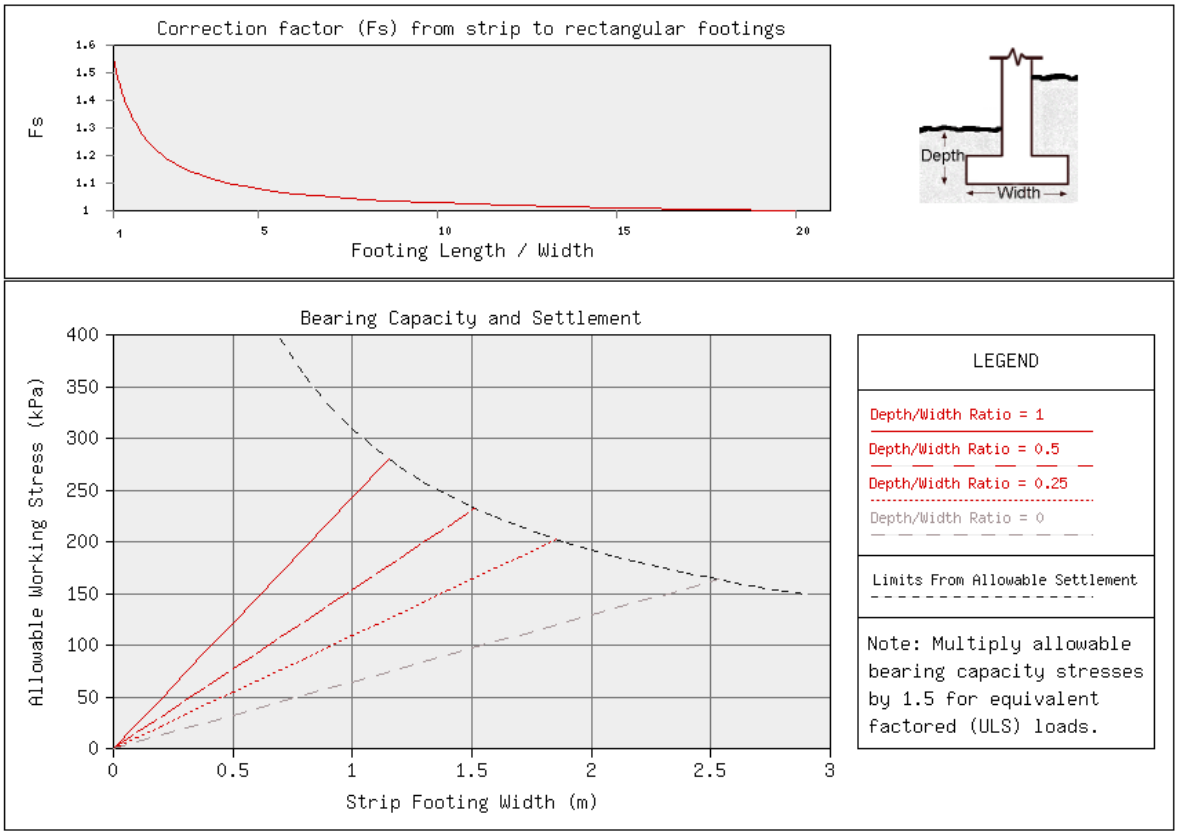


Figure 3: Recommended Bearing for Shallow Footings on Alluvial Gravel

From Figure 3 it can be seen an allowable working stress of approximately 100 kPa is recommended for a 400 mm wide by 400 mm deep strip footing founded within alluvial gravel. This corresponds to a factored (ULS) bearing capacity of approximately 150 kPa and an ultimate geotechnical bearing capacity of 300 kPa.

Minor liquefaction induced settlement could have some effect on an existing building with a shallow foundation; nearby testing estimates liquefaction induced settlement of 0-50 mm in a ULS seismic event.

In future construction the effects of liquefaction below the site is expected to be negligible as foundations are recommended to be constructed on piles bearing upon the non-liquefiable alluvial gravel unit below the site.

6.4.3 Foundations for 3 to 4 Storey Buildings

It is recommended that foundations for future multi-story development in this area are constructed on piles bearing within the underlying alluvial gravel. This has been observed between 2 and 4 m bgl at surrounding sites.

Screw piles, bored or driven piles can be considered for future construction. The recently constructed ICC building at 16-24 Don St, 150 m to the north, has 7 m long 800 mm diameter cased bored reinforced concrete piles supporting the structural loads. The foundation slab is supported on shorter, smaller diameter piles.

Bored and Franki pile rigs are available in Invercargill, whereas screw pile rigs will need to be established from Canterbury.

6.4.3.1 Bored Piles/ Franki Piles

Both traditional bored concrete reinforced piles and Franki piles are considered suitable for future construction.

The alluvial gravel below the two sites being assessed is estimated to be between 2 and 4 m bgl. However, a loose sand layer has been observed in discrete locations in the area surrounding the sites.

Piles should be installed a minimum of 3 pile diameters into the medium dense to dense gravel unit interpreted to underlie the sites to ensure that full end bearing is achieved.

Casing is likely to be required to support the pile bore during construction, due to the loose soils and relatively shallow groundwater.

6.4.3.2 Driven Timber Piles

A cost effective and relatively straightforward option may be to drive timber piles onto the gravels. The timber piles should be driven with a piling hammer to achieve a set determined using appropriate pile driving formula (e.g. wave equation analysis or Hiley formula). However the vibration effects of driven piles on nearby structures will have to be considered.

Trial piles should be carried out in advance of the main piling works to confirm pile depths.

Driven timber piles are more likely to be suitable to support minor structural loading or floor slabs.

6.4.3.3 Screw Piles

A screw pile consists of a steel circular hollow section with a helix welded tip and is installed by screwing it tip first into the ground. This piling method is advantageous as minimal vibration and noise is caused during construction, and it can be designed for both tension and compression forces. The design of screw pile is specialist and typically undertaken by the contractor who will be installing the piles. This design will require sonic boreholes to confirm design parameters and suitability of the installation and is a requirement of screw piling contractors.

6.5 Site Subsoil Category

For detailed design purposes it is recommended the magnitude of seismic acceleration be estimated in accordance with the recommendations provided in NZS 1170.5:2004.

Existing nearby drilling data suggests the site is Class D (deep soil site) in accordance with NZS 1170.5:2004 seismic provisions. A deep borehole contacting to bedrock would be required confirm whether Class C or D is appropriate.

6.6 Neighbouring Structures

The construction contractor should take the appropriate measures to control the construction noise, in accordance with Invercargill City Council requirements.

It is expected that conventional earthmoving equipment, such as hydraulic excavators, rollers and trucks as well as heavy piling equipment will be required during future building construction.

During fill compaction and pile driving/augering care should be taken to ensure that neighbouring properties are not adversely affected by ground vibrations, especially if fill and piles are being constructed in close proximity to neighbouring structures.

With regards to occupied properties in the wider area, the construction contractor should take appropriate measures to control the construction noise and vibration and ensure Invercargill City Council requirements are met.

7 Conclusions and Recommendations

- Data held on the GeoSolve database infers the geological model underlying the site areas comprise uncontrolled fill overlying alluvial silt, overlying discrete layers of alluvial sand, overlying alluvial gravel to moderate depth;
- The old Southland Times and Government Life building foundations are expected to comprise shallow strip footings, however the Government Life building does have a basement which decreases the thickness of alluvial silt underlying the foundations. Due to the basement that has been previously constructed the Government life building may be constructed upon alluvial gravel or a comparatively thin layer of alluvial silt overlying the alluvial gravel. This would have to be confirmed with site specific investigations;
- Shallow footings bearing upon alluvial silt are expected to provide an allowable bearing capacity of 40 kPa for a 500 mm wide and 500 mm deep footing. This is significantly below NZS 3604's definition of "good ground";
- Minor liquefaction induced settlement is predicted from testing completed on nearby sites in the Invercargill CBD. Between 0-50 mm of liquefaction induced settlement is predicted at nearby sites with the groundwater level predominately being within the alluvial sand and gravel underlying the area. Discrete lenses of loose alluvial sand are predicted to liquefy in a ULS seismic event;
- From existing nearby drilling the seismic soil classification for the site is considered likely to be Class D, however a deep borehole contacting to bedrock would be required to confirm whether class C or D is appropriate for design;
- Piles are recommended for future multi-level building foundation construction. Pile options are outlined in section 6.4 of this report. During the recent construction on

the ICC Building (16-24 Don St), 7 m long 800 mm diameter cased, bored concrete piles were installed.

- A risk of seismic activity has been identified for the region as a whole and appropriate allowance should be made for seismic loading during detailed design of the proposed building and foundations.

8 Applicability

This report has been prepared for the benefit of Batchelar McDougall Consulting with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

It is important that we be contacted if there is any variation in subsoil conditions from those described in this report.

It is understood that site specific investigations will be undertaken for future building foundation design.

Report prepared by:

.....

Mike Plunket

Geotechnical Engineer

Reviewed for GeoSolve Ltd by:

.....

Fraser Wilson

Senior Engineering Geologist

Reviewed for GeoSolve Ltd by:

.....

Colin Macdiarmid

Senior Geotechnical Engineer

TelferYoung
Valuers Property Advisors

Market Valuation

67 Esk Street
Invercargill
Invercargill City

Client: HWCP Management Ltd

Valuation Date: 16 January 2019

Thayer Todd Valuations Ltd trading as TelferYoung
(Southland)

Table of Contents

1.0 Executive Summary

Asset Valued:	67 Esk Street, Invercargill, Invercargill City

Upon completion, the subject property will comprise the original 1908 portion of The Southland Times building with a net lettable area over three floors of approximately 550.5 m^2, set on a 210 m^2 site. This historic building is located within the Invercargill CBD being strategically located within the planned HWCP Management Ltd inner city development.

Purpose of Valuation:	Market Value
Instructing Party:	Trevor Thayer
Client:	HWCP Management Ltd
Report Prepared For:	HWCP Management Ltd c/- Bonisch Consultants P O Box 1262 Invercargill 9840 Attention: Christine McMillan
Date of Inspection:	16 January 2019
Date of Valuation:	16 January 2019
Interest Valued:	Fee simple 107825
Basis of Valuation:	Market value as if complete on a vacant possession basis.
Land Area:	210m² (more or less)
Rentable Floor Area:	550.5m²
Tenancy Summary:	Vacant possession
Net Market Rent:	$119,125 per annum plus GST
Valuation Methodology:	The Market Value has been established by: + Income Approach + Market Approach
Valuation:	**Nine Hundred and Eighty Thousand Dollars ($980,000)** plus GST (if any). Indicating: + Yield on Market Income: 12.16% + $/m² of Rentable Floor Area: $1,782
Contract for Sale:	We are not aware of any sale and purchase agreement in place for the subject property.
Last Sale:	The entire subject property was purchased in October 2017 for $615,000.
Property Risk Profile:	'As if Complete' the property is considered to have a medium risk profile in comparison with other commercial properties in the locality.

The Executive Summary must be read in conjunction with the formal valuation report and with Thayer Todd Valuations Ltd Trading as TelferYoung (Southland) Statement of Limiting Conditions and Valuation Policy.

Significant Assumptions and Special Assumptions:	+ As instructed we have valued the property on the basis the original 1908 portion of the building will be retained, strengthened to 100% NBS along with the interior fully renovated to a modern standard of office space incorporating new stairs, lift, HVAC and fire alarm system. However, sprinklers have been excluded. + A new fee simple record of title will be issued for a land area of approx. 210 m^2.
Report Issue Date:	17 January 2019
Valuer:	Robert Todd - B Com (VPM), ANZIV, SPINZ Registered Valuer

TelferYoung policy requires that reports cannot be reassigned for any purpose beyond 90 days from the date of valuation. This policy has been set to meet professional indemnity insurance requirements. It is a condition of this report that any valuation needing to be reassigned beyond 90 days may require re-inspection by the valuer with an update fee charged.

2.0 Scope of Work

2.1 The Valuer

The valuation has been undertaken by Robert Todd who provides this objective and unbiased valuation. The valuer has no material connection with the instructing party or interest in the property and has the appropriate qualifications and experience to undertake the valuation.

2.2 Our Client

HWCP Management Ltd.

Other than the client or addressee, the report may not be relied upon by any third party. We accept no liability to third parties. Written consent is required for any third party wishing to rely on this report. We reserve the right to withhold that consent, or to review the contents of the report if consent for third party use is sought.

2.3 Other Intended Users

Bonisch Consultants

2.4 Purpose of the Valuation

Market Value.

2.5 Asset Valued

67 Esk Street, Invercargill, Invercargill City.

2.6 Valuation Currency

All dollars quoted in this report are NZD.

2.7 Basis of Valuation

We are to provide our opinion of Market Value which is defined in International Valuation Standards 2017 as:

The estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties have each acted knowledgeably, prudently and without compulsion.

2.8 Relevant Dates

Inspection Date:	16 January 2019
Valuation Date:	16 January 2019

2.9 Extent of Investigations

We have carried out an inspection of exposed and readily accessible areas of the improvements. However, the valuer is not a building construction or structural expert and is therefore unable to certify the structural soundness of the improvements. Readers of this report should make their own enquiries.

This report has been prepared for valuation purposes only and is not a geotechnical or environmental survey. If any defect is found, including structural defects, this information could impact on the value of the property.

We have not been provided with an environmental audit of the property and we are not aware of any potential environmental concerns. Our valuation and report assume that the land and buildings are unaffected by harmful contaminants or noxious materials which may impact on value. We refer you to our Statement of Limiting Conditions and Valuation Policy on matters relating to potential contamination.

We have not conducted a land survey of the subject property and assume all improvements lie within the title boundaries.

We have not sighted a current Land Information Memorandum for the subject property during the course of this valuation. Our report is subject to there being no outstanding requisitions or adverse information affecting the property.

2.10 Nature and Source of Information Relied Upon

Information used to prepare the valuation has been obtained from our property inspection and public records. Additional information relied on includes:

Name of Document	Source of Document
Identifier	Land Information Services Ltd

2.11 Assumptions and Special Assumptions

Standard valuation assumptions made in completing the report are stated in 'Extent of Investigations' and 'Statement of Limiting Conditions and Valuation Policy'.

Significant Assumptions and Special Assumptions made within the valuation are as follows:

+ As instructed we have valued the property on the basis the original 1908 portion of the building will be retained, strengthened to 100% NBS along with the interior fully renovated to a modern standard of office space incorporating new stairs, lift, HVAC and fire alarm system. However, sprinklers have been excluded.
+ A new fee simple record of title will be issued for a land area of approx. 210 m^2.

2.12 Reporting Format

We have provided a formal valuation report meeting all appropriate valuation and professional standards.

This report must be read in conjunction with Thayer Todd Valuations Ltd Trading as TelferYoung (Southland) Statement of Limiting Conditions and Valuation Policy.

2.13 Valuation Standards

Our valuation has been prepared in accordance with International Valuation Standards 2017 and Australia and New Zealand Valuation Guidance Notes and Technical Information Papers including:

+ IVS - Framework
+ IVS 101 - Scope of Work
+ IVS 102 - Investigations and Compliance
+ IVS 103 - Reporting
+ IVS 104 - Bases of Value
+ IVS 105 - Valuation Approaches and Methods
+ IVS 400 - Real Property Interests
+ ANZVGN 1 - Valuation Procedures - Real Property
+ ANZVGN 9 - Assessing Rental Value
+ ANZRPGN 1 - Disclaimer Clauses and Qualification Statements
+ ANZRPGN 4 - Methods of Measurement

3.0 Legal Description (Existing)

Identifier:	107825
Land Registration District:	Southland
Legal Description:	Lot 1 DP 326508
Estate:	Fee simple
Area:	2,021 m² (more or less)
Proprietor(s):	HWCP Management Ltd
Interests:	+ Subject to Section 59 Land Act 1948 (affects the part formerly Lot 1 DP 7637) + Appurtenant to the part formerly Lot 1 DP 4771 is a right of way and drainage created by Transfer 27195 + Subject to the conditions contained in the consent of the Borough Council endorsed on Transfer 27195 + Z181 Drainage Agreement under Section 227 of the Municipal Corporations Act 1920 (affects the part formerly Lot 1 DP 4771) + Z182 Drainage Agreement under Section 227 of the Municipal Corporations Act 1920(affects the part formerly Lot 1 DP 4771) + 181803 contains conditions of Council's consent to the right-of-way endorsed on Plan 7637 + Subject to rights of way (with limitations and restrictions as to height, which includes the construction of fire escapes and hoists) over part marked A, B on DP 326508 created by Transfer 245981 + Subject to rights of way (with limitations and restrictions as to height, which includes the construction of fire escapes and hoists) over part marked A, B on DP 326508 created by Transfer 245983 + Subject to rights of way (with limitations and restrictions as to height, which includes the construction of fire escapes and hoists) over part marked A, B on DP 326508 created by Transfer 245982 + The easements created by Transfers 245981, 245982 and 245983 are subject to Section 351E (1) (a) Municipal Corporations Act 1954 + Subject to a right (in gross) to convey electricity over parts marked A and B on DP 488503 in favour of Electricity Invercargill Limited created by Easement Instrument 10096054.2 + 10981427.2 Mortgage to ASB Bank Limited
Appendix:	Copy of the Record of Title is included as **Appendix A**

4.0 Rating Valuation and Statutory Charges (Existing)

4.1 Rating Valuation

As at 1 July 2017

Component	Value
Land Value	$1,240,000
Improvements	$120,000
Capital Value	**$1,360,000**

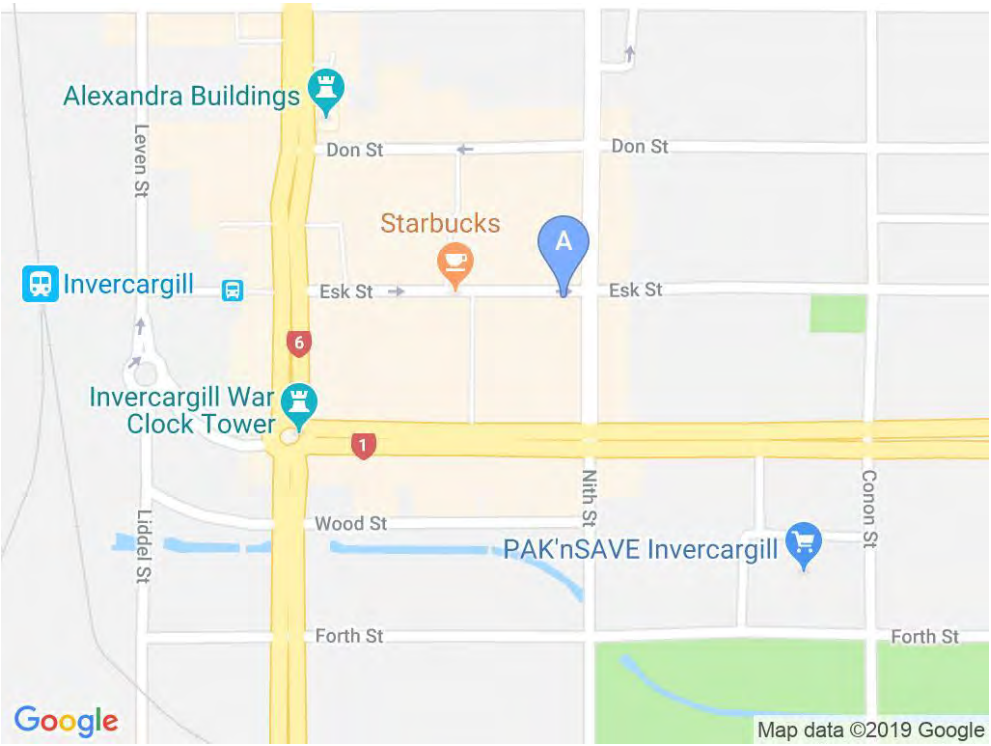
Rating Valuations are conducted on a mass appraisal basis, generally once every three years, in order to provide a basis to assist territorial authorities to collect revenue through rates. Individual properties are not inspected on a regular basis and changes in the improvements may not be recorded. The rating values are expressed on a Freehold Estate basis, even when the property might be leasehold.

4.2 Statutory Charges

As at the date of valuation, the rates per annum (inclusive of GST) are as follows:

Council	Value
Territorial Authority	$9,716.58
Regional Council	$952.97
Total Rates Payable	**$10,669.55**

5.0 Location



The subject property is located off the south side of Esk Street between Dee Street (SH 6) to the west and Kelvin Street to the east, within the centre of the Invercargill CBD. The subject is located on the inner city block to be developed by HWCP Management Ltd.

The surrounding development is predominantly retail along with the Kelvin Hotel plus H&J Smith Ltd department store. The majority of the surrounding retail is older with a number of obsolete premises within close proximity.

6.0 Land

Area:	210 m² (more or less)
Frontage:	17.20 metres (approximate)
Depth:	12.20 metres (approximate)
Shape:	Rectangular
Contour:	Level
Services:	All normal city services are available to the site
Comments:	The proposed site will be covered by the footprint of the remaining building following demolition of later additions, outlined in blue above.

7.0 Resource Management

7.1 Zoning

Territorial Authority:	Invercargill City
Plan Status:	Operative
Zone:	City Centre Sub Area
Zone Description:	Under the Invercargill City Council Operative District Plan as at 4 February 2005, the land is zoned as a City Centre Sub Area within an urban area. The City Centre Sub Area covers the central business district of the city and offers the opportunity for diversity of retail and commercial activities and services contributing to a focal point for the district, with the predominance of vehicles, pedestrians and large structures, together with the ability to store and use hazardous substances where this is an integral part of the process for business and to provide the opportunity for bright and vibrant building facades.
Development Controls:	Permitted activities include commercial, professional and retail activities, places of assembly, residential accommodation, reserves and infrastructure, with subdivision the only controlled activity. Manufacturing and processing are discretionary activities. The noise and vibration levels allow a maximum of 65 dBA measured at the boundary of the omission site. Height restrictions are not considered to be a significant Resource Management issue, with the exception of some sites which are subject to the Invercargill Airport Ltd designations for airport approach and land use control.

7.2 Proposed Zoning

Proposed District Plan:	Invercargill City Council (proposed plan)
Zone:	Business 1
Zone Description:	Under the 2013 Invercargill City Council proposed district plan, the land is zoned as Business 1. The zone seeks to maintain and reinforce the viability and vibrancy of Invercargill city centre by enabling a wide range of activities, by encouraging and maintaining a high level of amenity and by encouraging good urban design.
Development Controls:	There are a number of permitted activities within the Business 1 zone including retail, visitor accommodation, professional and personal services, restaurants, cafes, bars and taverns, child day care activity, communal or community service activity. Any activity not listed as permitted (other than heavy industry) up to 5000 square metres total floor space is a discretionary activity. Non-complying activities include heavy industry and any activity not listed as permitted with a total floor space exceeding 5000 square metres.

7.3 Heritage Buildings

7.3.1 Heritage New Zealand

The subject building is listed as a Historic Place Category 2 building List No. 2513.

7.3.2 Invercargill City Council

The building is identified as a Class 1 building under the 1997 Heritage Building Review as Class 1 'Complete Building Must Be Protected'.

8.0 Environmental Issues

8.1 Contamination

We have not been provided with an environmental audit of the property and we are not aware of any potential environmental concerns. We refer you to our Statement of Limiting Conditions and Valuation Policy on matters relating to potential contamination.

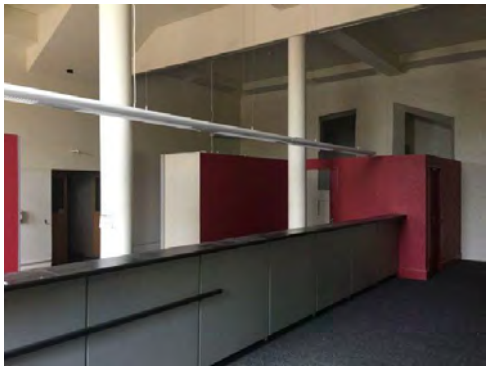
8.2 Land Information Memorandum

We have not been supplied with a Land Information Memorandum (LIM) relating to the property. Our report is subject to there being no outstanding requisitions or adverse information affecting this property. We reserve the right to amend our assessment should this not be the case.

9.0 Improvements

9.1 Overview

Upon completion, the subject property will comprise the original 1908 portion of The Southland Times building with a net lettable area over three floors of approximately 550.5 m^2.



9.2 67 Esk St, Invercargill

9.2.1 Floor Areas

The approximate floor areas are as follows:

	Gross Floor Area	Rentable Areas
Ground floor:	210.0 m²	182.5 m²
First floor:	210.0 m²	182.5 m²
Second floor:	210.0 m²	185.5 m²

The floor areas are based on the *'The Guide for the Measurement of Rentable Areas'* (revised June 2013) published jointly by the Property Council of New Zealand (PCNZ) and the Property Institute of New Zealand (PINZ), and also as summarised in Australia and New Zealand Real Property Guidance Notes (ANZRPGN) 4 – Methods of Measurement.

9.2.2 Construction

Foundations:	Concrete perimeter and pile
Flooring:	Timber
Exterior Walls:	Plaster and brick
Framing:	Structural brick, steel and timber
Roofing:	Colorsteel
Joinery:	Timber or aluminium (double glazed)
Internal Linings:	Gibraltar board
Ceilings:	Gibraltar board or suspended panel
Natural Lighting:	Adequate for use
Artificial Lighting:	LED
Services:	We have assumed a ducted HVAC system will be included along with commercial grade lift plus automatic and manual fire alarm system.

9.2.3 Description

Constructed between 1907 and 1908, the Southland Times Building has been home of The Southland Times for 100 years of its 150 year history. The brick Edwardian Italianate building, designed by Invercargill architect, Charles H. Roberts, has been gradually added to.

Upon completion the building will be earthquake strengthened to 100% NBS which we believe would include substantial steel work to the interior along with structural bracing and diaphragm support. We have assumed the interior will be completely relined with new plumbing, electrical and amenities added along with new stairway and entrance doors. We have also assumed new Gibraltar board or suspended panel ceilings will be added incorporating LED lighting.

Also upon completion the interior will comprise three levels of partially partitioned and open plan office space, providing a modern and functional tenancy.

9.3 Earthquake Categorisation

On 1st July 2017 the Building (Earthquake-prone Buildings) Amendment Act 2016 came into effect.

The country is split into low, medium and high seismic risk zones with respective timeframes for assessment of 5, 10 and 15 years, and strengthening to be carried out within 15, 25 and 35 years.

Invercargill is identified in the medium risk zone which requires Invercargill City Council to complete their assessment of earthquake prone buildings within 10 years from 1 July 2017 and those buildings falling short of the required 34% NBS would be required to be strengthened within 25 years after the end of the assessment timeframe.

Priority buildings need to be identified and remediated within half the time allowed for other buildings in the same seismic risk areas. Priority buildings are certain types of buildings in high and medium seismic risk areas that are considered to present a higher risk because of their construction, type, use or location. They may be buildings that are considered to pose a higher risk to life safety or buildings that are critical to recovery in an emergency.

The inner city area has been identified by the Invercargill City Council as a Priority Area, therefore the timeframe will be halved.

9.4 Building Act 2004

The Building Act 2004 requires that all buildings which include certain specified systems must have a Compliance Schedule and a Building Warrant of Fitness (BWOF). The Act requires the various services and other facilities as set out in the Compliance Schedule to be inspected on a regular basis, and the Warrant of Fitness to be renewed annually.

A building warrant of fitness will be issued upon completion and issue of final code of compliance following earthquake strengthening and refurbishment.

10.0 Valuation Approaches and Methods

10.1 Highest and Best Use

The Market Value of an asset will reflect its 'highest and best use'. The highest and best use is the use of an asset that maximises its potential and that is physically possible, legally permissible and financially feasible. The highest and best use may be for continuation of an asset's existing use or for some alternative use. This is determined by the use that a market participant would have in mind for the asset when formulating the price that it would be willing to bid.

Due to current rental levels within Invercargill city along with supply and demand of office space, we believe the highest and best use for the subject property would be for redevelopment rather than strengthening and refurbishment due to the risk and return profile following strengthening and refurbishment. We believe it would be uneconomic to refurbish and strengthen.

To establish Market Value we have utilised the following recognised valuation methods:

10.2 Income Approach

The Income Approach is predicated on the conversion of net actual or market income, which either is or could be generated by an owner of the interest, to value. The approach encompasses various methods to indicate value. Methods adopted in this instance include:

+ **Income Capitalisation**

This method encompasses the conversion of net income (actual, market or notional) to value via the application of a capitalisation rate or yield (investment return). The basic premise of income capitalisation is that a property investor expects a pre-determined rate of return on their investment. The yield varies according to a number of factors including: risk, type & scale of investment, location, residual lease term and expected income and capital value growth. The two main variables, namely income and yield, are analysed from available rental and sales evidence.

Implicit adjustments are made when determining an appropriate yield to apply, however, in instances where the contract rent varies from market rent, the present value of the variation is adjusted against the capitalised value. The capitalised value may also be adjusted for costs associated with vacancy if existing or imminent, refurbishment/incentives and capital expenditure.

10.3 Market Approach

The Market Approach provides an indication of value by comparing the asset with identical or similar assets for which price information is available.

This approach considers Market Value by comparing directly the property with sales of other similar properties. A unit of comparison is analysed, in this instance the rate per square metre ($/m²) of rentable floor area, in order to provide a practical basis of comparison where evidence is limited to properties with fewer similarities. Adjustments for a range of variables may also need to be considered.

Direct comparison using the Comparable Transactions Method is considered to be one of the best methods of valuation however seldom are any two properties directly comparable due to differences in age, floor area, quality, location, lease terms and cash flows.

11.0 Market Commentary

11.1 Economic Overview

New Zealand's economy has continued to grow and expanded faster than market expectations in the June 2018 quarter, increasing by 1.0% (2.7% annual average growth). This robust result was driven by widespread growth with only the mining sector reporting a decline, due in part to Marsden Point refinery shutting down for maintenance. Sectors experiencing strong growth included agriculture (up 4.1%, with milk production up and forestry rebounding from a sharp drop last quarter), electricity generation (up 3.7%), retail trade (up 1.5%), transport (up 1.8%) and recreational and other services (up 3.5%).

The economy is expected to continue to grow with Government investment in infrastructure and residential construction activity associated with KiwiBuild, policy changes associated with their Families Package and accommodation support payments which will support household consumption, as will increased spending on health and education sectors. Strength in the export sector will also help to bolster New Zealand's economic performance, although there has been a softening in the prices for some commodities recently (most notably dairy prices), overall the terms of trade remain elevated. Accommodative monetary policy along with the expectation the Reserve Bank (RBNZ) will not increase their benchmark interest rate next year also supports expected economic growth. Factors offsetting the key drivers of future economic growth include the slowdown in the rate of Canterbury rebuild post 2010/2011 earthquakes, moderation in the rate of house price inflation, and the gradual easing in the level of net overseas migration gains.

The Southland economy is performing well considering the potential impact of Mycoplasma Bovis on the rural sector. Tourist numbers within the region have increased over recent years with both guest nights and visitor spending up. New Zealand Aluminium Smelters recorded a $75m profit for the last financial year and have recommissioned the fourth Potline at Tiwai Point. The $240m Mataura Valley milk factory near Gore is now operating. The proposed $200m redevelopment of the Invercargill CBD by HWCP Management Limited, the planned new ILT hotel and the new Kmart development will be positive for Invercargill and the greater Southland province.

11.2 Regional Property Market

Demand for commercial and industrial properties throughout Southland has been steady during 2016 to late 2018, following a relatively static period of activity from circa 2011-2015. This in turn was preceded by a decline in demand over 2008 and 2009 which followed a strong period of activity from circa 2001 through to late 2007.

The past recession, global credit crisis along with tighter funding requirements from the main lending institutions plus closure of many second tier lenders has had a negative impact on the commercial property sector. Potential earthquake issues are having a significant impact with banks generally requiring buildings to be at least 67% NBS to secure funding without substantial deposit, along with insurance companies reluctant to provide cover on buildings below 67% NBS. Premiums are generally higher the lower the % NBS. Health and safety issues are also having negative implications for both tenants and landlords in regard to staff and client safety.

It is apparent that demand for older earthquake prone buildings has reduced considerably over recent years. An older building on Esk Street, occupied by a national retailer failed to sell during a tender process in December 2018. The vendors expectations on price were not considered unreasonable.

11.3 Rental Market

The Invercargill Central Business District has approximately 13,000 m^2 of vacant office space, and approximately 6,000 m^2 of vacant retail, excluding obsolete space as at 1 July 2017. The majority of this is considered to be inferior in regard to location and standard in comparison to the subject upon completion, however, due to the significant amount of vacant space, landlords need to be competitive with rents and be prepared to undertake refurbishment fitouts for tenants to compete with other landlords.

A current issue particularly from national companies and Government departments is a requirement for buildings to meet minimum standards in regard to the percentage of NBS. Although this may vary amongst companies and organisations, we are typically finding a minimum requirement of 67% NBS is being adopted. Not only are occupied buildings being considered but also neighbouring properties which may have an adverse impact on staff and customers in an earthquake event. Employers and landlords also have a duty under the Health and Safety at Work Act 2015 to provide a safe work place. This has implications on landlords throughout the country.

There are tenancies available within the new ASB building and the 20 Don Street building, along with older strengthened buildings such as the ex AMI building, which has been vacant for a number of years.

The proposed $200 million redevelopment of the Invercargill CBD by HWCP Management Ltd may have negative implications on some existing landlords should tenants wish to relocate from outside the proposed development area in the future.

12.0 Valuation Considerations

12.1 Highest and Best Use

Due to current rental levels within Invercargill city along with supply and demand of office space, we believe the highest and best use for the subject property would be for redevelopment rather than strengthening and refurbishment due to the risk and return profile following strengthening and refurbishment. We believe it would be uneconomic to refurbish and strengthen.

12.2 Vacant Possession

As there is no current tenant or proposed tenant, we have valued the property on a vacant possession basis following strengthening and refurbishment.

12.3 Capital Works/Refurbishment

As previously mentioned, we have assumed the building will be strengthened to a minimum of 100% NBS and fully refurbished. However, due to the age of the structure, ongoing maintenance to the exterior will likely be required.

13.0 Market Rent Assessment

13.1 Introduction

Income-based valuation assessments consider the cash flow that could be, or is, generated from the property. Part of the process is a review of the potential rental earning capacity, or Market Rent. Market Rent is defined in International Valuation Standard 104 as:

'The estimated amount for which an interest in real property should be leased on the valuation date between a willing lessor and a willing lessee on appropriate lease terms in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion.'

To establish a market rental for the premise we have made comparison with recent rental settlements for comparable accommodation in the wider location.

The best evidence is that of new leasing agreements of comparable premises in the same or similar locations with the date of the transaction being as close as possible to the subject rent review date. Regard can also be had to lease renewals and rent reviews where these are consistent with the new lease evidence, however carry less weight.

The rental evidence has been analysed on a Net basis (excluding operating expenses).

Adjustments made for variation in factors such as the size and quality of accommodation, location and where the lease terms are varied.

13.2 Rental Evidence

Rental settlements that assist in establishing a market rent include the following:

+ **CBD 1, Invercargill City**

Date:	1 May 2017			
Type:	Rent Review			
Analysis:	Office/Amenities	501.20m²	@	$251.28/m²
	Car Parks	10	@	$15.00/week
Comments:	This tenancy comprises a modern first floor office area with lift access and onsite car parking.			

+ **CBD 2, Invercargill City**

Date:	16 March 2016			
Type:	New Lease			
Analysis:	Office/Amenities	313.74m²	@	$301.85/m²
	Car Parks	6	@	$15.00/week
Comments:	Modern ground floor office tenancy located within CBD with on site car parking.			

+ CBD 3, Invercargill City

Date: 4 September 2017

Type: New Lease

Analysis:

Ground Floor Office	939.50m²	@	$315.00/m²
First Floor Office	258.50m²	@	$275.00/m²
Ground Store	32.00m²	@	$200.00/m²
First Store	27.50m²	@	$170.00/m²
Entry Canopy	28.50m²	@	$90.00/m²
Balcony	28.50m²	@	$90.00/m²
Courtyard	82.50m²	@	$90.00/m²
Covered Parks	6	@	$30.00/week
Uncovered Parks	21.00	@	$25.00/week

Comments: This is a modern purpose built office tenancy with high quality fit out and includes onsite car parking, well located within CBD.

+ CBD 4, Invercargill City

Date: 1 August 2016

Type: New Lease

Analysis:

Offices	703.00m²	@	$157.50/m²
Carparks	18	@	$20.00/week

Comments: This is a two storey commercial office building with 18 car parks.

+ CBD 5, Invercargill City

Date: 31 October 2016

Type: New Lease

Analysis:

First Floor	500.00m²	@	$180.00/m²
Covered	4	@	$20.00/week
Uncovered	6	@	$20.00/week

Comments: Refurbished, strengthened first floor office with lift access. Partial landlord contribution to fitout. >80% NBS

+ CBD 6, Invercargill City

Date: 1 May 2017

Type: New Lease

Analysis:

Office	374.00m²	@	$200.00/m²
Car Parks	5	@	$25.00/week

Comments: This is an ex retail premises converted to office, with EQ strengthening carried out. Well presented shell/ceiling fit out by landlord. Good profile, fringe location. Onsite car parking.

+ **CBD 7, Invercargill City**

Date: 1 October 2016

Type: Rent Review

Analysis:

Retail	495.00m²	@	$325.00/m²
Ground Office	340.00m²	@	$215.00/m²
First Floor	485.00m²	@	$140.00/m²
Covered	8	@	$25.00/week
Single Car Park	4	@	$23.50/week
Combined Car Park	10	@	$17.00/week

Comments: This is a modern refurbished two storey retail/office premises set on a prominent corner site with carparking. 87% NBS.

13.3 Summary of Market Rental Evidence

Based on the evidence available we analyse the following rental ranges:

Component	Rental Rate Range		
Offices	$157.50/m²	-	$325.00/m²

13.4 Market Rent Analysis

Our assessment of the potential market rental is as follows:

Component	Area			Rate				Rent
+ ***Tenant: Vacant***								
Ground Floor	182.5	m²	@	$250.00	per	m²	=	$45,625
1st Floor	182.5	m²	@	$200.00	per	m²	=	$36,500
2nd Floor	185.0	m²	@	$200.00	per	m²	=	$37,000
Market Rent								**$119,125**

14.0 Sales Evidence

14.1 Investment Properties

To assist in establishing a Market Value for the subject property we have analysed relevant sales of investment properties, including:

+ **83 Dee Street, Invercargill, Invercargill City**

Sale Date:	14 March 2017	
Sale Price:	$270,000	
Tenant:	Alexander Building	
Analysis:	Yield on Passing Income:	18.50%
	Building Net Rate:	$142/m²
Comment:	Built circa 1903 and known as the Alexander Building, this three level brick building includes ground floor retail with an established tenant, along with two upper floors with basic residential flats. Historic Place Category 2.	

+ **12 Don Street, Invercargill, Invercargill City**

Sale Date:	29 March 2017	
Sale Price:	$320,000	
Tenant:	Ex Storage Box	
	Yield on Market Income:	17.81%
	Building Net Rate:	$126/m²
Comment:	This is a 2 storey building, originally constructed circa 1890 with additions and alterations circa 1950. The premises includes ground floor secondary retail, along with first floor offices, upgraded circa 1980s. The building, which is regarded as earthquake prone, includes an adjoining ex billiard hall at the rear which is utilised as covered car parking. First floor partially occupied at date of sale along with covered car parking.	

+ **37 Esk Street, Invercargill, Invercargill City**

Sale Date:	6 March 2018	
Sale Price:	$650,000	
Tenant:	Kebab Shop	
Analysis:	Yield on Passing Income:	7.08%
	Yield on Market Income:	7.08%
	Residual Lease Term:	5.0 years
	Building Net Rate:	$485/m²
Comment:	This the sale of a 1910s two storey building with a ground floor tenant only, 5 year RLT. Poor NBS rating. Premium paid to obtain building.	

+ **36 Esk Street, Invercargill, Invercargill City**

Sale Date:	18 January 2019	
Sale Price:	$665,000	
Tenant:	EB Games / Hong Kong	
Analysis:	Yield on Passing Income:	13.33%
	Yield on Market Income:	13.33%
	Building Net Rate:	$401/m²

Comment: This is an older retail and restaurant premises with two tenancies with new leases entered into in late 2018. The building is set on a 506 m² site having been added to since original construction. The front of the building is approximately 35%-40% NBS with the rear of the building 20%-25% NBS.

+ **5 Tay Street, Invercargill, Invercargill City**

Sale Date:	24 April 2018	
Sale Price:	$725,000	
Tenant:	Various	
Analysis:	Yield on Passing Income:	11.32%
	Yield on Market Income:	12.32%
	Weighted Ave. Lease Term:	1.3 years
	Building Net Rate:	$780/m²

Comment: This is the sale of a 1970s two storey commercial office building with 12 basement car parks. The property is currently let to four tenancies with one vacant space at the rear of the first floor. The building has an NBS rating of 73%.

+ **82 Kelvin Street, Invercargill, Invercargill City**

Sale Date:	8 November 2017	
Sale Price:	$730,000	
Tenant:	McDowall Print Ltd	
Analysis:	Yield on Passing Income:	10.96%
	Yield on Market Income:	10.96%
	Equivalent Yield:	10.96%
	Discount Rate:	9.78%
	Residual Lease Term:	5.0 years
	Building Net Rate:	$285/m²

Comment: This is a 1960's showroom and office premises set on a prominent 1416 m² corner site together with adjoining warehouse and bulk store. 5 year lease with rights of renewal.

+ **207 Dee Street, Invercargill, Invercargill City**

Sale Date:	15 November 2018	
Sale Price:	$970,000	
Tenant:	AON / Vacant	
Analysis:	Yield on Passing Income:	8.00%
	Yield on Market Income:	13.24%
	Equivalent Yield:	10.67%
	Residual Lease Term:	4.3 years
	Building Net Rate:	$775/m²

Comment: This property comprises a prominent office/showroom premises occupied by Aon Insurance Brokers with one additional vacancy. The upgraded and earthquake strengthened building is set on a 1012 m² corner site located on the north western fringe of the Invercargill CBD. Building 67% NBS.

+ **40 Don Street, Invercargill, Invercargill City**

Sale Date:	26 June 2018	
Sale Price:	$1,000,000	
Tenant:	Southsure	
Analysis:	Yield on Passing Income:	4.50%
	Yield on Market Income:	12.50%
	Building Net Rate:	$356/m²

Comment: This is the sale of a 1980s two storey commercial building with lift access and 15 onsite covered carparks. The property was sold with the first floor vacant.

+ **22-28 Kelvin Street, Invercargill, Invercargill City**

Sale Date:	14 November 2018	
Sale Price:	$1,045,000	
Tenant:	Various	
Analysis:	Yield on Passing Income:	12.19%
	Yield on Market Income:	17.14%
	Weighted Ave. Lease Term:	2.0 years
	Building Net Rate:	$270/m²

Comment: This property comprises a multi tenanted central business district premises with partial vacancies originally built pre 1930s with later additions and alterations. The improvements are set on a prominent corner site having a total land area of 1416 m². NBS% of 17-38% over buildings.

+ **61-65 Yarrow Street, Invercargill, Invercargill City**

Sale Date:	1 February 2018	
Sale Price:	$1,310,000	
Tenant:	Wrens	
Analysis:	Yield on Passing Income:	8.40%
	Yield on Market Income:	9.54%
	Discount Rate:	9.96%
	Residual Lease Term:	8.0 years
	Building Net Rate:	$454/m²

Comment: Sale of a 2010 bulk retail premise with high stud warehouse set on 2024 m² site located on the fringe of the CBD. The original 2005 building rebuilt after snow damage.

+ **136 Spey Street, Invercargill, Invercargill City**

Sale Date:	19 August 2016	
Sale Price:	$1,726,400	
Tenant:	BDO	
Analysis:	Yield on Passing Income:	7.50%
	Yield on Market Income:	7.50%
	Discount Rate:	7.75%
	Weighted Ave. Lease Term:	10.0 years
	Building Net Rate:	$1,600/m²

Comment: Originally built circa 1974, the two storey office building was extensively refurbished 2016. The building with onsite carparking is set on a 1012 m² site located within the Central Business District. New long term lease to BDO.

+ **83 Liddel Street, West Invercargill, Invercargill City**

Sale Date:	1 April 2018	
Sale Price:	$2,440,000	
Tenant:	Mico	
Analysis:	Yield on Passing Income:	6.96%
	Yield on Market Income:	6.03%
	Equivalent Yield:	6.55%
	Discount Rate:	6.93%
	Residual Lease Term:	8.5 years
	Building Net Rate:	$2,078/m²

Comment: Sale of the new purpose built Mico premise comprising approximately 1001 m² of rentable floor area set on a 1733 m² site located approximately 1 km south west of the Invercargill CBD.

+ **340 Bond Street, West Invercargill, Invercargill City**

Sale Date:	26 October 2018	
Sale Price:	$3,131,034	
Tenant:	Brazier Scaffolding	
Analysis:	Yield on Passing Income:	7.25%
	Yield on Market Income:	5.78%
	Equivalent Yield:	6.74%
	Discount Rate:	7.15%
	Residual Lease Term:	10.0 years
	Building Net Rate:	$1,570/m²

Comment: This property comprises the Brazier Scaffolding Ltd tenancy with a net lettable area of 1514 m² plus fully developed yard area. The property is located approximately 2 km south west of the Invercargill CBD.

+ **101 Don Street, Invercargill, Invercargill City**

Sale Date:	27 June 2017	
Sale Price:	$5,856,164	
Tenant:	Malloch McLean	
Analysis:	Yield on Passing Income:	7.30%
	Yield on Market Income:	7.30%
	Equivalent Yield:	7.26%
	Discount Rate:	8.00%
	Residual Lease Term:	10.0 years
	Building Net Rate:	$3,342/m²

Comment: The subject property comprises a modern purpose built two storey office building occupied by Malloch McClean Ltd. The improvements built circa 2012 are set on a prominent 1902 m² corner site located within the Invercargill Central Business District, approximately 250 metres east of the Central Post Office.

+ Investment Sales Summary

Address	Sale Date	Sale Price	Yield	Building $/m²
83 Dee Street	14 March 2017	$270,000	18.50%	$142.00
12 Don Street	29 March 2017	$320,000	17.81%	$126.00
37 Esk Street	6 March 2018	$650,000	7.08%	$485.00
36 Esk Street	18 January 2019	$665,000	13.33%	$401.00
5 Tay Street	24 April 2018	$725,000	11.32%	$780.00
82 Kelvin Street	8 November 2017	$730,000	10.96%	$285.00
207 Dee Street	15 November 2018	$970,000	8.00%	$775.00
40 Don Street	26 June 2018	$1,000,000	12.50%	$356.00
22-28 Kelvin Street	14 November 2018	$1,045,000	12.19%	$270.00
61-65 Yarrow Street	1 February 2018	$1,310,000	8.40%	$454.00
136 Spey Street	19 August 2016	$1,726,400	7.50%	$1,600.00
83 Liddel Street	1 April 2018	$2,440,000	6.96%	$2,078.00
340 Bond Street	26 October 2018	$3,131,034	7.25%	$1,570.00
101 Don Street	27 June 2017	$5,856,164	7.30%	$3,342.00
Yield Range				**6.96% - 18.50%**
Building $/m² Range				**$126.00 - $3,342.00**

14.2 Sales Discussion

In establishing appropriate investment benchmarks for the subject property we have considered its investment profile in terms of:

+ **Location**

The subject property is well located within the Invercargill CBD.

+ **Building Quality**

Upon completion this older historic building will be strengthened to a minimum of 100% NBS with the interior refurbished to a good modern standard of office space.

+ **Scale of Investment**

The quantum of value 'as if complete' is not considered to be overly onerous from an investors perspective, however, due to the vacant possession this may limit the number of potential purchasers if offered on the open market with funding likely difficult to obtain from the main trading banks without substantial deposit.

+ **Conclusions**

Overall the subject property will be of a good refurbished standard whilst keeping the historic nature of the building. Due to the frontage having limited window profile, the ground floor will not be overly desirable from a retailers perspective. Therefore we have assumed a likely use as office space rather than retail. The lack of onsite car parking may be detrimental from a tenant and investors perspective, however, we understand car parking will be available on adjoining land if required. Long term demolition and building activity within the immediate area will likely reduce the number of potential tenants in the medium term. We believe the property would be of below average saleability upon completion.

15.0 Valuation Rationale

15.1 Income Approach

+ Income Capitalisation

In relation to the investment yield we have analysed a wide range of sales. Based on the sales evidence, and reflecting the key investment criteria of the subject property, assuming tenanted on a medium term lease we have concluded an appropriate return of 8.00% on the potential market cash flow. We then deduct an allowance for vacancy, unrecovered OPEX, leasing costs and property management.

Based on existing vacancies within the city, limited demand, along with likely disruption within the immediate area we have adopted a vacancy period of 42 months. This may in fact be regarded as being optimistic rather than pessimistic.

Calculations are as follows:

Income Capitalisation			
Income			
+	Market Income	$119,125	
Total Net Income		**$119,125**	
Net Income Capitalised	@ 8.00%		
Market Value			**$1,489,063**
Capital Items			
+	Less 42 months vacancy (42 months' rent)		($416,938)
+	Less unrecovered OPEX (1.5 months' rent per annum)		($52,117)
+	Less provision for leasing commission (2 months' rent)		($19,854)
+	Less management fees (5.00% per annum)		($20,847)
Market Value			$979,307
		Adopt	**$980,000**

Analysis

Sensitivity Analysis

Equivalent Yield	@	7.75%	=	$1,025,000
	@	**Adopted**	**=**	**$980,000**
	@	8.25%	=	$935,000

Benchmark Analysis

+ Yield on Market Income	12.16%
+ Initial Yield	0.00%
+ Equivalent Yield	12.16%
+ $/m^2 of Rentable Floor Area	$1,782

15.2 Market Approach

Our calculations are as follows:

Component	Area			Rate				Total	
Buildings									
Building	550.0	m²	@	$1,500	per	m²	=	$825,000	
Total Buildings Value									**$825,000**
Land									
Site	210	m²	@	$750	per	m²	=	$157,500	
Total Land Value									**$157,500**
Market Value									$982,500
								Adopt	**$985,000**

15.3 Valuation Reconciliation

Method	**Value**
Income Capitalisation	$980,000
Market Approach	$985,000
Adopt Market Value	**$980,000**

The income capitalisation approach is the most recognised, and understood, method in the market place for pricing an asset of this type. As a result, the market comparison method has been considered as a secondary method.

15.4 Investment Summary

Based on our adopted value, the following investment benchmarks are indicated:

Yield on Market Income:	12.16%
$/m² of Rentable Floor Area:	$1,782

15.5 Previous Sale Details

The entire subject property was purchased in October 2017 for $615,000.

16.0 Risk Analysis

16.1 Strengths & Opportunities

+ Well located within CBD
+ 100% NBS
+ Fully refurbished interior
+ Potential for leasing
+ Potential for sale

16.2 Weaknesses & Threats

+ Limited profile for retail display
+ Limited demand for commercial office space
+ Ongoing maintenance
+ Disruption during HWCP Management Ltd development
+ Economic
+ Environmental
+ Legislative (EQ and Health & Safety)
+ Competition (Other landlords)

16.3 Property Risk Profile

'As if Complete' the property is considered to have a medium risk profile in comparison with other commercial properties in the locality.

17.0 Valuation 'As if Complete'

We assess the Market Value of the property as at 16 January 2019 at:

$980,000
Nine Hundred and Eighty Thousand Dollars
Plus GST (if any).

The value can be apportioned as follows:

Component	Value
Land	$157,500
Improvements	$822,500
Market Value	**$980,000**

18.0 Significant Assumptions and Special Assumptions

+ As instructed we have valued the property on the basis the original 1908 portion of the building will be retained, strengthened to 100% NBS along with the interior fully renovated to a modern standard of office space incorporating new stairs, lift, HVAC and fire alarm system. However, sprinklers have been excluded.
+ A new fee simple record of title will be issued for a land area of approx. 210 m^2.

TelferYoung policy requires that reports cannot be reassigned for any purpose beyond 90 days from the date of valuation. This policy has been set to meet professional indemnity insurance requirements. It is a condition of this report that any valuation needing to be reassigned beyond 90 days may require re-inspection by the valuer with an update fee charged.

19.0 Statement of Limiting Conditions and Valuation Policy

Purpose

This valuation report has been completed for the specific purpose stated. No responsibility is accepted in the event that this report is used for any other purpose.

Responsibility to Third Party

Our responsibility in connection with this valuation is limited to the client to whom the report is addressed and to that client only. We disclaim all responsibility and will accept no liability to any other party without first obtaining the written consent of Thayer Todd Valuations Ltd trading as TelferYoung (Southland) and the author of the report. Thayer Todd Valuations Ltd trading as TelferYoung (Southland) reserves the right to alter, amend, explain or limit any further information given to any other party.

Reproduction of Report

Neither the whole nor any part of this valuation and report or any reference to it may be included in any published document, circular or statement without first obtaining our written approval of the form and context in which it may appear. Our report is only valid when bearing the Valuer's signature.

Date of Valuation

Unless otherwise stated, the effective date of the valuation is the date of the inspection of the property. This valuation is current as at the date of valuation only. The value assessed herein may change significantly and unexpectedly over a relatively short period (including as a result of general market movements or factors specific to the particular property). We do not accept liability for losses arising from such subsequent changes in value.

Without limiting the generality of the above comment, we do not assume any responsibility or accept any liability where this valuation is relied upon after the expiration of 3 months from the date of the valuation, or such earlier date if you become aware of any factors that have any effect on the valuation.

Legislation

We have not obtained a Land Information Memorandum (LIM) or Property Information Memorandum (PIM) for this property which, unless otherwise stated, is assumed to conform to all requirements of the Resource Management Act 1991, the New Zealand Building Code contained in the First Schedule to the Building Regulations 1992, the Building Act 2004 and any Historic Places Trust registration. Our valuation reports are prepared on the basis that properties comply with all relevant legislation and regulations and that there is no adverse or beneficial information recorded on the Territorial Local Authority (TLA) property file, unless otherwise stated. Legislation that may be of importance in this regard includes the Health & Safety at Work Act 2015, the Fire Safety and Evacuation of Buildings Regulation 1992, and the Disabled Persons Community Welfare Act 1975.

Registrations

Unless otherwise stated, our valuation is subject to there being no detrimental or beneficial registrations affecting the value of the property other than those appearing on the title. Such registrations may include Waahi Tapu and Historic Places Trust registrations.

Reliability of Data

The data and statistical information contained herein was gathered for valuation purposes from reliable, commonly utilised industry sources. Whilst we have endeavoured to ensure that the data and information is correct, in many cases, we cannot specifically verify the information at source and therefore cannot guarantee its accuracy.

Assumptions

This report contains assumptions believed to be fair and reasonable at the date of valuation. In the event that assumptions are made, based on information relied upon which is later proven to be incorrect, or known by the recipient to be incorrect at the date of reporting, Thayer Todd Valuations Ltd trading as TelferYoung (Southland) reserves the right to reconsider the report, and if necessary, reassess values.

GST

The available sources of sales data upon which our valuation is based generally do not identify whether or not a sale price is inclusive or exclusive of GST. Unless it has been necessary and possible to specifically verify the GST status of a particular sale, it has been assumed that available sale price data has been transacted on a plus GST (if any) basis, which is in accordance with standard industry practice for most commercial property. Should this interpretation not be correct for any particular sale or rental used as evidence, we reserve the right to reconsider our valuation.

Land Survey

We have made no survey of the subject property and assume no responsibility in connection with these matters. Unless otherwise stated, the valuation has been assessed conditional upon all improvements being within the title boundaries.

Unless otherwise stated, we have not undertaken investigations or been supplied with geotechnical reports with respect to the nature of the underlying land. Unless otherwise stated, the valuation has been assessed conditional upon the land being firm and suitable ground for the existing and/or potential development, without the need for additional and expensive foundation and retaining work or drainage systems.

Contamination

We have not undertaken an environmental audit of the property. Unless otherwise stated, our valuation and report is conditional upon the land and buildings being unaffected by harmful contaminants or noxious materials which may impact on value. Verification that the property is free from contamination and has not been affected by noxious materials should be obtained from a suitably qualified environmental expert.

Not a Structural Survey

Our inspection has been undertaken for valuation purposes only, and does not constitute a structural survey. Verification that the building is sound should be obtained from a suitably qualified building engineer. If the building is found to be unsound, this finding/new information is likely to impact on the value of the property.

Earthquake-Prone Buildings

We are aware that a number of buildings are, or may be potentially, affected by local territorial authority policies for 'earthquake-prone' buildings (Earthquake-Prone Building Policies) required to be in place under the Building Act 2004. The Earthquake-Prone Building Policies may require building owners to undertake engineering investigations and subsequent structural upgrading, demolition or other steps to meet the requirements of the Earthquake-Prone Building Policies. Unless otherwise stated, our valuation makes no allowance for any costs of investigation, upgrading, demolition or other steps which may be incurred by the building owner to meet the requirements of Earthquake Prone Building Policies. We are not qualified to determine the 'earthquake-prone' status of the buildings. Our valuation is therefore subject to a review, investigation and assessment of seismic performance of the building, by a suitably qualified building engineer, to determine the 'earthquake-prone' status of the building and where required, an estimate of any costs for structural upgrading, demolition or other steps required for the building to meet the requirements of Earthquake-Prone Building Policies. If the building is found to be 'earthquake-prone', this finding is likely to impact on the value of the property, and our valuation may materially alter as a result.

Systems

Our valuation has been assessed conditional upon all hot and cold water systems, electric systems, ventilating systems and other devices, fittings, installations or conveniences, including lifts and escalators where appropriate, as are in the building, being in proper working order and functioning for the purposes for which they were designed.

Market Valuations

Market valuations are carried out in accordance with the Valuation Standards and Guidance Notes. Market Value is defined “The estimated amount for which an asset or liability should exchange on the date of valuation between a willing buyer and a willing seller in an arm’s length transaction, after proper marketing and where the parties have each acted knowledgeably, prudently and without compulsion”.

No allowances are made in our valuations for any expenses of realisation, or to reflect the balance of any outstanding mortgages either in respect of capital or interest accrued thereon.

Water Leaks & Penetration Effects

We are aware that a number of buildings have developed problems associated with water leaks, water penetration, weather-proofing, moisture and water exit control systems, mould, fungi, mildew, rot, decay, gradual deterioration, microorganisms, bacteria, protozoa or like forms. Problems can result from defects in design, construction methods and materials used, or any combination of defects.

Our valuation has been assessed conditional upon all buildings and structures being constructed strictly in accordance with recommended practices and free from defect unless otherwise stated. We are not qualified to undertake, nor have we undertaken, a structural survey of the buildings or structures. We accept no liability for any defects that may arise as a result of poor building design, construction methods or building materials. If you have any concerns, you should engage a suitably qualified person to report on this matter. Defects revealed by a suitably qualified expert may affect the value of the property.

Professional Indemnity Cover

We have in force at the time of supplying the above valuation, current professional negligence insurance appropriate to the nature and level of our business activities. The Registered Valuer is covered by the policy.

Please contact the writer should you wish to discuss any matters raised in this report.

Yours faithfully

Thayer Todd Valuations Ltd trading as TelferYoung (Southland)

Robert Todd - B Com (VPM), ANZIV, SPINZ
Registered Valuer

Email: robert.todd@telferyoung.com

Appendix A
Record of Title

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**107825**
Land Registration District	**Southland**
Date Issued	25 September 2003

Prior References
SL6B/1090 SLB4/879

Estate	Fee Simple
Area	2021 square metres more or less
Legal Description	Lot 1 Deposited Plan 326508

Registered Owners
HWCP Management Limited

Interests

Subject to Section 59 Land Act 1948 (affects the part formerly Lot 1 DP 7637)

Appurtenant to the part formerly Lot 1 DP 4771 is a right of way and drainage created by Transfer 27195 - 21.1.1908 at 2.00 pm

Subject to the conditions contained in the consent of the Borough Council endorsed on Transfer 27195

Z181 Drainage Agreement under Section 227 of the Municipal Corporations Act 1920 - 3.10.1932 at 10.00 am (affects the part formerly Lot 1 DP 4771)

Z182 Drainage Agreement under Section 227 of the Municipal Corporations Act 1920 - 3.10.1932 at 10.00 am (affects the part formerly Lot 1 DP 4771)

181803 contains conditions of Council's consent to the right-of-way endorsed on Plan 7637

Subject to rights of way (with limitations and restrictions as to height, which includes the construction of fire escapes and hoists) over part marked A, B on DP 326508 created by Transfer 245981 - 29.9.1970 at 12:10 pm

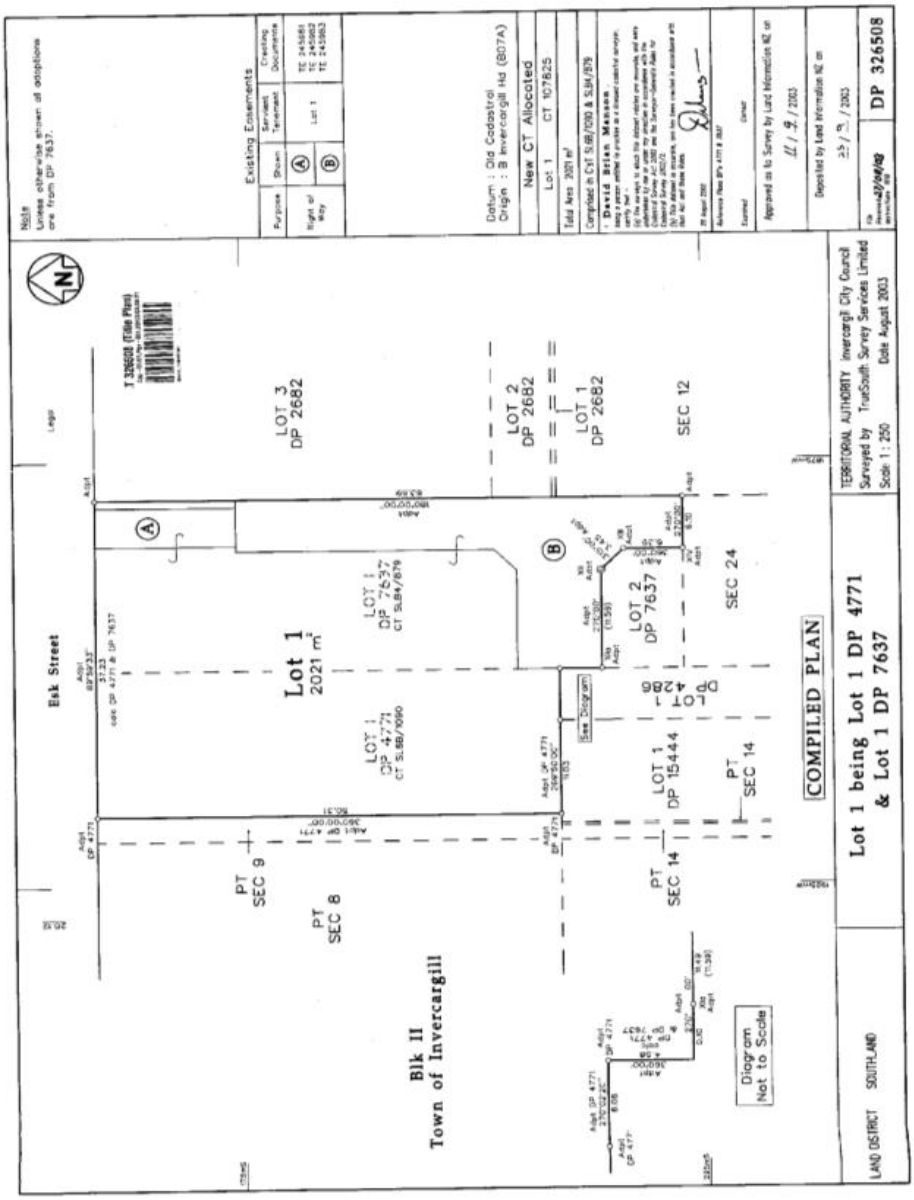
Subject to rights of way (with limitations and restrictions as to height, which includes the construction of fire escapes and hoists) over part marked A, B on DP 326508 created by Transfer 245983 - 29.9.1970 at 12:10 pm

Subject to rights of way (with limitations and restrictions as to height, which includes the construction of fire escapes and hoists) over part marked A, B on DP 326508 created by Transfer 245982 - 29.9.1970 at 12:10 pm

The easements created by Transfers 245981, 245982 and 245983 are subject to Section 351E (1) (a) Municipal Corporations Act 1954

Subject to a right (in gross) to convey electricity over parts marked A and B on DP 488503 in favour of Electricity Invercargill Limited created by Easement Instrument 10096054.2 - 18.9.2015 at 12:10 pm

10981427.2 Mortgage to ASB Bank Limited - 14.12.2017 at 4:25 pm


Note
Unless otherwise shown all boundaries are from DP 7637.
Existing Easements
Purpose
Shown
Servient Tenement
Creating Documents
Right of Way
A
B
Lot 1
TE 243681
TE 243682
TE 243683
Datum : Old Cadastral
Origin : B Invercargill Hd (B07A)
New CT Allocated
Lot 1 CT 107825
Total Area 2021 m²
Compiled in CT 15/B/1280 & 5/H/879
David Brian Manson
Approved as to Survey by Land Information NZ on
Deposited by Land Information NZ on
DP 326508
Esk Street
LOT 3 DP 2682
LOT 2 DP 2682
LOT 1 DP 2682
SEC 12
Lot 1 2021 m²
LOT 1 DP 7637 CT 5L/84/879
LOT 1 DP 4771 CT 5L/88/1090
LOT 2 DP 7637
SEC 24
LOT 1 DP 4286
See Diagram
LOT 1 DP 15444
PT SEC 14
PT SEC 9
PT SEC 8
PT SEC 14
Blk II
Town of Invercargill
Diagram Not to Scale
COMPILED PLAN
Lot 1 being Lot 1 DP 4771
& Lot 1 DP 7637
TERRITORIAL AUTHORITY Invercargill City Council
Surveyed by TrueSouth Survey Services Limited
Scale 1 : 250
Date August 2003
LAND DISTRICT SOUTHLAND

TelferYoung

Valuers Property Advisors

National Head Office:

TelferYoung Limited
Level 7, 52 Swanson Street
PO Box 105553,
Auckland City 1143

TelferYoung (Northland) Limited

17 Hatea Drive
PO Box 1093
Whangarei 0140
Telephone: 09 438 9599
Email: northland@telferyoung.com

TelferYoung (Auckland) Limited

Level 7, 52 Swanson Street
PO Box 5533
Auckland 1141
Telephone: 09 379 8956
Email: auckland@telferyoung.com

218 Lake Road, Northcote
PO Box 36030
North Shore City 0748
Telephone: 09 480 2330
Email: auckland@telferyoung.com

TelferYoung (Waikato) Limited

7 London Street
PO Box 616
Waikato Mail Centre, Hamilton 3240
Telephone: 07 839 2030
Email: waikato@telferyoung.com

07 871 5032 (Te Awamutu)
07 889 5990 (Morrinsville)
07 827 2030 (Cambridge)
Email: waikato@telferyoung.com

TelferYoung (Tauranga) Limited

Level 2, 49-51 The Strand
PO Box 455
Tauranga 3144
Telephone: 07 578 4675
Email: tauranga@telferyoung.com

81 Jellicoe Street
Te Puke 3119
Telephone: 07 573 8220
Email: tauranga@telferyoung.com

Unit A4, 15 Talisman Drive
Katikati 3129
Telephone: 0800 578 645
Email: tauranga@telferyoung.com

TelferYoung (Rotorua) Limited

1243 Ranolf Street
PO Box 2121
Rotorua 3040
Telephone: 07 348 1059
Email: rotorua@telferyoung.com

TelferYoung (Taranaki) Limited

143 Powderham Street
PO Box 713
New Plymouth 4340
Telephone: 06 757 5753
Email: taranaki@telferyoung.com

TelferYoung (Hawkes Bay) Limited

25 Pandora Road
PO Box 572
Napier 4140
Telephone: 06 835 6179
Email: hawkesbay@telferyoung.com

7 Gladstone Road
Gisborne 4010
Telephone: 06 868 8596
Email: hawkesbay@telferyoung.com

TelferYoung (Wellington) Limited

Level 4, 94 Dixon Street
Wellington 6011
Telephone: 04 472 3683
Email: wellington@telferyoung.com

TelferYoung (Nelson) Limited

Level 3, 105 Trafalgar Street
PO Box 621
Nelson 7040
Telephone: 03 546 9600
Email: nelson@telferyoung.com

TelferYoung (Canterbury) Limited

Level 1, 58 Armagh Street
PO Box 2532
Christchurch 8140
Telephone: 03 379 7960
Email: canterbury@telferyoung.com

17 Dee Street
Timaru 7910
Telephone: 03 687 1220
Email: canterbury@telferyoung.com

Level 1, 130A Percival Street
PO Box 138
Rangiora 7440
Telephone: 03 313 5355
Email: rangiora@telferyoung.com

TelferYoung (Otago) Limited

Level 3, 8 The Octagon
PO Box 497
Dunedin 9054
Telephone: 03 477 5796
Email: otago@telferyoung.com

TelferYoung (Southland)

135 Spey Street
PO Box 370
Invercargill 9840
Telephone: 03 218 4299
Email: southland@telferyoung.com

23 Medway Street
PO Box 334
Gore 9740
Email: southland@telferyoung.com