APPLICATION NUMBER:	LUC-2020-263
RELATED APPLICATIONS/LICENCES:	HAIL-2017-62; ABA-2019-2278; LUC-2019-540; LUC-2019-549; PCON-2019-646

PLANNING APPLICATION DETAILS FORM

Property Address	280 Cumberland Street Dunedin, 336 Cumberland Street Dunedin

Property Description:	Property No: 5027918,5065649, Legal Description: SEC 53 BLK XVI SO 14196 TN OF DUNEDIN, SEC 54 BLK XVI SO 14196 TN OF DUNEDIN, SEC 55 BLK XVI SO 14196 TN OF DUNEDIN, PT SEC 56 BLK XVI SO 14196 TN OF DUNEDIN, PT SEC 71 BLK XVI SO 14196 TN OF DUNEDIN, SEC 72 BLK XVI SO 14196 TN OF DUNEDIN, SEC 7..., SEC 60 BLK XVI SO 14196 TN OF DUNEDIN, PT SEC 61 BLK XVI DP 1491 TN OF DUNEDIN, PT SEC 61 BLK XVI SO 14196 TN OF DUNEDIN, SEC 62 BLK XVI SO 14196 TN OF DUNEDIN, SEC 63 BLK XVI SO 14196 TN OF DUNEDIN, SEC 64 BLK XVI DP 2188 TN OF DUNEDIN, SEC 65 ...

First Contact: (Applicant)	**Name:**	Ministry of Health
	Mail Address:	C/O Greenwood Roche, PO Box 139, Christchurch 8140
	Contact Email:	lauren@greenwoodroche.com
	Phone Number:	
	Method of Service	Preferred Method - Email

Description of Application:	land use consent to demolish a heritage listed building

Application Type:	Land Use Consent		
Consent Type:	Full Notified Land Use Consent	***Consent Nature***	Full Notified Land Use Consent

Major Category	Notified
Minor Category	Notified - Non Complying
Senior Planner or Responsible Officer:	Phil Marshall

Lodgement Date:	11 June 2020	**Lodgement Officer:**	Paula Myers
Amount Paid:	$8,750.00	**Invoice Number:**	811081

Application Requirements	**Signed Application Form**		**Copy of Title**	
	Locality Plan		**Site Plan**	
	Plans and Elevations		**AEE**	
	Affected Persons Consent			
Counter Comments:				

Boffa Miskell

Cadbury's Factory Demolition

Application for Resource Consent for Demolition of the Former Cadbury Factory
Prepared for Ministry of Health

11 June 2020

New Dunedin Hospital
PIKI TE ORA

MINISTRY OF HEALTH
MANATŪ HAUORA

Southern District Health Board
Piki Te Ora

Document Quality Assurance

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Status: FINAL	Revision: 1	Issue date: 11 June 2020

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1.0 Introduction

The Ministry of Health has embarked on the New Dunedin Hospital project. The project is aimed at delivering a new modern public hospital centred on the site of the former Cadbury factory in central Dunedin. The project is expected to be consented and constructed in stages over the next 10 years. Considerable work is required prior to construction of the new hospital facilities, including demolition, and site remediation and preparation.

The Southern Partnership Group (SPG) was originally established in 2015 to oversee the planning, design, and redevelopment of the hospital. Since that time, work on options for locating the new hospital has been overseen by this group and culminated in the selection of the Cadbury factory block and the Wilsons block to the north for the New Dunedin Hospital).

A Preliminary Site Masterplan completed in December 2018 identified a spatial configuration for the new hospital on these blocks, resulting in the Cadbury block being utilised for the hospital Acute Services Building (ASB), with a second building housing the Ambulatory Services Centre (ASC) to be located on the Wilsons block.

Further analysis and costing of the Masterplan option was completed in 2019 in the context of a greater technical understanding of site and design issues, and corresponding cost pressures. This led to a review and evaluation of different design options in February 2020, which confirmed a preferred configuration for the hospital broadly consistent with the Masterplan. Under this option, development will still be required across the entire Cadbury block. Concept design of the hospital commenced in March 2020 based on this option.

The existing street facades of the former Cadbury factory buildings fronting Cumberland and Castle Streets are scheduled heritage items under the Proposed Dunedin City District Plan (2GP). Consideration has been given to options which involve retention of the existing buildings and street facades as part of the new hospital. Technical assessment of these options has determined that it would not be feasible to retain the buildings or street facades due to a combination of design, seismic risk, construction feasibility, and cost factors.

Specifically, retention of the existing buildings or facades would unreasonably compromise the ability to provide the region with modern fit for purpose healthcare facilities that host modern models of care. Retention of the buildings or their facades through any method is therefore not a reasonable alternative to demolition. The standalone former Dairy and Machine House building adjacent to the southern boundary of the site fronting Castle Street can however be retained.

Resource consent is therefore being sought for the above ground demolition of the former Cadbury factory buildings and their scheduled heritage facades to enable development of the new hospital, with the exception of the Dairy and Machine House building. Resource consent is required as a non-complying activity due to demolition of the scheduled heritage facades, and demolition works at times likely to exceed the 2GP construction noise limits. Demolition of the non-heritage scheduled parts of the buildings is otherwise a permitted activity under the 2GP.

This application excludes the demolition of the former Cadbury distribution warehouse located at the northern end of the block adjacent to St Andrew Street, for which resource consent has been separately applied for and approved. It also excludes the below ground removal of the building slabs and foundations. Additional resource consents will be required from Dunedin City Council (DCC) and Otago Regional Council (ORC) for earthworks, and disturbance of contaminated soils. These resource consents will be applied for separately once additional soil contamination investigations are completed, and the methodology for managing contaminated soils is developed.

This application for resource consent is made pursuant to Section 88 of the Resource Management Act 1991 (RMA) and has been prepared in accordance with the Fourth Schedule of the RMA (reprint as at 29 October 2019) in such detail to satisfy the purpose for which it is required.

2.0 Applicant and Property Details

A completed application form is enclosed as **Appendix 1**. The summary details relating to the applicant and subject site are as follows:

To:	Dunedin City Council.
Applicant's Name:	Ministry of Health.
Address for Service:	Greenwood Roche PO Box 139 Christchurch 8140 Attention: Lauren Semple Phone: 021 771 340 Email: Lauren@greenwoodroche.com
Address for Fees:	Ministry of Health P O Box 5013 Wellington 6140 Attention: Kieran Reilly Phone: 027 270 3268 Email: Kieran.Reilly@health.govt.nz
Site Address:	280 and 336 Cumberland Street, Dunedin. (refer to the Application Site in **Appendix 2**)
Legal Description:	Sections 53-55 and 72-74 Block XVI Town of Dunedin, and Part Sections 56 and 71 Block XVI Town of Dunedin (comprised in Computer Freehold Register OT129/279). DP 5322 (comprised in Computer Freehold Register OT304/181). Sections 60-67 Block XVI Town of Dunedin (comprised in Computer Freehold Register OT13B/665). (refer Computer Freehold Registers, in **Appendix 3**)
Owner/Occupier Name and Address:	Ministry of Health, 133 Molesworth Street, Thorndon, Wellington 6011.
Site Area:	2.2303 ha.
District Plan Zoning:	Proposed 2GP – CEC North Zone (not operative). Operative District Plan - Industrial 1 Zone (operative).
District Plan Overlays:	Proposed 2GP – • Heritage Building B030, Cadbury Confectionary Ltd Buildings, Facades to Castle and Cumberland Street. (operative). • Archaeological Alert layer (operative). • Hazard 3 (Flood) overlay (not operative). • Hazzard 3 (Coastal) overlay (not operative).

3.0 New Dunedin Hospital Project Overview

3.1 Background

The Southern District Health Board (SDHB) operates publicly funded hospital and primary health care services in the Otago and Southland Regions. As with other DHBs it has a statutory responsibility for improving, promoting, and protecting the health of the population living in the region. The estimated resident population of the SDHB in 2016/17 was 319,200.

The vision of the southern health system is to achieve and deliver high quality and accessible healthcare to communities, supporting more people to enjoy a better, healthier, long life – *'better health, better lives, Whānau Ora'*. The Southern Strategy Health Plan Piki te Ora, 2014 presents six priorities for the Southern Heath System, which are:

- Developing a coherent Southern system of care.
- Building the system on a foundation of population health, and primary and community care.
- Securing sustainable access to specialised services.
- Strengthening clinical leadership, engagement and quality improvement.
- Enhancing system capability and capacity.
- Living within our means.

The SDHB operates several district level healthcare facilities, including Wakari Hospital in Dunedin, Southland Hospital, and Lakes Hospital. It also provides services out of a number of community owned rural facilities. These include Oamaru Hospital, Gore Hospital, Clutha Health First Hospital, and Maniototo Hospital.

Dunedin Hospital is the main referral hospital for the SDHB offering a range of clinical, non-clinical, and support services. In addition, Dunedin Hospital is a University teaching and clinical training hospital with strong links to the University of Otago and Otago Polytechnic Schools of Nursery, Midwifery, and Health Sciences. The SHDB also partners with the University in health research activities and has established a Health Research Office to facilitate inter-disciplinary research by its staff and partners.

Many of the existing Dunedin Hospital facilities have reached the end of their serviceable and economic life, lack disaster resilience, and are inadequate to meet anticipated future patient demand and models of care (particularly to service an increasing aging population). The Southern Partnership Group (SPG) was established by the Ministry of Health in September 2015 to oversee the planning, design, and redevelopment of Dunedin hospital to address these issues.

Following consideration of redevelopment options, the Government in August 2017 approved an Indicative Business Case for the full replacement of the Dunedin Hospital on a new site within the city. This is with the exception of the Southern Blood and Cancer Services which will remain at their current location at the existing Dunedin Hospital in the interim.

The subsequent site selection process resulted in the identification of the site of the former Cadbury factory and the Wilsons block to the north for the new hospital, and commenced with the purchase of the required land.

3.2 Preliminary Site Masterplan

The Preliminary Site Masterplan was completed in December 2018 to establish a spatial plan for the New Dunedin Hospital, and in particular define the location for the Acute Services Building and Ambulatory Services Centre, as the most significant built forms of the project. The Preliminary Site Masterplan layout is included in **Appendix 4**, and the full document is available at: https://www.newdunedinhospital.nz/the-project/hospital-site-masterplan-released.

The masterplan proposed the New Dunedin Hospital be located across three City blocks. These include: the site of the former Cadbury factory (Cadbury block); the block to the north (Wilsons block); and the site of the former Cadbury staff social club and car park (Cadbury carpark). Under the masterplan, the new hospital would provide 396 inpatient beds (later increasing to 454 by 2043), and 61-day bed equivalents to safely provide inpatient, ambulatory and outpatient services for adults, children, and neonates.

The following new buildings identified in the masterplan were to be developed as the first stage of the hospital development:

- **Ambulatory Services Centre (ASC)**, located on the Wilsons block. The ASC would operate as a single unit providing for the delivery of a comprehensive range of services offering consultation; treatments and therapies; and day surgery, procedures, and related diagnostic services.
- **Acute Services Building (ASB)**, located on the Cadbury block. The ASB would operate 24 hours a day/7 days a week, providing a range of acute specialist services; emergency intervention; diagnostic services; acute and elective surgery; paediatric and maternity care; inpatient care; and related clinical and non-clinical support services.

3.3 Design Evaluation Process

Further analysis and costing of the Preliminary Site Masterplan option was completed in 2019. This work was undertaken in the context of increased understanding of floorspace requirements, capacity demands, site and design issues, and cost pressures. This led to a review and evaluation of design options in February 2020. Options considered including locating the hospital entirely on the Cadbury block, entirely on the Wilsons block, or across both sites as per the Masterplan. Options were evaluated for their clinical performance, affordability, ability to expand, adherence to programme, and buildability. This process confirmed a preferred configuration for the hospital broadly consistent with the Masterplan.

This option will first deliver an Ambulatory Services Centre (ASC) at the southern end of the Wilson's block, followed by the Acute Services Building (ASB) on the Cadbury block. Development will still be required across all of the Cadbury block, with the southern portion of the block being used primarily for vehicle/ambulance access, circulation, loading, parking, and plant required for the functioning of the hospital.

With the completion of the options review and evaluation process, concept design of the new hospital is now underway. Block and Stack plans forming the initial stages of the concept design process are attached to the statement from the lead architects Warren and Mahoney/HDR/McCoy Wixon, contained in **Appendix 11**.

4.0 Existing Environment

4.1 Application Site and Surrounding Environment

4.1.1 Application Site

The site to which this application relates is the Cadbury block as shown in **Figure 2** below.

Figure 2 – Application Site

The application site is bound by Cumberland Street to the west, St Andrew Street to the north, and Castle Street to the east. The southern boundary adjoins other commercial properties, contained within the Otago Daily Times (ODT) complex of buildings.

The site was most recently used for confectionary manufacturing by Cadbury Confectionary Ltd, which commenced operations from the site in 1898. Production ceased on the site on the 23rd of March 2018, and the buildings have since been largely stripped of manufacturing plant. The existing buildings are further described in **section 4.2** below.

4.1.2 Surrounding Area

The surrounding area is predominantly commercial in character, with some residential use also present. The location of the surrounding uses is identified in **Figure 2** above, and a description of those uses, are set out in **Table 1** below.

Table 1 – Surrounding Land Uses

Site	Address	Land Use	2GP Heritage Scheduling
1	261 Cumberland Street	Countdown Supermarket	-
2	25 Great King Street	Dunedin Central Police Station	-
3	333 Cumberland Street	Quest Hotel	-
4	137 St Andrew Street	Victoria Hotel	-
5	359 Cumberland Street	Cello Technology	-
6	360 Cumberland Street	Ministry of Social Development and Otago Polytechnic. Land is owned by the Ministry of Health for the New Dunedin Hospital	-
7	85 Castle Street	Dunedin Central Fire Station	B029 – Central Fire Station, facades to Castle and St Andrew Streets
8	83 Castle Street	New Dunedin Hospital Project office.	-
9	81 Castle Street	Car park. Land is owned by the Ministry of Health for the New Dunedin Hospital	-
10	61 Castle Street	Strawberry Sound Hire	-
11	53 Castle Street	Commercial	-
12	45 Castle Street	Castle Street Panelbeaters	-
13	3 Anzac Avenue	Residential apartments	-
14	20F Anzac Avenue	Dunedin Railway Station	HS12 and B005 – Dunedin Railway Station.
15	52 Stuart Street	Otago Daily Times, offices, and ground floor retail	B564 – Allied Press Building, facades to Cumberland and Stuart Street, including all shop fronts.

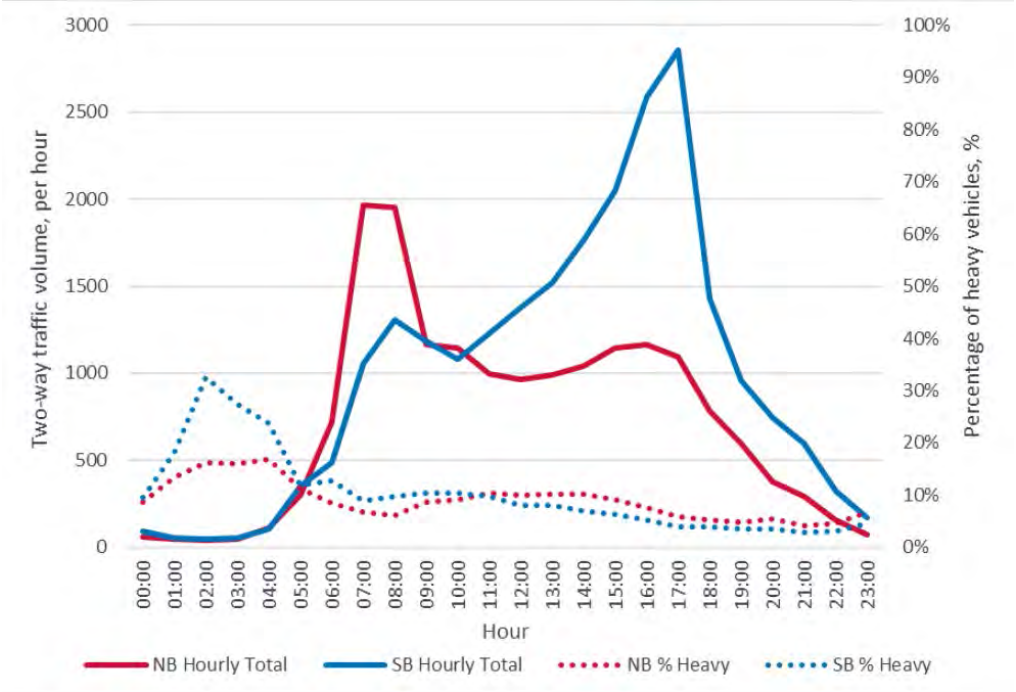
4.1.3 Transport Network

Cumberland and Castle Streets (State Highway 1) form the spine of the north/south transport network through the City, and are classified as Urban High Density Corridors in the 2GP. Cumberland Street runs one-way northbound, and Castle Street runs one way southbound. Both streets have a separated cycle lane adjacent to the site, followed by two traffic lanes, and parallel parking on the opposite side of the street. There are existing bus stops on Cumberland Street and Castle Street, opposite the site.

St Andrew Street (State Highway 88) links the Port of Otago to State Highway 1, and is classified as a Strategic Road in the 2GP. St Andrew Street operates as a two-way road, with two lanes in each direction. St Andrew Street also provides an east/west connection for Fire and Emergency New Zealand appliances departing the Dunedin Fire Station on Castle Street.

All three streets accommodate significant traffic volumes, particularly during the morning and afternoon peak times. The 2018 typical daily traffic profile for Stage Highway 1 is shown in **Figure 3** below, as taken from New Zealand Transport Agency (NZTA) telemetry site 63. Pedestrian volumes on the footpaths adjacent to the site are low recognising the vacant factory buildings.

Figure 3 – Typical daily traffic profile (from NZTA telemetry site 63, 2018 data)



4.1.4 Ambient Noise Levels

Marshall Day Acoustics has undertaken noise measurements at various locations around the application site during the day time. Their report is included as **Appendix 5**. Noise measurements demonstrated background noise levels are broadly consistent between positions and ranged from 69 to 72 dB L_{Aeq} across all the measurements. The existing noise environment in the area is generally governed by road traffic noise.

In order to better understand typical diurnal variance in noise levels, Marshall Day has analysed traffic volume data for Cumberland and Castle Street's. The daily traffic profile indicates there is minimal traffic throughout the quietest period of the night, with significant morning and evening peaks, relative to the normal day time level. Based on this traffic data Marshall Day have calculated that the noise levels at the facades of buildings immediately fronting the roads will be not less than 71 dB $L_{Aeq\ (24hr)}$ during the day. This is consistent with the measured noise levels which were broadly in the middle of the day, outside of peak times.

4.2 Description of the Existing Buildings

The site contains multiple interconnected buildings of varying age, size, height, and construction type. Other various ancillary structures are also located around the site, most notably two silos adjacent to the Castle Street frontage. **Figure 4** below identifies the main existing building blocks.

Figure 4 – Existing Buildings

WSP have assessed the condition of the existing buildings, and their report is included in **Appendix 6**. The condition of each of the main building blocks is summarised in **Table 2** below, with the exception of the Dairy and Machine House building which is to be retained, and the distribution warehouse which is not addressed in this application.

Table 2 – Description of Existing Buildings

Block	Description
 Block: 1 (Cadbury World) **Date:** 1868 **Heritage listing:** Street façade (2GP) **NBS rating:**[1] 20%	Block 1 comprises several interconnected buildings constructed in phases from 1868. The buildings are 3 - 4 stories high, and front Cumberland Street. The buildings consist of a concrete slab ground floor, unreinforced masonry walls, and timber framed floors and roof. The floor structure elements are set into the brick walls, but do not appear to be mechanically connected to the brickwork. The façade shows signs of damp penetration, and there are isolated fine cracks in the exterior plaster.
 Block: 2 (Reception and Offices) **Date:** 1868 **Heritage listing:** Street façade (2GP) **NBS rating:** 20%	Block 2 is a 4 storey building fronting Cumberland Street, constructed from 1868 onwards. The building is linked to Block 3A (described below). The building consists of concrete spread footing foundations, unreinforced masonry walls tied to reinforced concrete columns, concrete first floor, and timber framed floors on the remaining levels. The top storey has a mansard roof clad with slate on the Cumberland Street façade only. The rest of the building has a flat roof supported on timber beams. The façade shows signs of damp penetration and some fine cracks in the external render of the façade.

[1] New Building Standard (%NBS) rating.

Block	Description
 Block: 3A (Raw Materials and Manufacturing) **Date:** 1922 - 1924 **Heritage listing:** Street façade (2GP) **NBS Rating:** 20%	Block 3A is a 4 storey building fronting Cumberland Street constructed in 1922, and extended in 1924. The building consists of concrete perimeter and spread footing foundations, concrete and brick exterior, and concrete floors. The building has a flat roof, and there is a cavity brick parapet above the penthouse roof level. The façade shows sights of damp penetration at ground level, around the windows, and at roof level. The penthouse walls are very damp, and the internal gutter is cracked and in poor condition. There is a crack in the parapet brickwork where it sits on the reinforced concrete wall below.
 Block: 3C (Raw Materials) **Date:** 1924 – 1938 **Heritage listing:** Street façade (2GP) **NBS Rating:** 20%	Block 3C is a 3 - 4 storey building fronting Castle Street constructed in 1924, and extended in 1934 and 1938. The building consists of a concrete slab, reinforced concrete walls, concrete floors supported on steel beams. There is a straight joint between the Block 3C façade and the adjacent façade of Block 4B. The façade shows signs of damp penetration at ground level, the roof, and around windows, and minor cracking.

Block	Description
 Block: 4A (Engineering Workshop, Labs, Offices) **Date:** 1960 **Heritage listing:** Street façade (2GP) **NBS Rating:** 100%	Block 4A is a 3 storey building fronting Cumberland Street constructed in 1960. The building sits on 7.6m deep piles, and consists of a predominantly reinforced concrete frame, floors, and façade, with large windows on the external walls. A steel frame on the upper level supports the roof structure. There are no signs of distress in the façade.
 Block: 4B (Storage, Plant) **Date:** 1945 **Heritage listing:** Nil	Block 4B is located in the central yard of the site, and was constructed in 1945 as the boiler house for the factory site. The building consists of shallow concrete foundations, and reinforced concrete walls with a brick veneer. The building has been extended and altered a number of times, including the addition of various plantrooms constructed from concrete block.
	Block 4C is a five storey building fronting Castle Street completed in 1951, and extended in 1968. The building sites on a reinforced concrete cellular slab structure, and has a reinforced concrete frame, floors, and façade, with large windows on the external walls. A steel frame on the upper level supports the roof structure. There is a seismic gap between Block 4C and Block 5. There are no signs of distress in the façade.

Block		Description
Block:	4C (Engineering and Manufacture)	
Date:	1951	
Heritage listing:	Street façade (2GP)	
NBS Rating:	20%	
		Block 5 is a 5 storey building which spans the width of the entire site between Cumberland and Castle Street. It was completed in 1951, and extended in 1968. The building sites on a reinforced concrete cellular slab structure, and has a reinforced concrete frame, floors, and façade, with large windows on the external walls. A steel frame on the upper level supports the roof structure. There are no signs of distress in the façade.
Block:	5 (Manufacturing and Packing)	
Date:	1951	
Heritage listing:	Street façades (2GP)	
NBS Rating:	20%	

4.3 Heritage Values

4.3.1 History of the Cadbury Factory Site

The Cultural Narrative Precis prepared by Aukaha, included in **Appendix 9**, details the early history of the upper Otago Harbour area post 1848, including the process by which long standing Māori occupation and use of the area was subjugated by colonists. This included harbour reclamation, and subsequent development, including on the Cadbury factory site.

Underground Overground has completed a Heritage Impact Assessment which details the post-colonial history of the site, and provides an assessment of the heritage and archaeological values of the former Cadbury factory buildings. Its report is included in **Appendix 7**.

The block on which the Cadbury factory buildings are situated was surveyed by Charles Kettle in the 1840s as part of the original Dunedin settlement. At the time of initial survey, much of this block was still within a tidal inlet of the Otago harbour, and was reclaimed in the late 1860s.

The block was developed for mostly industrial uses during the 19th century, with smaller numbers of commercial premises and houses. Nineteenth century occupants include the New Zealand Distillery Co. and Albion Brewing Co. breweries, A & T Burt premises, the Otago Foundry, NZEEC, Dunedin Iron Works, New Zealand Implement Company, and R Hudson and Co.

Confectionery factory. The block retained its industrial character throughout the 20th and 21st century. The R Hudson and Co Confectionery merged to become Cadbury Fry Hudson in the 1930s eventually becoming Cadbury Confectionery Ltd. The company had taken over the entire site by 1950s.

The buildings that remain on the site contain elements of at least four pre-1900 buildings including: an 1875 cellar and 1868 small mill (the current Dairy and Machine House building); and an 1868 kiln and 1868 granary/malt floor (now part of Cadbury World and Office buildings). These buildings are shown in **Figure 5** below. Due to development over the twentieth and twenty-first centuries, few elements of the nineteenth century buildings are visible in the building façades. However, the Dairy and Machine House building has been recently restored to reflect its former 1918 façade. The façades of the remaining buildings have changed little from their 1920s to 1960s construction and alterations. The Cadbury buildings remain one of the last complexes of the continuous industrial development of nineteenth and twentieth centuries in central Dunedin.

Figure 5 – Pre-1900 Buildings Present

4.3.2 Heritage Listings

The New Zealand Heritage List – Rārangi Kōrero identifies New Zealand's significant and valued historical and cultural heritage places. The list informs and notifies the public, community organisations, agencies, and local authorities about significant heritage places, and is a source of information about them. The list is an information tool and does not provide any protection or control over the building. Protection is instead provided for through the District Plan.

Historic places, which include buildings, are listed as either Category 1 or 2 places:

- Category 1 places are of special or outstanding historical cultural significance or value.
- Category 2 places are of historical or cultural significance or value.

The Cadbury Confectionary Ltd buildings are included as a Category 2 Historic Place (List No. 2143) on the New Zealand Heritage List – Rārangi Kōrero. The buildings were first listed in 1982 under the Historic Places Act 1980 with a 'C' classification, which indicated it merits preservation because of its historical significance or architectural quality. Following changes to the classification system, the listing became a Category 2 Historic Place, which is defined by the Heritage New Zealand – Pouhere Taonga Act 2014 as a place of *'historical or cultural heritage significance or value.'*

The online list entry record refers to the buildings as the Cadbury Schweppes Hudson Limited Buildings and until recently, included reference to the listing being restricted to the façades of four buildings: *'Cadbury Schweppes Hudson Limited Buildings (Four Buildings) (Extended Façade)'.* A listing report has not been completed by Heritage New Zealand – Pouhere Taonga (HNZPT), and a two-page NZ Historic Places Trust Buildings Record Form completed in 1993, provides limited information about the buildings in the listing.

The facades of the Cadbury Confectionery Ltd buildings to Castle and Cumberland Streets were scheduled as a heritage item in the Dunedin City District Plan 2006.[2] The former Dairy and Machine House building was also included in the Anzac Square/Railway Heritage Precinct, identified as having significant heritage values. The District Plan scheduling of the street facades has been retained unchanged in the 2GP.[3] The extent of the street façade scheduling under the 2GP is shown in **Figure 6** below. The Dairy and Machine House building however is no longer included within the Anzac Square/Railway Heritage Precinct (and which has been renamed the Stuart Street Commercial Heritage Precinct).

There are four archaeological sites recorded on the application site and protected under the Heritage New Zealand – Pouhere Taonga Act 2014; sites I44/817, I44/922, I44/923, and I44/924.

[2] Schedule 25.1 Townscape and Heritage Buildings and Structures.

[3] Appendix A1.1 Schedule of Protected Heritage Items and Sites.

Figure 6 – 2GP Façade Heritage Scheduling

4.3.3 Heritage Values

Underground Overground have undertaken an assessment of the heritage values of the Cadbury factory buildings and their scheduled facades based on the guidance on appropriate methodology contained in the *Sustainable Management of Historic Heritage Guidance Information Sheet 9 Preparing a Heritage Impact Assessment* (NZHPT, 2007b) and *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS, 2011).

Detailed research has been completed to provide a comprehensive history of the site and its associations, and previous work undertaken identifying heritage values has also been considered, along with site visits to identify physical values. This information has informed an assessment of the significance of heritage values, including the archaeological, architectural, historic, scientific, and technological values of the buildings and broader complex.

A summary of the heritage values of the buildings identified by Underground Overground is provided in **Table 3** below:

Table 3 – Assessment of Heritage Values of the Cadbury Factory Buildings

Values	Significance
Archaeological Value	
Archaeological information	Moderate
Architectural Values	
Architectural merit	Low
Rarity	High
Representativeness	Moderate
Integrity	Low to High
Vulnerability	Yes
Context or Group	Moderate
Cultural Values	
Identity	Moderate
Public esteem	Moderate
Commemorative	Moderate
Education	Moderate
Tangata whenua	No
Statutory recognition	Yes
Historic Values	
People	High
Events	Moderate
Patterns	Moderate
Technological Value	
Technology and Engineering	Low – Moderate
Scientific Value	
Scientific	Yes

The individual heritage values for the Cadbury Factory buildings have been assessed as ranging from low to high, with greater value placed on the historic values of the site (particularly its connection to companies and individuals), rather than its architectural values (with the exception of architectural rarity and integrity), and technological or scientific values.

Architectural values include architectural merit, rarity, representativeness, integrity, vulnerability, and context or group. The Cadbury factory buildings have high architectural rarity. The buildings represent a rare complex of industrial buildings surviving at the heart of Dunedin's central business district. In the 1860s when the Cadbury site and A & T Burt site saw their first industrial occupation, they were amongst many others in the area. Slowly the manufacturers were pushed out of central Dunedin and concentrated to the south of the Octagon. The remaining buildings in the complex are reminders of the past functions of the site, including a distillery, brewery and confectionery. While there are several archaeological sites associated with breweries across the country, distilleries and confectioneries are under-represented amongst previously recognised heritage and archaeological sites.

In terms of architectural integrity, most of the buildings within the complex have been highly modified. High architectural integrity has therefore been identified for just one building in the complex, the Biscuit Factory and Dispatch Building (Blocks 4C and 5), as it represents an intact structure that has not been heavily modified. The building was constructed in in 1951 with a further two storeys added in 1968, with the latter being a discrete and easily readable addition. The Dairy and Machine House Building also retains a tangible link to distillery, brewery, and confectionery factory that operated from the site and is the best remaining example of these early phases of construction (1868 and 1875) within the complex. Similarly, the Cadbury World Building (Block 1), although extended on multiple occasions, still retains visible elements of the 1868 distillery buildings and has considerable heritage fabric from the early twentieth century additions.

In contrast, the buildings in the complex including their facades have low value in terms of their architectural merit. They are typical to the design, style and use of materials or craftsmanship of the period. The buildings are good examples of their time period in terms of design, type, and technology, and as such have moderate architectural representativeness. While isolated from other nineteenth century industrial buildings in Dunedin due to their removal through twentieth century development, the buildings still hold connections with other heritage buildings, forming a central Dunedin townscape that reflects nineteenth and early twentieth century development and entanglement of transportation and commercial businesses.

Archaeologically the buildings have moderate information potential. While the condition of the site is poor and the amenity value low, with all pre-1900 building heavily modified in the twentieth century, there is potential to gather archaeological information on brewery, distillery and confectionary manufacture sites. Few such site types have been recorded or archaeologically investigated in Dunedin or around the country. The archaeological contextual value as it represents an industrial complex, and can be considered in Dunedin's wider history as a manufacturing centre.

The buildings hold scientific value through their association with use as a Confectionery factory, but also as a brewery and distillery as well. However, technical values for the building have been assessed to be low to moderate. Most of the buildings we constructed using traditional building techniques and standard materials and therefore of low technical value. The only variation are the Office and Chocolate Factory and Garage buildings (Blocks 2 and 3A) for which a concrete distributing method was used for the first time in the South Island. Therefore, these buildings hold moderate technical values.

The Cadbury factory buildings have strong connections to many individuals and companies that are significant at a local, regional, national and international level. As a result, the buildings have moderate cultural values associated with identity, public esteem, commemoration, and education and the buildings are listed as a Category II listed Place (List No. 2143).The success of the confectionery and the longevity of the site are particularly due to its association with Richard

Hudson, R Hudson and Co and Cadbury Fry Hudson (and its iterations) whose drive for innovation to streamline not only their manufacturing process but also business management saw their products become a household staple.

Other names and businesses associated with the buildings include the New Zealand Distillery Company, the first legal distillery in the company along with architects such as Henry McDowell Smith, Miller and White. Key names in New Zealand's construction history have also been associated with the Cadbury factory buildings. The buildings are further associated with a number of key events and patterns in New Zealand's history at both a regional and national stage. National law changes affected the businesses associated with the site while they in turn contributed to regional and national exhibitions, showcasing their products in the late nineteenth and early twentieth century. Cadbury Fry further contributed to war efforts during World War II and were affected by the event. There was the construction of air raid shelters on the property and the company's production shifted incredibly during this period. Moreover, the companies were associated with betterment of employment welfare as well as cutting edge manufacturing techniques and innovations which drove the success of the businesses. For these reasons, the historic value of the buildings in terms of their connection to individuals and companies is high.

4.3.4 Heritage Significance

The overall level of significance of the Cadbury factory buildings has been assessed to be **medium.** This assessment is based on several factors.

The buildings within the complex are associated to past operations as a whisky distillery, brewery, and confectionery factory, for which there are few examples recorded around the country. While they hold low significance in terms of their architectural merit and varying levels of architectural integrity, most buildings are moderate examples of their class. The buildings hold scientific value through their association with use as a confectionery factory, but also as a brewery and distillery as well. Technical values range from low to moderate with most buildings constructed using traditional building techniques and standard materials.

The Cadbury factory buildings have significant associations with individuals and companies and hold the potential to contribute to regional studies of urban industrial and commercial development through contributions to wider patterns and event. However, the buildings also have moderate to high value historical associations with individuals, companies and events varying in significance from a local to international level. It is the buildings historical or cultural heritage significance or value that has led to the complex being list in as a Category 2 Historic Place (List No. 2143) on New Zealand Heritage List – Rārangi Kōrero. The Cadbury factory buildings are prominent and visible cultural ties to the histories of these individuals and companies easily accessible to the public, especially through the most visual aspect of the structures: the façades.

5.0 Description of the Proposal

5.1.1 Scope of the Application

Resource consent is sought for the above ground demolition of all the existing Cadbury factory buildings, including the facades which are scheduled heritage items under the 2GP. That is with the exception of the former Dairy and Machine House building located adjacent to the southern boundary fronting Castle Street, which will be retained.

The Dairy and Machine House building is being considered for non-clinical functions as part of the new hospital development. The final use of the building is still to be determined, but will likely be for uses where a lower level of seismic resilience is appropriate. Any strengthening and use of this building is outside the scope of this current application, and will be consented separately.

This application also excludes:

- Demolition of the former Cadbury distribution warehouse located at the northern end of the block adjacent to St Andrew Street. Resource consent for the above ground deconstruction of this building has been applied for in advance of this application, and was approved on the 28th of November 2019 (reference LUC-2019-540). Demolition of the building is in progress.
- The below ground removal of the building slabs and foundations of the demolished buildings. Additional resource consents will be required from DCC and ORC for earthworks, and disturbance of contaminated soils. These resource consents will be applied for separately once additional soil contamination investigations are completed, and the methodology for managing contaminated soils is developed.

5.1.2 Demolition Methodology

Demolition of the existing buildings will be carefully managed in the context of the surrounding urban environment, which contains noise sensitive activities, heritage buildings, essential services (police and fire stations), and key transportation routes (SH1 and SH88).

Demolition will be undertaken in accordance with a Demolition Management Plan (DMP) which will be prepared in conjunction with the appointed demolition contractor, and submitted to DCC for approval prior to work commencing. The DMP will set out the intended sequence, methods, and best practice environmental and site safety controls for demolition, to ensure any effects on the surrounding environment and activities are appropriately avoided or mitigated.

The anticipated sequence of demolition that will be included in the DMP is as follows:

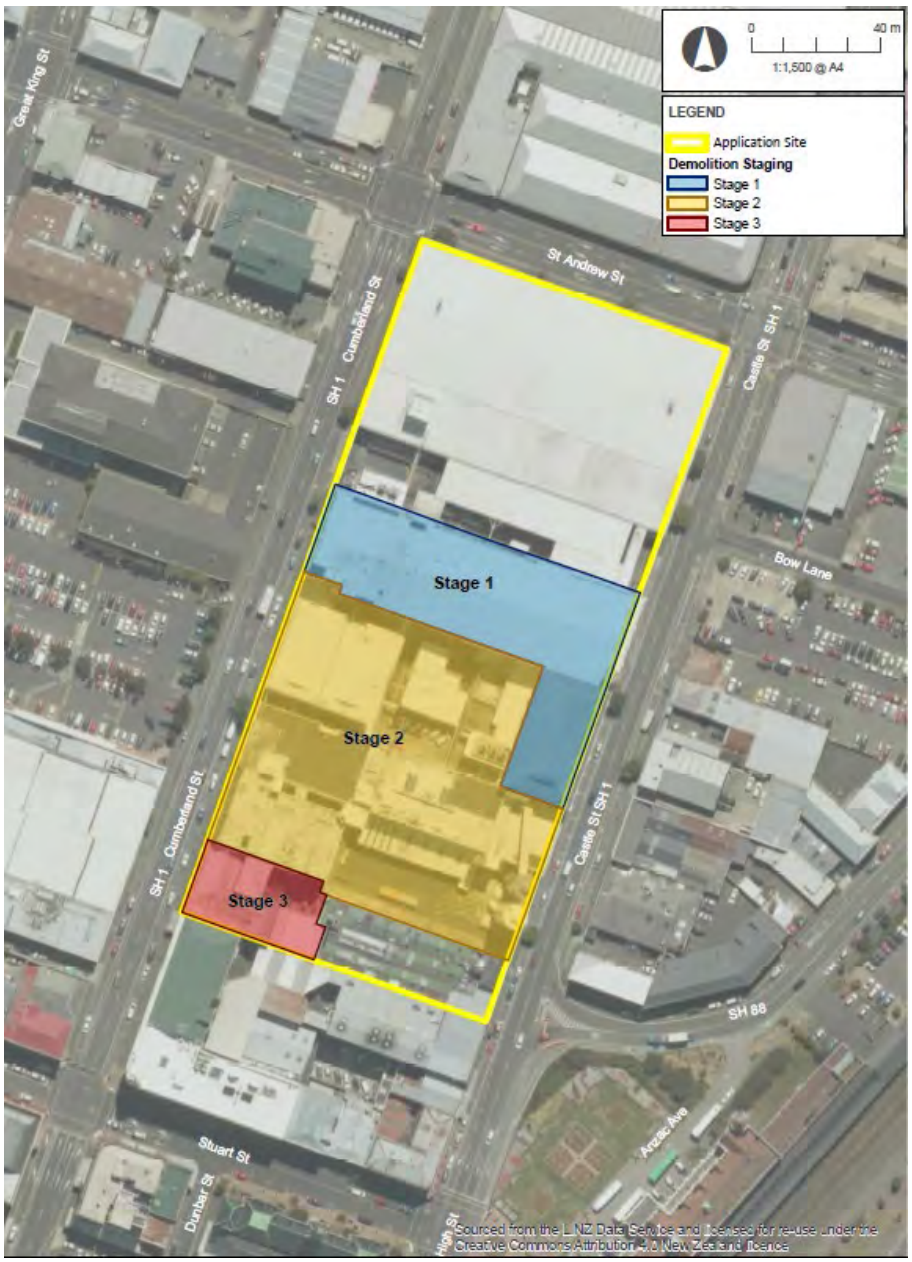
1. Enabling works – Prior to the commencement of works any site services will be disconnected, dilapidation reports prepared for neighbouring buildings, Work Safe notified of proposed asbestos removal work, and neighbours notified of impending work.
2. Site establishment – Site fencing and health and safety systems will be established, approved traffic management measures implemented, site office established, and demolition machinery delivered to the site.
3. Hazardous material removal – Asbestos and hazardous materials will be removed in accordance with all regulatory requirements.

4. Heritage recording – heritage recording of buildings will be undertaken by a specialist heritage practitioner/archaeologist in accordance with any resource consent conditions, and archaeological authority issued by HNZPT.

5. Soft strip out of buildings – Fixtures and services will be removed from all buildings simultaneously. This includes any heritage materials that are to be salvaged for potential reuse.

6. Demolition – Demolition will be staged in a north to south direction as shown in **Figure 7** below. Demolition in each stage will commence once demolition of the proceeding stage, is completed. Traffic management measures will be established and removed progressively as each stage is completed. Demolition waste will be progressively loaded onto trucks and removed from the site for reuse, recycling, or disposal.

Figure 7 – Demolition Staging



The buildings will be demolished using a variety of methods as follows reflecting the diversity of building construction, height, and site constraints:

- Stage 1 - The upper two stories of the buildings will be deconstructed by crane, and the remainder of the buildings will be demolished using a high reach excavator with multi-processor and grapple attachments.
- Stage 2 – The buildings will be demolished using standard reach excavators with multi-processor attachments. The silos adjacent to Castle Street will be deconstructed by crane.
- Stage 3 – The buildings will be deconstructed under the recommendations of specialist structural engineer to ensure stability of the adjacent heritage scheduled ODT building, and the Dairy and Machine House building. This may require installation of temporary protection works to the adjoining buildings and involve manual deconstruction of the roof, demolition of the main structure using a standard reach excavator with multi-processor attachments, followed by manual deconstruction of the remaining portion of the building adjacent to the ODT façade and Dairy and Machine House building.

The indicative overall work timeframe from soft strip out to completion of the above ground demolition is 80 weeks, with hard demolition currently anticipated to commence in March 2021 and be completed in February 2022. Within the timeframe, the indicative timeframe for completion of hard demolition of the above ground structures will be as follows:

- Stage 1 – 13 weeks
- Stage 2 – 27 weeks
- Stage 3 – 3 weeks

The demolition work on the Cadbury factory site will potentially overlap at times with programmed demolition work occurring on the Cadbury distribution warehouse, and Wilsons car park block to the north. The extent to which overlap will occur is contingent on consents being obtained, and work progress. Based on the current programme it is expected there will be overlap between the hard demolition of the buildings in stage 2 on the Cadbury block with the removal of the foundations on the Wilson's block buildings to the north.

Demolition works will be limited to Monday - Saturday, and occur between 7.30am and 6.00pm each day. There will be no works at night, Sunday's or public holidays, except where emergency works are required to protect public health and safety, or to accommodate the requests of specific stakeholders (e.g. undertaking high-impact works while an adjacent commercial premise is unoccupied).

The DMP will also incorporate environmental and health and safety controls which address the following:

- Asbestos controls to ensure asbestos is removed from buildings in accordance with the Health & Safety at Work (Asbestos) Regulations, and WorkSafe NZ Approved Code of Practice (ACOP). These will be detailed in an Asbestos Removal Control Plan.
- Waste management controls which minimises the amount of waste generated from demolition that is sent to landfill, and ensures hazardous materials and other waste sent to landfill is disposed of at consented facilities with the appropriate waste acceptance criteria. This will be detailed in a Waste Management Plan.

- Heritage protection controls to ensure there are no adverse effects on the structural integrity and heritage vales of surrounding heritage buildings, and in particular the Dairy and Machine House building, and the ODT building.
- Noise and vibration controls to ensure noise and vibration from demolition are mitigated, particularly for neighbouring activities and buildings. These will be detailed in a Noise and Vibration Management Plan.
- Health and safety controls to ensure the safety of the public and site workers during demolition, particularly on adjacent sites and roads. These will be detailed in a Site Specific Safety Plan.
- Traffic management controls to ensure the safe and efficient operation of the transport network during demolition, including management of truck movements, temporary traffic/cycle lane relocation and closures, and pedestrian routes. These will be detailed in a Traffic Management Plan, which will be submitted to NZTA and DCC as the road controlling authorities, for approval prior to works commencing.
- Controls to supress and minimise dust nuisance, and avoid the tracking of sediment off the site or into the Council reticulated stormwater network.

The approach to managing the effects of demolition, are further described in the Assessment of Environmental Effects in **section 7.0**.

The current proposal for which resource consent is sought, does not include the below ground removal of foundation slabs, foundations, and infrastructure. Resource consent for the below ground work will be sought separately once additional contaminated land investigations are completed, and the methodology for managing contaminated soils is developed. Below ground works are currently planned to commence in April 2022, and will be completed in June 2022.

It is intended that the final DMP, will be updated to incorporate any additional environmental and site safety controls needed to manage the below ground works prior to those works commencing (e.g. management of contaminated soils).

6.0 Reasons for the Application

6.1 Proposed Dunedin Second Generation District Plan (2GP)

The application site is zoned CEC North Zone under the Proposed Dunedin District Plan (2GP), and the site is subject to the Archaeological Alert, Hazard 3 (Flood), and Hazard 3 (Coastal) overlays.

Appendix A1.1 of the 2GP schedules the facades of the existing Cadbury buildings fronting Cumberland and Castle Streets as heritage items, as follows:

Site Number	***Item/Building Name***	***Address***	***HNZ Category***	***HNZ List Number***	***Protection Required***
B030	*Cadbury Confectionary Ltd Buildings*	*280 Cumberland Street Dunedin*	*2*	*2143*	*Facades to Castle and Cumberland Streets*

The Council issued decisions on the 2GP on the 7 November 2018. The heritage scheduling, and all relevant rules of the 2GP which relate to the proposal are beyond challenge, and therefore operative under section 86F of the RMA.

The Council notified Variation 1 (Minor Amendments) to the 2GP on the 20th of November 2019. The rules of Variation 1 do not currently have legal effect, other than where they relate to heritage or biodiversity matters.

The relevant 2GP rules for the purposes of this application are those for 'development activity' in the CEC North zone section D.18 of the Plan. Also relevant are the rules for 'temporary activities' in section B.4 of the Plan, and specifically those relating to 'construction'.[4]

Appendix 8 contains a compliance assessment of the proposal against the relevant 2GP rules, as amended by any Variation 1 rules that have legal effect. In summary, the proposal requires resource consent under the following rules:

- Rule 18.3.6.28 where demolition of a protected part of a scheduled heritage building or structure is a non-complying activity. The scheduled facades of the existing Cadbury factory buildings fronting Cumberland and Castle Streets will be demolished, with the exception of the Dairy and Machine House building.
- Rule 4.5.4.1(d) where demolition activity which exceeds the construction noise limits set out in rule 4.5.4.1(a) by more than 5dB LA_{eq} (15 min) is a non-complying activity. The noise and vibration assessment undertaken by Marshall Day Acoustics (contained in **Appendix 5**) has confirmed that at times the noise limits will be exceeded by more than 5dB.
- Rule 4.5.4.1(b) of the 2GP which requires demolition activity to comply with vibration performance standards. The noise and vibration assessment undertaken by Marshall Day Acoustics (contained in **Appendix 5**) has confirmed that the vibration limits could be exceeded where works occur adjacent to buildings beyond the site (e.g. the ODT

[4] The definition of 'temporary activity' includes 'construction', which is defined as *'the use of plant, tools, gear or materials as part of the… demolition of any building or structure. This definition includes all work from site preparation to site restoration.'*

building). The 2GP does not include a rule that classifies the status of activities that do not meet rule 4.5.4.1(b).

Overall the proposal is a **non-complying activity** under the 2GP. Section 104B of the RMA states that, where considering an application for a non-complying activity, the consent authority may grant or refuse the application. If the activity is granted, the consent authority may impose conditions pursuant to Section 108/108AA.

Soft strip out of the fittings and services from the existing buildings is to occur at the same time this application is being considered. This work does not involve any works to the scheduled facades of the Cadbury factory buildings, and will comply with all other 2GP rules. Consequently, this work can occur in advance as a permitted activity without resource consent.

6.2 Other Authorisations Required

In addition to this application, the following authorisations are required, prior to the commencement of the above ground demolition of the existing buildings:

- An archaeological authority is required from HNZPT under the Heritage NZ Pouhere Taonga Act 2014, where the proposed demolition works affect any archaeological site. As noted in **section 4.3.2**, above, the application site contains four recorded archaeological sites; I44/817, I44/922, I44/923, and I44/924.
- Approval will be required from NZTA under the Government Roading Powers Act 1989 for any temporary encroachment and structures required for demolition works on adjacent State Highways. A Traffic Management Plan will also be required to be approved by NZTA and DCC as the road controlling authorities for any temporary vehicle access arrangements and traffic/cycle lane closures required.

7.0 Assessment of Environmental Effects

In accordance with Section 104(1)(a) of the RMA this part of the application provides an assessment of the environmental effects of the application in such detail which corresponds with the scale and significance of effects that the activity may have on the environment.

7.1 Benefits of the Hospital Redevelopment

As outlined in **section 3.1**, the majority of the existing Dunedin hospital facilities have reached the end of their serviceable and economic life, lack disaster resilience, and are inadequate to meet anticipated future patient demand and models of care (particularly to service an increasing aging population).

Particular issues and challenges identified by the SPG during development of the Indicative Business Case (IBC) for redevelopment of the hospital included:

- The Clinical Services Building (CSB), Children's Pavilion Building, Fraser Building, and Psychiatric Services Building have reached, or are near to the end of their serviceable life and are uneconomic to repair or refurbish compared to the cost of a new facility. The state of the existing buildings creates material, clinical, financial, and organisational risks for the SDHB.
- The Ward Building, although structurally solid, has significant maintenance issues which impedes the delivery of efficient and effective services. Structural refurbishment would be very challenging and estimated to cost more than a new build. It would also not be plausible given services would need to be decanted floor by floor, while ensuring the hospital remains operational.
- The existing buildings and facilities are unsuited to efficient modern patient care. They have unsuitable structural grids, floor to floor heights, and floorplates, thereby compromising clinical functions and flows. Furthermore, there is no space for rapid assessment, lack of theatre capacity including day surgery, deficient day patient and outpatient zones, constrained ward space, and medical imaging and the emergency department are not co-located. These issues directly lead to increased costs, reduced service capacity, reduced productivity, and poorer patient outcomes.
- None of the existing hospital buildings meet IL4 building standards, which would significantly impact the day to day operation of the facility after a significant earthquake (1 in 500-year event). Both the CSB and Ward Building would be damaged to the point they would be unusable, although occupants would be at low risk.

Forecast demographic changes within the SHDB region will also drive the need for changes in facilities, and models of care. The proportion of the population that is aged 65+ is projected to increase in all areas within SDHB, and be at higher levels than elsewhere in New Zealand. Population aging means there will be a rapid growth in complex patients, and increased demands on bed and theatre capacity, and other resourcing. Future hospital services will need to provide an increased focus on generalism, increased theatre efficiency, more rapid discharge processes, and improved rehabilitation approaches.

Future service demands will be both clinically and financially unsustainable using the current facilities. A well designed, fit for purpose hospital is one of many enablers required to deliver more modern models of care and improve the effectiveness and efficiency of services across the SDHB

health care system. Without a new hospital, the SDHB will almost certainly fail to meet its long term service objectives and its commitment to deliver health services to the communities it serves.

The new Dunedin hospital will provide modern fit for purpose healthcare facilities to deliver on the vision and priorities of the broader health planning system outlined in the following documents:

- The 2016 New Zealand Health Strategy, which has five strategic, interconnected, themes aiming towards all New Zealanders living well, staying well and getting well: *'people-powered, closer to home, value and high performance, one team, and smart system'*.
- The South Island Regional Health Services Plan, which aims to keep people well and provide equitable and timely access to safe, effective, high-quality services as close to people's homes as possible.
- The Southern Strategy Health Plan – Piki Te Ora, which describes how Southern DHB will develop an effective and efficient system of care.
- Southern DHB Annual Plan and Māori Health Plan, which aim to improve patient access and population health outcomes, and achieve clinical and financial sustainability.

The vision is for the new hospital to be an exemplar of healthcare design in New Zealand. The new hospital will reduce fragmentation of clinical and non-clinical services through an optimised spatial layout that has more purposeful accommodation arrangements, and better adjacencies to reduce wasted travel time. There will be an opportunity for more shared areas between departments and reduced duplication of space, equipment and building services.

The new hospital will provide healthy people spaces, including an improved working environment for staff which will reduce delays, duplication of staff effort, interruptions and 'work arounds' that potentially lead to risks to patient care. It will also better enable adoption of information technology innovations such as patient portals and shared access to electronic data repositories including digital prescribing and medical imaging.

The critical hospital facilities will be constructed to IL4 building standards with separation from surrounding heritage buildings to provide high levels of seismic resilience. This will ensure hospital remains operational following a significant earthquake to support post-disaster recovery.[5]

Overall, the new hospital will deliver significant benefits for the health and wellbeing of the community of the SDHB region. The new hospital will enable rolling out of modern models of care that will improve the efficiency and effectiveness of hospital services. By changing the way in which services are organised in the new hospital, and how they integrate with primary care and allied health, the SDHB can realise the benefits of improved patient flow, improved quality of patient care, improved patient and staff safety, increased efficiency of service delivery, and reduced costs.

The hospital will also be designed to be well integrated and achieve accessibility and interaction with the surrounding urban environment, and promote a positive pedestrian experience. Aukaha is also working with Ministry to incorporate Kāi Tahu cultural elements into the design and layout. The new hospital will support urban regeneration in central Dunedin. The hospital will be an important landmark, located in walking distance from the centre of the city. It will provide a potential catalyst for further redevelopment in the surrounding city blocks. Such a regeneration outcome could be less certain if the Cadbury factory buildings were to remain without significant investment that provides for their adaptive reuse.

[5] IL4 buildings are those that are essential to post-disaster recovery, and include hospitals and other health care facilities having surgery or emergency treatment facilities.

7.2 Alternatives to Demolition

The selection of the Cadbury block for development for the New Dunedin Hospital is the culmination of considerable work completed since 2015 which has considered various hospital redevelopment options, sites, and spatial configurations. The following sections outline the various alternatives that have been considered, including the practicality of retaining the existing scheduled heritage facades and their incorporation into the design of the hospital.

7.2.1 Assessment of Alternative Hospital Redevelopment and New Site Options

The SPG assessed a range of options to address the deficiencies associated with the existing Dunedin Hospital facilities (summarised in **section 7.1** above), during development of the IBC for redevelopment of the hospital. A total of seven options were selected and assessed against a "do minimal" base case consisting of demolition and replacement of the existing CSB. In summary the options considered were:

- **Base case** – demolition of the existing Psychiatric Services building, CSB, and lecture theatres, and construction of a new replacement CSB. All other buildings would remain in operation.
- **Option A** – new CSB and refurbished Ward Building for ambulatory, inpatient, and university accommodation. The CSB would be constructed on university owned land adjacent to the hospital site.
- **Option B** – new CSB and inpatient unit (IPU), and using the Ward Building for outpatients and non-clinical services. As for option A, the CSB and IPU would be constructed on university owned land adjacent to the hospital site.
- **Option C** – new CSB and IPU that integrates and consolidates core services across several buildings into a logical arrangement. As for options A/B, the new development would be constructed on university owned land adjacent to the hospital site.
- **Option D** – same as for option C, but with health hubs providing ambulatory services in the community.
- **Option E** – new hospital on the Wakari hospital site accommodating all existing Dunedin hospital clinical and non-clinical services, and oncology.
- **Option F** – new hospital on another new site, accommodating all existing Dunedin hospital clinical and non-clinical services, oncology, and mental health facilities. This option did not include all existing Wakari services.
- **Option G** – complete new hospital on another new site, accommodating all existing Dunedin hospital and Wakari services.

The shortlisting of these options ruled out the base case and Option A as feasible options primarily because substantially renovating the Ward Building for clinical use would be a complex, disruptive, and time consuming process. Furthermore, it would not result in a modern, flexible, fit for purpose health facility compliant with IL4 building standards. Option G (full rebuild on another site) was also discounted as it was the least affordable and exceeded the requirements of the brief.

The remaining options were those that required a new build on a new site; either on the adjacent University owned land (options B, C and D), Wakari (option E), or other sites within Dunedin (option F). The options also varied on the scope of additional services to be incorporated. Following further analysis, Option B, and variations on Options E (new hospital at Wakari) and F (new hospital on a new site) were taken forward for further assessment.

The SPG ultimately determined that Option B involving a new CSB and IPU on University owned land, and retrofitting the Ward building for outpatients and non-clinical services, would provide a suboptimal solution with a number of disadvantages. These included a constrained site for future proofing, decanting and disruption to services, and retrofitting an old existing building, seismic risk and ongoing maintenance issues. While affordable on a build-cost basis, Option B would be more expensive when ongoing replacement of other end of life assets was factored in, and would take four years longer to deliver than a new purpose built facility.

In May 2017, the SPG recommended to the Ministry of Health that Options E (new hospital at Wakari) and F (new hospital on a new site) be taken through to consideration as part of the Detailed Business Case, resulting in the commencement of the site selection process. The SPG asked the Ministry of Health to develop draft criteria to assist with site selection for the new hospital. The Ministry and Treasury consulted with the Ministry of Education as a result of their extensive experience in selecting land for new schools and criteria were developed based on the Ministry of Education criteria. The University of Otago (the University) and Dunedin City Council were also consulted on the content of the criteria. In developing the criteria, it was also acknowledged that ensuring space for future expansion and including options for University teaching spaces were important considerations.

The final criteria set out in **Table 4** below were adopted by the SPG. All site options were firstly screened against four key stage 1 criteria. Options with satisfactory scores from this process were then assessed against the more comprehensive stage 2 criteria.

Table 4 – Site Selection Criteria

Stage 1 Criteria	Stage 2 Criteria	
1. Locality. 2. Land size and shape. 3. Current land use and form. 4. Access.	1. Site acquisition costs. 2. Perceived ease of acquisition. 3. Site size. 4. Topography. 5. Urban design potential. 6. District plan zone. 7. Existing site constraints. 8. Access. 9. Transport network. 10. Infrastructure services. 11. Geotechnical.	12. Flooding. 13. Contamination. 14. Ecological impact. 15. Iwi / cultural or other significance. 16. Relationship with the University of Otago and other training organisations. 17. City rejuvenation. 18. Noise. 19. Amenities. 20. Relationship with other DHB services.

The Ministry's initial search looked at six potential sites which included both greenfield and central city sites. While greenfield sites were generally considered to allow for less intensive development with more green space, a central city site was preferred by the DCC and the community due primarily to its accessibility and the desire to retain the workforce and visitors in the CBD.

The two greenfield sites considered were the existing land at Wakari hospital and the former Hillside railway workshop in South Dunedin. Although both sites were identified to have the potential for an attractive campus like environment, there were concerns regarding accessibility, transport links, and distance from both the University and central city with both of these sites. In addition, the topography of the Wakari site was identified as particularly challenging, with the history of heavy engineering at the Hillside site also of concern with respect to contamination issues.

The four Central City sites were:

- Cadbury: covering the Cadbury factory site in the block bound by Stuart-Cumberland-St Andrew-Castle Streets (excluding the land owned by the ODT), as well as the Castle-St Andrew-Anzac block to the east.
- Great King Street: bound by Cumberland-Great King-St Andrews-Hanover Streets as well as using parts of the current hospital site in three different blocks.
- Alhambra: comprising two blocks (including the North Ground) bound by Cumberland-Frederick-St David Streets and bisected by Dundas Street. The site comprised green space with the University on one side, and residential properties on the other three sides, which are mainly used as student accommodation
- Wilson: bound by Cumberland-Castle-St Andrews-Hanover Streets. It site had proximity to the DHB owned site that houses the Fraser Building and therapeutic pool across Hanover Street and the current boiler house location on Castle Street.

A proof of concept architectural process was commissioned by the Ministry which established that all four sites were big enough for the design of a functioning hospital, University teaching space and expansion.

The North Ground site commonly referred to as the Alhambra rugby grounds was investigated at the suggestion of the DCC, but was not supported by the University. Early investigations suggested that the acquisition of the green space (and subsequent closure of the rugby grounds) together with the surrounding residential land was likely to be difficult with consequential delays to the project. In addition, the low height surrounding buildings would make integration of the hospital into this environment, a difficult challenge. As a result, the SPG ruled out this option.

The Property Group was then commissioned to prepare a report assessing the remaining three sites against the site selection criteria. The assessment found very little difference between the sites based on an assessment on the criteria with no weighting.

At the end of 2017 a Local Advisory Group (LAG) was established for the Dunedin Hospital Project. This Group included DCC, the University, ORC, Ngai Tahu and NZTA. The LAG does not have decision making rights but does provide an advisory role to the SPG. In considering site selection, LAG participants discussed issues of cityscape, traffic considerations, impacts on the local economy and retailers, along with the impact for the University and its precincts. It was particularly noted that the University is a major contributor to the Dunedin economy and the nexus between health and tertiary education is the keystone of that economy. Further, the compactness of the health and tertiary education sectors (including but by no means limited to the medical school) is not replicated in NZ and only rarely in Australia. The associated medical research activity also contributes to employment and economic activity in Dunedin.

The relationship between the hospital and University, including their physical proximity, was therefore seen as particularly important and as such a weighting was applied to proximity to the University and the existing hospital together with ease of acquisition/likelihood of construction starting in 2020.

From this process, the site of the Cadbury factory, and Wilson's block was identified, and recommended by the SPG to be acquired for the New Dunedin Hospital. Particular benefits of the Cadbury and Wilsons blocks included:

- There would be no need to demolish existing hospital facilities and decant services for the new build, as would be the case at Wakari.
- The close proximity of the site to the existing hospital, the University of Otago, and central city.
- The combined size of the Cadbury and Wilson's blocks provided sufficient room for the required facilities and provided flexibility where parts of the complex could be located through the design process.
- The Cadbury factory site was already for sale as one block, enabling ease of acquisition.

Overall, the assessment of options undertaken though the IBC has determined that it would not be practicable to redevelop the existing hospital on that site or adjacent to it. Furthermore, the subsequent site selection process has determined that the Cadbury and Wilsons blocks are the only practicable option that meets the functional and operational needs of a new replacement hospital.

7.2.2 Alternative Spatial Configurations for the New Dunedin Hospital

Following selection of the Cadbury / Wilson's site as the location of the New Dunedin Hospital, the Preliminary Site Masterplan was completed by CCM Architects in December 2018 to establish a spatial plan for the hospital development, and in particular define the location for the Acute Services Building (ASB) and Ambulatory Services Centre (ASC), as the most significant built forms of the project.

CCM Architects have prepared a memorandum detailing the development of the spatial configuration of the hospital undertaken during the Preliminary Site Masterplan process. Their memorandum is included in **Appendix 10**, and a copy of the Preliminary Site Masterplan layout is included in **Appendix 4**. The full document is available at: https://www.newdunedinhospital.nz/the-project/hospital-site-masterplan-released.

The configuration for the hospital was developed using a range of principles and criteria, including geo-technical conditions, urban design, heritage features, land, ownership, and the functionality and accessibility of the buildings for their principal purpose. Engagement with a wide range of parties also assisted with developing preferred configurations, including clinical users, DCC, HNZPT, Ngāi Tahu, University, Polytechnic, ORC, and NZTA.

Various spatial arrangements were tested during the masterplan process, including:

- Locating both the ASB and ASC on the Wilsons block.
- Locating both the ASB and ASC on the Cadbury block.
- Locating the larger ASB on the Wilsons block, and the smaller ASC on the Cadbury block.
- Locating the ASB on the Cadbury block, and the ASC on the Wilsons block.

Through this process, locating the larger ASB on the Cadbury block, with the smaller ASC on the Wilsons's block was confirmed under the masterplan for the following reasons:

- It locates the smaller and lower ASC in the northern block and the larger ASB in the southern block. This offers a better fit in terms of urban form within the context of the wider CBD.
- It creates the opportunity for public outdoor amenity to the north and west of the site where it benefits from good sun and daylight.
- It provides an excellent linkage between the ASC with the existing hospital facilities (including the Southern Blood and Cancer Building that will remain in operation when the hospital is constructed), and the University research education precinct.
- It provides the opportunity on the northern part of the Wilsons block for future expansion and/or development of a health precinct (potentially in conjunction with the University of Otago).
- It would enable construction of the ASB on the part of the overall site (Cadbury) which has more consistent in-ground geotechnical conditions. Advice received during the Preliminary Site Masterplanning indicated that geotechnical conditions of the Wilsons block are varied, meaning it would be less suited to construction of an Importance Level 4 building (i.e. the ASB), and more suited to construction of an Importance Level 3 building (the ASC).

As discussed in **section 3.3**, further analysis and costing of the Preliminary Site Masterplan option was completed in 2019. This work culminated in a review and evaluation of design options in February 2020. This process has confirmed a preferred configuration for the hospital broadly consistent with the Masterplan, with the ASB located on the Cadbury block, and the ASC located on the Wilsons Block.

Concept design based on this option is underway. Block and Stack plans forming the initial stages of the concept design process are attached to the statement prepared by the lead architects Warren and Mahoney in **Appendix 11**. Under the preferred configuration, development will be required across all the majority of the Cadbury block, with the southern portion of the block being used primarily for vehicle/ambulance access, circulation, loading, parking, and plant required for the functioning of the hospital.

Their statement outlines that the preferred configuration shown in the Block and Stack was developed using a range of principles and criteria, including:

- Clinical performance – optimising clinical functionality to achieve the hospitals primary purpose as a tertiary health facility.
- Wider accessibility and interaction – ensuring the public can appropriately and easily access the hospital overcoming the significant level difference (approximately 1.7m) between the finished floor levels and surrounding streets.
- Integration with the surrounding urban environment – integrating the built form within the significant urban features of the immediate and wider environment, including the Railway Station and Anzac Square, the University of Otago, the Stuart Street Commercial Heritage Precinct, the Dunedin Central Fire Station, and the central business district.
- Pedestrian experience – A significant landscaped strip to the Cumberland St boundary provides an enhanced pedestrian experience and a precinct enabler that continues north thru the Wilson Block and wider Health Precinct. East-West pedestrian connections are

developed through the site. These two features meet in an open plaza zone on the north west corner of the Cadbury site.

- District Plan assessment matters – Achieving a configuration of the overall site and its buildings that is consistent with the outcomes sought in the 2GP. This includes matters relating to the surrounding urban environment, the existing heritage features on the Cadbury site and the accessibility of the site, but also pedestrian amenity and the visual impact from the hill suburbs across the Otago Harbour.
- Environmental features – Responding to geotechnical conditions on-site and matters such as potential flood risk.

Ongoing design development will be informed by the cultural narrative prepared by Aukaha (contained in **Appendix 9**), further functional briefings with clinical users, and preliminary consultation with representatives of Council, NZTA, University of Otago and others.

Overall, the assessment of options undertaken though the Masterplan process determined that locating the ASB on the Cadbury block would best integrate with surrounding urban context, and meet the functional and operational needs of a new replacement hospital. This has been reaffirmed through the recent options review and evaluation process, and emerging concept design.

7.2.3 Assessment of Façade Retention Options

The practicality of retaining the existing scheduled heritage facades and their incorporation into the design of the hospital has been assessed by undertaking a range of technical assessments, including assessment of:

- Different structural options for retaining the facades, including temporary support during demolition and construction. This is detailed in the report from engineers WSP included in **Appendix 6**.
- The costs of implementing the different options for retaining the facades identified by WSP. This is detailed in the report from quantity surveyors Rider Levett Bucknall (RLB) included in **Appendix 12**.
- The construction feasibility of the different options for retaining the facades, detailed in a buildability report from project managers RCP included in **Appendix 13**.
- The heritage implications of the different options for retaining the facades, detailed in the heritage impact assessment from Underground Overground in **Appendix 7**.
- Implications for the design and functionality of the hospital from retaining the buildings and scheduled facades. Considerations that formed part of the development of the Preliminary Site Masterplan are detailed in the memorandum from CCM Architects included in **Appendix 10**. Considerations that have formed part of the options review and evaluation, and concept design process are detailed in the statement from the hospital's lead architects Warren & Mahoney included in **Appendix 11**.

The outcome of these various assessments is outlined in the following sections. All of these reports, with the exception of the Warren & Mahoney design statement, were completed prior to completion of the options review and evaluation process and confirmation of a preferred configuration for the hospital. Following confirmation of the preferred configuration, each author was asked to review their respective reports and identify if the preferred configuration for the new hospital would have any material impact on the analysis and conclusions detailed in those reports.

In each case, the authors confirmed that no such impact could be identified, and as such, the conclusions of their original reports remain valid in relation to the preferred configuration.

7.2.3.1 Structural Options and Costs of Retaining Facades

WSP has undertaken a structural assessment of the existing scheduled facades, and identified a range of engineering options enabling their retention and theoretical incorporation into a hospital development the site. This includes options for temporary support of the facades during demolition of the buildings and construction of the new hospital. Its report and subsequent report addendum is included in **Appendix 6**.

Conceptual façade retention options have been developed that meet structural performance objectives in terms of the New Zealand Building Code. The hospital will be built to meet the requirements for an IL4 building. This includes the requirement to remain operational immediately following a 1 in 500-year earthquake, and to withstand a 1 in 2500-year earthquake. Any facades to be retained will therefore also need to meet these criteria.

The façade retention options developed also recognise that the hospital structure will be base isolated to provide the best protection against seismic hazards, and that the ground floor will be approximately 2 metres above street level at the St Andrew Street end of the site to mitigate the risk of a 1 in 500-year flood event. The options also recognise high floor to floor heights will be required to accommodate the services, structure, and space required for the hospital.

Eight façade retention options have been developed that provide a variety of methods for retaining the facades as part of a development of the site. The options have varying intrusion on the heritage fabric of the facades, and reversibility. These options involve either:

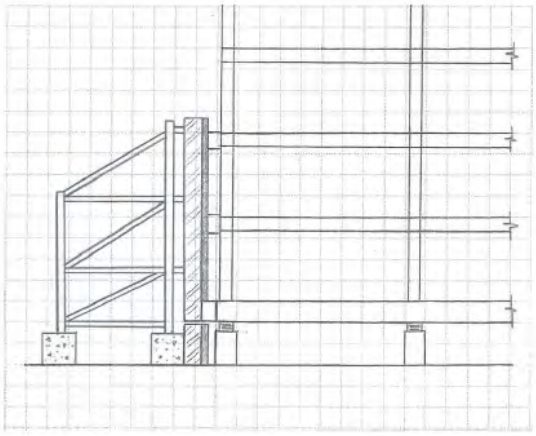
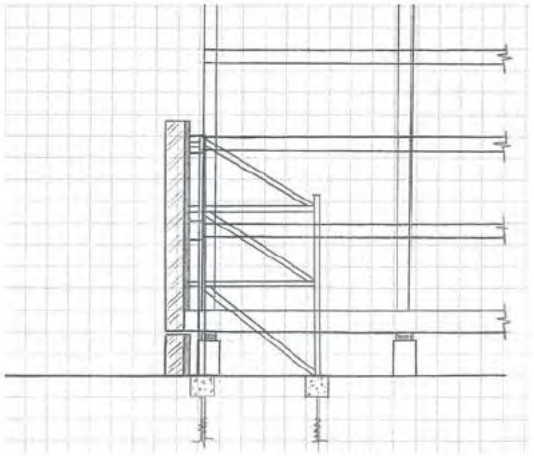
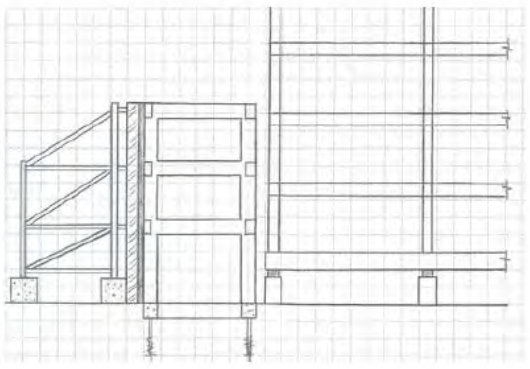
- The façade being detached from the existing foundation and connected to the base isolated main building structure (Options 1A and 1B).
- The façade being independently supported by a purpose built structure separated from the main building structure (Options 2A and 2B).
- The façade being supported by a purpose built structure, however joined to the base isolated new structure (Options 3A and 3B).
- The masonry façades of Blocks 1 and 2 being deconstructed and reconstructed with additional reinforcement (Option 4).
- Replacement of the facades with a Glass Reinforced Fibre (GRC) replica attached to the new building (Option 5).

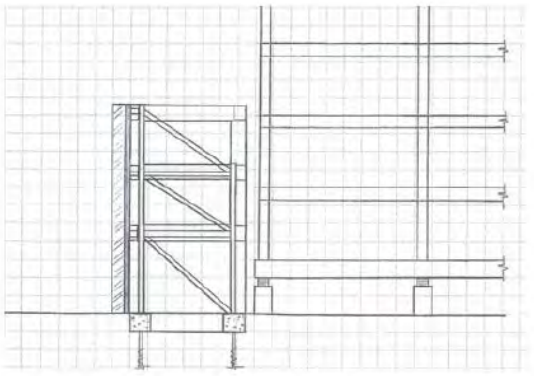
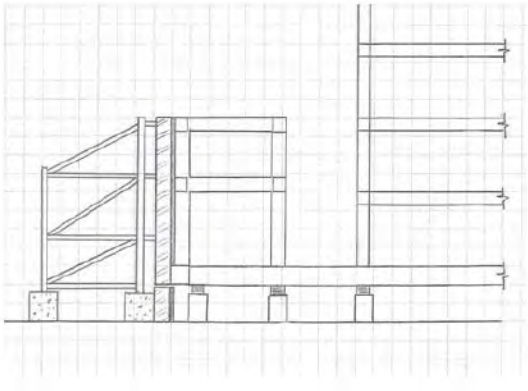
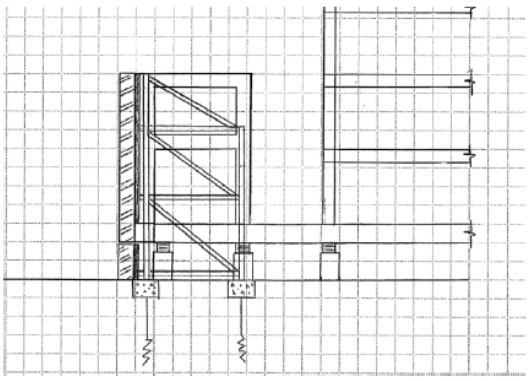
All options involve either temporary support during demolition and construction being provided by a bracing structure on the outside of the façade (street face), or inside of the façade with deconstruction and construction working around the braces. Concepts for an exterior bracing system for the facades are included in Appendix B of the WSP report.

The options also involve providing additional restraint to the masonry facades of Blocks 1 and 2 to prevent collapse or damage in earthquake shaking. This may include providing a grillage of steel fixed into the masonry, a reinforced concrete lining cast onto the back face of the masonry with dowels connecting it to the masonry, a fibre reinforced polymer system, or a hybrid of these options.

The eight options considered are described in **Table 4** below.

Table 4 – Façade Retention Options

Option	Conceptual Arrangement
Option 1A	
This option involves: • Facades cut and base isolated at the same level as the main structure. • The original façade may need to have joints inserted into it to allow for articulation into it to allow for articulation in the upper levels also. The temporary support structure will be erected outside the façade and fixed through the façade before the deconstruction of the buildings behind. The existing buildings will need to be carefully deconstructed in the vicinity of the façade.	
Option 1B	
This option is the same as option 1A except that the temporary support structure is fixed inside the existing building before deconstruction. This solution is possible, although the installation of the temporary support will be onerous. Whilst this system is technically possible, it will create considerable construction difficulties with the sequencing required.	
Option 2A	
This option involves: • The façade having its own independent support structure on piled foundations • Seismic gap to be created between the support structure and the new building. The foundations of the new support structure will have to be carefully considered to make them compatible with the façade. This is likely to involve underpinning the façade.	

Option	Conceptual Arrangement
Option 2B	
This solution is the same as option 2A except that the temporary support structure is fixed inside the existing building before deconstruction. The considerations described above for option 2A would also apply to this solution. Additionally, in this case the new supporting structure will have to be designed and built around the temporary support structure. Careful consideration will have to be given to the levels of main members and positions of bracing to make this possible.	
Option 3A	
This option involves: • The façade having its own independent support structure founded on the base isolation system of the new hospital building. • Façade cut at the base isolation level.	
Option 3B	
This solution is the same as option 3A except that the temporary support structure is installed inside the existing building before deconstruction.	

Option	Conceptual Arrangement
Option 4 – Deconstruct and Reconstruct	
This option involves deconstructing the façade of Blocks 1 and 2 brick by brick and rebuilding them with the new structure. The rebuilt brick walls would have reinforcing in the mortar joints horizontally and in cores through the brickwork vertically to allow them to be supported. This option avoids the need for temporary support.	
Option 5 – Replica Facade	
This option involves: • A Glass Reinforced Concrete (GRC) replica of a façade being made and attached directly to the new building structure. • The GRC would be made in thin panels (approx. 20mm thick) with a steel backing frame. • Joints in between panels allow for movement in a seismic event. • The GRC panels would be mounted on a steel frame attached to the building. This solution has the advantage that the replica façade is lightweight and can be attached directly to the new structure, allowing for more useable space within the new hospital building.	

The various options demonstrate that from a structural engineering perspective it is possible to retain the facades or replicate them. However, there are a number of engineering challenges:

- Any temporary support works will be substantial and if placed on the outside of the site will significantly impinge on the pavements, roads, and buried services of the state highways on Cumberland and Castle Streets. Conversely, while supporting the walls temporarily on the inside is possible, it would add significant complexity to construction, cost, and time.
- It is possible to attach the facades to the new buildings, however, a significant amount of additional structure will be required to achieve this.
- The brickwork facades to Blocks 1 and 2 are in poor condition mainly due to their age and damp penetration over many years, and they will require significant work to improve their integrity. There may also be a residual seismic risk with these masonry facades depending on the level of resilience adopted.
- The site is potentially susceptible to liquefaction. The brick facades of Blocks 1 and 2 have no reinforcing to tie them together and are very vulnerable to ground movement, and so the foundations of these facades will require strengthening which could include underpinning.

Quantity surveyors Rider Levett Bucknall (RLB) have undertaken an assessment of the capital costs of the additional works over and above standard demolition of the buildings that would be needed to implement each of the façade retention options. Its report and subsequent report addendum is included in **Appendix 12**.

A number of exclusions/assumptions have been adopted in undertaking the costings, and notably these include (but are not limited to):

- No allowance has been made for demolition of the existing buildings behind the facades. Additional costs with complex demolition associated with the façade retention options has been accounted for.

- Where piling is necessary, it has been assumed that any permanent structure / underpinning works will be the same as the main building, being to a depth of approximately 40 metres. Temporary piling for option 1B will be shallow piles to a depth of no more than 10 metres, and removed on completion.
- Allowance has been made for the estimated additional cost associated with a potentially piecemeal demolition methodology which will be required to undertake the internal bracing works under Options 1B, 2B, and 3B.
- For option 4, allowance has only been made for the masonry components of Blocks 1 and 2 to be deconstructed and reconstructed. It is assumed that the facades of all other concrete buildings will be retained as per Option 1A.
- No allowance has been made for connection to the new hospital structure, and would be an additional cost for any façade retention option.
- No allowance has been included for architectural / building services works required if facades are to be retained. A significant cost increase is expected to accommodate this.

The estimated total costs for each option are detailed in **Table 5** below.

Table 5 – Summary of Estimated Costs for Façade Retention Options

Option	Estimated Total Cost (ex GST)
Option 1A	$47,000,000
Option 1B	$58,800,000
Option 2A	$63,800,000
Option 2B	$69,000,000
Option 3A	$66,000,000
Option 3B	$74,600,000
Option 4 [6]	$51,000,000
Option 5	$32,600,000

The costs of façade retention are estimated to range from $36.2m to $74.6m, with the costs of each option reflective of the relative level of build complexity. Option 5 is the least costly option, recognising that it does not require retention of the existing facades during construction, and has reduced health and safety risk.

Options 1A, 2A, and 3A which place the temporary support on the exterior of the building cost less than Options 1B, 2B, and 3B which provide support on the inside of the existing facades. This recognises the additional complications of demolition and construction occurring in and around the bracing structure.

RLB has reviewed its cost assessment in light of the completion of the options review and evaluation process and preferred hospital configuration. Its report addendum confirms the minor changes in the configuration have no material impact on the overall quantum of costs estimated.

[6] Option 4 only captures the costs of disassembly and reconstruction of the masonry facades to Blocks 1 and 2 only. Other facades will be supported as per Option 1A.

7.2.3.2 Construction Feasibility of Retaining Facades

Project managers for the project, RCP, have considered the construction feasibility of retaining the facades under the various options. This includes consideration of the foundation works required, temporary support options, connection between the facades and building superstructure, and impact on street utilities and operation of the road network. Their report is included in **Appendix 13**.

There are significant construction challenges with providing the necessary temporary support on the inside of the facades under Options 1B, 2B and 3B. The internal structure of the existing buildings cannot be removed until the bracing is in place, and will need to be located as close as possible to the existing structure, while avoiding windows and doors where there is no structural resilience. Construction of the new hospital would also need to occur in and around the bracing until it is safe for it to be removed. Underpinning works and piling to be driven to provide support to the façade foundations in locations will be highly complex where the bracing structure is in place. Resolving the associated complications may not be feasible, such that the only viable option is to provide the temporary support on the outside of the building.

While simpler from a construction standpoint, placing the temporary support on the outside of the facades has other challenges. In particular, the bracing will cover essential utility services within Cumberland and Castle Streets, and impede the ability to service or repair those utilities during the 6 – 8 years the bracing is in place. The weight of the foundations and frames could also cause damage to in ground services, and some utilities may require relocation prior to works commencing to retain their ongoing resilience. Placing the bracing on the outside of the buildings would also require the closure of one lane of traffic and the existing separated cycle way on both Cumberland and Castle Streets. This will have a significant and sustained impact on traffic flows for the 6 – 8 years the bracing is in place, which may be untenable from a traffic management perspective.

The façade retention options also have implications for the functionality of the proposed hospital design, particularly where a seismic gap or change in floor level occurs. Options 3A and 3B result in a substantial gap between the supporting structure for the facades and the main hospital building which will impact on the efficient transfer of building services to the external portion of the building. Options 2A and 2B results in differential floor levels between the supporting frame for the facades and the main hospital building. Ramps and/or split level lifts would need to be incorporated to provide accessibility, while maintaining seismic separation. Efficient transfer of building services between split levels would also be complex, including ensuring weather tightness at the point of transition.

Several other factors affecting construction feasibility have been identified:

- On site lay down areas for construction works will be constrained by the facades remaining in situ.
- There will be increased duration of construction and disruption to the City.
- There will be elevated health and safety requirements, and increased complexity of construction techniques.

- The proximity to the heritage scheduled ODT building means vibration caused by excavation or driving piles for structural support of the existing façade foundations for Blocks 1 and 2 will need to be very carefully managed. Vibration effects are discussed further in **section 7.4.2** below.

7.2.3.3 Heritage Implications of Façade Retention Options

Underground Overground has considered the heritage implications of the different façade retention options. Its report is included in **Appendix 7**.

Retention of the building façades is not consistent with HNZPT best practice, and would result in them being retained as purely an aesthetic feature that would be unrelated to the structure behind them. This would be amplified where the new structure is a totally different scale to its predecessor. Options that require exterior temporary support bracing, separate the façade through base isolation, or seismically separate the facades from the new structures would also impact the heritage fabric of the facades, and impact on the utility of the remaining heritage structures.

Option 4 involving deconstructing the façade of Blocks 1 and 2 brick by brick and rebuilding them with reinforcing would significantly affect the integrity of the facades and result in the loss of some heritage fabric. As the Cadbury World building was constructed in multiple phases, this would blur the line between the distinct periods of construction. This contravenes the ICOMOS NZ charter, which advocates for minimum intervention, and HNZPT's guidelines. Even at a best-case scenario where each brick was removed, labelled and replaced in its exact position, there would be significant loss to the heritage values and also compromise the integrity of the original construction techniques.

The construction of a replica façade under Option 5 would have the greatest impact on the heritage values of the Cadbury factory buildings as it would result in complete demolition, thus removing all heritage values. The replica facades would only pay homage to the original building rather than provide any protection of cultural heritage values of the site, and would contravene multiple international heritage charters and guidelines.

7.2.3.4 Implications of Façade Retention for the Design and Functionality of the Hospital

CCM Architects memorandum in **Appendix 10** outlines the design considerations that formed part of the Preliminary Site Masterplan process. Warren and Mahoney's statement in **Appendix 11** further outlines the design considerations that have formed part of the recent options review and evaluation, and concept design process. Block and Stack plans forming the initial stages of the concept design process are attached to their statement.

The effective functioning of the ASB and safe and efficient patient care requires adjacency of hospital departments across the ground floor public and emergency care activities, and operating theatre floor above to manage clinical flows. The master plan and design evaluation processes have tested the floor area and clinical adjacency requirements to determine the optimal footprint of the ASB. The resulting building footprint of the ASB is not compatible with the retention of the existing buildings on the site, or scheduled facades.

The clinical activities of the ASB also require very specific ceiling heights and are heavily serviced. These space requirements, plus the structural beam depth determine the floor-to-floor heights. Initial design work incorporating inputs from hydrologists, structural engineers, services engineers, and health planners has confirmed that the required new floors would not align with

the levels of the existing buildings, meaning they are not suitable for efficient adaptive re-use as clinical buildings. Furthermore, existing changes of level between buildings would not allow for easy transfer of patient beds, wheelchairs, and logistics trolleys, which is an important aspect of efficient clinical planning.

The required floor to floor heights of the new ASB would also be incompatible with the window locations on the facades. Retaining the facades would result in interior spaces in the hospital that do not have adequate daylight or views. Misaligned floors would pass across existing façade windows in a way which would not be sympathetic to the existing architecture.

Public access and vehicle drop-off areas are a critical feature of an efficient and effective public hospital. The masterplan and preferred hospital configuration propose the building be set back from Cumberland Street, and formal landscaped drop-off area established at the hospital front door. The preferred configuration also for safety reasons separates the public drop-off area from the emergency vehicle corridor. The truck access is located at the southern end of the site. Hydrology studies indicate that a raised ground floor level approximately 2 metres above street level will be required to mitigate flood risk. This will necessitate considerable ramping from the road to enable vehicles to access the building. Retention of the existing buildings or facades would severely compromise the ability to accommodate these access ways, which would in turn adversely impact the safe and efficient circulation of vehicles and pedestrians through the site.

Overall, while the preferred configuration allows for the retention of the Dairy and Machine House building, it cannot practically accommodate retention of any other buildings or the facades. Retention of the existing facades would severely compromise the optimal design and clinical performance of the hospital.

7.2.3.5 Overall Assessment of Retaining Facades

WSP has undertaken a qualitative comparative evaluation of each of the façade retention options and a baseline “no façade retention” option, based on a range of criteria. The evaluation, which has been informed by their engineering knowledge and other technical assessments outlined in this AEE, is included in their report and subsequent report addendum in **Appendix 6**. The criteria considered include:

- Cost of façade retention, including associated with temporary support during demolition and construction, increased complexity of the hospital design, and time related costs.
- Construction time.
- Impact on heritage, including impacts of additional structural support and building connection on heritage fabrics, and reversibility.
- Impact on hospital, including loss of usable area, functionality, daylight, and views.
- Buildability, in terms of how difficult it will be construct.
- Traffic disruption during construction.
- Seismic resilience.
- Health and safety risk has been factored into the other criteria above.

The outcomes of the evaluation are summarised in a Red, Amber, Green (RAG) model, where red indicates the least favourable option, green indicates the most favourable option, and amber indicated some level of impact. The RAG evaluation is summarised in **Figure 8** below.

Figure 8 – RAG Evaluation (from WSP)

Consideration	Option								
	Baseline	1a	1b	2a	2b	3a	3b	4	5
	New Hospital 'Clear' Site							Deconstruct and Reconstruct	GRC Replica
Cost	G	A	R	A	A	R	R	R	A
Time	G	A	R	A	R	A	R	R	G
Impact on Heritage	R	A	A	A	A	A	A	R	R
Impact on Hospital	G	R	R	R	R	R	R	R	A
Buildability	G	A	R	G	R	A	R	A	G
Traffic Disruption	G	R	G	R	G	R	G	G	G
Seismic Resilience	G	A	A	R	R	A	A	A	G

All the options considered have at least one Red score, and all the options have at least one Amber severe limitation. This is in comparison to the baseline "no façade retention" option which only has one Red score for impact on heritage. The evaluation demonstrates that while it is possible to retain the façades, their retention will affect the layout and usage of the site, and both the extent and complexity of the construction work required. This will have significant cost, programme and health & safety implications.

WSP has reviewed the RAG assessment in light of the completion of the design evaluation process and preferred hospital configuration. Its report addendum confirms that the minor changes in the configuration have no material impact on the RAG assessment.

Overall taking into account the various technical assessments discussed in **sections 7.2.3.1 – 7.2.3.4** above, it is not considered practicable for the buildings or facades to be retained and incorporated as part the hospital development, due to a range of design, seismic risk, construction feasibility, and cost considerations. In summary retention of the buildings and facades (other than the Dairy and Machine House building) would:

- Significantly impact on the optimal design and functionality of the new hospital in terms of safe and efficient clinical use and flows, public and vehicle access (including for emergency vehicles), alignment of floor levels and fenestration, building services, management of risks from flooding and remaining earthquake prone buildings, and flexibility for expansion.

- Whilst having less impact on heritage values than total demolition of the facades, retention of the facades under Options 1 – 4 is not consistent with HNZPT best practice, and would result in them being retained as purely an aesthetic feature that would be

unrelated to the structure behind them. They would also to varying degrees impact the heritage fabric of the facades. Construction of a replica façade under Option 5 would remove all heritage values and contravene heritage charters and guidelines.

- Result in the retention of the masonry facades of Blocks 1 and 2, which may have a residual seismic risk following strengthening that would not be appropriate for a site which is essential to post-disaster recovery (except for Option 5).

- Significantly impact on the construction feasibility of the hospital as a result of the temporary facade support structure adding to construction complexity, impedance of in ground utilities, and sustained disruption of state highway traffic flows which may be untenable. Furthermore, it will add construction complexity, elevate health and safety requirements, and significantly increase the duration of construction.

- Result in significant additional build costs, irrespective of the façade retention option, that range from an estimated $36.2m to $74.6m.

7.3 Effects on Heritage Values

Underground Overground has assessed the effects of the demolition of the scheduled heritage facades on their identified heritage values summarised in **section 4.3.3**. Their report is included in **Appendix 7**.

The assessment of effects on heritage values is based on the three-stage approach adopted by ICOMOS. The assessment has considered the level of significance and the magnitude of the impacts against the heritage values to provide a determination of the significance of effects. The proposed actions have then been evaluated according to the district plan rules, best practice recommendations (including from HNZPT guidelines), the importance of the buildings or structures, their condition, potential for alternative use, and the benefits of the redevelopment.

The overall assessment of heritage values in **section 4.3.3**, has shown the former Cadbury factory buildings to have medium significance. Generally, the buildings have high historic value for connections to past individuals and companies, and high architectural values for rarity. One building (the Biscuit and Dispatch Building) has high architectural integrity in that it retains significant features from its time of construction, and later periods when key additions were carried out, while the remainder of buildings have low to moderate integrity values. The assessment otherwise found that the buildings and their facades had low architectural merit (in matters other than rarity), moderate representativeness values and moderate context/group value.

The Dairy and Machine House building will be retained and adaptively reused as part of the hospital redevelopment for non-clinical purposes. Although the building has low architectural merit, the building footprint and façade represent the changing functions of the building since it was first constructed in 1868 (small mill) and 1875 (cellar). While the building has been continuously adapted for different functions, the building has retained its Victorian industrial form and elements of the nineteenth century building remain. The façade reflects its later adaption in the early twentieth century as part of Hudson's confectionery factory and was restored to this period in the 2010's. Despite no longer retaining historic fabric, the reconstructed façade provides a historical connection to the building and its past use in a form that can be seen and appreciated by the public. There are few buildings in New Zealand that are associated with a whiskey distillery, brewery and confectionery manufacture and culturally and historically the building holds ties to the entire history of the wider site and these functions.

The retention and adaptive reuse of the Dairy and Machine House Building is assessed as having an overall **moderate beneficial effect** on heritage values. Most significantly in terms of positive benefits, the building will be retained, maintained and actively utilised as part of the new hospital, bringing new life into not only the building but the entire site. It is yet known how much of the building will be altered, however the main form of the building will be retained as will the recently restored frontage. The former ties the building to its earliest functions as part of a whiskey and distillery while the latter ties the building to its use as part of the confectionary manufacturer.

Demolition of all the remaining Cadbury factory buildings is assessed as having a **major adverse effect** on heritage values of the Cadbury factory buildings as an overall complex, as there is total alteration of key historic building elements and a comprehensive change to the setting. Demolition will result in the physical loss of six of these buildings which have heritage significance. It will also reduce the contextual value of the Dairy and Machine House Building that will remain on site. The statutory protections under the 2GP are focused on the façades of these buildings. Architectural merit (being one facet of architectural value) of the façades however contributes the least to their overall heritage value. Their most significant heritage value instead lies in their architectural rarity and their connection to individuals and companies of historic importance. While the impacts on these values cannot be removed or completely remedied, the adverse effects can be reduced through implementation of appropriate mitigation measures to mitigate the major adverse effect of demolishing the buildings and facades on heritage values.

Underground Overground have recommended a number of mitigation measures, in order to reduce the severity of the adverse effects on heritage values. The recommended mitigation measures include:

- Retention of one or more complete buildings to offset the loss of other heritage values, specifically the Dairy and Machine House Building and/or Cadbury World building.
- Consideration be given to preservation of the protected facades of the buildings cannot be retained.
- For buildings that are retained and adaptively reused, a record of alterations to historic fabric is compiled and a cyclical maintenance plan developed. Works should be guided by an updated conservation plan with interventions kept to a minimum and modelled prior to any work so that they have the least effect possible.
- The New Zealand Heritage List/Rārangi Kōrero and the DCC 2GP be updated to protect the façade and envelope of the Dairy and Machine House Building.
- Detailed building recording is undertaken for the heritage buildings to be demolished. Recording of pre-1900 buildings will be required under the HNZPTA 2014 and cannot be seen as mitigation under the RMA process. It is recommended for any post-1900 building to be demolished, that it be recorded to a Level II standard as defined by HNZPT (2018).
- A demolition plan is in place to ensure there are no adverse effects to heritage buildings within the complex or in the surrounding area.
- Salvage and reuse of heritage building materials within the new build occurs or are provided to interest groups where appropriate.
- Preservation of historical or archaeological features in situ for incorporation into the new hospital development; either displayed in the new buildings or part of the wider landscaping of the block.
- Include measures to engage the public during demolition and redevelopment, such as active hoardings with viewing areas and public interpretation.

- Targeted public interpretation within the hospital complex. This can be achieved through the display of material, items, stories, within an area(s) of the new build/campus – way finding, reuse of materials in street furniture, and signage, within the campus or buildings.
- The hospital design considers the heritage values of the heritage buildings remaining on the block along Cumberland and Castles Street and consider massing, setback and textures that contribute to streetscape and encourage movements of people and connections to other key locations.

With the adoption of these mitigation measures, including retention of the Dairy and Machine House building, the demolition of the Cadbury factory buildings is overall assessed as having a **moderate** adverse effect on heritage values. The Ministry of Health has committed to the recommended mitigation measures set out below:

- Retention and adaptive reuse of the Dairy and Machine House building, guided by a conservation plan and cyclical maintenance plan prepared by a qualified heritage specialist, and recording of alterations to heritage fabric.
- The Ministry supports updating of the New Zealand Heritage List – Rārangi Kōrero and 2GP to protect the façade of the Dairy and Machine House building.
- Detailed building recording of any buildings to be demolished to a Level II standard defined by HNZPT (2018).
- Inclusion of measures in the Demolition Management Plan to ensure there are adverse effects on the structural integrity and heritage vales of surrounding heritage buildings.
- Preservation where practicable and reasonable of significant historical or archaeological features for incorporation into the new hospital development, either displayed in the new buildings or part of the wider landscaping of the block with interpretative signage, where it would not compromise clinical or functional outcomes.
- Salvage and reuse of heritage building materials where practicable and reasonable within the new hospital and where it doesn't compromise clinical or functional outcomes; or otherwise provided to interest groups where appropriate.

Conditions of consent reflecting the above are set out in **section 7.5** that are proposed to be included on any resource consent to mitigate adverse effects on heritage values.

The relationship with other surrounding heritage buildings, including with respect to massing, setbacks, and textures relates to the design of the new hospital and therefore is unable to be addressed through this application to demolish the former Cadbury Factory buildings. These are matters will be considered through the continued design process for the layout and design of the Acute Services Building (ASB).

7.4 Effects of Demolition Activities

7.4.1 Demolition Management Approach

As outlined in **section 5.1.2** above, demolition will be undertaken in accordance with a Demolition Management Plan (DMP) containing a suite of associated management plans. The DMP will be prepared in conjunction with the appointed demolition contractor, and submitted to Dunedin City Council for approval prior to work commencing. The DMP will set out the intended sequence,

methods, and best practice environmental and site safety controls for demolition, to ensure any effects on the surrounding environment and activities are appropriately avoided or mitigated.

The DMP will incorporate environmental and health and safety controls to ensure:

- Asbestos is removed in accordance with the applicable regulations and codes of practice.
- The amount of waste generated that is sent to landfill is minimised, and hazardous materials and other waste sent to landfill is disposed at consented facilities with the appropriate waste acceptance criteria.
- There are no adverse effects on the structural integrity and heritage vales of surrounding heritage buildings.
- Noise and vibration are mitigated, particularly for surrounding activities.
- The safety of the public and site workers, particularly on adjacent sites and roads.
- The safe and efficient operation of the transport network, including management of truck movements, traffic/cycle lane relocation and closures, and pedestrian routes.
- Dust nuisance is supressed/minimised, and the tracking of sediment off the site or into the Council reticulated stormwater network is avoided.

The specific management measures will be outlined in the DMP and associated management plans. Overall, any adverse effects from demolition will be periodic and temporary in duration. Undertaking demolition in accordance with the DMP approved by DCC, will ensure any adverse effects on the surrounding environment and activities are appropriately mitigated as far as is practicable.

Conditions of consent set out in **section 7.5** that require preparation of the DMP for Council certification prior to works commencing.

The management of noise and vibration effects, and effects on the transport network during demolition are more specifically addressed in the following sections.

7.4.2 Noise and Vibration Management

The Noise and Vibration Assessment Report from Marshall Day Acoustics (contained in **Appendix 5**) assesses the noise and vibration effects of demolition activities on surrounding activities, including sensitive activities. The assessment is based on the guidance on the appropriate management and mitigation of demolition noise contained in New Zealand Standard *NZS 6903: 1999 Acoustics - Construction Noise,* on which the District Plan noise limits are based. Vibration has been assessed based on the criteria in German standard *DIN4150-3:2016 Vibration in Buildings – Part 3: Effects on Structures*.

While demolition noise is usually undesirable, exceedances of the applicable noise limits can be unavoidable in some situations. *NZS 6803: 1999* acknowledges that such exceedances are often considered reasonable if they are of a limited duration and best practicable option measures are implemented to avoid, remedy and mitigate the noise emissions as far as practicable.

In order to assess noise effects from the demolition works, the likely worst case predicted noise levels have been calculated at the façade of surrounding receiving buildings in accordance with NZS6803:1999. The calculated predicted noise levels are set out in **Table 7** below, and includes the required façade setback for the 70dBA L_{Aeq} day time long term duration noise limit under Table

1 and 2 of Rule 4.5.4.1(a) of the 2GP to be achieved. The 'daytime' limit applies between the hours of 7.30am – 6.00pm within which the majority of works will occur.

Table 7 – Indicative noise levels at 1m from a building façade (incl. effective barrier mitigation).

Activity	Activity level dB L_{Aw}	Activity mitigation dB	Façade noise level, dB LA_{eq} at distance, m					Required setback, m (70 dBA)
			5m	10m	20m	50m	100m	
Inspection	104	20	65	59	53	43	36	3
Soft strip out	107	10	78	72	66	57	49	13
Hard demo (low building)	108	0	89	83	77	67	60	38
Hard demo (high reach)	110	0	91	85	79	69	62	47
Hard demo (cut and crane)	108	0	89	83	77	68	60	41
Specialist demo (high reach)	107	0	88	82	76	66	59	36
Specialist demo (minor plant)	102	0	83	77	71	62	54	23

The noise levels received at surrounding buildings will also be influenced by the potential overlap of the demolition with other demolition occurring on other hospital project sites. The extent to which overlap will occur is contingent on consents being obtained, and work progress. The worst case predicted cumulative noise levels at the most sensitive receivers are set out in **Table 8** below. This takes into account the potential overlap of demolition of the Cadbury factory buildings with programmed foundation removal on the Wilsons block.

Table 8 – Cumulative noise levels at most sensitive receivers

Receiver	Critical period	Activities	Noise level, dB L_{Aeq}		
			Cadbury Factory	Wilsons	Combined
262 Cumberland Street (Countdown)	Aug 2020 – 2 weeks	Cadbury factory soft strip out	65		65
137 St Andrews Street (Victoria Hotel)	October 2021 – 1 week	Cadbury factory high reach demolition, and Wilsons block foundation removal	60	75	75

85 Castle Street (Fire station)	October 2021 – 1 week	Cadbury factory high reach demolition, and Wilsons block foundation removal	60	75	75
25 Great King Street (Police station)	August 2021 – 2 weeks	Cadbury factory high reach demolition	75		75
25 Great King Street (Police station)	May 2021 – 3 weeks	Cadbury factory top down demolition	74		74
261 Cumberland Street (Countdown)	November 2021 – 2 weeks	Cadbury factory high reach demolition	75		75
3 Anzac Avenue (Apartments)	January 2022 – 3 days	Cadbury factory high reach demolition	75		75

The predicted noise levels are conservative and represent the likely worst-case for each activity and at the highest or worst affected floor of the receiving building. In reality, the predicted levels will not be experienced on a continuous basis for the duration of the project and relief will be afforded to receivers as the levels and locations of activities vary. Minimal noise mitigation has also been assumed in the predicted noise levels. (e.g. hoardings, and interim screening by retained facades). Additional mitigation should achieve noise levels lower than those predicted.

The predicted worst case cumulative noise levels in **Table 8** above demonstrate that the 70dBA day time long term duration noise limit under Table 1 of Rule 4.5.4.1(a) of the 2GP will potentially be exceeded at a small number of noise sensitive receivers by up to 5dB L_{Aeq}, namely:

- 261 Cumberland Street (Countdown)
- 137 St Andrews Street (Victoria Hotel)
- 85 Castle Street (Fire station).
- 25 Great King Street (Police Station).
- 3 Anzac Avenue (Apartments)

The recorded ambient day time noise levels are in excess of 70dB L_{Aeq}, and therefore the effects from small exceedance of the noise limits at these sensitive receivers is considered to be low, compared within a quieter residential environment. Buildings further away will receive lower noise levels due to the greater separation distance and because of acoustic screening from intervening structures.

The ODT building is the only building immediately adjoining the demolition work. Noise levels received at this building from work on the wider site will remain well below 50dBA L_{Aeq} until deconstruction of the adjoining Cadbury World building commences. Deconstruction will result in noise levels of between 83 and 88 dB L_{Aeq} (at 5 metres), however internal noise levels within the building are expected to remain below 50dB L_{Aeq}.

During any remediation works to the wall of the ODT building, internal noise may be higher as a result of structure-borne transmission of noise (e.g. from hammering or drilling on the opposite side of the wall). Works on the wall will however only be for a short period at the end of the demolition programme. Similarly, the removal of the structure that forms the courtyard wall is likely to result in a short period of elevated noise levels as the wall is taken down.

Deconstruction activities across the site will not generally occur at night between the hours of 6.00pm – 7.30am, and therefore an appropriate noise environment for adequate protection of sleep will be provided at surrounding sensitive activities. Night-time activities will only occur where emergency works are required to protect public health and safety, or to accommodate the requests of specific stakeholders (e.g. undertaking high-impact works while an adjacent commercial premise is unoccupied). Such works are expected to be infrequent, if required at all. Prior notification of affected residents will take place prior to any night time work being undertaken.

Vibration from demolition works are expected to comply with standard *DIN4150-3:2016 Vibration in Buildings – Part 3: Effects on Structures* where receivers are on the opposite side of the roads to the worksite. However, vibration received at the ODT building adjoining the site will not comply with the standard.

The DMP prepared in conjunction with the appointed demolition contractor will include a Noise and Vibration Management Plan (NVMP) aimed at ensuring noise and vibration from demolition are mitigated so as to be reasonable, particularly for surrounding activities. The NVMP will be submitted to DCC prior to works commencing, and will include:

- The performance standards that must, where practicable, be complied with.
- Predicted noise and vibration levels for relevant equipment and/or activities.
- Mitigation considerations to identify the best practicable option with respect to deconstruction noise and vibration.
- Noise and vibration monitoring requirements, with triggers and feedback mechanisms.
- Communication, consultation and complaints response protocols.

Marshall Day Acoustics has produced a draft NVMP which is attached as Appendix F to the Noise and Vibration Assessment Report in **Appendix 5**. The final plan will include specific measures for managing periods of higher noise levels and vibration experienced at critical receivers, including:

- Noise received at the Dunedin Fire Station crew sleeping quarters, recognising that fire personnel may have unconventional sleep patterns. Management measures will be developed in liaison with Fire and Emergency New Zealand.
- Noise received in the office areas of the ODT building during remedial works to the facade.
- Vibration received at the ODT building, including sensitive working areas, and vibration sensitive equipment such as the printing press. This will include monitoring of the building for structural and cosmetic damage.

Overall, adverse noise and vibration effects will be of a low scale and intensity with the exception of vibration effects for the ODT building during demolition of the Cadbury World building, and noise effects for the same building during remedial works to the façade.

All demolition works will however be periodic and temporary in duration. They will also predominately occur only during day time hours when ambient noise levels are already highly elevated by traffic noise. Undertaking demolition in accordance with an NVMP approved by DCC,

will ensure any adverse noise and vibration effects on the surrounding environment and activities are appropriately mitigated as far as practicable, so as to be reasonable.

Conditions of consent are set out in **section 7.5** that are requires preparation of the NVMP for Council certification prior to works commencing.

7.4.3 Traffic Management

Demolition will require temporary closure of the footpaths adjacent to the site, and potentially require temporary relocation or partial closure of traffic/cycle lanes to provide a work zone for demolition machinery, and public and site worker safety.

The width of the work zone will be kept to the minimum necessary to ensure the operation of the road network returns to normal as quickly as possible. It is anticipated that the exterior work will occur quickly and the work zone reduced as the building is lowered in height.

Vehicles for transporting waste are anticipated to approach the site from the south along Cumberland Street, and depart from the north along Castle Street. However, depending on the final location of waste recycling and disposal sites, the access and egress routes may operate in reverse.

The DMP prepared in conjunction with the appointed demolition contractor will include a Traffic Management Plan (TMP) aimed at ensuring the safe and efficient operation of the transport network during deconstruction, including management of truck movements, traffic/cycle lane relocation and closures, and pedestrian routes. The TMP will be submitted to NZTA and DCC as the road controlling authorities prior to works commencing.

The Ministry of Health's transport advisors (Stantec) have engaged with NZTA and DCC's transport staff to agree key principles that will be used for traffic management during deconstruction, and which will form the basis for the measures included in the TMP. Those principles include:

<u>Pedestrians</u>

- The footpaths adjacent to the site can be closed for the duration of the works. One footpath on St Andrew Street must remain open at all times. Uncontrolled mid-block crossing of the roads by pedestrians is to be prevented.

<u>Vehicular Traffic</u>

- A temporary speed limit of 30km/hr can be imposed.
- All on street parking on Cumberland and Castle Streets can be removed and used for temporary relocation of the live traffic lanes.
- The traffic lanes and cycle lane on Cumberland and Castle Streets can be moved across laterally into the vacated on-street parking area during the inter-peak period of 10.00am – 3.00pm when the building façade is being deconstructed. Two vehicle lanes and the cycle lane must be maintained during this time.
- Cumberland and Castle Streets can be reduced to one traffic lane during the inter-peak period of 10.00am and 3.00pm on a strictly limited number of occasions when the building façade is being deconstructed, subject to NZTA approval.
- Cumberland and Castle Streets can be reduced to one traffic lane between 7.00pm – 7.00am Monday to Saturday when the building façade is being deconstructed.

- Short term closure of roads can occur between 7.00pm – 7.00am on Saturdays and Sunday's with appropriate detours in place and advance warning being given to key stakeholders and emergency services. St Andrew Street must continue to be able to be accessed by emergency vehicles.
- Heavy vehicles must be detoured through signal-controlled intersections. Heavy vehicles must not use local roads (e.g. Lower Stuart Street, or the right turn slip lane south of the Leviathan Hotel).
- The access to the Central Police Station must remain unobstructed.
- The bus stop adjacent to Countdown Supermarket on Cumberland Street can be moved south towards Stuart Street. The bus stop adjacent to 45 Castle Street can be closed off for intermittent periods for façade demolition work.

Cycle Lanes

- The separated cycle lane must be retained on the right hand side of the live vehicle lanes on both Cumberland and Castle Streets, however the lateral position may be moved across where the on-street parking is removed and separation provided. The current level of service for cyclists must not be significantly reduced, and conflict points with demolition vehicles must be minimised.
- When operation of Cumberland and Castle Streets is reduced to one lane under a speed restriction between 7.00pm and 7.00am, relocation of the cycle lane using a 1.2m coned lane may be possible. If the roads are closed for a short period, any detours must provide safe treatment for cyclists.
- Stop/go traffic control will be required when demolition vehicles cross the cycle lane to enter or exit the site. There must be no parking of trucks within the cycle lane whilst waiting to enter the site.

Overall, any adverse transport effects will be periodic and temporary in duration. Undertaking deconstruction in accordance with an TMP approved by DCC, will ensure any adverse transport effects on the surrounding environment and activities are appropriately avoided or mitigated as far as practicable.

Conditions of consent are set out in **section 7.5** that are requires preparation of the TMP for Council certification prior to works commencing.

7.5 Summary of Mitigation and Monitoring Proposed

Clauses 6(1)(e) and (g) of Schedule 4 of the RMA, requires a description of the mitigation measures and monitoring that will be undertaken. These are described above. Based on that assessment, the following conditions of consent are volunteered to be included in any resource consent to avoid or mitigate any adverse effects of the activity.

General:

1. *The demolition works shall be undertaken in general accordance with the information submitted in the resource consent application, prepared by Boffa Miskell Ltd, dated 11 June 2020, except where modified by the following conditions.*
2. *The Dairy and Machine House building shall be retained.*

Conditions to be met prior to demolition commencing:

3. *Detailed building recording of the Cadbury Factory buildings shall be completed by a suitably qualified heritage practitioner to a Level 2 standard defined by Heritage New Zealand – Pouhere Taonga. The record shall be provided to the Dunedin City Council and Heritage New Zealand – Pouhere Taonga within 6 months of the completion of demolition.*

4. *Each building to be demolished shall be surveyed by a suitably qualified heritage practitioner to identify significant historical or archaeological features and historic building materials that are able to be salvaged for either reuse in the hospital development, or made available to the wider community.*

5. *A Demolition Management Plan (DMP) shall be submitted to rcmonitoring@dcc.govt.nz and approved by the resource consent manager. This plan must include:*

    - *An Asbestos Removal Control Plan outlining how asbestos will be removed from buildings in accordance with the Health & Safety at Work (Asbestos) Regulations, and WorkSafe NZ Approved Code of Practice (ACOP).*

    - *A Waste Management Plan outlining how the amount of waste sent to landfill will be minimised, and ensures hazardous materials and other waste sent to landfill is disposed at consented facilities with the appropriate waste acceptance criteria.*

    - *A Heritage Protection Plan, prepared by a suitably qualified heritage practitioner outlining how works will be conducted to ensure there are no adverse effects on structural integrity and heritage values of surrounding heritage buildings, and in particular the Dairy and Machine House building, and the Allied Press (Otago Daily Times) Building.*

    - *A Noise and Vibration Management Plan prepared by an acoustic specialist that outlines how noise and vibration will be mitigated during demolition activities, and addresses NZS6803: 1999 "Acoustics – Construction Noise" and DIN 4150-3:2016 "Vibration in buildings – Part 3: Effects on structures". The plan must include measures for:*

        - *Higher noise generating activities that cannot practically comply with the noise limits in NZS6803: 1999 "Acoustics – Construction Noise".*

        - *Noise received at the Dunedin Fire Station crew sleeping quarters, developed in consultation with Fire and Emergency New Zealand.*

        - *Noise received in the office areas of the ODT building during remedial works to the facade.*

        - *Vibration received at the ODT building, including sensitive working areas, and vibration sensitive equipment such as the printing press, including monitoring of the building for structural and cosmetic damage.*

    - *A Site Specific Safety Plan outlining how hazards will be managed to ensure the safety of the public and site workers.*

    - *A Traffic Management Plan outlining how truck movements, traffic/cycle lane relocation and closures, and pedestrian routes will be managed to ensure the safe and efficient operation of the road network.*

- *Controls to supress and minimise dust nuisance, and avoid the tracking of sediment off the site or into the Council reticulated stormwater network.*

Conditions to be met during demolition:

6. *Significant historical or archaeological features and historic building materials identified for salvage under condition 4 above, are to be carefully removed and securely stored for potential reuse in the hospital development, or made available to the wider community.*

7. *All site works and demolition must be undertaken in accordance with the approved Demolition Management Plan required by condition 5 above.*

8. *The undertaking of demolition works must be limited to between 7.30am and 6.00pm, Monday to Saturday (inclusive). No demolition work may occur outside of these times, on Sundays, or public holidays, except where emergency works are required to protect public health and safety, or to accommodate the requests of specific stakeholders.*

9. *Noise from demolition works must comply where practicable with the recommended residential and commercial noise limits for long term construction outlined in Tables 1 and 2 of NZS6803: 1999 "Acoustics – Construction Noise". Where compliance is not practicable, demolition works must be undertaken in accordance with the measures for managing higher noise generating activities that are identified in the Noise and Vibration Management Plan required by condition 5 above.*

Conditions relating to future site development:

10. *Within 6 months following the commencement of demolition of Cadbury Factory buildings, and prior to any work being undertaken to the Dairy and Machine House Building:*

    - *A Conservation Plan shall be prepared by a suitably qualified heritage practitioner to provide guidance for the adaption, repair, restoration, execution of works, and maintenance of the Dairy and Machine House building in a way that ensures interventions to heritage fabric of the building are sympathetic and kept to a minimum.*

    - *A Cyclical Maintenance Plan shall be prepared by a suitably qualified heritage practitioner which sets out routine maintenance actions to be undertaken to ensure preservation of heritage fabric of the Dairy and Machine House building.*

11. *Where re-use of the stored significant historical or archaeological features and historic building materials as part of the hospital redevelopment is not practicable or reasonable or would compromise clinical and functional outcomes, the features and materials shall be securely stored and made available to the wider community for a minimum of 2 years following the completion of the hospital development on the site.*

Advice Notes:

a. *Prior to submitting the Traffic Management Plan required as part of condition 5, the plan should be provided to NZTA for review; and any feedback incorporated into the plan before it is submitted to the DCC for approval.*

7.6 Overall Evaluation of Environmental Effects

Having regard to the matters set out in the assessment above, it is considered that the demolition of the former Cadbury Factory buildings will have a range of environmental effects which are both beneficial and adverse in nature.

The assessment has outlined the alternatives to demolition of the Cadbury buildings, and their scheduled street facades. This demonstrates that demolition is the only practicable option and that the alternatives are not reasonable. Specifically:

- The assessment of hospital redevelopment and site options has determined that it would not be practicable to redevelop the existing hospital, and that the Cadbury and Wilsons blocks best meets the functional and operational needs of a new replacement hospital.
- The assessment of options undertaken though the masterplan process determined that locating the ASB on the Cadbury block would best integrate with surrounding urban context, and meet the functional and operational needs of a new replacement hospital. That has been reaffirmed through the recent design options and evaluation process. Development will be required across the entire Cadbury block, with the exception of the location of the Dairy and Machine House building.
- Retention of the buildings or facades would not be practicable as it would significantly impact on the optimal design and clinical performance of the new hospital, result in residual seismic risk, significantly impact on the construction feasibility of the hospital, and result in significant additional construction costs.

The loss of the existing buildings with their scheduled street facades is assessed as having a major adverse effects on heritage values. This will however be mitigated in part to reduce the severity of the adverse effects by retaining the Dairy and Machine House building which will provide a significant historical connection to the past uses of the site dating from 1868 to the present. The loss of heritage will also be mitigated by adopting a range of other measures including pre-demolition recording, and salvage of significant historical or archaeological features, and historic materials for reuse in the hospital redevelopment where practicable and reasonable, or use by wider community. With the adoption of these mitigation measures, the adverse effects on heritage will be reduced to a moderate adverse effect.

Regardless of whether this mitigation is provided, the loss of heritage values will be substantially offset through the significant healthcare benefits of the replacement hospital. The new hospital will provide modern fit for purpose tertiary healthcare facilities serving the entire SDHB region that will address the serviceability, disaster resilience, and patient care deficiencies associated with the existing hospital. The new hospital will provide an optimised spatial layout and medical facilities that will be more efficient, adaptable, flexible, resilient and cost effective than the current facilities. The new hospital will enable rolling out of modern models of care, including technology innovations. The new hospital will also be designed to integrate with the surrounding urban environment, incorporate Kāi Tahu cultural elements, and support urban regeneration in this part of the central city, providing a catalyst for further redevelopment. Such a regeneration outcome could be less certain if the Cadbury factory buildings were to remain without significant investment that provides for their adaptive reuse.

Demolition related effects, including noise, vibration, and traffic will at times be disruptive for surrounding properties and transport network users. However, they will be periodic and temporary in duration, and mitigated as far as practicable in accordance with best practice measures contained in a Demolition Management Plan provided to the DCC prior to demolition commencing. Demolition noise will be reasonable with this mitigation.

Given the above, it is considered that the environmental effects of the proposed demolition overall will be minor. The significant benefits of the hospital development that will serve the entire SHDB region are considered sufficient to offset the associated loss of heritage values, noting that all practicable efforts have been made to retain heritage, and mitigate for that loss.

8.0 Statutory Assessment

In accordance with Section 104(1) of the Resource Management Act 1991 ('RMA'), this part of the application addresses the following statutory documents, and other matters, which are relevant to the assessment of this proposal:

Statutory Documents (S104 (1)(b))

- Proposed Dunedin Second Generation District Plan (2GP).
- Operative Dunedin City District Plan (Operative District Plan).
- Partially Operative Proposed Otago Regional Policy Statement (Proposed RPS).

Other Matters (S104 (1)(c))

- Dunedin Central City Plan.
- Heritage Strategy for Dunedin City.

8.1 Proposed Dunedin Second Generation District Plan (2GP)

The relevant provisions of the 2GP are contained in the following sections of the Plan:

- Part A, Plan Overview and Strategic Directions, Section 2 Strategic Directions.
- Part B, City Wide Activities, Section 4 Temporary Activities.
- Part B, City Wide Activities, Section 6 Transportation.
- Part C, City Wide Provisions, Section 9 Public Health and Safety.
- Part C, City Wide Provisions, Section 13 Heritage.
- Part D, Management Zones, Section 18 Commercial and Mixed Use Zones.

The objectives and policies of the 2GP relevant to this application are set out in full in **Appendix 14.** Several of those provisions are identified as being subject to appeal and therefore cannot be given full weight over any equivalent objectives and policies in the Operative Dunedin City District Plan. Where provisions are subject to appeal, the equivalent objectives and policies of the Operative District Plan have been assessed in **section 8.2** below.

The relevant 2GP objectives and policies are assessed in the following sections.

8.1.1 Heritage Provisions

The relevant 2GP objectives addressing heritage matters are as follows:

- *Objective 2.4.1 – Form and structure of the environment – The elements of the environment that contribute to residents' and visitors' aesthetic appreciation for and enjoyment of the city are protected and enhanced. These include: c. built heritage, including nationally recognised built heritage.*
- *Objective 2.4.2: Heritage – Dunedin's heritage is central to its identity and is protected and celebrated as a core value of the city, through the heritage conservation of important heritage items, and the maintenance and active use of built heritage.*
- *Objective 13.2.1 – Scheduled heritage buildings and structures are protected.*
- *Objective 13.2.4 – Dunedin's archaeological sites are protected from inappropriate development and use.*

These objectives provide relatively strong direction to protect, retain, and actively use built heritage; and protect archaeological sites from inappropriate development and use. The supporting policies to implement these objectives however qualify the extent to which built heritage is to be protected, retained, and used. In particular, the policies provide for demolition *'in limited circumstances'* (policy 2.4.2.1(a)(ii), or where *'criteria are met'* as set out in policy 13.2.1.7 below:

a.

i. the building or part of the building poses a significant risk to safety or property; or

ii. the demolition is required to allow for significant public benefit that could not otherwise be achieved, and the public benefit outweighs the adverse effects of loss of the building; and

b.

iii. there is no reasonable alternative to demolition, including repair, adaptive re-use, relocation or stabilising the building for future repair.'

Taken together these objectives and policies are considered to generally seek protection of built heritage from demolition. The requirement for protection however is not absolute, and demolition may be appropriate in limited circumstances where there is a significant risk to safety or property, or demolition is required to allow for a significant public benefit that outweighs the loss of the building, and there is no reasonable alternative to demolition.

These matters have all been addressed in **section 7.0** of this application. None of the Cadbury factory buildings in their current state are considered to pose a significant imminent risk to safety or property, and therefore demolition is not being advanced under criteria (a)(i) of policy 13.2.1.7.

However, the criteria (a)(ii) and (b) of policy of 13.2.1.7 are met by the proposal. The demolition will provide for a significant public benefit, being a new replacement hospital providing fit for purpose healthcare facilities servicing the entire SDHB region, and enabling modern models of care. That significant public benefit will outweigh the loss of heritage values, noting that all practicable efforts have been made to retain heritage, and mitigate for that loss.

The significant public benefit could also not otherwise be achieved, in that the assessment of hospital redevelopment and site options has determined that it would not be practicable to redevelop the existing hospital. Locating the ASB on the Cadbury block would best integrate with surrounding urban context and meet the clinical needs, cost parameters, and programme requirements of a new replacement hospital.

There is no reasonable alternative to demolition. Assessment has determined retention of the buildings and facades would not be practicable as it would significantly impact on the optimal design and clinical performance of the new hospital, result in residual seismic risk, significantly impact on the construction feasibility of the hospital, and result in significant additional construction costs.

Policy 2.4.2.1(a)(iii) *'supports'* policy 13.2.1.1 *'encourages'* adaptive re-use, heritage conservation, restoration, and maintenance. To the extent that it is practicable, built heritage will be adaptively reused and restored through the retention and adaptive reuse of the Dairy and Machine House building for non-clinical purposes. A conservation plan and cyclical management plan will also be developed that will support sympathetic reuse, conservation, restoration, and maintenance of this building.

Policy 13.2.4.1 requires an archaeological authority to be obtained prior to undertaking earthworks on archaeological site. An archaeological authority will be obtained, noting however that no earthworks will be undertaken as part of the current application which relates only to above ground building demolition.

Overall, demolition of the Cadbury factory buildings will be consistent with the direction of the 2GP heritage objectives and policies given the demolition is required to allow for a significant public benefit that outweighs the loss of the building, and there is no reasonable alternative to demolition. Retention and reuse of the Dairy and Machine House building will also ensure an important element of the site and city's history is protected and enhanced.

8.1.2 Temporary Activity Provisions

Demolition is captured the 2GP definition of 'temporary activities'. The relevant 2GP objective addressing temporary activities are as follows:

- *Objective 4.2.1 – Temporary activities are enabled while:*
    - *a. minimising, as far as practicable, any adverse effects on the amenity and character of the zone; and*
    - *b. ensuring any adverse effects on people's health and safety are minimised as far as practicable.*

Objective 4.2.1 is implemented by policy 4.2.1.1 requiring temporary activities to *'minimise, as far as practicable'*, adverse effects on amenity of surrounding properties, and people's health and safety (policy 4.2.1.1). Policy 4.2.1.1 is subject to appeal, however there is no equivalent provision in the Operative Dunedin City District Plan.

Demolition will at times cause adverse effects on the amenity of surrounding properties from noise, vibration, traffic, and general disruption. Such effects will be periodic and temporary in duration. Amenity, and public health and safety effects will be minimised as far as practicable in accordance with best practice measures contained in a Demolition Management Plan approved by the DCC prior to demolition commencing. The demolition of the Cadbury factory buildings will therefore be consistent with the 2GP temporary activity objectives and policies.

8.1.3 Public Health and Safety Provisions

The relevant 2GP objective addressing public health and safety are as follows:

- *Objective 2.2.6: Public health and safety - The risk to people's health and safety from contaminated sites, hazardous substances, and high levels of noise or emissions is minimised.*
- *Objective 9.2.2 – Land use, development and subdivision activities maintain or enhance people's health and safety.*

Objective 2.2.6 is subject to appeal. These objectives are implemented through policy 9.2.2.1 which requires activities to *'avoid adverse effects from noise on the health of people or, where avoidance is not practicable, ensure any adverse effects would be insignificant.'*

The adverse noise effects from the demolition will be periodic and temporary in duration, and typically occur only during day time hours when ambient noise levels are already highly elevated by traffic noise. The work will be managed in accordance with best practice measures contained in a Noise and Vibration Management Plan approved by the DCC prior to demolition commencing. With these measures, adverse noise effects on public health and safety will minimised so as to be reasonable. People's health and safety overall will be maintained by these measures. The demolition of the Cadbury factory buildings will therefore be consistent with the 2GP public health and safety objectives and policies.

8.1.4 Transportation Provisions

The relevant 2GP objectives relating to transportation are as follows:

- *Objective 2.3.1 - Land and facilities important for economic productivity and social well-being – Land and facilities that are important for economic productivity and social well-being, which include industrial areas, major facilities, key transportation routes, and productive rural land are:*
    a. *protected from less productive competing uses or incompatible uses, including activities that may give rise to reverse sensitivity; and*
    b. *in the case of facilities, able to operate efficiently and effectively.*
- *Objective 2.7.2: Efficient transportation – The multi-modal land transport network, including connections between land, air, and sea transport networks operates safely and efficiently for all road users.*
- *Objective 6.2.3 – Land use, development and subdivision activities maintain the safety and efficiency of the transport network for all travel modes and its affordability to the public.*

The policies implementing those objectives identify the need to *'protect'* the safety and efficiency of key transportation routes (policy 2.3.1.5), and the *'support'* the safe and efficient operation of the multi model land transport network (policy 2.7.2.1). Adverse effects on the safety and efficiency of the transport network are to be *'avoided or, if avoidance is not practicable, adequately mitigated'* (policy 6.2.3.9). Objectives 2.3.1 and 6.2.3, and policies 2.3.1.5 and 6.2.3.9 are subject to appeal.

The adverse effects on the transportation will be periodic and temporary in duration. Demolition will be managed in accordance with a Traffic Management Plan developed in consultation with the NZTA, and approved by DCC prior to demolition commencing. The TMP will address management of truck movements, traffic/cycle lane relocation and closures, and pedestrian routes to ensure adverse effects on safe and efficient operation of the transport network are adequately mitigated, and key transportation routes protected. Protection of the key transportation routes would also be a less likely outcome whereby the scheduled heritage facades were retained temporarily supported in a way that would cause significant sustained disruption to traffic flows. The demolition of the Cadbury factory buildings will therefore be consistent with the transportation objectives and policies.

8.1.5 Commercial Zone Provisions

The relevant objectives relating the commercial zone are as follows:

- *Objective 2.3.3: Facilities and spaces that support social and economic wellbeing – Dunedin has a range of accessible recreational, sporting, social and cultural facilities and spaces, which provide for high levels of physical, social, and cultural well-being across the community.*
- *Objective 18.2.1 - Dunedin has a well-structured and economically and socially successful range of commercial and mixed use environments based on: …(f) an area to the north-east of the CBD (CEC – North Zone), similar to the CEC - South but also containing a mix of activities which support the adjoining CBD and Hospital zones.*

Policy 18.2.1.10 supports the implementation of these objectives by providing for hospital activity in the CEC North Zone, *'to allow for the relocation of Dunedin Hospital into this zone.'* Policy 18.2.1.10 is subject to appeal.

The demolition will facilitate relocation of Dunedin Hospital into the CEC North Zone, and in so doing will provide facilities that will support high levels of physical, social, and cultural well-being across the community. The demolition of the Cadbury factory buildings will therefore be consistent with these objectives and policies.

Based on the above assessment, the proposed demolition of the Cadbury factory buildings overall will be consistent with the relevant objectives and policies of the 2GP.

8.2 Operative Dunedin District Plan (Operative District Plan)

The relevant provisions of the Operative Dunedin City District Plan are contained in the following sections of the Plan:

- Volume 1, Section 21, Environmental Issues.
- Volume 1, Section 20, Transportation.

The objectives and policies of the Operative District Plan remain relevant where any equivalent objectives and policies of the 2GP are subject to appeal and cannot be given full weight. The objectives and policies of the Operative District Plan that remain relevant to this application are set out in full in **Appendix 14**, and are assessed in the following sections.

8.2.1 Environmental Provisions

The following environmental objective and policy of the Operative District Plan remain relevant given equivalent 2GP objective 2.2.6 is subject to appeal:

- *Objective 21.2.2 – Ensure that noise associated with the development of resources and the carrying out of activities does not affect public health and amenity values.*
- *Policy 21.3.3 – Protect people and communities from noise and glare which could impact on health, safety, and amenity.*

These provisions provide similar direction for noise as to the equivalent 2GP objectives 2.2.6 and 9.2.2, and policy 9.2.2.1, however they also address impacts on amenity values. The adverse noise effects from the demolition will be periodic and temporary in duration, and typically occur only during day time hours when ambient noise levels are already highly elevated by traffic noise. The work will be managed in accordance with best practice measures contained in a Noise and Vibration Management Plan approved by the DCC prior to demolition commencing. With these measures, adverse noise effects will be minimised so as to be reasonable, and people and communities will therefore be protected from noise that could impact on health, safety and amenity. The demolition of the Cadbury factory buildings will therefore be consistent with the environmental objectives and policies of the Operative District Plan.

8.2.2 Transportation Provisions

The following transportation objectives and policies of the Operative District Plan remains relevant given equivalent 2GP objectives 2.3.1 and 6.2.3, and policies 2.3.1.5 and 6.2.3.9 are subject to appeal:

- *Objective 20.2.2 – Ensure that land use activities are undertaken in a manner which avoids, remedies or mitigates adverse effects on the transportation network.*
- *Objective 20.2.4 – Maintain and enhance a safe, efficient and effective transportation network.*
- *Policy 20.3.3 – Provide for activities on roads and footpaths where this:*
  - *(a) Is compatible with the function of the road.*
  - *(b) Is safe for road users and pedestrians.*
  - *(c) Has no more than minor adverse effects.*
- *Policy 20.3.4 – Ensure traffic generating activities do not adversely affect the safe, efficient and effective operation of the roading network.*
- *Policy 20.3.5 – Ensure safe standards for vehicle access.*
- *Policy 20.3.6 – Encourage heavy traffic to use appropriate routes.*
- *Policy 20.3.8 – Provide for the safe interaction of pedestrians and vehicles.*
- *Policy 20.3.9 – To sustainably manage transport infrastructure, particularly that of national or regional importance, in a way which will provide for its effective operation and preserve its capacity to meet the reasonably foreseeable needs of future generations, while avoiding, remedying or mitigating any adverse effects resulting from the operation of this infrastructure.*

These provisions provide similar direction for transportation as to the equivalent 2GP objectives 2.3.1 and 6.2.3, and policies 2.3.1.5 and 6.2.3.9. The adverse effects on transportation will be periodic and temporary in duration. Demolition will be managed in accordance with a Traffic Management Plan developed in consultation with the NZTA, and approved by DCC prior to demolition commencing. The TMP will address management of appropriate truck movements, traffic/cycle lane relocation and closures, and pedestrian routes to ensure adverse effects on safe, efficient, and effective operation of the transport network are adequately mitigated, and effective operation of nationally/regionally important roads provided for. The demolition of the Cadbury factory buildings will therefore be consistent with the transportation objectives and policies of the Operative District Plan.

Based on the above assessment, the proposed demolition of the Cadbury factory buildings is will be consistent with the remaining relevant provisions of the Operative Dunedin City District Plan.

8.3 Partially Operative Proposed Otago Regional Policy Statement (Partially Operative RPS)

The Proposed Otago Regional Policy Statement was made partially operative on the 14th of January 2019. All of the objectives and policies relevant to this application are operative and replace any equivalent objectives and policies in the Operative Otago Regional Policy Statement 1998.

The 2GP provisions have been prepared to give effect to the Partially Operative RPS. However due to appeals on some of the relevant 2GP provisions relating to temporary activities, noise and transportation, the higher order direction of the Partially Operative RPS has been considered to resolve the uncertainty in the policy direction provided by the 2GP.

Objective 1.1 and supporting policies relevantly provides some direction for activities that affect social and cultural wellbeing, and the health and safety of communities. Objective 1.1 reads:

- *Objective 1.1 – Otago's resources are used sustainably to promote economic, social, and cultural wellbeing for its people and communities.*

Policy 1.1.2 supports the implementation of this policy by providing for the social and cultural wellbeing and health and safety of communities, including through *'avoiding significant adverse effects of activities on human health'.*

The management of the effects of on public health and safety through best practice management measures contained in a Demolition Management Plan approved by the DCC will ensure adverse effects on human health will be avoided, and social wellbeing promoted. The demolition of the Cadbury factory buildings will therefore be consistent with social and cultural wellbeing objectives and policies of the Partially Operative RPS.

Objective 4.3 and supporting policies address the management of infrastructure, including roads of national or regional importance. Objective 4.3 reads:

- *Objective 4.3 – Infrastructure is managed and developed in a sustainable way.*

Policy 4.3.5 explicitly requires *'avoiding significant adverse effects'* on the functional needs of infrastructure of national or regional significance, and otherwise '*avoiding, remedying, or mitigating'* other adverse effects.

The management of adverse effects on transportation in accordance with a Traffic Management Plan developed in consultation with the NZTA, and approved by DCC will ensure significant adverse effects on the nationally and regionally important state highway network will be avoided, and all other effects adequately mitigated, so as to ensure sustainable management of this infrastructure. The demolition of the Cadbury factory buildings will therefore be consistent with the infrastructure objectives and policies of the Partially Operative RPS.

Based on the above assessment, consideration of the higher order policy direction of the Partially Operative RPS has confirmed that despite the uncertainty in the policy direction provided by the 2GP due to appeals, the proposed demolition of the Cadbury factory buildings will be consistent with relevant provisions of the Partially Operative RPS.

8.4 Dunedin Central City Plan

The Dunedin Central City Plan was prepared by the DCC to guide development of the central city area. It establishes a vision for the central city, and an integrated series of initiatives and changes designed to work towards this vision.

The Plan divides the central city into "quarters" that are intended to reflect the different types of activities that occur in these parts of the city, encourage certain types of development into certain areas, and help foster a distinctive character in each. Within each quarter there are a number of key DCC led transformational projects aimed at improving the safety and accessibility of the city's public spaces, and creating compelling attractive spaces. The Plan also provides direction for other public agencies working within the area, and seeks to encourage alignment of private investment to contribute positively towards achieving the overall central city vision.

The Plan was conceived to prior the closure of the Cadbury factory, and the proposed New Dunedin Hospital Project. The Cadbury factory site falls outside the area considered by the Plan and the defined "quarters" in which transformational projects are proposed. However relevantly, it notes that *"improving connectivity and integration with surrounding areas is important"*, and that *"enhancing the central city will often rely on making changes outside of the area, particularly in terms of transport and infrastructure"*.[7]

Overall, the Plan is not a relevant consideration to the demolition of the former Cadbury factory buildings, given the site falls outside the scope of the Plan. Improved connectivity and integration of the central city with the surrounding area as sought by the Plan, will be a relevant consideration in informing the design process for the new hospital buildings.

8.5 Heritage Strategy for Dunedin (Heritage Strategy)

The Heritage Strategy for Dunedin was adopted by DCC on the 1st of October 2007. The strategy sets out the vision and goals for the sustainable management of Dunedin's heritage. It also provides the framework to guide the Council's future work programmes and initiatives for heritage, which includes working with property owners and other organisations concerned with heritage management. Seventy actions are included as options to achieve the strategies goals, which can be prioritised and programmed for implementation.

Relevantly, Goal 2 of the strategy identifies that recognition and protection of Dunedin's heritage can be achieved through:

[7] Page 4, Section 1.3 Dunedin Central City Plan.

- *2.2.1 - Initiating District Plan changes as required to address heritage protection provisions and update Schedule 25.1 of the District Plan to include all identified heritage items for protection.*
- *2.2.2 - Moving towards the protection of entire buildings and their surrounding land curtilage wherever possible, rather than only the facades or building envelopes.*
- *2.2.3 - Reviewing existing Schedule 25.1 listings to identify significant surrounding land and gardens, e.g. First Church, Larnach's Castle, Glenfalloch, Botanic Gardens, etc.*
- *2.2.4 - Promoting the use of covenants on Certificates of Title to prevent demolition or limit the extent of alterations to significant heritage items.*
- *2.2.5 - Making use of heritage orders to protect heritage items of special interest where they are considered to be at extreme risk.*
- *2.2.6 - Considering, though only as a last resort, the prospect of Council purchasing important heritage buildings deemed to be under dire threat.*

Actions 2.2.1 – 2.2.3 have been addressed through the Council's review of the District Plan, resulting in changes to the heritage scheduling and heritage protection provisions where required by the Council to give effect to the strategy. Relevantly there has been no change made to the scheduling of the facades of the existing Cadbury factory buildings as heritage items in the 2GP, and this scheduling is beyond appeal. The relevant 2GP heritage provisions have been considered in **section 8.1** above, and the demolition of the Cadbury building facades is not considered to be inconsistent with those provisions.

Action 2.2.4 promotes the use of covenants to prevent the demolition or limit the extent of alterations to significant heritage items. Such covenants are often required as conditions through a resource consent process to secure retention of heritage buildings. While such a covenant could be applied to the Dairy and Machine House building, conditions are otherwise proposed which will prevent demolition. Conditions are also proposed requiring preparation of a Conservation Plan that will guide future alterations to the building.

Actions 2.2.5 and 2.2.6 indicates the Council may consider use of heritage orders or purchase of property to protect special or important heritage buildings under threat, however those options have not been pursued by Council or NZHPT for the Cadbury buildings.

Overall, the recognition and protect Dunedin's built heritage sought by the strategy will not be achieved through the demolition of the Cadbury factory buildings. Retention of the Dairy and Machine House building is however consistent with the strategy.

8.6 Conclusion on Statutory Considerations

Having regard to the assessment above, it is considered that the demolition of the former Cadbury Factory buildings will overall be consistent with the direction of the provisions of the relevant statutory documents.

The demolition will be consistent with the provisions of the 2GP, and in particular key heritage objectives and policies, given the demolition is required to allow for a significant public benefit that outweighs the loss of the building, and there is no reasonable alternative to demolition. Implementing best practice measures included in a Demolition Management Plan approved by the DCC, will also ensure demolition is undertaken in a way that is consistent with those objectives and policies that address the appropriate management of temporary activities, public health and safety, and effects on transportation. Through ultimately allowing for the relocation of Dunedin

Hospital onto this site, the demolition is also consistent with those objectives and policies that provide for hospital activity in the CEC North Zone and support high levels of physical, social, and cultural well-being across the community.

The demolition will also be consistent with the provisions of the Operative District Plan where the transportation and environmental objectives and policies remain relevant and have continued weight as a result of appeals on the equivalent 2GP provisions. Consideration of the policy direction of the Partially Operative RPS has confirmed that where there is uncertainty in the policy direction provided by the 2GP due to appeals, the proposed demolition of the Cadbury factory buildings will still be consistent with relevant higher order objectives and policies addressing social and cultural wellbeing and infrastructure.

Given the overall consistency of the demolition with the provisions of the relevant statutory documents, it is considered that demolition would not impact on the integrity of the statutory documents, or create an adverse precedent for other future demolition proposals,

The Dunedin Heritage Strategy is a non-statutory document and therefore is to be given lesser weight in the overall statutory assessment. While demolition will not be consistent with the intentions of the strategy to recognise and protect Dunedin's built heritage, the demolition addresses the heritage protection provisions of the District Plan promoted by the strategy, and retention of the Dairy and Machine House will also support the strategy's goals.

9.0 Section 104D of the RMA

Section 104D provides particular restrictions for non-complying activities. This section states that a consent authority may grant a consent for a non-complying activity only if it is satisfied that it meets one of two tests; being that the adverse effects of the activity will be minor, or the application is for an activity which will not be contrary to the objectives and policies of the relevant operative and proposed plans.

The assessment at **section 7.0** of this application considers that demolition of the former Cadbury Factory with their scheduled street facades will have major adverse effect on heritage values. With the adoption of mitigation measures including retaining and adaptively reusing the Dairy and Machine House building, the adverse effects would be reduced to a moderate, but not less than minor adverse effect. Consequently, the demolition does not meet the section 104D(1)(a) “no more than minor adverse effects” test.

The assessment at **section 8.0** of this application considers that demolition will overall be consistent with the direction of the relevant Proposed 2GP and Operative District Plans, noting that the Operative District Plan only remains relevant and has weight where the equivalent 2GP provisions are subject to appeal. Consequently, the demolition meets the section 104D(1)(b) “not contrary to the objectives and policies of the plan” test.

The consent authority is therefore permitted to grant resource consent under section 104D.

10.0 Part 2 of the RMA

In the recent decision (*RJ Davidson Family Trust v Marlborough District Council [2018] NZCA 316* the Court of Appeal reconfirmed the pre-eminence of Part 2 matters in the consideration of resource consents.

Part II of the RMA sets out the purpose (**Section 5**) and principles (**Sections 6-8**) of the RMA. The overall purpose of the RMA is to *'promote the sustainable management of natural and physical resources'*. This is to be achieved by managing resources in a way which provides for the social, economic, and cultural wellbeing, and health and safety of people and communities. This is while sustaining the potential of natural and physical resources to meet the needs of future generations; and avoiding, remedying, and mitigating adverse effects of activities on the environment.

Section 6 RMA matters are of particular relevance to this application. Section 6(f) requires in achieving the purpose of the RMA to recognise and provide for the protection of historic heritage from inappropriate subdivision, use, and development. Section 7(c) and (f) of the RMA relevantly requires particular regard be had to the maintenance and enhancement of amenity values and the quality of the environment in achieving the purpose of the RMA.

The proposed demolition will enable the redevelopment of a new hospital that will provide modern fit for purpose tertiary healthcare facilities serving the entire SDHB region that will address the serviceability, disaster resilience, and patient care deficiencies associated with the existing hospital. The new hospital will enable modern models of care through an optimised spatial layout and medical facilities that will be more efficient, adaptable, flexible, resilient and cost effective. The new hospital will also integrate with the surrounding area, incorporate Kāi Tahu cultural elements, and support urban regeneration in this part of the central city.

Through enabling construction of the new hospital, demolition will therefore significantly provide for the social, economic, and cultural wellbeing, and health and safety of the community, including to meet the needs of future generations as sought by section 5 of the RMA. Such wellbeing would be better delivered than through retention of the existing buildings and their scheduled street facades, noting that all practicable efforts have been made to retain heritage and mitigate for its loss. Consequently, with regard to section 6(f) of the RMA demolition of the Cadbury factory buildings is not considered to be "inappropriate development", requiring protection of historic heritage.

Social, economic, and cultural wellbeing would also be realised while avoiding, remedying, or mitigating adverse amenity, health and safety, and transportation effects of demolition, through the implementation of a comprehensive Demolition Management Plan. Adverse effects from the loss of heritage will also be mitigated. Through the avoidance or mitigation of adverse effects, the development will maintain amenity values, and the quality of the environment, noting that any loss of amenity from demolition activity will be periodic and temporary in duration.

Given the above, overall it is considered that the proposal will achieve the purpose and principals of the RMA 1991.

12.0 Consultation

The Ministry of Health and consulted with both Heritage New Zealand – Pouhere Taonga (HNZPT) and the Dunedin City Council as part of preparing this application. Consultation with Dunedin City Council has principally been informative, with the Ministry of Health providing progress updates on the preparation of the application, and the scope of technical reports being prepared.

There has been ongoing consultation with HNZPT to inform them of progress of the application preparation and hospital concept design, discuss the scope of the Cadbury Confectionary Ltd building listing on the New Zealand Heritage List – Rārangi Kōrero, and invite feedback on Heritage Impact Assessment prepared by Underground Overground which forms part of the application.

Feedback on the Heritage Impact Assessment in particular noted:

- Consideration should be given to the effects the construction of the new hospital will have on the surrounding heritage items and overall streetscape, to ensure that negative effects are minimised. The effects to be considered include shading, scale and mass, fenestration and setback.
- The demolition of the remaining six Cadbury Limited Buildings, including the Cumberland Street and Castle Street facades, protected under the current and second generation District Plans, would be a significant loss of Dunedin's industrial heritage. The information requirements for demolition of a protected part of a scheduled heritage building, as a non-complying activity under the Dunedin City Council Second Generation Plan, include addressing the effect the demolition will have on heritage values, a discussion of the alternatives considered, and reasons why the alternatives are not reasonable.
- The Heritage Impact Assessment outlines the significant building safety requirements for, not only the establishment of a clinical building, but also the structures surrounding that building. The heritage significance of the six Cadbury Confectionary Ltd Buildings proposed for demolition has been assessed against their feasibility for retention and deemed that neither the reuse of the entire buildings nor the protected facades would be reasonable given the significant building safety requirements for the proposed new hospital.
- Where items are being demolished, retention must be thoroughly considered, if this is not reasonable, elements of the heritage buildings could be incorporated into the new build, where appropriate, to off-set the adverse effect that the demolition of the protected facades will have. There is reference in the assessment to distinct windows, timbers and bricks that could be re-used in the new build to reflect the history of the site.
- Retaining the Cadbury Dairy and Machine House Building is supported, which has significant heritage value and important links to the use of the entire site and Dunedin's early industrial history, as providing a degree of mitigation for the impact of the proposed development on the heritage of this area. The existing heritage assessment and inventory of the Dairy and Machine House Building (Oakley Grey Architects) is recommended to be utilised to guide the processes and decision-making for adaptive re-use. The first floor hasn't been assessed and evaluated in this report. Additional assessment of significant internal fabric should be carried out to establish which elements are of significant heritage value and, where possible incorporated into future design. This could include, where appropriate, the inclusion of significant elements of other buildings on the wider site.

In recognition of this feedback, the following is noted:

- The effects of the new hospital on surrounding heritage items and the overall streetscape, in terms of shading, scale, mass, fenestration, and setback is being considered through the concept design process for the new hospital, which itself will be subject to a resource consent process.
- The effect that demolition of the Cadbury Factory buildings will have on heritage values, the alternatives considered, and the reasons why the alternatives are not reasonable is fully addressed in this application and the supporting technical assessments.
- Retention of the buildings has been thoroughly considered and deemed to be unreasonable. Conditions are proposed requiring identification, salvage, and reuse of heritage fabric in the new hospital (where practicable or reasonable) to offset the effect of demolition. Materials that cannot be reused will be made available to the wider community.
- The Dairy and Machine House Building will be retained, and a Conservation Plan and Cyclical Maintenance Plan prepared to guide adaption, repair, restoration, execution of works, and maintenance of the building in a way that ensures interventions to heritage fabric of the building are sympathetic and kept to a minimum. These documents will build on the existing heritage assessment and inventory of the Dairy and Machine House Building (Oakley Grey Architects).

13.0 Conclusions

The Ministry of Health has sought resource consent for the above ground demolition of the former Cadbury factory buildings and their scheduled heritage facades (with the exception of the Dairy and Machine House Building) to enable development of the New Dunedin Hospital on this site. Resource consent is required as a non-complying activity under the 2GP due to demolition of the scheduled heritage facades, and demolition works at times likely to exceed the 2GP construction noise limits.

Demolition of the buildings and their facades is considered the only practicable option and that the alternatives are not reasonable. Specifically:

- The assessment of hospital redevelopment and site options has determined that it would not be practicable to redevelop the existing hospital, and that the Cadbury and Wilsons blocks best meets the functional and operational needs of a new replacement hospital.
- The assessment of options undertaken though the masterplan process determined that locating the ASB on the Cadbury block would best integrate with surrounding urban context, and meet the functional and operational needs of a new replacement hospital. That has been reaffirmed through the recent design options and evaluation process. Development will be required across the entire Cadbury block, with the exception of the location of the Dairy and Machine House building.
- Retention of the buildings or facades would not be practicable as it would significantly impact on the optimal design and clinical performance of the new hospital, result in residual seismic risk, significantly impact on the construction feasibility of the hospital, and result in significant additional construction costs. Retention of the existing buildings or facades would unreasonably compromise the ability to provide the region with modern fit for purpose healthcare facilities that hosts modern models of care.

The environmental effects of the proposed demolition have overall been assessed as minor. The significant benefits of the hospital development that will serve the entire SHDB region are considered sufficient to offset the moderate adverse effects from the loss of heritage values, noting that all practicable efforts have been made to retain heritage, and mitigate for that loss. This includes retaining and adaptively reusing the Dairy and Machine House building, and adopting a range of other measures including pre-demolition recording, and salvage of significant historical or archaeological features, and historic materials for reuse in the hospital redevelopment where practicable and reasonable, or use by wider community. Other demolition activity related effects, including noise, vibration, and traffic have been assessed as being periodic and temporary in duration, and will mitigated as far as practicable in accordance with best practice measures contained in a Demolition Management Plan.

The proposed demolition has been assessed overall as being consistent with the direction of the provisions of the relevant statutory documents. In particular, it will be consistent with the objectives and policies of the 2GP, including key heritage provisions by allowing for a significant public benefit that outweighs the loss of the buildings, and there being no reasonable alternative to demolition. The demolition will also be consistent with the provisions of the Operative District Plan to the extent that it remains relevant and has weight as a result of appeals on the equivalent 2GP provisions. Where there is uncertainty in the policy direction provided by the 2GP due to appeals, it has been confirmed that demolition will be consistent with the higher order policy direction of the Partially Operative RPS.

The demolition therefore meets the section 104D(1)(b) RMA test of being “not contrary to the objectives and policies of the plan”. Consequently, the consent authority is able to grant resource consent.

Demolition is consistent with purpose and principals of the RMA. In particular, through enabling construction of the new hospital, demolition will therefore significantly provide for the social, economic, and cultural wellbeing, and health and safety of the community, including to meet the needs of future generations as sought by section 5 of the RMA. Such wellbeing would be better delivered than through retention of the existing buildings and their scheduled street facades. Demolition of the Cadbury factory buildings is not considered to be “inappropriate development”, in the context of section 6(f) of the RMA requiring protection of historic heritage.

Given all the above, it is considered that resource consent is able to granted for the above ground demolition of the former Cadbury factory buildings.

Appendix 1: Completed Application Form

DUNEDIN CITY COUNCIL
Kaunihera-a-rohe o Otepoti

Application Form for a Resource Consent

50 The Octagon, PO Box 5045
Dunedin 9054, New Zealand
Ph 03 477 4000 | www.dunedin.govt.nz

PLEASE FILL IN ALL THE FIELDS

Application details

I/We Ministry of Health (must be the FULL name(s) of an individual or an entity registered with the New Zealand Companies Office. Family Trust names and unofficial trading names are not acceptable: in those situations, use the trustee(s) and director(s) names instead) hereby apply for:

☑ Land Use Consent ☐ Subdivision Consent

I opt out/do not opt out (delete one) of the fast-track consent process (only applies to controlled activities under the district plan, where an electronic address for service is provided)

Brief description of the proposed activity:
Above ground demolition of the former Cadbury factory buildings, with the exception of the Dairy and Machine House building.

See attached AEE for details.

Have you applied for a Building Consent? ☐ Yes, Building Consent Number ABA _____ ◆ No

Site location/description

I am/We are the: ▣ owner ☐ occupier ☐ lessee ☐ prospective purchaser of the site (tick one)

Street Address of Site: 280 and 336 Cumberland Street, Dunedin

Legal Description: Multiple - see attached AEE for details

Certificate of Title: Multiple - see attached AEE for details

Contact details

Name: Lauren Semple, Greenwood Roche (~~applicant~~/agent (delete one))

Address: PO Box 139, Christchurch Postcode: 8140

Phone (daytime): 021 771 340 Email: Lauren@greenwoodroche.com

Chosen contact method (this will be the first point of contact for all communications for this application)

I wish the following to be used as the address for service: ▣ email ☐ post ☐ other _____ (tick one)

Address for invoices or refunds (if different from above)

Name: Ministry of Health

Address: P O Box, 5013, Wellington 6140

Bank details for refunds

Bank Account Name: _____

Account Number: ☐☐ ☐☐☐☐ ☐☐☐☐☐☐☐ ☐☐

Bank Branch | Account Number | Suffix

Ownership of the site

Who is the current owner of the site? Ministry of Health

If the applicant is not the site owner, please provide the site owner's contact details:

Address: _____ Postcode: _____

Phone (daytime): _____ Email: _____

Occupation of the site

Please list the full name and address of each occupier of the site: Ministry of Health, 133 Molesworth Street, Thorndon, Wellington 6011

Monitoring of your Resource Consent

To assist with setting a date for monitoring, please estimate the date of completion of the work for which Resource Consent is required. Your Resource Consent may be monitored for compliance with any conditions at the completion of the work. (If you do not specify an estimated time for completion, your Resource Consent, if granted, may be monitored three years from the decision date).

February 2022 (month and year)

Monitoring is an additional cost over and above consent processing. You may be charged at the time of the consent being issued or at the time monitoring occurs. Please refer to City Planning's Schedule of Fees for the current monitoring fee.

Detailed description of proposed activity

Please describe the proposed activity for the site, giving as much detail as possible. Where relevant, discuss the bulk and location of buildings, parking provision, traffic movements, manoeuvring, noise generation, signage, hours of operation, number of people on-site, number of visitors etc. Please provide proposed site plans and elevations.

Above ground demolition of the former Cadbury factory buildings, with the exception of the Dairy and Machine House building.

See attached AEE for details.

Description of site and existing activity

Please describe the existing site, its size, location, orientation and slope. Describe the current usage and type of activity being carried out on the site. Where relevant, discuss the bulk and location of buildings, parking provision, traffic movements, manoeuvring, noise generation, signage, hours of operation, number of people on-site, number of visitors etc. Please also provide plans of the existing site and buildings. Photographs may help.

See attached AEE for details.

(Attach separate sheets if necessary)

District plan zoning

What is the District Plan zoning of the site? CEC North (Dunedin 2GP), Industrial 1 (Operative Dunedin City District Plan)

Are there any overlaying District Plan requirements that apply to the site e.g. in a Landscape Management Area, in a Townscape or Heritage Precinct, Scheduled Buildings on-site etc? If unsure, please check with City Planning staff.

Heritage Building B030 - Cadbury Confectionery Ltd Building Facades to Cumberland and Castle Street. Archaeological Alert Layer,

Hazard 3 (Flood), and Hazard 3 (Coastal) overlays (Dunedin 2GP).

Breaches of district plan rules

Please detail the rules that will be breached by the proposed activity on the site (if any). Also detail the degree of those breaches. In most circumstances, the only rules you need to consider are the rules from the zone in which your proposal is located. However, you need to remember to consider not just the Zone rules but also the Special Provisions rules that apply to the activity. If unsure, please check with City Planning staff or the Council website.

2GP Rule 18.3.6.28 - Demolition of the scheduled facades of the existing Cadbury factory buildings fronting Cumberland and Castle Streets is a non-complying activity.

2GP Rule 4.5.4.1(d) - Demolition activity will exceed the noise limits by more than 5dB, and is therefore is a non-complying activity.

2GP Rule 4.5.4.1(b) - Demolition activity will exceed the vibration limits adjacent to buildings beyond the site.

See attached AEE for details.

Affected persons' approvals

I/We have obtained the written approval of the following people/organisations and they have signed the plans of the proposal:

Name: _____

Address: _____

Name: _____

Address: _____

Please note: You must submit the completed written approval form(s), and any plans signed by affected persons, with this application, unless it is a fully notified application in which case affected persons' approvals need not be provided with the application. If a written approval is required, but not obtained from an affected person, it is likely that the application will be fully notified or limited notified.

Assessment of Effects on Environment (AEE)

In this section you need to consider what effects your proposal will have on the environment. You should discuss all actual and potential effects on the environment arising from this proposal. The amount of detail provided must reflect the nature and scale of the development and its likely effect. i.e. small effect equals small assessment.

You can refer to the Council's relevant checklist and brochure on preparing this assessment. If needed there is the Ministry for the Environment's publication "A Guide to Preparing a Basic Assessment of Environmental Effects" available on www.mfe.govt.nz. Schedule 4 of the Resource Management Act 1991(RMA) provides some guidance as to what to include.

See attached detailed assessment of environmental effects (AEE)

_____ (Attach separate sheets if necessary)

The following additional Resource Consents from the Otago Regional Council are required and have/have not (delete one) been applied for:

☐ Water Permit ☐ Discharge Permit ☐ Coastal Permit ☐ Land Use Consent for certain uses of lake beds and rivers ■ Not applicable

Declaration

I certify that, to the best of my knowledge and belief, the information given in this application is true and correct.

I accept that I have a legal obligation to comply with any conditions imposed on the Resource Consent should this application be approved.

Subject to my/our rights under section 357B and 358 of the RMA to object to any costs, I agree to pay all the fees and charges levied by the Dunedin City Council for processing this application, including a further account if the cost of processing the application exceeds the deposit paid.

Signature of Applicant/~~Agent~~ (delete one): Solicitor for K Temple Date: 10/6/2020

Privacy – Local Government Official Information and Meetings Act 1987

You should be aware that this document becomes a public record once submitted. Under the above Act, anyone can request to see copies of applications lodged with the Council. The Council is obliged to make available the information requested unless there are grounds under the above Act that justify withholding it. While you may request that it be withheld, the Council will make a decision following consultation with you. If the Council decides to withhold an application, or part of it, that decision can be reviewed by the Office of the Ombudsmen.

Please advise if you consider it necessary to withhold your application, or parts of it, from any persons (including the media) to (tick those that apply):

☐ Avoid unreasonably prejudicing your commercial position

☐ Protect information you have supplied to Council in confidence

☐ Avoid serious offence to tikanga Maori or disclosing location of waahi tapu

What happens when further information is required?

If an application is not in the required form, or does not include adequate information, the Council may reject the application, pursuant to section 88 of the RMA. In addition (section 92 RMA) the Council can request further information from an applicant at any stage through the process where it may help to a better understanding of the nature of the activity, the effects it may have on the environment, or the ways in which adverse effects may be mitigated. The more complete the information provided with the application, the less costly and more quickly a decision will be reached.

Fees

Council recovers all actual and reasonable costs of processing your application. Most applications require a deposit and costs above this deposit will be recovered. A current fees schedule is available on www.dunedin.govt.nz or from Planning staff. Planning staff also have information on the actual cost of applications that have been processed. This can also be viewed on the Council website.

Development contributions

Your application may also be required to pay development contributions under the Council's Development Contributions Policy. For more information please ring 477 4000 and ask to speak to the Development Contributions Officer, or email development.contributions@dcc.govt.nz.

Further assistance

Please discuss your proposal with us if you require any further help with preparing your application. The Council does provide pre-application meetings without charge to assist in understanding the issues associated with your proposal and completing your application. This service is there to help you.

Please note that we are able to provide you with planning information but we cannot prepare the application for you. You may need to discuss your application with an independent planning consultant if you need further planning advice.

City Planning Staff can be contacted as follows:

In Writing: Dunedin City Council, PO Box 5045, Dunedin 9054

In Person: Customer Services Centre, Ground Floor, Civic Centre, 50 The Octagon

By Phone: (03) 477 4000

By Email: planning@dcc.govt.nz

There is also information on our website at www.dunedin.govt.nz.

Information requirements

- [x] Completed and Signed Application Form
- [x] Description of Activity and Assessment of Effects
- [x] Site Plan, Floor Plan and Elevations (where relevant)
- [x] Certificate of Title (less than 3 months old) including any relevant restrictions (such as consent notices, covenants, encumbrances, building line restrictions)
- [ ] Written Approvals
- [ ] Forms and plans and any other relevant documentation signed and dated by Affected Persons
- [x] Application Fee (cash, cheque or EFTPOS only; no Credit Cards accepted)
- [ ] Bank account details for refunds

In addition, subdivision applications also need the following information

- [ ] Number of existing lots.
- [ ] Number of proposed lots.
- [ ] Total area of subdivision.
- [ ] The position of all new boundaries.

In order to ensure your application is not rejected or delayed through requests for further information, please make sure you have included all of the necessary information. A full list of the information required for resource consent applications is in the Information Requirements Section of the District Plan.

OFFICE USE ONLY

Has the application been completed appropriately (including necessary information and adequate assessment of effects)?

☐ Yes ☐ No

Application: ☐ Received ☐ Rejected

Received by: ☐ Counter ☐ Post ☐ Courier ☐ Other: _____

Comments: _____

_____

_____

_____

(Include reasons for rejection and/or notes to handling officer)

Planning Officer: _____ Date: _____

Appendix 2: Application Site

File Ref: C18012_003_A4P_ApplicationSite_CadburyFactory.mxd

This plan has been prepared by Boffa Miskell Limited on the specific instructions of our Client. It is solely for our Client's use in accordance with the agreed scope of work. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate. No liability or responsibility is accepted by Boffa Miskell Limited for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.

Boffa Miskell

www.boffamiskell.co.nz

Data Sources:
Cadastre sourced from LINZ Data Service

Projection: NZGD 2000 New Zealand Transverse Mercator

NEW DUNEDIN HOSPITAL

Application Site

Date: 05 November 2019 | Revision: 0

Plan prepared for Ministy of Health by Boffa Miskell Limited

Project Manager: ken.gimblett@boffamiskell.co.nz | Drawn: BMc | Checked: MDa

Figure 1

Appendix 3: Computer Freehold Registers

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General
of Land

Identifier	**OT129/279**
Land Registration District	**Otago**
Date Issued	11 November 1902

Prior References
OT11/278 OT41/61 OT49/100

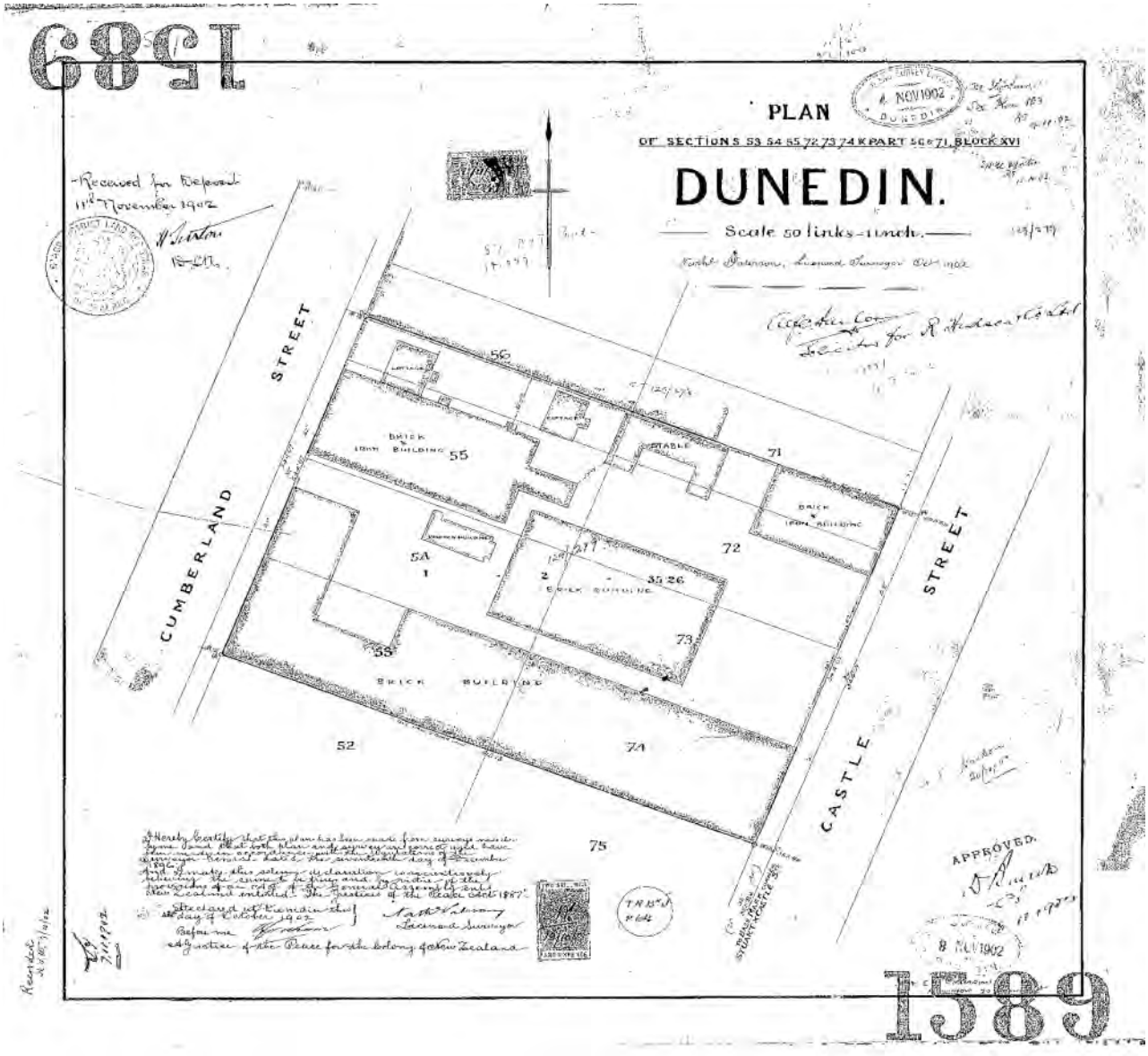
Estate	Fee Simple
Area	6962 square metres more or less
Legal Description	Section 53-55, 72-74 Block XVI Town of Dunedin and Part Section 56, 71 Block XVI Town of Dunedin
Purpose	for Health purposes

Registered Owners
Her Majesty The Queen

Interests

6626426.1 CERTIFICATE PURSUANT TO SECTION 77 BUILDING ACT 2004 THAT THIS COMPUTER REGISTER IS SUBJECT TO THE CONDITION IMPOSED UNDER SECTION 75(2) (ALSO AFFECTS OT13B/665 and OT304/181) - 28.10.2005 at 9:00 am

Identifier **OT129/279**



RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General
of Land

Identifier	**OT304/181**
Land Registration District	**Otago**
Date Issued	18 December 1940

Prior References

OT116/188	OT117/148	OT129/278
OT14/229	OT152/113	OT2/257

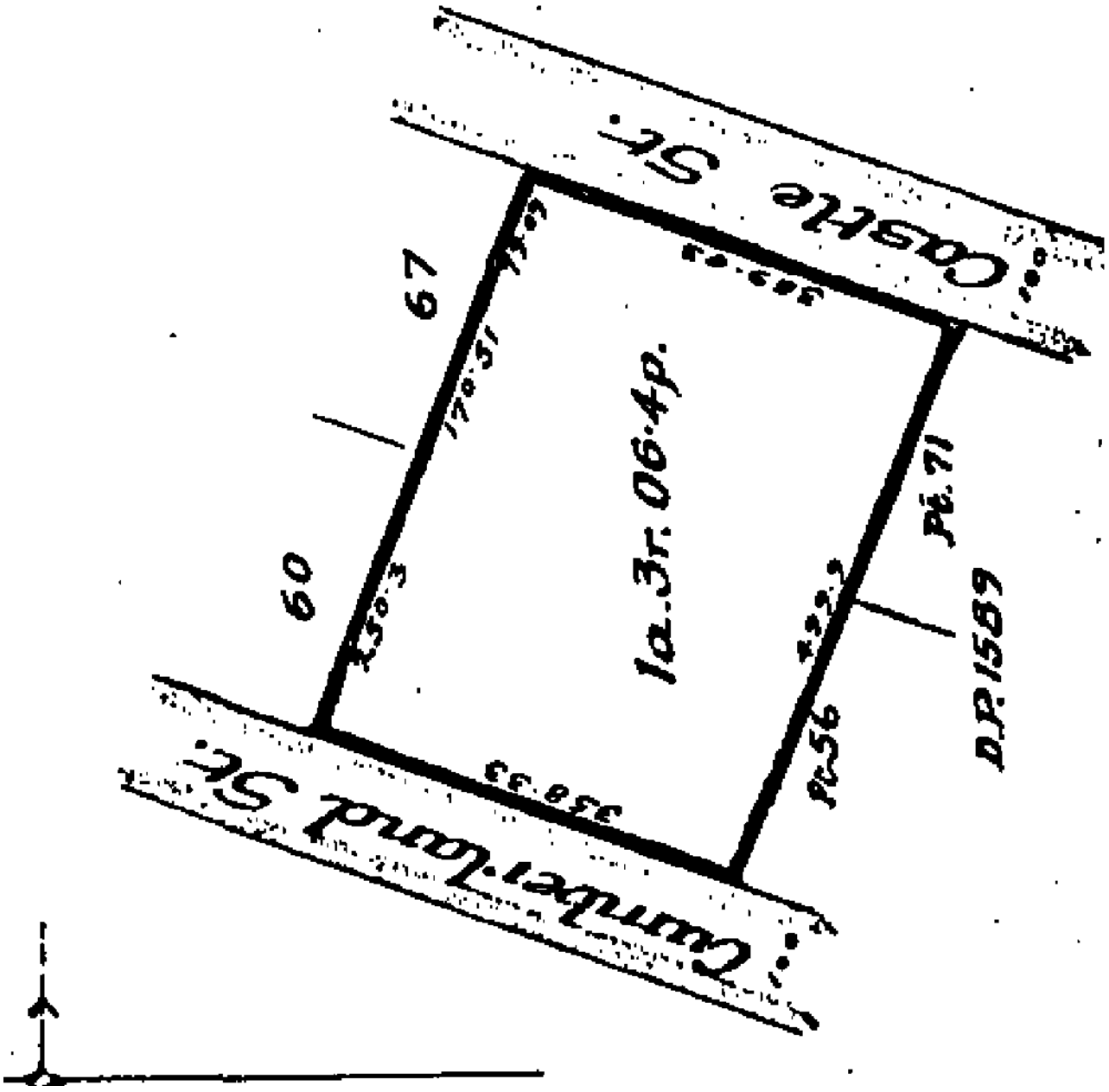
Estate	Fee Simple
Area	7244 square metres more or less
Legal Description	Deposited Plan 5322
Purpose	for Health purposes

Registered Owners
Her Majesty The Queen

Interests

6626426.1 CERTIFICATE PURSUANT TO SECTION 77 BUILDING ACT 2004 THAT THIS COMPUTER REGISTER IS SUBJECT TO THE CONDITION IMPOSED UNDER SECTION 75(2) (ALSO AFFECTS OT129/279 and OT13B/665) - 28.10.2005 at 9:00 am

Identifier **OT304/181**



RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Guaranteed Search Copy issued under Section 60 of the Land Transfer Act 2017

R.W. Muir
Registrar-General
of Land

Identifier	**OT13B/665**
Land Registration District	**Otago**
Date Issued	07 September 1990

Prior References

OT125/209	OT162/186	OT257/252
OT271/218	OT48/243	OT60/241
OT8B/624	OT94/52	

Estate	Fee Simple
Area	8097 square metres more or less
Legal Description	Section 60-67 Block XVI Town of Dunedin
Purpose	for Health purposes

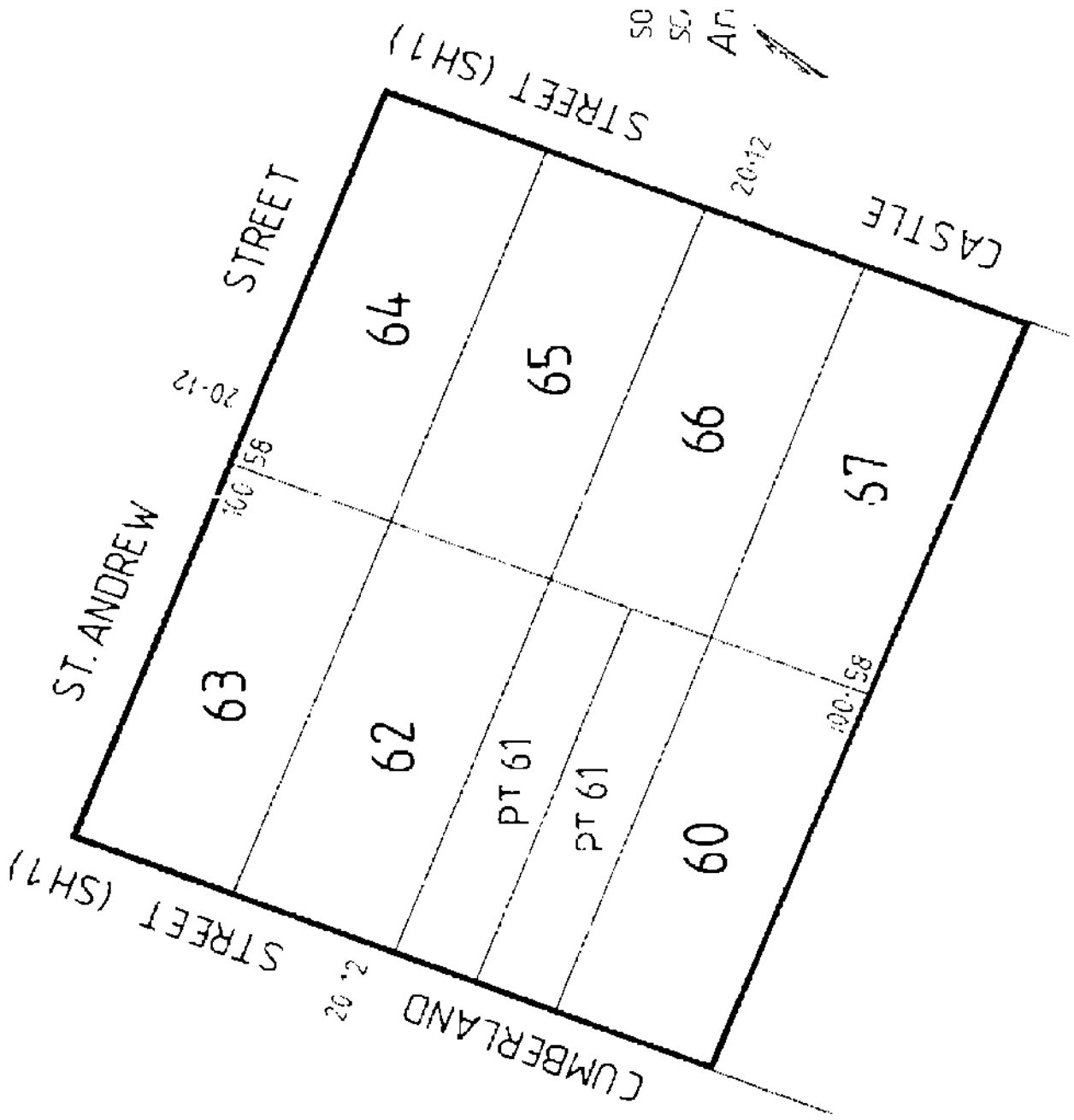
Registered Owners
Her Majesty The Queen

Interests

LIMITED AS TO PARCELS AS TO PARTS FORMERLY CONTAINED IN CT'S OT257/252 AND OT271/218

6626426.1 CERTIFICATE PURSUANT TO SECTION 77 BUILDING ACT 2004 THAT THIS COMPUTER REGISTER IS SUBJECT TO THE CONDITION IMPOSED UNDER SECTION 75(2) (ALSO AFFECTS OT129/279 and OT304/181) - 28.10.2005 at 9:00 am

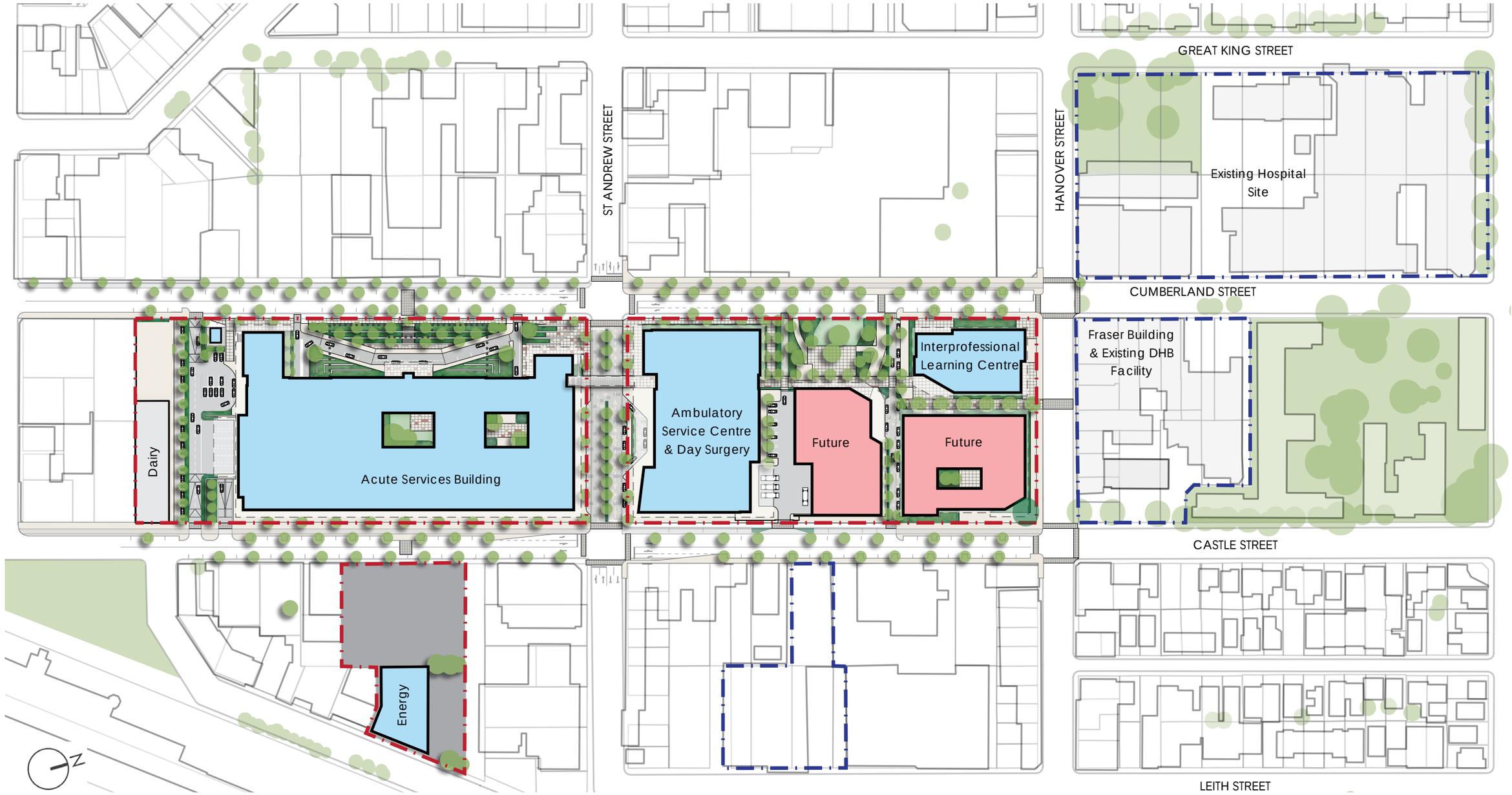
Identifier **OT13B/665**



Appendix 4: Preliminary Site Masterplan Layout

6.0 Indicative Preliminary Masterplan (C2)

Indicative Preliminary Masterplan



Future services to be accommodated on Business Case approval :
- Southern Blood & Cancer Services
- Translational Research Centre

Appendix 5: Marshall Day Noise and Vibration Assessment Report

MARSHALL DAY Acoustics

NEW DUNEDIN HOSPITAL: DEMOLITION NOISE AND VIBRATION ASSESSMENT (CADBURY'S BLOCK)

Rp 004 R01 20190708 | 4 June 2020

MARSHALL DAY Acoustics

Level 3 69 Cambridge Terrace
PO Box 4071
Christchurch 8140 New Zealand
T: +64 3 365 8455 F: +64 3 365 8477
www.marshallday.com

Project: **NEW DUNEDIN HOSPITAL: DEMOLITION**

Prepared for: **Ministry of Health**
133 Molesworth Street
Thorndon
Wellington 6011

Attention: **Paul Perniskie**

Report No.: **Rp 004 R01 20190708**

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Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Approved	-	Cadbury Block consenting	10 Oct 2019	G Walton	J Farren
Approved	R01	Updated worst-case cumulative noise level calculations (based on works programme dated 4 April 2020)	4 June 2020	M Schmid	G Walton

Certified System ISO 9001

EXECUTIVE SUMMARY

We have undertaken an assessment of noise and vibration associated with demolition works required for the New Dunedin Hospital project (NDH). This report specifically focusses on above-ground demolition of the **'Cadbury's Block'** (except the associated warehouse structure).

Our assessment is summarised in this report and we have focussed on:

- Noise emissions in relation to the New Zealand construction noise standard, NZS 6803:1999;
- Provisions relating to construction noise in the proposed (2GP) Dunedin City District Plan; and
- Vibration emissions in relation to both the District Plan requirements and international guidance commonly used to assess construction vibration in New Zealand.

Our calculations indicate that the construction noise limits given in Rule 4.5.4.1 of the proposed Dunedin City District Plan (2GP) will be exceeded at times. As predicted noise levels are more than 5 dB above the permitted performance standard, the activity will have **non-complying status with regard to noise**.

The District Plan construction noise limits are based on the guidance given in NZS 6803:1999. This Standard provides further guidance on the appropriate management and mitigation of construction noise, which is also of relevance to demolition activities. This Standard notes that, "noise from construction is generally of limited duration, [so] communities will usually tolerate a higher noise level provided it is no louder than necessary".

Our assessment shows that the noise limits will be exceeded in a few instances when demolition works occur at the boundaries of the Cadbury Block. We note that one instance of elevated noise levels is anticipated as a result of cumulative effects, as detailed in Table 12.

We also note that the existing noise environment in the area is already relatively high, principally due to road traffic noise levels from SH1. **Ambient noise levels are above the daytime 70 dB L_{Aeq} criterion**, hence exceeding this limit by a small margin will not necessarily result in adverse effects. NZS 6803 notes that "the high background level may warrant less stringent noise limits than those recommended", but the District Plan does not allow for any adjustment of the noise limits.

Specific focus has been given to the Otago Daily Times (ODT) building at 260 Cumberland St, which is the only receiver that directly adjoins the worksite. The existing Cadbury's structures will provide some screening to this building while they remain in place. Even when demolition of the closest structures commences, internal noise levels within the ODT offices are expected to be below 50 dB L_{Aeq}, which is the limit given in NZS 6803. However, a small number of high risk activities may elevate internal levels beyond this and specific management and controls will be required for these works (e.g. party wall works).

Overall, we consider that the noise and vibration levels at all receivers will be generally reasonable, subject to the suitable implementation of a Noise and Vibration Management Plan (NVMP) for the NDH project as a whole. The NVMP should outline the Best Practicable Option (BPO) measures to mitigate construction noise and vibration.

Most receivers are set back by at least the width of the road corridor from the works. We expect that vibration levels will comply with the relevant criteria beyond 30 metres from any works. Vibration risks can therefore comfortably be managed within the scope of the NVMP, which will facilitate the monitoring of demolition effects and, with a particular focus on adjacent heritage structures. Specific monitoring is also likely to be required for the ODT building, which is well within 30 metres of the closest works.

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APPENDIX F CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN

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1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has been engaged by the Ministry of Health (MoH) to assess noise and vibration arising from the clearance of land required for the New Dunedin Hospital project (NDH).

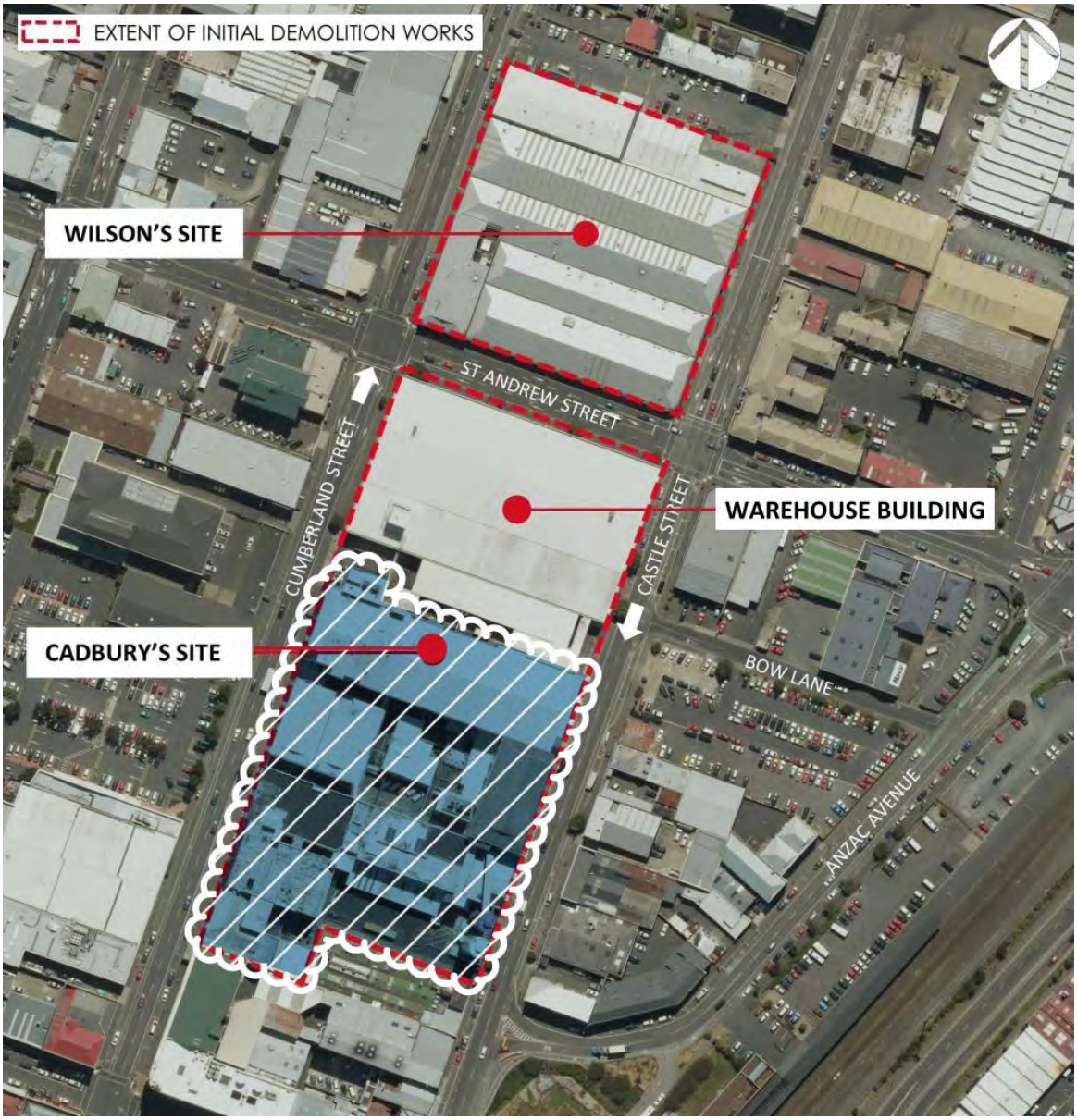
This report covers above-ground demolition of the remainder of the **'Cadbury's Block'**, aside from the separately-consented deconstruction of the associated warehouse building. While the NDH project will occur across two large blocks of land within the CBD (as shown in Figure 1 below), the resource consent for demolition will be split into distinct packages.

We have only focussed on the initial site clearance and demolition phase of the project; effects associated with future construction and operation are beyond the scope of this report.

Our assessment provides an indication of compliance in respect of the applicable District Plan noise and vibration limits, and assesses the effects on surrounding activities. We have also developed a framework for the management of demolition noise and vibration in the form of a draft Noise and Vibration Management Plan, which is intended to assist in minimising potential adverse effects.

Appendix A contains a glossary of acoustical terminology used in this report.

Figure 1: Overview of project and proposed demolition areas



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2.0 RELEVANT PERFORMANCE STANDARDS

The performance standards for noise and vibration arising from demolition activities are provided in the District Plan, with reference to other national and international standards. These are summarised in the following sections.

For the purpose of this report, we have used the broader description of 'construction' to apply to demolition activities, as the types of equipment used and means to assess effects are similar.

2.1 Dunedin City District Plan

We understand that the rules in the proposed 2GP now have legal effect (as of November 2018) and that the relevant rules are not subject to appeal.

Under the proposed 2GP, the application site falls under the CEC North Zone, while the land to the east and west is zoned as Industrial and Central Business District, respectively.

Rules for construction noise and vibration are provided under Rule 4 – Temporary Activities. Rule 4.3.1.2 provides that construction activity has 'permitted status' is if meets the performance standard for noise, given at Rule 4.5.4.1. These standards reflect the NZS 6803:1999 criteria, which are discussed below in Section 2.2.

We note that the permitted status under Rules 4.3.1.2 and 4.5.4.1 is only dependant on noise and not vibration. Rule 4.5.4.1 provides that:

- Exceeding the noise performance standards by <5 dB results in discretionary status;
- Exceeding the noise performance standards by ≥5 dB results in non-complying status;
- However, the rule is silent on the implications of contravening the construction vibration limits.

Regarding vibration, clause (b) specifies that, *"vibration from construction must not exceed a maximum particle velocity measured on any foundation of an adjacent building on another site, or the same site if different ownership, of 25mm/second for commercial buildings or 10mm/second for buildings housing noise sensitive activities".*

Rule 4.5.4.2 relates to hours of operation and specifies that 'temporary events' must not exceed certain hours. This rule does not apply to construction noise, for which time periods are provided in Rule 4.5.4.1.

2.2 NZS 6803:1999

New Zealand Standard NZS 6803:1999 "*Acoustics - Construction Noise*" is directly applicable to this project and provides both recommended noise limits and a range of noise management measures intended to reduce noise effects as far as practical.

Separate noise limits are provided for residential and commercial receivers in recognition of their different sensitivity to noise. The recommended upper noise limits from NZS 6803 are provided in Table 1 and Table 2. The noise limits apply at 1m from external façades of occupied buildings.

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Table 1: NZS 6803 recommended upper limits for construction noise received in residential zones and dwellings in rural areas

Time of week	Time period	Typical duration		Short-term duration		Long-term duration	
		dB L_{Aeq}	L_{AFmax}	dB L_{Aeq}	L_{AFmax}	dB L_{Aeq}	L_{AFmax}
Weekdays	0630 – 0730	60	75	65	75	55	75
	0730 – 1800	75	90	80	95	70	85
	1800 – 2000	70	85	75	90	65	80
	2000 – 0630	45	75	45	75	45	75
Saturdays	0730 – 1800	75	90	80	95	70	85
	1800 – 0630	45	75	45	75	45	75
Sundays and public holidays	0730 – 1800	55	85	55	85	55	85
	1800 – 0630	45	75	45	75	45	75

Duration: Typical – Construction work at any one location for more than 14 calendar days but less than 20 weeks
Short-term – Construction work at any one location for up to 14 calendar days
Long-term – Construction work at any one location with a duration exceeding 20 weeks

Table 2: NZS 6803 recommended upper limits for construction noise received in commercial areas for all days of the year[1]

Time of week	Time period	Typical duration	Short-term duration	Long-term duration
		dB L_{Aeq}	dB L_{Aeq}	dB L_{Aeq}
All days	0730 – 1800	75	80	70
	1800 – 0730	80	85	75

Notes in the Standard to the tables above:

1. *"The night time limits in Table 2 shall apply to activities carried out in industrial or commercial areas where it is necessary to prevent sleep interference, specifically where there are residential activities, hospitals, hotels, hostels, or other accommodation facilities located within commercial areas. The limits in Table 2 may also be used to protect other specific noise sensitive activities at certain hours of the day."* [NZS 6803:1999 Note 7.2.5]
2. *"One major factor which should be considered is whether there is a relatively high background sound level (L90) due to noise from sources other than construction work at the location under investigation. In such cases limits should be based on a determination of the existing level of noise in the area (a "background plus" approach)."* [NZS 6803:1999 Note 7.2.6]

With regard to the last note, the Standard states at C7.2.6 that:

> *"In urban areas, traffic noise may control the background sound level at relatively high levels, for example 60 dBA L_{90}. In such circumstances, the high background level may warrant less stringent noise limits than those recommended in* [the tables above]*."*

[1] The District Plan (2GP) additionally applies the Table 2 limits to: *"… Port and commercial and mixed use zones"*.

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2.3 Discussion of Noise Criteria

2.3.1 Land Use and Zoning

For this project the receiving environment is commercial and mixed use in nature and therefore the commercial area noise limits from Table 2 apply under Rule 4.5.4.1 a.ii. However, we note that the presence of dwellings within the mixed use areas means that the more stringent Table 1 noise limits should apply to these properties.

We consider this appropriate as, whilst the receiving environment around the site is generally commercial in nature, several properties have a residential function (e.g. dwellings or visitor accommodation) and it is appropriate to provide appropriate protection of sleep at night. Higher night-time noise limits would otherwise be appropriate for an exclusively commercial area, as most buildings will not be occupied at night.

2.3.2 Application of NZS 6803:1999

Numerical Limits

Considering the anticipated demolition timeframes of the overall NDH project, we recommend that the NZS 6803 long-term noise criteria be adopted in this instance. To best manage noise effects:

- The Table 1 noise limits should apply to any site with a residential function; and
- The Table 2 noise limits should apply to any other occupied site.

For long-term duration projects, the core daytime noise limits are the same for residential and commercial areas – 70 dB L_{Aeq}. However, if works occur at night or during the early morning or late evening, then the residential and commercial limits would differ. For this reason, it is important to note the type of occupancy of a receiving building and apply the correct limits accordingly.

Background Noise Levels

We note that the existing background noise levels are already elevated in this area due to traffic noise (discussed further in Section 3.1.1). However, while NZS 6803 provides for less stringent noise limits in such cases, the District Plan does not provide any mechanism by which the applicable noise limits can be adjusted accordingly. As such, we have not made any recommendations in this regard.

Although we anticipate that construction activities will mostly be able to comply with the NZS 6803 limits, there are likely to be occasions when the limits are exceeded. For example, this may occur when work is occurring at the edge of the site, directly opposite a receiver with no screening.

In respect of noise, this will make the activity either discretionary or non-complying under the District Plan (2GP), depending on the magnitude of the difference. Despite this, provision C7.2.6 of the Standard is a positive indication that potential adverse noise effects would be limited due to the existing noise environment.

2.3.3 Cumulative Noise

It is also important to be mindful of cumulative noise effects from other areas of the project. The demolition phases will overlap at times so, although the whole demolition scope will be split into separate consenting packages, noise effects can occur on a global basis and it is the long-term nature of the overall project that must be considered against the NZS 6803 criteria.

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2.4 Vibration Performance Standards

As discussed above, the District Plan (2GP) provides the following vibration assessment criteria:

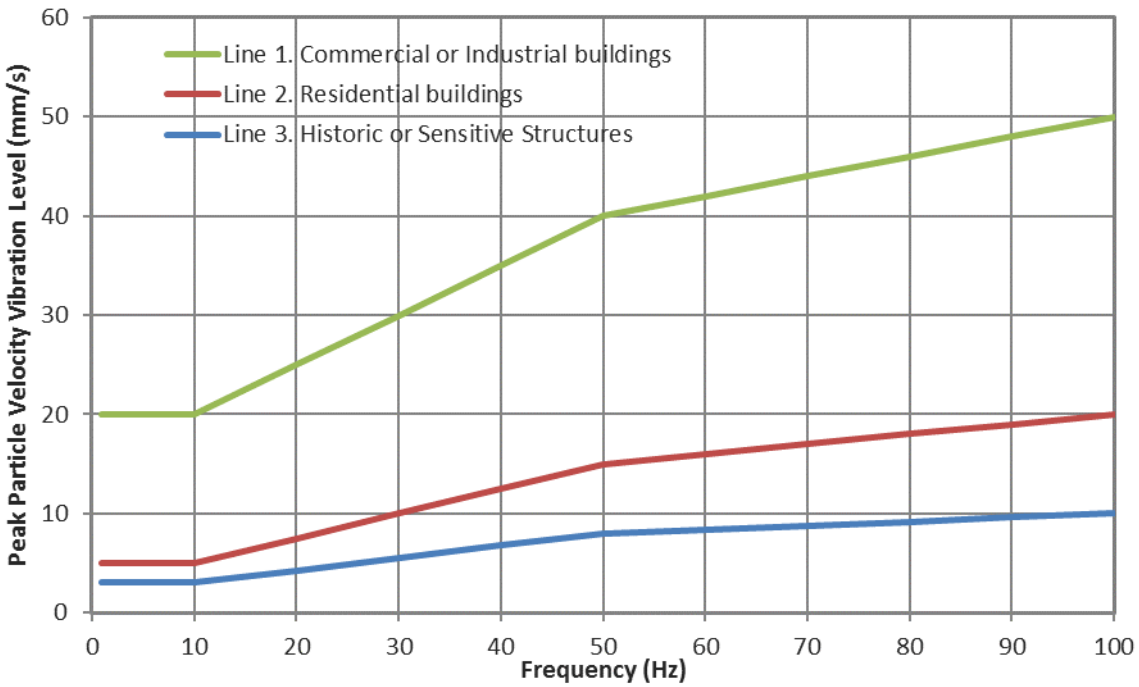
Table 3: Vibration performance standards from Rule 4.5.4.1 (b) of the District Plan (2GP)

Receiver Type	Vibration Limit (mm/s PPV)
Buildings housing noise sensitive activities[2]	10
Commercial buildings	25

Construction and demolition work that potentially affects the structure of buildings is normally assessed in New Zealand to the vibration guidelines in German Standard DIN 4150-3:2016 *"Vibration in buildings – Part 3: Effects on structures"*. These guideline values are intended to ensure that material vibration damage to structures does not occur. The short-term (transient)[3] vibration limits in Figure 2 and Table 4 overleaf apply at building foundations. The vibration limits in all other cases are summarised in Table 5.

The criteria relate to the avoidance of cosmetic building damage, such as cracking in paint or plasterwork. Cosmetic building damage effects are deemed 'minor damage' in the Standard and can generally be easily repaired. The cosmetic building damage thresholds are much lower those that would result in structural damage. The Standard states: *" Experience shows that **no** damage due to vibration adversely affecting serviceability … will occur if these guideline values are complied with"*.

Figure 2: Short-term (transient)[3] vibration at building foundations (DIN 4150-3:2016, Figure 1)



[2] Noise sensitive activities are defined in the 2GP as: *"Activities where people are more likely to be sensitive to a high level of noise because they are sleeping, studying, seeking medical treatment, or engaged in religious activity"*.

[3] Short-term (transient) vibration is defined in DIN 4150-3:2016 "*vibration that does not occur often enough to cause material fatigue and whose development over time and duration is not suitable for producing a significant increase in vibration due to resonance in the particular structure*".

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Table 4: Short-term (transient)[3] vibration limits (DIN 4150-3:2016, Table 1)

Structure Type	Peak Particle Velocity (PPV) Vibration Level (mm/s)				
	Foundation, all directions			Topmost floor, horizontal direction	Floor slab, vertical direction
	1-10 Hz	10-50 Hz	50-100 Hz	All frequencies	All frequencies
Commercial or Industrial buildings	20	20 to 40	40 to 50	40	20
Residential buildings	5	5 to 15	15 to 20	15	20
Historic or Sensitive Structures	3	3 to 8	8 to 10	8	20

Table 5: Long-term[4] vibration limits (DIN 4150-3:2016, Table 4)

Structure Type	Peak Particle Velocity (PPV) Vibration Level (mm/s)	
	Topmost floor, horizontal direction	Floor slab, vertical direction
Commercial or Industrial buildings	40	10
Residential buildings	15	5
Historic or Sensitive Structures	8	2.5

We note that the District Plan (2GP) vibration limits (Table 3) are much less restrictive then the guidance given in DIN 4150-3:2016. However, for comparison, we also note similar guidance is given in British Standard BS 5228-2:2009 *"Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration"*, as shown in Table 6 below.

Table 6: Transient vibration guide values for cosmetic damage (BS 5228-2:2009, Table B.2)

Structure Type	Peak Particle Velocity (PPV) Vibration Level (mm/s)	
	4 to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced or light framed structures Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

With respect to the criteria in Table 6, the Standard notes that:

> *"Minor damage is possible at vibration magnitudes which are greater than twice those given in* [Table 6]*, and major damage to a building structure can occur at values greater than four times the tabulated values. Definitions of the damage categories are presented in BS 7385-1:1990, 9.9.*
>
> *The guide values in* [Table 6] *relate predominantly to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due*

[4] Long-term (continuous) vibration is types not covered by the short-term vibration definition.

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to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in [Table 6] *might need to be reduced by up to 50%".*

Lowering the BS 5228-2:2009 low frequency guidance (i.e. around 15 Hz) by 50% yields values consistent with the District Plan guidance in Table 3.

We recommend that the guidance in DIN 4150-3:2016 is followed as far as practicable. Where compliance with these values cannot be maintained, the criteria in the District Plan and BS 5228-2:2009 provide a suitable backstop that still ensures an adequate degree of protection.

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3.0 ENVIRONMENTAL CONTEXT

3.1 Existing Environment

As shown previously in Figure 1, the NDH site is in a metropolitan area and hence immediately surrounded by a number of properties, including:

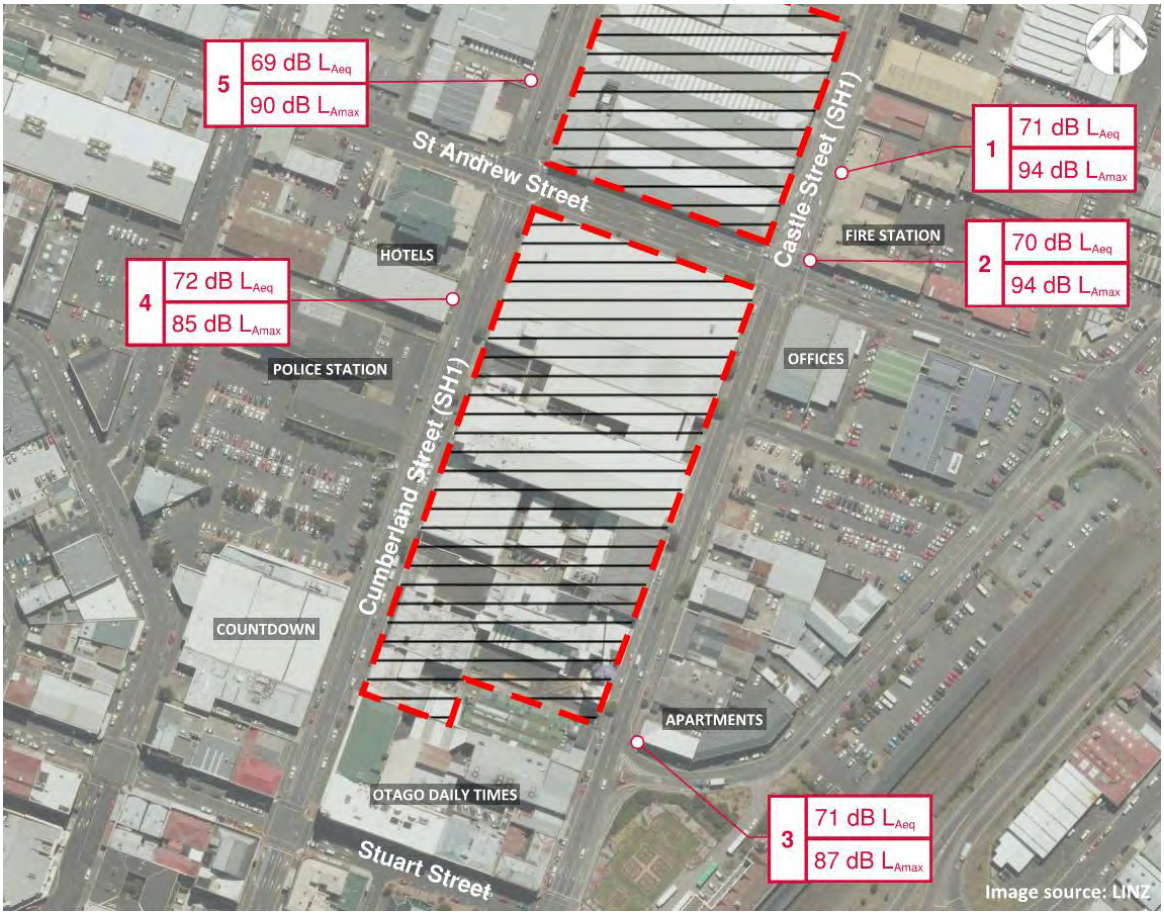
- Dunedin Police Station;
- Dunedin Central Fire Station (a heritage building);
- New World & Countdown Supermarkets;
- Apartments, hotels and mixed-use facilities;
- Miscellaneous industrial workshops and commercial premises; and
- The Otago Daily Times (ODT) Building (also heritage listed).

The existing noise environment in the area is generally governed by road traffic noise. State Highway 1 runs either side of the site on Cumberland and Castle Streets. Smaller east-west streets also carry reasonable levels of traffic (Hanover, St Andrew and Stuart Streets). We have surveyed existing traffic noise levels in the area in order to establish current levels of noise exposure.

3.1.1 Noise Surveys

We obtained noise measurements on 17 and 18 July 2019 at various locations around the application site. The results are summarised in Figure 3 below. Further details about the survey are provided in Appendix B. Measured background noise levels were broadly consistent between the positions and ranged from 58 to 63 dB L_{A90} across all of the measurements.

Figure 3: Summary of short-term noise monitoring results



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3.1.2 Traffic Analysis

The results of our short-term ambient noise monitoring indicate relatively consistent traffic noise levels in the vicinity of SH1. To better understand typical diurnal variance, we have analysed data on typical traffic volumes. We have focussed on the state highways, as these are the dominant roads.

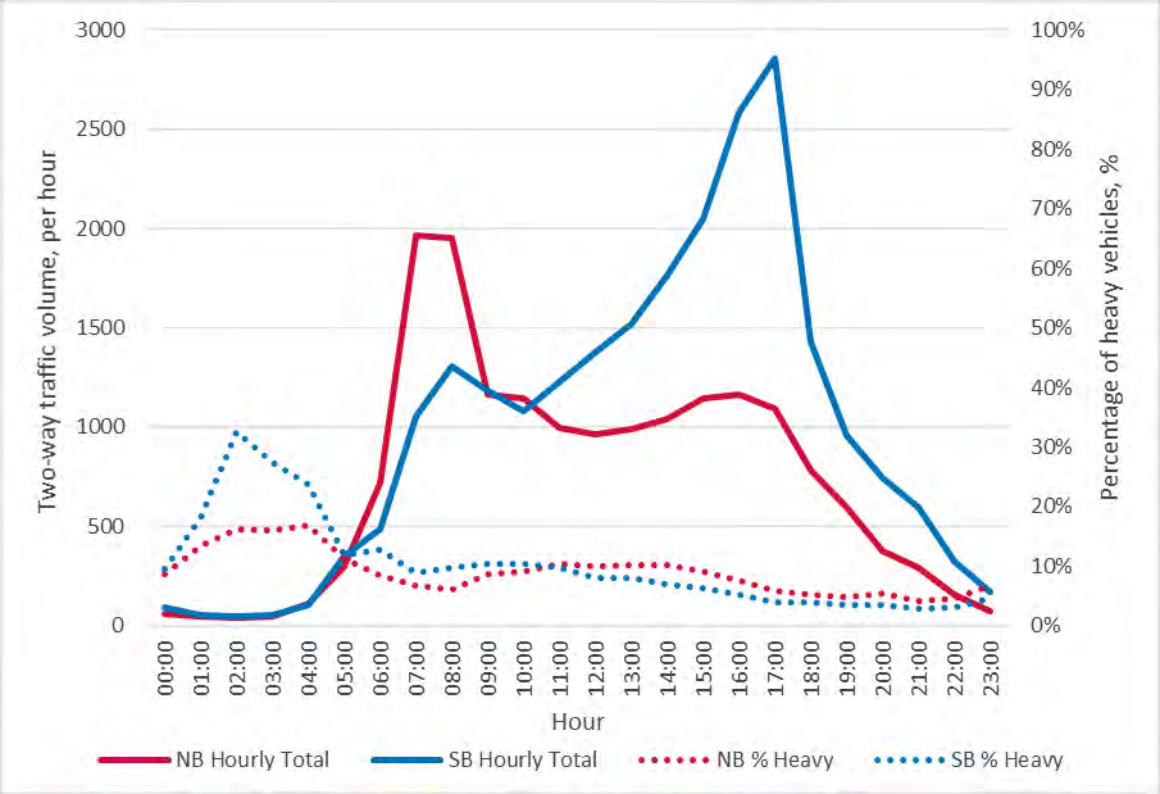
Table 7 summarises NZTA traffic count data from 2015 for SH1, just north of the application site (north of Hanover Street). Detailed publicly available data is limited for areas close to the site, but this provides an indication of the volume of daily traffic. Other public sources of information (e.g. Auckland Motorways' *Mobile Road*) also broadly indicate 15,000 vehicles per day each on Cumberland and Castle Streets.

Table 7: Summary of 2015 NZTA average daily traffic count data for site 706

Metric	SH1 northbound (Cumberland St)	SH1 southbound (Castle St)
AADT	14954	14906
% Heavy Vehicles	3	3

Figure 4 indicates the hourly distribution of traffic at the closest detailed telemetry site on SH1 in Burnside, south of the city. We assume the hourly profile will be similar in the CBD.

Figure 4: Typical daily traffic profile (from NZTA telemetry site 63, 2018 data)



The daily profile above shows that there is minimal traffic throughout the quietest period of the night, with significant morning and evening peaks, relative to the normal daytime level.

Based on the traffic data above, we calculate that noise levels at the façades of buildings immediately fronting SH1 will be not less than 71 dB $L_{Aeq\,(24\,hr)}$. This is consistent with our short-term measured noise levels, which were broadly in the middle of the day, outside of peak times. During this period, we would expect a +0-2 dB correction to the 24 hour L_{eq} to obtain the short-term, 1 hr, L_{eq}. During peak periods, the 1 hr level may be up to +1-2 dB higher again, while significantly lower at night.

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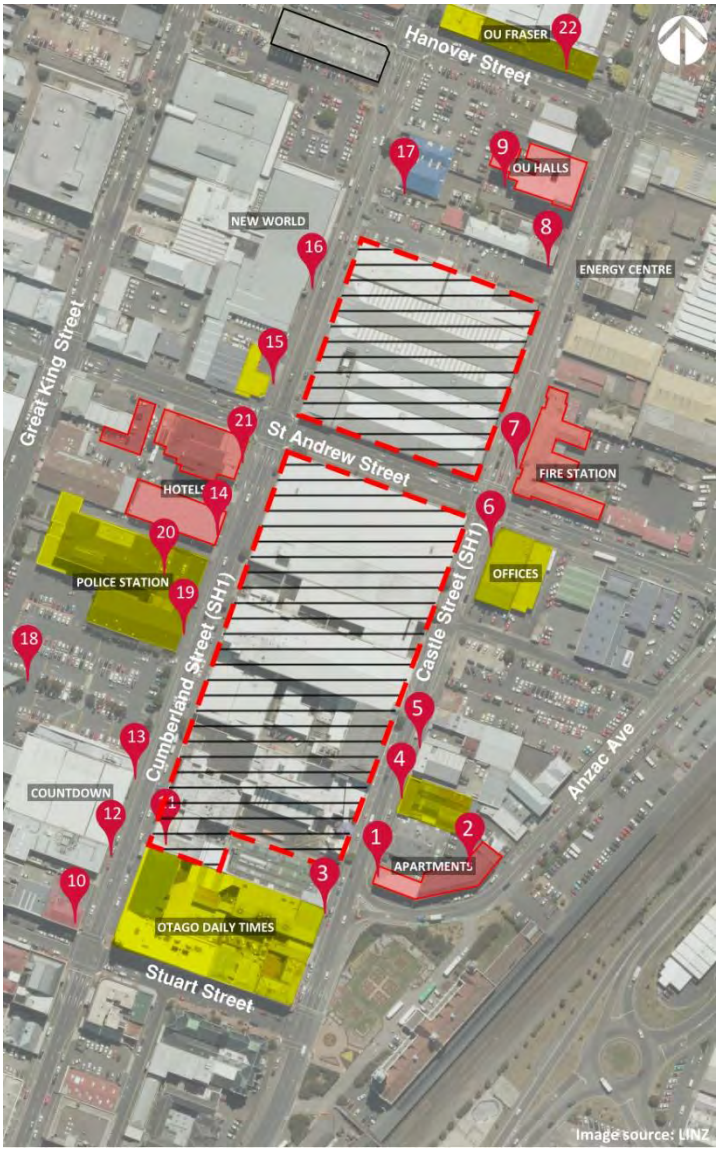
3.2 Sensitive Receivers

We have analysed the adjacent buildings to establish how sensitive they may be to noise, which typically depends on the exact usage. Figure 5 below indicates the adjoining receivers we have identified, along with their address in the accompanying table. Red shaded buildings occupy residential-type use, while yellow shaded buildings are commercial offices or similar where a moderate level of noise sensitivity may be expected. Unshaded buildings are typically less-sensitive commercial or industrial premises.

Figure 5: Noise sensitive receivers adjacent to the application site



ID	Address
1	3 Anzac Ave (Apartments)
2	5 Anzac Avenue (Apartments)
3	12 Castle St
4	53 Castle St
5	61 Castle St
6	83 Castle St
7	85 Castle St (Fire Station)
8	172 Castle St
9	192 Castle St (OU Halls)
10	70 Cumberland St
11	260 Cumberland St (ODT)
12	261 Cumberland St (Countdown)_S
13	261 Cumberland St (Countdown)_N
14	333 Cumberland St (Quest)
15	359 Cumberland St
16	371 Cumberland St (New World)
17	420 Cumberland St
18	1 Great King St
19	25 Great King St (Police)_E
20	25 Great King St (Police)_W
21	137 St Andrew St (Victoria Hotel)
22	OU Fraser Building, Hanover St

With regard to the noise limits discussed in Section 2.2, it is appropriate to apply the residential noise limits (Table 1) to red buildings and the commercial/mixed use limits (Table 2) to all other buildings.

We note that the Dunedin Central Fire Station is included as 'residential' as we understand that, in addition to its office facilities, the station has sleeping quarters and crews remain on site 24/7.

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4.0 SITE CLEARANCE AND DEMOLITION METHODOLOGY

4.1 Overall Project Phasing

We understand that the demolition will likely progress from north to south within each block, with works likely to be undertaken simultaneously in each block if practicable.

The key portions of the works have been split into 10 buildings or groups, labelled A to I. We have further divided the large building areas into smaller source areas for the purpose of our noise generation calculations, but this is not presented below. Building J (the former Dairy building) is being retained as part of the NDH project.

We understand that the existing buildings are as follows (bold text highlights parts of this consent package). Specific details around the Cadbury's Block works are provided overleaf.

- Building A is a 2 storey masonry building, the site of which will form the Wilson's staging area;
- Buildings B and C are 1 storey masonry buildings;
- Buildings D and E are 2 storey masonry buildings;
- Building F is a large former Cadbury's storage warehouse, which will be the staging area for the Cadbury's block;
- **Building G is a 5 storey masonry building, previously Cadbury's manufacturing and packing;**
- **Building H, further subdivided into seven portions, consists of several different buildings from 1-4 storeys high, including two silos; and**
- **Building I was previously occupied by Cadbury World.**

Figure 6: Indicative demolition staging plan

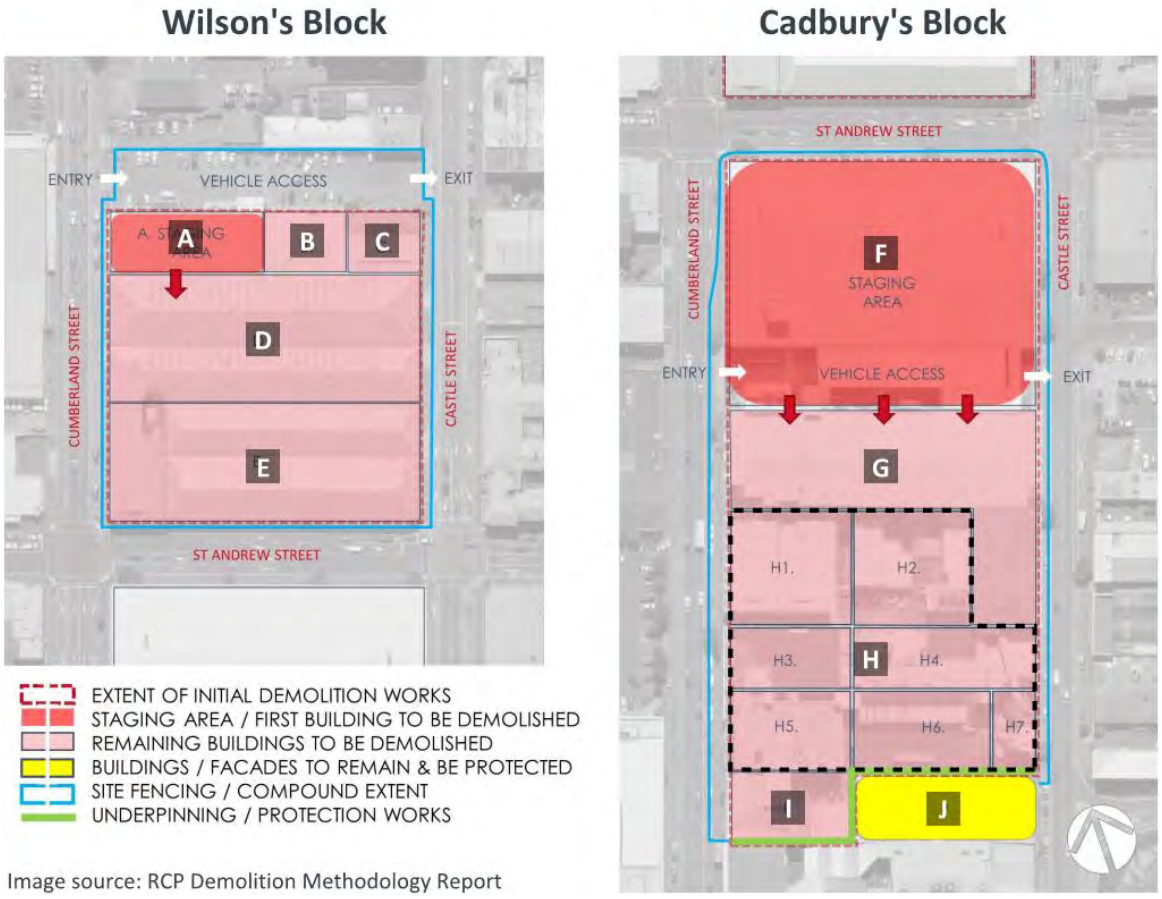

Image source: RCP Demolition Methodology Report

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4.2 Cadbury's Block Plan

The buildings within the Cadbury's Block are varied with differing heights and construction types. We note that the site of Building 'F' once cleared (the former warehouse) will form the staging area for these works.

4.2.1 Building Group G

These are the most significant structures, at five storeys high and of heavyweight masonry construction. The height of these buildings means that a crane will likely be required to deconstruct the top two storeys, with the remainder of the buildings then demolished using a high-reach excavator with multi-processor and grapple attachments.

4.2.2 Building Group H

By contrast, the buildings in the central portion of the Cadbury's Block are lower height, typically between one to four storeys. The lower portions of these buildings are generally masonry structures, with the top storey being of lightweight construction. These buildings are all likely to removed through use of standard excavators with multi-processor attachments.

A crane will be required to deconstruct the two silos in the south-eastern corner of the site. The height of the silos and space required for the crane means that a short-duration road closure may be required for these works.

4.2.3 Building Group I

This portion, in the south-western corner of the worksite was formerly the Cadbury World site and abuts the heritage-listed ODT building to the south. As such this building will require deconstruction with specialist engineering input. While the exact works methodology is therefore still unknown, we understand this is likely to comprise three phases:

- Manual deconstruction of the roof;
- Demolition of the main structure using a standard excavator with multi-processor attachments; and
- Manual deconstruction of the remaining portion of the building adjacent to the ODT façade.

Figure 7: Details of the 'Cadbury's Block' site

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4.3 Proposed Activity Programme

Indicative dates for key works phases associated with the deconstruction of the Cadbury's Block are given below.

Table 8: Indicative programme for Cadbury's Block demolition

Activity	Start Date	Duration
Strip-out (Building G)	July 2020	2 weeks
Strip-out (Building H)	July 2020	2 months
Strip-out (Building I)	August 2020	2 weeks
Hard demolition (Building G)	March 2021	3 months
Hard demolition (Building H)	July 2021	7 months
Hard demolition (Building I)	January 2022	2 weeks

The master programme for the demolition works of the buildings G-I is provided in Appendix C.

The programme shows that demolition of the Cadbury's Block will overlap to an extent with some adjacent works on the Wilson's Block and Cadbury Warehouse sites, so we have been mindful of cumulative noise effects. However, we note that there is reasonable spatial separation between the Wilson's and Cadbury's works areas, which limits the sensitivity of receivers to the north to southern work areas.

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5.0 CALCULATED NOISE LEVELS

We have undertaken our assessment based on the calculation procedures out lined in NZS 6803:1999 which, in turn, references BS 5228-1:1997 *"Code of practice for noise and vibration control on construction and open sites – Part 1"*.

It should be noted that these noise levels represent the likely worst-case for each activity and at the highest or worst-affected floor of the receiving building. The levels will not be experienced on a continuous basis for the duration of the project. Similarly, where activities overlap, the worst-case levels are assumed for each, which is unlikely to occur in practice.

Noise propagation for each of the key activity types is provided in Table 9 to demonstrate how noise decays with distance. This data is also shown as a graphical plot in Figure 8, while the detailed list of noise sources assumed in these calculations is provided in Appendix D.

Table 9: Indicative noise levels at 1m from a building façade (incl. effective barrier mitigation)

Activity	Activity Level	Activity Mitigation	Façade Noise Level, dB L_{Aeq} at distance, m					Required Setback, m
	dB L_{Aw}	dB	5	10	20	50	100	(70 dBA)
Inspection	104	20	65	59	53	43	36	3
Soft Strip-Out	107	10	78	72	66	57	49	13
Hard Demo (Low Buildings)	108	0	89	83	77	67	60	38
Hard Demo (High Reach)	110	0	91	85	79	69	62	47
Hard Demo (Cut & Crane)	108	0	89	83	77	68	60	41
Specialist Demo (High Reach)	107	0	88	82	76	66	59	36
Specialist Demo (Minor Plant)	102	0	83	77	71	62	54	23

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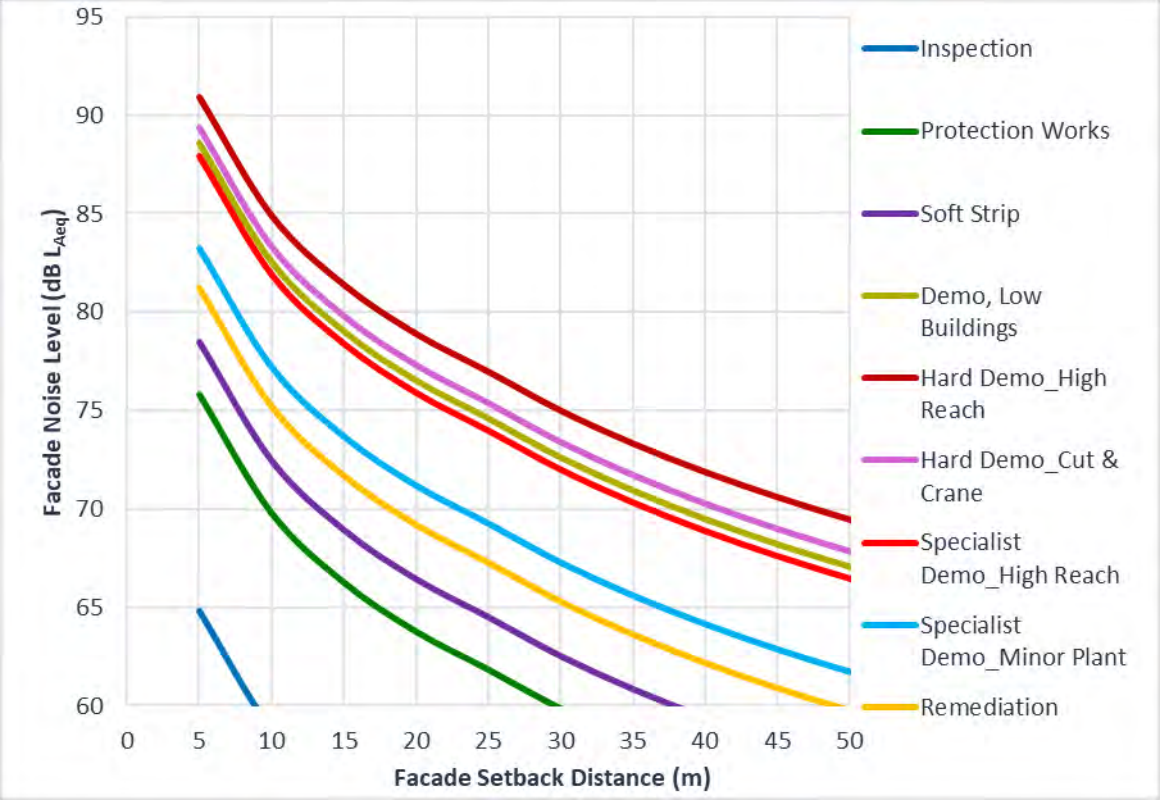
Figure 8: Indicative noise levels at 1m from a building façade (incl. effective barrier mitigation)



At this stage, minimal mitigation has been assumed for each activity, for example where site boundary hoarding or retained façades provide some acoustic screening can be reasonably assured. Once the exact methodology and phasing has been confirmed then an appropriate allowance can be made for increased levels of noise mitigation to specific plant items or activities as required. No further mitigation has been allowed for in our calculations except where stated.

5.1 Cumulative Noise Levels

It is necessary to establish where activities may overlap and generate higher cumulative noise levels at receivers. The activity noise levels presented above have been combined for when activities occur concurrently, based on noise levels at the following distances:

- 30 metres – representative of activity at the edge of site, opposite a receiver across SH1 **(this consent)**, noting that the 'acoustic centre' of activity will typically be inward of the site boundary;
- 50 metres – activity occurring opposite or close to a receiver, but not on the edge of the site **(this consent)**; and
- 100 metres – for concurrent NDH project activities in **other consents** (Table 9 maximum value).

Noting that the phasing does not realistically permit two activities to occur simultaneously at the minimum distance, the following two scenarios are presented:

1. Closest activity combined with distant activities (worst case, Table 10); and
2. Combinations of distant activities at both 50 and 100 metres (typical case, Table 11).

Again, we note that these calculations generally assume little or no mitigation between source and receiver, thus do not account for shielding due to intervening buildings, etc.

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Table 10: Combined noise level matrix for close and distant activities

		Close Cadbury's Activity (30m)									
	Distant Activity (50/100m)	None	Inspection	Protections	Soft Strip	Demo, Low Bldg	Demo, High Rch	Demo, Crane	Spec Dem, High	Spec Dem, minor	Remediation
Distant Cadbury's Activity (50m)	None	-	49	60	63	73	**75**	74	72	68	66
	Inspection	43	50	60	63	73	**75**	74	72	68	66
	Protection Works	54	55	61	63	73	**75**	74	72	68	66
	Soft Strip	57	58	62	64	73	**75**	74	73	68	66
	Demo, Low Buildings	67	67	68	68	74	**76**	**75**	74	70	69
	Demo, High Reach	69	69	70	70	**75**	**76**	**75**	74	72	71
	Demo, Cut & Crane	68	68	69	69	74	**76**	**75**	74	71	70
	Special Demo, High Reach	66	67	67	68	74	**76**	**75**	73	70	69
	Special Demo, Minor Plant	62	62	64	65	73	**76**	74	73	69	67
	Remediation	60	60	63	65	73	**75**	74	73	68	67
Warehouse Activity (100m)	Inspection	36	49	60	63	73	**75**	74	72	68	66
	Establish Office	57	58	62	64	73	**75**	74	73	68	66
	Erect Hoarding	52	54	61	63	73	**75**	74	72	68	66
	Soft Strip	49	52	61	63	73	**75**	74	72	68	66
	Demo, Warehouse	58	59	62	64	73	**75**	74	73	68	66
	Demo, Wall	52	54	61	63	73	**75**	74	72	68	66
	Demo, Concrete	45	51	60	63	73	**75**	74	72	68	66
Below Ground	Foundation works at 50m	69	69	70	70	74	**76**	**75**	74	71	71
	Foundation works at 100m	62	62	64	65	73	**76**	74	73	69	67

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Table 11: Combined noise level matrix for activities at greater distances

		Distant Cadbury's Activity (50m)									
	Distant Activity (50/100m)	None	Inspection	Protections	Soft Strip	Protections	Demo, Low Bldg	Demo, High Rch	Demo, Crane	Spec Dem, High	Spec Dem, minor
Distant Cadbury's Activity (50m)	None	-	43	54	57	67	69	68	66	62	60
	Inspection	43	46	55	57	67	69	68	66	62	60
	Protection Works	54	55	57	59	67	70	68	67	62	61
	Soft Strip	57	57	59	60	67	70	68	67	63	62
	Demo, Low Buildings	67	67	67	67	70	71	70	70	68	68
	Demo, High Reach	69	69	70	70	71	72	72	71	70	70
	Demo, Cut & Crane	68	68	68	68	70	72	71	70	69	68
	Special Demo, High Reach	66	66	67	67	70	71	70	69	68	67
	Special Demo, Minor Plant	62	62	62	63	68	70	69	68	65	64
	Remediation	60	60	61	62	68	70	68	67	64	63
Warehouse Activity (100m)	Inspection	36	44	54	57	67	69	68	66	62	60
	Establish Office	57	57	59	60	68	70	68	67	63	62
	Erect Hoarding	52	52	56	58	67	70	68	67	62	60
	Soft Strip	49	50	56	58	67	69	68	67	62	60
	Demo, Warehouse	58	58	60	61	68	70	68	67	63	62
	Demo, Wall	52	52	56	58	67	70	68	67	62	60
	Demo, Concrete	45	47	55	57	67	69	68	66	62	60
Below Ground	Foundation works at 50m	69	69	69	69	71	72	72	71	70	70
	Foundation works at 100m	62	62	62	63	68	70	69	68	65	64

The values given in the matrices above indicate that, for most activities and combinations, the predicted noise levels will meet the 70 dB L_{Aeq} permitted activity standard. However, some activities or combinations have the potential to exceed either the discretionary (red text, <75 dB L_{Aeq}) or non-complying (red shading, ≥75 dB L_{Aeq}) thresholds.

5.2 Noise Levels at Critical Receivers

To provide some more context to the values above, this section provides examples of the highest noise levels at the closest sensitive receiver locations. These examples include cumulative noise from other NDH activities.

While not discussed in this report, other activities are scheduled to occur concurrently, provided there are no project delays. These include activities in both the Cadbury's warehouse and Wilson's consent packages. Note that the examples below account for the highest noise levels from works

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associated with this consent, rather than the highest overall for the project, which may be due to works consented separately (e.g. below-ground works).

Table 12 sets out how the maximum noise level has been calculated for each receiver. Due to the overlap of scheduled activities, the 'critical period' referenced is the time in which the maximum level could occur – it is not anticipated to occur on a continuous basis for this period.

Noise received at the ODT building (260 Cumberland St) is discussed separately in the following section.

Table 12: Examples of worst-case cumulative noise level calculations

Receiver	Date	Critical Period	Activities	Noise Level, dB L_{Aeq}		
				This consent	Below-ground-works	Total
261 Cumberland St (Countdown)	Aug 20	2 wks	Soft Strip (Buildings H3, H5-6, I)	65	-	**65**
137 St Andrews St (Victoria Hotel)	Oct 21	1 wk	High Reach Demo Building H2, Below-Ground Works Building E	60	75	**75**
85 Castle St (Fire Station)	Oct 21	1 wk	High Reach Demo Building H4, Below-Ground Works Building E	60	75	**75**
25 Great King St (Police)	Aug 21	2 wks	High Reach Demolition Building G	75	-	**75**
25 Great King St (Police)	May 21	3 wks	Top-Down Demolition Building G	74	-	**74**
261 Cumberland St (Countdown)	Nov 21	2 wks	High Reach Demolition Building H5	75	-	**75**
3 Anzac Ave (Apartments)	Jan 22	3 days	High Reach Demolition Building H7	75	-	**75**

The data above shows that, where elevated noise levels are indicated, it is either due to below-ground works from the Wilson's Block or demolition occurring at the boundary of the Cadbury's Block.

5.3 Otago Daily Times Building

The ODT building is a unique receiver for this project in that it is the only one that immediately adjoins the worksite and does not benefit from separation by the road corridor. Moreover, works will occur right up to the party wall due to the demolition of Building I.

The ODT buildings south of the retained Dairy building are industrial in nature (being printing and production areas) and therefore not especially sensitive to noise. Conversely, the western areas bordering Cumberland Street have been described as 'intermittent office use' and are hence likely to be sensitive, at least at times.

While it remains, the presence of Building I will provide a buffer to the majority of NDH works, both in terms of spatial separation and as a noise barrier. NZS 6803 effectively recommends a long-term noise limit inside commercial buildings of 50 dB L_{Aeq} (Clause 7.2.7). Noise from works will remain comfortably below this criterion until Building I demolition begins in Jan 2022.

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Hard demolition of Building I is scheduled for around two weeks from this date. Whilst we are not familiar with the layout or construction of the ODT building, we have estimated internal noise levels received during this time based on some generic assumptions.

Table 9 indicates that the highest noise levels during the specialist deconstruction works in Building I are 83 and 88 dB L_{Aeq} (at 5 metres). Taking these as incident noise levels on the ODT façade, and with an allowance for flanking transmission via the side walls/windows, we anticipate that the internal noise level within the ODT west building will still remain below 50 dB L_{Aeq}.

However, this does not account for potential structure-borne transmission of noise during party wall works if there is any bridging between the structures (e.g. hammering or drilling on the opposite side of the wall). Internal levels may be higher in such cases and lead to disturbance. Works on the party wall itself will be for a short period at the end of Building I demolition. Similarly, the removal of the structure that currently forms the courtyard wall is likely to result in a short period of elevated noise levels as the wall is taken down.

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6.0 DISCUSSION OF DEMOLITION NOISE

The analysis in the preceding section confirms that the proposed activities have the potential to exceed the applicable long-term duration noise limits from NZS 6803:1999 when work is occurring close to adjacent properties.

Short term exceedances of the applicable noise limits can be unavoidable in some situations. However, NZS 6803 acknowledges that such exceedances are often considered reasonable if they are of a limited duration and Best Practicable Option (BPO) measures are implemented to avoid, remedy and mitigate the noise emissions as far as practicable.

6.1 Daytime Noise Emissions

Our calculations show that cumulative noise emissions will exceed the daytime noise limits at times at a small number of noise-sensitive receivers, as below. However, of these, only those highlighted in bold are directly as a result of activities in this consent package (refer Table 12).

- **3 Anzac Ave (Apartments)**
- **53 Castle St**
- **83 Castle St**
- 85 Castle St (Fire Station)
- **333 Cumberland St (Quest)**
- **359 Cumberland St**
- **25 Great King St (Police Station)**
- 137 St Andrews St (Victoria Hotel)

With regard to the Dunedin District Plan, the highest predicted noise levels exceed the permitted activity standard (NZS 6803 limits) by more than 5 dB (including a cumulative noise contribution). As such, the activity has **non-complying status** according to Rule 4.5.4.1 of the 2GP.

As discussed in Section 5.0, the calculations have been undertaken on a worst-case basis and, in reality, we anticipate that some relief will be afforded to receivers as the levels and location of activities vary. Appropriate management and additional noise mitigation measures may further reduce noise levels beyond those predicted, noting that we have assumed minimal mitigation.

Table 10 shows that most 'hard demolition' activities have a risk of exceeding the 70 dB L_{Aeq} daytime limit when occurring close to receivers. The information in Table 11 indicates that this risk is minimal once the activity is further away at around 50 metres, which essentially represents any point other than the closest activities. These tables, along with Table 12, indicate a slight elevation of risk due to cumulative noise influence from other NDH activities, but this is relatively minor. It is generally the closest activities that will result in the highest noise levels.

The results of our ambient noise monitoring indicate that daytime noise levels are typically already in excess of 70 dB L_{Aeq} at the façades of buildings on SH1. Thus, where the construction noise limits are exceeded by a small margin, the scale of effect will be quite low compared with in a quieter environment, such as a suburban residential area.

Considering wider noise effects, buildings further away than those focussed on in our assessment will receive lower noise levels due to the greater separation distance and because of acoustic screening from intervening structures. Passing pedestrian traffic will temporarily experience high levels of construction noise at times, but we note that no leisure areas (e.g. parks) are nearby where people would be likely to experience adverse effects for a prolonged period.

Section 5.3 highlights that, while noise within the ODT buildings will generally remain at a reasonable level in terms of demolition activities, some specific risk periods will occur in which potential adverse effects would best be dealt with through liaison with the buildings' owner and/or occupants.

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6.2 Night-time Noise Emissions

Demolition activities will not typically occur at night and therefore adjacent apartments and visitor accommodation will maintain an appropriate noise environment for adequate protection of sleep.

It may at times be necessary to schedule some activities at night in order to facilitate emergency works or to best accommodate the requests of specific stakeholders (e.g. undertaking high-impact works while a commercial premise is unoccupied). Such instances should be avoided as a matter of course and should only occur when absolutely necessary.

Infrequent occurrences of night works are likely to be acceptable on this basis and where prior notification of affected residents has taken place.

6.3 Noise Management and Mitigation

It has become best practice for projects of this scale to have a Noise and Vibration Management Plan (NVMP) which can identify potential breaches of the noise and vibration limits and put appropriate mitigation or management measures in place to ensure effects are reasonable.

At this stage of the project it is not appropriate to specify noise mitigation methods in detail, as the working methodology is not sufficiently developed. However, such issues are ideally captured in an NVMP.

The development of an NVMP for the overall NDH project should be a requirement on the successful Contractor(s), and should include:

- The performance standards that must, where practicable, be complied with;
- Predicted noise and vibration levels for relevant equipment and/or activities;
- Mitigation considerations to identify the BPO with respect to demolition noise and vibration;
- Noise and vibration monitoring requirements, with triggers and feedback mechanisms; and
- Communication, consultation and complaints response protocols.

We have provided a draft NVMP as Appendix F. This is intended to apply to the project as a whole, so not all aspects are relevant to this application. The NVMP identifies a number of critical receiving environments for which mitigation will need to be considered in detail by the Contractor:

1. Noise received in the office areas of the ODT building(s) during works on the party wall;

   Office spaces are likely to remain occupied during these works, unless prior arrangements can be made with the property managers. If this is unavoidable than care should be taken to minimise the scale, intensity and duration of works on the wall as far as practicable. Construction of a secondary wall structure within the occupied offices may, for example, be a means of facilitating ongoing use of the office space.

2. Noise received at the Dunedin Central Fire Station – in particular at the crew's sleeping quarters;

   The nature of the crew's work might mean that personnel have unconventional sleep patterns. The effects on resting and actively working personnel will require specific management by the Contractor, through liaison with Fire and Emergency New Zealand (FENZ), once the works methodology is further developed.

3. Noise arising during underpinning activity and sheet piling around Buildings B and C, which although owned by the MoH, may remain tenanted during a portion of these works.

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6.4 Overall Noise Effects

With regard to overall noise effects, while demolition or construction noise is usually undesirable, it is ultimately temporary and not necessarily unreasonable when all the relevant factors are taken into consideration.

The foreword of New Zealand Standard NZS 6803:1999 "*Acoustics – Construction Noise*" states:

> "*Construction noise is an inherent part of the progress of society. As noise from construction is generally of limited duration, people and communities will usually tolerate a higher noise level provided it is* ***no louder than necessary, and occurs with appropriate hours of the day****. The Resource Management Act 1991 requires the* ***adoption of the best practicable option to ensure*** *the emission of noise from premises does not exceed a* ***reasonable level****. The Act also imposes a duty on every person to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by, or on behalf of, that person*."

We consider that the noise levels will be generally reasonable with the adoption and implementation of a Noise and Vibration Management Plan (NVMP). This NVMP should outline the Best Practicable Option (BPO) measures to mitigate construction noise and vibration.

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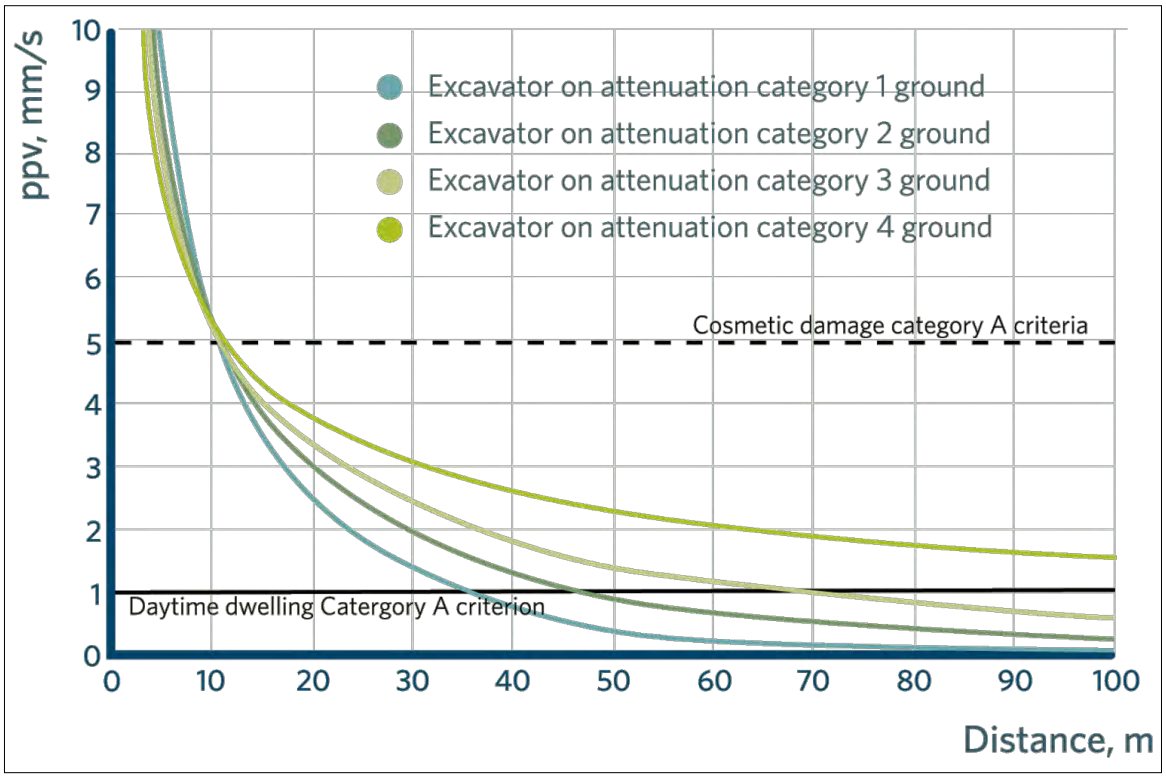
7.0 DEMOLITION VIBRATION LEVELS

In comparison to the prediction of noise, calculating vibration levels is more complex. This is primarily due to the propagation through non-uniform ground, combined with the coupling between the vibration source and the ground; and between the ground and the receiving building.

7.1.1 Empirical Analysis

Vibration received at a location from any given source will vary depending on a number of factors that determine the ground propagation conditions, e.g. soil type, density, elasticity, etc. Figure 9 provides an example of shows predicted vibration propagation over distance from an excavator for different ground types. This is from the NZTA's construction guidance[5] that has been developed based on empirical data discussed in their extensive research. The ground categories are broadly from: 1 – weak or soft; to 4 – hard, competent rock.

Figure 9: Predicted vibration from a 12 tonne excavator (Figure 4.31 of NZTA's construction noise guide)



In practice, our recent measurement experience with similar sources indicates that the NZTA guidance is somewhat conservative, as is generally the case for many "prediction" methodologies. For example, our own measurement data indicates typical levels of:

- 1.1 mm/s at 10 metres from Zaxis 330LC excavator loading dump truck;
- 0.2 mm/s at 19 metres from Zaxis 670LCH excavator loading dump truck; and
- 1.5 mm/s at 10 metres from an excavator operating a diaphragm wall rig.

On the basis of the data above, the conservative NZTA guidance suggest that vibration levels from an excavator working at 20 metres may vary between 2.5 and 3.8 mm/s, whereas our own measurements indicate that the upper levels of vibration will be between 1 and 2 mm/s.

[5] *State Highway Construction and Maintenance Noise and Vibration Guide*. NZ Transport Agency (2013).

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7.1.2 Set Back Distances

Table 13 summarises the expected set back distances required for the most probable vibration generating sources on site and the indicative separation distance to achieve compliance with the most stringent criteria reviewed – that from DIN 4150-3:2016 (based on generic ground conditions).

Table 13: Indicative distances to comply with vibration limits at building foundations

Equipment	Cosmetic Building Damage Setback (m)[6]		
	Heritage 2.5 mm/s PPV	Residential 5 mm/s PPV	Commercial 10 mm/s PPV
Vibratory Roller	30	14	6
Excavator (mid-size)	15	4	1
Sheet piling	30	11	4
Concrete/rock-breaker	16	10	7

The separation distances indicate that appropriate vibration management measures should be taken where vibration-generating activities are occurring close to buildings. Measures can include a structural condition assessment of identified buildings, installation of "tell-tale" crack monitors, and/or vibration monitoring during critical periods.

7.2 Vibration Effects

We anticipate that the criteria for residential and commercial buildings should be comfortably achieved where the receivers are on the opposite side of roads to the worksite. Table 13 indicates that compliance is also likely for heritage structures across the state highway (approximately 30 metres from works area to opposing façades), but we note that this is marginal.

While the primary vibration concern is typically structural or cosmetic building damage, people may be disturbed at levels that are significantly lower. Potentially affected parties should be informed about the vibration levels they may experience, along with general notifications around noise disturbance, and assured that vibration damage can only occur at magnitudes well above the threshold of perception.

In some cases, construction vibration can excite building structures. This is experienced as 'reradiated noise' within the building, rather than felt as vibration, but is the result of a structural transmission path. Predictions of reradiated noise levels are complex and site specific. Where necessary, a suitability qualified acoustic specialist should be engaged to provide guidance. Reradiated noise effects will be consistent with airborne noise effects for a given noise level.

Communication with affected parties in conjunction with vibration monitoring is considered the most practicable approach to minimising any effects on nearby affected parties.

7.3 Vibration Mitigation and Management

As with noise, vibration control and management measures should be contained with the project's NVMP (as described in Section 6.3). In addition to general risk management and monitoring thresholds, the following project-specific issues should be addressed:

1. Monitoring requirements for underpinning works, where sheet piling will occur close to the façades of occupied buildings (likely to require sensitivity testing during the start-up phase to determine the effects of local ground conditions).

[6] Based on regression analysis of available vibration measurements, plus a 100% safety factor.

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2. Appropriate assessment criteria for vibration-sensitive equipment in adjoining buildings, with specific reference to ODT's printing press. Appendix E has example guidance that may provide suitable limits (from BS 5228-2:2009). We note that monitoring of existing baseline vibration levels and liaison with ODT regarding hours of operation may be of benefit in this instance.
3. Monitoring of heritage structures and occupied sensitive working areas with the NDH building, likely to be required throughout Building I demolition works.

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8.0 PROPOSED CONDITIONS OF CONSENT

Overall, we are satisfied that, based on the provisional methodologies, the proposed demolition can be managed in an appropriate way to ensure that noise and vibration effects are reasonable.

To provide certainty that the works will occur in a manner consistent with this assessment, we recommend that the following conditions be included in any consent granted.

1. Demolition noise shall comply with the recommended residential and commercial noise limits for long term construction taken from Tables 1 and 2 of NZS 6803: 1999 *"Acoustics - Construction Noise"* as far as practicable.

   Note: this should apply on a cumulative basis to all demolition activities associated with the NDH project.

2. A Noise and Vibration Management Plan (NVMP) must be prepared by a suitably qualified person and submitted to Dunedin City Council 5 days prior to the commencement of the works. At a minimum, the NVMP must address the relevant measures in Annex E of NZS 6803:1999 "*Acoustics - Construction Noise*" and Appendix B of DIN 4150-3:2016 "*Vibration in buildings – Part 3: Effects on structures*". The NVMP must be implemented throughout the project and a copy must be maintained on site.

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APPENDIX A GLOSSARY OF TERMINOLOGY

Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
Frequency	The number of pressure fluctuation cycles per second of a sound wave. Measured in units of Hertz (Hz).
$L_{A10\,(t)}$	The A-weighted noise level equalled or exceeded for 10% of the measurement period. This is commonly referred to as the average maximum noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
$L_{Aeq\,(t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Masking Noise	Intentional background noise that is not disturbing, but due to its presence causes other unwanted noises to be less intelligible, noticeable and distracting.
PPV	Peak Particle Velocity For Peak Particle Velocity (PPV) is the measure of the vibration aptitude, zero to maximum. Used for building structural damage assessment.
Resonance	When a forcing frequency is the same as a resonant frequency of the structure, the structure is said to be in resonance.
RMS Velocity	For most applications where there is continuous vibration, vibration is measured in terms of root mean square RMS velocity (mm/sec), measured in any direction. Used for vibration annoyance.
Special Audible Characteristics	Distinctive characteristics of a sound which are likely to subjectively cause adverse community response at lower levels than a sound without such characteristics. Examples are tonality (e.g. a hum or a whine) and impulsiveness (e.g. bangs or thumps).
SPL or L_P	Sound Pressure Level A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing (20 μPa RMS) and expressed in decibels.
SWL or L_W	Sound Power Level A logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.

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APPENDIX B NOISE SURVEY DETAILS

The key details of the noise survey are as follows:

Date:	17 July 2019, 1400 - 1600 hrs and 18 July 2019, 1000 - 1200 hrs
Personnel:	Markus Schmid, Marshall Day Acoustics
Weather:	8 °C, minimal cloud, 1.5 - 3 m/s wind from the north-east
Instrumentation:	Brüel & Kjær Type 2250 analyser, serial 3010261, calibration due 22/05/2021 Brüel & Kjær Type 4231 calibrator, serial 3004051, calibration due 28/09/2019
Calibration:	Field calibration of the equipment was carried out before measurements, and the calibration checked after measurements. Observed change less than 0.1 dB.

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APPENDIX C CADBURY'S BLOCK WORKS PROGRAMME

Indicative programme of works (based on programme schedule dated 1/04/2020)

Task Name	Start Date	End Date	Work Building Location						
			A-C	D	E	F	G	H	I
CADBURY'S SITE DEMOLITION	25/02/20	31/08/20							
SOFT STRIP & SERVICE RELOCATION	25/02/20	25/08/20							
Site Establishment	25/02/20	02/03/20							
Soft Strip-Out - Building F	11/03/20	13/03/20							
Soft Strip-Out - Building G	24/07/20	13/08/20							
Soft Strip-Out - Buildings H1-H7	04/08/20	31/08/20							
Soft Strip-Out - Building I	12/08/20	25/08/20							
ABOVE GROUND WORKS	31/03/20	07/02/22							
Hard Demo - Building F	31/03/20	06/04/20							
Hard Demo - Building G	03/03/21	04/06/21							
Hard Demo - Buildings H1-H7	01/07/21	27/01/22							
Hard Demo - Building I	21/01/22	07/02/22							
BELOW GROUND WORKS	05/04/22	17/08/22							
Foundation Removal - Building F	05/04/22	18/04/22							
Foundation Removal - Building G	05/04/22	16/05/22							
Foundation Removal - Buildings H1-H7	05/04/22	17/08/22							
Foundation Removal - Building I	19/05/22	01/06/22							

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APPENDIX D DETAILED ACTIVITY NOISE LEVEL CALCULATIONS

Activity	Equipment	BS 5228 Ref.	No.	Source SWL	Usage Time	Source Control	Source Rating L_r	Activity SWL	Activity Control
				dB L_{Aw}	%	dB	dB L_{Aw}	dB L_{Aw}	dB
Inspection								**104**	**20**
Boarding windows	Hand-held hammer	D2.15	1	112	10%	0	102		
Cutting timber	Hand-held electric circular saw	D7.75	1	105	25%	0	99		
Establish Office								**104**	**0**
Lifting	Mobile telescopic crane	C4.41	1	99	50%	0	96		
Boarding windows	Hand-held hammer	D2.15	1	112	10%	0	102		
Lifting	Telescopic handler	C4.55	1	98	30%	0	93		
Distribution of material	Lorry	C2.34*	1	108	10%	0	98		
Erect Hoarding								**103**	**3**
Boarding windows	Hand-held hammer	D2.15	1	112	5%	0	99		
Trenching	Mini tracked excavator	C4.67	1	102	30%	0	97		
Cutting timber	Hand-held electric circular saw	D7.76	1	109	5%	0	96		
Miscellaneous	Handheld cordless nail gun	C4.95	1	101	15%	0	93		
Soft Strip								**107**	**10**
Breaking stud partition	Lump hammer breaking stud partition	C1.19	2	97	20%	0	93		
Breaking windows	Lump hammer breaking windows	C1.20	1	109	10%	0	99		
Cutting timber	Hand-held electric circular saw	D7.76	1	109	10%	0	99		
Breaking up/cutting steel	Gas cutter	C1.18	1	107	10%	0	97		

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Activity	Equipment	BS 5228 Ref.	No.	Source SWL	Usage Time	Source Control	Source Rating L_r	Activity SWL	Activity Control
				dB L_{Aw}	%	dB	dB L_{Aw}	dB L_{Aw}	dB
Miscellaneous	Angle grinder (grinder steel)	C4.93	1	108	15%	0	100		
Lifting	Telescopic handler	C4.55	1	98	50%	0	95		
Distribution of material	Lorry	C2.34*	1	108	10%	-5	103		
Hard Demolition – Warehouse								**106**	**0**
Breaking up concrete	Pulverizer mounted on excavator	C1.4	1	104	75%	5	98		
Breaking up/cutting steel	Tracked excavator	C1.16	1	110	50%	5	102		
Breaking up/cutting steel	Gas cutter	C1.18	1	107	10%	0	97		
Miscellaneous	Angle grinder (grinder steel)	C4.93	1	108	20%	0	101		
Breaking stud partition	Lump hammer breaking stud partition	C1.19	1	97	50%	0	94		
Breaking up concrete	Pulverizer mounted on excavator	C1.4	1	104	75%	5	98		
Hard Demolition – Warehouse Wall								**100**	**0**
Breaking up concrete	Pulverizer mounted on excavator	C1.4	1	104	35%	5	94		
Breaking up/cutting steel	Tracked excavator	C1.16	1	110	15%	10	92		
Breaking up/cutting steel	Gas cutter	C1.18	1	107	10%	0	97		
Hard Demolition – Warehouse Concrete								**103**	**0**
Breaking up concrete	Pulverizer mounted on excavator	C1.4	1	104	75%	0	103		

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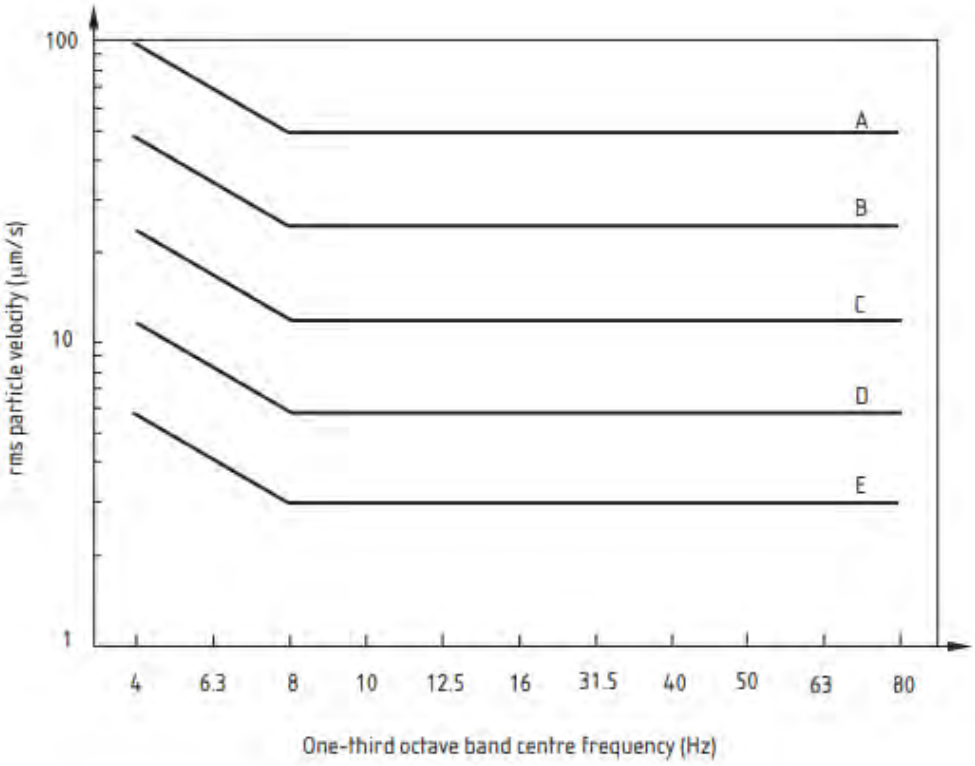
APPENDIX E EXAMPLE VIBRATION CRITERIA FOR SENSITIVE EQUIPMENT

The following data is reproduced from Figure B.2 and Table B.3 of British Standard BS 5228-2:2009 *Code of practice for noise and vibration control on construction and open site – Part 2: Vibration* and is provided as a guide for the vibration magnitudes at which the operation of particularly sensitive mechanical or electrical equipment can be compromised.

The Standard also notes that:

> *"Where there is uncertainty concerning the level of transmitted vibration and its acceptability to the particular environment, it is advisable to investigate the actual conditions and requirements in detail. Preliminary trials and monitoring can then be designed to establish a suitable procedure for the work. Alternatively, vibration criteria can be established through discussion with the manufacturer, supplier or operator. Where case-specific information is not available, or if otherwise appropriate, reference may be made to information from other sources, such as previous experience or published information. Figure B.2 illustrates a suite of curves showing the sensitivity to vibration of a variety of equipment, taken from* [a] *reference* [see footnote 7]*."*

Figure 10: Reproduction of Figure B.2 from BS 5528-2:2009 (Example of vibration criteria)



NOTE For key to graph, see Table B.3.

[7] Citation in BS 5228-2:2009: Ungar E.E., Sturz D.H. and Amick C.H. Vibration control design of high technology facilities. *Sound and vibration*, July 1990.

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Table 14: Reproduction of Table B.3 from BS 5528-2:2009 (Key to vibration criteria illustrated in Figure B.2)

Curve (from Figure B.2)	Facility, equipment or use	rms vibration velocity, µm/s
A	Bench microscopes at up to 400× magnification; optical and other precision balances; coordinate measuring machines; metrology laboratories; optical comparators. Microelectronics manufacturing equipment – Class A: Inspection, probe test, and other manufacturing support equipment.	50
B	Micro surgery, eye surgery, neurosurgery; bench microscopes at magnification greater than 400×; optical equipment on isolation tables. Microelectronics manufacturing equipment – Class B: aligners, steppers, and other critical equipment for photolithography with line widths of 3 µm or more.	25
C	Electron microscopes at up to 30 000× magnification; microtomes; magnetic resonance imagers. Microelectronics manufacturing equipment – Class C: aligners, steppers, and other critical equipment for photolithography with line widths of 1 µm.	12
D	Electron microscopes at greater than 30 000× magnification; mass spectrometers; cell implant equipment. Microelectronics manufacturing equipment – Class D: aligners, steppers, and other critical equipment for photolithography with line widths of 0.5 µm; includes electron-beam systems.	6
E	Microelectronics manufacturing equipment – Class E: aligners, steppers, and other critical equipment for photolithography with line widths of 0.25 µm; includes electron-beam systems; un-isolated laser and optical research systems.	3

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APPENDIX F CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN

(following pages)

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DRAFT

MARSHALL DAY Acoustics

NEW DUNEDIN HOSPITAL: DEMOLITION NOISE AND VIBRATION MANAGEMENT PLAN

Rp 002 20190708 | 21 August 2019

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Report No.: **Rp 002 20190708**

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Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
DRAFT		Draft for resource consent	21 Aug 2019	G Walton	

Certified System ISO 9001

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APPENDIX A GLOSSARY OF TERMINOLOGY

APPENDIX B SITE

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1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has been engaged by the Ministry of Health (MoH) to prepare a Noise and Vibration Management Plan (NVMP) for the demolition phase of the New Dunedin Hospital project (NDH).

This NVMP is required to satisfy [INSERT Consent Condition]. It identifies the performance standards for the Project and sets out best practicable options (BPO) for noise and vibration management.

This NVMP should be implemented throughout the demolition and construction period. It should be considered a 'living document' that is expanded and updated as the Project progresses and working conditions become clearer. It is intended to be the primary tool to manage the Project's construction noise and vibration effects.

A glossary of terminology is included in Appendix A.

2.0 PROJECT DESCRIPTION

2.1 Overview

The works involve [Expand as required e.g. short description of the project or specific activity relevant to this document].

Site maps identifying [works, sensitive receivers, land marks, etc.] are attached in Appendix B.

The works are scheduled for approximately [X months], between [month year] and [month year]. Therefore, the long-duration construction noise limits apply (Section 3.2).

Construction hours will be 0730 – 1800 hrs, Monday to Saturday.

2.2 Construction Methodology

The construction methodology for this Project is summarised as follows:

- [e.g. site clearance works] (X days / weeks / months)
- [e.g. excavation and foundations] (X days / weeks / months)
- [e.g. building construction] (X days / weeks / months)

2.3 Contact Details

Contact details for the relevant personnel are included in Table 1. The <INSERT Project Manager> is ultimately responsible for implementing this NVMP.

Table 1: Contacts

Role	Name	Organisation	Phone	Email
Project Manager	TBC	TBC	TBC	TBC
Acoustic Specialist	TBC	TBC	TBC	TBC
Public Complaints	TBC	TBC	TBC	TBC

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3.0 PERFORMANCE STANDARDS

3.1 Conditions of Consent

This NVMP is required to satisfy the following (proposed) conditions of consent:

1. <INSERT conditions of consent>

3.2 Noise

Construction noise must be measured and assessed in accordance with the provisions of New Zealand Standard NZS 6803:1999 "*Acoustics - Construction Noise*". The noise limits apply at 1m from external façades of occupied buildings.

The relevant construction noise limits from [Condition X (refer Section 3.1), are summarised in Table 2.

Table 2: Construction noise levels for activities sensitive to noise[1] (e.g. occupied dwellings)

Time of week	Time period	Long-term duration[2]	
		dB L_{Aeq}	L_{AFmax}
Weekdays	0630 – 0730	55	75
	0730 – 1800	70	85
	1800 – 2000	65	80
	2000 – 0630	45	75
Saturdays	0730 – 1800	70	85
	1800 – 0630	45	75
Sundays and public holidays	0730 – 1800	55	85
	1800 – 0630	45	75

3.3 Vibration – Cosmetic Building Damage

Condition Y (refer Section 3.1) requires construction vibration to be measured and assessed in accordance with German Standard DIN 4150-3:1999 "*Structural vibration – Part 3: Effects of vibration on structures*". The short-term (transient)[3] vibration limits in Figure 1 apply at building foundations in any axis. The vibration limits in all other cases are summarised in Table 3.

[1] Activities sensitive to noise are defined as "*Any dwelling, visitor accommodations, boarding house, marae, Papakainga, integrated residential development, retirement village, supported residential care, care centres, lecture theatres in tertiary education facilities, classrooms in education facilities and healthcare facilities with an overnight stay facility*".

[2] Construction work at any one location with a duration exceeding 20 weeks.

[3] Short-term (transient) vibration is "*vibration which does not occur often enough to cause structural fatigue and which does not produce resonance in the structure being evaluated*".

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Figure 1: Short-term (transient)[1] vibration at building foundations (DIN 4150-3:2016, Figure 1)

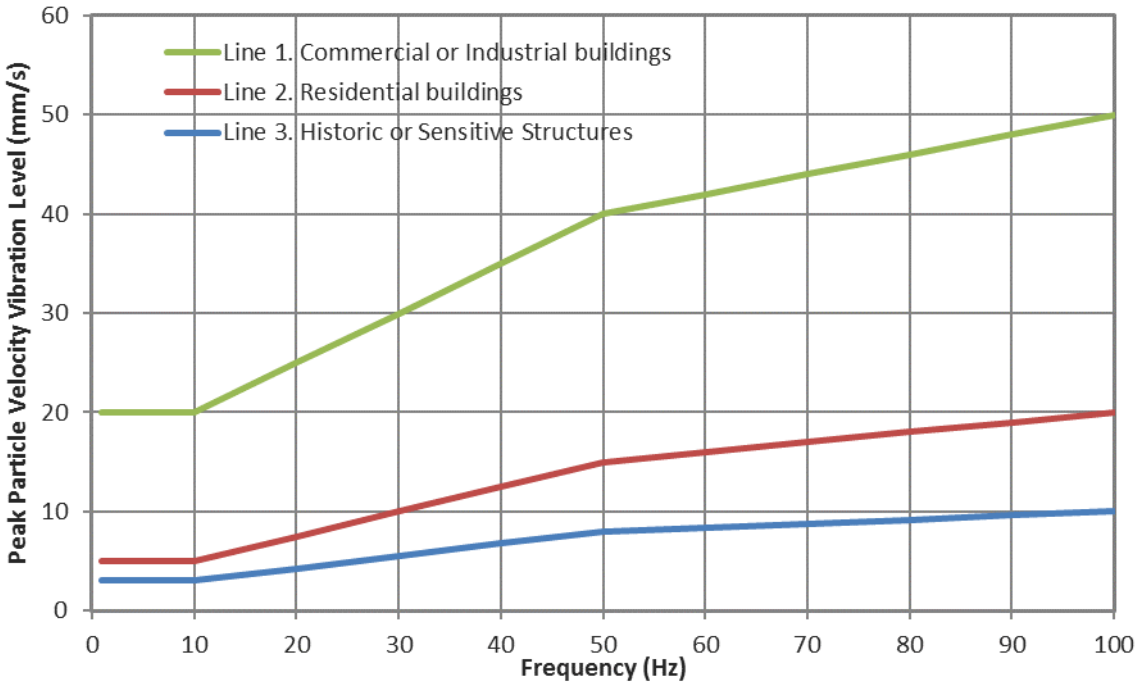

Table 3: Vibration at horizontal plane of highest floor (DIN 4150-3:2016, Tables 1 and 3)

Structure Type	Peak Particle Velocity Vibration Level (mm/s)	
	Short-term (transient)[3]	Long-term (continuous)[4, 5]
Line 1. Commercial or Industrial buildings	40	10
Line 2. Residential buildings	15	5
Line 3. Historic or Sensitive Structures	8	2.5

The criteria relate to the avoidance of cosmetic building damage, such as cracking in paint or plasterwork. Cosmetic building damage effects are deemed 'minor damage' in the Standard and can generally be easily repaired. The cosmetic building damage thresholds are much lower than those that would result in structural damage. The Standard states: "*Experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur*."

4.0 PREDICTED LEVELS

4.1 Noise

Table 4 provides indicative construction noise levels for proposed activities. It should be used by the Project Manager (or nominated person) prior to construction to inform what equipment will require mitigation and/or management and when. It should be kept up to date by the project's Acoustic Specialist when new information becomes apparent through noise monitoring (Section 7.1) or other means.

[4] Long-term (continuous) vibration includes types not covered by the short-term vibration definition

[5] The long-term (continuous) criteria can apply at all floor levels, but levels are normally highest at the top floor

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Table 4: Indicative noise levels at 1m from a building façade[6] with effective noise barriers[7]

Equipment	Sound Power Level (dB L_{Aeq})	Noise Level (dB L_{Aeq})			Setback (m)
		10 m	20 m	50 m	70 dB L_{Aeq}
INSERT noise sources					

The noise level received inside a noise sensitive space (e.g. an office or living room) will depend on the external noise level, sound insulation performance of the façade (particularly the glazing) and room details (such as the room dimensions and surface finishes). These factors can vary widely.

The Construction Noise Standard (NZS 6803) recommends noise limits assessed at 1m from the external façade of a building, assuming a façade sound level difference of 20 decibels. However, 20 decibels is particularly conservative for modern buildings. With knowledge of the façade glazing type, the sound insulation performance can generally be estimated as follows:

- Sealed glazing 30 decibels façade sound level difference
- Openable windows (closed) 20 – 25 decibels façade sound level difference
- Open windows 15 decibels façade sound level difference

Table 5 and Table 6 provides guidance on the effects in noise sensitive spaces during the day and night respectively, depending on the external noise level and façade glazing type. The potential effects are colour coded as follows:

Typically acceptable

Annoyance and reduction in work efficiency for some occupants (day)
Sleep disturbance for some occupants (night)

Annoyance and degradation of communication quality for most occupants (day)
Sleep disturbance for most occupants (night)

[6] In accordance with the requirements of NZS 6803: 1999 (Section 3.2), inclusive of 3 decibels façade reflection

[7] Assuming 10 decibels shielding from effective noise barriers (Section 5.5)

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Table 5: Daytime noise levels in commercial & industrial buildings and habitable rooms

External Noise Level (dB L_{Aeq})	Estimated Internal Noise Level (dB L_{Aeq})			
	Sealed glazing	Openable windows (modern building)	Openable windows (historic building)	Open windows
90 – 95	60 – 65	65 – 70	70 – 75	75 – 80
85 – 90	55 – 60	60 – 65	65 – 70	70 – 75
80 – 85	50 – 55	55 – 60	60 – 65	65 – 70
75 – 80	45 – 50	50 – 55	55 – 60	60 – 65
70 – 75	40 – 45	45 – 50	50 – 55	55 – 60

Table 6: Night-time noise levels in visitor accommodation bedrooms

External Noise Level (dB L_{Aeq})	Estimated Internal Noise Level (dB L_{Aeq})			
	Sealed glazing	Openable windows (modern building)	Openable windows (historic building)	Open windows
70 – 75	40 – 45	45 – 50	50 – 55	55 – 60
65 – 70	35 – 40	40 – 45	45 – 50	50 – 55
60 – 65	30 – 35	35 – 40	40 – 45	45 – 50
55 – 60	25 – 30	30 – 35	35 – 40	40 – 45
50 – 55	20 – 25	25 – 30	30 – 35	35 – 40
45 – 50	15 – 20	20 – 25	25 – 30	30 – 35

4.2 Vibration

Table 7 provides indicative construction vibration levels for proposed activities that have the potential to result in vibration in building structures. It should be used by the Project Manager (or nominated person) prior to construction to inform what equipment will require mitigation and/or management and when. It should be kept up to date by the Acoustic Specialist when new information becomes apparent through vibration monitoring (Section 7.2) or other means.

Table 7: Indicative distances to comply with vibration limits at building foundations

Equipment	Cosmetic Building Damage Setback (m)[8]		
	Heritage 2.5 mm/s PPV	Residential 5 mm/s PPV	Commercial 10 mm/s PPV
INSERT vibration data			

[8] Based on regression analysis of available vibration measurements, plus a 100% safety factor

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Equipment	Cosmetic Building Damage Setback (m)[8]		
	Heritage 2.5 mm/s PPV	Residential 5 mm/s PPV	Commercial 10 mm/s PPV

In some cases, construction vibration can excite building structures. This is heard as 'reradiated noise', rather than felt as vibration within the building, but is still the result of a structural transmission path. Predictions of reradiated noise levels are complex and site specific. Where necessary, a suitability qualified acoustic specialist should be engaged to provide guidance. Reradiated noise effects can be estimated using the guidance in Table 5 and Table 6 in Section 4.1.

5.0 MITIGATION AND MANAGEMENT

5.1 Training

All staff will participate in an induction training session prior to the start of construction, with attention given to the following matters:

- Construction noise and vibration limits
- Activities with the potential to generate high levels of noise and/or vibration (Section 4.0)
- Noise and vibration mitigation and management procedures (Section 5.0)
- The sensitivity of receivers and any operational requirements and constraints identified through communication and consultation (Section 6.0)

Awareness of current noise and vibration matters on, or near active worksites, will be addressed during regular site meetings and/or 'toolbox' training sessions.

5.2 Equipment Selection

When selecting construction equipment, where practicable:

- Prioritise quieter construction methodologies (e.g. bored piling instead of drop hammer piling)
- Prioritise electric motors over diesel engines
- Prioritise rubber tracked equipment over steel tracked equipment
- Equipment should be suitably sized for the proposed task
- Equipment should be maintained and fitted with exhaust silencers and engine covers
- Avoid tonal reversing or warning alarms (suitable alternatives may include flashing lights, broadband audible alarms or reversing cameras inside vehicles)

5.3 Scheduling

Where practicable, avoid night works. Where necessary, noisy works should be programmed early in the evening or night-time period to avoid sleep disturbance. Note that people tend to be less disturbed by low frequency, continuous engine noise, than intermittent noise or activities with special audible character (e.g. reversing beepers, whistling, banging tailgates or shouting).

Stakeholder engagement will be critical and should be undertaken for occupiers of properties within 100m of the night works (Section 6.0).

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5.4 General Measures

Complaints can arise whether or not noise and vibration levels comply with the Project limits. To avoid complaints, general mitigation and management measures include, but are not be limited to, the following:

- Avoid unnecessary noise, such as shouting, the use of horns, loud site radios, rough handling of material and equipment, and banging or shaking excavator buckets
- Avoid steel on steel contact such as during the loading of scaffolding on trucks
- Avoid high engine revs through appropriate equipment selection and turn engines off when idle
- Maintain site accessways to avoid pot holes and corrugations
- Mitigate track squeal from tracked equipment, such as excavators (may include tensioning and watering or lubricating the tracks regularly)
- Minimise construction duration near sensitive receivers
- Stationary equipment (e.g. generators) should be located away from noise sensitive receivers and site buildings and material stores used to screen them
- Orient mobile machinery to maximise the distance between the engine exhaust and the nearest sensitive building façade (e.g. excavators)
- Utilise noise barriers and enclosures where appropriate (Section 5.5)
- Implement specialised mitigation measures for concrete cutting (Section 5.6), concrete breaking (Section 5.7), piling (Section 5.8)
- Ensure advanced communication is complete (Section 6.0) prior to commencing activities that are predicted to exceed the noise and vibration performance standards (Section 4.0)
- Where nearby sensitive receivers are identified with particularly noise and/or vibration sensitive equipment and/or activities (e.g. medical centres or laser eye surgery), a suitably qualified and experienced specialist (e.g. Member of the Acoustical Society of New Zealand) should review the performance standards (Section 4.0) to ensure they are appropriate and participate in consultation (Section 6.2).
- Undertake monitoring as appropriate (Section 7.0)

5.5 Noise Barriers

5.5.1 Temporary Noise Barriers

Temporary noise barriers should be used where a construction noise limit is predicted to be exceeded (Section 4.1) and the barriers would noticeably reduce the construction noise level. They should be installed prior to works commencing and maintained throughout the works. Effective noise barriers typically reduce the received noise level by 10 decibels.

Where practicable, the following guidelines should be incorporated in the design and utilisation of temporary noise barriers:

- The panels should be constructed from materials with a minimum surface mass of 6.5 kg/m^2. Suitable panels include 12 mm plywood or the following proprietary 'noise curtains':
  - Duraflex 'Noise Control Barrier - Performance Series' (www.duraflex.co.nz)
  - Soundex 'Acoustic Curtain - Performance Series' (www.ultimate-solutions.co.nz)
  - Flexshield 'Sonic Curtain with 4 kg/m^2 mass loaded vinyl backing' (www.flexshield.co.nz)

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- Alternatives should be approved by a suitably qualified acoustic specialist because some proprietary noise curtains have insufficient surface mass for general use

- The panels should be a minimum height of 2 m, and higher if practicable to block line-of-sight
- The panels should be abutted or overlapped to provide a continuous screen without gaps at the bottom or sides of the panels
- The panels should be positioned as close as practicable to the noisy construction activity to block line-of-sight between the activity and noise sensitive receivers

Where positioned on the site boundary, additional local barriers should be considered near the activity to ensure effective mitigation for sensitive receivers on upper floor levels.

5.5.2 Permanent Noise Barriers

Permanent boundary fences may be constructed, or existing fences upgraded, to provide effective noise mitigation during construction. However, where required for mitigating noise from future activities (post construction), the panels must be constructed from materials with a minimum surface mass of 10 kg/m^2, such as 18 mm plywood or 20 mm pine. Other guidelines for the design and utilisation of barriers are the same as those in Section 5.5.1.

5.6 Concrete Cutting

Where practicable:

- Minimise the cutting period, and, the number of cutting periods (e.g. complete all cutting in one extended period rather than two shorter periods with the same overall duration)
- Use a unit fitted with a blade shroud and a 'quiet' blade type (tooth design)

5.7 Concrete Breaking

Where practicable:

- Minimise the duration of breaking (e.g. small rocks should be excavated directly and larger boulders removed by truck for breaking offsite), and, the number of breaking periods (e.g. complete all breaking in one extended period rather than two shorter periods with the same overall duration)
- Match the size of breaker to the scale of the works (i.e. large enough to undertake the works efficiently, but avoiding oversized units)
- Match the chisel/tip type to the material and use a dampened bit to avoid ringing
- Avoid 'blank' firing by engaging the material before commencing and stopping before it fires through the material
- For concrete breaking, an initial perimeter saw cut should be made at the perimeter to reduce vibration transfer to nearby buildings
- For rock breaking, initial breaking should be undertaken at the perimeter of the rock excavation area. This will enable monitoring of the highest vibration levels received at nearby buildings for compliance purposes (Section 7.2). It will also mitigate the vibration transfer from subsequent breaking by creating a 'trench' of fractured rock between the breaker and nearby buildings.

5.8 Piling

Where practicable:

- Prioritise piling methods that minimise noise and vibration (e.g. augured, screw or press-in piles over impact driven or vibratory piling methods)

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- TO BE COMPLETED ON RECEIPT OF FURTHER DETAIL

6.0 ENGAGEMENT

6.1 Communication

Written communication (e.g. newsletter) should be provided to occupiers of buildings within 40 m of the site at least 1 week prior to the Project commencing. It should acknowledge that some activities are predicted to generate high noise and/or vibration levels that may result in disturbance for short periods. It should include details of the overall works, its timing, duration and contact details where complaints and enquiries should be directed.

Written communication during the works:

- Public site signage should include contact details
- Regular project updates should include details of impending activities that may result in disturbance, including concrete cutting (Section 5.6), concrete breaking (Section 5.7) and piling (Section 5.8). It should include scheduled timing and duration of these activities and contact details where complaints and enquiries should be directed.
- Occupants of buildings within 100m of night works should be advised at least 5 days prior to the works commencing. While the communication should focus on construction noise as the predominant effect, it should also note the potential for perceptible vibration.

6.2 Consultation

Table 8 and Figure 4 in Appendix B identify sensitive receivers where noise and/or vibration is predicted to exceed the performance standards.

Table 8: Sensitive receivers

Address	Building Type[9]	Occupancy	Noise (Section 4.1)	Vibration (Section 4.2)
				Cosmetic Building Damage
X Name Street	Residential	Dwelling	X	X
Y Name Street	Commercial	XXX Retail Shop	X	-

Consultation should be undertaken to address reasonable concerns about noise and vibration on a case-by-case basis. The <INSERT NAME> should address any concerns and complaints in accordance with Section 6.3. When discussing vibration concerns, it is important to convey that vibration can be felt at levels well below those that pose a risk of cosmetic building damage. A copy of all correspondence should be made available to Council upon request.

The following process will be implemented by the Project Manager (or nominated person). It is for any construction activity measured to exceed the relevant construction noise and vibration performance standards:

- For exceedances of the construction vibration standards, activities should cease as soon as safe and practicable to do so
- Review the construction methodology, mitigation measures and management strategies to ensure they represent the BPO. This should consider affected parties interests, practicability and material benefit of further measures, and implications to Project timing, duration and cost

[9] Classifications with respect to Tables 1 and 3 of DIN 4150-3:1999 *"Structural Vibration - Effects of Vibration on Structures"* (i.e. historic/sensitive, residential or commercial/industrial)

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- Undertake consultation with affected parties to understand their sensitivities, including times, activities and locations. Consultation should focus on a collaborative approach to managing the adverse effects from construction noise and vibration. A project representative should be contactable during works. A record of consultation should be kept at the site office and be available to the affected parties and Council if requested.
- Implement measures to avoid significant adverse effects as agreed with the affected party and monitor the activity to verify the extent of any adverse effects
- For exceedances of the construction vibration cosmetic building damage thresholds in Section 3.3, a detailed building condition survey will be undertaken in accordance with Section 7.3. If damage has not occurred, then that activity can continue provided the measured vibration level is not exceeded further and the construction methodology is the BPO. If damage has occurred, alternative construction methods should be investigated, and the consent holder should commit to repairing the damage within a reasonable timeframe.
- The installation of mechanical ventilation should be considered for noise sensitive receivers where external windows must be closed to avoid significant adverse noise effects and no alternative ventilation system is present. This will be implemented only after all other general noise management and mitigation have been deemed impracticable.
- Temporary relocation should be considered for sensitive receivers where all practicable noise and vibration management and mitigation measures have been implemented and significant adverse noise effects are predicted. This will be in exceptional cases only, and advice from the Acoustic Specialist will be sought prior.

6.3 Complaints Response

All construction noise and/or vibration complaints should be recorded in a complaints file that is available to Council on request. For each complaint, an investigation should be undertaken involving the following steps as soon as practicable:

- Acknowledge receipt of the concern or complaint within 24 hours and record:
  - Time and date the complaint was received and who received it
  - Time and date of the activity subject to the complaint (estimated where not known)
  - The name, address and contact details of the complainant (unless they elect not to provide)
  - The complainant's description of the activity and its resulting effects
  - Any relief sought by the complainant (e.g. scheduling of the activity)
- Identify the relevant activity and the nature of the works at the time of the complaint
- If a reasonable complaint relates to building damage, inform the on-duty site manager as soon as practicable and cease associated works pending an investigation.
- Review the activity noise and/or vibration levels (Section 4.0) to determine if the activity is predicted to comply with the relevant performance standards (Section 0) at the complainants building. Consider addended monitoring to verify the underlying reference level assumptions.
- Review the mitigation and management measures in to ensure the activity represents the BPO (Section 5.0). Review the relief sought by the complainant. Adopt further mitigation and management measures as appropriate.
- Review the potential residual effects (Section 4.0) of activities that are predicted to exceed the relevant performance standards

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- Report the findings and recommendations to the Project Manager, implement changes and update this NVMP as appropriate
- Report the outcomes of the investigation to the complainant, identifying where the relief sought by the complainant has been adopted or the reason(s) otherwise.

In most cases, ceasing the activity would provide immediate relief. In some cases, this may not be practicable for safety or other reasons. The complainant shall be kept updated regularly during the time it takes to resolve the matter.

7.0 MONITORING

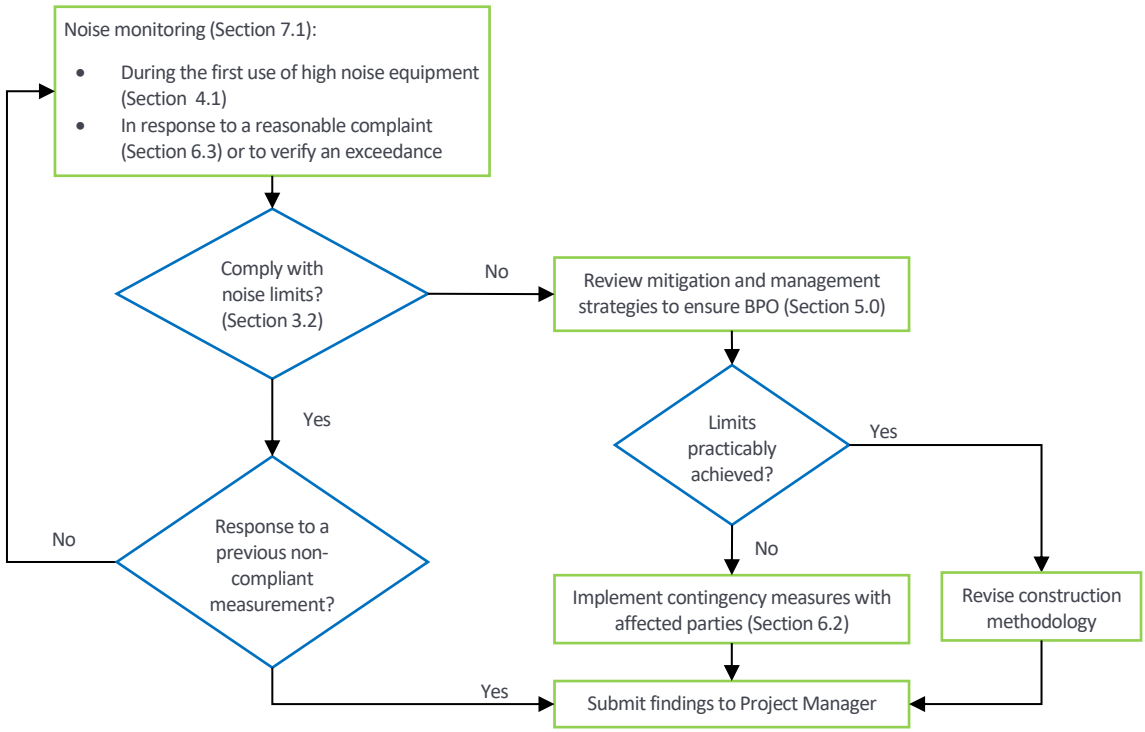
7.1 Noise

Noise levels should be monitored:

- During the first occurrence of [insert activity e.g. concrete breaking, sheet piling and other] activities that are predicted to exceed the noise limits (Section 4.1), and
- In response to a reasonable noise complaint (Section 6.3)
- At 1m from the most affected building façade, or proxy position and adjusted for distance and façade reflections where appropriate
- By a suitably qualified and experienced specialist (e.g. Member of the Acoustical Society of New Zealand) in accordance with the requirements of New Zealand Standard NZS 6803:1999 *"Acoustics - Construction Noise"*
- For a representative duration, reported with the measured level (e.g. 65 dB $L_{Aeq\,(30min)}$)
- The results should be used to update Section 4.1 if appropriate

A noise monitoring flowchart is presented in Figure 2.

Figure 2: Noise Monitoring Flow Chart



7.2 Vibration

Vibration should be monitored:

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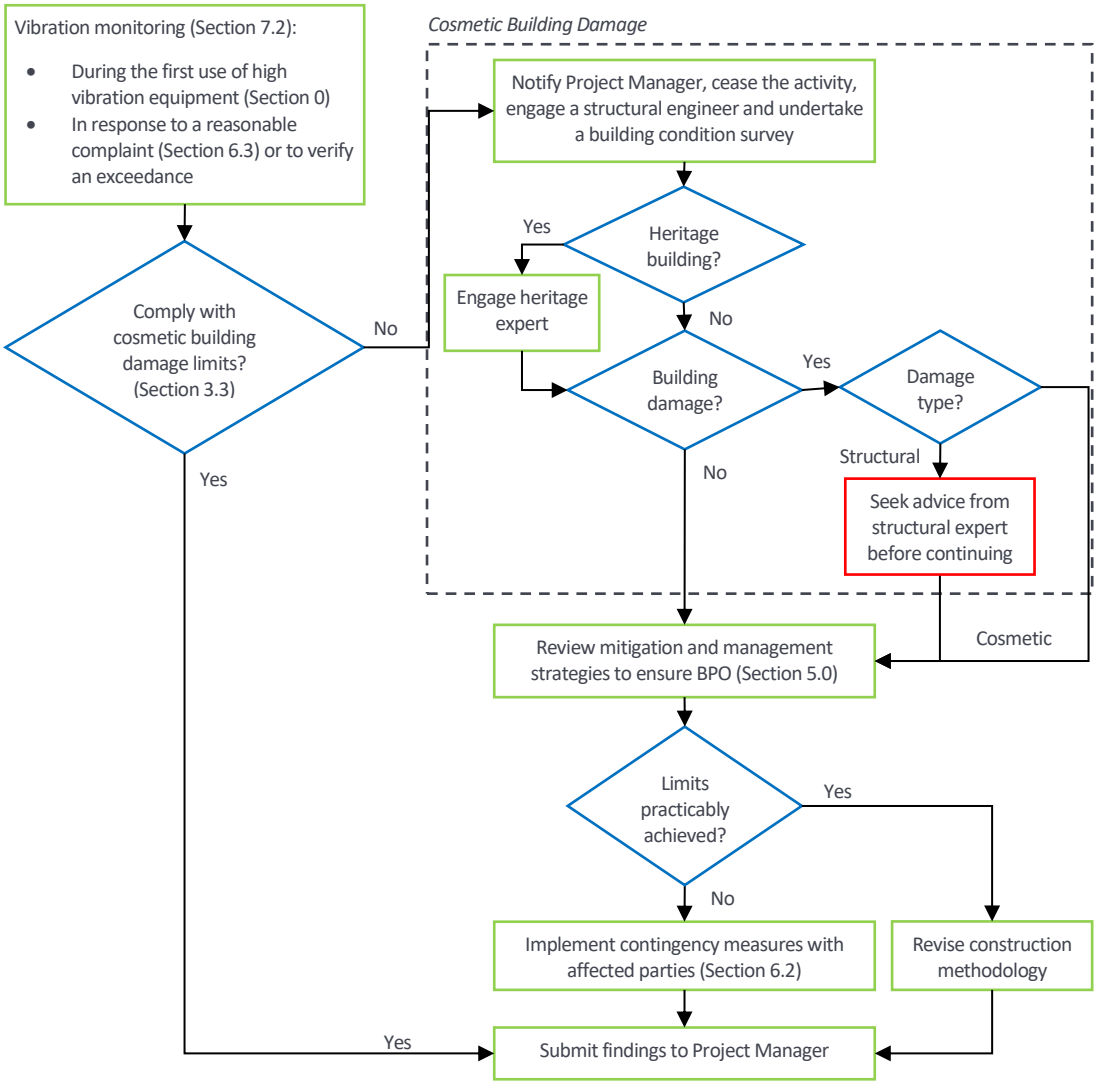
- During the first occurrence of [insert activity e.g. concrete breaking] activities that are predicted to exceed the vibration limits (Section 4.2) and following the completion of pre-construction building condition surveys (Section 7.3)
- In response to a reasonable vibration complaint (Section 6.3)
- At the closest building foundations and/or the top floor level as appropriate where consent to access the building of interest has been requested and granted
- By a suitably qualified and experienced specialist (e.g. Member of the Acoustical Society of New Zealand) in accordance the requirements of German Standard DIN 4150-3:2016 "*Vibration in buildings – Part 3: Effects on structures*"
- For a representative construction duration, measured in [2] second intervals
- The results should be used to update Section 4.2 if appropriate

A vibration monitoring flowchart is presented in Figure 3.

Figure 3: Vibration Monitoring Flow Chart



7.3 Building Condition Surveys

Cosmetic building damage (e.g. plaster or paint cracking) is an effect that is relevant to the building owner only (i.e. rather than tenants or leaseholders). People generally perceive vibration at levels

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significantly lower than those levels that would result in cosmetic building damage and an understanding of this often alleviates receivers' concerns.

A condition survey should be undertaken for the following buildings (Sections 4.2 and 6.2):

- Address X (Building Type: historic / residential / commercial)
- Address Y (Building Type: historic / residential / commercial)
- Address Z (Building Type: historic / residential / commercial)

The Project Manager should request in writing the approval of the property owner to undertake a building condition survey at the following times:

- Prior to construction commencing, as required by Condition X (Section 3.1) and where vibration is predicted to exceed the cosmetic building damage limits (Section 4.2)
- During construction, as required by Condition Y (Section 3.1), where vibration is measured to exceed the cosmetic building damage limits in (Section 4.2) and/or in response to a reasonable claim of damage from construction vibration (Section 6.3)
- Post construction, as required by Condition Z (Section 3.1) and to avoid subsequent claims of damage from construction vibration (Section 6.3)

If a vibration exceedance has occurred but there is no resulting cosmetic damage, then that activity can continue provided the measured vibration level is not exceeded further and the construction methodology already adheres to the BPO. If damage has occurred, alternative construction methods should be investigated and the [the client] should rectify the damage at its own cost, as soon as practicable, in consultation with the owner of the property.

Each building condition survey should:

- Be undertaken by a suitably qualified person
- Provide a description of the building
- Determine the appropriate structure type classification[10] with respect to DIN 4150-3:2016 *"Vibration in buildings – Part 3: Effects on structures"* (i.e. historic/sensitive, residential or commercial/industrial)
- Document and photograph the condition of the building, including any cosmetic and/or structural damage
- The results should be provided to the property owner and be available to Council on request

[10] Classifications with respect to Tables 1 and 3 of DIN 4150-3:2016 *"Vibration in buildings – Part 3: Effects on structures"* (i.e. historic/sensitive, residential or commercial/industrial)

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APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, the receiver.
dB	Decibel (dB) is the unit of sound level. Expressed as a logarithmic ratio of sound pressure (P) relative to a reference pressure (Pr), where dB = 20 x log(P/Pr).
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) to more closely approximate the frequency bias of the human ear. A-weighting is used in airborne acoustics.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level commonly referred to as the average level. The suffix (t) represents the period, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{AFmax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
NZS 6803:1999	New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise"
Vibration	When an object vibrates, it moves rapidly up and down or from side to side. The magnitude of the sensation when feeling a vibrating object is related to the vibration velocity. Vibration can occur in any direction. When vibration velocities are described, it can be either the total vibration velocity, which includes all directions, or it can be separated into vertical (up and down vibration), horizontal transverse (side to side) and horizontal longitudinal direction (front to back) components.
PPV	Peak Particle Velocity (PPV) is the measure of the vibration amplitude, zero to maximum, measured in mm/s.
BS 5228:2009	British Standard BS 5228:2009 "Code of practice for noise and vibration control on construction and open sites, Part 1: Noise, Part 2: Vibration"
DIN 4150-3:1999	German Standard DIN 4150-3:1999 *"Structural Vibration - Effects of Vibration on Structures"*

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APPENDIX B SITE

Figure 4: INSERT SITE PLAN

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Appendix 6: WSP Façade Retention Engineering Assessment Report

Addendum

New Dunedin Hospital – Engineering Assessment of Existing Facades

Blocks 1 to 5 Cumberland Street
Blocks 3 to 5 Castle Street

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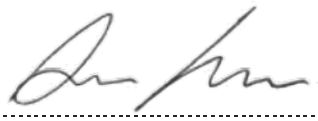

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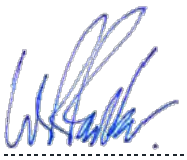
Principal Engineer

And



Will Parker
Technical Director

Approved for release by

Kevin Wood
Project Director

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Introduction

WSP (formerly WSP Opus) was commissioned by the Ministry of Health to review the existing heritage facades on the Cadbury Site and to consider (from an engineering perspective) whether it was possible to retain them either independently or by way of being incorporated into the new hospital construction. That assessment is contained in *New Dunedin Hospital - Property & Building Survey Services - Engineering Assessment of Existing Façades Report.*

The assessment of the facades and options for their retention was undertaken in the context of the original Preliminary Site Masterplan which indicated a preferred location for the New Dunedin Hospital (NDH) extending across both the Cadbury and Wilsons sites. Further analysis and costing of that layout option was subsequently completed in 2019 which led to an options evaluation process. During that process, WSP was asked to consider whether relocation of the NDH entirely on the Cadbury site would result in any material difference to the findings of its original assessment. As set out in the report, no such material difference was identified.

The configuration and layout of the new Hospital has been re-evaluated and adjusted since the original report was completed. The Ministry of Health has now confirmed that the NDH will be located across both the Cadbury site and the Wilsons site but with a smaller footprint (illustrated in Appendix A). The southern portion of the Cadbury site is proposed to be used primarily for vehicle/ambulance access, circulation and parking, and plant required for the functioning of the NDH.

The Ministry of Health has asked WSP to consider whether this preferred layout would have any material impact on the findings of its original assessment. WSP's response to that request is detailed in this Addendum.

The disclaimer and limitations described in the original report apply to this addendum also.

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Façade Retention Considerations

The currently proposed layout for the ground floor of the new hospital on the Cadbury site is shown in Figure A-1 below. The location of the existing heritage facades are marked with red lines to show their proximity to the proposed buildings.

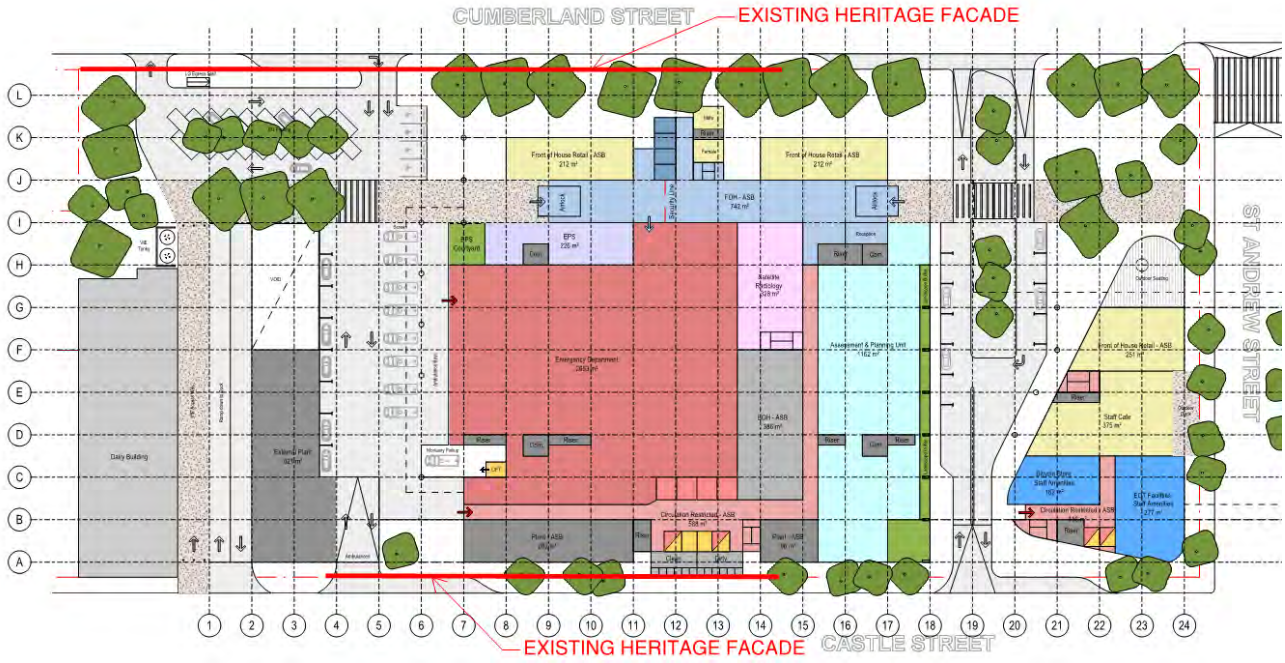

Figure A-1 : Level 00 – Block and Stack Option 5.3 with façade locations

Figure A-1 shows that the new hospital building is significantly setback from the line of the existing Cumberland St facades and setback to a lesser extent from the Castle St facades. The new laundry area between grids 11 and 14 is proposed to be built out to the street boundary, this is now the only area where the new hospital building extends to the existing façades. The existing facades cross the proposed ambulance and carpark entrance and exit points.

Option Evaluation

RAG Analysis

The Red, Amber, Green (RAG) table outputs have been reassessed considering the latest layout. The impact on each factor is discussed below.

Cost

The cost of the façade retention, both temporary and permanent, is likely to reduce marginally where the new building is significantly setback, as the complexity of the build reduces with more available space. However, this was not considered a significant enough change to affect the RAG analysis outcome.

Time

With more of the new hospital setback form the street boundary, the façade retention construction time has improved slightly for some of the options. However, it is still significantly

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more than the baseline of building a new hospital on a cleared site and the RAG assessment has not changed.

Impact on Heritage

Where the hospital is now setback further from the street boundary, the impact on heritage is potentially greater as it will be more obvious that the retained facades are not part of a larger building, but are instead standalone elements. This separation potentially decreases the heritage value of the retained facades. For these options (2A, 2B, 3A and 3B) the assessment has been left as "Amber", as despite the potentially increased impact, these options are still significantly better than demolition or re-construction which have been scored as "Red".

Impact on Hospital

The impact on the hospital, such as useable site area, vehicle access routes, daylight access and views from the hospital is still very significant, so the RAG assessment is unchanged.

Buildability

The buildability of the façade retention supports has improved slightly with more space to work, but again not enough to change the RAG table assessments.

Traffic Disruption

The impact on traffic remains unchanged for each option. However, it is potentially more likely that on Cumberland Street with more space for temporary bracing within the site, that one of the less intrusive options (2B, 3A and 3B) would be chosen. On Castle Street, the impact on traffic could still be significant. Again, these factors are not sufficient to change the assessments.

Seismic Resilience

The seismic resilience of the various options is unchanged.

Site wide Considerations

Both the Cumberland St carpark entrance and exit, and the ambulance bay entrance and exit, are incompatible with the existing façades. The permanent support required for the existing facades will also have a severe impact on the proposed carpark circulation and the number of carparks possible.

Setting the hospital building back from the neighbouring unreinforced masonry buildings to the south, as currently proposed, is a sensible approach to managing the seismic hazard from neighbouring sites.

RAG table options

The RAG table is reproduced below in Table A-1 for reference, but has not changed as noted above.

Options 1a and 1b could now only occur in a short section along Castle Street where the new hospital will be built to the street boundary.

Options 2a and 2b – are both slightly more buildable with the additional space between the facades and the new hospital. Option 2b is still time consuming with the staging required to install the temporary bracing, allow safe demolition and the construction of the permanent frames.

Options 3a and 3b – both involve extending the isolation plane out to, and through the facades to provide the best seismic resilience. This is less practical with a greater distance to the main building.

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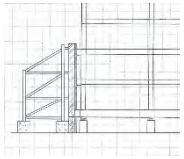
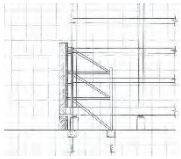
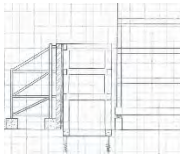
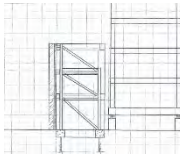
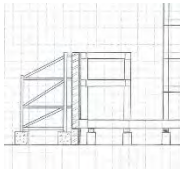
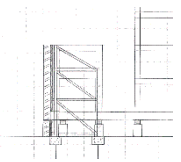
Table A-1: Update RAG Analysis Table.

Consideration	Option								
	Baseline	1a	1b	2a	2b	3a	3b	4	5
	New Hospital 'Clear' Site							Deconstruct and Reconstruct	GRC Replica
Cost	G	A	R	A	A	R	R	R	A
Time	G	A	R	A	R	A	R	R	G
Impact on Heritage	R	A	A	A	A	A	A	R	R
Impact on Hospital	G	R	R	R	R	R	R	R	A
Buildability	G	A	R	G	R	A	R	A	G
Traffic Disruption	G	R	G	R	G	R	G	G	G
Seismic Resilience	G	A	A	R	R	A	A	A	G

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Conclusion

The conclusions of the original report remain unchanged when the latest hospital layout is considered. Some minor changes to the factors were noted, but the changes were not significant enough to change the RAG table. assessments.

It is still possible to retain the façades; however, this will affect the layout and usage of the site, and both the extent and complexity of the construction work required. This will have significant cost, programme and health & safety implications.

The smaller footprint of the proposed hospital means that if the facades were retained it will become more obvious that they are standalone features. This will potentially increase the impact on their heritage value while still having a significant effect on the new hospital.

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New Dunedin Hospital - Property & Building Survey Services

Engineering Assessment of Existing Façades
Blocks 1 to 5 Cumberland Street
Blocks 3 to 5 Castle Street

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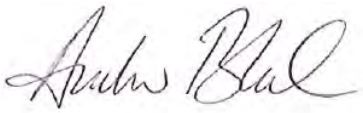

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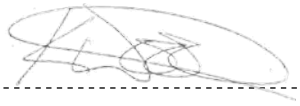

Kevin Wood
Project Director

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Appendix C: Façade support Options – Additional Details
Appendix D: ASNZS 1170.0 Extracts
Appendix E: Building Façades – More Detailed Information
Appendix F: Examples of Façade Retention

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5	03/10/2019	Andrew Blacker/ Simon Burrough	Will Parker	Kevin Wood	Final
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Revision Details

Revision	Details
1	Draft for client review
2	Draft for client review
3	Draft for client review
4	Draft for client review
5	Final

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Executive Summary

WSP Opus have been commissioned by the Ministry of Health, via RCP, to review the existing façades on the Cadbury Site from an engineering perspective and to consider if they can be retained either independently or by being incorporated into the new hospital construction.

WSP Opus have visited the site to visually inspect all the façades. An assessment of their current condition has been made. This is recorded in a summary table for quick reference, and in more detail in Appendix A.

The new hospital buildings proposed for the Cadbury site will be designed to meet the Building Code requirements for an importance level 4 (IL4) building. This includes the requirement to remain operational immediately following a 1 in 500-year earthquake and to withstand a 1 in 2500-year earthquake. This includes the hospital buildings, the services which make it operational, access ways for the public, supplies, emergency vehicles, and the helicopter service. Therefore, any façades to be retained either free standing in these areas, or as part of the hospital structure, will also need to meet these criteria.

It is possible to retain the façades, however their retention will affect the layout and usage of the site, and both the extent and complexity of the construction work required. This will have significant cost, programme and health & safety implications. From our Red/Amber/Green (RAG) analysis all the options considered had at least one 'Red' score, indicating that none of them could be considered favourable, and that all the options have at least one severe limitation.

The concept design of the hospital is currently being developed. It is therefore not possible to determine the most suitable retention treatment for each block, as the location of the hospital building footprint in relation to the facades is not known at this stage. Consequently, a range of options have been considered.

Any temporary supporting works will be substantial and if placed on the outside of the site will significantly impinge on the pavements, roads and buried services of the state highways on Cumberland and Castle Streets. To support the walls temporarily on the inside is possible as shown in the options, although this would add significant complexity, cost and time.

The method of attaching the façades to new buildings will depend on the final design chosen. It is possible to attach the facades to the new buildings; however, a significant amount of additional structure will be required to achieve this. The existing façades have many openings for windows and doors which are unlikely to line up with floor levels proposed for the new hospital which may further compromise the design.

The brickwork facades to Blocks 1 and 2 of the Cadbury site are in poor condition mainly due to their age and damp penetration over many years, and they will require significant work to improve their integrity, including upgrading the foundations to mitigate the effects of liquefaction. There may also be a residual seismic risk with these masonry facades depending on the level of resilience adopted.

In total seven options to retain the facades were considered including de-constructing the facades and rebuilding with reinforcement and erecting replica facades in lightweight GRC panels. These last two options are unlikely to be preferred due to their greater impact on the heritage fabric:

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Introduction

The new Dunedin Hospital is proposed to be built on the former Cadbury factory site between Castle Street and Cumberland Street in Central Dunedin.

The configuration and layout of the new Hospital has been subject to extensive evaluation. The initial Preliminary Site Masterplan was released in December 2018 and indicated a preferred location of the Hospital which extended across the Cadbury site and onto the northern block (known as the Wilsons site). Further analysis and costing of that layout option was subsequently completed in 2019 which led to a further options evaluation process. As a result of that process, the preferred site layout now locates the new Dunedin hospital buildings entirely on the Cadbury site.

The assessment detailed in this report was undertaken in the context of the original Preliminary Site Masterplan. Following confirmation of the final preferred site layout, an update of this assessment was undertaken to determine whether that layout would result in any material differences to the findings of the original assessment. The existing buildings and façades on the Cadbury site have heritage value as outlined in the Underground Overground report.

Through RCP, WSP Opus has been requested by the Ministry of Health to review the engineering implications of retaining the existing building façades on the former Cadbury site. This included the following:

- Façade condition assessment.
- Concept design and drawings of a temporary bracing system.
- Development of façade retention options.
- Evaluation of retention options.

In developing conceptual options to retain the façades, we have considered both temporary support during partial deconstruction and construction of new buildings, and permanent support, where the façades are supported by the new hospital buildings, or independent purpose-built support structures.

Note that we have not been asked to advise on:

- The Dairy and Machine House building.
- The engineering feasibility of retaining the existing buildings on the site, although we note that Initial Seismic Assessments of the oldest buildings are approximately 20%NBS(IL2), so they would require a seismic upgrade to form part of the hospital complex.

Andrew Blacker and Simon Burrough have visited the site several times from June 2019 to September 2019 to inspect the façades of the existing buildings at each floor level internally, and from street level externally. Will Parker visited the site in September 2019.

A selection of original construction drawings and alteration drawings were available and have been reviewed.

WSP Opus have reviewed the geotechnical study prepared by Beca for Mondelez on the Cadbury site in 2017. Previous structural reports on the buildings, Block 1A, Block 2A, Block 3A and Block 5 by Hanlon and Partners have also been reviewed.

The configuration and layout of the new Hospital has been subject to extensive evaluation. The initial Preliminary Site Masterplan was released in December 2018, indicated a preferred location of the Hospital across both the Cadbury and Wilsons blocks. Specifically, the new Acute Services Building would be located on the Cadbury Site, and the new Ambulatory Services Centre would be constructed on the Wilsons Site to the north. Further analysis and costing of that layout option was subsequently completed in 2019 led to a further options evaluation process undertaken by

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the Ministry of Health. As a result of that process, the preferred site layout was revised, and now locates the new Dunedin hospital buildings entirely on the Cadbury site. The Acute Services Building is proposed to be on the southern end of the Cadbury Site with the Ambulatory Services Centre on the northern end of the site.

The assessment detailed in this report was undertaken in the context of the original Preliminary Site Masterplan. Following selection of the final preferred site layout (i.e. Cadbury only), a review confirmed that the change in layout would have no material impact on the findings of this assessment.

Concept design of the new Hospital buildings in accordance with that preferred site layout is now underway.

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The façades in question are shown in plan in Figure 1 below and may be listed as: -

A. Cumberland Street side (Approx. North West facing)
    1. Block 1 (Cadbury World)
    2. Block 2 (Reception and Offices)
    3. Block 3A (Raw Materials and Manufacturing)
    4. Block 4A (Engineering Workshop Labs and Offices)
    5. Black 5 (Manufacturing and Packing)

B. Castle Street Side
    1. Block 3C (Raw Materials)
    2. Block 4C (Engineering and Manufacture)
    3. Block 5 (Manufacture and Packing)

Figure 1: External view of temporary propping to façade.

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Structural Performance Objectives

Building Code Requirements

Hospital

The hospital buildings on the site will have emergency, surgical and post-disaster functions. The buildings will therefore be designed as Importance Level 4 (IL4) facilities in accordance with AS/NZS 1170.0. The hospital will also need to meet the serviceability limit states as prescribed by AS/NZS 1170.0. Refer Appendix D for the relevant extracts from AS/NZS 1170.0.

The Ultimate Limit State at IL4 requires that the hospital will maintain life safety in a 1 in 2500-year earthquake. The Serviceability Limit State SLS2 requires that it shall remain largely undamaged and fully operational after a 1 in 500-year earthquake.

Façades Temporary Support

The Importance Level to be adopted for the temporary support of the façades would be a minimum of Importance Level 2 (IL2 - normal buildings) but could be considered to be Importance Level 3 due to their high value to the community. This would align with the time and expense which would be required to retain the façades. The temporary support may be required for several years and a design life of 5 years has been considered for the design of temporary support.

Permanent Façade Support

If the façades are incorporated with the hospital structure, they would also be designed as IL4 structures. If the façades are separate structures but could affect the operation or access to the hospital, they would also be designed as IL4 structures. At this stage, as the layout of the site is unknown, they have conceptually been considered as IL4 structures.

Strength

There are minimum levels of strength for existing buildings prescribed by the Building Act, generally 34% New Building Standard (NBS). Guidance on levels of strength and their relative risk is also provided by the New Zealand Society for Earthquake Engineering (NZSEE). NZSEE recommend a minimum rating of 67%NBS. It should be noted that the guidance on strengthening generally treats heritage buildings on a case by case basis, and we expect that the Ministry of Health would also take this approach. The strength target that has been adopted at this stage is 100%NBS(IL4), noting that for the masonry façades, the wall capacities would be based on probable rather than dependable strengths.

Stiffness

The existing heritage façades in Block 1 and 2 are solid masonry walls which are typically at least 350mm thick. These walls are very stiff but have weak mortar. The wall strength comes from adhesion of the mortar and from the weight of masonry above. Walls acting out of plane rely significantly on the weight of the masonry above, and for this reason span vertically. They span between horizontal lines of support such as floors and the roof. This is provided there is suitable connections and the floors and roof can provide the required support.

The walls are relatively brittle. Once the wall has cracked the adhesion is lost and the only capacity available is that generated by the weight of the wall above closing the crack. After cracking, the residual strength in plane can be relied on provided that the displacements are small enough. It should also be noted that this damage may be difficult to repair.

Seismic Resilience

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For the purposes of this report, we will use the term resilience to mean the reduction in damage to, or ease of repair of, the heritage façades in future earthquakes. This is partly covered by the Building Code requirements for an IL4 Building (refer to the following section), especially the SLS2 requirements which require the building to be operational following a 1 in 500-year earthquake.

Resilience can be incorporated by a combination of the following:

- Reducing the level of seismic demand that the façades are exposed to, for example by incorporating seismic isolation.
- Providing improved support to the façades, for example by providing additional structural elements.

When considering the retention of the heritage façades we have also attempted to develop options that will answer the following questions:

- How will any retained structural heritage fabric perform in future earthquakes?
- How can resilience be incorporated into the remedial works to limit future damage to heritage fabric?
- How can the structural intervention be effective yet be minimised?
- How can resilience be incorporated in a reversible manner?
- If resilience is reversible, how will this affect the building's aesthetics and use?

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Figure 2: Aerial view of Cadbury block. New hospital outline in blue from the masterplan.

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Building Façades

Each of the building façades affected by the construction of the new hospital have been reviewed and are considered below, further detail is in Appendix A & E.

Cumberland Street Elevations

Table 1: Cumberland Street Elevations 1.

Block	**1 (Cadbury World)**	**2 (Offices)**	**3A**
Date	1868	1868	1924
Material	Unreinforced masonry (URM)	Unreinforced masonry (URM)	Reinforced concrete with some URM
Condition	Rising damp and water ingress, isolated fine cracks	Rising damp	Rising damp with damp in roof and penthouse

Table 2: Cumberland Street Elevations 2.

Block	**4A**	**5**
Date	1960	1947
Material	Reinforced concrete	Reinforced concrete
Condition	Generally good	Some wear & tear but no signs of distress

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Castle Street Elevations

Table 3: Castle Street Elevations.

Block	3C	4C	5
Date	1938	1947	1947
Material	Reinforced concrete	Reinforced concrete	Reinforced concrete
Condition	Rising damp and minor cracking	Some wear & tear but no signs of distress	Some wear & tear but no signs of distress

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New Hospital Structure

The Hospital Buildings proposed for the former Cadbury site are currently in the early stages of concept design. The current concept indicated in figure 2 shows that the buildings will be positioned where the buildings and heritage facades are currently located, noting that there is some space at the southern end of the site. Based on information received from Holmes Consulting we understand the following key design decisions have been made that will be relevant to the façade retention:

1. The Importance Level 4 structure will be base isolated.
2. The ground floor of the ASB will be approximately 2m above street level at the St Andrew Street end, to avoid a 1 in 500-year flood event.
3. High inter-storey heights will be required to accommodate the services, structure and space required for a modern hospital.
4. The structure above the isolation level is likely to be a moment resisting frame.

Base isolation provides best practice protection against seismic hazards. It requires a significant movement allowance at the isolation level, typically in the order of ± 500mm. The existing façade cannot accommodate this movement and would need to be isolated itself and its weight supported or separated to allow for the differential movement.

Base isolation typically occurs below the ground floor level. As the ground floor will need to be raised, the isolation movement plane will be visible in the façade.

With the ASB having different floor heights to the existing buildings, the façade windows are likely to cross the floors of the new structure. When this occurs the façade windows could be blanked out to make this work visually. This means that less natural light would enter the building.

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Façade Retention Considerations

Heritage & Site Planning Considerations

We have read the report on the site by Underground Overground and so have an appreciation of the heritage values of the site and existing buildings. We further understand that maintaining the buildings in their current form and use would be most desirable to minimise loss of their heritage value.

In these scenarios, the key heritage and planning considerations include:

- The heritage value of the façades without the buildings behind.
- How the façades fit with the new buildings on the site.
- How the site can be used and meet other planning objectives.

We note that these matters are outside our scope, which is limited to the structural engineering feasibility of retaining the façades, but we have endeavoured to outline conceptual options which should help inform answers to these questions.

The options developed also consider alternative techniques which have:

- Varying intrusion on the heritage fabric of the façades.
- Reversibility, for example steel frame restraint to façades is more easily removed than concrete linings.

We also note that very little information is available at this stage on the nature and extent of the new buildings including the likely structural systems. We have therefore made assumptions on building typology noting that further information and input from others will be required to define comprehensive options. These could incorporate several parts or sub-options of the conceptual options outlined in this report.

Conventional Restraint or Seismically Isolated

Conventional Restraint

The façades are currently founded on shallow strip foundations with lateral restraint provided by the existing buildings which are connected to the façades. In option 2, the façades continue to be supported on the existing footings which would be upgraded - possibly by installing piles if required to provide the appropriate level of support to prevent collapse or minimise damage to an agreed level. New structures would be constructed, likely in steel or concrete (walls or frames) to provide the lateral stability required to meet the performance objectives.

Façades Supported on Isolation System

The façade above the level of the isolation plane would be supported on the isolation plane provided for the new hospital building. We understand that the ground floor and isolation plane will be set at a level above the flood level for the site and that this is approximately 2m above ground level on St Andrews Street. The lower section of the façade would continue to be founded on the existing strip footing which would be upgraded as noted above. This section of the façade would also need an enhanced lateral support near the top, primarily because of the reduction in gravity load from the wall above.

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Façade Supported by Hospital or Purpose-Built Structure

Hospital

The section of façade above the isolation plane would be supported by the hospital building, with a restraint designed to slide in the in-plane direction to allow for the much greater stiffness of the façade in this direction.

Depending on the stiffness of the hospital structure (assumed to be a seismically isolated structure with a stiff steel frame superstructure at this stage), the façade may need to be further articulated to undergo the out of plane deformations experienced in a seismic event, without significant damage. This would likely require additional support with either concrete or steel to provide the necessary support.

Façades Supported by Purpose- Built Structure

In this scenario, the supporting structure could be designed to have a stiffness compatible with the façade so that they could be connected in both directions.

Support Required to Façades

Concrete Façades

The concrete façades of buildings 3a – 5 are effectively reinforced concrete frames, although they vary in design and capacity, and have not been assessed in detail at this stage. This means they are not expected to need support over and above that provided at each floor level and by the walls or frames that abut the façades. This support would be provided by the temporary restraints, and by the permanent support structures.

Masonry Façades

The masonry façades of buildings 1 & 2a are unreinforced masonry brick. This means they have limited capacity to span between lines of supporting floors and walls, and so will require additional restraint to prevent collapse or damage in earthquake shaking.

From the Geotechnical reports the site is potentially susceptible to liquefaction. The brick façades have no reinforcing to tie them together and are very vulnerable to ground movement from liquefaction. Underpinning is likely required to ensure their stability if the ground liquefies.

The extent of restraint will be determined by the level of resilience required and the seismic demand, which will be reduced if the façades are supported on the seismically isolated building.

This restraint can be provided by a number of structural systems which would be supported by the temporary and permanent structures including:

- A grillage of steel members fixed into the masonry.
- A reinforced concrete lining cast onto the back face of the masonry with dowels connecting it to the masonry.
- A Fibre Reinforced Polymer (FRP) system likely incorporating additional masonry reinforcement, for example Helifix.

A hybrid of the above systems could also be used, and the choice of system would likely depend on the level of demand and resilience as noted above, in addition to buildability, cost, heritage and other considerations.

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Temporary Bracing Exterior or Interior

Exterior

This is the most common way to temporarily support a façade that is being retained, as it essentially provides a clear workspace behind the façade to carry out the required deconstruction and new construction including any foundation work.

The main drawback with this approach is the space the braces take up outside the building, which in this case is the footpath, cycleway and road. Refer to the drawings for further detail.

Interior

This approach is much less common but has been used in the Wellington CBD on office buildings, where the floor levels can align with the original building floor levels. The main advantage with this approach is that the access to the outside of the building is relatively unaffected. There are however many drawbacks including the complexity of installing the bracing, and then carrying out the deconstruction and undertaking the new construction working around the braces. This also makes construction less efficient due to the limited access for plant and materials and the management of health & safety is more challenging.

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Façade Options

Options for the temporary and permanent support of the façades have been considered and are outlined below. These are concept ideas that are subject to further design development. The likely impact and relative cost of the different types of solution are analysed in the following section.

Seven design options have been considered. With these the various options for temporary support and the transition to permanent support have been considered. Hand sketches provide a visual representation of each scheme.

Temporary and Permanent Support

Concept temporary support structures for the façades along Cumberland Street and Castle Street are shown on the sketch drawings in Appendix C.

Option 1A

This option involves:

- Façades cut and base isolated at the same level as the main structure.
- The original façade may need to have joints inserted into it to allow for articulation in the upper levels also.

The temporary support structure will be erected outside the façade and fixed through the façade before the deconstruction of the buildings behind. The existing buildings will need to be carefully deconstructed in the vicinity of the façade.

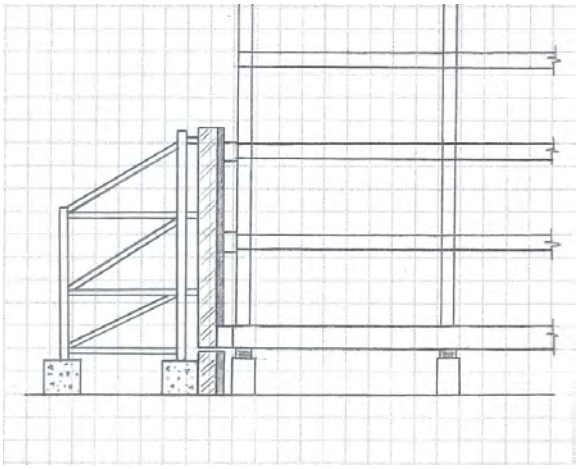

Figure 3: Option 1A

Option 1B

This option is the same as option 1A except that the temporary support structure is fixed inside the existing building before deconstruction.

This solution is possible, although the installation of the temporary support will be quite onerous.

Whilst this system is technically possible, it will create considerable construction difficulties with the sequencing required.

Refer to Appendix E for more discussion.

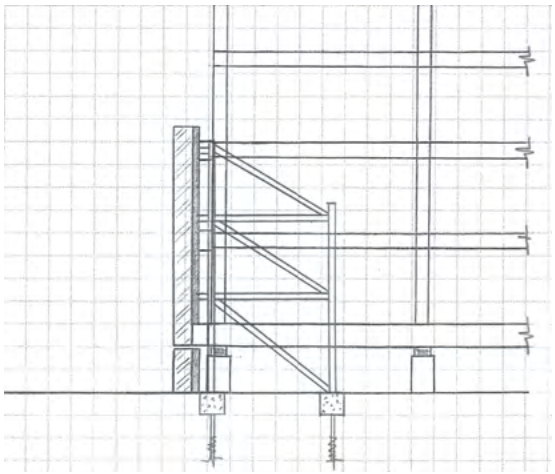

Figure 4: Option 1B.

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Option 2A

This option involves:

- The façade having its own independent support structure on piled foundations
- Seismic gap to be created between the support structure and the new building.

The foundations of the new support structure will have to be carefully considered to make them compatible with the façade. This is likely to involve underpinning the façade.

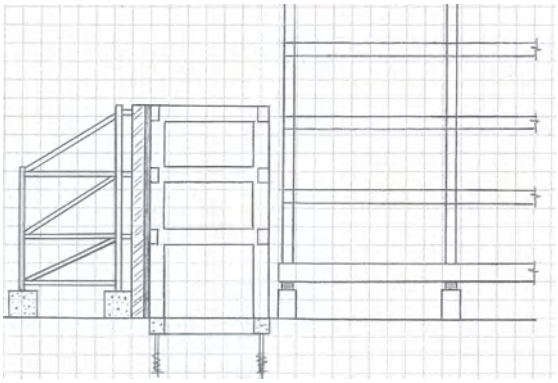

Figure 5: Option 2A.

Option 2B

This solution is the same as option 2A except that the temporary support structure is fixed inside the existing building before deconstruction.

All the consideration described above for option 2A would also apply to this solution.

Additionally, in this case the new supporting structure will have to be designed and built around the temporary support structure. Careful consideration will have to be given to the levels of main members and positions of bracing to make this possible.

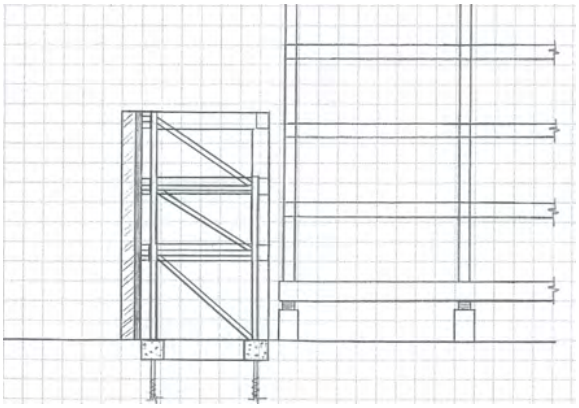

Figure 6: Option 2B

Option 3A

This option involves:

- The façade having its own independent support structure founded on the base isolation system of the new hospital building.
- Façade cut at the base isolation level.

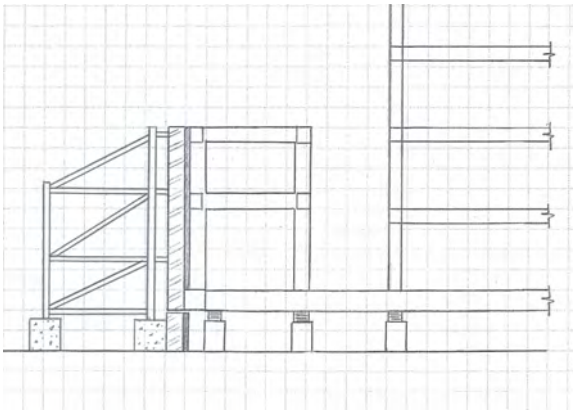

Figure 7: Option 3A

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Option 3B

This solution is the same as solution 3a except that the temporary support structure is installed inside the existing building before deconstruction.

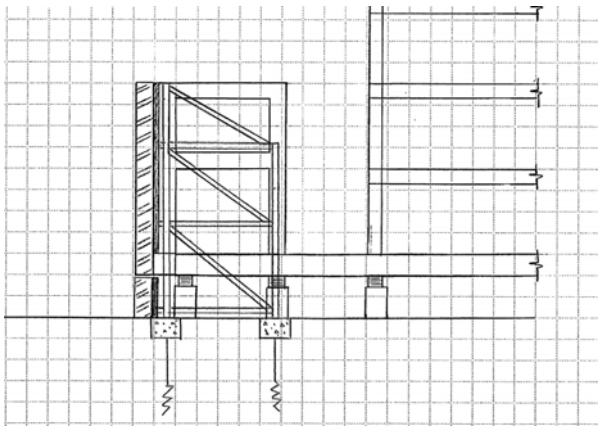

Figure 8: Option 3B

Option 4 – Deconstruct and Reconstruct

This option involves deconstructing the façade brick by brick and rebuilding them with the new structure. The rebuilt brick walls would have reinforcing in the mortar joints horizontally and in cores through the brickwork vertically to allow them to be supported. This option avoids the need for temporary support.

Option 5 - Replica Façade

This option involves:

- A Glass Reinforced Concrete (GRC) replica of a façade being made and attached directly to the new building structure.
- The GRC would be made in thin panels (approx. 20mm thick) with a steel backing frame.
- Joints in between panels allow for movement in a seismic event.
- The GRC panels would be mounted on a steel frame attached to the building.

This solution has the advantage that the replica façade is lightweight and can be attached directly to the new structure, allowing for more useable space within the new hospital building.

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Option Evaluation

RAG Analysis

The following table outlines the key aspects of each option and comparatively assesses their pros and cons. This is summarised using a Red, Amber, Green (RAG) model with each factor qualitatively compared relative to the other options. Red shading indicates the least favourable option, green indicates the most favourable option and amber indicates some level of impact from the indicated factor.

This analysis provides a relative scale between options, with a range of criteria. For the baseline we have considered the new hospital as being built on a brownfield or 'clear' site. We have selected colours for each factor from our engineering knowledge and experience with input from the wider project team on other factors to be considered. The RAG analysis table can be found as Table 4 at the end of this section.

The criteria for the RAG are discussed below, noting that health and safety risk is considered in all the options, for both the temporary and permanent construction. All work needs to be carried out in a safe manner. The effect of additional health and safety precautions is factored into other criteria as appropriate. For example, where risk mitigation measures include complex construction sequencing such as installing temporary braces inside the existing building, this has been considered in the cost, time and buildability factors.

Cost

This is the cost of the façade retention, both temporary and permanent. It also considers the cost related to the increased complexity of the hospital design and additional time related costs due to the façade work on the overall project.

Time

This is the construction time relative to the baseline of building a new hospital with the site cleared.

Impact on Heritage

This is relative, and it is noted that retaining only the façade of a heritage building is a significant impact in itself. The other impacts relate to the intrusion required to introduce additional support to the façades, their connection to the heritage fabric and reversibility.

Impact on Hospital

This considers how the façade retention will reduce the useable site area available for the hospital, including vehicle access routes etc.

It also considers how the façades will impact the structure of the new hospital and the effect on daylight and views from the hospital. For example, existing façade windows could align with new floor levels, without an obscuring treatment the floor would be seen through the window.

Buildability

This considers how difficult it will be to construct both the temporary and permanent support structures, including foundations.

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Traffic Disruption

This considers the disruption to vehicle, cycle and pedestrian traffic during construction as a result of the temporary façade bracing. This does not consider disruption to the operation of the hospital, as the traffic flows into and out of the site are not sufficiently understood at this stage.

Seismic Resilience

This indicates the relative seismic performance in terms of likely damage and repair required to the façade or supporting structure in a major earthquake. Refer to the section of structural performance for more detail.

Discussion of Options

The options have been deliberately kept as general as possible so that they can be selected in whole or in part to suit any approach to the overall site or a specific building.

Sitewide Considerations

A key driver is the footprint of the new hospital building as this will define which options are feasible. We understand that the plan in Figure 2 is very preliminary in nature, however if this is indicative of what is carried forward, this will narrow the options which can be adopted. We also understand that there may be vehicles trafficking into the building below the first-floor level, this is likely to be incompatible with the existing façade where this occurs. This plan also suggests that the hospital footprint may not extend as far south as Block 1, although we understand that the design team are currently looking for more space on site. Depending on the footprint and the use of the southern area, there may be an option to strengthen this building along with the façade, noting this is outside the scope of this report.

There are unreinforced masonry walls on both sides of the boundary of Block 1 and the neighbouring ODT and Allied Press Building. Although consideration of these walls is outside the scope of this report, depending on the proposed use of this area, and any proposed upgrade of the neighbouring building, temporary and permanent restraint of this wall is likely to be required.

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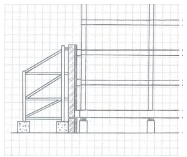
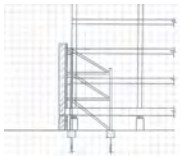
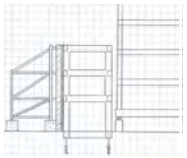
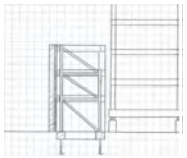
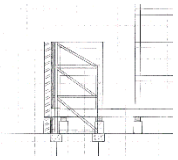
Table 4: RAG Analysis Table.

Consideration	Option								
	Baseline	1a	1b	2a	2b	3a	3b	4	5
	New Hospital 'Clear' Site							Deconstruct and Reconstruct	GRC Replica
Cost	G	A	R	A	A	R	R	R	A
Time	G	A	R	A	R	A	R	R	G
Impact on Heritage	R	A	A	A	A	A	A	R	R
Impact on Hospital	G	R	R	R	R	R	R	R	A
Buildability	G	A	R	G	R	A	R	A	G
Traffic Disruption	G	R	G	R	G	R	G	G	G
Seismic Resilience	G	A	A	R	R	A	A	A	G

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Conclusion

We have developed this high-level report on the existing facades of the former Cadbury Factory site to consider feasibility and provide options on how the facades could be retained and incorporated into the new hospital buildings on the site.

The concept design of the hospital is currently being developed. It is therefore not possible to determine the most suitable retention treatment for each block, as the location of the hospital building footprint in relation to the facades has not been confirmed. Consequently, a range of options have been considered.

It is feasible to retain the façades; however, this will affect the layout and usage of the site, and both the extent and complexity of the construction work required, which will have significant cost, programme and health & safety implications.

The temporary supporting works will be significant and if placed on the outside of the facades will significantly impinge on the footpath, cycleway, roads and buried services of the state highways on Cumberland and Castle Streets. To support the walls temporarily on the inside is feasible as shown in the options, although this would add significant complexity, cost and time as well as an increased health & safety risk.

The methods of attaching the façades to new buildings will depend on the final design chosen. It is possible to attach the facades to the new buildings; however, a significant amount of additional structure will be required to achieve this. The existing façades have many openings for windows and doors which are unlikely to line up with floor levels proposed for the new hospital which may further compromise the design.

The brick facades to Blocks 1 and 2 of the Cadbury site are in poor condition mainly due to their age and damp penetration over many years, and they will require significant work to improve their integrity. There may also be a residual risk with these depending on the level of resilience decided upon.

From the geotechnical reports the site is potentially susceptible to liquefaction. The brick façades of Blocks 1 & 2 have no reinforcing to tie them together and are very vulnerable to ground movement, and so the foundations of these facades will require strengthening which could include underpinning.

Two other alternatives have also been considered which are unlikely to be preferred due to their greater impact on the heritage fabric:

1. Carefully de-constructing the facades and rebuilding using the original bricks incorporating reinforcement. This facade would require considerably less supporting structure.

2. Constructing replica facades in lightweight GRC panels which would require substantially less structural support.

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Explanatory Notes/Limitations

This report contains the professional opinion of WSP Opus as to the matters set out herein, in the light of the information available to it during preparation, using its professional judgment and acting in accordance with the standard of care and skill normally exercised by professional engineers providing similar services in similar circumstances. No other express or implied warranty is made as to the professional advice contained in this report.

We have prepared this report in accordance with the brief as provided and our terms of engagement. The information contained in this report has been prepared by WSP Opus at the request of its client, The Ministry of Health. It is not possible to make a proper assessment of this report without a clear understanding of the terms of engagement under which it has been prepared, including the scope of the instructions and directions given to and the assumptions made by WSP Opus.

This report has been prepared as part of the Ministry of Health's submission to the Dunedin City Council in support of its resource consent application for the Dunedin Hospital Project ('Purpose'). The report may only be used for this Purpose and may be relied on only by the Ministry of Health and the Dunedin City Council for submitting and assessing the resource consent application

The report is also based on information that has been provided to WSP Opus from other sources or by other parties. The report has been prepared strictly on the basis that the information that has been provided is accurate, complete and adequate. To the extent that any information is inaccurate, incomplete or inadequate, WSP Opus takes no responsibility and disclaims all liability whatsoever for any loss or damage that resulting from any conclusions based on information that has been provided to WSP Opus.

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Appendix A
Schedule of Façades

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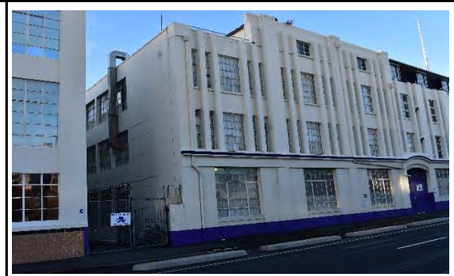
NDH - Cadburys Block Survey of Facades

No.	Block No.	Description	Date Constructed	Construction	Estimated height	Assessment of present condition - see also schedule of photographs	%NBS IL2 from Hanlon IEP (for building)	
Cumberland Street Elevations								
1	1	Cadbury World Building	Earliest construction 1868	Solid Brickwork - numerous openings including large doors and window opening at ground floor level.	11.0m (From Hanlon Alteration Drawings)	Quite poor. Brickwork is damp from water penetration from the roof and also some rising damp at the bottom. Several bricks seem to be soft and the surface can be rubbed off by hand. Rendered externally - some fine to medium cracking noted.	20%	
2	2	Cadbury Reception and Offices	Unknown but a portion thought to have been constructed in 1868	From the south end (right end of picture) for five windows the construction is solid brickwork. To the north of that the façade has been altered and combined with the front of Block 3A and the link joining the buildings. Probably reinforced concrete circa 1924(?)	12.0m with the mansard roof section above that	Most of the brickwork cannot be seen as it is plastered inside and rendered outside. Rising damp affecting the plaster is seen at low level. Sign of rising damp also present on the outside. Several fine cracks in the external render.	20%	
3	3A	Raw Materials	Ground floor constructed 1922, upper floors added 1924. Penthouse added later.	Reinforced Concrete wall. Building is reinforced concrete floor on steel framing. Believed to be on shallow spread footings.	approx15.0m at penthouse. 12.0m to north.	Inside is plastered. Signs of rising damp at the bottom has affected plaster in small areas some minor rust staining. Similar at higher levels where damp either from the windows, operations or the roof have affected the plaster and there are areas where some rust staining is present. Penthouse walls are very damp and internal gutter is cracked and in very poor condition. Top of parapet is brickwork and there is a crack where it sits on the RC wall below.	About 20%. It is thought that the steel frame beam and column joints offer little resistance in the N-S direction	
4	4A	Engineering workshop at ground with offices above	1960	Reinforced Concrete on piled foundations. Pile 7.60m deep	Approx. 12.0m	The wall is plastered on the inside and rendered and painted on the outside. At the ground floor there are some signs of ware and tear but generally there are no signs of distress or problems.	Hanlons have calculated this to be 100% but it does not appear to have been a full DSA	

5	5	Chocolate manufacture and packaging	1951, additional storey added 1968.	Reinforced flat slabs on internal columns with external column and beam frames. Foundation is a cellular reinforced concrete ground slab.	Approx. 18.0m - lift tower is higher - circa 21.0m	Rendered and painted inside and out. Some signs of wear and tear but no signs of distress.	20% NBS	
Castle Street Elevations								
6	3C	Raw Materials	Building constructed 1924, Castle Street extension 1938	No drawings for this building. Probably an extension of block 3B	11.0m	Painted inside and out. Damp penetration at the bottom and at the top from the roof and around some of the windows - mould staining from condensation. Minor cracking noted particularly ion the outside. Crack at corner of window at second floor level.	20% - same issues as 3A	
7	4C	Manufacture, Storage and Packaging	1951, additional storey added 1968.	Reinforced concrete flat slabs on columns. Exterior reinforced concrete column and beam frames. Foundation cellular reinforced concrete flat slab on ground. Top floor is steel portal frames - some ties to façade.	18.0m	Painted inside and out. Tiles under windows and ground level. Large openings at ground floor filled in with blockwork. Sign of wear and tear but no particular signs of distress.	25% due to brittle nature of internal column and beam system.	
8	5	Chocolate manufacture and packaging	1951, additional storey added 1968.	Reinforced concrete flat slabs on columns. Exterior reinforced concrete column and beam frames. Foundation cellular reinforced concrete flat slab on ground. Lift shaft between blocks 4 and 5. Seismic Gap.	18.0m	Painted inside and out. Tiles under windows and ground level. Large openings at ground floor filled in with blockwork. Sign of wear and tear but no particular signs of distress.	20% lack of ductility in internal framing and possible brittle failure.	

Appendix B
Temporary Bracing Concept Drawings

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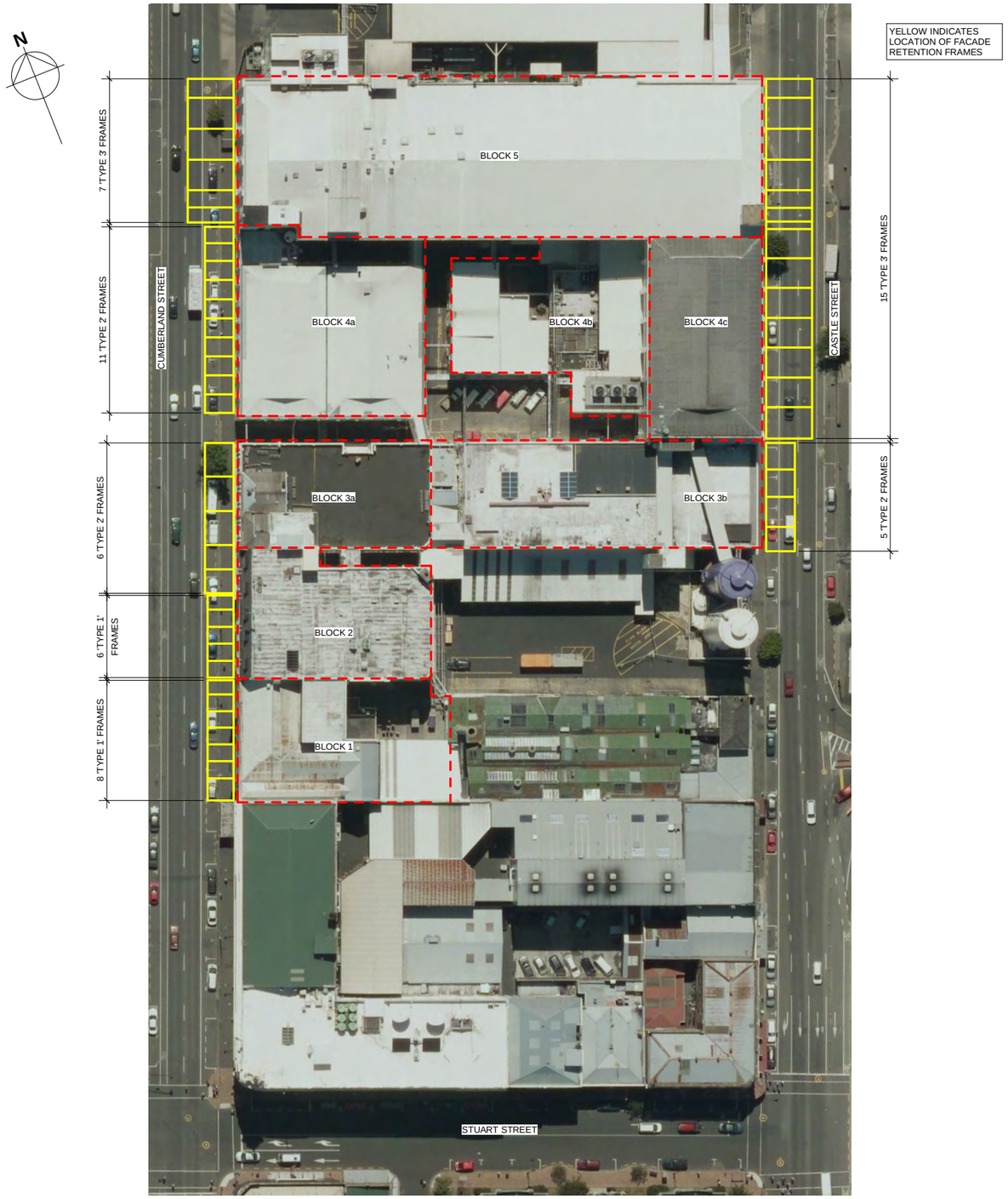

SITE PLAN
SCALE 1 : 500

300mm
200mm
100
50
0 10mm

NOTES

1. ALL SKETCHES TO BE READ IN CONJUNCTION WITH THE WSP OPUS REPORT 'ENGINEERING ASSESMENT OF EXISTING FACADES'.
2. EXISTING STRUCTURE IS SHOWN INDICATIVELY ONLY. VERIFY DIMENSIONS & CONFIGURATION OF EXISTING STRUCTURE ON SITE BEFORE COMMENCING ANY WORKS & NOTIFY ENGINEER IF ANY DIFFERENCES TO WHAT IS INDICATED ON THE SKETCHES ARE ENCOUNTERED.
3. EXISTING SERVICES NOT SHOWN. VERIFY LOCATION OF ALL EXISTING SERVICES ON SITE BEFORE COMMENCING ANY WORKS.
4. ALL EXTERNALLY EXPOSED STEELWORK INCLUDING FIXINGS TO BE HOT DIP GALVANIZED U.N.O.
5. REFER SK-2000 & SK-2100 SERIES SKETCHES FOR FRAME ELEVATIONS U.N.O.

CONCEPT DRAWINGS FOR INDICATIVE PRICING ONLY

REVISION	AMENDMENT	APPROVED	DATE
A	CONCEPT DESIGN	S.R.B	2019-10-02

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STRUCTURAL

SCALE: As indicated @ A1
ORIGINAL SIZE: A1
DRAWN: K.HAMPSHIRE
DESIGNED: M.ALEXANDER
APPROVED: S.BURROUGH
DRAWING VERIFIED: G.McGILL
DESIGN VERIFIED: S.BURROUGH
APPROVED DATE: 2019-10-02

CONCEPT DESIGN

PROJECT
MINISTRY OF HEALTH
280 CUMBERLAND STREET, DUNEDIN
FACTORY FACADE RETENTION

TITLE
SITE PLAN

OPUS PROJECT NO.	PROJ-ORIG-VOL-LVL-TYPE	SHEET NO.	SUITABILITY	REVISION
6-CM537.00		SK-1300	-	A

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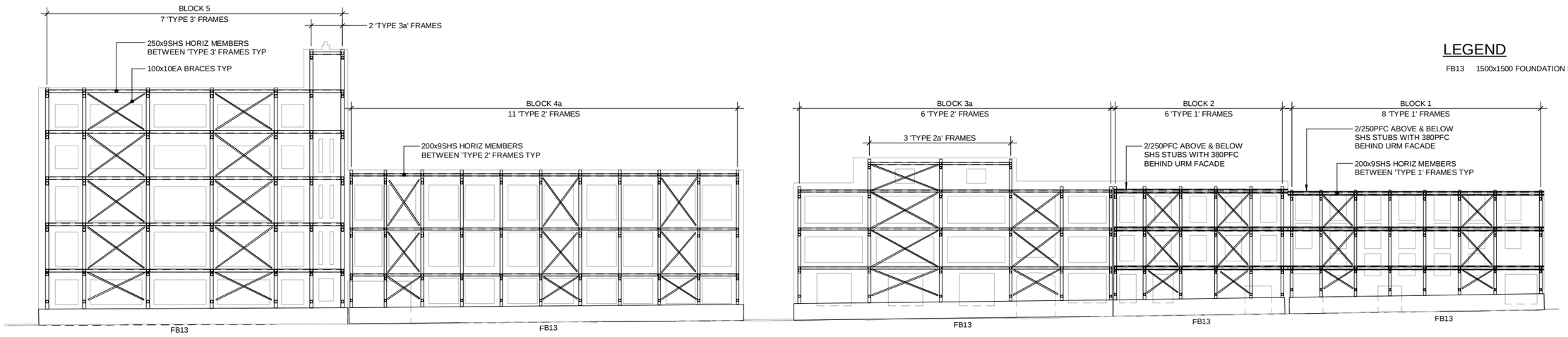
3. EXISTING SERVICES NOT SHOWN. VERIFY LOCATION OF ALL EXISTING SERVICES ON SITE BEFORE COMMENCING ANY WORKS.
4. ALL EXTERNALLY EXPOSED STEELWORK INCLUDING FIXINGS TO BE HOT DIP GALVANIZED U.N.O.
5. REFER SK-2100 SERIES SKETCHES FOR TYPE 1, 2 & 3 FRAME ELEVATIONS.

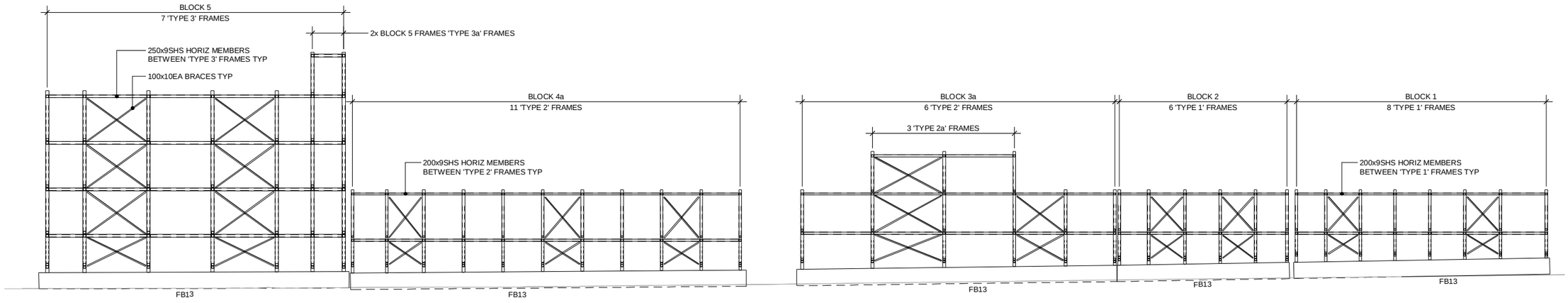
LEGEND

FB13 1500x1500 FOUNDATION BEAM.



ELEVATION AT CUMBERLAND STREET - EAST

SCALE 1 : 200



ELEVATION AT CUMBERLAND STREET - WEST

SCALE 1 : 200

REVISION	AMENDMENT	APPROVED	DATE
A	CONCEPT DESIGN	S.R.B	2019-10-02

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STRUCTURAL

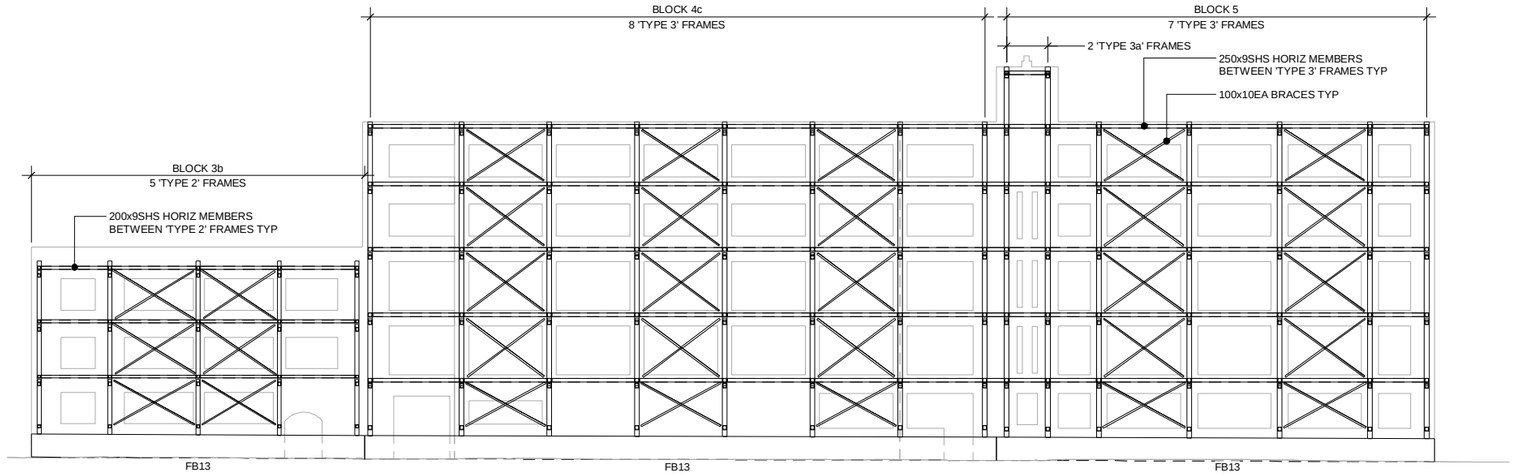
SCALE		ORIGINAL SIZE
As indicated @ A1		A1
DRAWN	DESIGNED	APPROVED
K.HAMPSHIRE	M.ALEXANDER	S.BURROUGH
DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
G.McGILL	S.BURROUGH	2019-10-02

CONCEPT DESIGN

PROJECT
MINISTRY OF HEALTH
280 CUMBERLAND STREET, DUNEDIN
FACTORY FACADE RETENTION

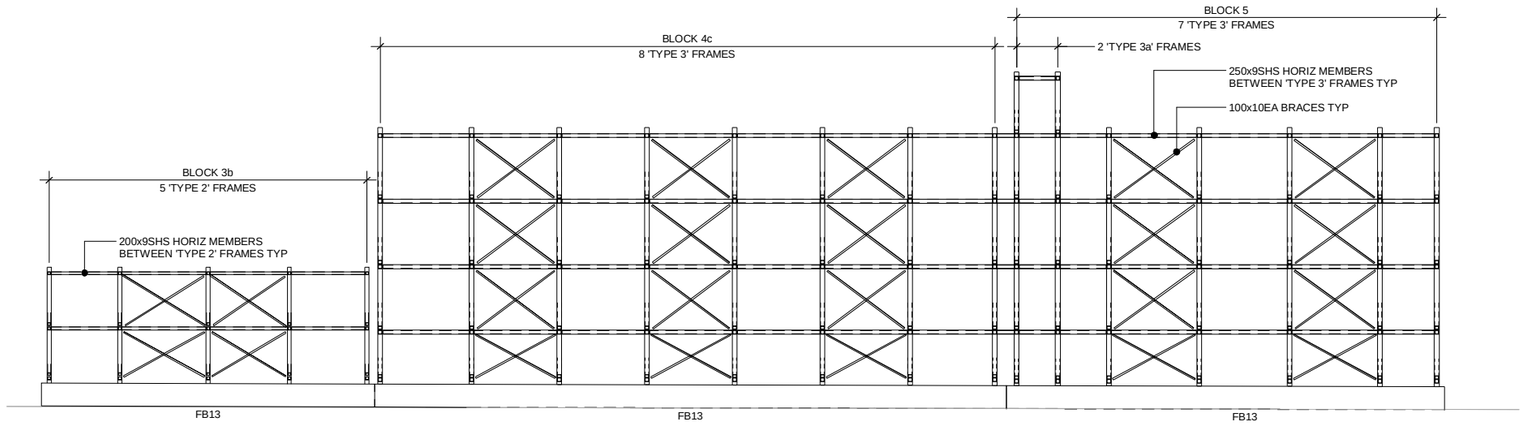
TITLE
ELEVATIONS AT CUMBERLAND STREET

OPUS PROJECT NO.	PROJ-ORIG-VOL-LVL-TYPE	SHEET NO.	SUITABILITY	REVISION
6-CM537.00		SK-2001	-	A



ELEVATION AT CASTLE STREET - WEST

SCALE 1 : 200



ELEVATION AT CASTLE STREET - EAST

SCALE 1 : 200

NOTES

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5. REFER SK-2100 SERIES SKETCHES FOR TYPE 1, 2 & 3 FRAME ELEVATIONS.

LEGEND

FB13 1500x1500 FOUNDATION BEAM.

CONCEPT DRAWINGS FOR INDICATIVE PRICING ONLY

REVISION	AMENDMENT	APPROVED	DATE
A	CONCEPT DESIGN	S.R.B	2019-10-02

MINISTRY OF HEALTH
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STRUCTURAL

SCALE: As indicated @ A1
ORIGINAL SIZE: A1

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DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
G.McGILL	S.BURROUGH	2019-10-02

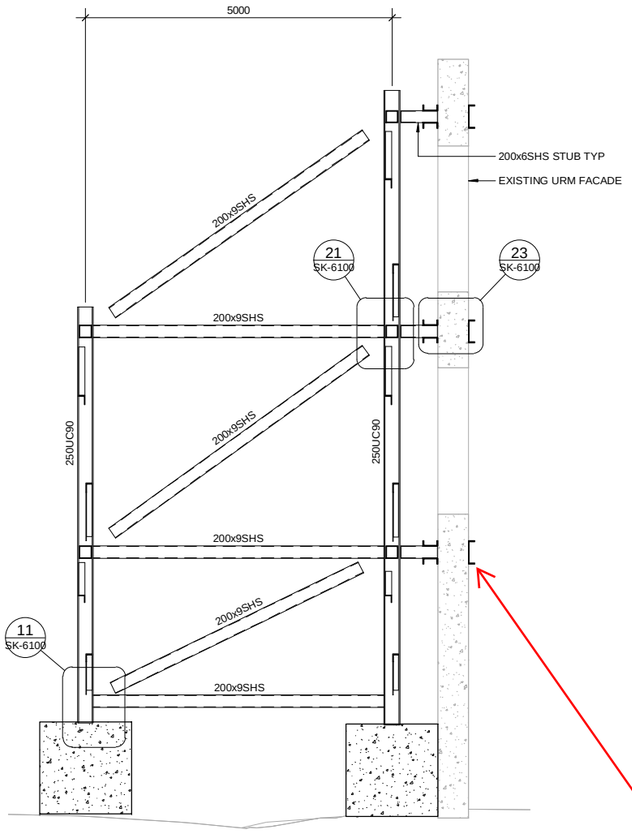
CONCEPT DESIGN

PROJECT
MINISTRY OF HEALTH
280 CUMBERLAND STREET, DUNEDIN
FACTORY FACADE RETENTION

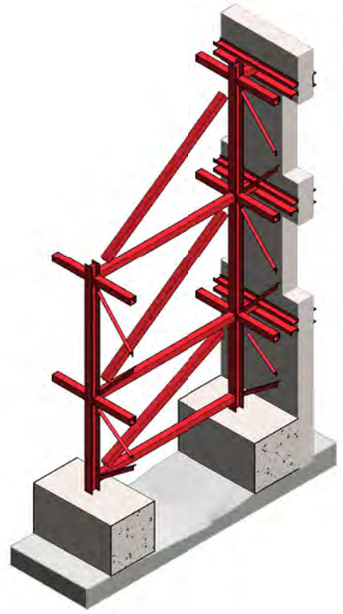
TITLE
ELEVATIONS AT CASTLE STREET

OPUS PROJECT NO.	PROJ-ORIG-VOL-LVL-TYPE	SHEET NO.	SUITABILITY	REVISION
6-CM537.00		SK-2003	-	A

Original sheet size A1 (841x594) Plot date: 2/10/2019 8:08:46 a.m. C:\Revit Local Files\Revit 2019\6CM537-OIC-01-ZZ-M3-S-0001_CENTRAL_2019_wekhh0.rvt



TYP 'TYPE 1' FRAME ELEVATION
SCALE 1 : 50



TYP 'TYPE 1' FRAME ORTHOGRAPHIC
SCALE

INSTALL STEEL PFC GRILLAGE BEHIND URM FACADES (50kg/m2)

NOTES

1. ALL SKETCHES TO BE READ IN CONJUNCTION WITH THE WSP OPUS REPORT 'ENGINEERING ASSESMENT OF EXISTING FACADES'.
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G.McGILL	S.BURROUGH	2019-10-02

CONCEPT DESIGN

PROJECT
MINISTRY OF HEALTH
280 CUMBERLAND STREET, DUNEDIN
FACTORY FACADE RETENTION

TITLE
TYPICAL FRAME 1 ELEVATION & ORTHOGRAPHIC VIEW

OPUS PROJECT NO.	PROJ-ORIG-VOL-LVL-TYPE	SHEET NO.	SUITABILITY	REVISION
6-CM537.00		SK-2101	-	A

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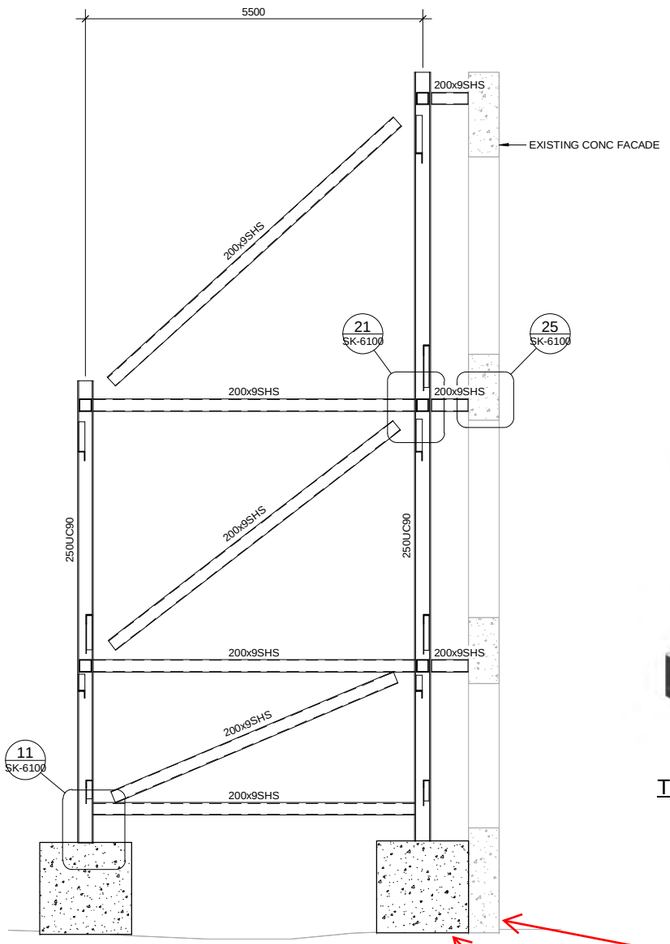

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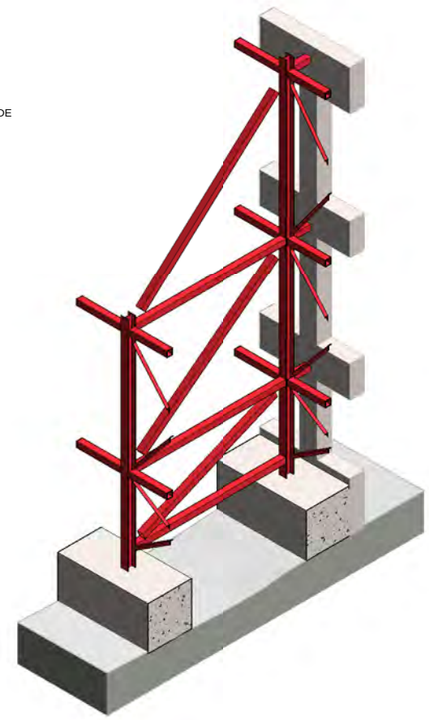
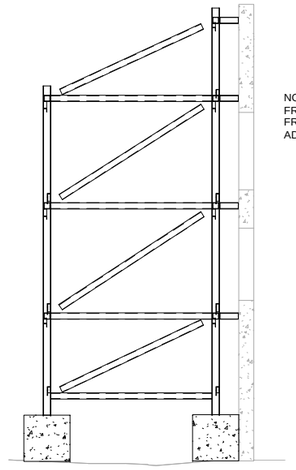


TYP 'TYPE 2' FRAME ORTHOGRAPHIC
SCALE



NOTE:
FRAME 'TYPE 2a' SIM TO FRAME 'TYPE 2' WITH ADDITIONAL VERTICAL FRAMING

TYP 'TYPE 2a' FRAME ELEVATION
SCALE 1 : 100

2/M20 THREADED RODS AT EACH COLUMN LOCATION. ~600MM LONG THROUGH EXISTING WALL BASE. EPOXY INTO PRECAST BLOCK 200MIN

PRECAST CONCRETE FOUNDATION BLOCKS. 40 kg/m3 REINFORCING. 3m LONG UNITS JOINED TOGETHER WITH 4 no. STEEL BRACKETS PER JOIN (10kg PLATE + 4/M20 EPOXY BOLTS)

NOTES

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300mm
200mm
100
50
0 10mm

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G.McGILL	S.BURROUGH	2019-10-02

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PROJECT
MINISTRY OF HEALTH
280 CUMBERLAND STREET, DUNEDIN
FACTORY FACADE RETENTION

TITLE
TYPICAL FRAME 2 ELEVATION & ORTHOGRAPHIC VIEW

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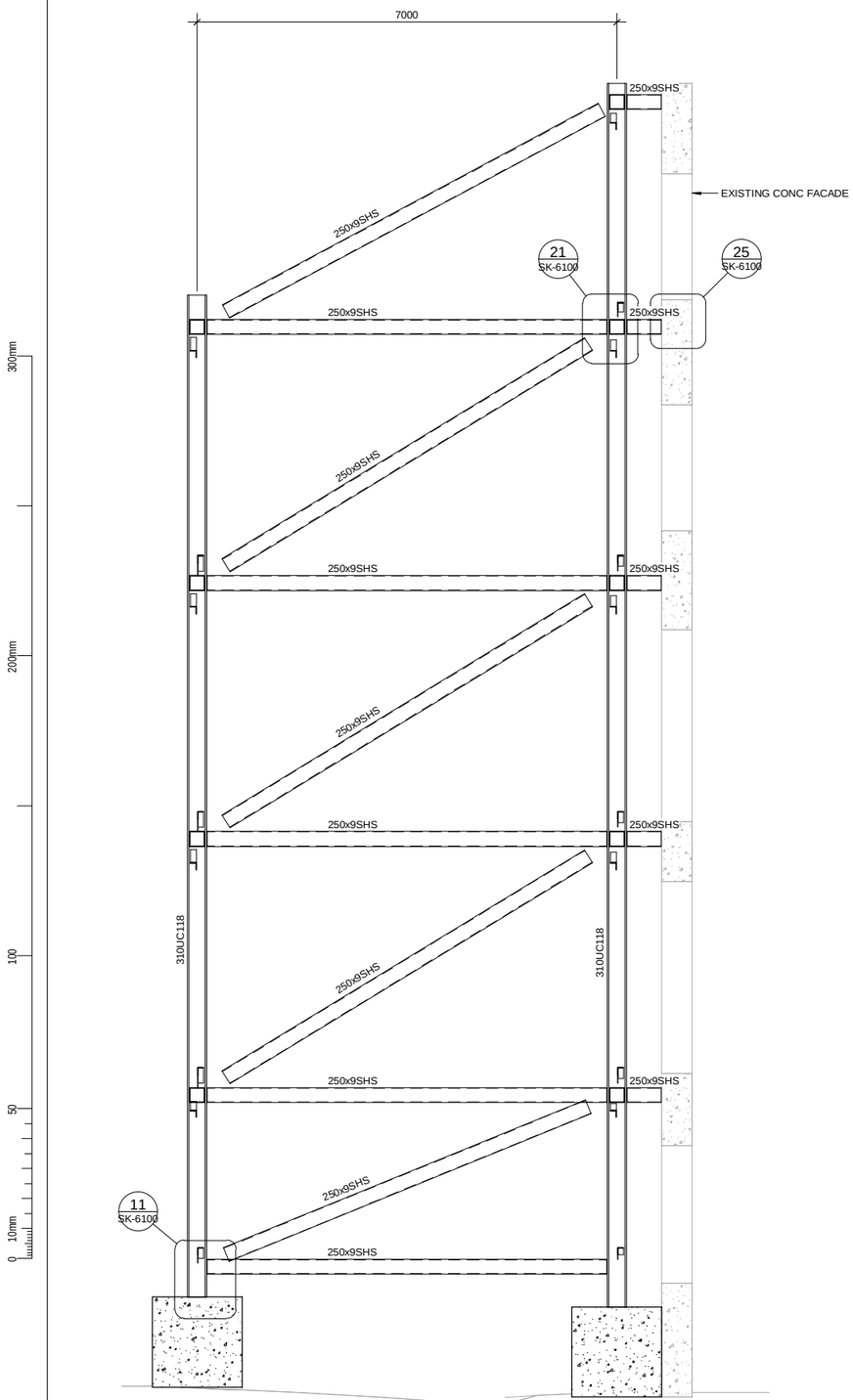
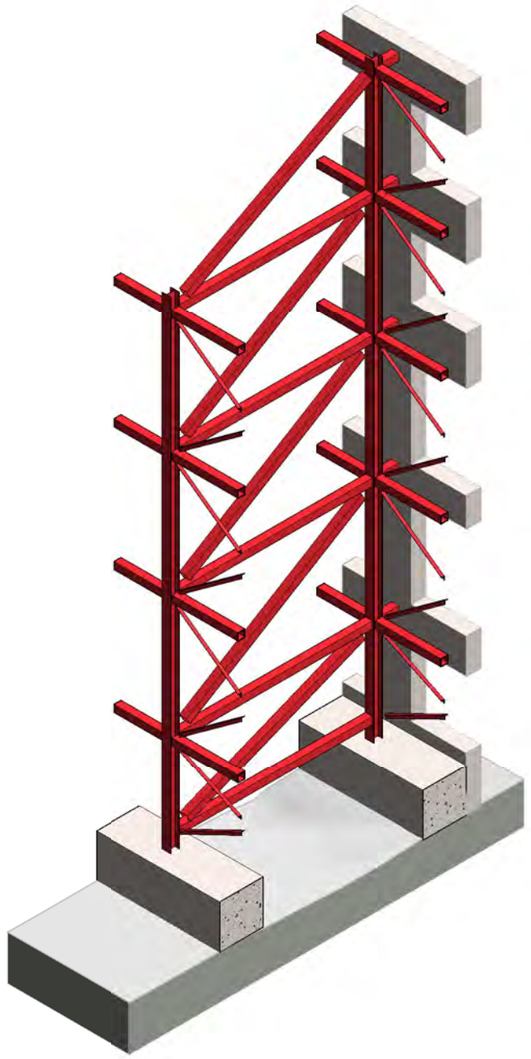
6-CM537.00		SK-2102	-	A



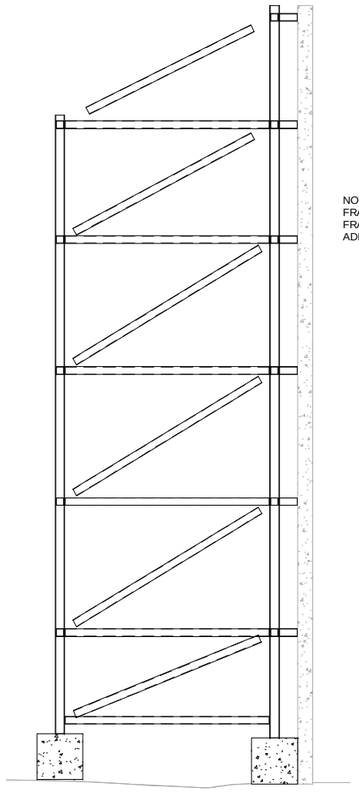
TYP 'TYPE 3' FRAME ELEVATION

SCALE 1 : 50



TYP 'TYPE 3' FRAME ORTHOGRAPHIC

SCALE



NOTE:
FRAME 'TYPE 3A' SIM TO
FRAME 'TYPE 3' WITH
ADDITIONAL VERTICAL FRAMING

TYP 'TYPE 3a' FRAME ELEVATION

SCALE 1 : 100

NOTES

1. ALL SKETCHES TO BE READ IN CONJUNCTION WITH THE WSP OPUS REPORT 'ENGINEERING ASSESMENT OF EXISTING FACADES'.
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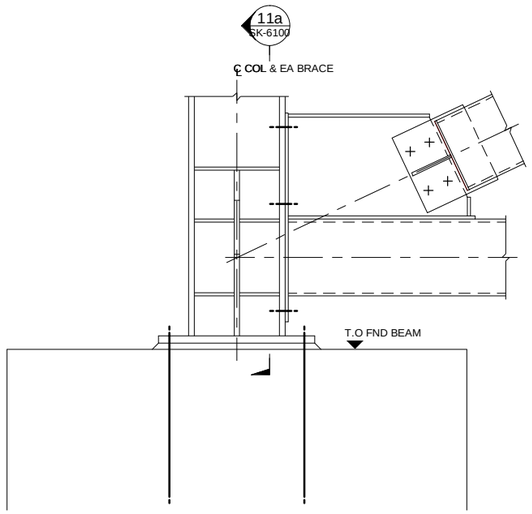
APPROVED: S.BURROUGH
DRAWING VERIFIED: G.McGILL
DESIGN VERIFIED: S.BURROUGH
APPROVED DATE: 2019-10-02

CONCEPT DESIGN

PROJECT
MINISTRY OF HEALTH
280 CUMBERLAND STREET, DUNEDIN
FACTORY FACADE RETENTION

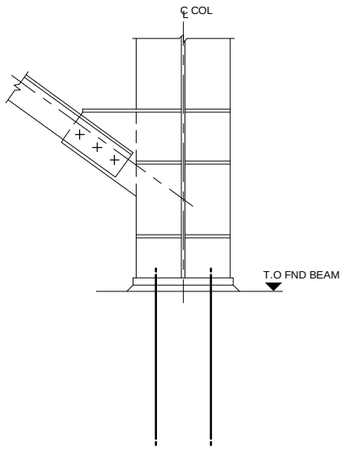
TITLE
TYPICAL FRAME 3 ELEVATION & ORTHOGRAPHIC VIEW

OPUS PROJECT NO.	PROJ-ORIG-VOL-LVL-TYPE	SHEET NO.	SUITABILITY	REVISION
6-CM537.00		SK-2103	-	A



11 DETAIL
SK-2101 SCALE 1 : 10

TYP BASE PLATE



11a SECTION
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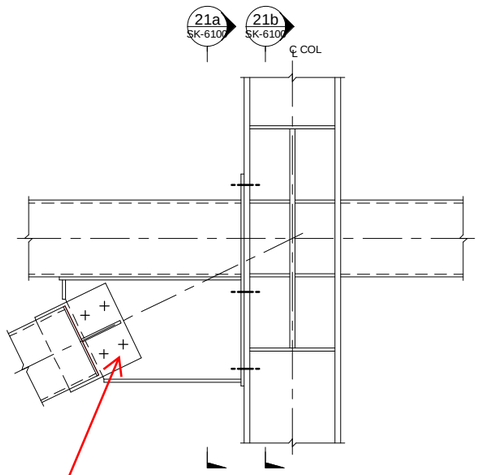
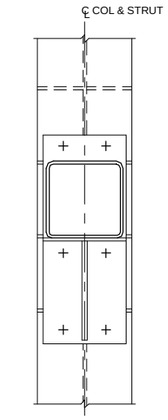


21 DETAIL
SK-2101 SCALE 1 : 10

TYP BEAM/COL/BRACE



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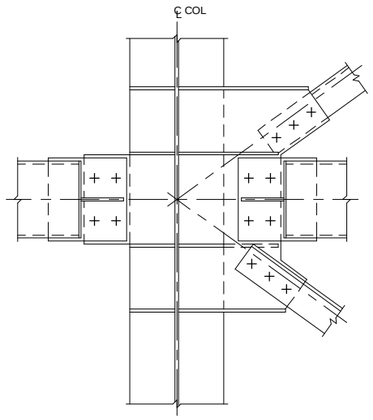
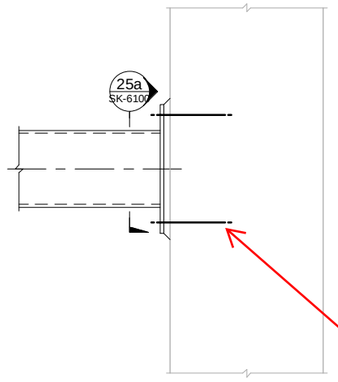


21b SECTION
SK-6100 SCALE 1 : 10

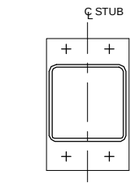
M20/8.8TB BOLTS THROUGH OUT U.N.O

M20/8.8S THROUGH BOLTS



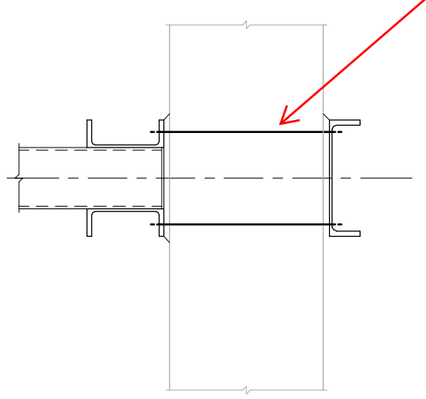
25 DETAIL
SK-2102 SCALE 1 : 10

TYP SHS STUB/EXISTING WALL



25a SECTION
SK-6100 SCALE 1 : 10

M20/8.8S EPOXY BOLTS, 150MIN EMBEDMENT



23 DETAIL
SK-2101 SCALE 1 : 10

SHS STUB/EXISTING WALL AT 'TYPE 1' FRAME

NOTES

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DRAWING VERIFIED	DESIGN VERIFIED	APPROVED DATE
G.McGILL	S.BURROUGH	2019-10-02

CONCEPT DESIGN

PROJECT
MINISTRY OF HEALTH
280 CUMBERLAND STREET, DUNEDIN
FACTORY FACADE RETENTION

TITLE
STEELWORK DETAILS

OPUS PROJECT NO.	PROJ-ORIG-VOL-LVL-TYPE	SHEET NO.	SUITABILITY	REVISION
6-CM537.00		SK-6100	-	A

Appendix C
Façade Support Options – Additional Detail

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Façade Options

Options for the temporary and permanent support of the façades have been considered and are outlined below. These are concept ideas that are subject to further design development. The likely impact and relative cost of the different types of solution are analysed in the following section.

Seven design options have been considered. With these the various options for temporary support and the transition to permanent support have been considered. Hand sketches provide a visual representation of each scheme.

Temporary Support

Concept temporary support structures for the façades along Cumberland Street and Castle Street are shown on the sketch drawings in Appendix C.

Option 1A

This option involves:

- Façades cut and base isolated at the same level as the main structure.
- The original façade may need to have joints inserted into it to allow for articulation.

The temporary support structure will be erected outside the façades and fixed through the façade before the deconstruction of the buildings behind. The existing buildings will need to be carefully deconstructed in the vicinity of the façade.

To accommodate the significant amount of movement required at the base isolation level, the façade will also need to be separated at the same level. The upper section of the façade will be supported by beams from the new structure. The joint at the isolation level will have to be carefully filled with a waterproof filler that is flexible and can be replaced after a significant seismic event.

Smaller differential seismic movement between the upper levels of the façade and the new structure will also need to be accommodated. The façade will have a different stiffness from the new building which means it will move differently in an earthquake, especially in the direction along the façade. The connections will need to allow differential movement to take place along the façade so that neither the façade or new building is compromised. It may also be necessary to introduce joints into the old façade to give the ability to articulate and move towards the street with the new buildings without suffering a brittle failure. This will need careful consideration from both a structural and heritage standpoint.

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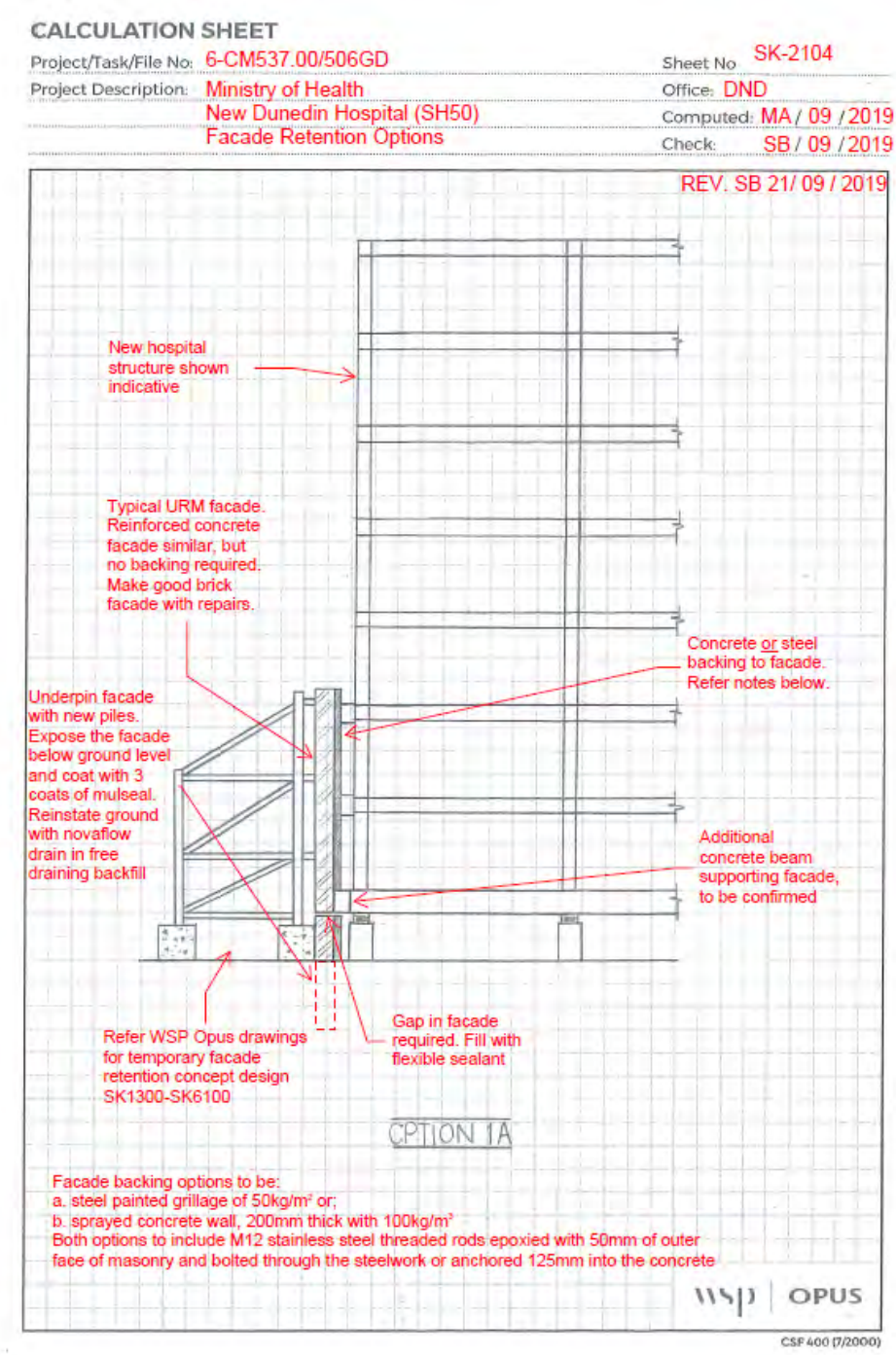

Figure 9: Option 1A.

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Option 1B

This option is the same as option 1A except that the temporary support structure is fixed inside the existing building before deconstruction. The advantage is that this does not encroach on the state highway. However, scaffolding outside will be required in the short term to permit the erection and bolting through the wall as required. Pattress plates or framing may be required on the outside – particularly for the brick walls – to ensure that the façade is fully supported.

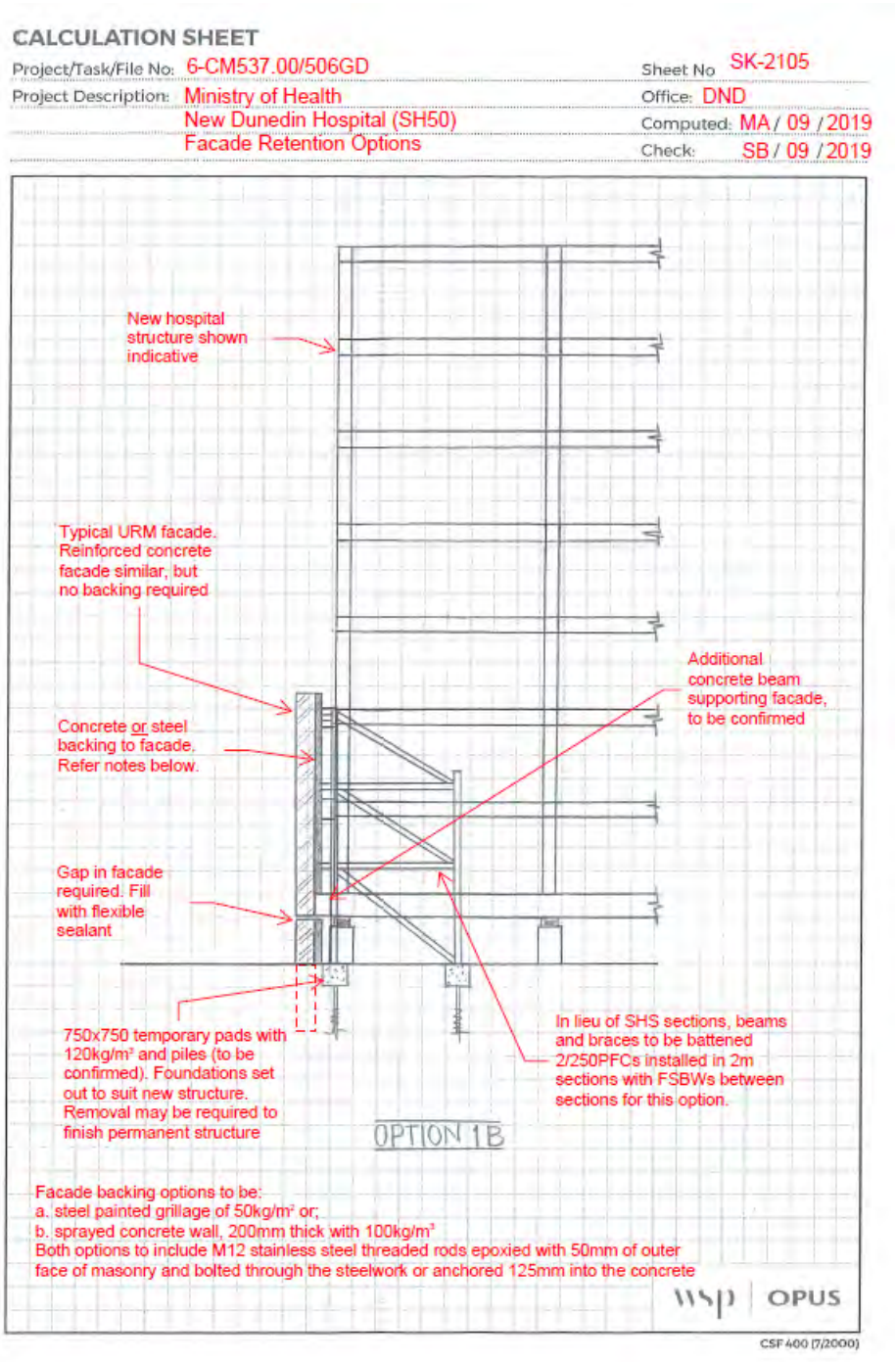

Figure 10: Option 1B.

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This solution is possible, although the installation of the temporary support will be quite onerous. The following points should be noted: -

1. To install the temporary framing inside the existing building it will have to be designed in sections that can be moved into place by hand and bolted and welded together on site.
2. The installation will require holes to be made in floors to accommodate the vertical supports which would be craned through the roof. Additional support around each opening would be added as required.
3. The foundations for the façade support will have to be constructed inside the existing buildings. Installing large precast units will not be practical inside the building. Small piling rigs will be required with multiple extensions due to the lack of height inside the existing buildings. This will be time consuming.
4. The deconstruction sequence will have to consider the temporary support and not compromise it. This will mean more careful and slower deconstruction and quite often hand work to ensure the temporary supports remain undamaged.
5. Construction of the new structure will have to sequenced in such a way that it can be built around the temporary support and the connections made to the existing façade.
6. Only when the existing façade has been fully connected to the new structure can the temporary support be removed. This will have to be removed in small sections which can be manually handled within the floor space of the new building. It is expected that this will require cutting up of sections of the temporary support to allow them to be manoeuvred.

Whilst this system is technically possible, it will create considerable construction difficulties with the sequencing required.

Option 2A

This option involves:

- Façade has its own independent support structure on piled foundations
- Seismic gap to be created between the support structure and the new building.

This method envisages the façade to be temporarily supported and a new independent support structure constructed behind it. This could be in the form of a steel or concrete frame with bracing as necessary. The façade and supporting structure would be separated from the new hospital building with a seismic gap.

The foundations of the new support structure will have to be carefully considered to make them compatible with the façade. This is likely to involve underpinning the façade.

The existing façade will need to be connected to the support structure with a detail which will permit longitudinal movement to take place so that the stiffer façade is not compromised by greater movement of the new support structure behind.

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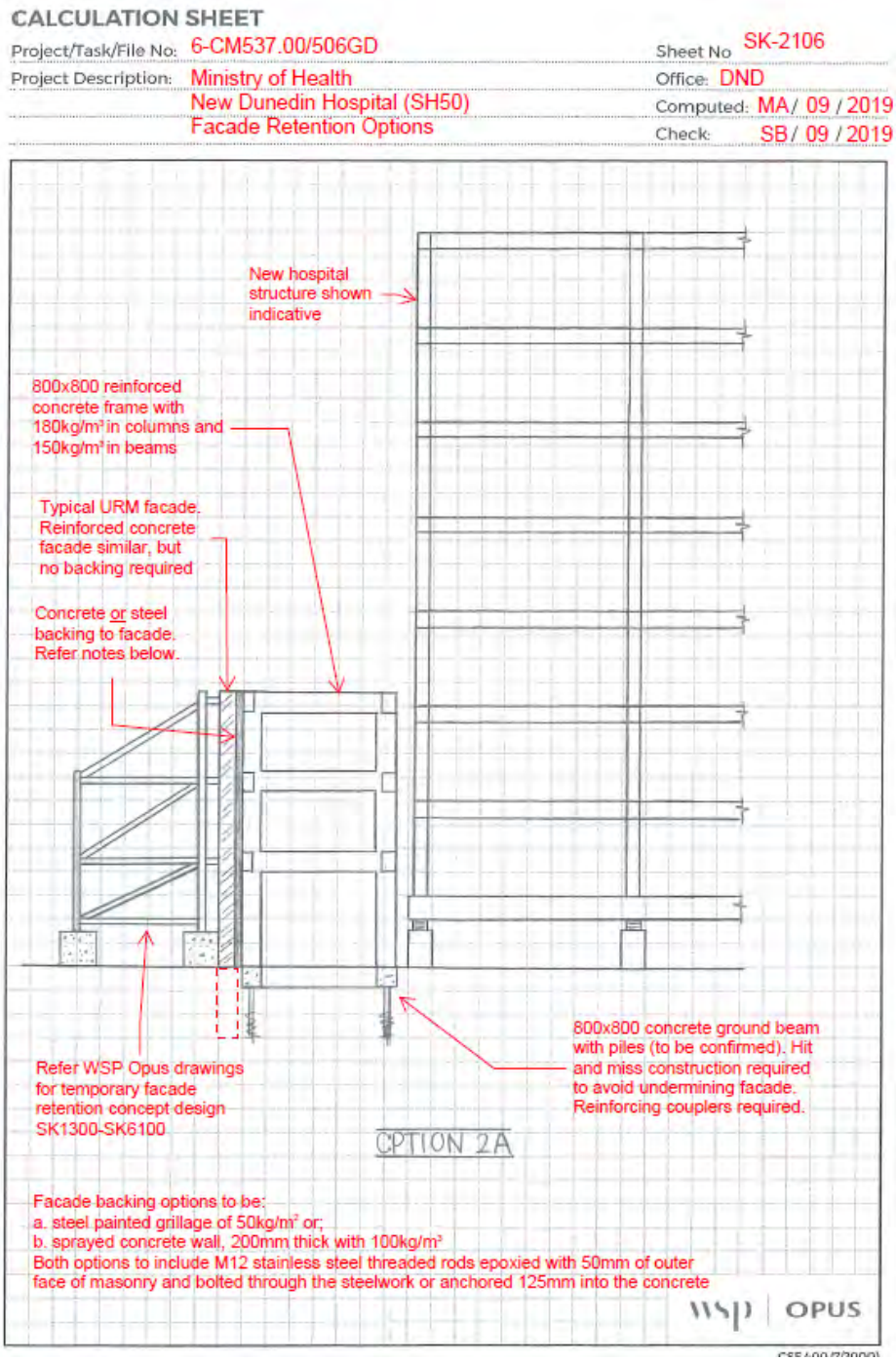

Figure 11: Option 2A.

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Option 2B

This solution is the same as option 2A except that the temporary support structure is fixed inside the existing building before deconstruction.

All the consideration discussed above for option 2A would also apply to this solution.

In this case the new supporting structure will have to be designed and built around the temporary support structure. Careful consideration will have to be given to levels of main members and positions of bracing to make this possible.

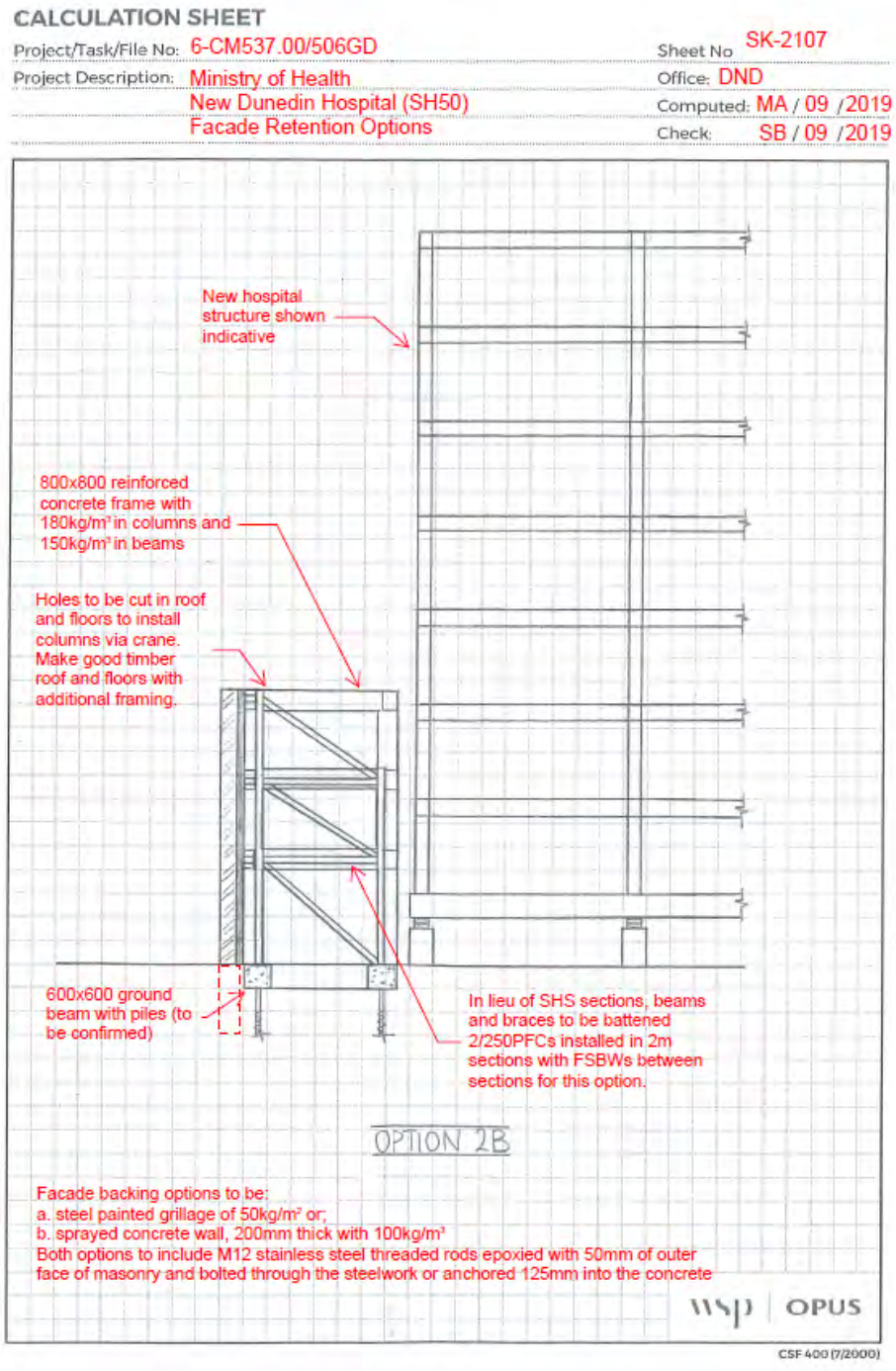

Figure 12: Option 2B.

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Option 3A

This option involves:

- Façade has its own independent support structure founded on the base isolation plane of the new hospital building.
- Façade cut at the base isolation level.

This solution places the permanent façade support structure on the same base isolation plane as the new hospital buildings. This will reduce the differential movement between the structures and the seismic forces on the bulk of the façade providing a high level of hazard protection. However, the stiffness and hence movement of the façade and its support structure will be different to that of the newly designed hospital building. A seismic separation will still be required to allow for this.

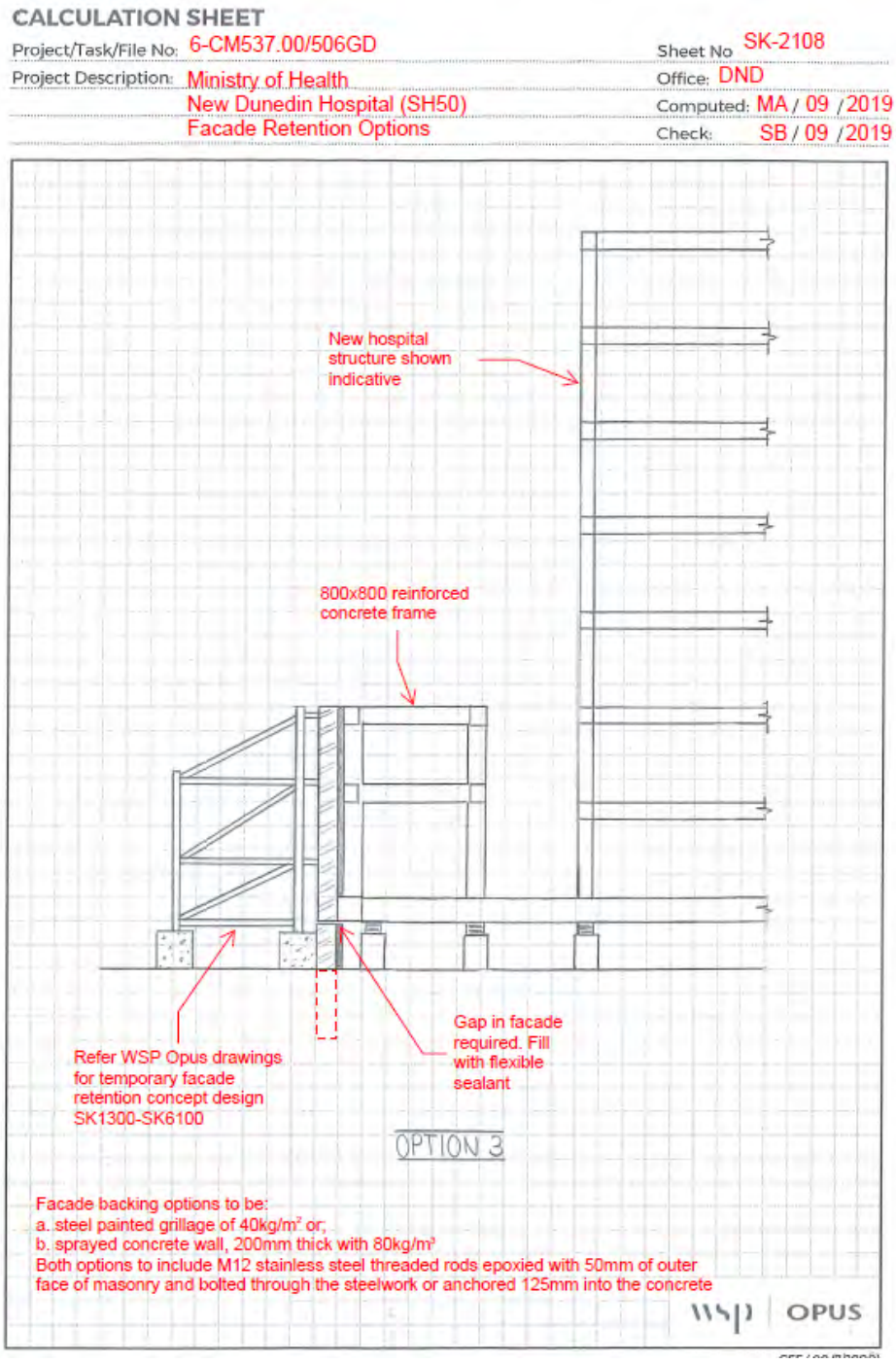

Figure 13: Option 3A.

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Option 3B

This solution is the same as solution 3a except that the temporary support structure is fixed inside the existing building before deconstruction.

Placing the temporary support structure on the inside makes this build much more difficult than other solutions. The isolation plane will have to be constructed around the temporary support. The temporary support will then have to be carefully modified so that it is supported from the base isolation plane. The temporary support and façade will then have to be cut to allow the base isolation plane to become functional. After that the construction of the permanent façade structure and the new hospital building can commence above the base isolation level.

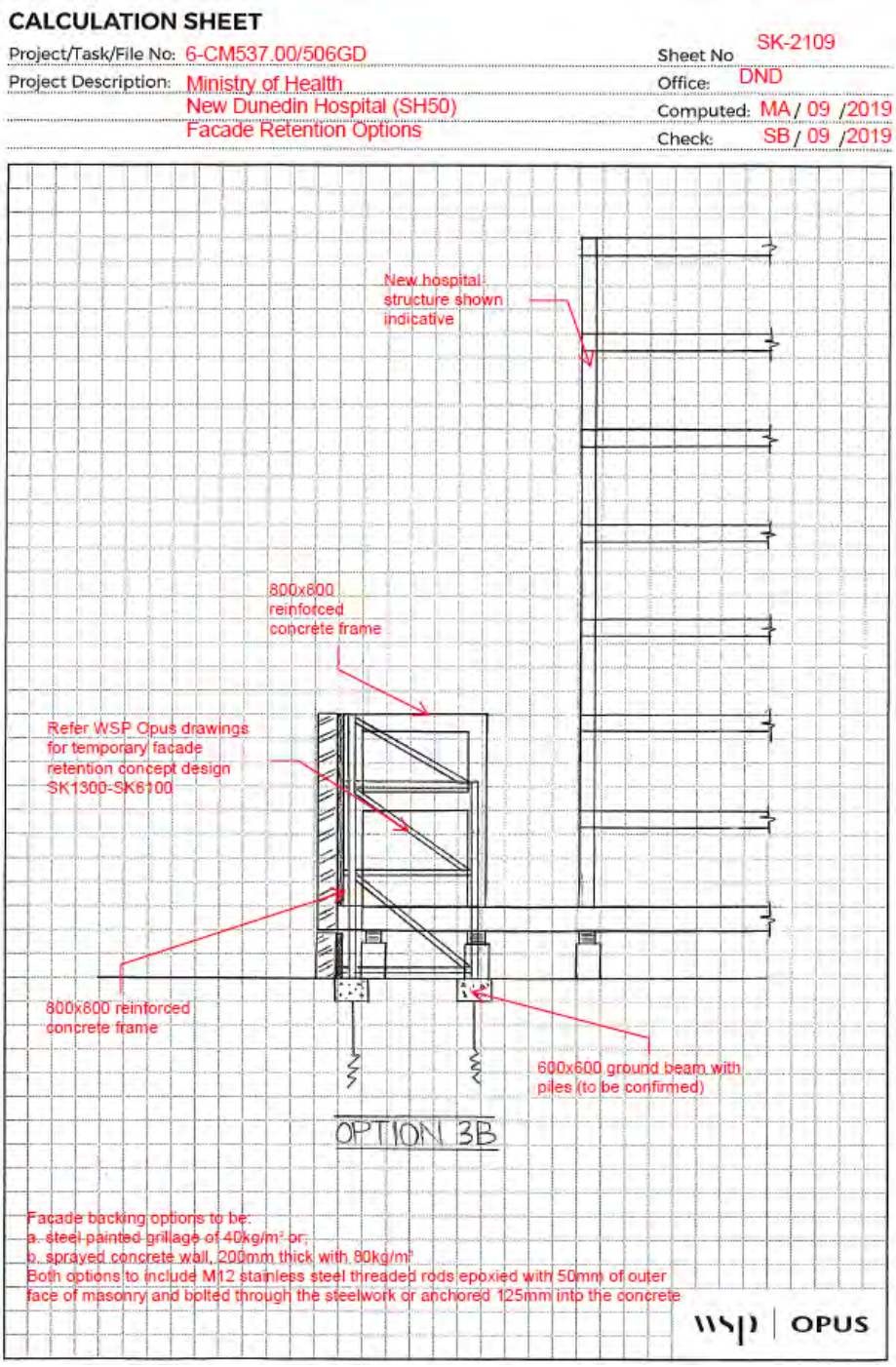

Figure 14: Option 3B.

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Option 4 – Deconstruct and Reconstruct

This option involves deconstructing the façade brick by brick and rebuilding them with the new structure. The rebuilt brick walls would have reinforcing in the mortar joints horizontally and in cores through the brickwork vertically to allow them to be supported. This option avoids the need for temporary support.

Option 5- Replica Façade

This option involves:

- A GRC replica of a façade being made and attached directly to the new building structure.
- The GRC would be made in panels with joints in between to allow for movement in a seismic event.
- The GRC panels would be mounted on a steel frame attached to the building.

This solution has the advantage that the replica façade is lightweight and can be attached directly to the new structure, allowing for more useable space within the new hospital building.

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Appendix D
ASNZS1170.0 Extracts

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TABLE 3.2

IMPORTANCE LEVELS FOR BUILDING TYPES—NEW ZEALAND STRUCTURES

Importance level	Comment	Examples
1	Structures presenting a low degree of hazard to life and other property	Structures with a total floor area of <30 m^2 Farm buildings, isolated structures, towers in rural situations Fences, masts, walls, in-ground swimming pools
2	Normal structures and structures not in other importance levels	Buildings not included in Importance Levels 1, 3 or 4 Single family dwellings Car parking buildings
3	Structures that as a whole may contain people in crowds or contents of high value to the community or pose risks to people in crowds	Buildings and facilities as follows: (a) Where more than 300 people can congregate in one area (b) Day care facilities with a capacity greater than 150 (c) Primary school or secondary school facilities with a capacity greater than 250 (d) Colleges or adult education facilities with a capacity greater than 500 (e) Health care facilities with a capacity of 50 or more resident patients but not having surgery or emergency treatment facilities (f) Airport terminals, principal railway stations with a capacity greater than 250 (g) Correctional institutions (h) Multi-occupancy residential, commercial (including shops), industrial, office and retailing buildings designed to accommodate more than 5000 people and with a gross area greater than 10 000 m^2 (i) Public assembly buildings, theatres and cinemas of greater than 1000 m^2 Emergency medical and other emergency facilities not designated as post-disaster Power-generating facilities, water treatment and waste water treatment facilities and other public utilities not designated as post-disaster Buildings and facilities not designated as post-disaster containing hazardous materials capable of causing hazardous conditions that do not extend beyond the property boundaries
4	Structures with special post-disaster functions	Buildings and facilities designated as essential facilities Buildings and facilities with special post-disaster function Medical emergency or surgical facilities Emergency service facilities such as fire, police stations and emergency vehicle garages Utilities or emergency supplies or installations required as backup for buildings and facilities of Importance Level 4 Designated emergency shelters, designated emergency centres and ancillary facilities Buildings and facilities containing hazardous materials capable of causing hazardous conditions that extend beyond the property boundaries
5	Special structures (outside the scope of this Standard—acceptable probability of failure to be determined by special study)	Structures that have special functions or whose failure poses catastrophic risk to a large area (e.g. 100 km^2) or a large number of people (e.g., 100 000) Major dams, extreme hazard facilities

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3.4.2 Serviceability limit states

Serviceability limit states shall include—

(a) SLS1—the structure and the non-structural components do not require repair after the SLS1 earthquake, snow or wind event; and

(b) SLS2—the structure maintains operational continuity after the SLS2 earthquake.

For serviceability limit states for structures of importance levels 2 to 4, the annual probability of exceedance (P) for wind, snow and earthquake loads shall be determined as given in Table 3.3.

NOTE: Guidelines for limits associated with serviceability events are given in Appendix C.

TABLE 3.3

ANNUAL PROBABILITY OF EXCEEDANCE

Design working life	Importance level	Annual probability of exceedance for ultimate limit states			Annual probability of exceedance for serviceability limit states	
		Wind	Snow	Earthquake	SLS1	SLS2 Importance level 4 only
Construction equipment, e.g., props, scaffolding, braces and similar	2	1/100	1/50	1/100	1/25	
Less than 6 months	1	1/25	1/25	1/25	—	
	2	1/100	1/50	1/100	1/25	
	3	1/250	1/100	1/250	1/25	
	4	1/1000	1/250	1/1000	1/25	
5 years	1	1/25	1/25	1/25	—	—
	2	1/250	1/50	1/250	1/25	—
	3	1/500	1/100	1/500	1/25	—
	4	1/1000	1/250	1/1000	1/25	1/250
25 years	1	1/50	1/25	1/50	—	—
	2	1/250	1/50	1/250	1/25	—
	3	1/500	1/100	1/500	1/25	—
	4	1/1000	1/250	1/1000	1/25	1/250
50 years	1	1/100	1/50	1/100	—	—
	2	1/500	1/150	1/500	1/25	—
	3	1/1000	1/250	1/1000	1/25	—
	4	1/2500	1/500	1/2500	1/25	1/500
100 years or more	1	1/250	1/150	1/250	—	—
	2	1/1000	1/250	1/1000	1/25	—
	3	1/2500	1/500	1/2500	1/25	—
	4	*	*	*	1/25	*

* For importance level 4 structures with a design working life of 100 years or more, the design events are determined by a hazard analysis but need to have probabilities less than or equal to those for importance level 3.

Design events for importance level 5 structures should be determined on a case by case basis.

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Appendix E
Building Façades – More Detailed Information

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Building Façades – More Detailed Information

Each of the building façades affected by the construction of the new hospital have been reviewed and are considered below.

Cumberland Street Elevations

Block 1

Block 1 comprises several interconnected buildings. The original building and building façade were constructed in many phases, the earliest being in 1868.

Figure 15: Cumberland Street façade of Block 1.

The building is three and four storeys high and is constructed of unreinforced masonry brick (URM) walls with a concrete slab at ground level. The upper storeys have timber framed floors with a screed finish and a timber framed roof. The ground floor level housed the Cadbury World facility. From this level, the supporting structure of the first floor is visible and consists of double steel RSJ beams which span between and into the URM walls. In general, the floor structure elements are set into the brick walls but were not observed to be mechanically connected to the brickwork.

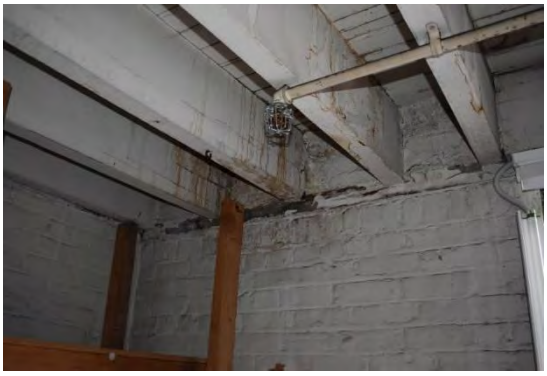

Figure 16: Underside of second floor adjacent to façade wall.

The Cumberland Street façade is approx. 11 metres high and is constructed of URM with regular window openings. The wall varies in thickness from 18" (457mm) at the ground floor, to 9" (229mm) parapet at roof level, according to the drawings available. The façade wall is currently supported by the timber floor structures, as timber joists and rafters are set into the brickwork, and steel tie rods help by tying the top of the wall back to the internal structure.

Existing drawings show the original building to have shallow concrete pads of an unknown depth. Later extensions are shown to have similar foundation types.

Figure 17: External view of the façade wall to Block 1 showing plaster carks and damp at pavement level.

The wall shows many signs of damp penetration and it may be assumed that the brickwork itself is quite wet. At the bottom of the wall externally there are signs of rising damp. The external surface of the wall is plastered and there are several fine cracks in the plaster.

Hanlons carried out an Initial Seismic Assessment (ISA) of the Cadbury Factory Site. The Initial Evaluation Procedure, as part of the ISA process, is considered to be just an initial, "first stage" look at the building's seismic assessment and is used to provide an indication of the seismic rating for the building. The building in Block 1 was rated 20%NBS*(IL2)* which was based on the observation that there is no visible connection between the main elements of the building.

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Block 2

Figure 18: External view of the block 2 façade looking South.

Block 2 comprises a four-storey building used for offices on the upper floors and factory staff facilities on the ground floor. The date of original construction is unknown although a portion is thought to have been constructed in 1868 along with the original building and façade of Block 1.

The external URM walls of the building are tied to reinforced concrete columns at regular centres around the perimeter. The top storey has a mansard roof structure clad with slate on the Cumberland Street façade only. The rest of the building has a flat roof which appears to be supported on timber beams. These beams are supported on intermediate timber columns throughout the building. The upper floors are timber framed with timber partitions and are supported on regularly spaced beams and columns. The first-floor structure was replaced with reinforced concrete floor slab in 1958 and the existing timber columns were encased with steel and capped to support the slab above. Further alterations to the timber partitions were made in 1982 to redevelop the office spaces.

From the drawings, the building foundations are shown to be spread footings beneath columns.

Figure 19: Internal view of the wall at ground floor level showing damp penetration.

The Cumberland Street façade wall is approx. 12m metres high (not including the mansard section), constructed of URM with regular window openings. It is shown to be 24" (610mm) thick at the first-floor level. The north end of the Block 2 façade wall is distinctively different from the south end. The decorative pattern from the Block 3A façade extends into the façade of Block 2 as a link structure connects the buildings. There is a service entrance on the ground floor level beneath the link. The mansard roof structure extends the full width of the Block. Internally, the façade wall is lined with plaster, and cladding at the higher levels and therefore is not clearly visible. No indicators of distress to the wall materials were observed.

To remove the building while retaining the façade, would require that the mansard roof be removed entirely, thus reducing the overall height of the structure. Supporting the link section of the façade would also represent a challenge.

As for Block 1, Hanlons carried out an IEP and rated the building at 20%NBS*(IL2)*. It is therefore likely to be equally as challenging to strengthen and support the Block 2 façade, as for Block 1.

Block 3A

Block 3A is situated on the Cumberland Street side of Block 3. It is a four-storey building, with a façade on Cumberland Street. There is limited information on the age and construction of the building but, it would appear that the ground floor was originally constructed in 1922 with the upper floors added in 1924. An extension towards Cumberland Street and an additional penthouse storey were added later.

Figure 20: Cumberland elevation of Block 3A.

The original building is constructed of concrete columns around the perimeter external walls with cavity brick infills beneath large windows. The ground floor has a concrete slab and the upper levels have

concrete floors supported on steel RSJ beams spanning between steel RSJ columns. The steelwork is connected with riveted connections. The extension is of similar construction but with circular internal columns – thought to be steel RSJ columns encased in concrete – on the ground level supporting the slab above. The external walls have reinforced concrete columns and beams with windows and concrete infills and the building typically has a flat roof and the external walls extend above to form a parapet. There is a four storey lift shaft on the south side of the building which was observed to be a concrete frame with a mix of URM and concrete infill.

The Cumberland Street façade is approx. 16m high at the penthouse and approx. 14.8m to the north of that and is constructed of reinforced concrete columns with reinforced concrete spandrels beneath windows at each level. There are no drawings of the original building available, but the penthouse extension drawings indicate that the main wall is 300mm thick with columns on the outside which project a further 300mm. According to the drawings, there is a cavity brick parapet above the penthouse roof level.

From the drawings, the foundations are shown to be perimeter strip footings with spread footings beneath internal columns.

Damp penetration at the ground level (rising damp) was observed around the windows and at roof level. The penthouse is particularly damp the internal gutter against the façade wall has large cracks.

Hanlons IEP rates the building at 20%NBS*(IL2)* due to the lack of ductility in the framing connections.

Block 4A

Figure 21: Cumberland Street façade of Block 4A.

Block 4A is situated on the Cumberland Street side of Block 4 and was constructed in 1960. It is predominantly a reinforced concrete frame with reinforced concrete spandrels beneath large windows on the external walls. The building is three storeys high with reinforced concrete floors spanning between reinforced concrete columns at each level. The top level is constructed of steel portal frames which support the roof structure. The steel portal frames span between external concrete walls and are connected at the knee. The ground floor was used for engineering workshops and areas for glucose and melting processes. The first floor was upgraded to an office space in 1994 with timber partition walls. There is a reinforced concrete stair tower on the east side.

The Cumberland Street façade is approx. 14m high and is constructed of reinforced concrete columns with reinforced concrete spandrel infills beneath large windows. The columns are 1'9" (534mm) thick and support the edge of the concrete slab floor structures with tapered column heads. The infill spandrels are 10" (254mm) thick. The wall has a large opening at the ground floor, used as a service entrance, and many large windows. The size and number of openings in this wall may present challenges to its retention

The building foundations comprise 25ft (7.6m) deep piles which are likely to be more resilient than the strip footings but are still within the 7m layer considered as liquefiable. Careful analysis of the piles would be required to determine their performance in an IL4 seismic event. The façade wall has a ground beam type foundation which is supported on a line of piles.

Hanlons IEP has calculated the seismic rating of the building at 100%NBS*(IL2)*.

Block 5

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Block 5 spans the entire width of the Cadbury Factory site with façades on Cumberland Street and on Castle Street. The four-storey building was designed as a biscuit factory at the same time as Block 4C in 1947. Construction of the building was completed in 1951. An additional fifth storey was added in 1968.

Figure 22: Cumberland Street elevation of Block 5.

The building comprises regularly spaced circular concrete columns with cone shaped column heads supporting the first, second and third floor slabs while square concrete columns with concrete beams support the fourth-floor slab. The top storey is constructed of steel portal frames supporting the roof and creating a large open floor area. The external walls are constructed of reinforced concrete columns and concrete infills beneath window openings. There is a seismic gap between Block 4A and Block 5.

There is a five-storey reinforced concrete lift shaft and stair well at each end of the building which may need to be removed as part of the façade retention.

The Cumberland Street façade is approx. 22m high and is constructed of reinforced concrete columns with reinforced concrete spandrel infills beneath large windows. The columns are 1'9" (534mm) thick and support the edge of the concrete slab floor structures with tapered column heads. The infill spandrels are 10" (254mm) thick.

According to the drawings available, the building foundations comprise a reinforced concrete cellular slab structure approximately 1.4m below ground level and 2.8m below ground level in the lift shaft.

The wall is painted on both the internal and external face. Some evidence of wear and tear were observed but no signs of distress.

Hanlons IEP rated the building at 20%NBS*(IL2)* because of the general lack of ductility in the structure and the likelihood of brittle failure.

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Castle Street Elevations

Block 3C

Figure 23: Castle Street elevation of Block 3C.

Block 3C is situated on the Castle Street side of Block 3. It is a three-storey building with a façade on Castle Street. The original building was constructed in 1924. It was extended in 1934 and a third storey was added. According to the drawings, the building was constructed with a temporary end and was extended towards Castle Street with a similar construction type in 1938. This building is often referred to as Block 3B, and the Castle Street extension as Block 3C. The buildings were used for raw materials and manufacturing plant. A staff cafeteria was constructed on the fourth storey of Block 3B in 1938 and was later refurbished in 1989.

The original building is constructed of concrete columns and beams around the perimeter external walls with cavity brick infills beneath large windows. The ground floor has a concrete slab and the upper levels have concrete slab floors supported on steel RSJ beams spanning between steel RSJ columns. The steelwork is connected with riveted connections. The building extension has a similar construction with concrete infills between columns on the external walls. The top storey cafeteria is constructed with a timber framed roof and URM walls with timber beams spanning between URM columns and intermediate timber posts. There is a four-storey reinforced concrete stairwell and lift shaft on the south side of the building and a three-storey blockwork stairwell at the east end, which is connected to the façade wall.

The Castle Street façade is approx. 14m metres high and is believed to be constructed of reinforced concrete with large window openings. There are no drawings of this section of building available but by site measure the façade wall is approximately 300mm thick. There are some further projections to the decorative section to the south end of the wall. There is a large opening on the found floor level which may present a challenge for retention.

The wall is painted on both the internal and external face. Damp penetration was observed at the bottom of the wall at ground level, at the top from the roof, and around some of the windows. There was also evidence of mould staining from condensation. Minor cracking was noted particularly on the external face. There was also a crack observed at the corner of a window at second floor level.

There is a straight joint between the Block 3C façade and the adjacent façade of Block 4B. Further investigation will be required however, if both façades were preserved, this may create problems of the different façades pounding against each other.

Block 4C

Block 4C is situated on the Castle Street side of Block 4 and is a five-storey concrete framed building used for workshops and packaging. The original three storey building was designed in 1947 as a biscuit factory and construction was completed in 1951. An additional two storeys were added in 1968.

The building comprises regularly spaced circular concrete columns with cone shaped column heads supporting the first and second floor slabs, and square concrete columns with concrete beams supporting the third and fourth floor slabs. The top storey is constructed of steel portal frames supporting the roof and creating a large open floor area. The external walls are constructed of reinforced concrete columns and concrete spandrels beneath window openings. The ground floor level of the building was altered in 2008 with the addition of concrete masonry block partition walls.

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Block 4C was constructed at the same time as Block 5 and therefore share similar construction details, including foundations. The buildings are adjoined and there is an open accessway between blocks on each level. There is also a seismic gap between the buildings.

The Castle Street façade is approx. 22m high and is constructed of reinforced concrete columns with reinforced concrete spandrel infills beneath large windows. The columns are 1'9" (534mm) thick and support the edge of the concrete slab floor structures with tapered column heads. The infill spandrels are 10" (254mm) thick.

The wall is painted on both the internal and external face. There are tiles under the windows and on the ground level and there are large service vehicle openings which have since been filled in with concrete blockwork. There are signs of wear and tear on the wall but no particular signs of distress such as significant cracking, bulging or other damage.

Block 5

Block 5 spans the entire width of the Cadbury Factory site with façades on Cumberland Street and on Castle Street. The construction at the Castle Street side is therefore the same as Cumberland Street.

The Castle Street façade is also the same in height (approx. 22m) and construction. Note that at the north end of the building, there is an extended return and the fourth-floor cantilevers over the edge of the floor below. If the building were to be demolished, and the façade retained, this would require further review. Similar to the Cumberland Street elevation there is a service lift at the Block 4 end.

Figure 24: Castle Street elevation of Block 5.

There is evidence of some damp staining on the wall, at low level, and some minor cracks in the plaster, but overall the façade appears to be in good condition.

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Appendix F
Examples of Façade Retention

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Examples of Façades Retention

Wellington East Girls College

The Wellington East Girls College has a category 1 listed façade. It is unreinforced brickwork although it had previously been strengthened by cutting out sections of the brickwork and casting in reinforced concrete columns and beams.
The following photographs give an indication of the extent of the works required firstly in the temporary support stage and secondly to strengthen and tie the existing wall into the new building permanently.

Figure 25: Aerial view of the temporary support.

Figure 26: External view of the temporary propping.

Figure 27: Internal view showing the start of the strengthening works required.

Figure 28: view showing the extent of the temporary propping.

Figure 29: Internal concrete beams to reinforce and support the brickwork.

Figure 30: Internal view of the building progressing.

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Figure 31: Aerial view showing the construction proceeding.

Figure 32: Extent of the strengthening work inside.

McKenzie and Willis Christchurch

The McKenzie and Willis Store in Christchurch has been rebuilt retaining the original façade. Steel bracing frames were installed on the outside of the building to temporarily hold the facades.

Figure 33: Inside view of the temporary support for the Mackenzie and Willis façade Christchurch.

Figure 34: External view of the temporary propping.

Note that there are additional internal steel columns to support the brickwork around the window openings. They are bolted through the wall at relatively close centres to connect the internal support to external raking supports. The original steel beam at first floor level and the circular columns below are braced by the supporting structure.

Externally the raking supports are required to fully support the wall. They extend out a significant distance from the wall. Concrete blocks are used for kentledge (to prevent uplift). Any supporting foundations cannot be seen.

The external supporting frames also have substantial foundations. In this case they are piled because of the adjacent retaining wall.

In this case reinforced concrete was added to the façade which was then tied into the stiff steel structure of the strengthened building.

A significant amount of strengthening works have been carried out to strengthen and support the brickwork façade form the inside.

For this development the reinforced concrete floors are connected to the façade walls to assist with fixing them in place and to distribute the seismic forces. In this case it has worked well because the original window openings have been incorporated into the design so that they align

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between floors. This will be more challenging for the Cadbury facades due to inconsistencies in the floor and window levels between blocks.

Replica façade – Mayfair Hotel Christchurch

It is possible to reproduce the façades by casting replica sections in GRC (Glass Fibre Reinforced Concrete). Projects have been completed with replica façades created in this way. An example of this is the Mayfair Hotel which was reconstructed in Christchurch after the original building had been demolished post-earthquake. Figure 35 below, show an elevation of the GRC façade with the panel layout on the left and the supporting steel structure behind the GRC panels on the right.

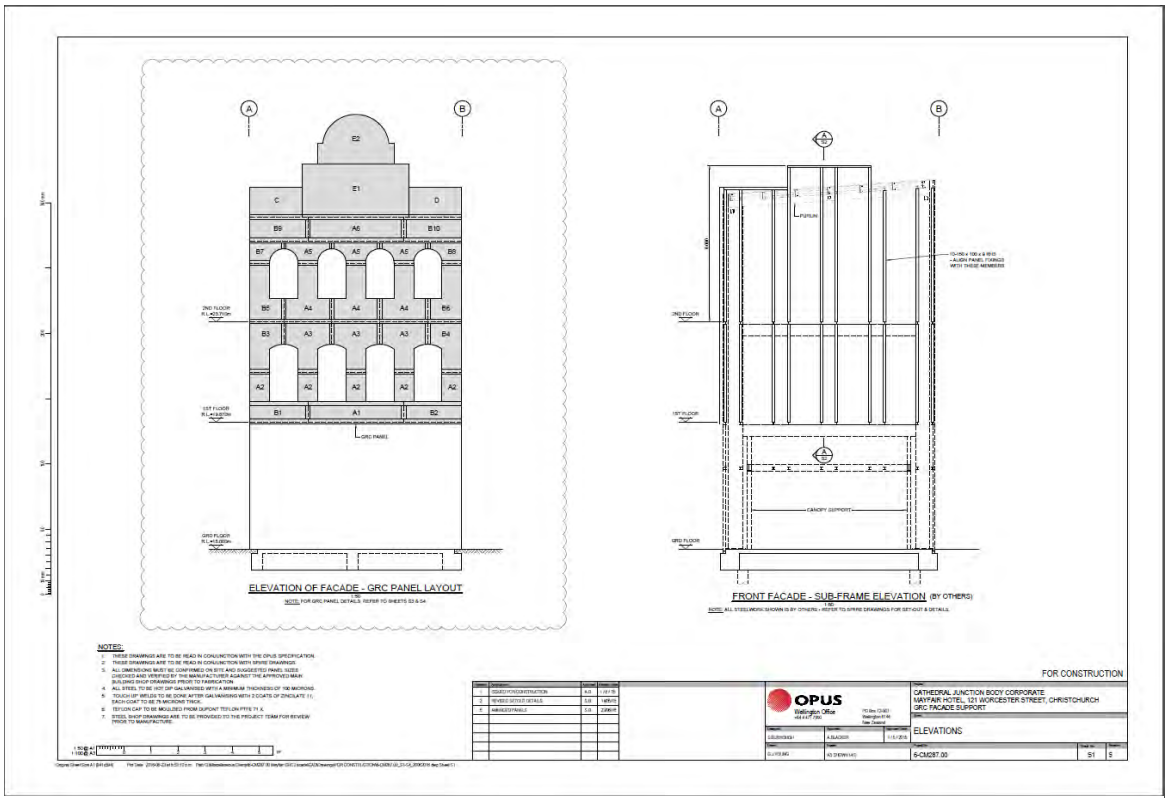

Figure 35: Drawing showing the supporting structure for the GRC panels.

The minimum standard in the building code allows for parts up to 7.5kg (i.e. an individual brick) to be unrestrained. This balances cost and risk. It may be difficult to achieve a complete and satisfactory restraint of these walls and it would not be possible to restrain every single brick. As discussed above, with the agreement of NZ Heritage a reinforced concrete wall may be designed to carry the old façade as a veneer. Whilst this is possible it has its own limitations in terms of weight and stiffness and the size of supports to accommodate it in the new buildings.

As an alternative, if it is essential to retain the brick façades it would be possible to do so by carefully demolishing them and then rebuilding them – using as many of the original bricks as possible but with building in reinforcement and ties to allow the whole wall to be restrained in a satisfactory manner.

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Appendix 7: Underground Overground Heritage Impact Assessment Report

Underground Overground Archaeology

Dunedin Hospital Development, Cadbury Confectionary Ltd Buildings

A Heritage Impact Assessment

Report Prepared for Ministry of Health
Author: Megan Lawrence, Naomi Woods, Dawn Cropper and Hayden Cawte
Reviewed by: Dawn Cropper
Submitted: May 2020

Underground Overground Archaeology

Dunedin Hospital Development, Cadbury Confectionery Ltd Buildings

A Heritage Impact Assessment

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Project Details

Archaeological Site No.	I44/817
HNZPT List/Rārangi Kōrero Entry No.	List No. 2143
DCC Heritage Register	Site No. B030
Property Address	280 Cumberland Street
Client	Ministry of Health
Client Address	PO Box 5013, Wellington
Report Authors	Megan Lawrence, Naomi Woods, Dawn Cropper and Hayden Cawte
Reviewed By	Dr Dawn Cropper
Report Submitted	May 2020
Report Submitted To	Dunedin City Council, Heritage New Zealand Pouhere Taonga, Ministry of Health

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Cover Photo: Burton Brothers Studio, 1874. *Dunedin Panorama.* Hocken Snapshop.

Executive Summary

UOA has been commissioned by the Ministry of Health undertake a heritage impact assessment of the buildings and site area at 280 Cumberland Street (DP 4846, Part Sections 56 and 71, Sections 53 to 55 and 72 to 74, Block XVI, SO 14196). These buildings are referred to as the Cadbury Confectionery Ltd Buildings and have been previously recognised for their heritage values with a Category II listing on the New Zealand Heritage List/Rārangi Kōrero (List No. 2143). These same buildings are also registered as B030 on the 2006 Dunedin City District Plan (Schedules 25.1 and 25.2) and the Second Generation Dunedin City District Plan (2GP) (Schedule A1.1), which affords protection to the facades to Castle and Cumberland Streets. Furthermore, within the extent of the Cadbury Confectionery Ltd Buildings, two archaeological sites are recorded: the Cadbury Factory Site (I44/817) and the A & T Burt Site (I44/922).

Historical research undertaken as part of this assessment identified that the area encompassed by the Cadbury Confectionery Ltd Buildings was occupied prior to 1900, with evidence of occupation at least as early as the 1860s. Nineteenth century occupants include the New Zealand Distillery Co. and Albion Brewing Co. breweries, A & T Burt premises, the Otago Foundry, NZEEC, Dunedin Iron Works; New Zealand Implement Company and R Hudson and Co. Confectionery factory. The R Hudson and Co Confectionery merged to become Cadbury Fry Hudson in the 1930s (and would eventually become Cadbury Confectionery Ltd) and the company had taken over the entire site by 1950s. The building façades listed by HNZPT and scheduled by the DCC are largely associated with the development of the site from the 1920s to the 1960s. However, these buildings do contain elements of at least four pre-1900 buildings including: an 1875 cellar and an 1868 small mill (also known as the Dairy and Machine House Building); an 1868 kiln and an 1868 granary/malt floor (now part of Cadbury World and the Office Buildings).

Due to development over the twentieth and twenty-first centuries few elements of the nineteenth century buildings are visible in the façades. However, the cellar or Dairy and Machine House Building has been reconstructed recently to reflect its former 1918 façade, while the façades of the remaining buildings have changed little from their 1920s to 1960s construction and alterations. The Cadbury Confectionery Ltd Buildings remain one of the last complexes of the continuous industrial development of nineteenth and twentieth centuries in central Dunedin.

While the new hospital development has been able to be designed to retain the Dairy and Machine House Building, we understand that as a result of implications for cost, compromise to clinical efficiencies, construction complexity, time delays and health and safety concerns, the Ministry of Health has determined it is necessary to seek to demolish six out of seven Cadbury Confectionary Buildings, including their façades. This HIA therefore evaluates the effects of the demolition of those buildings and their facades on the heritage values of the Cadbury Confectionery Ltd Buildings.

Heritage values are complicated and within each value assessed there are several aspects to be considered. For instance, for architectural values of the buildings, the architecture itself, along with integrity, rarity, representativeness, context or group, and vulnerability are to be analysed. By way of summary, our assessment concludes that the overall heritage value of the buildings is of medium significance. Generally, the buildings were assessed as having high historic value for connections to past individuals and companies, and high architectural values for rarity. One building (the Biscuit and Dispatch Building) had high architectural integrity in that it retains significant features from its time of construction, and later periods when key additions were carried out, while the remainder of buildings had low to moderate integrity values. The assessment otherwise found that the buildings and their facades had low architectural merit (in matters other than rarity), moderate representativeness values and moderate context/group value. Overall, the assessment concludes that the loss of the remaining buildings and façades will have a major adverse effect on heritage values but that the adaptive reuse of the Dairy and Machine House Building would have a moderate beneficial effect.

It is important to note that the statutory protections afforded by the Dunedin City District Plan and the 2GP are focused on the façades. This assessment concludes that the architectural merit of the facades contributes the least to their overall heritage value, with architectural rarity and historic values in terms of connection to function, individuals and companies having higher significance. While the impacts on these values cannot be removed or completely remedied, the adverse effects can be reduced through mitigation strategies. To that end, UOA has recommended a number of measures which would mitigate the adverse effect resulting from demolition of the Buildings and their facades, including retention and adaptive reuse of certain buildings, building and other archaeological recording, salvage and reuse of historic materials, preservation or retention of features, building samples and artefacts as well as public interpretation If these measures are implemented, this assessment concludes that the adverse effect of demolition on the heritage values those Buildings and their facades currently hold will be moderate.

Abbreviations

Abbreviation	Definition
DCC	Dunedin City Council
Heritage New Zealand	Heritage New Zealand Pouhere Taonga
HNZPTA	Heritage New Zealand Pouhere Taonga Act (2014)
IL4	Importance Level 3
IL4	Importance Level 4
NZAA	New Zealand Archaeological Association
RMA	Resource Management Act (1991)
UOA	Underground Overground Archaeology Ltd.

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1 Introduction

Underground Overground Archaeology Ltd (UOA) has been commissioned by the Ministry of Health to undertake a Heritage Impact Assessment (HIA) of the buildings and site area at 280 Cumberland Street (DP 4846, Part Sections 56 and 71, Sections 53 to 55 and 72 to 74, Block XVI, SO 14196) (Figure 1-1). This block is subject to a proposal which would see a new Dunedin hospital constructed on this site. The site is currently occupied by a complex of industrial buildings including four pre-1900 structures. This HIA has been prepared to accompany an application to Dunedin City Council (DCC) for consent to demolish those buildings and their facades to enable use of the site for the new Dunedin Hospital development.

The Cadbury Confectionery Ltd Buildings were first listed on the HNZPT List/Rārangi Kōrero in 1982 as a Category 2 Historic Place (List No. 2143). The listing refers to the buildings as the Cadbury Schweppes Hudson Limited Buildings and records the extended façades of four buildings. The factory buildings cover all of DP 1589 and DP 5322. The criteria for classification was not outlined at the time. Thus, as a Category 2 historic place, it is only specified that the buildings are of historical or cultural significance or value. The facades to Castle and Cumberland Streets, across the same property boundaries, were also registered as B030 on the 2006 Dunedin City District Plan (Schedules 25.1 and 25.2) and the Second Generation Dunedin City District Plan (2GP) (Schedule A1.1). The Dairy and Machine House building on Section 74 and the adjacent Section 73 BLK XVI, Dunedin, was incorporated into the Anzac Square/Railway Heritage Precinct (TH11) in the precinct the 2006 Dunedin City District Plan; however, it is no longer part of this precinct (now referred to as the Stuart Street Commercial Heritage Precinct) in the 2GP.

Historical research undertaken as part of this assessment identified that the area encompassed by the Cadbury Confectionery Ltd Buildings was occupied prior to 1900, with evidence of occupation at least as early as the 1860s. Nineteenth century occupants include the New Zealand Distillery Co. and Albion Brewing Co. breweries, A & T Burt premises, the Otago Foundry, NZEEC, Dunedin Iron Works; New Zealand Implement Company and R Hudson and Co. Confectionery factory. The R Hudson and Co Confectionery merged to become Cadbury Fry Hudson in the 1930s (and would eventually become Cadbury Confectionery Ltd) and the company had taken over the entire site by 1950s. The building façades listed by HNZPT and registered by the DCC are largely associated with the development of the site from the 1920s to the 1960s. However, these buildings do contain elements of at least four pre-1900 buildings including: an 1875 cellar and an 1868 small mill (also known as the Dairy and Machine House Building); an 1868 kiln and an 1868 granary/malt floor (now part of Cadbury World and the office buildings).

Due to development over the twentieth and twenty-first centuries few elements of the nineteenth century buildings are visible in the façades. However, the cellar or Dairy and Machine House Building has been restored recently to reflect its former 1918 façade, while the façades of the remaining buildings have changed little from their 1920s to 1960s construction and alterations. The Cadbury Confectionery Ltd Buildings remain one of the last complexes of the continuous industrial development of nineteenth and twentieth centuries in central Dunedin.

An archaeological assessment and archaeological authority from Heritage New Zealand will also be sought. There are four archaeological sites recorded within the block (including that occupied by the modern Cadbury warehouse building); sites I44/817, I44/922, I44/924, and I44/923. Two of these sites are located within the extent of the Cadbury Confectionery Ltd Buildings: the historic Cadbury Factory (I44/817) and the A & T Burt site (I44/922). Determination of archaeological values are based on criteria established by Heritage New Zealand (NZHPT, 2006).

Figure 1-1. Location of the "Cadbury Block" within the project area.

2 Statutory Requirements

There are two main pieces of legislation that provide protection for heritage values. The Resource Management Act 1991 requires local authorities to set up and operate a district plan that identifies items of importance and provides objectives, policies and rules for how activities that affect these sites must be considered. The Heritage New Zealand Pouhere Taonga Act 2014 establishes the New Zealand Heritage List and protects archaeological sites. Any proposed works that have the potential to affect heritage items are also assessed against the provisions of the International Council on Monuments and Sites (ICOMOS) New Zealand Charter for the Conservation of Places of Cultural Heritage Value (ICOMOS New Zealand Charter 2010).

2.1 Resource Management Act (1991)

The heritage provisions of the Resource Management Act (1991) were strengthened with the Resource Management Amendment Act (2003). The Resource Management Amendment Act (2003) contains a more detailed definition of heritage sites and now considers historic heritage to be a matter of national importance under Section 6. The Act requires City, District and Regional Councils to manage the use, development, and protection of natural and physical resources in a way that provides for the well-being of today's communities while safeguarding the options of future generations.

The Act defines historic heritage as those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived from archaeological, architectural, cultural, historic, scientific, or technological qualities. Historic heritage includes:

- Historic sites, structures, places and areas,
- Archaeological sites,
- Sites of significance to Māori, including Wahi Tapu; and,
- Surroundings associated with the natural and physical resources.

It should be noted that this definition does not include the 1900 cut-off date for protected archaeological sites as defined by the Heritage New Zealand Pouhere Taonga Act 2014. Any historic feature that can be shown to have significant values must be considered in any resource consent application.

Section 87A of the RMA defines classes of activities, including permitted, controlled, restricted discretionary, discretionary, non-complying, and prohibited, and their requirements for resource consent (if any). These activities are summarised below.

- **Permitted Activity** – an activity that complies with the requirements, conditions and permissions. Resource consent is not required.
- **Controlled Activity** – an activity that must comply with the requirements, conditions and permissions of the district plan, which the council may impose conditions (restricted to the discretionary matters). Resource consent is required.
- **Restricted Discretionary Activity** – an activity that requires resource consent, which the council has the authority to decline consent or grant it and impose conditions (restricted to the discretionary matters) for the matters over which discretion is restricted. If granted, the activity must comply with the requirements, conditions and permissions.
- **Discretionary Activity** – an activity that requires resource consent, which the council has the authority to decline consent or grant it with or without conditions (restricted to the discretionary matters). If granted, the activity must comply with the requirements, conditions and permissions.
- **Non-Complying Activities** – an activity that that requires resource consent, which the council may decline the consent or grant it with or without conditions, but only if the Council is satisfied that the requirements of Section 104D are met and the activity must comply with the requirements, conditions, and permissions.
    - **Section 104D** Particular Restrictions for Non-Complying Activities

(1) Despite any decision made for the purpose of notification in relation to adverse effects, a consent authority may grant a resource consent for a non-complying activity only if it is satisfied that either—
  (a) the adverse effects of the activity on the environment (other than any effect to which section 104(3)(a)(ii) applies) will be minor; or
  (b) the application is for an activity that will not be contrary to the objectives and policies of—
    (i) the relevant plan, if there is a plan but no proposed plan in respect of the activity; or
    (ii) the relevant proposed plan, if there is a proposed plan but no relevant plan in respect of the activity; or
    (iii) both the relevant plan and the relevant proposed plan, if there is both a plan and a proposed plan in respect of the activity.
(2) To avoid doubt, section 104(2) applies to the determination of an application for a non-complying activity.

- **Prohibited Activities** – an activity for which no resource consent can be made, nor can the council grant consent for it.

2.1.1 The Dunedin City Council District Plan

The operative Dunedin City District Plan was released in 1995 and became fully operative in 2007. The proposed Second Generation Dunedin City District Plan (2GP) was notified in September 2016, and as of 7 November 2018, all rules in the proposed 2GP had legal effect, meaning that the rules of both the 2GP and operative District Plan apply. Provisions of the 2GP that are not under appeal are deemed to be operative, while both the operative District Plan and the 2GP rules apply to those provisions of the 2GP under appeal. The objectives, policies and rules of the operative and proposed District Plans are discussed below.

The 2006 District Plan

The District Plan (2006) identifies physical heritage resources worthy of identification in their own right, including sites of townscape and heritage significance, buildings and precincts of townscape and heritage value, and sites of cultural importance, including archaeological sites and those sites of importance to Māori. This plan provides a schedule of protected townscape and heritage buildings and structures in Appendix 25.1. All Category I and II buildings listed on the on New Zealand Heritage List/Rārangi Kōrero are included in this Appendix due to their contribution to Dunedin's Townscape through their individual heritage value. Other buildings are part of this schedule as they also contribute to a townscape or heritage precinct's character and thus are considered worthy of protecting. Each building or structure identified is referenced either by their façade (that may include multiple street frontages); the entire external building envelope (all external surfaces of the building) or the bulk appearance (the appearance of the structure from a specific area). The plan also provides a schedule of archaeological sites registered by the New Zealand Historic Places Trust (Appendix 25.2). The schedule does not include all archaeological sites, as there are many more recorded in the New Zealand Archaeological Association (NZAA) site recording scheme, and many that have not been previously recorded. The plan identifies that if properties are within a heritage or townscape precinct, an identified building or heritage site is included within a property, or the property is situated within an urban landscape conservation area, then activities are subject to the provisions outlined in the Townscape Section (13) of the plan.

There are four objectives in the Townscape Section (13) of the District Plan (2006) that specifically relate to heritage. The first is that buildings and parts of buildings, places and sites which are of heritage value are recognised and protected (Objective 13.2.3). The policies that promote this objective include avoidance of demolition of buildings, parts of buildings and other structured identified to be of townscape or heritage value (Policy 13.3.6); excluding signs which adversely impact upon the townscape or heritage values of buildings or precincts (Policy 13.3.7); retaining the natural appearance of exposed stone and brick on building facings within townscape or heritage precincts (Policy 13.3.8); keep alterations to the external design and appearance of all buildings within

identified precincts within the character of the precinct (Policy 13.3.9); encouragement of restoration, conservation, continued use and adaptive reuse of buildings with townscape and heritage values (Policy 13.3.10); and, identification for protection buildings, structures, sites and other features which have heritage value (Policy 13.3.13).

The second objective that relates to heritage is that buildings and places that contribute to the townscape character are recognised and maintained (Objective 13.2.4). On top of Policies 13.3.9 and 13.3.10, the policies that promote this objective also include new buildings on corner sites reinforcing the character of the central City precincts (Policy 13.3.3); and, providing an environment suitable for pedestrians in high pedestrian usage areas (Policy 13.3.11).

The third objective relating to heritage is ensuring that the character of significant townscape and heritage precincts is maintained or enhanced (Objective 13.2.5). On top of Policies 13.3.6 to 13.3.8, the policies that promote this objective also include protecting as well as enhancing the heritage and townscape values of 17 precincts identified in Policy 13.3.4 (including the Anzac Square/Railway Station Precinct); and, requiring any development within identified precincts to maintain and enhance the townscape, heritage character and values of that precinct (Policy 13.3.5).

The fourth objective that relates to heritage is to ensure that development does not adversely affect the character and amenity of the central City precincts (Objective 13.2.6) Policies 13.3.3, 13.3.4 and 13.3.9 as outlined above, promote this objective

Within the sustainable management of natural and physical resources considerations (Section 4) there are two policies that relate to heritage. The first objective is enhancing the amenity values of Dunedin (Objective 4.2.1) and the policy that promotes this is maintaining and enhancing amenity values (Policy 4.3.1). The second objective is ensuring that significant natural and physical resources are appropriately protected (Objective 4.2.4) and the policy that specifically relates to heritage that promotes this is providing for protection of natural and physical resources of the City that commensurate with their local, regional and national significance (Policy 4.3.4).

Heritage is also considered for signage in Section 19 of the District Plan (2006). The first objective relating to heritage is ensuring signs do not adversely affect the townscape and heritage values of buildings (Objective 19.2.3). The policies that promote include Policy 13.3.7, outlined above, as well as controlling the design, location, size and number of signs erected at any given location to avoid, remedy or mitigate any adverse effects including on heritage and townscape values (Policy 19.3.2.) consideration for the erection of signs on heritage or townscape buildings on a case by case basis (Policy 19.3.3).

To meet the objectives and policies of the District Plan (2006), the DCC has established rules that dictate the activities that may affect heritage including outlined in the Townscape Section (Section 13.7) of the plan. Below is a summary of these rules.

- **Rule 13.7.1 Permitted activities.** This rule provides guidance on alterations, additions, erections, and demolition that do not affect listed parts of a scheduled building as well as painting, restoration and repair of buildings on Schedule 25.1 and those located with a townscape or heritage precinct (including the Anzac Square/Railway Station Heritage Precinct).
- **Rule 13.7.2 Controlled activities.** This rule provides guidance on the erection of new buildings (with respect to external design and appearance) and covers assessment matters of which consider the values of the townscape and heritage precinct and the relationship of the building with the setting.
- **Rule 13.7.3 Discretionary Activities (restricted).** This rule provides guidance on additions, alterations, painting, and coverings that do not comply with Rule 13.7.1, as well as the removal or demolition of entire or parts of buildings located within townscape and heritage precincts and those listed in Schedule 25.1 as well as covering assessment matters. The latter includes consideration the building's profiles from public

places; style and character; design and appearance; townscape and heritage significance (and reasons for a listings by the New Zealand Historic Places Trust); relationship to setting; importance to the wider community; precinct values; conservation principles of ICOMOS New Zealand Charter of the Conservation of Places of Cultural Heritage Value; authenticity of architectural design; potential for adaptive reuse, retainment, relocation and for partial retention of part of the building; and the proposed replacement building.

- **Rule 13.7.4 Non-Complying Activities.** This rule provides guidance on the removal or demolition of buildings, parts of buildings and other structures listed in Schedule 25.1 not provided for in Rules 13.7.1 - 13.7.3.

The Second Generation Dunedin City District Plan

The 2GP has defined heritage sites as including both buildings and structures and their associated curtilage, gardens, open spaces, and other landscaping features. Appendix A1.1 of the 2GP is a schedule of protected heritage items and sites, including scheduled heritage buildings, scheduled heritage sites, character contributing buildings, archaeological sites. The plan identifies nine residential heritage precincts and ten commercial heritage precincts. None of these precincts apply to the site.

Heritage is identified as being a significant contributor to Dunedin's identity (Objective 2.4.2) and policies are in place to identify heritage buildings and structures (Policy 2.4.2.1) and develop rules to manage their development (Policy 2.4.2.2) along with their adaptive reuse (Policy 2.4.2.3). The criteria utilised by the DCC to identify significant heritage buildings and structures includes historic and social significance; spiritual/cultural significance, including significance to Māori; design significance; and technological/scientific significance. Heritage is also a key to the District Plan's policy to ensure the city's central business district remains vibrant and provides "the highest level of pedestrian experience that attracts visitors, residents and businesses to Dunedin" (Objective 2.4.3), with policies relating to identifying key pedestrian routes (Policy 3.4.3.1), protection of the heritage streetscape and amenity of the central business district (Policy 2.4.3.2), manage the number of signs to maintain building and streetscape amenity (Policy 2.4.3.3), and maintain or enhance vibrancy and density through rules restricting the distribution of retail and office activity (Policy 2.4.3.4).

The first objective of the 2GP relating to heritage is that scheduled heritage buildings and structures are protected (Objective 13.2.1). The policies that promote this objective include encouraging maintenance and adaptive reuse (Policy 13.2.1.1), require repairs, maintenance and restoration (Policy 13.2.1.2), require earthquake strengthening (Policy 13.2.1.3), enable work to comply with alterations and change of use under the Building Act 2004 (Policy 13.2.1.4), only allow other additions and alterations under discretion (Policy 13.2.1.5), only allow removal for location under specific criteria (Policy 13.2.1.8), and provide for general retail in scheduled heritage buildings to maximise adaptive reuse (Policy 13.2.1.9). Relevantly to the current proposal, Policy 13.2.1.7 is to avoid the demolition unless particular criteria are met including where "demolition is required to allow for significant public benefit that could not otherwise be achieved, and the public benefit outweighs the adverse effects of loss of the building; and there is no reasonable alternative to demolition".

The second heritage objective of the 2GP is that the heritage values of scheduled heritage sites are protected. Policies that address this objective include restrictions on development within and around the heritage site (Policy 13.2.2.1) and only allow for subdivision of scheduled heritage sites under certain circumstances (Policy 13.2.2.2.).

The third objective is that heritage streetscape character of heritage precincts is maintained or enhanced. The plan identifies nine residential heritage precincts and ten commercial heritage precincts. Policies that have been established to uphold this objective include require repairs and maintenance, restoration and earthquake strengthening of character contributing buildings (Policy 13.2.3.1).

Table 2-1. Definitions Under the 2GP.

Term	Definition
Building	A structure that includes a roof that is, or could be, fully or partially enclosed with walls. The definition of building includes the parts of buildings defined as building utilities and rooftop structures.
Character-contributing buildings	Buildings identified as character-contributing buildings in Appendix A1.1
Demolition	The complete or partial destruction of a building or structure.
Fabric	The physical material of any building, structure or site, including subsurface material, structures, interior and exterior surfaces, fixtures and fittings.
Façade	The part of a building facing onto any public place.
Heritage Conservation	Safeguarding the cultural heritage value of a building or place, while retaining authenticity and integrity.
Protected Part	The part or parts of a scheduled heritage building, or scheduled heritage structure detailed in Appendix A1.1 - Schedule of Protected Heritage Items and Sites under the heading 'protection required'.
Removal for Relocation	Moving a building from its current location to a new location either on the same or a different site.
Repairs and Maintenance	Work required to make good decayed or damaged fabric of a building or structure, or to prevent deterioration of the fabric, and in the case of a scheduled heritage site, all normal work required to maintain the garden or landscape features or structures. For clarity, this includes: • painting, only where the building or structure was previously painted • re-cladding • replacement of doors, windows, gates and roof; and in relation to an interior, redecoration and all normal work required to maintain the fittings, decoration, trim, surfaces, materials or structures. This definition excludes activities defined as additions and alterations.
Restoration	To accurately return the fabric of a building or structure to a known earlier form by reassembling and reinstating components using new or original materials. For the sake of clarity, restoration includes the removal of later components or additions, except where they are specifically protected in Appendix A1.1.
Scheduled heritage Building	A heritage building listed in Appendix A1.1 - Schedule of Protected heritage Items and Sites.
Scheduled Heritage Site	A heritage site listed in Appendix A1.1 - Schedule of Protected Heritage Items and Sites.

To meet the objectives and policies of the 2GP, the DCC has established rules that dictate the activities that may affect heritage, including:

- **Rule 13.3 Development and Performance Standards**. This rule provides guidance on the colour choices for heritage buildings, materials and design, and requirements relating to archaeological sites.
- **Rule 13.4 Assessment of Controlled Activities**. This rule relates to activities including earthquake strengthening, restoration of a protected façade or scheduled heritage item, and certain alterations to non-character contributing buildings within a heritage precinct.
- **Rule 13.5 Assessment of Restricted Discretionary Activities**. Rule 13.5 considers the assessment of performance standard contraventions that affect a protected part of a heritage building (e.g., materials and design and maximum volume for network utility activities) and heritage precincts (e.g., boundary setbacks, building colour, fence height and design, heights, location/screening of carparking, materials and design, signs, and location of network utility activities).
- **Rule 13.6 Assessment of Restricted Discretionary Activities**. Under Rule 13.5, the council identify the assessment consideration for restricted discretionary activities, activities relating to scheduled heritage sites (e.g., new buildings/structures, parking, earthworks, network utility assets, wind generators, hydro generators, solar panels, etc.), subdivision on a scheduled heritage site, additions and alterations that affect a protected part of a scheduled heritage item, removal of a scheduled heritage building for relocation, and all subdivision activities on sites containing scheduled heritage items. This rule also considers activities that relate to heritage precincts; including new buildings/structures; additions/alterations of character contributing buildings; demolition or removal for location of a character contributing building, non-protected part of a scheduled heritage building, or other building with a street frontage; and all other restricted discretionary public amenities activities.
- **Rule 13.7 Assessment of Discretionary Activities.** Rule 13.7 outlines the discretionary activities on a scheduled heritage site (discretionary transportation activities, discretionary public amenities, natural hazard mitigation earthworks and structures, network utility structures, and substations) and in a heritage precinct (natural hazard mitigation earthworks and structures, network utility structures, and substations).

- **Rule 13.8 Assessment of Non-Complying Activities.** Rule 13.8 includes the assessment of non-complying activities, such as demolition of a protected part of a scheduled heritage building or structure, and assessment of non-complying performance standard contraventions (e.g., archaeological site earthworks and location and screening of car parking).
- **Rule 13.9 Special Information Requirements.** Section 13.9.1 outlines the requirements for demolition of a scheduled heritage building, including
    - A Heritage Impact Assessment addressing the effect the demolition will have on heritage values, including a full discussion of the alternatives considered, including quantified reasons why the alternatives are not reasonable.
    - Where demolition is proposed due to seismic risk, a detailed seismic assessment, fully quantified costs and an economic analysis of seismic upgrade (including a staged upgrade) to the minimum requirements by a Chartered Professional Engineer qualified engineer with demonstrated experience of assessment and seismic upgrade of buildings with the same or similar construction form and materials. The information should include the methods of strengthening considered.
    - Where partial demolition is proposed:
        - Evidence of the structural feasibility of retaining the part of the building proposed for retention.
    - All information provided in support of any resource consent application, including engineering assessments, consideration of alternatives and design statements may be peer reviewed by Council prior to making a decision.

2.2 Heritage New Zealand Pouhere Taonga Act (2014)

The Heritage New Zealand Pouhere Taonga Act (2014) came into effect in May 2014, repealing the Historic Places Act 1993. The purpose of this act is to promote identification, protection, preservation, and conservation of New Zealand's historical and cultural heritage. HNZPT administers the act and was formerly known as the New Zealand Historic Places Trust (Pouhere Taonga).

Archaeological sites are defined by this act as

(a) any place in New Zealand, including any building or structure (or part of a building or structure), that--:

(i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and

(ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and

(b) includes a site for which a declaration is made under section 43(1)

Additionally, HNZPT has the authority (under section 43(1)) to declare any place to be an archaeological site if the place

(a) was associated with human activity in or after 1900 or is the site of the wreck of any vessel where that wreck occurred in or after 1900; and

(b) provides, or may be able to provide, through investigation by archaeological methods, significant evidence relating to the historical and cultural heritage of New Zealand.

Archaeological sites are protected under Section 42 of the act, and it is an offense to carry out work that may "modify or destroy, or cause to be modified or destroyed, the whole or any part of that site if that person knows, or ought reasonably to have suspected, that the site is an archaeological site", whether or not the site has been previously recorded. Each individual who knowingly damages or destroys an archaeological site without having the appropriate authority is liable, on conviction, to substantial fines (Section 87).

Any person wishing to carry out work on an archaeological site that may modify or destroy any part of the site, including scientific investigations, must first obtain an authority from HNZPT (Sections 44(a,c)). The act stipulates that an application must be sought even if the effects on the archaeological site will be no more than minor as per

Section 44(b). A significant change from the Historic Places Act (1993) is that "an authority is not required to permit work on a building that is an archaeological site unless the work will result in the demolition of the whole of the building" (Section 42(3)).

HNZPT will process the authority application within five working days of its receipt to assess if the application is adequate or if further information is required (Section 47(1)(b)). If the application meets the requirements under Section 47(1)(b), it will be accepted and notice of the determination will be provided within 20 to 40 working days. Most applications will be determined within 20 working days, but additional time may be required in certain circumstances. If HNZPT requires its own assessment of the Maori values for the site, the determination will be made within 30 working days. If the application relates to a particularly complex site, the act permits up to 40 days for the determination to be made. HNZPT will notify the applicant and other affected parties (*e.g.*, the land owner, local authorities, iwi, museums, *etc.*) of the outcome of the application.

Once an authority has been granted, modification of an archaeological site is only allowed following the expiration of the appeals period or after the Environment Court determines any appeals. Any directly affected party has the right to appeal the decision within 15 working days of receiving notice of the determination. HNZPT may impose conditions on the authority that must be adhered to by the authority holder (Section 52). Provision exists for a review of the conditions (see Section 53). The authority remains current for a period of up to 35 years, as specified in the authority. If no period is specified in the authority, it remains current for a period of five years from the commencement date.

The authority is tied to the land for which it applies, regardless of changes in the ownership of the land. Prior to any changes of ownership, the land owner must give notice to HNZPT and advise the succeeding land owner of the authority, its conditions, and terms of consent.

An additional role of HNZPT is maintaining the New Zealand Heritage list, which is a continuation of the Register of Historic Places, Historic Areas, Wahi Tapu, and Wahi Tapu Areas. The list can include archaeological sites. The purpose of the list is to inform members of the public about such places and to assist with their protection under the RMA (1991).

2.3 Protected Objects Act (1975)

The Protected Objects Act (1975) was established to provide protection of certain objects, including protected New Zealand objects that form part of the movable cultural heritage of New Zealand. Protected New Zealand objects are defined by Schedule 4 of the act and includes archaeological objects and taonga tuturu. Under Section 11 of the Protected Objects Act (1975), any newly found Maori cultural objects (taonga tuturi) are automatically the property of the Crown if they are older than fifty years and can only be transferred from the Crown to an individual or group of individuals through the Maori Land Court. Anyone who finds a complete or partial taonga tuturu, accidentally or intentionally is required to notify the Ministry of Culture and Heritage within:

(a) 28 days of finding the taonga tuturu; or

(b) 28 days of completing field work undertaken in connection with an archaeological investigation authorised by the HNZPT.

2.4 ICOMOS New Zealand Charter 2010

The ICOMOS New Zealand Charter is a set of guidelines on cultural heritage conservation used in the New Zealand heritage sector by local bodies in district plans and heritage management, and by practitioners and forms a recognised benchmark for conservation standards and practice. A copy of the New Zealand Charter can be found in Appendix B.

3 Methodology

A heritage impact assessment (HIA) is required to accompany a resource consent application where there are likely effects to heritage items. In preparing this HIA, guidance on methodology is considered from *Sustainable Management of Historic Heritage Guidance Information Sheet 9 Preparing a Heritage Impact Assessment* produced by the then New Zealand Historic Places Trust (NZHPT, 2007b) and *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS, 2011) (Appendix B). However, UOA recognises that any assessment must be fit for purpose to both the heritage values of a property and the proposed works. UOA conducted detailed documentary research to provide a comprehensive history of the site and associations of with significant individuals and companies. UOA also considered the previous work done identifying heritage values both at the site level as well as in the broader heritage landscape. In order to determine the physical values of the site, a site visit was done during which a comprehensive photographic record was taken for each room. This data informs the significance assessment, which, along with the criteria established by the regional and district plans, guides the evaluation of how demolition may affect the heritage values of the site. Mitigative measures have also been identified and recommended on the basis of those identified values.

3.1 Research to Inform the Significance Assessment

UOA consulted numerous sources of documentary evidence in order to determine the historical context of the project area. The results of the documentary research are provided in Section 4.1. The sources utilised in this research include:

- Land title records (held by Archives New Zealand)
- Historic newspapers (accessed via the Papers Past website)
- Historic maps (accessed via QuickMap)
- Historical photographs of the area and the property (searches were conducted using the DigitalNZ website, Hocken Snapshop, Museum of New Zealand Te Papa Tongarewa – collections online, Alexander Turbull Library, and Southland Museum)
- Documentary resources including: Farminer 2014, Oakley Gray Architects Ltd (2010),

This assessment also considers the previous work identifying heritage values for both the site and the broader region, including examination of archaeological and heritage reports, as well as documentation in district plans and with Heritage New Zealand. Previously recorded archaeological and heritage sites near the project area can provide information that is valuable for assessing the heritage value of a site, and this was accomplished through examination of entries on ArchSite (the New Zealand Archaeological Associations site recording scheme), HNZPT's Annual Information, and the DCC District Plan and heritage resources.

In addition to the online version of ArchSite, which allows users to view information about individual archaeological site, UOA also subscribes to the ArchSite GIS dataset of all previously recorded approved archaeological sites. This dataset allows UOA to explore the broader distribution of specific archaeological site types across the South Island, which is useful for identifying rarity and uniqueness of site types.

UOA subscribes to the HNZPT's Annual Information (with quarterly updates), which includes Category I and Category 2 listed places, historic areas, wāhi tūpuna (places important to Māori for ancestral significance and associated cultural and traditional values), wāhi tapu (places sacred to Māori in the traditional, spiritual, religious, ritual or mythological sense such as maunga tapu, urupā, funerary sites and punawai), and wāhi tapu areas (areas that contain one or more wāhi tapu). Again, this information is useful for considering rarity and uniqueness of site types, as well as documenting the heritage assets in the surrounding areas. List reports specific to the proposed work are valuable resources, as they include previous work identifying the heritage values of the list entry.

Site visits were undertaken over multiple days by Hayden Cawte, Dawn Cropper, and Megan Lawrence on 11, 18 and 28 April 2019. A comprehensive photographic record was compiled of each room to provide visual documentation of the current state of the property and buildings as well as the integrity of the heritage fabric.

3.2 Significance Assessment of Heritage Values, Assessment of Effects, and Mitigative Measures

Assessment of heritage significance is guided by the criteria outlined in Heritage New Zealand Pouhere Taonga Act 2014, the definition of historic heritage in the Resource Management Act 1991, and best practice standards from HNZPT (NZHPT, 2007a). The assessment criteria used in this assessment build from these sources and are defined in Table 3-1 provided below, which consider the archaeological, architectural, cultural, historic, scientific, and technological value. Specific rankings for each value have been defined by Bowman (2017), and they are utilised here to ensure that heritage values are assessed systematically.

Table 3-1. Assessment criteria for physical, historic, and cultural values (NZHPT, 2007a) **with rankings following Bowman** (Bowman, 2017)**.**

Archaeological Values	
Archaeological Information	Does the place or area have the potential to contribute information about the human history of the region, or to current archaeological research questions, through investigation using archaeological methods? • **High** - has the potential for national or regional archaeological values i.e. rare site types, sites from the first phase of settlement, particularly intact physical remains. • **Moderate** - has the potential for local archaeological values i.e. relatively early, possibility of relativity intact physical remains, representative types. • **Low** - known to be pre-1900, or has the possibility of pre-1900 evidence, but unlikely to have high or moderate archaeological values.
Architectural Values	
Architectural Merit	Is the place significant because of its design, form, scale, materials, style, ornamentation, period, craftsmanship or other architectural element? • **High -** highly original, early, ideal, landmark or innovative design, style, use of materials, or craftsmanship for the period. • **Moderate -** good design, style, use of materials, or craftsmanship for the period • **Low** - typical design, style use of materials, or craftsmanship for the period
Rarity	Is the place or area, or are features within it, unique, unusual, uncommon or rare at a district, regional or national level or in relation to particular historical themes? • **High** - first, only remaining or one of very few of the period, locally/regionally/nationally. • **Moderate** - one of few of the period, locally/regionally/nationally. • **Low** - common for the period, locally/regionally/nationally.
Representativeness	Is the place or area a good example of its class, for example, in terms of design, type, features, use, technology or time period? • **High** - has all the key characteristics of architecture or technology of the period. • **Moderate** - has many of the characteristics of the architecture or technology of the period. • **Low** - has few characteristics of the architecture or technology or period.
Integrity	Does the place have integrity, retaining significant features from its time of construction, or later periods when important modifications or additions were carried out? • **High** - unchanged or has had important modifications since construction retaining heritage values. • **Moderate -** unimportant changes since construction but essential character and most heritage values retained. • **Low** – character changed significantly with few heritage values remaining
Vulnerability	Is the place vulnerable to deterioration or destruction or is threatened by land use activities? • Yes/no
Context or Group	Is the place or area part of a group of heritage places, a landscape, a townscape or setting which when considered as a whole amplify the heritage values of the place and group/ landscape or extend its significance? • **High** - principal contributor to the dominant values of the group. • **Moderate** – compatible with the group but not a principal contributor to the dominant values of the group. • **Low** – of little importance to the group.
Cultural Values	
Identity	Is the place or area a focus of community, regional or national identity or sense of place, and does it have social value and provide evidence of cultural or historical continuity?

	• **High** - focus of national or regional community identity, sense of place or social value or has special age value such as constructed within the first 30 years of settlement. • **Moderate** - focus of local community identity, sense of place or social value or has age value such as construction between 1870 and 1900. • **Low** – has minor community focus, sense of place or social value.
Public esteem	Is the place held in high public esteem for its heritage or aesthetic values or as a focus of spiritual, political, national or other cultural sentiment? • **High** - focus of national or regional community identity, sense of place or social value, recommended for listing, discussed in national publications, or received an award at the national, or local level. • **Moderate** - focus of national or regional community identity, sense of place or social value, recommended for listing, discussed in national publications, or received an award at the national, or local level. • **Low** – focus of national or regional community identity, sense of place or social value, recommended for listing, discussed in national publications, or received an award at the national, or local level
Commemorative	Does the place have symbolic or commemorative significance to people who use or have used it, or to the descendants of such people, as a result of its special interest, character, landmark, amenity or visual appeal? • **High** - commemorates national or regional endeavours or people at a national, regional or local level. • **Moderate** - commemorates national or regional endeavours or people at a national, regional or local level • **Low** – commemorates national or regional endeavours or people at a national, regional or local level
Education	Could the place contribute, through public education, to people's awareness, understanding and appreciation of New Zealand's history and cultures? • **High** - commemorates national or regional endeavours or people at a national, regional or local level. • **Moderate** – commemorates national or regional endeavours or people at a national, regional or local level. • **Low** – has minor potential for education.
Tangata whenua	Is the place important to tangata whenua for traditional, spiritual, cultural or historical reasons? • Yes/no
Statutory recognition	Does the place or area have recognition in New Zealand legislation or international law including: World Heritage Listing under the World Heritage Convention 1972; registration under the Historic Places Act 1993; is it an archaeological site as defined by the Historic Places Act 1993; is it a statutory acknowledgement under claim settlement legislation; or is it recognised by special legislation? • Yes/no
Historic Values	
People	Is the place associated with the life or works of a well-known or important individual, group or organisation? • **High** - intimately associated with a group or person of national or regional significance. • **Moderate** – intimately associated with a group or person of local significance. • **Low** – minor or peripheral connection to a locally significant group or person.
Events	Is the place associated with an important event in local, regional or national history? • **High** - intimately associated with events of national or regional significance. • **Moderate** – intimately associated with events of national or regional significance. • **Low** – minor or peripheral connection to a locally significant event.
Patterns	Is the place associated with important aspects, processes, themes or patterns of local, regional or national history? • **High** - intimately associated with events of national or regional significance. • **Moderate -** intimately associated with pattern of local significance. • **Low** – minor or peripheral connection to a locally significant pattern.
Scientific	
Scientific	Does the area or place have the potential to provide scientific information about the history of the region? • Yes/no
Technological	
Technology and Engineering	Does the place demonstrate innovative or important methods of construction or design, does it contain unusual construction materials, is it an early example of the use of a particular construction technique or does it have the potential to contribute information about technological or engineering history? • **High** - highly original, ideal, innovative or early construction design for the period • **Moderate** - good example of construction design for the period • **Low** - common construction design for the period

3.3 Streetscape Analysis

Streetscape considers the context of a building amongst its neighbours and surrounding landscape. The streetscape is a significant consideration for heritage buildings, yet the assessment of architectural value largely considers the

building on its own merits and does not consider the wider streetscape value. As noted above, the heritage values identified in Table 3-1 are based on the definition of historic heritage in the RMA 1991, criteria in the HNZPTA 2014, and best practice standards from HNZPT (NZHPT, 2007a).

Streetscape analysis considers the heritage building within its broader setting, and the method used here follows Sheppard (2015). The analysis generally considers the entire street (both sides) on which the building is located from intersection to intersection, except where the street is particularly long or there is a physical barrier (e.g., a hill) that limits the view of the streetscape. The streetscape analysis considers land use, built form (building height, setbacks, width, and separation), architectural character, heritage (fabric and activities), and landscape character (e.g., common vegetation features).

3.4 Assessment of Effects on Heritage Values

The Department for Transport (2008) established a three-stage approach for assessing the effects on heritage, which has been embraced by many heritage practitioners and advocates (Bond & Worthing, 2016; ICOMOS, 2011; NZTA, 2015). This approach requires careful consideration of at three clearly defined stages, (1) assessment of overall level of significance, (2) assessment of the magnitude of impact and (3) determination of the significance of effects, and while it remains a qualitative assessment, there is clear guidance and justification for the decisions made at each stage (DfT, 2008).

Once the heritage values have been identified, it is necessary to consider the overall level of significance, whether the site be significant at the international, national, regional, or local level (Table 3-2). This scale for measuring the level of significance, ranging from very high for sites of international significance to sites of low significance that may represent a site of local significance but having poor preservation or contextual associations.

Table 3-2. Levels of significance (adapted from DfT, 2008).

Level of Significance	Criteria
Very High	• World Heritage Sites • Assets of acknowledged international importance • Assets that can contribute significantly to acknowledged international research objectives • Historical landscapes of international value (designated or not) and extremely well-preserved historic landscapes with exceptional coherence, time depth, or other critical factor(s)
High	• Scheduled asset and undesignated assets of schedulable quality and importance • Category 1 listed buildings and Category 2 listed buildings of special interest. • Other listed buildings that can be shown to have exceptional qualities in their fabric or associations not adequately reflected in their listing category • Conservation areas containing very important buildings • Undesignated structures of clear national importance • Designated and undesignated historic landscapes of outstanding historic interest; undesignated landscapes exhibiting considerable coherence, time depth, or critical factor(s) • Assets that can contribute significantly to acknowledged national research objectives
Medium	• Designated or undesignated assets that contribute to regional research objectives • Category 2 listed buildings • Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical association • Conservation areas containing important buildings that contribute significantly to their historic character • Historic townscapes or built-up areas with important historic integrity in their buildings, or built settings (e.g., street furniture or other structures) • Designated landscapes of special historic interest (including Category 2 registered parks and gardens); undesignated landscapes that would justify such a designation; averagely well-preserved historic landscapes with reasonable coherence, time depth, or other critical factor(s); landscapes of regional value.
Low	• Designated and undesignated assets of local importance including those comprised by poor preservation and/or poor survival of contextual association • Assets of limited value, but with potential to contribute to local research objectives • Locally listed buildings and historic (unlisted) buildings of modest quality in the fabric or historical association • Historic townscapes or built-up areas of limited historic integrity in their buildings or built settings (e.g., street furniture or other structures) • Robust undesignated historic landscapes; historic landscapes with importance to local interest groups; and historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations
Negligible	• Assets with very little surviving archaeological interest • Buildings of little architectural or historical note • Landscapes with little significant historical interest

Assessing and evaluating the potential effects on heritage values can be very difficult and subjective. To mitigate against this, UOA follows the defendable system defined by the Department for Transport (2008) and adopted by others, including ICOMOS (ICOMOS, 2011). Using this system, the impacts are first considered to be either beneficial or adverse, including both direct impacts to the site (a primary consequence of the proposed work) or indirect (resulting from a secondary consequence). The assessment of effects considers the magnitude of the proposed work on the heritage asset on a nine-point scale, ranging from a major adverse effect to a major beneficial effect (Table 3-3). The significance of effects can be either adverse or beneficial on a scale ranging from neutral to very large and is determined using the value or overall level of significance and the magnitude of the effects, as shown in the matrix below (Table 3-4).

Table 3-3. Magnitude of the impacts of the proposed work against the heritage values (Department for Transport, 2008).

Magnitude	Description
Major	Change to key historic building elements, such that the asset is totally altered. Comprehensive change to the setting.
Moderate	Change to many key historic building elements, such as the asset is significantly modified. Changes to the setting of an historic building, such that it is significantly modified
Minor	Change to key historic building elements, such that the asset is slightly different. Changes to the setting of an historic building, such that it is noticeably changed.
Negligible	Slight changes to historic building elements or setting that hardly affect it.
No change	No change to fabric or setting.

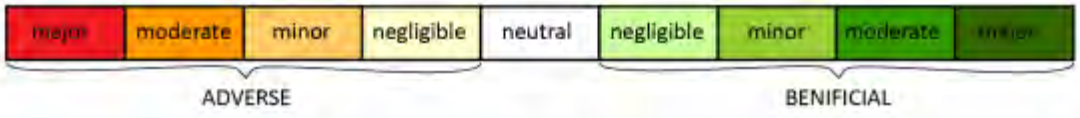

Table 3-4. Matrix of significance of effects on the heritage values (DfT, 2008).

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

Once the significance of effects on heritage values has been defined, the proposed work is considered against the rules of the District Plan, which have been outlined in Section 2.1.1. The rules are prescriptive based on the inclusion of assets on the Heritage Register. The District Plan also includes matters to be addressed in applications to council, with recommended mitigation measures. The effects are then considered against best practice recommendations, such as the guidelines provided by HNZPT and any local design guidelines, the importance of the buildings or structures, their condition, potential for alternative use, and the benefits of the redevelopment.

HNZPT have provided guidelines on the assessment of adverse effects on heritage values with specific information relating to the façade retention and the demolition or alteration of historic buildings (NZHPT, 2007b). The guidelines are summarised below.

Alterations and Additions to Historic Buildings

HNZPT encourages the adaptation of historic buildings as a way to continue the liveability and utility of the structure but advocates for alterations that result in minimal loss of cultural heritage value. The following important design considerations for alterations and/or additions to heritage buildings are outlined in the above report:

- Retain surviving internal and external heritage fabric as far as possible and disturb, distort or obscure it as little as possible.
- Respect the design, form, scale, materials, workmanship, patina of age, colours, contents, location, curtilage and setting, including alterations that have heritage value.
- Avoid work that will compromise or obscure fabric of heritage value.

- Ensure any new work is of a scale and location that it does not dominate the heritage place and respects its setting.
- New work should be appropriately recorded.

In addition, HNZPT provides checklists to determine the appropriateness of interior and exterior alterations to heritage buildings:

Partial Demolition of Historic Buildings

It is deemed best practice to retain significant heritage buildings in their entirety, and so partial demolition and/or retention of the façades does not comply with conservation best practice. The following considerations should be addressed before proceeding with this activity:

- Any part of a building or structure that will be demolished should be fully recorded and documented both prior to, and during the partial demolition process.
- Partial demolition should not be allowed unless it does not adversely affect the significance and integrity of the place.
- The proposed partial demolition should be limited to parts of the building (including interior) that have been identified in a conservation plan or heritage assessment as having no significance, are not contributory to the significance of the heritage place, are intrusive, or where the partial demolition reveals fabric of higher degree of significance.
- The proposed partial demolition should be limited to parts of the building that are beyond physical repair due to fire or other damage.
- Partial demolition should be informed by the concept of greater or total conservation benefit with respect to a large complex group of structures and buildings. It may be that the removal of minor parts of a building may be justified to achieve the conservation of most significant places on the entire site. All other avenues should be explored before this option is considered and all decisions must be informed by a conservation plan.
- The new structure (behind the façade) should not be visible when viewed from principal viewing points identified in an urban design or heritage assessment.
- Where a façade is to be retained it should include at least one room-depth of the original structure to permit an understanding of the relationship between the original exterior and the interior functions.
- The design of the retained façade should retain the original shape, pitch, covering material and decoration of the roof.
- The retained façade should be subject to active repair and maintenance, retaining original elements and detailing.
- Where modifications to the ground floor frontage of the façade are essential to accommodate a new use, the design should harmonise with the rest of the elevation, reflecting in particular the design of any original fenestration. Modifications to the façade above ground floor level should be avoided.
- The floor levels in the new structure should match existing floor levels. Where this is impracticable care should be taken to ensure floors and/or suspended ceilings do not run horizontally across window openings on the retained façade.
- Any façade retention proposal should ensure that window spaces open into interior spaces. Views to the exterior of the new building or the sky should be avoided.
- The scale and dimensions of the interior spaces immediately behind the façade should be the original interiors, fully restored. Where this is not possible, care should be taken to ensure that interior dimensions and lighting visible from the street is of compatible scale and form.

Demolition of Historic Buildings

HNZPT is opposed to the demolition of historic buildings, except for cases where it is unavoidable due to the structure being beyond repair. Demolition is viewed as inconsistent with sustainable management of resources and

as an irreversible removal of cultural heritage that is often regretted in the future. For cases where this activity is proposed, the following considerations should be taken into account:

- Any building or structure that will be demolished should be fully recorded and documented both prior to, and during the demolition process.
- With regard to a large or complex site, the proposed demolition will not compromise the integrity and significance of the place, streetscape, area or landscape.
- Demolition may be acceptable when a building or structure is considered to be 'beyond repair'. It may be structurally unsafe, may have been damaged by natural event, or may have been irreversibly damaged by fire. This matter often requires evidence from a professional engineering assessment.
- Demolition should be informed be the concept of greater or total conservation benefit with respect to a large complex group of structures and buildings. It may be that the demolition of minor parts of a building may be justified to achieve the conservation of most significant places on the entire site. all other avenues should be explored before this option is considered and all decisions must be informed by a conservation plan.
- All alternatives to demolition should be explored including new and compatible uses, repair and maintenance works, maintenance plans, and appropriate alterations and changes.

4 Background Research

The physical and historical setting of a site provides invaluable contextual information regarding the heritage values of a site. The broader history of Dunedin establishes the environment in which the Cadbury Confectionery Ltd Buildings were established and guides the interpretation of the site's significance at a local level. Likewise, the geographical setting played an important role in determining why people were drawn to Dunedin and how the town was settled. Consideration of the location of the site in relation to its physical setting is important for understanding the history of the region. The landscape played a significant role in determining how the city was settled, and Dunedin's residents considerably altered the natural environment. The following sections provide a general overview of the geomorphology of Dunedin and consider changes that have occurred to the landscape over time and the current built environment.

4.1 Physical Environment and Setting of Dunedin

The geographical setting is important for understanding the archaeology of the region. The landscape played a significant role in determining how the city was settled, and Dunedin's residents considerably altered the natural environment. The following sections provide a general overview of the geomorphology of Dunedin and consider changes that have occurred to the landscape over time and the current built environment.

4.2 Geomorphology

The geomorphology of the area immediately surrounding Dunedin can be characterised by several distinctive landforms, including the Otago Harbour, the Dunedin Volcano, the Taieri Plains, and the Coastal Ranges. The central city lies within an area of relatively low relief and is bounded by a ridge that runs south-west to north-east (Figure 4-1, Figure 4-6). When Dunedin was initially settled, there was little flat land within the central city, with the current flat land along the harbour being the result of an extensive reclamation programme. From the ridge of hills surrounding the central city, the land dips down to the west along the Kaikorai Valley and to the north at the Leith Valley before rising sharply to the ring of hills that surrounds the city. There are numerous peaks along these hills, reaching a maximum height of 739m above sea level at Swampy Summit. The hills are dissected by numerous gullies and valleys with rivers, streams, and creeks, with the prominent water within the city including the Water of Leith and the Kaikorai Stream. Most of the residential areas of the city are hilly, including areas within the Dunedin Volcano and Coastal Ranges. Less than a tenth of the urban area is flat to gently sloping (*i.e.*, less than 8°), which primarily consists of Quaternary valley fill or coastal sediments (Glassey, Barrell, Forsyth, & Macleod, 2003). Both the topography and the drainage systems have played an integral part in how the land was utilised. Caversham is situated just back from the head Otago Harbour and suburbs of the city extend along the coast and harbour to the north-east, to the Taieri Basin to the west, and along the flats and coastal ranges to the south.

Figure 4-1. Photograph of Dunedin with St Kilda in the foreground looking north towards the city and surrounding hills (Glassey et al., 2003).

4.3 Harbour Reclamation

Since the initial settlement of Dunedin, the landscape has been significantly transformed. Dredging and land reclamation are the two most obvious changes to Dunedin's physiography. The survey of the harbour by Captain Stokes in 1850 showed that many areas were very shallow and this significantly restricted access into the harbour (Davis, 2009). In 1859 a plan for the improvement of the harbour was developed, with dredging being of the upmost importance (Davis, 2009). Work concentrated on deepening the outer and inner bars; the latter of which was completely removed through natural scour after the alignment channels at Harington Bend and Deborah Bay (Davis, 2009). The improvements to the harbour also included dredging the Port Chalmers basin and the Victoria Channel, which provided a more direct route between Port Chalmers and Dunedin (Davis, 2009). While dredging was a primary focus, the Harbour Board also constructed training walls within the Upper Harbour and at the entrance to the harbour that directed the flow of water into defined channels (Davis, 2009). It is estimated that between 1875 and 1914 that over seven million cubic metres of sediment were removed from the harbour. Development and maintenance of the harbour continue today.

Dredging and land reclamation were concomitant, with the sediment derived through dredging used to reclaim land (Otago Daily Times, 1911). When Kettle first devised the plan for Dunedin, he drew important roadways straight through the shoreline indicating that his original intention was for there to be some land reclamation. Land reclamation began in 1861 with the Harbour Board being granted "421 acres 3 roods and 13 perches more or less" below the high water mark (Province of Otago, 1862), and in May 1862 this area was officially included within the City of Dunedin (McDonald, 1965). While jetties had been built in the 1850s, intensive land reclamation was not underway until 1863. The reclamation plans had been originally drawn up by the provincial engineer C. R. Sawyer at an estimate cost of £355,000 for reclamation of 136 acres. In March of 1862 the Dunedin Town Board applied to the government for a loan of £10,000, however they were declined so the Board further applied to be able to "hypothecate the rates" (Otago Daily Times, 1862). The article further notes the need of the expansion for the growing town. Furthermore, other accounts note that an area where the line of Princes Street was encroached upon by the shoreline had to be bypassed and was referred to as 'Mud Terrace.' As well as sediment from the harbour, the fill used for the reclamation included the spoil from works on nearby Bell Hill (McDonald, 1965; Otago Daily Times, 1870; Otago Witness, 1863). Rail lines were set up near Gaol Street (now Dunbar Street) in order to transport the spoil to the reclamation grounds (Otago Daily Times, 1870). Using historic maps overlain with the modern Google maps image we are able to track the land reclamation during the nineteenth century (Figure 4-2). Photographs of Dunedin prior to and during the reclamation illustrate the significant change to the landscape (Figure 4-5, Figure 4-6, and Figure 4-7).

From the initial reclamation works until today, the coastline of the Otago has changed radically. Infrastructure works were the primary impetus for early land reclamation, including improvements for the wharves at both Dunedin and Port Chalmers, for the railway between Port Chalmers and Dunedin, and for roading projects (New Zealand Parliment House of Representatives, 1877; Province of Otago, 1862, 1876, 1883, 1909). Roading projects included the widening of Anderson's Bay Road and the construction of embankments across Pelichet Bay (for the railway and road) by prisoner work gangs (Otago Daily Times, 1870; Otago Witness, 1871).

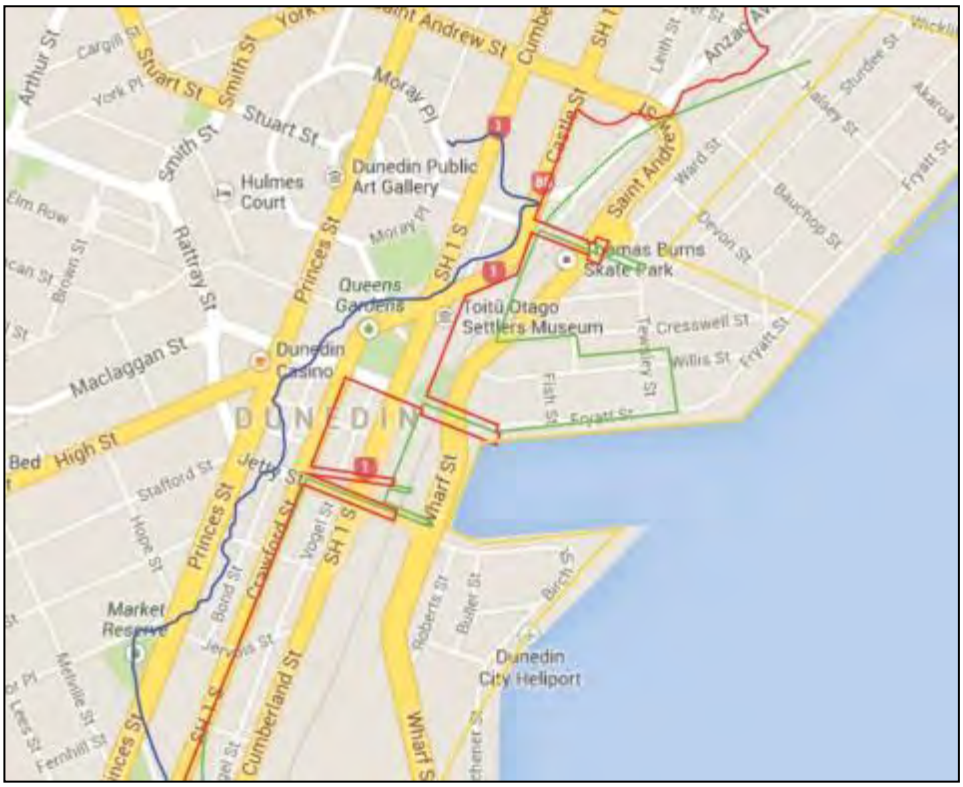

Figure 4-2. Map showing approximation of phases of reclamation with coloured lines over Google Maps (2013) image indicating changing shorelines in the nineteenth century. Blue – Original shoreline from 1853 map, Red – 1870 shoreline, Green - 1875 shoreline, Yellow – 1889 shoreline.

Figure 4-3. Otago Harbour 1858 (Tensfeld, 1852).

Figure 4-4. Otago Harbour 1865 (Perry, 1865).

Figure 4-5. Otago Harbour from Roslyn *circa* 1890 (Anonymous, 1890).

4.4 Built Environment

Dunedin has a mixture of commercial, industrial, and residential areas, with the central city remaining the commercial hub of Dunedin. This commercial area includes the central business district extending from the Octagon north-east along George Street and the Warehouse Precinct to the south-west of the Octagon. There are industrial areas throughout Dunedin with the two most prominent areas being adjacent to the railway along the inner harbour and Burnside through to Green Island. There are also several smaller commercial centres in suburban areas like Roslyn, Green Island, and South Dunedin. There are numerous smaller satellite industrial areas along the west harbour at Port Chalmers and Ravensbourne, and there is also a light industry and commercial zone along Kaikorai Valley Road. The residential areas extend out from the central city, and the outlying residential areas tend to be focused on transportation routes (the railway in particular), the harbour, and the seaside (Tweedie, 1952).

Dunedin is notable for the planning of large tracts of green space within the city (Figure 4-4). The town belt was part of the original city plan and covers approximately 200 hectares fringing the central city to the west, south, and north. The Dunedin Botanic Gardens comprise the north-east portion of the town belt and cover an area of 28 hectares. These gardens were established in 1863, making them the oldest botanic gardens in New Zealand. The town belt originally terminated to the east of the botanic gardens and the cemetery at Pelichet Bay, also known as Logan Lagoon; however, this land was eventually reclaimed to create Logan Park (McDonald, 1965).

Figure 4-6. The site and plan of Dunedin, 1846-1847 (Forrest, 1964).

4.5 A Brief History of Māori Occupation

Dunedin is well known for its early colonial history and for the presence of numerous Māori archaeological sites and places of cultural importance. There was a concentration of early Māori settlement in southern New Zealand, both coastal and inland, that would contrast later periods. Multiple early sites are found along the coasts within Dunedin city boundaries, including early sites at Waimataitai, Pleasant River, Seacliff, Warrington, Long Beach, Murdering Beach, Kaikai's Beach, Harwood, Papanui Inlet, Little Papanui, Anderson's Bay (Anderson, 1983), St Clair (Glover, 2009), and the mouth of the Kaikorai Stream (Harding, 1957).

The end of the early period saw the decline in population of the southern South Island as food sources such as moa and fur seal became increasingly scarce. The changing reality of life in the southern South Island heralded a string of migrations from North Island Māori that would eventuate in the tenure of Ngāi Tahu throughout the area. This period of migration was roughly concurrent, though not necessarily linked, with large scale changes in South Island cultural expression, manifested in the transition from then early to the late phases of Māori material culture (Hamel, 2001).

Just prior to and at the time of European contact there was a concentration of settlement about the coastal margins of what is now Dunedin's outer harbour and Māori activity throughout what is now Dunedin appears to have been intense (see Entwisle, 1998). There is a rich traditional history associated with the area detailing the genealogy, conflict, and interaction between groups of Ngāi Tahu and Ngāti Momoe about the outer harbour (Beattie, 2009; Taylor, 1952). William Isaac Haberfield, a Whaler based out of Moeraki, estimated in the 1830s the population at the Māori harbour head to be as high as 2000 and up to 500 at Purakanui (Poverty Bay Herald, 1906).

The majority of late/proto-historic Māori sites in the Dunedin area are known through ethnographic sources rather than archaeological survey. These include sites (including several pa) at Warrington, Mapoutahi, Purakanui, Long Beach, Murdering Beach, Te Waiparapara, Pukekura, Tarewai Point, Te Rauone, Otākou, Ruatitoko, Tahakopa, Omate, Te Waipekapeka, Otiheiti, Koputai, and Otepopo (Hamel, 2001). A small settlement, Ōtepoti, is reported to have existed at the current location of the Dunedin city centre (Taylor, 1952).

4.6 A Brief History of Dunedin

Dunedin was founded as a joint venture between the New Zealand Company and the Lay Association of the Free Church of Scotland. The town was to be the nucleus of the Otago settlement, a planned colony built primarily for protestant Scottish settlers. The town name of Dunedin, the Gaelic name for Edinburgh, had already been settled upon when the land on which the town would be established was decided by Frederick Tuckett, a New Zealand Company surveyor, in 1844. Sealers and whalers were said to have used the harbour possibly as early as 1817. The current corner of Princes and Water Streets is believed to be the place where early Māori had landed their canoes when entering into Otago, and it continued to be used as a landing place by the early European settlers, the first of whom arrived in 1848 (McDonald, 1965; Reed, 1956).

The initial 1840s and 1850s settlement in Dunedin was focused on the Princes Street area to the south of the Octagon, with the first occupied sections clustered around a landing place at the mouth of the Toitu Stream (now Water Street). Residential sections were developed towards the northern and southern ends of Princes Street and up Stafford Street, while a small commercial centre grew up along Princes Street between Jetty Street and Dowling Street. During this period Bell Hill, sitting between this settlement and the Octagon, restricted northward development (Watt, 1972).

Several roads had been formed through the central city. Towards the end of the 1850s work had begun cutting through Bell Hill, which opened up the Octagon area and North Dunedin to settlement. About half of the quarter-acre town sections had been sold by 1857. Photographs from 1860 and 1861 show scattered structures on the slopes and flats of the Octagon and North Dunedin (Figure 5 1). From these photographs, it is clear that streets in these inner-city residential areas had begun to be formed, but most were in a poor state. Most homes away from the town centre appeared to be small (two to four room) cottages; although, "hansom villas were springing up within and without the town belt" (Clark, 1961).

Figure 4-7 The Octagon in 1860, looking north-west (Burton Brothers, 1860).

The arrival of the gold rush and its associated wealth in 1861 saw an extremely rapid development of central Dunedin. The commercial area along Princes Street grew larger, with two storey buildings replacing the modest cottage-like buildings that had been erected previously. Offices clustered here, especially at the exchange area, while retail buildings (and development in general) continued to expand northwards up along George Street and southwards further down Princes Street. Accompanying these developments, hotels appeared all the way from Manor Street in the south to Fredrick Street in the north.

The inner-city residential areas developed in concert with the development of businesses in the town centre. Clusters of tents appeared on undeveloped sections on the hills above Princes Street, and new houses were constructed on the flats to the north and south. It was on these flats that sanitation was regarded as being the worst during the early gold rush years (1860s), with the various streams running down to the foreshore being heavily polluted. The tidal inlet to the north of the octagon was turned into a veritable cesspool (McLintock, 1949). A series of panorama photographs from 1865 clearly shows the aftermath of the gold rush on the inner-city residential areas, with buildings filling the majority of the space within the town belt. Many of these appear to be small cottages.

These developments were accompanied by the physical transformation of the landscape. The gradual removal of Bell Hill continued, and land began to be reclaimed in the harbour. Reclamation work started in the early 1860s and by 1864, with the help of a prisoner work force, properties were ready for sale on the strip of land between Bond and Crawford Streets (McDonald, 1965). Efforts were also made to improve roads.

The general layout of the town centre that arose by the end of the 1860s was to endure into the 1870s and onwards as Dunedin gradually became an industrial and commercial power. Retail areas straddled the Octagon, and store fronts lined the northern end of Princes Street and the southern end of George Street. Offices remained clustered around the exchange area. While the spatial distribution of these enterprises did not change much, the wooden premises they occupied at the end of the gold rush era were gradually replaced by more substantial structures of stone and brick reflecting the growing wealth and stability of the region (Clark, 1961; Watt, 1972). A systematic programme of street formation began in 1874, and by 1878, many of the main streets within the town centre had been much improved (though still quite susceptible to becoming muddy in rain). Streets were laid with packed metal and edged with cobbled gutters and stone kerbs (McDonald, 1965).

Outside of the town centre, the rapid increase in Dunedin's population saw the majority of land within the town belt developed by the 1870s, mostly as residential sections. This is evidenced by the photographic record that shows the urban sprawl of the time as well as by the rapid expansion of the city into the suburbs. Between 1878 and 1886, numerous subdivisions appeared on the suburban sections surrounding Dunedin, and the populations of these suburbs more than doubled. Half of Dunedin's population were living in the suburbs by the 1880s, with Dunedin Central having a population of 23,243 and the suburbs 22,275 (Watt, 1972).

By the end of the nineteenth century, all of the inner-city residential area was occupied, and a distinct variation in the socio-economic character of different parts of the city had arisen. Generally, this was marked by topography. The wealthier developments occupied the hillside around Royal Terrace and London Street, while the houses of the poor were densely clustered in the gully around Stafford Street or on the eastern portions of the north Dunedin flat. The continual growth of the city within an area restricted by the town belt had meant that many of the original quarter acre sections had been significantly subdivided. Housing in the poorer areas was very dense, with some properties only occupying sections of approximately 150m² (Clark, 1961). Even in the wealthier areas, where sections were generally larger, it was rare to encounter an intact quarter-acre town section (Clark, 1961).

An 1864 map of Dunedin and areas of proposed land reclamation shows the centre of the Cadbury Block as within the tidal inlet (Figure 4-8). By 1870, the project area had been entirely reclaimed, with the shoreline running along the east side of Castle Street (Figure 4-2).

Figure 4-8. Detail from 1864 map showing the Cadbury Block partially within the inlet (McKellar & Co Ltd, 1864).

5 A History of the Cadbury Confectionery Ltd Buildings

The Cadbury Confectionery Ltd Buildings is situated on what was once Town Sections 53 to 58 and 68 to 74, part of the block bounded by St Andrew Street to the north, Castle Street to the east, Stuart Street to the south and Cumberland Street to the west. This block was surveyed by Charles Kettle in the 1840s as part of the original Dunedin settlement. At the time of initial survey, much of this block was still within a tidal inlet of the Otago harbour, and settlement of this part of Dunedin did not truly take off until the area was reclaimed in the late 1860s.

This portion of Block XVI was mostly industrial during the nineteenth century, with smaller numbers of commercial and premises and a small number of houses. Block XVI has retained its industrial character throughout the twentieth and into the twenty-first century. Up until recently, the block has been dominated by the expansion Cadbury Confectionery factory. The building development through the nineteenth and twentieth century for the area on which the Cadbury Confectionery Ltd Buildings are situated today is shown in Figure 5-1. The discussion below has been broken up into two sections relating to the two main areas of occupation prior to their amalgamation in 1938 by Cadbury Fry Hudson.

5.1 History of the A & T Burt Site (Site I44/922)

The A & T Burt site comprises the northern half of the present-day extent of the listed Cadbury Confectionery Ltd buildings. The site is made up from historic Town Sections 57 to 59 and 68 to 70, Block XVI Town of Dunedin, and includes SEC 57-59 and 68-70 BLK XVI DP 5322 SO 14196 (part of 280 Cumberland Street). This site extent is based on the shared nineteenth history and use of these properties, which were the location of several foundries that eventually all came to be owned and operated by A & T Burt at the end of the nineteenth century. A summary of key events and land transactions for this site is presented in Table 5-1 below.

5.1.1 1860-1874: Otago Foundry and Others

The first record of occupation on site I44/922 comes from the 1860 rates records that note a foundry as present on Sections 58, 59 and 68, owned and run by David Mason and William Wilson. These sections had been owned by John Hyde Harris, former Dunedin Mayor, since 1857 but had been unoccupied until the foundry was established. The foundry is likely one of the buildings visible at the norther end of Block 16 in the 1861 photograph of the area (Figure 5-2). Mason and Wilson's Otago Foundry was the first such establishment in Dunedin and the foundry undertook the first iron casting at these Cumberland Street premises in 1862 (Otago Witness, 1862a).

A description of the premises a year later describes a pattern shop where patterns or models in wood were prepared for the casting of iron; a fitting room contained " a maze of straps and pulleys in constant motion, each turning a lathe or some revolving machine"; casting rooms in which the moulds from the pattern room were being put to use; a fitting shop where the products were worked to run smoothly; a cupola where the iron is melted for the moulds; and a fire fanned by bellows connected to a steam engine (Otago Daily Times, 1863a). The buildings were neither "expensive nor imposing". They were looking to expand at this time however the next section they had purchased on the block was yet to be reclaimed (Otago Daily Times, 1863a). The Otago Foundry continued to occupy their Cumberland Street premises until 1892

Figure 5-1 Figure showing all known nineteenth and twentieth century buildings and their initial construction dates at the location Cadbury Confectionery Ltd Buildings Site.

Table 5-1. Summary of key events for the A & T Burt Site.

Year	Event	Source
1857	Unoccupied Sections 58, 59 and 68 owned by John Hyde Harris	DCC Rates Records
1859	Unoccupied Sections 69-72 owned by Frederick H Richardson and Section 57 by John Thompson	DCC Rates Records
1860	William and Mason (Otago Foundry) owned and occupying foundry on Sections 58, 59 and 68	DCC Rates Records
1862	Otago Foundry undertake first iron casting in Otago on site on Sections 58, 59 and 68	Otago Witness, 1862
1869	Sections 57 and 70 occupied by Dunedin Iron Works	Perry, 1980
1874	Otago Foundry, Kauri Timber yard and other commercial/industrial buildings present on site Construction of brick frontage, truncating older iron building on Section 57 Start of construction of building in Section 69	Burton Brothers Studio, 1874
1876	Workshops, foundry and premises on site occupied by A & T Burt on Section 57 and 70 and Otago Foundry on Sections 58, 59, 68 and 69	DCC Rates Records
Late 1870s	Otago Foundry building present on Sections 68 and 69	Burton Brothers Studio, n.d.
1879	Fire damages Otago Foundry blacksmith's shops, fitters' shop and offices	Auckland Star, 1879
1886	Workshops, foundry, offices and premises on site, occupied by A & T Burt on Section 57 and 70 and New Zealand Implement Company on Section 69.	DCC Rates Records
1889	A & T Burt occupy Sections 57 and 70, Otago Foundry Sections 58 and 59, and Begg & Williamson (New Zealand Implement Company) Sections 68 and 69 Kauri Timber and other buildings on Section 58 replaced by extension of the building in Section 59 south	Bare, 1889
1891	Castle Street factory sold to NZEEC	Evening Star, 1891
1892	NZEEC occupy factory on Section 69 Iron buildings have been removed from Section 68 A & T Burt have extended premises into part Section 56 and part Section 58	Jones, 1892
1896	Workshops, foundry, offices and premises on site, occupied by A & T Burt and NZEEC	DCC Rates Records
1898	A & T Burt own and occupy Sections 58 and 59	DCC Rates Records
1899	A & T Burt own and occupy Sections 68 and 69	DCC Rates Records
1902	Extension to building on Sections 56, 57 and 70 Extension to lead pipe shop planned	DP 1589 DCC Archives
1903	Addition of Pattern and Core shop on Section 58 Brick pattern and boiler making building (southern extent) present on west end of Section 69	DCC Archives
1904	Brick moulding shop building replaced iron building at east end of Section 69 by this time Moulding shed had been extended to east end of Section 70 Moulding shed extended south across east end of Section 70	DCC Archives; Dunedin Drainage and Sewerage Board, 1905
1905	Boiler making building extension at the rear present in Sections 58 and 59 Northern extent of boiler making building (iron) in Section 68 present	Dunedin Drainage and Sewerage Board, 1905
1906	Fire in pattern department Alterations made to roof of pattern shop Brick moulding shop replaced by corrugated iron moulders shop	Star, 1906; DCC Archives
1911	Second extension to lead pipe shop planned in 1911	DCC Archives
1918	New pattern shop and store in Section 69	DCC Archives
1922	A & T Burt occupying all buildings on site Brick building moulding shop extended west	Council of the Fire Underwriters Association of New Zealand, 1922
1938	Boiler making building in Sections 58 and 59 extended at the rear A & T Burt sell their property to Cadbury Fry Hudson and move their premises to North East Valley	DP 5322; Auckland Star, 1938; Kynaston, 2012

Figure 5-2 Detail from 1861 photograph with red arrow showing what is likely the Otago Foundry buildings owned by Wilson and Mason (Meluish, 1861). Note this building is around one or two town sections further north than described in the rates records at this time.

Other areas of the site were owned by Frederick H Richardson (Sections 69-72) and John Thompson (Section 57) in 1859 and 1860 but were listed in the rates records as unoccupied. Rieman's 1869 business directory indicates C R Howden & Co as occupants of Section 57, fronting Cumberland Street (Figure 5-3). This company (also known as the New Zealand Distillery Company) opened Dunedin's first distillery on their Cumberland Street property in 1869 and were known around the South Island for their whisky and gin (Cromwell Argus, 1870; Hawkes Bay Herald, 1868). In addition to Section 57, Howden & Co owned Sections 53, 54, 56, 71, 72, 73 and 74 which form the Cadbury Factory site (I44/817) discussed below, but a woodcut shows that, although Sections 56 and 57 were owned by this company, there were no brewery buildings on site. Section 57 and 70 were instead occupied by the Dunedin Iron Works, with a large building fronting Cumberland Street and two smaller buildings on Section 70 (Figure 5-4).

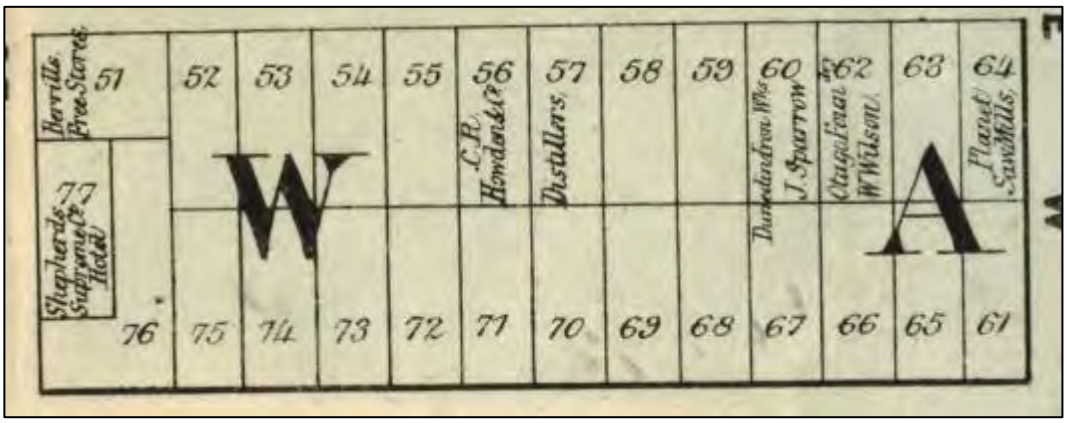

Figure 5-3. Detail from Rieman's Directory showing commercial occupants on the Cadbury Block in 1869 (Rieman, 1869).

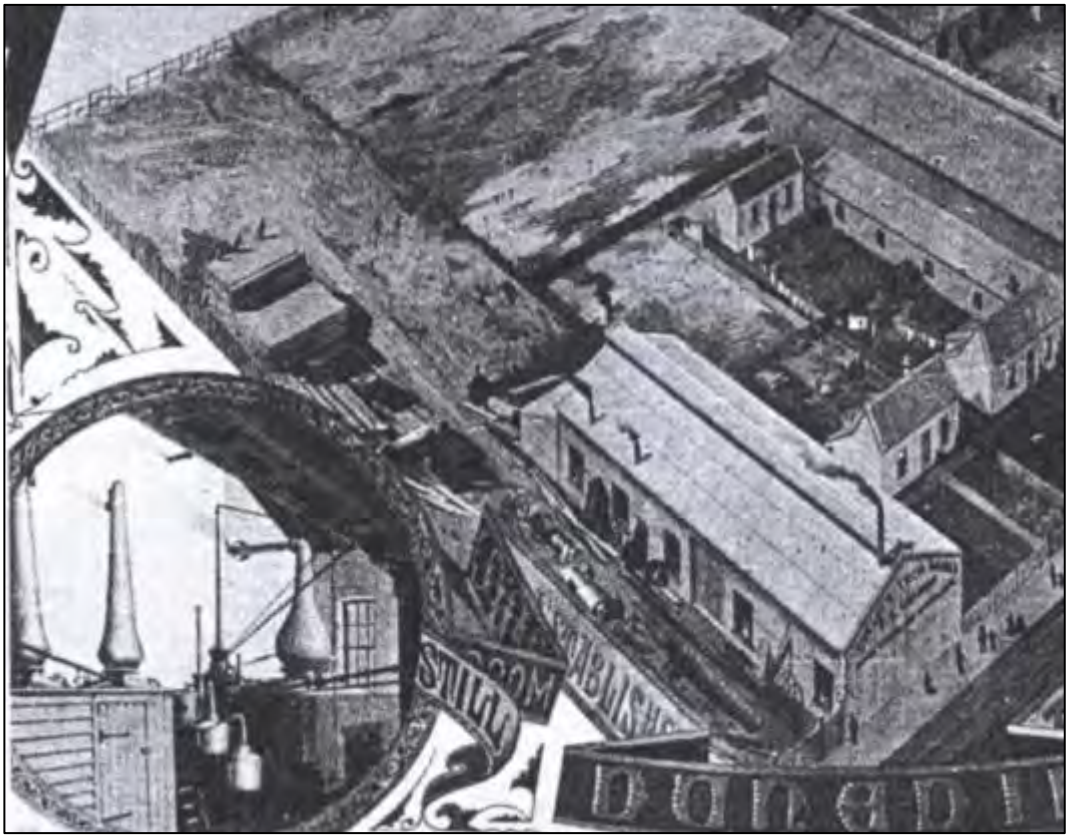

Figure 5-4. Detail from woodcut showing Dunedin Iron Works occupying Sections 57 and 70 in c.1868 (Perry, 1980)**.**

5.1.2 1874-1886: Otago Foundry, A & T Burt and Others

An 1874 photograph (Figure 5-5) of the site shows the building depicted in the c.1868 woodcut as having been recently truncated and a new brick front in the process of construction. Numerous other buildings are present on Sections 58 and 59 to the north, including a small timber building with "Kauri Timber Yard" painted on the side and a larger Otago Foundry building. No buildings are present on the east half of the site. However, the chimney under construction, marks the start of buildings in Section 69.

Another photograph taken at the end of the decade (Figure 5-6) shows the completed front of the two storey iron works building, by this time occupied by engineering firm A & T Burt, and a range of industrial buildings covering most of the site. The 1876 rates records note the owners of Sections 57 and 70 as the NZ Distillery Company and the occupants as A & T Burt, while the remainder of the site was owned by William Wilson and occupied by the Otago Foundry. The foundry had completed chimney and buildings behind in Sections 68 and 69 are also present by the late 1870s. In 1879 a fire that began in the neighbouring McLeod Bros. soap works caused significant damage to the blacksmith shop and three-storey brick building to the north of the Cumberland Street frontage of the site, at the time occupied by the Otago Foundry (Auckland Star, 1879).

Figure 5-5. Detail from 1874 photograph showing approximate outline of site I44/922 in red (Burton Brothers Studio, 1874). Photograph is looking northeast.

Figure 5-6. Detail from late 1870s photograph showing the approximate outline of site I44/922 in red (Burton Brothers Studio, n.d.). Photograph is looking east.

5.1.3 1886-1892: Otago Foundry, A& T Burt and Others

In 1886 the rates records list A & T Burt as the owners and occupiers of Sections 57 and 70, James Richardson as the owner of Section 69 and the New Zealand Implement Company as the occupier, while the remainder of the site was owned by the National Bank of New Zealand. The buildings listed on site at this time include a foundry, engineer workshops, offices and shops. Two smaller industrial firms identified as occupying the site were the New Zealand Electrical and Engineering Company (NZEEC) and the New Zealand Implement Company. The New Zealand Implement Company, also known as Begg & Wilkinson, were manufacturers of agricultural equipment and fencing supplies.

An 1889 block plan reveals more detail of the site occupants and layout (Figure 5-7). The Otago Foundry is still recorded as occupying the portion of the site owned by the National Bank in 1886, suggesting that the business

was bailed out by the bank during the 1880s but continued to function at the site. By this time the Otago Foundry had extended the most northerly building on their premises south replacing the Kauri timber building and other early structures in Section 58. The buildings on the Castle Street frontage of Sections 68 and 69 occupied by engineers Begg & Williamsons while A & T Burt continue to occupy their buildings on Section 57 and 70, including the main brick building on Cumberland Street that had been raised to three storeys.

A & T Burt extended their most southern building into part of Section 56 (1892 Rates Records), replacing the cottage on this lot. Most structures on the site were constructed of iron, with the exception of the buildings on the Cumberland Street frontage of A & T Burt's property (visible during and shortly after construction in Figure 5-5 and Figure 5-6) and two timber sheds at the rear of the Otago Foundry. By 1892, the Otago Foundry had vacated their premises and the site was occupied by A & T Burt and the New Zealand Electrical and Engineering Company (Figure 5-7). The New Zealand Electrical and Engineering Company had first purchased a factory on the property in 1891 and by 1892, they had extended the iron building at the eastern end of the Section 69 north while all the buildings on Section 68 had been removed. The 1896 rates records list the occupants of the site as A & T Burt and Thomas Stevenson of the NZEEC.

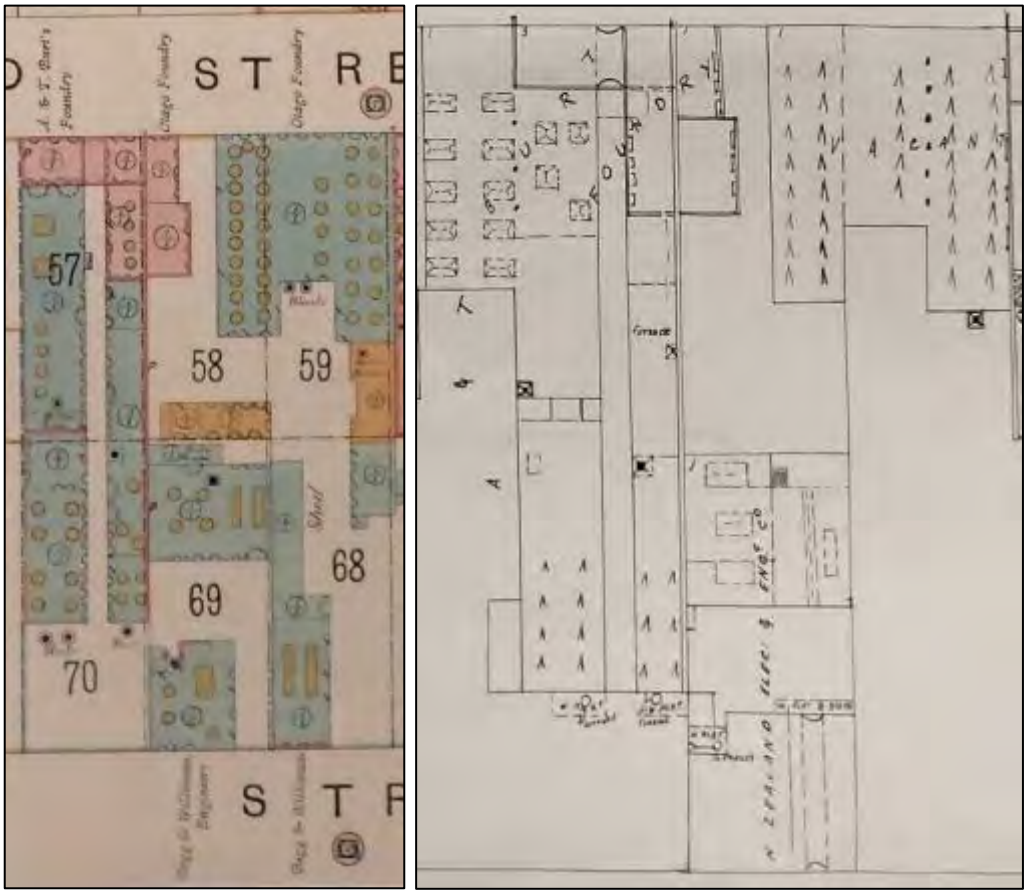

Figure 5-7. Left: detail of 1889 block plan showing brick (pink), timber (yellow) and iron (blue) buildings on site I44/922 (Bare, 1889). Right: detail of 1892 block plan showing buildings on site I44/922 (Jones, 1892).

5.1.4 1892-1938: A & T Burt

In 1898 rates records indicate A & T Burt owned and occupied Sections 58 and 59 and by the following year Sections 68 and 69, effectively taking over the whole site. Their buildings including the large three-storey brick structure (visible in Figure 5-9 and Figure 5-8) known as "the works" (Cyclopedia Company Ltd, 1905). A 1905 account of the works (Cyclopedia Company Limited, 1905) gives an idea of the scale and layout of the buildings on site, several of which were previously occupied by the Otago Foundry. This premises held engineering and blacksmithing departments, workman's store, dressing shop, iron moulding shop, finishing and pattern shop, brass foundry, coppersmith's shop, boiler house, boiler and fluming pipe shop, warehouse, and a plumbing shop (Figure

5-10). The interiors of the A & T Burt offices are shown in Figure 5-11 and Figure 5-12 and these were likely located in the main three-storey brick building facing on to Cumberland Street. By this time the brick and iron buildings on the southern portion of Sections 56 as it had been extended east by 1902 (Building No. 1 in Figure 5-10). Many of the factory buildings contained large machinery or other features the remains of which may be encountered during earthworks at the site, including a 16ft deep watertight pit in the iron moulding shop (located behind the main brick building), the brick and concrete floor of the brass foundry and the foundations of large chimneys in the brass foundry and boiler house (Cyclopedia Company Ltd, 1905). Foundations for the larger forges, furnaces and other metal working equipment may also have survived.

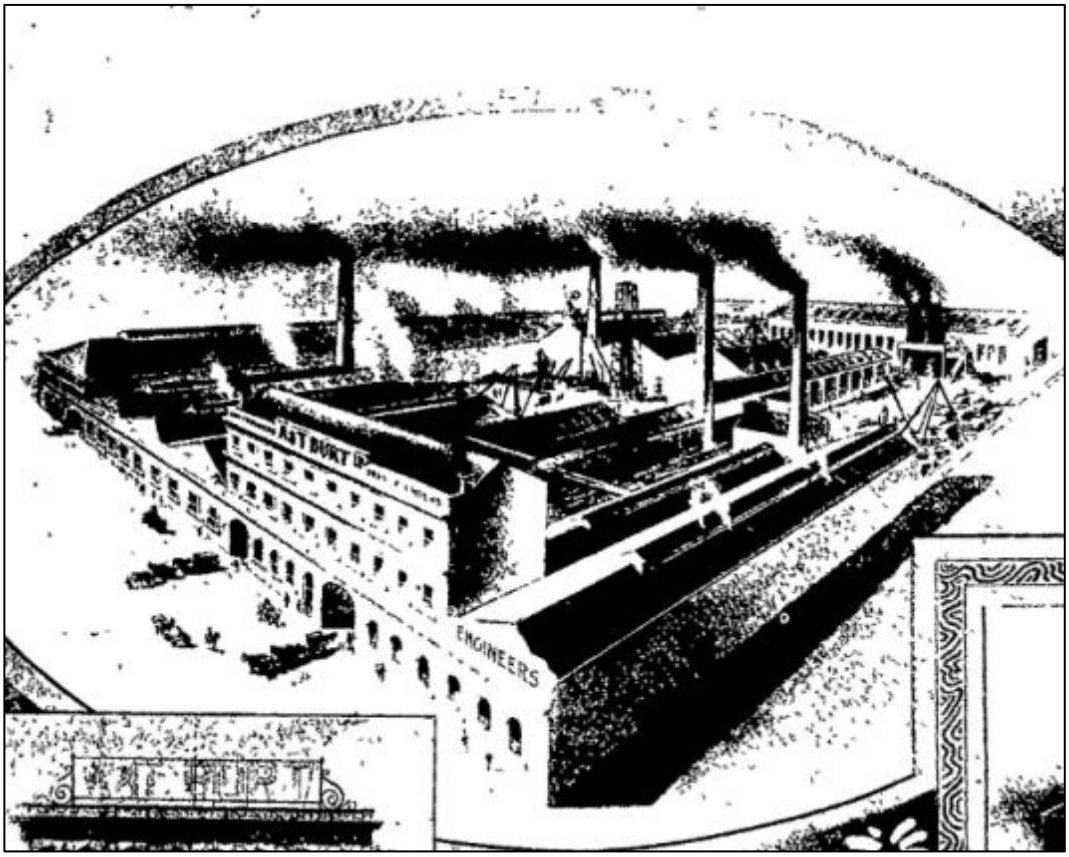

Figure 5-8 A & T Burt premises in 1906 ("Our Industries: No. 9 A & T. Burt, Ltd.," 1906)

Figure 5-9 1890s-1900s photograph taken sometime looking south at the Cumberland Street façade of the A & T Burt Premises (Anon., n.d.-f).

Figure 5-10. Left: detail of 1905 drainage plan showing brick (orange), timber (yellow) and iron (blue) buildings on site I44/922 (Dunedin Drainage and Sewerage Board, 1905). Right: detail from 1922 plan showing buildings and occupants on site I44/922 (Council of the Fire Underwriters Association of New Zealand, 1922).

Figure 5-11 The interior of the general A & T Burt Offices in the late nineteenth or early twentieth century (Anon., n.d.-b)

Figure 5-12 The interior of William Burt's (Alexander's son) Office in the late nineteenth or early twentieth century (Anon., n.d.-d)

Throughout the first two decades of early twentieth century A & T Burt undertook a number of changes to the premises. Most of these changes can be seen in the differences between the 1905 plan and the 1922 plan (Figure 5-10), whereby many pre-1900 buildings were replaced or altered. This included extending the brick and iron buildings on the southern portion of Sections 56 between 1892 and 1902 (Building No. 1 in Figure 5-10). An iron and wood extension was planned for a lead pipe shop at the rear of 1902 and again in 1911 (DCC Archives). (Figure 5-13). This building is visible in the 1906 photograph along with the original lead pipe shop (Figure 5-14). Plans for a second addition in 1911, built before 1922, shows the first extension (Figure 5-15)

Replacing an earlier iron shed and water closet, 1903 plans of a proposed addition in Section 58 show A & T Burt's pattern and core shop (Figure 5-16). The building ran alongside the moulding shop running east-west through the property. A chimney is shown adjacent to the core shop and this possibly aligns with the furnace in the moulding shed shown in the 1892 plans (Figure 5-7). The interior of the core shop is shown in Figure 5-17, showing brick walls of the building along with the windows as shown in the 1903 plan. In the same year as the pattern shop, changes were also made to the pattern store in Section 69 (Figure 5-18). These plans indicate that at least the southern portion of the pattern store, visible across Sections 68 and 69 in the 1905 plans, was present by 1903, and had likely replaced the earlier iron NZEEC building at the same location. The northern extent of this building, made of iron, was either constructed at the same time or was later addition for boiler making. The interior of the pattern store building (Building No. 6 in Figure 5-10) is shown in Figure 5-19. While the pattern and core shop is not shown in the 1905 plan, it had been completed by 1906 as the roof of the building was altered in 1906 (Figure 5-20). This may have been a result of a fire that tore through the pattern department in the same year, causing damages of up to £1000 (Star, 1906).

The pattern shop was shifted in 1918 and moved to Section 69 adjacent to the existing pattern store (Figure 5-21). A new pattern store was also proposed for the first floor however the 1922 plans indicate this was still used for boiler making (Building No. 9 in Figure 5-10). The original pattern shop was replaced by an electroplating and galvanising building (Building No. 7 in Figure 5-10).

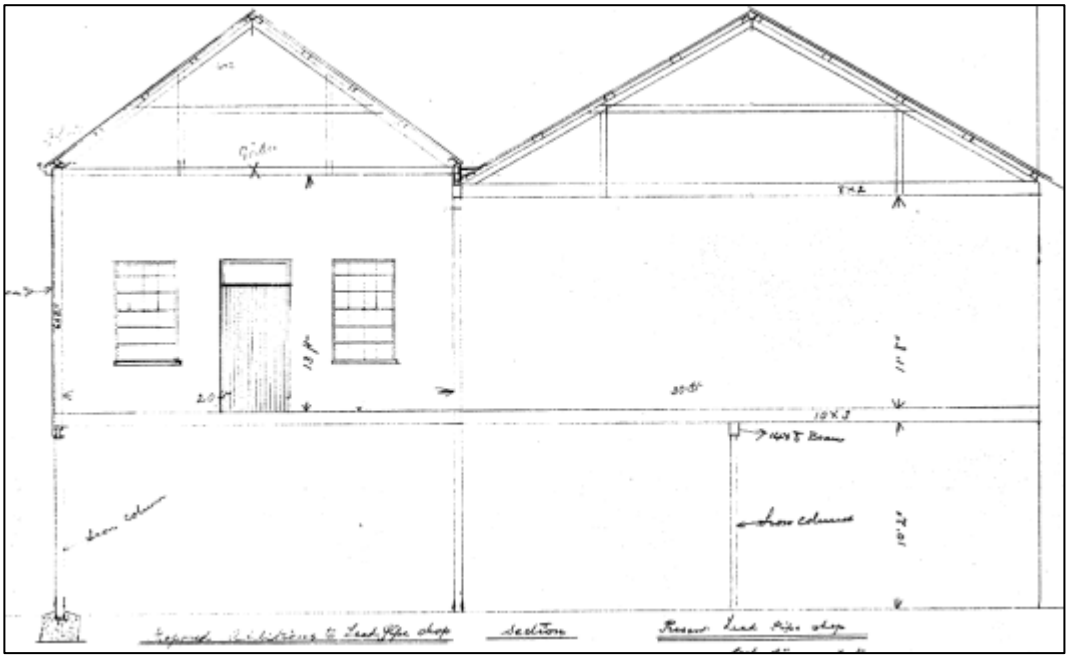

Figure 5-13. 1902 plans for the addition to the lead pipe shop (DCC Archives).

Figure 5-14. Photograph taken in 1906 showing the Castle Street frontage (red line) of the A & T Burt Site (Auckland Weekly News, 1906).

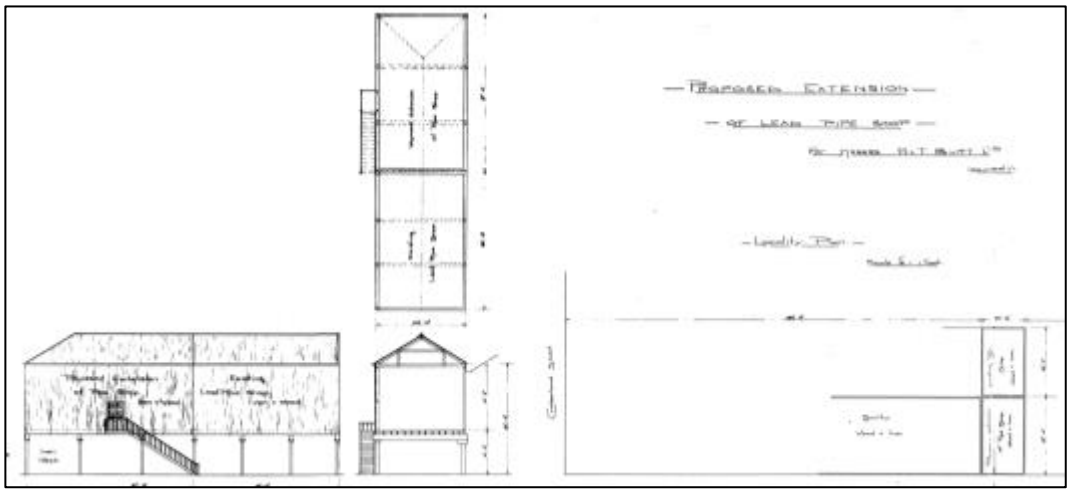

Figure 5-15 1911 plans for second addition to the lead pipe shop (DCC Archives).

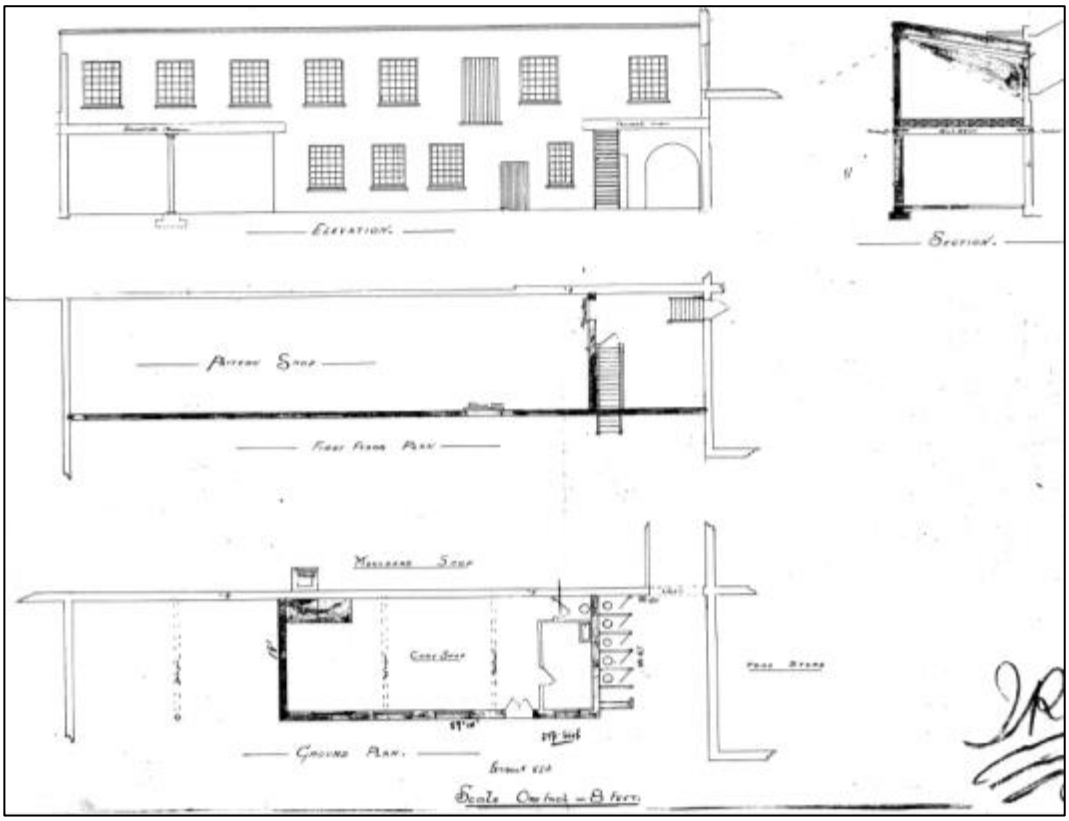

Figure 5-16 1903 plans of the pattern shop and core shop in Section 58 (DCC Archives).

Figure 5-17. View of A & T Burt's core store (Anon., n.d.-a)

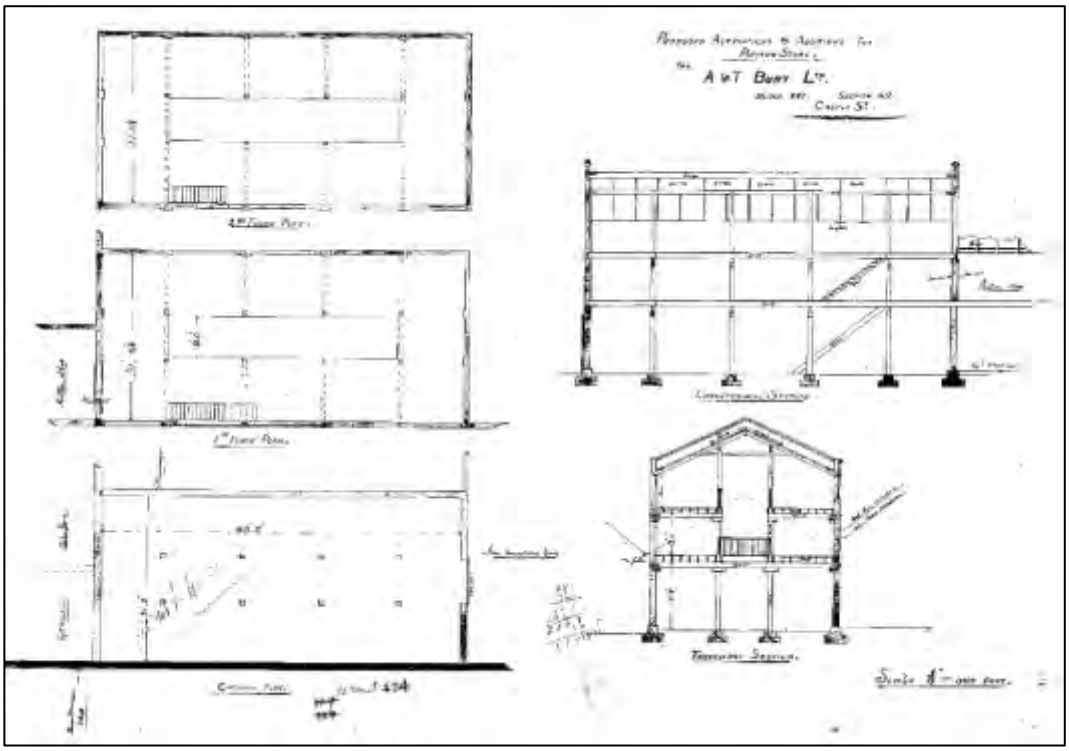

Figure 5-18 1903 alterations and additions for the pattern shop (DCC Archives).

Figure 5-19. View of A & T Burt's pattern store (Anon., n.d.-e).

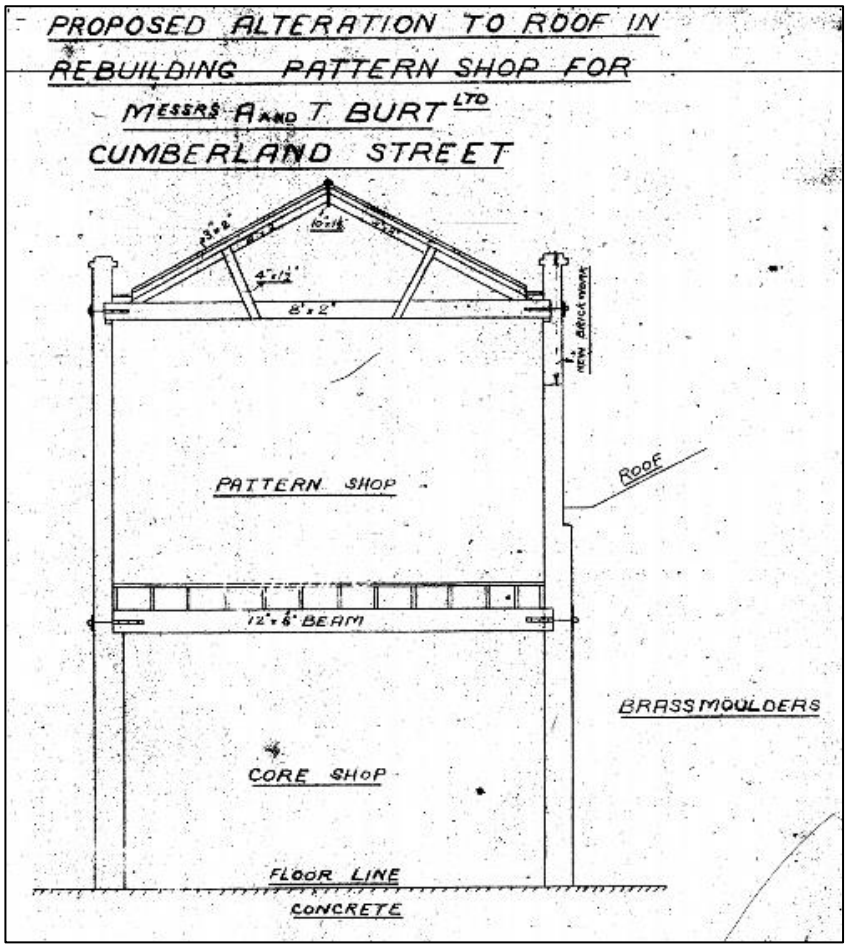

Figure 5-20 1906 plans for roof alterations to the pattern and core shop (DCC Archives)

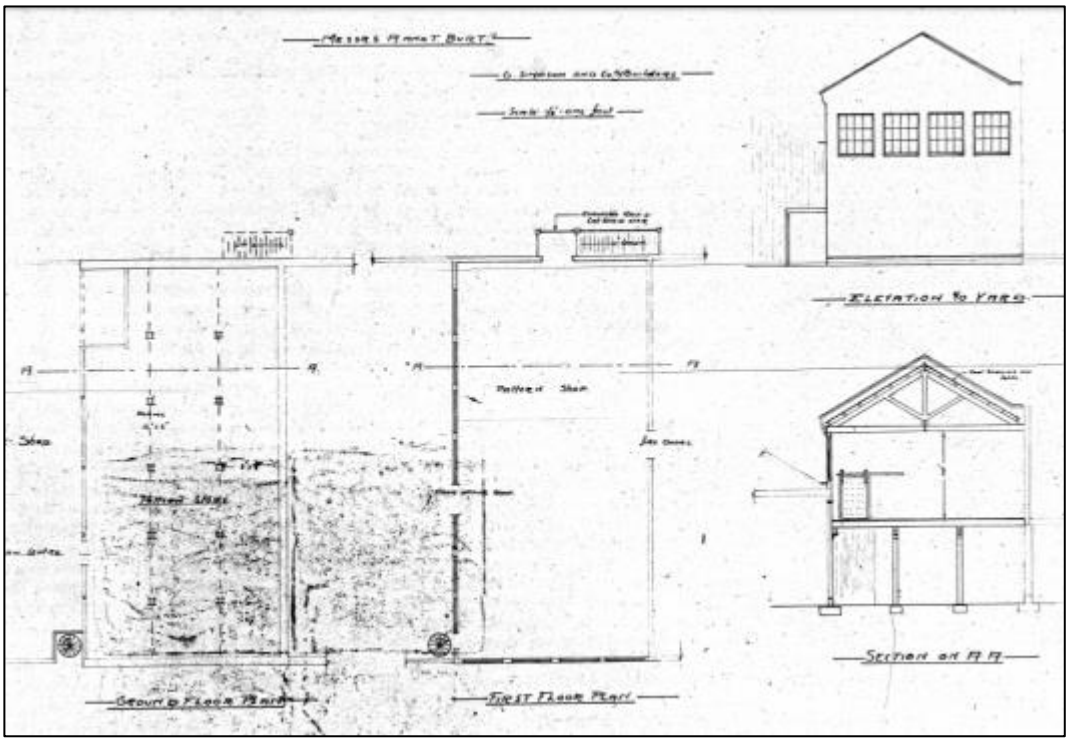

Figure 5-21 1918 plans for a new pattern shop and store on Section 69 (DCC Archives).

At the Castle Street extent of the A & T Burt premises, plans from 1904 indicate that the moulding shed (Building No. 3 in Figure 5-10) had been extended to run the length of Section 70. This building is visible in the 1906 photograph (Figure 5-14) The interior of this building is shown in Figure 5-22 with an iron wall to the west and south and a brick wall to the north as well as unlined earth floor. It is interesting to note that the 1905 plan only shows an outline of the building, perhaps indicating that only a roof line or canopy existed when the survey for the plan was undertaken. The moulding shed ran alongside a brick building (Figure 5-10 and Figure 5-23), that by 1904 had replaced the iron building visible in 1889 plans (Figure 5-7).

Plans show proposed northern and southern iron additions to the moulding shed and shop in 1904 on Sections 69, 70 and 71(Figure 5-23 and Figure 5-24). The southern building had been constructed by 1906 as it is visible the 1906 photograph of the Castle Street frontage (Figure 5-14). The interior of the southern building is shown in Figure 5-25 with a slightly different roof framing than shown in the plan. The northern extension is not visible in the 1906 photograph (Figure 5-14). Yet another 1906 image (Figure 5-8), published ten months after the photograph was taken, shows both the northern and southern extensions. It is clear that some artistic license has been taken by the illustrator of the image, yet it suggests that the northern corrugated iron extension, was present by this time replacing the earlier brick building. By 1922, the moulders shop is depicted to have been extended west (Building No. 5 in Figure 5-10).

The final building altered by A & T Burt was the boiler making building in Sections 58 and 59 (Building No. 10 in Figure 5-10). One of the Otago Foundry's earliest buildings, A & T Burt extended the building to the back of the section and connected to the rest of the building between 1892 and 1905, and a second time to the rear between 1927 and 1938 along with a chimney immediately to the north. The second rear addition also included a chimney however had been removed by 1942 (Figure 5-26).

At the end of 1938 A & T Burt sold their property on Cumberland Street to Cadbury Fry Hudson and shifted their premises to North East Valley (Kynaston, 2012). They received £30,000 for the property (Auckland Star, 1938).

Figure 5-22. Photograph looking east of the iron moulding structure (Anon., n.d.-c).

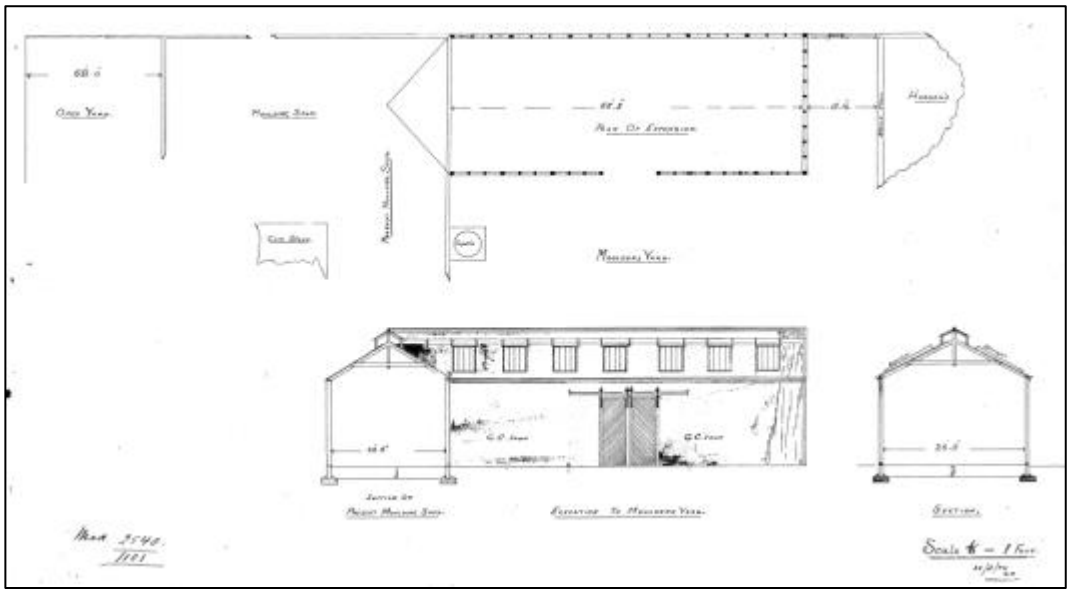

Figure 5-23. 1904 plans looking for the southern extension to the moulders shop constructed before 1906 (DCC Archives).

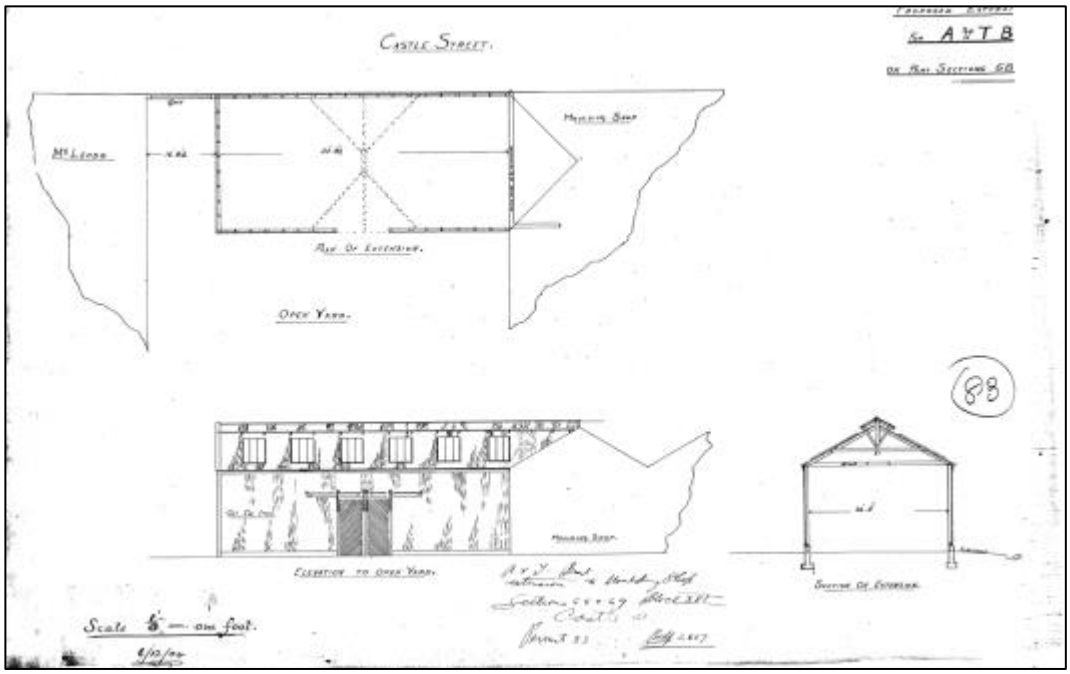

Figure 5-24. 1904 plans for the northern extension to moulding shop not constructed (DCC Archives).

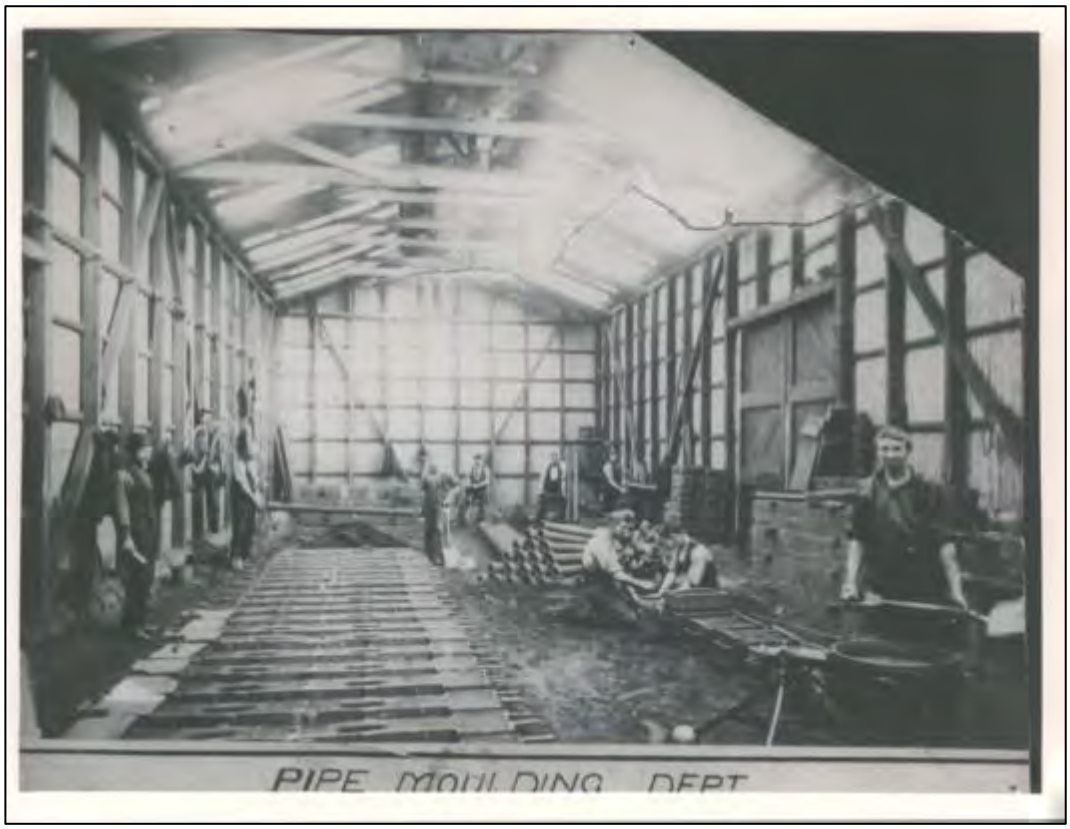

Figure 5-25. Photograph showing the interior of the iron moulding building. Note that the roof framing is different to that showing to the 1904 plans (Anon., n.d.-e).

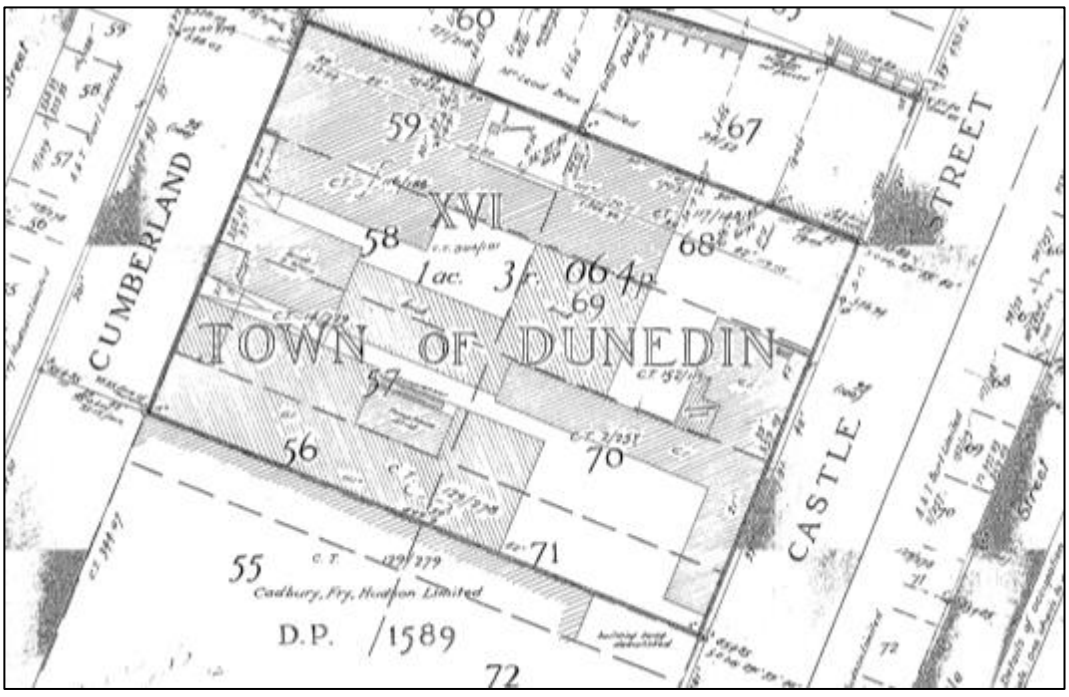

Figure 5-26 DP 5322 showing the layout of the A & T Burt premises in 1938 (note the building being demolished immediately south of the A & T Burt property).

5.2 A History of the Cadbury Factory Site (I44/817)

The Cadbury Factory site comprises the southern half of the present-day extent of the listed Cadbury Confectionery Ltd buildings. The site has been previously recorded as including historic Town Sections 53, 54, 73 and 74, Block XVI Town of Dunedin, but as a result of this assessment the extent has been broadened to include Sections 55, 56, 71 and 72. This site extent is based on the shared nineteenth century history of these properties,

which were owned and occupied by a series of breweries. Multiple previous assessments have been undertaken on part of site I44/817 (mainly focusing on sections 53 and 74), and the following history builds on these reports (Brooks & Jacomb, 2010; A Farminer, 2014; Parkinson, 2011). A summary of key events for this site is presented in Table 5-2 below.

5.2.1 1858-1868: Monson and Brunton

The first recorded occupation at the Cadbury Factory site (I44/817) comes from the 1858 rates records when a house and shop are noted as present on Section 54, owned and occupied by William Henry Monson, who also owned unoccupied Sections 72, 74 and 75. Section 53 was owned by Edward Bowes Cargill by this date but was unoccupied, while the remainder of the sections within the site were not listed in the rates records this year. This may be a result of the majority of the site still being within the tidal inlet. The following year (1859), William Monson is listed as owning and occupying Sections 54 and 73 with "house, shop etc", and owning the unoccupied Sections 53, 74 and 75. William Monson was an architect and builder and was one half of Monson Brothers with Frederick Kidall Monson until the partnership dissolved in 1860 and William slipped further into debt until he was declared bankrupt in 1864 (Otago Daily Times, 1863d, 1864; Otago Witness, 1860).

By 1861, Monson's property was listed as occupied by David Brunton along with Sections 55, 56 and 74, and noted as containing "buildings". Brunton was another builder and so likely continued to use the site in the same way Monson had before him, until he too went into insolvency in 1863 (Otago Daily Times, 1863c). Upon entering insolvency, Brunton's Cumberland Street property, which he had leased from Edward McGlashan for a term of 14 years from February 1862, was mortgaged to Frederick Joseph Moss and William Darling, who put the leasehold up for auction in early 1863 (Otago Daily Times, 1863b).

Table 5-2. Timeline of key events relating to the Cadbury Confectionery Buildings.

Year	Event	Source
1858	House and shop present on Sec 54, owned and occupied by W H Monson	DCC Rates Records
1859	"House, shop etc" present on Secs 54 and 73, owned and occupied by W H Monson	DCC Rates Records
1861	Buildings present on Secs 53-56, 73 and 74, owned and occupied by David Brunton	DCC Rates Records
1868	New Zealand Distillery Company purchased site, first brewery buildings erected	Parkinson, 2011
1869	Site fully reclaimed, part occupied by C R Howden & Co., distillers	Rieman, 1869
c.1875	Property sold to the Albion Brewing and Malting Co.	Parkinson, 2011
1876	Above-ground brick beer cellar constructed on Section 74, Site owned and occupied by Albion Brewing and Malting Co, part of brewery and three cottages on site	DCC Rates Records
1878	Marshall and Copeland purchase the company and premises and the company becomes Albion Brewing Co.	Otago Daily Times, 1879; Farminer, 2014
1886	Section 56 owned by Bendrix Hallenstein, one house on property, rest of site owned and occupied by John Marshall, Albion Brewing Co. premises on property	DCC Rates Records
1886	Albion Brewing Company declared bankrupt	Leckie, 1996
1887	Marshall and Copeland sell Albion Brewery to Williamson and Murray	Taranaki Herald, 1887
1889	Site owned by Bank of NZ, brewery and two houses on site	DCC Rates Records
1898	Site purchased by R. Hudson & Co.	Farminer, 2014, DCC Rates Records
1901	Biscuit Factory constructed in Sections 72 and 73 Southern extension to the brewery building on Cumberland Street which had been raised two storeys by this time	DCC Archives
1902	Additional Stables, and brick and Iron building present on Section 71. Biscuit factory in Sections 72 and 73 burns down. By this date the façade of the cellar building had been altered from the exposed multi-gable roof line to a masonry façade.	Farminer, 2014; DP 1589;
1902-3	Biscuit factory in Sections 72 and 73 rebuilt	Parkinson, 2011
1904	Second storey added to brick and Iron building on Section 71	DCC Archives
1905	Plans prepared for cloak room in Sections 72 and 73 along Castle Street	DCC Archives
1907	Plans prepared for larger building across Sections 72 and 73 to replace cloak room building	DCC Archives
1908	Waipori power connected to the flour mill	Evening Star, 1908; Findlay, 2009
1909	Plans prepared for mixing and chocolate packing building in Section 54	DCC Archives
c. 1911	Offices established in front of Section 74 by Hudson and Co.	Parkinson, 2011
1915	Plans prepared for extension of mixing room and chocolate packing building west in Section 54 and showing two storey addition to central section of the brewery building on Cumberland Street present at this time in Section 53	DCC Archives

Year	Event	Source
1918	Façade altered on the Dairy building frontage to Castle Street	Brooks & Jacombs, 2010; Farminer, 2014; Parkinson, 2011
1922	By 1922, two remaining cottages on Section 56 removed, buggy building added south of stables on Section 72, kiln and malt house on Section 57 refitted to become carpenter workshop and stores by this time, smutters room added to brewery building (now grain store) and additional floor added to mill in Section 53. Plans prepared for ground floor of new chocolate factory and garage to replace stores and carpenter's workshop on Section 55	Council of the Fire Underwriters Association of New Zealand, 1922; DCC Archives
1924	Rear three storey portion of the Chocolate Factory and Garage Building (concrete) present by this time on Sec 54. Plans prepared for additional floors for the front portion of the chocolate factory and garage in Secs 55 and 56. Plans prepared for Chocolate and Biscuit Factory building at the rear of Secs 71 and 72.	DCC Archives
1926	Fourth storey (with mansard roof) was added to the grain store, dinning and dressing room at the front of Sec 54 while. Top floor altered for use as box factory	DCC Archives
1927	By 1927, an eastern extension confectionary factory had been added behind grain store in Sec 53. Extension of Chocolate and Biscuit Factory east to meet older buildings forming façade along Castle Street in Secs 71 and 72. The 1902-3 biscuit factory was extended east in Secs 72 and 73 to adjoin buildings forming façade along Castle Street	Fire Insurance Plans, 1927
1930	R. Hudson and Co. merge with the Cadbury and Fry companies forming Cadbury Fry Hudson	Barringer, 2000
1931	Construction of 90 ft concrete chimney stack in the engine house in Section 53	Farminer, 2014
1938	A & T Burt sell their property to Cadbury Fry Hudson The pre-1900 eastern brick building forming part of the Chocolate and Biscuit Factory as well as the dining and cloak rooms in Section 71 and 72 replaced by a concrete and steel framed building designed by Miller and White and constructed by William McLellan Ltd.	Auckland Star, 1938; Evening Star, 1939
1940	Renovations to the A & T's engineers and carpenters' shop along Cumberland Street in Section 57	DCC Archives
1942	A & T's iron moulding buildings removed from Sections 69 and 70, and replaced by slit trenches and subsequently air raid shelters. By 1942 the Confectionery factory extension behind the grain store in Section 53 raised to four storeys	DCC Archives
1945	Plans for central boiler house drafted for Sections 57 and 58	DCC Archives
1946	Air raid shelters demolished in 1946	Barringer, 2000
1947	All A & T buildings removed from the property except for refitted engineers and carpenters store on Section 56. A long building was constructed north of the remaining engineers and carpenters store by this time on Section 56. Start of construction of new biscuit factory on Sections 58, 59, 68 and 69 with a dispatch building immediately south in Section 69 and 70. Staff lunchroom had been added to the top of the Dairy and Machine House Building	1947 aerial photographs; Barringer, 2000
1948	Power and services station constructed to the west of the boiler house on Section 69 and 70	DCC Archives
1951	New Biscuit Factory and Dispatch Building completed on Sections 58, 59, 68, 69 and 70	Barringer, 2000
1954	By this time, the façade of the Dairy and Machine House Building on Section 74 was altered (building plastered)	Farminer, 2014
1957	Refitted engineers and carpenters store on Section 56 no longer present	1957 aerial images
c. 1957	The façade of the Dairy and Machine House Building on Section 74 was altered again (brick and plaster removed as well as brick parapet)	Farminer, 2014
1959	Central boiler house extended into Sections 69 and 70. Mill building removed from Section 53.	DCC Archives
1961	Engineering workshops, labs and office building constructed on Secs 56 to 58.	DCC Archives
1966	Covered loading bay built at the location of the removed mill building on Section 53, renovations to first floor offices in Dairy building.	DCC Archives
1968	Two-storey addition to the biscuit factory in Sections 58, 59, 68 and 69	DCC Archives
1969	Central boiler house extended a second time further east on Sections 69 and 70. Pre-1902 boiler house on Section 53 removed by this time.	DCC Archives
1985-6	1902-3 biscuit factory and buildings east along Castle Street replaced by a paved access area	DCC Archves
1991	Crumb silos transferred to the car park	DCC Archives; Barringer 2000
2016/2017	Lunchroom removed and roof replaced on the eastern end of the Dairy and Machine House Building	
2017	90 ft chimney stack in the engine house in Section 53 reduced to 3m	Otago Daily Times, 2017
2018	Dairy building façade in Section 74 was restored to a design based on the 1930s frontage.	

5.2.2 1868-1875: New Zealand Distillery Company

In 1868 the property was purchased by the New Zealand Distillery Company and they commenced construction of their distillery (Figure 5-27). The buildings were constructed of brick and bluestone and had concrete foundations (Perry, 1980). A woodcut print from around 1868 (Figure 5-27) advertised the New Zealand Distillery Company buildings. Pairing this with an 1873 article describing the distillery, it is possible to identify the functions of many of the buildings on the premises. The distillery's buildings included a brick building with malt floor (No. 1) beneath a granary loft at the southwest corner of the property; a kiln (No. 2), malt house (No. 2) and adjacent office to the north of this; another kiln (No. 1) and crushing mill along the southern edge of the property; a

cooperage, and possible small mill, shed and still room located towards the east of the premises; a spirit store likely in the southeast corner containing both a vatting room and a small experimental still; and three cottages to the northwest corner of the premises in Sections 55 and 56 (A Farminer, 2014; Perry, 1980; The Otago Guardian, 1873). It is interesting to note that several buildings had cement floors including both the malt house and malt floor, as well as kiln No. 1 (The Otago Guardian, 1873).

The distillery buildings are visible in an 1874 photograph taken of the site as well as one of the cottages in the northwest corner, fronting Cumberland Street (Figure 5-28). Of these buildings, three - the possible small mill, granary/malt floor and kiln buildings - remain on site today; although, they are highly modified and incorporated into a far larger buildings (the granary/malt floor and kiln are part of the Cadbury World building, while the small mill is part of the Dairy and Machine House Building). It is also possible that the walls of another two buildings (the possible still room and a lean-to to the south of the crushing mill and kiln) exist today.

There were a total of 30 employees, of which the brewer, distiller as well as the engineer occupied the three cottages on the property (Perry, 1980). The lack of development at the rear of the property can be attributed to poor reclamation. As one commenter noted that as the government had failed to complete the reclamation of the tidal area, 'a most unsightly fever-bed is kept at the back of the premises, which must prove highly detrimental to the health of the neighbourhood unless filled before the hot weather sets in.' (The Otago Guardian, 1873).

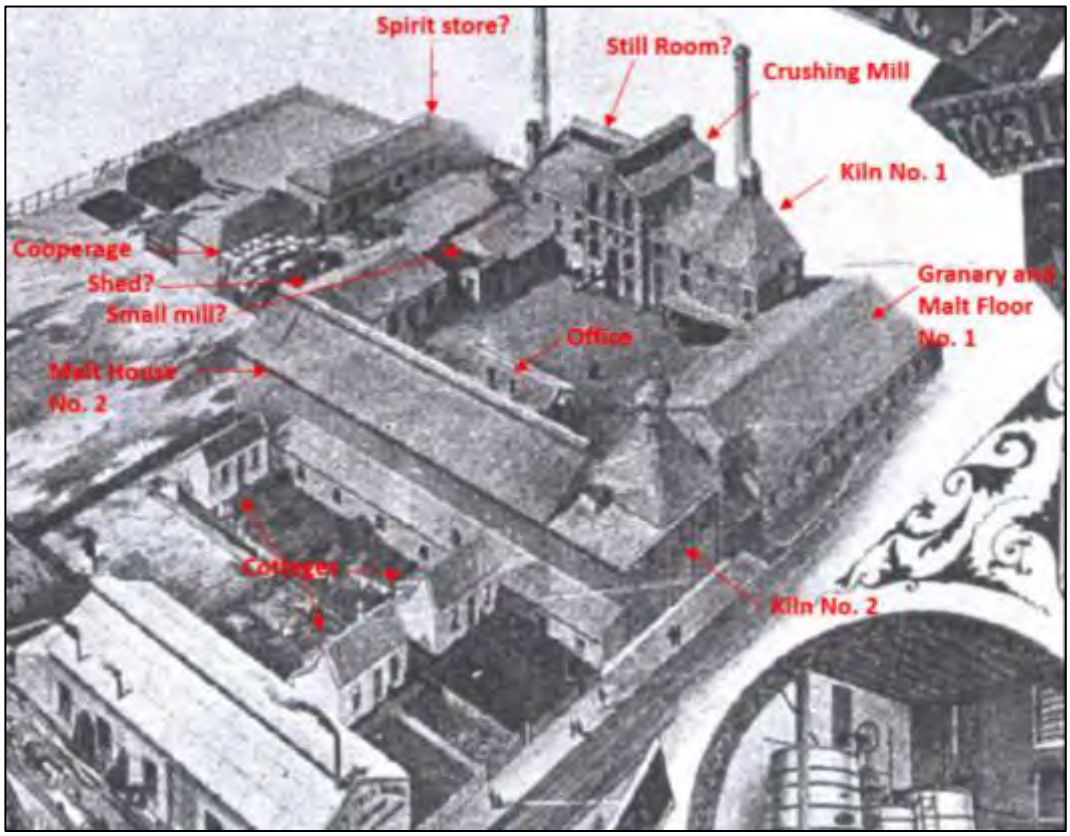

Figure 5-27.A c. 1868 woodcut image showing the New Zealand Distillery Company premises with labels in red of the building functions (Perry, 1980)**. These functions are based on later plans and from Parkinson (2011) and Farminer (2014). Image is looking southeast.**

Figure 5-28. Detail from 1874 photograph showing approximate outline of site I44/817 in red (Burton Brothers Studio, 1874). Photograph is looking northeast.

5.2.3 1875-1898 Albion Brewing Company

In 1875 the property was purchased by the Albion Brewing Company, and according to Parkinson (2011) and Farminer (2014), an above-ground brick beer cellar was constructed in the southeast corner of the site (Section 74) in 1875, part of which was incorporated into the Dairy and Machine House Building still standing in that location today. The cellar building measured 188ft long by 66ft (57m by 20m) and had a first floor that was used as a granary. Farminer (2014) also argues that the western wall of the cellar incorporated part of the earlier (c.1868-1873) building (the wall of the possible still room) constructed by the New Zealand Distillery Company, as evidenced by the distinctive dogleg in this wall. The cellar can be seen in a late 1870s photograph (Figure 5-29). While it is obscured by crushing mill which by this time had been raised two storeys, it appears the cellar's multi-gable roof extends all the way to Castle Street and does not have a prominent facade. The 1876 rates records note that the entire site was owned by the Albion Brewing Company and contained a brewery and three cottages. The three cottages are clearly visible late 1870s photograph taken further north (Figure 5-30).

In 1878 the property was offered for sale and a plan prepared showing the buildings present (Figure 5-31). The Albion Brewing and Malting Company were taken over by the Albion Brewing Company and the focus of the business shifted purely to beer production. Major changes are visible on the plan, including the addition of the cellar building and the addition of a cooperage building which ran east-west. The old cooperage was to be used as a shed. One unidentified building in the 1868 woodprint, is not visible late 1870s photo and appears to have been replaced with a shed in the 1878 plan. By 1889 this building had been removed.

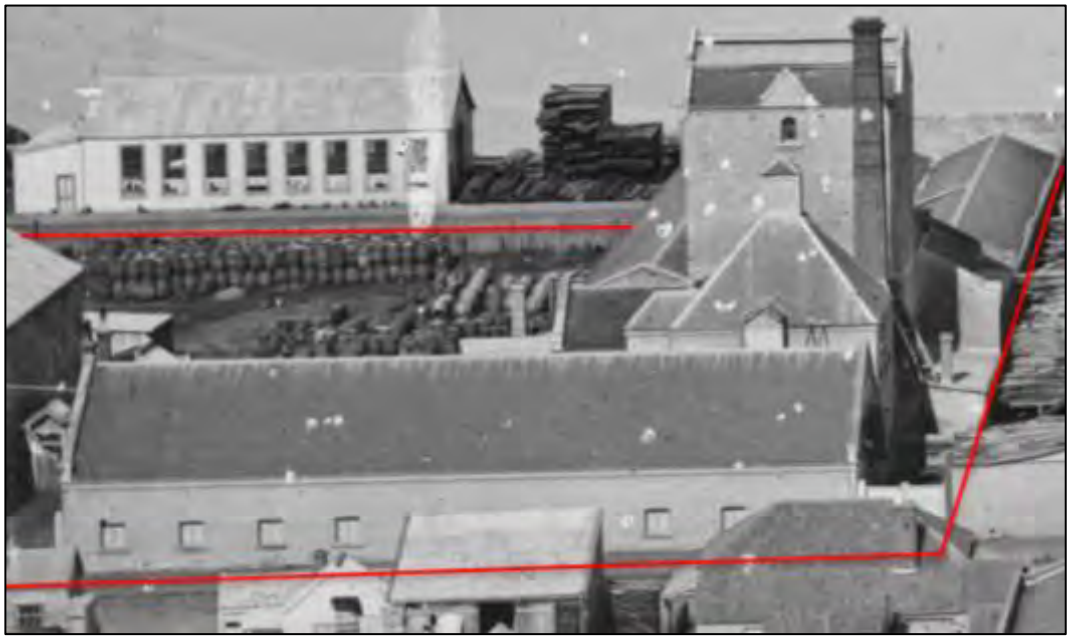

Figure 5-29. Detail from late 1870s photograph showing the approximate outline of site I44/817 in red (Burton Brothers Studio, n.d.). Photograph is looking east. Note the cellar multi-gable roof appears to extend all the way to the Castle Street footpath.

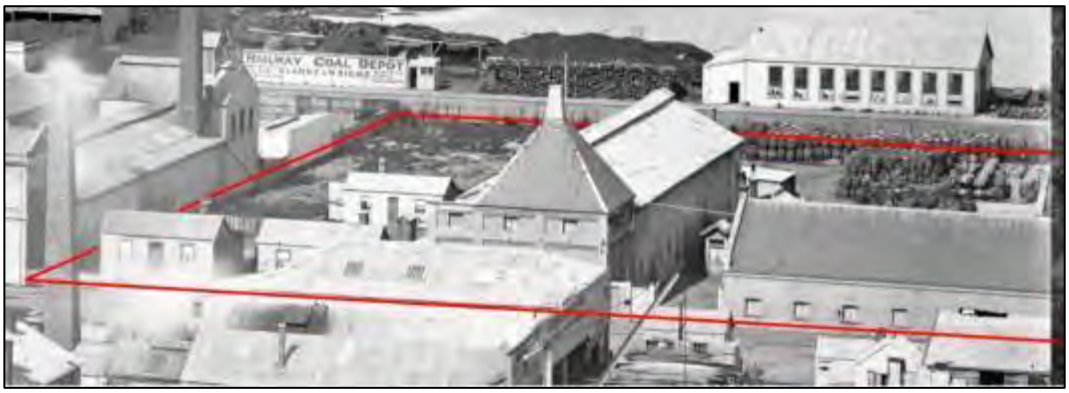

Figure 5-30. Detail from late 1870s photograph showing the approximate outline of site I44/817 in red (Burton Brothers Studio, n.d.). Photograph is looking east.

Marshall and Copeland purchased the Albion Brewing Company on Cumberland Street in 1878. An article produced a year later described the premises:

> "The buildings are mainly of brick and stone, with slated roofs. They were originally built for the New Zealand Distillery Company and are of the most thoroughly substantial character… the Albion company added several costly improvements such as a cellar, the estimated cost of which was £2000" (Otago Daily Times, 1879).

The outfit of the buildings wasn't suited to Marshall and Copeland's business, so they too made considerable changes replacing everything except for a 12-horse powered engine (Otago Daily Times, 1879). The description that follows indicates however that while substantial internal alterations were made the premises still continued with a number of the existing buildings:

> There are two malthouses, No. 1 is a substantial brick building 37 feet by 100 feet… the drying kiln is … 24 feet square, with a wirecloth floor 16 ft above the fire. The kiln is loaded by steam and the barley is taken in by the same means. This granary also contains eight large airtight malt bins. No. 2 is a building of brick and iron 54 feet by 121 feet… The kiln is 25 feet square with a wirecloth floor, 17 feet above the fire in this instance. Although the kiln is at a distance of over 210 feet from the steam, windless steam is utilised for loading in connection with it also.
>
> A great feature of the Albion Brewing buildings is the extensive cellarage and storage accommodations. The cellar covers over a quarter of an acre. It opens on to Castle Street and is connected with the main railway line by a siding running directly into the centre of it. It is floored with concrete throughout and an excellent system of drainage has been established by means of trap-sinks…the floor slopes in every direction to the sinks…Above the cellar… and communicating with it by a lift, is a floor for the storage of the beer in bulk.
>
> On the Premises is a workshop in which a lathe, small circular saw &c. are fitted up and here a good deal of carpentry work is done, and the spare wood utilised for making the bungs, &C. (Otago Daily Times, 1879).

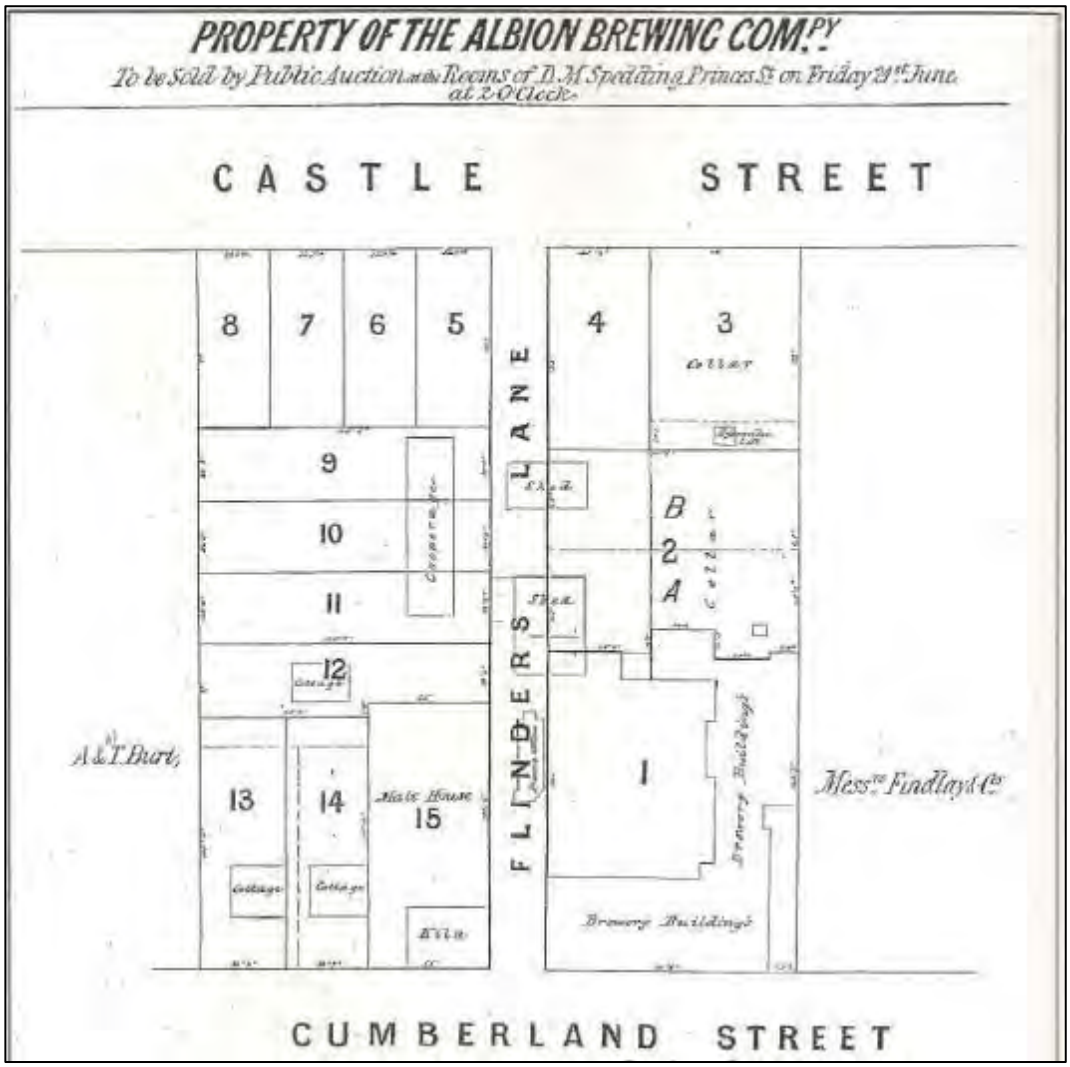

Figure 5-31. Detail from 1878 plan showing buildings on site I44/817 (A Farminer, 2014).

Details on the occupants of the cottages were scant following New Zealand Distillery Company, but they are present on plans until the early twentieth century. The 1886 rates records note that one of the cottages was owned by Bendix Hallenstein, one of the founders of the New Zealand Clothing Factory, the Drapery and General Importing Company and Hallenstein Brothers Ltd (Evening Star, 1905). It is highly unlikely that Hallenstein ever occupied the tiny timber cottage on Section 56, instead he probably purchased it as an investment and let it out to working-class occupants, possibly his own employees or those of the surrounding businesses. The other cottages were likely used for the same purposes by the various brewery owners, as New Zealand Distillery Company had, in a similar way to the workers' housing offered by the Speights brewery on Rattray Street during the nineteenth century (Gillies & Farminer, 2015).

The Albion Brewing Company continued to occupy the site until 1886 when they were declared bankrupt (Leckie, 1997). Marshall and Copeland sold the brewery to Williamson and Murray in 1887 (Taranaki Herald, 1887). The brewery buildings and land were owned by the Bank of New Zealand according to the 1889 rates records, and were periodically used by businesses such as agricultural agents Samuel Orr and Co. to display their wares (in this case farming machinery) to potential customers (Clutha Leader, 1890). Although an 1889 block plan still describes the brewery buildings as housing the Albion Brewery (Figure 5-32). This is likely indicative of G. Lintott & Co. who occupied and used the premises as the Albion Malt Houses (Leckie, 1997). By the time of an 1892 block plan the buildings are labelled as vacant (Figure 5-32), and they remained so until biscuit and confectionery manufacturer Richard Hudson and Co purchased the premises in 1898 (Southland Times, 1898). As noted above in the, the 1892 block plan also indicates that sometime between 1889 and 1892 the most northern cottage was removed from the property and with an A&T Burt building extending into Section 56.

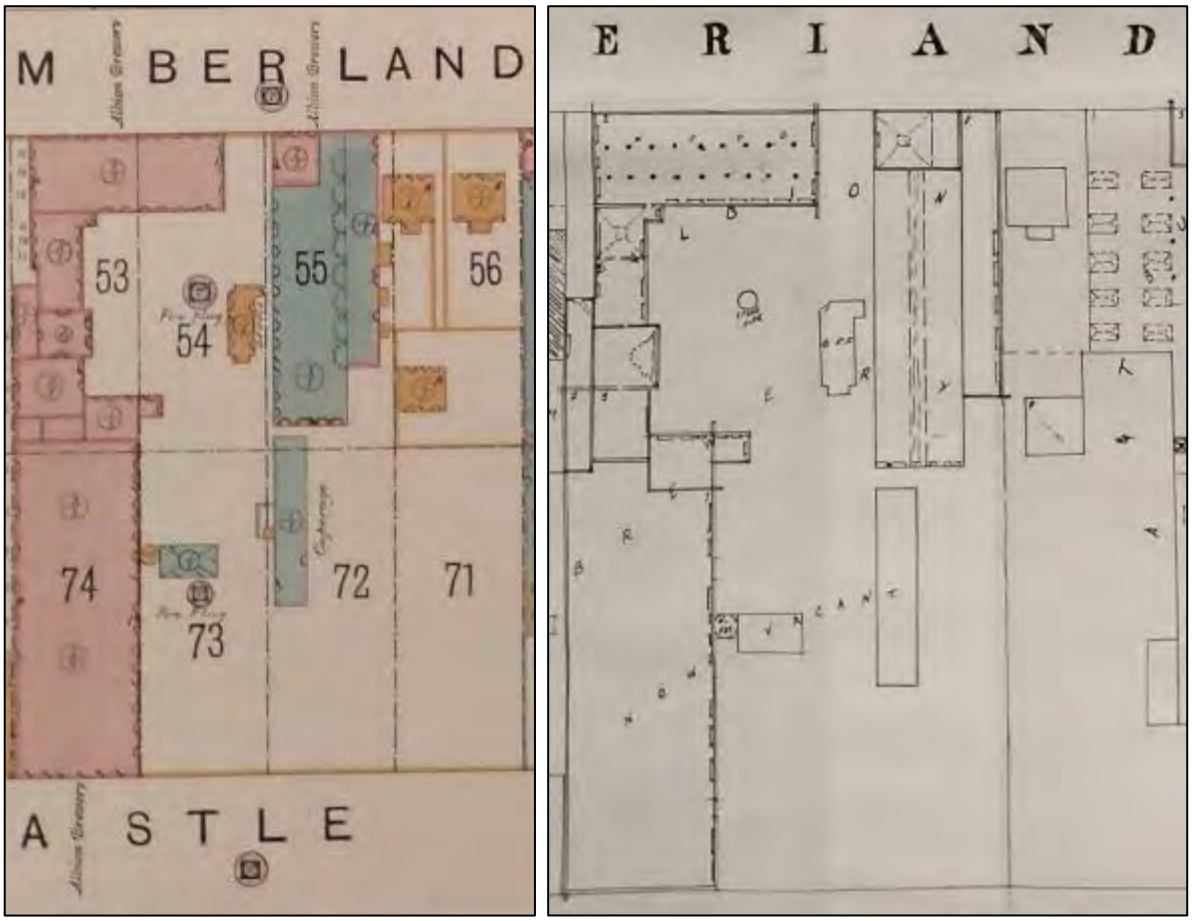

Figure 5-32. Left: detail of 1889 block plan showing brick (pink), timber (yellow) and iron (blue) buildings on site I44/817 (Bare, 1889). Right: detail of 1892 block plan showing buildings on site I44/817 (Jones, 1892).

5.2.4 1898-1930: R. Hudson and Co.

In 1898 R Hudson and Co. purchased the land within Sections 53 to 55, 72 to 74, and part Sections 56 and 71. Yet, the distillery premises at the time did not provide enough space for the expansion of Confectionery and biscuit manufacture (Otago Daily Times, 1900). Of the pre-1900 buildings on the premises, four buildings although heavily altered survive today: the 1868 granary/malt floor, the 1868 kiln, the 1868 possible small mill and the 1875 cellar building (Figure 5-33). The majority of alterations that have impacted these pre-1900 buildings have occurred in the twentieth century.

Figure 5-33 Plan of the Cadbury Block showing the location of site I44/817 (dashed white line), the pre-1900 buildings still present today.

Alterations to the Granary/Malt floor and Kiln Buildings (Cadbury World and Office Buildings)

The brick brewery buildings (granary/malt floor and kiln) along Cumberland Street were altered in nine phases in the late nineteenth and early twentieth century, eventually becoming part of the present-day Cadbury World and offices buildings. **Phase one** took place in 1901, as the building was extended to the south up to the property boundary (DCC archives). At the same time the southern end of the granary/malt floor was raised two storeys while the kiln at the rear was raised one storey so that the entire building was four storeys. The 1901 plan for this work shown in Figure 5-35 indicates that the existing brick work of the granary/malt floor façade was kept on the ground floor though earlier windows had been bricked in by this stage (DCC archives). It is interesting to note that there are slight differences in the facades seen in the 1901 plans and the panoramic view likely taken in 1905 (Figure 5-36). The latter image shows only three bays of windows in contrast to the four visible on the plans. This image also shows that the original northern extent of the granary/malt floor was retained. The raised storeys of the granary/malt floor feature two parallel gables running east-west. The gables are two different sizes, likely as they meet at the location of what was the load bearing southern external wall of the building.

Phase two of construction occurred behind the northern end of the granary/malt floor (DCC archives). Plans from 1909 indicate that a building that would become the mixing room and chocolate packing building in Section 54, was constructed in sections, starting with the rear of the building (Figure 5-37). This building had temporary iron walls to be removed when the building was extended to the west and north.

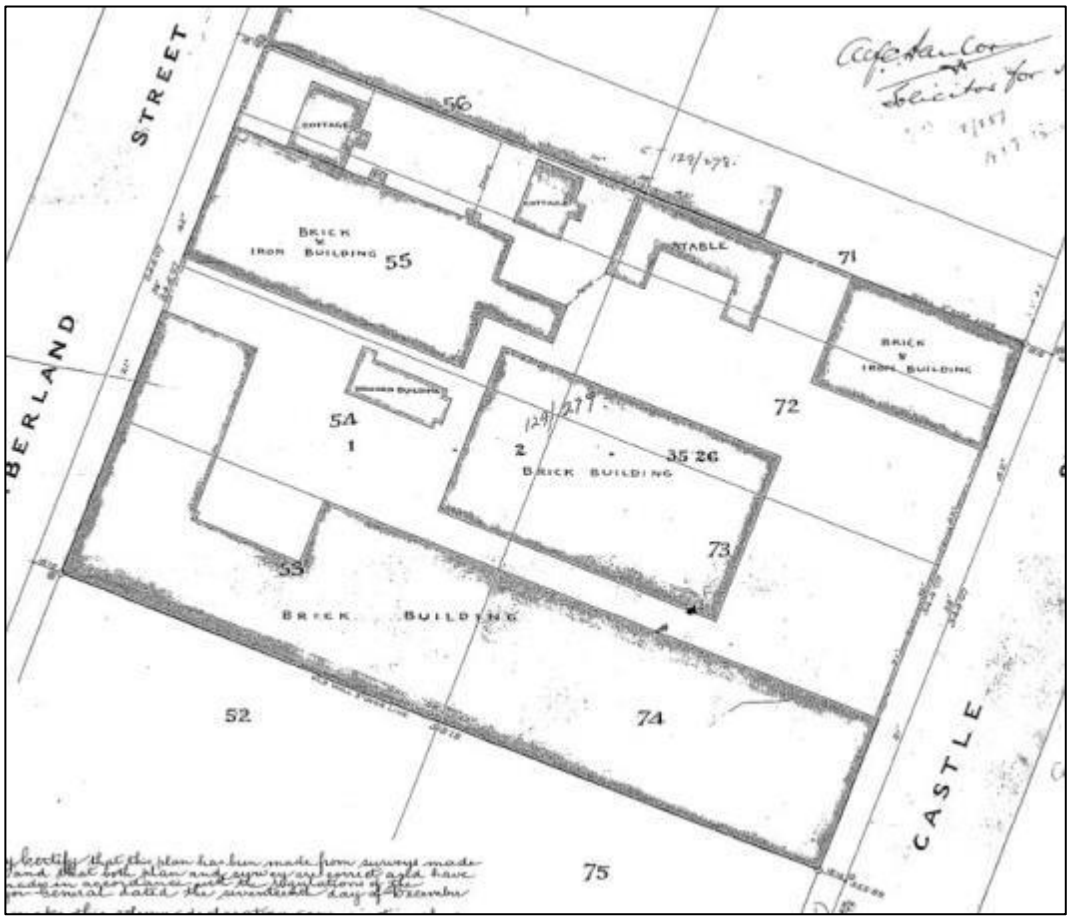

Figure 5-34. Detail from 1902 survey plan showing buildings on site I44/817 (DP 1589).

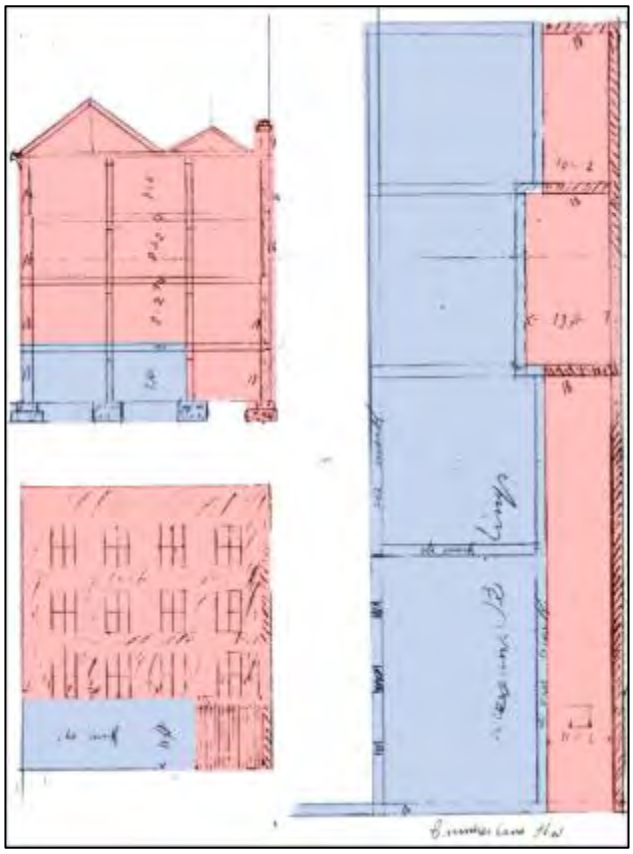

Figure 5-35 1901 plan showing the 1901 Phase one southern and upper extension (hashed lines and highlighted red) to the granary/malt floor and kiln buildings on Cumberland Street (DCC Archives). The 1868 building is highlighted blue. The profile view shows the Cumberland Street façade.

Figure 5-36. April 1901 photograph (top) showing the granary/malt floor building (highlighted blue) prior to the Phase one alterations (Muir and Moodie Studio, 1901). Part of a c. 1905 panoramic view (bottom) showing the 1901 Phase one southern and upper storey extension to the granary/malt floor and kiln buildings (highlighted red) (W Beattie & Co., n.d.). The 1868 central and northern extent of the granary/malt floor building is also visible to the north unaltered (blue). Note the biscuit factory in the background. The top photograph shows the 1901 factory, while the bottom photograph shows the almost identical 1902 building with "Hudsons" advertised on the roof.

Between 1901 and 1915 alterations were made to the central portion of the granary/malt floor (**Phase three**) (DCC archives). A further two storeys were added to match the southern portion of the building as shown in 1915 plans (Figure 5-38). These 1915 plans also show **Phase four**, the western extension of the building in Section 54, which encapsulated the northern extent of the granary/malt floor building. As a result of the multiple phases of construction the floors of the northern extent of the building do not align with the southern extent of the building (Figure 5-35 to Figure 5-37). Accordingly, the central **Phase three** addition aligns with the southern alterations during **Phase one**, while the northern **Phase four** alterations were built to align with the **Phase two** construction. **Phases three** and **four** may have occurred at the same time, but this is not clear.

Phase five comprised a northern extension and third storey added between 1915 and 1922 (Council of the Fire Underwriters Association of New Zealand, 1922). By 1922, the front of building housed a grain store, dinning and dressing room in Section 54 (Figure 5-38). This may have occurred at the same time as the western extension in **Phase four**. The Council of the Fire Underwriters Association of New Zealand 1922 plan indicates further changes in use of the interior of buildings by this time as the granary/malt floor had become a grain store and kiln building housed a smutters room. The building would eventually become what is today the Cadbury World building. The Phase two, four and five alterations are also shown to house a mixing room and chocolate packing department. This would eventually become what is today the offices building.

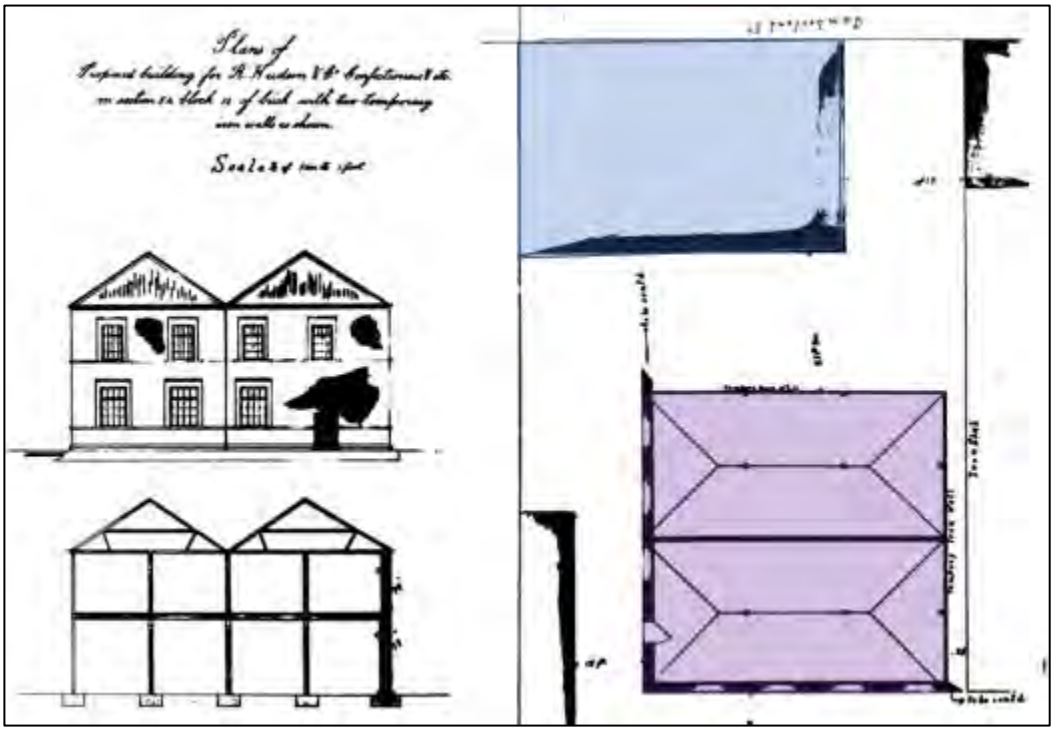

Figure 5-37 1909 plan showing the new building (Phase two) highlight purple that would be extended west to meet the northern extent of the granary/malt floor building highlighted blue. Note the temporary iron walls for further expansion (DCC Archive).

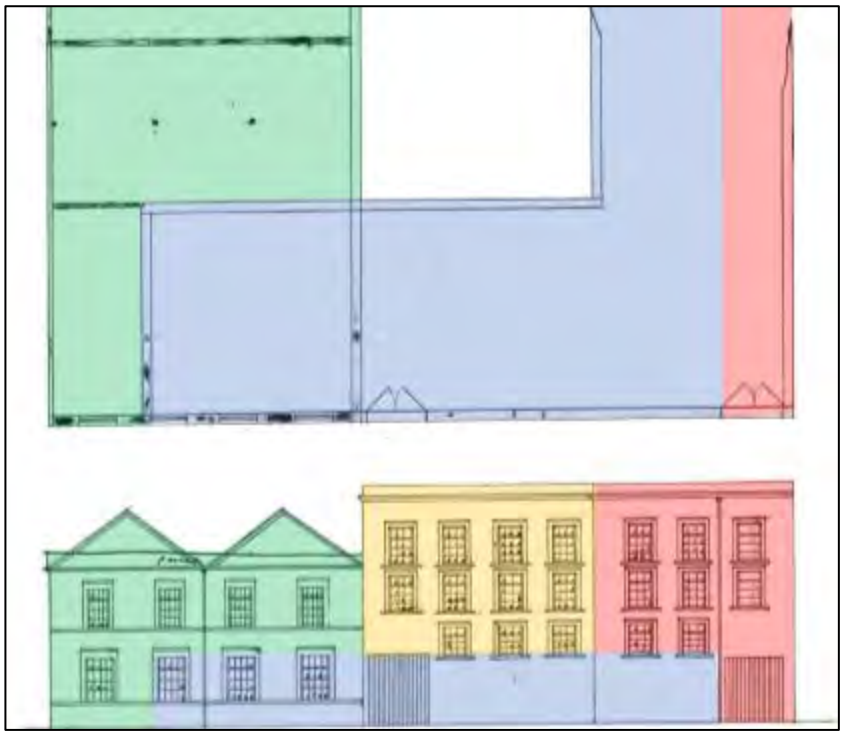

Figure 5-38 1915 plans showing the Cumberland Street façade of the granary/malt floor and kiln buildings (DCC Archive). The original 1868 granary granary/malt floor and kiln buildings are highlighted blue (note that while the mezzanine or first storey of granary/malt floor building is original, the windows were added during Phases one and three). Subsequent alterations are highlighted red for Phase one (1901), yellow for Phase three (1901-1915), and green for Phase four (1915). Phase two (1909) is not visible, even in the plan drawing, as it is immediately out of picture behind Phase four.

The next phase, **Phase six**, represents the construction of a large four storey concrete building to the rear of the mixing room and chocolate packing department. It is possible this concrete structure may have completely replaced the earlier **Phase two** 1909 brick building at this location as well as part of the extensions undertaken in **Phases four** and **five**. The new building is visible in a circa 1922 to 1924 photograph (Frank Duncan and Co. c. 1922-1924). As such, this is possibly the building completed by the Fletcher Construction Co for R. Hudson and Co in 1922 (Progress, 1922). Fletcher Construction Co had had used a concrete distributing method for the first time in the South Island to complete the building.

Between 1922 and 1924 the building was extended to the north (connecting it with the a garage building) (**Phase seven**) (DCC Archives) and by 1926 the fourth storey (with a mansard roof) was added to the front of the building (**Phase eight**) (Figure 5-41 and Figure 5-42), part of which would be used to provide space for a box factory (DCC Archives). Another extension immediately behind the granary/malthouse had been completed by 1927, a confectionery factory (**Phase nine**) (Figure 5-41) This may have occurred during phase eight, however this is unclear. Furthermore while 1927 fire insurance plans show the extension, they do not indicate how many storeys it was at this time. By 1942 aerial photographs indicate it was four storeys in height, aligning with the **Phase six** concrete building to the north.

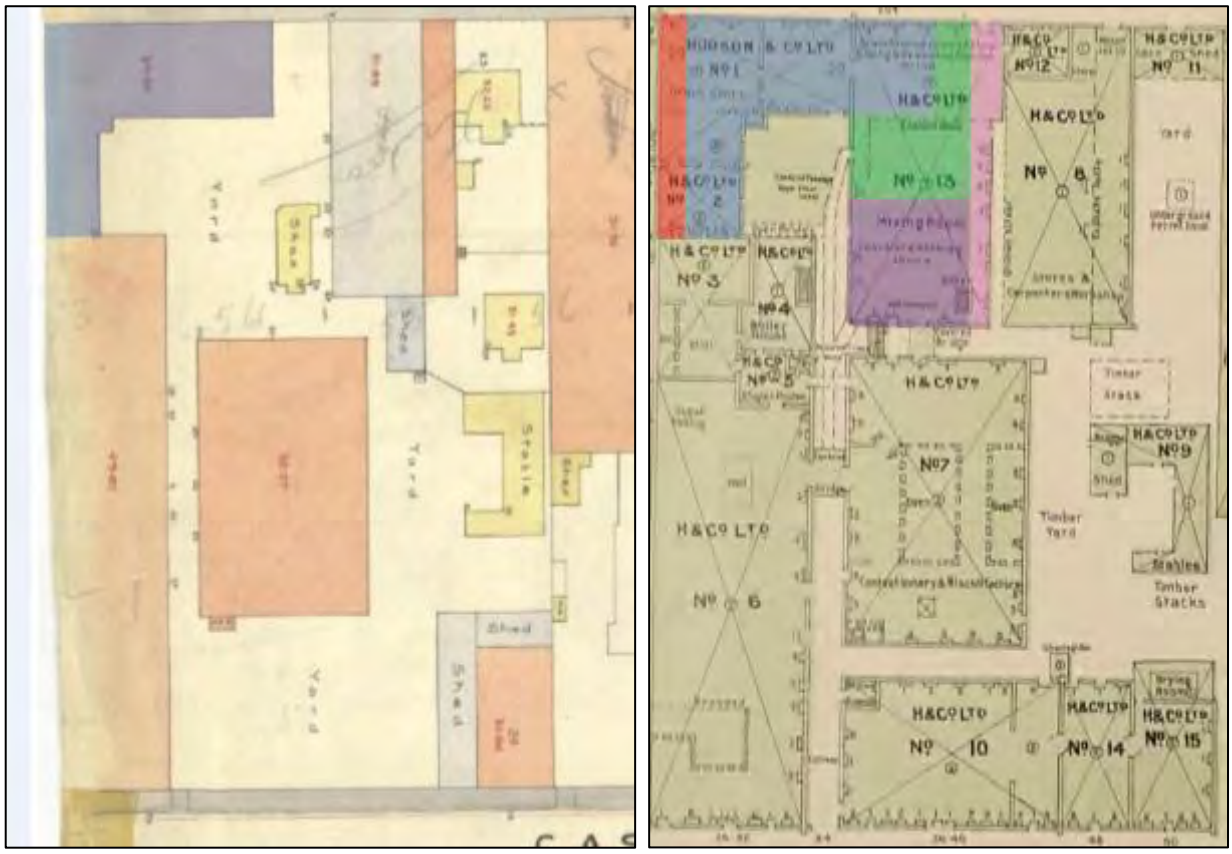

Figure 5-39. Left: detail of 1905 drainage plan showing brick (orange), timber (yellow) and iron (blue) buildings on site I44/817 (Dunedin Drainage and Sewerage Board, 1905). Right: detail from 1922 plan showing buildings and occupants on site I44/817 (Council of the Fire Underwriters Association of New Zealand, 1922). The original 1868 granary granary/malt floor and kiln buildings are highlighted blue. Subsequent alterations are highlighted red for Phase one (undertaken in 1901 and present by 1905 but just out of picture on the right image), purple for Phase two (1909), green for Phase four (1915), and pink for Phase five (1915-1922). Phase three (1901-1915) here is not shown on these plans it featured additional upper floors only rather than a horizontal extension.

Figure 5-40 Circa 1922-1924 photograph showing buildings the alterations granary/malt floor and Kiln buildings (Frank Duncan and Co. c. 1922-1924). The original 1868 granary granary/malt floor and kiln buildings are not visible; however, subsequent alterations are highlighted red for Phase one (1901), yellow for Phase three (1901-1915), green for Phase four (1915), pink for Phase five (1915-1922), and brown for Phase six (1922).

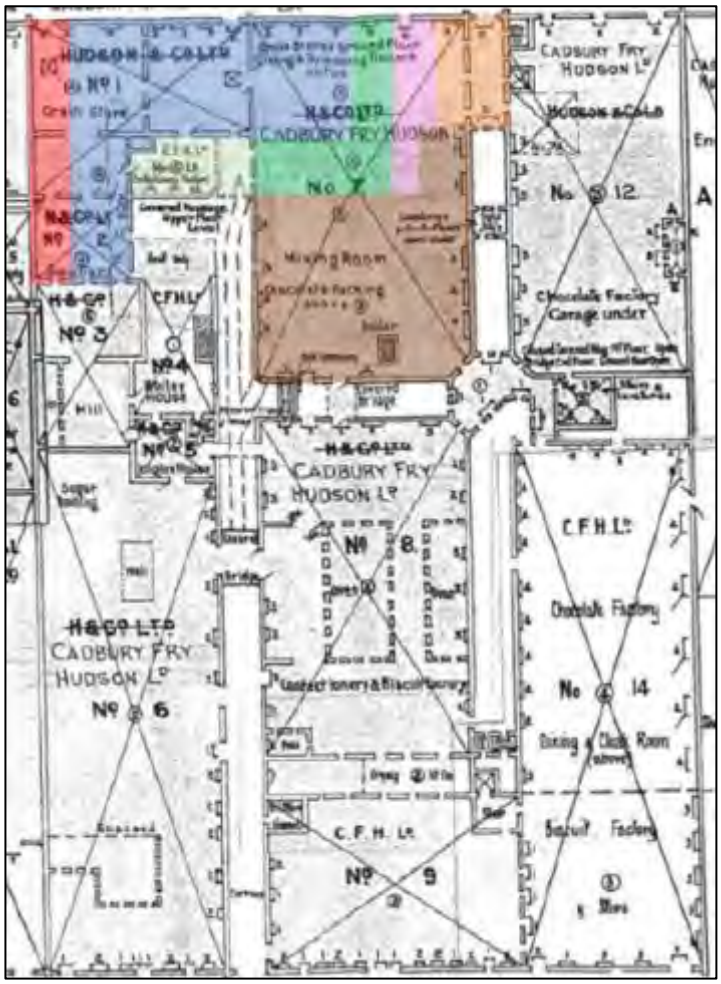

Figure 5-41. 1927 Fire Insurance plans. The original 1868 granary granary/malt floor and kiln buildings are highlighted blue. Subsequent alterations are highlighted red for Phase one (1901), green for Phase four (1915), pink for Phase five (1915-1922), brown for Phase six (1922), orange for Phase seven (1924) and light green for Phase nine (1927). Note that Phase two is not present and the Phases four and five alterations have been shortened as a result of the construction of the Phase six building.

Figure 5-42 Photograph looking east at the Cumberland Street façade showing changes to the original 1868 granary granary/malt floor and kiln buildings are highlighted blue. Subsequent alterations are highlighted red for Phase one (1901), yellow for Phase three (1901-1915), green for Phase four (1915), pink for Phase five (1915-1922), orange for Phase seven (1924) and light blue for Phase eight (1924-1926).

Alterations to the Cellar and Small Mill (Dairy and Machine House Building)

As noted by Farminer (2014) the earliest clear views of the Castle Street frontage are from 1902 and circa 1903-1906 photographs (Figure 5-43 and Figure 5-49). The masonry frontage with a central access way to the more industrial cellar visible is different to those from the late 1870s photographs in which the buildings multi-gable

roof appears to extend all the way to the Castle Street footpath. These early twentieth photographs indicate that the façade had been altered sometime between the late 1870s and 1902. R Hudson and Co. were listed at this address in street directories from 1902 onwards, and by 1910 had converted the Castle Street front of the building into offices. One significant alteration to this building was the façade change in 1918 shown in Figure 5-49 (Brooks & Jacombs, 2010; A Farminer, 2014; Parkinson, 2011). Three windows on the first floor had been removed; an awning, a large doorway and adjacent public double door entranceway installed; and, a redesigned arched parapet with signage was further added. The brick work was exposed, and relief rusticated plasterwork used for the ground floor façade. The central portion of the cellar building itself would become home to a finished goods store and dairy, housing a milk condensing plant. It is unclear when this change occurred except that it was early in Hudson's ownership of the property (Brooks & Jacombs, 2010; A Farminer, 2014; Parkinson, 2011). Plans from 1922 show that a covered bridge was constructed from the second floor of the central cellar building through to the 1902 biscuit factory, providing easy access to the dairy and finished goods store. These same plans show that the pre-1900 possible small mill, now with a second storey added sometime after 1889, had been converted into engine house and it opened to connect through into the cellar building (Figure 5-39).

Figure 5-43. Top: 1902 photograph of the cellar building with the office alterations at the front along Castle Street (red arrow) (Muir and Moodie Studio, 1902).

Figure 5-44. Top: 1903-06 photograph of the biscuit factory in Town Sections 72 and 73 to the left of the offices in Town Section 74. Bottom: altered 1918 façade of the Hudson building in 1928 (Figure 12 in Brooks & Jacombs, 2010).

Pre-1900 buildings and Post-1900 Buildings No Longer Present

Alterations were made to other pre-1900 buildings, and over time they were gradually replaced through the site. Between 1905 and 1922 the two remaining cottages were removed, while the office building labelled shed in the 1905 plan was removed around 1909 when another building was constructed at this location (Phase two of the granary/malt floor alterations discussed above) (Figure 5-45). Plans from 1922 show the mill was still present behind the kiln building in the 1922 building, adjacent to a boiler house and engine house (former possible small mill). Power was also first installed to the flour mill off castle street in 1908. This was the first flour mill to connected to Waipori Power – the first hydro-electrical generation system to be publicly owned in New Zealand (Evening Star, 1908; Findlay, 2009).

Upon taking over the premises, R Hudson and Co began a series of improvements, constructing numerous new buildings beginning with a new three storey biscuit factory on Sections 72 and 73 in 1901 (Figure 5-34) (Parkinson, 2011). To make way for the factory, the malt house to the northeast was shortened. The factory was 70 ft by 100 ft (Otago Daily Times, 1900) The walls of the factory were strengthened using steel bands left over from the barrels of the distillery. A travelling oven from Hudson's earlier factory in Moray Place was also installed in the new factory (Comer, 1973).

This building was short lived as it was destroyed by fire in mid-1902. Reports suggest that, although the fire was intense and destroyed the biscuit factory and all of its contents, no other parts of the site were significantly affected (Lake County Press, 1902). Within five weeks the factory was producing biscuits again. The walls were left standing due to the steel bands put in place and it was thus possible to cover the structure with a temporary roof. But by 1903 the factory had been completely rebuilt and was operating (Parkinson, 2011). The new building also included one of the first automated Grinnell Sprinkler systems used in Dunedin (Ingram & Clements, 2010). This system proved its worth as eight years later another fire on R Hudson and Co. premises was quickly confined through the successful use of the sprinkler system.

Between 1892 and 1902 two further buildings were also constructed to the north of the biscuit factory. These buildings were stables and a brick building with two adjacent iron sheds. The exact function of the brick building is unclear. It is likely that these buildings were constructed soon after R. Hudson Co took over the property and in 1904 Hudson added a second storey to the brick building (Figure 5-46).

In 1905 plans were submitted to DCC for a brick cloak room building between Castle Street and the biscuit factory. This building can be seen in Figure 5-49 to Figure 5-52. The two photographs also show a substantial wall in front of the cloak room. This building was replaced between 1907 and 1922 by the much larger building across Sections 72 and 73 (Buildings No. 10 and 14 in Figure 5-45) visible in the 1907 plans (Figure 5-50, Figure 5-51 and Figure 5-52) and the 1928 photograph (Figure 5-49). In the 1922 plan this building is shown to extend north and adjoins the earlier brick building, built sometime between 1892 and 1902 in Section 71 (Building No. 15 in Figure 5-45).

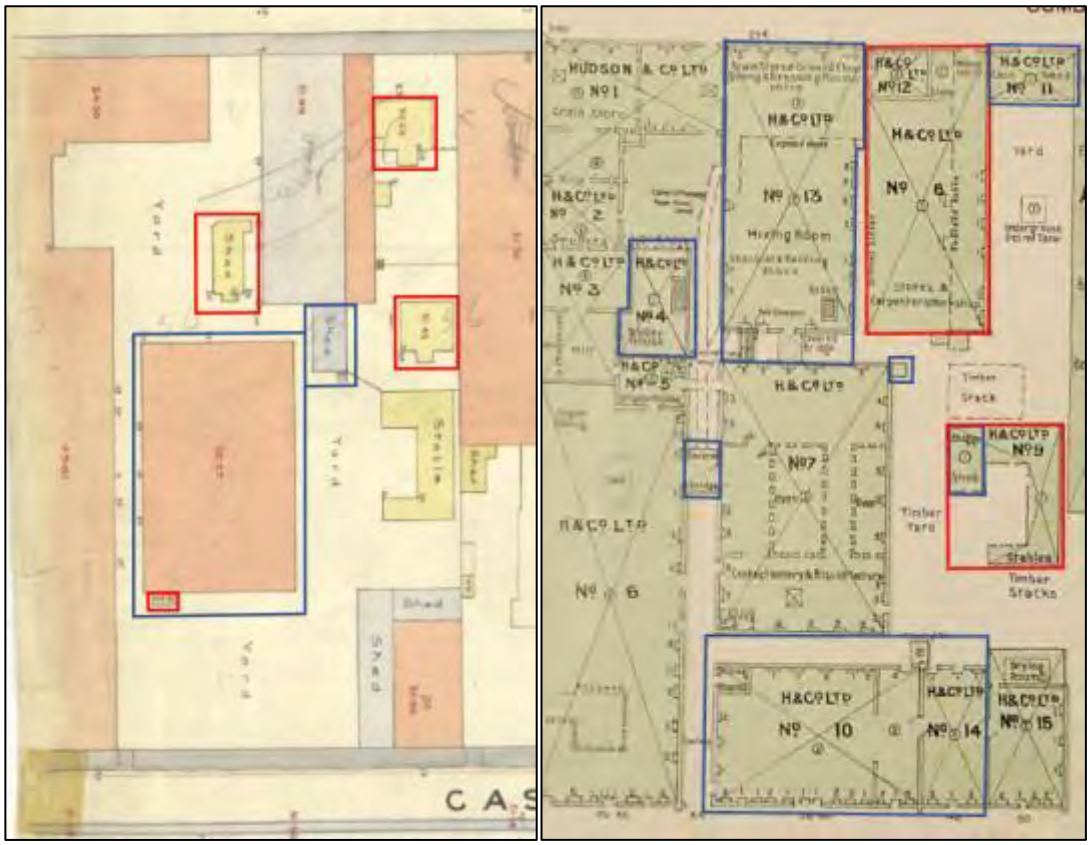

Figure 5-45. Left: detail of 1905 drainage plan showing brick (orange), timber (yellow) and iron (blue) buildings on site I44/817 with pre-1900 buildings removed by 1922 outlined red and buildings constructed between 1898 and 1905 outlined blue (Dunedin Drainage and Sewerage Board, 1905). Right: detail from 1922 plan showing buildings and occupants on site I44/817 with pre-1900 buildings removed by 1930 outlined red and buildings constructed between 1905 and 1922 outlined blue. Building No. 11 had also been removed by 1927 (Council of the Fire Underwriters Association of New Zealand, 1922).

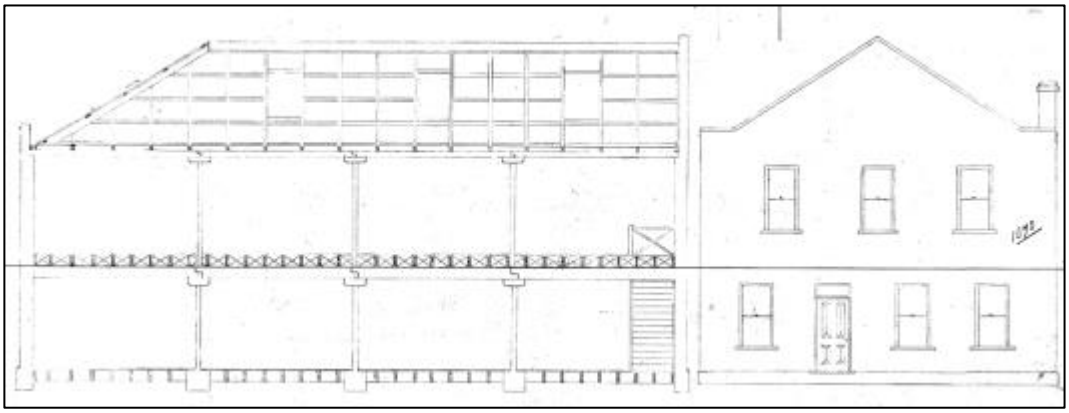

Figure 5-46 1904 plan for a second story for the brick building on Section 71 (DCC Archives).

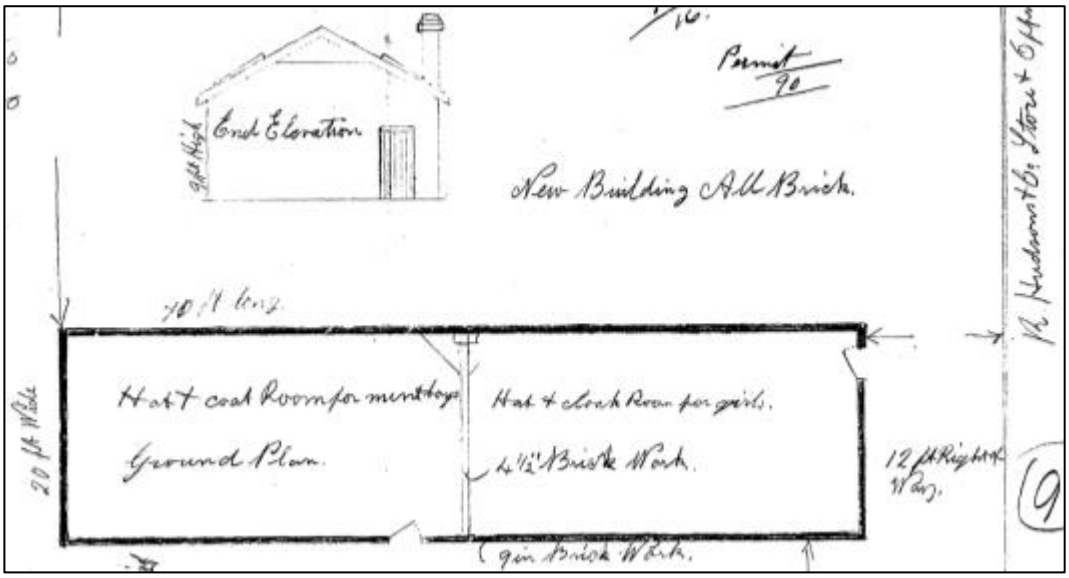

Figure 5-47 Plans for a cloak room in front of the three-storey brick biscuit factory (DCC Archive)

Figure 5-48. Photograph from 1906 showing the southeast end of the Cadbury factory site (Auckland Weekly News, 1906)**.**

Figure 5-49. Top: 1900s photograph of the Biscuit factory in Town Sections 72 and 73 to the left of the offices in Town Section 74. Bottom: altered façade of the Hudson building in 1928 (Figure 12 in Brooks & Jacombs, 2010).

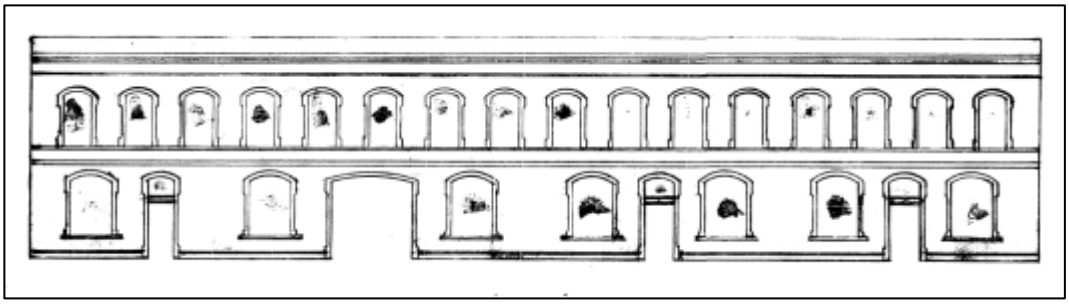

Figure 5-50 1907 plans showing the building façade along Castle Street built between 1907 and 1910 on Sections 72 and 73 (DCC Archive).

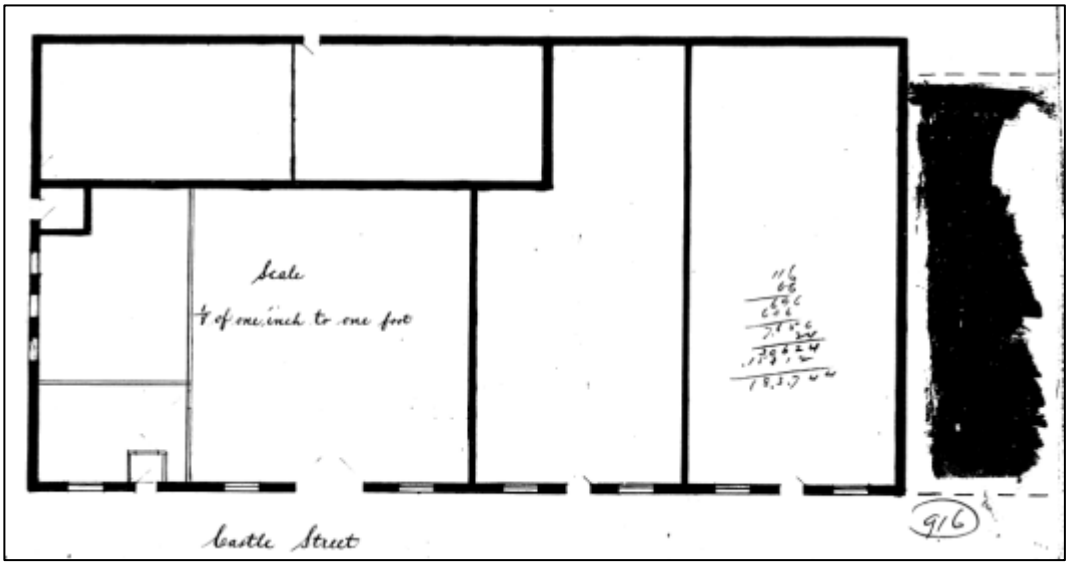

Figure 5-51 1907 plans showing the building along Castle Street built between 1907 and 1910 on Sections 72 and 73 abutting the earlier brick building in Section 71. (DCC Archive).

Figure 5-52. 1922 façade of the Dairy and Office Building and Biscuit factory in Town Section 72 and 73 abutting the earlier brick building in Section 71 (Anon., 1922).

Construction of the Chocolate Factory and Garage Building

The stores and carpenter's workshop (which had been converted in the early twentieth century from the kiln and malt house at this location), had been removed by 1924 (Building No. 8 in Figure 5-45) replaced by a chocolate factory and garage, still present today (Building No. 12 in Figure 5-41). This building had also been constructed in multiple phases. The rear section of the building is visible in the 1922-24 photograph (Figure 5-40) and given this buildings similarity to the upper floors of the mixing room and chocolate packing building to the south, they were likely constructed at the same time. Thus, this section may have been completed by the Fletcher Construction Company in 1922 as well thus forming **Phase one** of construction (Progress, 1922). At the same time or immediately after this the ground floor garage at the front of the building was constructed in **Phase two.** The eastern notch of the rear initial concrete phase can be seen to the rear of 1922 plans for the garage (Figure 5-53). This garage may have been present by the time the 1922-24 photograph was taken; however, the view of this part of the building is obscured. Two extra storeys were added in **Phase three** to the front of the building in 1924 (Figure 5-54). Both the 1922 and 1924 plans (Figure 5-53 and Figure 5-54) show the factory and garage building adjoining to the chocolate packing and mixing room building to the south, indicating that between 1922 and 1924, the latter building had been extended north (Phase seven of the granary/malt floor alterations discussed above). The façade of the Chocolate Factory and Garage Building extended into the chocolate packing and mixing room building to the south.

Construction Chocolate and Biscuit Factory Building

Plans from 1924 indicated that a concrete building was to be built behind the Chocolate Factory and Garage Building (Figure 5-55). The plans indicate that there were to be future extensions east towards Castle Street. By 1927 this building (Building No. 14 in Figure 5-41) had been extended east to connect with the older two most eastern buildings on Sections 71 and 72 (Buildings No. 14 and 15 in Figure 5-45). Together these would form a dining, cloak room, Chocolate and Biscuit Factory

The initial construction and extension of the building saw the removal of the nineteenth century stables buggy building (Building No. 9 in Figure 5-45). The buggy building had been constructed between 1905 and 1922. Later twentieth century excavations for a cocoa storage tank came across a large horse bone possibly associated with the stables (Thomson, n.d.), suggesting archaeological remains associated with the stables have not been completely destroyed. Similarly to the Chocolate and Biscuit Factory in Sections 71 and 72, the 1902-3 biscuit factory was also

extended east to connect with the remaining older buildings forming the Castle Street Façade in Sections 72 and 73 (Buildings No. 8 and 14 in Figure 5-41).

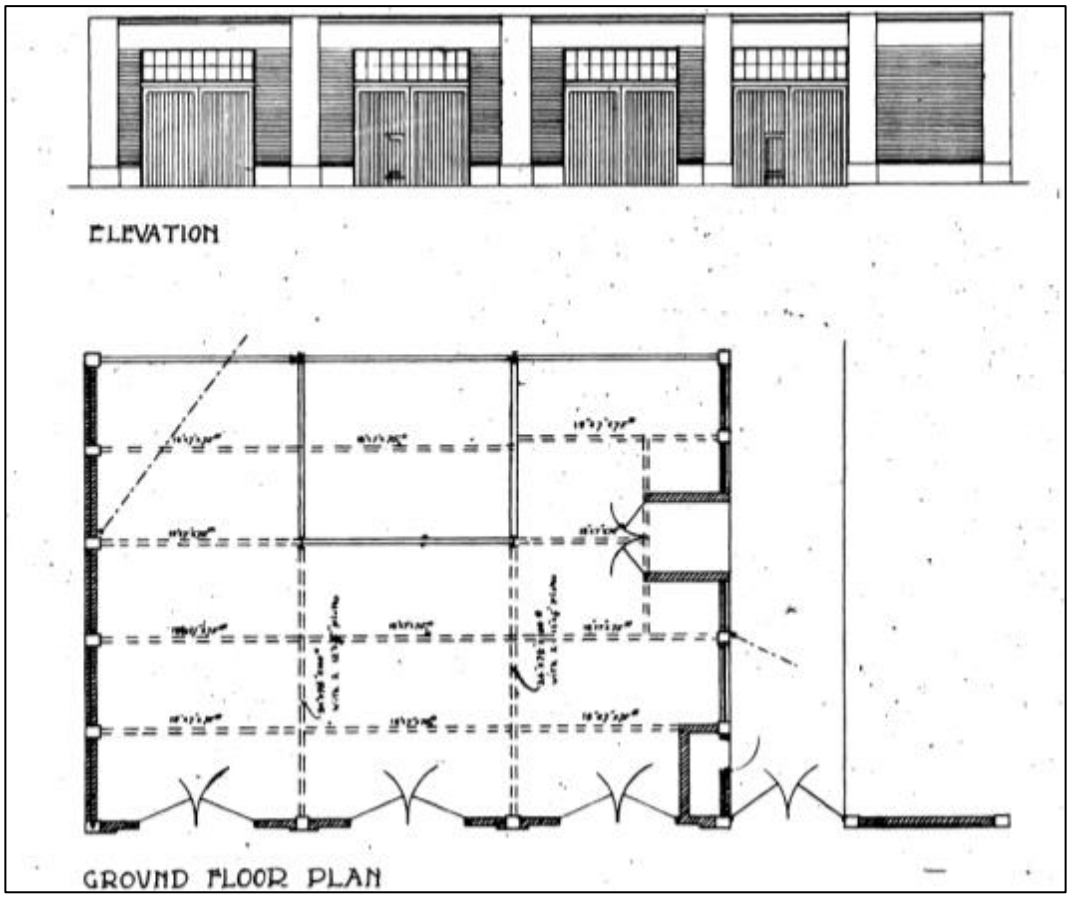

Figure 5-53 1922 plans showing the ground floor and Cumberland Street Façade of Building No. 12 (DCC Archives).

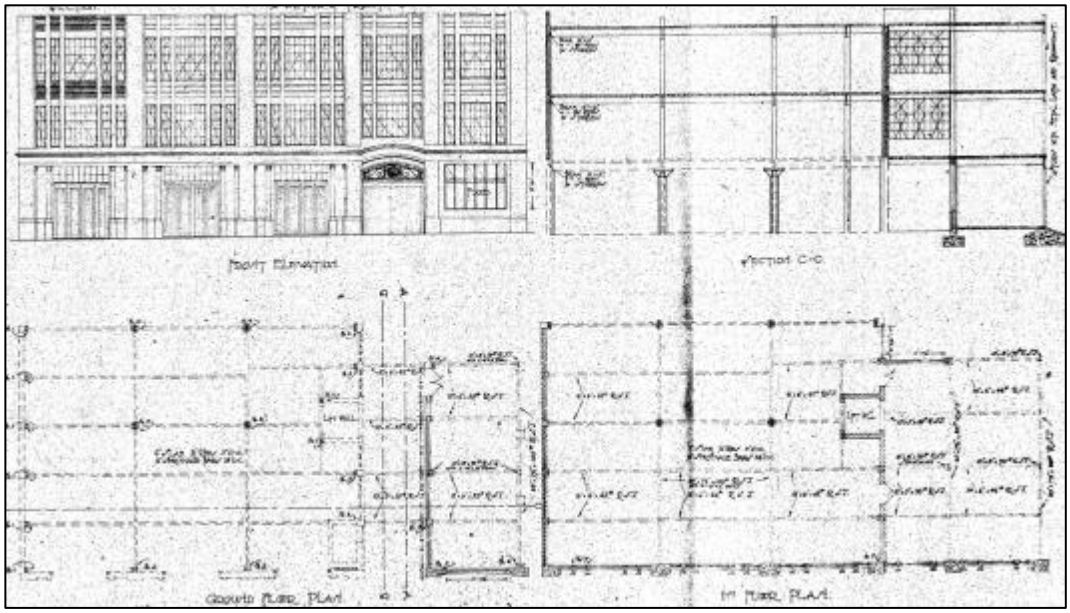

Figure 5-54 1924 plans show two further storeys at the front of Building No. 12.

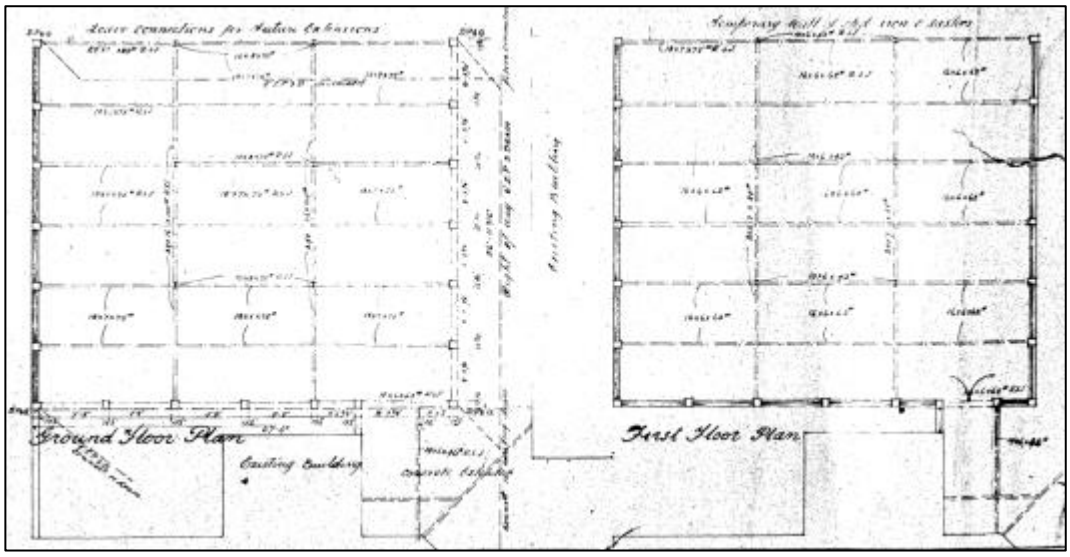

Figure 5-55 1924 plans showing the new factory to be built towards the rear of Sections 71 and 72

5.2.5 1930-Present: Cadbury Fry Hudson Onwards

When the R. Hudson and Co. merged with the Cadbury and Fry companies, Cadbury Fry Hudson was established in 1930 and further alterations to the premises occurred, including modifications to some of the remaining nineteenth century buildings.

Alterations to the Granary/Malt Floor and Kiln Buildings (Cadbury World and Office Buildings)

The most significant change to the pre-1900 granary/malt floor and kiln building or what had become the grain mill (and what would eventually become part of the Cadbury World Building), was the removal of the original pre-1900 mezzanine floor, and the remaining first and ground floors were reinforced in 1959 (Figure 5-56). Plans for this work were prepared by Stevenson and Williams. The last major change to the building was the refitting to establish Cadbury World in 2001 and the Cadbury Café in 2014 on the ground floor.

In 1958 plans were drawn up to replace the timber floors of mixing room and chocolate packing building (later office building) on the ground and floors with reinforced concrete, and it is likely that the work was completed the following year ("Cadbury Site Buildings – Block 1a-6a," n.d.). Originally, the first floor of the mixing room and chocolate packing building (later office building) had incorporated the northern extent of granary/malt floor building; however, the 1958 plans show that the north and east brick walls were removed. The building was eventually refitted for offices and reception in 1983.

Alterations to the Cellar Building and Possible Small Mill (Dairy and Machine House Building)

Early changes to the cellar building by Cadbury, Fry Hudson included the installation of a milk processing plant imported from Bourneville (Building No. 6 in Figure 5-41) (Barringer, 2000), while a 90 ft concrete chimney stack was constructed in the possible small mill in 1931. This building was later referred to as the engine room followed by mixing room (Building No. 5 in Figure 5-41)[1] (A Farminer, 2014). By 1947 a staff lunchroom had been constructed on the top of the cellar building and can be seen in 1958 photograph (Figure 5-57) at the east end of the building (A Farminer, 2014). In 1949, vents were added to the gable roof structure of the cellar building, which likely occurred at the same time as the roof structure and timber floor were removed to be replaced by a steel framework structure at the west end of the building for a milk processing plant (A Farminer, 2014; Oakley Gray Architects Ltd., 2010).

The building façade was altered again in the mid-twentieth century. Between 1947 and 1954 the building was plastered (A Farminer, 2014). In 1957, plans were submitted to the council to modernise the façade (Figure 5-58),

[1] The top of the chimney stack was reduced to 3m in 2017 as it was an earthquake risk (Otago Daily Times, 2017).

which essentially stripped the plaster and brick detailing installed in 1918. The awning was removed and replaced with a smaller canopy while the frontage was completely covered with a plain cement render and new concrete parapet (Figure 5-58 and Figure 5-59). The plans for this alteration were prepared by Miller, White and Dunn.

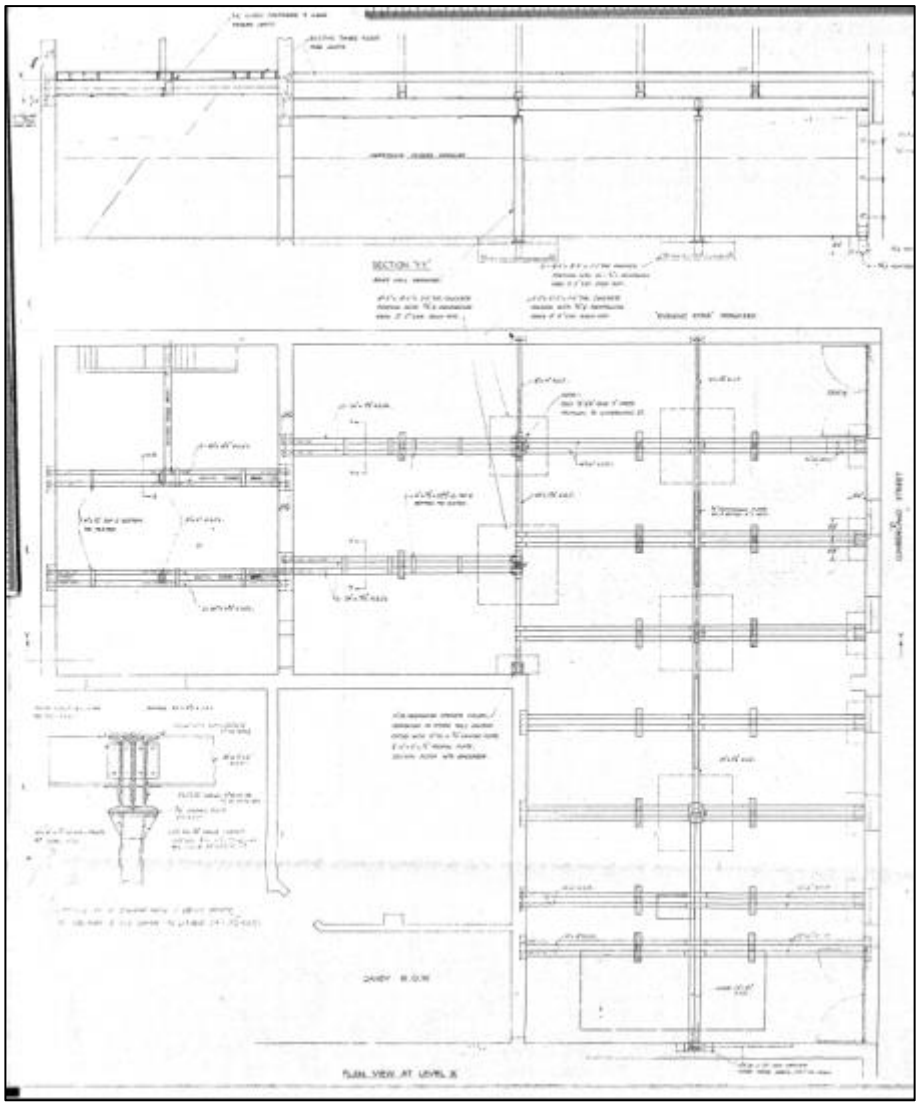

Figure 5-56 Reinforcement plans by Stevenson and Williams for the first floor of the grain mill (former granary/malt floor and kiln building) (DCC Archives Property Files).

Various internal changes were further made to the building with 1959 plans (DCC Archives) indicating that the concrete flooring in the central portion of the building was higher than the southeast corner which was to be built up to the same level at this time (Figure 5-60). The plans further indicate that the floor was to be raised to match the existing level and that stairs were shifted from this same area to slightly further west (Figure 5-60). In the early 1960s the temporary corrugated first floor of the machine house was replaced by brick (Figure 5-61 and Figure 5-62). Major alterations were made to the first floor of the eastern office extent of the cellar building in 1966 (Figure 5-63 and Figure 5-64). Plans of the first-floor show that the offices on the first floor had a unique design with bay windows to the rear looking out over a small garden.

In 2016 and 2017 works began to redevelop and restore the cellar building which had not been used since the mid-2000s (Morris, 2017). The plans for the changes were designed by Origin Consultants, while the engineer for the project was Steve Macknight and the builders Cook Brothers Construction (DCC Archives). During this time, the lunchroom was removed at the eastern end of the building and the roof replaced. However, Mondelez, who owned the company at the time announced the closure of the Dunedin factory. They would go on to sell the land to the Crown for the development of the new Dunedin Hospital. In 2018 they completed the restoration of the façade

(leaving the interior of the building unfinished) as the "last official act" undertaken by the company (Edwards, 2018).

The cellar building façade was reconstructed to a design based on the 1918 frontage. This involved partial demolition of the 1950s and 1960s façade, that had replaced the earlier curved and architecturally designed detailing of the parapet. As such the parapet was reduced and returned to its 1918 curved appearance with central plaster panel. The work repairing and redecorating the timber sash windows (Ryder Consulting Limited, 2016), as well as decorative work to restore the 1918 architectural design, aesthetic and historical value such as plasterwork detailing, mouldings, lintels, ashlar banding, cornices and relief decoration ("HNZPT Listing Documents: List No. 2143," n.d.).

Plans included removing the ground-floor window in the centre, and enlarging the opening to the wider 1918 doorways, with the ground floor windows either side to be removed, and wider windows added that also matched the 1918 design. These changes were to re-establish the lost architectural and aesthetic values, as well as its historical connections to the Cadbury Fry Hudson company by reigniting its prominence as the main entrance and headquarters (Andrea Farminer, 2016) However the as-built design in 2018 varied slightly as the wide windows are located in the centre of the building, while two double glass doors are situated either side where the windows were previously situated. The doors feature the same plasterwork moulding above as was formerly over the windows in 1918, and thus similar aesthetic and architectural values were still increased through the works, although historic value were lowered slightly by the change of plans.

A two-colour paint scheme was also used. This was to align with standard branding of the Cadbury's company as well as "break up the surrounding monochromatic streetscape and … return an element to the Anzac Square/Railway Heritage Precinct" (Ryder Consulting Limited, 2016) Other elements incorporated included restoring a central flagpole to the building. Plans also included the re-instalment of canopy over the central portion of the building as it was a considered a significant feature of the 1918 façade again re-establishing its historical connections to the Cadbury Fry Hudson company marking its prominence as the main entrance and headquarters. However, this was not completed during the 2018 changes and marks a distinct difference from the 1918 appearance of the façade (Andrea Farminer, 2016)

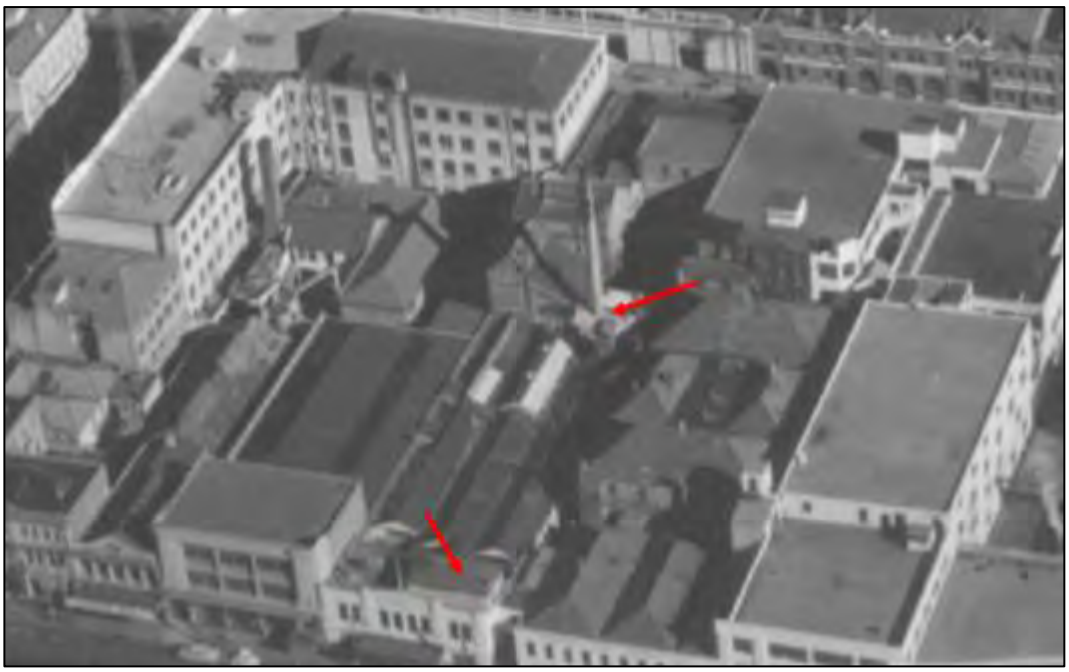

Figure 5-57 1957 aerial photograph showing lunchroom addition to the cellar building and chimney stack alterations to the possible small mill building (red arrows).

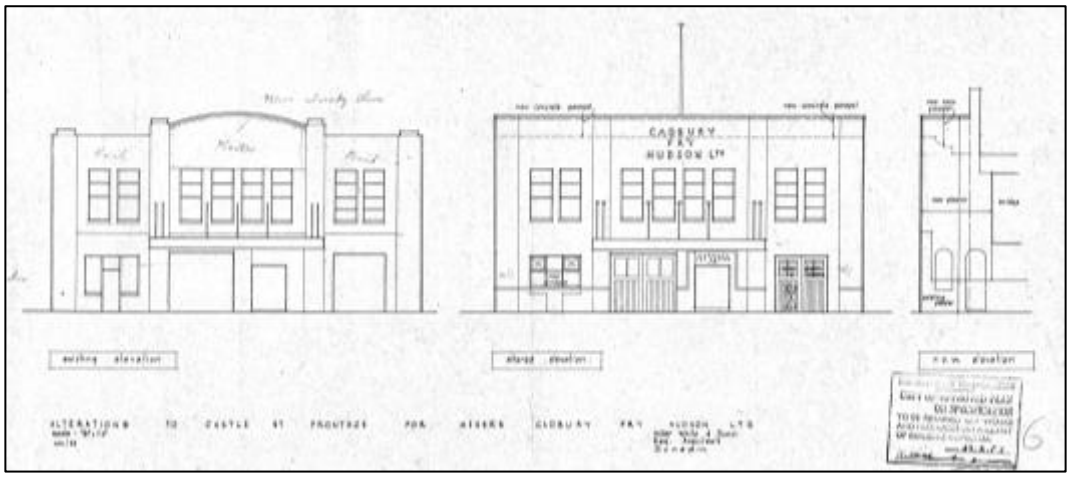

Figure 5-58 1957 plan of façade changes (DCC Archives Property Files).

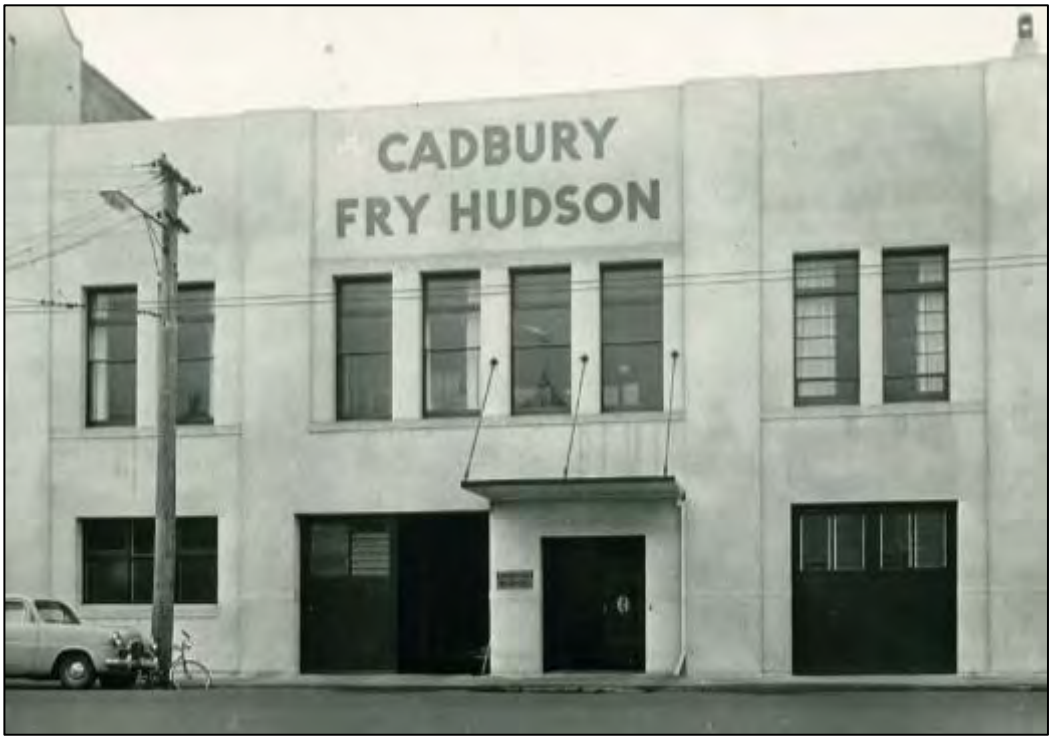

Figure 5-59. Former Dairy and Machine House Building around 1968 showing the later cement plaster render (Figure 13 in Brooks & Jacombs, 2010).

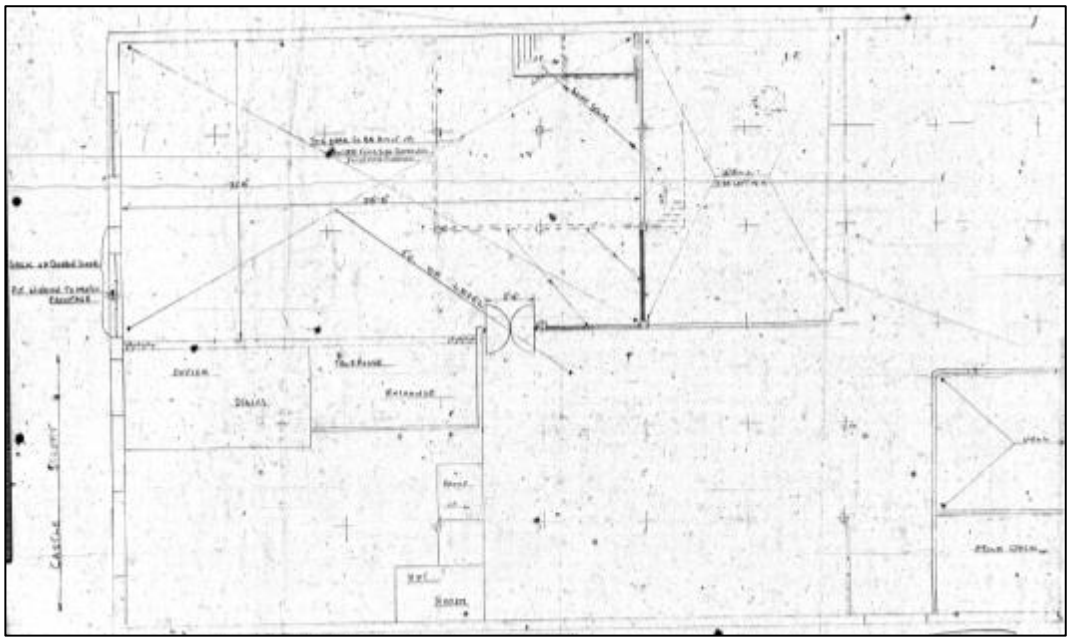

Figure 5-60 1959 plans to extend the concrete floor of the Dairy and Machine House Building. Note that the floor in the southeast corner of the building had to be raised.

Figure 5-61. Likely early 1960s photo showing the demolition of the old boiler house. The rear wall of the machine or former engine house is visible to the left and the cellar building to the right (Figure 13 in Farminer, 2014). The north return wall of the mill or still room building is visible in the centre of the photo.

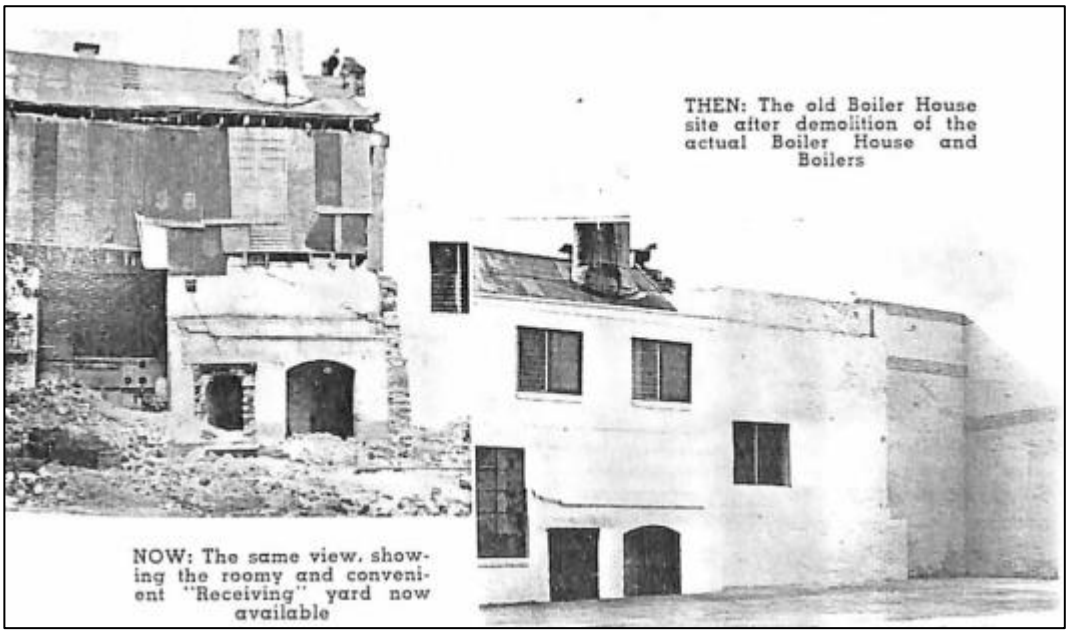

Figure 5-62. Photo of the Cadbury Fry Hudson Limited buildings before and after demolition of the boiler house (Thomson, n.d. : pg. 37). The dog legged wall of the cellar building is visible to the left which is likely the wall of the original still room.

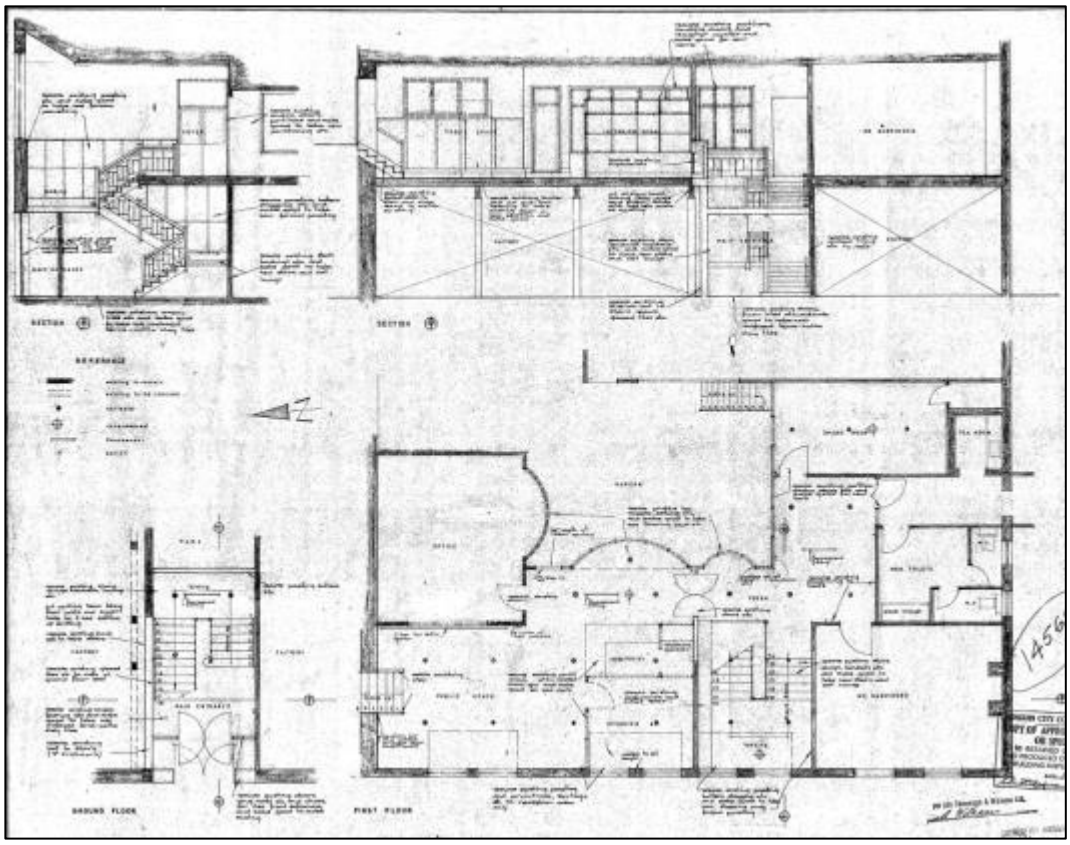

Figure 5-63 Plans by Stevenson and Williams showing the existing offices in 1966 to the first floor offices in the Dairy and Machine House Building (DCC Archives)

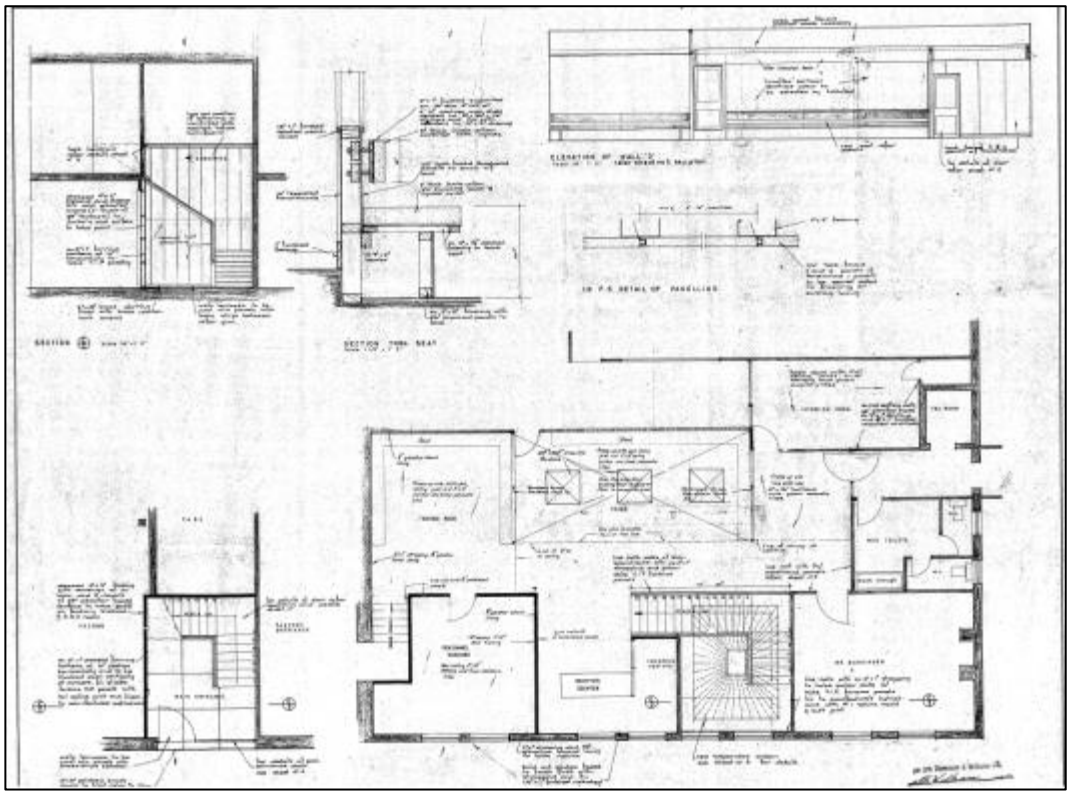

Figure 5-64 Plans by Stevenson and Williams of 1966 alterations to the first floor offices in the Dairy and Machine House Building (DCC Archives).

Alterations to the Chocolate Factory and Garage Building

The main change to the Chocolate Factory and Garage Building was the addition of the penthouse in 1939. This structure sat on top of the building forming the fourth storey. The design of the building façade with a modernist influence was continued up to the newest storey ("Cadbury Site Buildings – Block 1a-6a," n.d.).

Alterations to the Chocolate and Biscuit Factory Building

Structural support changes and alterations were to the Chocolate and Biscuit Factory in the mid to late 1930s (Building No. 14 in Figure 5-41). These included changes to the ground, first and second floors in 1934 planned by McDowell Smith (Figure 5-65), such as addition of reinforced concrete slabs and the replacement of windows to match the existing windows. Changes to the third floor in 1938 were designed by Miller and White and included the addition of exterior brick walls and timber frame roof forming the cafeteria level as it exists today (Figure 5-66).

The pre-1900 brick building portion of the Chocolate and Biscuit Factory (Part Building No. 14 in Figure 5-41) and the early twentieth century portion (Building No. 15 in Figure 5-45) were also demolished in 1938 (Figure 5-26). The buildings were replaced with 71 by 65 ft, three-storey addition facing out onto Castle Street. The addition contained an additional storeroom and a goods lifts to move product easily. It was also far sturdier than the one preceding it, as it was constructed with steel framing and reinforced concrete. Designed by Miller and White and constructed by William McLellan Ltd the building was "plastered in an attractive manner" (Evening Star, 1939). As noted above Miller and White had also planned the third-floor alterations of the central portion of the chocolate factory building immediately behind suggesting that these changes were made simultaneously.

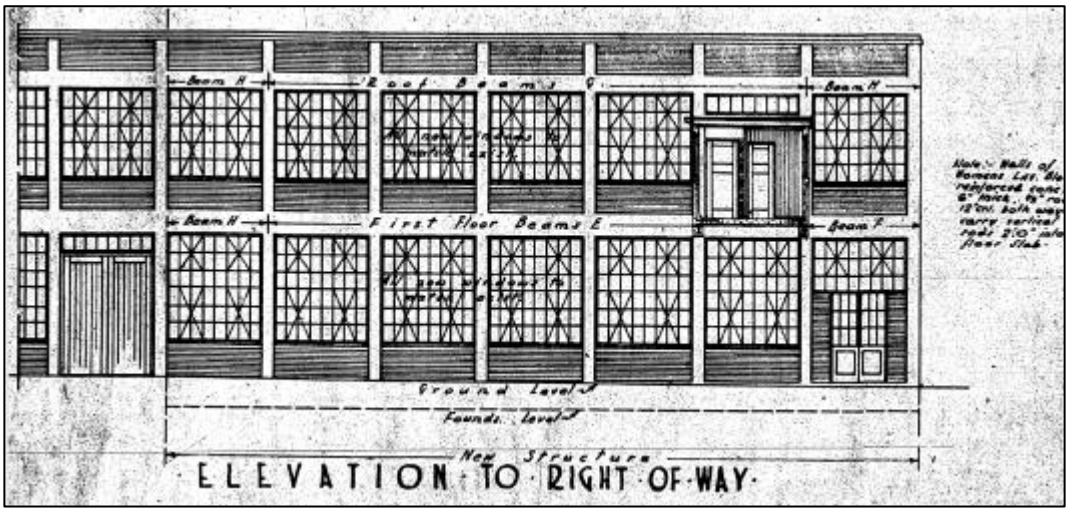

Figure 5-65 1934 plans by H McDowell Smith of changes to the south elevation of the chocolate factory building's ground and first floor.

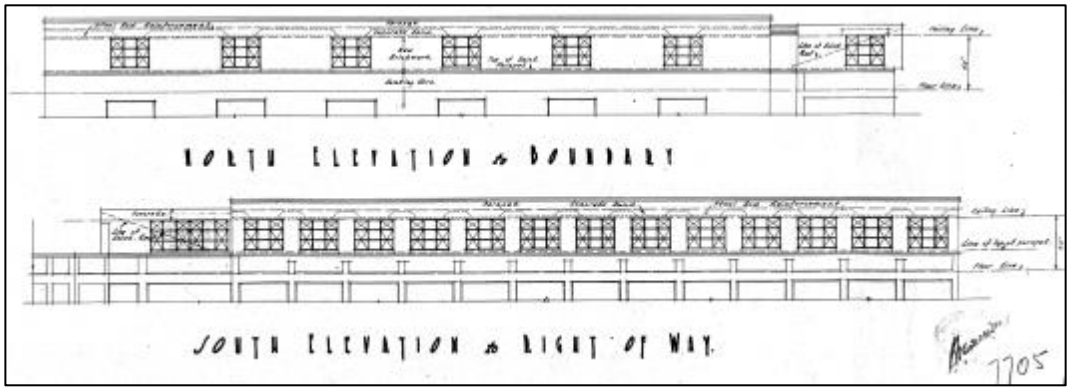

Figure 5-66 1938 plans by Miller and White of the north and south elevations of the third floor of the chocolate factory building.

Construction of the Biscuit and Dispatch Building

Cadbury Fry Hudson purchased A & T Burt premises to the north just prior to World War II, where eventually they would construct large biscuit and dispatch building from Castle to Cumberland Street. Changes were made to outfit some of the existing buildings and replacing others during and following the war. Renovations were quickly made to the newly purchased buildings, transforming A & T Burt's engineers and carpenters' shop along Cumberland Street (Figure 5-67) around 1940.

Development plans for the new biscuit factory building were in the pipeline from the 1930s (Barringer, 2000; C. V. Smith, 1968). However, World War II interrupted the planning and construction of this building at the northern end of the newly purchased property and with the entrance and threat of Japan in the war, slit trenches were constructed along the vacant land where the A & T Burt iron moulding buildings had been removed between 1938 and 1942. The trenches soon superseded by four air-raid shelters in 1942 facing out on to Castle Street. These shelters were provided by the Cadbury Hudson Fry, and subsidised by the government and Dunedin City Council (Figure 5-68). They had double brick walls and reinforced concrete eight inches thick. At 1200 square feet, they could each hold 175 people. Each shelter was partitioned into four section so that if one section was struck the other three would not be affected (Barringer, 2000). The buildings were never used for this purpose, and following the war were used for storage, before being demolished in 1946.

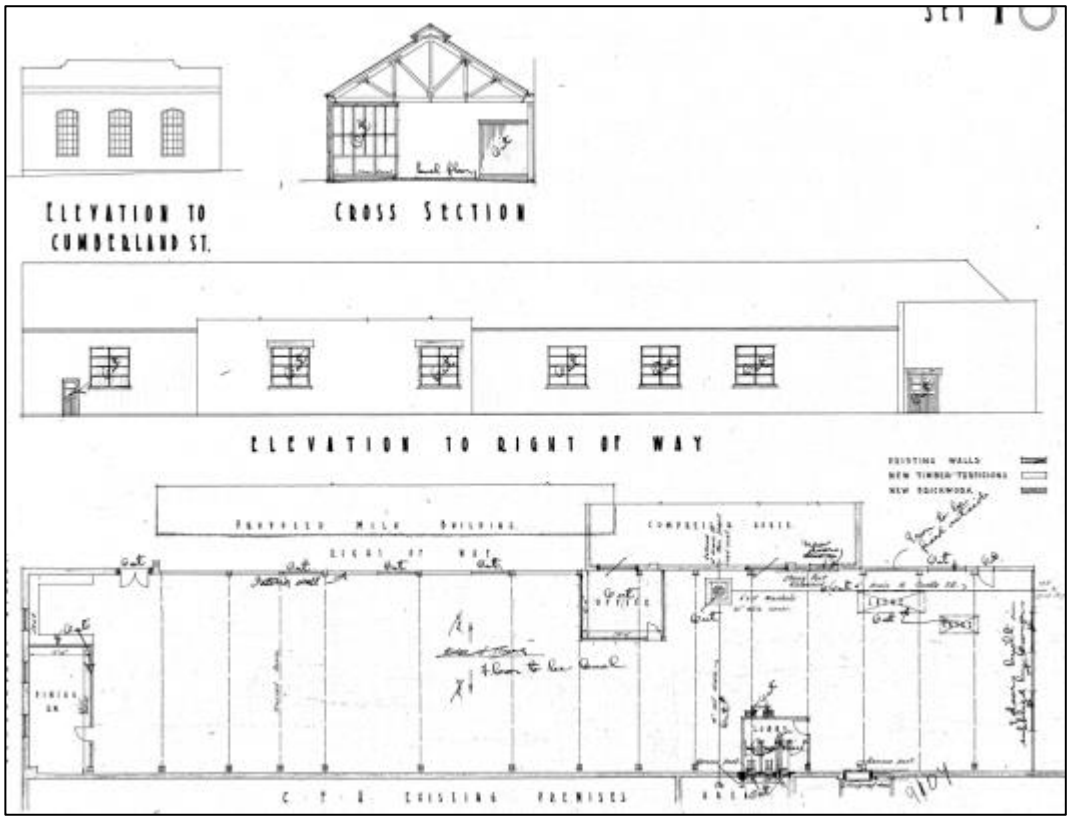

Figure 5-67. 1940 Plan for refitting the Engineers and Fitting shops (No. 1 in 1927 plan) (DDC Archive).

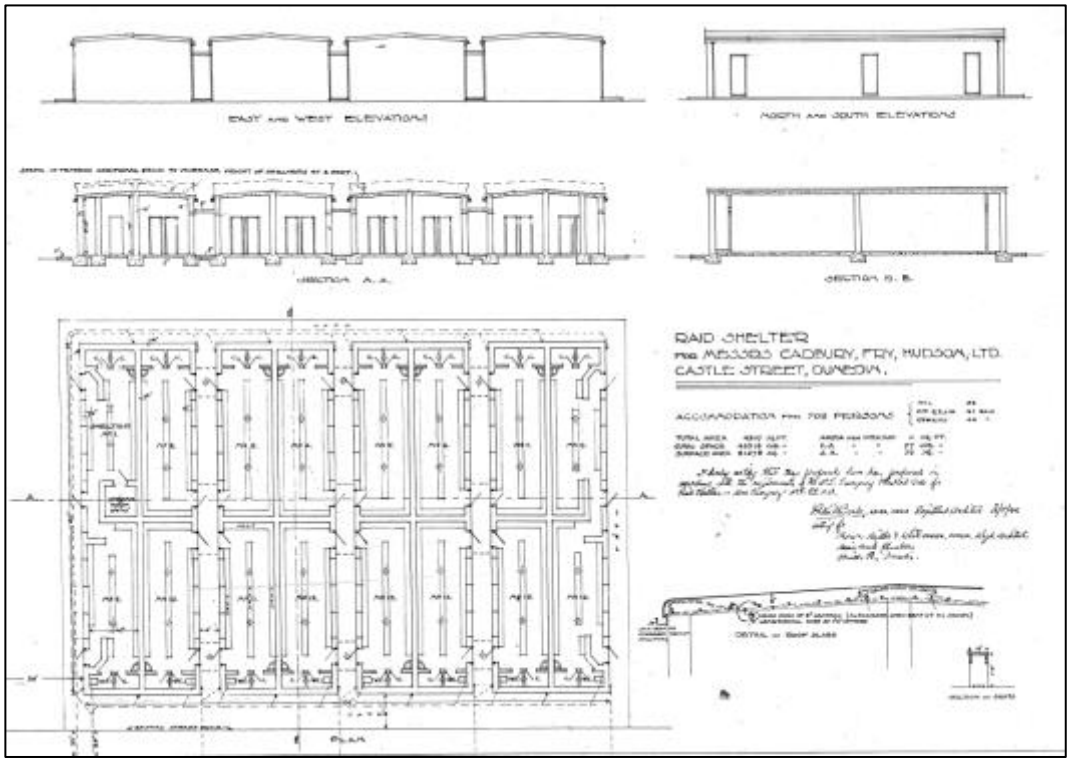

Figure 5-68 1942 plans for air raid shelters (DCC Archives)

Plans were prepared in 1947 for the new building by Miller and White and engineer JRG Hanlon. Aerial images from 1947 show all the buildings along the northern edge of the property had been removed and construction for the new block started in the same year 1947 (Figure 5-69 to Figure 5-71). However, the building, comprising a biscuit factory running between Castle and Cumberland Streets in Block 5A-C and a dispatch building in Block 4C facing out onto Castle Street, was not complete until 1951 (Barringer, 2000). Once the building was complete it

housed two new large electric ovens. Cadbury's was the first factory in New Zealand to install such ovens ("HNZPT Listing Documents: List No. 2143," n.d.). The plans for the dispatch extent of the building only show two storeys with a planned third floor, while the biscuit factory extent was only three storeys with at least one additional storey planned. The lift shafts at the east and west end of the biscuit factory ran to their present-day extents in the plans emphasising the future thought of additional storeys. Seven years later in 1968, the two upper storeys of the biscuit factory (Block 5A to C), and the three upper storeys of the dispatch end of the building (Block 4C), all designed again by Hanlon, were added (Figure 5-74). The façades of each of these buildings still stand largely as they did in the 1960s (Figure 5-72 and Figure 5-75).

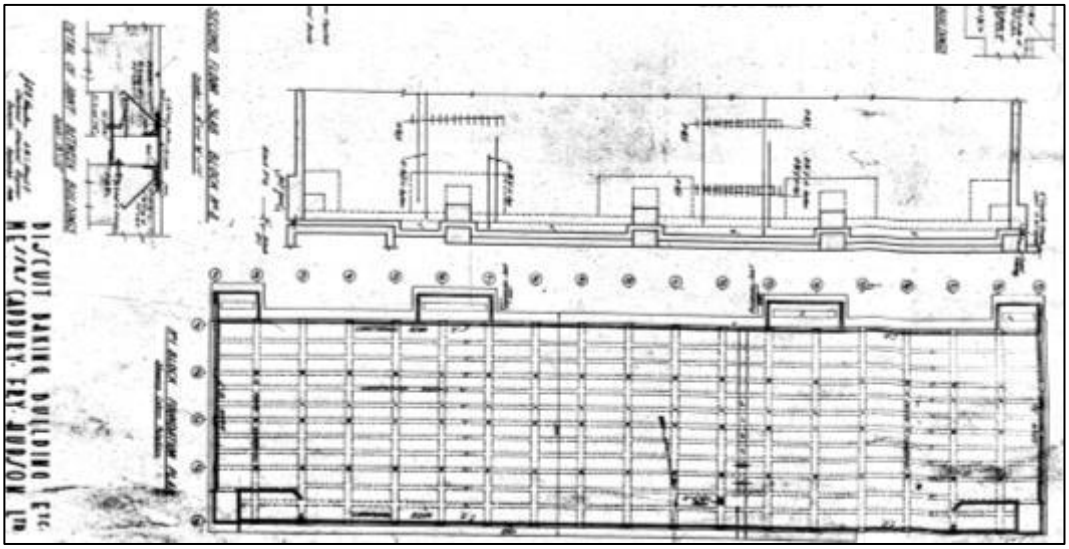

Figure 5-69 1947 plans for the biscuit factory not finished until 1951 (DCC Archives).

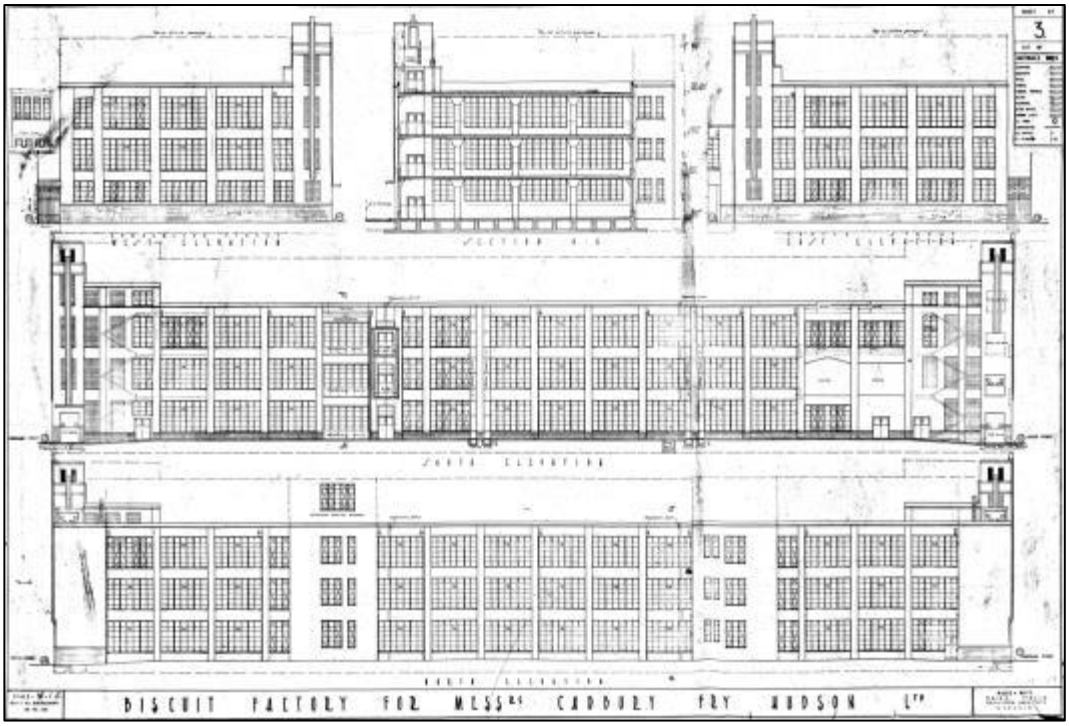

Figure 5-70 1947 plans for the biscuit factory not finished until 1951 (DCC Archives).

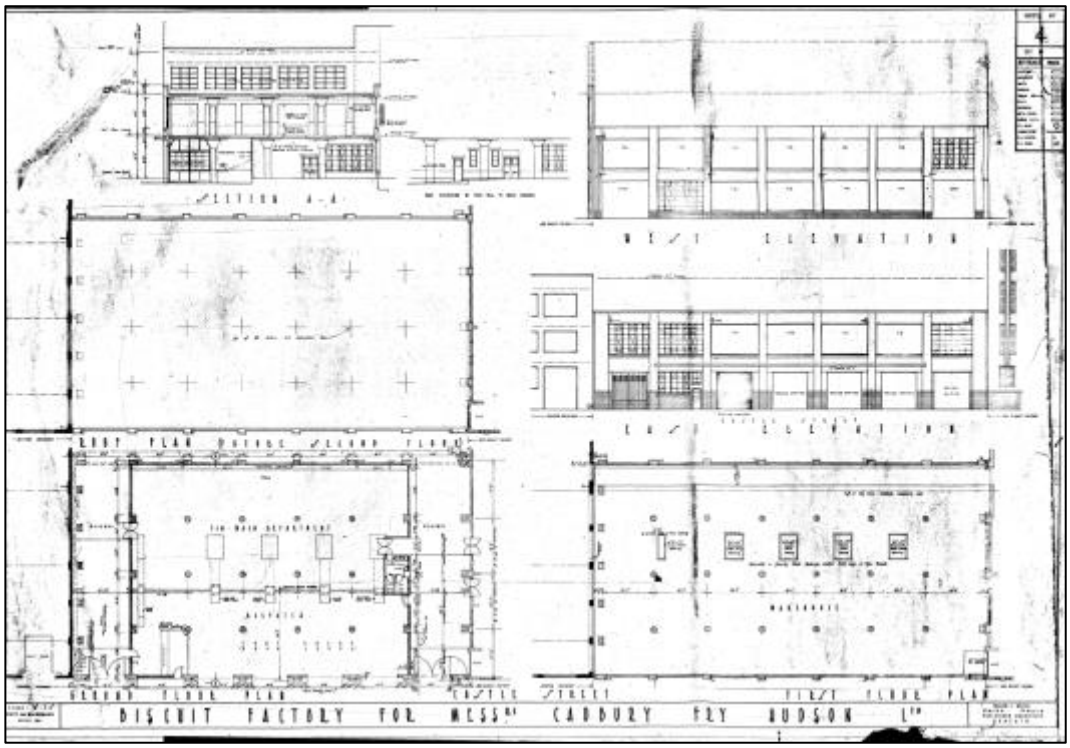

Figure 5-71 1947 plans for the dispatch building not finished until 1951 (DCC Archives)

Figure 5-72. Photograph taken in the late 1960s (though before 1868) of the Cadbury Fry Hudson Limited buildings on Castle Street (Smith, 1968: Pg. 17).

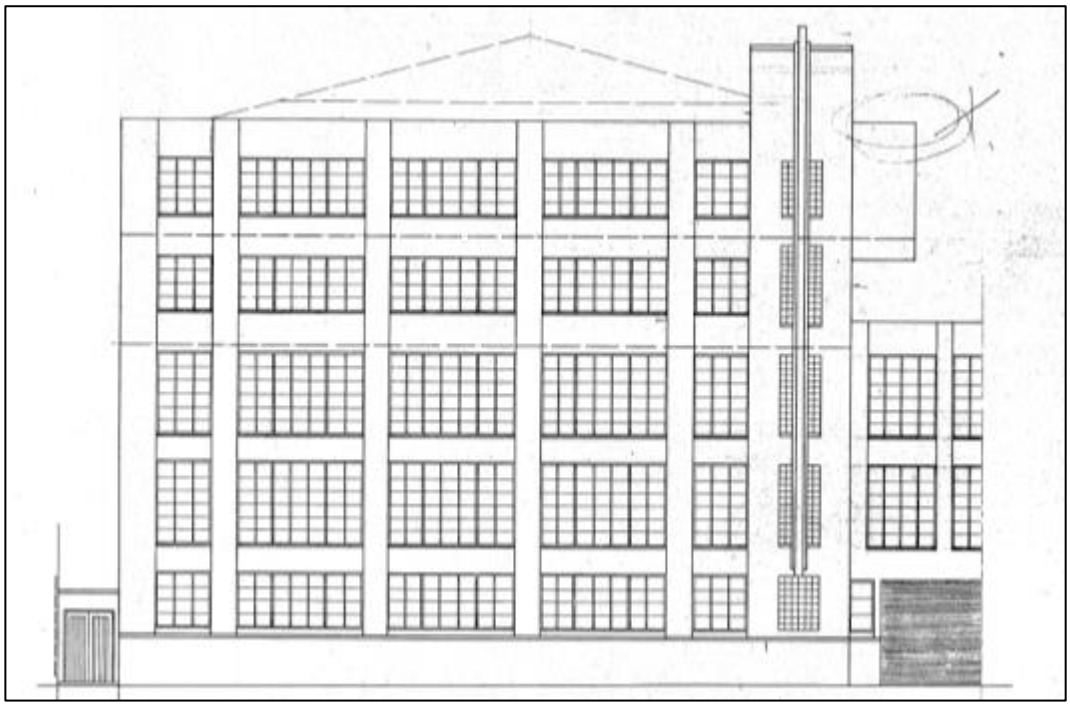

Figure 5-73. 1968 Cumberland Street façade change to Block 5 biscuit factory (DDC Archives).

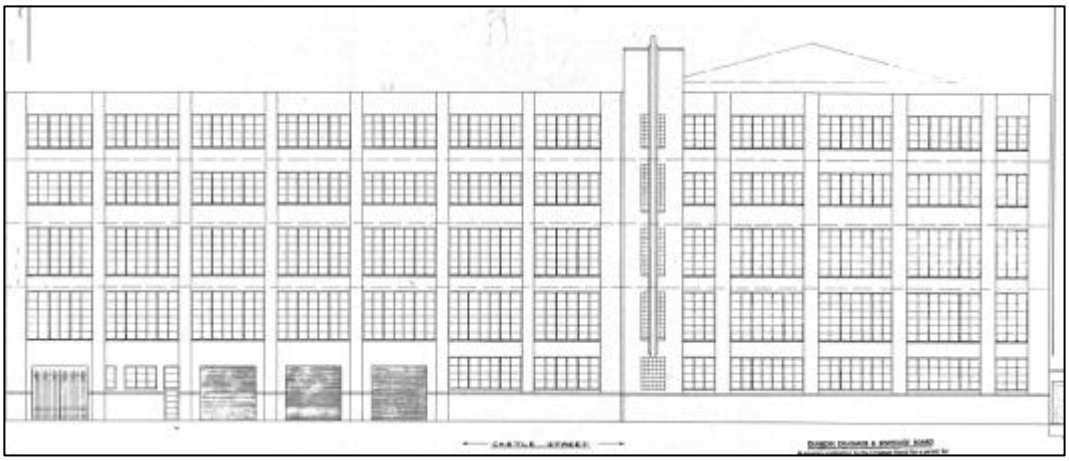

Figure 5-74 1968 Castle Street façade change to Block 4 and 5 Biscuit Factory and Dispatch Building (DDC Archives).

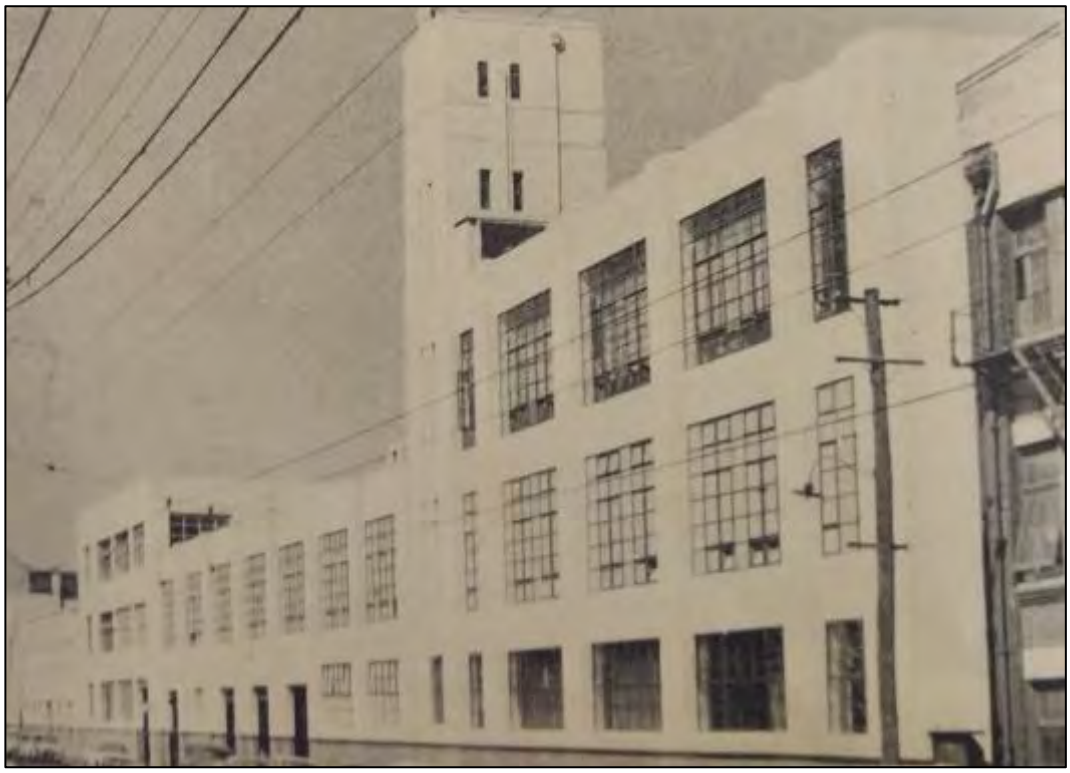

Figure 5-75. Photograph of the Cadbury Fry Hudson Limited in the late 1960s buildings (though before 1968) on Castle Street (Smith, 1968: Pg. 16)

Construction of the Engineering Workshop, Labs and Office Building

Plans for Engineering Workshop, Labs and Office Building (Block 4A) were also designed by the engineer JRG Hanlon in 1960 and the building was constructed soon after constructed in 1961 (Figure 5-76). The footprint of the building has remained unchanged since its initial construction however changes have been made to the building such as 1994 office upgrades on the first floor and essence room upgrade on the second floor (Figure 5-77).

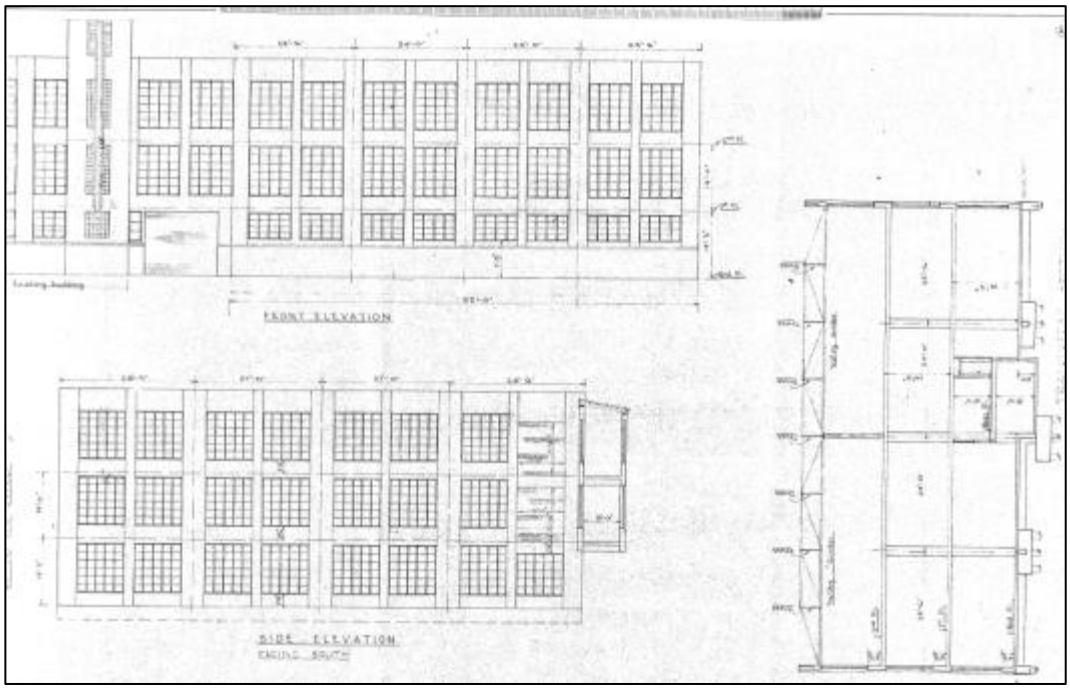

Figure 5-76 1961 plans for engineering workshop, labs and offices building (DCC Archives).

Figure 5-77. 1994 plans of upgrades to offices on first floor (left) and essence room on the second floor (right) of the engineering workshop, labs and offices building.

Other Buildings across the Site

A number of other changes went ahead on the A&T Burt land following the war. In 1945 plans were drafted to construct a central boiler house in Block 4B that would service the entire premises (Figure 5-78). Between 1945 and 1947 aerial photographs show that this building had been constructed with all remaining A & T Burt buildings except for the southern extent of the refitted engineers and carpenters store removed from the site (Figure 5-79). However, even the eastern extent of this store building was altered significantly. An additional long building to the north is also visible in these images. This building was not present in 1945 plans of the property and was likely built around the same time as the boiler house. Following this a power and services station was constructed in Block 4C to the west of the boiler house around 1948 (Figure 5-80). The boiler house itself was extended in 1959 and again in 1969, while water tanks were constructed in immediately behind the dispatch building in Block 4C at the same time.

In 1959, the pre-1900 mill buildings in Block 1B were removed (Buildings No. 3 and 4 in Figure 5 40). The pre-1902 boiler house was also likely removed around the same time as it does not appear in later 1967 aerials (Figure 5 65 and Figure 5 68). This would align with the extension of the central boiler house in 1959 (DCC Archive). Only the engine house remained, which would become the machine house still present today (Farminer, 2014), and a covered loading bay replaced mill buildings in 1966.

Between 1985 and 1986 the 1903 biscuit factory and the buildings in front along Castle Street in Block 2B and 2C were demolished (Retrolens), replaced a carpark and eventually 1950s crumb silos transferred to this space from their earlier location on Cumberland Street in 1991, where Countdown is located today (Figure 5-81), while in 1995 a crumb processing plant was added to the north side of the biscuit factory building.

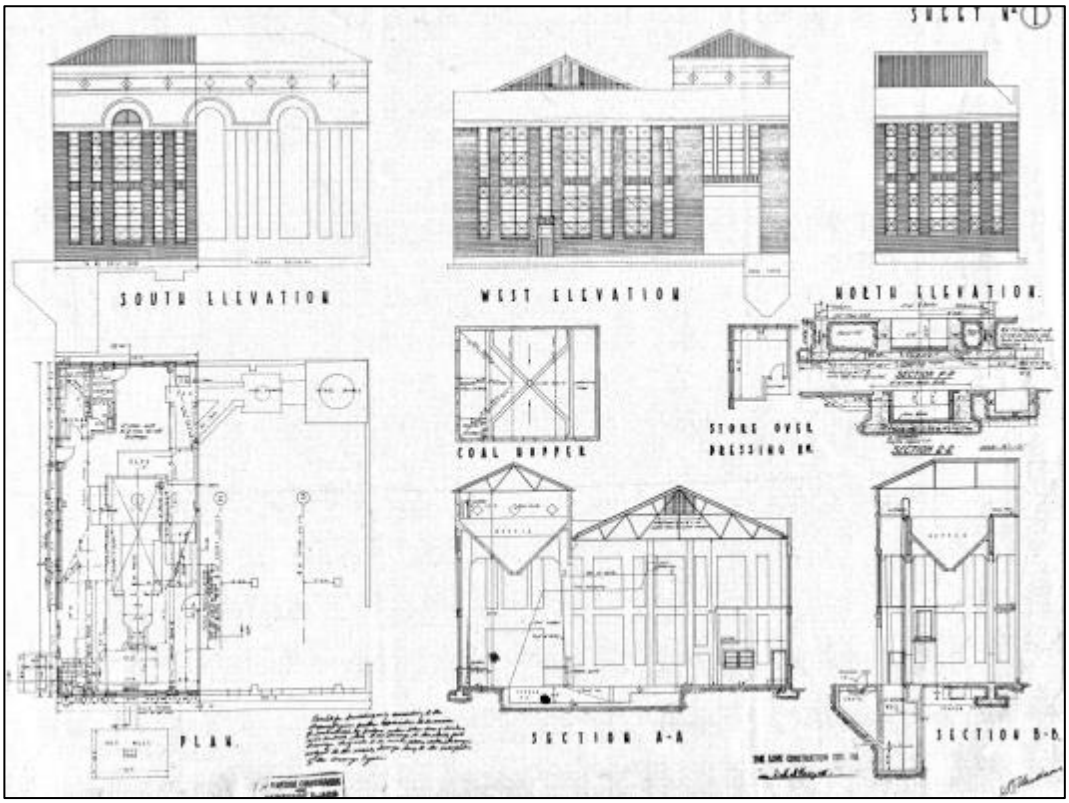

Figure 5-78 1945 plans of central boiler house (DCC Archives).

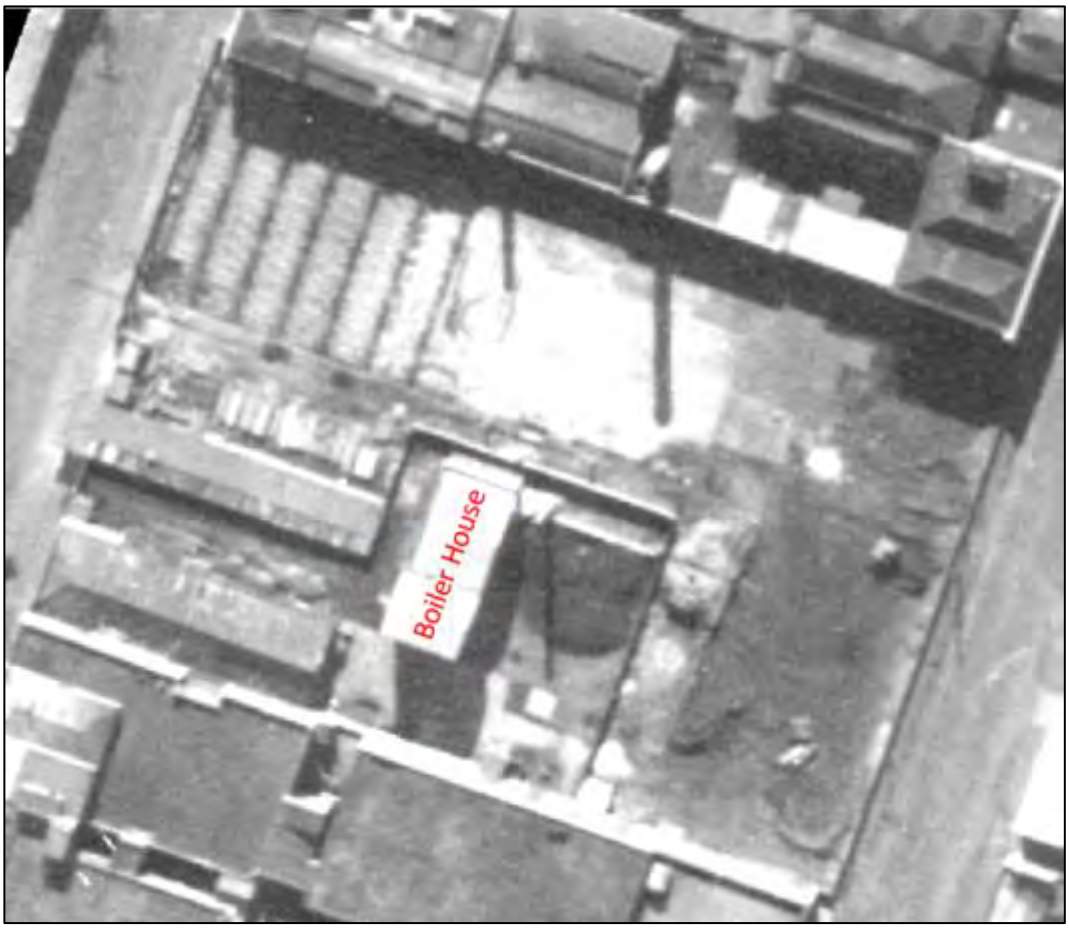

Figure 5-79 1947 photograph showing location of new boiler house (Retrolens). The old engineers and carpenter's building is located just south west of the boiler house with an unidentified 1945 to 1947 building to the west of the boiler house.

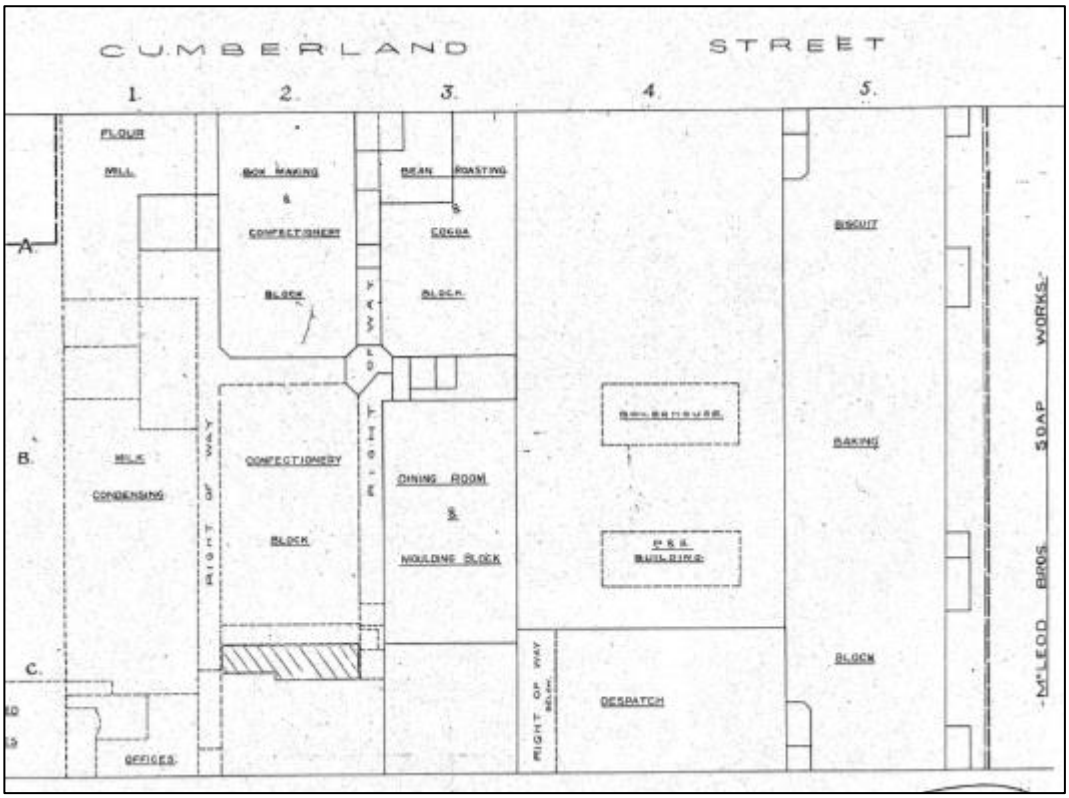

Figure 5-80 1959 plan of the entire Cadbury Confectionery Ltd Buildings showing blocks 1A to 5C.

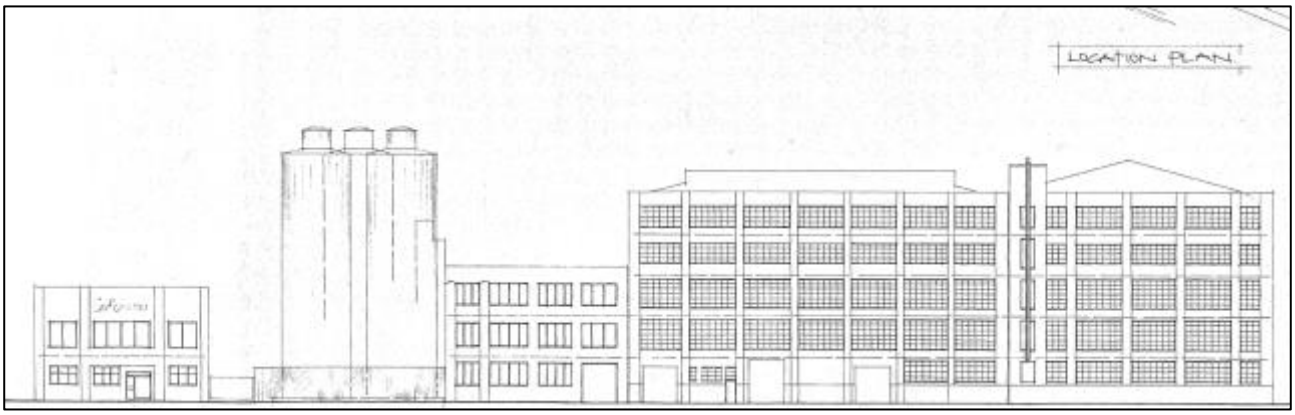

Figure 5-81. 1991 Plan of entire factory façade except for the south of Block A on Castle Street (DCC Archives). The block 2B and 2C buildings have been removed and the crumb silos built.

5.3 Significant Associations with the Cadbury Confectionery Ltd Buildings Site

The history of the occupants and businesses associated with this site is filled with modernisation in both technologies as well as in labour and employment. But the firms utilising the property participated in wider global networks of trade and exchange, importing raw goods and machinery from Europe and America and exporting finished goods around the country and overseas as well.

5.3.1 C R Howden & Co's and the New Zealand Distilleries Company

The New Zealand Distillery first began operating on 1869 following the enactment of the *Distillation Act* 1868. The company was started by C. R. Howden and R. M Robertson, who had previously operated as wine and spirit merchants. Howden was also known for playing golf near Dunedin at Balmacewan, and he along with others first established Otago Golf Club. Robertson had been a partner in Wright, Stephenson & Co. Ltd which has evolved and today operates as PGG Wrightson. Howden and Robertson were quickly joined by W. J. Larnach, of Larnach's

Castle fame and E. W. Humphries (Perry, 1980). John McGregor was called upon to design the distillery, initially for the corner of Manor and Crawford Streets; however, the location was shifted to Cumberland Street (Perry, 1980).

While they invested a great deal of money into the project, it took a while for endeavour to take off. They had difficulties finding appropriate staff and barley. They had used Kauri to construct their vats but the wood had unfortunately tainted 99,000 litres of product (Perry, 1980). Furthermore, copper for the stills were discovered to be the wrong thickness and would wear out in three years rather than ten first thought.

James Hart was the first managing distiller and claimed to be a descendant of Shakespeare's sister. Duncan McGregor worked as the coadjutor who had come to New Zealand as a gold seeker 18 years earlier. They managed to overcome difficulties and produce the companies first whisky in October 1869 – New Zealand's first whiskey produced under licence (Perry, 1980).

The company stepped away from traditional Scottish manufacture, as the product moved from room to room and did not retrace its steps during the course of its production. The company did import peat from the Isle of Islay costing £10 per tonne as the local peat trialled did not provide adequate flavour (Perry, 1980). American oak was used for casks made on the premises, and the company imported around 17000 grain bags a year; local Green Island coal was used in the factory. Another consideration was the pure water required for the production of the whiskey. Again, the water provided by the Dunedin Water Works Company was found to be unfavourable and for £600, they switched to spring water from the town belt. The water came from the property of a Mr. Logan who would eventually become their distilling manager. Logan had been in New Zealand since 1854 and had been clerk to Captain Cargill, the Superintendent of the province (Perry, 1980). The town belt spring water continued to be used into the twentieth century on the property. A select amount of barley was imported from California when there was a local shortage.

Between 1869 and 1873 the company produced 805,000 litres of spirit from 98,743 bushels of malt and grain, predominantly frown in New Zealand (Perry, 1980). In just four years the company had doubled its sales. Despite overcoming early tribulations and a successful first few years, the company did not last long. Following the abolition of duty preferences for local distilleries, the New Zealand Distilleries were forced to close their doors due to "representation to the government from Scottish Distilleries" (Comer, 1973; C. V. Smith, 1968). In an agreement with the government, the company was paid £20,000 to cease production in 1873 (Perry, 1980).

5.3.2 Albion Brewing Company

The Albion Brewing and Malting Company first took over the distillery in 1875. The company was initially formed as a consortium, and its provisional directors includes: James Anderson, W. J. M Larnach, James Brown, George Dobson, H.J. Walter Henry Driver, G.W. Elliot, W.D. Murison, Robert Paterson, Job Wain Jnr, David Proudfoot. It is interesting to note that William Larnach was on the board for both the New Zealand Distillery Company and the Albion Brewing Company. The shareholders included ranged from publicans to storekeepers. W. H. Lathbury was the company's first brewer in 1875 had previously worked at the Tooth & Co.'s Cascade Brewery in Sydney, and he had previously worked in Burton-on-Trent, England (Leckie, 1997). Robert Wilson Eskdale, who had worked as Howden's manager, also went on to manage the New Albion Brewing and Malting Co following the dissolution of the New Zealand Distillery Company. However, his personality was described as not one easily gotten on with (Perry, 1980), and he reportedly did not get on with Lathbury. Eventually Eskdale resigned and was replaced by G. S. Brodrick (Leckie, 1997).

The first brewing at the factory occurred on September the 4th 1875; however, the result was failure and ended in the gutter. Yet by December 1875, Albion beer was on sale. More problems arose with the customs department taking an interest in the remaining equipment of the New Zealand Distillery Company distillery and its potential for producing illegal sprits. The company had to provide a written guarantee that the machinery would not be used while owned by the company, leading to its sale the following year. Further difficulties with staffing and production

resulted in a loss of £2806 in the first eleven months. Things did not get better for the company. Lathbury soon resigned and the staff went from 30 to 12 within eleven months. Despite some profits in 1877, the following year the company posted a loss and they ceased brewing following the wishes of shareholders (Leckie, 1997).

The Albion Brewing Company was purchased by John Marshall and James Copeland in 1878, and they brewed their first batch in January the following year. Marshall and Copeland had been in the brewing business in Dunedin since 1861, and they turned out as much beer as their brewery on the Water of Leith could produce. The brewery went from producing 676 barrels in 1862 to 9500 barrels in 1878. Limited by the size of their brewery, Marshall and Copeland looked to increase production by securing a new and significantly larger brewery. They purchased the Albion Brewing Company premises in June 1878 for £25,000 pounds despite the property being valued at £27,000 (Otago Daily Times, 1879).

Marshall appears to have been an eccentric character, with one article describing him as having "regular dress [that] included a top hat and thigh-length high-polished seaboots" (Auckland Star 1961 in Perry, 1980: 96). Marshall, originated in Antrim, Ireland and had spent a number of years sailing ships with Mediterranean and Russian trade out of Clyde, Scotland.

In an 1879 article stated that the Albion Brewing Company was one of Dunedin leading breweries. The improvements made to the brewery focused on "labour-saving appliances to the fullest extent" (Otago Daily Times, 1879). The firm predominantly used locally grown barley but also received shipments from California. Their hops were imported foremost from Britain, but they also purchased hops from Nelson, Tasmania and again California (Otago Daily Times, 1879). The company further sent a selection of the their products to the 1879 Sydney Exhibition (Otago Daily Times, 1879).

The move to Cumberland Street was not successful for Marshall and Copeland. The partners had overextended their business financially (Kynaston, 2012). The exacts details of this financial strain is unclear but there were likely several factors that contributed to the failing of the Marshall and Copeland's brewary. These included the death of John Marshall's brother in 1883, the 1880s depression and increasing competition (Jones, 1998; Leckie, 1997). Of the latter, the Speights brewery (established in 1876) had quickly become a keen competitor, who even during the depression years increased their sales. Speights eventually took over the New Zealand and Pacific market of unsuccessful brewery of Marshall and Copeland (Jones, 1998). By 1886 John Marshall had declared himself bankrupt (Leckie, 1997).

5.3.3 Richard Hudson (1841-1903) and R. Hudson and Co.

Richard Hudson was born in Chippenham, Wiltshire, England. From the age of 11, he worked for the Great Western Railway in the locomotive and carriage works, and by 14 he shifted away from the 12-hour six day a week shifts to work as a cabin boy out of Bristol (Barringer, 2000). Following three years of sailing aboard cargo ships, Hudson then became a baker's apprentice. He first arrived in New Zealand after jumped ship in the Lyttleton Harbour from the 'Indian Empire' that had travelled from Bristol in 1865 (Comer, 1973; C. V. Smith, 1968). To evade authorities, he established himself under the pseudonym of Daniel Bullock. He joined the gold rushes that had lured him to the country and Hokitika but did not have much luck on the goldfields. He eventually returned to Christchurch and acquired work as a baker for John Griffen of Griffen's Biscuits fame. At this time, he met and married Mary Ann Riley. After two years of working for Griffen, the couple moved to Dunedin in 1868 (Comer, 1973; C. V. Smith, 1968).

In Dunedin Hudson became a pastry cook in the Arcade between High Street and McLaggan Street. Following the birth of his first son, Richard James in 1869, Hudson purchased his own biscuit baking machine, which had been displayed in the 1865 New Zealand Exhibition, and rented his own bakehouse in Dowling Street. Given the slow patronage to his new store, he looked towards the ships coming into the Otago Harbour to bolster his business and sold his goods from a barrow on the wharves (Comer, 1973; C. V. Smith, 1968).

Hudson eventually had enough money to set up a successful coffee shop in the Arcade. He quickly expanded and was soon producing dessert biscuits, cakes, lollies and comfits (Comer, 1973; C. V. Smith, 1968). He further purchased a Confectionery-making plant and hired a trained confectioner. Adept at working with the machines and adapting them for varying purposes, he was able to produce goods efficiently. Biscuits produced in Hudsons factories included Abernathy, Bedford, Shades of Mother England, while Cracknel, Bath and Madeira cakes were also produced. Women were employed to make lozenges with a wide range of flavours including peppermint, clove, musk, and cayenne (Comer, 1973; C. V. Smith, 1968).

Hudson reinforced his assets by investing in numerous properties and putting in a £450 stake in a steam laundry. Despite difficulties finding skilled staff, the business grew, and Hudson formed a company with Jane Hardwich and Catherine Fenn (Comer, 1973), forming "Excelsior Steam Confectionery and Biscuit Factory – R Hudson & Company Limited, Proprietors." To house the new factory, they purchased the Masonic Hall on Moray Place, despite fierce opposition from the Masonic Hall Company in 1876 (Barringer, 2000; Comer, 1973). The hall was fitted out as a factory, but it soon became too small, so the building was demolished. At this site Hudson, constructed a new factory and hotel. The front of the new building formed a boarding house and restaurant known as the "Coffee Palace" with hairdresser, baths and dining room, while Hudson's offices and the factory were at the rear (Barringer, 2000; Comer, 1973; C. V. Smith, 1968).

In 1884, Hudson travelled overseas to visit factories across Europe inspecting and purchasing the newest and latest machinery for the producing cocoa and chocolate. The machinery was brought back to New Zealand in 1885, and it was soon producing the first chocolate manufactured in New Zealand (Comer, 1973; C. V. Smith, 1968). The cocoa and chocolate endeavour saw Hudson hire over 100 employees. They produced cocoa, drinking chocolate as well as homeopathic cocoa. The company expanded to Auckland, Wellington and Christchurch around 1886. The company purchased space on the corner of St Andrew and Cumberland Streets, where they installed one of just two roller flour mills located outside of Great Britain (Comer, 1973; C. V. Smith, 1968). By 1889 the company produced the first moulded chocolates in the southern hemisphere (Otago Daily Times, 1993).

By the late 1800s, Hudson stepped back from his business due to ailing health and his eldest sons started to take on more responsibilities. His attention turned to other matters, such as setting up a public library (Comer, 1973; C. V. Smith, 1968). While, Hudson was the first Dunedin employer to give a half-day holiday to his employees on Saturday, and the firm was later one of the first to instate an eight-hour work day, Richard Hudson had himself worked long hours, 16 to 18 hours days (Comer, 1973; Otago Daily Times, 1930; C. V. Smith, 1968). It has been suggested that such a strenuous work life may have contributed to his shortened life, however, this was considered to a be a key factor in the success of the company (Otago Daily Times, 1930).

In 1898 Hudson and Co purchased the Cadbury Factory site. Hudson's sons each took on various roles in the business: Richard became the company chairman, Rob the works manager, while Ambrose became responsible for the chocolate department, Charles for the flour mill, Arthur for biscuit production, and Bill for the engineering team (Comer, 1973; C. V. Smith, 1968). Upon purchasing the Cumberland Street premises, the innovation of the company continued. The three-storey biscuit factory constructed in 1901 would house two machine ovens made by their own fitting shops. The ovens themselves were 50 feet long, comprised around 15 tons of ironwork and were the first of their kind to be built in the southern hemisphere (Otago Daily Times, 1900) The new premises had to overcome the early trial of the destruction by fire of the new biscuit factory in 1902. Hudson could see the fire from his window and he immediately called the fire brigade even instructing them as to where he would like them to focus their efforts to save important equipment (Comer, 1973; C. V. Smith, 1968). By 9am the next morning Hudson was looking at rebuilding. Through his son Richard, they applied for a bank loan to rebuild, and the bank offered to cover whatever the works cost. In the end this turned out to be a £50,000 loan, which was paid back by 1912.

Following their father's death (1903), the six sons took over the business, and their mother Mary also took avid interest in the company. The formed a new company with all the sons participating as directors and Richard at the

helm (Comer, 1973). The years between 1903 and 1930 has been referred to as the "Era of the Six Sons" (Cadbury Schweppes Hudson Limited, 1990). Despite their father's best directions to save the machinery, the fire was taken as an opportunity to modernise the factories machinery. After acquiring the lasted chocolate producing plant and new Gabel Moulding Machines, sales increased. In 1918 the brothers experimented with condensing milk, and in 1919 they purchased a milk condensing plant from overseas (C. V. Smith, 1968). Improved quality and output lead the business to grow rapidly despite setbacks such as a 1923 flood (Figure 5-84), which saw Castle Street under three feet of water and flooding the ground floor of the Castle Street factory (Barringer, 2000). A second flood in the city just six years later again the ground floor of the factory flooded, likely costing the company hundreds of pounds (Otago Daily Times, 1929). Despite these trials, the Hudson company did well in the latter 1920s. During the 1925-26 South Seas Exhibition, the company received a great deal of publicity as their chocolates were amongst those offered as prizes at the event. The Hudsons' Chocolate was in high demand and soon the slogan "Must be Hudsons" was developed (Comer, 1973; C. V. Smith, 1968).

Figure 5-82. Photo of the R Hudson and Co Chocolate Department around 1906 (Barringer, 2000).

Figure 5-83. Photo of the R Hudson and Co chocolate packing room in 1928 (Otago Daily Times, 1993).

Figure 5-84 Photograph looking the Castle Street façade during the 1923 flood.

Figure 5-85. Advertisement for Hudsons' Chocolate with the new slogan, used even following the merger with Cadburys (Evening Star, 1932).

5.3.4 Cadbury Fry Hudson Ltd

John Cadbury first established himself as a grocer in Birmingham, England in 1824, but within seven years he had moved into the manufacturing of drinking chocolate and cocoa. When John retired in 1861, he left the Cadbury

business to his sons Richard and George. The process of pressing cocoa butter from the cocoa beans was introduced in 1866 to the company (C. V. Smith, 1968)(Barringer, 2000). As a result, the company was able to produce new types of eating chocolates. In 1879 the company established its well-known Bournville factory (Barringer, 2000). Their old factory had become too small for the number of staff and quantity of products creating an unhealthy work environment. Believing that a fate of the business rested in the welfare of its employees, the new factory offered more space and better working conditions, as well as being located close to railway lines and a ready supply of steam to power the factory machinery (Barringer, 2000).

Cadbury began exporting overseas in 1881. In 1897 the company made the first milk chocolate, and within five years they had created a process for producing milk chocolate that was successful in Britain. Milk chocolate and Bourneville Cocoa were key in their international success (Barringer, 2000).

In 1918 Cadbury Brothers amalgamated with another company, Joseph Fry and Sons (Barringer, 2000). Fry and Sons, who like Cadbury, had a history of developing cocoa products steeped in a Quaker ideology. Joseph Fry had first established his business in Bristol from 1728. Both Cadbury and Fry had suffered in their international exports during First World War. Combined, the two companies pushed their overseas markets, establishing factories in places such as Montreal and Claremont, Tasmania (Barringer, 2000). The Claremont factory was Cadburys first overseas, and it bore similarities with Bourneville (Raabus, 2017). Soon after the factory was built, a number of workers cottages were constructed of which a number still stand today and are heritage listed by the Tasmanian Government.

Figure 5-86 Photograph of Cadbury's Claremont Factory (left) and estate established for the workers (right) (Archives office of Tasmania).

Cadbury's exports to New Zealand were increasing in the early twentieth century; however, an increased tax placed on imported chocolate resulted in the decision by Cadbury to manufacture goods in New Zealand. As a result, they joined up with the R. Hudson & Co. forming the Cadbury Fry Hudson Ltd in 1930, with R. Hudson & Co. relinquishing the controlling share in the firm (Comer, 1973; C. V. Smith, 1968).

While the company started to manufacture some of Cadbury and Fry lines, the depression years meant the newly formed company faced difficulties (Otago Daily Times, 1993). The company looked towards further modifications of the factory, especially in departments beyond chocolate, that had been lagging behind. Where possible machinery was introduced to replace hand labour. One key shift in the business model was a focus on marketing. R. Hudson & Co. did not place too much emphasis on advertising as quality of goods was where money should be focused. In contrast Cadburys favoured targeted and efficient advertisements. Despite significantly more money being spent on advertising, while not immediate, they did come to see an upturn in sales after a slow first year following the merger. One successful campaign was "The Chocolate Plane" piloted by Captain MacGregor, a WWI RFC pilot. The plane not only flew executives to their destinations, but also visited numerous centres taking customers for flights (C. V. Smith, 1968). Continuing the good labour relations that Hudson implemented, Cadbury Fry Hudson was one of the first companies to restore the 10 percent wage cut employees had suffered in

1931, and provided the local Dunedin City Council a number of short term loans (C. V. Smith, 1968). The company was likely one of the first in New Zealand to further offer a superannuation scheme for its employees (Barringer, 2000). By the mid-1930s Cadbury Fry Hudson had over 500 employees and was acclaimed for its great contribution to Dunedin's economy as well as producing exemplary goods with one contemporary stating "your products are equal to the finest imported" (Otago Daily Times, 1936).

Further steps to modernise the factory focused on elongated spaces which minimized handling of the products, and to accomplish this, the company looked to the land owned by A & T Burt to the north. Cadbury Fry Hudson purchased the land and established the long building between Castle and Cumberland Street (Barringer, 2000). When designing the building, they considered future expansions, as the building was engineered to be able to cope with another storey. Other considerations of the expansion included: space for production materials, flour mixing at the Cumberland Street end of the new building and space for handling and despatch of the products at the Castle Street end. The tin washing plant was placed so that the tins could be sent to the biscuit ovens for packaging of the biscuits. Similarly a new boiler house was also established for the new building, however it was built in the centre of the premises so that it could cater the entire factory (Barringer, 2000). Approval for the new block was given in 1939, however the war put a halt to developments plans.

While the onset of war created difficulties for the company, it also opened up new sales as well. Just prior to the war, the Department of Industries and Commerce asked Cadbury Fry Hudson to manufacture Bournville Cocoa locally. Despite the financial strain this imposed on the company, they placed the order for the necessary machinery from Bournville. The plant was shipped twice and sunk both times by German U-boats; however, the third shipment of the machinery made it to New Zealand, and the company was producing Bournville Cocoa from 1942 (Barringer, 2000). World War II saw the cancelation of all Confectionery and chocolate lines except for chocolate blocks that stretched the sugar short in supply. The war contracts required three shifts for certain departments and required up to 750 personnel, predominantly woman. As a result of the massive service biscuit contract, nearly all domestic production was discontinued (C. V. Smith, 1968). The company also set up a newsletter called *the Chocolate Soldier* to send overseas news from the company and Dunedin. The newsletter continued well into the second half of the twentieth century (C. V. Smith, 1968). Following World War II the company grew significantly leading the market of production of chocolate and cocoa (Otago Daily Times, 1993).

Following the war, the company expanded, and the potential for a Cadbury factory to be established in the North Island was raised with Bourneville to produce Hudson Biscuits. However, it was not until the 1960s that land was purchased in Papakura for the establishment of another factory. The factory itself completed in 1965, and despite some early setbacks, was soon helping the Dunedin factory with the grown demand for Cadbury products.

A significant move for the company was the 1960 introduction of the Hollerith accounting tabulator, which automated the production of not just invoices and statements but also financial and sales statistics all previously compiled by hand. The technology improved both speed and accuracy (Otago Daily Times, 1993). In 1963 the new "1301" computer was installed at Cadburys, the first New Zealand company to do so (Barringer, 2000).

The company merged with Schweppes to become Cadbury Hudson Limited in 1973, and 13 years later they merged with Cadbury Schweppes Australia, resulting in goods produced in New Zealand travelling to Australia and vice versa. Completing the historical circle, Cadbury took over the Griffin's Confectionery business in 1990 from Britannia Brands (NZ) Limited in exchange for the Hudson Biscuit business (Cadbury Confectionery Limited, n.d.; Otago Daily Times, 1993). The Papakura factory was a part of this exchange (Barringer, 2000), and it still operates today producing Griffins' products. At least part of the 1960s building still exists today.

In 1991 the company became Cadbury Confectionery Ltd, manufacturing goods in Dunedin (on the Cadbury Factory Site) and Avondale, Auckland with a new Confectionery factory in the latter (Cadbury Confectionery Limited, n.d.).

Figure 5-87 Photograph of the 1960s Papakura factory. Fletcher Group Services designed the building, with architect WH Gray (The Fletcher Trust Archive).

5.3.5 Otago Foundry

Several of the occupants of the A & T Burt site were prominent businesses in nineteenth and early twentieth century Dunedin. The Otago Foundry, one of the city's earliest large-scale metal working businesses, was established by William Wilson and David Mason. Mason, described as having "a quiet and retiring nature" (Otago Witness, 1896), had arrived in New Zealand around 1856 and with him he had brought a plant to start an ironworks. The foundry undertook the first iron casting at their Cumberland Street premises in 1862 (Otago Witness, 1862b). However, by this time William Wilson was noted to be operating the business with a Mr Selby (Otago Daily Times, 1863a; Otago Witness, 1862b). Mason went on to become the inspector of iron works for the Otago Harbour Board in 1874 and then worked on dredges for the Sew Hoy Mining Company (Findlay, 2009). One article describes the operations under Wilson and Selby (Otago Daily Times, 1863a) as "extensive and important operations" where "only the best artizans [sic] are employed and special training". The foundry employed around 40 men and it was noted that they received high wages at this time (Otago Daily Times, 1863a).

By the mid-1860s the company was undertaking notable contracts, and items constructed at this time by the company included an iron hulled steamboat for the Harbour Steam Company (Findlay, 2009). The boat was designed by a local engineer, Mr Darling, built "by a resident practical builder of iron builders", Sparrow, while the local company Briscoe and Co. supplied the materials (Otago Witness, 1867). This was the first time the Harbour Steam Company had relied entirely upon local labour to provide a steamboat. The newspaper report at the time also indicated that once complete, it would "be the largest and finest steamer which had yet been designed and constructed within the Colony" (Otago Witness, 1867). The vessel was expected to be launched from the Otago Foundry (Otago Witness, 1867). Shortly after vacating their Cumberland Street premises in the early 1892, the Otago Foundry was purchased by John McGregor & Co and experienced a resurgence in the early twentieth century (Farquhar, 2006). This firm was responsible for constructing the *SS Earnslaw* in 1912, which still sails on Lake Wakatipu today.

5.3.6 The Dunedin Iron Works

The Dunedin Iron Works, established by Robert Sparrow, was another early Dunedin foundry, established next door to the Otago Foundry in the late 1860s. The firm was extremely successful and opened a second plant on newly reclaimed Willis Street in 1874, before being sold in 1894 and rebranded as the Dunedin Foundry (Allport, 2013). One of the Dunedin Iron Works' best-known outputs was the *Platypus*, a submarine designed for accessing alluvial gold deposits and manufactured by the firm in 1873. Sparrow was contracted to construct the hull of the vessel at their Cumberland Street plant by Villaine and Nuttall on behalf of the Submarine Mining Company (West Coast Times, 1873). A newspaper article from August 1873 describes the completed vessel:

> "Those who expect to see a very handsome vessel, answering to preconceived notions of 'a boat,' will be disappointed. Externally, it is a huge iron shell, having no beauty to recommend it; but, on examination, well adapted to the work it is intended to be put to. It is, in fact, an iron tube of 35ft in extreme length, and 7ft 2in in diameter. It is not, however, of equal size throughout, as about 8ft from the nose it is gradually tapered to what may fairly be described a point – not a mathematical one, having no dimensions; but a material one, pretty well rounded and strongly rivetted… The way in and out of this iron cave is by a manhole at the top, and fitted over this is a dome 5ft 8in high and 3ft 6on in diameter. Around this is a balcony with hand rail and fittings. When inside the door is shut, like Noah's Ark, from without. In a line with this dome or turret, on each side is what may be termed a paddle-wheel, inclosed [sic] in an air and water-tight cover. The wheels are 8ft in diameter, and 2ft wide, with 32 arms each, to which are attached curvilinear floats or paddles." (Evening Star, 1873)

The *Platypus* was launched from the Rattray Street jetty on 13 December 1873 in front of a large crowd, most of whom were expecting the vessel to capsize and sink immediately. This did not occur and the submarine was successfully towed to the Stuart Street jetty where it was to receive the finishing touches before its underwater debut (Otago Daily Times, 1873). Despite two relatively successful trials in the Otago Harbour, the *Platypus* never made it to its intended destination of the Molyneux River, instead being abandoned for many years on the Dunedin foreshore before being transported to Barewood Station on the Strath Taieri where part of the vessel served as a water tank (Evening Star, 1928b). Anecdotal evidence suggests that part was also left in Dunedin and utilised as a tank by McLeod Brothers soap and candle works (Bisset, 2019), although no further information could be found to support this claim. Two large sections of the hull are currently on display at the Middlemarch Museum, but the rest of the vessel is missing.

5.3.7 A & T Burt

A & T Burt were another prominent engineering firm established in Dunedin during the early 1860s by Scottish brothers Alexander and Thomas Burt. Both brothers had faced hardship in Scotland and so migrated to Victoria in 1859, and caught by the gold fever, Alexander arrived in New Zealand in 1861 (Kynaston, 2012). After major successes during the Dunstan gold rush of the 1860s, Alexander turned to the plumbing trade, and with Thomas joining him from Australia, they established a shop in Dunedin in 1862 (McDonald, 1965; Parry, 1990). Thomas handled the physical works of the company while Alexander managed the business. One of their first major contracts was providing gas lighting for the 1865 New Zealand Exhibition being held in Dunedin. A & T Burt opened a large retail store, foundry and engineering workshop on the corner of Cumberland and Stuart Streets in 1874, before moving their production centre to further along Cumberland Street to the location of site I44/922 (the northern half of the present-day extent of the listed Cadbury Confectionery Ltd) buildings in the late 1870s (Parry, 1990).

Figure 5-88 Alexander Burt in 1884 ("Alexander Burt," 1884) from the early twentieth century (Otago Witness, 1920).

Figure 5-89. Photograph of Thomas Burt (Figure from "Dunedin's Buried History: Burt, Thomas," 2003).

Despite Thomas' death in 1884, Alexander continued to expand the firm, and by the early twentieth century the firm had expanded to Wellington, Christchurch, Invercargill, Auckland, Timaru and even London ("A & T Burt Limited," n.d.; Farquhar, 2006). In Dunedin, their premises extended across the entirety of site I44/922. The company put their products on display, wining many prizes at all three Dunedin exhibitions as well as 1914 Auckland exhibition, and Alexander focused on producing products that would be competitive with imports from overseas (Cyclopedia Company Ltd, 1905; Parry, 1990). In the late nineteenth and early twentieth century, the company was involved with producing mining machinery, railway castings, bridges (Figure 5-90), refrigerating machinery, tramlines (Figure 5-90), mains and service pipes through Dunedin, shipping contracts, distillery plans as well domestic fittings, thus servicing a range of New Zealand industries and sectors (Cyclopedia Company Ltd, 1905). By 1905, the company employed 300 people throughout the country (Kynaston, 2012).

Like other major companies in Dunedin, A & T Burt gave back to the city donating £2000 pounds for a paddling pool and fountain at Moana Pool. Alexander Burt was known for fostering technical education in the city (Otago Witness, 1920). Driven by childhood struggles, Burt supported evening classes at the Caledonian Society, where he was made a life director; he was on the Arthur Street School committee for over thirty years; and he founded the Dunedin Technical School with G. M. Thomson in 1918 (Parry, 1990). When Alexander passed away, he left £300 to the school and the King Edward Technical College assembly hall was named in his honour (Parry, 1990)

A detailed article in 1921 described the contemporary A & T Burt plant and illustrates the variety of works from plumbing to heavy engineering (Otago Daily Times, 1921a):

- The engineering department contained construction projects for the New Zealand Paper Mills, as well as hydraulic rams for a customer and their own warehouse as well as refrigeration machines.
- The foundry contained work for the Wellington State Fire Insurance building and the New Zealand Insurance Company building in Auckland.
- The boiler shop works for boiler-making as well as bridge and building constructions were underway.
- The brass foundry manufactured brass work for the engineers and plumbers, while the brass moulding department supplied brass castings to the engineering department.
- Coppersmiths shops produced copper circulators and boilers.
- The company also manufactured all types of lead pipes, galvanised iron and down pipes and shop spoutings as well as baths and tanks.

The company was also inventing new products with the article noting a "newly patented rapid water heater" was being tested before taking it public (Otago Daily Times, 1921a). The company employed a great number of employees and the article stated that they manufactured more products and designs than any other factory in the country (Otago Daily Times, 1921a).

When Alexander Burt died in 1920, his son William C Burt took over as chairman of directors. William Morley took over in 1930 shifting the focus of the company to importing and merchandising rather than manufacturing.

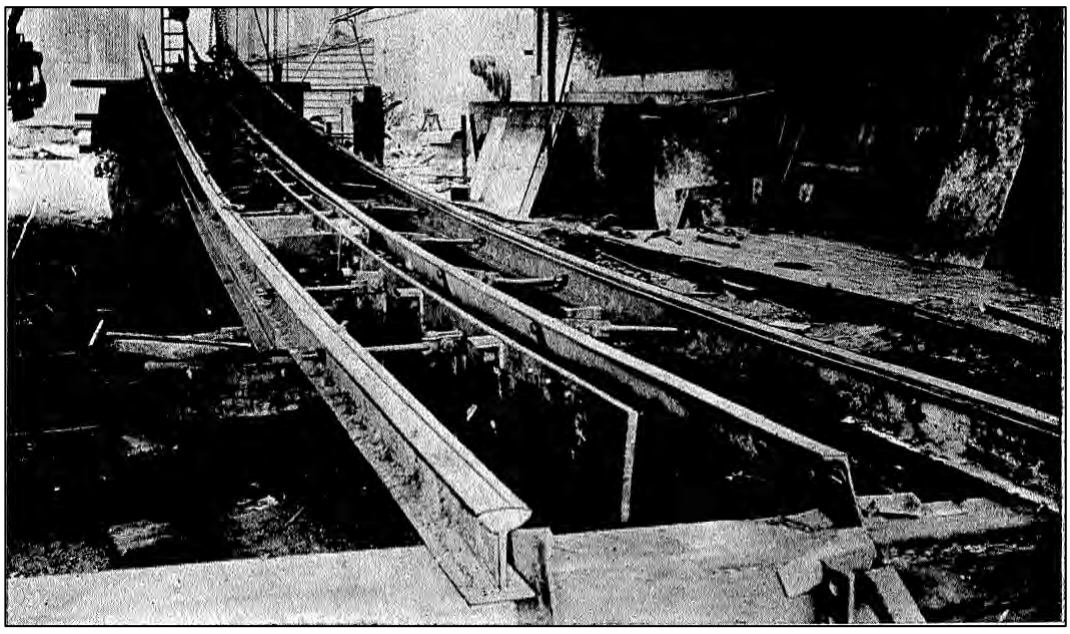

Figure 5-90 Underground work for the Kaikorai Valley Tramline produced by A & T Burt (Otago Witness, 1910).

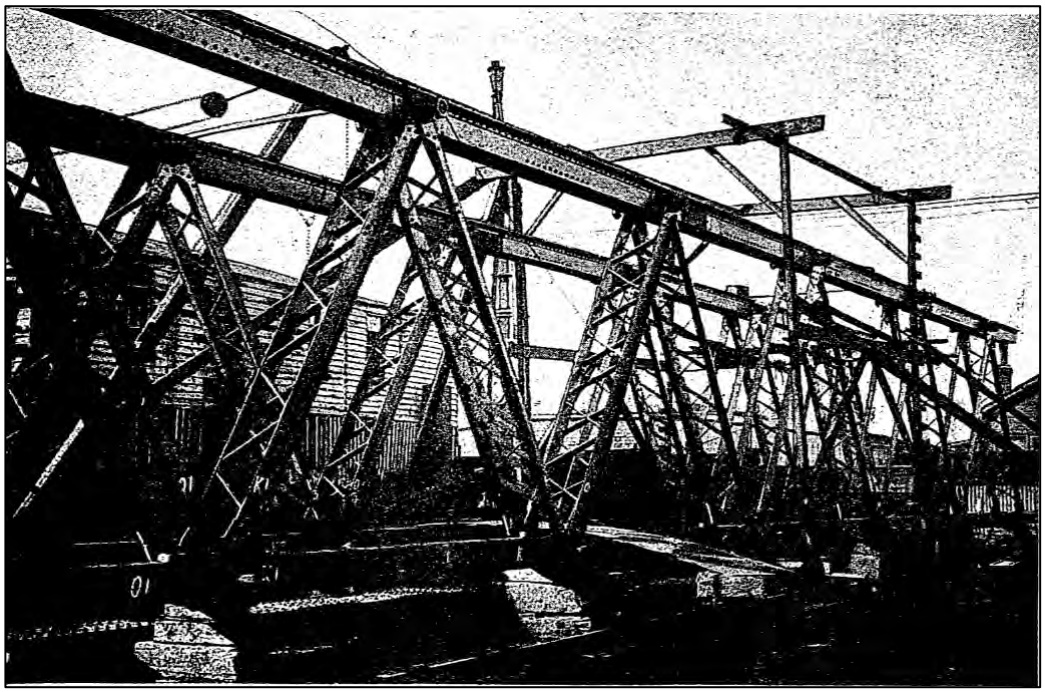

Figure 5-91 Construction of the Claudelands Bridge, Hamilton under construction at A & T Burt's Foundry (Otago Witness, 1908)

5.3.8 NZEEC and New Zealand Implement Company

Two smaller industrial firms, NZEEC and the New Zealand Implement Company, also occupied the A & T Burt Site (Site I44/922). Begg & Wilkinson were manufacturers of agricultural equipment and fencing supplies and occupied the Castle Street frontage of site I44/922 from the mid-1880s to 1889 when the partnership dissolved and Begg continued the business as the New Zealand Engineering and Implement Company (Otago Witness, 1889b). Following this rebranding, the company shifted its focus to the manufacture of flax and gold mining machinery and remodelling its Castle Street premises to make use of all available space (Otago Witness, 1889a). Begg retired in 1891 and sold his Castle Street plant and stock to the NZEEC (Evening Star, 1891). The NZEEC were responsible for providing electrical light to "a very large proportion" of industrial premises across the South Island using a combination of arc and incandescent lights (Mataura Ensign, 1894). In 1893 this company used their technology to project the results of that year's general election onto the side of the *Otago Daily Times* building and a billboard in Dowling Street (Otago Daily Times, 1893).

5.3.9 John McGregor

John McGregor designed the first New Zealand Distillery Company Building, that was initially to be located at the corner of Crawford and Manor Streets but was eventually built on the Cadbury Factory Site. McGregor was an active architect between the 1860s and 1880s (Entwisle, 2013), and in 1865 he was operating out of the Princess Street Chambers (McDonald, 1965). It is interesting to note that McGregor also shared offices with the well-known architects, H. F Hardy and W.B Armson, and they were closely situated to architects R. A Lawson, David Ross as well Mason and Clayton. It has been suggested the close proximity of the architects likely increased competition between them, and they did not move to form a professional body (Robert McDougall Art Gallery, 1983). Prior to the New Zealand Distillery Company buildings, he had designed a warehouse at 8 Stafford Street, that had been decorated with a Venetian Gothic Style with Oamaru stone façade; this building has been heavily altered since its initial design but is now scheduled on the Dunedin City District Plan as B273 (the Ross & Glendining Building shown in Figure 5-92). The distillery buildings were far less elaborate in comparison (David Murray, 2015). He also undertook residential designs and is thought to have designed an 1870s brick cottage in Melrose, Roslyn a residence for the lawyer Arthur Nation (partner of a legal firm with Charles Kettle and James Macassey). For a cottage, the building was elaborate, featuring hand-painted ceilings, stained glass, and timber joinery; the residence became known in the late 1800s as 'Melrose' (David Murray & Breese, 2016).

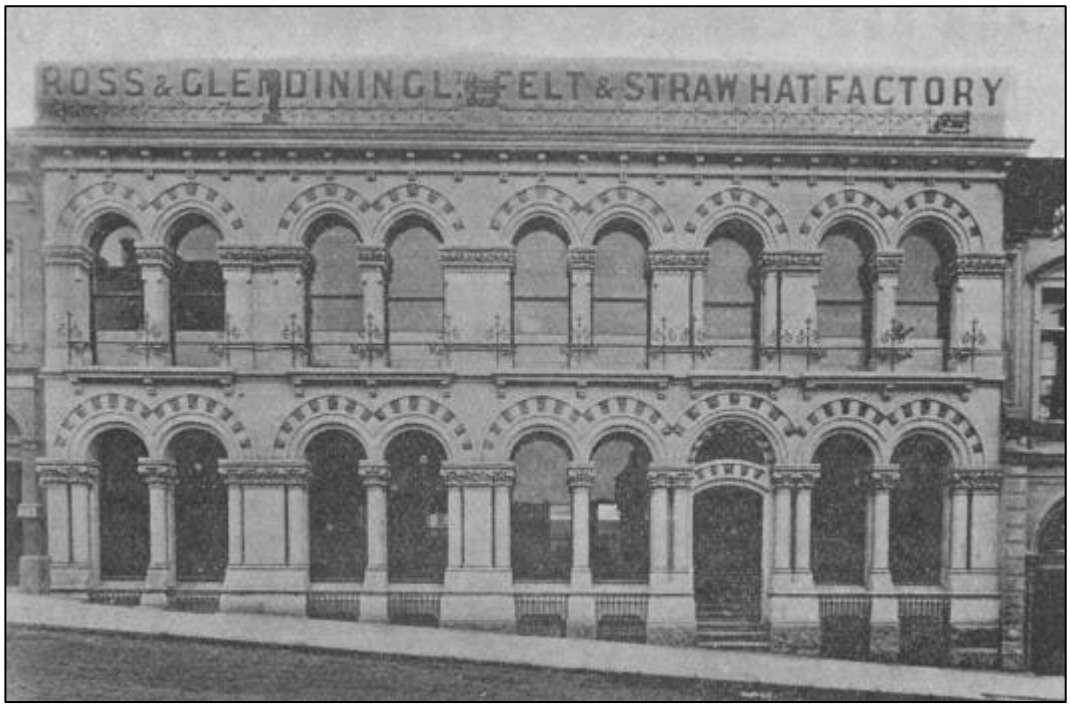

Figure 5-92 Early 1900s illustration of the Ross & Glendining Building (Fahey, 1906 in D Murray, 2015). The original 1866 building designed by McGregor is on the right. The entrance visible in the image was in the centre of the original building. The extension was done by Mason & Wales replicating the initial design of the building.

5.3.10 Fletcher Construction Company

James Fletcher started in the field of construction in 1909, when he first built a house in Dunedin with Albert Morris. However, it wasn't until 1915 that the Fletcher Bros Ltd was formed, which was renamed the Fletcher Construction Company Ltd four years later when his brothers joined the business (Fletcher Construction, 2019; The Univerity of Auckland Business School, 2010). The company tendered for both large commercial projects and public works including Dunedin's municipal swimming pool and the St Kilda Town Hall (The Univerity of Auckland Business School, 2010). It was early on in the company's history when they undertook the construction of the cement building for R. Hudson and Co. James held strong to deliverable timelines, forming relationships around New Zealand and overseas to enable this (Fletcher Construction, 2019). The company moved to Auckland in 1925, contributing to landmark constructions in Auckland and Wellington during the depression years. Fletcher Holdings was publicly listed in 1940, with the Fletcher Construction Company forming its largest subsidiaries (The Univerity of Auckland Business School, 2010). In the 1950s the company continued to grow yet held on to the values of James Fletcher, undertaking joint ventures with oversea companies to bid for local tenders and working with the government to take on the construction of houses at the Kawerau township. The latter would be New Zealand's largest construction project undertaken at that time (The Univerity of Auckland Business School, 2010). The company still operates today as Fletcher Building Limited, one of New Zealand's largest listed companies.

5.3.11 Miller and White

Eric Miller and James H. White formed part of the architects Miller and White, established in 1927, and contributed to Dunedin's built heritage. They had worked separately in the city prior to forming the partnership, and as Miller and White, they had designed the 1929 façade for the Irvine and Stevenson building on St Andrew Street (David Murray, 2014a); additions to the RSA Building in 1938 and 1944 (David Murray, 2014b); the 1939 NZR Road Services building (part of the Otago Settlers Museum); Lawson and Lousely houses on the corner of Pitt Street and Heriot Row; the St John's Building on York Place in 1938 (C. Smith, 2009); and the 1948 Hercus Building of the Otago Medical School (David Murray, 2014a). The University of Otago was one of their key clients, who they had inherited from Edmund Anscombe in 1928. When Miller died in 1948, Ian Gilman Dunn joined the company and the firm became Miller, White and Dunn (Farquhar, 2010). The company was well known for their modernist style (C. Smith, 2009), and this is evident in their design of the 1938 alterations to the chocolate factory and 1957

design to update the façade of the Dairy and Machine House Building. The large open windows featured in the factory lightened the whole factory and gives the factory a distinct light and open feel that influenced the design of future factory buildings on the site.

The modernist approach can also be seen in the alterations of Hudson's family home, designed by Eric Miller; the Hudson family home is located on Tweed Street, Roslyn (HNZPT List No. 373). Miller added a number of unique changes to the home. For instance, the drawing room featured a large bay of windows providing the house with sun and views (Irvine, 2012). The house also featured stain glass windows throughout the building including in the bathroom. These windows along with the associated with Miller, heightened the significance of the house.

5.3.12 Henry McDowell Smith

Henry McDowell Smith was an architect who began his career in Newcastle-upon-Tyne, England, before relocating to Dunedin in 1908 to work with Edmund Anscombe. In 1912 he was sent to Invercargill to take the position of branch manager for Anscombe and his new business partner Leslie Coombs (Otago Daily Times, 1912). This partnership was short-lived, however and by the following year McDowell Smith replaced Coombs as partner (Otago Daily Times, 1913; Southland Times, 1913). The business of Anscombe and McDowell Smith flourished, and by 1919 they were advertising as architects, structural engineers and community planners (Otago Daily Times, 1919). McDowell Smith left the company in 1921 to set up his own practice in Dunedin (Otago Daily Times, 1921b) and went on to design numerous early modernist buildings around the country. Like Miller and White, he designed a number of modernist buildings around Dunedin including the Law Courts Hotel in the 1930s, Fletcher offices in around 1950 and the Unipol Gym (formerly the Williamson and Jeffreys building) also around 1950 (C. Smith, 2009). Similar modernist style can be seen reflected in the portion of Block 3B, part of the chocolate factory, designed by McDowell.

Figure 5-93. Law courts hotel, Dunedin (Mattinbgn, 2011).

5.3.13 William McLellan Ltd

William McLellan Ltd was a key player among Dunedin's construction firm operating between 1910 and 1966(Farquhar, 2006). The constructed a variety buildings around the city and further afield including the Anglican Cathedral in 1915 (New Zealand Times, 1915), a 1930s radio station at Highcliff (Auckland Star, 1935), the Octagon Theatre (Otago Daily Times, 1940); the Southland hospital (Press, 1933); the Invercargill Post Office (Auckland Star, n.d.). A decade before working on the steel and concrete building for the Cadbury Confectionery Ltd buildings, McLellan Ltd were advertising their skill in steel structural work (Evening Star, 1928a). They also had worked previously with other modernist architects, Mandeno and Fraser. Together they constructed the new banking chambers in Queenstown using reinforced concrete construction (Lake Wakatip Mail, n.d.).

6 Previous Work Identifying Heritage Values

Previously identified heritage sites and places near the project area can also provide information that is valuable for assessing the heritage values and impacts to the wider heritage landscape. UOA carried out comparative analysis using ArchSite (the New Zealand Archaeological Association's site recording scheme), the HNZPT List/Rārangi Kōrero, the DCC Schedule of Townscape and Heritage Buildings and Structures (Schedule 25.1 2006 Dunedin City District Plan), the DCC Schedule of Protected Heritage Items and Sites (Appendix A1.1, 2GP). The results of a brief comparative analysis are documented here.

The collective reference for the buildings at 280 Cumberland Street reported on here varies between the Dunedin District Plans and the HNZPT List/Rārangi Kōrero. The Cadbury Confectionery Buildings Ltd are scheduled as such on the both the 2006 and 2GP Dunedin District Plans. However, on the HNZPT List/Rārangi Kōrero the buildings are currently scheduled as the Cadbury Schweppes Hudson Limited Buildings.

6.1 Previous Recognition of Heritage Value

The Cadbury Confectionery Ltd Buildings are included as a Category 2 Historic Place (List No. 2143) on New Zealand Heritage List/Rārangi Kōrero. The Cadbury Confectionery Ltd Buildings were first listed in 1982 under the Historic Places Act 1980 with a 'C' classification, which indicates that merits preservation because of its historical significance or architectural quality[2] (pers. com. Sarah Gallagher, Heritage Assessment Advisor, HNZPT, 10 April 2019). When the classification system changed, the listing became a Category 2 Historic Place, which is defined by the HNZPTA 2014 as a place of "historical or cultural heritage significance or value".

The online list entry record refers to the buildings as the Cadbury Schweppes Hudson Limited Buildings and until recently, included reference to the listing being restricted to the façades of four buildings: "Cadbury Schweppes Hudson Limited Buildings (Four Buildings) (Extended Façade)" (HNZPT Listing Documents). A listing report has not been completed by HNZPT, but HNZPT holds a paper file on the site, which includes a two-page *N.Z. Historic Places Trust Buildings Record Form*; a copy of this form is provided in Appendix A. The form, completed in 1993, provides extremely limited information about the buildings in the listing. The factory buildings, covering all DP 1589 and all DP 5322, were recorded to have been made of brick and plaster in a utilitarian style.

There has been some confusion on whether the Castle Street façades of the Dairy and Machine House Building, the Biscuit Factory and Dispatch Building and the Chocolate and Biscuit Factory Building were included in the initial listing for the Cadbury Confectionary Ltd Buildings. A recent technical change request document was prepared by HNZPT for a technical change to the listing to keep their information up to date. In this document they identified that it was unclear if the Castle Street façade was included in the listing (Heritage New Zealand Pouhere Taonga, 2019). The listing includes a photograph of the four buildings thought to be referred to in the original board minutes. However, the listing includes the address 40 Castle Street (now part of 280 Cumberland Street) and 280 Cumberland Street written in next to it. When HNZPT notified owners under the transitional provisions of the Historic Places Act 1993, the address provided was '280 Cumberland Street' yet the legal description provided was 'All DP 1589 and all DP 5322', which includes Dairy and Machine House Building and the other Castle Street façades (Heritage New Zealand Pouhere Taonga, 2019).

As a result of the technical change the listed name became "Cadbury Schweppes Hudson Limited Buildings (Former)" while the address became 280 Cumberland Street, and the legal description is DP 5322 (RT OT304/181), Secs 53-55, 72-74 and Pt Secs 56 and 71, Blk XVI (OT129/279), Otago Land District (Heritage

[2] Section 35 (1) of the Historic Places Act 1980 states: The trust may from time to time classify buildings according to their historical significance or architectural quality, as follows: (a) Those buildings having such historical significance or architectural quality that their permanent preservation is regarded as essential: (b) Those buildings which merit permanent preservation because of their very great historical significance or architectural quality: (c) Those buildings which merit preservation because of their historical significance or architectural quality: (d) Those buildings which merit recording because of their historical significance or architectural quality.

New Zealand Pouhere Taonga, 2019). This land includes the Dairy and Machine House Building, the rear of the Biscuit Factory and Dispatch Building as well as the Chocolate and Biscuit Factory Building. However, it not explicit in whether the Castle Street façades are considered part of the listing (Heritage New Zealand Pouhere Taonga, 2019).

The Dunedin City District Plans are clearer. The facades to both Cumberland and Castle Streets across the same property boundaries identified in the listing were registered as B030 on the 2006 Dunedin City District Plan (Schedules 25.1 and 25.2) and the 2GP (Schedule A1.1). The former Dairy and Machine House Building on Section 74 and the adjacent Section 73 BLK XVI, Dunedin, was incorporated into the Anzac Square/Railway Heritage Precinct (TH11) in the precinct the 2006 Dunedin City District Plan; however, it is no longer part of this precinct (which is now referred to as the Stuart Street Commercial Heritage Precinct) in the 2GP.
As part of the Cadbury Confectionery Ltd building were within the Anzac Square/Railway Heritage Precinct (TH11), it is important here to identify why the area was identified in the DCC District Plan (Dunedin City Council, 2006). Precincts in Dunedin contribute to the heritage character and townscape of the city, and the Anzac Square/railway Station Precinct have been identified as a result of their significant heritage values (Dunedin City Council, 2006).

Figure 6-1: Map showing previously recorded archaeological and heritage sites in central Dunedin surrounding the Cadbury Block

Anzac Square is one of the Dunedin areas that holds the most continuity in occupation from European settlement and is surrounded by various buildings of architectural significance with the Railway Station, the Law courts and the Dunedin Prison surrounding the open space. Anzac Square and the Railway Station were identified to be a possible 'anchor' at the terminus of lower Stuart Street and the area surrounding it, the space was noted to be lacking in definition as it is not an enclosed space on all sides (Dunedin City Council, 2006). One key feature of the Anzac Square/Railway Heritage Precinct was the lack of modern buildings that could undermine the architectural significance of the built heritage in this area. In its 2006 District Plan the council identified a number of values which were to be enhanced in the Precinct. Those that specifically related to the Cadbury Confectionery Ltd Buildings were: the presence of heritage buildings; the height of the buildings defining the area on its norther edge; no modern buildings; buildings adjacent to heritage buildings are comparable in height; street furniture is fitting to the character of the area; colours used in the precinct are subdued and align with the historic character of the area (i.e. unpainted red brick, off-white, cream, and subdued darker colours such as deep green or grey); and minimal signage and signs are not displayed from facades (Dunedin City Council, 2006). As noted above however, no part of the Cadbury site is included in that equivalent Precinct under the 2GP.

6.2 Previous Investigations of the Cadbury Confectionery Limited Buildings (List No. 2143/ District Plan Site No. B030)

Previous investigations of the Cadbury Confectionery Ltd Buildings have focused predominantly on the former Cadbury Dairy and Machine House Building (1875 - former cellar) with the machine house (1868 – former possible small mill) to the rear, which has seen continuous use since their construction. It is important to note that all previous investigations were written when the Dairy and Machine House Building was situated within the Anzac Square/Railway Heritage Precinct (TH11) as defined by the 2006 Dunedin City District Plan. Three key reports have been prepared for the buildings: an archaeological assessment was undertaken by Southern Pacific Archaeological Research (Brooks & Jacombs, 2010), a concurrent cultural heritage assessment was undertaken Oakley Gray Architects Ltd (2010) for potential plans to demolish the building, and review of heritage significance discussing redevelopment options for the Cadbury Confectionery Ltd buildings was prepared by Jackie Gillies + Associates (Farminer, 2014).

Brooks & Jacombs (2010) identified that the age of the Dairy and Machine House Building as well as its connection to Dunedin's early industrial sector underpinned the **historical values** of the building, as it is one of the last buildings associated with the 1870s brewery operations associated with manufacture of whiskey, beer and Confectionery. Similarly, Oakley Gray Architects Ltd (2010) and Farminer (2014) highlighted the buildings' associations with an early Dunedin distillery and brewery as well as the biscuit and chocolate factory. Farminer (2014) explicitly acknowledged it was New Zealand's first legal distillery site, with the oldest structures surviving from 1868 distillery (the former possible small mill and west wall of the Dairy and Machine House Building), 1870s to 1880s associations with the Albion Brewing Company (the main construction of the cellar that would become the Dairy and Machine House Building), as well as the building's connection with Richard Hudson (the east end of the building housing his offices from around 1918). Overall, the previous investigations considered the buildings to have "considerable historic significance" due to it industrial past and associations with notable organisations (Oakley Gray Architects Ltd., 2010).

In regards to the **architectural value**, all three reports remarked on the significant changes to the Dairy and Machine House Building including multiple façade alterations, internal modifications and the addition of "an intrusive lunchroom" on the roof Oakley Gray Architects Ltd (2010). As such the exterior of the building was undermined architecturally and aesthetically from its original Victorian industrial appearance so that it had little relationship to with its surroundings or neighbourhood (Oakley Gray Architects Ltd., 2010). Aside from the central interior of the Dairy and Machine House Building, which displays a good example of the original Victorian construction, Oakley Gray Architects Ltd (2010) assessed the building to have little evidence of noteworthy design elements. However, all three reports were written prior to the refurbishing of the façade in the 2018. Moreover Brooks & Jacombs (2010) highlighted the potential of the building to provide insight into mid to late nineteenth

century building design, especially archaeological and engineering techniques. Oakley Gray Architects Ltd (2010) also noted that the construction features of the remainder of the building were unlikely to have changed dramatically. Farminer (2014) further highlights that the Dairy holds its footprint and overall form of the original 1875 cellar building and the Machine House retains its 1868 possible small mill footprint and first floor and despite later second floor additions. As such it holds an industrial legacy harking back to the earliest distillery on the site. Farminer (2014) acknowledged that the kauri and rimu trusses and floor structure remained in the central and eastern office areas of the dairy in good condition, and the central section of the building suffered only minor alterations in the twentieth century. However as with Oakley Gray Architects Ltd (2010), it was assessed that the significant changes to other portions of the building detracted from the overall significance of the building as did the overall poor condition.

Oakley Gray Architects Ltd (2010) describe the **technological or scientific values** as significant in relation to the overall purpose of the overall factory site, rather than the building itself being important on its own. Importantly they do note that elements of the central interior of the building holds some rarity value, though the rest of the building has been so modified as to have significant importance as an industrial building. The changes to the altered fabric of the building was identified by Farminer (2014) to inform the technological significance of the building with distinctive changes in requirements for the key functions of the building. As highlighted in the Oakley Gray Architects Ltd (2010) assessment of structural elements, Farminer (2014) again reiterated the importance of the 1875 timber floor and roof structures in relationship to mid-nineteenth century craftmanship. Later elements of craftmanship were also highlighted by the 1918-1930s office interiors such as a plaster ceiling, which survived in good condition and can be associated with the Hudsons.

Of note is the identified **social importance** of the building given that the R. Hudson and Co. and the iterations of the Cadbury companies to follow were large employers in Dunedin, right up to the closure of the Cadbury Factory in 2018 (Oakley Gray Architects Ltd., 2010). Farminer (2014) is also more explicit in connecting the **cultural (and spiritual) significance** of the building with the first distillery and establishment of the New Zealand whiskey industry as well as its contribution to Dunedin's brewing culture as well as industrial character. Farminer (2014) further acknowledged the continuous association of the site with chocolate manufacture through the twentieth century as well as the more recent importance of the site for local tourism, emphasised by the identification of the Dairy and Machine House Building as the oldest building on site during Cadbury World tours.

As with the previous reports, the Farminer's (2014) review highlighted its **contextual significance** in relation to nineteenth-century industrial and social aspects of the building's history. While the façade at the time was considered to be of low value aesthetically it was noted to contribute to the townscape in that it enclosed the Cadbury site and was part of the wider Castle Street frontage (Farminer, 2014). Moreover, beyond Castle Street, the building also contributed to the city plan of Dunedin as an early trace of nineteenth century development.

In recognition of the specific **archaeological values** of the building, Brooks & Jacombs (2010) identified the potential to understand more about the construction, modification and use of the building, particularly in the change over time as it moved from a brewery to Confectionery and Dairy and Machine House Building. They along with Farminer (2014) also acknowledged the potential for subsurface remains to exist beneath the building prior to the construction of the cellar. Given the early date of the possible small mill (later machine house) and the cellar (later dairy) built soon after, Farminer (2014) noted that this building has high archaeological value given the original fabric they contain. Farminer (2014) also acknowledged that the alterations to the building provide "a richness and 'time-depth' to the site" in regard to the development of the site and as such are not solely detrimental to the buildings character but add to the story of the building. While the amenity value of the buildings was considered to be low, Farminer (2014) motioned that this would be high value if repairs were made to the building and it was made accessible to the public.

Having examined the building, Oakley Gray Architects Ltd (2010) assigned values of significance to specific elements of the building. Most elements were assessed to be of some significance, no heritage significance or

intrusive (i.e., detract from the overall cultural heritage significance); though some elements were assessed to have higher significance. Throughout the buildings, original brick walls painted and or plastered were considered to have some to considerable significance, except for the painted brick walls of the storage area and the 1870s walls in the tearoom on the first floor which were of considerable significance. Original timber columns throughout the building were assessed to be of considerable significance as well as elements relating to the timber first floor structure. A number of elements throughout the building were also considered to be of considerable significance including: tie rod ends/boss and timber framed windows on the exterior north façade; the exposed bluestone foundation in the interior of the machine house; the east and part south wall of the older original building at the west end of the machine house; the roof and eight light fixed timber framed windows of the storage area; timber window in WC 1; and an existing window in WC 2 (Oakley Gray Architects Ltd., 2010).

The roof of the west end of the machine house had some timber rafters, collar ties, sarking that were considered to be of some to considerable significance, as was the high opening in the original south wall gable. The underside of the first-floor timber structure associated with the original 1870s cellar construction had been altered, with holes filled in or hatches created so it was assessed to be either from considerable to no significance as was the floor in the storage area. Similarly, timber windows in a smoko room on the ground floor had been modified to incorporate glass louvres and was either intrusive or considerable significance as was the carpeted timber floor of the office space (Oakley Gray Architects Ltd., 2010).

6.3 Archaeological Sites within the Project Area

Prior to the start of the hospital development works, there was one recorded archaeological site within the Cadbury Block: site I44/817, the location of a nineteenth century commercial and industrial activity. As described above, this site sits on land that was reclaimed from the foreshore during the 1860s and was subsequently occupied by the New Zealand Distillery Company's distillery complex, the Albion Brewing Company's brewery and R. Hudson & Company's Confectionery factory (ArchSite 2018). Prior to this heritage impact assessment and associated archaeological assessments, only two nineteenth century buildings were noted to have survived on the site, a possible small mill built (also referred to as the machine house) in 1868 for the New Zealand Distillery Company and a ground-level brick cellar built in 1875 for the Albion Brewery. Both buildings were significantly altered for use as a Dairy and Machine House Building for R. Hudson & Co in the early twentieth century. Previous site visits had described the brick cellar/dairy as being in fair condition on the site record form, but this had not been updated since renovations were carried out in late 2017. This site has since been updated with the results of further historic research and site visit results of this report and associated archaeological assessment of effects for the Hospital development.

As part of the archaeological assessment for the Cadbury Block between Stuart Street and St Andrew Street, three other archaeological sites were recorded: sites I44/922, I44/924 and I44/923. The first was the A & T Burt Site which is situated within the extent of the Cadbury Confectionery Ltd buildings, on land that had been reclaimed in the 1860s. The pre-1900 history of the site was also commercial and industrial activity. As described above the site was occupied by the Otago Foundry, Dunedin Iron Works; New Zealand Implement Company, New Zealand Electrical and Engineering Company, and A & T Burt. By 1910, A & T Burt had taken over the entirety of the site.

I44/924 was located immediately adjacent to the Cadbury Confectionery Ltd Buildings and records the location of the McLeod Brothers soap and candle works operating from 1869 onwards, while I44/923 just south of this records the location of 1860s houses as well as Planet sawmills, followed by the Coombes and Sons Cumberland Street tannery and cottages. Interestingly the main tannery building at this site was owned by Richard Hudson of Hudson & Co in 1896 and fitted out as a roller flour milling plant for his biscuit and confectionery company (Otago Daily Times, 1900; DCC Archives). This was two years prior to purchasing the property on which the Cadbury Confectionery Ltd Buildings now stand.

In the wider Dunedin Hospital Development area (including the blocks to the immediate north and west of the site), 18 other sites have been recorded. Two sites I44/894 and I44/895, located in the block bounded by Bow Lane, Castle Street, and Anzac Avenue, are both locations of industrial occupation on land reclaimed from the foreshore in the 1870s and 1880s. Sixteen sites (I44/903 to I44/918) are located in the block bounded by Cumberland, Castle, Hanover, and St Andrew Street. The majority of these sites record domestic occupation. There was significantly less industrial and commercial activity in this block, however the few businesses located across the block included a coal and timber yard (I44/903), dairy (I44/907), shops (I44/909 and I44/908), and a factory (I44/918). Domestic residences were also located at each of these sites. All these sites were recorded as part of an assessment for the Cadbury Carpark block as part of the first stages of the Dunedin hospital development (Woods, 2019b, 2019a).

6.4 Archaeological Sites in Central Dunedin

There are currently 188 recorded archaeological sites in the central Dunedin area, including two Māori and 186 non-Māori sites (note: this does not include pending sites on ArchSite). Section 4 demonstrated that there has been both Māori and colonial occupation in the Dunedin area prior to 1900. The archaeological investigations that have been done in central Dunedin have been limited to areas where development has taken place and as such do not accurately reflect the abundance of archaeological sites in this part of the city. The distribution of archaeological sites in the vicinity of the Dunedin Hospital project area is shown in Figure 6-2.

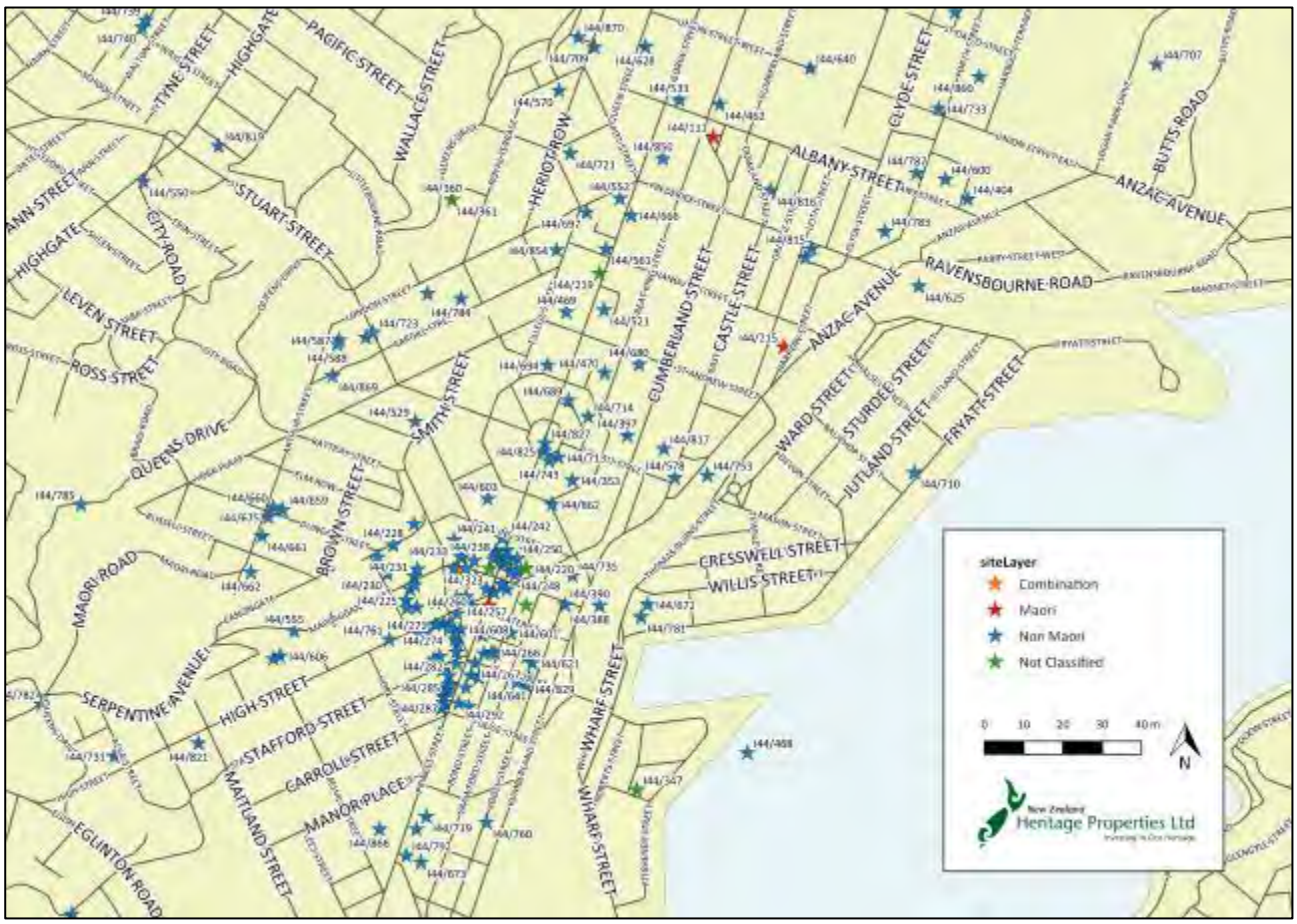

Figure 6-2. Archaeological sites within Central Dunedin.

6.4.1 Māori Sites

There are three previously recorded archaeological site in central Dunedin classified on ArchSite as being Māori; however, one is actually colonial in origin. Site I44/214 is the location of a canoe landing place at the mouth of the Toitū Stream, beneath the junction of Bond and Water Streets. This site was also the landing place for the first Scottish settlers who arrived in 1848. No physical remnants of the landing place are currently visible. Site I44/215

is the location of an adze discovered during drainage excavations on Harrow Street in the early 1990s. This location would have been along the original foreshore and illustrates the possibility of finding Māori archaeological remains in this area. Site I44/111 is classified as Māori on ArchSite and described as a "disturbed midden"; however, a review of the site record form reveals that the midden contained nineteenth century colonial material that was re-deposited on a triangle of land between SH1 and Walsh Street during the 1970s. The location of the two correctly classified Māori sites shows that there is a possibility of encountering Māori archaeological remains during excavations along the original foreshore of central Dunedin.

6.4.2 Colonial Sites

There are 186 previously recorded colonial archaeological sites in the central Dunedin area, with a cluster around the oldest part of town to the south of the Octagon and the remainder of the sites more scattered. The most common site type in this area is commercial/industrial (n=82), which includes sites of nineteenth century stores, warehouses, hotels, foundries, factories and other commercial/industrial premises. These sites are generally found within the modern central business district, either side of the Octagon, and reflect this area's past as the manufacturing centre of the settlement. Domestic sites account for 55 colonial sites within central Dunedin and include a range of housing types from clusters of small working-class rental accommodation in the centre city to large middle-class estates in the hill suburbs. Twenty-five colonial sites fall under the transport and communication heading and include historic roads, the railway station (I44/390), Jetty Street Wharf (I44/468) and areas of cobbles, setts and nineteenth century kerb and channel. The remaining colonial sites in the area relate to the administrative and recreational development of the city and include sites such as banks, police stations, schools, memorials and council chambers. The spatial distribution of these sites reflects the expansion of Dunedin during the nineteenth century.

6.5 Specific Site Types in the Archaeological Record

This assessment has identified a range of archaeological sites within the hospital project area, and many are types that are regularly found in urban contexts around New Zealand. Undertaking a review of similar sites that have been previously recorded can help inform the assessment of values for the sites within the project area and also provide insights into the types of features, remains and/or material that may be encountered during the proposed works.

6.5.1 Commercial and Industrial Sites

In general, commercial and/or industrial sites are one of the most common archaeological site types in New Zealand. This is partly due to the nature of commercial activity and the regular refitting, altering and redeveloping these buildings undergo throughout their use-lives. Across the South Island, there are more than 500 recorded commercial/industrial sites on the ArchSite database, with examples found in almost every urban area. The nature of these sites is extremely varied due to the wide range of activities that fall under the commercial/industrial heading, however there are some general trends noticeable among those sites that have been investigated. Commercial and industrial scale activities produce more waste than residential occupation, and the type of waste produced is usually more uniform than that found on residential sites.

Several large mixed commercial/industrial sites have been investigated in Dunedin, and all have resulted in large artefact assemblages that tend to fit in with recorded activities on the property, thus allowing for an in depth look at specific industries and companies. At the Farmers site, material and contexts relating to various site occupants were recorded, including a monumental mason, livery stables, cordial factory and bootmakers (Petchey, 2004). Across George Street, development of the Wall Street Mall encountered remains relating to a timber yard, hotels and various shops (Petchey, 2009b). Investigations at 356-358 George Street found deposits of glass chemical bottles from the site's use as a photography studio in the late nineteenth century (Davies, Cawte, Murray, & Forster-Garbutt, 2016). At each of these sites, the commercial deposits were found alongside, and sometimes mixed within, material relating to domestic occupation. It is highly likely that this will also be the case for the Dunedin Hospital project area.

Mixed commercial/industrial sites investigated in Christchurch have produced similar assemblages and encountered similar archaeological contexts. Perhaps one of the most comparable to the proposed works is the Justice and Emergency Services Precinct in Christchurch that covered 12 town sections (Williams, Garland, & Geary Nichol, 2017). Across this site, 190 archaeological features were recorded and a sample of 13,400 artefact fragments representing a minimum of 5636 items was recovered. Features and deposits were able to be attributed to several known commercial enterprises that occupied parts of the site during the nineteenth century, including a sawmill, foundry, bootmaker, milliner and tailor. In addition to these specific commercial features and deposits, a gully crossing the site was filled with general waste from the surrounding properties. Analysis of the archaeological features and artefacts revealed a clear shift from residential occupation to commercial and industrial at the site. This shift was a gradual one and so there were several decades when people were living among commercial and industrial premises, and often dumping their household waste in the same place as the businesses. A similar, but far smaller, site was investigated in Lyttelton (Tremlett, Garland, & Whybrew, 2017) and similar trends were observed. Large dumps of aerated water bottles and areas stained with coal dust were found amongst more mixed deposits of general refuse and were able to be attributed to Curtis & Co., an aerated water manufacturer and coal merchant who occupied the site during the nineteenth century.

6.5.2 Brewery Sites

Just ten breweries have been registered with ArchSite in the South Island, and a further four sites with hop kilns have been recorded. Five previously recorded breweries within Dunedin provide comparisons for those within the project area. Two of these sites are of interest. The first is the Water of Leith Brewery, located at the intersection of Cumberland Street and Duke Street. This brewery was established in 1862 by John Marshall and James Copeland, who operated out of the premises until 1879 (Cable, 2005), the year after they purchased the Albion Brewing Company at the location of the Cadbury Confectionery Ltd buildings. The business was incredibly successful and the largest brewery in Otago it was appreciated locally and overseas (Leckie, 1997). While newspaper reports indicate they did not operate out of the premises after 1879 (Otago Daily Times, 1879), they still continued to own the brewery, until they sold it to Williamson and Murray, along with the Albion brewery, in 1887 (Taranaki Herald, 1887). The Water of Leith brewery was eventually sold to McGavin and Co. in 1899 and became the Union Brewery (Cable, 2005; Hawkes Bay Herald, 1868). The brewery was demolished in 1976 when the Cumberland one-way system was established (Cable, 2005). There was no archaeological report prepared as part of the demolition, nor have there been further subsurface archaeological investigations since this time.

The second site of interest is the Speights Brewery (I44/233), which is the only brewery in the South Island to have had a final report submitted to Heritage New Zealand detailing the archaeology at the site (Gillies & Farminer, 2015). It is suggested that brewery sites will have a common set of inter-related buildings, such as the maltings/brewhouse, cellars, malt kiln, offices, due to the necessary functional requirements (Gillies & Farminer, 2015). Cobbled floors were identified at the Speights Brewery (Gillies & Farminer, 2015), and such features may therefore be expected at the brewery sites identified within the project area.

Elsewhere in the South Island, the Black Eagle Brewery in Invercargill has been investigated archaeologically (Lewis, Cropper, Woods, Cawte, & Scrivener, 2018). Similar structural features to those found at the Speights site were encountered, as well as numerous bottle dumps that enabled changes in bottle manufacture and styles throughout the brewery's life to be examined (Lewis et al., 2018).

6.5.3 Foundry Sites

Thirteen foundry sites have been previously recorded on ArchSite in the South Island, three of which are located in Dunedin. These sites include the Vulcan Foundry at 232-242 George Street (I44/521), an unnamed foundry at 154 Dundas Street (I44/712) and the Victoria Foundry at the Otago Dental School Complex (I44/850). All three sites have been excavated a various archaeological remains associated with each of the foundries were identified. During independent archaeological investigations a crucible and iron ore lens were identified at the Vulcan

Foundry (Middleton & Maxwell, 2011); the location of a foundry at 154 Dundas Street was confirmed by the identification of kaolin/firebricks and other nineteenth century deposits as well as a metal slag deposit (Forster-Garbutt, 2017); and, the concrete foundations of the Victoria Foundry was exposed during excavations at this site (Gaffney, Russell, Woods, & Greig, 2018).

As identified above excavations of foundries have occurred elsewhere in the South Island, in particular Christchurch where the majority of foundry sites (eight in total) are located. On top of a number of nineteenth century foundries recorded as part of the Justice and Emergency Services Precinct, other foundries around Christchurch have been identified archaeologically. Excavations have encountered rubbish pits filled with coal ash and metal slag, furnaces, box drains, and concrete pads relating to the P and D Duncan Foundry at 194 Tuam Street (Dooley, Haley, & Dickson, 2018); brick furnaces associated with an unnamed foundry have been exposed at 550 Columbo Street (Dodd, 2011); and, a charcoal stained deposit containing large amounts of metal waste was possibly associated with the Atlas Foundry at 63-65 Manchester Street (Hickey & Tremlett, 2016). Each of these sites highlight the potential of unearthing foundry associated remains within the Cadbury Block.

6.5.4 Domestic Sites

In total, 43 historic domestic sites have been recorded on ArchSite in Dunedin with a further ten historic land parcels being recorded. Several of these domestic sites have been investigated and can act as comparisons for those within the project area. Nineteenth century residential occupation sites saw a range of activities through their use life. These sites, unlike today, would have been used for various activities such as growing food and discarding household refuse. The backyard would have also included outbuildings associated with the house, such as the privy, fowl house and coal shed. Two types of remains will most likely be encountered in the project area: rubbish deposit features and structural features associated with the dwellings and outbuildings.

Late nineteenth and early twentieth century household rubbish deposits vary from modern disposal practices. Items during these times were intended to have longer use lives that what we have today, and therefore the majority of deposited items would have been broken or no longer needed for their purpose. On occasion householders did discard unbroken items, but this was generally a result of a major life event such as a marriage (Campbell & Furey, 2013) or as a result of deliberately conspicuous consumption (Woods, 2017). Items that had a short use or single use life were generally made from organic materials which do not survive in the archaeological record. Household refuse disposal and back yard spaces have been recorded at numerous sites in Dunedin, and so they can be used to inform the material and features likely to be encountered during this project. A site at 26 St David Street (I44/568) was occupied by various households from the mid-1860s onwards alongside small commercial premises, however the material recovered appear to all relate to the domestic occupation (Lawrence, 2014). Part of the Wall Street mall site (I44/469) was occupied by a group of small tenanted working-class cottages nestled between commercial and industrial properties and a sheet refuse deposit was attributed to the cottage occupants (Petchey, 2009a). In comparison, the Countdown development in Mosgiel encountered a range of domestic sites due to the extent of the earthworks that were undertaken. A total of 84 pits were identified in the area and were dug for the use of disposing household rubbish (Cropper, D.; Watson, C.; Woods, N.; Cawte, 2018). The sites with the longest history of occupation had the largest number of pits, with 23 pits being the highest number identified for a singular site (Cropper, D.; Watson, C.; Woods, N.; Cawte, 2018).

Structural remains of domestic houses are one of the more prominent features when investigating pre-1900 houses. These remains vary greatly from building footprints, piles and stone floors to retaining walls, cellars and brick work. One site within Dunedin that demonstrates these structural remains is the site at 159 Leith Street (I44/554). This was the site of a domestic residence that was constructed in 1877. The house was demolished and under it were the remains of the original piles (McPherson, Dyer, Taylor, Shaw, & Cawte, 2013). A site with slightly different features is "The Chesnuts" at 403 High Street, Dunedin (I44/821). This was a site of domestic occupation stretching back as early as 1862. The house was demolished in the 1930s, though some structural remains were identifiable at the time of the site visit including several concrete and stone retaining walls (Woods, 2017).

It is suggested that domestic sites will see both types of remains, structural and artefactual. Rubbish deposits will most likely be encountered in the backyard areas of the site, while structural remains may vary across the site depending on the use of the area over time.

6.6 Heritage Sites within Dunedin

Dunedin is well known for its rich built heritage and architectural history. Following European settlement of Dunedin, the earliest buildings were situated around the vicinity of Princes and Rattray Street. The buildings included late Regency cottages and hip and gable roofed houses. A number of the larger two-storey houses featured dormers, while the smaller one storey buildings were often just four roomed cottages. An early commercial building was a large stone store at the end of Jetty Street on the edge of the harbour. Scottish vernacular architectural styles feed into many of the designs around the city such as the Presbyterian church (Findlay, 2009). By 1858 there were 291 houses throughout Dunedin. Most were made of timber (207), 13 brick, 13 iron, 2 stone and 56 made of alternative materials. The latter were predominantly wattle and daub and ponga log (Findlay, 2009).

As noted above in Section 4, following the Otago Gold Rush in 1861, the early cottage structures were replaced by two-storey buildings. Offices clustered in the centre of Dunedin, especially at the exchange area, while retail buildings (and development in general) continued to expand northwards up along George Street and southwards further down Princes Street. Accompanying these developments, hotels appeared all the way from Manor Street in the south to Fredrick Street in the north. Clusters of tents appeared on undeveloped sections on the hills above Princes Street, and new houses were constructed on the flats to the north and south. The inner-city residential areas developed in concert with the development of businesses in the town centre. Many of the 1850s building were incorporated into later structures (Findlay, 2009). Despite this there is little surface remains of the buildings associated with the first decade of occupation in the city. The Victorian/Edwardian appearance of the city still emanates through the design and appearance of later nineteenth century buildings throughout the city.

Following stages of reclamation, industrial areas sprouted in the lower central Dunedin area where low-lying muddy ground was prevalent. The distillery, brewery and factories that occupied the Cadbury Confectionery Ltd Buildings, represent this industrial development (Figure 6-3). Unfortunately, industrial heritage sites have been neglected throughout New Zealand as grand public buildings (e.g., churches and town halls) typically steal the show. However more recently there has been more recognition for the history and the heritage potential of industrial built environment. Dunedin's Warehouse Precinct provides a good example of the positive steps to reinvigorating a landscape of factories and warehouse (Trapeznik, 2014). In this space the heritage, aesthetic, and functional values of these buildings have started to be realised and a number have been restored and repurposed, highlighting a valuable historical landscape in Dunedin's central city.

Within Dunedin, there are 368 items on the New Zealand Heritage List/Rārangi Kōrero. Of these 123 are located with Dunedin's central suburbs (Stuart Street to Frederick Street, Harbourside, High Street to Stuart Street, and Fernhill). The most common type of the listed sites within this central area are commercial items (41), followed by domestic (29) and civic (23) items. Only one item on the List in this area, beyond the Cadbury Confectionery Ltd Buildings, was industrial manufacturing sites: Dunedin Harbourside Historic Area (List No. 7767). However, there are a number of buildings such as the NZ Clothing Company Limited Building (List No. 2159), Crown Milling Company Building (List No. 366), Kempthorne Prosser Building (List No. 4729) and the H.E. Shacklock Buildings (List No. 2160) which have been identified as factory and manufacturing buildings or associated with such activity but have not been categorised as manufacturing buildings in the Listings details (Trapeznik, 2014).

In the immediate vicinity of the Cadbury Confectionery Buildings Ltd there are no other industrial buildings. The Anzac Square/Railway Heritage Precinct (TH11), which Cadbury Confection Buildings Ltd was considered part of in the 2006 Dunedin City District Plan, contains three other listed civic and transport related buildings. The three other buildings that make up this precinct are the Dunedin Railway Station, Platform and Gates (B005; List No. 5); the Dunedin Law Courts (B560, List No. 4374); and, the Dunedin Prison (B269, List No. 4035). Two other

commercial building façades in this Precinct are registered on the District Plan within the TH11 Heritage Precinct: the Station Mews, former Stones Publishers (B004) and McCarthy's buildings on the corner of Stuart and Castle Street (B561).

The proximity of the Cadbury Confectionery Buildings Ltd to the Railway Station is not coincidental, but in fact a reflection of the importance of infrastructure for commercial success. For R. Hudson and Co. and likely other business established nearby the railway station connected their businesses to wider markets and was a pull factor in deciding the location for establishing their businesses.

Other listed items located in close proximity to the Cadbury Confectionery Buildings Ltd include the Allied Press Ltd Building (List No. 2135; B564); Fitness Centre Building (List No. 2153; B565); Security Building (List No. 2216; B567); Allbell Chambers (List No. 2134; B568); and, Stephens Inks Building (List No. 2219; B411). All of these buildings are commercial office buildings. There is only one building, located slightly further away, that is scheduled building that is associated with confectionary: The May & Co. Factory at 249 Cumberland Street (B048). Thus the, the Cadbury Confectionery Buildings Ltd represents one of the last ties to continuous nineteenth and twentieth century manufacturing history in this area.

Figure 6-3 Engraving showing Dunedin in 1875. The block in which the Cadbury Confectionery Ltd Buildings are located is outlined in red. Note the boggy nature of the land in and surrounding the block (Cooke, A. B. in Findlay, 2009: Figure 19)**.**

6.6.1 Other Heritage Sites within Block XVI

There are a number of scheduled heritage buildings located within Block XVI. All buildings to the south of the Cadbury Confectionery Ltd Buildings formed part of the George Street or Lower Stuart Street Townscapes (TH10 and TH11) in the 2006 District Plan. They also form part of the Stuart Street Commercial Heritage Precinct in the 2GP. The Dunedin Allied Press Ltd Building at 52 Stuart Street is scheduled as a heritage building on both the 2006 and 2GP Dunedin City District Plan as B564, protecting facades to Cumberland and Stuart Streets, including all shop fronts. Plans for the new Evening Star building, or what would become known as the Dunedin Allied Press Ltd Building, on the corner of Cumberland and Stuart Streets were designed by Edmund Anscombe in 1926. Two years later the building had been completed (Coulter, 1992). This building is also listed as a Category 2 Listed Place (List No. 2135) on the Rārangi Kōrero/The New Zealand Heritage List.

The building at 2-14 Stuart Street is scheduled as a heritage building on the 2006 and 2GP Dunedin City District Plan as B561, protecting facades to Stuart and Castle Streets. This building was constructed in 1907, designed by architects Walden & Barton (David Murray, 2013) and occupied by A & W McCarthy. McCarthy specialised in

guns, locks, and fishing equipment, while the building itself was home to their offices, shops and workshops (David Murray, 2013). Arthur McCarthy was an interesting individual. As a pacifist he studied both Marxism and socialism, opposed World War I conscription. Moreover he became the United Labour Party's national secretary in 1912 (David Murray, 2013).

There are some changes in the 2GP City District Plan as the three buildings at 18, 28-30 and 52 Stuart Street are scheduled as character contributing buildings (respectively CC062, CC063 and CC702). The building at 18 Stuart Street (CC062) is the only other building on the block constructed prior to 1900. The building was built sometime between 1874 and the late 1880 and according block plans (Bare, 1889), by 1889 was home to the Supreme Court Hotel. The building continued to be used as a hotel into the twentieth century, although it changed names multiple times. These names included Empire Rest (Jones, 1892), City Buffet Hotel (Council of the Fire Underwriters Association of New Zealand, 1922); and Miramar Private Hotel ("Fire Insurance Plans," 1927). The neighbouring building at 28-30 Stuart Street (CC063) was constructed between 1922 and 1927 and was occupied by Mooney and Co. Wool and Skin Merchants in the 1920s ("Fire Insurance Plans," 1927). The last character contributing building is situated on the same land parcel as the Allied Press Building; however, it forms the Castle Street frontage of the property. This is the 1922-7 building that housed International Harvester Co. of N.Z. Ltd and wholesale merchants Riach and McLennan (CC702). Within the same property one other building still present today and constructed in the 1920s facing out to Castle Street was occupied by the Co-operative Dairy Company of Otago ("Fire Insurance Plans," 1927). Part of this building has been removed in the twentieth century but the portion front on to Castle Street still stands.

These buildings predominantly relate to the early twentieth century commercial development of the area, rather than the industrial activity that dominated the block further east. However, it is interesting to note that the Co-operative Dairy Company likely supplied R Hudson and Co. and later Cadbury Fry Hudson with dairy products. Indeed, such a relationship may have spurred their presence at this location.

The building at 249 Cumberland Street (a block further south from the Cadbury Confectionary Ltd Buildings) was designed by George William Gough and constructed in 1900. The building is scheduled on the both the 2006 District Plan and the 2GP as B047 with the building's façade and bulk appearance to Cumberland Street are protected. Of importance to this project, is that the building was constructed as a confectionery factory by H. May & Co. However, following the financial troubles led to the labelling of Henry May as a "wholesale forger" and he allegedly "carried on a system of forging other men's names as endorsement to his bills. It was speculated at the time that his "suicide by drowning in St. Clair Baths" was a result of his business concerns (Evening Post, 1901). In the same years as May's death, R. Wilson & Co. took over the premises for the production of coffees, teas and spices (D Murray, 2013). While the products changed rapidly after initial development, the occupants of the building in the early twentieth century focused on the production of food and drink.

6.6.2 Industrial Heritage Sites within Dunedin

The closest listed industrial buildings to the Cadbury Confectionery Ltd Buildings are those included in the Dunedin Harbourside Historic Area (List No. 7767). This area covers the land between Roberts and Creswell Streets between the current harbourside and the railway line. The buildings in this area are associated with port operations and associated businesses that developed in the early twentieth century, around the same time as the beginnings of the R Hudson & Co.'s factories in Cumberland Street (Beauchop, 2008). This development followed reclamation of the area at the end of the nineteenth century. The key importance of this area is that it was the convergence point of land and sea transportation. While there were many different businesses in the area, all were in some way tied to the servicing of the ships and their cargo (i.e., ships chandlers, harbour boards, marine engineering works, and customs). The port connected Dunedin with the rest of the nation and wider global trade networks. Even before the establishment of this area, Richard Hudson sold his biscuits on the wharves to the seafarers sailing in and out of Dunedin. This marks the importance of a wider market that Richard Hudson tapped into. Like the railway station, the portside offered a direct connection to national and even international markets (Beauchop, 2008). The port also offered a more local space for connections as an epicentre of a variety of

workplaces and their relationships with the wider city, as well as a meeting point for visitors to Dunedin arriving off the incoming ships.

The wider area registered on the list is a product of the long industrial history of the area ranging from engineering to warehouse structures. The facades of the buildings that survive presently reflect their uses, especially the "rhythms of the engineering works and wharf sheds" (Beauchop, 2008). From an architectural perspective the buildings further provide a variety of design ideas and building types. The utilitarian buildings in particular hold an architectural value in the streetscape as their form is a product of the function. These building are also important from a technological perspective as not only do the buildings themselves offer different building technologies, but also technological developments associated with the business occupying the buildings. While there are buildings that do not contribute to the historic and architectural values of the area, development of these buildings are recommended to be sympathetic to the wider historic area (Beauchop, 2008).

Some of the buildings within the Dunedin Harbourside Historic Area are located within the Queens Gardens Heritage Precinct (TH12) and three registered buildings on the District Plan (B106, B754, B755). There are 19 other registered items in the Historic Area also registered on the District Plan. These include such industrial buildings as the Iron & Steel Company of New Zealand Ltd Store (B759) and Dunedin Engineering & Steel buildings (B766 and B767). While the Queens Gardens Heritage Precinct is no longer present in the 2GP, all of the heritage items are still registered.

The next closest collection of industrial buildings is that of the Warehouse Precinct. The warehouse precinct was not a specific registered area on the HNZPT List or the 2006 District Plan. However it has been identified as an area of special heritage importance and was reported on by Trapeznik (2014). At this time Trapeznik (2014), identified the area of industrial heritage to cover the land within the bounds of the harbourside, Princes Street, Queens Gardens and the Oval. This was not a recognised precinct on the 2006 District Plan however the area overlapped with the Queens Gardens Heritage Precinct (TH12) and the Vogel Street Heritage Precinct (TH13). In the 2GP, the Warehouse Industrial Commercial Heritage Precinct is registered however it covers land between Rattray, Police Cumberland Streets and stops between Bond and Princess Streets. As the registered items discussed below are still registered on the 2GP, the area identified by Trapeznik (2014) is referred to as the Warehouse precinct.

The buildings include some derelict as well as others that have been revamped to portray the beauty in utilitarian nature of the building in appreciation of the warehouse precincts heritage (Trapeznik, 2014). While the majority of the buildings still standing in this area were warehouses, offices and stores, some buildings are directly associated with historic manufacturing that occurred in the Precinct. This area is a number of buildings relating to different type of industries than seen in and around the Cadbury Confectionery Ltd Buildings. The Hallensteins' clothing factory opening in Dowling Street in 1883 (List No. 2159; B061). This building, a Category 1 listed place, is notable in that it is unmodified for a warehouse and factory, with a classical façade that is largely unchanged since 1905. It is "considered to be the best of Dunedin's early warehouses" (HNZPT, n.d.-c). This was one of Hallensteins early factories, with production located on the upper two storeys of the building where 250 to 300 people worked, and the ground floor was used for storage, packing and receiving goods. This building supplied all 36 Hallensteins stores around New Zealand (HNZPT, n.d.-c; Trapeznik, 2014). The first premises of Hallensteins from 1874 is also listed as the Taimex Building (List No. 4745, B508), though there are few details in the Listing for this building (HNZPT, n.d.-c; Trapeznik, 2014).

H. E. Shacklock Buildings (List No. 2160, B498) were the location of Shacklock and Co iron foundry in 1892. Prior to this the building had been a grain and wool store owned by William Larnach. Over the course of the twentieth century the firm extended the premises north and south and expanded their repertoire and continued to produce coal ranges until 1971. The façade of the grain and wool store building was retained although the building itself was extensively modified (Trapeznik, 2014). There are few details for this building in the HNZPT listing.

There are a number of buildings associated with the industrial heritage of the warehouse precinct, in particular the manufacturing of goods that are not on the New Zealand Heritage List however the façades are listed on the Dunedin City District Plan. These include the building at 13 Stafford Street which was used as a clothing factory by TG Pascoe's from 1878 and subsequently by Ross and Glendining in 1889 (B548). The firm had three factories housing a thousand workers near the Exchange (Trapeznik, 2014). Ross and Glendining had their former factory at 8 Stafford Street, which is scheduled along with their warehouse at 167 & 169 High Street, as B273.

Immediately west of the warehouse precinct was the largest drug manufacturer and importer in New Zealand was Kempthorne Prosser and Co. located at the Savemart building on Stafford Street (List No. 4729; B549) and is considered to be a good example of a Victorian industrial building. Kempthorne Prosser and Co. was founded in 1863. Originally, they were located at the Sew Hoy and Sons head office is today, until the 1870s and they moved into the Savemart building, following an earlier drug merchant. Kempthorne Prosser and Co. were successful and formed a public company in 1879 and they company continued to run until the 1970s (HNZPT, n.d.-b).

Just beyond the warehouse district another listed factory building is Crown Milling Company Building (List No. 366; B388) located on Manor Place, which was initially used as a stone mill by Anderson and Mouat from 1867. The brick building has been altered multiple times in the 1870s and 1890s, though the Listing details notes that "the building has benefitted greatly from these alterations and additions". The "functional and quite striking" building is also distinguished as a noteworthy instance of Victorian Industrial architecture (HNZPT, n.d.-a).

Beyond the central city (i.e. Stuart Street to Frederick Street, Harbourside, High Street to Stuart Street, and Fernhill suburbs), only one other building in Dunedin is listed as a manufacturing factory/workshop. This is Romison's Confectionery Works (List No. 9720) (Beauchop, 2018). This building was constructed in 1910, almost a decade after R. Hudson and Co. established their business at the Cumberland and Castle Street premises. The building was used as a factory until the 1940s and Romison was another local confectioner who had established his business in Dunedin in the 1880s. When the Romison retired the business was sold and moved to Oamaru and still operates today as the Rainbow Confectionery. The building was later used as the popular University Bookshop, significantly contributing to the literary culture of Dunedin. The building today survives as a relatively unaltered Edwardian factory. It had been designed by Edmund Anscombe and presents a utilitarian design however its three gabled roof a notable element of the Great King Street streetscape (Beauchop, 2018). This building is not registered on the 2006 District Plan or the 2GP.

Of note throughout the heritage sites throughout Dunedin, and in particular those relating to industrial activity, is that each building reflects the specific uses of the building and the different requirements of the vast array of manufactured goods in Dunedin. There are few industrial manufacturing buildings remaining in the central city, and only one other building, other than the Cadbury Confectionery Ltd buildings, that relate to the manufacture of biscuits and chocolate and no representations of early distillery activity in the city. However, in contrast to the Cadbury Confectionery Ltd Buildings, those industrial manufacturing buildings that do remain are largely unmodified examples of late nineteenth and early twentieth century manufacturing buildings, contributing significantly to the local streetscapes.

7 On-Site Observations

Site visits were undertaken over multiple days by Hayden Cawte, Dawn Cropper, and Megan Lawrence on 11, 18 and 28 April 2019. The purpose of this visit was to make a photographic record of the exterior and interior of the buildings and to assess the visible building fabric, primarily focussing on the facades and any remains of pre-1900 materials or features. An examination of the Cadbury Confectionery Ltd Buildings within the wider streetscape was also considered during the site visit. A detailed photographic record of the Cadbury Confectionery Ltd buildings is included in Appendix B.

7.1 Building Layout

The site is presently occupied by a complex of commercial buildings, separated out into blocks with the buildings labelled south to north as blocks one through five and running west to east labelled A through C (Figure 7-1). These blocks are arbitrary and can refer to one or multiple buildings, however they provide an easy locational reference throughout the wider Cadbury Factory extent. Thus, the buildings in the southwest corner of the property can be easily referred to as Block 1A. There are two further blocks (six and seven) to the north which are beyond the extent of the scheduled and listed Cadbury Confectionery Ltd buildings within Blocks 1A to 5C.

There are seven buildings that form the facades listed as part of the Cadbury Confectionery Ltd (B030 on the 2006 Dunedin City District Plan and the 2GP) or Cadbury Schweppes Hudson Ltd buildings (List No. 2143). The buildings were originally listed on the New Zealand Heritage List/Rārangi Kōrero as the extended façade of four buildings; however, neither 2006 Dunedin City District Plan nor the 2GP specified a number of buildings scheduled. Defined by their historic development from construction, alterations, and the current extents and usage, seven buildings have been identified in this report as forming the façades to Cumberland and Castle Streets. These buildings have been defined as follows:

- **Dairy and Machine House Building (Block 1B-C):** While currently empty, the building incorporates the 1875 cellar and the 1868 possible small mill. Later functions include mixing room machine/engine room, offices and dairy. The building is situated southeast extent of the property and forms the southern extent of the Castle Street facade.
- **Cadbury World Building (Block 1A)** The building incorporates the 1868 granary/malt floor and kiln building and later functions including a grain store and smutters room. The building was converted into Cadbury World in the early 2000s and later a café in 2014. The Cadbury World runs the along southern and western extents of the property forming the southern portion of the Cumberland Street façade.
- **Office Building (Block 2A)**: The building incorporates the northern end of 1868 granary/malt floor building, while later construction encapsulated this structure the building was used for other purposes such as grain storage, dining, dressing and mixing rooms and chocolate packing. The building was converted to office and reception in the 1980s. The Office Building runs the western extent of the property forming part of the Cumberland Street façade with adjacent Cadbury World and Chocolate Factory and Garage Building.
- **Chocolate Factory and Garage Building (Block 3A):** Over various phases of construction from the 1920s, this building was used as a chocolate factory and garage. More recent uses for the building include space for raw materials and pilot plant. This building forms the central portion of the Cumberland Street façade.
- **Chocolate and Biscuit Factory (Block 3B-C):** Over various phases of construction from the 1920s, this building was predominantly used as a chocolate factory, as well as a biscuit factory and dining and cloak room. More recent and details uses for the building include space for raw materials, van camp and a cafeteria. This building forms the central portion of the Castle Street façade.
- **Engineering Workshop, Labs, and Offices (Block 4A):** The building was constructed in the 1960s and while changes to the interior have been made, the building footprint has not been altered. The building has been used for food testing as well as board rooms and tour spaces. The building forms part of

Cumberland Street façade immediately adjacent to the Biscuit Factory and Dispatch Building and the Chocolate and Biscuit Factory.

- **Biscuit Factory and Dispatch Building (Block 4C, 5A-C)**: Initially constructed in the 1950s, this building was predominantly used as Biscuit Factory and Dispatch Building, however it has been more recently used as a chocolate making factory, engineers' workshop, tin washing, starch packing, enrobing, moulding and drying rooms, mould wash, packing rooms and more. The building forms the northern extent of both the Cumberland Street and Castle Street façades.

The onsite observations below focus on the listed and scheduled buildings; however, there are other buildings located throughout the site. A central boiler room building and powerhouse building (both in Block 4B), are also located within the project area, as is a modern loading bay that separates the dairy and Cadbury World buildings. These buildings, although located within the extent of archaeological sites I44/922 and I44/817, were constructed after 1900 and do not have street façades. As such they are not registered or listed as a heritage buildings structures and they do not trigger building archaeological requirements. Silos accessible from the biscuit and dispatch building do feature prominently in the Castle Street frontage; however, these were relocated to this location in the 1990s. These buildings are only touched on briefly in the following sections. All other areas are paved for pedestrian and vehicle access.

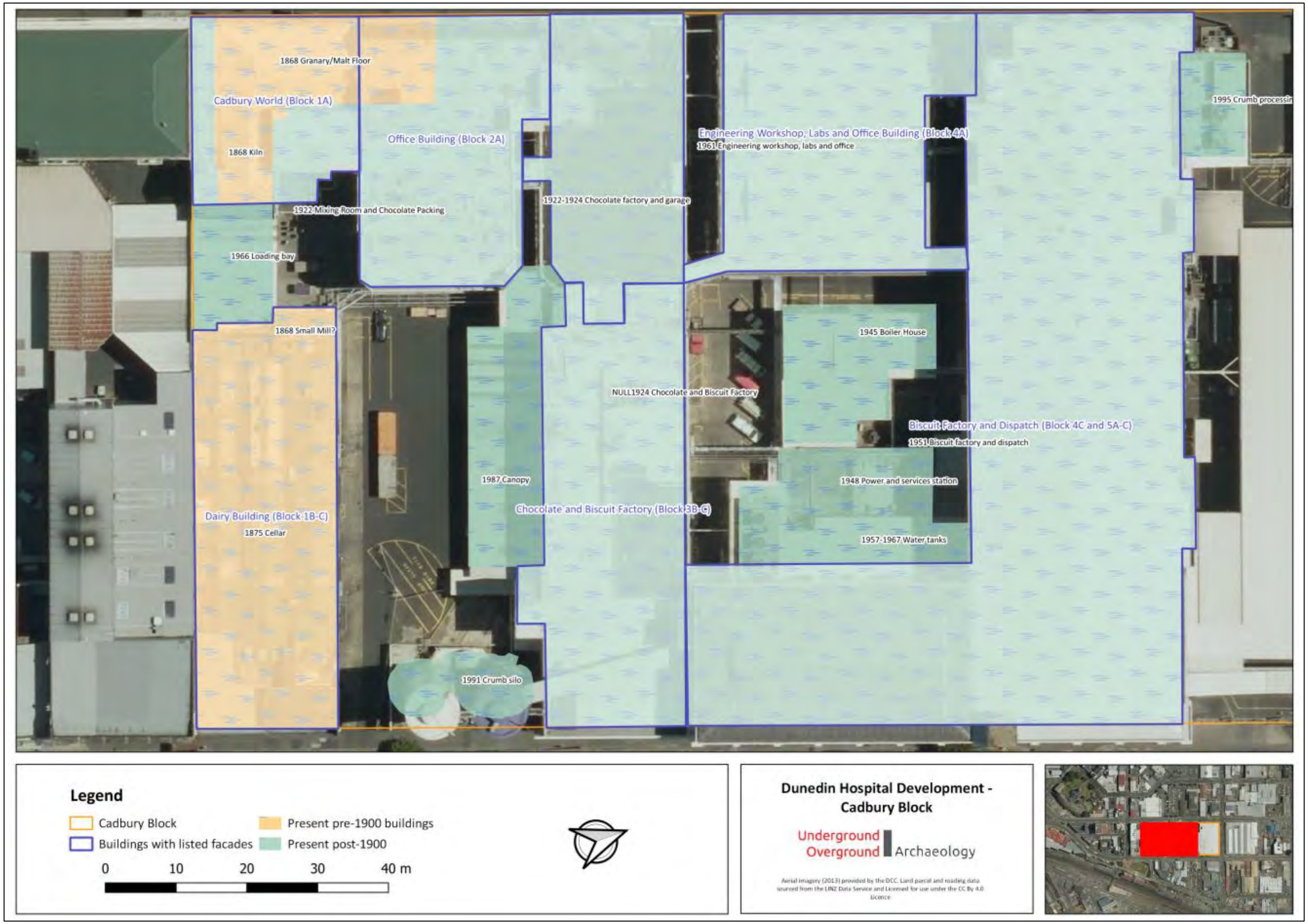

Figure 7-1. Aerial image showing the Cadbury Confectionery Limited Buildings (including the Dairy and Machine House, Cadbury World, Office, Chocolate Factory and Garage, and Biscuit Factory and Dispatch Buildings) with present post-1900 and pre-1900 buildings.

7.2 Dairy and Machine House Building (Block 1B-C)

The Dairy and Machine House Building is situated in the southwest corner of the project area on what was once Sections 53 and 74 Block XVI, forming a Castle Street façade. It is a two-storey building that is rectangular in plan and is currently empty (Table 7-1 and Figure 7-2). While there are two entrances to the building from Castle Street, these entrances remained unused following changes to the façade in 2018. There are also pedestrian and vehicle entrances to the building located along the northern elevation accessed via the paved access area. The first floor of the building could not be accessed due to health and safety concerns of stability.

Table 7-1. Summary of built structures at 280 Cumberland Street: Dairy and Machine House Building (Block 1B-C).

Number of Floors	2
Rooms per Floor	Ground Floor – 4 rooms Floor 1 – Not accessible
Roof style	Multi-gable with cross gable/Single Gable/mono-pitched
Roof Material	Corrugated iron
Windows	Fixed (multi-pane)
Foundations	Unknown
Floors	Concrete
Ceilings	N/A
Wall construction material	Brick
Wall Coverings	Plaster/paint
Floor Covering	Penny tiles (restricted to a small entryway); other areas have no coverings
Distinctive Modifications	• Initial construction of possible small mill in 1868 and cellar around 1875 • Addition of stone masonry façade between late 1870s and 1902 • By around 1910 east end converted to offices • Façade change in 1918 with plaster and brick detailing • Construction of chimney stack to possible small mill building in 1931 • Lunchroom added to the top of the building by 1947 • Timber floor and roof structure at west end of the building replaced with steel framework likely around 1949. • Building façade plaster between 1947 and 1954 • 1957 modernisation of façade striping the plaster and brick detailing • Concrete flooring in southeast corner of building raised to align with central concrete floor in 1959 • Temporary corrugated iron second storey of small mill added between 1889 and 1922 replaced in 1960s by brick • 1966 alterations to the internal layout of first floor • Lunchroom removed and roof replaced between 2016 and 2017 • Façade reconstructed to reflect the 1918 appearance of the building

7.2.1 Exterior

The main elevation of the two-storey brick building faces out onto Castle Street (Figure 7-3). The façade was reconstructed[3] in 2018 to reflect the 1918 façade, rather than its earlier Victorian period frontage. As such the top of the building features an arched parapet with further plasterwork embellishments on the pilasters. The windows on the second floor were restored with timber sills. The ground floor does vary slightly from the 1918 façade as the wide windows are located in the centre of the building, while two double glass doors are situated either side where the windows were previously situated. The doors feature the same plasterwork moulding above as was formerly over the windows in 1918, as is simulated rustication achieved using plaster over cement board along the entire ground floor frontage. Unlike the 1918 façade however, the frontage no longer features an awning over the central portion of the ground floor.

The eastern elevation of the building illustrates the distinct purposes of the building with the eastern end forming the offices (converted around 1918, although present at this end of the building from at least 1902), the central portion forming the cellar and early twentieth century dairy and the western end, the small mill and later machine house (Figure 7-4). The walls are plastered brick and the remains of the shortened 90 ft chimney is still visible rising from the small mill (later machine house/engine house). There are three current access points into this side

[3] The term reconstructed has been used here instead of restored as the ICOMOS NZ charter defines reconstruction as rebuilding as closely as possible to a documented earlier form, using new materials. In contrast, restoration means to return a place to a known earlier form, by reassembly (i.e., original fabric) and reinstatement, and or by removal of elements that detracted from its cultural heritage value.

of the building: two sliding doors opening into the central Dairy and Machine House Building and one modern roller door opening into the small mill. The cross gable facing east is likely a remnant of a covered bridge, constructed between 1905 and 1922, between the Dairy and Machine House Building and the 1902 biscuit factory.

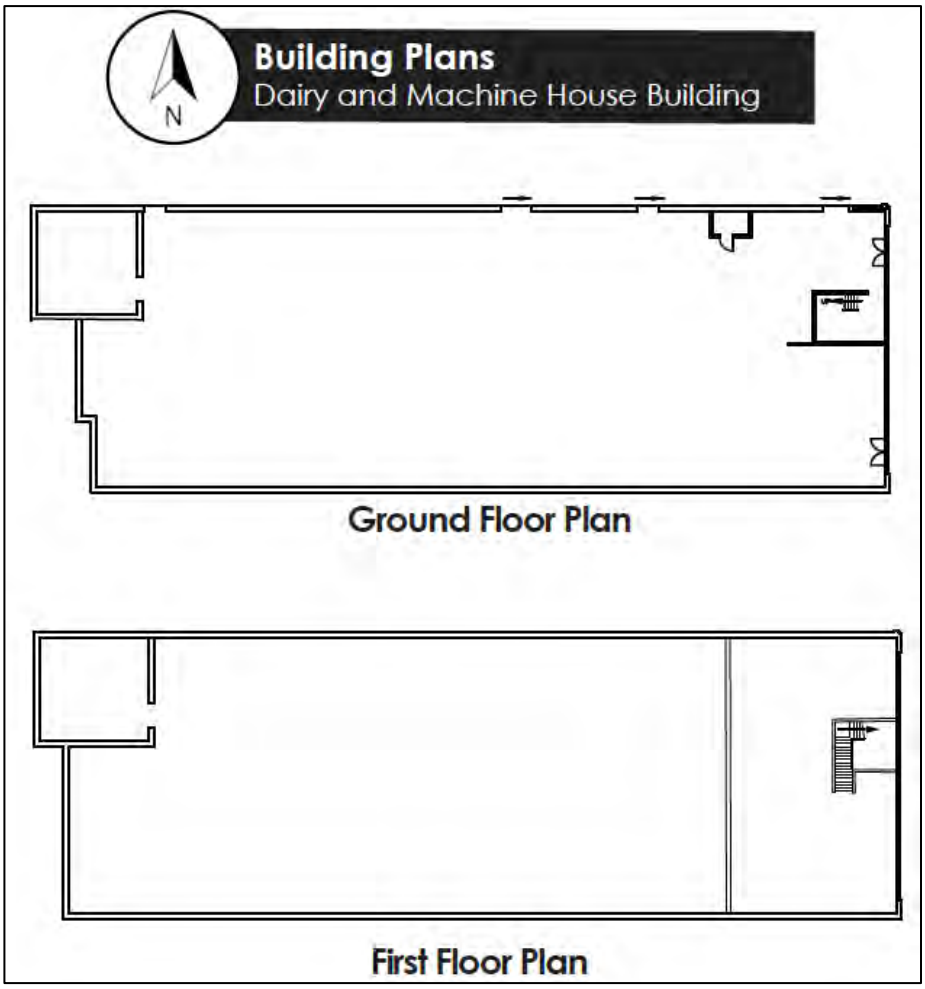

Figure 7-2. Floor plan of the Dairy and Machine House Building, adapted from those supplied from Ritchie Fieldwick at the Southern District Health Board.

Figure 7-3 Photograph looking west at the Castle Street façade of the Dairy and Machine House Building.

The western extent of the small mill features two bricked-in openings that would have originally led into the machine house from the boiler house (Figure 7-5). Above this is the later twentieth century second floor addition to the small mill building, which had replaced the earlier temporary corrugated iron addition. The central Dairy and Machine House Building, and modern covered loading bay further share the former brick wall that ran between the still room and cellar (Figure 7-6). An archway is visible set back from the machine house along the shared wall, suggesting that there was a door or window situated at this location, yet it too is now blocked in (Figure 7-7). From an aerial view, the office extent of the building has a mono-pitched roof, while the central portion of the building features a multi-gable roof with a cross gable in the centre and a number of skylights adjoining the single-gable roof of the machine house.

Figure 7-4 Photograph looking southeast (left) and south (right) at the eastern side of building one showing the three distinct portions: the eastern offices, the central dairy, and the western machine house.

Figure 7-5. Photograph looking east at the western wall of the machine house showing the blocked-in windows. A close-up photograph is shown on the right.

Figure 7-6 Distinct dog-legged wall of the former shared wall between the cellar and the mill (today the Dairy and Machine House Building and covered loading bay).

Figure 7-7 Photograph looking east at the former doorway or window arch located on the shared wall between what was once the cellar and mill

7.2.2 Interior

The interior of the Dairy and Machine House Building has undergone a number of modifications since the 1875 construction of the cellar to accommodate changing functions. The central room is an open space, except for a partitioned stairwell area at the eastern end of the building leading to the second storey. This area was closed off in the 1966 renovations (Figure 5-63 and Figure 5-64). The suspended screen from the second-floor ceiling, visible in the 1966 plans, is still present in the building today (Figure 7-8). The south wall of this partitioned area (Figure 7-9) is formed of brick and may relate to the 1875 construction of the cellar. This wall features two windows that

were blocked prior to 1959, likely when the stair well was installed at this location (Figure 5-60). The location of a former stairwell to the second floor is also visible at the eastern end along the southern wall of the building. There is evidence of a stairwell landing halfway up the stairs (Figure 7-10). These stairs are located further east than the two other stairwells indicated in the 1959 plans suggesting they were used prior to this date (Figure 5-60). At the same height as the landing there are a number of possible joist pockets (Figure 7-10). These ran quite low in comparison to the current floor level, and while the original height of the floor was raised in 1959, it does not appear in older photos of the façade to have been considerably lower than the current level. As such the possible joist pocket locations may have been for a mezzanine level. Later stairs visible on the 1959 plans are located further west (Figure 7-11).

There is a distinct variation in the windows visible between the office portion of the building and the central dairy portion. The former features arched single hung sash windows (one over one) with segmental arches and architraves (Figure 7-12) While the architraves have likely been replaced, the arched windows may be original features of the Victorian design of the building as they are visible in the early 1900s photographs of the building. Between the arched office windows is a smaller rectangular window, which is visible in the early twentieth century photos of the building. The central dairy portion of the building features predominantly fixed single or multi-paned windows. All but one of the first-floor windows feature slight arches. A few multi-paned fixed windows with slight arches are also visible in these early photographs indicating that at least the location of some of the first-floor windows along the eastern elevation of the building are likely associated with the 1875 cellar building.

The entire of the ground floor is paved in cement except for a small area of penny tiles under the stair well in the east office portion of the building and possible concrete tiles in the central dairy portion of the building. Throughout the dairy portion of building there is evidence of raised concrete partitions on the floor that would have once been used for wells and milk decks. The walls of the Dairy and Machine House Building where visible are brick overlaid with plaster and or paint (Figure 7-13). The main feature of the machine house portion of the building was the base of the 1931 90 ft chimney stack.

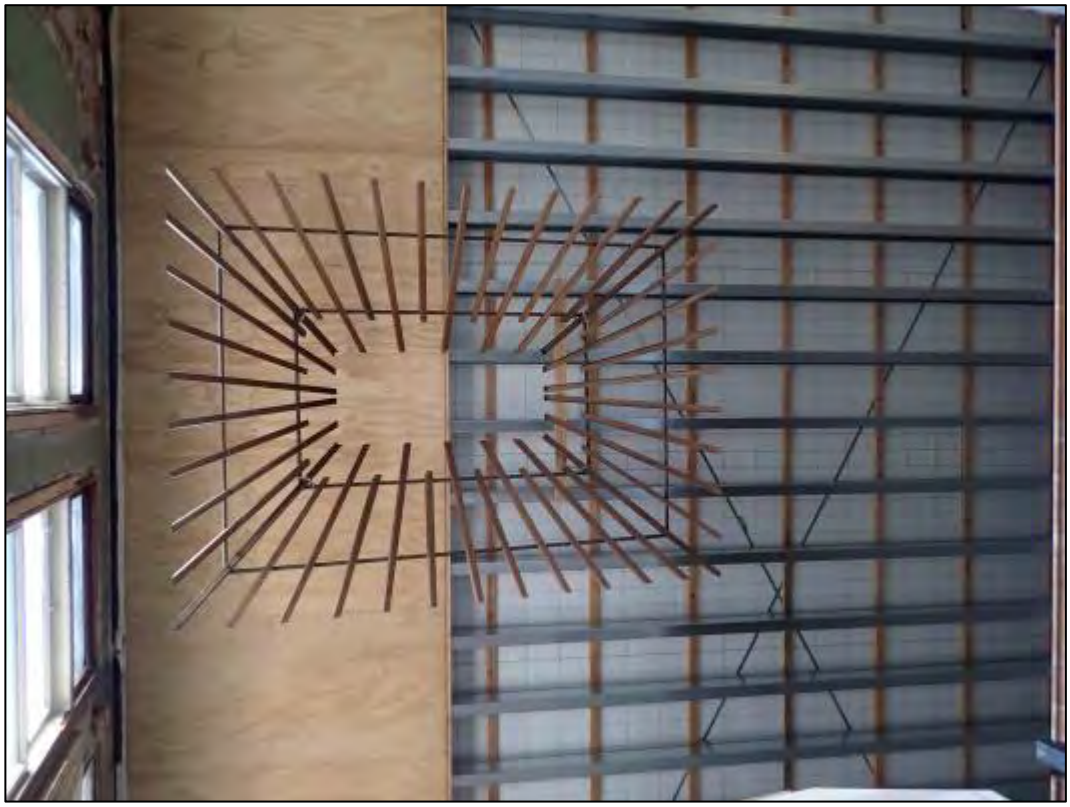

Figure 7-8. Suspended screen visible in the 1966 plans above the stairwell to the second floor.

Figure 7-9. Photograph looking north at partition wall with two blocked in windows and the bottom of the stairwell leading from the partitioned area to the first floor.

Figure 7-10 On the left is photograph looking south on ground floor of the Dairy and Machine House Building at location of first former staircase. A landing is visible half-way up. On the right is a photograph looking south on ground floor of the Dairy and Machine House Building at possible joist insertion points. These are at the same height as the first former staircase landing and possibly indicate there was a mezzanine floor at this height.

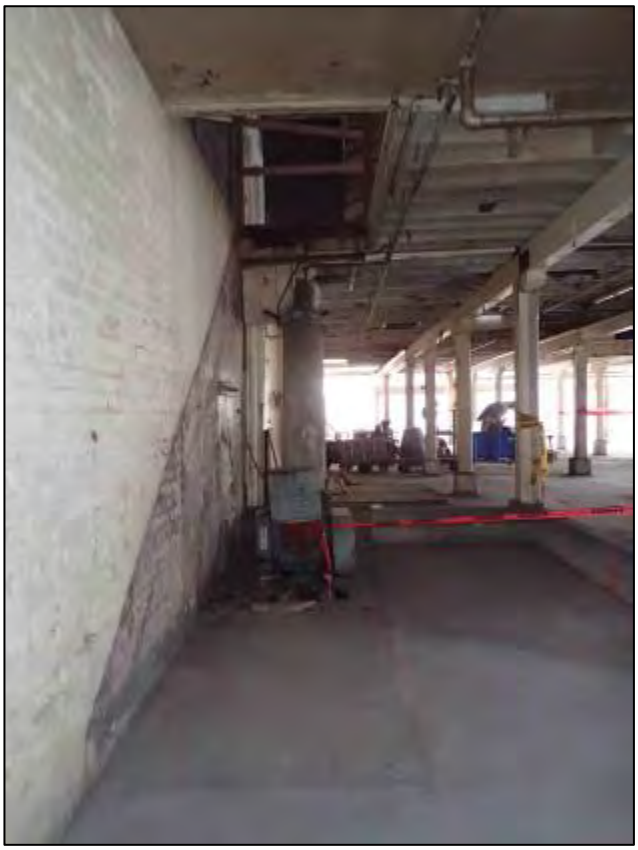

Figure 7-11 Photograph looking west on ground floor of the Dairy and Machine House Building at location of second former staircase visible in 1959 plans.

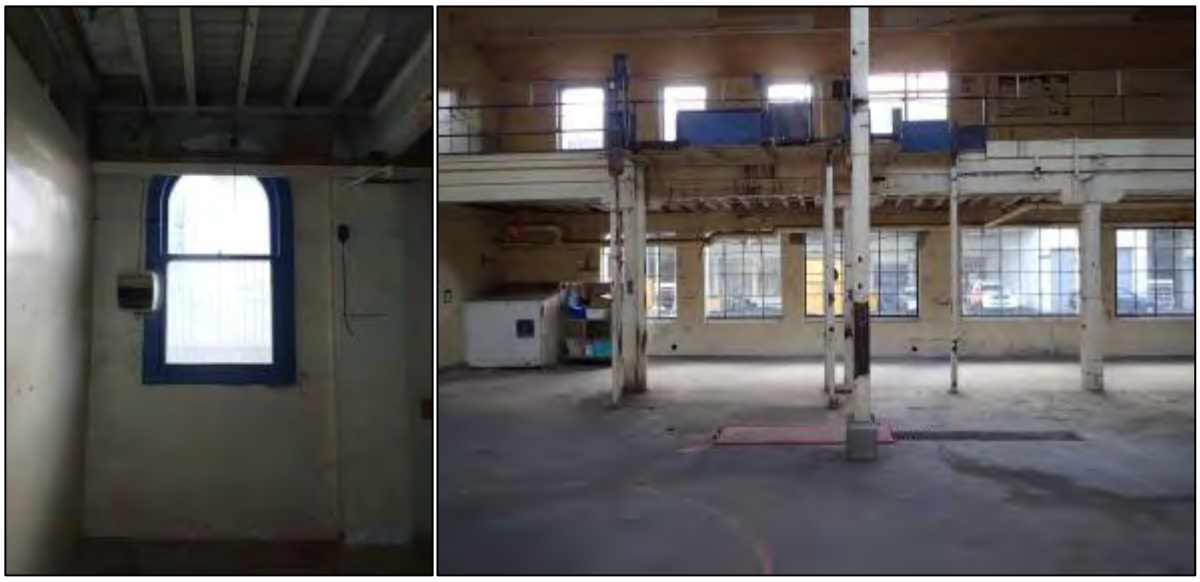

Figure 7-12 Photographs looking north at single hung sash window in the office portion of the Dairy and Machine House Building (left) and at multi-pane fixed windows of the dairy central portion (right).

Figure 7-13 Photograph looking west at the plastered brick wall of ground floor in the machine house building.

7.3 Cadbury World Building (Block 1A)

The Cadbury World building is three to four storeys and runs the along southern and western extents of the site (Table 7-2 and Figure 7-14). It is situated on what was once Sections 53 and 54 Block XVI, forming a Cumberland Street façade immediately adjoining the Office Building (Block 2A). Along this frontage there are two pedestrian entrances.

Table 7-2. Summary of built structures at 280 Cumberland Street: Cadbury World Building (Block 1A).

Number of Floors	3-4
Rooms per Floor	Ground Floor – 8 rooms Floor 1 – 6 Rooms Floor 2 – 3 rooms Floor 3 – 3 (accessible from Office Building)
Roof style	Multi-gable with two cross gables/ Flat pitched roof
Roof Material	Corrugated iron/ concrete
Windows	Fixed (multi-pane) and awning casement windows
Foundations	Shallow spread footings
Floors	Concrete, tongue and groove
Floor Coverings	Linoleum, carpet
Wall Construction Material	Brick
Ceilings	Exposed
Wall Coverings	Plaster/paint/unknown
Distinctive Modifications	• Initial construction granary/malt floor and kiln in 1868 • In 1901 building extended south to property boundary; southern end of granary/malt floor raised two storeys; and, the kiln at the rear was raised one storey. The entire building was thus four storeys • Between 1901 and 1915 two storeys were added to the central portion of the granary and malt floor • Addition of confectionery factory south between 1922-1927 • Removal of mezzanine floor and reinforcement of the remaining ground and first floors in 1959 • Refitting to establish Cadbury World in 2001 • Refitting to establish Cadbury Café in 2014

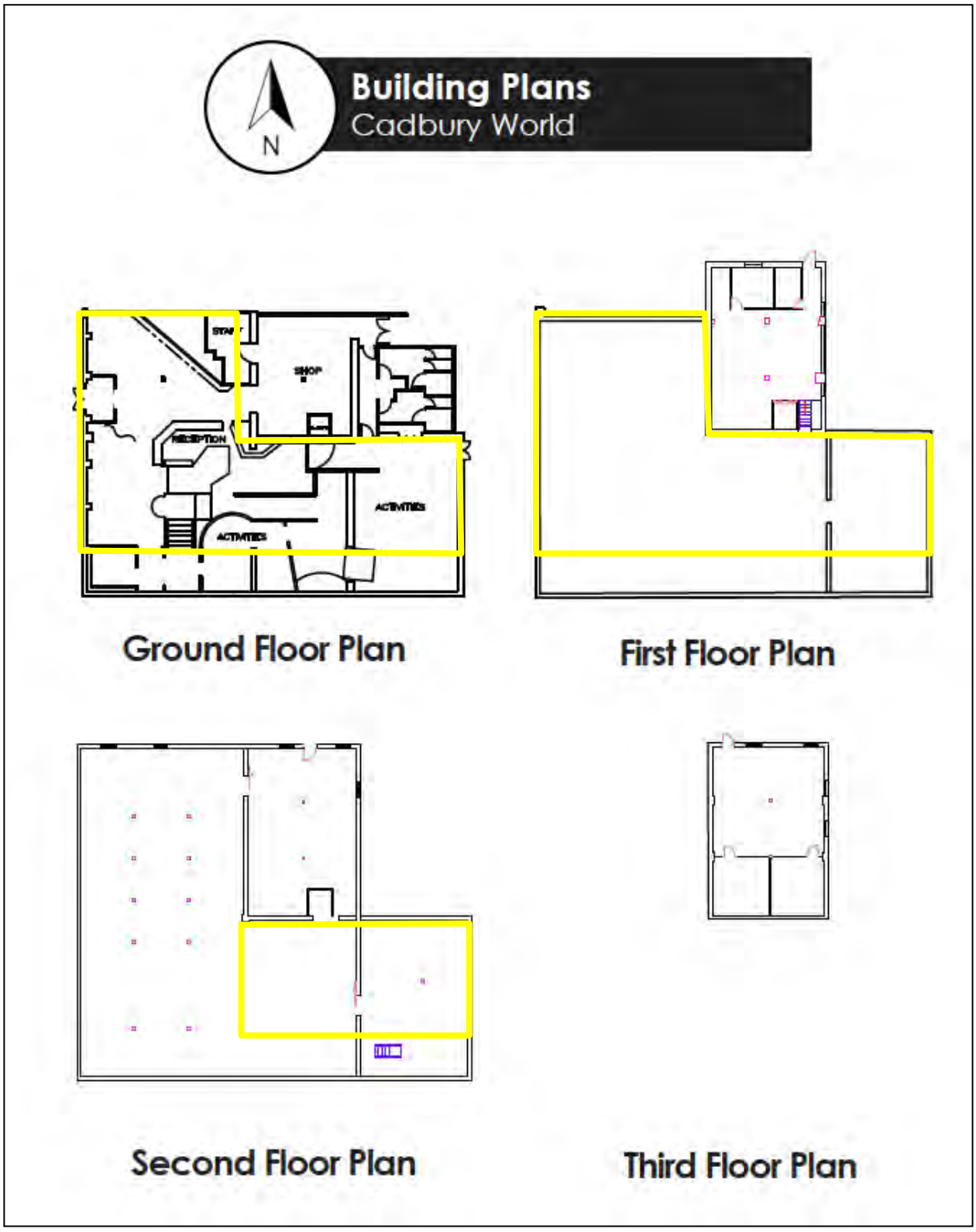

Figure 7-14. Floor plan of the Cadbury World building, adapted from those supplied from Ritchie Fieldwick at the Southern District Health Board. The approximate extent of the pre-1900 buildings are outlined yellow.

7.3.1 Exterior

The façade of the Cadbury World building is a blend of the multiple phases of construction throughout the building (Figure 7-38). Cadbury World is three storeys and features a flat parapet with multiple multi-paned fixed windows and a glass double door with a canopy above. To the north end of Cadbury World is a pedestrian access way with roller door and glass double door access to the cafe, while a modern single pane window is situated to the south where an earlier door was located (visible in 1922 plans). The Cadbury World façade has changed little from its appearance in the early 1920s (Figure 5-40).

Figure 7-15 Photograph looking east at the Cumberland Street façade of Cadbury World.

To the rear of the building above and below a modern loading bay, the southern exterior painted brick wall of the 1868 kiln is visible (Figure 7-16 and Figure 7-17). The addition of the third floor (now second storey) in 1901 is not visible from the exterior; however, the southern extension is discernible. At the location of the southern extension there is a distinct break in the wall where it steps in. This step in may relate to a pre-1900 lean-to established at the rear of the kiln and crushing mill buildings. The step in of the lean-to building continues along the brick wall forming the southern end of the modern loading bay connecting the rear exterior wall of the the Cadbury World and Office Building with the rear of the Dairy and Machine House Building (Figure 7-18). A second, taller pre-1900 lean-to of the still room is also possibly visible to the east of the first lean-to. The wall of the still room lean-to appears to have been raised prior to the late 1870s when a photo shows it to be higher than the first lean-to adjacent to the kiln and crushing mill (Figure 5-29).

Returning to the Cadbury World building, on the east elevation there are two former bricked-in windows visible as is one more on the northern wall along with two modern windows and one vent along in what was the former kiln building (Figure 7-17). There are two entrances to the building through the café (former granary/malt floor), a shop area (former confectionery factory) or through Cadbury World (former kiln building). The roof of Cadbury World (kiln and granary/malt floor), although it has been reclad in the later twentieth century, matches the early 1902 roof line with a multi-gabled roof with a cross gable at the rear (Figure 5-36). Another gable roof crosses the most northern of these gables and runs north. This is likely associated with the later raising of the central portion of the granary/malt floor building between 1901 and 1915. The 1920s addition to the rear forming the Confectionery factory as well as another post-1950s toilet block addition to the rear feature flat-pitched roofs.

Figure 7-16. Photograph looking southwest (left) and west (right) at the eastern wall of the former kiln and northern wall of the former mill building. Note the jut into the wall is on the second storey. This may be associated with pre-1900 lean-to at the rear of the kiln and mill buildings

Figure 7-17 Photograph looking southwest at the eastern and norther wall of former smutters and kiln building. The upper floor was added sometime between 1892 and 1901, while the southern extension of 1901 is visible at the rear. There is one blocked in window on the eastern wall and another on the northern wall.

Figure 7-18 Photograph looking north at wall between Dairy and Machine House Building and the Cadbury World and Office Building. Note that the eastern end of the building has been raised.

7.3.2 Interior – Ground Floor

There were remnants of the pre-1900 granary/malt floor located throughout Cadbury World and café interior. In the café a brick wall running east-west, which was present by 1922 (the presently bricked in doorway is visible in plans from this time), abutted an earlier brick wall running north-south (Figure 5-23 and Figure 5-24). This wall demarcates the east extent of the pre-1900 granary and malt floor. It is unclear if when the east west wall was added, the north-south wall was opened to create an accessway through the building or if the opening was always present to provide access to the rear of the building. The remainder of the brick wall would have formed the granary/malt floor is covered with modern cladding and linings; however, it likely extends through Cadbury World to the south and into the office/reception building to the north.

The mezzanine level of the granary/malt floor, and kiln building was removed in 1959 and the additional steel supports are visible throughout the ground floor of Cadbury World (Figure 7-21). The open mezzanine level windows are partially visible along the west wall of Cadbury World, while three former windows are visible along the form northern external wall of the kiln building (Figure 7-22). There is also evidence for a partition wall or perhaps an external wall, suggesting the building was extended slight south (Figure 7-23)

Figure 7-19. Photographs looking northwest (left) at southern internal partition wall on the ground floor of the Cadbury World Building and northeast (right) at the abutment of the same wall to an earlier external wall to the west. The wall was likely present from 1922. Note the blocked-in doorway on the northern internal wall.

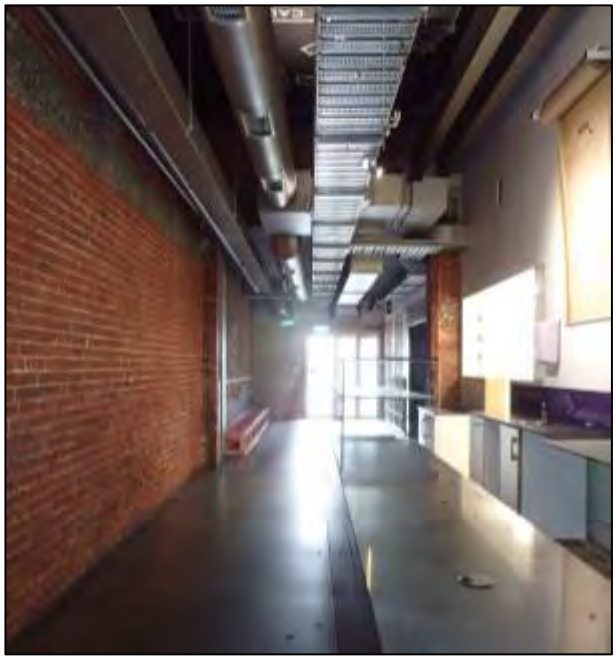

Figure 7-20. Photograph looking west on the ground floor of the Cadbury World building. Note the brick remnant of a north-south wall either side of the room. This is likely the original walls of the granary and malt floor. The opening that they form was present by 1922 and may be associated with the earliest outlay of the building however this is unclear.

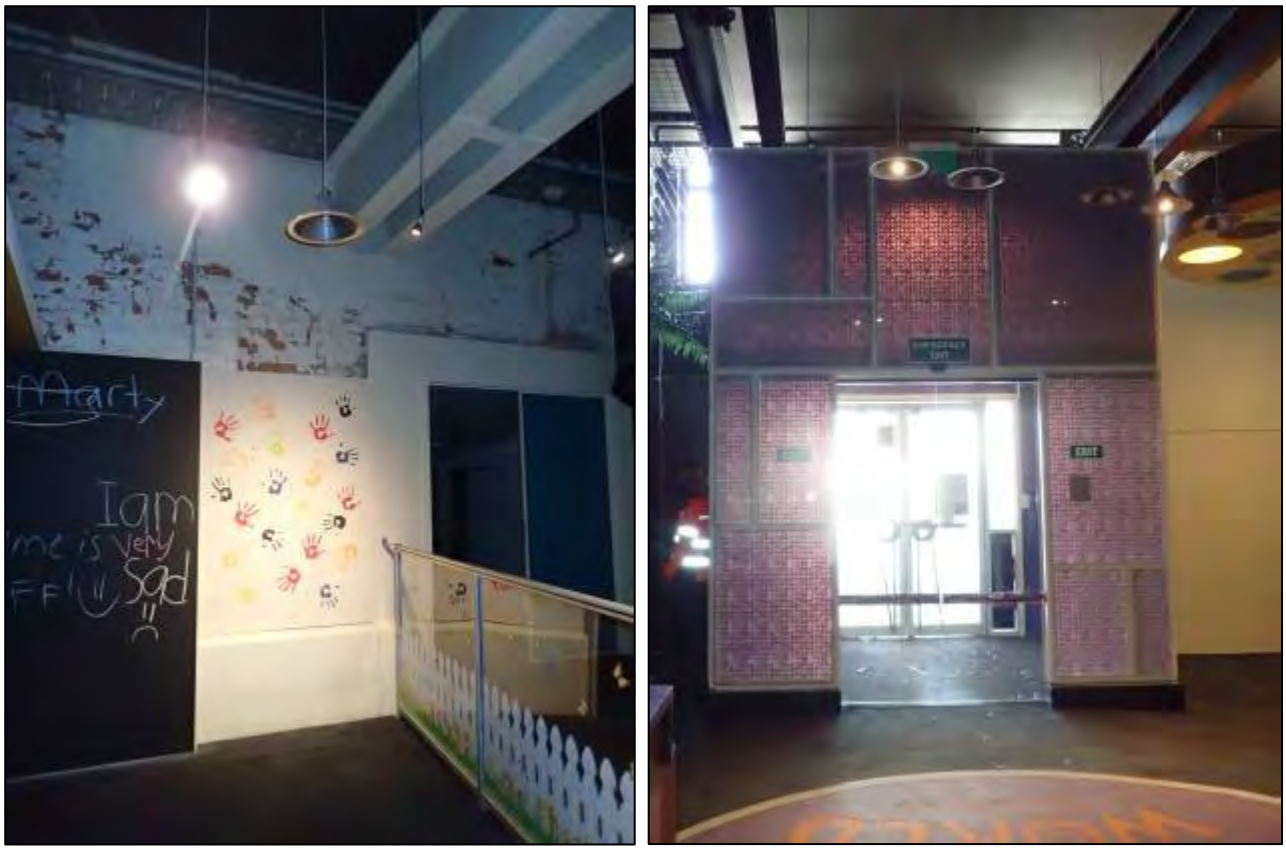

Figure 7-21. Photographs looking east (left) and west (right) on the ground floor of the Cadbury World building showing steel beams. Note the windows of the mezzanine floor above the door in the photograph on the left.

Figure 7-22. Photograph of interior wall of Cadbury World building that would have originally form the north exterior wall of the pre-1900 kiln. Note the bricked in windows of what was once the mezzanine level.

Figure 7-23. Detail photograph of interior wall of Cadbury World building that would have originally form the north exterior wall of the pre-1900 kiln showing a possible ground floor partition wall and joist insertion point for the original mezzanine level.

7.3.3 Interior – First floor

During the site visit a number of former doors and windows were identified on the interior of the building, some associated with the pre-1900 layout of the kiln and later smutters room to the east and the open kiln space that adjoined openly with 1891-1901 raised granary/malt floor third storey (now second storey). The east extent of the kiln or smutters room contains three bricked in doorways that may have once provided access to the earlier mill building adjacent to the kiln (Figure 7-24). Another window is also visible bricked in on the northern wall of the same room. Out to the following room west there are three doorways, two had been bricked up while one still opens with a steel roller door, which rolls over the blocked in doorway to the north (Figure 7-25). The blocked door to the south was located within the area of the 1901 extension indicating that it was installed in the twentieth century.

Towards the west of the north extent of the former kiln building, a possible former window frame or doorway is visible (Figure 7-26). The now blocked in feature was either a window constructed prior to the addition of the confectionery factory on the other side of the wall between 1922 and 1942, or a doorway established (possibly from a former window) through into the later addition.

The floor and ceiling of the most easterly room of the former kiln and smutters room displays possible remnants of its former use. There are dark staining and covered holes that may relate to machinery and chimneys used in these buildings (Figure 7-27 and Figure 7-28). There is also evidence of stairs in this room and the large western open room of the kiln and granary/malt floor building that were likely added at the same time the building was extended south in 1901 (Figure 7-29). The floor of the former granary/malt floor, kiln and smutters building was covered with concrete.

The windows facing Cumberland Street from the granary/malt floor building are all multi-pane wood framed windows on the ground and first floors suggesting that the older windows were replaced to match the 1902-1915 raised extent of the building (Figure 7-30).

Figure 7-24 Blocked in doorways and windows in the former kiln building looking east (top right and left and bottom left) and northeast (bottom right).

Figure 7-25 Photographs looking east at two blocked in doorways (top) either side of current doorway (bottom) to the eastern room of the former kiln and smutters room.

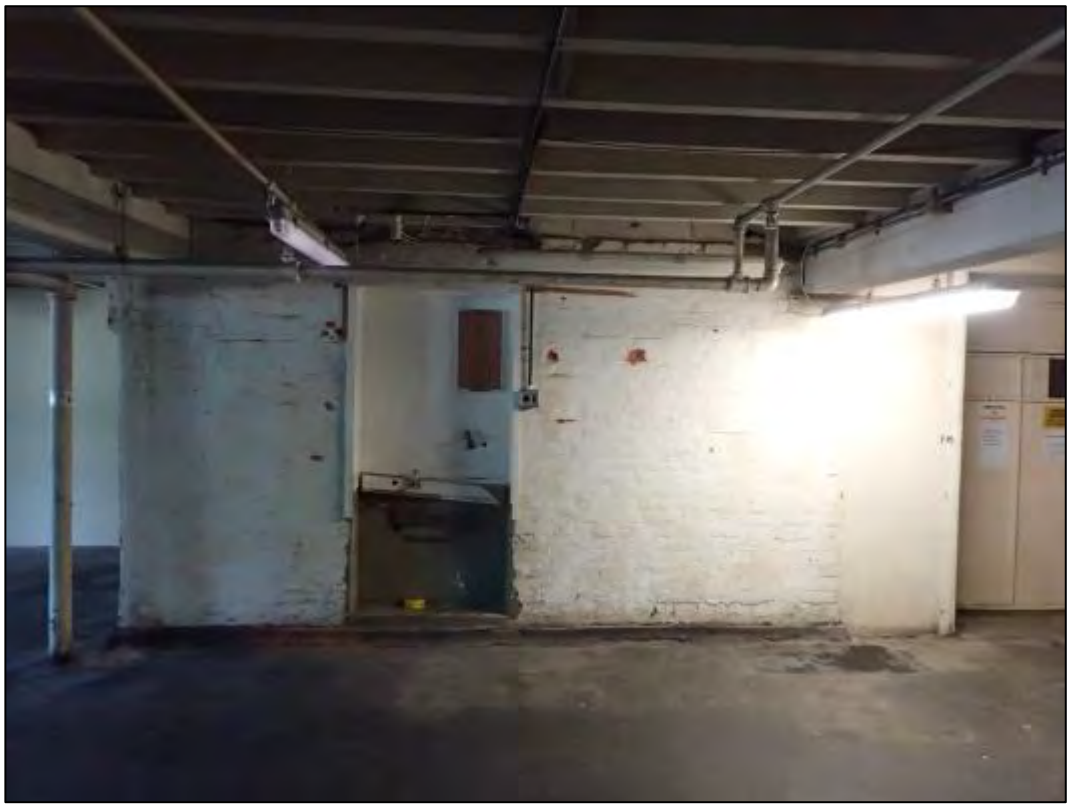

Figure 7-26. Photograph looking north at original kiln wall. There is a stone arch visible above the tap area to the east is a diagonal line rising up.

Figure 7-27 Photograph looking north at circular floor stain and covered floor in former kiln building.

Figure 7-28 Photographs showing location of blocked in roof (left) and floor (right) of possible former chimney in former kiln building.

Figure 7-29. Photographs showing former stairwell in the 1901 southern extension looking west in the western area of the former kiln building (left) and southwest in the most easterly room of the same building (right)

Figure 7-30 Photograph looking west at multiple fixed pane window on the first floor of Cadbury World. All windows along the western wall are the same suggesting they were added and older windows replaced to match the 1902 and 1915 windows when the central portion of the granary and malt floor was added or that the new windows were added to match the earlier 1889 to 1901 style of windows.

7.3.4 Interior – Second Floor

On the second floor it is possible to view the roof framing of the raised former granary/malt floor, and kiln building. The central gable running east-west and the adjacent southern extension gable from 1901, as well as the later northern raising extent between 1902 and 1915 feature common roof framing with collar ties (Figure 7-31 and Figure 7-32). Where the east-west gables met the cross gable in the west at the rear of the former kiln building, the building features common roof framing reinforced with steel (Figure 7-33).

As with the first floor, there are a number of blocked in windows or doorways. Two blocked in windows were visible on the north wall of the former granary and malt floor building as well as one smaller window still present (Figure 7-32). These windows are associated with the 1902-1915 upper storey addition as this would have been an exterior wall, established prior to the 1915-1922 raising of the office/reception building immediately north.

Another blocked-in window is visible on the northern wall of the most easterly room of the former kiln building as was a doorway on the eastern wall that would have led through into the mill building (Figure 7-34). Both the window and the doorway are likely associated with the 1889 to 1901 third floor addition (now second floor) to the kiln building. Facing Cumberland Street in the granary/malt floor building are covered four-pane wood-framed fixed windows which had been replaced from the original 12-pane windows. These windows match those of the Office Building at the front and rear of the Office Building, thus were likely changed between 1915 and 1922 with the northern extension and eastern concrete extension of the Office Building.

The floor of the former granary/malt floor, and kiln building was covered with concrete however a small patch of tongue and grove floorboards was exposed beneath in the most eastern room of the building (Figure 7-35). The walls were painted brick.

Figure 7-31 Photograph looking south (left) at column in the second floor of the Cadbury World building with the 1901 southern extension behind and photograph looking west (right) at roof structure of the southern extension.

Figure 7-32 Photograph looking north at the roof framing and the windows of the second floor north wall of the Cadbury World building associated with the 1901-1915 storey addition. Prior to the 1915-1922 raising of the offices and shop building this would have been an exterior wall.

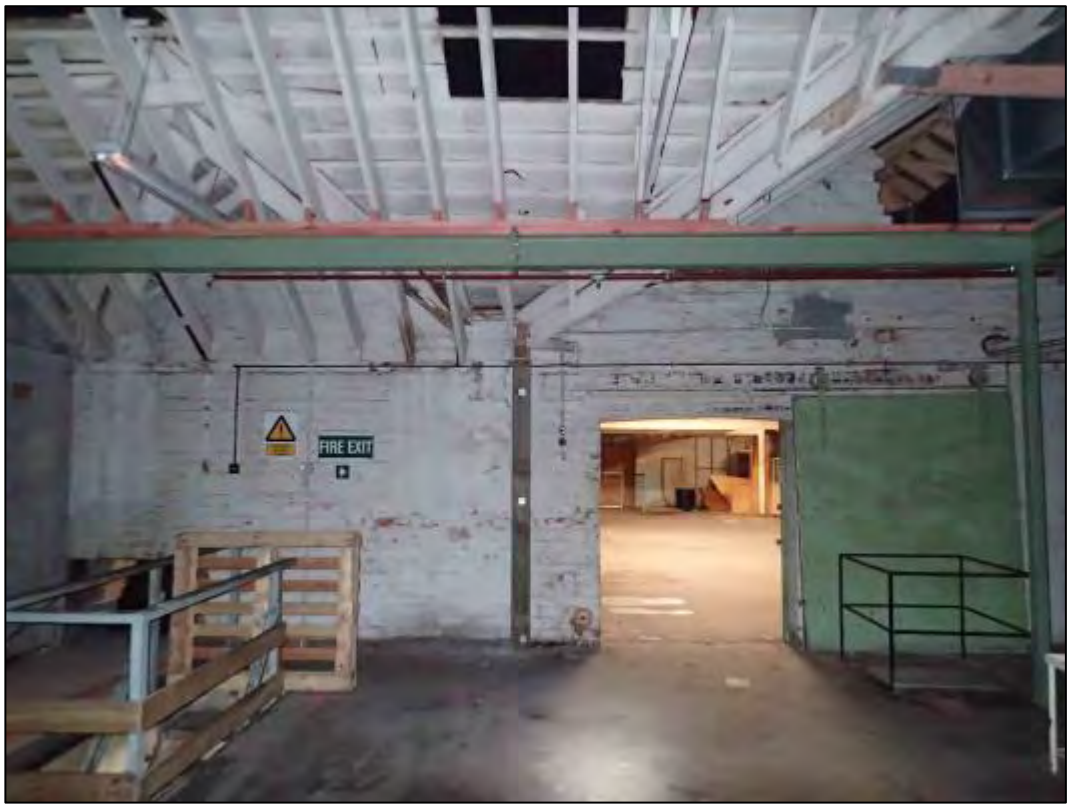

Figure 7-33 Photograph looking north at interior of Cadbury World building showing steel framing added to roof structure and steel columns. Note earlier skylights have been covered.

Figure 7-34 Photograph looking east (left) at a blocked in door way and north (right) at a blocked in window in the second floor of the Cadbury World building the most easterly room of the former kiln building.

Figure 7-35 Photograph of tongue and grove timber underneath concrete of the floor in the second floor of the Cadbury World building.

7.3.5 Interior – Third Floor

Only the later Confectionery factory to the rear of the building had building had four storeys and it is only accessible from the neighbouring Office Building. Painted brick walls are visible in this section of the building, while steel casement windows face out to the south. This window is associated with 1920s or later additions to the building.

Figure 7-36 Photograph of windows on third floor looking east from the confectionery factory towards the rear of Cadbury World.

7.4 Office Building (Block 2A)

The Office Building runs the along western extent of the site (Table 7-3 and Figure 7-37). It is situated on what was once Sections 54 and 55 Block XVI, forming a Cumberland Street façade immediately adjoining the Office Building (Block 2A). Along this frontage there is one pedestrian entrance, as well as a pedestrian and vehicle accessway between this building and the adjacent Chocolate Factory and Garage Building (Block 3A).

Table 7-3. Summary of built structures at 280 Cumberland Street: Office Building (Block 2A).

Number of Floors	4
Rooms per Floor	Ground Floor – 9 rooms Floor 1 – 25 Rooms Floor 2 – 24 rooms Floor 3 – 31 rooms
Roof Style	Flat pitched roof with mansard roof
Roof Material	Bitumen membrane over concrete; tiles on mansard roof, possibly asbestos
Windows	Fixed (multi-pane); casement windows
Foundations	Shallow spread footings
Floors	Concrete, tongue and Groove
Floor Coverings	Linoleum, carpet
Wall Construction Material	Brick and concrete
Ceilings	Softboard or hardboard
Wall Coverings	Paint/Softboard or hardboard
Distinctive Modifications	• Initial construction granary/malt floor and kiln in 1868 (north end incorporated into Office Building) • Western extension of a 1909 brick building encapsulating the northern extent of the granary/malt floor building in 1915 • Third storey addition and extension north between 1915 and 1922 • Large four storey concrete building likely constructed in 1922 replacing the 1909 brick building and part of the 1915 to 1922 extensions • Building extended to the north connecting to the Chocolate Factory and Garage Building between 1922-1924 • By 1926 a fourth storey with a mansard roof was added to the front of the building • First floor rebuilt with a reinforced concrete slab and steel columns for support • Refit for offices and reception in 1983

7.4.1 Exterior

The façade of the Office Building is a blend of the multiple phases of construction throughout the building (Figure 7-38). The Office Building is four storeys and features a mansard roof. One doorway is present at the southern end of the building. It is interesting to note that the ground floor of the southern half of the building façade features very few windows in comparison to the rest of the frontage. This may be a result of the windows of the original granary/malt floor structure being filled in and rather than being realigned to match the extensions and additional storeys added later.

The southern extent of the Office Building façade has changed little from its appearance in the early 1920s (Figure 5-40), aside from the later addition of the fourth storey and mansard roof. There is, however, a distinct difference in the façade marking the extension north that occurred in 1924 and the additions to the adjacent building (Chocolate Factory and Garage Building – Block 3A) that occurred at the same time. This resulted in the Chocolate Factory and Garage Building façade extending south into the Office Building frontage. and it has changed little from this time This section features larger multi paned windows with plain plaster pilasters running vertically up and down the building. The ground floor features plastered moulding over a large window and runs north to arch over the gates to the vehicle access under the first floor that runs between the office/reception building (Block 2A) and raw materials building (Block 3A).

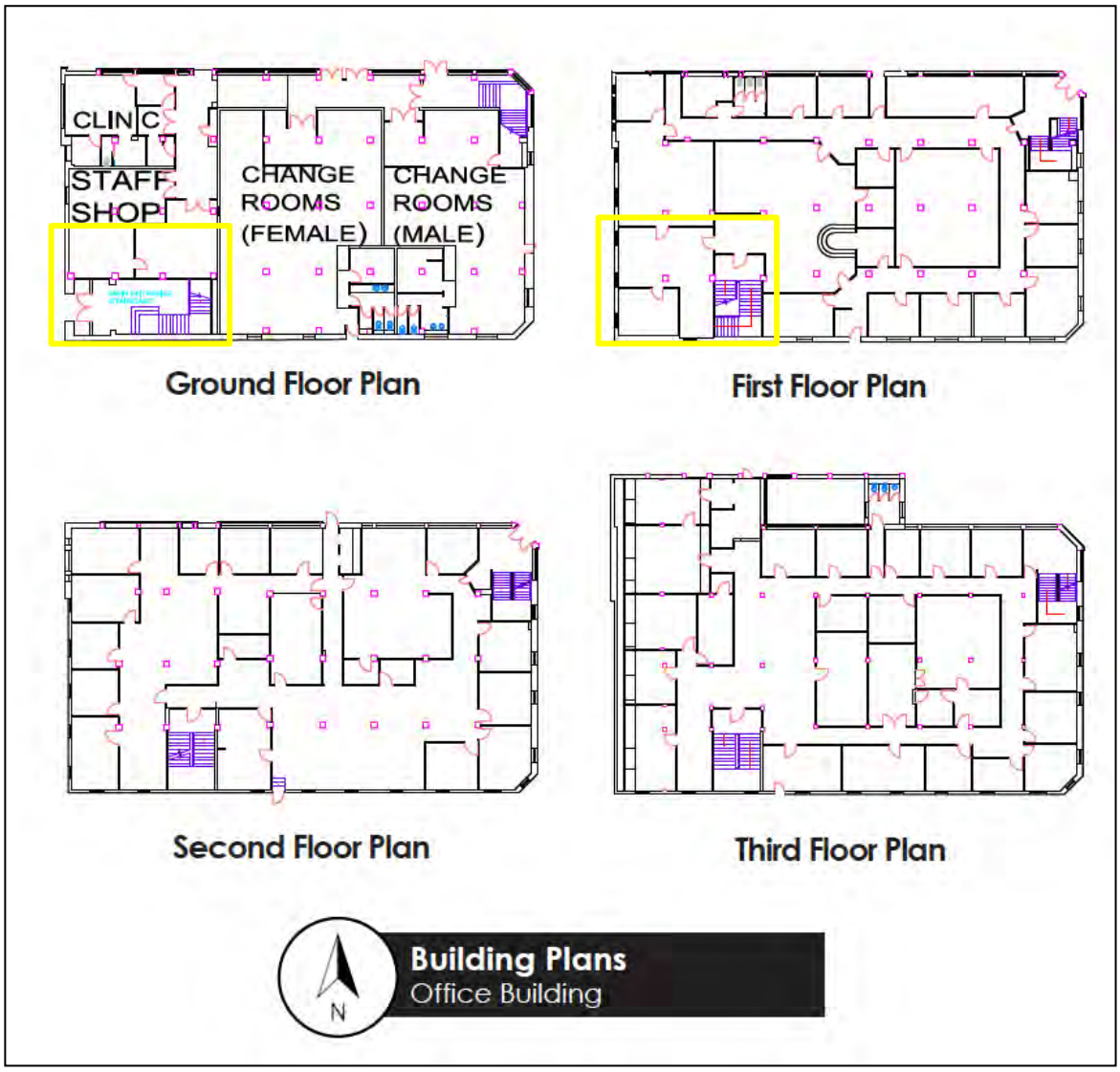

Figure 7-37. Floor plan of the Office Building, adapted from those supplied from Ritchie Fieldwick at the Southern District Health Board. The approximate extent of the pre-1900 building is outlined yellow.

Figure 7-38. Photograph looking east at the Cumberland Street façade of the Office Building.

The rear of the Office Building has a painted plaster finish (Figure 7-39). There are three entrances to this building on the ground floor on its northern and southern elevations. The earliest form of this extent of the building (the 1909 brick structure) is not visible as it was likely replaced in 1922 by a concrete building; however, the 1924 northern extension is visible as the windows are much larger than the four paned fixed windows to the south. The Office Building extent features flat pitched roofs except for the mansard roof visible from Cumberland Street.

Figure 7-39. Photograph looking west at the rear of the Office Building (Block 2A).

7.4.2 Interior

The office extent of the building has been completely refitted with modern wall and floor linings. It is unclear how much of the partition walls and interior fittings have been altered since this occurred in 1983 (Figure 7-43 and Figure 7-44). However, there are some distinctive elements within the building. On the ground floor there is a step up between the rear and front of the building that may be associated with the various stages of alterations and additions made to the buildings in the late nineteenth and early twentieth century (Figure 7-40).

The former exterior windows of the Office Building are visible from the from the later 1922-1927 confectionery factory extension on the first and third floors (Figure 7-41 and Figure 5-44). The windows feature diagonal brick framing at the top of the window and suggest that later additions to the building kept a similar style of window to earlier parts of the building, with pointed brick framing at the top of the window. The first-floor window is associated with the 1915 western addition to the Office Building. Another similar former window was visible from the from the third floor of the latter confectionery factory building while the latter windows are associated with the fourth storey that had been added by 1926.

One key variation on the third floor was the presence of a central computer room, once home to Cadbury's Computer Department. This floor also featured different windows to the rest of the building (Figure 7-45). Facing out from the mansard roof are multi-pane windows, featuring top hung (awning) ventilators. These window types are associated with 1920s addition to the building.

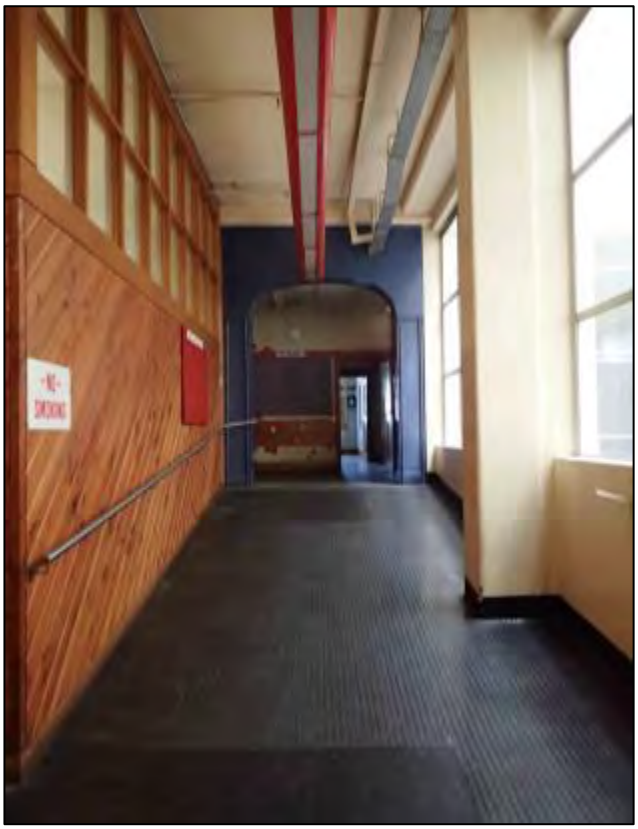

Figure 7-40. Photograph looking west the rise to the front portion of the Dairy and Machine House Building in the 1924 extension.

Figure 7-41. Photograph looking north at a former exterior window of the Office Building (Block 2A) associated with the 1915 western addition to the building. This photograph is taken from the later 1922-1927 addition at the rear of the Cadbury World building on the first floor.

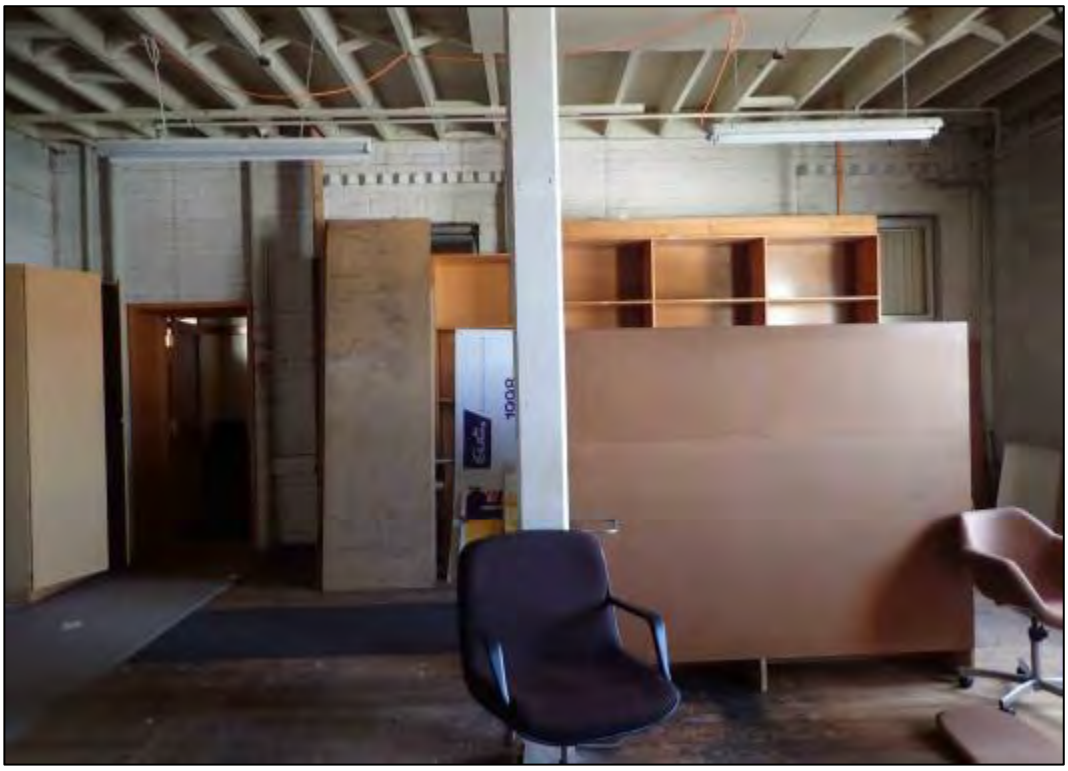

Figure 7-42. Photograph looking north at former exterior windows of the Office Building (Block 2A) associated with the 1915-1922 third storey addition to the building. This photograph is taken from the later 1922-1927 addition at the rear of the Cadbury World building on the third floor.

Figure 7-43 Photograph looking south at office portion of the Dairy and Machine House Building.

Figure 7-44 Photograph looking south at office portion of the Dairy and Machine House Building.

Figure 7-45. Photograph of windows on third floor looking west facing out from the mansard roof.

7.5 Chocolate Factory and Garage Building (Block 3A)

The Chocolate Factory and Garage Building is four storeys and rectangular in plan (Table 7-4 and Figure 5-46). It is situated on what was once Sections 55 and 56 Block XVI, forming a Cumberland Street façade immediately

adjoining the Office Building (Block 2A). There is a pedestrian and vehicle accessway between this building and the adjacent Office Building, as well as two pedestrian entrances along the north and south elevations of the building.

Table 7-4. Summary of built structures at 280 Cumberland Street: Chocolate Factory and Garage Building (Block 3A).

Number of Floors	4
Rooms per Floor	Ground Floor – 4 rooms Floor 1 – 12 rooms Floor 2 – 15 rooms Floor 3 – 8 rooms
Roof Style	Flat pitched roof /hipped roof
Roof Material	Bitumen membrane over concrete/corrugated iron
Windows	Fixed (multi-pane); casement
Foundations	Spread footings, unknown
Floors	Concrete
Floor Coverings	Linoleum
Wall Construction Material	Reinforced concrete
Ceilings	Exposed/Unknown
Wall Coverings	Paint/unknown
Distinctive Modifications	• 1922 construction of the concrete rear of the building • 1922-24 front addition of the garage • 1924 addition of two upper storeys • 1939 addition of penthouse, creating a fourth storey

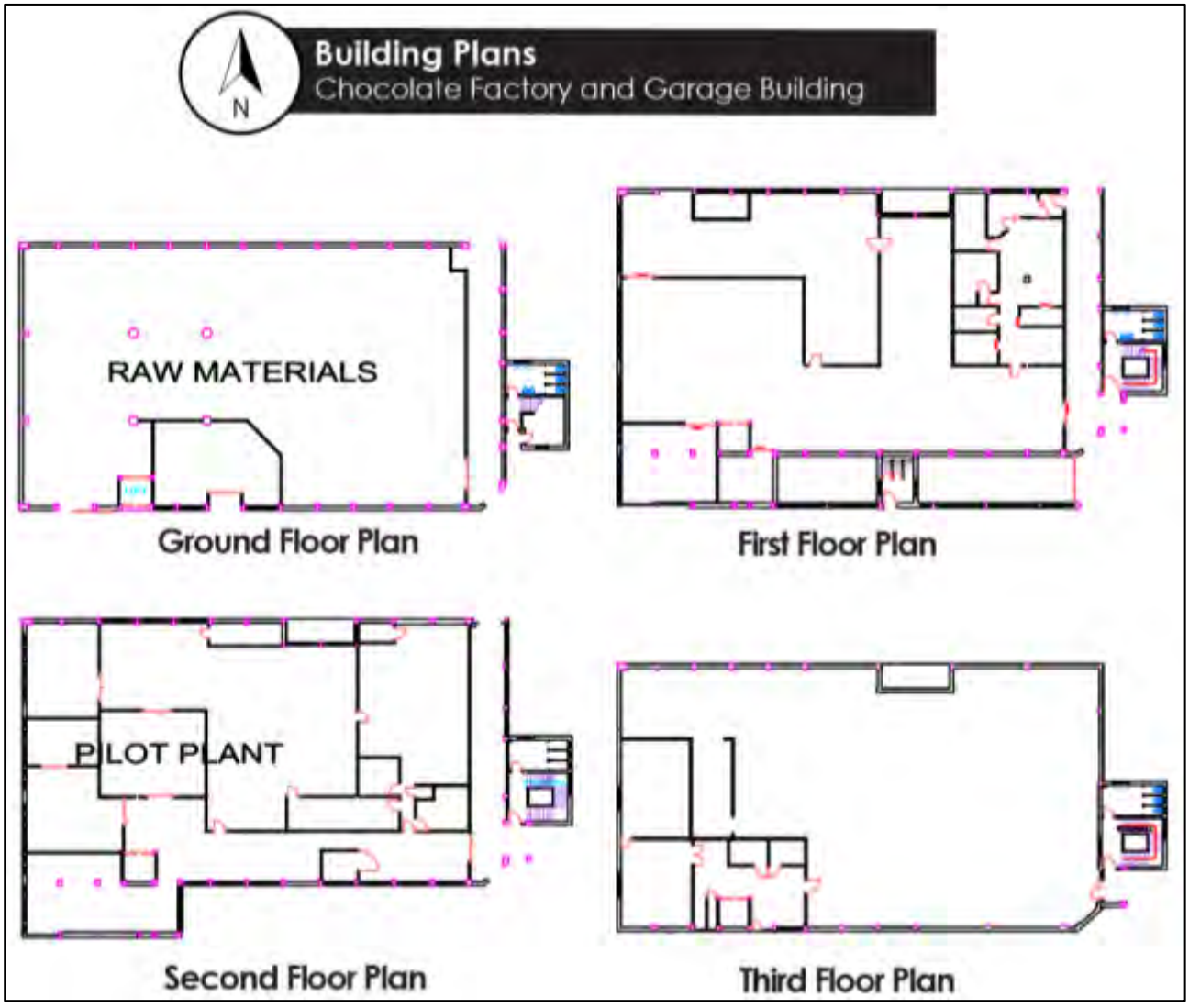

Figure 7-46. Floor plan of the Chocolate Factory and Garage Building, adapted from those supplied from Ritchie Fieldwick at the Southern District Health Board.

7.5.1 Exterior

The Cumberland Street façade of the Chocolate Factory and Garage Building is connected to the Office Building (Block 2A), and there is a clear crossover for where the two buildings meet. This is likely a result of the front portion of the chocolate factory building being constructed around the same time. In 1922 the ground floor façade was designed, and the plain features of this garage design is still visible on the ground floor today. Two storeys were added in 1924, which feature an early modernist influence with the building's ornamentation limited to plain pilasters with some detailing running across the top of the first floor and that incorporates the high arch over a vehicle and pedestrian accessway. The elevation has changed little since 1924, and a prominent feature are its large multi-paned steel windows (Figure 5-54). When the fourth storey was added in 1939, the 1924 detailing was simply extended.

The building largely features a flat pitched roof except for two hipped roof additions to the building along Cumberland Street. Access to the building is possible from open arch at the northern end of the façade on Castle Street.

Figure 7-47 Photograph looking east at the Cumberland Street façade of the chocolate factory building.

7.5.2 Interior

The interior of the building is dominated by factory space, with concrete floors steel framing. The rooms are clearly designed around the buildings function as a garage or factory (Figure 7-51). The floors were either exposed concrete or lined with linoleum. As noted above there is some variation in window stylings with the majority of the building windows being multi-paned with steel sashes with a variety of openings and ventilators.

Figure 7-48 Photograph of the Chocolate Factory and Garage Building looking west at the former garage on the ground floor (left), and looking north at the former factory on the first floor (right).

7.6 Chocolate and Biscuit Factory Building (Block 3B-3C)

The chocolate factory building is four storeys and rectangular in plan (Table 7-5 and Figure 7-49). It is situated on what was once Sections 55, 56, 71 and 72 Block XVI, forming a Castle Street façade immediately adjoining the Biscuit Factory and Dispatch Building to the north (Block 4C-5C). There is a pedestrian accessway at the north end of the Castle Street frontage, and multiple other entrances on the southern, western and northern elevations of the building.

Table 7-5. Summary of built structures at 280 Cumberland Street: Chocolate and Biscuit Factory Building (Block 3B-C).

Number of Floors	4
Rooms per Floor	Ground Floor – 6 rooms Floor 1 – 13 rooms Floor 2 – 1 rooms Floor 3 – 17 rooms
Roof sStyle	Flat pitched roof /hipped roof
Roof Material	Bitumen membrane over concrete/corrugated iron
Windows	Fixed (multi-pane); casement
Foundations	Spread footings, unknown
Floors	Concrete
Floor Coverings	Linoleum
Ceilings	Exposed/softboard or hardboard
Wall Construction Material	Concrete
Wall Coverings	Paint/unknown
Distinctive Modifications	• 1924 construction of the western extent of the building • 1924-1927 extension east to adjoin earlier buildings along Castle Street • 1934 alterations including addition of reinforced concrete slabs, and replacement of windows to match existing • 1938 replacement of the Castle Street end of the building (two pre-1900 and early 1900s buildings) with three-storey reinforced concrete addition with steel framing. In the same year alterations were made to the third floor of the building including the addition of exterior brick walls and timber frame roof forming the cafeteria level as it exists today

7.6.1 Exterior

The eastern end of the Chocolate and Biscuit Factory building was constructed in 1938, replacing the nineteenth and early twentieth century portion of the building. The Castle Street façade features art deco elements with plaster reaming running vertically up and down pilasters at the southern end of the façade. Steel sashes again were utilised; however, the windows at the southern end are also more decorative featuring sympathetic windowpane designs to the plasterworks. Across the top of the building runs decorative yet simple plaster moulding. The façade is unusual in that it is asymmetrical, with ornamentation largely restricted to the south bay of the building. This perhaps signals that there were plans to extend the building further south, but this could not be confirmed during the timing of this assessment.

The buildings largely features a flat pitched roof except for two hipped roof additions to the building along Cumberland Street. Access to the building is possible from open arch at the northern end of the façade on Castle Street.

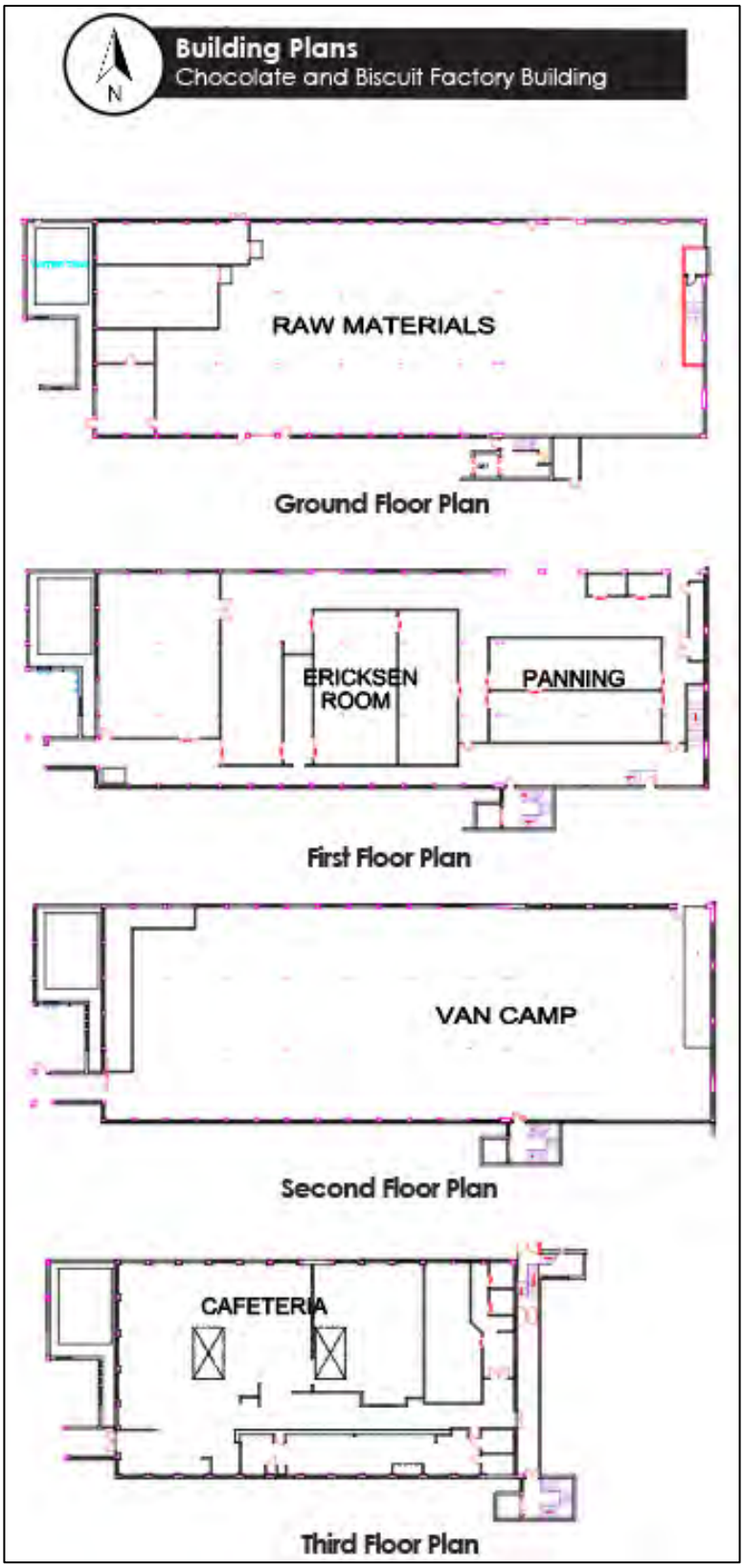

Figure 7-49. Floor plan of the Chocolate and Biscuit Factory building, adapted from those supplied from Ritchie Fieldwick at the Southern District Health Board.

7.6.2 Interior

The interior of the building features predominantly factory space, with concrete floors steel framing. The rooms are clearly designed around the buildings function as a factory and cafeteria (Figure 7-51). The floors were often lined with linoleum through much of the factory. In discrete areas the walls were constructed or lined using different materials, likely marking later additions to the original wall (Figure 7-52). One is the brick wall and door designed by McDowell Smith in 1934. While slightly altered from the initial design, the wall still features the key elements of the design (Figure 5-65) As noted above there is some variation in window stylings with the majority of the building windows being multi-paned steel sashes with a variety of openings and ventilators. The windows on the northern side align with McDowell Smith's plans of the ground and first floor indicating the window styles were to match those already present. Miller and White's 1938 plans of the fourth floor show a variant design (Figure 5-65 and Figure 5-66). It is interesting to note that on the western façade there were more decorative windows present at the south end, which were likely design by Miller and White in 1938, and are a marked contrast with the other more utilitarian windows of the building (Figure 7-53).

Figure 7-50 Photograph looking west at the Castle Street façade of the Chocolate and Biscuit Factory building.

Figure 7-51 Photograph of the Chocolate and Biscuit Factory building looking east at the of the factory space (Block 3b-c) on the second floor (left); and, looking west at the cafeteria on the third floor (right).

Figure 7-52 Photograph looking south at bricked in wall section in the Chocolate and Biscuit Factory (Block 3B-C) on the ground floor (left) and looking south at tongue and grove wall lining on the second floor.

Figure 7-53 Photograph looking south (left) and east (right) at variant multi-pane window on the second floor of the Chocolate and Biscuit Factory building (Block 3B-C) second floor.

7.7 Engineering Workshop, Labs, and Office Building (Block 4A)

The Engineering Workshop, Labs, and Office Building is three storeys and roughly square in plan (Table 7-6 and Figure 7-54). It is situated on what was once Sections 56 to 58 Block XVI, forming a Cumberland Street façade immediately adjoining the Biscuit Factory and Dispatch Building (Block 5A) to the north. Along this frontage there is a pedestrian and vehicle accessway between this building and the adjacent Biscuit Factory and Dispatch Building. Other entrances to the building are situated along the southern and eastern ends of the building.

Table 7-6. Summary of built structures at 280 Cumberland Street: Engineering Workshop, Labs and Office Building (Block 4A).

Number of Floors	3
Rooms per Floor	Ground Floor – 18 rooms Floor 1 – 36 rooms Floor 2 – 8 rooms
Roof Style	Dutch Gable
Roof Material	Colorsteel
Windows	Fixed (multi-pane); casement
Foundations	Driven reinforced concrete piles
Floors	Concrete
Floor Coverings	Linoleum, carpet
Ceilings	Exposed/softboard or hardboard
Wall Construction Material	Reinforced concrete
Wall Coverings	Exposed/softboard or hardboard
Distinctive Modifications	• 1961 construction of building • 1994 upgrades to essence room on the second floor and offices on the first floor

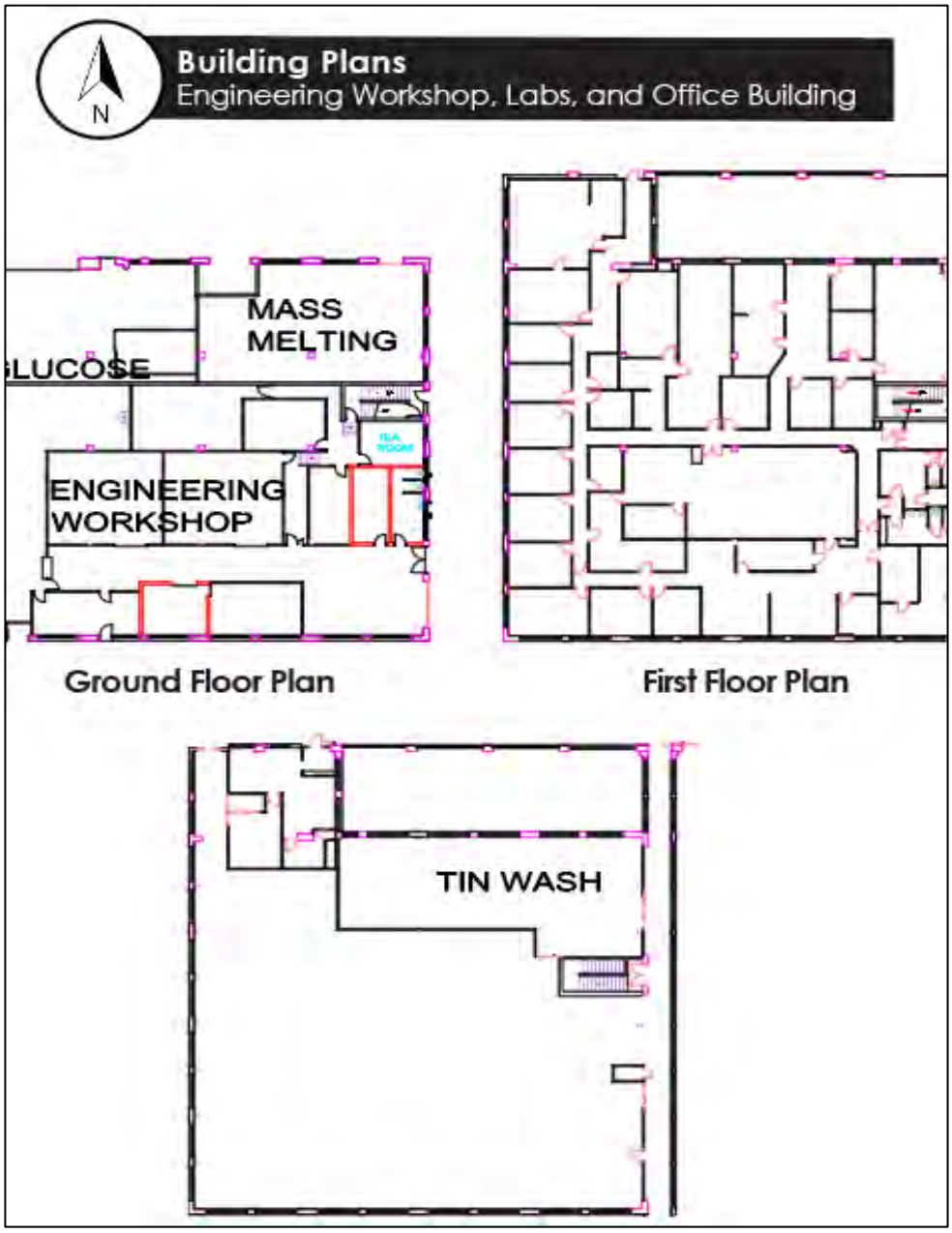

Figure 7-54. Floor plan of the engineering workshop, labs and Office Building, adapted from those supplied from Ritchie Fieldwick at the Southern District Health Board.

7.7.1 Exterior

The façade reflects the utilitarian nature of the building, with few decorative elements (Figure 7-60). There is a vehicle and a pedestrian access way present at the northern end of the building on Cumberland Street. Aside from minor changes, the façade of this building largely remains true to the initial designs and construction of the early 1960s. This building has been designed to match the earlier biscuit and dispatch building to the north with all of the windows on the Cumberland Street frontage are multi-pane steel sashes. Brown tiling featured around the bottom of the building is continuous from the biscuit and dispatch building. The building, although largely utilitarian, also complements the adjacent chocolate factory building façade with pilasters running vertically along the building.

Figure 7-55 Cumberland Street (left) and Castle Street (right) façades of the biscuit and dispatch building.

7.7.2 Interior

The interior of the building predominantly laboratory, factory operations, office space, and occasional rooms for tours, each of the rooms are clearly featuring the functions their space (Figure 7-62). This is the only building with a basement level above which is a mezzanine level. The walls of the basement feature the lower portion of a blocked window and an open window that runs up into the mezzanine level, suggesting suggests that the basement and the mezzanine were later additions to the building. The floors were lined with linoleum or carpet while the ceilings have been covered with soft or hardboard. The majority of the building's windows are multi-paned fixed or casement windows with a variety of openings and ventilators (Figure 7-63).

Figure 7-56 Photographs of Engineering Workshop, Labs, and Office Building looking west at food testing laboratory on the first floor (top left), northwest at Cadbury tour space on the first floor (top right), west at tin wash on the second floor (bottom left) and northwest at office room on the first floor (bottom right).

Figure 7-57 Photograph looking east into basement and Mezzanine from ground level (left) and at basement wall (right). Note the brick infill and the open window running up into the mezzanine level above.

7.8 Biscuit Factory and Dispatch Building (Block 4C and 5A-C)

The biscuit and dispatch building is five storeys and L-shaped in plan (Table 7-7, Figure 7-58 and Figure 7-59). It is situated on what was once Sections 58, 59, 68 and 69 Block XVI, forming Cumberland Street and Castle Street façades. The building immediately adjoins the engineering workshop, labs, and office Building (Block 4A) to the south on Cumberland Street and the Chocolate and Biscuit Factory (Block 3C) on Castle Street, also to the south.

Along the Castle Street frontage there are two pedestrian entrances, as well as a vehicle access way to the south of the building.

Table 7-7. Summary of built structures at 280 Cumberland Street: Biscuit Factory and Dispatch Building (Block 4C and 5A-C).

Number of Floors	5
Rooms per Floor	Ground Floor – 21 rooms Floor 1 – 27 rooms Floor 2 – 29 rooms Floor 3 – 19 rooms Floor 4 – 35 rooms
Roof Style	Dutch Gable
Roof Material	Colorsteel
Windows	Fixed (multi-pane); casement
Foundations	Concrete slab
Floors	Concrete
Floor Coverings	Linoleum
Ceilings	Exposed/softboard or hardboard
Wall Construction Material	Reinforced concrete
Wall Coverings	Exposed/softboard or hardboard
Distinctive Modifications	• 1951 completion of building construction • Addition of two storeys to the biscuit factory and three to the dispatch portion of the building in 1968

7.8.1 Exterior

As with the Engineering Workshop, Labs, and Office Building, the Biscuit Factory and Dispatch Building façades reflect the utilitarian nature of the building with few decorative elements (Figure 7-60). However, the building still complements the adjacent Chocolate Factory and Garage Building façade with pilasters running vertically along the building. A key feature of the east and west façades is the lift shaft which features a slightly more decorative pilaster running the height of the building adorned with long rectangular windows either side up to the fourth floor. There is a pedestrian doorway immediately south of the central lift shaft on the Castle Street frontage, another further south as well as a vehicle entrance at the south corner of the building. There are three covered blocks on the ground level of the Castle Street Frontage, south of the central lift shaft. These are the former vehicle entrances for the dispatch building. Aside from minor changes, the facades of this building largely remain true to the initial designs and construction between the late 1940s and early 1950s, however the upper two storeys of the building have lower ceiling heights, and this is reflected in the building's façades. All of the windows on the Cumberland and Castle Street frontages are multi-pane steel sashes. The brown tiling featured around the bottom of the building that continues around the side elevations and even inside where the later additions have been made to the building.

7.8.2 Interior

The interior of the building predominantly factory space, with no attempts to disguise its concrete and steel construction. The rooms clearly feature the functions of various factory spaces (Figure 7-61 and Figure 7-62). The first and second floors of the factory feature columns with capitals reminiscent of the lotus style (also referred to as mushroom-shaped columns), which were utilised throughout modernist architecture in the 1930s (Figure 7-61and Figure 7-63).

The floors were often lined with linoleum through much of the factory, while floors and ceilings have simply been painted As noted above there is some variation in window stylings with the top two floors of the chocolate factory and dispatch building being narrower than the lower floors likely as a result of being a later addition (Figure 7-63).

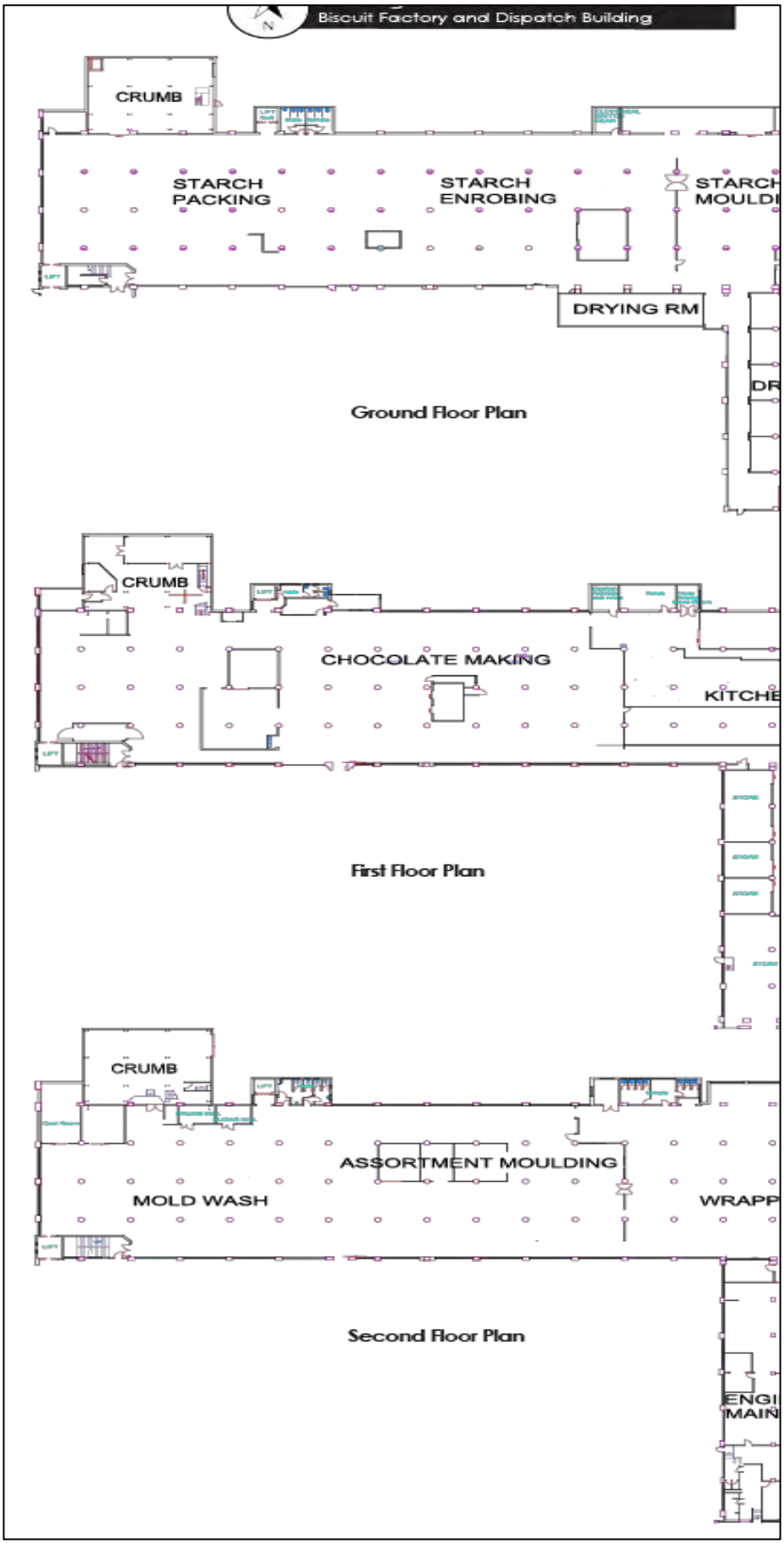

Figure 7-58. Plans of the ground to second floors of the Biscuit Factory and Dispatch Building, adapted from those supplied from Ritchie Fieldwick at the Southern District Health Board.

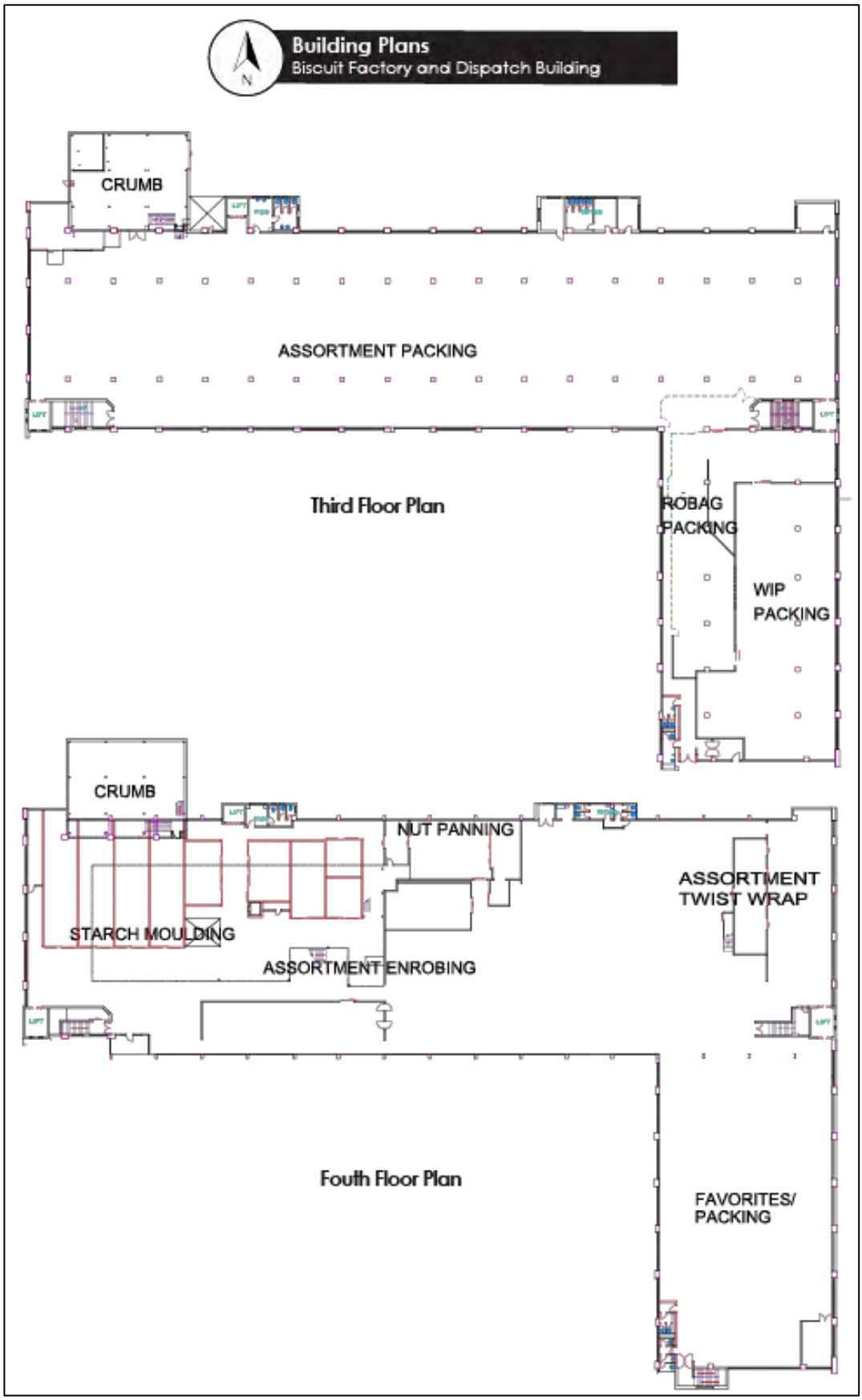

Figure 7-59. Plans of the third and fourth floors of the engineering workshop, labs and Office Building, adapted from those supplied from Ritchie Fieldwick at the Southern District Health Board.

Figure 7-60 Cumberland Street (left) and Castle Street (right) façades of the biscuit and dispatch building.

Figure 7-61 Photograph of the biscuit and dispatch building (Block 5C) on the third floor looking west (left) and on the first floor looking northwest (right).

Figure 7-62 Photograph looking west at factory space (Block 5C) on the fourth floor (left) and photograph of drying room in the biscuit and dispatch building (Block 4C) looking west on the ground floor.

Figure 7-63 Photograph looking east (left) at windows on the second floor (Block 5C); looking southeast (right) at windows on the third floor (Block 5C).

7.9 Streetscape

All seven of the Cadbury Confectionery Ltd Buildings can be considered in relation to each other, as well as other buildings along Castle and Cumberland Streetscapes. The five buildings (Cadbury World Building; Office Building; Chocolate Factory and Garage Building; Biscuit Factory and Dispatch Building; and, Engineering Workshop, Labs, and Office Building) that form the façade along Cumberland Street form a distinct factory block, with no thoroughfare through to Castle Street. The only clear separation between the buildings being a narrow pedestrian and vehicle accessway. There are distinct variations in each of the buildings' designs (from plan undecorated frontages on the Cadbury World building to a modernist inspired Chocolate Factory and Garage building to the north) and height (the northern end of the Biscuit Factory and Dispatch Building is distinctly higher reaching five storeys, while the remaining buildings range from three to four storeys). From the ground level, the blockade formed by the buildings all constructed hard up against the footpath still form a congruous early twentieth century industrial setting along the one-way street system.

It is interesting to contrast this industrial façade with the neighbouring buildings. While the more recent purpose-built warehouse is a comparable modern equivalent of the Cadbury Confectionery Ltd Buildings, purpose built for the factory itself, the remaining buildings on this block are more orientated to Dunedin's commercial businesses rather than industry. The Dunedin Allied Press Ltd Building (List No. 2135 and schedule B564) at 52 Stuart Street for instance was constructed between 1926 and 1928, a similar period to the construction of the Chocolate Factory and Garage Building, yet it is dramatically different to all the Cadbury Confectionery Ltd buildings. The brick building designed by Edmund Anscombe features a far larger number of decorative elements (i.e., plasterwork moulding and combination of exposed brick and plaster render), that creates a far less brute appearance on the roadside, in spite of the building being distinctly taller than the neighbouring Cadbury Confectionery Ltd buildings, while also constructed hard up against the footpath.

On the opposing side of the street, almost all sense of the historic industrial nature of the area has also been lost with the modern instalment of the Countdown supermarket and its associated carpark, as well as the hotel and police buildings to the north. However, to the south of the block on the corner of St. Andrew and Cumberland Streets, is an A & T Burt building. This building pays homage to the iron foundry established across the road where the Cadbury Confectionery Ltd buildings are situated today. Yet, given separation of the Cadbury Confectionery Ltd buildings and the A & T Building by the road, the early twentieth century and distinctly modern commercial buildings, the respective A & T Burt and Cadbury Confectionery Ltd buildings feel isolated and unconnected when travelling down Cumberland Street.

On Castle Street there is a less cohesive façade for the three Cadbury Confectionery Ltd buildings with a frontage to the south (Dairy and Machine House Building; Chocolate and Biscuit Factory building; and Biscuit Factory and

Dispatch Building). The Chocolate and Biscuit Factory building, and the Biscuit Factory and Dispatch Building form a similar industrial streetscape to that presented by the Cadbury Confectionery Ltd buildings on the Cumberland Street façade. Again, while varying from three to five storeys and stylistic architectural differences, the buildings together form a dominant factory appearance right up against the footpath along Castle Street. While starkly different to all other Cadbury Confectionery Ltd buildings the factory buildings are complimented by the marked presence of the two large silos. These are also a direct reflection of factory processes visible from the street.

There is a large gap from the Chocolate and Biscuit Factory and adjacent silos to the Diary and Machine house building. This gap forms the gated Castle Street vehicle entrance. The Diary and Machine house building feature more of a commercial or business appearance towards the street, as they were directly associated with the R. Hudson and Co. and later Cadbury Fry Hudson offices. This frontage is more complimentary to other heritage buildings in the area than the chocolate factory, and Biscuit Factory and Dispatch Building. Further south towards St Andrew Street are the former commercial premises of the following businesses: International Harvester Company, Riach & McLennan (wholesale merchants), the Co-operative Diary Co., and A. &. W. McCarthy Ltd (specialists of guns, locks and fishing equipment). The International Harvester Company and Riach & McLennan building is a character contributing building with a protected façade to Castle Street (CC702), while the McCarthy building is scheduled as a Heritage Building (B561), and its façade to Castle and Lower Stuart Streets. Both buildings were constructed in the first couple of decades of the twentieth century and feature Edwardian and modernist elements. Again, they feature more decorative elements than the factory buildings further south (i.e. recessed panels, pilasters, and cornices) however the modest decorative elements are complimentary to those of the diary building (i.e. arched parapet, plasterwork moulding, and simulated rustication). Overall the Dairy and Machine House Building along with those buildings further south form a cohesive streetscape easily visible from the Anzac square gardens and railway station across the road, that reflects early twentieth century business development along Castle Street.

On the other side of Castle Street there is distinct variation throughout the block. At the southern end, the Anzac Square gardens and the impressive early twentieth century railway station dominate the streetscape, forming a distinct lavish landscape of city infrastructure with the Law Courts on Lower Stuart Street opposite. This is the only green space provided along the Castle Street block. Indeed, in contrast immediately north is a number of one to three storey industrial buildings, many likely established with instalment as a result of the railway itself, as well as a small carpark along the west side of Castle Street. These smaller buildings, despite being part of the late nineteenth and early twentieth industrial landscape do not tower over the street and as a result contrast the Cadbury Confectionery Ltd buildings which dominate the street with their height and lack of thoroughfare. Thus, the factory buildings again feel isolated along the one-way Castle Street, a last remnant of large-scale, continuous century twentieth century factory development.

8 Constraints and Limitations

Minor constraints and limitations affecting this project include limited documentary and photographic records. Not all property records were consulted during the course of this assessment, however, in most cases the rates records and property files were able to provide the necessary details to allow for the development of a relatively comprehensive understanding of nineteenth and twentieth century activity within the Cadbury Factory Block. During the site visit the second storey of the Dairy and Machine House Building (part of Cadbury Confectionery Buildings Ltd) could not be accessed due to health and safety concerns. As a result, the first floor which likely contains elements of the pre-1900 structure could not be examined. Despite this the accrued information was also able to confidently inform the heritage values assessment and assessment of effects on such values.

9 Heritage Values

As is discussed in Section 6, the Cadbury Confectionery Ltd Buildings are included as a Category 2 Historic Place (List No. 2143) on the New Zealand Heritage List/Rārangi Kōrero. Until recently, the HNZPT online list record made explicit reference to the listing relating to the extended facades of four buildings; although, it did not specify which buildings this referred to. The assessment criteria utilised in the HNZPT listing was not outlined at the time. Since being listed in 1982, a review report of the listed buildings has not been undertaken and only a listing file of relevant collated documents are held by HNZPT, and no discussion of these values could be found in this file. Thus, as a Category 2 Historic Place, it is only specified that the buildings are of historical or cultural significance or value.

The Cadbury Confectionery Ltd Buildings are scheduled on the District Plan (B030; 2006, 2018), which states the protection extends only to the Castle and Cumberland Street facades. As such, the facades to the following buildings are protected:

- Dairy and machine house building (Block 1B-C; historically the cellar and possible small mill buildings)
- Cadbury World building (Block 1A; historically incorporated part of the granary/malt floor and kiln buildings),
- Office building (Block 2A; historically incorporated part of the granary/malt floor building),
- Chocolate factory and garage (Block 3A),
- Chocolate and biscuit factory (Block 3B-C)
- Engineering workshop, labs, and offices (Block 4A)
- Biscuit and dispatch building (Block 4C and 5A-C)

It is acknowledged that the other buildings within the complex that do not have street elevations, including the boiler house (constructed 1945 with extensions in 1959 and 1969) and power and services station (built around 1948), have heritage value, but are not protected under the District Plan. Likewise, the 1950s crumb silos were relocated to their current position in 1991 and are also not included in this discussion of heritage values.

While the District Plan protects the street façades of the buildings within the complex, heritage value is far more than their aesthetic from a street view perspective; although, this is certainly an important factor. This assessment consider the archaeological, architectural, historic, scientific, and technological values of the buildings and broader complex, and a detailed assessment of the heritage values of these buildings are provided in Table 9-1 below. The evaluation of the heritage values for the Cadbury Confectionery Ltd Buildings draws from the HNZPT listing documents for List No. 2143, previous heritage reports, and the research undertaken for this report using the criteria outlined in Section 3.2.

Previous heritage, architectural and archaeological assessments of the Cadbury Confectionery Ltd Buildings have predominantly focused on the Dairy and Machine House Building (Brooks & Jacomb, 2010; A Farminer, 2014; Oakley Gray Architects Ltd., 2010; Parkinson, 2011). The most recent review by Farminer (2014) recognising the heritage value of the Dairy and Machine House Building concludes:

> Overall, the former Dairy building and Machine House have significant heritage value both as tangible reminders of Dunedin's early settlement and expansion, and as evidence of the industrial/manufacturing history of the site from the 1860s. Within their historic fabric, the two buildings demonstrate the significance of the historic manufacturing link between their original distillery origination, the brewery phase, Hudson's biscuit production period, and the Cadbury Fry Hudson era of Confectionery production right up to the recent use of the building by Cadbury/Mondelez NZ.

Table 9-1 Assessment of heritage values for the Cadbury Confectionery Ltd Buildings.

Archaeological Value	
Archaeological Information Moderate	***Does the place or area have the potential to contribute information about the human history of the region, or to current archaeological research questions, through investigation using archaeological methods?*** The Cadbury Confectionery buildings are situated within two archaeological sites which have moderate archaeological information potential: I44/817 and I44/922. Site I44/817 (historic Cadbury site) comprises Town Sections 53-56 and 710-74, Block XVI Town of Dunedin. It includes three of the listed building façades (the Dairy and Machine House Building, Cadbury World and offices, and the chocolate factory) and part of the fourth listed building façade (the Biscuit Factory and Dispatch Building). The remains of four pre-1900 buildings are present or partially present on site. These include the 1868 New Zealand Distillery Company buildings granary/malt floor and kiln buildings incorporated into the present-day Cadbury World and Office Building, and the possible small mill incorporated into the Dairy and Machine House Building. The 1875 cellar constructed for the Albion Brewing Company, is also incorporated into the Dairy and Machine House Building. There are also the possible partial remains of two further buildings, an 1868 lean-to and still room. The condition of the site is poor as all pre-1900 buildings have all been heavily modified in the twentieth century resulting in minimal nineteenth century fabric surviving, and they thus also have a low amenity value. While the Dairy and Machine House Building façade is visible, it was restored to reflect the early twentieth century façade, and no original heritage fabric remains visible on the façade. Similarly, the pre-1900 brewery has been highly modified in the early twentieth century and many earlier features have been removed or masked by these modifications. Beyond buildings, no other archaeological features are visible, and the condition of any subsurface archaeological material is unknown. While commercial and industrial sites are common in Dunedin there are only four other brewery sites in Dunedin, and a final report has only been submitted for investigations into one of these sites: the Speights Brewery (I44/233). Both surface and subsurface archaeological remains at this site possess some contextual value in relation to and reveal information on the development of central Dunedin during the nineteenth century. This includes land reclamation processes; the early Dunedin brewery industry with New Zealand Distillery Company and the Albion Brewing Company operating from the premises in the nineteenth century; as well as the confectionery manufacturing industry, in particular one of Dunedin's most prominent businesses with R Hudson and Co. chocolate and biscuit manufacturers, occupying the site from 1898 through into the twentieth century. Site I44/922 comprises historic Town Sections 57 to 59 and 68 to 70, Block XVI Town of Dunedin, and includes SEC 57-59 and 68-70 BLK XVI DP 5322 SO 14196. It includes one of the listed building façades (the Biscuit Factory and Dispatch Building). No pre-1900 structures or features remain visible at the site, and the presence, location and condition of subsurface features remains is unknown. There is the potential to encounter subsurface remains relating to industrial activity with such foundries as the Otago Foundry and A & T Burt, as well as other industrial companies operating from the site from the 1860s onwards. There are relatively few foundry sites identified in the South Island with only three located in Dunedin. All three sites (I44/521, I44/850, and I44/712) have been previously investigated archaeologically, yet none of these previous investigations have involved excavations over the entire site. The A & T Burt site possesses some contextual value in that the site itself represents an industrial complex of buildings and features. It has additional contextual value when it is considered as part of this area of Dunedin's long history as a manufacturing centre. Archaeological investigations at this site has potential to inform us about several aspects of Dunedin's nineteenth century development, including reclamation, infrastructure and industry. It should also be possible to link archaeological features and/or deposits to those well-known businesses including the Otago Foundry and A & T Burt.
Architectural Values	
Architectural Merit Low	***Is the place significant because of its design, form, scale, materials, style, ornamentation, period, craftsmanship or other architectural element?*** Architectural merit considers the overall values embodied within the architecture of a building as a whole, and the building's aesthetic is just one element to be considered. The evaluation of the heritage values of an industrial site will inherently vary from the evaluation of a standalone structure, as they generally comprise a complex of buildings constructed through time, with buildings often having very specific functions. The industrial nature of the complex has meant that buildings have evolved over time with a multitude of extensions and additions that have resulted in the buildings merging together and blurring the lines as to where one building starts and the other begins. Overall, the architectural merit of the complex is low, meaning that is typical to the design, style and use of materials or craftsmanship for the period. The values of each of the four buildings with protected facades are further described below. **<u>The Dairy and Machine House Building</u>**: the architectural merit of the Dairy and Machine House Building is **low** (design, form, scale, materials, style, ornamentation, period, and craftsmanship are typical of the period). The Dairy and Machine House Building was constructed in two main phases, including the 1868 possible small mill building and the 1875 cellar, along with significant alterations in the early twentieth century converting the building to a dairy. Throughout the use-life of this building, its façade has been updated in accordance with changing architectural styles, and as such, all historic ornamentation has been lost. The first clear photographs of the façade from 1902

display a clear Victorian frontage with a central access way to the more industrial central cellar portion of the building. This façade was not the original, as late 1870s photographs indicate that the multi-gable roof appears to extend all the way to the Castle Street footpath. It is unclear when the between 1875 and 1902 the masonry frontage was added. In 1918 the façade was altered significantly with the removal of first floor windows, two central doorways added and redesigned arched parapet. On top of this the brick work was exposed and the relief rusticated plasterwork used for the ground floor façade. By this time the cellar behind itself had been converted into a finished foods store and dairy. The building façade was altered again in the mid-twentieth century, with designs prepared by Miller, White and Dunn. By the 1960s had been stripped of the 1918 the plaster and brick detailing, and instead covered with a plain cement render and new concrete parapet. In 2018 the Dairy and Machine House Building façade was reconstructed to a design based on the 1918 frontage, which has considerably improved its aesthetic values. The improved aesthetic merit of this elevation was not without compromise (i.e., the lack of integrity of the façade in particular), but it does provide a strong connection to the history of the site. Moreover, the scale of the building and its massing from a streetscape perspective is much more in keeping with the surrounding commercial buildings on Castle Street, as opposed to the massive buildings located elsewhere in the complex.

The north elevation, which is also visible from the street, is unornamented and features windows of various styles, including some that are believed to be original to the building (e.g., the arched single hung windows). Later alterations to this elevation included the addition of the cross gable marking the location of a covered bridge (since removed) that once connected the dairy to the biscuit factory

The form of the building reflects the additions through time as related to its changing function. While the functions of the central and western portion of the building changed in the twentieth century, very little of the building's architecture did, and the building retained its Victorian industrial nature befitting the use of the building. The building began as the small mill (1868) for the New Zealand Distillery Company, with an extension to the east creating a cellar (1875) for the Albion Brewing Company with excellent access to the railway via a purpose-built siding. In the early twentieth century, R. Hudson and Co. converted the building to a finished goods store and dairy (milk processing plant), coinciding with the 1918 façade update. Later the small mill was converted to an engine house then a mixing room, the façade was modernised again, and a staff room was added above the dairy. Internal changes were made to the entire building, including the replacement of timber floors and the installation and extension of concrete floors.

Cadbury World Building (Block 1A): The architectural merit of the Cadbury World building is **low** (design, form, scale, materials, style, ornamentation, period, and craftsmanship are typical of the period).

The Cadbury World building is the southernmost building on Cumberland Street. The Cadbury World building was constructed over several phases, which is reflected in the building's Cumberland Street façade. The building incorporates part of the 1868 granary/malt floor building along Cumberland Street and the kiln building to the rear; however, with the purchase of the premises by R. Hudson and Co. from the early twentieth century onwards, the modifications overwhelmed the pre-1900 industrial design of the brewery buildings. These changes started with a southern extension, which brought the building to the property boundary, and at the same time, the entire building was raised to four storeys. Between 1901 and 1915, two storeys were added the central portion of the granary/malt floor building, extending the Cadbury World building to its current width.

On the interior, significant alterations have resulted in the loss of the clear granary/malt floor and kiln buildings with the removal of a mezzanine floor in 1959 and consequent reinforcement. While the ground floor was transformed into Cadbury World in 2001 and the Cadbury Café in 2014, the upper floors retain their open plan with traces of the original granary/malt floor and kiln buildings walls still remain.

Office Building (Block 2A): The architectural merit of the Office Building is **low** (design, form, scale, materials, style, ornamentation, period, and craftsmanship are typical of the period).

The Office Building is situated on Cumberland Street to the north of the Block 1A building and south of the chocolate factory and garage (Block 3A), which is easily delineated by its distinctive mansard roof. The building was constructed in multiple phases beginning with the 1868 granary/malt floor building. In 1909, a new building was constructed behind the granary/malt floor building (later replaced with a concrete building), and by 1915 an extension was constructed that not only connected the 1909 building to those along Cumberland Street, but also saw the building extended to the north and raised to two stories. Between 1915 and 1922, another extension was made, creating an additional bay of windows to the north and adding another floor. Based on photographic evidence, a large concrete extension had been created at the rear of the building likely in 1922, replacing the 1909 building. The building was further extended north in 1924 (steel and concrete), creating a connection with the chocolate factory, and by 1926 the fourth storey with a mansard roof was added. At this time, the front of the building served as the grain store on the ground floor with dressing rooms above, while the rear of the building had a mixing room on the lower floor and chocolate packing area above. Around 1959, the north and east wall of the granary/malt floor building was removed during alterations that saw timber floors replaced with reinforced concrete (ground and first floors). In 1983 the mixing and chocolate packing building was refitted for offices and reception.

The façade is a collage of various changes to the building over thirty years, with distinctive elements, such as the mansard roof, a result of these changes rather than the earliest buildings. The façade is further confused by the fact that the frontage of the chocolate factory to the north was extended across part of the Office Building when the connection between these two buildings was established in 1924. There is incongruity between the extent of the mansard roof and the 1924 façade. It is possible that a small remnant of the western wall of the granary/malt floor building remains; however, this can only be confirmed through invasive investigation of the building.

The interior of the building has been extensively modified, with removal of the internal floors and foundations in 1959 and replacement with reinforced concrete and the 1980s interior linings.

Chocolate Factory and Garage (Block 3A): The architectural merit of the chocolate factory and garage is **low** (design, form, scale, materials, style, ornamentation, period, and craftsmanship are typical of the period).

Block 3A is a four-storey building with a frontage to Cumberland Street that sits between the engineering workshop, labs, and offices building (Block 4A) to the north and the Office Building (Block 2A) to the south. The which was built in multiple phases between 1922 and 1930 using reinforced concrete and steel. The first phase of construction in 1922 comprised a low garage out to Cumberland street with a three-storey factory building to the rear. In 1924, additional floors were added above the garage, bringing the entire building to three storeys; the façade was also extended to the south, thereby connecting the chocolate factory and Office Building. A penthouse was added in 1939, raising the building to four storeys.

The 1924 Cumberland Street façade of the building appears much as it does today with later alterations, such as a 1939 penthouse, aligning with the 1924 design. It features an early modernist influence yet retains a functional and factory appearance with the building's detail limited to pilasters and large multi-square paned windows some of with plaster work detailing running across the top of the first floor and that incorporates the high arch over a vehicle and pedestrian accessway. Unusually, the decoration on the façade is not symmetrical, with the southern end having ornamentation not seen elsewhere on the building.

Internally, structural support changes and alterations were made to the chocolate factory in the mid to late 1930s. These included changes to the ground and first floors in 1934 (designed by McDowell Smith) and changes to the third floor in 1938 (designed by Miller and White), the later forming the cafeteria level as it exists today. Architecturally, the interior of the building reflects its industrial functional requirements.

Chocolate and Biscuit Factory (Block 3B-C): The architectural merit of the Chocolate and Biscuit Factory is **low** (design, form, scale, materials, style, ornamentation, period, and craftsmanship are typical of the period).

The Chocolate and Biscuit Factory is a three-storey building with a frontage to Castle Street, which is situated to the east of the chocolate factory and garage (Block 3A) and to the south of the biscuit and dispatch building (Block 5). The western extent of the was constructed in 1924 and extended to adjoin nineteenth and early twentieth century building lining the Castle Street frontage by 1927. In 1938, using reinforced concrete and steel nineteenth and early twentieth century portions at the eastern end of the building. The replacement at the was designed by Miller and White and constructed by William McLellan Ltd while connections to Block 3A were established, the two buildings remain quite distinct.

The Castle Street façade has changed little since 1938, with art deco plaster reaming running vertically up and down pilasters as well as decorative windows at the southern end of the façade. In contrast, the rest of the building is relatively plain, with only decorated with a simple plaster moulding, likely reflecting the industrial and manufacturing functions of the building. The façade is unusual in that it is asymmetrical, with ornamentation restricted to the south bay of the building. This perhaps signals that there were plans to extend the building further south, but this could not be confirmed during the timing of this assessment.

The interior of the building is unadorned, representing the utilitarian function of the space, with few exceptions. An area in the southeast corner of the second floor shows quite different linings, including tongue and groove panelling on a wall and linoleum tiles on the floor, perhaps indicative of a former lunch or staff room.

Engineering Workshop, Labs, and Offices Building (Block 4A): The architectural merit of the engineering workshops, labs, and offices building is **low** (design, form, scale, materials, style, ornamentation, period, and craftsmanship are typical of the period).

The engineering workshop, labs, and offices building is a three-storey reinforced concrete building on Cumberland Street, that has a connection to the biscuit and dispatch building to the north and is separated by an access way to the Chocolate Factory and Garage Building to the south. The building was designed by engineer JRG Hanlon in 1961 and was constructed was soon after. The footprint of the building is still the same as it was when the building was first constructed however, there have been some internal modifications such as upgrades to offices on the first floor and the essence room on the second floor in 1994.

The façade of the building is in keeping with the adjacent biscuit and dispatch building (constructed 1951) comprised of ten bays of steel multi-paned windows with unornamented spandrels and columns between. The interior of the building is separated into many small rooms, with linings suiting the different functions of the building (engineering workshop, labs, and offices).

Biscuit and Dispatch Building (Block 4C and 5A-C): The architectural merit of the chocolate factory building is **low** (design, form, scale, materials, style, ornamentation, period, and craftsmanship are typical of the period).

The biscuit and dispatch building is a long L-shaped five-storey reinforced concrete building that extends from Cumberland Street to Castle Street. Plans for a three-storey building were prepared for Cadbury Fry Hudson by Miller and White and engineer JRG Hanlon in 1947; although, the building was not completed until 1951. The portion of the building between Cumberland and Castle Streets (Block 5A-C) was utilised for biscuit baking, while the extension along Castle Street (Block 4C) was the dispatch hub. Two additional storeys were added to the building in 1968, again designed by Hanlon.

The façade reflects the utilitarian nature of the building, with few decorative elements in keeping with the modern style. However, the building still complements the adjacent chocolate factory building façade with a select number of pilasters running vertically along the building. A central feature of the east and west façades is the lift shaft which

	displays a slightly more decorative pilaster running the height of the building adorned with long rectangular glass block windows either side up to the fourth floor. The windows on the lower three stories are multi-paned steel sashes with ventilators, while longer rectangular panes were utilised in the windows on the 1968 upper two stories. The building was designed with long linear production in mind, with the interior spaces being open from one end of the building to the other. The 1951 floors feature large concrete columns with a modern take on the papyrus capitals. The interior finishes represent the utilitarian function of the space.
Rarity High	***Is the place or area, or are features within it, unique, unusual, uncommon or rare at a district, regional or national level or in relation to particular historical themes?*** Architectural rarity is assessed here on a scale of low value, being common for the period, to high value, being the first or one of the very few remaining of the period at a local to national level. Based on the research undertaken for this assessment, UOA considers the Cadbury Confectionery Ltd Buildings to have **high** rarity. The extant buildings within the complex represent its past functions as a whisky distillery, brewery, and confectionery manufacture. There are a large number of industrial and commercial buildings that survive at a district, regional and national level in New Zealand; however, those relating to the specific functions of brewing and confectionery manufacturing are rare. Moreover, the Cadbury Confectionery Ltd Buildings one of the last representations of wider industrial activity immediately below the Octagon from the 1880s into the twentieth century. The New Zealand Heritage List/Rārangi Kōrero contains no historical information so making meaningful comparisons at a regional or national level is difficult if not impossible. Based on searches of the listing name, there are three other listed breweries across the country (Thorndon Brewer Tower, Wellington; Wards Brewery Historic Area, Christchurch; and Black Horse Brewery, Wetherstons), but no distilleries were identified in the list. There is only one listed building associated with confectionery manufacture: the Romison's Confectionery Works (List No. 9720), which is located in Dunedin and is now occupied by the University Book Shop; although, other buildings associated with food manufacturing are included on the New Zealand Heritage List/Rārangi Kōrero. On ArchSite, thirteen breweries have been recorded nationally, with ten being within the South Island, including Speights Brewery (I44/233), Caversham Brewery (I44/639), Burkes Brewery & Station (I44/864) and the Water of Leith Brewery (I44/382) in Dunedin. The latter has connections to the Cadbury Factory Site, being the former location of Marshall and Copeland's Albion Brewing Company. There are no known confectionery manufacturing sites recorded on ArchSite apart from the Cadbury Factory Site; however, food manufactory sites are better represented.
Representativeness Moderate	***Is the place or area a good example of its class, for example, in terms of design, type, features, use, technology or time period?*** Architectural representativeness is measured on a scale of low, moderate and high, with low representativeness meaning that the building has few characteristics of the architecture or technology of the period, while high representativeness means that the building has all key characteristics. The complex of industrial buildings represents the history of the site and shows the transition in design through time. Most buildings are considered moderate examples of their class, with the exception of the Office Building (Block 2A), which has been heavily modified over multiple phases. **The Dairy and Machine House Building**: The Dairy and Machine House Building is a **moderate** example of the pre-1900 industrial architecture, with the building representing one of the few buildings on the site that can still bear witness to the function of the site as a distillery (i.e., small mill, 1868), brewery (cellar extension in 1875), and Confectionery manufacturer (dairy for R. Hudson and Co). The design of the building and its features are typical of its industrial use in the Victorian and Edwardian periods, as demonstrated through the utilitarian finishes (concrete floors, painted brick walls, etc.). As has been noted above, the building's façade has changed over time, reflecting the changing image of R. Hudson and Co and Cadbury Fry Hudson Ltd and their desire to promote the modernity of their company, while in 2018, the façade was restored to reflect the 1918 façade and the long tradition of the company. **Cadbury World Building (Block 1A)**: The Cadbury World building retains a small portion of the New Zealand Distillery Company's 1868 granary and malt floor with additions comprising the bulk of the building between 1901 and 1915. Th while little remains of the initial period of construction, the remainder of the building has many of the characteristics of industrial buildings constructed in the early twentieth century (e.g., brick loadbearing walls and timber columns, girders, joists and floors). Many of the features of these early twentieth century additions remain visible and readable today. As such, the Cadbury World building is considered a **moderate** example of an early twentieth century industrial building. **Office Building (Block 2A)**: The Office Building was constructed in multiple phases, incorporating a small portion the New Zealand Distillery Company's 1868 granary and malt floor, with much of the building constructed between 1915 and 1926. This building has been heavily modified, and the interior in particular (1980s office fitout); therefore, it is considered to have **low** representativeness. **Chocolate Factory and Garage (Block 3A):** The chocolate factory and garage was constructed in phases between 1922 and 1930 and is a **moderate** example of an industrial building with reinforced concrete construction, with the façade being a good representation of a restrained modern façade. Additions to the building are easily read and are sympathetic to the original design.

	Chocolate and Biscuit Factory (Block 3B-C): The western end of Chocolate and Biscuit Factory was constructed between 1922 and 1927, with the western end of the building constructed in 1938 using reinforced concrete and steel. The building has seen few modifications after 1938, and it has an understated modern façade designed by Miller and White. It is considered to be a **moderate** example of an industrial building constructed in the 1920s and 1930s. **Engineering Workshop, Labs, and Offices Building (Block 4A)**: Block 4A was designed to house the engineering workshop, labs, and offices and was constructed in 1961. The design, by JRG Hanlon, represents a continuation of the style used in the neighbouring biscuit and dispatch building constructed a decade previously. In contrast to the factory buildings, the scale of Block 4A is much smaller. UOA considers the building to be have a low representativeness. **Biscuit and Dispatch Building (Block 4C and 5A-C)**: The biscuit and dispatch building was constructed in two phases (1951, 1968) is a **moderate** example of a purpose-built reinforced concrete industrial building, showing the transition in manufacturing process to linear mechanisation. There have been few modifications to the building through its use-life, apart from the addition of two floors in 1968.
Integrity Low to high	***Does the place have integrity, retaining significant features from its time of construction, or later periods when important modifications or additions were carried out?*** Architectural integrity of the buildings in the complex was assessed on the basis that low integrity indicates the character of the building to be changed significantly, with few heritage values remaining, moderate integrity meaning the changes are unimportant and most heritage values remain, and high integrity meaning that the building is unchanged or has had important modifications that retain their heritage value. UOA has found the buildings within the complex to have integrity values that range from high to low. **The Dairy and Machine House Building**: The Dairy and Machine House Building has a **moderate** architectural integrity, apart from the restored facade. As noted by Farminer (2014) and Oakley Gray Architects Ltd (2010) distinctive elements of nineteenth century building are still present within the building (i.e., nineteenth century industrial design of the trusses, floor and roof structures of kauri and rimu in the central cellar and eastern office section of the building as well as the multi-gable roof of the building). Both Farminer (2014) and Oakley Gray Architects Ltd (2010) noted the compromised integrity of the building with the addition of such features as the lunchroom on top of the building. Work began on restoration work of the building in 2016, seeing the removal of the intrusive lunchroom and replacement of the roof. In 2018, restoration work was undertaken on the building's façade, creating an appearance similar to the R Hudson and Co. 1918 façade. While this façade no longer retains historic fabric, it creates an important historical connection that the public can interact with. **Cadbury World Building (Block 1A)**: The architectural integrity of the first phase of the building (1868) is low with all but a few brick walls removed; however, there is **moderate** integrity to the early twentieth century additions that comprise the bulk of the building. The ground floor has been most heavily modified through time; but in the floors above, the early twentieth century fabric remains visible in many areas. In the interior of the building the removal of the southern wall, a mezzanine floor as well as other changes, such as the establishment of the wide entrance through the granary/malt floor building which would be used eventually for the Cadbury Café, means that even if the original fabric could be identified beneath the internal adornments of Cadbury World or café, the pre-1900 structure would be more a reflection of changes and processes that affected the building in the twentieth century than the earliest architectural design of the building. **Office Building (Block 2A)**: UOA considers the Office Building to have **low** integrity. Not only has the structure seen multiple phases of construction, the interior of the building has been substantially changed, transforming it from its previous industrial use (front - grain store on the ground floor with dressing rooms above; rear - mixing room on the lower floor and chocolate packing area above) to an office building. In 1959, extensive work was carried to allow the replacement of the existing timber floors (ground floor and first floor) with reinforced concrete slabs, necessitating significant modifications to the foundations and replacement of the timber columns with steel columns encased in concrete. While the 1980s interior fit-out largely remains, it is not considered to have heritage value. **Chocolate Factory and Garage (Block 3A):** The Chocolate Factory and Garage Building was largely built in the 1920s. The integrity of this building is **moderate**. The building was initially constructed as a single storey garage to Cumberland Street, with a taller chocolate factory to the rear; however, the building was extensively modified several years later bringing the entire building up to three storeys and extending the façade to the south. A fourth storey was added in 1939. The interior of the building has few linings, as such, the concrete walls, columns, and ceiling remain true. The exterior of the building has high integrity, and the fourth floor is easily discernible as a later addition. **Chocolate and Biscuit Factory (Block 3B-C)**: The Chocolate and Biscuit Factory was constructed between 1922 and 1938 and has seen modifications through time, including both internal and external changes. As such, UOA considers the factory to have **moderate** integrity. **Engineering Workshop, Labs, and Offices Building (Block 4A)**: Block 4A was constructed in 1961, and there have been few external modifications over time. Internally, there are likely to have been numerous changes making the rooms fit for use in their various functions. As such, UOA considers Block 4A to have **moderate** integrity. **Biscuit and Dispatch Building (Block 4C and 5A-C)**: The Biscuit Factory and Dispatch Building have **high** architectural integrity. The lower three stories were constructed in 1951, with an additional two stories constructed in 1968. Only minor work on the exterior building as part of routine maintenance and only minor changes to the interior.

Vulnerability Yes	***Is the place vulnerable to deterioration or destruction or is threatened by land use activities?*** The Cadbury factory was closed in 2019 and sold to the Ministry of Health. Without constant use and upkeep of the buildings as purposely designed, the buildings already display signs of deteriorating conditions. However, wider structural issues were certainly present prior to this transaction that have also increased the vulnerability of the buildings considerably. Prior to the closure of the factory, work was underway to convert the Dairy and Machine House Building into the new home of Cadbury World. The roof was replaced, and façade restored; however, significant work remains to be done on the interior of the building. At the time of the assessment survey, the first floor of the Dairy and Machine House Building could not be accessed due to health and safety concerns. UOA also found that areas of the Cadbury World building had been blocked off and appeared to have not been used for some time. When buildings are vacant, even for a short period, they become vulnerable to decay and are often vandalised; however, the Ministry of Health has taken steps to avoid this and has a security company constantly monitor the site. Consideration to the retention of the building façades along Cumberland and Castle Streets was given in a report undertaken by WSP-Opus which identified further inherent structural issues with the buildings (Blacker & Burrough 2019). In the Cadbury World and Office Building, a lack of mechanical connections was noted between the wall and floors, while the walls of Cadbury World and office, chocolate factory, and Biscuit Factory and Dispatch Buildings show signs of damp penetration and external rising damp as well. An initial evaluation procedure identified that these three buildings have ratings of 20% NBS, and the brick façades of the Cadbury World and Office Building in particular would "require significant work to improve their integrity, including upgrading the foundations to mitigate the effects of liquefaction" . With considerations towards the heritage of the existing buildings as well as the design and public safety requirement of the new hospital, WSP-Opus deemed that while "it is possible to retain the façades… their retention will affect the layout and usage of the site, and both the extent and complexity of the construction work required. This will have significant cost, programme and health and safety implications" (Blacker & Burrough 2019).
Context or Group Moderate	***Is the place or area part of a group of heritage places, a landscape, a townscape or setting which when considered as a whole amplify the heritage values of the place and group/ landscape or extend its significance?*** This assessment considered whether the Cadbury Confectionery Ltd Buildings had context or group value, with high value meaning that it is a principal contributor to the dominant values of the group, moderate being compatible with the group, and low being of little importance to the group. Overall, UOA considers the contextual value of the Cadbury Confectionery Ltd Buildings to be **moderate**. While isolated from other nineteenth century industrial buildings in Dunedin due to removal through twentieth century development, the buildings still hold connections with other heritage buildings, forming central Dunedin townscape that reflects nineteenth and early twentieth century development and entanglement of transportation and commercial businesses. Within Block XVI, there are a number of recognised heritage buildings; however, only one other building is listed: the Dunedin Allied Press Ltd Building (List No. 2135 and schedule B564). This building was constructed between 1926 and 1928, a similar period to the construction of the Chocolate Factory and Garage Building, yet it is dramatically different to all the Cadbury Confectionery Ltd buildings as it features ornate decorative elements, more typical of late Victorian and early Edwardian Renaissance revival commercial architecture. At the south end of Castle Street are the former commercial premises of the following businesses: International Harvester Company, Riach & McLennan (wholesale merchants), the Co-operative Diary Co., A. &. W. McCarthy Ltd (specialists of guns, locks and fishing equipment), as well as Mooney and Co. Wool and Skin Merchants on lower Stuart street. The International Harvester Company and Riach & McLennan building is a character contributing building (CC702), as is the Mooney and Co. Wool and Skin Merchants building (CC062), while the McCarthy building is scheduled as a Heritage Building (B561). The façades to Castle and Lower Stuart Streets of the McCarthy and International Harvester Company buildings are protected. The three buildings were constructed in the first couple of decades of the twentieth century and feature Edwardian and modernist elements. Again, they feature more decorative elements than the factory buildings further south; however, the modest decorative elements are complimentary to those of the diary and machine house building. One other character contributing building is located in Block XVI, the building at 18 Stuart Street (CC062) and it is the only other building on the block constructed prior to 1900. The building was built sometime between 1874 and the late 1880 and, by 1889 was home to the Supreme Court Hotel (Bare, 1889). In contrast to the industrial Cadbury Confectionary Ltd buildings the premises continued to be used for commercial occupation, as it continued as a hotel into the twentieth century. On the other side of Castle Street there is distinct variation throughout the block. At the southern end, the Anzac Square gardens and the impressive early twentieth century railway station (B005) dominate the streetscape, forming a distinct lavish landscape of city infrastructure with the Law Courts (B0560) on Lower Stuart Street opposite. This is the only green space provided along the Castle Street block. In contrast, immediately north are several one to three storey industrial buildings, many likely established with instalment as a result of the railway itself, as well as a small carpark along the west side of Castle Street. These smaller buildings, despite being part of the late nineteenth and early twentieth industrial landscape do not tower over the street and as a result contrast with the Cadbury Confectionery Ltd buildings which dominate the street with their height and lack of thoroughfare. Thus, the factory buildings again feel isolated along the one-way Castle Street, a last remnant of large-scale, continuous nineteenth and twentieth century factory development.

Cultural Values	
Identity Moderate	***Is the place or area a focus of community, regional or national identity or sense of place, and does it have social value and provide evidence of cultural or historical continuity?*** Identity value was assessed on a scale of low to high, with low being meaning it has a minor contribution, while a high value indicates it to be a focus of national or regional community identity, sense of place or social value or has special age value such as constructed within the first 30 years of settlement. The cultural value of the Cadbury Confectionery Ltd Buildings is **moderate**. The site has been a site of continuous industrious activity from the 1860s onward, with the northern half of the site being the location of several foundries and later operated by A & T Burt and the southern extent initially having a residential/commercial occupation then transitioning to a distillery, brewery, and confectionery. The products produced by both A & T Burt, the Albion Brewing Company, and R. Hudson and Co. (and their succeeding companies) have received recognition in the local, regional and national identity, but it is Cadbury chocolate in particular that has a strong national identity. Under Marshall and Copeland, the Albion Brewing Company gained local acclaim as one of Dunedin leading breweries and their products were sent overseas as well to the 1879 Sydney Exhibition (Otago Daily Times, 1879). The evolving Cadbury Confectionery companies from 1898 contributed to both local and national identity (Comer, 1973; C. V. Smith, 1968). Under the Hudson's directive the companies increasingly popular through their success at the 1925-26 South Seas Exhibition (Comer, 1973; C. V. Smith, 1968). Later Cadbury Fry Hudson continued establishing the positive press for the company with successful marketing campaigns throughout the country including the 'Cadbury Plane' piloted by Captain MacGregor, a WWI RFC pilot that flew both Cadbury executives as well as customers (C. V. Smith, 1968). During World War II, Cadbury Fry and Hudson kept their deployed employees and others up to date overseas with happenings at the factory and Dunedin, by establishing the *Chocolate Soldier* newsletter. It was so successful that the newsletter continued following the war (C. V. Smith, 1968). Following World War II, the company grew significantly leading the market of production of chocolate and cocoa. Even in the past twenty years the Cadbury business upkept the Dunedin factory's prominence at local, regional and national levels. This is easily seen in the popularity of the Jaffa race that occurred yearly for 16 years before the last race in 2017. This success and pre-eminence of these companies is a continuation of businesses that operated in buildings no longer present such as the A & T Burt company, an Iron foundry that had considerable standing throughout the country. They constructed or contributed to such notable structures as the Wellington State Fire Insurance Building, the Claudelands Bridge in Hamilton, and the Kaikorai Valley Tramline (Otago Daily Times, 1910, 1921a).
Public esteem Moderate	***Is the place held in high public esteem for its heritage or aesthetic values or as a focus of spiritual, political, national or other cultural sentiment?*** The Cadbury Confectionery Ltd Buildings has moderate public esteem for its heritage values, aesthetic values, and as a place of manufacture. This has been recognised by the listing of the buildings' façades as a Category 2 Historic Place. The existence and persistence of an inner-city chocolate factory garnered high public esteem amongst the local population. The later development of "Cadbury World" extended this esteem to a national and international level.
Commemorative Moderate	***Does the place have symbolic or commemorative significance to people who use or have used it, or to the descendants of such people, as a result of its special interest, character, landmark, amenity or visual appeal?*** The commemorative value of the Cadbury Confectionery Ltd Buildings is moderate, meaning that it commemorates national or regional endeavours or people at a national, regional or local level. The Cadbury Confectionery Ltd buildings have long been a workplace for a large number of Dunedin's population. Even the earlier businesses such as A & T Burt hired relatively large numbers of employees by the early twentieth century and R. Hudson and Co. and later Cadbury iterations continued to hire large numbers of individuals. R Hudson had hired over 100 people from the 1880s and by the mid-1930s Cadbury, Fry and Hudson had over 500 employees. It was acclaimed at this time for its great contribution to Dunedin's economy (Otago Daily Times, 1936). The Cadbury buildings have continued to be a rich source of jobs for Dunedin right up until 2018. As such these buildings likely hold special interest to those individuals who toiled away in the factories and offices as well as their descendants. The buildings, in particular Cadbury World and the Dairy and Machine House Building, were a draw card for tourists and contributed to Dunedin tourism economy. Tours of the factory buildings instilled the history of the Confectionery manufacturers place and as noted by Farminer (2014) the tours highlighted the significance of the age of the Dairy and Machine House Building.
Education Moderate	***Could the place contribute, through public education, to people's awareness, understanding and appreciation of New Zealand's history and cultures?*** Investigation of the archaeology and heritage at this site have the potential to reveal moderate information about nineteenth century industrial development in Dunedin, with details on particular businesses (i.e., breweries and confectionery manufacture) as well as numerous notable New Zealand businesses (e.g., Albion Brewing Company and R. Hudson and Company). Much information has been lost in the constant development of the site over the twentieth century even of the Dairy and Machine House Building which retains the most integrity of its pre-1900 elements. However, as the premises was used for continuous industrial use for over the past 100 years, even later developments seen in the buildings will provide insight into the adaptations and changing nature of the various business operations from the premises.

Tangata whenua No	***Is the place important to tangata whenua for traditional, spiritual, cultural or historical reasons?*** There are no known tangata whenua values associated with the Cadbury Confectionery Ltd Buildings.
Statutory recognition Yes	***Does the place or area have recognition in New Zealand legislation or international law including: World Heritage Listing under the World Heritage Convention 1972; registration under the Historic Places Act 1993; is it an archaeological site as defined by the Historic Places Act 1993; is it a statutory acknowledgement under claim settlement legislation; or is it recognised by special legislation?*** The Cadbury Confectionery Ltd Buildings are included as a Category 2 Historic Place (List No. 2143) on New Zealand Heritage List/Rārangi Kōrero. The Cadbury Confectionery Ltd Buildings were first listed in 1982 under the Historic Places Act 1980 with a 'C' classification, which indicates that merits preservation because of its historical significance or architectural quality (pers. com. Sarah Gallagher, Heritage Assessment Advisor, HNZPT, 10 April 2019). When the classification system changed, the listing became a Category 2 Historic Place, which is defined by the HNZPTA 2014 as a place of "historical or cultural heritage significance or value". The facades to Castle and Cumberland Streets across the same property boundaries were also registered as B030 on the 2006 Dunedin City District Plan (Schedules 25.1 and 25.2) and the 2GP (Schedule A1.1). The Former Cadbury Building on Section 74 and the adjacent Section 73 BLK XVI, Dunedin, was incorporated into the Anzac Square/Railway Heritage Precinct (TH11) in the precinct the 2006 Dunedin City District Plan; however, it is no longer part of this precinct and is now referred to as the Stuart Street Commercial Heritage Precinct in the 2GP. The Cadbury Confectionery Ltd Buildings are also recorded as part of archaeological sites I44/817 and I44/917 on the NZAA site recording scheme, NZAA.
Historic Values	
People High	***Is the place associated with the life or works of a well-known or important individual, group or organisation?*** There are several significant businesses and individuals associated with the operations on the premises of Cadbury Confectionery Ltd Buildings, as well as the architects who designed those buildings. Overall, UOA considers there to be high values as these associations are significant at both regional and national levels, and in some instances internationally. The New Zealand Distillery Company was the first brewery to operate off the premises. Buildings associated with start of this company are still present incorporated into the Cadbury Confectionery Ltd Buildings today. The company started operating in 1869 and was established by C. R. Howden and R. M Robertson, who had previously operated as wine and spirit merchants. Howden was also known for playing golf near Dunedin at Balmacewan, and he along with others first established Otago Golf Club. Robertson had been a partner in Wright, Stephenson & Co. Ltd which has evolved and today operates as PGG Wrightson. Howden and Robertson were quickly joined by W. J. Larnach, of Larnach's Castle fame and E. W. Humphries (S. Perry, 1980). The Albion Brewing and Malting Company first took over the New Zealand Distillery Company distillery in 1875. It was formed as a consortium, amongst which William Larnach was a member. In the same year the company started brewing and they also built the cellar building still incorporated today into the Dairy and Machine House Building. By December 1875, Albion beer was on sale. However, the business never took off. The Albion Brewing Company was purchased by John Marshall and Copeland in 1878 and brewed their first batch in January the following year. They had first started their business in Dunedin in 1861, producing as much beer as their brewery on the Water of Leith could produce. However, with the company's growth they looked for new premises (Otago Daily Times, 1879). By 1879 they were one of Dunedin's leading breweries. In spite of this, move to Cumberland Street was not successful for Marshall and Copeland. The partners were under too much financial strain. This paired with his brother's death in 1883, John Marshall declared himself bankrupt three years later (Leckie, 1997). Richard Hudson (1841-1903) was a prominent Dunedin figure, known as both a businessman as well as for his philanthropic endeavours. He established himself in New Zealand as a baker, training under John Griffen of Griffen's Biscuits and eventually established his own business in Dunedin in 1868 (Comer, 1973; C. V. Smith, 1968). He eventually formed the company R Hudson and Co. and established his confectionery manufacturing premises along Cumberland and Castle Streets in 1898. In the late nineteenth century, Hudson passed his business on to his six sons. Cadbury Fry Hudson Ltd formed in 1930 as an amalgamation of three companies that would continue to operate R. Hudson and Co.'s premises along Cumberland and Castle Streets. These three companies were the Cadbury Company, Fry and Sons, and R. Hudson and Co. Cadbury was established in 1824 in England as grocers but soon entered into the drinking chocolate and cocoa, and eventually the eating chocolate market for which the company is well known for today. Fry and Sons, like Cadbury, had a history of developing cocoa products in England from 1728. Although both Cadbury and Fry had suffered in their international exports during First World War, combined, the two companies pushed their overseas markets. John McGregor was called upon to design the New Zealand Distillery Company distillery, initially for the corner of Manor and Crawford Streets. However, the location was shifted to Cumberland Street (S. Perry, 1980). John McGregor created several other more ornate and elaborate buildings around Dunedin, including the warehouse or factory at 8 Stafford Street, and the Melrose residence in Roslyn.

	The architectural firm Miller and White was established in 1927 by architects Eric Miller and James H. White. The firm has contributed significantly to Dunedin's built heritage designing such buildings as the Irvine and Stevenson building, the 1939 NZR Road Services building (part of the Otago Settlers Museum) and 1938 St John's Building on York Place. Miller and White were known for the early modernist architecture (C. Smith, 2009) and elements of this can be seen in the later extents of the chocolate factory building designed by this firm. Henry McDowell Smith was an architect who began his career in Newcastle-upon-Tyne, England, before relocating to Dunedin in 1908 to work with Edmund Anscombe. McDowell Smith left the company in 1921 to set up his own practice in Dunedin (Otago Daily Times, 1921b) and like Miller and White went on to design numerous early modernist buildings around Dunedin and the country. A similar modernist style can be seen reflected in the portion of the chocolate factory, designed by McDowell Smith. Fletcher Bros. Ltd (1915 to present) was an early twentieth century construction company established by James Fletcher. Fletcher started construction in 1909, when he first constructed a house Dunedin with Albert Morris. The company grew to become one of New Zealand's most well-known construction firms the Fletcher Construction Company. The initial concrete part of one or both of the current Cadbury Confectionery Limited buildings was constructed by the Fletcher Construction company: The Cadbury World and Office Building and the chocolate factory building. William McLellan Ltd was another key player among Dunedin's construction firms operating between 1910 and 1966 (Farquhar, 2006). They constructed a variety of buildings around the city and further afield including the Octagon Theatre, the Southland hospital and the Invercargill Post Office. A decade before working on the steel and concrete building for the Cadbury buildings (the eastern extent of the chocolate factory), McLellan Ltd were advertising their skill in steel structural work (Evening Star, 1928a). They also had worked previously with other modernist architects, Mandeno and Fraser. Together they constructed the new banking chambers in Queenstown, another reinforced concrete building (Lake Wakatip Mail, n.d.). Although no buildings relating to the following individuals or business exist on the premises, they contribute to the historic values of the land on which the Cadbury Confectionery Buildings stand today. The Otago Foundry was established by William Wilson and David Mason and was the first such foundry in Dunedin, one of the city's earliest large-scale metal working businesses. The foundry undertook the first iron casting at the Cumberland Street premises in 1862. However, by this time William Wilson was noted to be operating the business with a Mr Selby. By the mid-1860s the company was undertaking notable contracts including an iron hulled steamboat, for the Harbour Steam Company (Findlay, 2009). Shortly after vacating their Cumberland Street premises in the early 1892, the Otago Foundry was purchased by John McGregor & Co and experienced a resurgence in the early twentieth century (Farquhar, 2006). The Dunedin Iron Works was established by Robert Sparrow in the late 1860s. The firm was extremely successful and opened a second plant on newly reclaimed Willis Street in 1874, before being sold in 1894 and rebranded as the Dunedin Foundry (Allport, 2013). One of the Dunedin Iron Works' best-known outputs was the Platypus, a submarine designed for accessing alluvial gold deposits and manufactured by the firm in 1873 (West Coast Times, 1873). A & T Burt were another prominent engineering firm established in Dunedin during the early 1860s by Scottish brothers Alexander and Thomas Burt. After major successes during the Dunstan gold rush of the 1860s, Alexander turned to the plumbing trade, and with Thomas joining him from Australia they established a shop in Dunedin in 1862 (McDonald, 1965; Parry, 1990). Thomas handled the physical works of the company while Alexander managed the business. One of their first major contracts was providing gas lighting for the 1865 New Zealand Exhibition being held in Dunedin. A & T Burt moved their production centre to Cumberland Street to the location of the Cadbury Confectionery Ltd Building in the late 1870s (Parry, 1990). The company was involved with producing mining machinery, railway castings, bridges (refrigerating machinery, tramlines mains and service pipes through Dunedin, shipping contracts, distillery plans as well domestic fittings, thus servicing a range of New Zealand industries and sectors (Cyclopedia Company Ltd, 1905). Like other major companies in Dunedin, A & T Burt gave back to the city donating £2000 pounds for a paddling pool and fountain at Moana Pool. Alexander Burt was further known for his philanthropic natures as he fostered technical education in the city (Otago Witness, 1920).
Events Moderate	***Is the place associated with an important event in local, regional or national history?*** UOA has determined there to be moderate associations with events of a national and regional significance. There are a number of events associated with the occupants of the Cadbury Confectionery Ltd buildings. With the enactment of the *Distillation Act* 1868, New Zealand Distillery Company became New Zealand's first legal distillery. The Act not only made distillation legal but also made it profitable for entrepreneurs in the Whiskey markets as it did not set excise duty unreasonably high (Perry, 1980). In direct contrast, following the abolition of duty preferences by the government for local distilleries, the New Zealand Distillery Company were forced to close their doors. This was not the only instance where national changes in laws affected the direction of companies associated with the Cadbury Confectionery Buildings. Cadbury's exports to New Zealand were increasing in the early twentieth century however an increased tax placed on imported chocolate resulted in the decision by the Cadbury company to manufacture goods in New Zealand and started looking to build a new factory in New Zealand. As a result, they joined up with the Hudson Brothers forming Cadbury Fry Hudson Ltd in 1930, with Hudson relinquishing the controlling share in the firm (Comer, 1973; C. V. Smith, 1968). World War II had a major impact on the site. Not only did Cadbury Fry Hudson establish air raid shelters (now removed), but the direction of the company's production shifted incredibly, opening new markets while closing others.

	World War II saw, except for chocolate blocks that stretched the sugar short in supply, the cancelation of all Confectionery and chocolate lines. However, war contracts required three shifts for certain departments and required up to 750 personnel, predominantly woman. As a result of the massive Service Biscuit contract, nearly all domestic production was discontinued (C. V. Smith, 1968). Many of the business operating on the premises had a great deal to do with various exhibitions. A & T Burt won a number of prizes at all three Dunedin Exhibitions as well as 1914 Auckland exhibition (Cyclopedia Company Ltd, 1905; Parry, 1990). One of their first major contracts was providing gas lighting for the 1865 New Zealand Exhibition being held in Dunedin. As noted above, under Marshall and Copeland Albion Brewing Company products were sent overseas as well to the 1879 Sydney Exhibition (Otago Daily Times, 1879). While under the Hudsons' directive the companies became household names through their success at the 1925-26 South Seas Exhibition (Comer, 1973; C. V. Smith, 1968).
Patterns Moderate	***Is the place associated with important aspects, processes, themes or patterns of local, regional or national history?*** The Cadbury Confectionery Limited buildings are associated with two main themes, significant at a local level. The first is leading in cutting edge manufacturing techniques and innovations which drove the success of the businesses. The second is the betterment of employment welfare by the various businesses. From the outset the New Zealand Distillery Company were undertaking novel ideas. Not only did they produced New Zealand's first whiskey produced under licence In October 1869 (S. Perry, 1980b), but the manufacturing process did not follow the traditional Scottish manufacture, something that was likely reflected in the distillery's building itself. The New Zealand Distillery Company had the product moved from room to room, rather than retrace its steps during the course of its production. When Marshall and Copeland purchased the Albion Brewing Company, they made vast improvements to the brewery which focused on "labour-saving appliances to the fullest extent" (Otago Daily Times, 1879). With Hudson taken over the premises, the changes made for the confectionery manufacturing also featured novel ideas. In the newly constructed three-storey biscuit factory in 1901, the company would house two machine ovens made by their own fitting shops. The ovens themselves would be 50ft in length, comprise around 15 tons of ironwork and were the first of their kind to be built in the southern hemisphere (Otago Daily Times, 1900). The building itself was strengthened using steel bands left over from the barrels of the distillery, which were a significant factor in enabling quick reuse of factory as the walls still stood following the 1902 fire, until the factory could be completely rebuilt (Comer, 1973; Parkinson, 2011). The post-fire rebuild also featured state of the art technology: one of the first automated Grinnell Sprinkler systems used in Dunedin (Ingram & Clements, 2010). During the Era of the Six Sons, the fire was taken as an opportunity to further modernise the factories machinery. The Hudson sons acquired the latest chocolate producing plant and new Gabel Moulding Machines, increasing their sales. When power was also first installed to the flour mill off Castle Street in 1908, this was the first flour mill to connected to Waipori Power – the first hydro-electrical generation system to be publicly owned in New Zealand (Evening Star, 1908; Findlay, 2009). While this building is no longer present, sub-surface remains of this connection may exist. When the company became Cadbury, Fry and Hudson the newly formed firm looked towards further modifications of the factory, especially in departments beyond chocolate, that had been lagging. Where possible machinery was introduced to replace hand labour (C. V. Smith, 1968). Further steps to modernise the factory focused on elongated spaces which minimized handling of the products. The best space was the land owned by A & T Burt to the north. Cadbury Fry Hudson purchased the land and established the long building between Castle and Cumberland Street (Barringer, 2000). Other considerations of the expansion included: space for production materials, flour mixing at the Cumberland Street end of the new building and space for handling and despatch of the products at the Castle Street end. The tin washing plant was placed so that the tins could be sent to the biscuit ovens for packaging of the biscuits. Similarly, a new boiler house was also established for the new building, however it was built in the centre of the premises so that it could cater the entire factory efficiently (Barringer, 2000). The 1951 biscuit factory also was home cutting edge technology with two new large electric ovens. Cadbury's was the first factory in New Zealand to install such ovens ("HNZPT Listing Documents: List No. 2143," n.d.). A more recent technological development for the company was the 1960 introduction of the Hollerith accounting Tabulator. This technology allowed the production of not just invoices and statements but also financial and sales statistics all previously compiled by hand. The technology improved both speed and accuracy (Otago Daily Times, 1993). In 1963 the new "1301" computer was installed at Cadburys, the first New Zealand company to do so (Barringer, 2000). This was also Dunedin's first computer and is now of the main attractions of the *Dunedin goes Digital* exhibit at Toitū Museum. One of Richard Hudson's early decisions as a business owner was consideration to the employment and care of his employees as a healthy business model. He was the first Dunedin employer to give a half-day holiday to his employees on Saturday, and the firm was later one of the first to instate an eight-hour workday (Comer, 1973; C. V. Smith, 1968). Continuing good labour relations that Hudson implemented, Cadbury Fry and Hudson was one of the first companies to restore the 10 percent wage cut employees had suffered in 1931 and lent the local Dunedin City Council a number of short-term loans (C. V. Smith, 1968). The company was likely one of the first in New Zealand to further offer a superannuation scheme for its employees (Barringer, 2000). Although any buildings relating to the Otago Foundry have been removed, even this early company was at the centre of local developments. It was the city's earliest large-scale metal working businesses. They were part of the construction of the iron hulled steamboat, which was the first time the Harbour Steam Company had relied entirely

	upon local labour to provide a steamboat (Otago Witness, 1867). The foundry was had a positive reputation of employment from the outset as it was noted that they received high wages for the 1860s (Otago Daily Times, 1863a).
Technological Value	
Technology and Engineering Low to Moderate	***Does the place demonstrate innovative or important methods of construction or design, does it contain unusual construction materials, is it an early example of the use of a particular construction technique or does it have the potential to contribute information about technological or engineering history?*** As discussed above, the innovative manufacturing processes were a significant historical pattern to the Cadbury Confectionery Ltd Buildings; however, the buildings themselves were generally constructed using standard methods. While not necessarily an engineering innovation, great craftsmanship is shown in how well-executed the numerous additions to the buildings. Moreover, the forethought of the engineers who designed many of the buildings to accommodate future expansion should not be overlooked. Overall, UOA has found the technological value to vary across the buildings on site from low (common construction design for the period) to high (highly original or innovative early construction design for the period). Many of the machines that were once in the building would have been considered to have high technological values; however, these were removed when the building was sold. Many of the plans for these buildings were left in the Office Building, and UOA recommended they be offered to Hocken Collections, University of Otago. **The Dairy and Machine House Building**: The technological value of the Dairy and Machine House Building is **low**. Traditional building techniques and standard materials were utilised in the building's construction, with the brick walls being the tangible link to the building's early construction. On the interior, the timber columns, bolsters, beams, joists and flooring are typical materials. The dairy originally had a concrete floor, which is of note for the period; however, it is unknown if this floor remains in situ beneath the modern concrete slab laid in 1959. **Cadbury World Building (Block 1A)**: The technical value of the Cadbury World building is **low**. Traditional material and methods, including brick load-bearing walls and timber columns, bolsters, beams, joists, and flooring, were utilised in the construction of the granary and malt floor as well as the early twentieth century additions. One point of interest is the use of a concrete floor in the 1868 kiln. Concrete was an available material, but not widely utilised in the 1860s; it is possible that this early slab remains in situ beneath the modern floor. **Office Building (Block 2A)**: The early phases of the Office Building utilised standard building techniques; however, the 1922 concrete addition constructed by Fletcher in 1922 using a concrete distributing method that was used for the first time in the South Island; as such, the technological value for this portion of the building is considered **moderate**. **Chocolate Factory and Garage (Block 3A):** Part of Block 3A was constructed in 1922 at the same time as the concrete extension to Block 2A, also utilising, for the first time a new concrete distributing method; therefore, the technological value for this portion of the building is considered **moderate**. A further concrete and steel extension was made in 1924, bringing the building to three storeys. A fourth storey was added in 1939. **Chocolate and Biscuit Factory (Block 3B-C)**: This three-storey building was constructed using concrete and steel. No technological innovations were identified in the construction of this building. **Engineering Workshop, Labs, and Offices Building (Block 4A)**: Block 4A was constructed in 1961 using reinforced concrete. No technological innovations were identified in the construction of this building. **Biscuit and Dispatch Building (Block 4C and 5A-C)**: This large building was constructed in 1951, with an additional two storeys added in 1968. No technological innovations were identified in the construction of this building.
Scientific Value	
Scientific Yes	***Does the area or place have the potential to provide scientific information about the history of the region?*** The Cadbury Confectionery limited buildings can contribute to scientific information of the region's history. As highlighted by Oakley Gray (2010) for the Dairy and Machine House Buildings, the Cadbury Confectionery Ltd Buildings on the whole hold scientific value through their association with use as a Confectionery factory, but also as a brewery and distillery as well. The complex can provide insight into the development of buildings in response to manufacturing processes in both industries as well as adaptive reuse of spaces moving from one industry to another and underlining guiding principles of factory organisation.

9.1 Summary of Heritage Values

As demonstrated by the assessment above, the individual heritage values for the Cadbury Confectionery Ltd Buildings range from low to high with greater value placed on the historic values of the site (particularly its connection to companies and individuals) rather than its architectural (with the exception of architectural rarity and integrity), technological or scientific values which are generally low to moderate.

The assessment of architectural values includes consideration of architectural merit, rarity, representativeness, integrity, vulnerability, and context or group. This assessment has identified that the Cadbury Confectionery Ltd Buildings have high architectural rarity. The Cadbury Confectionery Ltd Buildings represent a rare complex of industrial buildings surviving at the heart of Dunedin's central business district. In the 1860s when Cadbury site and A & T Burt site saw their first industrial occupation, they were amongst many others in the area. Slowly the manufacturers were pushed out of central Dunedin and concentrated to the south of the Octagon. The extant buildings in the complex are reminders of the past functions of the site, including a distillery, brewery and confectionery. While there are several archaeological sites associated with breweries across the country, distilleries and confectioneries are under-represented amongst previously recognised heritage and archaeological sites.

In terms of architectural integrity, most of the buildings within the complex have been highly modified, and as such, only the Biscuit Factory and Dispatch Building was determined to have high architectural integrity, as it represents an intact structure that has not been heavily modified. The Biscuit and Dispatch Building was constructed in in 1951 with a further two storeys added in 1968, with the latter being a discrete and easily readable addition. The Dairy and Machine House Building retains a tangible link to distillery, brewery, and confectionery factory that operated from the site and is the best remaining example of these early phases of construction (1868 and 1875) within the complex. Similarly, the Cadbury World Building, although extended on multiple occasions, still retains visible elements of the 1868 distillery buildings and has considerable heritage fabric from the early twentieth century additions.

In contrast, the buildings in the complex including their facades have low value in terms of their architectural merit. They are typical to the design, style and use of materials or craftsmanship of the period. The buildings are good examples of their time period in terms of design, type, and technology, and as such are observed to have moderate architectural representativeness While isolated from other nineteenth century industrial buildings in Dunedin, the buildings still hold connections with other heritage buildings, forming central Dunedin townscape that reflects nineteenth and early twentieth century development and entanglement of transportation and commercial businesses. Thus they complex is considered to have moderate context or group values.

Archaeologically the buildings have moderate information potential. While the condition of the site is poor and the amenity value low, with all pre-1900 building heavily modified in the twentieth century, there is potential to gather archaeological information on brewery, distillery and confectionary manufacture sites. Few such site types have been recorded let alone archaeologically investigated in Dunedin or around the country. The archaeological contextual value as it represents an industrial complex and can be considered in Dunedin's wider history as a manufacturing centre.

The buildings hold scientific value through their association with use as a Confectionery factory, but also as a brewery and distillery as well. However, technical values for the building have been assessed to be low to moderate. Most of the buildings we constructed using traditional building techniques and standard materials and thus were considered to be of low technical value. The only variation are the Office and Chocolate Factory and Garage buildings for which a concrete distributing method was used for the first time in the South Island. Thus, it is considered that these buildings hold moderate technical values.

The assessment of historic values includes associations with people, events, and patterns. UOA has found that the Cadbury Confectionery Ltd Buildings have strong connections to many individuals and companies that are significant at a local, regional, national and international level. As a result, the building has moderate cultural values associated with identity, public esteem, commemoration, and education and the buildings are listed as a Category II listed Place (List No. 2143).The success of the confectionery and the longevity of the site are particularly due to its association with Richard Hudson, R Hudson and Co and Cadbury Fry Hudson (and its iterations) whose drive for innovation to streamline not only their manufacturing process but also business management saw their products become a household staple.

Other names and businesses associated with the buildings include the New Zealand Distillery Company, the first legal distillery in the company along with architects such as Henry McDowell Smith, Miller and White. Even key names in New Zealand's construction history have been associated with the Cadbury Confectionery Ltd Buildings. The buildings are further associated with a number of key events and patterns in New Zealand's history at both a regional and national stage. National law changes affected the businesses associated with the site while they in turn contributed to regional and national exhibitions, showcasing their products in the late nineteenth and early twentieth century. Cadbury Fry further contributed to war efforts during World War II and were affected by the event. Not only was there the construction of air raid shelters on the property the company's production shifted incredibly during this period. Moreover, the companies were associated with betterment of employment welfare as well as cutting edge manufacturing techniques and innovations which drove the success of the businesses. For these reasons, the historic value of the buildings in terms of their connection to individuals and companies is considered high.

9.2 Conclusion on Heritage Significance

The overall level of significance of the Cadbury Confectionery Ltd Buildings has been assessed to be **medium.** This assessment is based several factors. The buildings within the complex are associated to past operations as a whisky distillery, brewery, and confectionery factory, for which there are few examples recorded around the country, let alone Dunedin. While they hold low significance in terms of their architectural merit and varying levels of architectural integrity most buildings are considered moderate examples of their class. The buildings hold scientific value through their association with use as a confectionery factory, but also as a brewery and distillery as well, while technical values ranging from low to moderate with most buildings constructed using traditional building techniques and standard materials. The Cadbury Confectionary Ltd Buildings have significant associations with individuals and companies and hold the potential to contribute to regional studies of urban industrial and commercial development through contributions to wider patterns and event. However, the buildings also have moderate to high value historical associations with individuals, companies and events varying in significance from a local to international level. It is the buildings historical or cultural heritage significance or value have led to the complex being list in as a Category 2 Historic Place (List No. 2143) on New Zealand Heritage List/Rārangi Kōrero. The Cadbury Confectionary Ltd buildings are prominent and visible cultural ties to the histories of these individuals and companies easily accessible to the public, especially through the most visual aspect of the structures: the façades.

10 Description of Proposed Work

The current Dunedin hospital is in poor condition and does not have the capacity to adequately service the health care needs of Dunedin and the lower South Island. The development of a new hospital in the city will therefore provide "a once in a generation opportunity to build modern and sustainable hospital facilities" that will not only serve the region's current population, but will be able to be more efficiently integrated into Dunedin's health-education sector (Ministry of Health, 2019b). The new hospital will provide a setting for nurturing the best possible future health care workers as well as enabling world leading healthcare research to take place in Dunedin. After public engagement and careful consideration of possible hospital sites, the Ministry of Health chose a central city location as it allowed for a flat building site that is close to the existing hospital, university and polytechnic, and will be easily accessible by public transport. The new Dunedin hospital development will be the largest single hospital build ever in New Zealand and one of the largest building projects in Dunedin's history

The new hospital buildings are expected to be required to be built to Importance Level 4 (IL4) facilities as defined in AS/NZS 1170 Structural Design Actions. IL4 buildings must be constructed in such a way that they remain operational following a disaster, such as an earthquake, and include a variety of buildings such as hospitals, fire stations, police station, power stations, air traffic control towers, water treatment facilities. Construction of the buildings, as well as excavations for site clearance, services and landscaping will also likely require extensive earthworks across the site.

The configuration and layout of the new Hospital buildings has been the subject of extensive evaluation over a significant period of time with respect to clinical optimisation, cost, constructability, future flexibility, consentability and expediency.

An initial Preliminary Site Masterplan was released in December 2018 and indicated a preferred location of the Hospital which extended across the Cadbury site and onto the northern block (known as the Wilsons site). Specifically, the new Acute Services Building was identified to be located on the Cadbury Site, and the new Ambulatory Services Centre on the Wilsons Site to the north. Further analysis and costing of that layout option was subsequently completed in 2019 which led to a further options evaluation process. Similar criteria including clinical performance, affordability and flexibility were again used to identify the preferred site layout. Options identified as part of that process included locating the NDH entirely on the Cadbury site, entirely on the Wilsons Block or across both sites as per the original masterplan. Subsequent review in late 2019 and the early part of 2020 has seen the preliminary masterplan decision upheld and results in the Block and Stack design presented as part of this application. Concept design is being progressed on this configuration.

It is clear that some of these spatial arrangements may have enabled the retention of the Cadbury buildings or their facades (Flowers, 2019). However, there are several reasons identified in both the initial masterplan work (Flowers, 2019) and in the subsequent re-evaluation work as to why the proposed spatial arrangement resulting in the requirement for demolition remains preferred including that the configuration results in:

- Optimisation of clinical outcomes;
- The most cost-effective solution to providing the required services
- The largest and tallest building being located furthest to the south providing a preferred urban form within the context of the wider CBD;
- The main hospital entrances being closer to the bus hub and the centre of Dunedin;
- An enhanced opportunity to place public outdoor amenity along the north and west sides of the site making the most of sun and daylight;
- Utilisation of the more favourable soil conditions of the Cadbury Block and,
- Retention of the existing electricity sub-station in the short term;

- Utilisation of land already owned by the Crown, allowing for commencement of the works to start sooner (delays would increase the clinical and health and safety risks of remaining in the current premises any longer than necessary).

When considering the retention of buildings and facades on the property, several factors were important for the effective functioning of the hospital (Flowers, 2019). These include clinical relationship and area needs, public and emergency care activities, and clinical flows. The layout of the new building is based on the areas required by each of the hospital departments, their functional relationships with other departments and access points. Consequently, the building design is not readily compatible with retaining the remaining Cadbury Confectionary Ltd Buildings. These buildings do not meet the IL4 standard and most building are 20% NBS against an IL2 standard, significantly less than IL4 standard, and the new hospital would need to meet 100% NBS (Flowers, 2019). The current buildings and their floor levels would not be efficient for "fit-for-purpose acute clinical activities" and while adaptive reuse may be considered, it would require fitting acute clinical activities on other areas of the site, which is not achievable. Moreover, the hospital activities require specific heights (based of inputs from hydrologists, structural and service engineers and health planners) that do not align with the current floor levels of the Cadbury Confectionary Ltd buildings. Such practical matters as transfer of patient beds, logistics trolleys and wheelchairs, are not easily facilitated by the current buildings (Flowers, 2019).

As described in further detail below, alternatives to complete retention and reuse of the buildings were also thoroughly investigated. These included alternative scenarios to enable retention of the facades such as constructing different types of support, deconstruction and reconstruction, and construction of replica facades. However, these options have also been discounted on the basis of structural engineering challenges and the fact that it "would compromise optimal and efficient clinical planning" (Flowers, 2019). The new building would likely be base isolated, which would make either retaining and integrating the buildings or just their façades "extremely problematic", increasing the engineering difficulty of the development that would require "overly-restrictive" and be an "unacceptable burden on the construction of the new hospital" (Flowers, 2019). The retention of part of a building would need to consider fall risk, with particular concern given to the functionality of and access to the hospital following a disaster, and a collapse zone would be required around the remain structure(s). Even the use of replicas was deemed unsuitable for the hospital, as it would still face the same issues as the existing façades. In regard to access, drop-off areas are critical in the effective operation of the hospital and the set back of the building west-northwest greatly increases the public amenity values of the new development.

Other factors that contributed to the decision against retaining the facades include: clinical and support flow; vehicle and public access; floor level alignment; project cost and programme; optimal locations for emergency vehicles; provision of a ground floor well enough above the flood plain (2m above street level) and readily accessible from the street; and flexibility in future planning and expansion (Flowers, 2019).

10.1 Alternative Options – Façade Retention

The Ministry of Health commissioned WSP Opus (Blacker & Burrough 2019) to assess, from an engineering perspective, options which would enable retention of the facades of the Cadbury Confectionery Ltd Buildings (excluding the Dairy and Machine House Building). The report assesses the structural condition of the façades; identifies façade retention options (including the design of temporary bracing structures); and evaluates these options. The conclusions of that report are summarised below.

If retained, the façades would need to be designed to meet 100% New Building Standard as an IL4 structure to meet the requirement that the building be operational following a 1 in 500-year earthquake (Blacker & Burrough 2019). At a minimum, temporary support of the façades (which may be necessary for several years) would need to be designed to an Importance Level 2 (or 3) standard. Currently the initial seismic assessments indicate that the oldest buildings are approximately 20% New Building Standard (IL2) (Blacker & Burrough 2019). Most of the older buildings' façades (Cadbury World, office, chocolate factory and garage, and Chocolate and Biscuit Factory

buildings) were noted to suffer from rising damp. The Cadbury World building also suffered from water ingress and isolated fine cracks, while the Chocolate Factory and Garage Building (Block 3A) also had damp in the roof and penthouse (Blacker & Burrough 2019). The façades of the newer engineering workshops, labs, and Office Building and the Biscuit Factory and Dispatch Building were generally good although the later showed some signs of wear and tear (Blacker & Burrough 2019).

As described in further detail in the following section, various temporary and permanent support options were considered along with deconstruction and reconstruction and the instalment of a glass fibre reinforce concrete (GRC) replica. Those options were then assessed in the Opus report using Red Amber Green (RAG) analysis that considers the following factors: cost, time, heritage impact, hospital impact, buildability, traffic disruption, and seismic resilience (Table 10-1). The RAG analysis concludes that the baseline option (a clear site for the new hospital) was the only option to receive the most favourable rating (Green) on all considerations, other than heritage where it unsurprisingly received the least favourable rating (Red) (Blacker & Burrough 2019). The next closest option was a glass fibre reinforce concrete (GRC) replica (discussed further below), which received Green rankings for four factors. The impact of this option on heritage was also identified as the least favourable option (Blacker & Burrough 2019). All remaining options were otherwise generally identified to have some impact (Amber) or be less favourable against the factors, with some receiving at most one Green rating (Blacker & Burrough 2019). None of the options received a most favourable rating (Green) for their impact on heritage.

Overall, the Opus report determined that while it would be technically feasible to retain the façades, doing so (through any of the options) would significantly affect the layout and usage of the site, and impact the extent of construction work required which would in turn have significant cost, programme and health and safety implications (Blacker & Burrough 2019). Each of the retention options was identified to have negative impacts on such aspects as clinical planning and user experience, seismic resilience, building methodology, cost and construction programme (Flowers, 2019). This was especially so for the Cadbury World and Office buildings which have suffered from damp penetration and a great deal of work would be involved in increasing their integrity. Moreover, there is potential the buildings are susceptible to liquefaction. As they are not reinforced, they are vulnerable to ground movement, and the foundations would require strengthening (Blacker & Burrough 2019). Following the options presented the Ministry of Health architects, CCM architects stated, "it is our opinion that all of the retention options would severely restrict the optimal and efficient planning of a modern fit-for-purpose acute hospital" (Flowers, 2019).

Consideration	Option								
	Baseline	1a	1b	2a	2b	3a	3b	4	5
	New Hospital 'Clear' Site							Deconstruct and Reconstruct	GRC Replica
Cost	G	A	R	A	A	R	R	R	A
Time	G	A	R	A	R	A	R	R	G
Impact on Heritage	R	A	A	A	A	A	A	R	R
Impact on Hospital	G	R	R	R	R	R	R	R	A
Buildability	G	A	R	G	R	A	R	A	G
Traffic Disruption	G	R	G	R	G	R	G	G	G
Seismic Resilience	G	A	A	R	R	A	A	A	G

Table 10-1. Table showing the Red Amber Green (RAG) analysis for alternative façade retention options (Blacker & Burrough 2019: Table 4). Red: least favourable option; Amber: some level of impact; Green: most favourable options.

10.1.1 Heritage Impacts of Façade Retention Options – General Discussion

While the District Plan extends protection to the building facades along Cumberland and Castle Street, UOA considers partial demolition or façade retention to be a less desirable option. 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, 2007b). 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 as would be the case here. 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.

Option 1a: Exterior Temporary Support Structure

This option will involve erecting a temporary support structure on the exterior of the façade prior to the deconstruction of the buildings behind (Figure 10-1). The façades would be cut and the base isolated at the same level as the main structure. This deconstruction would need to be carefully undertaken, especially in the vicinity of the façade. The original façade may require the insertion of joints to allow for articulation in the upper levels. This approach will heavily impact the pavements, roads and even buried services located along the Cumberland and Castle Streets State highways (Blacker & Burrough 2019). This is one of the least expensive options, with an estimated total cost of $47,000,000 (Rider Levett Bucknall Christchurch, 2019).

Option 1b: Interior Temporary Support Structure

This approach is the same as Option 1a except the temporary support would be constructed on the interior of the current building prior to its deconstruction (Figure 10-1). This would mean the support would not extend into the state highways, only short-term scaffolding. The installation of the supports in this manner would be onerous and create a number of construction difficulties. The challenges include, but are not limited to, the temporary framing that need to be designed in section, placed by hand and fixed together on site; the support foundations that need to be constructed inside the existing buildings (large precast units will not be practical in the building); and construction of new structures that will have to be built around the supports and the connecting to the façade (Blacker & Burrough 2019). This is one of the middling options price wise, with an estimated total cost of $58,800,000 (Rider Levett Bucknall Christchurch, 2019).

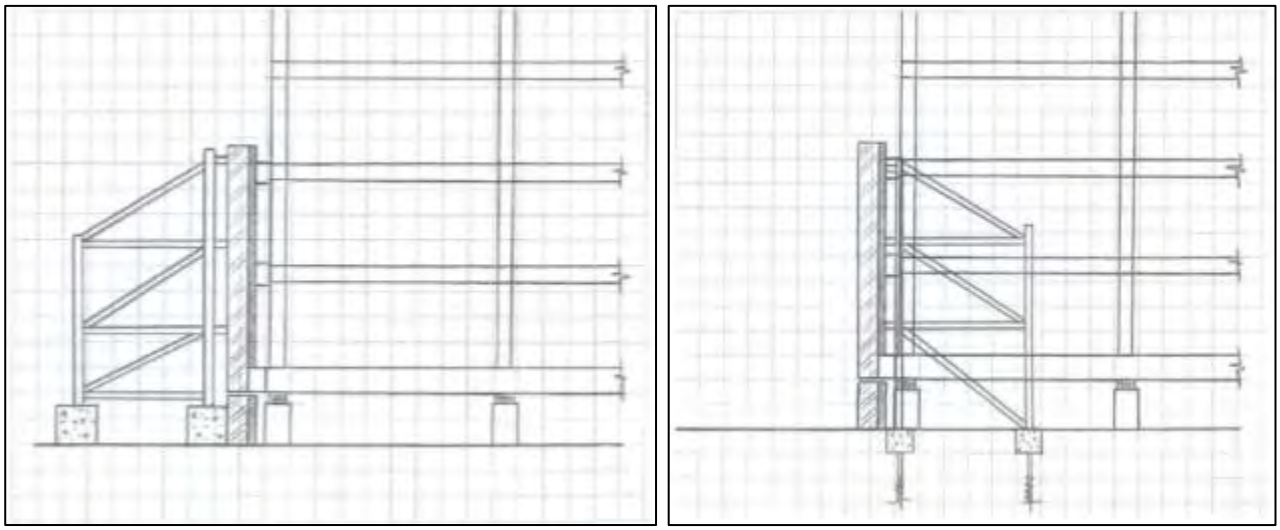

Figure 10-1. Hand sketch representations of Options 1a (left) and 1b (right) (Blacker & Burrough 2019: Figures 2 and 3).

10.1.2 Heritage Impacts of Options 1a and 1b

Both options received an Amber rating for heritage impact in the RAG analysis, indicating that they would result in some level of negative impact on heritage values. That rating results from the disturbance and interference with the original heritage fabric that would occur through the necessary modifications (for Option 1a) and base separation required for both options.

While not the least favourable of the options assessed, these options will result in some adverse impacts on the heritage value of the facades. More specifically, the exterior temporary support structure used in Option 1a would require irreversible modifications to the existing structure (such as insertion joints for articulation with the upper levels) and the original heritage fabric. Separating the façade through the base isolation (required for both options) will also result in impact to the heritage fabric of the façades.

Option 2a: Exterior Temporary Support Structure and Independent Support Behind

This option will involve erecting a temporary support structure with a new independent support structure on piled foundations constructed behind, either with steel or concrete framing (Figure 10-2). A seismic gap would be created between the support structure and the new building. The foundations would need to be compatible with the façade which may require underpinning the façade. Again, the temporary structure would encroach on the state highways (Blacker & Burrough 2019). This is again one of the middling options price wise, with an estimated total cost of $63,800,000 (Rider Levett Bucknall Christchurch, 2019).

Option 2b: Interior Temporary Support Structure and Independent Support Behind

This approach is the same as Option 2a except the temporary support would be constructed on the interior of the current building (Figure 10-2). This approach will involve designing and building the new supporting structure

around the temporary support structure. Again, the temporary structure would encroach on the state highways (Blacker & Burrough 2019). This is one of the most expensive options, with an estimated total cost of $69,800,000 (Rider Levett Bucknall Christchurch, 2019).

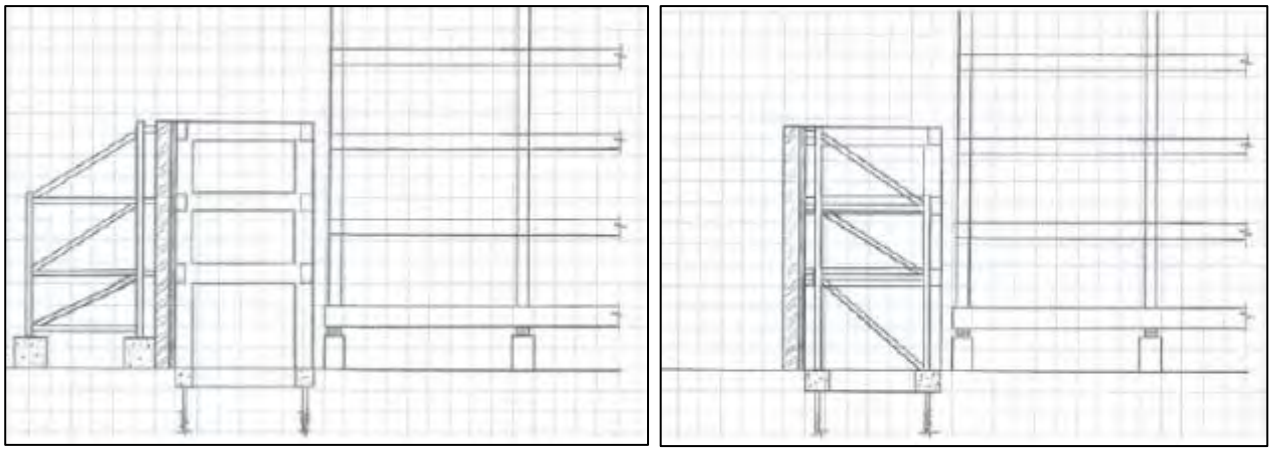

Figure 10-2. Hand sketch representations of Options 2a (left) and 2b (right) (Blacker & Burrough 2019: Figures 4 and 5).

10.1.3 Heritage Impacts of Options 2a and 2b

These options also received an Amber rating for heritage impact in the RAG analysis, indicating that they would result in some level of negative impact on heritage values.

Both options would require seismic gaps, with the temporary support structures on the exterior (Option 2a) or interior (Option 2b) with independent supports behind. Consequently, while some amenity value would be retained, in particular for Option 2b, the façades will be physically separated and disconnected from the new structures, thus not actively part of the new building and detracting from the utility of the remaining heritage structures.

Option 3a: Exterior Temporary Support Structure and Permanent Support Structure Founded on the Base Isolation Layer of the New Hospital Buildings

This option will involve erecting the façade with its own independent support structure on the same base isolation layer as the newly constructed hospital building (Figure 10-3). This would provide increased hazard protection as it would reduce seismic forces on the façade as well as the differential movement between the façade and the new building. The façade would be cut at the level of the base isolation layer. A seismic gap would be created between the support structure and the new building. Again, a temporary support structure would be required on the exterior of the building, extending into the State Highways (Blacker & Burrough 2019). This is one of the most expensive options, with an estimated total cost of $66,200,000 (Rider Levett Bucknall Christchurch, 2019).

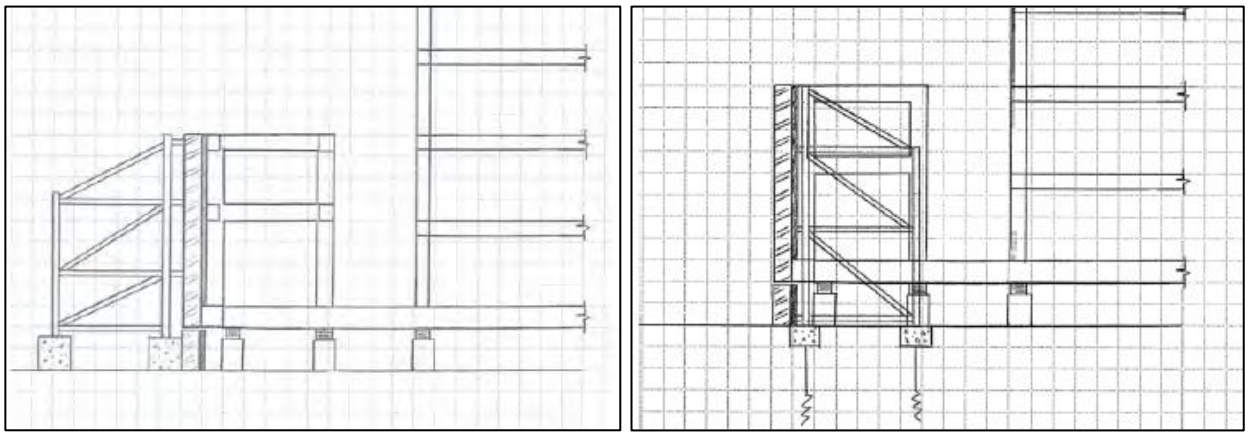

Figure 10-3. Hand sketch representations of Options 3a and 3b (Blacker & Burrough 2019: Figure 6 and 8).

Option 3b: Exterior Temporary Support Structure and Permanent Support Structure Founded on the Base Isolation Layer of the New Hospital Buildings

This approach is the same as Option 3b except the temporary support would be constructed on the interior of the current building prior to its deconstruction. This approach would be much more difficult as it would involve constructing the isolation plane around the temporary support structure that would then be modified so that it is supported on the base isolation plane. Then the construction could begin on the permanent support structure and new building (Blacker & Burrough 2019). This is the most expensive option, with an estimated total cost of $74,600,000 (Rider Levett Bucknall Christchurch, 2019).

10.1.4 Heritage Impacts of Options 3a and 3b

These options also received an Amber rating on the RAG analysis, resulting from the impact on the heritage fabric that would occur through the necessary modifications and base separation required for both options.

As with Options 1a and 1b, Options 3a and 3b require the base isolation of the facades, which will impact the heritage fabric. Both options also require seismic gaps with the temporary support structure on exterior (Option 3a) or interior (Option 3b) and the permanent support structure founded on the base isolation layer. As such, the façades would again be separated from the hospital building. Consequently, while some amenity value would be retained, in particular for Option 2b, the façades will be physically separated and disconnected from the new structures, thus not actively part of the new building and detracting from the utility of the remaining heritage structures.

Option 4: Deconstruct and Reconstruct

This option only considers the buildings with brick façades and does not include those with concrete façades. The approach would involve dismantling the brick facades brick by brick and then rebuilding them along with the new structure. As a result, this approach would not need a temporary support. The brick walls could then be reinforced horizontally in mortar joints. Cores running through the brick work would provide support (Blacker & Burrough 2019). This is one of the lower cost but still expensive options, with an estimated total cost of $51,000,000 (Rider Levett Bucknall Christchurch, 2019).

10.1.5 Heritage Impact of Option 4

This option received a Red rating for heritage in the RAG analysis, indicating an unfavourable impact.

While there would be the reuse of original masonry under this option, this approach would significantly affect the integrity of the facades and would result in the loss of heritage fabric. For the Cadbury World Building, which was constructed in multiple phases, this would blur the lines between these distinct periods of construction. Such a scenario directly contravenes the ICOMOS NZ charter, which advocates for minimum intervention, and HNZPT's (2007b) guidelines, which advise that "partial demolition should not be allowed unless it does not adversely affect the significance and integrity of the place" and should retain original elements and detailing with modifications above the ground floor avoided. Even at a best-case scenario where each brick was removed, labelled and replaced in its exact position, there would be significant loss to the heritage values and would compromise the integrity of the original techniques.

Option 5: Replica Façade

In this method, a GRC replica of the facades would be made and attached to the new building structure. Panels with joins in between would make up the GRC, allowing for seismic event movement. These panels would be attached to the building on a steel frame mound. This lightweight replica would provide more useable space for the new hospital buildings (Blacker & Burrough 2019). This is the lowest cost (but still relatively expensive) option, with an estimated total cost of $32,600,000 (Rider Levett Bucknall Christchurch, 2019).

10.1.6 Heritage Impact of Option 5

This option also received a Red rating in the RAG analysis. In terms of alternatives to demolition of the facades, this option would have the most negative impact on the heritage values of the Cadbury Confectionary Ltd Buildings.

Multiple international charters and guidelines disagree with or do not recommend the use of replicas or reconstruction for the protection of heritage buildings. For instance, the Riga charter views reconstruction as misrepresenting the remains or evidence of the past and that structures should be reflective of the period in which they were constructed. This does not necessitate that new buildings mar the historic landscape in which they are constructed but can be designed and constructed in a way that is sympathetic and maintain the context they are built into (ICCROM, Latvian National Commission for UNESCO, & State Inspection for Heritage Protection of Latvia, 2000; Khalaf, 2017). Although more recent consideration has been given to replicas being compatible with both intangible and tangible heritage, there are a number of conditions that are considered alongside this. Buildings should maintain local construction cultures such as traditional craftmanship and techniques, constructed with available materials that can portray the sense of place. However, this is the exception and replicas are considered unfavourable imitations of the past structures (Smith 2006 and Khalaf 2016 in Khalaf, 2017).

The Venice Charter also protects the truth of historical charters following along the lines of architecture should not try to 'raise the dead' (ICOMOS, 1964; Khalaf, 2017; Ruskin, 1890). It is considered dishonest to the building's history and gives an untrue form of the building's change over time. In this light both restoration and reconstruction are both considered negatively. In the Venice Charter, if new work is required then it must be distinct from the original and clearly identifiable or else it represents a false sense of history (ICOMOS, 1964; Khalaf, 2017). The reconstruction of a removed building or other cultural resource is not considered to be heritage conservation in the Canada's Historic Places standards and guidelines. Instead the standards for interventions of built structures defers to the idea that "it is better to preserve than to repair, better to repair than to restore, better to restore than to reconstruct" (Didron 1839 in Canada's Historic Places, 2003), placing reconstruction and replicas as the lowest form of heritage protection. Following this, the guidelines recommends repairs as opposed to reconstructions for elements important to defining the heritage value of a heritage place. If the same principles are applied to the retention of façades for the Cadbury Confectionary Ltd Buildings, replicas it should be the last option considered prior to demolition.

While the assessment detailed in this report was undertaken in the context of the original Preliminary Site Masterplan (as generally replicated in the current Block and Stack) consideration has been given to the implications for heritage values of locating all of the NDH entirely on the Cadbury site and whether that would result in any material difference to the findings. A review has confirmed that the change in layout would have no material impact on the findings of the original assessment. Put simply, only the option of locating on the Wilsons Block in its entirety would result in any material change to these findings and that option has been rejected for clinical, financial, timing, future flexibility and other reasons.

On that basis, the Ministry of Health has determined that it is necessary to seek the complete demolition of all of the former Cadbury Buildings except for the Dairy and Machine House Building on Castle Street. No other buildings or parts thereof (including façades) of the Cadbury Confectionery Ltd Buildings, recorded as Category 2 Historic Place (List No. 2143) and scheduled as heritage items on the DCC District Plan (Item B030), will be retained. As previously stated, the preferred spatial arrangement of the buildings will still allow for the retention and adaptive reuse of the Dairy and Machine House.

11 Assessment of Effects on Heritage Values

The Ministry of Health propose to demolish all buildings within the project area except for the Dairy and Machine House Building in the southeast corner of the site. The removed buildings will make way for the construction of the new Dunedin Hospital. The Dairy and Machine House Building will be retained and will be adaptively reused for non-clinical use. Such a building does not need to meet as high building code requirements as will be necessary for other hospital buildings. No other buildings or parts thereof within the Cadbury Confectionery Ltd Buildings, recorded as Category 2 Historic Place (List No. 2143) and scheduled as heritage items on the DCC District Plan (Item B030), will be retained.

This section assesses the effects of the proposed demolition of the Cadbury Confectionary Ltd Buildings and their facades and the adaptive reuse of the Dairy and Machine House Building on their heritage values of the Cadbury Confectionery Buildings Ltd using the methods outlined in Section 3.1. The assessment of effects considers the level of significance and the magnitude of the impacts against the heritage values to provide a determination of the significance of effects. As set out in the tables below (Table 11-1 and 11-2) the level of magnitude of those respective effects range from major adverse to major beneficial. As set out in the significance of heritage values range from negligible to very high. The effects are then considered against best practice recommendations, the importance of the buildings or structures, their condition, and their potential for alternative use.

A separate archaeological assessment has been completed that considers the potential impacts to archaeology (Woods & Lawrence, 2019) as required under the Heritage New Zealand Pouhere Taonga Act 2014. An archaeological authority application will be lodged with HNZPT, as it will be required to demolish any pre-1900 building and to undertake earthworks that may encounter subsurface archaeology.

Table 11-1.Magnitude of the impacts of the proposed work against the heritage values (Department for Transport, 2008).

Magnitude	Description
Major	Change to key historic building elements, such that the asset is totally altered. Comprehensive change to the setting.
Moderate	Change to many key historic building elements, such as the asset is significantly modified. Changes to the setting of an historic building, such that it is significantly modified
Minor	Change to key historic building elements, such that the asset is slightly different. Changes to the setting of an historic building, such that it is noticeably changed.
Negligible	Slight changes to historic building elements or setting that hardly affect it.
No change	No change to fabric or setting.

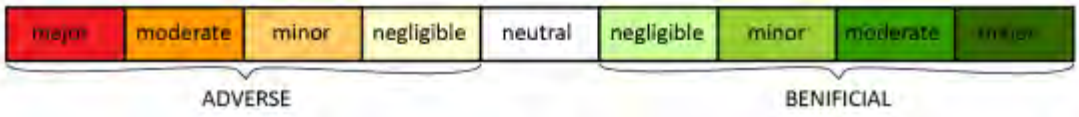

Table 11-2.Matrix of significance of effects on the heritage values (DfT, 2008).

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

11.1 Adaptive Reuse of the Dairy and Machine House Building

The Ministry of Health propose to adaptively reuse the Dairy and Machine House Building. Although building has low architectural merit, the building footprint and façade represent the changing functions of the building since it was first constructed in 1868 (small mill) and 1875 (cellar). The building has retained its Victorian industrial form with distinctive elements of the nineteenth century building are still present within the building as well as the retention of the building footprint providing a moderate integrity assessed for the building. It is also moderate

representation of such architecture with elements of the nineteenth century building existing within the building. On the other hand, the façade reflects its later adaption in the early twentieth century for confectionery and was restored to this period in the 2010s. Despite no longer retaining historic fabric, the reconstructed façade provides a historical connection to the building and its past use in a visual format that can be seen and appreciated by the public. There are few buildings in New Zealand that are associated with a whiskey distillery, brewery and confectionery manufacture and culturally and historically the building holds ties to the entire history of the wider site and these functions. The Dairy and Machine House Building is complimentary to its neighbouring buildings to the south such as the McCarthy Building (B561), forming a historic streetscape representative of Dunedin's early twentieth century commerce and industry.

The plans for the new hospital are currently in the design phase so the exact details for modifications to this building are not available. However, it has been proposed that the building be used for non-clinical purposes.
As such it can be assumed there will be considerable changes to the interior of the building, as the ground floor is largely an open spaced with a cement floor and brick walls separating the main staircase. Moreover, the first floor is currently inaccessible due to health and safety concerns and strengthening, and repairs would be required before access to this floor could be realised before consideration is given to interior design for an alternative use. Retention of the building, in particular the façade and building footprint, will however retain the historic values of the building, especially as proposed non-clinical use of the building will allow for "less – sterile" activities such as office space, cafe/hospitality or ancillary retail that would encourage integration with, and exposure of, heritage elements. The openness of the building as a hospital through which much of the public will pass through, will enable to an extent an appreciation of the building for both past and present functions, rather than the private building that would remain largely closed to the public.

The ICOMOS NZ Charter states that "where the use of a place is integral to its cultural heritage value, that use should be retained". Ideally, it is desirous to maintain the intended function of a building for which it was built; however, this building has seen significant transformations through its life history. The benefit of it being adaptively reused and actively occupied far outweighs any adverse effects caused through change in function. Furthermore, adaptive reuse of heritage buildings is promoted by the DCC District Plan, by HNZPT, and by ICOMOS New Zealand. The District Plan (2006) and 2GP specifically promote restoration, conservation and adaptive reuse of heritage buildings (Policies 13.3.10 and 13.2.1.1 respectively). HNZPT encourages the adaptation of historic buildings as a way to continue the liveability and utility of the structure but advocates for alterations that result in minimal loss of cultural heritage value (NZHPT, 2007b). Both ICOMOS NZ and HNZPT identify that additions and alterations should be compatible and reversible to avoid adverse effects to the heritage values of the building.

Assessment: Moderate beneficial effect. The adaptive reuse of the Dairy and Machine House Building will have an overall moderate beneficial effect, with a balance of the positive effects outweighing the minor adverse effects identified. Most significantly in terms of positive benefits, the building will be retained, maintained and actively utilised as part of the new hospital, bringing new life into not only the building but the entire site. It is yet unknown how much will be altered throughout the building except that the main form of the building will be retained as will the recently restored frontage. The former ties the building to its earliest functions as part of a whiskey and distillery while the latter ties the building to its use as part of the confectionary manufacturer.

Recommendations: As there are currently no specific plans for the adaptive reuse of the building that can be evaluated, UOA recommends that the alterations to the building be guided by a conservation plan. Previously, a cultural heritage assessment was prepared by Oakley Grey Architects, which has provided a heritage inventory. Given the recent work on the building, UOA recommends that this be reviewed and updated to a conservation plan to guide the proposed works. A cyclical maintenance plan should also be commissioned (or included in the conservation plan) to promote the active management of the heritage building.

The design for alterations of the building should take into account the recommendations of the ICOMOS NZ Charter 2010 and HNZPT (NZHPT, 2007b). The guidelines from HNZPT advocate that the adaptive reuse of historic buildings should consider the following points.

- Retain surviving internal and external heritage fabric as far as possible and disturb, distort or obscure it as little as possible.
- Respect the design, form, scale, materials, workmanship, patina of age, colours, contents, location, curtilage and setting, including alterations that have heritage value.
- Avoid work that will compromise or obscure fabric of heritage value.
- Ensure any new work is of a scale and location that it does not dominate the heritage place and respects its setting.
- New work should be appropriately recorded.

Plans for the design for the building should be submitted to HNZPT and the DCC for prior approval.

11.2 Demolition of the Remaining Listed and Scheduled Buildings

The new hospital development requires the removal of the Cadbury Confectionery Buildings Ltd, except for the Dairy and Machine House Building. These buildings include: the **Cadbury World Building (Block 1A)** that incorporates the 1868 granary/malt floor and kiln building and was eventually converted into Cadbury World in the early 2000s; the **Office Building (Block 2A)** used for grain storage, dining, dressing and mixing rooms and chocolate packing, the building incorporated the northern end of 1868 granary/malt floor building that was later encapsulated by further construction in the early twentieth century; the **Chocolate Factory and Garage Building (Block 3A)** constructed over various phases from the 1920s and used as a chocolate factory and garage; the **Chocolate and Biscuit Factory (Block 3B-C)** built over various phases from the 1920s and predominantly used as a chocolate factory, as well as a biscuit factory and dining and cloak room; the **Engineering Workshop, Labs, and Office Building (Block 4A)** constructed in the 1960s and used for food testing as well as board rooms and tour spaces; and, the **Biscuit Factory and Dispatch Building (Block 4C, 5A-C)** that was constructed in the 1950s and predominantly used as Biscuit Factory and Dispatch Building.

The **Cadbury World Building** is one of three buildings on the premises which is associated with the 1860s occupation of the site, in particular the distillery. Later adapted for the brewery and confectionery manufacture, the building has served as part of the Cadbury factory into the twenty-first century most recently as a key attraction as the Cadbury World and Café, drawing Dunedin, New Zealand and overseas visitors. Although one of the few buildings that have historic associations with a distillery, brewery and confectionery factory, the building is considered to have low architectural merit especially in consideration of its earliest functions. The building was altered over various stages, alterations that have overwhelmed the initial pre-1900 industrial design associated with the distillery and brewery on both the interior and exterior. Little remains of the earliest forms of the building; however, many of the additions to the building were made in the early twentieth century for use as part of the confectionery factory. Thus, this building is more reflective of an early twentieth century industrial building.

The **Office Building** is the last of the three buildings on the premises which is associated with the 1860s occupation of the site, in particularly the distillery. However, the northern end of the granary and malt floor that forms part of the building has been swamped by multiple additions in the early twentieth century. The building has been heavily modified, especially the interior and has low integrity values. It is notable however that the 1922 concrete addition was constructed using a concrete distributing method for the first time in the South Island.

The **Chocolate Factory and Garage Building** and the **Chocolate and Biscuit Factory building are** associated with the early twentieth century development of the confectionery factory under R Hudson and Co and Cadbury Fry Hudson in the 1920s and 1930s. It is notable that the 1922 concrete portion of the Chocolate and Garage

building was also built with concrete distributing method. The buildings are good examples of reinforced concrete construction reflected early twentieth century construction and, despite modifications, use of the buildings.
The **Engineering Workshop, Labs, and Office Building** is a 1960s building associated with the development of Cadbury Fry Hudson to the north of the site. This building continued similar style and design seen in the Biscuit Factory and Dispatch Building constructed in the decade before.

The **Biscuit Factory and Dispatch Building** is a 1950s building associated with the development of Cadbury Fry Hudson to the north of the site. After a long period of planning this building was a purpose-built reinforced concrete building reflecting transitions of manufacturing processes of the time. This was the only building identified to have high architectural value as aside from an addition in the late 1960s only minor works on the exterior building as part of routine maintenance and only minor changes to the interior.

As highlighted above buildings relating to brewing and confectionery manufacture are rare. In the centre of Dunedin there is further few industrial buildings left in an area that was once home to various industrial factories. The buildings are also rare remnants of the continuous industrious activity from the 1860s industrial activity located immediately below the Octagon and are associated with companies that gained national and international acclaim. Considering the various architectural attributes evaluated above, UOA found there to be low architectural merit, moderate representativeness and moderate context/group value, while high values were identified for rarity and integrity (only the one 1950s building). The industrial nature of the Cadbury Confectionery Ltd Buildings mean they have been built and altered to suit a very specific purpose, and generally lower emphasis was given by the architects to creating an outstanding architectural feature with resulting flat and relatively monotonous facades.

Assessment: Major adverse effect. Demolition of the remaining Buildings and their facades is considered to have a major adverse effect upon the heritage values of the Cadbury Confectionary Ltd Buildings as an overall complex as there is total alteration of key historic building elements and a comprehensive change to the setting. Demolition will result in the physical loss of six of these buildings which have heritage significance. It will also reduce the contextual value of the Dairy and Machine House Building that will remain on site.

As noted in this assessment, the statutory protections under the 2GP are focused on the façades of these buildings. The façades however reflect the values for the entirety of the buildings. They are the physical reminder of all other values, presenting the industrial heritage of the building to the public. Thus, demolition will significantly affect all heritage values of these façades as well as the buildings themselves, particularly given the limited ability to mitigate effects on such values. It is however the conclusion of this assessment that the architectural merit (being one facet of architectural value) of the façades contributes the least to their overall heritage value. Their most significant heritage value instead lies in their architectural rarity and their connection to individuals and companies of historic importance. While the impacts on these values cannot be removed or completely remedied, the adverse effects can be reduced through mitigation strategies. To that end and as discussed in further detail in the next section, it is UOA's opinion that implementation of appropriate measures would mitigate the major adverse effect of demolishing the buildings and facades on heritage values.

Recommendations: First and foremost, UOA recommends the retention of these buildings, in particular the Cadbury World Building. If this is not feasible, it is then recommended that façade retention Options 1 to 3 be considered for the Cadbury Confectionary Ltd Buildings. UOA advises against Options 4 and 5 as they have significant adverse effects on the heritage values.

If financial, health and safety, clinical, and construction practicalities indicate there is no reasonable alternative to demolition, UOA recommends that the mitigation measures described in the next section are implemented through any resource consent for demolition.

11.3 Effects on Surrounding Heritage Items

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 redeveloped if at all possible (ICOMOS, 2010). The Cadbury Confectionary Ltd Buildings are industrial in nature, characterised by nineteenth and early twentieth century factory buildings most of which are between one and three-storeys.

As identified above, the Cadbury Confectionery Ltd Buildings are some of the few remaining buildings relating to continuous 1860s to early twentieth century industry in the area below the Octagon. While there are a number of heritage buildings located on the same block, most were constructed in the early twentieth century and relate to Dunedin's commercial business rather that industry. Such buildings include the Dunedin Allied Press Ltd Building (List No. 2135 and schedule B564) at 52 Stuart Street, the McCarthy Building, scheduled as a Heritage Building (B561), at the corner of Castle and Lower Stuart Streets, or the International Harvester Company and Riach & McLennan building that a character contributing building with a protected façade to Castle Street (CC702). With the construction of the Countdown Supermarket, the hotel and police buildings the only other building of an industrial nature along Cumberland Street is an A & T Burt Building. Presently, there is a lack of cohesive industrial feeling that would have once formed the streetscape along Cumberland Street as a result of twentieth century development. The loss of the Cadbury Confectionery Ltd Building will however be another reduction in the industrial presence along this street.

On Castle Street, the Chocolate and Biscuit Factory building, and the Biscuit Factory and Dispatch Building form a similar industrial streetscape to that presented by the Cadbury Confectionery Ltd buildings on the Cumberland Street façade. The Dairy and Machine House Building features more of a commercial or business appearance towards the street, likely as it was directly associated with the R. Hudson and Co. and later Cadbury Fry Hudson offices. This frontage is more complimentary to other heritage buildings in the area than the Chocolate Factory, and Biscuit Factory and Dispatch Buildings. Overall the Dairy and Machine House Building along with those buildings further south form a cohesive and complimentary streetscape easily visible from the Anzac Square Gardens and railway station across the road, that reflects early twentieth century business development along Castle Street.

Assessment: Overall UOA considers that Cadbury Confectionery Ltd Buildings as representations of late nineteenth and early twentieth century industrial townscape are presently isolated in their current setting. However, their removal from the site and the construction of the new hospital will still have an impact on the surrounding heritage buildings such as Dunedin Allied Press Building on Cumberland Street and the McCarthy Building or the International Harvester Company and Riach & McLennan building on Castle Street. As final plans for the new hospital are not yet complete, the full effects of the development on surrounding heritage items are not yet known. UOA recommend that the design consider potential effects on the adjacent heritage buildings to ensure that negative impacts are minimised. Such considerations include shading, scale and mass, fenestration and setback. The retention of the more commercial and decorative façade of the Dairy and Machine House Building will complement those commercial buildings further south and contribute to the wider heritage landscape visible from the Anzac Square Gardens and railway station.

11.4 Summary and Overall Assessment of Effects on Heritage Values

The proposed new hospital development will result in the loss of six Cadbury Confectionary Ltd Buildings. One building, the Dairy and Machine House, will be retained as reused as an administrative building. No other façades of the Cadbury Confectionery Ltd Buildings, recorded as Category 2 Historic Place (List No. 2143) and scheduled as heritage items on the DCC District Plan (Item B030), will be retained. The removed buildings will make way for the construction of the new Dunedin Hospital.

This assessment has concluded that overall the heritage value of the Cadbury Confectionary Ltd Buildings is **medium**. The above assessment has concluded that the adaptive reuse of the Dairy and Machine House Building will have a **moderate beneficial impact** on those values, while demolition of the remaining six buildings and their facades will have a **major adverse impact**.

Using these conclusions regarding the heritage value and magnitude of impact in the matrix below, UOA considers that the proposed new Hospital development (and more particularly, the adaptive reuse of the Dairy and Machine House Building and demolition of the six remaining buildings) will have a **moderate to large adverse effect** on the heritage values of the Cadbury Confectionary Ltd Buildings (Table 11-3). That conclusion does not take into account the impact of implementing the mitigation measures described in the following section. As set out in that section, if those measures are implemented, UOA considers that the magnitude of the impact or adverse effect would be considered **moderate.**

Table 11-3. Matrix of significance of effects on the overall heritage values (DfT, 2008).

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

11.5 New Zealand Heritage List/Rārangi Kōrero and DCC District Plans Schedules

As it is proposed that all buildings, apart from the Dairy and Machine House Building, are removed from the site, both the New Zealand Heritage List/Rārangi Kōrero and heritage schedules for the DCC district plans will need to be updated. Given the lack of clarity on whether or not the Dairy and Machine House Building is included in List No. 2143, it is not clear if a new listing for the retained building will be required or if a change to the current listing removing all other Cadbury Confectionary Ltd buildings would suffice. Either way OUA recommends that the Dairy Building façade and envelope be included on the List given the buildings' age, that it contains both features of both the original building and changes made to the building over time, as well as its historical ties the wider Cadbury complex. It is similarly recommended that the 2GP scheduling be restricted to solely the façade and envelope of Dairy and Machine House Building.

11.6 Archaeological Requirements and the Demolition of Pre-1900 Buildings

While the effects to archaeology are not a focus of this HIA, the requirements under the HNZPTA 2014 are discussed briefly here as there is potential for overlap with the resource consent decision. Moreover, it is important to understand at the design stage, the implications of the HNZPTA 2014 when considering the future of buildings within the complex that were constructed prior to 1900.

The assessment survey has confirmed that remains of pre-1900 buildings are present on the south side of the site, namely in the Dairy and Machine House Building fronting on to Castle Street and within the Cadbury World and Office Buildings on Cumberland Street. As such, demolition of these buildings or earthworks across the site would trigger the requirement of an archaeological authority, with typical conditions being recording of demolished, archaeological monitoring of earthworks, recording of all archaeological evidence, and reporting on the results of investigations.

The archaeological authority would be required, which would stipulate recording of the building(s) prior to demolition. On the basis of the result of the heritage assessment, it is probable that at least the pre-1900 buildings would require a minimum of a Level II recording should they be demolished. As defined by HNZPT (2018), a Level II recording would include a minimum of:

- Measured drawings of all principal interior and exterior elevations.
- Recording of the principal parts of the internal timber frame of the building or structure (as necessary).

- Measured drawings of overall building/structure, including where relevant, all floor plans, ceiling plans and roof plans
- Subfloor plans, including floor joists, bearers, wall footings or piles.
- Plans and sections (as necessary) to record ceiling joists and roof structures.
- Cross sections to show interaction of building elements and spaces (as necessary).
- Detailed written description of the structural elements.
- Detailed written description of the exterior.
- Detailed written description of each room.
- Detailed written description of the building's/structure's development over time (potentially including a stratigraphic matrix or matrices).
- Extensive photography.
- Selective sampling of historic fabric.

12 Mitigation Measures

As noted in the previous section, the proposed work required for the new hospital development will have both beneficial and adverse effects on the heritage values of the Cadbury Confectionary Ltd Buildings and their façades. Mitigation is a useful tool to reduce or remove unnecessary adverse effects and to offset those adverse effects that cannot be otherwise avoided. There are few hard and fast rules for mitigation, as this needs to be considered on an individual basis for each project. Mitigative measures proposed here include undertaking the proposed work under the guidance of conservation principals, building recording, reuse of building materials, and public interpretation.

12.1 Retention and Adaptive Reuse

Adaptation of historic places requires a careful balance to ensure that the heritage values are not significantly altered. The District Plan provides protection to the Cumberland Street and Castle Street facades; therefore, the retention of one or more complete buildings could be considered mitigation to offset the loss of other heritage values. Should it not be feasible to adapt all heritage buildings or their facades, considerations should be given to the full retention of one or more buildings. As noted above, UOA identifies the Dairy and Machine House Building and the Cadbury World building as candidates for complete retention.

The Dairy and Machine House Building is an ideal candidate for such an option, as it is the clearest example that retains clear physical manifestations of the past functions of the site as a whisky distillery, brewery, and confectionery manufacture, and the restored façade provides a strong historical connection for the public. Unlike the other buildings on the complex, the smaller scale of the Dairy and Machine House Building makes it a strong candidate for adaptation. Cadbury World building would also be a candidate for retention, given that it has phases of construction associated with the distillery and confectionery and the upper floors retain significant heritage fabric from the early twentieth century modifications. Retention and adaptive reuse of heritage buildings should include a design that will see the building(s) be actively utilised for hospital activity. Adaptation of historic buildings is promoted by the DCC, and is specifically identified in Policy 2.4.2.3 of the 2GP. The ICOMOS NZ Charter (2010) identifies that adaptation of historic buildings is often required to ensure their continued use, and HNZPT (2007b) encourages the adaptation of historic buildings as a way to continue the liveability and utility of the structure but advocates for alterations that result in minimal loss of cultural heritage value. Both ICOMOS NZ and HNZPT identify that additions and alterations should be compatible and reversible to avoid adverse effects to the heritage values of the building.

Presently only the Dairy and Machine House Building has been selected for retention by the Ministry of Health. The Dairy and Machine House Building will be a significant heritage building that will form a key part of the development. Its adaptive reuse secures not just the future of the building which has continuous historic ties to the entire history of the site from an 1868 whiskey distillery to confectionary manufacture from the turn of the century. Although plans have not been finalised, the commitment to adaptively reuse the Dairy and Machine House Building will require considerable investment through strengthening, repairs and proposed fit out costs for its future use. This works offsets to an extent the loss of the remaining six Cadbury Confectionery Ltd buildings. Furthermore, the reuse of the building will reinvigorate the building, introducing a new stage in the history of the complex that will be shared with the community as it will be a part of the hospital that will be seen by the greatest numbers of public visitors.

Adaptive reuse of historic buildings must be done in a sympathetic manner to ensure that heritage fabric is not lost or compromised, and the integrity of the building remains. UOA recommends that all work be guided by an updated conservation plan with interventions be kept to a minimum and their placement will be modelled prior to any work so that they have the least effect possible. A conservation plan is a robust but flexible document that provides a description of the building(s) and setting, defines their significance (including a heritage inventory), develops policies for future use, and provides advice for its care and management (Kerr, 2013). It is recommended

that the conservation provides clear guidance for adaptation, repair, restoration, execution of works, and maintenance. Furthermore, all work should be done in accordance with the ICOMOS NZ charter, and guidance from HNZPT (2007d) to ensure that the heritage values are not affected by the adaptation. Design Plans for the building should be submitted to HNZPT and the DCC for prior approval.

Maintaining historic buildings requires a higher level of planning than many modern buildings, and it is important that repairs and maintenance are informed by heritage specialists and guided by a conservation plan or cyclical maintenance plan. Such specialists may include those who could reliably comment on the walls, roofing and windows. A cyclical maintenance plan is essential for the active management of any heritage building. Maintenance is defined as "routine, cyclical, non-destructive actions necessary to slow the deterioration of a historic place. It entails periodic inspection; routine, cyclical, non-destructive cleaning; minor repair and refinishing operations; replacement of damaged or deteriorated materials that are impractical to save" (Parks Canada, 2004). Maintenance is often the most cost-effective way of preserving built heritage, and measures as simple as removing debris from gutters can save the building from significant damage if done regularly. A cyclical maintenance plan should be prepared that provides an outline of simple schedule of maintenance and/or repairs done on a seasonal or annual basis, and it is recommended that the heritage building is surveyed following significant weather events. Problems or changes to the buildings and site should be identified and managed in accordance with a conservation plan, cyclical maintenance plan, or professional heritage advice.

Documentation of changes to the heritage building and its fabric is recommended by ICOMOS NZ and HNZPT (2007d), and it is also briefly mentioned in the assessment matters in the District Plan. UOA recommends that any repair or maintenance work is systematically recorded and that a record of this work be supplied to the DCC to keep on file with the property record, thereby creating a permanent archive of the changes to the buildings. At a minimum, this record should include:

- A plan showing where the work was undertaken
- Photographs before, during, and after the alteration
- A description of the work done, and the materials and methods used
- The name of the contractor
- Date the work was completed.

12.2 Mitigation of the Effects of Demolition and Construction

The demolition and construction works must be carefully managed to ensure that there are no unexpected adverse effects on the remaining heritage buildings. While there is space at the vehicle entrance and area surrounding the Dairy and Machine House to the north, to the west the modern and older buildings to be demolished are built up against the building along with the ground concrete pads of these buildings and the vehicle areas. As a result, measures must be in place to ensure that the Dairy and Machine House Building is protected during removal of these buildings and the concrete pads.

Consideration must also be given to the foundations of the new hospital and if the selected design may affect the Dairy and Machine House Building foundations. UOA recommends that vibration management plan should be put in place to monitor any effects of vibrations during the earthworks and construction on the surrounding buildings. The selected construction methods should aim also to mitigate vibrations; for example, screw piles will be used over driven piles, where required.

12.3 Recording of the Cadbury Confectionery Buildings to be Demolished

As noted previously, the recording of the Cadbury World and Office Buildings is a requirement under the HNZPTA; for the pre-1900 portions of the buildings. Therefore, the recording should not be considered mitigation against its demolition. Specific recommendations regarding the recording of the Cadbury World and Office Buildings were made in the archaeological assessment (Woods & Lawrence, 2019), including that HNZPT

grant an archaeological authority permitting the demolition of the Cadbury World and Office Buildings and they be recorded to a Level II standard as defined by HNZPT (2018), all earthworks be monitored by an archaeologist, and a final report documenting the results of the archaeological investigations be completed.

Building recording of the remaining four Cadbury Confectionary Ltd buildings (Chocolate Factory and Garage Building, the Chocolate and biscuit factory, the Engineering Workshop, Labs, and Office Building, and, the Biscuit Factory and Dispatch Building) and the post 1900 modifications to the Cadbury World and Office Buildings is recommended as a mitigative measure to offset the loss of this. UOA recommends that this recording be done to a minimum of a Level II standard as defined by HNZPT (2018). As such, this would include a minimum of:

- Measured drawings of all principal interior and exterior elevations.
- Recording of the principal parts of the internal timber frame of the building or structure (as necessary).
- Measured drawings of overall building/structure, including where relevant, all floor plans, ceiling plans and roof plans
- Subfloor plans, including floor joists, bearers, wall footings or piles.
- Plans and sections (as necessary) to record ceiling joists and roof structures.
- Cross sections to show interaction of building elements and spaces (as necessary).
- Detailed written description of the structural elements.
- Detailed written description of the exterior.
- Detailed written description of each room.
- Detailed written description of the building's/structure's development over time (potentially including a stratigraphic matrix or matrices).
- Extensive photography.
- Selective sampling of historic fabric.

12.4 Salvage and Reuse of Historic Materials

When historic buildings cannot be adapted or moved, potential exists to reuse and recycle building materials. Historic buildings and structures contain a rich assemblage of building materials, and this is a valuable resource. Building materials that are good candidates for reuse, included stone, 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 (Figure 12-1). Similarly, historic timber is also a good candidate for reuse and recycling and bring a warmth that new timbers cannot replicate. The materials could also be considered for use in landscaping plans such as brick utilised in hard landscaping. There are possible distinct windows throughout the Cadbury Confectionary Ltd Buildings, as shown in Figure 12-2, that could be recycled, repurposed and feature in the new hospital building. While some distinct windows may be more recent additions, they all would help to display and retain the history of the site right up to 2019 in a physical and visible way.

UOA recommends that materials from the six Cadbury Confectionary Ltd Buildings are utilised in the redevelopment where possible or provided to interest groups where appropriate. Further consideration should be given to timber or joinery being salvaged with preference given to their use in the redevelopment or off-site. As such, UOA recommends that where potential items for reuse are identified, they be carefully removed from the buildings and stored for potential reuse in the new hospital development where possible.

Figure 12-1 Examples of exposed and partially exposed brick from the Cadbury World building that might be salvaged and reused elsewhere in the hospital development.

Figure 12-2. Detailing of windows in the Chocolate and Biscuit Factory building (left) and Biscuit Factory and Dispatch Building (right) that could be considered for recycling into the new hospital building.

12.5 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 where encountered. Incorporating extant archaeological and historic features in the new hospital development could be through either displays built into the new buildings or in the wider landscaping of the block. Such features that may be considered for in situ preservation include cobbled floors, brick or stone lined wells, cellars, or rare archaeological material such as the remains of an early timber of ponga building. Such mitigation is dependent on what is identified, their location, and the flexibility of the design.

12.6 Public Interpretation

Public interpretation is a commonly used means to offset adverse effects on heritage values, and there are many different ways that information can be shared. The methods chosen to disseminate the story of the Cadbury Confectionary Ltd Buildings should comply with the *ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites* (2008), which defines interpretation broadly as:

> The full range of potential activities intended to heighten public awareness and enhance understanding of cultural heritage site. These can include print and electronic publications, public lectures, on-site and directly related off-site installations, educational programmes, community activities, and ongoing research, training, and evaluation of the interpretation process itself.

How information is shared should consider the audience, as different types of dissemination will be more appropriate for audiences of different ages, levels of accessibility, and levels of connection to the site. For example, what appeals and encourages interaction with individuals in one age range, may not be appropriate to another. Importantly, the information should be relatable to the experiences of the audience. The fact that the proposed redevelopment is a public hospital means that there is enormous potential within the institution for multi-layered interpretation of the site, the business, individuals and events important to this complex. Various methods of public interpretation should be considered by the Ministry of Health. Such outreach could begin from demolition phases of development and continue throughout the entire development process. For instance, measures to engage the public during demolition and redevelopment, could include active hoardings with viewing areas and public interpretation. Following the completion of the hospital targeted public interpretation can be undertaken within the hospital complex itself. This can be achieved through the display of material, items, stories within an area(s) of the new build, placeholders and way finders, as well as the reuse of materials in street furniture, signage, within the buildings. In addition, other infrastructure that could be explored include visual reconstructions (e.g., 3D models, augmented reality, virtual reality, etc.), presentations that includes oral histories, and off-site archiving of written information. Applications or online presentation of such are other facets which could, with careful consideration and integration, weave together the various narratives of the Cadbury Confectionary Ltd Buildings and early histories of the site. Such interpretations could be provided on the hospital website itself or accessed through a link on the Hospital website to a separate webpage created. Successful applications and websites have been made for historic sites present and long gone such as Waikato Wars Driving Tour (https://www.heritage.org.nz/apps/the-waikato-war) or the Christchurch based High Street Stories (http://www.highstreetstories.co.nz/). These resources weave together photographs, oral histories, architecture, archaeology and augmented realities to provide public access to the past histories of places.

The types of interpretation used should also address research themes that are significant at a local and national level. A series of themes were proposed in a *National Research Framework* (NZHPT, 2007b), and those appropriate to this project include contributions to reconstruction of regional histories, sense of place, and the archaeology of identity. More specifically, these research themes could explore the occupation of the site prior to the construction the whiskey distillery in 1868; the establishment of the distillery and later brewery on the site; the establishment of the Hudson's confectionary factory; important individuals and business associated with the site; significant business processes and development from the 1860s through to the early twentieth century; and significant architects associated with the Cadbury Confectionary Ltd Buildings.

12.7 Retention of Building Samples and Artefact Assemblages

The artefact assemblage collected during the new hospital development earthworks will be highly significant to material culture studies in Dunedin and provide comparative data that could be incorporated into national and global studies. While standard artefact analysis will be undertaken in the preparation for the final archaeological report following the works, there are many aspects and analyses that such a consultancy report will not feasibly include. However, more detailed and nuanced research-driven analyses could be facilitated through such institutions as the University of Otago, Toitū Otago Settlers Museum, or Otago Museum if the artefact assemblages are retained. In this light, UOA recommend that such institutions be consulted that would consider storing and making the assemblage available for future analyses. Allowances would need to be made for storage and curation costs (i.e. storage space, archival boxes and bags), especially for organic material that would require specialist conservation.

12.8 Hospital Design

The design process for the new hospital development should adopt principals of modern urban design in any new development to provide a benefit over the current site coverage and street activation. The industrial nature of the Cadbury Confectionery Ltd Buildings mean they have been built and altered to suit a very specific purpose, and generally lower emphasis was given by the architects to creating an outstanding architectural feature with resulting flat and relatively monotonous facades. As such, the buildings dominate the block, essentially creating an imposing barrier between Cumberland and Castle Street, which discourages the flow of people or generate foot traffic.

Any proposed development of this site should consider massing, setback and textures that contribute to streetscape and encourage movements of people and connections to other key locations. This would be an improvement on the current site layout and the lack of street activation. Any new design should further contribute positively to the streetscape, encourage pedestrian flows where possible, and form connections, through design, to other blocks and precincts. Temporary and permanent effects on surrounding historic heritage should also be considered, for example, the adjacent Otago Daily Times building. Consideration to incorporating design features or elements on the new hospital that pays homage to the history of the site and the current facades should also be undertaken.

12.9 Management of Effects Through Mitigation

Evaluation of the effectiveness of mitigation methods is subjective. While it is acknowledged by ICOMOS that such measures can be used to avoid, reduce and compensate adverse impacts (ICOMOS, 2011), quantification of the effects of mitigation has been discussed little in heritage literature. In this light, only some heritage impact assessments have considered and weighed general mitigation strategies the more specific use of such measures as relocation of works, relocation of heritage structures, recording of structures and public interpretation and engagement (Bowman, 2013; Cushing, Nithiyanantham, Cary, Yildiz, & Bush, 2019; Howell-Meurs, 2018). Yet more often, assessments in New Zealand only identify mitigation strategies including public interpretation, public viewing opportunities, salvaging building material, building recording, archaeological investigation (A. Brown & Burnett, 2015; J. Brown, 2018; Cropper, Woods, & Scrivener, 2018; Stevens, 2019).

As described by Walton (1999) "professional judgements often have to be made about the desirability of mitigation or protection on the basis of limited evidence" and while based on accepted procedures and best practice, heritage assessments are largely based in the heritage consultants knowledge of the region and subject. Overall the consideration towards the minimisation of negative impact is taken from a baseline position of what was likely to have occurred if the project was proposed (NZTA, 2015). Thus, the following assessment is a culmination of the understanding of heritage values, effects of the proposed works and the mitigation strategies, weighing the positive heritage outcomes against the negative effects of the proposed hospital development on the Cadbury Confectionary Ltd Buildings complex. The mitigation strategies encompass adaptive reuse, salvage, preservation, recording of both the heritage buildings and subsurface archaeological remains, retention of building and artefact samples, considerations for the heritage streetscape, public dissemination of the significant histories of the site. These proposed strategies aim to effectively reclaim some of the heritage values associated site lost with the removal of the buildings. UOA considers that if the mitigation strategies are implemented then significance of effects on the overall heritage values will be **moderate**.

Table 12-1. Matrix of significance of effects on the overall heritage values if mitigation measures are implemented (DfT, 2008).

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

13 Conclusion and Recommendations

UOA has been commissioned by the Ministry of Health undertake a heritage impact assessment of the buildings and site area at 280 Cumberland Street (DP 4846, Part Sections 56 and 71, Sections 53 to 55 and 72 to 74, Block XVI, SO 14196). These buildings are referred to as the Cadbury Confectionery Ltd Buildings and have been previously recognised for their heritage values with a Category II listing on the New Zealand Heritage List/Rārangi Kōrero (List No. 2143). Consequently, these same buildings are also registered as B030 on the 2006 Dunedin City District Plan (Schedules 25.1 and 25.2) and the 2GP (Schedule A1.1), which affords protection to the facades to Castle and Cumberland Streets. Furthermore, within the extent of the Cadbury Confectionery Ltd Buildings, two archaeological sites are recorded: the Cadbury Factory Site (I44/817) and the A & T Burt Site (I44/922).

The current Dunedin hospital is in poor condition and does not have the capacity to adequately service the health care needs of Dunedin and the lower South Island. A proposal has been presented that would see the establishment of a new hospital framed by Castle Street and Cumberland Street to the east and west, and Hanover Street and the former Cadbury factory site to the north and south. .

Given the findings of this assessment, the values are such that reuse of the existing buildings should be considered in the first instance as promoted by the DCC in the District Plan (2006, 2018), HNZPT (2007b) and ICOMOS NZ (2010). However, due to costs, health and safety concerns, compromised clinical outcomes, and construction programmes, the Ministry of Health has determined that it is necessary to seek the complete demolition of all former Cadbury Buildings except for the Dairy and Machine House Building on Castle Street. No other buildings or parts thereof (including façades) of the Cadbury Confectionery Ltd Buildings, recorded as Category 2 Historic Place (List No. 2143) and scheduled as heritage items on the DCC District Plan (Item B030), will be retained. Although final plans for the new hospital buildings are yet to be completed; construction of the buildings, as well as excavations for site clearance, services and landscaping will also likely require extensive earthworks across the site.

The six buildings to be demolished include the **Cadbury World Building (Block 1A)**, that incorporates the 1868 granary/malt floor and kiln building and was eventually converted into Cadbury World in the early 2000s; the **Office Building (Block 2A)** that incorporates the northern end of 1868 granary/malt floor building, while later construction encapsulated this structure the building was used for other purposes such as grain storage, dining, dressing and mixing rooms and chocolate packing; the **Chocolate Factory and Garage Building (Block 3A)** that was constructed over various phases from the 1920s and was used as a chocolate factory and garage; the **Chocolate and Biscuit Factory (Block 3B-C)** that was built over various phases from the 1920s and predominantly used as a chocolate factory, as well as a biscuit factory and dining and cloak room; the **Engineering Workshop, Labs, and Office Building (Block 4A)** constructed in the 1960s and used for food testing as well as board rooms and tour spaces; and, the **Biscuit Factory and Dispatch Building (Block 4C, 5A-C)** that was constructed in the 1950s and predominantly used as Biscuit Factory and Dispatch Building.

One building will be retained: the **Dairy and Machine House Building (Block 1B-C)**. The rear portion of this building was once a small mill constructed in 1868 in association with the whiskey distillery, and an 1875 cellar associated with the later brewery forms the remainder of the building. While the building has been continuously been adapted for different functions, the building has retained its Victorian industrial form and elements of the nineteenth century building existing within the building today. The façade reflects its later adaptation in the early twentieth century as part of Hudson's confectionery factory and it was restored to this period in the 2010s. Despite no longer retaining historic fabric the façade provides a historical connection to the building and its past use presented to the public. There are few buildings in New Zealand that are associated with the functions a whiskey distillery, brewery and confectionery manufacture and culturally and historically the building holds ties to the entire history of the wider site and these functions. The retention and proposed adaptive reuse of this building will have a beneficial impact on the heritage values of this site.

The statutory protections under the Dunedin City District Plan and the 2GP are limited to the façades of the Cadbury Confectionery Ltd Buildings, and as the most publicly visible aspect of the buildings, the facades reflect the heritage values of the entirety of the structures. This assessment has taken into account all heritage values, including archaeological, architectural (including architectural merit, integrity, rarity, representativeness, context or group, and vulnerability), cultural values (identity, public esteem, commemorative, education, tangata whenua, and statutory recognition), historic values (people, events, and patterns), scientific values, and technological values. Overall, the assessment of heritage values shows the Cadbury Confectionery Ltd Buildings to have moderate heritage value. This assessment has identified that the adaptive reuse of the Dairy and Machine House Building will have a moderate beneficial impact on those values, while demolition of the remaining six buildings and their facades will have a major adverse impact. Based on the evaluation of the heritage values and magnitude of impact, UOA considers that proposed new hospital development (specifically, the adaptive reuse of the Dairy and Machine House Building and demolition of the six remaining buildings) will have a **moderate to large adverse effect on** the heritage values of the Cadbury Confectionary Ltd Buildings. While the effects on these values cannot be removed or completely remedied, the adverse effects can be reduced through mitigation strategies. Mitigation for effects to historical and cultural values requires measures that maintain connection with the past, and methods that recognise the cultural values within the development. With these mitigation strategies in place, UOA considers that the overall adverse effect on the heritage values could be reduced to moderate.

The demolition of the remaining buildings and their protected facades to enable the new hospital development on the site is considered to have a major adverse impact on the heritage values of the site and its buildings. As the buildings' overall heritage value is considered to be of medium significance, the impact of that major adverse effect is assessed as moderate to large. If the recommended mitigation measures are implemented (including retention and adaptive reuse of the Dairy and Machine House Building), the severity of the adverse effect would be reduced and would be classified as moderate.

Mitigation identified that will reduce the adverse effects include:

- The District Plan provides protection to the Cumberland Street and Castle Street facades; therefore, the retention of one or more complete buildings could be considered mitigation to offset the loss of other heritage values. As noted above, UOA identifies the Dairy and Machine House Building and the Cadbury World building as candidates for complete retention.
- Consideration should be given to the preservation of the protected facades if the buildings cannot be retained.
- Within buildings that are retained and adapted, a record of alterations to historic fabric should be compiled and a cyclical maintenance plan should be developed. Works should be guided by an updated conservation plan with interventions be kept to a minimum and their placement be modelled prior to any work so that they have the least effect possible.
- The New Zealand Heritage List/Rārangi Kōrero and the DCC 2GP should be updated to protect the façade and envelope of the Dairy and Machine House Building.
- Detailed building recording should be undertaken for any heritage buildings to be demolished. Note that recording of pre-1900 buildings will be required under the HNZPTA 2014 and cannot be seen as mitigation under the RMA process. UOA would recommend that for any post-1900 building to be demolished, it be recorded to a Level II standard as defined by HNZPT (2018), as in most instances there are existing and detailed plans available for these buildings. Level II recording would require, at a minimum,
    - Measured drawings of all principal interior and exterior elevations.
    - Recording of the principal parts of the internal timber frame of the building or structure (as necessary).
    - Measured drawings of overall building/structure, including where relevant, all floor plans, ceiling plans and roof plans
    - Subfloor plans, including floor joists, bearers, wall footings or piles.

    - Plans and sections (as necessary) to record ceiling joists and roof structures.
    - Cross sections to show interaction of building elements and spaces (as necessary).
    - Detailed written description of the structural elements.
    - Detailed written description of the exterior.
    - Detailed written description of each room.
    - Detailed written description of the building's/structure's development over time (potentially including a stratigraphic matrix or matrices).
    - Extensive photography.
    - Selective sampling of historic fabric.
- A demolition plan should be in place to ensure there are no adverse effects to heritage buildings within the complex or in the surrounding area.
- Salvage and reuse of heritage building materials within the new build or provided to interest groups where appropriate
- Preservation of historical or archaeological features in situ for incorporation into the new hospital development either displayed in the new buildings or part of the wider landscaping of the block.
- Include measures to engage the public during demolition and redevelopment, such as active hoardings with viewing areas and public interpretation.
- Targeted public interpretation within the hospital complex. This can be achieved through the display of material, items, stories, within an area(s) of the new build/campus- way finding, reuse of materials in street furniture, signage, within the campus or buildings.
- The hospital design should consider the heritage values of the heritage building remaining on the block along Cumberland and Castles Street and consider massing, setback and textures that contribute to streetscape and encourage movements of people and connections to other key locations

13.1 Further Considerations

Given the number of pre-1900 buildings (or portions of) that remain, the size of the post-1900 structures, as well as the dense nature of subsurface sites, the amount of post-consent heritage and archaeological works required are likely to be significant and should be factored into both budget and timeline requirements.

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Appendix A. N.Z. Historic Places Trust Buildings Record Form

N.Z. HISTORIC PLACES TRUST BUILDINGS RECORD FORM

COMPUTER No: 2143

HP FILE No:

TAKEN BY: Lois Gale 1991 (Cumberland St Records)

Negative held by: Regional Office Neg. Ref. No.

BUILDING TYPE: Commercial

OWNER Name: Cadbury Confectionery
Address: P.O. Box 890, DUNEDIN

OCCUPIER Name: as above
Address:

RECOMMENDED CLASSIFICATION

Research by: Debbie Coulter Inspected by

NAME of Building/Structure: Cadbury Confectionery Buildings (formerly Cadbury Schweppes Hudson)

REGION: Otago

LOCAL BODY: Dunedin City Council

CITY/TOWN: Dunedin

STREET AND No.: 40 Castle Street

DISTRICT SCHEME DETAILS: Not listed

IF BUILDING IS PART OF AN HISTORIC AREA, ENTER NAME OF PRECINCT OR CONSERVATION AREA

ARCHITECTURAL INFORMATION:

Style: Utilitarian

Construction: Brick & plaster

Materials: " " "

Architect/s:

Engineer/s:

Builder/s:

Date of Construction: Most constructed after the fire of 1902

Associated Buildings:

Use/s: Factory

Condition of Building: Good

(This record form was completed June, 1993)

HISTORICAL INFORMATION

HISTORY

Richard Hudson, founder of the firm R. Hudson & Co., which continues today as Cadbury Confectionery, first built on this site in 1900. Although the three-storey factory he erected was gutted by fire in 1902, Hudson embarked on a re-building programme and the company continues to operate from the site today. Before Hudson purchased the site, it was home to New Zealand's (then) only whiskey distillery, which had been closed by the government as a result of representations from Scottish distillers.

Richard Hudson was born in England circa 1841 - a time when there was much poverty following the Industrial Revolution. He was orphaned at the age of nine years and after working as a belt runner in the locomotive and carriage body works of the Great Western Railway, he went to sea at the age of fourteen years. Three years later he returned to England to become apprenticed to the bakery trade. In 1865 Hudson came to New Zealand on the sailing ship Indian Empire.

After a brief period at the Hokitika goldfields with little success, he travelled to Christchurch, where he obtained a job with John Griffin, baker, (who later founded the famous biscuit firm of Griffin's). In Christchurch he married Mary Ann Riley and the couple went south in 1868 to Dunedin, which was enjoying the gold boom.

After a number of jobs, Richard Hudson decided to go out on his own and purchased a biscuit baking machine, rented a bakehouse and started making biscuits and pies. As business was slow initially, Hudson began to sell ships biscuits to the vessels visiting the harbour. He sold the biscuits from a barrow down at the wharves. It was from this small beginning that Hudson built up his business into a large biscuit and chocolate manufacturing firm. Important in the firm's history were Hudson's investigations into the chocolate and cocoa markets. In 1884 he visited various European factories. He eventually purchased a plant form a French firm and a successful chocolate, claimed to be the first in the Southern Hemisphere, was duly produced. It is said Hudson obtained his recipe from England.

CRITERIA FOR CLASSIFICATION *(Please tick box or encircle letter as applicable. If necessary add brief (e.g. one word) explanation.)*

1 a b c |.....|
2 a b c d e f g |.....|
3 ☐ |.....|
4 a b c d e |.....|
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9 a b c |.....|
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11 ☐ |.....|
12 ☐ |.....|
13 a b |.....|
14 ☐ |.....|
15 ☐ |.....|

REFERENCES *(Write on separate sheets as necessary)*

Hudson died in 1903, not long after the fire in his new factory. The firm however continued as a company run by Hudson's six sons who were directors.

In 1930 the company Hudson had founded joined with Cadbury Fry to become Cadbury Fry Hudson Ltd. From 1973 until 1991 the company was known as Cadbury Schweppes Hudson Ltd. Today its title is Cadbury Confectionery Ltd reflecting a recent change in emphasis to solely chocolate and confectionery manufacture. (In 1990 the Hudson biscuit business was sold and the Griffins sugar confectionery business acquired).

Sources - refer to attached sheet

Appendix B. ICOMOS New Zealand Charter for the Conservation of Places of Cultural Heritage Value

ICOMOS New Zealand Charter

for the Conservation of Places of Cultural Heritage Value

Revised 2010

Preamble

New Zealand retains a unique assemblage of **places** of **cultural heritage value** relating to its indigenous and more recent peoples. These areas, **cultural landscapes** and features, buildings and **structures**, gardens, archaeological sites, traditional sites, monuments, and sacred **places** are treasures of distinctive value that have accrued meanings over time. New Zealand shares a general responsibility with the rest of humanity to safeguard its cultural heritage **places** for present and future generations. More specifically, the people of New Zealand have particular ways of perceiving, relating to, and conserving their cultural heritage **places**.

Following the spirit of the International Charter for the Conservation and Restoration of Monuments and Sites (the Venice Charter - 1964), this charter sets out principles to guide the **conservation** of **places** of **cultural heritage value** in New Zealand. It is a statement of professional principles for members of ICOMOS New Zealand.

This charter is also intended to guide all those involved in the various aspects of **conservation** work, including owners, guardians, managers, developers, planners, architects, engineers, craftspeople and those in the construction trades, heritage practitioners and advisors, and local and central government authorities. It offers guidance for communities, organisations, and individuals involved with the **conservation** and management of cultural heritage **places**.

This charter should be made an integral part of statutory or regulatory heritage management policies or plans, and should provide support for decision makers in statutory or regulatory processes.

Each article of this charter must be read in the light of all the others. Words in bold in the text are defined in the definitions section of this charter.

This revised charter was adopted by the New Zealand National Committee of the International Council on Monuments and Sites at its meeting on 4 September 2010.

Purpose of conservation

1. The purpose of conservation

The purpose of **conservation** is to care for **places** of **cultural heritage value**.

In general, such **places**:

(i) have lasting values and can be appreciated in their own right;
(ii) inform us about the past and the cultures of those who came before us;
(iii) provide tangible evidence of the continuity between past, present, and future;
(iv) underpin and reinforce community identity and relationships to ancestors and the land; and
(v) provide a measure against which the achievements of the present can be compared.

It is the purpose of **conservation** to retain and reveal such values, and to support the ongoing meanings and functions of **places** of **cultural heritage value**, in the interests of present and future generations.

Appendix C. Photographic Record

Appendix C Photographic Record

Dairy and Machine House Building - Exterior

Figure C-1. Photograph looking west at the Castle Street façade of the dairy and machine house building.

Figure C-2. Photograph looking southeast at the eastern elevation showing two distinct portions: the eastern offices and the central dairy.

Figure C-3. Photograph looking south at the eastern elevation showing two distinct portions: the central dairy and the western machine house.

Figure C-4. Photograph looking east at the western wall of the machine house showing blocked-in windows.

Figure C-5. A close-up photograph looking east at the western wall of the machine house showing the blocked-in windows.

Figure C-6. Distinct dog-legged wall of the former shared wall between what was once the cellar (presently referred to as the dairy building) and the mill.

Dairy and Machine House Building - Exterior

Figure C-7. Photograph looking east at the former doorway or window arch located on the shared wall between what was once the cellar (presently referred to as the dairy building) and mill.

Dairy and Machine House Building - Interior

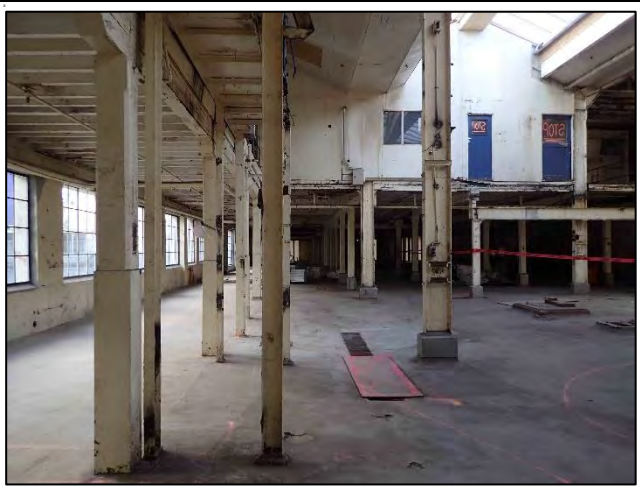

Figure C-8. Photograph looking east at second floor of the dairy and machine house building.

Figure C-9. Photograph looking north at partition wall with two blocked in windows and the bottom of the stairwell leading from the partitioned area to the first floor.

Figure C-10. Photograph looking east at the partitioned area at the east end of the dairy and machine house building.

Figure C-11. Photograph of penny tiles encountered in the east office end of the dairy and machine house building.

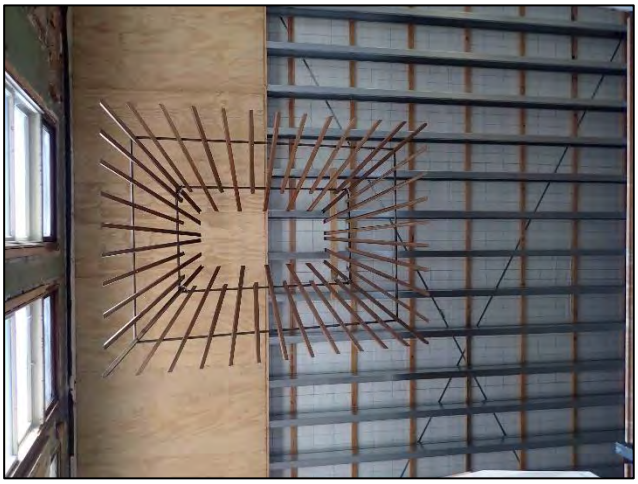

Figure C-12. Photograph showing the suspended screen visible in the 1966 plans above the stairwell to the second floor.

Figure C-13. Photograph looking south on ground floor of the dairy building at location of first former staircase. A landing is visible half-way up.

Dairy and Machine House Building - Interior

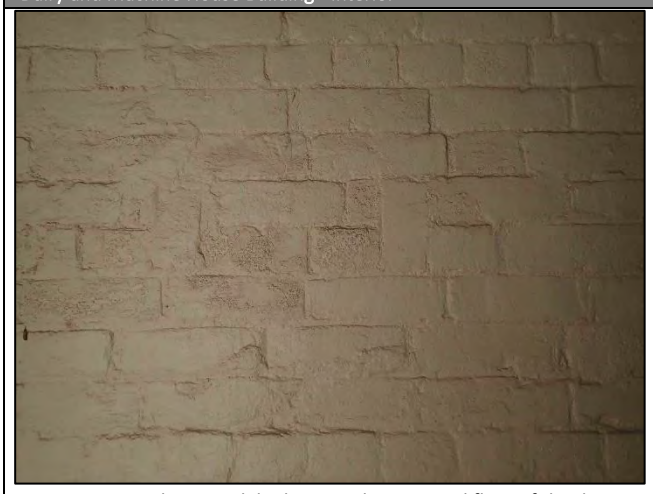

Figure C-14. Photograph looking south on ground floor of the dairy building at possible joist insertion points. These are at the same height as the first former staircase landing and possibly indicate there was a mezzanine floor at this height.

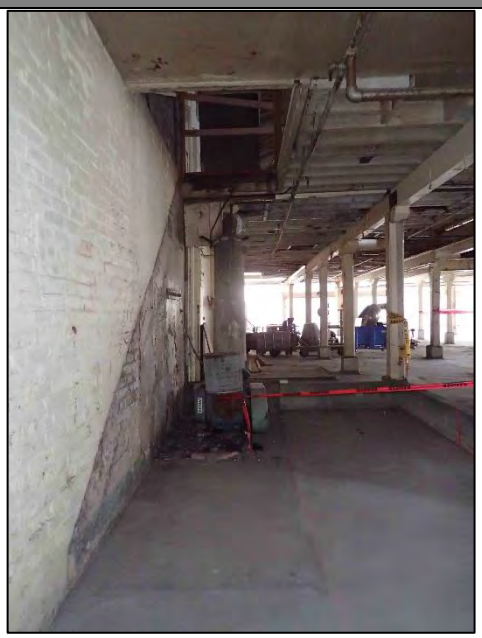

Figure C-15. Photograph looking west on ground floor of the dairy and machine house building at location of second former staircase visible in 1959 plans.

Figure C-16. Photograph looking north at single hung sash window in the office portion of the dairy and machine house building.

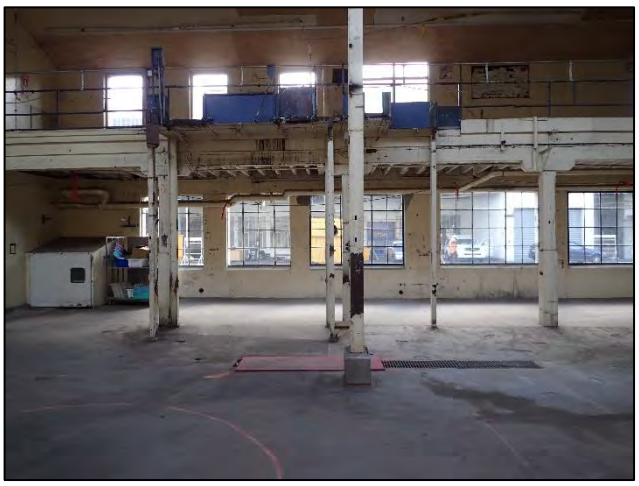

Figure C-17. Photograph looking north at multi-pane windows of the dairy central portion of dairy and machine house building.

Dairy and Machine House Building - Interior

Figure C-18. Photograph looking west at the ground floor of dairy and machine house building.

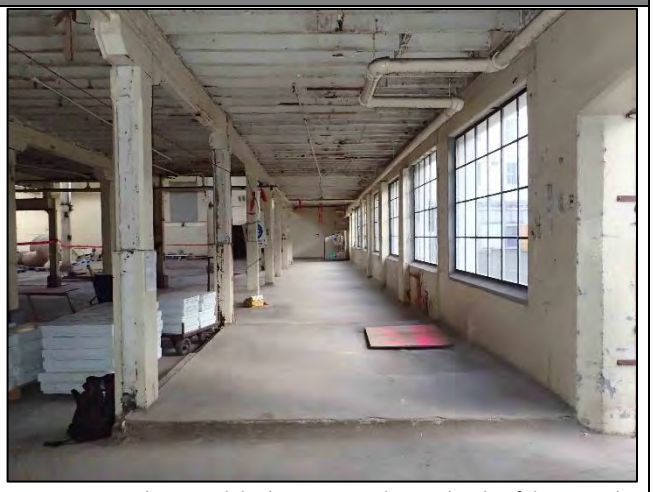

Figure C-19. Photograph looking west at the north side of the central dairy portion of the dairy and machine house building.

Figure C-20. Photograph showing penny tiling in the office portion of the dairy and machine house building.

Figure C-21. Photograph showing tiling in the central dairy portion of dairy and machine house building.

Figure C-22. Photograph looking south machine house portion of the dairy and machine house building. The larger cylindrical item to the right it the base of the once 90 ft. concrete chimney

Figure C-23. Photograph looking west at the plastered brick wall of ground floor in the machine house portion of dairy and machine house building.

Cadbury World Building - Exterior

Figure C-24. Photograph looking east at the Cumberland Street façade of Cadbury World.

Figure C-25. Photograph looking southwest at the eastern and norther wall of former smutters and kiln building. The upper floor was added sometime between 1892 and 1901, while the southern extension of 1901 is visible at the rear. There is one blocked in window on the eastern wall and another on the northern wall.

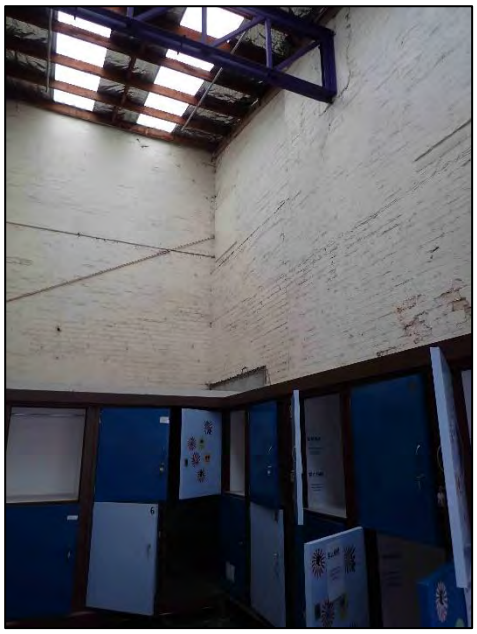

Figure C-26. Photograph looking southwest at the eastern wall of the former kiln and northern wall of the former mill building. The upper floor was added sometime between 1892 and 1901, while the southern extension of 1901 is visible at the rear. Note the jut into the wall is on the second storey.

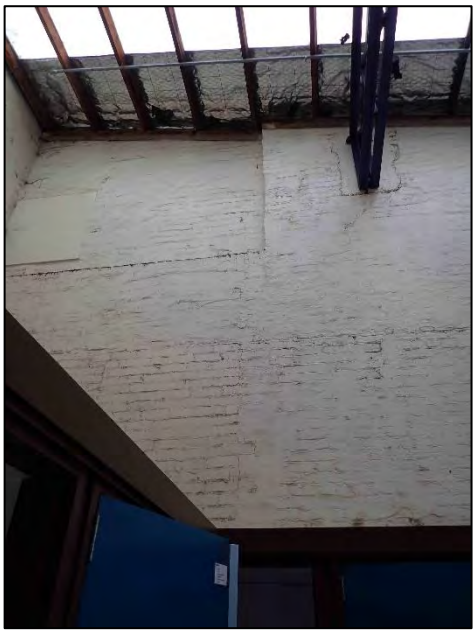

Figure C-27. Photograph looking southwest west at the eastern wall of the former kiln and northern wall of the former mill building. The upper floor was added sometime between 1892 and 1901, while the southern extension of 1901 is visible at the rear. Note the jut into the wall is on the second storey.

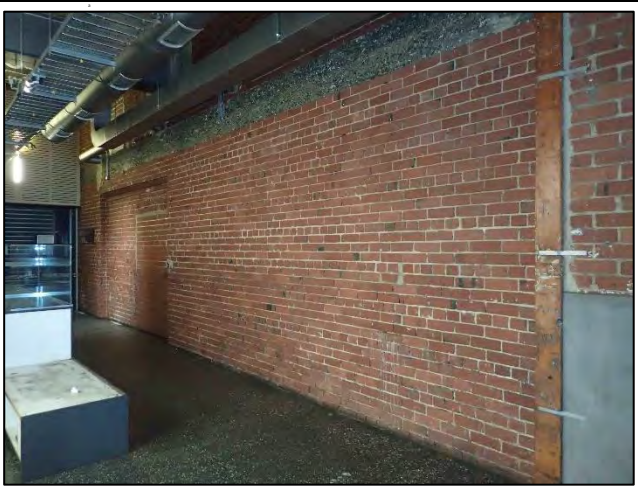

Figure C-28. Photographs looking northwest at southern internal partition wall on the ground floor of the Cadbury World café. The wall was likely present from 1922. Note the blocked-in doorway on the northern internal wall.

Figure C-29. Photographs looking northeast at the abutment of southern internal partition wall on the ground floor of the Cadbury World café to an earlier external wall to the west.

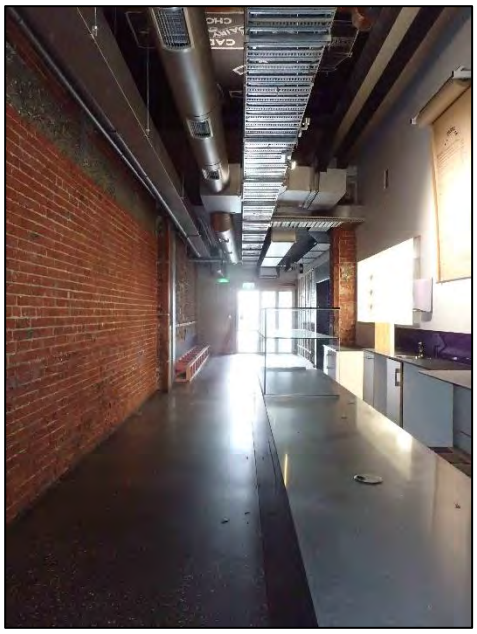

Figure C-30. Photograph looking west on the ground floor of the Cadbury building. Note the brick remnant of a north-south wall either side of the room. This is likely the original walls of the granary and malt floor building. The opening that they form was present by 1922 and may be associated with the earliest outlay of the building however this is unclear.

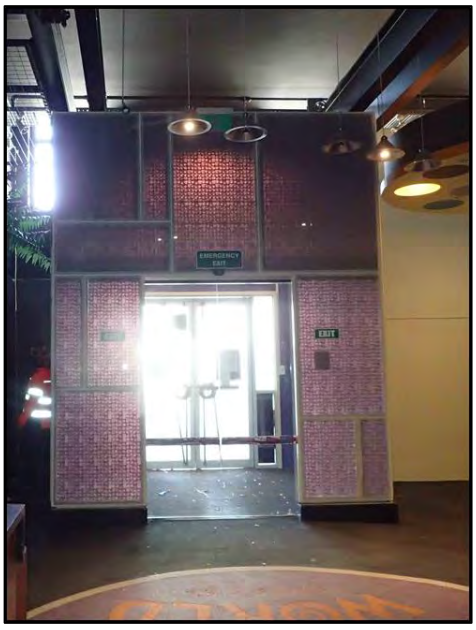

Figure C-31. Photograph looking west in the ground floor of the Cadbury World building showing steel beams. Note the windows of the mezzanine floor above the door in the photograph on the left.

Cadbury World Building – Ground Floor

Figure C-32. Photograph of interior wall of Cadbury World building that would have originally form the north exterior wall of the pre-1900 kiln. Note the bricked in windows of what was once the mezzanine level.

Figure C-33. Detail photograph of interior wall of Cadbury World building looking northwest that would have originally formed the north exterior wall of the pre-1900 kiln showing an arch above a blocked-in window.

Figure C-34. Detail photograph of interior wall of Cadbury World building that would have originally form the north exterior wall of the pre-1900 kiln showing a possible ground floor partition wall and joist insertion point for the original mezzanine level.

Figure C-35. Blocked in doorway in the former kiln building looking east.

Figure C-36. Blocked in doorway in the former kiln building looking east.

Figure C-37. Blocked in doorway in the former kiln building looking east.

Figure C-38. Blocked in window in the former kiln building looking northeast.

Figure C-39. Photograph looking east at blocked in doorway to the eastern room of the former kiln and smutters room.

Figure C-40. Photograph looking east at blocked in doorway to the eastern room of the former kiln and smutters room.

Figure C-41. Photograph looking east at two blocked in doorways (top) either side of current doorway (bottom) to the eastern room of the former kiln and smutters room.

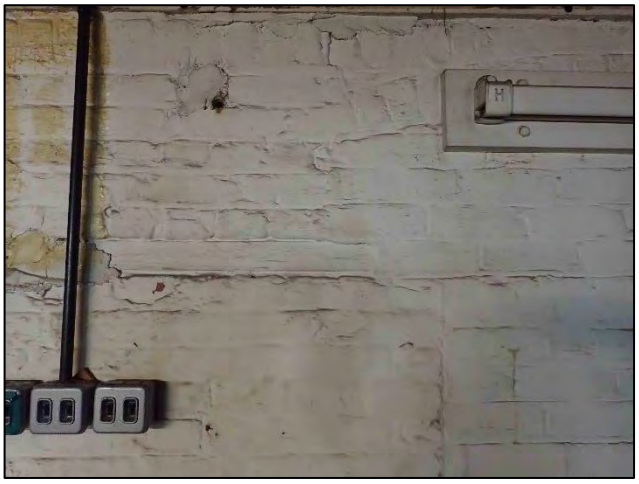

Figure C-42. Photograph looking south at detail of blocked in doorway of the former kiln building. Note the wood to the left of the doorway

Cadbury World Building – First Floor

Figure C-43. Photograph looking northwest at blocked in doorway and stepped out portion of the wall into the eastern room of the former kiln building.

Figure C-44. Photograph showing former stairwell in the 1901 southern extension looking west in the western area of the former kiln building.

Figure C-45. Photograph showing former stairwell in the 1901 southern extension looking southwest in the most easterly room of the same building (right)

Figure C-46. Photograph looking west at multi-pane fixed window on the first floor of Cadbury World.

Cadbury World Building – Second Floor

Figure C-47. Photograph looking south at column on second Floor 2 of the Cadbury World building with the 1901 southern extension behind.

Figure C-48. Photograph looking west at roof structure of the southern extension.

Figure C-49. Photograph looking north at the roof framing and the windows of the second-floor north wall of the Cadbury World building associated with the 1901-1915 storey addition. Prior to the 1915-1922 raising of the offices and shop building this would have been an exterior wall.

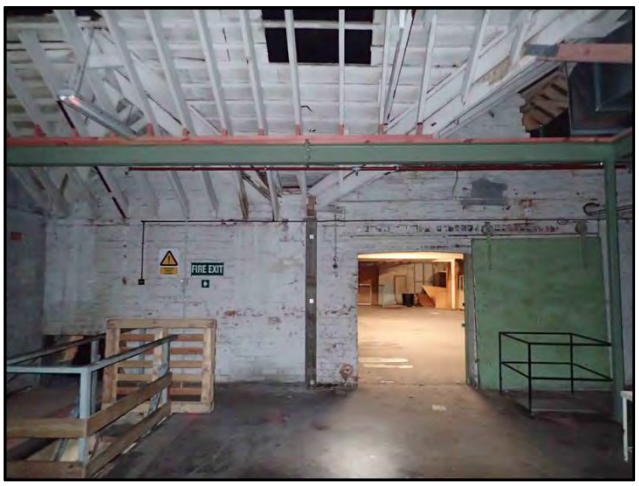

Figure C-50. Photograph looking north at interior of Cadbury World building showing steel framing added to roof structure and steel columns. Note earlier skylights have been covered.

Cadbury World Building – Second Floor

Figure C-51. Photograph looking east at a blocked in doorway in the second floor of the Cadbury World building, the most easterly room of the former kiln building.

Figure C-52. Photograph looking north (left) at a blocked in window in the second floor of the Cadbury World building, the most easterly room of the former kiln building.

Figure C-53. Photograph of tongue and grove timber underneath concrete of the floor in the 2nd floor of the Cadbury World building.

Cadbury Building – Third floor

Figure C-54. Photograph of window on third floor looking east from the confectionary factory of the Cadbury World building.

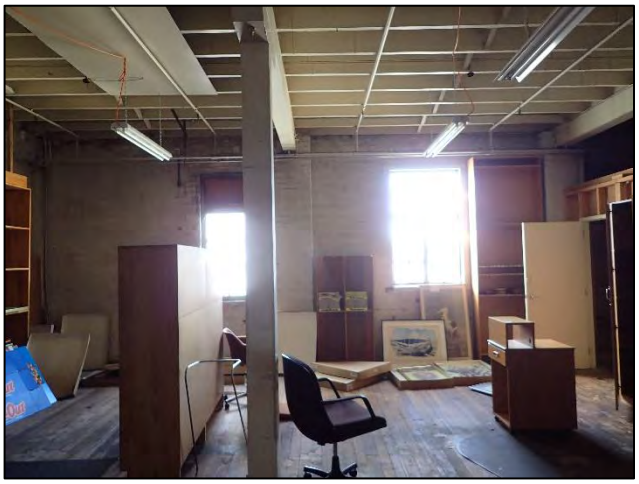

Figure C-55. Photograph of the confectionary factory of the Cadbury World building on third floor looking west.

Figure C-56. Photograph of the confectionary factory of the Cadbury World building on third floor looking west.

Office Building - Exterior

Figure C-57. Photograph looking east at the Cumberland Street façade of Office Building.

Figure C-58. Photograph looking west at the rear of the office building building and 1920s addition to the rear of Cadbury building

Office Building – Interior

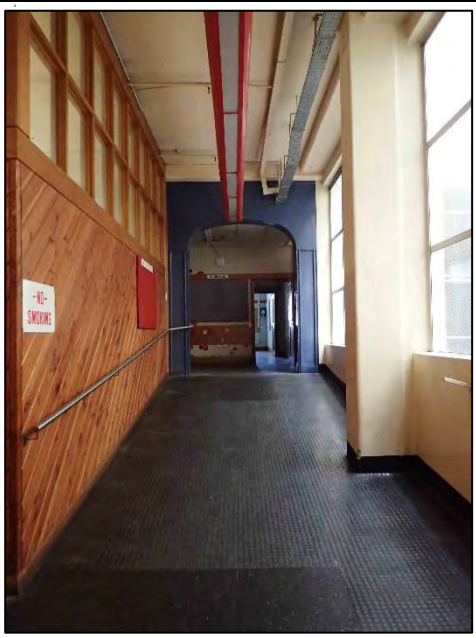

Figure C-59. Photograph looking west the rise to the front portion of office building in the 1924 extension of the ground floor.

Figure C-60. Photograph looking north at a former exterior window of the office building (Block 2A) associated with the 1915-1922 third storey addition to the building. This photograph is taken from the later 1922-1927 addition at the rear of the Cadbury World building on the first floor

Office Building – Interior

Figure C-61. Photograph looking south at office portion of Building 1 on first floor.

Figure C-62. Photograph looking northwest at office portion of the office building on the first floor showing Cadbury Joyville sign

Figure C-63. Photograph looking south at office portion of the office building on the first floor.

Figure C-64. Photograph looking southwest at office building on the second floor..

Office Building – Interior

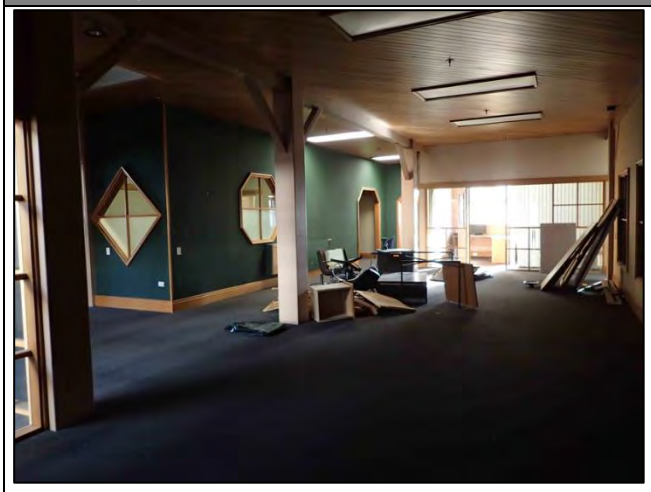

Figure C-65. Photograph looking northeast at office space on the third floor.

Figure C-66. Photograph looking northwest at office portion of the office building showing former exterior windows associated with the 1915 addition to the building. This photograph is taken from the later 1922-1927 addition at the rear of the Cadbury World building on the third floor.

Figure C-67. Photograph of window on third floor looking west facing out from the mansard roof (right).

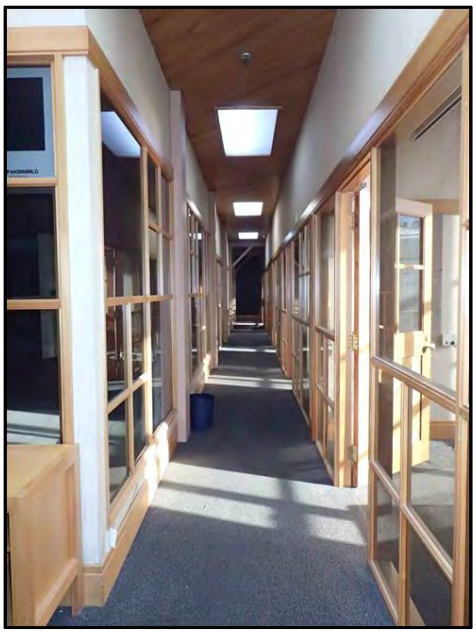

Figure C-68. Photograph looking west at office corridor on the third floor.

Office Building – Interior

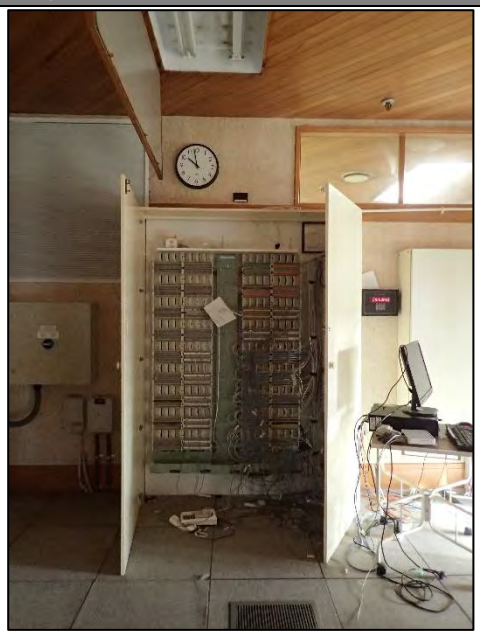

Figure C-69. Photograph looking south at computer boards on third floor.

Chocolate Factory and Garage Building - Exterior

Figure C-70. Photograph looking east at the Cumberland Street façade of the chocolate factory and garage building

Chocolate Factory and Garage Building - Interior

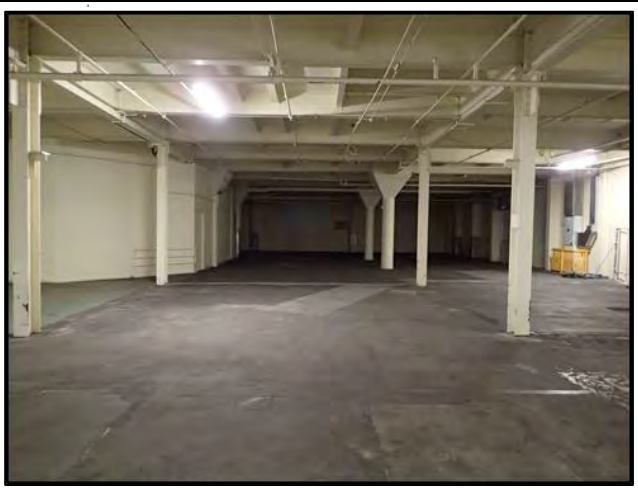

Figure C-71. Photograph looking west at at the former garage on the ground floor.

Figure C-72. Photograph looking north at chocolate factory and garage building on the first floor.

Figure C-73. Photograph looking north at corridor along chocolate factory and garage building on the first floor.

Chocolate and Biscuit Factory Building - Exterior

Figure C-74. Photograph looking west at the Castle Street façade of the chocolate and biscuit factory.

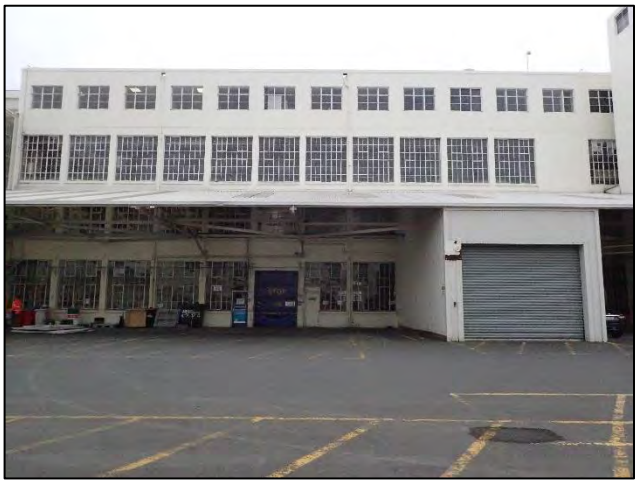

Figure C-75. Photograph looking north at the southern elevation of the chocolate and biscuit factory.

Chocolate and Biscuit Factory Building - Interior

Figure C-76. Photograph looking east at chocolate and biscuit factory building on the ground floor.

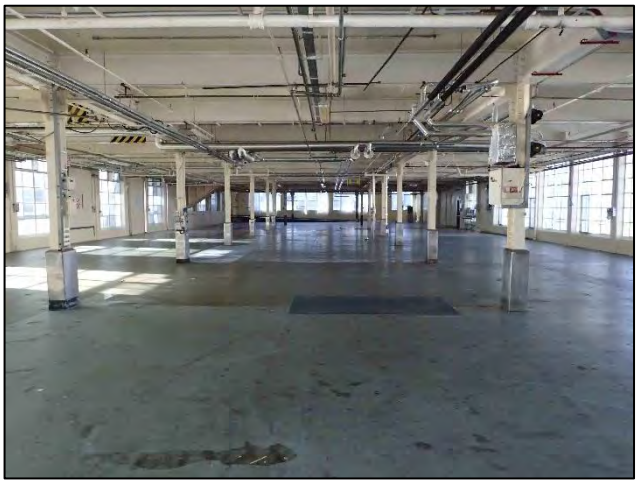

Figure C-77. Photograph looking east at chocolate and biscuit factory building on the second floor.

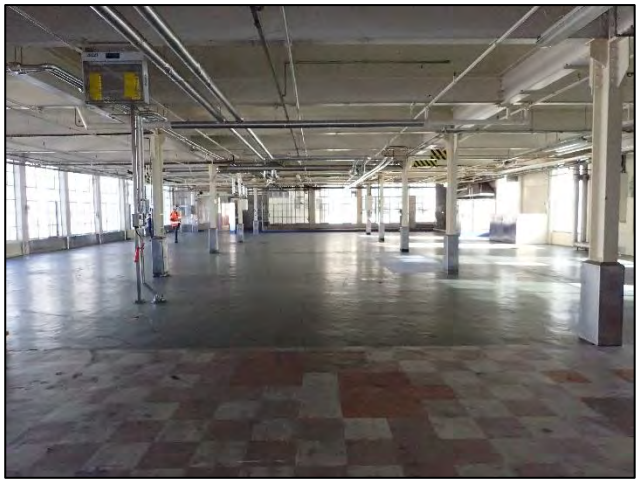

Figure C-78. Photograph looking west at chocolate and biscuit factory building on the second floor.

Figure C-79. Photograph looking west at third floor cafeteria of chocolate and biscuit factory building.

Chocolate and Biscuit Factory Building - Interior

Figure C-80. Photograph looking east at third floor cafeteria of Building 3 (Block B-C).

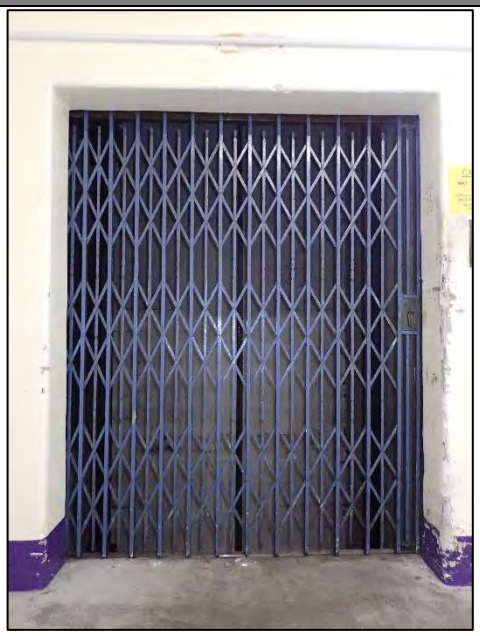

Figure C-81. Photograph looking west at third floor lift shaft.

Figure C-83. Photograph looking south at tongue and grove wall lining on the second floor of Building 3 (Block C).

Figure C-82. Photograph looking south at bricked in wall section in Block B-C of Building 3 on the ground floor

Chocolate and Biscuit Factory Building - Interior

Figure C-84. Photograph looking east at decorative window in Building 3 Building 3B-C on the second floor.

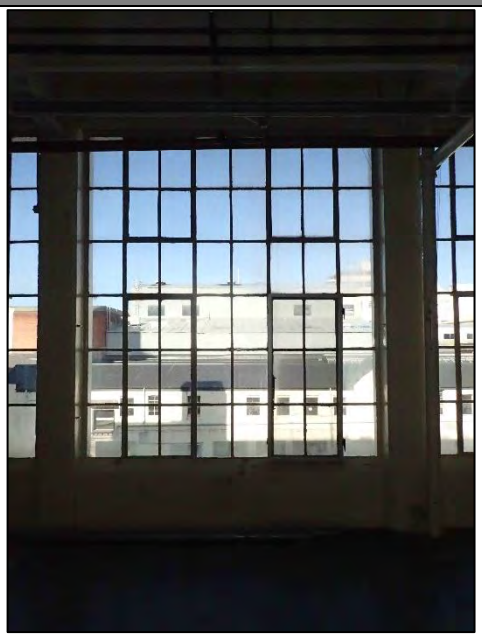

Figure C-85. Photograph looking south (left) and east (right) at variant multi-pane window on the second floor of building 3 (Block 3B-C) second floor.

Engineering Workshop, Labs and Office Building - Exterior

Figure C-86. Photograph looking northeast at the Cumberland Street façade of engineering workshop, labs and office building.

Figure C-87. Photograph looking west at overbridge between the engineering workshop, labs and office building (Blocks 4A) and the biscuit and dispatch building (Block 5A).

Engineering Workshop, Labs and Office Building - Interior

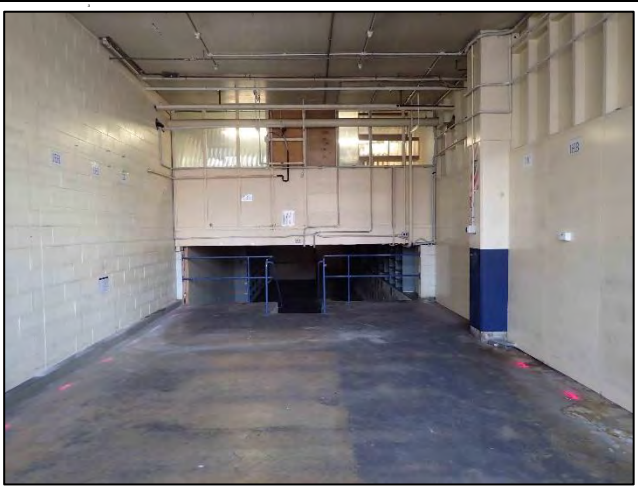

Figure C-88. Photograph looking east into basement and at mezzanine of engineering workshop, labs and office building from ground level.

Figure C-89. Photograph looking east at basement wall of Building 4 (Block 4A). Note the brick infill and the open window running up into the mezzanine level above.

Figure C-90. Photograph looking east at tongue and groove of mezzanine above basement in engineering workshop, labs and office building.

Figure C-91. Photograph of corridor in engineering workshop, labs and office building looking east on the ground floor.

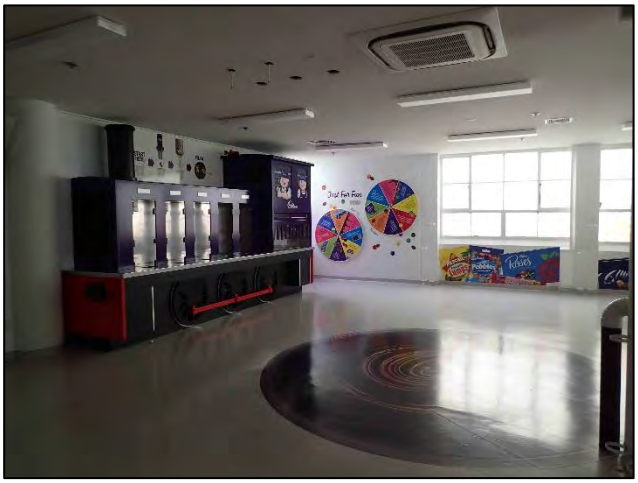

Figure C-92. Photograph looking northwest at Cadbury tour space in engineering workshop, labs and office building on the first floor.

Figure C-93. Photograph looking west at food testing laboratory in engineering workshop, labs and office building on the first floor.

Engineering Workshop, Labs and Office Building - Interior

Figure C-94. Photograph looking west at engineering workshop, labs and office building showing tin wash on second floor.

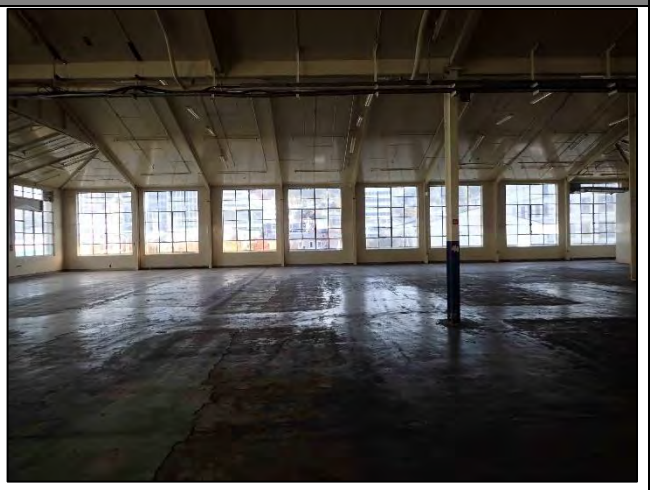

Figure C-95. Photograph looking west at engineering workshop, labs and office building on the second floor.

Figure C-96. Photograph looking west window of engineering workshop, labs and office building on the first floor.

Figure C-97. Photograph looking northwest at office space in the engineering workshop, labs and office building on the first floor.

Biscuit and Dispatch Building - Exterior

Figure C-98. Photograph looking southeast at the Cumberland Street façade of the biscuit and dispatch building.

Figure C-99. Photograph looking southwest at the Castle Street façade of the biscuit and dispatch building.

Figure C-100. Photograph looking northeast at the rear of the biscuit and dispatch building.

Biscuit and Dispatch Building - Interior

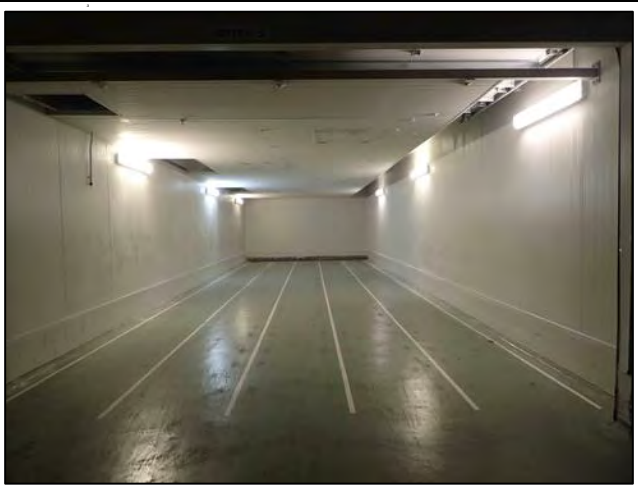

Figure C-101. Photograph of drying room in the biscuit and dispatch building (Block 4C) looking west on the ground floor.

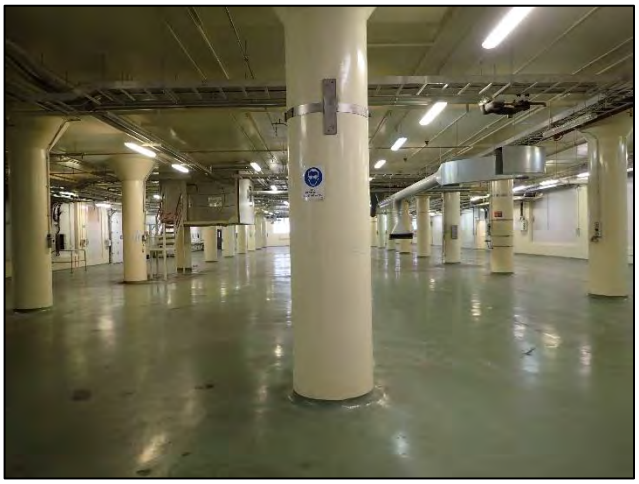

Figure C-102. Photograph looking west at ground floor in the biscuit and dispatch building (Block 5A-B).

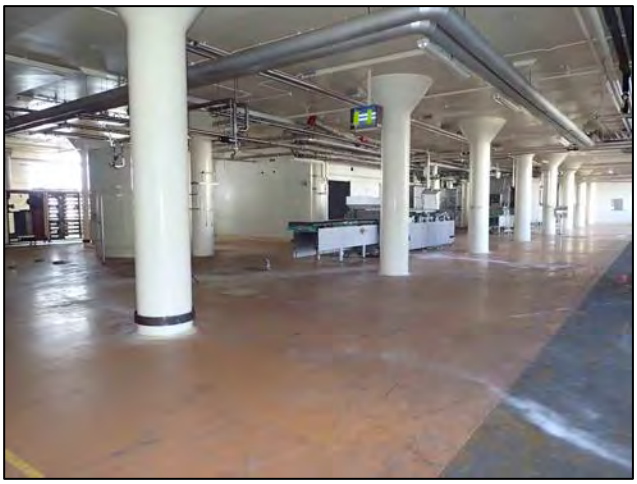

Figure C-103. Photograph looking northwest at the biscuit and dispatch building (Block 5A-B) on the first floor.

Figure C-104. Photograph looking north at the biscuit and dispatch building (Block 5A) on the first floor.

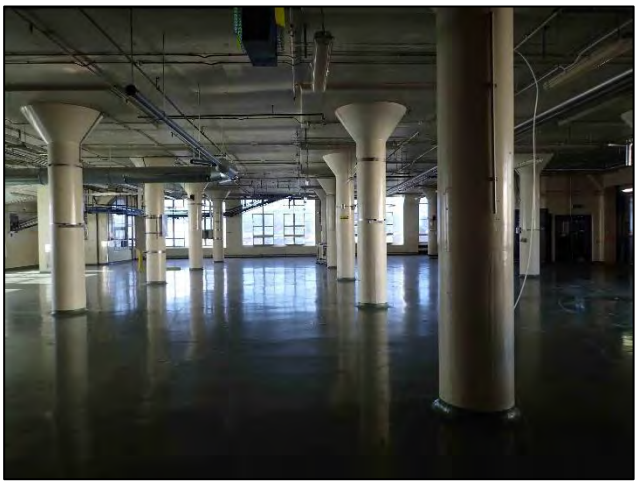

Figure C-105. Photograph looking east at the second floor of the biscuit and dispatch building (Block 5C)

Figure C-106. Photograph looking south at the second floor of the biscuit and dispatch building (Block 4C)

Biscuit and Dispatch Building - Interior

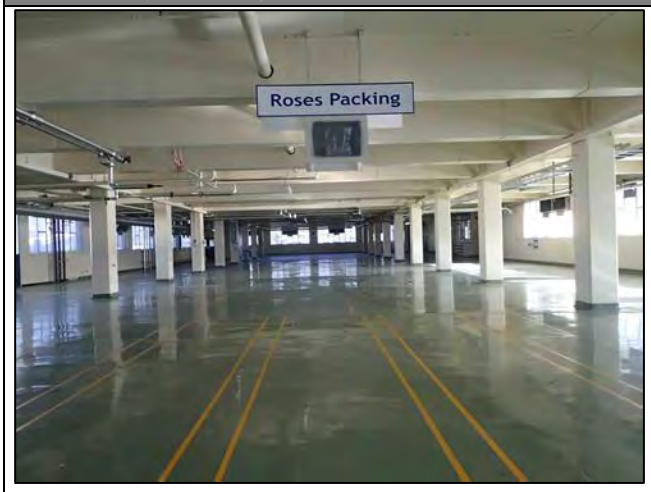

Figure C-107. Photograph of the biscuit and dispatch building (Block 5C) on the third floor looking west.

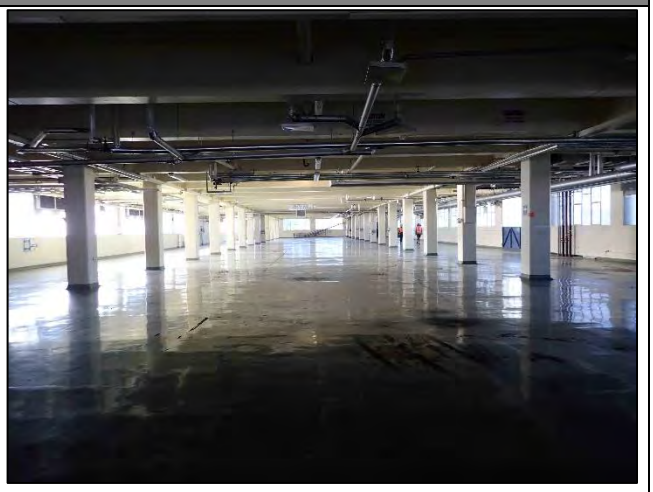

Figure C-108. Photograph looking east at the biscuit and dispatch building (Block 5B-C) on the third floor.

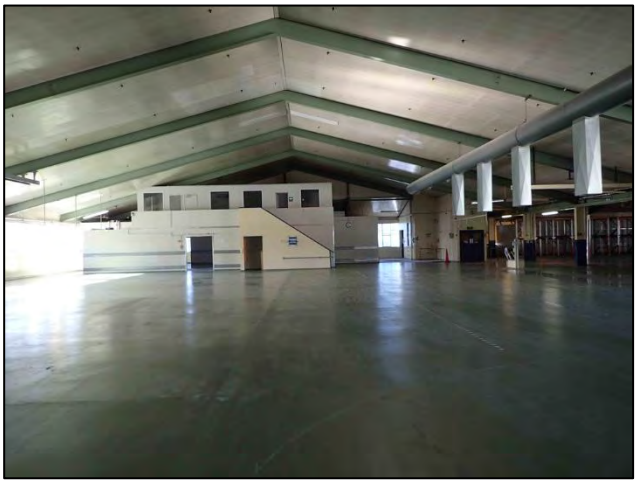

Figure C-109. Photograph looking east at fourth floor of the biscuit and dispatch building (Block 5C).

Figure C-110. Photograph looking west at fourth floor of the biscuit and dispatch building (Block 5C).

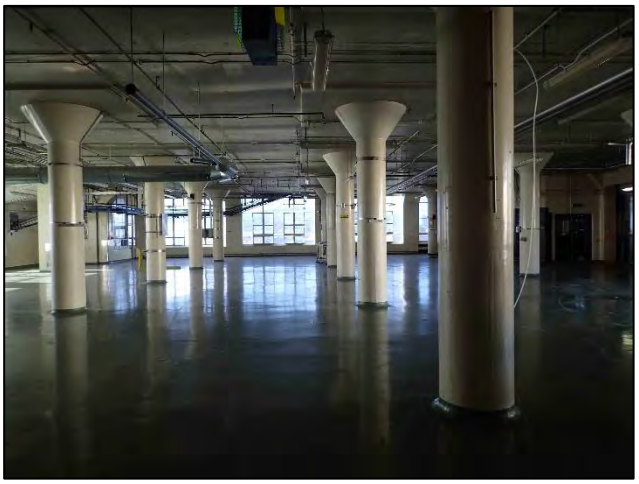

Figure C-111. Photograph looking east at windows on the second floor of the biscuit and dispatch building (Block 5C)

Figure C-112. Photograph looking southeast at windows on the third floor of the biscuit and dispatch building (Block 5C)

Other Buildings on the Premises

Figure C-113. Photograph looking southeast at central boiler house constructed in the 1940s (Block 4B).

Figure C-114. Photograph looking north at central boiler house constructed in the 1940s (Block 4B).

Figure C-115. Photograph looking northeast at central boiler house extensions in the 1950s and 1960s (Block 4B).

Figure C-116. Photograph looking north at ground floor in central boiler house (Block 4B).

Other Buildings on the Premises

Figure C-117. Photograph looking west at ground floor wall in central boiler house (Block 4B). Note the concrete and steel construction.

Figure C-118. Photograph looking north east at covered in area (Block 4B) to the rear of the dispatch building, possibly once the exterior as features the same brown tiling as seen on Building 4 façades.

Appendix 8: District Plan Compliance Assessment

Proposed Dunedin Second Generation District Plan (2GP)

Provision	Relevant Requirement	Commentary
Definitions		
Definition of "temporary activities"	means: The category of land use activities that consists of: • Construction	"Construction" includes demolition as per definition below.
Definition of "construction"	means: The use of plant, tools, gear or materials as part of the erection, installation, repair, maintenance, alteration, dismantling or demolition of any building or structure; or site development. This definition includes all work from site preparation to site restoration.	"Construction" includes demolition.
City Wide Activities		
Temporary activity rule 4.3.2.1	The following performance standards that apply to all "temporary activities": a. Development standards b. Light spill	Confirms the performance standards that apply to demolition. See below for relevant performance standards that apply.
Temporary activity rule 4.3.2.2	Construction is a permitted activity where the relevant performance standards are met.	Confirms demolition is permitted where performance standards are met. See below for relevant performance standards.
Noise performance standards 4.5.4.1(a)	Construction must not exceed the following limits measured and assessed in accordance with NZS6803:1999 Acoustics Construction Noise. Construction noise received at buildings housing "noise sensitive activities": - Weekdays, 6.30am – 7.30am = $55dB_{LAeq}/75_{Lmax}$ - Weekdays, 7.30am – 6.00pm = $70dB_{LAeq}/85_{Lmax}$	Does not comply. Noise from the proposed demolition works will be received in a buildings housing 'noise sensitive activities'. In addition, noise will be received in the surrounding industrial and commercial zones.

Provision	Relevant Requirement	Commentary
	- Weekdays, 6.00am – 8.00pm = $65dB_{LAeq}/80_{Lma}$ - Weekdays, 8.00pm – 6.30am = $45dB_{LAeq}/75_{Lma}$ - Saturdays, 7.30am – 6.00pm = $70dB_{LAeq}/85_{Lmax}$ - Saturdays, 6.00pm – 7.30am = $45dB_{LAeq}/75_{Lmax}$ Construction noise received in industrial, commercial, and mixed use zones (other than above): - Any day, 7.30am – 6.00pm = $70dB_{LAeq}$ - Any day, 6.00pm – 7.30am = $75dB_{LAeq}$	The proposed above ground demolition works are expected to take approximately 80 weeks. Accordingly, the 'long term duration' noise limits apply. The noise and vibration assessment from Marshall Day Acoustics (**Appendix 5**) confirms that the proposed demolition works will not comply with these limits at times, and therefore will not be a permitted activity.
Noise performance standards 4.5.4.1(b)	Vibration from construction must not exceed a maximum particle velocity measured on any foundation of an adjacent building on another site, or 25mm/second for commercial buildings or 10mm/second for buildings housing noise sensitive activities.	Does not comply. The noise and vibration assessment from Marshall Day Acoustics (**Appendix 5**) confirms that the proposed demolition works will not comply with these limits at times, and therefore will not be a permitted activity.
Noise performance standards 4.5.4.1(c)	Construction that exceeds the noise limits in noise performance standard 4.5.4.1(a) by less than 5dB LA_{eq} (15min) is a discretionary activity.	The noise and vibration assessment from Marshall Day Acoustics (**Appendix 5**) confirms that the proposed demolition works will at times exceed the noise limits by more than 5dB, and therefore will not be a discretionary activity.
Noise performance standards 4.5.4.1(c)	Construction that exceeds the noise limits in noise performance standard 4.5.4.1(a) by more than 5dB LA_{eq} (15min) is a non-complying activity.	The noise and vibration assessment from Marshall Day Acoustics (**Appendix 5**) confirms that the proposed demolition works will at times exceed the noise limits by more than 5dB, and therefore will be a non-complying activity.
Development performance standard 4.5.1.1	Temporary buildings, structures, earthworks, and site development activities associated with temporary activities must meet the maximum height, height in relation to boundaries,	Complies. All temporary buildings and structures, and site development activities will

Provision	Relevant Requirement	Commentary
	setbacks, hazard exclusion areas, vegetation clearance standards, and earthworks performance standards of the zone in which they are located, except: a. temporary signs (see Rule 4.5.7); b. setbacks from coast and water bodies, provided buildings and structures are set back from the coast or water bodies a minimum of 5m; and c. temporary buildings and structures associated with construction are exempt from meeting performance standards for maximum height, height in relation to boundary, and boundary setbacks provided they are erected for no more than 90 days.	meet the maximum 20m height performance standard for the CBD Edge Commercial North zone. There is no relevant setback, hazard exclusion area, or vegetation clearance performance standards relevant to the site. No earthworks are proposed as part of this proposal.
Light spill performance standard 9.3.5	Light spill measured at the notional boundary of any residential building must not exceed 10 Lux between 7am-10pm. Light spill standard does not apply to light spill from the headlights of motor vehicles.	Complies. No exterior lighting is proposed as part of the demolition, and therefore the performance standard does not apply.
Development activity status rule 18.3.6.28	Demolition of a protected part of a scheduled heritage building is a non-complying activity.	Does not comply. Demolition of the protected street facades of the Cadbury Confectionary Company buildings is proposed (other than the Dairy and Machine House building).

Appendix 9: Aukaha Cultural Narrative Precis

Cultural Narrative Précis

Prepared for: Ministry of Health

Project Name: New Dunedin Hospital

Introduction and overview

Mana whenua, led by Aukaha Limited, are deeply invested in the New Dunedin Hospital (NDH) project. This interest is driven primarily by the NDH's *location* and *function*. Aukaha is therefore hopeful that the NDH, though ultimately a utilitarian facility, can thoughtfully reflect Kāi Tahu history before and since 1848, especially as it relates to the upper harbour area. By such means, we seek to avoid a continuation of the worst parts of that history: namely, the active obstruction of a collective Kāi Tahu presence in and around Dunedin – and consequent Māori health inequities that continue to burden Māori lives and households in southern Te Waipounamu.

Location

From a Kāi Tahu vantage, the NDH site is a window into the harsh realities of Dunedin's colonial settlement. Put differently, the post-1848 history of this general area illustrates the process by which nineteenth century Kāi Tahu became strangers and trespassers in their own lands.

This process of subjugation happened quite quickly. In 1848 local Kāi Tahu boat crews helped pilot British immigrant ships into Otago Harbour. These people taught colonists how to fish, ferried their families and goods from Koputai to Ōtepoti, and assisted colonists with their first buildings. As Thomas Hocken wrote, "The Maoris helped their new comrades with all the good humour of the race; indeed their assistance was invaluable in the erection of these primitive dwellings."[i] However, as occurred with Māori in other parts of New Zealand – and indeed indigenous people throughout the Anglo-settler world – as soon as colonists were independent of Kāi Tahu, the former looked upon the latter with a mixture of indifference and contempt. This occurred as early as 1851 when colonial authorities physically removed Kāi Tahu from a favoured campsite in Rattray Street; an evening of haka apparently being the final straw.[ii]

The seeds of this situation were sewn in 1844 when colonial officials rejected attempts by Kāi Tahu leaders to secure boat landings and adjacent reserves in the upper harbour. This was despite colonial officials noting longstanding Māori occupation and use of this area.[iii] Undeterred, Kāi Tahu continued to lobby Crown officials for land in the upper harbour after 1848 and central government granted a Māori reserve on Dunedin's foreshore in 1852. Otago's provincial council bitterly opposed this course of action and worked hard to overturn it. This was achieved in 1866 when the government vested the reserve in the council, effectively ending collective Kāi Tahu land ownership within Dunedin city.[iv]

Central government also intervened in the late 1850s to erect a residence for Kāi Tahu visiting Dunedin after the provincial council consistently failed to do so. Until then, men and women, young and old, mainly from Ōtākou, were reduced to sleeping under upturned boats, even in the depths of winter with snow on the ground.[v] Built on council-owned land at the foot of High Street, this modest "Native Hostelry" was completed in early 1860 and became a popular marketplace. It was here that Kāi Tahu groups continued to sell fish and potatoes to colonists in mutually beneficial exchanges. However, the building was literally buried and then dismantled a mere five years later as Princes Street was backfilled and widened during the gold-rush.[vi] Promises of a replacement facility were not honoured.[vii] As one historian recently put it, "Ōtākou Māori…effectively lost access to the Dunedin market, just as it boomed."[viii]

The process of land reclamation that consumed the Native Hostelry, especially after Bell Hill was quarried and spread out over the adjoining foreshore, continued in patchworked fits and bursts in the upper harbour over the next hundred years. This land was given over to mainly industrial uses, including the former Cadbury site which is at the heart of the NDH. In any event,

reclamation negatively impacted upon the ecology of Otago Harbour, which is a key mahika kai (food source) for Kāi Tahu. The harbour's fish and shellfish also came under huge pressure as colonists began commercial fishing. By 1876, for example, 16 boats and 40 men worked the inner harbour alone.[ix] This overfishing undermined traditional Kāi Tahu reliance on maritime resources,[x] but did so precisely as colonial settlement severely restricted access to land-based mahika kai. As a government commissioner wrote in 1891:

> In olden times, before the advent of the Europeans and the settlement of the country, [Kāi Tahu] were at liberty to go at will in search of food, but now, should they chance to go fishing or bird-catching in any locality where they have no reserve, they are frequently ordered off by the settlers.[xi]

In summary, for Kāi Tahu, colonial land loss and the attendant erosion of political power and mahika kai, which began in 1848, are all observable at and through the NDH site. While these are undeniably difficult aspects of Dunedin's past, this history also shows that our Kāi Tahu ancestors were, as with colonial-era Māori more generally, "adaptive and…influential survivors, rather than perpetual victims."[xii] Aukaha believes that the NDH project presents multiple opportunities to thoughtfully reflect that tenaciousness.

Function

The colonial state purchased land from Kāi Tahu in essentially eight large transactions.[xiii] The biggest of these, by a huge margin, was Kemp's Deed, which was hurriedly and haphazardly undertaken in mid-1848. This covers the bulk of Te Waipounamu, including most of present-day Canterbury and Otago. During negotiations for this block, and so too the later Murihiku Deed in 1853, government agents held out the promise of schools and hospitals to Kāi Tahu communities as part payment for tribal lands. Indeed, a government agent involved in both transactions later attested that:

> [I]n making purchases from the natives I ever represented to them that though the money payment might be small, their chief recompense would lie in the kindness of the Govt. towards them, the erection & maintenance of schools & hospitals for their benefit.[xiv]

This official thought regional hospitals should be established and made available to Kāi Tahu people. He further thought these facilities would be supplemented by roaming medical attendants who visited Kāi Tahu villages. The Ōtākou-based chief, Te Matenga Taiaroa confirmed that during land purchase negotiations "there were other words referring to schools [and] hospitals…on account of which the land was given."[xv] Likewise, in 1879 the Ruapuke Island-based chief, Teone Topi Patuki recalled that he and other Kāi Tahu representatives assented to purchase terms presented to them decades earlier due to mention of health and education facilities.[xvi] Indeed, the aforementioned government agent explained that, "I found these promises of great weight in inducing the Natives to come in-but these promises have not yet been fulfilled."[xvii] These "promises" of schools and hospitals, in his words, were "of great use" in breaking "down their strong and most justifiable opposition…and in facilitating the acquisition of…lands …nearly as large as England."[xviii]

Kāi Tahu appeals for schools and hospitals throughout and beyond the 1850s thus became part and parcel of Te Kerēme, the so-called Ngāi Tahu Claim. As the Waitangi Tribunal wrote in 1991, this became "an essential part of [the] overall claim for recognition that the Crown had yet to fulfil the terms of the purchases."[xix] The Tribunal noted that government built a hospital in Dunedin in the 1850s, "apparently as a direct response to Ngai Tahu [sic] representations."[xx]

However, it found that after the Otago province took this facility over in 1856, central government provided minimal financial assistance for Māori patients who "soon found themselves unwelcome there."[xxi] A Crown historian thus admitted to the Tribunal that the government's

provision of medical care to Kāi Tahu was "woefully inadequate."[xxii] This historical context also helps to explain the significance of the NDH to Kāi Tahu.

In addition to these underlying features – of place and of history – Kāi Tahu interest in the NDH is motivated by contemporary challenges. We refer here to a range of negative health outcomes experienced by Kāi Tahu and mātāwaka in southern Te Waipounamu, compared with the region's non-Māori population. Reducing these health inequities is a key concern for Aukaha and requires ongoing and coordinated input from iwi and whānau as well as the state and health practitioners. In so doing, the NDH building itself will play a crucial role. For example, physical expression of values such as tapu, mana, whakapapa and mauri will have a direct bearing on the utility and efficacy of the NDH for Māori users and Māori staff alike. Aukaha is therefore committed to creative design processes that achieve this in ways that are culturally relevant but also fiscally prudent and operationally practical.

Conclusion

Demolition of the former Cadbury factory, which forms the corpus of the NDH site, will shortly begin. Those tasked with building the NDH, and indeed the public at large, will soon view this block of land as a blank slate – in much the same way as Dunedin's earliest Pākehā colonists viewed the upper harbour in the 1840s. However, then, as now, Kāi Tahu history lays beneath and Kāi Tahu hopes for the future hang in the air. Aukaha, on behalf of Mana whenua and Papatipu Rūnaka, looks forward to refining these aspirations and weaving them into the NDH.

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[i] Thomas Hocken, *Contribtuions to the Early History of New Zealand [Settlement of Otago]*, (London: Sampson Low, Marston and Company, 1898), pp. 95-97.

[ii] Jonathan West, *The Face of Nature: An Environmental History of the Otago Peninsula*, (Dunedin, N.Z.: Otago University Press, 2017), p. 180; Bill Dacker, *Te Mamae me te Aroha – The Pain and the Love: A history of Kāi Tahu Whānui in Otago, 1844 – 1994*, (Dunedin, N.Z.: Otago University Press, 1994), pp. 31-32.
and Dacker

[iii] See for example, Edward Shortland, *The Southern Districts of New Zealand: A Journal with Passing Notices of the Customs of the Aborigines*, (London: Longman, Brown, Green & Longmans, 1851), pp. 174-76; "THE OTAKOU NATIVE LAND CLAIMS: THEIR ORIGIN, HISTORY, AND DEVELOPMENT," *Otago Daily Times*, 12 November 1892, p. 5.

[iv] Dacker, pp. 32, 37-38; West, p. 329.

[v] Dacker, p. 42; West, pp. 180-81; Shrader, pp. 197.

[vi] Schrader, pp. 197-98; West, p. 181.

[vii] West, p. 181.

[viii] Ibid.

[ix] West, p. 216.
[x] See Ibid., pp. 215-17; 264-65.
[xi] Alexander Mackay, Report on Middle Island Native Land Question, *AJHR* (1888), p.8. See also West, p. 264.
[xii] After Hautahi Kingi, "The Past Matters: Reflections on Tangata Whenua," *The Pantograph Punch*, 15 April 2015: https://www.pantograph-punch.com/post/past-matters-tangata-whenua, and K. R. Howe, "Review of Michael King, *The Penguin History of New Zealand*," *New Zealand Herald*, 23 October 2003: https://www.nzherald.co.nz/lifestyle/news/article.cfm?c_id=6&objectid=3530379
[xiii] There were technically 10 land purchases, but three of these – the Port Cooper Deed, Port Levy Deed and Akaroa Deed (entered into between 1849 and 1856) – relate to Banks Peninsula.
[xiv] Waitangi Tribunal, *Ngāi Tahu Land Report 1991*, 19.2.1.
[xv] Ibid., 8.10.13.
[xvi] Ibid., 10.6.4.
[xvii] Ibid., 8.8.21.
[xviii] Ibid., 19.2.2.
[xix] Ibid., 2.13.
[xx] Ibid.
[xxi] Ibid.
[xxii] Ibid.

Appendix 10: CCM Design Memorandum

MEMORANDUM **MEMO-001.A**

Project	**NEW DUNEDIN HOSPITAL : PRELIMINARY SITE MASTERPLANNING**	
Subject	Cadbury Heritage Facades	
Date	08 October 2019	
Prepared by	Adam Flowers,	Director, CCM Architects
Prepared for	Ministry of Health	

1.0 Introduction

This memorandum has been prepared for the Ministry of Health as a commentary to inform decision making on the possible retention (or otherwise) of the Cadbury facades on Cumberland and Castle streets in the context of Preliminary Site Masterplanning and facility healthplanning. This memorandum should be read in conjunction with the WSP Opus Engineering Assessment of Existing Facades and the New Dunedin Hospital Preliminary Site Masterplan document. This memorandum does not make any comment on the history of the site, heritage value, or quality of the existing buildings or facades; reference should be made to specialist architectural heritage advice in this regard.

2.0 Preliminary Site Masterplan

An excerpt from the Preliminary Site Masterplan Report (the Masterplan) is attached as Appendix 1. It sets out the preferred configuration for the Acute Services Building (ASB) and the Ambulatory Services Centre (ASC) related to the New Dunedin Hospital project.

As set out in the Masterplan document, the preferred configuration was developed using a range of principles and criteria including geo-technical conditions, urban design, heritage features, land ownership and, importantly, the functionality and accessibility of the buildings for their principal purpose. These criteria were articulated through a workshop process with the Southern District Health Board. The principles and the Masterplan have been endorsed by the Southern Partnership Group. The criteria are described in detail in the Masterplan. Options were assessed against these principles and criteria.

As part of the master-planning process, engagement with a wide range of parties was undertaken. This included extensive functional briefings with the clinical users to determine the requirements of the building and high-level engagement with the Dunedin City Council, Heritage New Zealand, Ngai Tahu, and University of Otago. The project has also been discussed with the Otago Polytechnic, Otago Regional Council, and NZTA through the Local Advisory Group established through the New Dunedin Hospital project.

3.0 Spatial Arrangement

Various spatial arrangements were tested during this process including:

- Locating both buildings on the northern block (known as the Wilsons block)
- Locating both buildings on the southern block (known as the Cadbury Block)
- Locating the larger Acute Services Block (ASB) on the Wilsons Block, with the smaller Ambulatory Services Building (ASC) on the Cadbury block
- Locating the ASB on the Cadbury Block with the ASC on the Wilsons Block.

Through a series of workshops with the SDHB it was determined that locating the ASB on the Cadbury Block with the ASC on the Wilsons Block provided the optimal spatial configuration for the following reasons:

- It locates the smaller and lower buildings (ASC) in the northern block and the largest and tallest building form (ASB) in the southern block. This provides a preferred urban form within the context of the grain of the wider CBD.

- It locates the main entrances of the hospital facilities closer to the centre of Dunedin and to the new Bus Hub

- It creates the opportunity for public outdoor amenity to the north and west of the site where it benefits from good sun and daylight. The reverse configuration would create the undesirable effect of over-shadowing of the newly created outdoor space.

- It provides an excellent linkage between the ASC with the existing hospital facilities (including the Southern Blood and Cancer Building that will remain in operation when the hospital relocated to the new site), and the University research and education precinct

- Advice during the Preliminary Site Masterplanning indicated variability in the geo-technical conditions of the northern block. This variability creates a more difficult in-ground engineering challenge for the ASB. The ASB is a very large building, required to be built to Importance Level 4 (IL4) standard, while the ASC is expected to be constructed to a lower Importance Level 3 (IL3) standard. Initial indications from the geo-technical and structural engineers suggest that locating the larger IL4 building on the Wilson site would be technically difficult due to the variability of soil conditions expected under that particular site. The Cadbury block is considered to be preferable for appropriate piling for the IL4 ASB facility due to the more consistent in-ground conditions across this site.

- It allows for retention of the existing electricity sub-station in the short to medium term while a replacement sub-station is constructed, enabling a timely commencement of works.

- It utilises the existing Crown ownership of the Cadbury site allowing for the timely commencement of the most complex parts of the new Hospital. The size and scale of the ASB is such that any delays in commencement of the build would increase the clinical and health and safety risks of staying in the existing premises longer than is necessary.

4.0 Heritage Considerations

Having determined the preferred spatial arrangement of the building elements, early design studies considered the implications for the listed heritage facades and the “Dairy Building” on the Cadbury site. While it has been possible to plan the new facility whilst retaining the Dairy Building at the south end of the site, a design solution that would allow retention of the heritage facades has not been developed. The reasons for this are as set out below.

The key drivers for the effective functioning of the ASB are the clinical relationships and area needs across the ground floor public and emergency care activities and the operating theatre floor above. Safe and efficient patient care requires adjacency of hospital departments across the podium floors to manage clinical flows. Our briefing process has tested the area and adjacency requirements for the hospital, and these briefing requirements drive the overall size and dimensions for the podium. Effectively, this means that the footprint for the new facility will be optimally determined by the areas required by each department and their functional relationships with other departments and access points. The resultant building footprint is not immediately compatible with the retention of the existing buildings on site. It becomes impractical to split clinical floors to reduce the footprint in order to retain the existing listed facilities. Moreover:

- The ASB is required to be built to IL4 standard, requiring particularly high structural resilience. The existing heritage buildings do not meet this standard. The WSP Opus Engineering Assessment suggest that most of the existing buildings are in the order of 20% NBS against an

IL2 standard (which is significantly lower than the IL4 standard required for the new ASB). The WSP Opus report offers a range of options for façade retention that all have negative impacts on clinical planning & user experience, building methodology, seismic resilience, cost and construction programme. Some options impact the traffic flows on state highways during the construction period. The report concludes that "it is feasible to retain the façades; however, this will affect the layout and usage of the site." It is or opinion that all of the retention options would severely restrict the optimal and efficient planning of a modern fit-for-purpose acute hospital.

> Integration of the acute clinical services within the existing buildings and floor levels would not be efficient for fit-for-purpose acute clinical activities. Adaptive re-use for workspace or other support activities would be thinkable, but would be dependent on being able to fit all acute clinical activities efficiently onto other areas on site, which has not been achievable on the current area schedule and functional brief.

> The clinical activities of the ASB require very specific ceiling heights and are heavily serviced. These space requirements, plus the structural beam depth determine the floor-to-floor heights. Detailed design work is required to determine the new building floor levels with accuracy. Initial concept design work incorporating inputs from hydrologists, structural engineers, services engineers, and health planners suggests that the required new floors will not align with the levels of the existing heritage buildings, meaning that the existing buildings are not considered to be suitable for efficient adaptive re-use as a clinical building. Furthermore, existing changes of level between buildings would not allow for easy transfer of patient beds, wheelchairs, and logistics trolleys, which is an important aspect of efficient clinical planning.

> Any consideration for retention of sections of the existing buildings (for example the southern section (Block 1 as described in the WSP Opus report), should be mindful of the fall risk and collapse zone that would be required around retained buildings, and how they may impact on the post-disaster functionality of the hospital and access to the hospital.

Retaining only the existing heritage facades as part of the new ASB design was also considered however this was rejected for the following reasons:

> The new hospital is expected to be base-isolated. Maintaining the existing facades would require the facades to be either detached from their foundations and supported off a new base-isolated structure, or engineered to be free-standing with a base-isolated structure allowed to move independently behind it. Refer to WSP Opus Engineering Assessment options. Façade retention solutions are extremely problematic in engineering terms, and would place an overly-restrictive and unacceptable burden on the construction of a new hospital.

> The floor to floor heights of the new ASB are incompatible with the existing window locations on the facades. This would result in interior spaces in the new hospital that do not have adequate daylighting or views. Misaligned floors would pass across existing façade windows in a manner which is unlikely to be sympathetic to the existing architecture.

> Access points are a key issue for hospital planning. For safety reasons, emergency ambulance traffic is separated from public vehicle activity around the hospital but public vehicle drop-off, shuttle drop-off, and taxi drop-off areas remain critical features of an efficient and effective public hospital. Masterplan stage hydrology studies indicate that a raised ground floor level approximately 2m above street level will be required to mitigate flood risk. This level change will require considerable ramping from the road for vehicles to navigate. The masterplan proposes a formal landscaped drop-off area to Cumberland Street which enables the roads to ramp up to the front door, creating a formal landscaped entry to Cumberland Street. This setback facing west-northwest creates considerable

public amenity which is appropriate for a civic building of this nature.

The WSP Opus option for replacement of the existing facades with lightweight GRC replicas is not considered appropriate. While likely to be cheaper than retention of existing façade, this option would repeat the same issues with retained facades of misaligned floor levels to windows. The loss of authenticity as a result of replacement of heritage construction with lightweight replicas would be the subject of heritage and conservation architectural discussion.

Conclusion

A robust preliminary site masterplanning process identified a preferred arrangement of buildings across the two sites with the new Acute Services Building located on the existing Cadbury factory site.

The post-disaster requirements for the new hospital require an acute facility that meets 100% NBS for an Importance Level 4 building. The existing buildings and their facades fall well short of this structural standard, and would require significant strengthening to meet the code. The new facility is likely to be base isolated, which increases the engineering difficulty of integrating the new facility with existing buildings or facades. Engineering assessment by WSP Opus has explored a range of options for façade retention.

Efficient clinical planning for an acute healthcare facility is not compatible with the configuration of the heritage buildings on site as they currently stand.

Façade retention, while possible, establishes a structural engineering challenge. We believe that façade retention would burden the planning of the new facility in a manner which would compromise optimal efficient clinical planning.

A requirement to retain the existing facades would require a fundamental re-think of the masterplanning preferred option and would negatively impact:

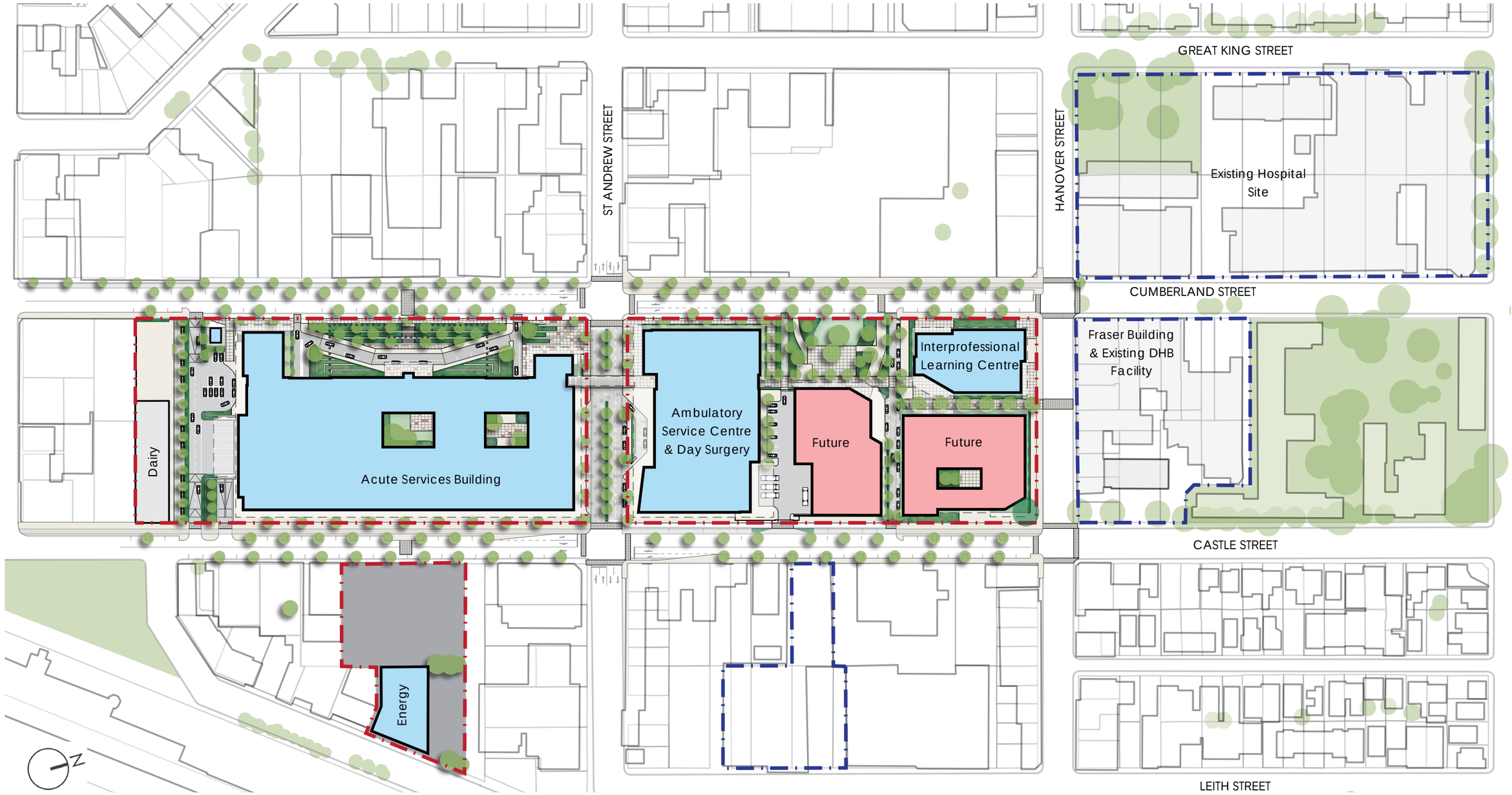
- The ability to optimally plan the new facility for best clinical and support flows
- The ability to optimally plan the site for vehicle and public access
- Alignment of required floor levels with existing floors
- Control over location of fenestration to suit internal activities
- Project cost
- Project programme
- The ability to access the site in optimal locations for emergency vehicles
- Locating a ground floor that is appropriately above the flood plane, and is readily accessible from the street.
- A flexible expansion strategy for the hospital

APPENDIX 1

New Dunedin Hospital Preliminary Site Masterplan
Preferred Option

6.0 Indicative Preliminary Masterplan (C2)

Indicative Preliminary Masterplan



Future services to be accommodated on Business Case approval :
- Southern Blood & Cancer Services
- Translational Research Centre

Appendix 11: Warren and Mahoney Design Statement

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Lauren Semple
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PO Box 139
CHRISTCHURCH 8140
New Zealand

8 June 2020

Dear Lauren,

8167 - New Dunedin Hospital
Subject: Cadbury Heritage Facades

Introduction

Warren and Mahoney (*WAM*), HDR and McCoy Wixon were appointed as the lead architects for the concept design and detailed design stages of the new Dunedin Hospital (*NDH*) from 18 November 2019.

The design reset work set out in this memorandum builds on work undertaken by CCM Architects prior to that date.

This memorandum:

- Provides a brief summary of the development of the NDH project from the Preliminary Site Masterplan to the preferred design Block and Stack;
- Provides a brief summary of the important design components of the preferred design; and
- Confirms that the heritage considerations and the design response to those considerations set out in section 4 of the CCM Architects memorandum[1] (*CCM Memorandum*) have remained the same as the preferred design has progressed.

Development of the Design

As illustrated in Appendix 1 of the CCM Memorandum, the Preliminary Site Masterplan (delivered in late December 2018) indicated a preferred location of the NDH extending across both the Cadbury and Wilsons sites.

As set out in the CCM Memorandum, a number of spatial arrangements were tested during the early stages of developing the design which would form the basis of the Preliminary Site Masterplan. Those included locating the NDH buildings entirely on the Wilsons block or entirely on the Cadbury block, or spread across both blocks in different configurations. Ultimately the layout in the Preliminary Site Masterplan was determined to provide the optimal spatial configuration for a range of reasons including:

- It locates the smaller and lower building (the Ambulatory Services Centre (*ASC*)) in the northern block and the largest building form (the Acute Services Building (*ASB*)) in the southern block. This offers a better fit in terms of urban form within the context of the wider CBD.
- It creates the opportunity for public outdoor amenity to the north and west of the site where it benefits from good sun and daylight.
- It provides a linkage between the ASC with the existing hospital facilities (including the Southern Blood and Cancer Building that will remain in operation when the NDH is constructed), and the University research education precinct.
- It provides the opportunity on the northern part of the Wilsons block for future expansion and/or development of a health precinct (potentially in conjunction with the University of Otago).]

[1] Flowers, A. (2019) *New Dunedin Hospital: Preliminary Site Masterplan, Cadbury Heritage Facades,* Memo-001.A, CCM Architects, 08 October 2019.

- It would enable construction of the ASB on the part of the overall site (Cadbury) which has more consistent in-ground geotechnical conditions. Advice received during the Preliminary Site Masterplanning indicated that geotechnical conditions of the Wilsons block are varied, meaning it would be less suited to construction of an Importance Level 4 building (i.e. the ASB), and more suited to construction of an Importance Level 3 building (the ASC).
- It utilises existing Crown ownership of the Cadbury site to allow for the timely commencement of the most complex parts of the NDH.

A subsequent options review and evaluation process concluded in February 2020 in which all of the design assumptions were revisited to confirm the most appropriate location for the building(s). The decision to house the new hospital facilities in two buildings, an Acute Services Building (ASB) and an Ambulatory Services Centre (ASC) across the two blocks was confirmed and concept design commenced in March 2020.

Concept Design
A Block and Stack developed by WAM and HDR is attached as **Appendix 1** to this Memorandum and forms the initial stages of the concept design process.

The preferred configuration shown in the Block and Stack was developed using a range of principles and criteria including:

- ***Clinical performance -*** optimising the clinical functionality of the NDH to achieve its primary purpose as a tertiary health facility.
- ***Wider accessibility and interaction -***ensuring the public can appropriately and easily access the NDH overcoming the significant level difference (approximately 1.7m) between the finished floor levels and surrounding streets.
- ***Integration with the surrounding urban environment –*** integrating the built form within the significant urban features of the immediate and wider environment, including the Railway Station and Anzac Square, the University of Otago, the Stuart Street Commercial Heritage Precinct, the Dunedin Central Fire Station, and the central business district.
- ***Pedestrian experience***. A significant landscaped strip to the Cumberland St boundary provides an enhanced pedestrian experience and a precinct enabler that continues north thru the Wilson Block and wider Health Precinct. East-West pedestrian connections are developed through the site. These two features meet in an open plaza zone on the north west corner of the Cadbury site.
- ***District Plan assessment matters.*** Achieving a configuration of the overall site and its buildings that is consistent with the outcomes sought in the Dunedin Second Generation District Plan. This includes matters relating to the surrounding urban environment, the existing heritage features on the Cadbury site and the accessibility of the site, but also pedestrian amenity and the visual impact of the NDH from the hill suburbs across the Otago Harbour.
- ***Environmental features.*** Responding to geotechnical conditions on-site and matters such as potential flood risk.

Building on the engagement undertaken during development of the Preliminary Site Masterplan, the preferred design will also be informed by a cultural narrative prepared by Aukaha, further functional briefings with clinical users, and preliminary consultation with representatives of Council, NZTA, University of Otago and others.

Alongside support from a wider technical team within WAM and HDR, the design has been the subject of on-going peer review from urban designers McIndoe Urban.

Heritage Considerations
The design reset process has also provided a further opportunity to consider the implications of the NDH on both the scheduled heritage facades of the former Cadbury Factory and the Dairy Building on the Cadbury site.

For the reasons set out in the CCM Memorandum, while the preferred design would allow for retention of

the Dairy Building to the south of the site, it cannot practically accommodate retention of any other building and their heritage facades. Specifically:

- As with the earlier design in the Preliminary Site Masterplan, the clinical area and adjacency requirements of the ASB and the way in which these must be accommodated in the preferred design are not compatible with retention of the facades. Reconfiguration of the layout to address that incompatibility would make the effective and efficient clinical performance of the building almost impossible
- The ASB will need to be built to an Importance Level 4 standard. To be incorporated as part of the ASB, the facades would therefore require significant structural enhancement which again could further compromise the clinical performance of the ASB.
- Initial concept design work indicates that, as with the Preliminary Site Masterplan design, new floor levels of the NDH will not align with the levels of the existing heritage buildings nor are the floor to floor heights of the new ASB compatible with existing window locations on the facades. These challenges would again have adverse consequences for the clinical performance of the ASB and the overall design outcome.
- As the CCM Memorandum notes, access points are a key matter for consideration in the planning and design of hospitals. For safety reasons, the public vehicle access corridor has been separated from the emergency vehicle corridor (which includes separate access for ambulances) that is located on the southern end of the Cadbury site. In addition, the location of the VIE (Oxygen) tank and accompanying truck access are also located at the south end of the site. Retention of any part of the existing facades would severely compromise the ability to accommodate these access ways, which would in turn adversely impact the safe and efficient circulation of vehicles and pedestrians through the site.

Yours sincerely,

Darryl Haines
Principal
BArch (Hons) BBSc ANZIA Reg Arch
darryl.haines@warrenandmahoney.com
—
Issued On behalf of Warren and Mahoney Dunedin Hospital ltd
Direct + 64 (3) 961 9700

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BLOCK AND STACK OPTION 5.3 PRESENTATION APRIL 28, 2020

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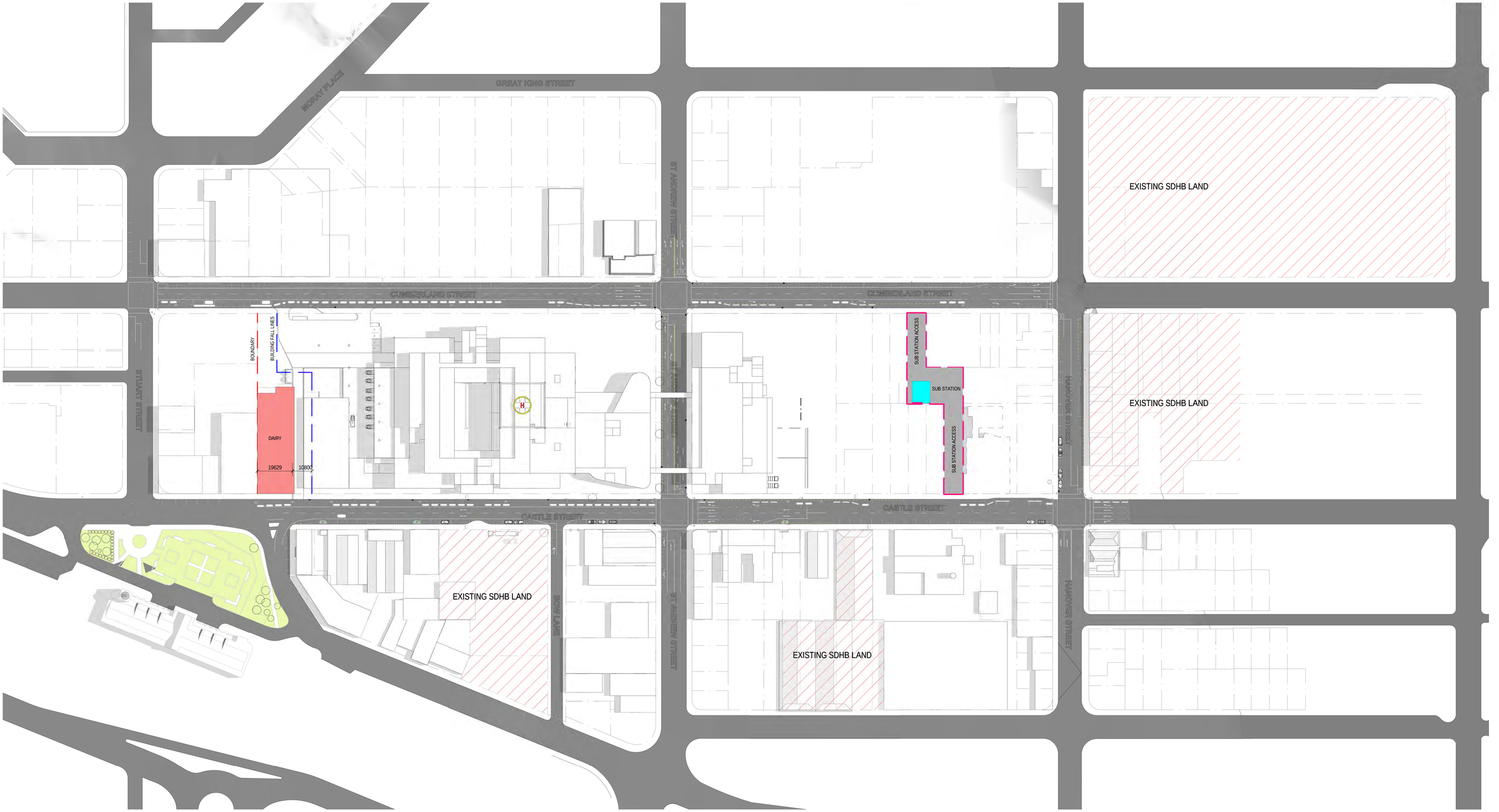

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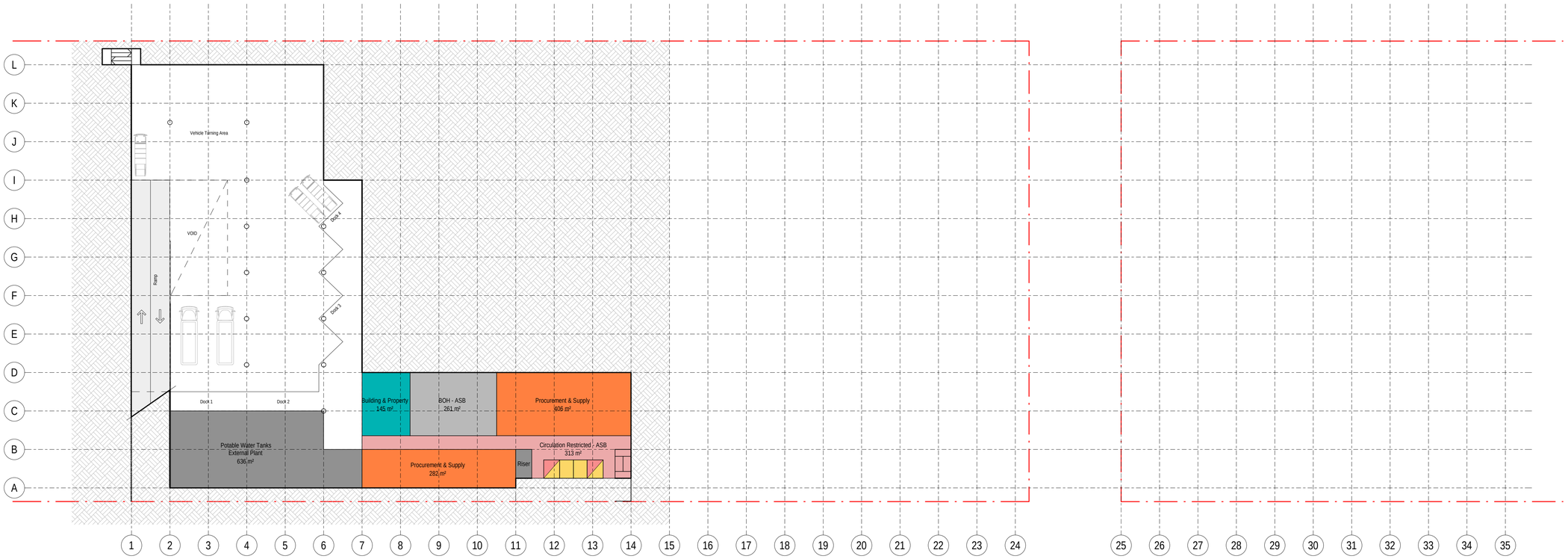

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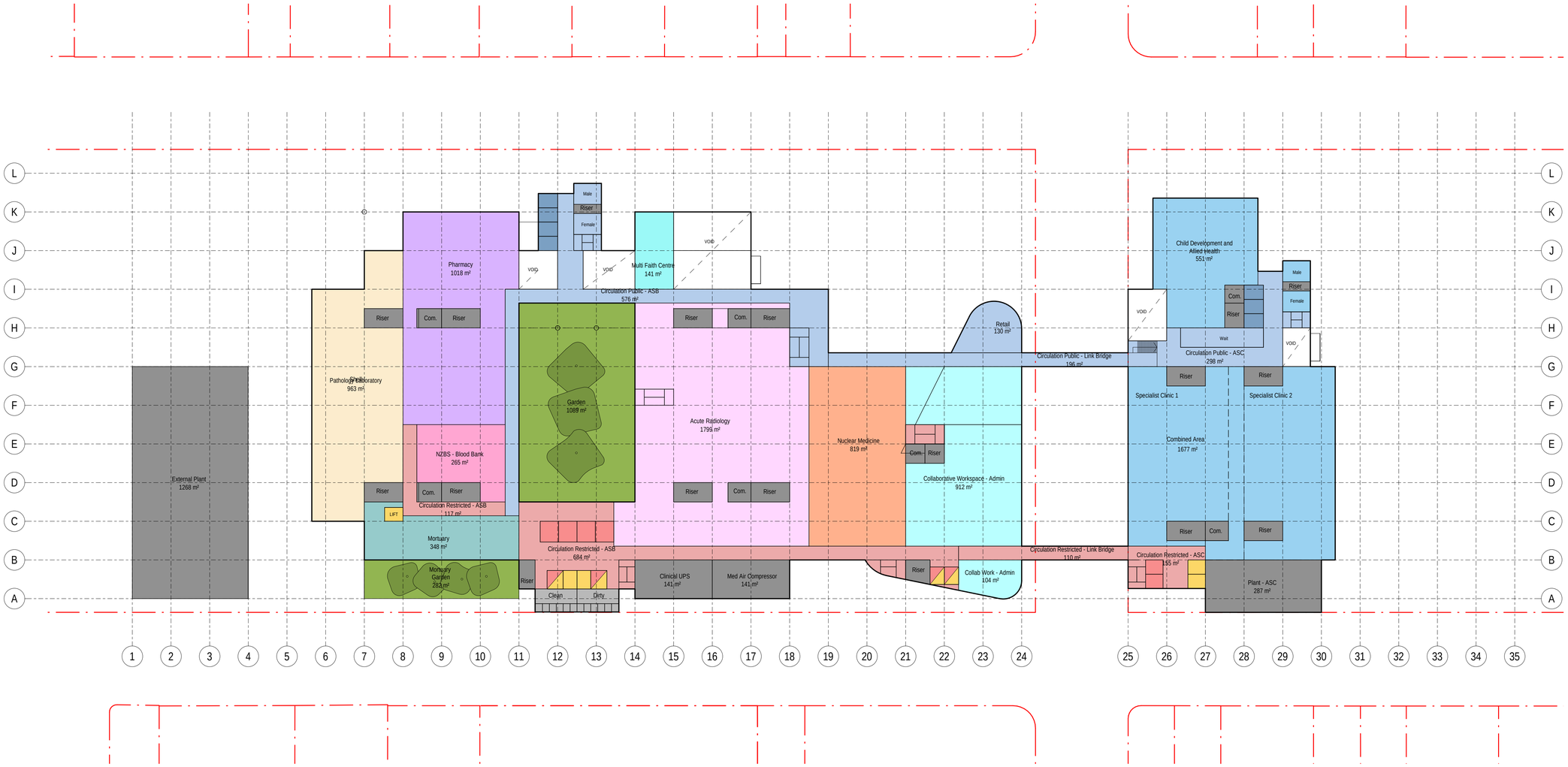

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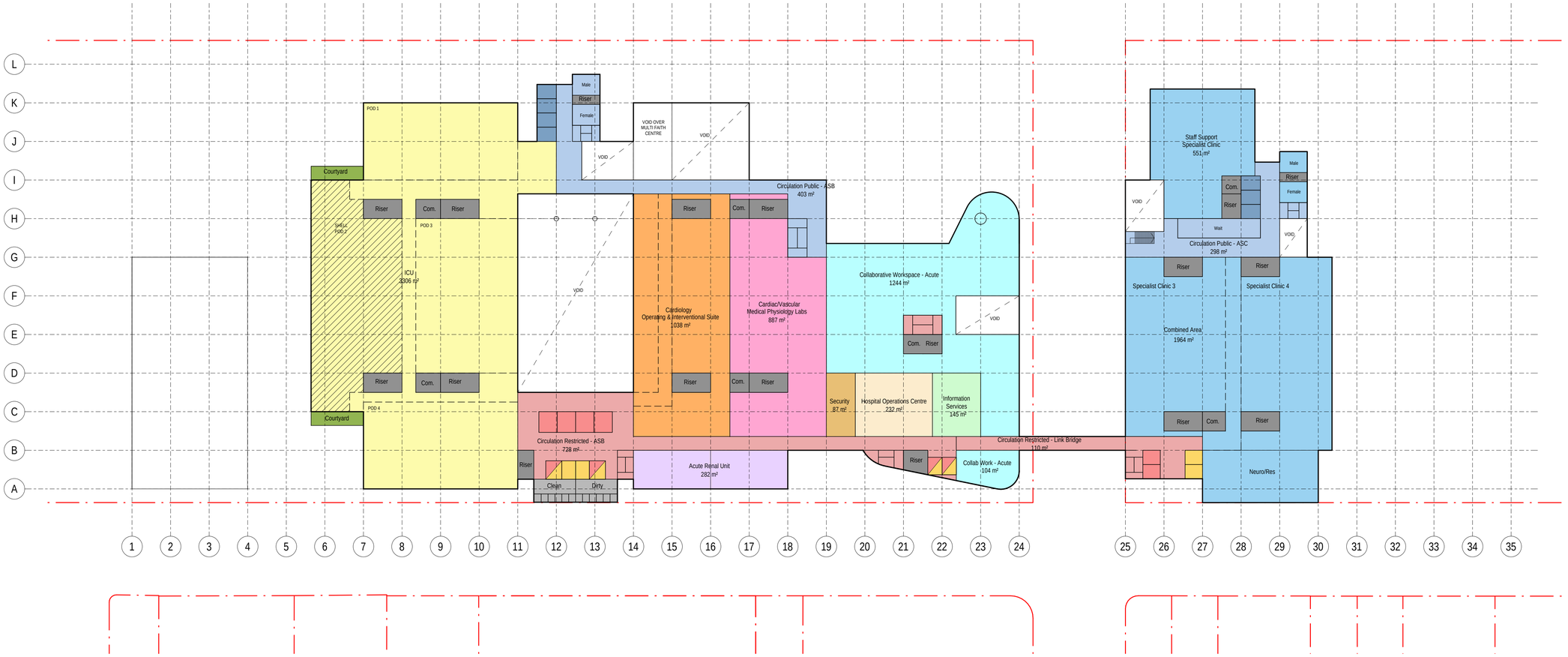

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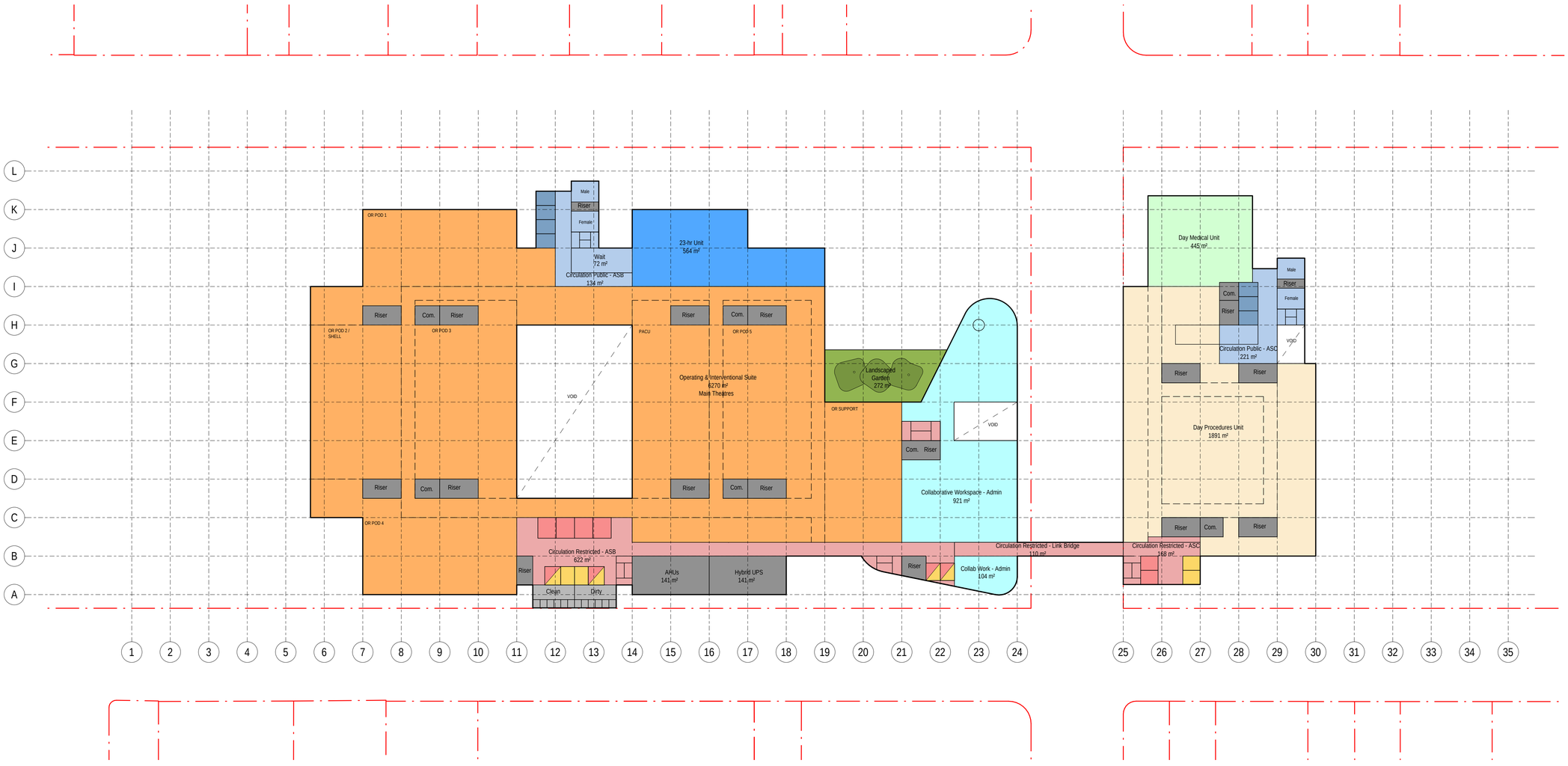

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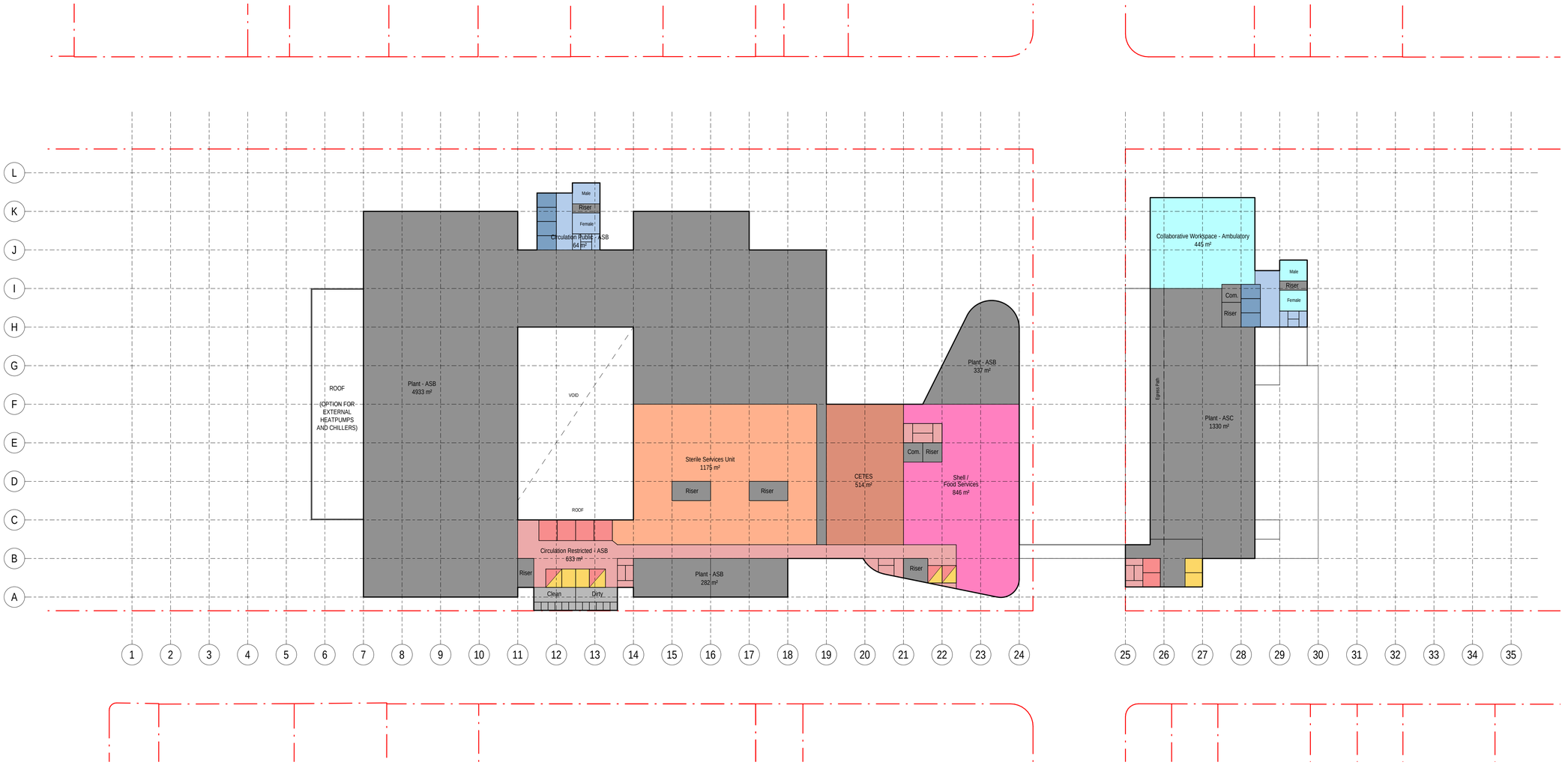

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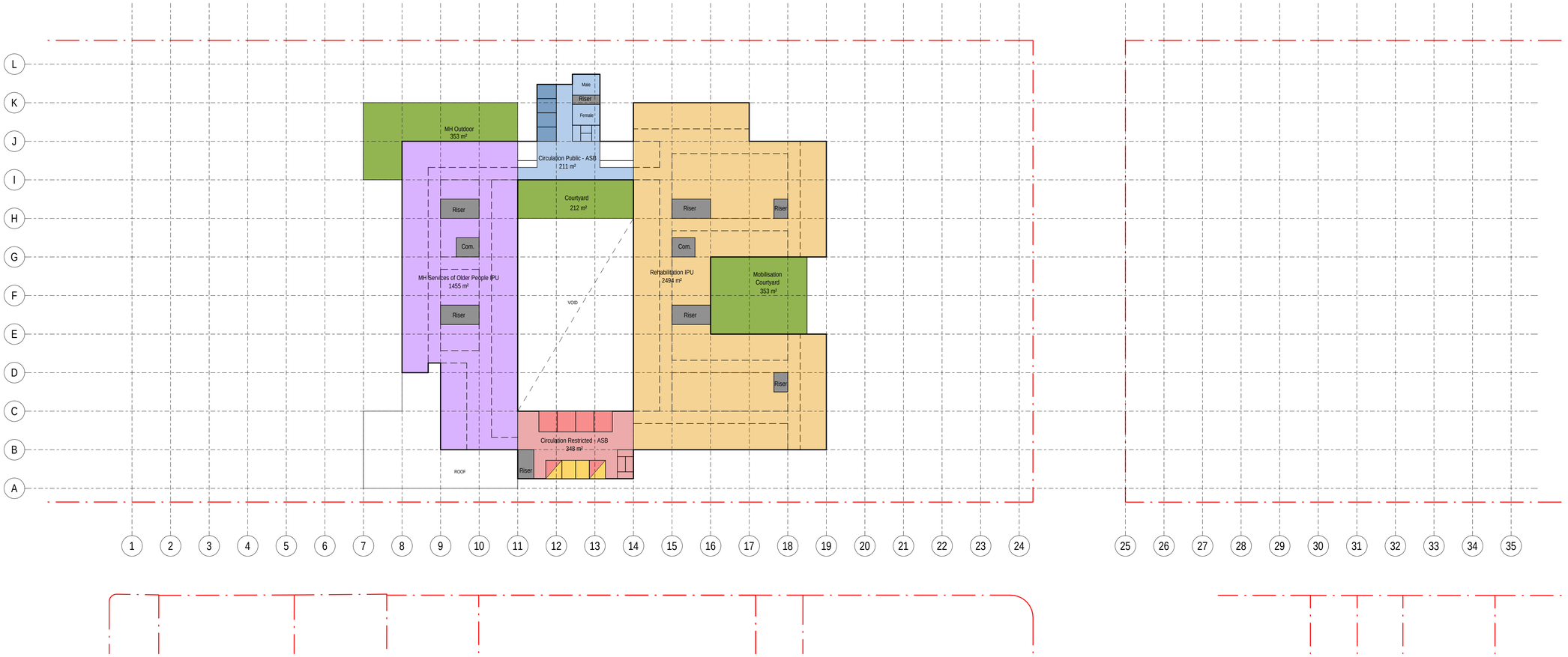

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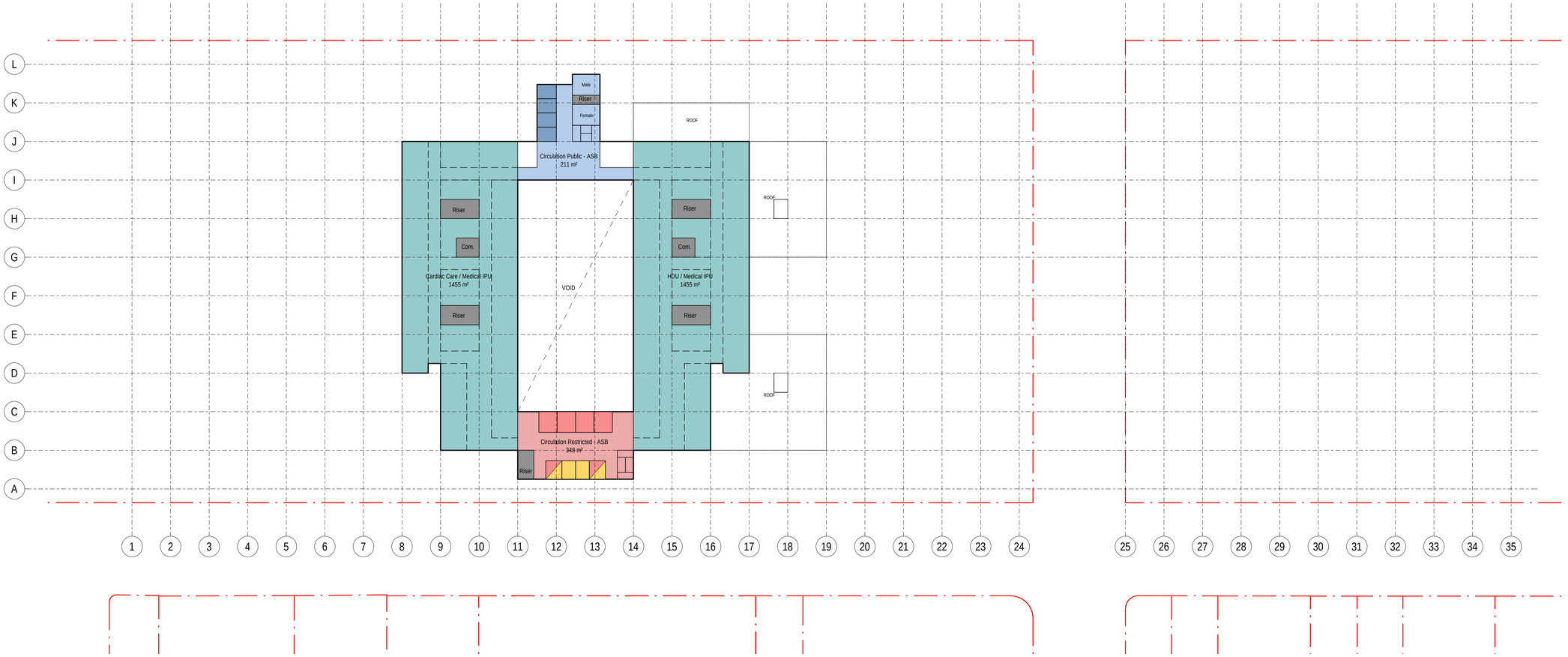

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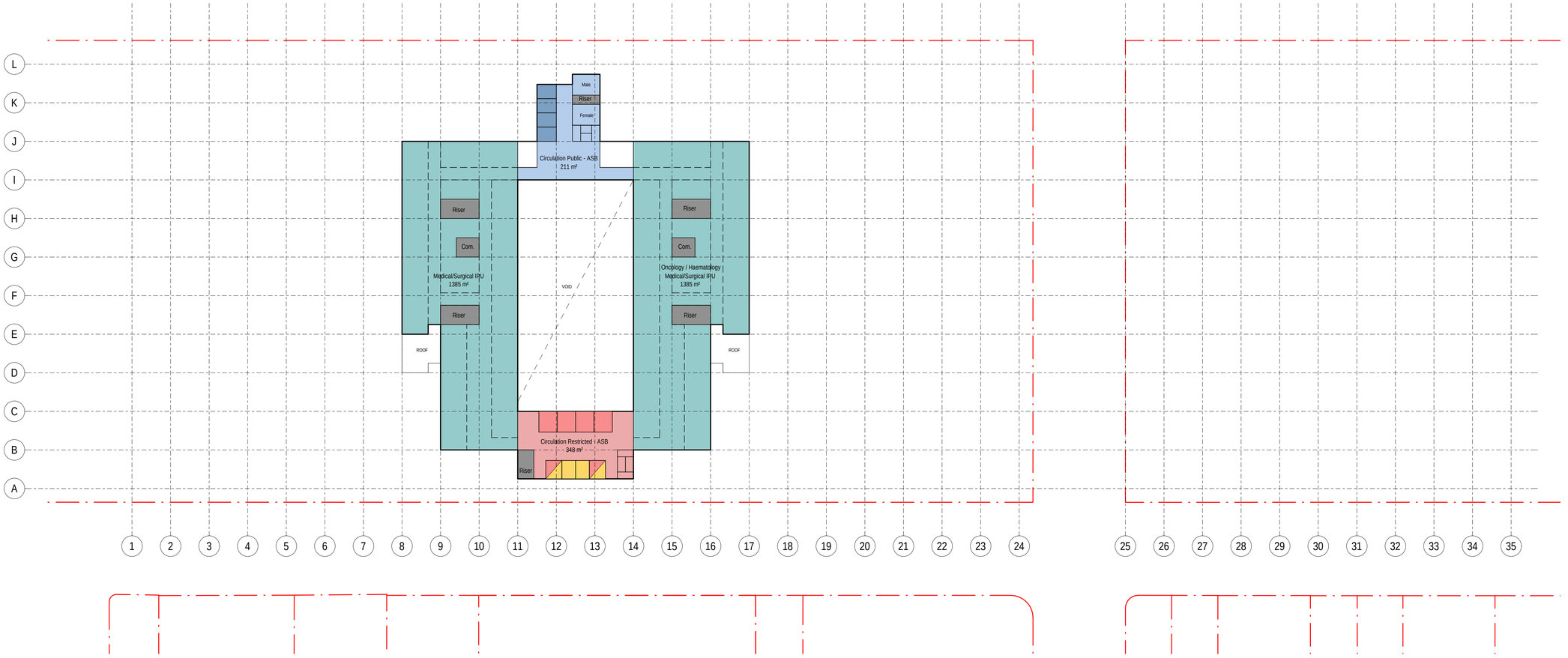

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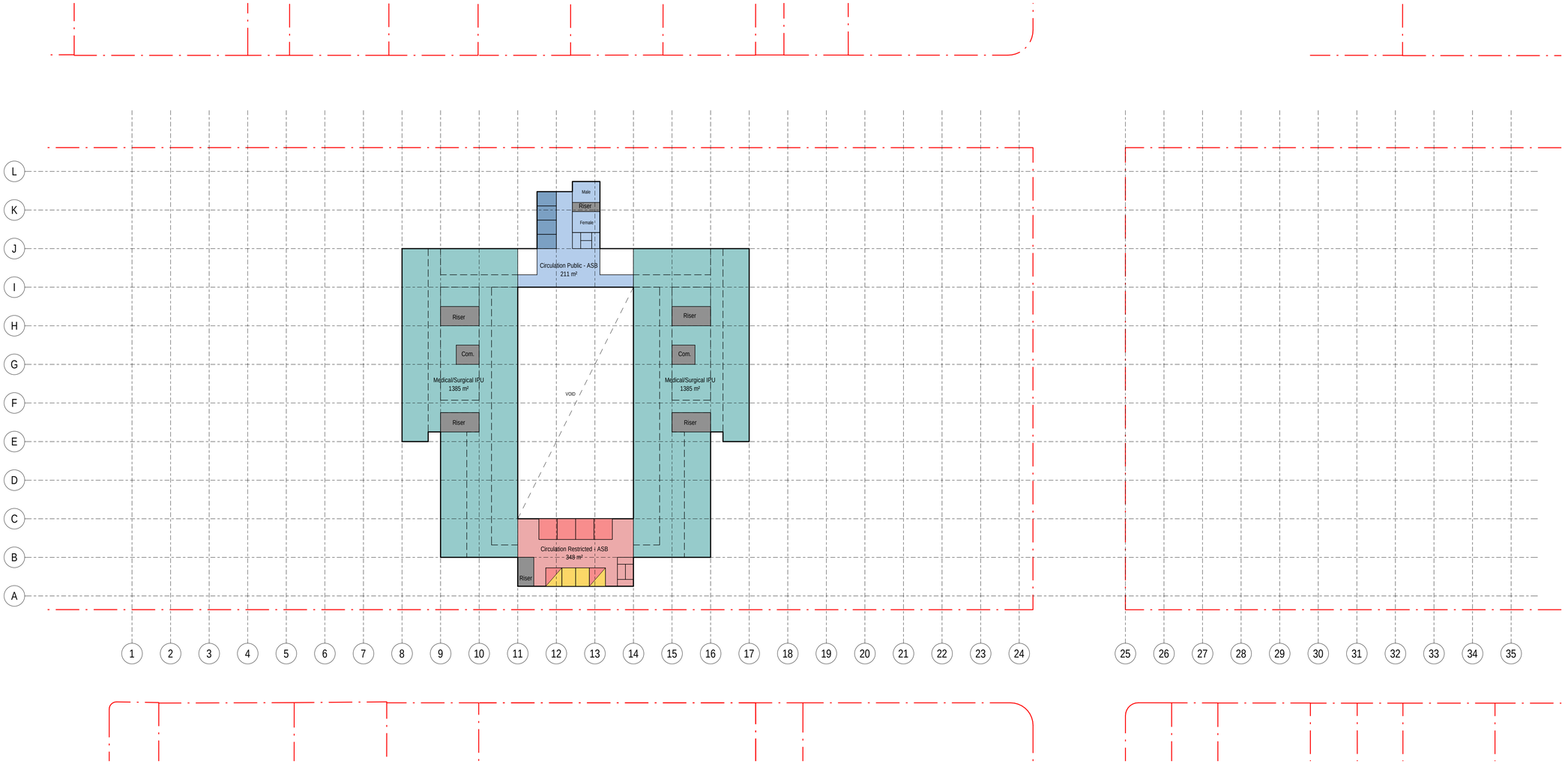

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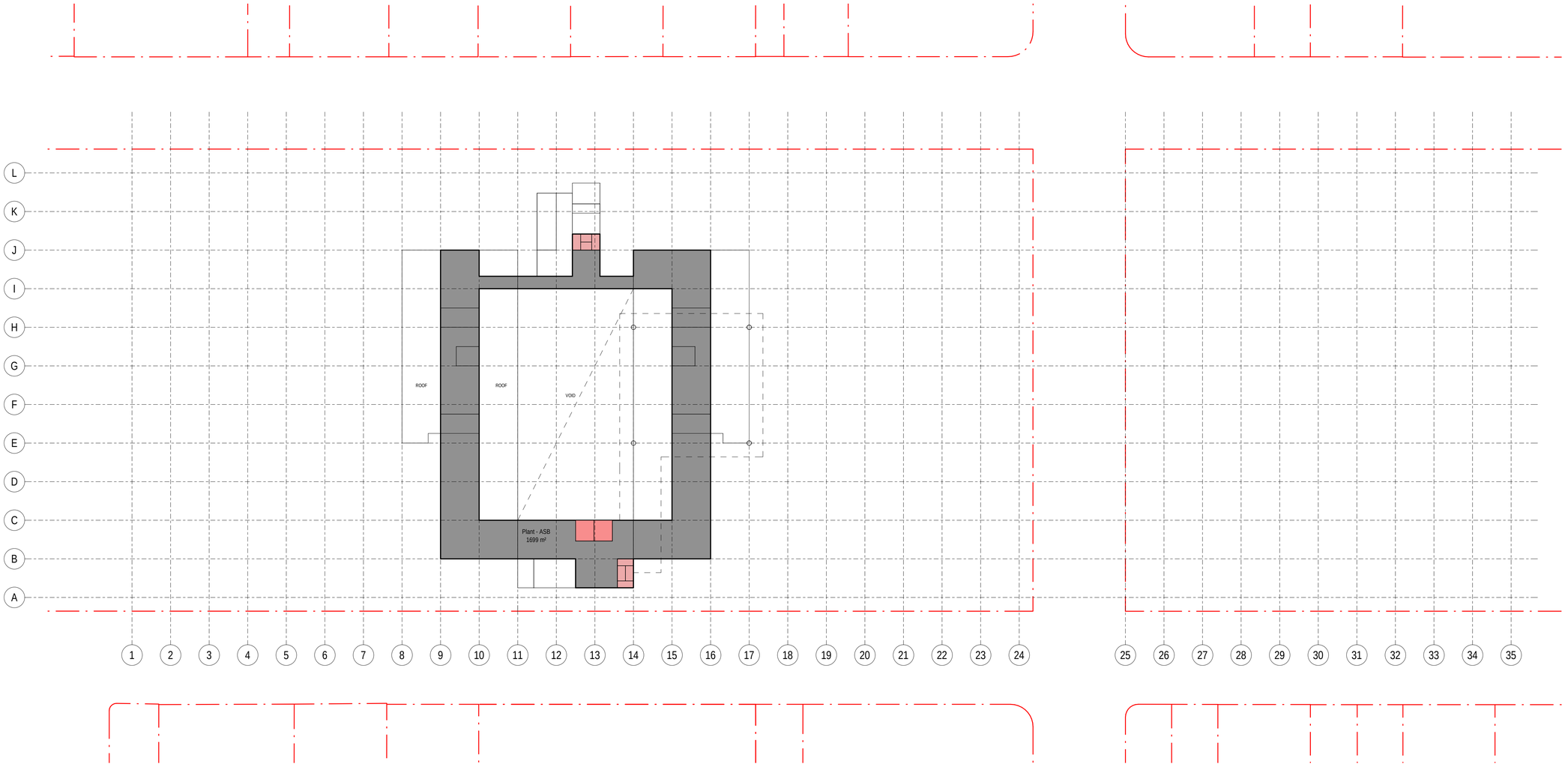

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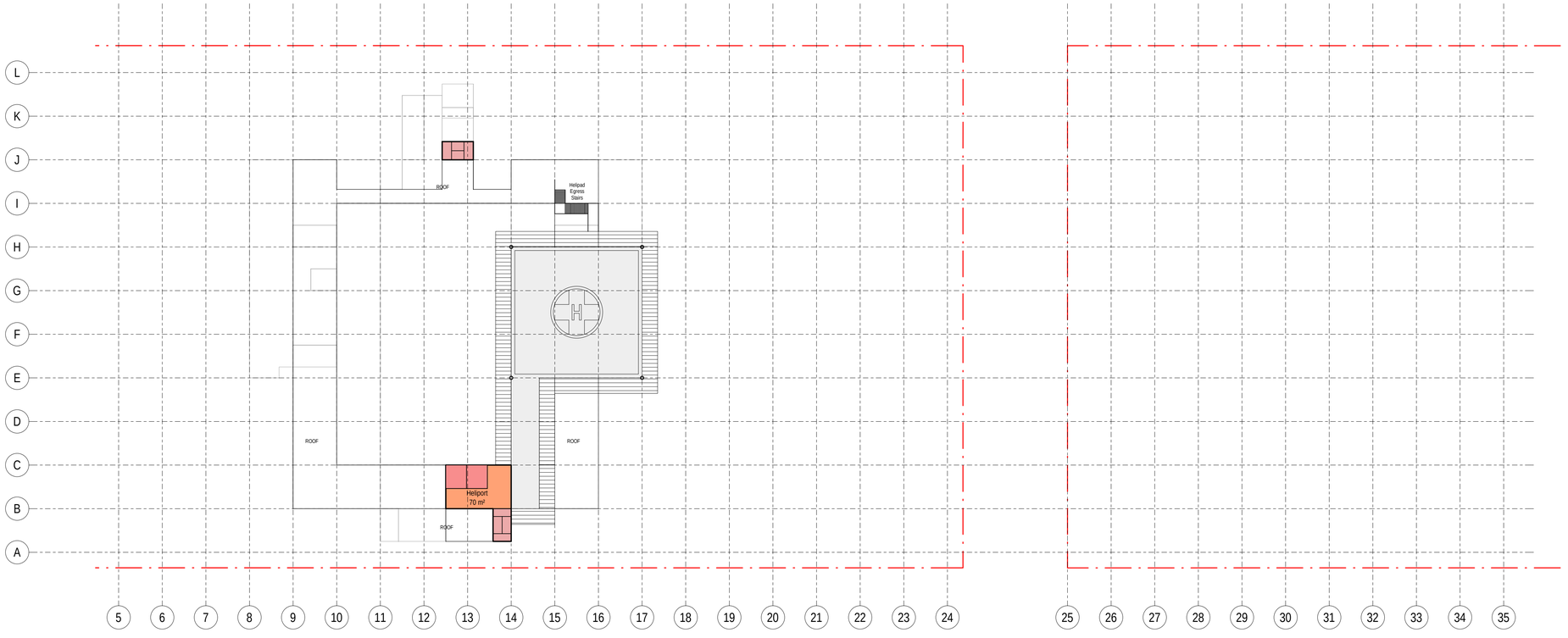

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CUMBERLAND ST DROP OFF

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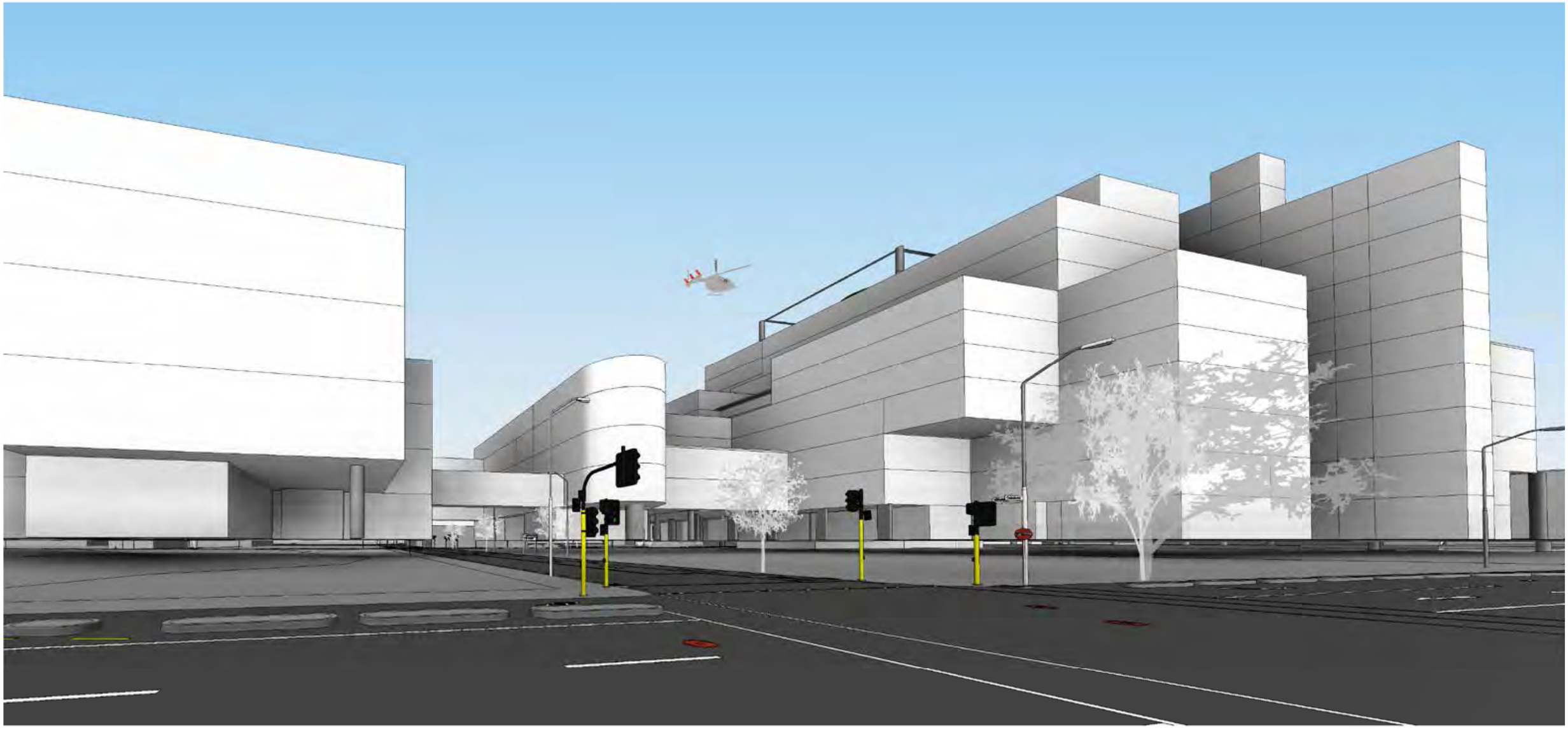

NEW DUNEDIN HOSPITAL

CUMBERLAND ST ED ENTRY

NEW DUNEDIN HOSPITAL

BLOCK AND STACK - AERIAL 1

NEW DUNEDIN HOSPITAL

BLOCK AND STACK - CUT 1

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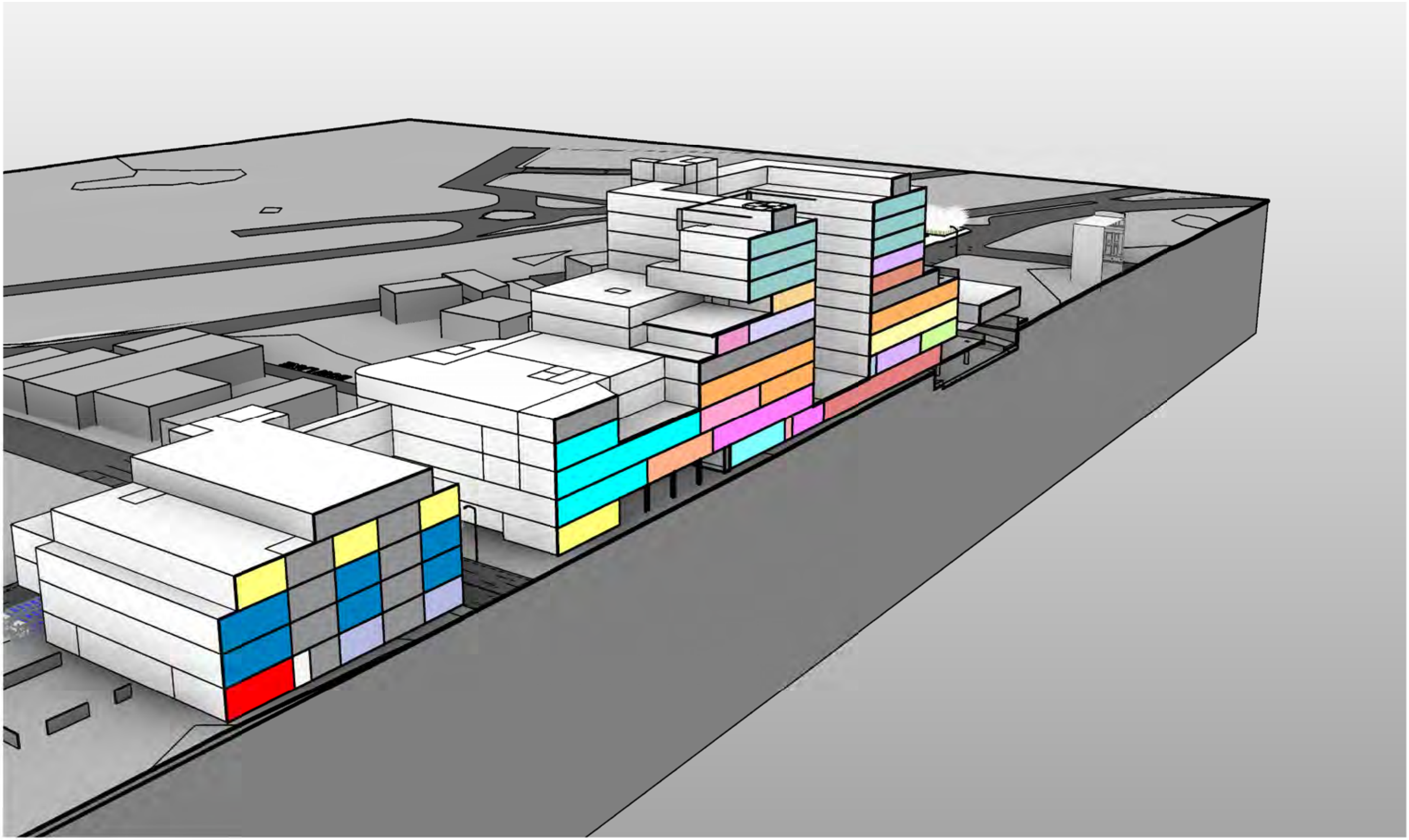
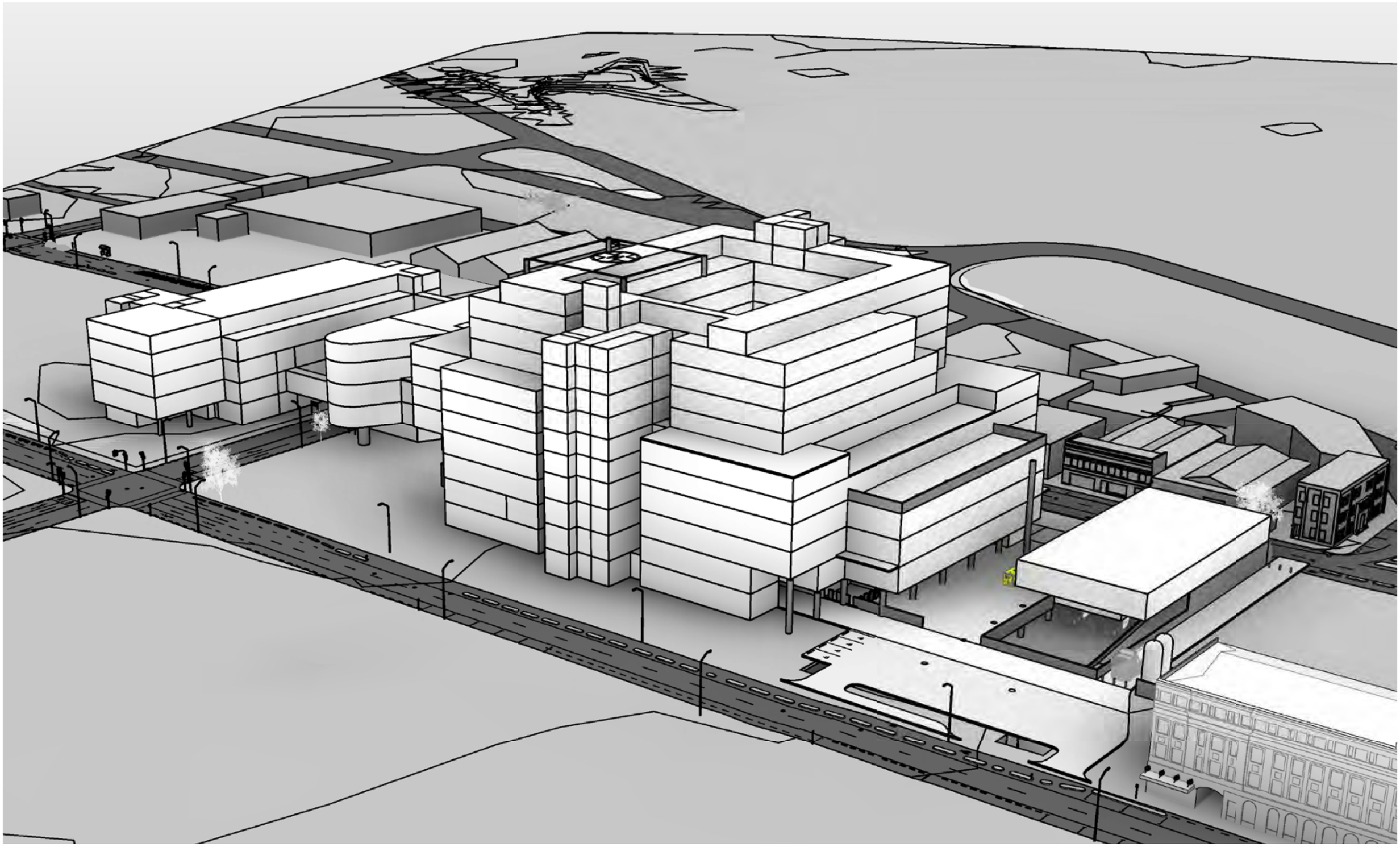


NEW DUNEDIN HOSPITAL

BLOCK AND STACK - AERIAL 2

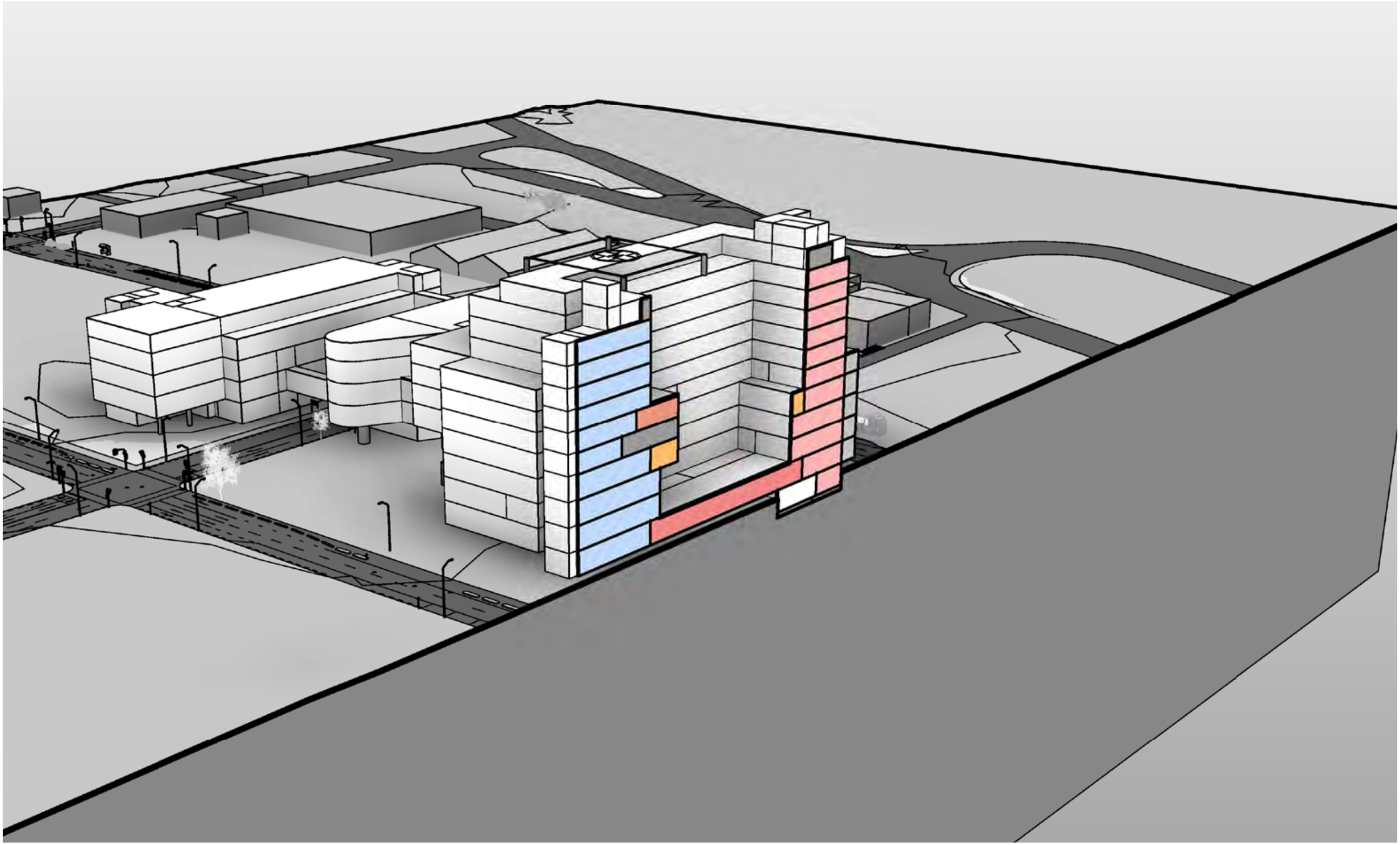
WARREN AND MAHONEY® HDR McCOYWIXON ARCHITECTS



NEW DUNEDIN HOSPITAL

BLOCK AND STACK - CUT 2

WARREN AND MAHONEY® HDR McCOYWIXON ARCHITECTS



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Appendix 12: RLB Façade Retention Cost Report

Level 1
254 Montreal Street
Christchurch

T: +64 3 354 6873

14 May 2020

Blair Collie

PO Box 6696

Wellesley Street

Auckland

Attention: Blair Collie

Dear Blair,

NEW DUNEDIN HOSPITAL, FAÇADE RETENTION OPTION ESTIMATES

ADDENDUM CLARIFICATION

Please find attached our memorandum addendum to our original report dated October 2019 regarding the WSP Opus Addendum dated May 2020.

We trust that our report is of assistance, but any queries, please do not hesitate to contact us.

Yours faithfully

Neil O'Donnell

RIDER LEVETT BUCKNALL CHRISTCHURCH
Director

Email: neil.odonnell@nz.rlb.com

Cc – R. Murdoch – Greenwood Roche

Addendum to Report

Ministry of Health – New Dunedin Hospital

Heritage Demolition Consent Application (May 2020)

Rider Levett Bucknall (RLB) was commissioned by the Ministry of Health to undertake an assessment of the capital cost for options put forward in the WSP/Opus report for the possible retention of the existing heritage facades at the proposed new Dunedin Hospital (NDH) site.

The retention options in the WSP Opus report were identified on the context of the original Preliminary Site Masterplan which indicated a preferred location for the NDH extending across both the Cadbury and Wilsons sites in central Dunedin.

Further options evaluation process for the layout of the NDH was completed subsequent to the finalising of reports by WSP Opus and RLB. The Ministry of Health has now confirmed that the NDH will locate across the entirety of the Cadbury site and extend into the southern end of the Wilsons site. The southern portion of the Cadbury site is proposed to be used primarily for vehicle/ambulance access, circulation and parking, and plant required for the functioning of the NDH.

The Ministry of Health consequently asked WSP Opus to consider whether this preferred layout would have any material impact on the findings of its original assessment. In response to that request, WSP Opus issued an addendum to its original assessment, identifying the relevant impacts. RLB has reviewed that addendum, and advises the following:

- Potential minor changes have been identified due to the reconfiguration of the layout.
- The proposed configuration would require further works to retain the existing façade as highlighted in the WSP report, the facades currently block off the proposed entry ways.
- Regarding option 1, it is noted that the ability to retain the existing façade based on the current configuration would only be possible to a limited elevation along the proposed laundry.
- For option 3, we have assumed that the reference to the extension of the isolation plane refers to extending the lower level connection to the proposed building; as per our report, all costs associated with the connection between any of the façade retention options and the proposed new buildings are excluded.
- RLB emphasizes that the costs submitted do not include for any costs associated with the additional design fees for further reconfigurations of the existing site and no allowances for additional architectural and / or services required in retaining the existing facades; this would be a potential significant increase from those costs identified.

Overall, based on the minor potential changes, we do not consider that these will a material impact on the overall quantum set out in our report.

25 OCTOBER 2019

NEW DUNEDIN HOSPITAL, FAÇADE RETENTION OPTIONS

MINISTRY OF HEALTH

Prepared For

Ministry of Health

Submitted on

25 October 2019

Prepared By

Rider Levett Bucknall Christchurch
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Christchurch 8140
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RLB.com

Project number

CH1595

MINISTRY OF HEALTH
MANATŪ HAUORA

Southern District Health Board
Piki Te Ora

New Dunedin Hospital
PIKI TE ORA

RLB Rider Levett Bucknall

Rider Levett Bucknall

Level 1
254 Montreal Street
Christchurch

T: +64 3 354 6873

25 October 2019

Blair Collie

PO Box 6696

Wellesley Street

Auckland

Attention: Blair Collie

Dear Blair,

NEW DUNEDIN HOSPITAL, FAÇADE RETENTION OPTION ESTIMATES

Please find attached our Report for the façade retention options.

We trust that our report is of assistance, but any queries, please do not hesitate to contact us.

Yours faithfully

Neil O'Donnell

RIDER LEVETT BUCKNALL CHRISTCHURCH
Director

Email: neil.odonnell@nz.rlb.com

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Rider Levett Bucknall

Project Director

Neil O'Donnell
Director
neil.odonnell@nz.rlb.com

This report is for the use only of the party to whom it is addressed and shall be used for no other purposes without the written consent of Rider Levett Bucknall. No responsibility is accepted for any third party who may use or rely on the whole or any part of the contents of this report.

1.0 EXECUTIVE SUMMARY

This Report has been prepared by Rider Levett Bucknall (RLB) for the Ministry of Health to assist and inform the potential capital cost for the options put forward for the possible retention of the existing heritage facades at the proposed new Dunedin Hospital site.

Our report has been prepared on a GST exclusive basis.

1.1 SCOPE OF REPORT

- RLB have received the WSP / Opus Façade Retentions options report dated 3rd October 2019 which provides 8 potential options for the retention of the existing facades to the proposed new hospital.
- The costings for options 1A -3B are for the façade retention works only; this includes for additional costs associated with the demolition works as necessary to retain the facades based on the retention option. It does however exclude the cost of standard demolition.
- The costing for option 4 is for the retention of the concrete framed facades and the reconstruction of the unreinforced masonry to blocks 1 and 2 only.
- The costing for option 5 is based on the replica of the existing façade in a GRC solution. This option excludes for all demolition works as this is assumed would be undertaken separately.
- Where piling is deemed necessary, we have assumed for the purposes of the exercise that any permanent structure / underpinning works are to be treated as per the main building; a depth of approx. 40m.
- Due to the concept level of this estimate, no allowance has been made for the connection to the proposed new hospital structure. Should any façade retention option progress, this shall need to be considered in addition to the costs set out below.
- **No allowances** have been included for the works associated with the architectural / building services works which will be required to part of the proposed building if the existing facades are retained, as the extent is currently unknown. We expect a **significant cost increase** to accommodate this.

1.2 CLARIFICATIONS

We draw your attention to the following clarifications:

- Options 1A, 2A and 3A assumes that the precast foundations shall be laid on the existing ground surface and no excavation of existing highways will be required.
- For all options with works extending into the main highway, allowances have been made for the making good of the road on completion (topcoating the existing substrate).

- For options 1A, 2A, 3A and 4 where the propping is indicated to extend into the highway, we believe State Highway 1 will require partial closure. We have currently assumed that this will be allowed on a termed basis (for a fixed duration) during the works and have allowed a provisional sum for traffic management. We have not allowed for any costs associated with sequencing if deemed required by NZTA.
- We have assumed that works would be undertaken during normal working hours; rates do not include for out of hours working.
- It is assumed that the propping structure shall be single use throughout the works; no allowance has been made for potential staging of the works.
- For options 1, 2, 3 and 4, allowance has been made for the temporary removal of existing glazing and temporary sealing of existing openings during the works.
- Allowance has been made for minor repairs / replacements to the façade materials to options 1,2. 3 and 4. The extent of replacement works required will be dependent upon the condition of the façade at the time of the works.
- Steel grillage to options 1, 2 and 3 have been included to the unreinforced masonry construction only as indicated.
- For the purposes of pricing, it has been assumed that a deep piled solution will be required as part of the underpinning works. Allowances have been made on this basis to a depth of approx. 40m to reflect the main structure.
- It is assumed that the temporary piles under option 1B, shall be shallow depth piles (no deeper than 10m) to be removed upon completion. Our rate reflects this.
- For building 4A, it is noted that there are currently existing piles insitu. No allowance has been made for removing these piles; it is assumed that the new underpinning works would be cast alongside the existing foundation to the deeper depths indicated.
- All allowances for proposed substructures are provisional until further details become available to firm the proposals up.
- It is assumed for options 1B, 2B and 3B, that all bracing works would be undertaken in the first instance prior to the significant demolitions works. Allowances have been made for the estimated additional cost associated with the potentially, piecemeal methodology of demolition which will be required to achieve this.
- Option 3A and 3B excludes for any connection of the proposed reinforced concrete frame to the new hospital construction; this would need to be reviewed and accommodated separately once details are known.
- For option 3B, it has been assumed, for pricing purposes, that the screw piles as identified in options 1B and 2B will be required to anchor the foundation of the temporary propping structure.

- No allowance on any option, unless stated, has been made for the demolition of the existing buildings. Any additional costs associated with the complex demolition works have been accounted for.
- For options 4 and 5, no allowance has been made for the demolition / removal of the existing foundation where required. It is assumed that these would form part of the demolition contract (and staged accordingly where required).
- For option 4, it is understood that the masonry to blocks 1 and 2 only are to be deconstructed and reconstructed. Allowances have been made as per option 1A for the remainder of structures to prop external the existing frame / facades as appropriate.
- Allowances have been made under option 4 for the removal and reconstruction of the masonry infills to the ground floor only. This is assumed on the basis of the Opus report and that the remainder of the construction is concrete frame and infill panel construction.
- For option 5, allowance has been made for joints within the panels. This is provisional and subject to confirmation as to location / extent.
- Unless otherwise stated, no allowance has been made for the connection between the proposed existing façade retention system and joint to the new build structure.
- We have made **no allowance** associated with the additional architectural and building services required due to the constraints imposed by retaining the existing façade. We understand that there is a strong likelihood of options 2 and 3, of additional services, seismic connections etc being required to facilitate the changes in floor levels to suit the variance between the imposed existing façade floor junctions and indicated current concept design. This would need to be assessed subject to the information becoming available, however, we note, we would expect this would add **significant costs** to the current budget.
- No allowance has been made for the potential loss of useable space related to the various options proposed. This would need to be accounted for in the space planning calculations as to the potential impact.
- Due to the nature of the risk associated with the proposed works, we have included a Design and Construction contingency and Project Contingency, both at 15%.
- An allowance for dewatering has been included due to the need to excavate to expose the existing foundation.

1.3 EXCLUSIONS

We draw your attention to the following exclusions:

- Demolition of existing structures; allowance for additional costs associated with the proposed façade retention works only.
- Remediation of Contaminated ground
- Ground Improvement unless otherwise stated
- Upgrades to existing services
- Access to existing services during the works
- New build construction costs; these are deemed to be treated separately
- Costs associated with the architectural and services due to the constraints associated with facilitating the design around the retention of the existing façade.
- Land Costs
- Development Contributions
- Specific Flood Remediation Requirements
- DHB Internal Project and Direct Management/Staff Costs
- Costs associated with any potential dispute associated with the façade retention options and delays to the project
- GST
- MOH / DHB costs

2.0 SUMMARY COST OPTIONS

Option	Estimated Total Cost
Option 1A	$47,000,000
Option 1B	$58,800,000
Option 2A	$63,800,000
Option 2B	$69,800,000
Option 3A	$66,200,000
Option 3B	$74,600,000
Option 4[1]	$51,000,000
Option 5	$32,600,000

[1]Note, as confirmed with RCP, option 4 is for the disassembly and reconstruction of the unreinforced masonry facades to block 1 and 2 only. The remainder of this option is to be propped as per option 1A.

*Clarifications and exclusions as noted above

3.0 BASIS OF REPORT

This report has been prepared on the basis of the following assumptions:

- Rates have been based on recent projects from RLB's extensive database of recent Projects in New Zealand.
- The dates used to calculate escalation during Design and Construction are based on recent experience.
- The rates included in this report are solely for the use of the Dunedin Hospital project and should not be used in the preparation of estimates for any other purpose.

This report has been prepared on a GST exclusive basis except where otherwise noted.

AUTHORISATION

This report has been prepared by:

Siobhan Neville

and authorised for issue by:

Neil O'Donnell

RLB.com

AFRICA | AMERICAS | ASIA | EUROPE | MIDDLE EAST | OCEANIA

RLB Rider Levett Bucknall

Appendix 13: RCP Construction Feasibility Report

New Dunedin Hospital
PIKI TE ORA

RCP

Assessment of Buildability

in relation to Cadbury façade retention

Issue Date: November 2019

Project name:	New Dunedin Hospital
Project address/location:	Cumberland/Castle Street

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9. Other Buildability Factors 13

Version	Date	Issued For	Status	Owner
DRAFT 0.1	22 October 2019	Internal review	Draft	B Collie
DRAFT 0.2	29 October 2019	Internal review	Draft	B Collie
VERSION 1.0	05 November 2019	External Comment	For Review	M Allen
VERSION 2.0	**08 November 2019**	**Information**	**Final**	**M Allen**

1. Executive Summary

RCP has been engaged by the Ministry of Health as Design and Project Managers for the New Dunedin Hospital development. It is our responsibility to provide guidance and recommendations to the Ministry during the hospital's development. This report provides a recommendation to the Ministry in relation to the feasibility of retaining the heritage buildings and/or facades on the former Cadbury Buildings.

Taking into account the various specialist reports and technical opinions provided to the Ministry in relation to this matter, it is our considered opinion that retention of the existing buildings or facades (other than the Dairy Building) would unreasonably compromise the Ministry's ability to provide the region with a modern, state of the art hospital that incorporates significant healthcare technology and hosts modern models of care.

In reaching that position we have taken into account technical inputs from the following industry specialists to analyse buildability within key building/design parameters:

- CCM Architects who have provided information regarding effects on hospital design.
- WSP-Opus who have provided structural advice regarding retention of the existing building facades.
- Rider Levett Bucknall (RLB), the project Quantity Surveyors who have provided pricing of the façade retention options outlined by WSP Opus.
- Stantec who have produced a Traffic Management Strategy (TMS) that sets out the likely NZTA requirements related to traffic management associated with the retention options.

Our analysis reaches the conclusion that the costs to the project in terms of time, resource allocation and compromising of the ultimate built outcome are such that an application for resource consent to demolish the buildings and facades should be progressed.

2. Brief description of facade retention options

Reproduced below is a table created by WSP-Opus identifying façade retention options. A "RAG" (Red, Amber & Green) format has been used to visually demonstrate how the options compare against each other, with each item assessed against the options identified on the left side of the table and the New Hospital used as the Baseline. The following assumptions are used:

- Both options 1[1], assume a hospital built right up against the façade.
- Both options 2[2], assume a separate structure to the facades, seismically separated from a new structure.
- Both options 3, assume a separate structure to the façade but seismically joint to the new structure.
- Option 4 assumes deconstruction & reconstruction of the façade.
- Option 5 assumes replacement of the existing façade with a lightweight Glass Reinforced Concrete replica.

Image 1: WSP-Opus – RAG table Façade retention options.

[1] Options a & b indicate the side of the façade the structural supports are located
[2] As above

3. Analysis of Foundations Works Required

The following section outlines practical matters that will need to be taken into account in assessing the various options.

Underpinning

Underpinning is a method of stabilisation in which the ground under the structure needs to be reinforced to properly support the structure above. With underpinning, the ground underneath the edge of the structure needs to be removed (exposing the underside of the existing foundation) so that the ground around it can be stabilised and reinstated. Depending on how deep the existing foundations are, there may be a need to introduce sheet piling or benching to provide safe working spaces. Sheet piling creates a temporary cantilevered retaining wall, where interlocking steel sheets (about 300 wide) are mechanically driven into the ground, and the soil on one side is excavated providing a lowered working platform. Benching works in a simpler way, by excavating down in stages some distance apart creating safe working levels. Benching however requires more space and may not be a viable option on constricted sites.

In some cases where ground conditions are poor there may be evidence of the building slumping (typically identified by diagonal cracking of exterior claddings), in which case the existing foundations need to be jacked up lifting the structure to its original location prior to reinstating the underside of the foundations. Moreover, depending on the condition of the ground, piling may be required to provide sufficient bearing to the foundations. Underpinning needs to happen in stages along the foundation (often referred to as "Hit and Miss") to ensure there is still sufficient bearing to the structure and no undermining occurs. Undermining is a very real risk associated with these works and safety procedures and protocols need to be carefully followed.

Increasing bearing capacity and stabilising the ground

There are some options available to obtain an increased soil bearing capacity of the ground, with the main options being piling, or raft slabs. Piling involves penetrating through bad soils until a firm bearing layer is found that can support the new structure. A raft slab involves creating a solid base on top of what could be bad soil. The rafts are engineered to specific depths and have reinforcing layers throughout so that if there is subsidence underneath the slab, the strength of the raft will cause it to span over the soft spots not impacting the structure above. With raft slabs there is a chance for some settlement, but this would occur over the whole structure and would likely not be noticed.

Base Isolation / Seismic separation

The New Dunedin Hospital is required to be designed at IL4 (Importance Level 4), meaning that in a significant seismic event the hospital will still be operational. As part of this requirement the structural design consultants have adopted a base isolation approach. This allows the ground to move under the hospital while the base isolators dampen the effect and allow the building to 'slide or float' on its foundations minimising damage to the structure and its occupants

Discussion

In retaining the existing Cadbury facades, the WSP-Opus report provides options that require both underpinning and piling. To underpin the existing foundation walls, a clear space of approx. 10m (width and height) would be required. This would allow for machine access to excavate and pile as required.

Driving piles in and around existing foundations is a complex exercise. Especially if the underpinning and piles are to be driven with the structural façade frames on the inside of the existing building, this must happen in a way that takes into account coordination of the following:

a) the existing structure that is to be removed but only after the façade supports go in.
b) the temporary facade supports located in a place that is structurally supportive to the façade (i.e. not across windows) but also in a place that doesn't impact the new structure location.
c) Ensuring sufficient room for temporary foundations to support the façade frames. These foundations will need to be buried so will likely be sacrificial, the location of these need to be coordinated around the new foundation design.
d) the new structure to be installed while the façade frames are still in place, while still allowing space to disassemble and remove the frames.
e) the avoidance of all services that may be affected i.e. 33kva cables in the footpath on Castle street.

The complexity described above may reveal later in the design stage that support frames on the inside of the building may not be viable. If this is the case, support frames on the outside of the building will be the only viable option.

The proximity of the older unreinforced masonry Cadbury buildings adjacent to the Heritage listed Allied Press (ODT) building, also means that vibration caused by excavation or driving sheet piles or structural piles etc will need to be very carefully managed. Specific matters such as the vibration impacting the operation of the ODT printing press and the financial repercussions of this are also significant issues to be managed.

Further, considerable thought would need to be put into the impact of retaining facades that border neighbouring buildings when the new structure will be designed to move considerably in a seismic event. This movement would have significant effects on the neighbouring buildings, and it is not clear at this point how such effects can be managed. In order to retain the facades (that are currently fixed to the ground) and keep the base isolation approach, there needs to be a seismic separation introduced to any façade retention option. Four of the six façade retention options (1a, 1b, 3a, 3b) indicate horizontally cutting the façade to physically separate it from its original foundation. After a seismic event the separation gap would need to be checked and remedial work would be required. While the process to provide the seismic separation in this area would be hugely complex and costly, it is most likely the least onerous for future remedial work. The other two options (2a, 2b) have a seismic separation between a new frame supporting the facades and the main hospital structure. The issues that arise from this are more fully covered in Section 5.

4. Analysis of Façade Temporary Works

Installing the temporary structural façade supports on the exterior of the building (options 1a, 2a & 3a) would be the favoured option and have the least impact from a new construction standpoint. There is enough space for the foundations to be placed and the frames to be fixed in place. It allows the internal construction of the hospital to progress without the need to build in and around temporary frames. The downside with this option is the street-run services and necessary traffic management, refer sections 6 & 7 respectively.

The option to have the façade supports on the inside (options 1b, 2b & 3b) of the building creates other difficulties. All buildings have 'structure lines' typically set out in a grid type format, these structure lines are used to transfer the weight of the buildings structure. Loads come down the building from the highest level through the columns, beams and bracing systems into the foundations. Between these structure lines is where windows / doors, etc are located.

The internal structure of the Cadbury Buildings cannot be removed before the temporary façade restraints are in place. These restraints will need to be located as close to the existing structure lines as possible to accommodate the loads of the façade when the internal structure is gone. Importantly, the restraints cannot be located over windows / doors as the buildings hold no structural resilience in these areas. Similarly, for the construction of the new hospital to adjoin the existing facades, this will need to happen in and around the temporary restraints until it is safe for them to be removed. The complexity of making this a reality should not be underestimated, and for this reason the option of temporarily bracing the facades from the inside is not considered feasible. It then follows that the impact on the state highway and utilities beneath cannot be avoided

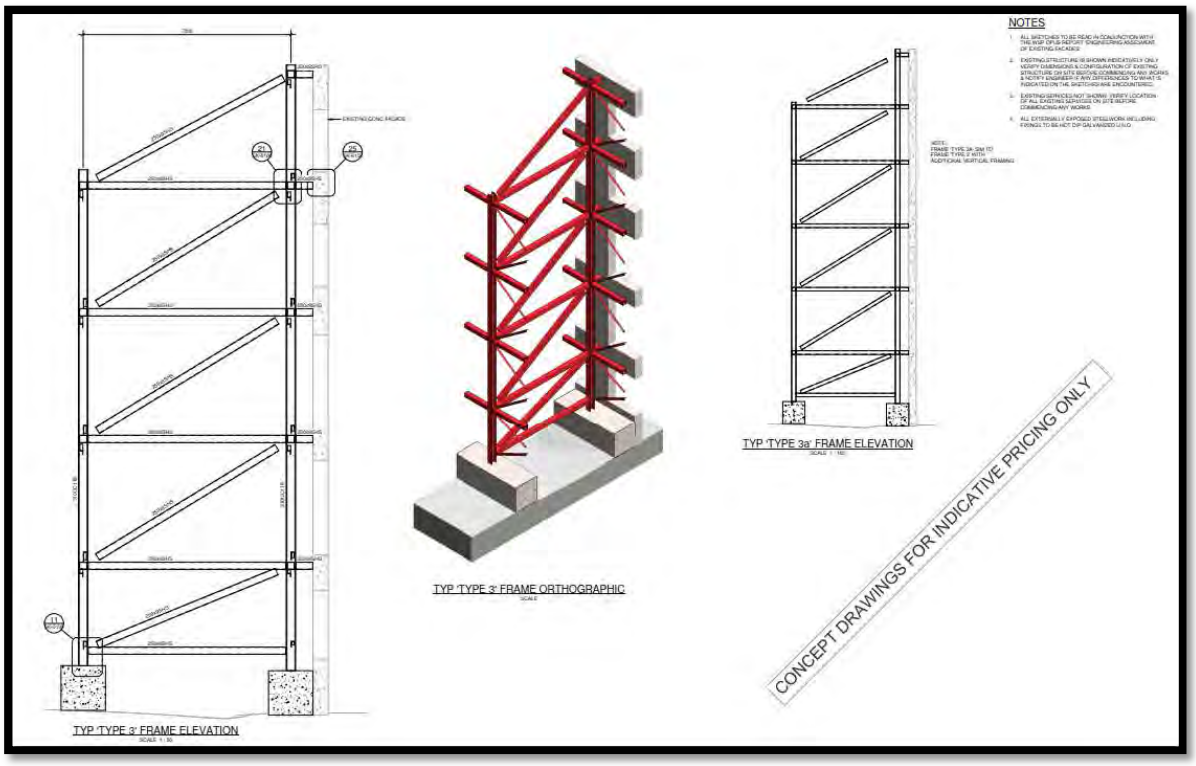

Image 2: WSP-Opus façade retention structural frame

5. Analysis of Complex Connections between Façade and New Superstructure

Establishing a connection between an existing façade and a new structure is always going to pose challenges, and it becomes even more difficult when the façade needs to be upgraded to meet an IL4 standard.

The façade retention options outlined within the WSP-Opus report provide different construction approaches, separated out in the analysis below.

Option 1a & 1b shows a full height hospital building built hard up against the existing façade. Both options 1 & 3 have the same façade connection / seismic separation methodology so comments made will be common to both.

While this option would be the simplest to erect, having a new hospital structure abut an existing façade does create complications. Specifically, the corresponding floor levels won't line up, which leads to existing windows being at the floor levels of the new hospital and would therefore need to be filled in.

In addition, while the physical structural connection between the existing facade and the new structure would be relatively simple, the challenge comes as to when or where the connection can take place and whether there are other items in the way.

Finally, in-ground works to allow the building to be established up against the boundaries will cause significant delays (using the complex methods outlined in section 3).

By way of positive implication, impact on new services with options 1a and 1b will be low as the façade is the only portion of the building that is fixed to the new hospital structure.

Option 3 however, does have a frame fixed to the façade with a substantial gap to the main hospital building. This will impact on the functionality of a new hospital design in that the building services (ducted, tray run, and pipe run) won't easily transfer through to the external portion of the building.

Options 2a & 2b shows a frame fixed to the façade which is seismically separated from the new hospital. This is a different approach to Options 1 & 3.

This option allows for new floor levels to be established to match the existing openings in the façade, however as the facades have differing floor levels, ramps or split-level lifts would then be required. It then becomes more complex with the connection to the new hospital building which again will have different floor to floor levels. Such changes in levels will have an impact on the hospital's new layout and how usable spaces for staff and patients are created.

As ramps are to be avoided within Hospitals where possible, split level lifts would need to be provided. This would then require separation between the split floors which will impact on natural light. The split floors also create a problem for the structure as there needs to be a seismic separation at the location of the split levels.

This option would also create difficulties in transferring building services between the split levels because there needs to be an allowance for considerable movement. Transitioning ceiling services from a single floor to split levels would be incredibly complex and create more demand on the plant required. This also makes the weathertightness transition a lot more difficult, as moving parts are harder to keep completely sealed. More precaution would be required to implement secondary and tertiary levels of defence to the ingress of moisture. More so, when any seismic event happens, the services and weathertightness areas would need to be checked and most likely require remedial action.

Finally, for all options the unreinforced masonry buildings (block 1 & 2) have multiple skins of brick that could be significantly fixed on the back face but still extremely hard to hold on the street frontage. During a seismic event there would be significant risk of bricks dislodging and falling to the footpath.

6. Analysis of Impact on Existing Street Utilities

Public services such as power, water supply, foul sewer, stormwater, reticulated gas etc within the traffic corridor will also need to be considered with the retention of the facades.

There are essential city services running inside Cumberland, Castle and St Andrew Streets. If there were façade supports to be installed along Cumberland and Castle streets, the structural frames and foundations will cover some of these services. As these frames may be in position for 6-8 years this would severely impede the ability to access them should service / repair be needed. The weight of the foundations and frames also needs to be verified to ensure they would not cause damage to the in-ground services. It is conceivable that some of these utilities will require relocation prior to façade retention works commencing to retain their underlying resilience.

Image 3: Power services map (Aurora)

Image 4: Three Water services map (DCC)

Link to Aurora Energy online services map
http://www.arcgis.com/home/webmap/viewer.html?webmap=36c788a9848e4c869e96187e6517dacb&extent=170.4277,-45.9217,170.6092,-45.8423

Link to DCC services online map
https://dunedin.maps.arcgis.com/apps/webappviewer/index.html?id=16c606211c8441c18691a449807fb6a2

7. Analysis of Compromise to the Traffic Network

The site is located between three arterial routes of Dunedin city's traffic system - the dual carriageway one-way systems (SH1) running North (Cumberland St) & South (Castle St) on either side and St Andrew St (two way dual carriageway) running between the proposed blocks identified for hospital development. There are also separated cycleways which run on both Cumberland and Castle St closest to the Cadbury site.

An exclusion zone on the exterior of the site to protect the public will be required, It will be at least the width of the footpath, but may at times be required to extend onto the cycle ways and state highways (which will affect access to inground services). If the structural façade supports are on the outside of the building the exclusion zone would need to incorporate these areas.

The WSP Opus report identifies façade retention options (1a, 2a & 3a) that provide structural framing to the exterior of the building (on the street side). While this option would be preferred as far as buildability is concerned, (as it causes no disruption to the internal site construction), some of the structural frames protrude 8.700m out from the facade and would require closure to one lane of traffic and the cycle lane.

A Traffic Management Strategy prepared by Stantec identifies some scope to move the lanes over and away from the Cadbury site (refer Images below), but only for brief periods. This will be untenable if the structural frames were required to stand in place for 6-8 years as is anticipated.

Therefore, as it stands, there is a conflict between creating a temporary façade structure and maintaining the current flow and utility of the state highway network on both sides of the site. It is clear that retention of the heritage facades will have a significant and sustained impact on the operation of the state highways either side.

Image 5: Stantec TMS existing road layout

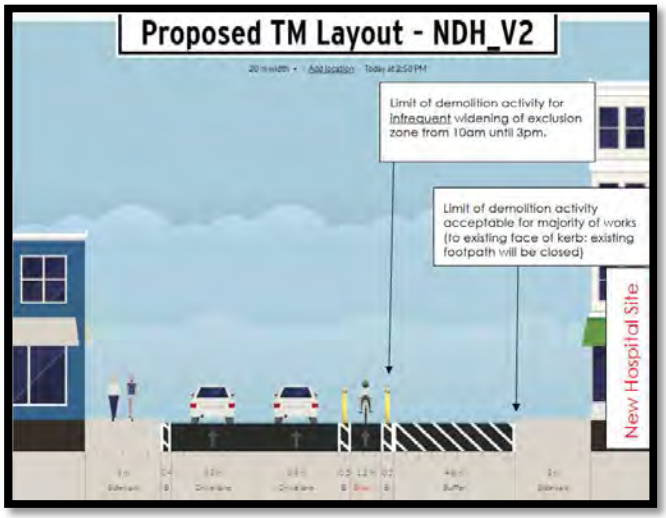

Image 6: Stantec TMS proposed road layout

8. Overall Analysis of Estimated Costs

The façade retention options below have been estimated to range from $32.6m to $74.6m.

It is evident in the estimates that the options 'A' which have the façade supports on the exterior of the building are a lesser cost than options 'B' having the supports on the inside face of the facades. The difference reflects the extra complications associated with having the façade supports on the inside face of the building. The increase in estimated price between options 1, 2 & 3 are reflective of the complex buildability of these options.

Option 4 allows for all unreinforced masonry facades (Block 1 & 2 only) to be deconstructed by hand, catalogued and stored in a warehouse until it's time to place them back in exactly the same location. This option includes the need for propping (as per Option 1A) to the remaining concrete facades.

Option 5 is for a completely new façade to be created from Glass Reinforced Concrete (GRC) to mimic the existing Cadbury facades. Sufficient information will be required / captured from the existing facades so that the new facades can be replicated almost identically. This option has the lowest estimated cost because it doesn't require the need to actually retain any facades during the construction of the new hospital and has the best outcome in respect of risks for Health and Safety. However, it is of course, not strictly retention of the heritage façade.

Option	Estimated Total Cost
Option 1A	$47,000,000
Option 1B	$58,800,000
Option 2A	$63,800,000
Option 2B	$69,800,000
Option 3A	$66,200,000
Option 3B	$74,600,000
Option 4'	$51,000,000
Option 5	$32,600,000

Image 7: Summary Cost Options from RLB Façade Retention Report October 2019

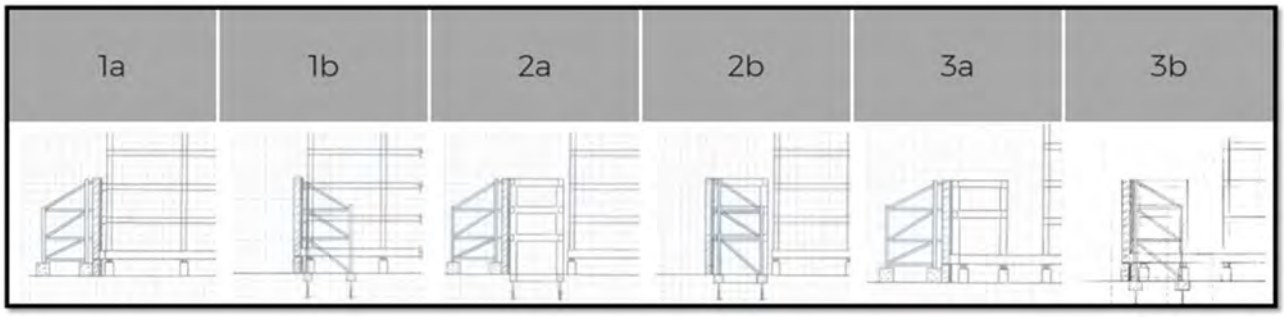

Image 8: WSP-Opus Façade retention options

9. Other Buildability Factors

There are other factors which will have an impact on buildability as set out below. These conditions are very hard to quantify yet add considerable complexity and safety risk to an already constrained site.

Some examples of these complexities include:

- No lay down areas suitable for major construction works when building up against facades that are insitu.
- Increased duration of construction and longer disruption impact on the city.
- Elevated designer and client obligation to Safety in Design principles.
- Integration from new design methodology to old construction techniques creating further complexity.
- Retention of the facades at the street boundary limit options for integration and activation of the new development at ground level, Ideally the new hospital would be articulated to allow for sufficient urban realm development.
- Frailty of the masonry will be exposed by vibration from the significant piling activities that are proposed beneath the new superstructure.

Appendix 14: Objectives and Policies of the Statutory Planning Documents

Partially Operative Proposed Otago Regional Policy Statement (Proposed RPS)

Part B Chapter 1 Resource management in Otago is integrated

Objective 1.1 – Otago's resources are used sustainably to promote economic, social, and cultural wellbeing for its people and communities.

Policy 1.1.2 – Social and cultural wellbeing and health and safety

Provide for the social and cultural wellbeing and health and safety of Otago's people and communities when undertaking the subdivision, use, development and protection of natural and physical resources by all of the following:

a) Recognising and providing for Kāi Tahu values;

b) Taking into account the values of other cultures;

c) Taking into account the diverse needs of Otago's people and communities;

d) Avoiding significant adverse effects of activities on human health;

e) Promoting community resilience and the need to secure resources for the reasonable needs for human wellbeing;

f) Promoting good quality and accessible infrastructure and public services.

Part B Chapter 4 Communities in Otago are resilient, safe and healthy

Objective 4.3 – Infrastructure is Managed and Developed in a Sustainable Way

Policy 4.3.1 – Recognise and provide for infrastructure by all of the following:

a) Protecting and providing for the functional needs of lifeline utilities and essential or emergency services;

b) Increasing the ability of communities to respond and adapt to emergencies, and disruptive or natural hazard events;

c) Improving efficiency of natural and physical resource use;

d) Minimising adverse effects on existing land uses, and natural and physical resources;

e) *Managing other activities to ensure the functional needs of infrastructure are not compromised.*

Policy 4.3.2 – Recognise the national and regional significance of all of the following infrastructure:

a) *Renewable electricity generation activities, where they supply the National Grid or local distribution network;*

b) *National Grid;*

c) *Electricity sub-transmission infrastructure;*

d) *Telecommunication and radiocommunication facilities;*

e) *Roads classified as being of national or regional importance;*

f) *Ports and airports and associated navigation infrastructure;*

g) *Defence facilities;*

h) *Rail infrastructure;*

i) *Municipal infrastructure.*

Policy 4.3.3 – Provide for the functional needs of infrastructure that has regional or national significance, including safety.

Policy 4.3.5 - Protect infrastructure with national or regional significance, by all of the following:

a) *Restricting the establishment of activities that may result in reverse sensitivity effects;*

b) *Avoiding significant adverse effects on the functional needs of such infrastructure;*

c) *Avoiding, remedying or mitigating other adverse effects on the functional needs of such infrastructure;*

d) *Protecting infrastructure corridors from activities that are incompatible with the anticipated effects of that infrastructure, now and for the future.*

Part B Chapter 5 People are able to use and enjoy Otago's natural and built environment

Objective 5.2 - Historic heritage resources are recognised and contribute to the region's character and sense of identity.

Policy 5.2.1 – Recognise all the following elements as characteristic or important to Otago's historic heritage:

a) *Residential and commercial buildings;*

b) *Māori cultural and historic heritage values;*

c) *19 th and early 20th century pastoral sites;*

d) *Early surveying, communications and transport, including roads, bridges and routes;*

e) *Early industrial historic heritage, including mills and brickworks;*

f) *Gold and other mining systems and settlements;*

g) *Dredge and ship wrecks;*

h) *Coastal historic heritage, particularly Kāi Tahu occupation sites and those associated with early European activity such as whaling;*

i) *Memorials;*

j) *Trees and vegetation.*

Policy 5.3.2 – Protect and enhance places and areas of historic heritage, by all of the following:

a) *Recognising that some places or areas are known or may contain archaeological sites, wāhi tapu or wāhi taoka which could be of significant historic or cultural value;*

b) *Applying these provisions immediately upon discovery of such previously unidentified archaeological sites or areas, wāhi tapu or wāhi taoka;*

c) *Avoiding adverse effects on those values that contribute to the area or place being of regional or national significance;*

d) *Minimising significant adverse effects on other values of areas and places of historic heritage;*

e) *Remedying when adverse effects on other values cannot be avoided;*

f) *Mitigating when adverse effects on other values cannot be avoided or remedied;*

g) *Encouraging the integration of historic heritage values into new activities;*

h) *Enabling adaptive reuse or upgrade of historic heritage places and areas where historic heritage values can be maintained.*

Proposed Dunedin Second Generation District Plan (2GP)

Note: Shading of text below denotes provisions remain subject to appeal. Underlining denotes defined terms in the 2GP.

Part A, Plan Overview and Strategic Directions, Section 2 Strategic Directions

Objective 2.2.6: Public health and safety – The risk to people's health and safety from contaminated sites, hazardous substances, and high levels of noise or emissions is minimised.

Policy 2.2.6.1: Protect people from noise, light or offensive emissions that may create adverse effects on health or well-being through rules that:

a. encourage heavier industrial activities into industrial zones, which have lenient noise limits and do not allow residential or other noise sensitive activities in these zones;

b. require adequate separation distances between noise sensitive activities and activities that may generate excessive noise in the rural zones;

c. require acoustic insulation of buildings containing noise sensitive activities in mixed use environments;

d. allow for lighter industrial activities in mixed use zones, provided any parts of the activity that may generate excessive noise or odour are in a part of the building without doors and windows opening onto a pedestrian street frontage mapped area;

e. restrict the level of noise and light spill from activities and development to safe levels depending on the nature of the receiving environment (zone); and

f. restrict activities that generate high levels of noise from locating in residential zones.

Objective 2.3.1: Land and facilities important for economic productivity and social well-being – Land and facilities that are important for economic productivity and social well-being, which include industrial areas, major facilities, key transportation routes, network utilities; and productive rural land are:

c. protected from less productive competing uses or incompatible uses, including activities that may give rise to reverse sensitivity; and

d. in the case of facilities, able to operate efficiently and effectively.

Policy 2.3.1.5: Identify key transportation routes, and protect the safety and efficiency of these roads from inappropriate subdivision or development through:

a. rules that control the location and design of access points; and

b. rules that require minimum on-site car parking and loading requirements.

Objective 2.3.3: Facilities and spaces that support social and economic wellbeing – Dunedin has a range of accessible recreational, sporting, social and cultural facilities and spaces, which provide for high levels of physical, social, and cultural well-being across the community.

Objective 2.4.1: Form and structure of the environment – The elements of the environment that contribute to residents' and visitors' aesthetic appreciation for and enjoyment of the city are protected and enhanced. These include:

a. *important green and other open spaces, including green breaks between coastal settlements;*

b. *trees that make a significant contribution to the visual landscape and history of neighbourhoods;*

c. *built heritage, including nationally recognised built heritage;*

d. *important visual landscapes and vistas;*

e. *the amenity and aesthetic coherence of different environments; and*

f. *the compact and accessible form of Dunedin.*

Objective 2.4.2: Heritage – Dunedin's heritage is central to its identity and is protected and celebrated as a core value of the city, through the heritage conservation and retention of important heritage items, and the maintenance and active use of built heritage.

Policy 2.4.2.1 –

a. *Identify in a schedule (Appendix A1.1) buildings and structures that have significant heritage values and use rules to:*

    i. *manage additions and alterations to, or removal for relocation of these buildings, in a way that maintains important heritage values;*

    ii. *restrict demolition of these buildings except in limited circumstances;*

    iii. *support adaptive re-use, heritage conservation and restoration; and*

    iv. *prioritise protection of heritage values over compliance with other performance standards where there is a conflict.*

b. *Identify heritage buildings and structures based on the following criteria:*

    i. *historic and social significance;*

    ii. *spiritual/cultural significance, including significance to Māori;*

    iii. *design significance; and*

    iv. *technological/scientific significance.*

Policy 2.4.2.3 - Encourage adaptive re-use of heritage buildings through rules that:

a. *enable a wider range of activities to be undertaken in scheduled heritage buildings in the Warehouse Precinct and the Smith Street and York Place zones);*
b. *exempt scheduled heritage buildings from minimum parking standards;*
c. *enable earthquake strengthening; and*
d. *enable work required to comply with sections 112 and 115 of the Building Act 2004.*

Objective 2.7.2: Efficient transportation – The multi-modal land transport network, including connections between land, air, and sea transport networks operates safely and efficiently for all road users.

Policy 2.7.2.1 –

Support the safe and efficient operation of the multi-modal land transport network through rules that:

a. *provide for transportation activities;*
b. *manage the location, scale and design of high trip generators;*
c. *manage the location, number and design of vehicle accesses;*
d. *require on-site vehicle loading where vehicle loading on-street could compromise the safety and efficiency of the transport network;*
e. *require on-site car parking where necessary to enable adequate accessibility and to avoid or adequately mitigate adverse effects on the safety and efficiency of the transport network;*
f. *manage the design of parking, loading and access areas; and*
g. *require minimum separation distance of vehicle crossings from level crossings.*

Policy 2.7.2.2 – Encourage cycling by:

a. *considering the need for and design of on-site cycle parking as part of consent applications where accessibility is a relevant consideration;*
b. *considering the safety of cyclists entering and exiting sites where effects on the safe and efficient operation of the transport network is a relevant consideration;*
c. *enabling parking spaces required through minimum parking standards to be used for bicycle parking; and*

d. *considering reductions in parking requirements where a travel management plan which encourages cycling has been implemented and/or a lower requirement due to a shift to active modes and/or public transport has been demonstrated.*

Part B, City Wide Activities, Section 4 Temporary Activities

Objective 4.2.1 – Temporary activities are enabled while:

c. *minimising, as far as practicable, any adverse effects on the amenity and character of the zone; and*

d. *ensuring any adverse effects on people's health and safety are minimised as far as practicable.*

Policy 4.2.1.1 – Require temporary activities to be designed and operated to minimise, as far as practicable, adverse effects on:

a. *the amenity of surrounding properties; and*

b. *people's health and safety.*

Part B, City Wide Activities, Section 6 Transportation

Objective 6.2.3 – Land use, development and subdivision activities maintain the safety and efficiency of the transport network for all travel modes and its affordability to the public.

Policy 6.2.3.9 - Only allow land use and development activities or subdivision activities that may lead to land use or development activities, where:

a. *adverse effects on the safety and efficiency of the transport network will be avoided or, if avoidance is not practicable, adequately mitigated; and*

b. *any associated changes to the transportation network will be affordable to the public in the long term.*

Part C, City Wide Provisions, Section 9 Public Health and Safety

Objective 9.2.2 – Land use, development and subdivision activities maintain or enhance people's health and safety.

Policy 9.2.2.1 – Require activities to be designed and operated to avoid adverse effects from noise on the health of people or, where avoidance is not practicable, ensure any adverse effects would be insignificant.

Part C, City Wide Provisions, Section 13, Heritage

Objective 13.2.1 – Scheduled heritage buildings and structures are protected.

Policy 13.2.1.1 – Encourage the maintenance, ongoing use and adaptive re-use of scheduled heritage buildings, including by enabling repairs and maintenance, earthquake strengthening, and work required to comply with section 112 (Alterations) and section 115 (Change of Use) of the Building Act 2004 where it is done in line with policies 13.2.1.2-13.2.1.4.

Policy 13.2.1.7 – Avoid the demolition of a protected part of a scheduled heritage building or structure unless the following criteria are met:

a.

i. the building or part of the building poses a significant risk to safety or property; or

ii. the demolition is required to allow for significant public benefit that could not otherwise be achieved, and the public benefit outweighs the adverse effects of loss of the building; and

b. there is no reasonable alternative to demolition, including repair, adaptive re-use, relocation or stabilising the building for future repair; and

c. for building and structures located within a heritage precinct:

i. development post demolition will maintain or enhance the heritage streetscape character and amenity in accordance with Policy 13.2.3.6; and

ii. conditions will be imposed which would give reasonable certainty that this will be completed within an acceptable timeframe.

Objective 13.2.4 – Dunedin's archaeological sites are protected from inappropriate development and use.

Policy 13.2.4.1 – Require an archaeological authority to be obtained, if one is required, prior to undertaking earthworks on a scheduled archaeological site.

Part D, Management Zones, Section 18 Commercial and Mixed Use Zones

Objective 18.2.1 - Dunedin has a well-structured and economically and socially successful range of commercial and mixed use environments based on:

a. the CBD, which is the focus for employment, retail, entertainment, leisure, visitor accommodation, and arts and culture activities;

b. vibrant and viable principal centre, suburban and rural centre zones, which provide hubs for social and economic activity for rural, suburban and principal communities;

c. *Neighbourhood Centre Zone, which provides for the day to day needs of local areas, with the Neighbourhood Destination Centre Zone also servicing visitor needs, and the Neighbourhood Convenience Centre Zone also servicing the needs of passing motorists;*

d. *a range of mixed use zones (WP, PPH, SSYP and HE zones) around the edge of the CBD, which provide for a compatible mix of inner-city living, commercial, and light industrial activities;*

e. *an area south of the CBD (CEC – South Zone), which provides for high trip generators, large format general retail and bulky goods retail which are likely to be incompatible with the amenity expectations of the CBD and which may require larger sites than available in the CBD;*

f. *an area to the north-east of the CBD (CEC – North Zone), similar to the CEC – South but also containing a mix of activities which support the adjoining CBD and Hospital zones;*

g. *an area around Andersons Bay Road (TR Zone), which provides for trade related retail and specific categories of high trip generators, which are likely to be incompatible with the amenity expectations of the CBD; and*

h. *an area around Birch and Kitchener Streets and the coast (HE Zone) which provides for the continuation of the existing environment characterised by industrial activity, while allowing for a transition toward a vibrant and attractive place to live, work and visit by also providing for conference, meeting and function, entertainment and exhibition, restaurant, visitor accommodation, training and education and residential activities.*

Policy 18.2.1.10 - Provide for hospital activity in the CEC - North Zone, to allow for the relocation of Dunedin Hospital into this zone.

Operative Dunedin District Plan

Environmental Issues

Objective 21.2.2 – Ensure that noise associated with the development of resources and the carrying out of activities does not affect public health and amenity values.

Policy 21.3.3 – Protect people and communities from noise and glare which could impact on health, safety, and amenity.

Transportation

Objective 20.2.2 – Ensure that land use activities are undertaken in a manner which avoids, remedies or mitigates adverse effects on the transportation network.

Objective 20.2.4 – Maintain and enhance a safe, efficient and effective transportation network.

Policy 20.3.3 – Provide for activities on roads and footpaths where this:

(a) Is compatible with the function of the road.

(b) Is safe for road users and pedestrians.

(c) Has no more than minor adverse effects.

Policy 20.3.4 – Ensure traffic generating activities do not adversely affect the safe, efficient and effective operation of the roading network.

Policy 20.3.5 – Ensure safe standards for vehicle access.

Policy 20.3.6 – Encourage heavy traffic to use appropriate routes.

Policy 20.3.8 – Provide for the safe interaction of pedestrians and vehicles.

Policy 20.3.9 – To sustainably manage transport infrastructure, particularly that of national or regional importance, in a way which will provide for its effective operation and preserve its capacity to meet the reasonably foreseeable needs of future generations, while avoiding, remedying or mitigating any adverse effects resulting from the operation of this infrastructure.