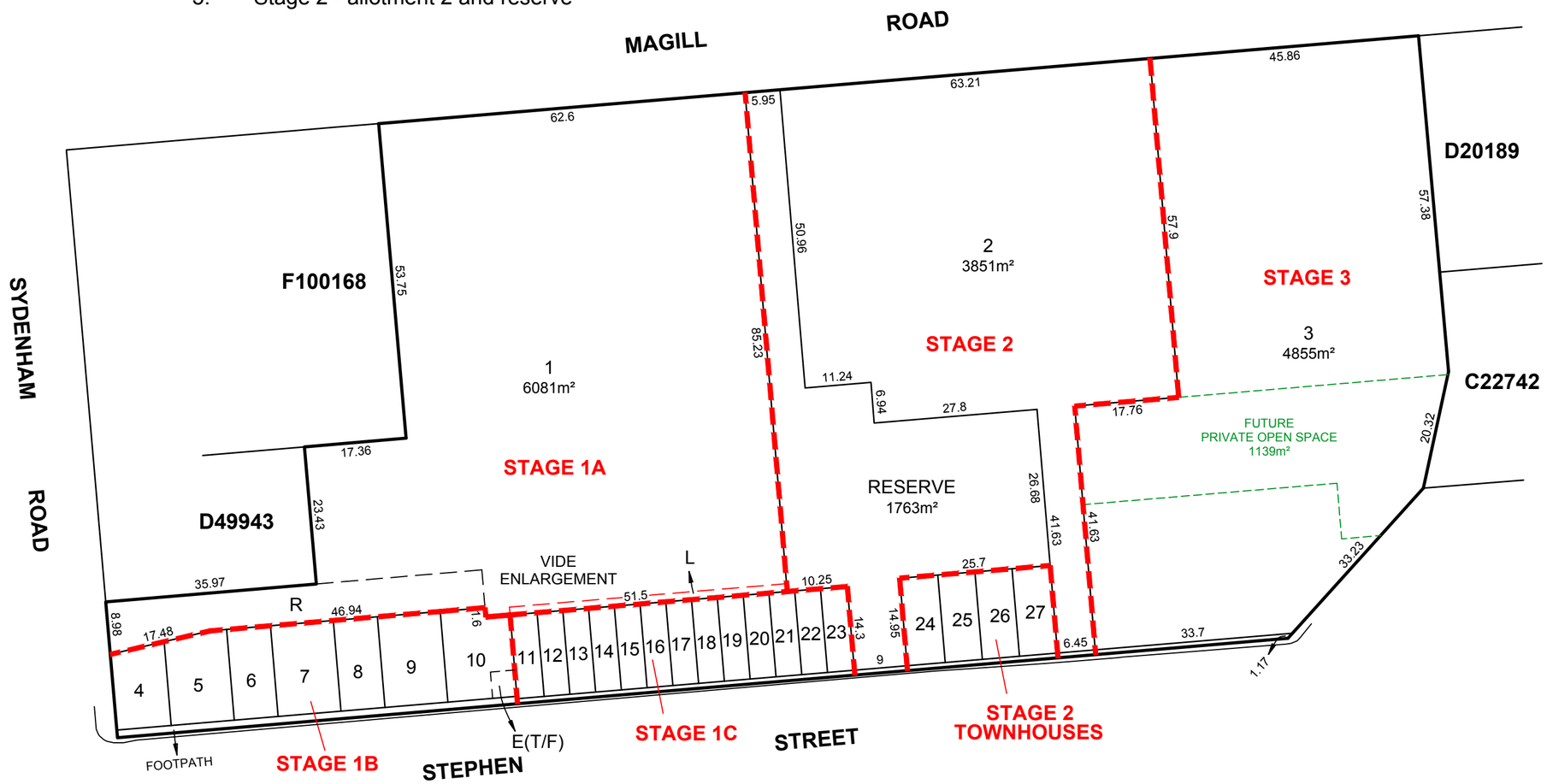
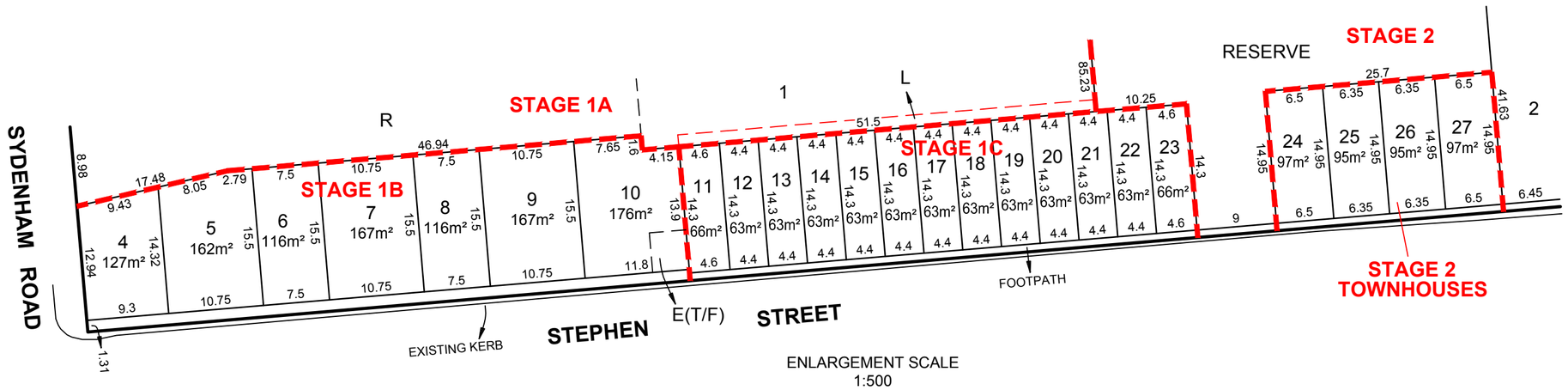
DEVELOPMENT AND LANDS TITLES OFFICE
LODGEMENT SEQUENCE

1. Superlot plan to create stages 1A, 1B, 1C, 2 & 3 superlots and Stephen Street road widening
2. Stage 1B - allotments 4 to 10
3. Stage 1C - allotments 11 to 23
4. Stage 2 Townhouses - allotments 24 to 27
5. Stage 2 - allotment 2 and reserve

AMENDED PLAN
29.06.2018
AMENDED PLAN
30.07.2018
AMENDED PLAN
22.08.2018





ENLARGEMENT SCALE
1:500

Development No. 155 / D047 / 18
City of Norwood Payneham & St Peters

Proposed Plan of Division
Allotments 701 & 702 in D49943
Allotments 17 to 21 in F100166
Allotments 22 to 27 in F100167
Allotment 28 in F100168
Allotment 35 in F100169
Allotments 50 to 53 in F250838
Hundred of Adelaide
in the area named
NORWOOD

C'ST 6153/860, 6176/954, 6153/846, 6153/847, 6153/848, 6153/849, 6153/850, 6153/852, 6153/853, 6153/854, 6153/855, 6153/856, 6153/857, 6153/851, 6153/845, 6198/719

0 7.5 15 30 45 60 75 m

1:750 @ B3

Proposed Easement

E(T/F) SAPN transformer
L Light and air in favour of allotments 11 to 21
R Right of way in favour of allotments 4 to 10

No. of original allotments	20
No. of proposed allotments	27
Total Area	1.899ha
Reserve	(9.3%) 1766m²

Dimensions and areas are subject to survey.

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Original Sheet Size B3

Mark Antony Peter Williams
LICENSED SURVEYOR

REF: A001018.BULD	
DWG NO.: A001018PROP5(E)	
REVISION: E	
RHF 22.08.2018	

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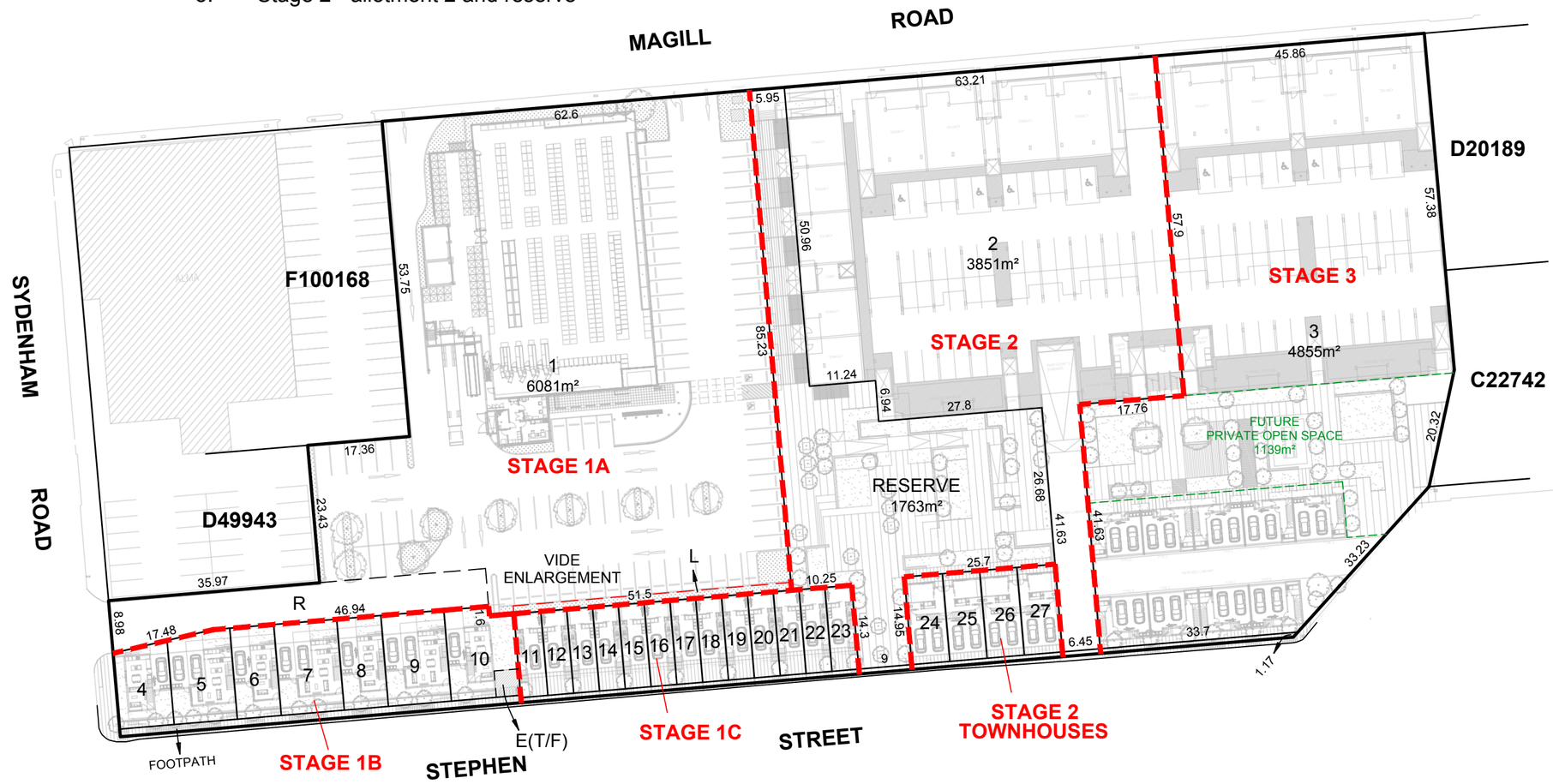
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+ Construction + Mining +
+ Spatial Information Management +

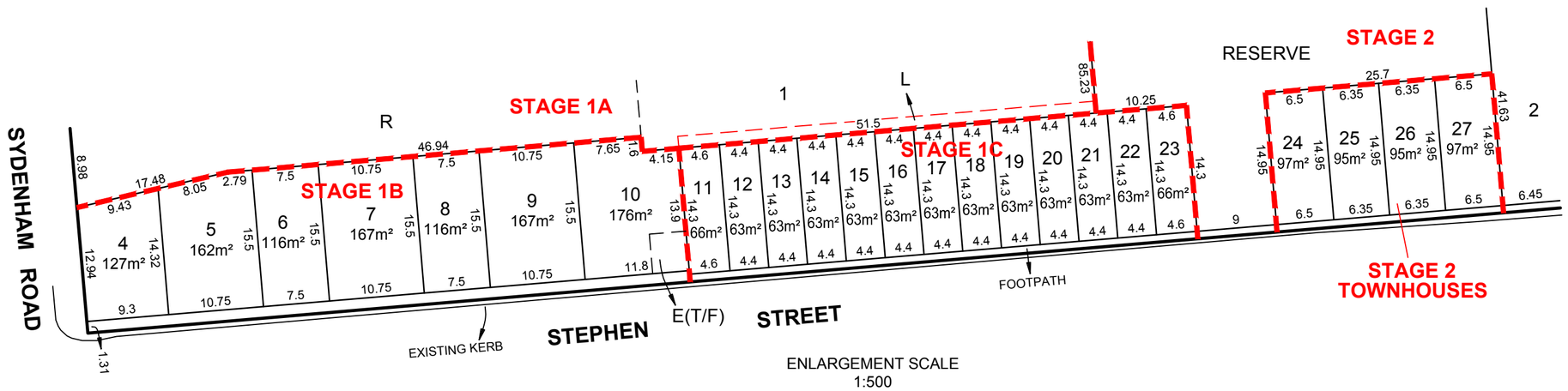
Alexander Symonds Surveying Consultants

DEVELOPMENT AND LANDS TITLES OFFICE
LODGEMENT SEQUENCE

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IMAGE 4



IMAGE 3

CHAPEL STREET

ROAD

SYDENHAM

GEORGE STREET

MAGILL

STEPHEN

STREET

ROAD

THE AJAMA TAVERN

BITUMEN CARPARK

WAREHOUSE

BUS STOP

REV	DATE	DESCRIPTION	CALC	FIELD
		ADDITIONS, AMENDMENTS AND APPROVALS		

LEGEND

47.87VK VERANDAH
47.87GUT EDGE OF GUTTER
48.12OH OH WIRE LEVEL
47.87TK TOP KERB
47.36WT WATER TABLE
45.16FL FLOOR LEVEL
48.12IL INVERT LEVEL
TAP
WATER METER
SPRINKLR / IRRIG VALVE
HYDRANT
DOMESTIC OUTLET
DOWNPIPE
DOMESTIC SUMP
STORMWATER MHOLE
SEP / GRATING
47.51TC TOP OF CAPPING
47.51R TOP OF RIDGE
47.51TP TOP OF PARAPET
TEL COMM. COLUMN/PIT
TRAFFIC LIGHT
SIGN / BUS SIGN
LITTER BIN
MAIL BOX / SIGNAL BOX
TICKET MACHINE
ROAD / ELEC. SERVICE
WATER SV / FP
ELEC. / GAS METER
GAS SERVICE
PSM PEG / TBM
SURVEY MARKS
BOREHOLE
POWER / LIGHT POLE
CABLE MARKER
STOBIE / WOODEN POLE
POST / BOLLARD
SEWER MH / IO / SIP
UNKNOWN POINT / SERVICE
TREE / SHRUB
Possible REGULATED / SIGNIFICANT TREE by measurement only (trunk greater than 2.0m circumference). Professional advice from council / arborist required.
EDGE of VEGETN
ROAD SIGN / HOARD.
SEWER PIPE UG
TEL. COMM. UG
WATER PIPE UG
BUILDING
WALL
GI BUILDING
FENCE
GATE
BOTTOM OF BANK
TOP OF BANK
CHANGE OF GRADE
DRAIN
DCDB LINE
EDGE OF PAVING

COORDINATE SYSTEM

VERTICAL:	AHD
HORIZONTAL:	GROUND PLANE ORIENTED TO: MGA 94 ZONE 54
SCALE: GROUND	(CSF = 1.0001688)

ADOPTED STATION & AUTHORITY

PSM 6628/42411	RL:	51.482 SDB
PSM	E:	283437.105 SDB
	N:	6133667.828 SDB

SDB denotes SA Government survey data base

0 2 4 8 12 16 20 m

1:200

ORIGINAL SHEET SIZE A0

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Notes:
Property boundaries shown hereon have been compiled from the government records and have not been verified by field survey.

CONTOUR INTERVAL:	0.2m	
SURVEY:	TLH	JAN 2018
DRAWN:	TLH	23.01.2018
CHECKED:	RSW	23.01.2018

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DETAIL AND LEVEL SURVEY
MAGILL ROAD
NORWOOD

DRAWING No. A001018_DETAIL(0) 2D

SHEET 1 OF 2

REVISION 0



IMAGE 2



IMAGE 1



IMAGE 5

283360 E
283380 E
283400 E
283420 E
283440 E
283460 E
283480 E

STEPHEN STREET
MAGILL ROAD
STEPNEY STREET
BITUMEN DRIVEWAY
BITUMEN CARPARK
GRAVEL CARPARK
WAREHOUSE
DISUSED CARAVAN SHOWROOM
RETAINING WALL
APARTMENTS
VETERINARY SERVICE
CONCRETE RAMP
CONCRETE
PAVED
COLUMN
TEL PIT
SEWER MH
SEWER GRAVITY MAIN
WATER METER
GAS METER
HYDRANT
TRAFFIC LIGHT
POWER POLE
TREE
BOREHOLE
51
52
53

N

REV	DATE	DESCRIPTION	CALC	FIELD
		ADDITIONS, AMENDMENTS AND APPROVALS		

LEGEND

47.81ER VERANDAH
47.87GUT EDGE OF GUTTER
48.12OH OH WIRE LEVEL
47.51TK TOP KERB
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WALL
G BUILDING
CONCRETE
FENCE
GATE
BOTTOM OF BANK
TOP OF BANK
CHANGE OF GRADE
DCDB LINE
EDGE OF PAVING

COORDINATE SYSTEM	
VERTICAL:	AHD
HORIZONTAL:	GROUND PLANE ORIENTED TO: MGA 94 ZONE 54
SCALE: GROUND	(CSF = 1.0001688)

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PSM	E:	283437.105 SDB
	N:	6133667.828 SDB

SDB denotes SA Government survey data base

0 2 4 8 12 16 20 m

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DETAIL AND LEVEL SURVEY
MAGILL ROAD
NORWOOD

DRAWING No. A001018_DETAIL(0) 2D

SHEET 2 OF 2

REVISION 0

masterplanning
architecture
consultation
heritage + interpretation
cultural tourism
urban design

mulloway studio



76 MAGILL RD, NORWOOD
(FORMER CAROMA FACTORY)

CULTURAL HERITAGE INTEGRATION + INTERPRETATION

MULLOWAY studio

for **CACA NOMINEES PTY LTD / ALDI STORES**

mulloway

[01 AUG 2018]

TECT02-04

DOCUMENT CONTROL

issue number	revision issue date	revision notes
00	8 May 2018	Preliminary – In Progress Issue
01	9 May 2018	Preliminary – In Progress Issue
02	20 July 2018	Draft Issue
03	27 July 2018	Issue
04	01 Aug 2018	Issue

INTRODUCTION

Mulloway Studio were engaged by CACA/ALDI to provide cultural heritage integration and interpretation for the proposed redevelopment of the former Caroma site on Magill Road, Norwood.

Essentially Mulloway's participation is about finding opportunities for integrating cultural representation into the architecture, landscape, and public space within the redeveloped site. Consideration of the cultural heritage will enrich the project in a number of ways:

- Helps to create a thematic narrative for the project.
- Informs and enriches the overall identity and experience of the place.
- Assists in integrating the new development into the existing community and urban environment.

We have undertaken research to identify the history, key people, stories, and significance of the place. We have identified background documentation sources and records that will assist in constructing a detailed understanding of the site and will provide a foundation for integrated interpretation. From this research the key themes and storylines that will be presented in the redevelopment have been distilled. Ultimately these sources will inform the final text and image content to be embedded in the outcomes on-site.

Evaluation of the site, the existing layout and building fabric, work processes and traces of former uses has been undertaken. We are liaising with the City of Norwood Payneham & St Peters Cultural Centre and have contacted former Caroma employees that worked at the factory, to understand both technical and personal experiences of the Place.

While the work in this report provides a basis for sound decision making and design progress, it is anticipated that further research and investigation will be undertaken at a more detailed level in line with the development of the design proposals.

BACKGROUND COMPONENTS

background documentation/resources

- 76 Magill Rd Masterplan report v6 (22 March 2018).
- Series of historic aerial photographs providing site layout + surrounds.
- Refer also following section for list of site background sources.



historic aerial images

SITE BACKGROUND

History of area

The suburb of Norwood was first laid out in 1847. It is part of the City of Norwood Payneham and St Peters. Prior to local government amalgamation, the City of Norwood was the oldest South Australian local government municipality.

History of surrounding sites of interest

The remnants of the East Torrens Destructor are located at Chimney Park, 64 Appelbee Crescent, across the road from 76 Magill Road (the former Caroma Norwood factory). The East Torrens Destructor officially opened on 6 February 1930 and burned the refuse of households and trades for the councils of Kensington and Norwood. It was not well-received by the residents, who complained about the smell and claimed that the smoke was affecting the value of their properties.

History of site

From the mid 19th Century, until the early twentieth, the area was the site of a Cox's 'brick yard.' The place incorporated the base material clay pits, pug mills, kilns and associated activities.

> "The brickyards of Messrs. Cox Brothers, of Norwood, are situated on seven and a half acres of ground which lie between the north end of Sydenham-road and Osmond-terrace. Here the whole process of converting the natural soil of the ground into hard bricks has been for the last ten years actively carried on, so that many of the best buildings in Adelaide may be said to have been dug out of Norwood — a city sprung from its own suburbs" *South Australian Register* 15th December 1859, p.3

Paper bags and box manufacturers, Silver & Co ltd, were located on Chapel Street Norwood. Based on its presence in local newspapers, it was in operation from 1900 to approximately 1930. According to the Progressive Risk Management Pty Ltd (PRM)'s *Environmental site assessment: Caroma Manufacturing Facility* (2016), there is evidence that some type of box factory used the site of 76 Magill Road, it is likely this was Silver & Co given the close proximity from Chapel Street.

History of Caroma

Charles Rothauser arrived in Australia in 1938. Charles and his wife Christine began a doll making business in 1939 in Gay's Arcade, Adelaide, named Quality Toy Company.

> "There is an interesting little story in progress in a doll factory that you find wandering up rambling stairs and along dark passages in old Gay's Arcade. It is the story of Budapest Bachelor of Engineering, and his wife who came to Australia three years ago."
> *The Advertiser*, Saturday 29 November 1941, p.11.

Christine dressed the dolls in costumes, but when she did not have enough dolls to keep up with production, Charles started making the dolls. According to an article from *The Advertiser* in 1941 Charles was trying to find an unbreakable material for the dolls faces. In this business Charles found a niche in the embryonic plastics field.

He continued to make dolls until the 1950s but also manufacturing other plastic products under the name Industrial Products Limited. In 1948 Harry Whillis a detailer for AM Bickford and Sons (South Australian company now known as Bickfords, which at the time manufactured pharmaceutical products), designed the world's first disposable polypropylene syringe. Prior to 1948 glass syringes were used, but penicillin would become clogged. At first the disposable syringes were made of polyether, but this material softened when heated and would have to be sterilised prior to packaging, which was very expensive. The injected moulded syringe made from polypropylene could be heat sterilised. Rothauser (Industrial Products Limited) manufactured the syringe for AM Bickfords and Sons.

In 1956 Rothauser renamed the company 'Caroma'. Caroma began manufacturing toilets and bathroom fittings, and has since contributed several innovative inventions that have transformed sanitary ware globally.



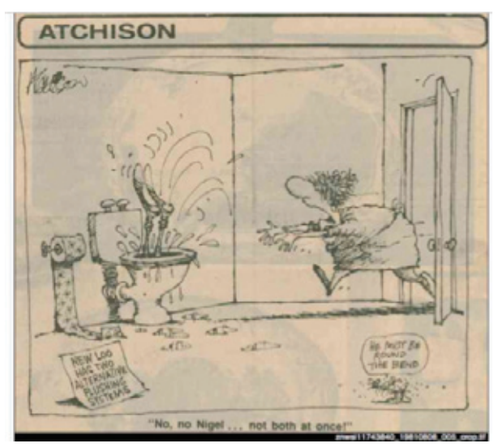
Rothauser's doll making, *The Advertiser* 1941



J. & T. Cox brickyard and kilns, Osmond Terrace, Norwood.1913 *State Library SA*

In late 1950s Caroma developed the world first one-piece plastic cistern, which was designed to combat Adelaide's corrosive water. In 1980 with a $130,000 Commonwealth Industry Grant a designer at Caroma, Bruce Thompson, developed a duel flush system that had different volumes: full flush (11.0 litres) and half flush (5.5 litres). The toilet bowl also had to be redesigned to ensure less water could still remove the waste. The duel flush saved each household 32000 litres of water a year. This later led to legislation around Australia that all new buildings would have duel flush toilets. When released the 'duo-set' was available in five colours Royal Blue, Chocolate, Avocado, Almond and Ivory. Caroma gained a global reputation, known for its combination of style and environmental awareness. Today it continues to be at the forefront of design and manufacturing, and is the market leader for water efficient sanitary ware.

According to ABC news The Norwood Caroma factory had been operating in Norwood for 73 years (1951-2014). The Norwood factory officially closed 24 February 2017. Manufacturing in Australia has now ceased and most of Caroma's production is completed in China. Australia will continue to be a distributor.



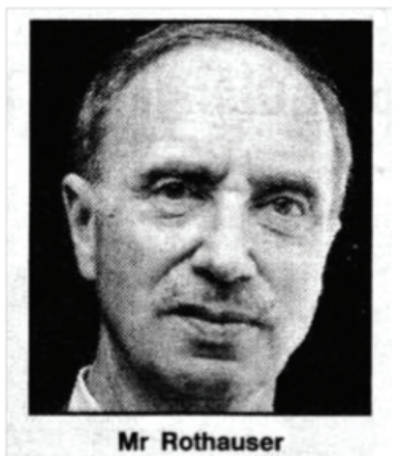
Michael Atchison cartoon-*The Advertiser, 1981,*

Stories of people

Charles Rothauser

Born 25 November 1913 in Budapest Hungary, Rothauser was educated as an architect in Vienna. He passed away at age 83 (May 18 1997) in Versailles, France from a stroke. He had a home there which he would use to escape the South Australian winter.

Married to Christine Rothauser, they had three daughters. Rothauser was a member of long list of associations: foundation member of P*lastics Institute of Australian* in SA in 1947, founding member of the *Mental Health Association Australia*, former president of the *Plastics Institute of Australia* and committee member of the *Richard Wagner Association*. In an article for the *Sunday Mail* (1997) Christine reflected "One important one was his work with the Mental Health Association- he fought for people not to be locked in cages." In 1987 he was also awarded an Officer of the Order of Australia (Charles Rothauser AO) for his service to secondary industry, particularly the design and manufacturing of plastics.


Mr Rothauser

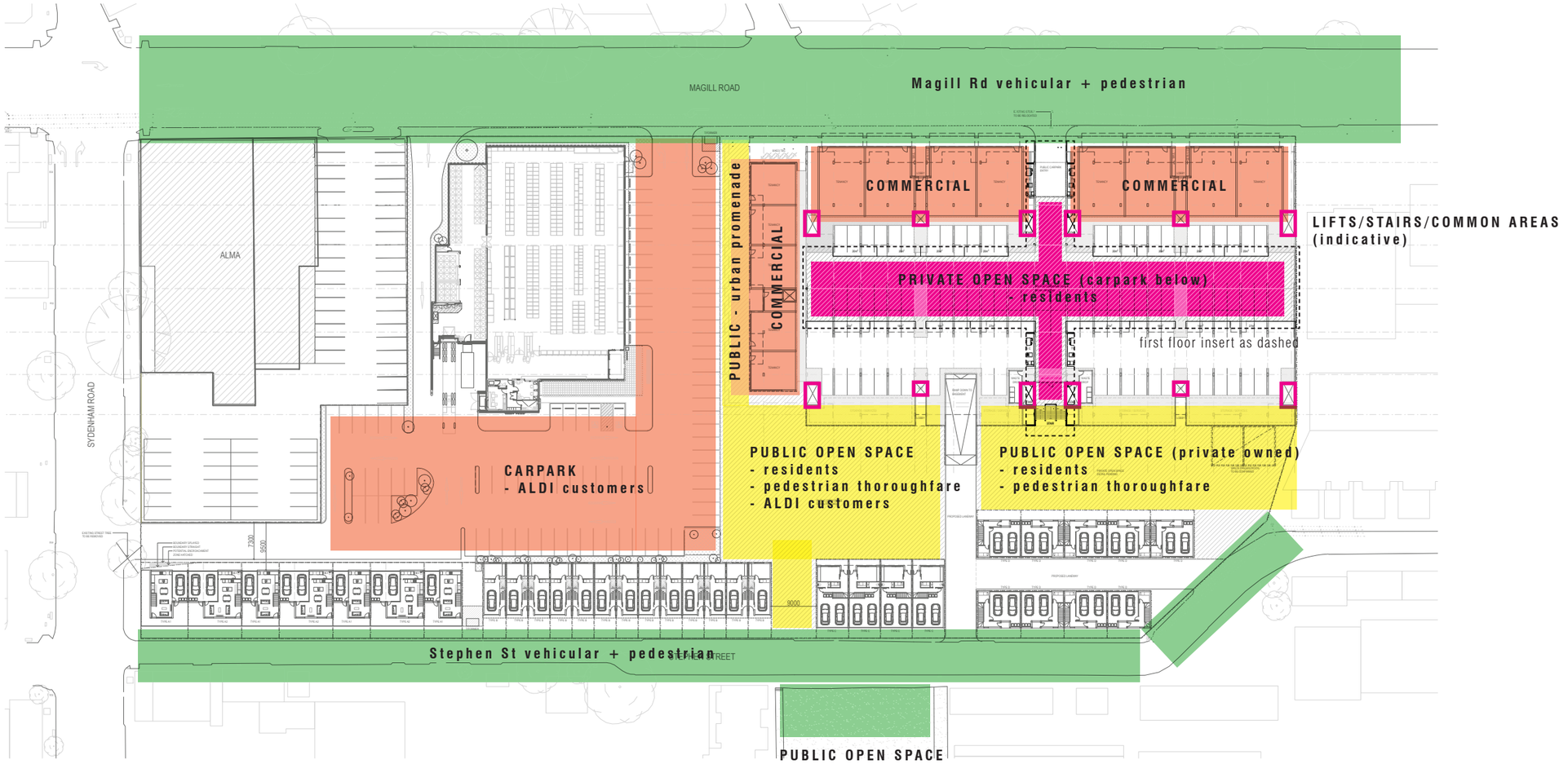

Christine Rothauser (right), *National Archives*


PLASTICS CONVENTION OPENS

The Minister for the Interior, Mr. Fairhall (right), talks with the Federal president of the Plastics Institute of Australia, Mr. E. K. Stewart (centre), and a delegate from South Australia, Mr. Charles Rothauser, after the opening of the Plastics Convention in Canberra yesterday. Mr. Fairhall opened the convention at Industry House and Mr. Stewart delivered the opening address.

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1:1000 @ A3

AUDIENCE ANALYSIS

It is important to understand who the audience will be and how they will use the site, to establish how the interpretive material should be targeted.

The majority of the audience will be residents and ALDI/ commercial customers and therefore exposed to the material incidentally. Visitors from outside the site will approach the site as a destination (e.g. ALDI), or use the open space for recreation or as as a throughway.

The experience of the site will be either once-off, or repeat/ regular visititation for residents and ALDI customers.

Audience groups:

- ALDI customers – around entrance, carpark, spillover into public open space.
- Other commercial – Magill Rd frontage.
- On-site residential (open spaces, internalised courtyard, common/circulation areas, lifts).
- Public through-ways – Chimney park/Stephen St through to ALDI/Magill Rd. Audiences include recreational/exercise/dog walkers, etc.
- Public edges of site – pedestrian/vehicular traffic.

PUBLIC (site external)

PUBLIC (site internal)

SEMI-PRIVATE (commercial)

SEMI-PRIVATE (residential)

PRIVATE/ALDI – not shaded

base site plan is based on drawings supplied 13 July 2018 – first floor private open space inserted over ground plan for diagrammatic purpose

THEMES

The site is of significance because it is associated with:

- Caroma owner/founder/inventor Charles Rothauser – invented;
  - Injection moulding plastic
  - Syringe
  - Dual flush toilets – arguably the most significant development in water saving technologies.
- Caroma factory operations were significant – at a state and national level.
- Caroma factory employed significant numbers of people and was a well-known enterprise contributing to the identity of this part of Norwood.
- The surrounding locale is significant because it retains early settlement patterns of street layout, houses, and hotels.
- Urban development and land-use economics is in a constant state of change and evolution.
- Second Creek (together with other waterways) formed a key movement path for Kaurna people around the Adelaide plains.
- The understanding of the relationship of urban development patterns over the pre-existing topography and landscape.
- Brick, made from local material is often one of the earliest signifiers of settlement, evident in the built environment.

STORYLINES

- The proximity of urban development to the city centre.
- Changes in urban development patterns and land-use economics
- Residential to industrial to residential changes.
- Local identities
- Former uses of the site: Boot factory and Box factory
- Adjacent hotel (Alma)
- East Torrens destructor
- Second Creek
- Caroma operations
- Key individuals associated with Caroma
- Cox's Brickyard



Second Creek route

INTERPRETATION STRATEGIES OVERVIEW

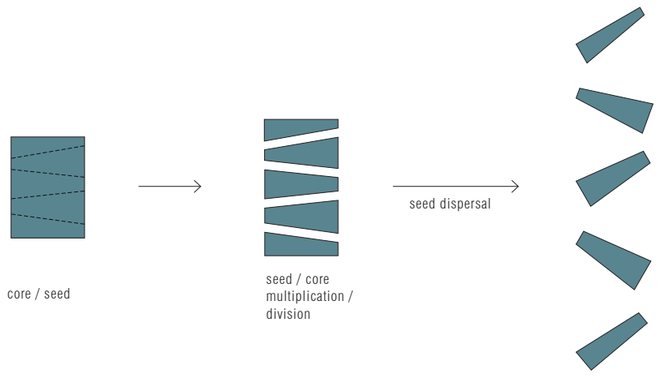
The following are preliminary strategies that can inform the design in a number of ways within a three-tiered approach. There will be some degree of overlap between the tiers as strategies are developed.

This is an in-progress, non-exhaustive list based on our initial observations of the site as well as general interpretive strategies for public and semi-private spaces.

These are generic strategies that will need to be developed to specifically reflect the themes and storylines pertaining to the site and surrounding area.

Cultural integration + interpretation may also be considered within any **programmes or events** that may take place on the site, such as markets, gatherings, art events, etc.

The whole cultural integration + interpretation strategy will work as an **integrated system**, operating as a series of clues and metaphors that provide a holistic narrative when understood as a whole. This system can be represented by the following diagram:



TIER 1 – Broader planning / Informing design decisions

Principles to enrich the design outcomes of the site – layout, views, materials, retaining any remnant fabric, building location and design, traffic movement patterns, arrival.

Following our preliminary review of the existing site, principles and motifs that may inform the broader design include:

- Retaining or re-using elements of the existing building fabric.
- Overlay/re-folding of existing site/factory/production line layout.
- Sawtooth patterning – achieving light penetration into buildings and transparency viewing South.
- Lightweight and exposed structure and services.
- Semi-compartmentalised spaces – as existing enclosed/glazed/upper storey offices, partitioning.
- Factory colour scheme.
- Sightlines and visibility around corners – as factory safety methods.
- Former showroom public interface on Magill Rd – has parallel with proposed commercial frontages and residential showroom.
- Principles relating to the broader history of the site and local context e.g. materiality – to be further developed.

TIER 2 – Provocative interpretation

Strategies for embedding heritage interpretation in a variety of provocative, incidental ways that set up questions and engender curiosity – integrated with pavements, landscaping, facades, playgrounds, artworks.

- Interpretation in the ground surface – in carparks/ paths/landscaping. May be text-based or patterning. Small scale for pedestrian view, large scale for view from upper storeys.
- Embed within open space furniture.
- Interpretive playground/water feature.
- Text, patterning, murals embedded in building facades.
- 3D sculptural elements.
- Interpretation in eaves/overhangs.
- Incorporating remnant artefacts – factory clock, signage, safe work posters, convex mirrors, gantry structures.
- Existing factory floor patterning and colour scheme. delineating pedestrian/equipment/vehicular zones, high visibility.
- Treatment around ramped vehicle entry – former access to National Warehouse off Stephen St coincides with possible carpark ramp.
- Interpretive artworks.

TIER 3 – Didactic information

Strategies for detailed information delivery. Text and image-based information to be provided on-site – potentially wall-mounted of totem elements.

- Graphic panels (2D or 3D elements) – text & images.
- May also link digitally to external apps or websites – e.g. Caroma, City of Norwood Payneham St Peters heritage, walks and trails.

OPPORTUNITIES FOR INTERPRETATION

The following site plan provides an overview of key opportunities for interpretation and possible distribution of storylines across the site.

The interpretation is focussed around the **central public open space** at the intersection of North-South and East-West pedestrian movement. A **primary interpretive node,** for example an artwork interpreting Caroma's innovation in materials and processes, would provide an overview of the Caroma story and act as a central anchor for other provocative interpretation dispered across the site.

The placement of storylines is indicative and aims to demonstrate a strategic approach to targeting the different audiences, and providing a comprehensive, yet varied, experience across the site.

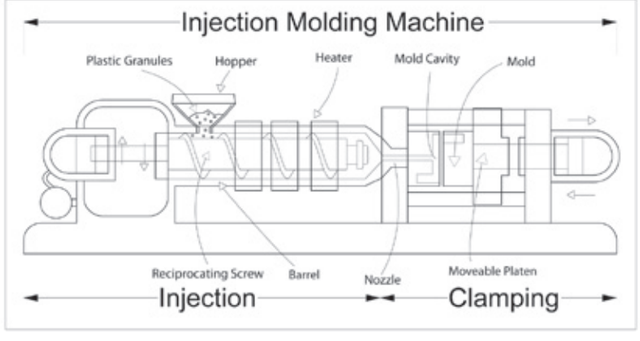
As an **integrated system**, the 'answers' to the key storylines will be located within the central public zone, with the 'questions' or 'clues' distributed throughout the site, including the more private zones and site edges.

Ultimately there will be a degree of overlap and re-folding of storylines throughout the different areas.

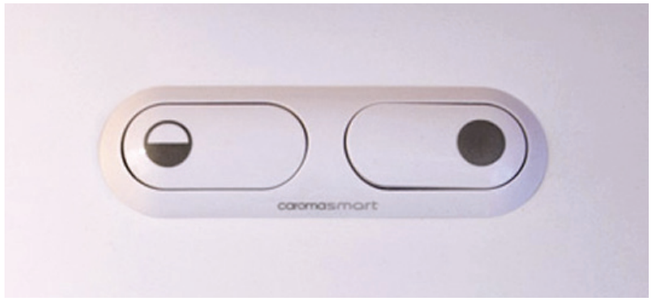
The following plan indicates opportunities under the three tiers described: **Tier 1 – Broader planning** / **informing design decisions**, **Tier 2 – Provocative interpretation** and **Tier 3 – Didactic information**.

While some specific references are made to Tier 1 relating to conceptual approaches to the site, this tier also provides general principles to enrich design outcomes throughout, such as re-use of existing fabric and materials that reflect the area's history. Specific opportunities will emerge through further assessment of the existing site and the demolition process.

Following the plan, the key strategies are demonstrated by diagrams, design precedents and references images.



manufacturing processes e.g. injection moulding machine
image: Wikipedia



'dual flush' symbols

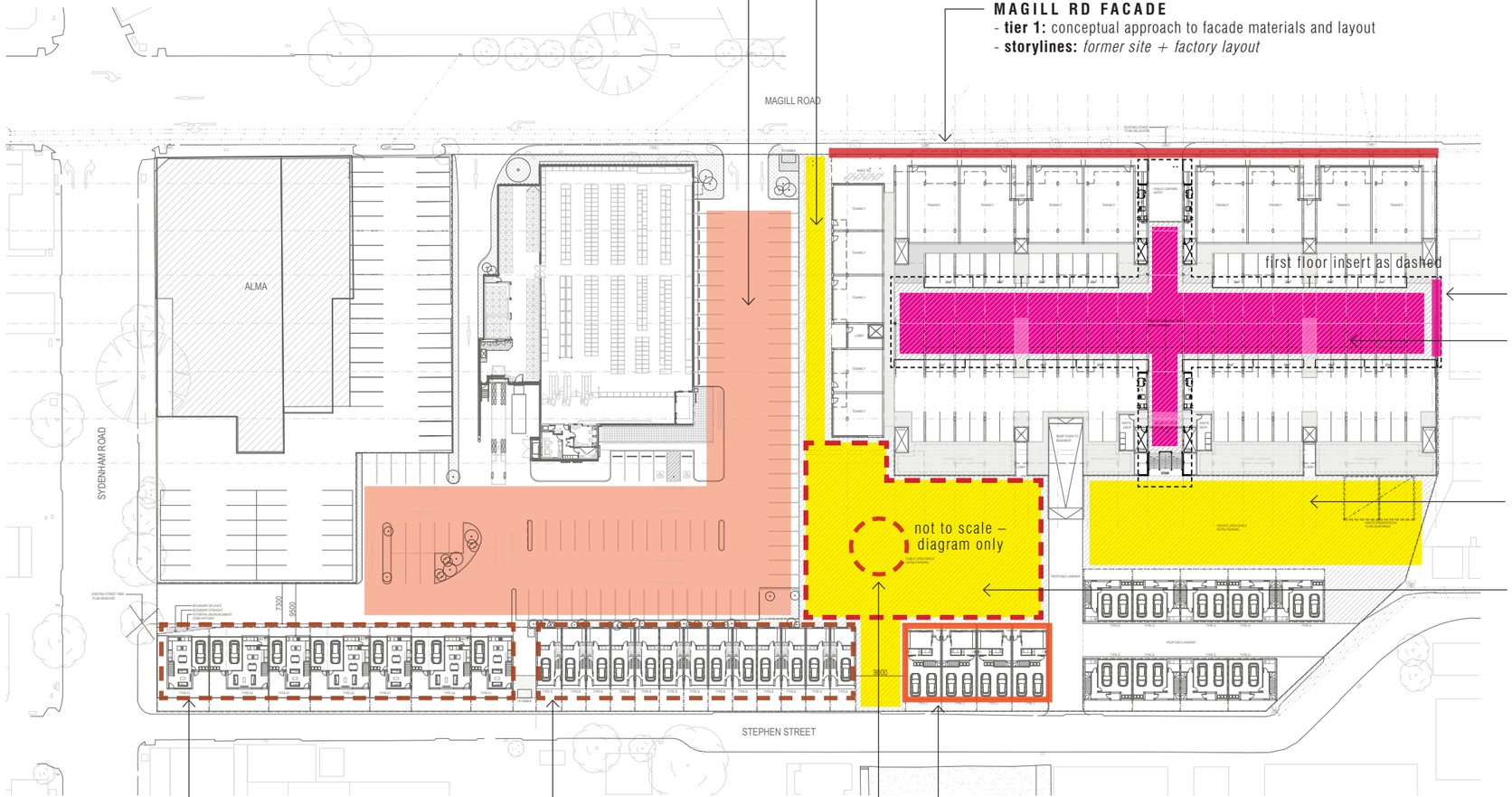
example forms referencing key Caroma innovations that could inform a primary interpretive node on-site

OPPORTUNITIES FOR INTERPRETATION – SITE DIAGRAM

ALDI CARPARK
- **tier 2:** provocative interpretation to road surface and/or kerbing, e.g. etched or painted
- **storylines:**
  - *former commercial uses of the site: boot factory and box factory*

URBAN PROMENADE
- **tier 2:** provocative interpretation in ground surface, architecture, furniture
- **tier 3:** didactic information, signage- freestanding or integrated with architecture
- **storylines:** provides an introduction to key storylines, possibly via a series of nodes along the thoroughfare

MAGILL RD FACADE
- **tier 1:** conceptual approach to facade materials and layout
- **storylines:** *former site + factory layout*



END WALL SURFACE
- **tier 2:** provocative interpretation, e.g. mural, mosaic, text, or a retained artefact

PRIVATE OPEN SPACE
- **tier 2:** provocative interpretation in landscape: ground, furniture, could be designed for view from pedestrian level + balconies above
- **storylines:**
  - *residential to industrial to residential changes, key individuals*

PUBLIC OPEN SPACE (private owned)
- **tier 2:** provocative interpretation in landscape: ground, retaining walls, furniture
- **tier 3:** may include some supporting didactic information
- **storylines:** *clues supporting storylines in western open space*

PUBLIC OPEN SPACE – <u>PRIMARY INTERPRETATION AREA</u>
- **tier 2:** provocative interpretation in landscape: ground, steps retaining walls, furniture
- **tier 3:** didactic information, signage- freestanding or integrated with landscape
- **storylines:**
  - *Caroma*
  - *Kaurna people and Second Creek*
  - *changes in urban development patterns and land-use economics*
  - *local identities*
  - *former uses of the site: boot factory and box factory*
  - *adjacent hotel (Alma)*
  - *East Torrens Destructor*

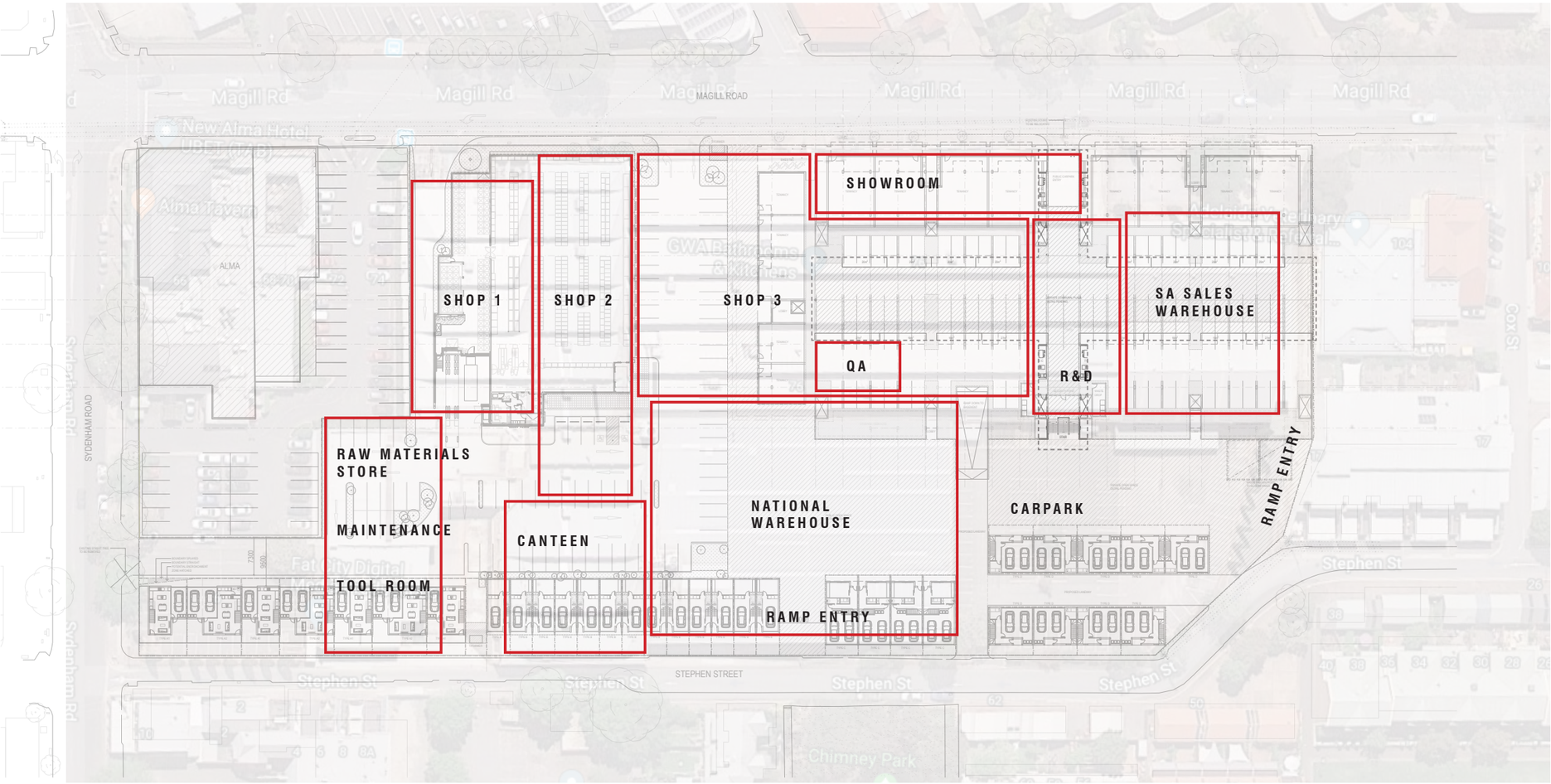
APARTMENTS TYPE A
- **tier 1:** row of apartments conceptually interpretive of brick cottages

APARTMENTS TYPE B
- **tier 1:** row of apartments conceptually interpretive of box factory

APARTMENTS TYPE C – 'STREET ART' TO PERIMETER WALL SURFACES
- **tier 2:** provocative interpretation, e.g. mural, mosaic, text
- **storylines:** *to be developed*

<u>PRIMARY INTERPRETIVE NODE</u>
- a central anchor for other interpretation across the site
- more complex and layered than other interpretation
- subject to further investigation of the landscape, could be an in-ground treatment/ artwork/installation with both provocative and didactic interpretation
- **storylines:** *Caroma- processes, materials, operations, key individuals*

base site plan is based on drawings supplied 13 July 2018 – first floor private open space inserted over ground plan for diagrammatic purpose



1:1000 @ A3

OVERLAY OF EXISTING CAROMA FACTORY LAYOUT

– indicative, based on aerial image and on-site evacuation plan

This overlay is included as reference, to begin to understand the footprint and layout of the former factory and past uses in relation to the proposed redeveloped site.

base site plan is based on drawings supplied 13 July 2018 – first floor private open space inserted over ground plan for diagrammatic purpose

INTERPRETATION STRATEGIES

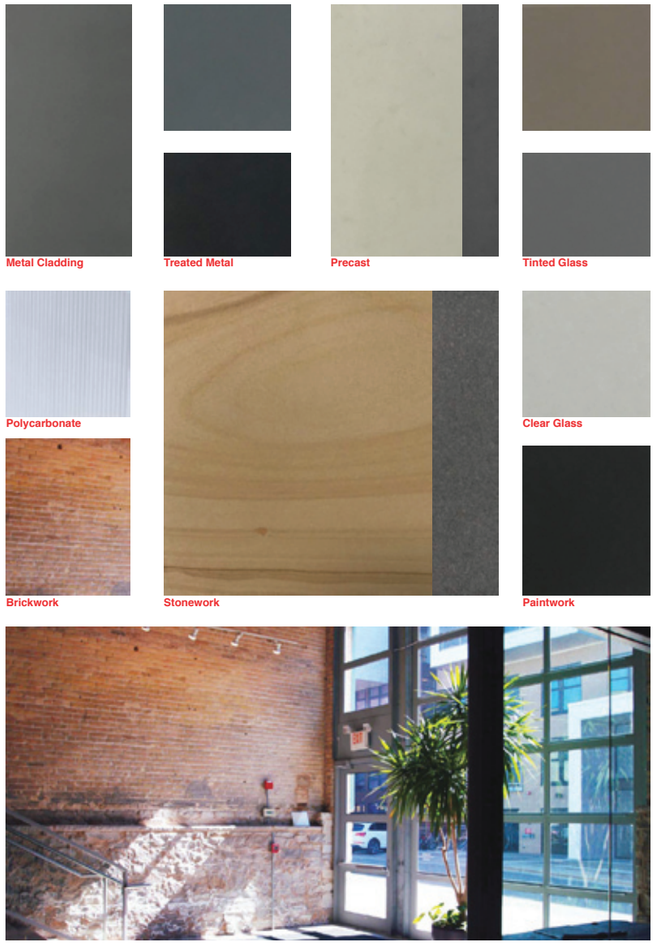
The following section demonstrates the three tiers and key strategies for interpretation through a number of site photos, diagrams, precedents and visual reference images.

Interpretation strategies can be demonstrated by design precedents that show how the strategies have been executed in other places.

The precedents are not intended to be read as directly transferrable to the site, rather they demonstrate similar approaches and outcomes that may inform and inspire development.

TIER 1: BROADER PLANNING / INFORMING DESIGN DECISIONS

Principles relating to the broader history of the site and local context e.g. materiality



proposed material palette for Magill Rd – reflecting brick cottages, industrial uses
(extracts from PLP submission v0-2)



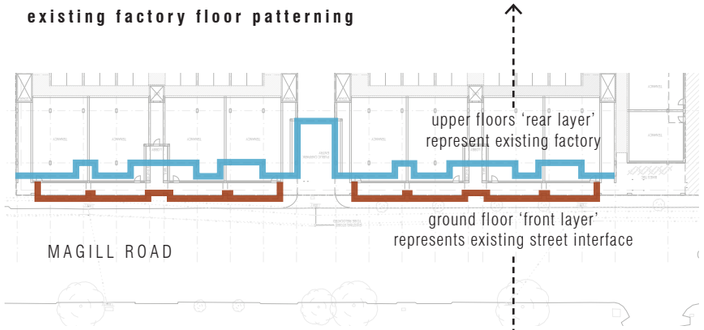


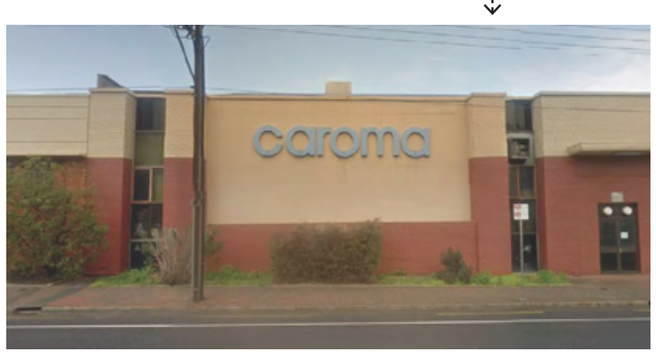
precedent:
material selections + colours reflective of the site/surrounds informing new built outcomes
project: Hart's Mill Precinct
image: Don Brice/Mulloway Studio

Re-folding of existing site/factory/production line layout



existing factory floor patterning

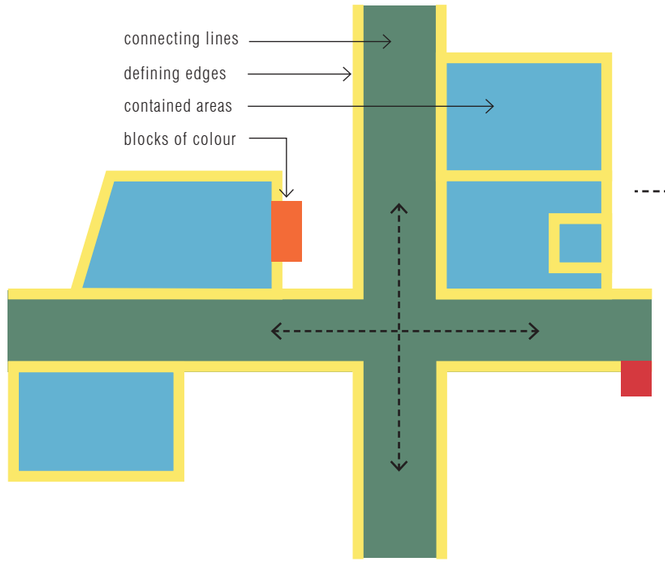




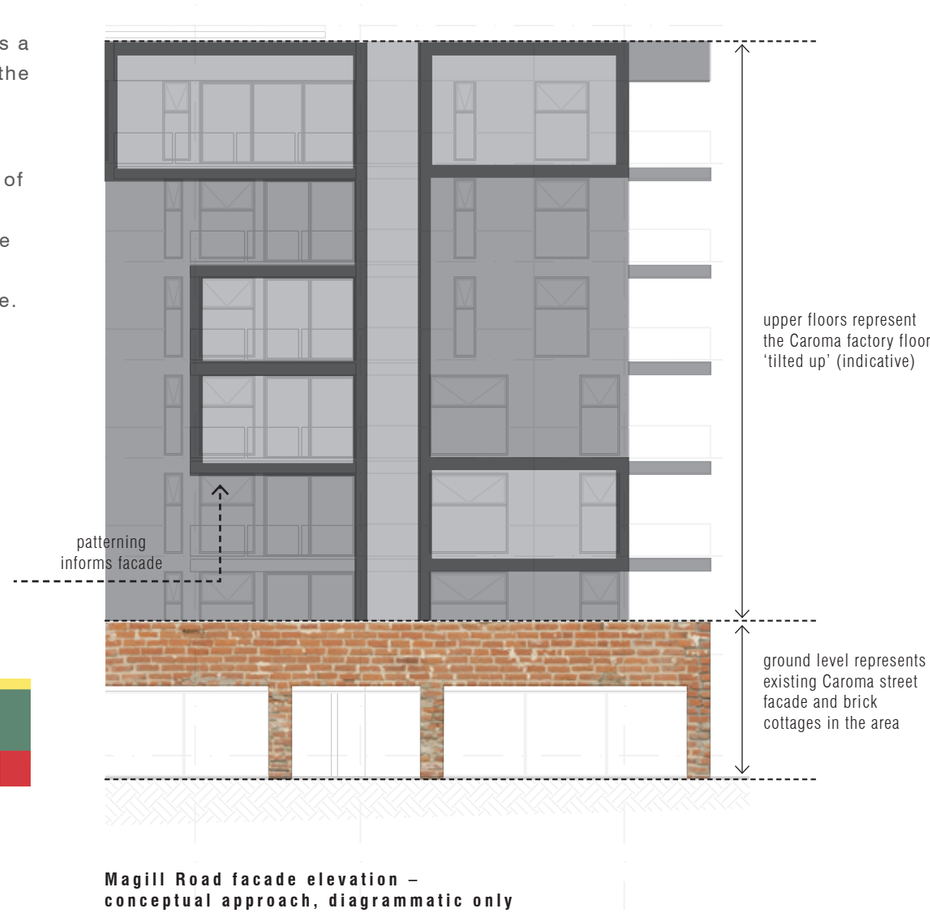
existing Magill Rd facade
(photo from PLP submission #2)

The Magill Road facade can be considered conceptually as a cross-section through the existing site, 'tilted up' to form the new elevation.

At ground level, a new brickwork facade represents the existing Caroma Magill Rd interface, and is also reflective of the history of brick cottages in the area. The upper floors, set back from the ground facade, is then interpretive of the Caroma industrial spaces behind, and could incorporate motifs from the factory floor patterning into the new facade.



factory floor patterning – conceptual analysis



**Magill Road facade elevation –
conceptual approach, diagrammatic only**

Overlaying aspects of the existing footprint within the new site



precedent:
historic floor plan layout on ground surface
project: Museum of Sydney
image: Kara Brugman via Flickr

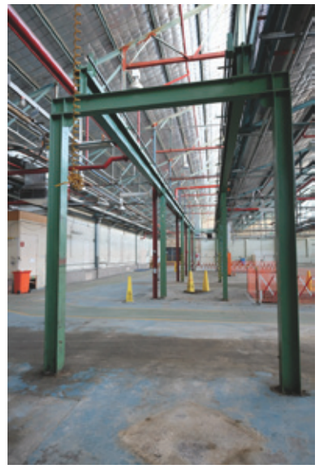


precedent:
former church outlined on ground, materials reflect metallurgic past of the town
image: Pinterest

Retaining or re-using elements of the existing building fabric

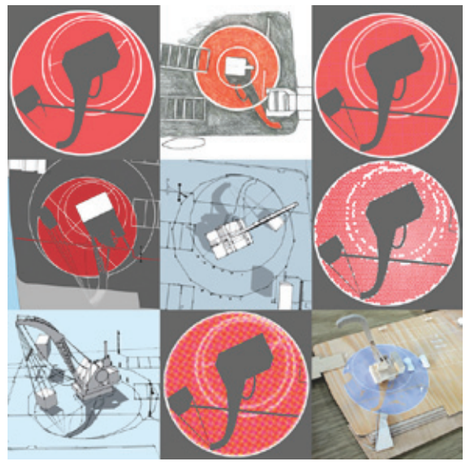






example artefacts at existing site that could be retained and re-used





precedent:
adaptation + ground plane interpretation of remnant industrial equipment
project: Franklin Wharf project, Hobart
images: landezine.com

TIER 2: PROVOCATIVE INTERPRETATION

Interpretation in the ground surface – hardscape

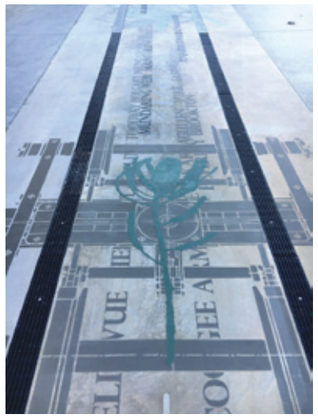






precedent:
in-ground text/graphics
project: works by Gordon Young





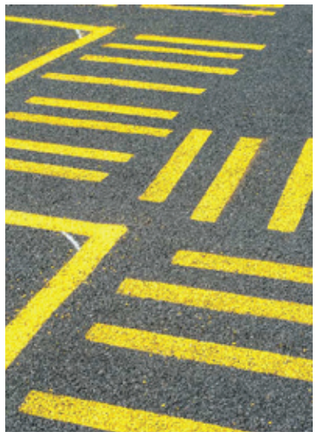
precedent:
in-ground machinery diagram
project: Midland Railway Square
image: LinkedIn



precedent:
text in-lay within paving
project: 140 William St Interpretation, Perth
image: Mulloway Studio

Interpretation in the ground surface – carpark





precedent:
carpark surface treatment
project: Dans ma benne benne benne by Dientre!
images: landezine.com



precedent:
text within parking lines
project: Central Greenough Installations
image: Mulloway Studio



precedent:
graphics within parking bays
images: Pinterest

Interpretive open space furniture



precedent:
text-based urban furniture,
also designed for viewing from height
project: POBL + Machines, Gordon Young
image: gordonyoung.net





precedent:
urban furniture integrated with remnant site artefacts
project: Old Port Fremantle interpretation
image: Mulloway Studio



precedent:
text-based urban furniture
project: Bezos Centre for Innovation
image: studiomatthews.com



precedent:
interpretive furniture based on thematic 'surveying' dimensions, considered materials, with embedded artefacts
project: Willunga Main Street
image: Mulloway Studio



precedent:
thematic sculptural elements

Interpretive playground





precedent:
thematic playground referencing industrial milling processes – cultural heritage through interpretive play
project: Harts Mill Surrounds
images: Don Brice/Mulloway Studio

Water playground



project: Rings Fountain, Boston
images: Heidi Harting Photography



project: Rings Fountain, Boston
images: Heidi Harting Photography

water playground or feature can interpret the significance of water technology, water conservation, significance of Second Creek to Aboriginal people

Interpretive water feature in landscape



project: Midland Railway Square
image: Metropolitan Redevelopment Authority



image: Jason Hawkes, ArchDaily



image: hansn via Flickr



image: unknown via Pinterest



project: decorative water feature, Bergen plaza, Bard Breivik
image: Pinterest

interpretation of natural creek flow + artificial drainage

Text or patterning embedded in building facades, retaining walls etc





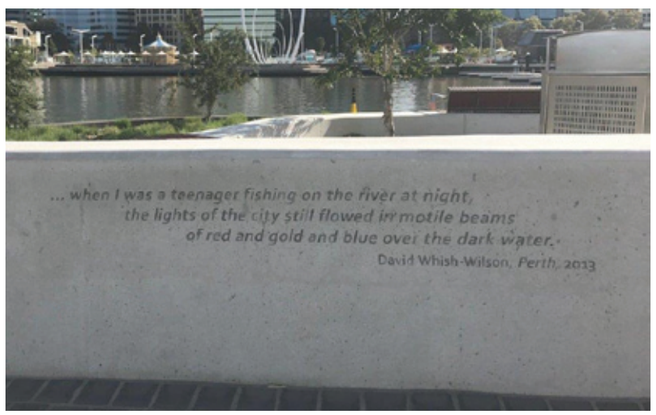
precedent:
text embedded digitally within building fabric
project: by Jenny Holzer
image: unknown



precedent:
interpretation through light and shadow
image: Pinterest



precedents:
facade patterning techniques



precedent:
etched text in retaining walls/seating plinths
project: Elizabeth Quay Heritage Interpretation Strategy
image: Mulloway Studio

3D sculptural elements









precedent:
interpretation of changes to urban layout over time – urban installation mounted to retaining wall
project: one40 William St interpretation, Perth
images: Mulloway Studio

Referencing sightlines and visibility around corners – as factory safety methods





precedent:
convex and concave reflective installations
project: various, Anish Kapoor
images: via Pinterest



precedent:
'Sky Mirror' provides view to the sky
project: one40 William St interpretation, Perth
image: Mulloway Studio

TIER 3: DIDACTIC INFORMATION

Detailed text + images presented on signage within the public open space



'totem' signage embedded within seating terraces/hardscape
project: Elizabeth Quay Heritage Interpretation Strategy
image: Mulloway Studio



waist level signage
project: one40 William St interpretation
image: Mulloway Studio



ground level incidental signage
project: Old Port Fremantle interpretation
image: Mulloway Studio

Detailed interpretation within commercial spaces, residential foyers





GTAconsultants



Proposed Mixed Use Development
76 Magill Road, Norwood
Transport Impact Assessment

Client // CACA / ALDI
Office // SA
Reference // S146860
Date // 24/08/2018

Proposed Mixed Use Development

76 Magill Road, Norwood

Transport Impact Assessment

Issue: B 24/08/2018

Client: CACA / ALDI
Reference: S146860
GTA Consultants Office: SA

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	23/08/2018	Final	Ian Bishop	Paul Morris	Paul Morris	PMO
B	24/08/18	Minor amendments	Ian Bishop	Paul Morris	Paul Morris	

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1. Introduction

1.1 Background

A mixed-use development is proposed at a site located at 76 Magill Road, Norwood. The proposed development comprises of retail and residential uses with associated parking.

GTA Consultants was engaged to undertake a transport impact assessment of the proposed development to accompany a development application.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- existing traffic and parking conditions surrounding the site
- parking demand likely to be generated by the proposed development
- suitability of the proposed parking in terms of supply (quantum) and layout
- traffic generation characteristics of the proposed development
- proposed access arrangements for the site

1.3 References

In preparing this report, reference has been made to the following:

1. Norwood Payneham and St Peters (City) Development Plan, consolidated 19 December 2017
2. Roads & Maritime Services (RMS) Technical Direction – TDT2013/04a – Guide to Traffic Generating Developments – Updated Traffic Surveys
3. Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
4. Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2002
5. Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
6. plans for the proposed development prepared by Select Architects and Tectvs
7. various technical data as referenced in this report
8. other documents as nominated.

2. Existing Conditions

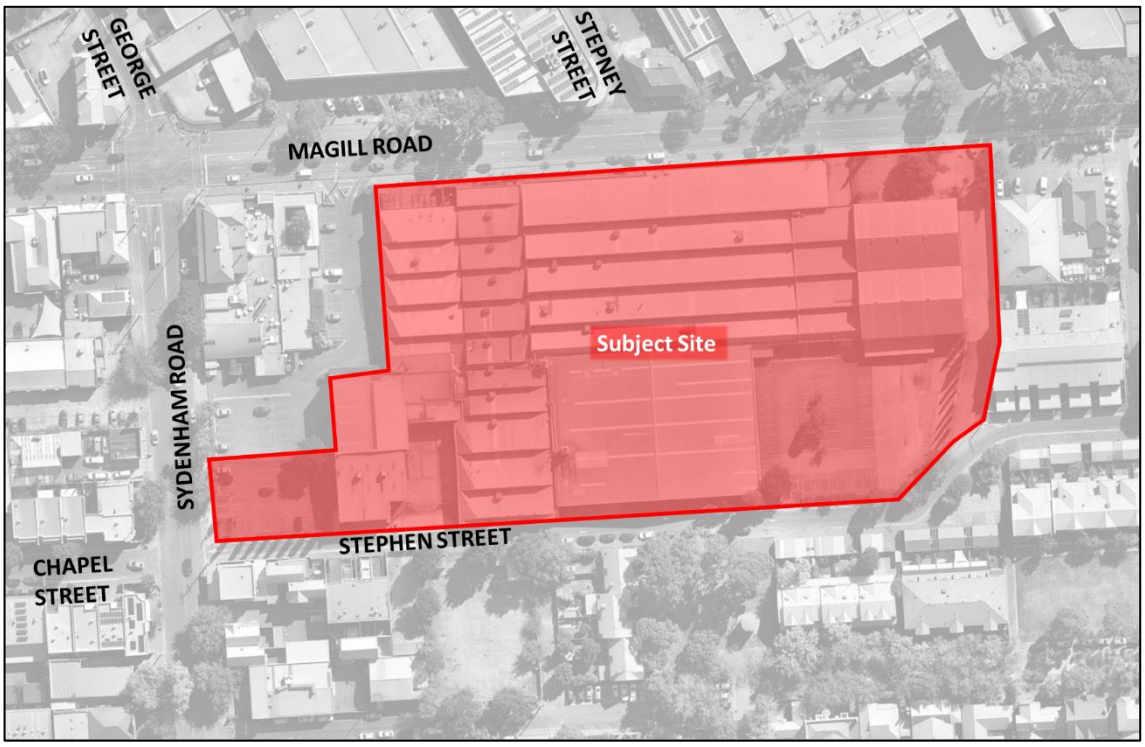
2.1 Subject Site

The subject site is located between Magill Road and Stephen Street, Norwood. The site of approximately 1.899 ha has a frontage of approximately 178 metres to Magill Road, 233 metres to Stephen Street and 23 metres to Sydenham Road.

The site is located within an Urban Corridor Zone and was previously occupied by Caroma Industries. The existing site has a number of access points to Magill Road and Stephen Street which were used by light and heavy vehicles associated with the former manufacturing and retail sales uses associated with the previous use. The surrounding properties include a mix of residential and commercial land uses.

The location of the subject site and the surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject Site and its Environs



2.2 Road Network

2.2.1 Adjoining Roads

Magill Road

Magill Road is an arterial road managed and maintained by the Department of Planning, Transport and Infrastructure (DPTI). It is a single carriageway two-way road configured with two travel lanes in each direction and aligned in an approximately east – west direction. The carriageway is approximately 15.2 metres wide set within a road corridor approximately 20 metres wide. Bicycle lanes are provided on the southern and northern side of Magill Road

adjacent the site, which operate 7:30am – 9:00am and 4:30pm – 6:00pm respectively Monday to Friday. Outside of these times, on-street parking is permitted on both sides of Magill Road.

The carriageway cross section comprises 3.5m and 2.6m wide traffic lanes on the northern side and 3.0 to 3.2 metre traffic lanes on the southern side with 1.2 metre part-time bicycle lanes on both sides. The footpath on the southern side is approximately 3 metres wide along the site frontage.

Magill Road is subject to a sign posted speed limit of 60 km/h and carries approximately 22,400 vehicles per day[1].

Figure 2.2: View south of Magill Road adjacent site (looking west)



Sydenham Road

Sydenham Road is a collector road managed and maintained by the City of Norwood, Payneham & St Peters (Council) and links between The Parade and Magill Road. It is a single carriageway two-way road configured with one travel lane in each direction and aligned in an approximately north – south direction. The road comprises a carriageway approximately 13 metres wide set within a road corridor approximately 20 metres wide. On-street parking is permitted on both sides of Sydenham Road, which are subject to time restricted parking control. Traffic signals are located at its intersection with Magill Road.

Sydenham Road is subject to a default urban speed limit of 50km/h and carries approximately 6,000 vehicles per day[1].

[1] Department of Planning Transport and Infrastructure Annual Average Daily Traffic Volume Estimates (2015),

Figure 2.3: View south of Sydenham Road (looking south)

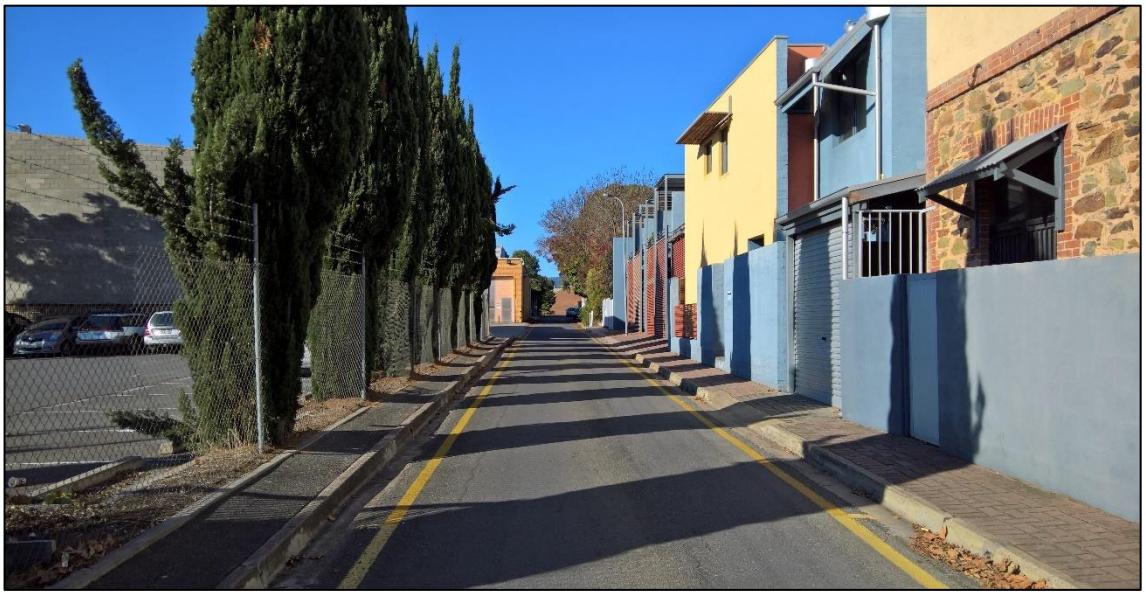


Stephen Street

Stephen Street is a local street managed and maintained by Council. It comprises a single carriageway ranging from 3.6 metres to 6.4 metres wide adjacent the site. It is aligned in an approximately east to west direction, with movements permitted only in the westbound direction. On-street parking is generally not permitted on Stephen Street except for a short section on the southern side mid-block adjacent the site.

Stephen Street is subject to a default urban speed limit of 50 km/h and carries less than 500 vehicles per day[2].

Figure 2.4: View of Stephen Street (looking east)



[2] Based on first principles assessment undertaken by GTA Consultants

2.2.2 Surrounding Intersections

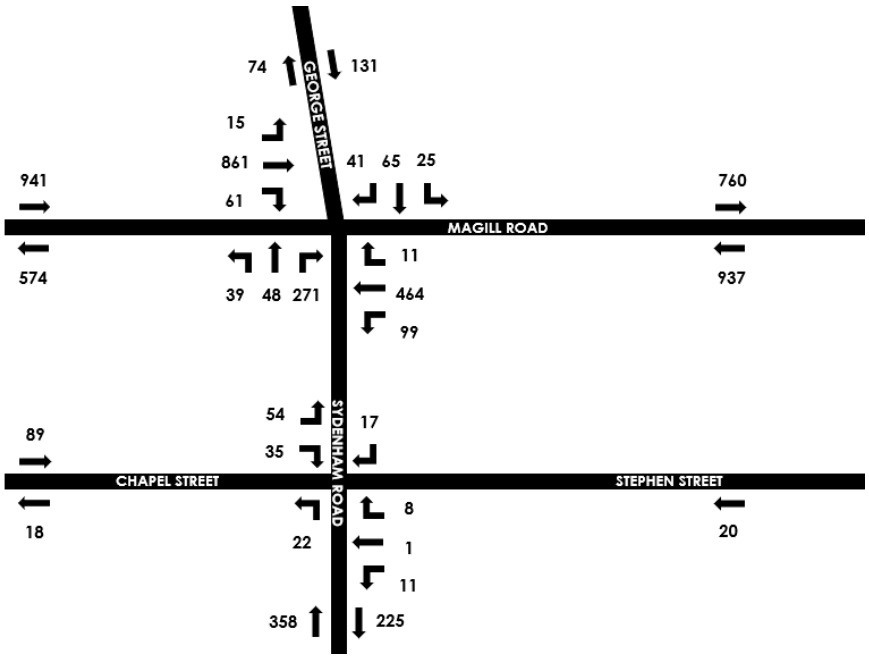
The following intersections are located in the vicinity of the site:

- Magill Road / Sydenham Road / George Street (signalised)
- Magill Road / Stepney Street (unsignalised)
- Magill Road / Cox Street (unsignalised)
- Sydenham Road / Chapel Street / Stephen Street (unsignalised)
- Stephen Street / Cox Street (unsignalised)

2.2.3 Traffic Volumes

GTA Consultants undertook a traffic survey on key roads in the vicinity of the site on 9 May 2018 between 4:45pm and 5:45pm. The turning movements recorded during the survey are shown in Figure 2.5.

Figure 2.5: Existing PM Peak Hour Traffic Volumes



2.2.4 Crash Data

A review of the crash history for the roads and intersections adjoining the subject site has been sourced from the Department of Planning, Transport and Infrastructure (DPTI). The locations of the crashes for the five-year period (2012 to 2016) are shown in Figure 2.6 and a summary of the crashes is presented in Table 2.1.

Figure 2.6: Crash Data (2012-2016)

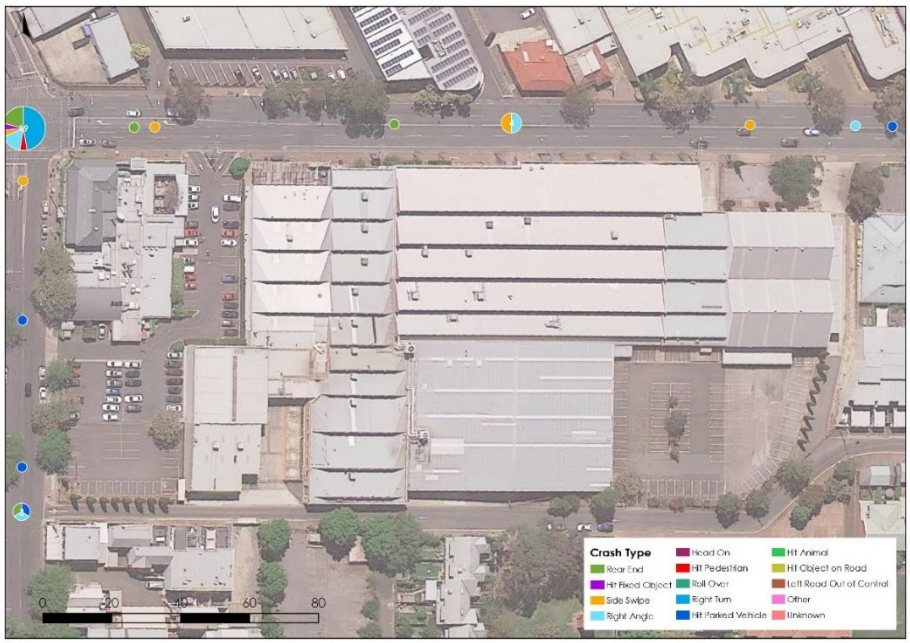


Table 2.1: Crash Statistics Summary (2012 – 2016)

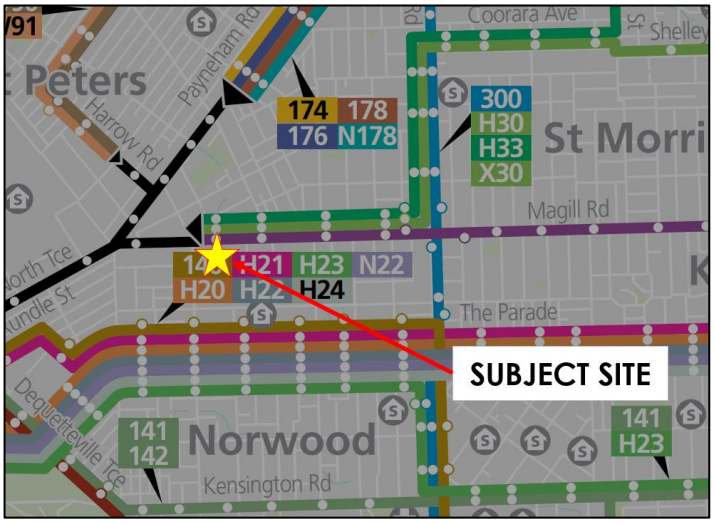
Location	No. of Crashes	Type of Crash	Crash Severity			
			Fatal	Serious Injury	Minor Injury	Property Damage
Magill Road / Sydenham Road (Intersection)	19	4x Rear End 1x Hit Fixed Object 1x Side Swipe 3x Right Angle 1x Hit Pedestrian 9x Right Turn	0	1	9	11
Stephen Street / Sydenham Road (Intersection)	3	1x Rear End 1x Right Angle 1x Hit Parked Vehicle	0	0	1	2
Sydenham Road Midblock (between Magill Road and Stephen Street)	3	1x Side Swipe 2x Hit Parked Vehicle	0	0	0	3
Magill Road Midblock (between George Street and Stepney Street)	3	2x Rear End 1x Side Swipe	0	0	1	3

Based on the above, right turn and rear end crashes were the most common crashes at the intersections while hit parked vehicle and rear end crashes were the most common along mid-block sections. There were no recorded crashes on Stephen Street during the period.

2.3 Sustainable Transport Infrastructure

Figure 2.7 shows the subject site in relation to existing public transport routes within its vicinity.

Figure 2.7: Public Transport Map



Based on the above, the site is located within a go-zone, with bus services operating at a minimum 15 minute frequency between 7:30am and 6:30pm Monday to Friday. There are three (3) bus services with different route variations:

- B10, which operates between Magill and West Lakes Interchange via the City;
- H30 which operates between Paradise Interchange and West Lakes Interchange via the City;
- H33 which operates between Rostrevor and Henley Beach via the City;
- Bus Stop 4 on Magill Road is located immediately adjacent site.

2.3.1 Pedestrian Infrastructure

Pedestrian paths are located on both sides of Magill Road, Sydenham Road and Stephen Street adjacent the subject site. The intersection of Magill Road/Sydenham Road is located to the west within 70 metres from the subject site and incorporates signalised pedestrian crossings.

2.3.2 Cycle Infrastructure

Bicycle lanes are provided on the southern and northern side of Magill Road with operation Monday to Friday between 7:30am – 9:00am and 4:30pm – 6:00pm respectively.

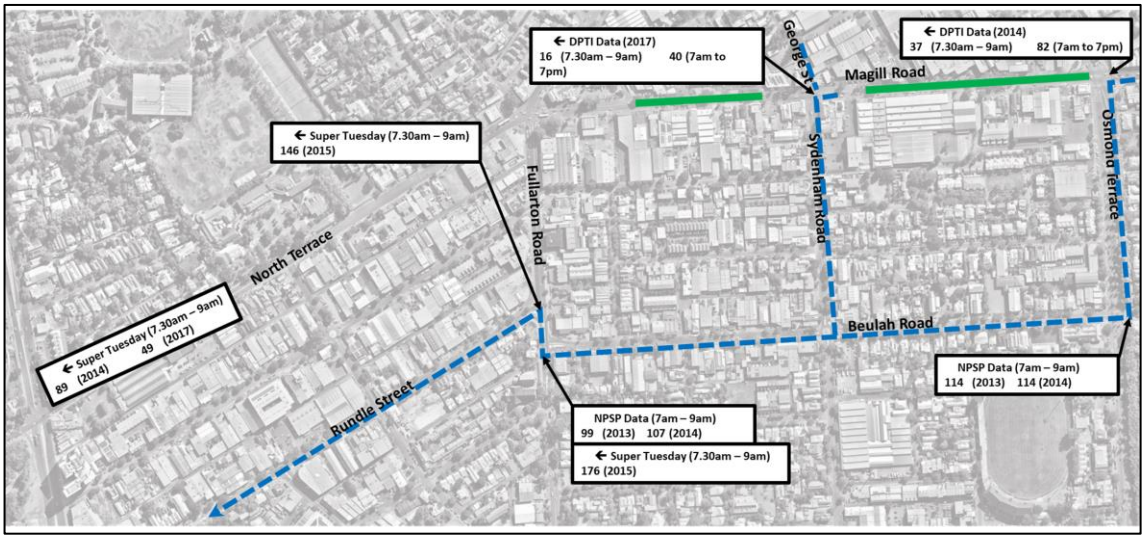
Cycling data was obtained for the following intersections:

- Magill Road / Osmond Terrace / Nelson Street
- Magill Road / Sydenham Road / George Street

The data indicates that in 2014, the AM cycle lane operation period was typically the busiest peak with 38 cyclists travelling in the eastbound direction and a total of 87 cyclists eastbound between 7am and 7 pm. Further data from 2017 recorded 14 cyclists travelling in the eastbound direction during the lane's operational time and a total of 40 cyclists eastbound between 7am and 7 pm. The reduction in cyclists on Magill Road suggests potential redistribution to the Beulah Road route located to the south of Magill Road. This route has been upgraded between Portrush Road and Fullarton Road to provide improved cyclist crossing and lane facilities in various

locations. Beulah Road will be upgraded as a "Bicycle Boulevard" by the City of Norwood Payneham and St Peters in conjunction with DPTI to provide a safe cycling environment between the eastern suburbs and the city. The distribution of bicycle volumes between Magill Road and Beulah Road are shown in Figure 2.8.

Figure 2.8: Cycle Volume Data (2013-2017)



3. Development Proposal

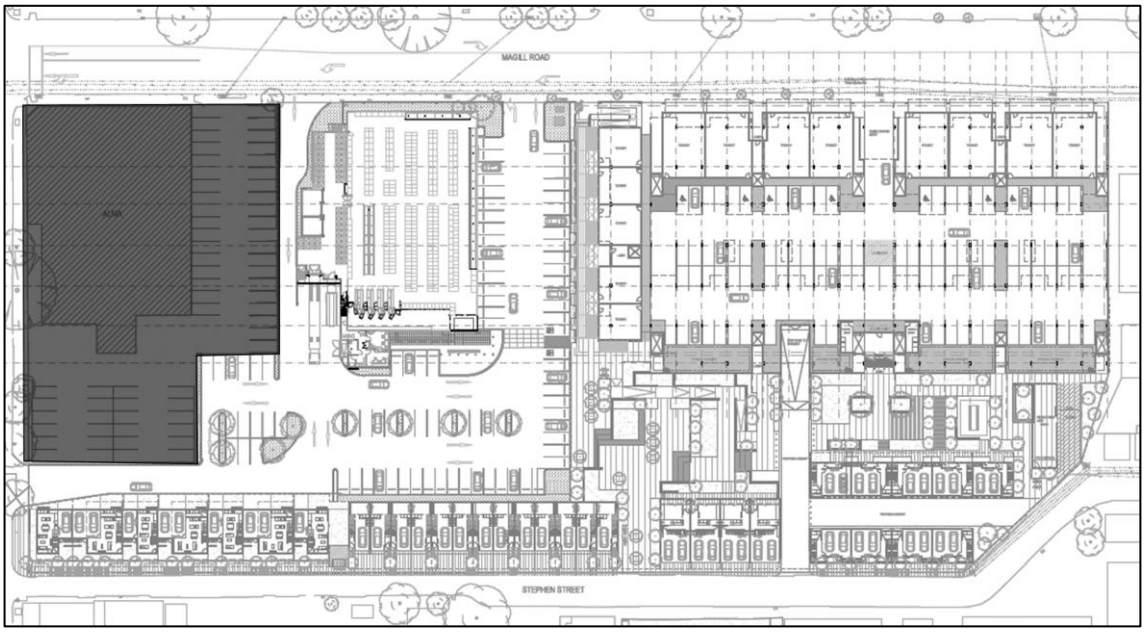
3.1 Land Uses

The proposed development comprises:

- Retail tenancies, including an ALDI store with a total gross floor area of approximately 1,657 sq. m and speciality retail tenancies with a GFLA of 1,300 sq. m.
- 33 townhouses with parking for up to 62 vehicles
- 208 apartments (dwellings)
- Ground level car park with 89 public parking spaces
- Under croft car park with 107 public parking spaces
- Private basement car park with 198 parking spaces
- Community & private open space

The proposed site layout is shown in Figure 3.1.

Figure 3.1: Proposed Site Layout Plan



3.2 Car Parking

The proposed development includes car parking provision as follows:

- ALDI car park– 89 spaces including 2 parking spaces for people with disabilities
- Apartment building car park – 305 spaces including 7 parking spaces for people with disabilities with 107 spaces under croft and 198 spaces in the basement. Approximately 9 spaces in the undercroft car park will be reserved for residential use with the balance of the residential spaces supplied in the basement car park.
- Townhouses – 62 Parking spaces

3.3 Vehicle Access

The following access points have been proposed for the site:

- ALDI car park access point on Magill Road (entry and exit)
- ALDI delivery vehicle access point on Magill Road (entry only)
- Apartment building access point on Magill Road
- ALDI car park and townhouse access to Sydenham Road (entry and exit)
- Residential Apartment Access – Stephen Street (entry and exit)
- Residential Townhouse Access – Stephen Street (entry and exit)
- Residential Town House Access (7 Townhouses) – via ALDI car park Sydenham, Road access (entry and exit)
- Waste Collection Access – Stephen Street (entry and exit)

There are also 17 townhouses which are proposed to have direct access from Stephen Street.

3.4 Pedestrian Access

Access to the site will be available from each frontage being Magill Road, Sydenham Road and Stephen Street.

4. Car Parking

4.1 Development Plan Car Parking Requirements

The Development Plan provides the following rates for parking in the Urban Corridor Zone as per Tables 4.1 to 4.3 below.

Table 4.1: Non-residential development excluding tourist accommodation

Location of development	Desired minimum number of vehicle parking spaces	Maximum number of vehicle parking spaces
All Designated Areas (unless otherwise stated)	3 spaces per 100 square metres of gross leasable floor area	6 spaces per 100 square metres of gross leasable floor area
Urban Corridor Zone	3 spaces per 100 square metres of gross leasable floor area	5 spaces per 100 square metres of gross leasable floor area

Table 4.2: Residential development, in the form of residential flat buildings and residential development in multi-storey buildings

Location of development	Rate for each dwelling based on number of bedrooms per dwelling	Plus, number of required visitor parking spaces
Urban Corridor Zone	1 per studio (no separate bedroom), 1, or 2-bedroom dwelling	0.25 per dwelling

Table 4.3: Row, semi-detached and detached dwellings

Location of development	Number of bedrooms, or rooms capable of being used as a bedroom	Number of required vehicle parking spaces
Urban Corridor Zone	1 or 2 bedrooms	1
	3 + bedrooms	2

Based on the above, a summary of the parking requirements for the proposed land uses is provided in Table 4.4.

Table 4.4: Parking Requirement Summary

Land Use	Minimum Parking Rate	Maximum Parking Rate	Floor Area / Number of Dwellings	Minimum Parking Requirement	Maximum Parking Requirement
Retail (ALDI & Other Tenancies)	3 spaces per 100 square metres of gross leasable floor area	5 spaces per 100 square metres of gross leasable floor area	2,957 sq. m	89	148
Residential Apartments	1 per studio (no separate bedroom), 1, or 2-bedroom dwelling	N/A	72 x 1 BR 136 x 2 BR	208	208
Residential Apartments	Visitor = 0.25 per dwelling	N/A	208	52	52
Townhouses	1 per 1 or 2 bedrooms 2 per 3+ bedrooms	N/A	22 x 2 BR 11 x 3 BR	22 22	22 22
	Total			**393**	**452**

4.2 Parking Analysis

The proposed 208 (72 x 1BR and 136 x 2BR) apartments would require 208 parking spaces and 52 visitor spaces for a total of 260 parking spaces (based on the Development Plan).

The retail tenancies of some 3,000 sq. m across the site would have a minimum requirement of 89 car parking spaces and a maximum provision of 148 car parking spaces based on the Development Plan for non-residential uses. There would be 134 spaces available for the retail uses from the open and undercroft car park which would be within the range specified in the Development Plan for non-residential uses (between 3 and 5 spaces per 100sq.m).

The townhouses will feature garages for their own parking with the proposed supply shown in Table 5:

Table 5: Townhouse Parking Summary

Townhouse Type	Bedrooms	Total Dwellings	Parking Supplied	Parking Required
A1	3	2	2	4
A2	3	3	6	6
A3	3	2	2	4
B	2	13	26	13
C	3	4	8	8
D	2	9	18	9
TOTAL		**33**	**62**	**44**

Visitor parking for the townhouses would be available on Sydenham Road, Stephen Street (in existing parking areas) and the apartment/retail ground level car park.

The townhouses would require 44 residential parking spaces based on the Development Plan, and 62 spaces are proposed in total.

4.3 Adequacy of Parking Supply

The parking available for retail uses on the site will total 134 spaces including the open car park and part of the undercroft car park which would be appropriate for anticipated demands and in accordance with desired minimum and maximum range of parking in the Development Plan.

The apartments will provide 208 parking spaces for residents and 52 spaces for visitors to total 260 parking spaces in accordance with the Development Plan.

Parking for individual townhouses will vary against the Development Plan but overall a total of 62 spaces will be provided.

The total parking available within the development meet the minimum and maximum requirements of the development plan and is therefore considered appropriate.

Furthermore, due to the nature of the mixed-use development, the parking peaks will occur at different times, resulting in a lower occupancy throughout the day. For example, residential parking will peak from the evening through to the morning and the retail will occur during the day and in the early evening.

4.4 Car Parking Layout

The parking layout has been reviewed in accordance with Australian Standard/New Zealand Standard for Off Street Car parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009).

Some of the key design features are detailed below:

- parking spaces within the ALDI development will be a minimum 2.6m wide and 5.5m long set within a minimum 7.0m wide aisle, which meets the requirements for a User Class 3A parking facility;
- parking spaces for people with disabilities will be a minimum 2.4m wide and 5.4m long, set within a minimum 7.0m wide aisle, with the adjacent associated shared space.
- Parking spaces within undercroft and basement carparks for the apartment building are 2.5 metres wide by 5.4 metres long set within an aisle 6.2 metres wide, which meets the requirements for a User Class 2 parking facility.

In locations where aisles are adjacent walls or other structures, an additional 300 mm clearance will be provided for any type of parking space.

- Seven parking spaces for people with disabilities will be provided in the undercroft car park for retail, residential and visitor use.
- Two parking spaces for people with disabilities will be provided in the ALDI ground level car park.

Further to the above, the grades within the parking area must conform to the following requirements (as per AS/NZS2890.1:2004, AS/NZS2890.6:2009 and AS2890.2:2002):

- Maximum grade of 1 in 20 (5%) across nature strip
- Maximum grade of 1 in 40 (2.5%) across any footpath
- Maximum grade of 1 in 20 (5%) for 15 metres into the site (where commercial vehicles use the driveway)
- A maximum grade of 1 in 6.5 (15.4%) along commercial vehicles circulation roads, the maximum grade shall be 1 in 8 (12.5%) where reverse manoeuvres are required
- A maximum grade of 1 in 20 (5%) measured parallel to the angle of parking
- Maximum grade of 1 in 16 (6.25%) measured in any other direction to the angle of parking.

These requirements will need to be confirmed through detailed design.

4.5 Access

Public Access – Magill Road

Access to the public and car park servicing the retail tenancies and residential apartments will be provided via a two-way crossover on Magill Road. The proposed access will accommodate left and right turns into the site and left turn exits onto Magill Road. A channelised right turn lane has been proposed for Magill Road to ensure right turning traffic is separated from through traffic. This is shown in Figure 4.3.

The access will primarily cater for light vehicles however will also cater for a small volume of commercial traffic requiring loading access for the speciality retail tenancies.

ALDI Access 1 – Eastern Access on Magill Road

A light vehicle entry has been proposed east of the proposed store location. This access point will facilitate left and right turn entry and left turn exit. A channelised right turn lane has been proposed for the access.

ALDI Access 2 – Western Access on Magill Road

The access point west of the proposed store will facilitate ingress movements for trucks only.

Bus Stop 4 on Magill Road will require relocation to between the western and eastern ALDI access on Magill Road to accommodate the installation of the western access

ALDI Access 3 – Access on Sydenham Road

Access to and from Sydenham Road will be provided via the proposed laneway. The proposed carriageway width will be suitable for two-way movements for ALDI traffic and residential traffic from the adjacent townhouses. The access will also facilitate the ALDI delivery vehicle exiting the site to return to Magill Road via Sydenham Road. Seven of the proposed town houses will have garages facing the laneway. These garages will be setback 3 metres to provide improved access and sight lines for vehicles reversing from a garage. This will assist with managing safe access to these garages during peak times of the adjacent uses.

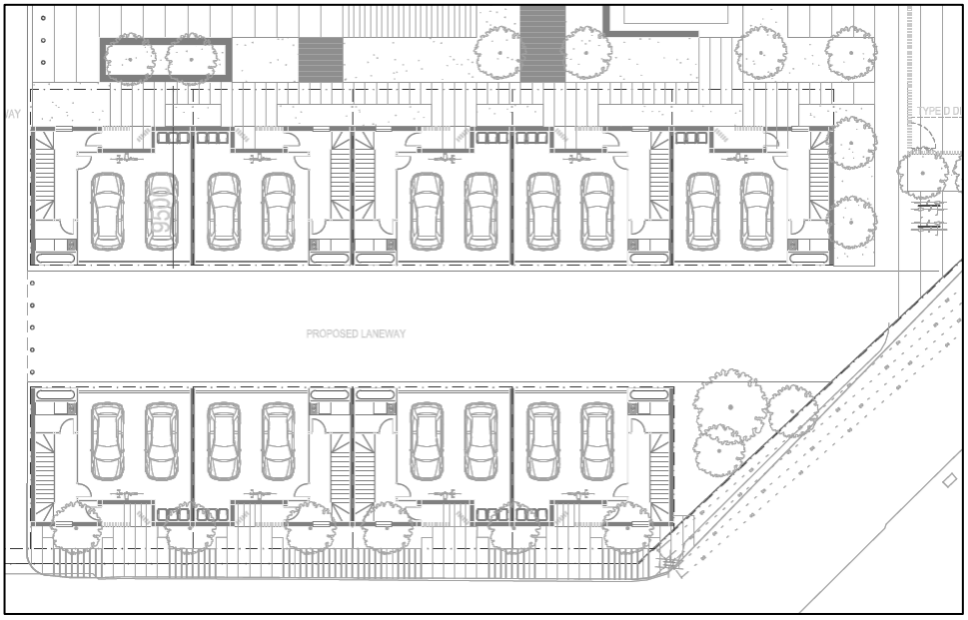
Residential Apartment Driveway – Access on Stephen Street

A residential apartment driveway has been proposed from Stephen Street to the basement car park. It will accommodate two-way traffic. Pedestrian sight lines for the access will be appropriate at its intersection with Stephen Street due to setback of the adjacent buildings.

Residential Townhouse Laneway – Access on Stephen Street

An access for nine (9) townhouse dwellings is proposed onto Stephen Street. The access will be 6.0 metres wide and facilitate two-way traffic to and from Stephen Street. This lane will not enable access to the apartment driveway to the west. A review of the laneway intersection with Stephen Street has been undertaken with minor modifications recommended in Figure 4.1 to ensure separation from the proposed waste collection driveway.

Figure 4.1: Stephen Street – Proposed Townhouse Access

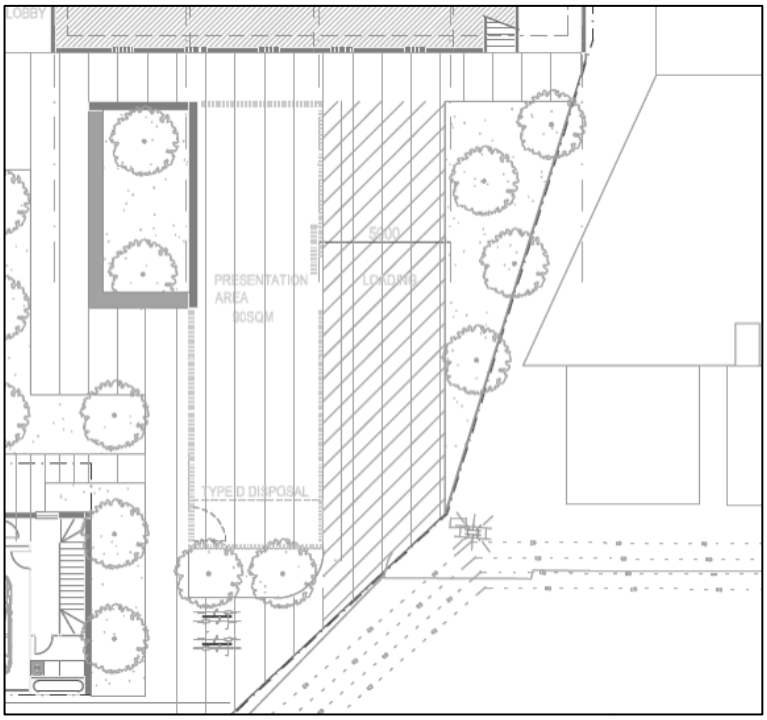


Waste Collection Driveway– Access on Stephen Street

A driveway from Stephen Street is proposed to facilitate refuse collection for a 10.6 metre refuse vehicle. The proposed refuse access is shown in Figure 4.2. Based on rear-loading by this vehicle, the vehicle will reverse into the driveway, and then exit with a forward movement back to Stephen Street. The low volumes on Stephen Street will enable this reverse manoeuvre to be

undertaken safely and efficiently. It is understood this may occur approximately 3 times per week.

Figure 4.2: Stephen Street – Waste Vehicle Access



4.6 Magill Road Access – Proposed Painted Median

The Guide to Road Design Part 4: Intersections and Crossings – General (Austroads, 2017) provides information regarding warrants for the provision of turning treatments at intersections. Figure A.10 (in that Guide) considers the warrants for turn treatments on the major road at unsignalised intersections. It is noted that this figure refers to intersections and is not relevant to access points and driveways.

Notwithstanding, based on Figure A.10 and the traffic volumes at the access in Section A, a channelised right turn lane (CHR) is required. A channelised right turn lane into the ALDI site has been proposed backing onto the right turn lane onto George Street. A full width channelised right turn lane cannot be provided without reducing the capacity of the right turn lane onto George Street. A back-to-back right turn lane has also been provided for the public car park and Stepney Street with a 17.5-metre-long travel lane and 20 metre taper. This will facilitate 3 – 4 vehicle storage and has been designed in accordance with the DPTI Road Design Standard S-4069 'Typical Median Opening Treatment'. Based on the SIDRA Analysis shown provided in Section 8, the 95th percentile storage capacity for right turn movements into the site will not exceed one vehicle. Therefore, the proposed treatment is considered acceptable.

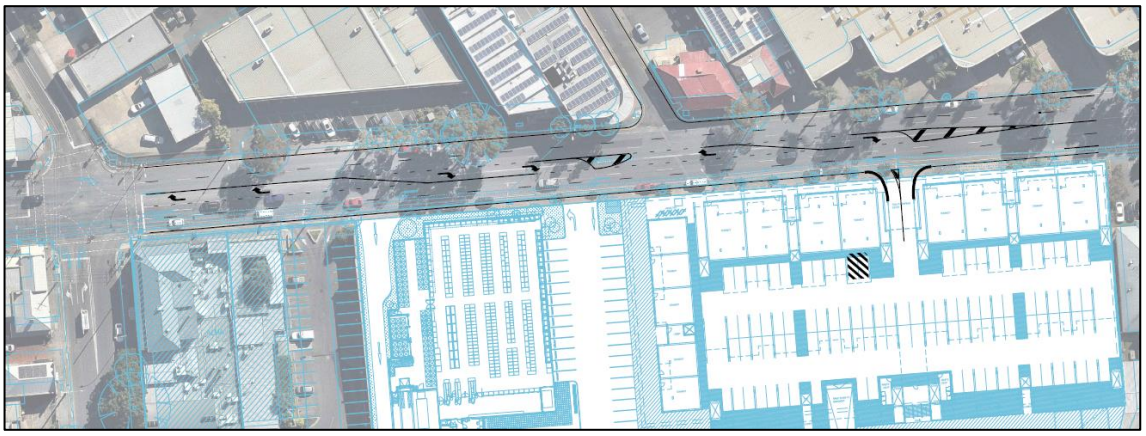
Figure 4.3 illustrates the proposed treatment along Magill Road. It is acknowledged the part-time bicycle lanes along Magill Road will need to be removed to facilitate the median treatment however the bicycle lane presently ends just prior to the Sydenham Road intersection. The actual impact on cycling is considered minor since bicycle lanes to the west on Magill Road are discontinuous and there are no cycling facilities into the city along North Terrace.

Alternative bicycle routes are available (via Beulah Road 300 metres to the south) for safer travel by cyclists not confident enough to contend with sharing the kerbside lane with traffic – the lack

of bicycle lane will not deter the more experienced commuter cyclists using Magill Road. Inexperienced cyclists are able to use the footpath along Magill Road if desired, or preferably divert to Beulah Road for an alternative route.

Cycling data obtained within the vicinity of the site suggests that cycle traffic has redistributed since 2014 as a result of other improvement works to cycle facilities in alternative corridors including Beulah Road as a key cycling corridor between the eastern suburbs and the city.

Figure 4.3: Proposed Right Turn Median Treatment on Magill Road



5. Sustainable Transport Infrastructure

5.1 Bicycle End of Trip Facilities

Bicycle parking rates are set out in Table NPSP/10 of the Norwood, Payneham & St Peters Development Plan for a shop as follows:

Residential component of a multi-storey / residential flat building:

Resident:	*1 for every 2 dwellings*
Visitor :	*1 for every 5 dwellings*

Shop:

Employee:	*1 for every 150 sq. m GLFA*
Shopper :	*1 for every 300 sq. m GLFA*

Application of the above rates to the proposed development will result in a bicycle parking requirement of 104 spaces for residents, 42 spaces for visitors, 20 spaces for employees and 10 spaces for retail.

The proposed development will provide at least 208 bicycle parking spaces in the form of bike racks within each of the apartment dwellings. Communal bicycle storage areas are also provided on the south side of the basement car park.

A bicycle rail will be provided within the ALDI component of the development for customer and staff bicycle parking.

The proposed bicycle parking will generally accord with the demands anticipated by the site and exceed the requirements in the Development Plan.

5.2 Walking Cycling Network

The pedestrian connection between the car park and ALDI Store entrance is suitable. Direct pedestrian access from Magill Road will also be available to the retail tenancies and apartments.

To facilitate the provision of right turn lanes on Magill road into the site, the cycle lane on either side of Magill Road will require removal within the vicinity of the site due to road width constraints. It is estimated that approximately 180 metres of cycle lane will require removal.

5.3 Public Transport

The site is accessible by public transport as discussed in Section 2.3.

As outlined in Section 4.5, Bus Stop 4 is located immediately adjacent to the site and is proposed to be relocated to between the eastern and western ALDI access to facilitate construction of the western ALDI access on Magill Road.

Agreement with DPTI will be sought for the relocation of the bus stop.

6. Loading Facilities

6.1 Proposed Loading Arrangements

6.1.1 ALDI Store

A loading area is proposed to be located adjacent the building at the western side of the site, with entry proposed via Magill Road and egress proposed via Sydenham Road. The loading dock will be provided in accordance with ALDI's standard detail. A bin store will also be located in the loading dock area. GTA understands ALDI deliveries will be made using vehicles up to 19.0 metre semi-trailers and will require approximately 2 deliveries per day. A swept path analysis has been carried out to assess the adequacy of the proposed loading arrangements for a semi-trailer.

Figure 6.1considers a 19.0 metre semi-trailer turning left from Magill Road, straightening and reversing into the loading dock.

Figure 6.2 shows the 19.0 metre semi-trailer exiting the site onto Sydenham Road via the proposed laneway.

Figure 6.1: Site Ingress – 19.0m Semi Trailer

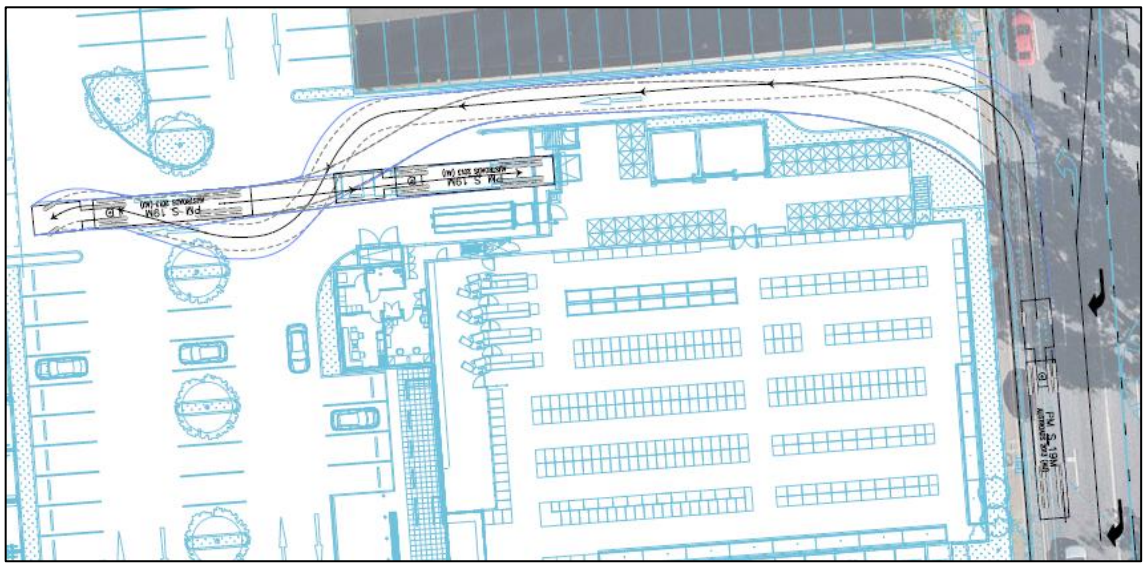
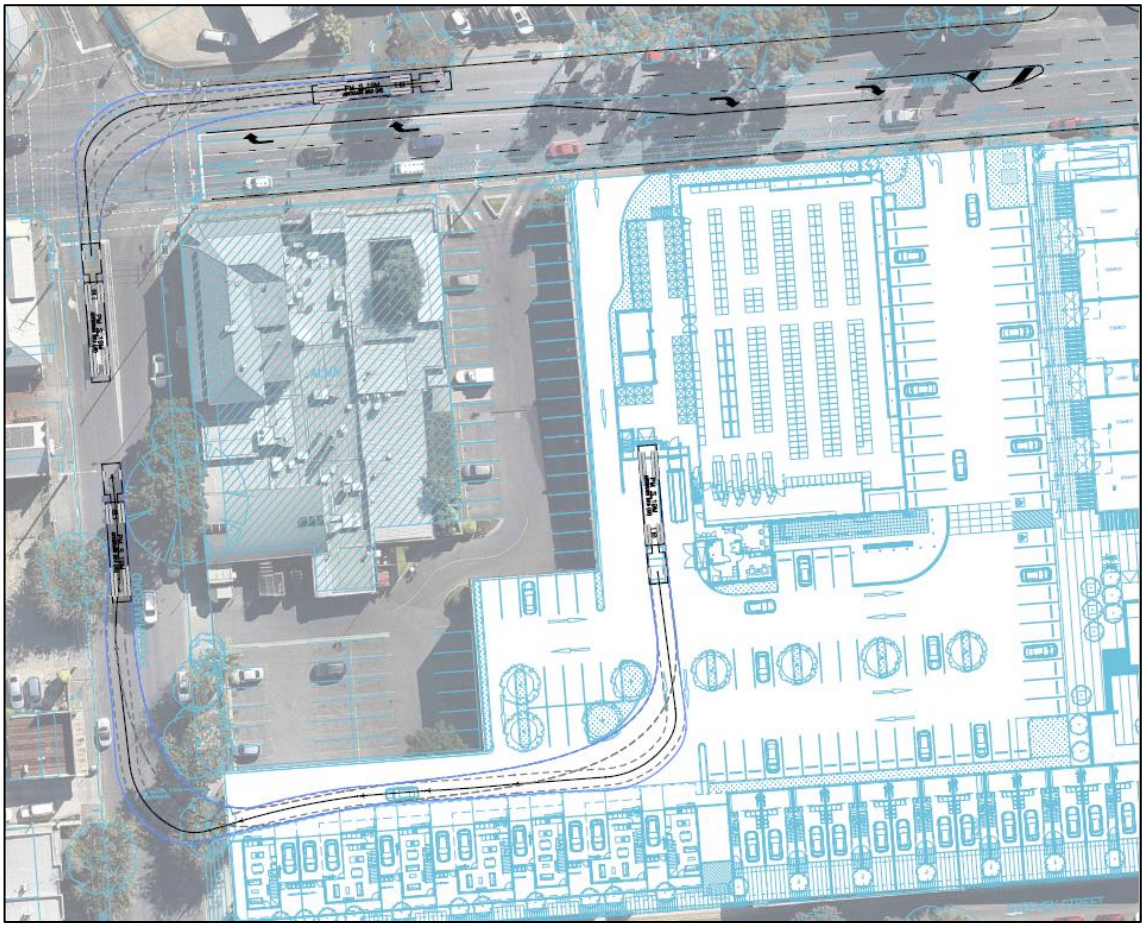


Figure 6.2: Site Egress – 19.0m Semi Trailer



It is noted that the site has been designed for access by 20.0 metre semi-trailers for deliveries to the ALDI Store. These vehicles may be used in the future based on approval of access routes when required subject to necessary approvals and/or permits. Magill Road is currently an approved route for PBS Level 1A vehicles (up to 20 metres) whilst Sydenham Road would require a route to be approved if required.

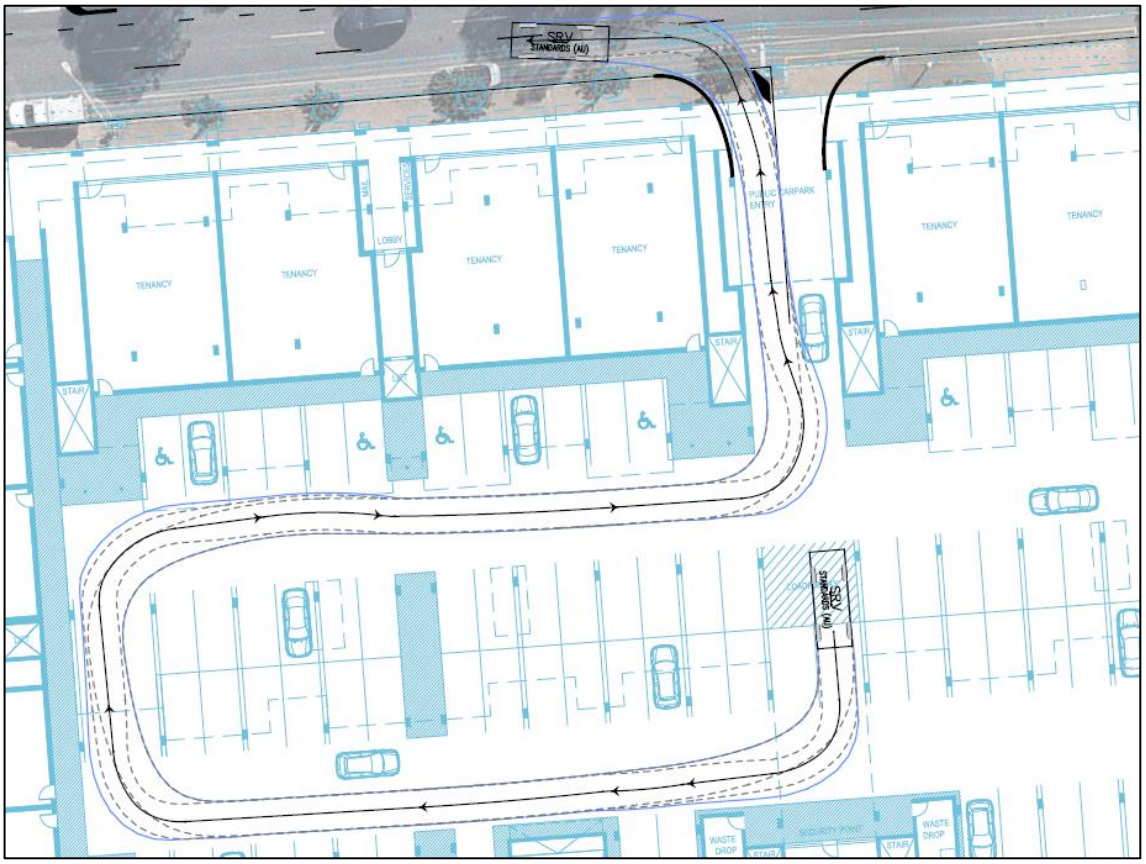
6.1.2 Retail Tenancies Deliveries

Deliveries for the retail tenancies will take place by vehicles up to a 6.4 metre Small Rigid Vehicle (SRV). Entry and exit will occur via Magill Road as shown in Figure 6.3 and **Figure 6.4**respectively. Minor kerb modifications and line marking changes will be made to the access to ensure simultaneous movements will be maintained.

Figure 6.3: Retail Tenancy – SRV Entry



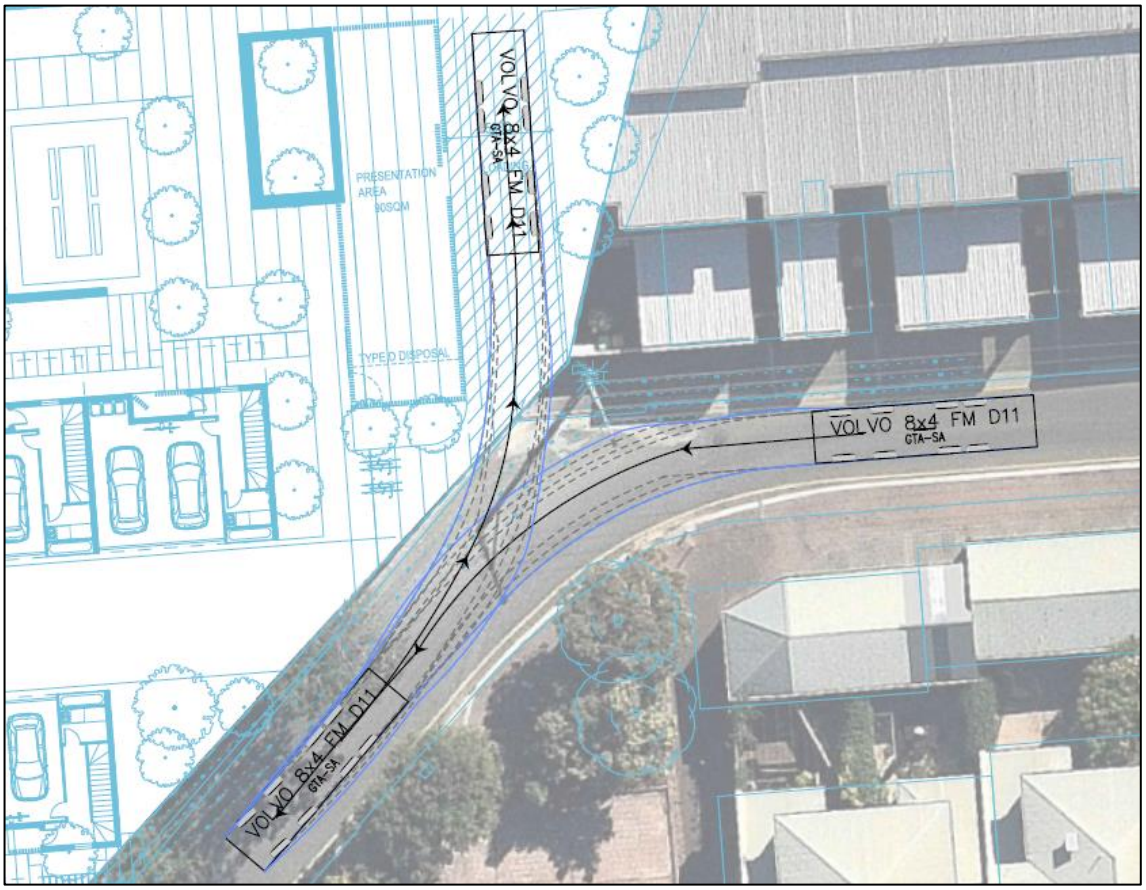
Figure 6.4: Retail Tenancy – SRV Exit



6.1.3 Residential Apartment and Retail Waste Collection

Waste collection for the residential apartments and retail tenancies will occur at the south-east corner of the site, with entry and exit proposed via Stephen Street. Collection will occur by vehicles up to 10.6 metre refuse vehicle with entry occurring via a reverse manoeuvre from Stephen Street. The truck will then exit in a forward direction westbound along Stephen Street as shown in as shown in Figure 6.5. The driveway will be designed to ensure there is suitable sight distance along Stephen Street and adequate separation from the adjacent access servicing the townhouses. The low volume of traffic on Stephen Street will facilitate safe and efficient access.

Figure 6.5: Waste Collection – 10.6 Metre Refuse Vehicle



6.1.4 ALDI Waste Collection

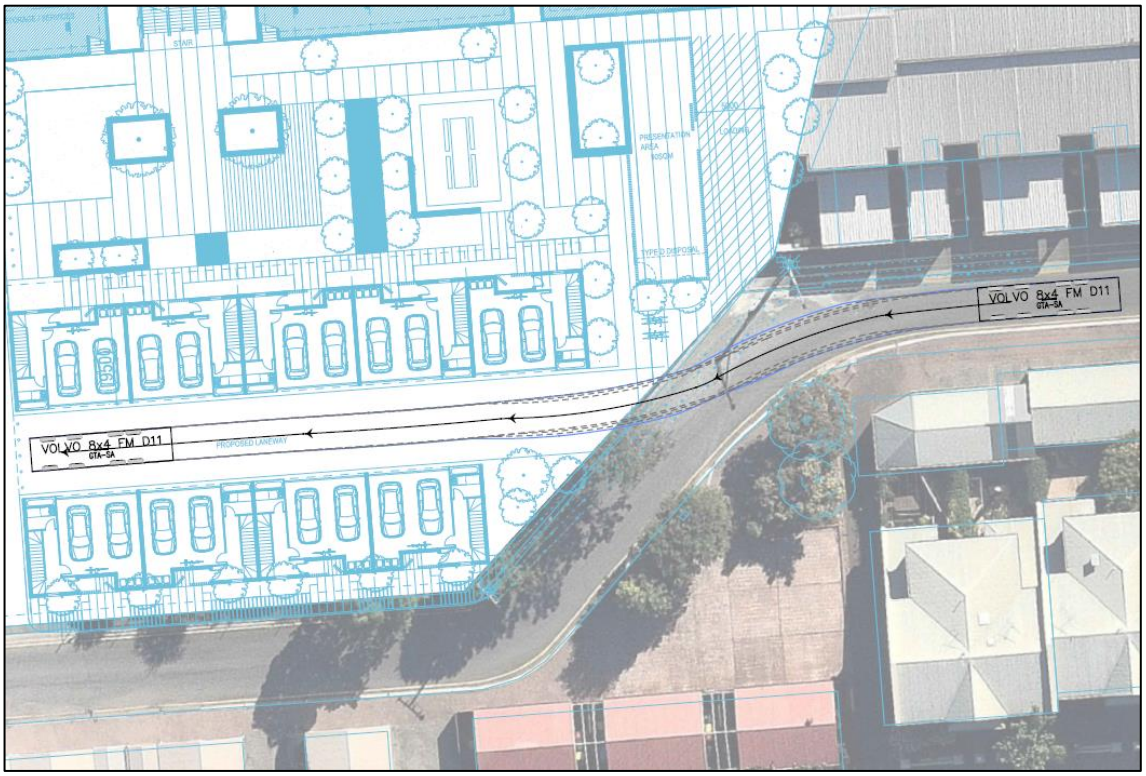
Waste collection vehicles for ALDI will be via the proposed loading dock, using the same routes and manoeuvres as the delivery vehicles shown in Figures 6.1 and 6.2 The vehicles would be a typical commercial waste collection vehicles up to 10.6 metres in length. No turn paths are shown for this vehicle given it has been designed for up to 20.0 metre vehicles. These vehicles would access the ALDI site on generally a weekly basis.

6.1.5 Kerbside Collection

Townhouse refuse collection will be via kerbside collections which will require parking restrictions or marked bin placement areas to be provided along Stephen Street, Sydenham Street and the Sydenham Street access lane into the ALDI car park.

Kerb side refuse collection will also be provided for the townhouses at the east side of the site, located on the north side of the proposed access lane. A 10.6 metre refuse vehicle can enter into the access lane in a forward direction, collect refuse then reverse back onto Stephen Street. The turn path for refuse collection from the access lane is shown in Figure 6.6.

Figure 6.6: Turn path for refuse collection from the access lane



7. Traffic Impact Assessment

7.1 Traffic Generation

7.1.1 Design Rates

An estimate of the traffic generated by the proposed development was made with reference to the RMS Guide to Traffic Developments – Updated Surveys (2013) and empirical data collated by GTA for ALDI sites.

Traffic generation rates for each development have been summarised in Table 7.1.

Table 7.1: Traffic Generation Rates

Use	Quantity	Peak Trip Rate	AM Peak Trips	PM Peak Trips	Daily Trip Rate	Daily Trips
Apartments	208	0.5 trips per dwelling	104	104	5 trips per dwelling	1,040
Townhouses	33	0.6 trips per dwelling	20	20	6 trips per dwelling	198
Retail Tenancy	1,300 sq. m	10 trips per 100 sq. m	13	130	100 trips per 100 sq. m	1,300
ALDI	1,657 sq. m	15 trips per 100 sq. m	25	249	150 trips per 100 sq. m	2,486
TOTAL			**162**	**503**		**5,024**

Based on the above, the site will generate in the order of 500 trips during the PM peak hour and 5,024 daily trips. The AM peak hour would be much less with 162 trips anticipated consisting mostly of residential trips.

7.1.2 Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

i configuration of the arterial road network in the immediate vicinity of the site;
ii existing operation of intersections providing access between the local and arterial road network;
iii distribution of households in the vicinity of the site;
iv configuration of access points to the site.

It is assumed that all apartment residents will park in the basement car park which would cater for these trips via the rear driveway to Stephen Street.

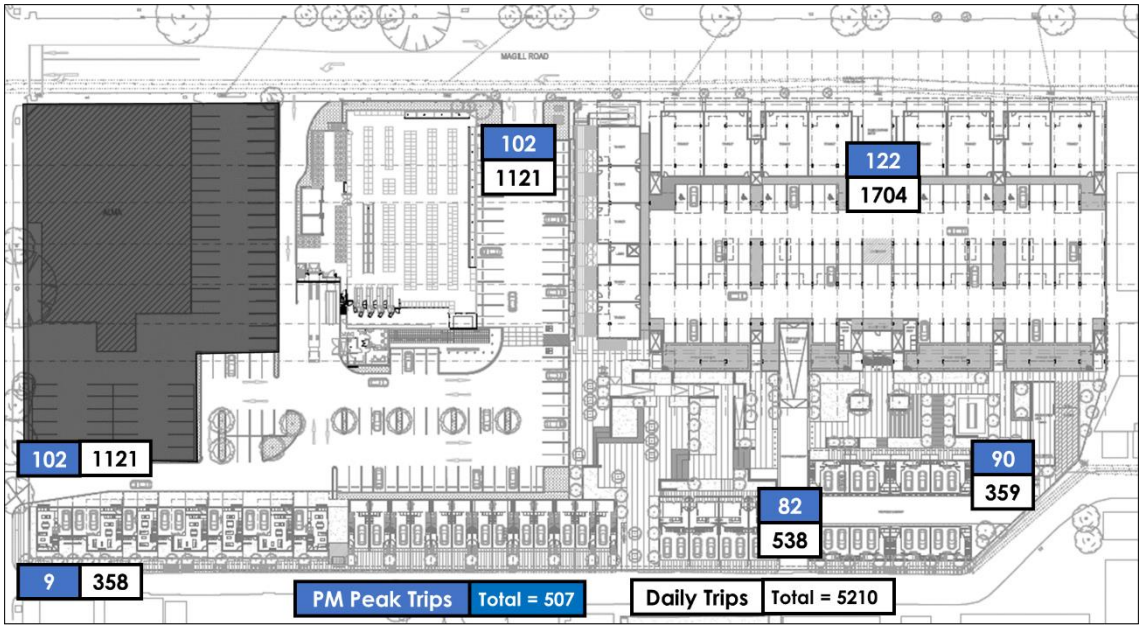
The Magill Road driveway for the apartment/retail would cater for retail trips and visitors to the apartments.

There would be some reduction in traffic volumes due to linked trips (i.e. trips associated with more than one land use on the site), but these have not been considered in the assessment. It is likely that linked trips would be in the order of 10 to 20% but will depend on the actual retail uses proposed on the site.

A passing trade discount would also apply based on traffic already on Magill Road and, in particular, accessing the ALDI store (but has not been considered within the review and as such the analysis presents a "worst case" scenario).

The peak hour and daily traffic volumes for each access is shown in Figure 7.1.

Figure 7.1: Distribution of Daily and PM peak Hour Trips Between Accesses



Based on the above, Figure 7.2 has been prepared to show the additional development generated traffic movements on the surrounding network and Figure 7.3 shows the total network traffic post development.

Figure 7.2: Development Generated Traffic Movements

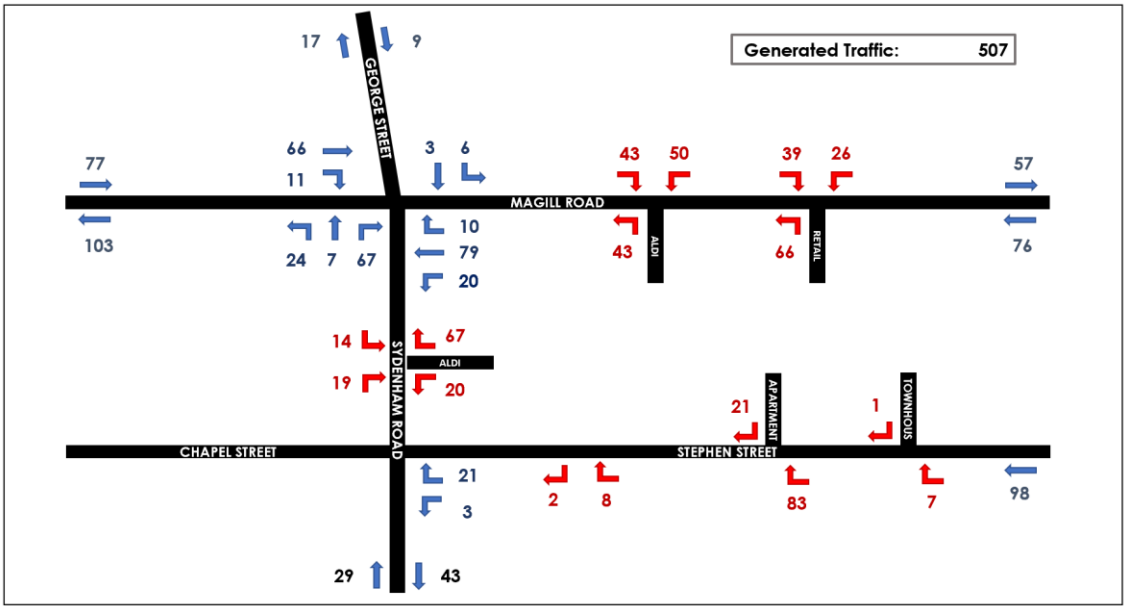
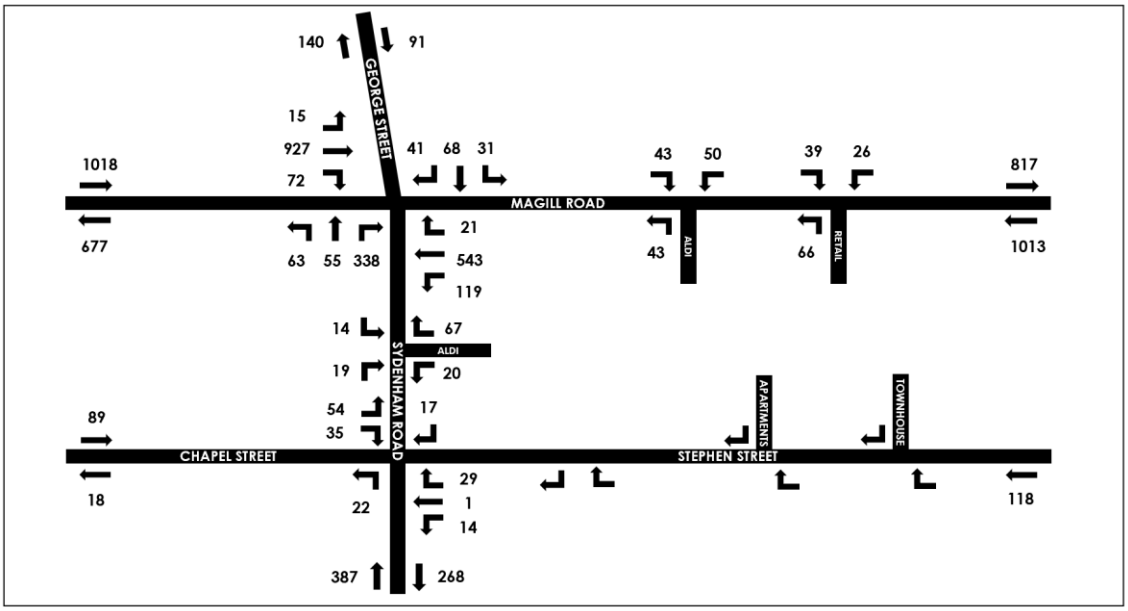


Figure 7.3: Total Traffic Volume Post Development



7.2 Traffic Impact

GTA has undertaken an analysis of the development accesses and surrounding intersections pre and post development. The results are presented in the following sections.

7.2.1 Sydenham Road, Magill Road and George Street

An analysis of the existing traffic at the intersection of Sydenham Road, Magill Road and George Street Intersection is shown in Figure 7.4.

Figure 7.4: SIDRA Results: Sydenham Street, Magill Road and George Street – Existing Traffic

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Sydenham Road											
1	L2	41	2.4	0.178	44.0	LOS D	4.4	31.3	0.80	0.69	35.3
2	T1	51	2.4	0.178	38.5	LOS D	4.4	31.3	0.80	0.69	35.9
3	R2	285	2.4	0.582	49.5	LOS D	15.6	111.3	0.92	0.83	32.7
Approach		377	2.4	0.582	47.4	LOS D	15.6	111.3	0.89	0.80	33.4
East: Magill Road											
4	L2	104	4.1	0.353	28.4	LOS C	11.9	86.2	0.68	0.65	41.7
5	T1	488	4.1	0.353	23.4	LOS C	11.9	86.2	0.68	0.62	42.9
6	R2	12	4.1	0.071	45.1	LOS D	0.6	4.1	0.78	0.70	33.7
Approach		604	4.1	0.353	24.7	LOS C	11.9	86.2	0.68	0.62	42.5
North: George Street											
7	L2	26	3.2	0.556	63.5	LOS E	8.3	60.0	0.99	0.80	29.6
8	T1	68	3.2	0.556	57.9	LOS E	8.3	60.0	0.99	0.80	30.1
9	R2	43	3.2	0.556	63.5	LOS E	8.3	60.0	0.99	0.80	29.6
Approach		138	3.2	0.556	60.7	LOS E	8.3	60.0	0.99	0.80	29.9
West: Magill Road											
10	L2	16	4.4	0.584	32.5	LOS C	23.3	169.6	0.79	0.71	40.6
11	T1	906	4.4	0.584	26.5	LOS C	23.3	169.6	0.77	0.69	41.8
12	R2	64	4.4	0.215	36.6	LOS D	2.8	20.6	0.73	0.74	36.9
Approach		986	4.4	0.584	27.2	LOS C	23.3	169.6	0.77	0.69	41.4
All Vehicles		2105	3.9	0.584	32.3	LOS C	23.3	169.6	0.78	0.70	39.0

The results show that the intersection is operating at Level of Service (LOS) C with a degree of saturation (DOS) of 0.584. This is well within accepted performance criteria. The average delay through the intersection is approximately 32 seconds and the 95th percentile back of queue is approximately 170 metres.

An analysis was undertaken for the intersection incorporating development traffic for the ALDI and mixed-use portions of the development. The results of the analysis are shown in Figure 7.5.

Figure 7.5: SIDRA Results: Sydenham Street, Magill Road and George Street – Post Development Traffic

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Sydenham Road											
1	L2	66	2.4	0.223	42.3	LOS D	5.9	41.9	0.80	0.71	35.7
2	T1	58	2.4	0.223	36.7	LOS D	5.9	41.9	0.80	0.71	36.4
3	R2	356	2.4	0.668	48.7	LOS D	19.7	140.7	0.94	0.85	32.9
Approach		480	2.4	0.668	46.3	LOS D	19.7	140.7	0.90	0.81	33.7
East: Magill Road											
4	L2	125	4.1	0.441	30.9	LOS C	15.5	112.2	0.73	0.69	40.6
5	T1	572	4.1	0.441	25.6	LOS C	15.5	112.2	0.73	0.66	41.8
6	R2	22	4.1	0.167	52.8	LOS D	1.2	8.7	0.85	0.73	31.5
Approach		719	4.1	0.441	27.4	LOS C	15.5	112.2	0.73	0.66	41.2
North: George Street											
7	L2	33	3.2	0.632	65.2	LOS E	9.1	65.4	1.00	0.81	29.2
8	T1	72	3.2	0.632	59.6	LOS E	9.1	65.4	1.00	0.81	29.6
9	R2	43	3.2	0.632	65.2	LOS E	9.1	65.4	1.00	0.81	29.2
Approach		147	3.2	0.632	62.5	LOS E	9.1	65.4	1.00	0.81	29.4
West: Magill Road											
10	L2	16	4.4	0.667	35.3	LOS D	27.6	200.7	0.85	0.76	39.4
11	T1	976	4.4	0.667	28.9	LOS C	27.6	200.7	0.82	0.73	40.7
12	R2	76	4.4	0.311	41.8	LOS D	3.7	26.8	0.79	0.77	35.0
Approach		1067	4.4	0.667	29.9	LOS C	27.6	200.7	0.82	0.73	40.2
All Vehicles		2414	3.8	0.668	34.4	LOS C	27.6	200.7	0.82	0.73	38.1

The results show that the intersection would continue to operate at LOS C post development. There is a slight increase in the DOS to from 0.584 to 0.668. Notwithstanding, the intersection will continue to operate below capacity. There is an increase in the average delay (2.1 seconds) and 95th percentile queue (31 metres. Notwithstanding, the intersection would continue to operate well within acceptable performance criteria and the impact of the development is considered low.

7.2.2 Sydenham Road / Stephen Street

The results of the analysis of existing traffic conditions at the intersection of Sydenham Road and Stephen Street are shown in Figure 7.6.

Figure 7.6: SIDRA Results: Sydenham Road and Stephen Street – Existing Traffic

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Sydenham Road											
1	L2	23	0.0	0.162	5.6	LOS A	0.0	0.0	0.00	0.04	58.0
2	T1	319	0.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.04	59.6
Approach		342	0.0	0.162	0.4	NA	0.0	0.0	0.00	0.04	59.5
East: Stephen Street											
4	L2	12	0.0	0.025	6.2	LOS A	0.1	0.6	0.36	0.60	52.2
5	T1	1	0.0	0.025	7.4	LOS A	0.1	0.6	0.36	0.60	52.6
6	R2	8	0.0	0.025	9.2	LOS A	0.1	0.6	0.36	0.60	52.0
Approach		21	0.0	0.025	7.5	LOS A	0.1	0.6	0.36	0.60	52.1
North: Sydenham Road											
8	T1	212	0.0	0.114	0.2	LOS A	0.2	1.1	0.09	0.05	59.2
9	R2	18	0.0	0.114	6.8	LOS A	0.2	1.1	0.09	0.05	57.6
Approach		229	0.0	0.114	0.7	NA	0.2	1.1	0.09	0.05	59.1
West: Chapel Street											
10	L2	57	0.0	0.108	6.7	LOS A	0.4	2.8	0.43	0.67	52.0
12	R2	37	0.0	0.108	9.4	LOS A	0.4	2.8	0.43	0.67	52.0
Approach		94	0.0	0.108	7.7	LOS A	0.4	2.8	0.43	0.67	52.0
All Vehicles		686	0.0	0.162	1.7	NA	0.4	2.8	0.10	0.15	58.0

The results show that the intersection would operate at LOS A and low DOS (0.162). The average delay through the intersections is only 2 seconds and the 95th percentile queue is approximately 3 metres.

Figure 7.7: SIDRA Results: Sydenham Road and Stephen Street – Post Development Traffic

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Sydenham Road											
1	L2	23	0.0	0.192	5.6	LOS A	0.0	0.0	0.00	0.03	58.0
2	T1	384	0.0	0.192	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		407	0.0	0.192	0.3	NA	0.0	0.0	0.00	0.03	59.6
East: Stephen Street											
4	L2	15	0.0	0.077	6.5	LOS A	0.3	1.8	0.49	0.73	50.7
5	T1	1	0.0	0.077	8.7	LOS A	0.3	1.8	0.49	0.73	51.1
6	R2	31	0.0	0.077	11.0	LOS B	0.3	1.8	0.49	0.73	50.7
Approach		46	0.0	0.077	9.5	LOS A	0.3	1.8	0.49	0.73	50.7
North: Sydenham Road											
8	T1	282	0.0	0.153	0.2	LOS A	0.2	1.6	0.10	0.05	59.2
9	R2	23	0.0	0.153	7.3	LOS A	0.2	1.6	0.10	0.05	57.6
Approach		305	0.0	0.153	0.8	NA	0.2	1.6	0.10	0.05	59.0
West: Chapel Street											
10	L2	57	0.0	0.125	7.0	LOS A	0.4	3.1	0.49	0.71	51.4
12	R2	37	0.0	0.125	11.0	LOS B	0.4	3.1	0.49	0.71	51.4
Approach		94	0.0	0.125	8.5	LOS A	0.4	3.1	0.49	0.71	51.4
All Vehicles		853	0.0	0.192	1.9	NA	0.4	3.1	0.12	0.15	57.8

The results show post development, the intersection broadly would remain at LOS A. The right turn movements on Stephen Street and Chapel Street are LOS B however this is considered satisfactory. The average delay through the intersection remains 2 seconds and the 95th percentile queue remains approximately 3 metres. The development therefore appears to have a minimal impact on the intersection.

7.2.3 Sydenham Road Laneway

The results of the analysis of the intersection of Sydenham Road and the proposed laneway is shown in Figure 7.8.

Figure 7.8: SIDRA Results: Sydenham Road Laneway

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Sydenham Road											
2	T1	384	2.4	0.199	0.1	LOS A	0.2	1.3	0.05	0.03	59.1
3	R2	20	0.0	0.199	6.7	LOS A	0.2	1.3	0.05	0.03	58.2
Approach		404	2.3	0.199	0.4	NA	0.2	1.3	0.05	0.03	59.1
East: ALDI Access											
4	L2	21	0.0	0.125	6.4	LOS A	0.4	2.9	0.47	0.73	51.4
6	R2	71	0.0	0.125	9.2	LOS A	0.4	2.9	0.47	0.73	30.4
Approach		92	0.0	0.125	8.5	LOS A	0.4	2.9	0.47	0.73	35.3
North: Sydenham Road											
7	L2	15	0.0	0.134	5.1	LOS A	0.0	0.0	0.00	0.03	56.8
8	T1	264	2.4	0.134	0.0	LOS A	0.0	0.0	0.00	0.03	59.5
Approach		279	2.3	0.134	0.3	NA	0.0	0.0	0.00	0.03	59.4
All Vehicles		775	2.0	0.199	1.3	NA	0.4	2.9	0.08	0.11	54.3

Based on the above the intersection would operate at LOS A with a low DOS of 0.198. The average delay is approximately 1 second and the 95th percentile back of queue is approximately 3 metres. The intersection is therefore considered to operate satisfactorily.

7.2.4 Magill Road Western (ALDI Car Park) Access

The results of the analysis of the intersection of Magill and the ALDI car park access is shown in Figure 7.9

Figure 7.9: SIDRA Results: Magill Road Western (ALDI Car Park) Access

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: ALDI Access											
1	L2	45	0.0	0.058	8.1	LOS A	0.2	1.4	0.48	0.70	47.5
Approach		45	0.0	0.058	8.1	LOS A	0.2	1.4	0.48	0.70	47.5
East: Magill Road											
4	L2	53	0.0	0.291	5.6	LOS A	0.0	0.0	0.00	0.06	57.8
5	T1	1039	4.1	0.291	0.0	LOS A	0.0	0.0	0.00	0.03	59.5
Approach		1092	3.9	0.291	0.3	NA	0.0	0.0	0.00	0.03	59.4
West: Magill Road											
11	T1	901	4.1	0.399	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	45	0.0	0.122	14.6	LOS B	0.4	2.9	0.77	0.90	41.4
Approach		946	3.9	0.399	0.7	NA	0.4	2.9	0.04	0.04	58.7
All Vehicles		2083	3.8	0.399	0.7	NA	0.4	2.9	0.03	0.05	58.8

Based on the above the intersection would primarily operate at LOS A (right turn movement into ALDI will operate at LOS B) with a low DOS of 0.399. The average delay is approximately 1 second and the 95th percentile back of queue is approximately 3 metres. The intersection is therefore considered to operate satisfactorily.

7.2.5 Magill Road Eastern (Residential Building) Access

The results of the analysis of the intersection of Magill and the proposed eastern access point is shown in Figure 7.10.

Figure 7.10: SIDRA Results: Magill Road Eastern (Residential Building) Access

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Residential Access											
1	L2	69	0.0	0.091	8.3	LOS A	0.3	2.2	0.49	0.73	48.4
Approach		69	0.0	0.091	8.3	LOS A	0.3	2.2	0.49	0.73	48.4
East: Magill Road											
4	L2	27	0.0	0.284	5.6	LOS A	0.0	0.0	0.00	0.03	58.0
5	T1	1039	4.1	0.284	0.0	LOS A	0.0	0.0	0.00	0.01	59.7
Approach		1066	4.0	0.284	0.2	NA	0.0	0.0	0.00	0.02	59.7
West: Magill Road											
11	T1	860	4.1	0.381	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	41	0.0	0.106	14.1	LOS B	0.4	2.6	0.75	0.90	43.2
Approach		901	3.9	0.381	0.7	NA	0.4	2.6	0.03	0.04	58.9
All Vehicles		2037	3.8	0.381	0.7	NA	0.4	2.6	0.03	0.05	58.9

Based on the above the intersection will primarily operate at LOS A (right turn movement into under croft car park will operate at LOS B) with a low DOS of 0.381. The average delay is approximately 1 second and the 95th percentile back of queue is approximately 2.5 metres. The intersection is therefore considered to operate satisfactorily.

The above SIDRA Analysis indicates that all intersections associated within the proposed development will continue to operate at a suitable Level of Service (LOS). While the intersections can expect an increase in the average queue length and delay, this will only be minor.

8. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

i The proposed development generates a minimum parking requirement of 393 spaces and a maximum requirement of 452 spaces in accordance with the Development Plan for the combined land uses proposed for the site.

ii The parking available for retail uses on the site will total 134 spaces and is in accordance with desired minimum and maximum range of parking in the Development Plan.

iii The apartments will provide a total of 260 parking spaces in accordance with the Development Plan.

iv Parking for individual townhouses will vary against the Development Plan but overall a total of 62 spaces will be provided.

v The provision of parking will be suitable to cater for typical demands associated with retail and residential uses in a mixed use development, and in a location where public transport, walking and cycling will provide transport modes instead of catering for unsustainable private vehicle only travel.

vi The proposed parking layout is consistent with the dimensional requirements as set out in the Australian/New Zealand Standards for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009) for a Class 2 and Class 3A facility.

vii The proposed development plan generates a bicycle parking requirement of 176 spaces.

viii The development will provide at least 208 bicycle parking spaces for residents in the form of a bike rack in each apartment and at least a further 8 bicycle parking spaces within the outdoor public spaces and a cycle rail will be provided within the ALDI car park. Secure communal bicycle storage will be provided on the southern side of the basement car park.

ix A loading area for the ALDI store is proposed on the western side of the building. A 19m semi-trailer can enter the site in a forward direction via a dedicated access on Magill Road for delivery vehicles, reverse into the loading bay and then exit the site in a forward direction onto Sydenham Road. After 10pm, delivery vehicles can exit in a forward direction back out onto Magill Road through the eastern ALDI access.

x Construction of the western ALDI access on Magill Road will require Bus Stop 4 to be relocated between the eastern and western ALDI accesses.

xi Loading for the retail tenancies will be undertaken by vehicles up to a 6.4 metre SRV. Delivery vehicles can enter the under-croft car park in a forward direction, access the loading bay and exit the car park in a forward direction.

xii Refuse collection will occur at the south-east corner of the site via Stephen Street using up to a 10.6 metre refuse vehicle. The vehicle will reverse into the site refuse collection area, collect refuse and then exit onto Stephen Street in a forward direction.

xiii Kerbside refuse collection for the townhouses will require parking restrictions or marked bin storage areas to be provided on Stephen Street, Sydenham Street and the ALDI car park access lane from Sydenham Street, to facilitate refuse collection.

xiv The site is expected to generate in total 500 trips per hour during the PM peak period. The AM period would be much less with 162 trips anticipated consisting mostly of residential trips with the retail uses not generating very much traffic at this time.

xv The intersections adjacent the site have been modelled using SIDRA Intersection 7.0. The outputs from the results confirm that all intersections would operate at a suitable level of Service with average queue lengths and delays within acceptable limits. The existing Magill Road/Sydenham Road/George Street Intersection will maintain the same level of service with marginal increases in the average delay and 95th percentile queue length.

xvi The impact on the adjacent road network will be minor based on the anticipated traffic generation of the site and proposed median treatment on Magill Road.

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76 Magill Rd Mixed Use Residential (High-density) Development

Waste Management Plan

Prepared for: Buildtec

16 August 2018

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Description	76 Magill Rd Mixed Use Residential (High-density) Development		
Version	FINAL DRAFT (Amended per Client instructions)		
Issued	16/8/2018		
Verification	Prepared by	Checked by	Approved by
Name	C. Colby	Client	C Colby
Signature			

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1 Introduction

This document presents a waste management plan (WMP) for the 76 Magill Rd Mixed Use Residential (High-density) Development (the "Development"). The Developer is Buildtec, Project Architect is Tectvs, and Traffic Engineer is GTA Consultants.

The scope of this WMP is the mixed-use residential component of the site excluding proposed Aldi supermarket – see Section 2 below.

The WMP explains how the Development can manage waste effectively to achieve regulatory requirements and desired design and operating objectives, including those recommended by the South Australian Better Practice Guide (State Guideline) (Zero Waste SA, 2014) and Council expectations for waste management in these types of development. The WMP should be read in conjunction with other planning approval documentation for the Development referenced herein.

2 Development Description

The Development would be in the City of Norwood, St Peters & Payneham (Council). Per plans provided (Drawing No. PA-01 and PA-01A, issued July 2018 by Tectvs; and 76 Magill Rd Development Report issued by Buildtec (undated)), the Development is on a *ca.* 20,000m^2 site – see Figure 1 overleaf – bounded by Magill Rd to the North, the Alma Hotel and Sydenham Rd to the West, Stephen St to the South, and private property(ies) to the East. The Development is expected to be built in three stages as follows (but this is not fixed) and highlighted in Figure 1.

- ***Stage 1 (S1)*** –
  - *Aldi Supermarket (excluded from WMP scope);*
  - *Seven (7) Type A Torrens-titled townhouses facing Stephen St;*
  - *Thirteen (13) Type B Torrens-titled townhouses facing Stephen St;*
- ***Stage 2 (S2)*** –
  - *Three multi-storey (6 levels + Basement) Apartment Buildings A, B & C:*
    - *110 apartments;*
    - *ca. 810m^2 of Ground floor commercial tenancies in Buildings A & B;*
  - *Four (4) Type C Torrens-titled townhouses facing Stephen St;*
- ***Stage 3 (S3)*** –
  - *Two multi-storey (6 levels + Basement) Apartment Buildings D & E:*
    - *88 apartments;*
    - *ca. 470m^2 of Ground floor commercial tenancies in Building D;*
  - *Nine (9) Type D Community-titled townhouses with rear-lane access to car parking.*

The Stage 2 and 3 Apartment Buildings would be built over a common Ground-level podium and Basement car park (and thus would be interconnected by a shared public space on the Level 1 platform).

Table 1 two pages over summarises the Development's land use metrics (used for waste system design) (excluding the Aldi Supermarket). *Table 1 includes the recommended Waste Resource Generation Rate (WRGR) classification (for each land use) based on the State Guideline (Zero Waste SA, 2014), which are used for estimation of waste and recycling volumes to assess waste storage required for the site.*

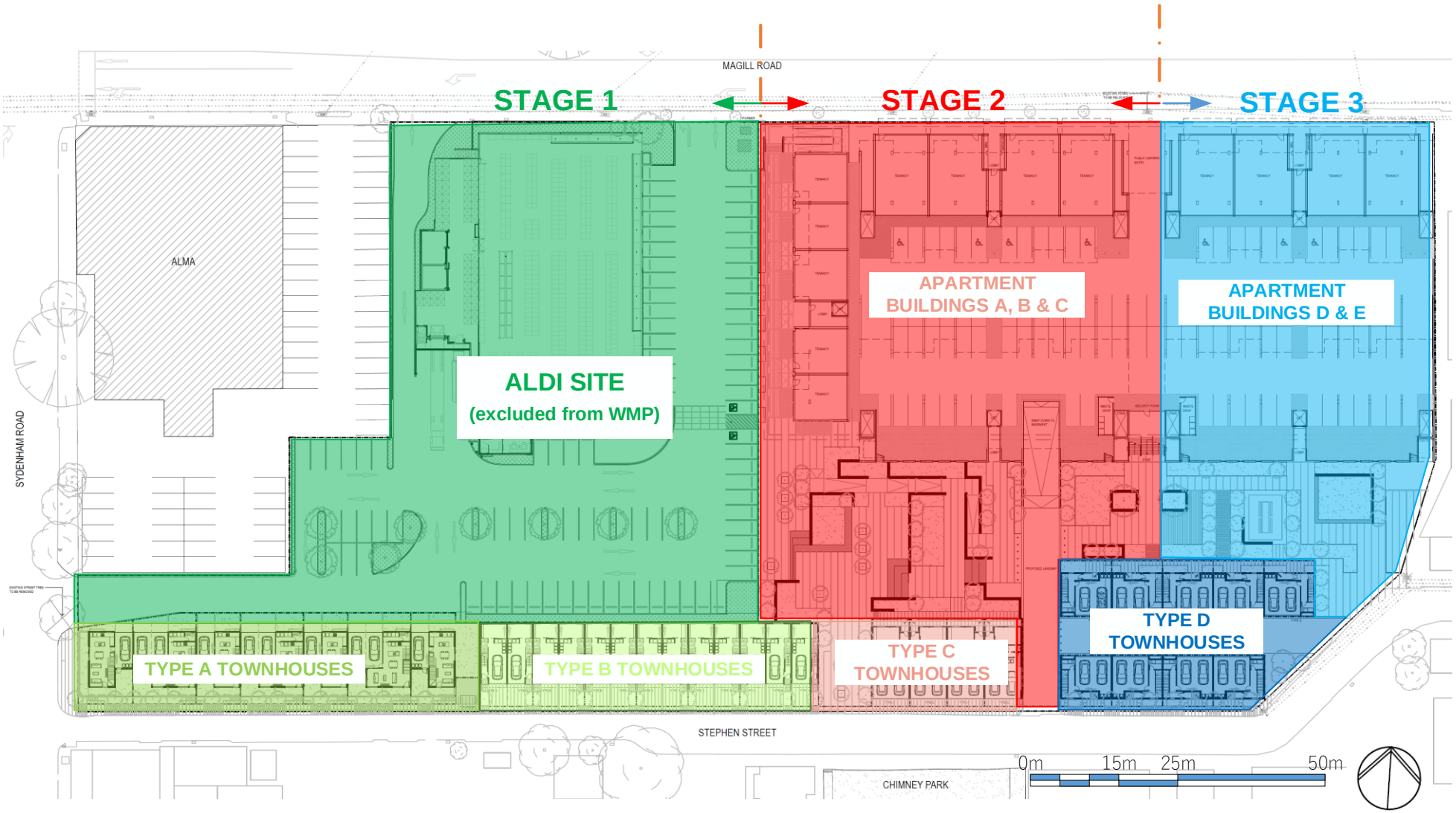


Figure 1 – Ground Level plan and site boundary for Development, reproduced from the Drawings. *Illustrates main land uses and proposed staging of Development*

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Table 1 – Summary of land uses for the Development, their WRGR Description(s) and relevant Development Metric(s)

Land Use	Description	Plan Reference	WRGR Classification*	Development. Metric(s)	
Residential	Townhouses (Torrens Titled) (S1)	Type A, Stephen St West	High Density Residential Dwelling with Rear/Front Yard Garden Waste Allowance^	7	Dwellings
				21	Bedrooms
	Townhouses (Torrens Titled) (S1)	Type B, Stephen St Central		13	Dwellings
				39	Bedrooms
	Townhouses (Torrens Titled) (S2)	Type C, Stephen St Central		4	Dwellings
				12	Bedrooms
	Townhouses (Community Titled) (S3)	Type D, Stephen St East & Rear Access Lane	High Density Residential Dwelling	9	Dwellings
				18	Bedrooms
	Apartment Building A (S2)	West		22	Apartments
				46	Bedrooms
	Apartment Building B (S2)	North West		44	Apartments
				92	Bedrooms
	Apartment Building C (S2)	South West		44	Apartments
				92	Bedrooms
	Apartment Building D (S3)	North East		44	Apartments
				92	Bedrooms
	Apartment Building E (S3)	South East		44	Apartments
				92	Bedrooms
Public & Common Space (Residential)	Apartment Buildings A-C Other Internal/Semi-External Trafficked Areas (S2)	Apartment Buildings A-C	Showroom	300	m^2 GFA
	Apartment Buildings D & E-Other Internal/Semi-External Trafficked Areas (S3)	Apartment Buildings D & E		200	m^2 GFA
Commercial	Apartment Building A (S2)	West	Retail ≤ or > 100m^2	270	m^2 GFA
			Café/Restaurant - Modified#	70	m^2 GFA
	Apartment Building B (S2)	North West	Retail > 100m^2	350	m^2 GFA
			Café/Restaurant - Modified#	120	m^2 GFA
	Apartment Building D (S3)	North East	Retail > 100m^2	350	m^2 GFA
			Café/Restaurant - Modified#	120	m^2 GFA

* Per classification for Waste Resource Generation Rates (WRGRs) in the State Guidelines (Zero Waste SA, 2014)

^ Additional 10L/bed/week organics provision for Rear/Front Yard Clippings waste from Torrens-titled townhouses

Modified Café / Restaurant WRGR to reflect Light Café tenant: General waste WRGR derated by 40%, recycling by 20%, and food waste by 50%.

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3 Stakeholder Engagement

Discussions were held with the Developer (Buildtec) and Traffic Consultant (GTA consultants) to confirm most appropriate types of waste storage, the location and space available for this storage, and how waste and recycling bins could be collected.

Buildtec separately engaged with Council (specific details not available) about access to the kerbside service for Torrens-titled townhouses (Types A-C) on Stephen St and whether kerbside bins could be presented on the opposite of Stephen St given this road was one way and side-lifting trucks could not lift bins from the north side of this street.

- Council indicated that it was open to presentation of bins on the opposite side of Stephen St, this approach already occurred elsewhere in the Council area, so long as it did not impede access to other properties and was performed in an organised and controlled manner acceptable to East Waste (Council's waste contractor).

East Waste was consulted on the proposed waste management arrangements (as outlined in this WMP) (Powa, 2018), with the following advice received.

- Collections are available to residential land uses, not commercial land uses, which will need to organise their own private collection services.
- Kerbside collection services to (Type A-C) Torrens-titled townhouses:
    - These could be (and are already) provided along Sydenham Rd and Stephen St.
    - Kerbside presentation on the opposite side of Stephen St was considered not an issue so long as Council was willing to approve it, and the following approach is acceptable at other locations.
        - Bin presentation on road immediately inside but slightly set (e.g. 20cm) in front of kerb;
        - Parking controls on collection days to ensure bin presentation space is free collection truck access to kerbside to lift bins; and
        - Bin presentation positions to be marked to ensure bins are presented in correct location and in controlled and organised manner.
- Collections to apartment buildings and community-titled townhouses:
    - These buildings and townhouses would not be suitable for access to kerbside collection.
    - East Waste was commencing rear-lift services to these types of developments in the Council area:
        - These services would provide up to twice weekly collections of skip bins and/or MGBs for general waste, recycling and food waste.
        - Collection access would need to be provided to an on-site bin presentation location, where standard-sized rear-lift trucks (e.g. up to 10m length, up to 3.5m travel and operating height) could park, and bins were easily accessible (within 30m, transfer path with no steps or grades greater than 1:10) for emptying.
        - Where reversing was required for collection access, this should be during entry, not exit, and needed to be designed to ensure public safety and avoid traffic impact. *[Note: East Waste trucks were equipped with 360° cameras and proximity sensors for this purpose.]*
- Hard waste collections:
    - Council residents are entitled to up to two (2) free at call hard waste collections per year provided by East Waste: https://www.npsp.sa.gov.au/our_services/waste_and_recycling/hard_waste_and_e_waste
    - The Torrens-titled townhouses can automatically access this service subject to agreeing on a suitable kerbside presentation location with Council and/or East Waste.

    - The apartment buildings and community-titled townhouses can access this service too if provision can be made and agreed with Council or East Waste for suitable on-site presentation arrangements.
- The other following general waste system design and operating requirements should be achieved or considered.
    - The South Australian Environment Protection (Waste to Resources) Policy 2010 (W2REPP) (Government of South Australia, 2011), e.g.
        - *A 3-bin service is expected for Council collections in Metropolitan Adelaide, otherwise waste would need to be separately (i.e. privately) collected and subject to resource recovery processes before disposal to landfill.*
        - *A weekly collection of general waste from residential premises is required.*
    - City of Norwood, Payneham and St Peters Development Plan (Department of Planning, Transport & Infrastructure, 19 December 2017), e.g.
        - *Infrastructure:*
            - *141 Development should enable economic and effective servicing for … recycling and waste collection …*
        - *Residential Development:*
            - *208 Site coverage should ensure that sufficient space is provided for: … (g) convenient storage of household waste and recycling receptacles*
            - *233 Site facilities for group dwellings and residential flat buildings of greater than six dwellings should include: … c) household waste and recyclable material storage areas away from dwellings*
        - *Medium and High-Rise Development (3 or More Storeys):*
            - *285 Development should provide a dedicated area for the on-site collection and sorting of recyclable materials and refuse, green organic waste and wash-bay facilities for the ongoing maintenance of bins. This area should be screened from view from public areas so as to not to detract from the visual appearance of the ground floor.*
        - *Centres, Shops & Business:*
            - *292 Provision for the movement of people and goods within business, centre and shopping zones or areas should comply with the following: (e) adequate and convenient provision should be made for service vehicles and the storage and removal of waste goods and materials*
        - *CITY WIDE:*
            - *12 Development should take place in a manner which is not liable to cause an unreasonable nuisance to neighbours or the community or significantly detrimentally affect the amenity, use or enjoyment of nearby properties.*
            - *13 Development fronting a laneway (including a service lane), or other minor or unserviced street should only take place where: … (c) existing infrastructure and services, including the collection of waste are available …;*
    - South Australian Better Practice Guide – Waste Management in Residential or Mixed-Use Developments (Zero Waste SA, 2014), which:
        - *Provides guidance on expected design and operation of waste management systems for medium to high density residential and mixed-use developments.*

The above Developer and/or Council and East Waste guidance has been incorporated into the waste system design for this Development.

4 Waste & Recycling Service Provision

Table 2 below outlines the recommended waste services by land use per Table 1. The different waste service classifications listed in Table 2 are explained below.

- ***Routine Services –*** These require on-site waste storage and routine and regular collections, which would include general waste, dry (comingled) recyclables and food waste & yard clippings (where applicable).
- ***On-call services –*** These involve non-frequent collections, such as Hard waste and are organised and provided on an as-needed basis.
- ***Maintenance services –*** Some waste items (e.g. lighting in the common areas of apartment building, garden waste in common areas) would be removed and disposed of by the contractor providing the related maintenance service (and hence on-site waste storage is not usually needed or provided).
- ***External Services –*** These are where waste items (e.g. printer cartridges, lighting) can be dropped off by tenants/residents at external locations (e.g. Officeworks, waste depot) (and thus, separate on-site waste storage is not usually needed or provided).

Table 2 – Expected or recommended waste & recycling services for the Development

Service Type	Residential			Commercial	
	Apartments	*Townhouses*	*Public & Common Space*	*Cafés*	*Retail*
Routine (regularly scheduled)	• General Waste • Recycling • Food Organics		• General Waste	• General Waste • Recycling • Food Organics • Recycled deposit containers (OPTION) • Cooking Oil (OPTION)	• General Waste • Recycling
On-call (as needed)	• Hard/E-waste				
Maintenance (waste removed by contractor)	• Garden Waste (Common Areas) • Sanitary (public and commercial toilets) • Lighting (where applicable)				
External (by tenant off-site)	• Lighting • Printer Cartridges • Batteries				

5 Waste & Recycling Volumes

Table 3 overleaf estimates expected waste and recycling volumes for the Development (in Litres/week). *WRGRs (in the State Guideline) do not exist for sanitary, lighting, printer cartridge or battery waste. Volumes of these waste items, however, are relatively small, and thus, have not been estimated. The waste generation for garden waste from common areas is not estimated as this is a maintenance service and on-site storage is not needed. The waste/recycling volumes for Torrens-titled townhouses allow for yard clippings in the food waste stream (see Table footnote). The café commercial tenancy WRGRs are derated to more reasonably reflect a Light Café situation (not a full-service restaurant, which the WRGRs in the State Guidelines are based on).*

Note: For the Apartment Buildings, these WRGRs project the expected peak week generation rate if every bedroom in these Buildings is occupied. This is unlikely or rarely to be the case, and thus, the Apartment Buildings' waste and recycling volumes in Table 3 could overestimate actual generation taking place and bin collection requirements. Consequently, many of the bins allocated for storage (based on the volumes projected in Table 3) at site may not be presented during each collection event. This has been considered when allocating space in the presentation room (see later) and by proposing the following management actions should this space not be enough.

- *Extra (private) collections above the 2 per week provided by East Waste (see later) may be scheduled by Building Management in weeks where there are more full bins than space allowed for in the presentation room (as described later).*
- *Alternatively, the temporary hard waste presentation area allowed for at the presentation point (as described later) may be temporarily used for presentation of bins when space in the presentation room is not able to accommodate.*

Table 3 – Estimated waste & recycling volumes (Litres/week) for Development. *N/A – Not Applicable; NE – Not estimated*

Waste/Recycling Service	Residential					Commercial tenancies, Apartment Buildings A, B & D	
	Apartment Buildings A-C S2	*Apartment Building D & E S3*	*Torrens-Titled Townhouses (Types A-C) S1 & S2*	*Community-Titled Townhouses (Type D) S3*	*Public & Common Space: Apartment Buildings S2 & S3*	*Cafés S2 & S3*	*Retail S2 & S3*
	L/week	*L/week*	*L/week*	*L/week*	*L/week*	*L/week*	*L/week*
General Waste	6,900*	5,520*	2,160	540	1,838	3,906	4,278
Dry Comingled Recycling	5,750*	4,600*	1,800	450		3,472	4,074
Food/Garden Organics	2,300	1,840	1,440	180		4,340	
Hard waste	1,610	1,288	504	126	88	109	170
E-waste	288	230	90	23	7	7	14
Garden Waste (Common Areas)	Not Estimated: Maintenance Waste item, no on-site storage needed						
Lighting waste	Not Estimated: Minor volumes						
Printer Cartridges/Batteries	Not Estimated: Minor volumes						
Sanitary Waste (Common Areas/Commercial tenancies)	Not Estimated: Minor volumes						
TOTAL	**16,848**	**13,478**	**5,994**	**1,319**	**1,932**	**11,833**	**8,535**

* Uncompacted

^ Residential waste generation based on High Density Dwelling generation rates in State Guidelines (Zero Waste SA, 2014) with extra 10L/bed/week applied to organics generation for Torrens-titled townhouses, and an extra 5L/bed/week for Community-titles townhouses to provide for Rear/Front Yard Clippings

Modified Café / Restaurant WRGR to reflect Light Café tenant: General waste WRGR derated by 40%, recycling by 20%, and food waste by 50%.

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6 Waste Management System

6.1 Waste Storage Area(s)

There would be the following different types or areas of waste bin storage (Waste Storage Areas) at the Development, which are illustrated in Figure 2, Figure 3, Figure 4 and Figure 6(on pages overleaf).

1) **Torrens-titled Type A Townhouses – *see illustration in Figure 2 overleaf***
    - *These townhouses are entitled to a standard Council kerbside collection and would store their 3-bin set (140/240/240L MGBs) in their garages.*
    - *On Council designated kerbside collection days, these residents would transfer these bins (via private rear lane) to a kerbside collection point on Sydenham Rd (agreed with Council and East Waste).*
2) ***Torrens-titled Types B & C Townhouses – see illustration in Figure 3 two pages overleaf***
    - *These townhouses are entitled to a standard Council kerbside collection and would store their 3-bin set (140/240/240L MGBs) in their garages.*
    - *On Council designated kerbside collection days, these residents would transfer these bins (via private rear lane) to an on-road kerbside collection point on opposite side of Stephen St (as agreed with Council and East Waste).*
3) **Community-Title Type D Townhouses – *see illustration in Figure 4 three pages overleaf***
    - *These residents would dispose of waste into shared skip bins located within a purpose designed bin station enclosure on the western boundary of the site.*
    - *These bins would be transferred (and replaced with an empty) in a nearby common (shared with apartment building residents) skip bin presentation room for (weekly) collection by East Waste via Loading area.*
4) **Apartment Buildings A-E residential (inc. public place) waste – *see illustrations in Figure 4, Figure 5 and Figure 6 (four pages overleaf)***
    - *Residents in these buildings would have access to local disposal rooms at Ground Level (per Figure 4) on the Southern side of the building complex:*
        - *One of these would be built during Stage 2 for Apartment Buildings A, B & C*
        - *The other would be built at Stage 3 for Apartment Buildings D & E*
    - *Residents would access these local disposal rooms using corridors, lifts and/or walkways within or interconnecting the apartment buildings at Ground and Level 1 (refer Figure 4 and Development plans for Level 1)*
    - *The local disposal room would contain waste-chute like access disposal points (or waste drops) that discharge to a waste room below at Basement level – see Figure 6 – where bins would be located and swapped over with empties when full.*
        - *The local disposal rooms would include a 660L skip bin for disposal of flat-packed large cardboard items/boxes by residents to minimise potential blockage of the waste-chute like access disposal points.*
        - *The chutes or waste drops for general waste & recycling would include a compactor that would reduce volume (up to 2.5× for general waste and up to 1.75× for recycling, which would reduce number of bins required (use of these compactors has been reviewed and confirmed as acceptable with East Waste* (Powa, 2018)*)*
        - *The waste rooms at Basement level would include extra bins for public place waste disposal by the Body Corporate.*
    - *Full bins would be transferred using tug and vehicular driveway and ramp to Ground Level to the common (shared with Townhouse Type D) skip bin presentation room for (twice weekly) collection by East Waste via adjacent Loading area*

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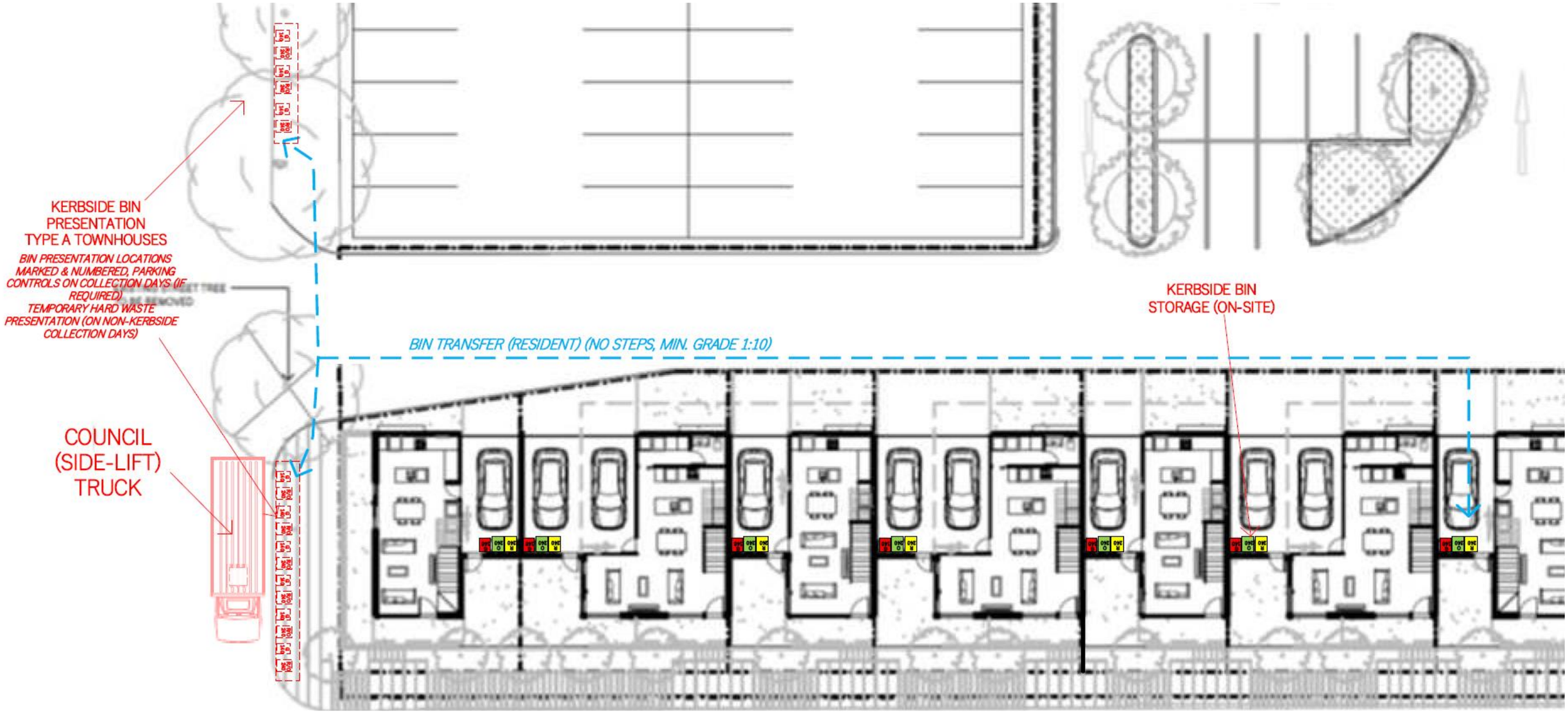


Figure 2 – Illustration of waste storage areas and systems for Type A townhouses, including proposed kerbside presentation locations on Sydenham Rd.

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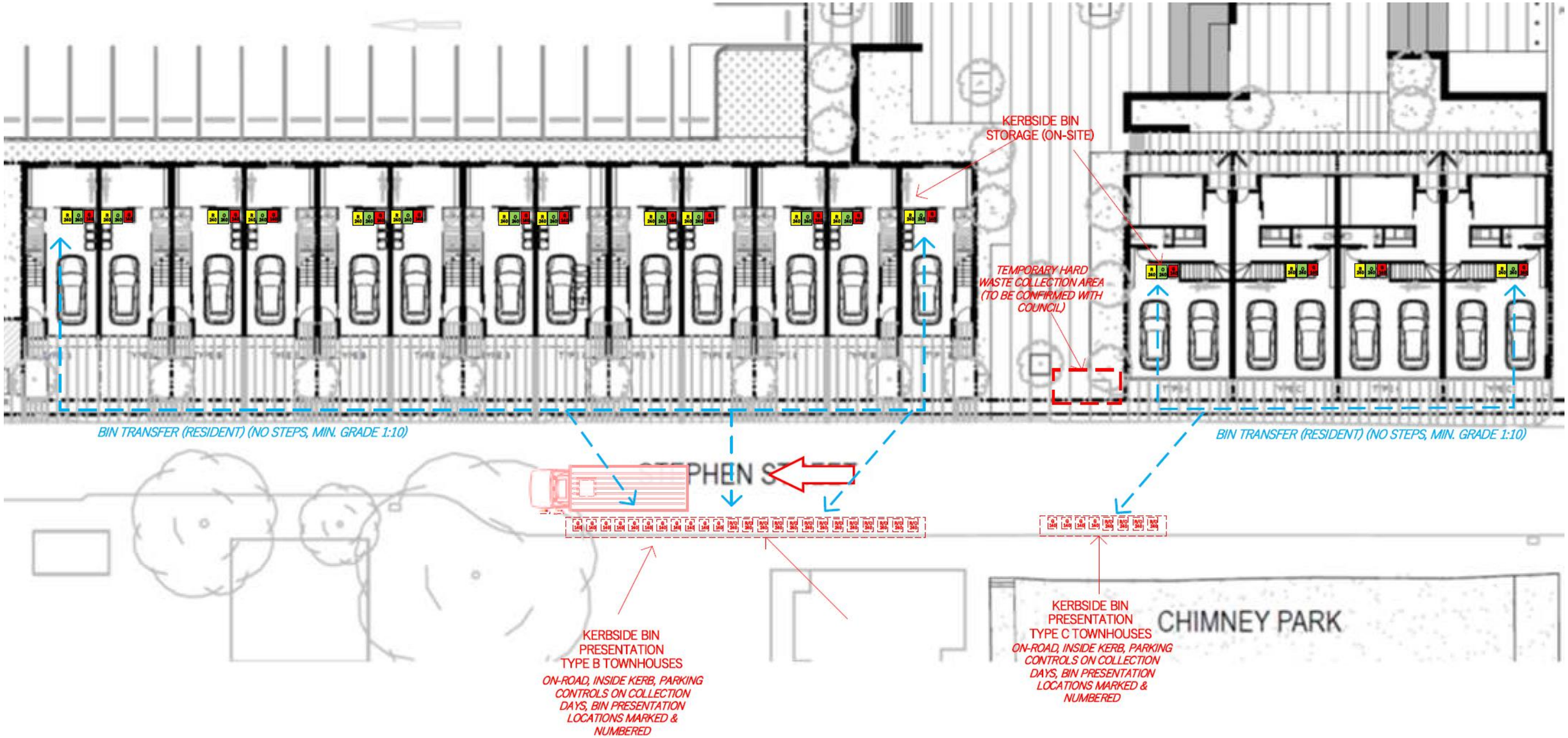


Figure 3 – Waste storage areas and systems for Type B & C townhouses, including proposed kerbside presentation locations on opposite side of Stephen St.

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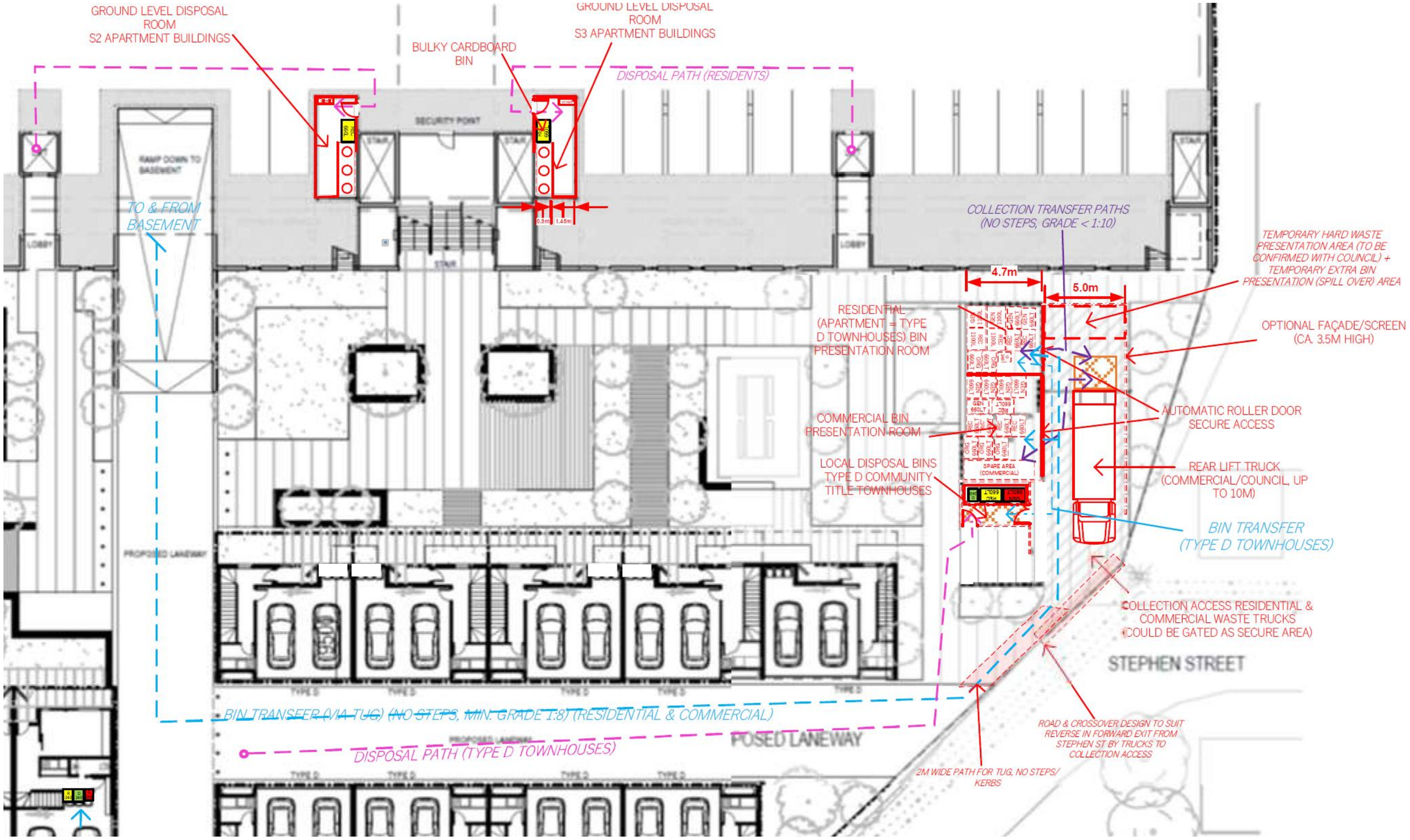


Figure 4 – Waste storage areas and/or systems for Type D townhouses and at Ground Level for apartment buildings – residential and commercial – including Loading area for rear-lift collection services. *See Figure 5 for Close of Apartment Building and Type D townhouse presentation rooms and Loading area*

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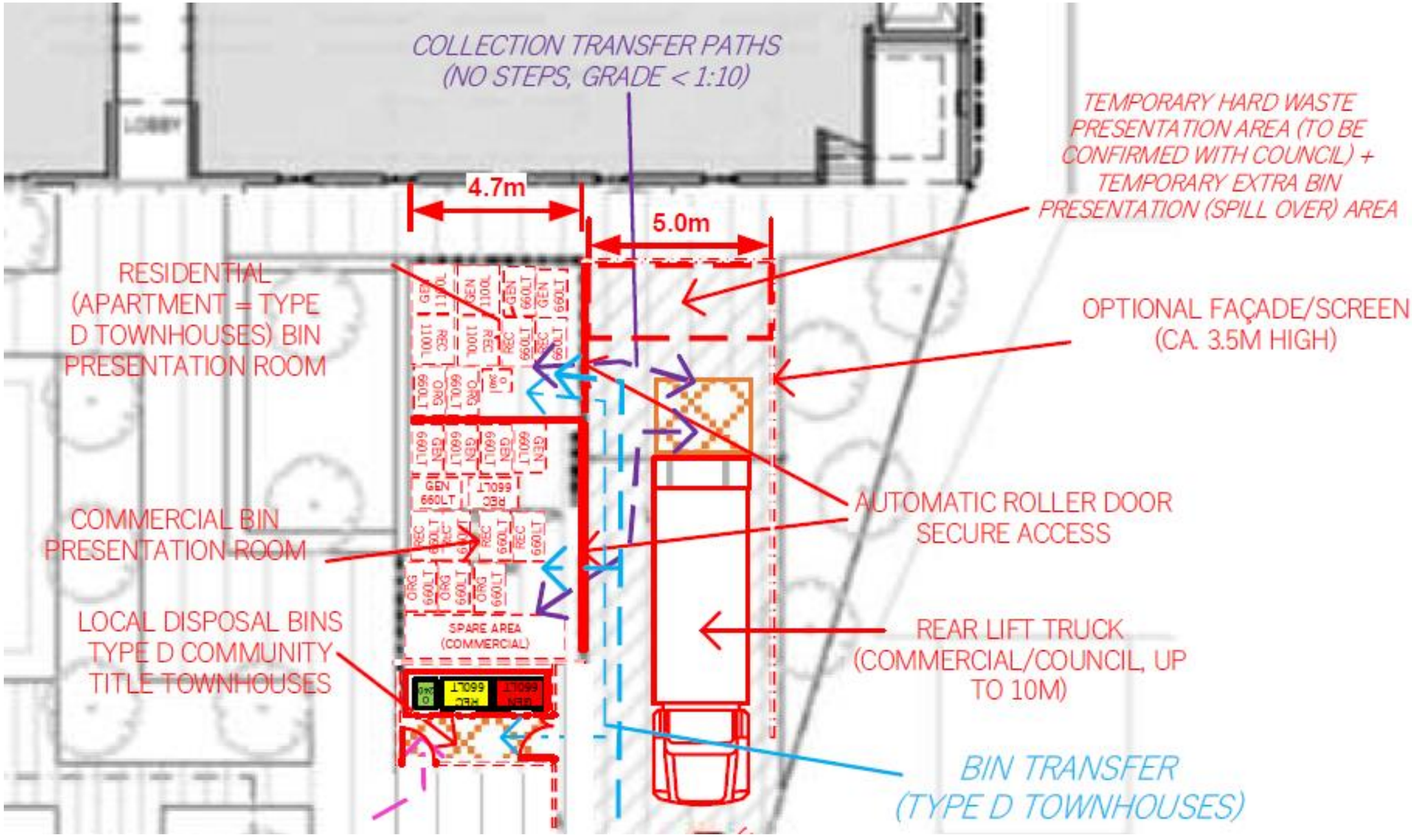


Figure 5 – Close up from Figure 4 of Apartment Building and Type D townhouse presentation rooms and Loading area.

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Figure 6 – Waste storage areas and/or systems at Basement Level for apartment buildings – residential and commercial tenancies, including bin transfer pathways to Ground Level and tug parking area.

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5) Apartment Buildings, commercial tenancies – *see illustrations in Figure 4 and Figure 6*

- *Commercial tenancies would be provided with dedicated or shared (walk-in) waste rooms in the Basement, accessible using lifts and corridors, for disposal of waste & recycling.*
- *Before designated collection days, the commercial tenants would arrange for bins to be transferred (and swapped over with empties) using a tug to a separate Ground-level shared presentation room – see Figure 4 – for collection by private contractor.*
- *The final configuration of these waste rooms, types and size of bins and collection services would be decided when the tenancy is leased.*

Table 4 below gives a schedule of recommended bin storage in each of these Waste Storage Areas for Routine Services. This Table includes for each land use and service:

- *Number and type of bins;*
- *Collection frequency (expected or proposed); and*
- *Service provider and expected collection truck type.*

For commercial tenancies, these details are based on the Development Metrics assumed in Table 1, which are believed to reasonably reflect the likely leasing outcomes for these areas. But as will be noted in Figure 4 and Figure 6 additional space is allowed in event that these requirements are different (e.g. additional food hospitality tenants) and/or commercial tenancies elect other and additional services (e.g. recycled deposit container, cooking oil, etc.)

Potential bin configurations in these Waste Storage Areas for recommended bin storage (per Table 4) are illustrated in Figure 2, Figure 3, Figure 4 and Figure 6.

- *These illustrations demonstrate that adequate space is provided in these Waste Storage Areas to meet the site's waste management requirements.*

Table 4 – Waste storage and bin schedule for Routine Services, including collection frequency and collection service provider (assuming Development Metrics in Table 1 and Waste / Recycling volumes in Table 3)

Waste Storage Area(s)		Routine Service	Estimated Waste/Recycling Volumes (L/week)	Provider	Collection Frequency (Events/week)	Max. Bins/Items Stored & Collected (per Event)		
						No.	*Size (L)*	*Type*
1. Torrens Titled Townhouses, Types A-C (S1 & S2)		General Waste	2208	East Waste Council kerbside	Weekly	21	140	MGB
		Recycling	3067		Fortnightly	21	240	MGB
		Food Organics	1840		Fortnightly	21	240	MGB
2. Community Titled Townhouses, Type D (S3)		General Waste	540	East Waste Council Rear-Lift	Weekly	1	660	Skip
		Recycling	450		Weekly	1	660	Skip
		Food Organics	180		Weekly	1	240	MGB
3. Apartment Buildings	*a. Apartment Buildings A-C Residential (S2)*	General Waste	2760		2	2	1,100	Skip
		Recycling	3833		2	2	1,100	Skip
		Food Organics	2300		2	2	660	Skip
	b. Apartment Buildings D + E Residential (S3)	General Waste	2208		2	2	1,100	Skip
		Recycling	3067		2	2	1,100	Skip
		Food Organics	1840		2	2	660	Skip
	Public Place (S2 & S3)	General Waste	1838		2	2	660	Skip
4. Café tenancies (Shared &/or Separate Bin Sets)		General Waste	3906	Private contractor	3	3	660	Skip
		Recycling	3472		3	3	660	Skip
		Food Organics	4340		3	3	660	Skip
5. Retail (Shared)		General Waste	4278		3	3	660	Skip
		Recycling	4074		3	3	660	Skip

* Compacted waste/recycling volumes – up to 2.5-3× for general waste and up to 1.75× for recycling

6.2 System Operation

6.2.1 Routine Services

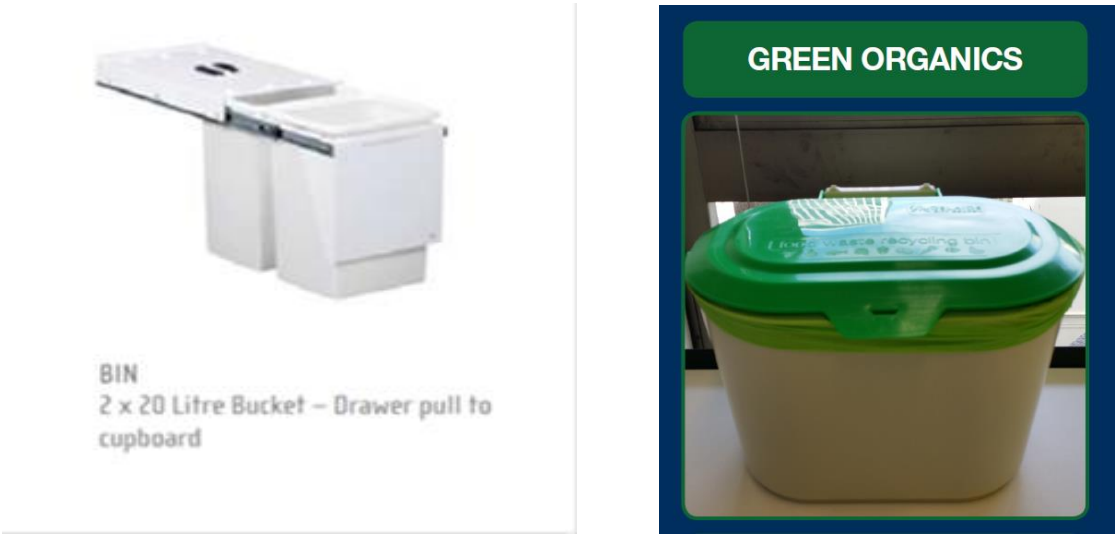
The following summarise how the waste systems would operate for Routine Services to each land use at the Development. It includes guidance and details on how these systems should be designed and operate.

6.2.1.1 Torrens-titled Townhouses, Types A-C

User Storage – Residents would be provided with suitable kitchen bins with handles to enable easy carriage from their dwellings to their Local Disposal Area, e.g. Figure 7 below:

a) *General waste bin – at least 20L in size (bag lined)*
b) *Commingled recycling waste bin - at least 20L in size*
c) *Food organics bin (as specified or otherwise agreed with Council) (compostable bag lined)*

Note: Council supplies every house with a ventilated kitchen organics basket and also provides an annual supply of compostable bags (see: https://www.npsp.sa.gov.au/our_services/waste_and_recycling/kitchen_organics_service).



(a) (b)

Figure 7 – Examples of suitable waste and recycling kitchen bins: *(a) General waste & recycling - 2×20L Buckets in pull-our draw; and (b): Bench-top food waste kitchen caddy* **(Adelaide City Council, 2016)**

Local Disposal – The residents would carry waste in their kitchen bins to their kerbside bin set stored in their garages, for disposal.

Waste Storage –

- This would be the 3-bin kerbside set located in their garages – see Figure 2 and Figure 3
- These storage areas should be naturally or mechanically ventilated to minimise odour issues.

Presentation/Collection Transfer –

- On designated Council kerbside collection days, residents would transfer relevant bins (usually the evening before) from their garage storage area to their kerbside presentation point.
  - For Type A townhouses, this kerbside presentation point would be marked bin locations on Sydenham Rd (per Figure 2) agreed with Council and East Waste.
  - For Types B & C townhouses, the kerbside presentation point would be marked bin locations on opposite side of Stephen St (per Figure 3) agreed with Council and East Waste.
- The Council kerbside contractor (East Waste) would empty the bins.

- Residents would retrieve and return their empty bins to their garages (that day).

Collection –

- Kerbside collection occurs from the street with the (side-lifting) truck lifting and emptying the MGBs presented on the road verge.
- Collection time per bin is usually up to 5 seconds.
    - All bins per service on Sydenham Rd should be emptied within 1-2 minutes (allowing for truck movements between bins)
    - All bins per service on Stephen St should be emptied within 3-4 minutes.

6.2.1.2 Type D Community-titled Townhouses

User Storage – Like Torrens-titled townhouses above, these residents would similarly be provided with suitable kitchen bins for each service with handles to enable easy carriage from their dwellings to their Local Disposal Area (e.g. Figure 7).

Local Disposal – The residents would carry waste in their kitchen bins via their garage exit and rear lane to a nearby local disposal bin station – see Figure 4 and Figure 6.

Waste Storage –

- The local disposal bin station would also be the waste storage area and include a 660L skip bins each for general waste and recycling disposal plus 240L MGB for food waste disposal (per Table 4 and illustrated in Figure 4 and Figure 6).
    - The access doors or disposal points to these bins should be designed to accommodate larger waste items including bulky cardboard and access should be secured by access code.
- Each bin would be equipped with level sensors providing text message notification or alerts to Body Corporate property management staff if these bins were becoming full.

Presentation/Collection Transfer –

- On weekly basis (or earlier if bins happen to be filled) the Body Corporate property management staff would swap the bins in the bin station over with empties and transfer the bins to the nearby common (shared with apartment building residents) skip bin presentation room for collection (per Figure 4).

Collection –

- Would be performed by the Council contractor, East Waste, using rear-lift collection truck.
- The Council contractor would reverse in from Stephen St into the adjacent Loading area provided – see swept path modelling for up to 10.2m vehicle prepared by the Traffic Engineer in Figure 8 overleaf.
- overleaf, which demonstrates reversing entry and forward exit to and from Stephen St into this Loading area.
    - *Note: Council may require the Community Corporation(s) owning this part of the site to indemnify Council's waste contractor when driving their vehicle or collecting waste on-property.*
- The Council contractor would open (using key or secure access code) the bin presentation room's access door, pull bins out, empty them, then return empty bins back to the room.
- Collections for these bins would generally be required on weekly basis.
- The time required (on-site) to empty these bins should be less than 5min (per service) to empty bins.

{Cont. two pages overleaf}

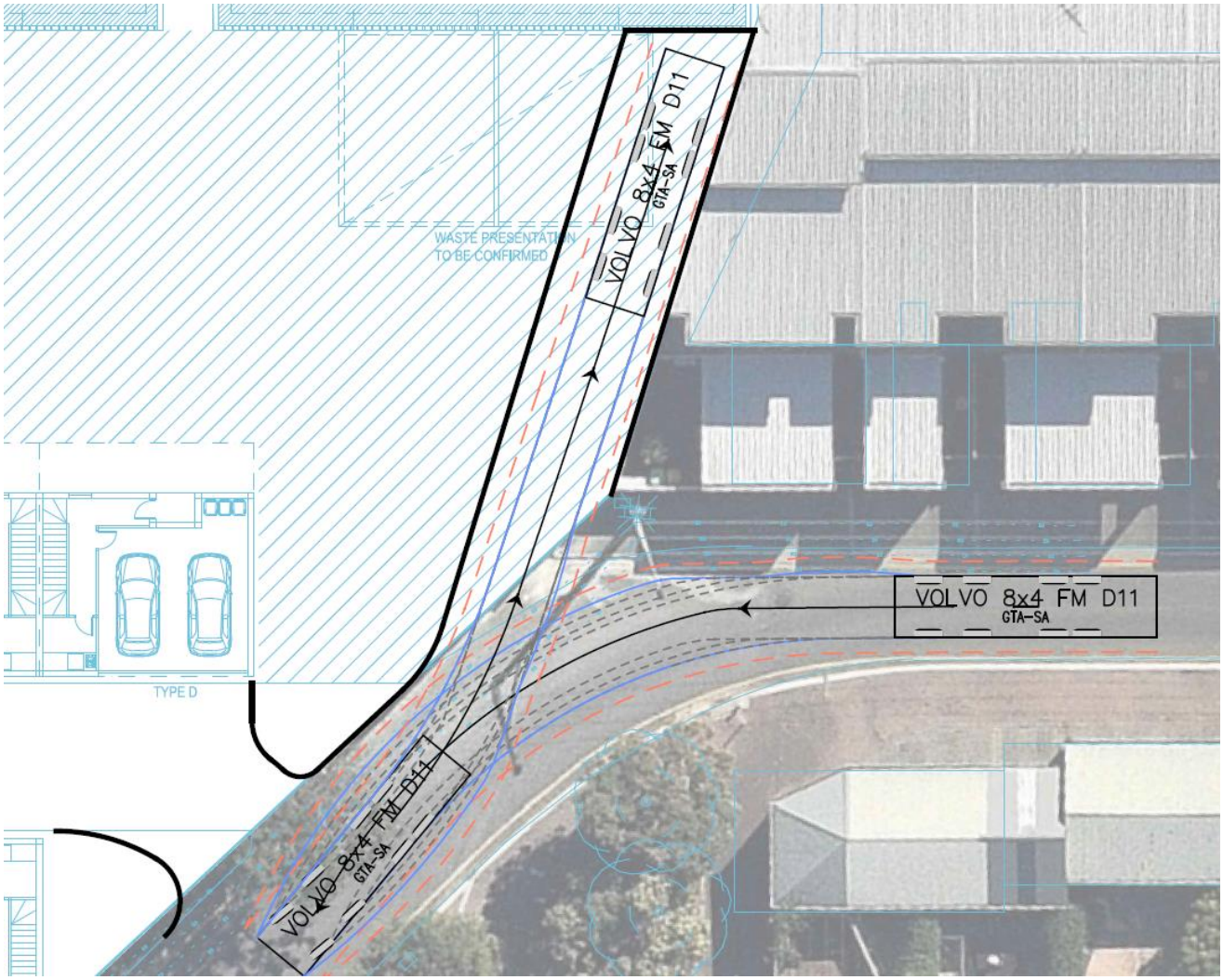


Figure 8 – Swept path modelling of reverse entry from and forward exit to Stephen St for collection from presentation areas for apartment buildings, Type D townhouses and commercial tenancies at Development (GTA Consultants, 25 July 2018). *Note: This figure is yet to be updated to reflect most recent site configuration for loading area. Not to scale, refer to final Traffic Report by GTA Consultants for updated drawing with swept path modelling.*

6.2.1.3 Apartment Buildings – Residential Waste (Stages 2 & 3)

User Storage – Again, (like the townhouses) these residents would be provided with suitable kitchen bins with handles for each service to enable easy carriage from their dwellings to their Local Disposal Area for disposal (e.g. Figure 7).

Local Disposal –

- The residents would carry waste in their kitchen bins via corridors, Lifts and/or walkways to the Local Disposal Room at Ground Level – see Figure 4 – and empty them using the access disposal points (e.g. like waste chute disposal points) on the Waste Wall or for bulky cardboard waste (flat packed) into the 660L skip bin provided.

- The access disposal points would empty into chutes (or waste drops) discharging to bins below in a Waste Room at Basement level – see Figure 6.
    - The general waste and recycling chutes would be equipped with suitable chute or overhead compactors to reduce waste volume.
- When these (chute discharge) bins were full, they would be swapped over with empties located within this Waste Room.
    - Each bin would be equipped with level sensors providing text message notification or alerts to Body Corporate property management staff when bins were becoming full.

Waste Storage – These would be skip bins, size and number per Table 4 and illustrated in Figure 6.

Presentation/Collection Transfer –

- On twice weekly (or more frequent) basis the Body Corporate property management staff would swap the full bins in the waste rooms over with empties and transfer the bins to the nearby common (shared with Townhouse D residents) skip bin presentation room for collection (per Figure 4).
- These transfers would be performed using a motorised tug – see example in Figure 9 overleaf.
    - This tug would be securely parked in the basement when not in use – e.g. see Figure 6.
    - The tug would be specified and selected so it was able to easily transfer up to 3×1,100L bins filled with compacted general waste or 3×660L bins filled with food waste (whichever was deemed heavier), at a time from Basement up ramp to Ground level presentation room.

Collection –

- Would be performed in the same way as described for Type D townhouses (see Section 6.2.1.2 above) with Council waste contractor providing up to twice weekly collection of bins from the presentation room.
    - *In event that more bins (in Waste Storage Areas) are full than space available for presentation in the presentation room, Building Management may:*
        1) *Organise for these bins to be separately collected by a private contractor, from the presentation room on a separate day; and/or*
        2) *Present these bins in the temporary hard waste area at the Loading Area for East Waste to collect.*
- The time required to collect and empty all the bins presented from (all five) apartment buildings at the Development could be up to 15-20min (per service).

6.2.1.4 Apartment Buildings 1/A & 2/B – Public place waste

The public areas in the Apartment Buildings would have public bins (in common areas) serviced by the Body Corporate. These bins are usually for general waste only, about 60-80L, and are lined (or bagged) (although larger 140L MGBs can be used sometimes in outside areas). Cleaners or Body Corporate property management staff would empty these bins and dispose the waste into dedicated public place waste skip bins in one of the two basement-level Waste Storage areas for the apartment buildings (per Figure 6). These bins when full would be transferred with residential waste skips to the Ground Level presentation room for collection by the Council contractor, East Waste (in the same way as outlined above).

{Cont. overleaf}



Figure 9 – Picture example of commercially available motorised tug pulling 1,100L bins, final selection to be decided at detailed design

6.2.1.5 Commercial tenancies – Apartment Buildings (A, B & D)

User Storage – These tenancies would have bins located in-tenancy for disposal of their waste and recycling. The types and size of bins would be decided during tenancy fit-out as they depend on type of commercial activity, but they would allow staff and/or cleaners to safely transfer the waste and recycling to the Basement-level waste storage area(s) for disposal.

Local Disposal – Tenancy staff and/or cleaners would transfer waste & recycling via corridors and Lifts to the Basement-level storage area(s) – per Figure 6 – and empty it into the tenancy or shared skip bins or MGBs provided (as decided at tenancy fit-out).

Waste Storage area(s) –

- The commercial tenancies would be provided with shared and / or separate rooms as show in Figure 6.
- As an example, Table 4 gives a list of bin types and numbers to service the assumed tenancy configuration in Table 1, and Figure 6 illustrates that these bins can be accommodated across proposed waste storage areas that have been nominally allocated.

Presentation/Collection Transfer –

- Like the apartment building waste/recycling bins, the commercial waste/recycling bins would be transferred via tug to a separate commercial Ground-level presentation room (adjacent the residential presentation room).
- A private waste contractor would park in the adjacent Loading area, would open (using key or secure access code) the commercial presentation room's access door, pull bins out, transfer to the collection point, empty them, then return empty bins back to the enclosure.

Collection –

- Would be by a private contractor, parking in the proposed Loading Area next to this presentation room (per Figure 4)
- The trucks used by the private contractor would be similar in size to those used by the Council contractor and access the loading area in the same way (as explained above and illustrated in Figure 8).

        - *Note: These Private Contractors may require the Community/Strata Corporation(s) that owns this section of the site to indemnify them when driving their vehicle or collecting waste on-property.*
    - We recommend that the Body Corporate(s) for Apartment Buildings engage a common waste contractor for all commercial tenancies at the Development, which would minimise collection visits and traffic activity along Stephen St.

6.2.2 On-call

6.2.2.1 Hard waste/E waste – All Land Use Activities

These would be provided for residents as follows.

- ***Type A Townhouses*** – Would access the Council hard waste service.
    - Council presently provides up to two at-call free collection service to residents.
    - Residents would book hard waste collection with Council's waste contractor, East Waste – see https://www.eastwaste.com.au/.
    - The presentation area for hard waste would be a suitable road verge area on Sydenham Rd as agreed with Council and East Waste on a day outside designated collection days (i.e. when this area was not used for kerbside bin presentation).
- ***Type B & C Townhouses*** – Would access the Council hard waste service too.
    - These residents would organise and book a hard waste collection service in the same way as described above.
    - However, they will need to confirm with Council and East Waste a suitable and secure hard waste presentation area on the northern side of Stephen St.
        - For this purpose, it is proposed that an area in the public thoroughfare between (easternmost) Type B and (westernmost) Type C townhouses is set aside as a temporary and shared hard waste presentation area – as illustrated in Figure 3 – subject to confirmation and approval by Council when the Development becomes operational.
        - Alternatively, another suitable location(s) for hard waste presentation by these residents could be identified with Council and/or East Waste.
- ***Type D Townhouses & Apartment Buildings*** – Could also access the Council hard waste service or organise a private collection direct from their townhouse or apartment.
    - The rear of the existing Loading area – see Figure 4 – could serve as a common or shared temporary hard waste presentation area for Council (or private) collections.
        - If such temporary hard waste drop-off location can be agreed with Council and East Waste, these residents could book and use the Council's at-call hard waste collection in the same way as described above for Type A-C Townhouse residents.
        - The Council contractor would park their vehicle in the adjacent Loading Area (per Figure 4).
        - *Note: East Waste may require that the Community/Strata Corporation(s) and/or Body Corporate Manager(s) align Council hard waste collection events for residents in Type D townhouses and Apartment buildings (e.g. on one day per month).*
        - *It is recommended hard waste bookings should be made outside designated residential waste collection days to avoid any potential conflict with Loading area use and presentation area access for these collections.*

- Alternatively, Townhouse D and Apartment Building residents would organise hard waste collection direct from their apartments.
    - The Community Corporation(s) and/or Body Corporate Manager(s) would provide residents with relevant information about available services.
- ***Commercial tenants, Apartment Buildings*** – These tenants would organise their own hard waste collections, direct from their tenancies, using private contractors.
    - The private contractors providing these services would use the Loading area provided at site to deliver these services.
    - We recommend that these services to commercial tenants are coordinated by Community Corporation(s) and/or Body Corporate Manager(s) to avoid access conflicts to the Loading area.

The Building User Manuals for residents and/or commercial tenants at the Development would advise on availability and/or organizing Hard /E-waste collection services.

6.2.3 Maintenance

Common or public grounds at the proposed development would generate garden and public place waste. In addition, waste would be generated by maintenance activities in Apartment Buildings, Townhouses, or to other common area or shared infrastructure (e.g. lighting, repair work, roads, public lighting etc.). These maintenance-generated waste materials would be handled and disposed of by the contractor undertaking these services. [Dedicated on-site storage for these waste materials is therefore not needed.]

6.2.4 External

Residents and commercial tenants would be able to dispose of smaller waste items, such as printer cartridges, batteries and lighting, to publicly available external drop off points, which accept these materials.

The Building User Manual for residents and commercial tenants at the Development will include advice on external drop-off points for these waste items.

6.2.5 Collection Point & Collection events

The waste collection points for the Development introduced above are listed and reiterated below, including additional general notes and guidance on how these should be designed and/or operate.

- **Council kerbside collections to (Types A-C) Torrens-titled Townhouses –**
    - Kerbside collection occurs from the street (Sydenham Rd or Stephen St) with the (side-lifting) truck lifting and emptying the MGBs presented on the road verge.
    - For this purpose, there would need be to be the following arrangements in place.
        - Type A townhouses –
            - Garage vehicle access paths and the rear private lane would be used by residents to transport bins to the Sydenham Rd kerbside presentation zone.
            - The Sydenham Rd kerbside presentation road verges should have marked locations for bins to ensure they are allocated and placed correctly with suitable separation distances (between bins).
            - Parking controls may also need to be considered to ensure collection trucks can access the bins on collection days, this should be reviewed with Council and East Waste.
        - Type B & C townhouses –
            - Resident would use their garage vehicle access paths, pedestrian path and cross Stephen St with bins to access their marked kerbside presentation areas.
            - Kerbside presentation zones on Stephen St would require –

        - Marking of bin presentation locations to ensure they are allocated and placed correctly with suitable separation distances (between bins); and
        - Parking controls on kerbside collection days so bins can be presented, and collection trucks were able to access the bins.
    - Collection time per bin is usually less than 5 seconds (per service collection).
        - All bins presented on Sydenham Rd should be emptied within 1-2 minutes (per service) (allowing for truck movements between bins).
        - Bins presented on Stephen St should be emptied within 3-4 minutes (per service) (allowing for truck movements between bins).
- **Rear-lift skip bin & MGB collections for Type D townhouse & Apartment Building residential waste –**
    - The collection point would be the proposed Loading area next to presentation rooms (or the temporary hard waste area may be occasionally used if there are extra bins to be collected than space in this room), which would be accessible from Stephen St (per Figure 4 and Figure 8) and where the Council waste contractor would park their collection truck to access and empty waste and recycling bins.
        - This Loading area and the presentation rooms would be screened so they are visually unobtrusive to nearby apartment building and townhouse residents, visitors to adjacent public/private areas, neighbouring properties and/or the public from Stephen St.
        - The design of the Loading area should reflect access clearances noted below.
    - This Loading area should make provision for an up to 10.24m rear-lift collection vehicle in line with City of Charles Sturt Guidelines (City of Charles Sturt, 2010) – see Figure 10 overleaf – and we recommend that it is gated (with keypad or remote access) to secure the area against unauthorised access.
    - If the Loading area is covered, it should make provision for a minimum height clearance of 3.7m (from Ground to lowest cover structure) to accommodate access and operation by rear-lift trucks.
    - The collection frequency and times at this location would be as follows.
        - Twice weekly per Routine service or 6 collection events per week (unless extra collections are scheduled when bins to be collected exceed space available in presentation room).
        - Collection time per event – up to 15-20min per service.
        - Collections should be scheduled during daytime hours on weekdays to minimise impact on residents and traffic (along Stephen St and nearby streets).
- **Rear-lift skip bin & MGB collections for Apartment Building commercial tenancies –**
    - The collection point would the same Loading Area for residential collections (per Figure 4 and Figure 8).
    - Collections could be up to three times per week, and the time required (on-site) for collection events should be less than 15-20min (per service) to empty bins.
        - Collection frequencies and times, however, will depend on the service and type of tenancies located at the Development.
        - We recommend the Body Corporate(s) engage a common private waste contractor across all commercial tenancies to minimise collection events.
        - These private collections should be scheduled during daytime hours on weekdays and weekends to minimise impact on residents and traffic, but at times to avoid conflict with Council waste collections to the Development.

6.2.6 Collection Vehicles & Access

- **Council kerbside collections to Torrens-titled Townhouses –**
    - East Waste already operates kerbside collections for Council along Stephen St and other surrounding streets in Norwood using standard-sized (side-lifting) collection vehicles.

- Consequently, there should be no issues with providing this service for kerbside collection to Torrens-titled Townhouses at the Development (as proposed in this WMP) so long as suitable kerbside presentation zones are designed, and parking controls are applied (on Sydenham Rd and Stephen St) as already set out above.

- **Rear-lift collections to Apartment Buildings and Type D Townhouses–**
  - These rear-lift trucks can come on a variety of sizes.
    - We recommend that the City of Charles Sturt Waste Guidelines (City of Charles Sturt, 2010) are used to specify minimum requirements, Figure 10 below reproduces the specifications for rear-lift collection trucks from these Guidelines.
    - Swept path modelling by the Traffic Engineer – see Figure 8 – has already demonstrated that trucks of these size can access the proposed Loading Area (per Figure 4).
    - For manoeuvering collection trucks on-site, the clearance at Ground Level along this swept path and inside the Loading area should be ≥ 3.7m, which is greater than the minimum (travel) height clearance required for rear-lift trucks specified in Figure 10.

Rear loading collection vehicle	
Length overall	10.24m
Width overall	2.5m
Operational height	3.5m
Travel height	3.5m
Weight (vehicle only)	12.4 tonnes
Weight (payload)	9.5 tonnes
Turning circle	18.0m
Gross vehicle weight (when full)	21.9 tonnes

Figure 10 –Recommended specifications for rear-lift trucks from City of Charles Sturt Guidelines (City of Charles Sturt, 2010).

6.3 Collection & Traffic Issues

The proposed collection arrangements were described in Section 6.2.5 and 6.2.6 above.

During detailed design, the Developer should confirm with Council and East Waste the collection access arrangements to:

- Proposed kerbside presentation zones on Sydenham Rd and Stephen St for Torrens-titled Type A-C townhouses.
- Proposed Loading area and collection access from Stephen St for rear-lift collection services to Type D townhouses and apartments buildings.

This confirmation should include any proposed parking controls or street/road modifications or markings to support collection access when the Development becomes operational.

For rear-lift collection services to the Type D townhouses and apartments buildings, the Community / Strata Corporation(s) owning the section of the site required for collection access, loading area and

presentation rooms may be required by Council and/or East Waste to sign a liability waiver, so they can access and use this collection point (to provide services).

For all residential rear-lift services to the Development, we recommend that collections should be scheduled on week days and between 7am and 6pm, ideally at times outside peak traffic periods along surrounding streets and connecting main roads. The same should apply to rear-lift services to commercial tenancies in apartment buildings except where weekend collections are required which should be restricted to 9am-5pm periods.

6.4 Bin cleaning (& On-site Bin Wash Area)

A temporary on-site bin cleaning area is provided for waste/recycling bins used by Type D townhouse and apartment building waste systems, this is in co-located in (one or both of the) the Basement waste storage area(s) and multipurposed with bin storage area – see Figure 6.

- *This bin wash area would require grading to a sewer drain with basket screen to remove gross solids, tiles or epoxy coating to water-proof adjacent walls and flooring, standard cold-water supply faucet and commercial-grade electrical power supply (if pressure washer system is to be used), plus bunds and screens for use during bin wash events.*
- *Bin washing activity would be managed by the relevant Strata/Community Corporation(s).*
- *Bin washing would be timed to occur immediately after bins are emptied.*
- *During bin washing, bins ordinarily stored on the bin wash area would be temporarily relocated outside the waste storage room.*

Alternatively, bin cleaning at the Development may be outsourced to an external contractor (which may remove the requirement for an on-site bin wash area).

- *In this event, an external contractor can remove bins from site, replacing them with an empty spare, clean the bins, then return them to site.*

6.5 Transfer pathways

The transfer pathways for the waste systems at the Development are described above and illustrated in Figure 2, Figure 3, Figure 4 and Figure 6. The following is provided as a guide for sizing and designing transfer pathways which should be referred to during detailed design.

- *Transfer pathways –*
  - *User disposal – less than 30m and free of steps, no grades greater than 1:15, to cater for mobility impaired users.*
  - *Local disposal points to central storage – sufficient width to accommodate relevant bins or waste loads being transferred (see below), free of steps, with no grades greater than 1:12*
  - *Collection – less than 15m with no grades greater than 1:10 with ramps installed where navigating kerbs*
- *Corridor/Path widths where transferring bins –*
  - *240L MGBs or smaller bins / loads – min. 1,000 mm (1,200mm preferred)*
  - *660L skip bins – min. 1,200mm (1,400mm preferred)*
  - *1,100L skip skips and/or other waste loads – min. 1,500mm (1,600mm preferred)*
- *Doors –*
  - *Local disposal access – 800mm*
  - *Transfer pathways– Appropriate to the size of bin to be transported, e.g.*
    - *240L MGB – min. 800mm*
    - *660L skip – min. 1,200mm*
    - *1,100L skip – min 1,500mm*
- *Floors – Hard surfaces where bins and skips are to be carted*
- *Lifts – All lifts should be sized to allow for bulky hard waste items.*

Based on current plans, these requirements for transfer pathways in the Development appear to be generally satisfied. All relevant transfer pathways should, however, be reviewed and confirmed at detailed design stage to ensure they are appropriate.

6.6 Operation, Management & Communication

- ***Waste system operation and management*** –
    - **Type A-C Torrens-titled townhouse residents** – Would be responsible for managing their waste systems following advice from Council regarding access, operation and use of their kerbside collection service.
    - **Apartment and Type D townhouse residents** – The relevant Community / Strata Corporation(s) would be responsible for managing and operating the waste systems at the site.
        - *For shared components of these waste systems (e.g. transfer paths, presentation rooms/areas, collection point, organising collections), this may require delegation of responsibilities and creation of rights-of-access between different Community / Strata Corporations operating at the Development.*
        - *Council should be consulted on waste system operation and management and may provide advice and support to the Community / Strata Corporations and their residents.*
    - **Commercial tenancies** – The relevant Apartment Building Community / Strata Corporation(s) would be responsible for managing these waste systems in conjunction with property owners and/or commercial tenants.
        - *Again, where shared components of these waste systems exist, there may need to be delegation of responsibilities and establishment of rights-of-access.*
- ***Building User Manual*** – Advice and instructions on waste management and using the waste systems would be included by the Developer in the Building User Manuals developed for residents and commercial tenants, including contact information for further information, questions and issues.
    - *Council should be consulted on this advice and instructions and may provide relevant information to include in the Building User Manual, particularly for the Torrens-titled townhouse residents.*
    - *This may include advice to residents on how to properly dispose of other waste / recycling items including lighting, batteries and hazardous household waste.*
- ***Community/Strata title arrangements for Apartment Building and Type D Townhouse residents and commercial property owners –*** Obligations for these residents and/or property owners to properly access, operate and use the waste systems would be written into the Community/Strata plan lodged with the Lands Titles Office (including delegation of responsibilities and creation of rights-of-access).
- ***Residential and Commercial tenancy agreements for Apartment Building and Type D Townhouse residents and commercial tenants –*** Should include requirements to comply with the above obligations to use waste systems correctly and responsibly.
- ***Emergency Response Plan for Type D Townhouse Community/Strata Corporations –*** Should include response measures (or contingencies) for:
    - Waste collection services suspended or not available; and
    - For Apartment Buildings:
        - Lift access failure to Ground Level Local Disposal Areas for residents (including contingency measures to support mobility impaired residents) and to Basement storage areas for tenants;
        - Motorised tug failure for transport of bins from Basement waste storage areas to Ground Level presentation areas; and
        - Waste chute/drop blockage.

6.7 Other Waste System Design or Management Issues

The following would be considered and/or implemented for waste systems at the Development. More details for some of these items can be resolved at detailed design stage with waste contractors and/or Council.

1) **Bins** – These would align to Council bin colours or otherwise comply with Australian Standard for Mobile Waste Containers (AS 4213).
    - *Council should be consulted on bin selection and colours for residential waste bins and should provide these bins where they are delivering the collection service.*
2) **Signage** –
    - Appropriate signage in all Local Disposal (and walk-in Waste Storage) Areas should be used to ensure correct disposal of waste and recycling.
    - This signage should conform to the signage requirements of Council and/or the State Guideline (Zero Waste SA, 2014).
        - *Council should be consulted on signage for residential waste systems and may supply signage to the Development for this purpose.*
3) **Vermin, hygiene & odour management (inc. ventilation) –**
    - Inspection & Cleaning –
        - An inspection and cleaning regime would be developed and implemented by Community / Strata Corporation(s) for waste systems at the Development, including ensuring that surfaces and floors around disposal areas, transfer pathways and waste storage areas are kept clean and hygienic and free of loose waste and recycling materials.
            - *All Local Disposal and Waste Storage areas should be graded to a sewer drain with tiling or epoxy coating to floors and adjacent walls to waterproof the area and for cleaning.*
            - *If not covered and with separate sewer drain for cleaning, any waste spillage in the residential or commercial apartment building presentation areas should be swept up immediately and not hosed into stormwater drains, which should be equipped with temporary stoppers which can be fitted during such cleaning activity.*
        - Similar obligations for commercial tenants to inspect and clean their waste systems and storage areas would be included in their tenancy agreements.
    - Odour Control –
        - All Local Disposal, Waste Storage and Presentation rooms in waste systems for the Apartment Buildings and Type D townhouses –
            - *Should be mechanically (or naturally) ventilated for control of odours.*
            - *The ventilation would extract to atmosphere, to prevent odour build up.*
            - *The extraction vent discharge location(s) would be selected to avoid impact on residents, tenants and/or neighbours.*
            - *It should be a requirement for food waste bins in these areas that lids are closed after disposal events or during presentation.*
        - Torrens-titled townhouses – *These bins are located inside garages and it is recommended that ventilation if provided to minimise odour issues and residents are encouraged to ensure the bins are closed after use and kept clean such that they should not negatively impact on themselves (and/or neighbours).*
    - Waste chutes / drops –
        - These chutes or drops to be installed in the apartment buildings (between Local Disposal Rooms at Ground and the discharge bins in the Basement) should be designed to include:
            - *Odour control – Access disposal points should close when not in use and the chute or drop should operate under negative pressure, so odours do*

not emanate into the Local Disposal Room during operations, with vent to external area that does not impact on residents or neighbours.

- *Cleaning – Automated or manual sprinkler system for cleaning of the chute/drop internals (which can discharge to sewer drain in Waste area below).*
- *Maintenance access – Access points for easy maintenance or removal or blockages in event these were to occur.*

4) **Access & security** –
   - Access to the Apartment Building and Type D Townhouses' Residential and/or Commercial Local Disposal, Waste Storage and Presentation Rooms/Areas should be secure and only accessible by key or fob or access code.
     - *The relevant key or fob or access code(s) would be provided to residents, Body Corporate staff and/or waste contractor(s) delivering services to the Development.*
     - *CCTV is recommended to monitor waste disposal practices in all Local Disposal (and walk-in Waste) Areas and presentation rooms and the Loading area.*

7 References

Adelaide City Council. (2016). *Guide to waste & recycling bins.*

City of Charles Sturt. (2010). *Residential Waste and Recycling Guidelines for New Developments - December 2010.*

Department of Planning, Transport & Infrastructure. (19 December 2017). *Development Plan for Norwood Payneham and St Peters (City).*

Government of South Australia. (2011, November 24). Environment Protection (Waste to Resources) Policy 2010.

GTA Consultants. (25 July 2018). *Proposed Mixed Use Development 76 Magill Road, Norwood Transport Impact Assessment - Preliminary Draft.*

Powa, R. (. (2018, July 26). Final discussions regarding suitability of proposed waste systems at 76 Magill Rd for East Waste collection.

Zero Waste SA. (2014). South Australian Better Practice Guide – Waste Management in Residential or Mixed Use Developments.

ALDI Stores
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ABN 90 196 565 019

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SOUTH AUSTRALIA

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Friday, 27 July 2018

Mr Richard Dwyer
Managing Director
Ekistics
PO Box 32
Goodwood, SA 5034

Dear Richard,

Re: ALDI Food Stores - Waste Management Overview & Management - proposed Norwood Store

ALDI Stores (ALDI) is committed to improving sustainability. ALDI strives to sustain its local and global environment, organisational health and ability to create a positive, viable future. ALDI includes environmental sustainability principles and targets in all aspects of its decision-making.

In order to plan sustainable and effective waste and recycling programs, ALDI receives data on current recycling services from our appointed waste and recycling contractors, these include audits of quantities from different waste streams, rates of contamination and weights of each collection. Analysis of this data results in improvements being communicated and implemented to further improve ongoing initiatives and develop others as required.

ALDI's in store operation is considerably different when compared with other supermarkets. All products ALDI retails are delivered pre-packaged. ALDI do not undertake the preparation of food for sale on site, we do not have an in store delicatessen, butcher, bakery or green grocer. This results in the waste streams and quantities of waste generated being a small proportion of that generated by a conventional supermarket.

The waste generated by an ALDI store is limited to four key areas and is managed and disposed as outlined further below;

General:	Waste disposed of in the general/waste bin is limited to waste generated by staff on their lunch breaks (food packaging) and office based waste. All the waste is collected in and disposed in sealed/tied heavy duty plastic rubbish bags prior to being placed in the external bin for collection
Organic:	Organic waste which is generated by fruit/vegetables and meat that does not meet the strict quality controls that ALDI require and/or are nearing/past the products best before date. This waste stream is very minimal. In line with our corporate responsibly policy we have partnered with two companies, Foodbank and SecondBite. SecondBite collect from each of our stores every day, they collect 99% of the organic waste referred to above. Foodbank collect from our distribution centre
Cardboard:	Cardboard waste is generated from used cardboard packaging - waste cardboard is to be collected and stored in an onsite compactor within our back of house store

	area and collected and returned by ALDI transport to our Distribution Centre for recycling
Plastic:	Plastic wrapping is collected by ALDI transport and recycled at the ALDI distribution centre.
Bin size:	Each store is supplied with a single 1.5 cubic metre bin. The bins are fully contained and equipped with a hinged lid and contained in the Bin Enclosure in the loading dock.
Bin location:	Each store bin is located within a secure enclosure, as per the attached photos of our Victor Harbor store.
Collection frequency:	The collection of the bin is undertaken by a third party contractor. The contractor will attend the store on average three times per week to collect the contents of the bin. The collection will be managed at ALDI's request at specified times and coordinated to avoid any conflict with ALDI Transport deliveries.
Collection duration:	The third party contractor will be on site for approximately 3 minutes.
Truck size:	10.5m front load truck

Please refer to the included pictures for your reference and reassurance.

Should you require any further information or seek to clarify the contents of this please contact me

Yours sincerely,
ALDI Stores



Nigel Uren
Property Director



Example of standard bin enclosure (ALDI Victor Harbor)



Example of 10.5m front load truck

WALLBRIDGE GILBERT AZTEC

76 Magill Road, Norwood

STORMWATER MANAGEMENT REPORT

Project No. ADL189138 / ADL170773
Rev. C

01 August 2018

Revision History

Rev	Date	Issue	Originator	Checker	Approver
A	24/07/2018	For Information	WRS	WRS	WRS
B	31/07/2018	Preliminary Issue	WRS	WRS	WRS
C	01/08/2018	Preliminary Issue	WRS	WRS	WRS

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Appendices

Appendix A Site Aerial Photograph & Council Stormwater
Appendix B Engineering Survey
Appendix C Architectural Plans
Appendix D Flood Mapping Extract
Appendix E Council Stormwater Infrastructure Plans
Appendix F Civil Concept Calculations
Appendix G Site Civil Concept

1 INTRODUCTION

1.1 BACKGROUND

WGA has been engaged to prepare a Stormwater Management Plan and Concept for an ALDI supermarket and multi-level residential complex at 76 Magill Road in Norwood. The proposal also includes separately placed and titled residences to the rear of both sites, with access to Stephen Street.

This report is intended to conceptually outline the stormwater management design for the proposed development and detail the stormwater management methodology for the site. Consideration is given to possible site levels and adjacent developments. A final detailed design must be carried out to provide construction documentation and incorporate the stormwater design principles outlined in this report, as well as ensure level and grade compliances are assured. The final documentation is considered to be beyond the scope of this report.

1.2 SCOPE OF THE ASSESSMENT

The preparation of the plan comprises the scope of services listed below:

- Site visit
- Liaise with the City of Norwood Payneham St Peters (Council) to determine appropriate and relevant stormwater requirements for the specific site
- Prepare a Stormwater Management Plan detailing the proposed method of collection and the disposal of site generated stormwater runoff
- Prepare preliminary sketch concept plans showing likely site drainage infrastructure, detention capacities and discharge points
- Provide supporting stormwater calculations to match the intent of the concept plans

1.2.1 Documentation

The client has provided preliminary Architectural Plans for the proposed developments and structures.

2 DETAILED REPORT

2.1 DEVELOPMENT DESCRIPTION

The proposed development fronts the southern side of Magill Road in Norwood, broadly in the area between Cox Street to the east and Sydenham Road to the west. The development of the proposed ALDI store is in the westernmost section, and comprises 89 carparks. A mixed use multi storey development is proposed for the eastern portion of the site whilst the southern portion of the site, adjacent Stephen Street, is intended to accommodate 33 residential townhouses. Refer to Appendix A for an Aerial Photograph of the subject site with an overlay of the intended precincts.

2.2 CATCHMENT DESCRIPTION

Covering a combined total of over 18990m^2 (of which the proposed ALDI site precinct utilises 6201m^2), the subject site is currently occupied by the existing, uninhabited 'Caroma' commercial / industrial complex. The existing site is fully developed to total impermeability, with most of the area being covered by large roofs and the remainder consisting of sealed industrial pavements.

The site land falls steadily to the north-northwest, with both Magill Road and nearby Sydenham Road dropping down towards their combined intersection. Stephen Street, on the site's southern fringe, similarly grades down to the west, although not as markedly. A copy of the current engineering survey is attached in Appendix B.

Copies of the proposed architectural plans may be found attached within Appendix C. The drawings outline the proposed 'post-development' catchment.

2.3 EXISTING STORMWATER DRAINAGE

Whilst some aspects of the internal stormwater drainage system finds its way to the Stephen Street system currently, a large portion of the existing site generally discharges into the Magill Street watertable via a substantial number of galvanised box drains. Appendix A's Aerial Photograph also indicates the available Council stormwater systems, and demonstrates that no in-ground stormwater system passes the Magill Road frontage of the site.

The City of Norwood Payneham St Peters has provided some detail of the expected flooding risk, as well as existing underground drainage systems in the nearby streets. An extract from the "First to Fifth Creeks 1 in 100 year Flood Inundation Map" is to be found within Appendix D, and shows that the project site is not impinged upon by these events. Magill Road flooding issues, however, are evident a distance further to the west.

The Council drawings of existing stormwater pipe systems show a 375mm diameter pipe main extending along Stephen Street at the higher level and discharging into an 825mm diameter main at Sydenham Road. It also shows a pipe system reaching towards the south-eastern section of the site from the Stephen and Cox Street intersection. Refer to Appendix E for details.

2.4 COUNCIL REQUIREMENTS

Council have confirmed the following storm water requirements with respect to the site:

- On site detention storage (to reduce the peak flow rate) is required to reduce the site outflow. Although the future site will be more permeable than it currently is, downstream Council systems are often over-capacity with public flooding being the result. We are to limit the 'post-development' stormwater outflow in 1 in 5 year ARI events to no greater than the existing 'pre-development' outflows occurring in 1 in 100 year ARI events. This is a significant reduction in what currently leaves the site to be collected on Magill Road itself.

- Site levels are to be set to provide a clear overland flow path for the 1 in 100 year flows where possible

- Stormwater quality improvement measures (such as GPTs) are encouraged to treat the quality of the stormwater runoff from any trafficable areas (outdoors car parks etc).

2.5 STORMWATER MANAGEMENT METHODOLOGY

Based on the information received from, and our meeting with, Council representatives, the following stormwater management methodology is proposed. The site will be divided into two individual precincts (Aldi & Mixed Use), to minimize the need for future easements on titles.

Some discharge from the Aldi precinct will be directed, in a controlled manner, to the Magill Road watertable, whilst the bulk will be directed to the existing underground stormwater main located within Sydenham Road. The discharge from the ALDI precinct is to be limited to approximately 102L/Sec in total, and so the discharge to the Sydenham Road system will be limited by an orifice fitting within the system. Oversized underground pipes are intended to provide the majority of this storage, with use also made of the loading dock recess during more extreme events.

The ground floor levels of the Mixed Use buildings will likely follow the Magill Road grade down to the west, with the central car park entrance level pivotal. Tenancy accessibility along the northern elevation will also be key and the easternmost tenancies must remain above the Magill Road kerb level.

The townhouse dwellings to the south, fronting Stephen Street, will be built above the kerb level, with most dwellings discharging their collected stormwater to the south directly into the Stephen Street watertable. There will be a driveway entry from Stephen Street into the basement of the multi storey buildings with relatively steep grades down to basement level. There is also a common driveway between the easternmost townhouses unit which is to be graded slightly down to the east, towards Stephen Street.

Preliminary stormwater calculations to meet Council's discharge requirements for the 100 year ARI event indicate that a portion of the stormwater may be discharged immediately from the site whilst a significantly larger volume is required to be temporarily stored (detained). The immediate discharge is to be directed to both the Magill Road and Stephen Street water tables with the detention volume balance captured in large underground tanks placed below the basement level. Multiple pumps will gradually empty these tanks towards Magill Road via spaced box drains, each limited to 20 L/sec output.

Relatively clean roof water could potentially be separated for re-use, whilst the majority of the external carpark collection is to pass through an adequately sized pollution control device prior to entering the detention tank. This may be a Rocla First Defence FD450 or similar approved.

In this multi-use precinct proposed, a detention capacity of 212m^3 and a maximum outflow of 108.1 L/sec must be met.

Refer to Appendix F and Appendix G for the relevant Stormwater Detention Calculations and Concept Plans.

2.6 SUMMARY

The Preliminary Concept Plans and Calculations contained within this report have been prepared to demonstrate the philosophy behind the proposed treatment of the stormwater runoff from both the proposed ALDI store and the adjacent Mixed Use developments. Consideration has been given to both the surface levels and discharge issues. The information provided is preliminary and will be subject to the detailed design and documentation of both precincts

APPENDIX A

SITE AERIAL PHOTOGRAPH & COUNCIL STORMWATER

SITE AERIAL PHOTOGRAPH & COUNCIL STORMWATER LOCATIONS



APPENDIX B

ENGINEERING SURVEY



IMAGE 4



IMAGE 3

CHAPEL STREET

GEORGE STREET

SYDENHAM ROAD

MAGILL ROAD

STEPHEN STREET

THE ALMA TAVERN

WAREHOUSE

BITUMEN CARPARK

GRAVEL CARPARK

REV	DATE	DESCRIPTION	CALC	FIELD
		ADDITIONS, AMENDMENTS AND APPROVALS		

LEGEND

COORDINATE SYSTEM	
VERTICAL:	AHD
HORIZONTAL:	GROUND PLANE ORIENTED TO: MGA 94 ZONE 54
SCALE: GROUND	(CSF = 1.0001688)

ADOPTED STATION & AUTHORITY		
PSM 662824/41	RL:	51.482 SDB
PSM	E:	283437.105 SDB
	N:	6133067.828 SDB
SDB denotes SA Government survey data base		

0 2 4 8 12 16 20 m

1:200

ORIGINAL SHEET SIZE A0

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Notes:
Property boundaries shown hereon have been compiled from the government records and have not been verified by field survey.

CONTOUR INTERVAL:	0.2m	
SURVEY:	TLH	JAN 2018
DRAWN:	TLH	23.01.2018
CHECKED:	RSW	23.01.2018

Alexander & Symonds Pty Ltd
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South Australia 5067
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DETAIL AND LEVEL SURVEY
MAGILL ROAD
NORWOOD

DRAWING No.	SHEET 1 OF 2	REVISION
A001018_DETAIL(0) 2D		0



IMAGE 2



IMAGE 1



IMAGE 5

STEPHEN STREET

MAGILL ROAD

283360 E

283380 E

283400 E

283420 E

283440 E

283460 E

283480 E

RETAINING WALL

WAREHOUSE

CONCRETE RAMP

BITUMEN DRIVEWAY

GRAVEL CARPARK

CONCRETE

PAVED

VETERINARY SERVICE

APARTMENTS

DISUSED CARWASH WORKROOM

STEPHEN STREET

MAGILL ROAD

NORWOOD

LEGEND

- TOP KERB
- TOP OF CAPPING
- EDGE OF GUTTER
- TOP OF RIDGE
- WATER TABLE
- TOP OF PARAPET
- FLOOR LEVEL
- TEL, COMM, COAX UNIT
- INVERT LEVEL
- TRAFFIC LIGHT
- TNP
- SIGN / BUS STOP
- WATER METER
- LETTER BIN
- SPRINKLER / HYDRANT VALVE
- MAIL BOX / SIGNAL BOX
- HYDRANT
- TROLLEY MACHINE
- DOMESTIC OUTLET
- STEEL / WOODEN POLE
- BOLLARD
- ROAD CLOSURE
- DOMESTIC WIRE
- SERVICE
- POWER / LIGHT POLE
- DOMESTIC SUMP
- WATER SV / FP
- CABLE MARKER
- STORMWATER MH/GP
- BLDG / GAS METER
- BOREHOLE
- ANY CAMPING
- GAS SERVICE
- SURVEY MARKS
- SEWER MH / SP
- UNKNOWN POINT / SERVICE
- TREE / SHRUB
- EDGE OF VEGETN
- ROAD SIGN / NOMEN.
- FENCE
- EDGE OF PAVING
- BOTTOM OF BANK
- TOP OF BANK
- CHANGE OF GRADE
- DRAIN
- SEWER PIPE U/G
- TEL, COMM U/G
- WATER PIPE U/G
- BUILDING
- WALL
- CEILING
- CONCRETE
- GATE

COORDINATE SYSTEM	
VERTICAL:	AHD
HORIZONTAL:	GROUND PLANE ORIENTED TO: MGA 94 ZONE 54
SCALE: GROUND (CSF = 1.0001688)	

ADOPTED STATION & AUTHORITY		
PSM 66282/42411	RL:	51.482 SDB
PSM	E:	283437.105 SDB
	N:	6133657.826 SDB

SDB denotes SA Government survey data base

0 2 4 8 12 16 20 m

1:200

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Property boundaries shown hereon have been compiled from the government records and have not been verified by field survey.

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DRAWN:	TLH	23.01.2018
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		ADDITIONS, AMENDMENTS AND APPROVALS		

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DETAIL AND LEVEL SURVEY
MAGILL ROAD
NORWOOD

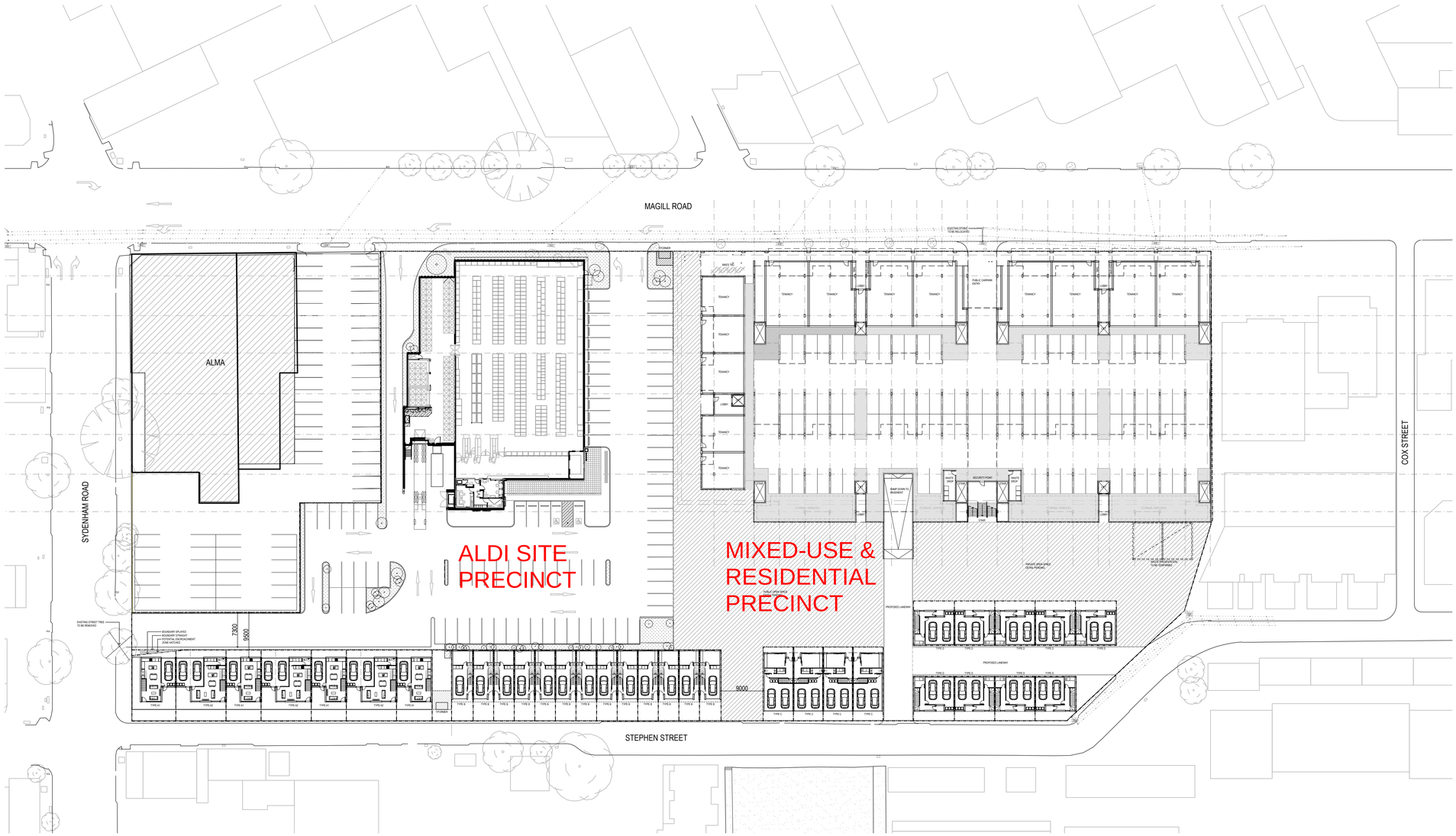
DRAWING No. A001018_DETAIL(0) 2D

SHEET 2 OF 2

REVISION 0

APPENDIX C

ARCHITECTURAL PLANS



GROUND FLOOR PLAN
1:500 @ A1

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PROJECT
76 MAGILL ROAD
NORWOOD

CLIENT
ALDI | CA CA

DRAWING
GROUND FLOOR PLAN

NORTH

SCALE
AS SHOWN

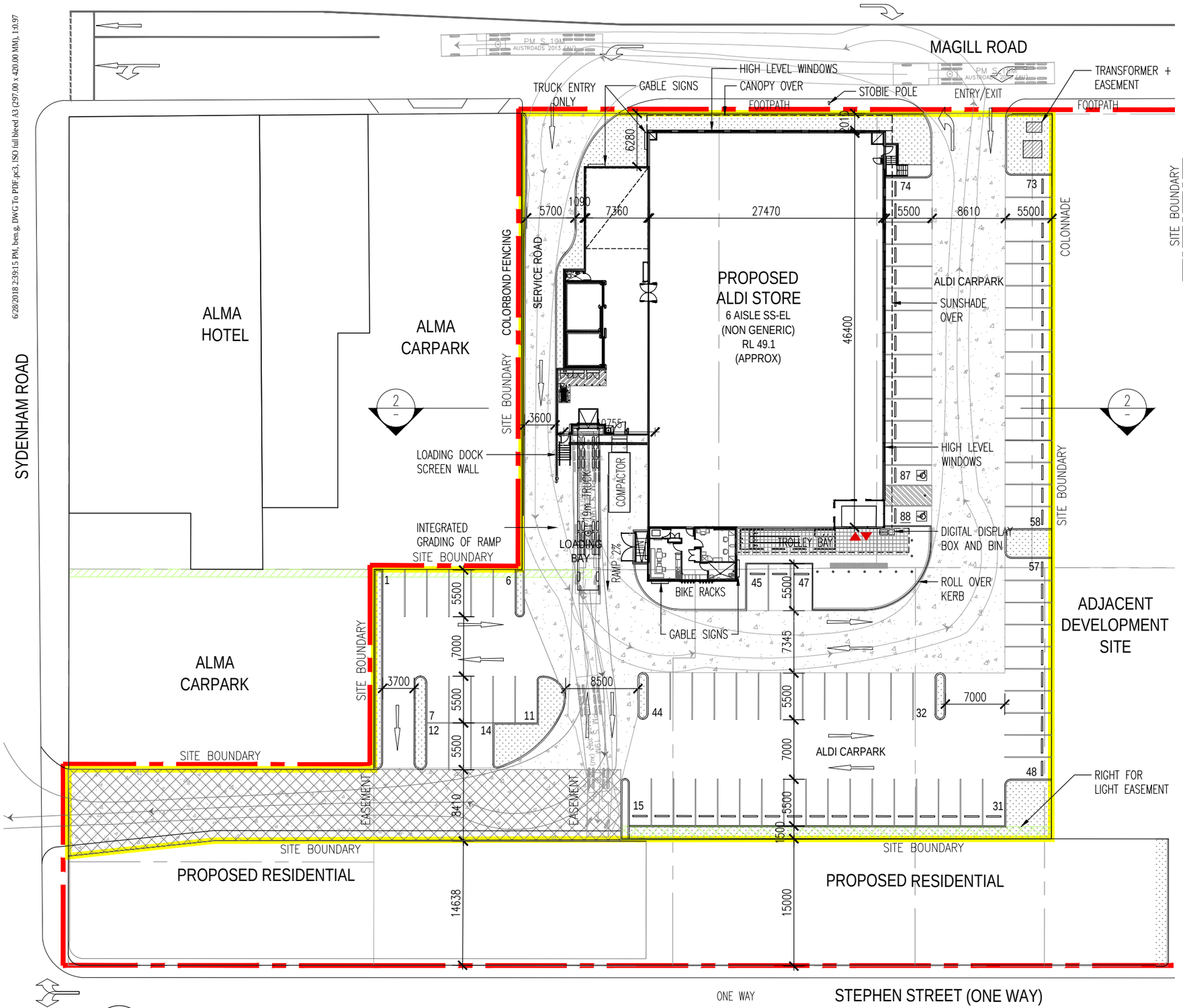
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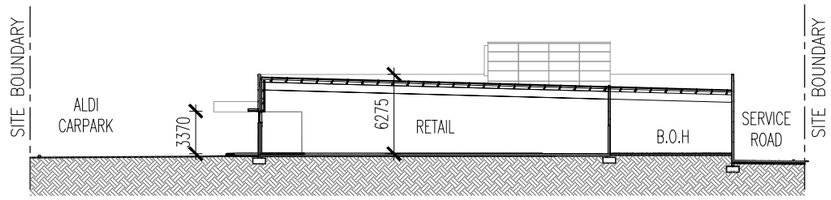
PROJECT NO
28055

DWG NO
P01

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©28/2018 2:39:15 PM, ben.g, DWG To PDF.pc3, ISO full bleed A3 (297.00 x 420.00 MM), 1.0.97





2 / - PROPOSED SECTION
1:500

PROPERTY DESCRIPTION	
TOTAL SITE AREA	18978m²
TOTAL ALDI SITE AREA	6201m²
ALDI BUILDING GROSS AREA	1663m²
ALDI BUILDING NETT AREA	1634m²
ALDI RETAIL NETT AREA	1274m²
BOH NETT AREA	286m²
AMENITIES NETT AREA	78m²
REMAINING NETT AREA	364m²
RESERVE AREA	-
PARK / TRAFFIC AREA	3675m²
NUMBER OF CAR PARKS	88
NUMBER OF BOH PALLETS	62
CAR SPACES REQUIRED BY COUNCIL	-
LANDSCAPED AREA	
EASEMENT (EXISTING)	
EASEMENT (NEW)	
RIGHT OF WAY	
CONCRETE PAVEMENT (TRUCK PATH)	
ALDI SITE BOUNDARY	
SITE BOUNDARY	

1 / - PROPOSED SITE PLAN
1:500 @ A3

PRELIMINARY ONLY
FOR CLIENT COMMENT

0 5 10 20

N

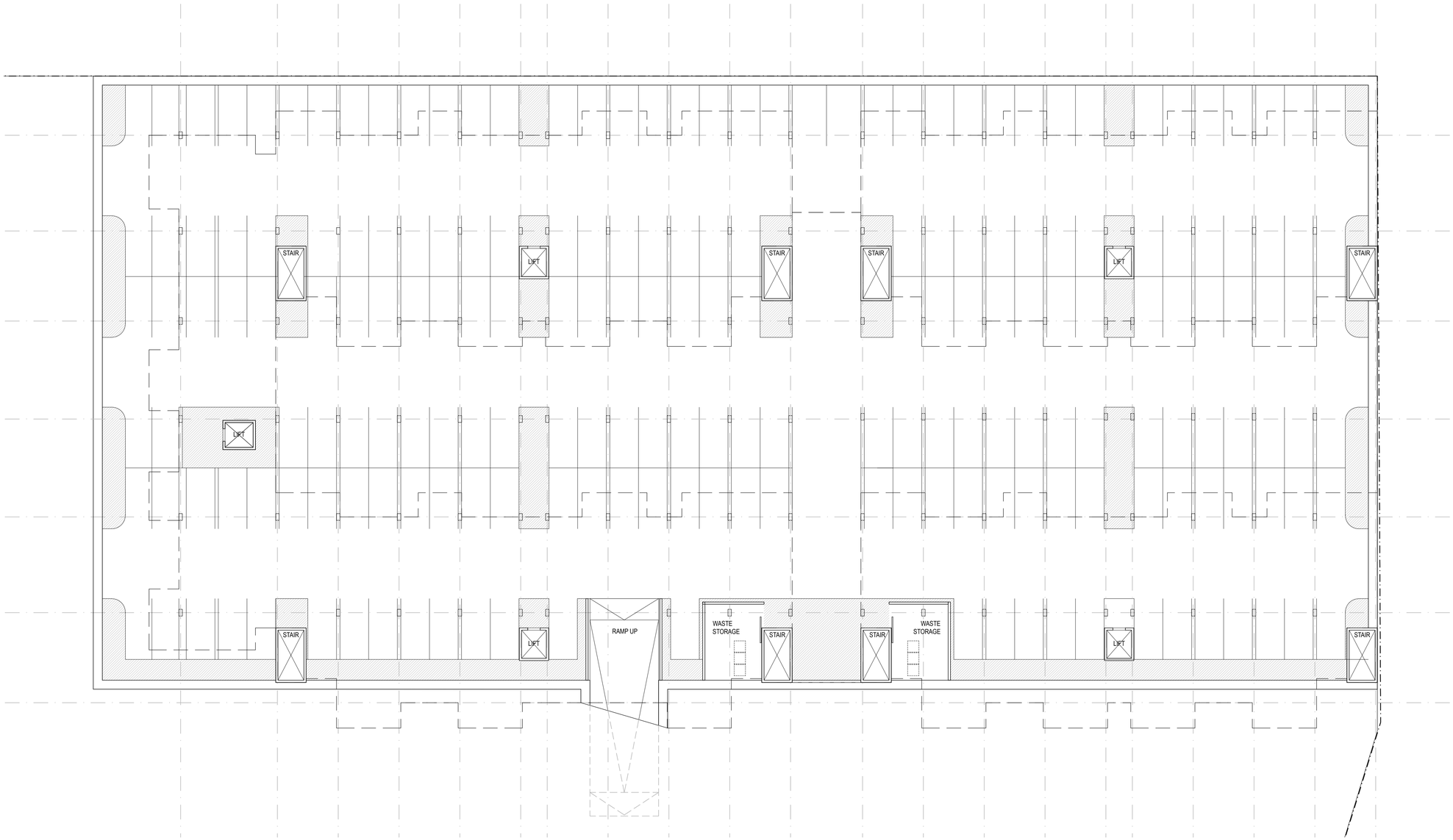
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P1	28.06.18	SITE PACK	BG BE

ALDI NORWOOD

76 MAGILL ROAD, NORWOOD, SA 5067

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Director: Peter Serra AIA - Architect Reg: 15818

PROJECT NO: A1611 | PROPOSED SITE PLAN | DRAWING STATUS / NO: SITE PACK SP03-2



APARTMENT BASEMENT FLOOR PLAN

1:200 @ A1

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NORWOOD

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DRAWING
BASEMENT
APARTMENTS

NORTH

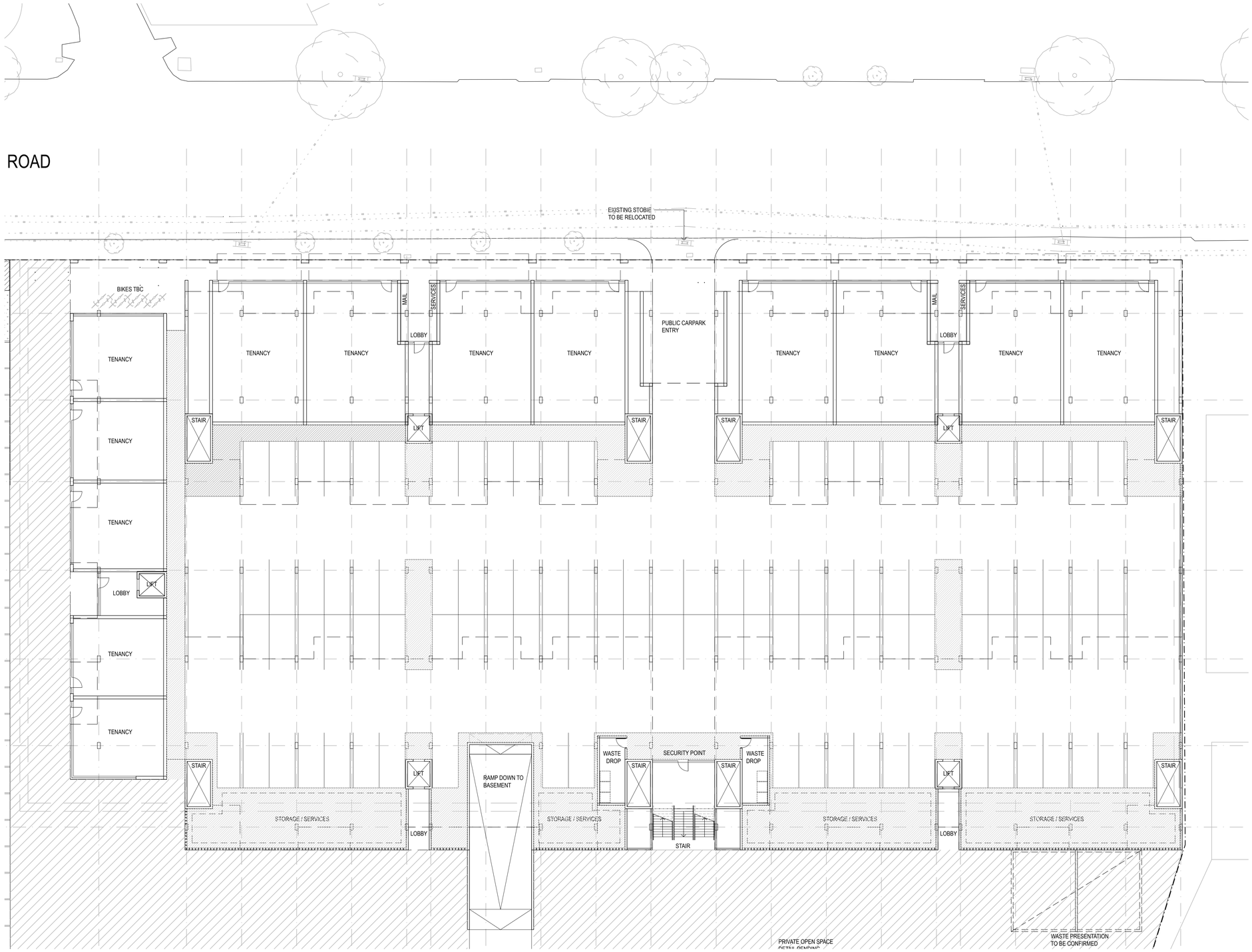
SCALE
AS SHOWN

DATE
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PROJECT NO
28055

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APARMENT GROUND FLOOR PLAN

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PROJECT
76 MAGILL ROAD
NORWOOD

CLIENT
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DRAWING
GROUND FLOOR PLAN
APARTMENTS

NORTH

SCALE
AS SHOWN

DATE
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PROJECT NO
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DWG NO
P13

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APARTMENT LEVEL 1 FLOOR PLAN

1:200 @ A1

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PROJECT
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NORWOOD

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FIRST FLOOR PLAN
APARTMENTS

NORTH

SCALE
AS SHOWN

DATE
JULY 2018

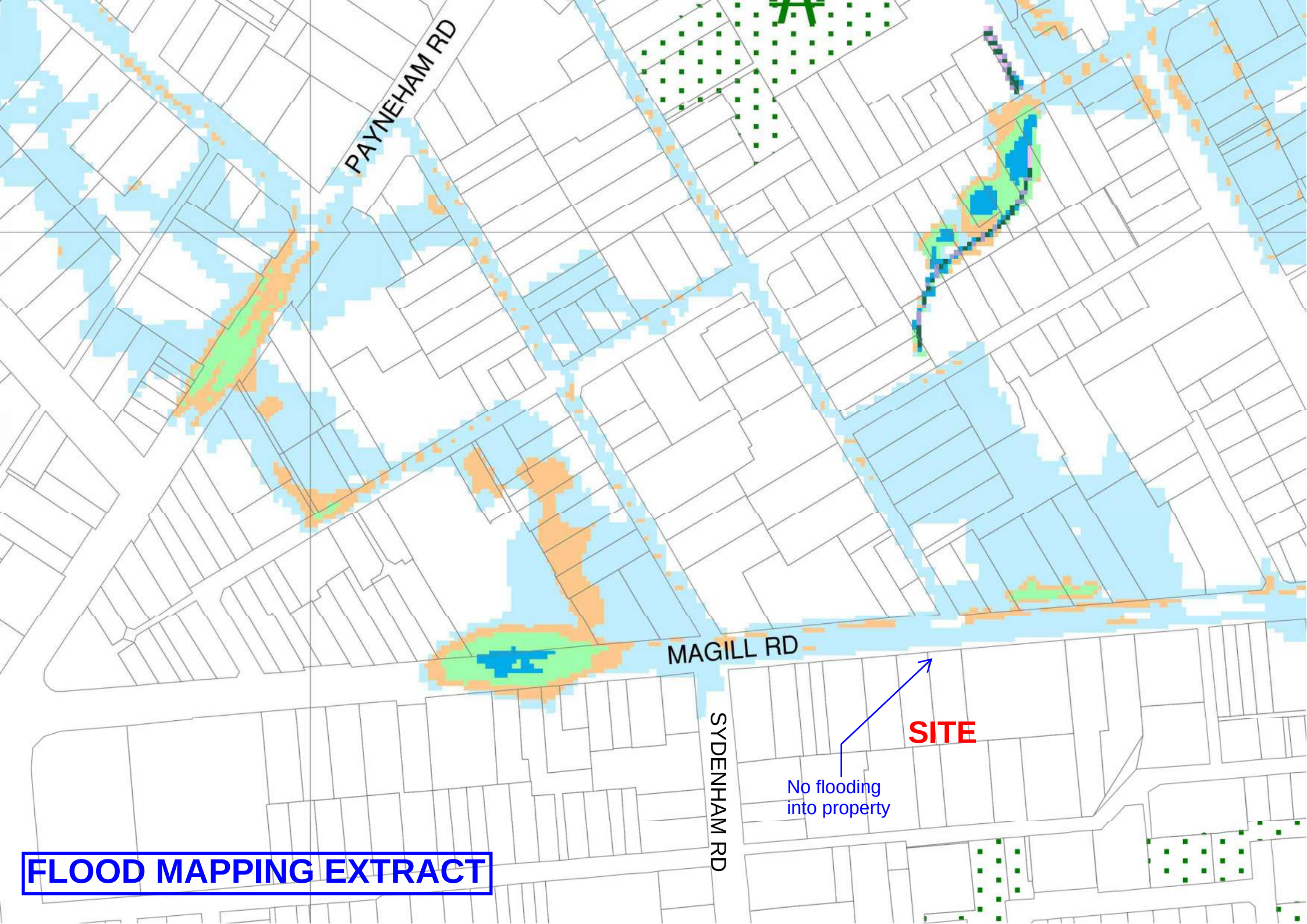
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APPENDIX D

FLOOD MAPPING EXTRACT

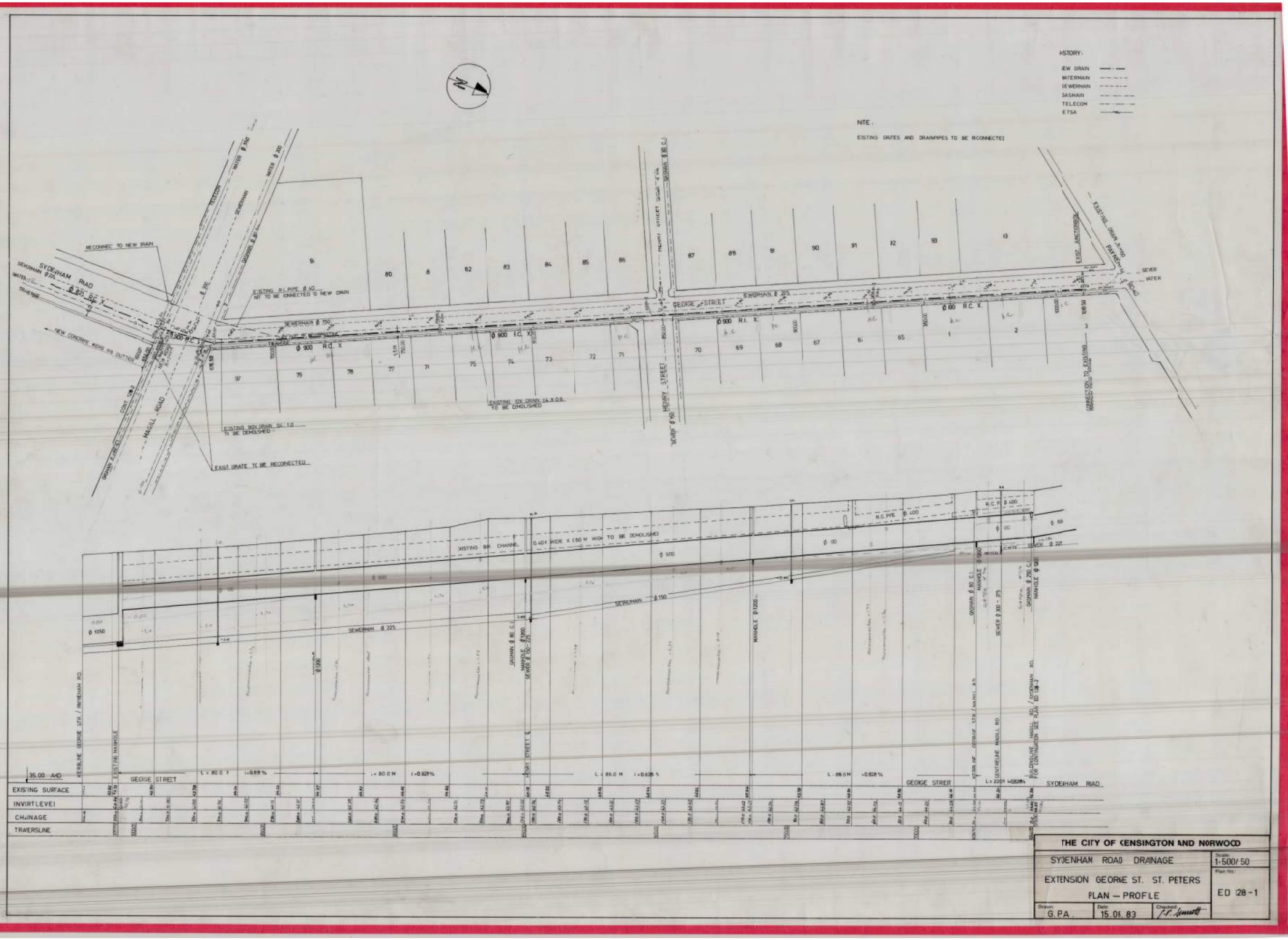


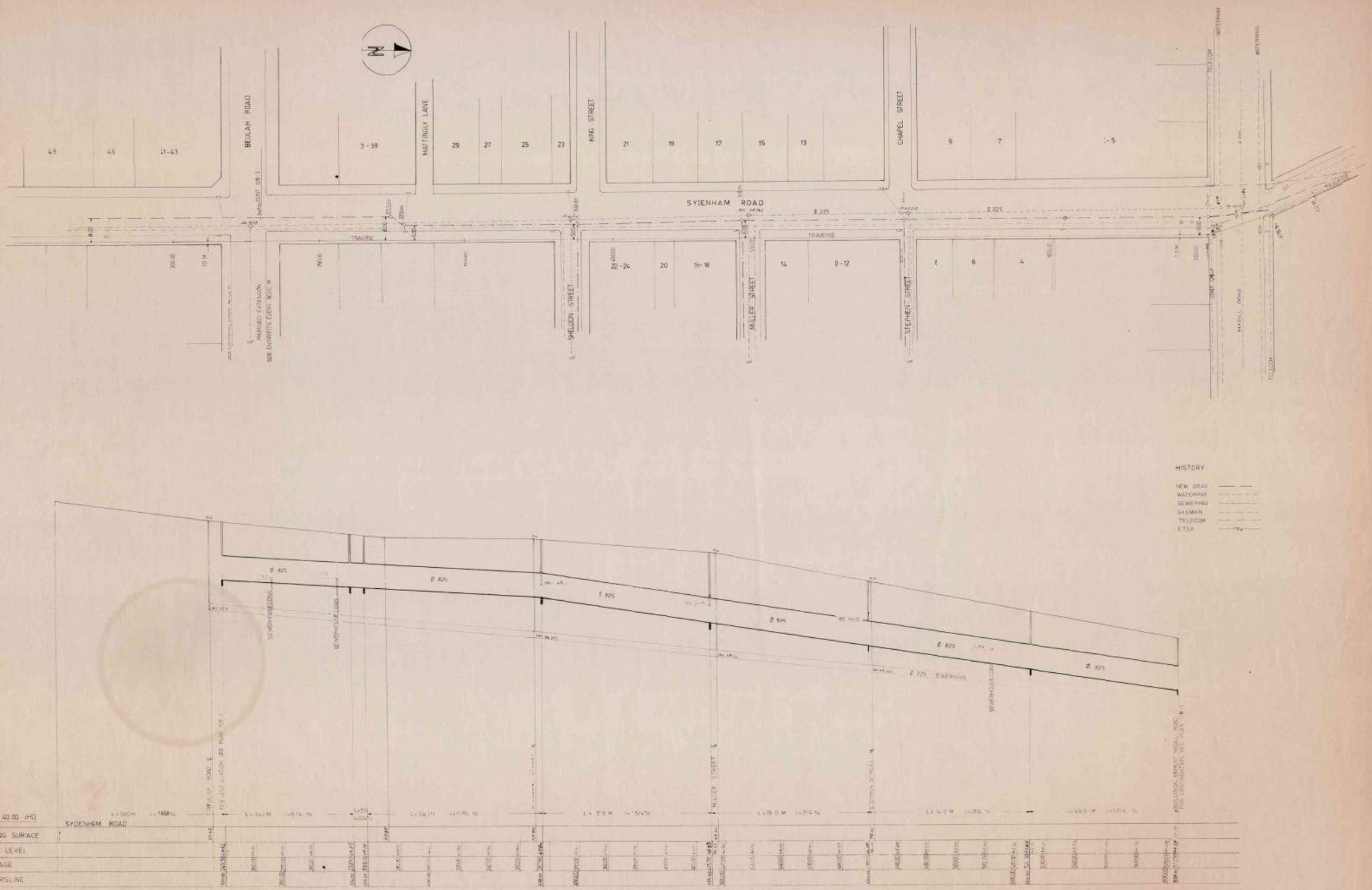
FLOOD MAPPING EXTRACT

APPENDIX E

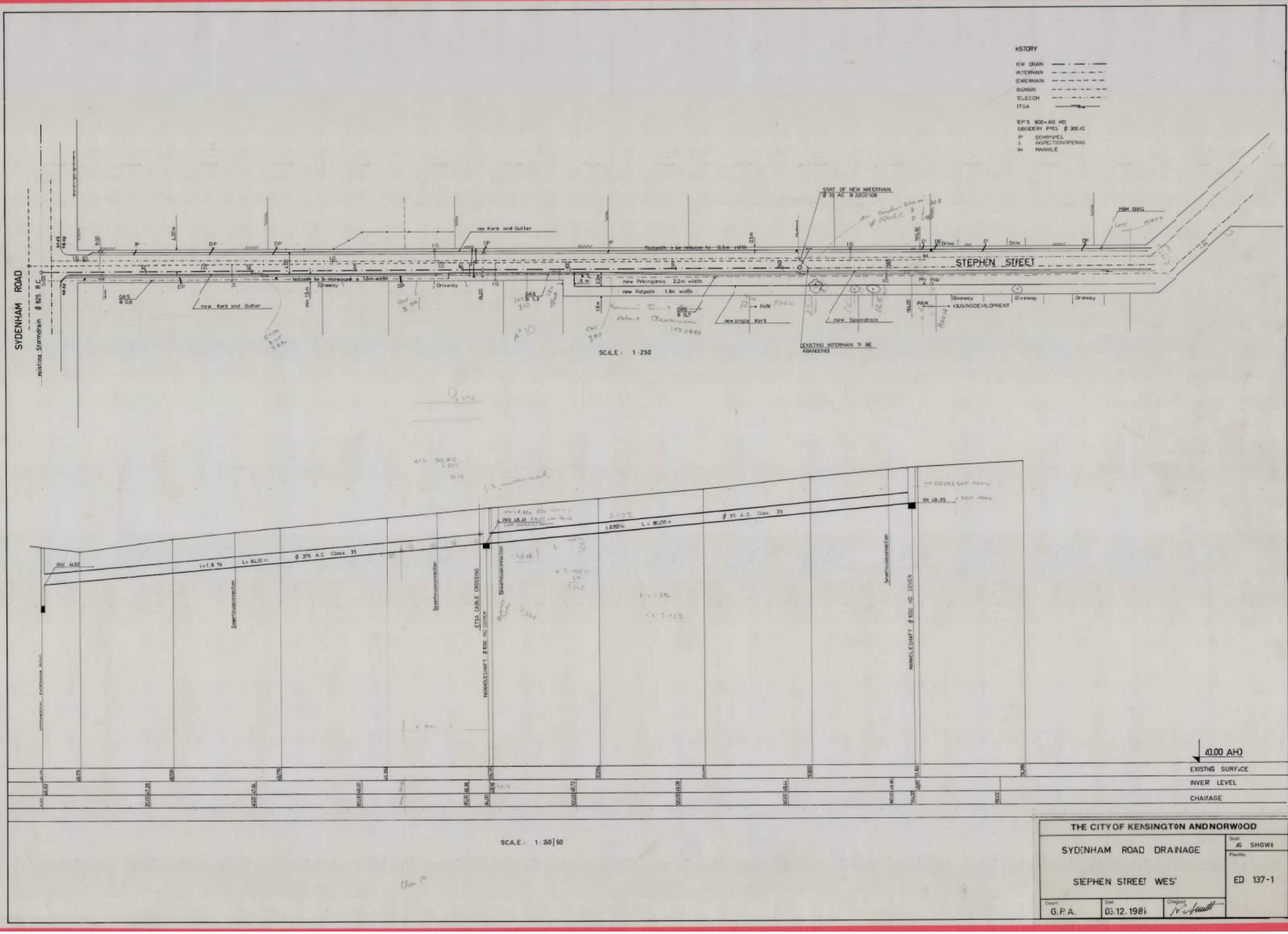
COUNCIL STORMWATER INFRASTRUCTURE PLANS

ED 128


HISTORY:
NOTE:
EXISTING GRATES AND DRAINPIPES TO BE RECONNECTED
RECONNEC TO NEW MAIN
SYDENHAM RAD
HAGGILL ROAD
GEORGE STREET
HENRY STREET
EXISTING R.C. PIPE Ø 450 NOT TO BE CONNECTED TO NEW DRAIN
EXISTING BOX DRAIN 0.6 X 0.6 TO BE DEMOLISHED
EXIST GRATE TO BE RECONNECTED
EXISTING BK CHANNEL 0.404 WIDE X 0.60 M HIGH TO BE DEMOLISHED
EXISTING MANHOLE
GEORGE STREET
SYDENHAM RAD
EXISTING SURFACE
INVIRT LEVEL
CHAINAGE
TRAVERSLINE
THE CITY OF KENSINGTON AND NORWOOD
SYDENHAM ROAD DRAINAGE
EXTENSION GEORGE ST. ST. PETERS
PLAN — PROFILE
Scale: 1-500/50
Plan No: ED 128-1
Drawn: G.P.A.
Date: 15.06.83
Checked:



THE CITY OF KENSINGTON AND NORWOOD		
SYDENHAM ROAD DRAINAGE		1500 / 50
BEULAH ROAD TO MAGILL ROAD		
PLAN — PROFILE		ED 128-2
Drawn G.P.A.	Date 17.06.83	

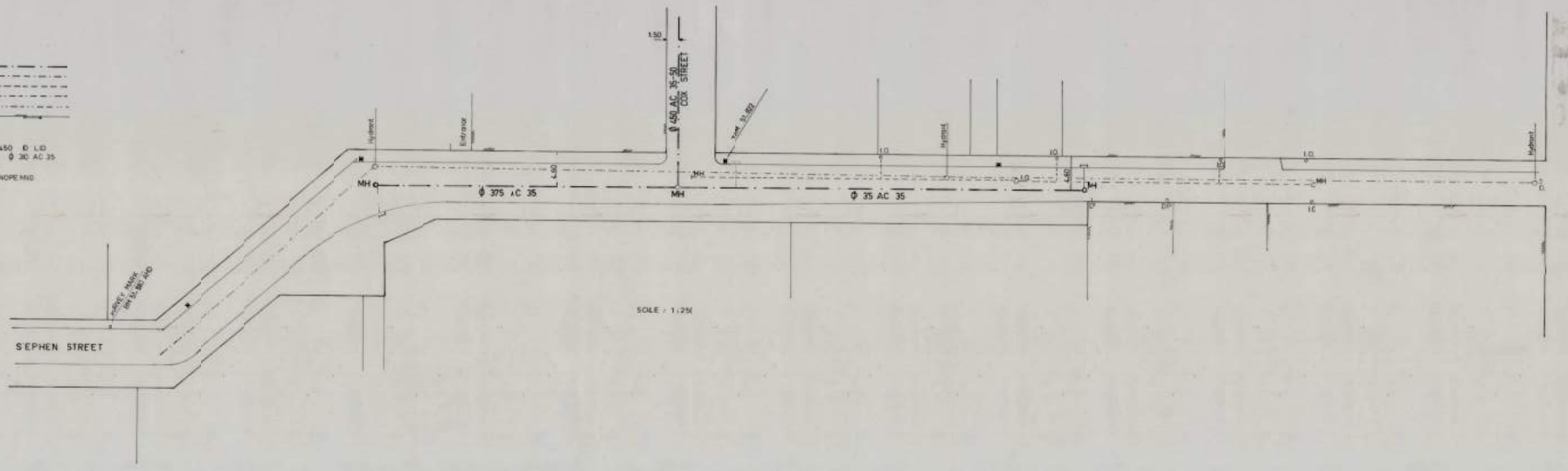

HISTORY
KW DRAIN
WATERMAIN
SEWERMAIN
GASMAIN
TELECOM
ITSA
EP'S 900 x 60 HD
UBSIDERY PIPES Ø 300 RC
DP DOWNPIPES
I.O. INSPECTIONOPENING
MH MANHOLE
SYDENHAM ROAD
existing Stormdrain Ø 825 R.C.
START OF NEW WATERMAIN Ø 90 AC @ 220.0 108
PBM 19851
STEPHEN STREET
new Kerb and Outter
Footpath to be reduced to 0.5m width
new Pelkingpiins 2.2m width
new Flatpath 1.8m width
new Kingle Kerb
new Spoondrain
EXISTING WATERMAIN TI BE ABANDONED
HOUSINGDEVELOPMENT
SCALE : 1:250
INV. 44.92
i=1.8 %
L= 84.00 m
Ø 375 A.C. Class 35
Sewerhouseconnection
ETSA CABLE CROSSING
MANHOLE/SHAFT Ø 900 HD LINER
INV. 48.41
i 2.19 %
INV. 49.85
40.00 AHD
EXISTING SURFACE
INVER LEVEL
CHAINAGE
SCALE : 1:250/50
THE CITY OF KENSINGTON AND NORWOOD
SYDENHAM ROAD DRAINAGE
STEPHEN STREET WEST
Scale AS SHOWN
Plan No. ED 137-1
Drawn G.P.A.
Date 03.12.1985
Checked

ED 137

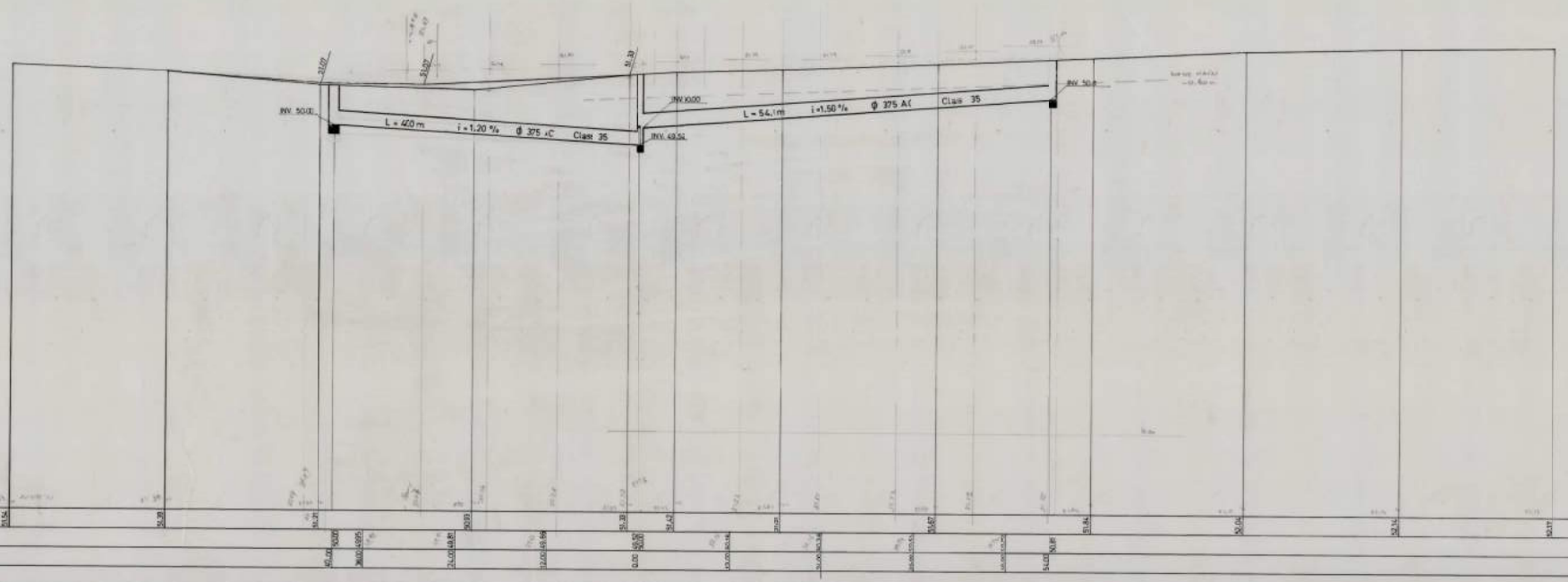
HISTORY

NEW DRAIN
WATERMAIN
SEWERMAIN
GASMAIN
TELECOM
ETSA

SEP'S 900x450 ID LID
SUBSIDIAR' PIPE ϕ 30 AC 35
DP DOWNPIPE
ID INSPECTIONOPENING
MH MANHOLE



SCALE : 1:250



SCALE : 1:150 | 50

THE CITY OF KENSINGTON AND NORWOOD			
SYDENHAM ROAD DRAINAGE STEPHEN STREET EAST			Scale: AS SHOWN Plan No: ED 137-2
Drawn: S.P.A.	Date: 19.2.1985	Checked: J.F. Arnott	

APPENDIX F

CIVIL CONCEPT CALCULATIONS

WGA

WALLBRIDGE GILBERT AZTEC

Job Number WAD170773
Designer WRS
Date JULY 2018
Page Number SWC1-ALDI

ALDI STORE PROPOSAL

MAGILL ROAD, NORWOOD

Stormwater Detention Calcs - concept phase.

- Flooding on Magill Rd of concern to Council, as is capacity of nearby stormwater system. No 100 year ARI ponding breaches the site
- "Post-Development" 100 year ARI events are to be detained on site, such that no more stormwater outflow is discharged than that from a critical "Pre-Development" 5 year ARI event.

PRE-DEVELOPMENT

Site Area = 6201 m²

Currently = 90% roof, 10% conc. pavement

$\Rightarrow C_W = (0.9 \times 1.0)_{\%} + (0.1 \times 0.9)_{\%} = 0.99.$

∴ CRITICAL 5 YEAR OUTFLOW (PRE)

$\Rightarrow I^{5yr}_{10min} = 60.1$ mm/hr

$Q^{5yr}_{10min} = (0.99 \times 60.1 \times 6201)/3600$

$= 102.5$ L/sec

* ie LIMIT POST DEVELOPMENT OUTFLOW TO 102.5 L/SEC

– Based on 10 min time of concentrations, allow 2 x 15 L/sec max., to discharge to Magill Rd. via galvanized box drains

• Post-Development Impermeability Coefficient

$A_{total} = 6201\ m^2$

Roof total	≈ 1950 m²	C = 1.0	⇒ $C_{W\ post} = 0.90$
Landscape	≈ 251 m²	C = 0.1	
Pavement	≈ 4000 m²	C = 0.9	

In terms of 30 L/sec maximum to Magill Rd, based on $C_W = 0.95$ we'd be looking to target 2 x 415 m² of area (ie 415 m² at $C_W = 0.95$ would give 15 L/sec max. outflow in a 100yr, 10 min event).

∴ Say 2 x 415 m² = 830 m² of site area discharged to the front direct

⇒ Remaining Area = 6201 − 830 = 5371 m², from which only 102.5 − 30 = 72.5 L/sec may result

Refer to conceptual Stormwater Detention Calcs on sheet SWC3-ALD1 and onwards

Critical Detention Component V = 90.6 m³, restricted by a 170mm Ø orifice plate on outlet pipe plumbed into Sydenham Road system.

Detention Capacity to be provided throughout site in oversized pipework and in Loading Dock recess itself (which would be the last of the volume visible)

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Basic Stormwater Detention Assessment

Title: ALDI Norwood - part to Sydenham Rd

Job No: WAD170773 **Page: SWC3-ALDI**

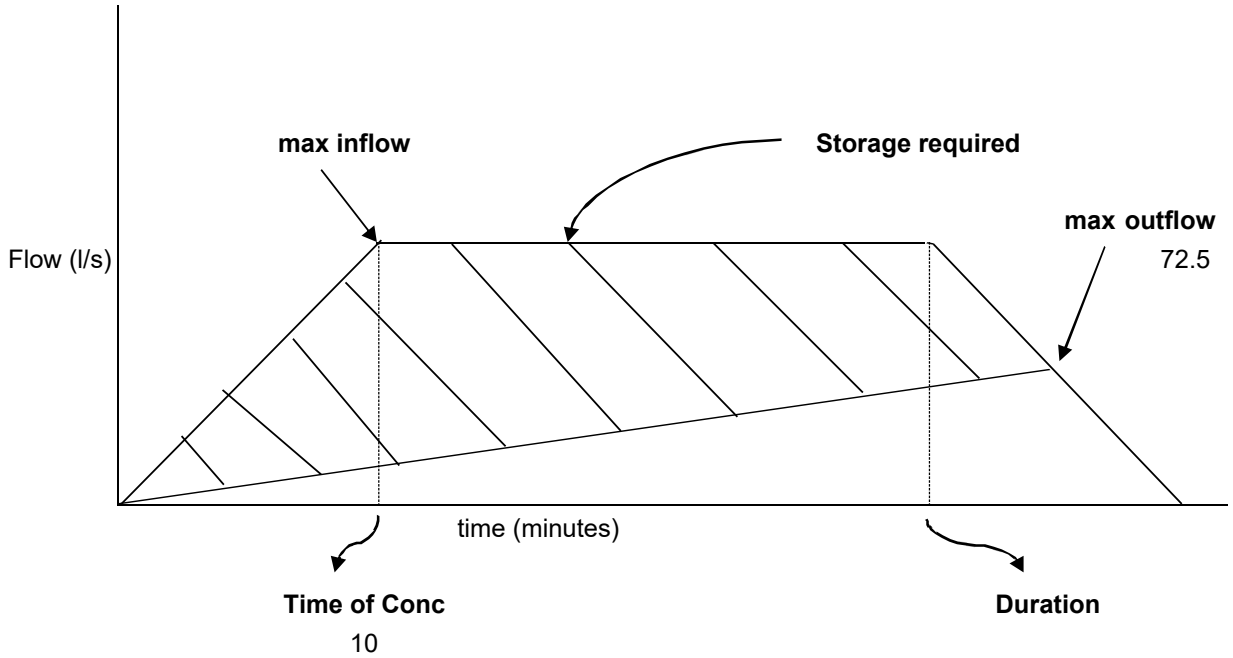
Area remaining 5371 m²
Coeff Permeability 0.9
Location: Norwood
Time of conc. 10 min
ARI Storm 100 Year
Max Outflow Qp 72.5 l/sec

Duration min	Intensity mm/hr	Inflow rate Ip l/sec	Inflow Vol Vi m3	Max Storage Smax m3	
5	186	249.8	74.93	42.30	
5.5	178	239.0	78.87	45.16	
6	172	231.0	83.14	48.34	
6.5	166	222.9	86.93	51.04	
7	161	216.2	90.80	53.82	
7.5	156	209.5	94.26	56.20	
8	151	202.8	97.32	58.17	
8.5	147	197.4	100.67	60.43	
9	143	192.0	103.69	62.36	
9.5	139	186.6	106.39	63.97	
10	136	182.6	109.57	66.07	
11	129	173.2	114.32	68.65	
12	124	166.5	119.88	72.03	
13	119	159.8	124.63	74.61	
14	114	153.1	128.58	76.38	
15	110	147.7	132.93	78.56	
16	106	142.3	136.64	80.09	
17	103	138.3	141.07	82.34	
18	99	132.9	143.57	82.67	
19	96	128.9	146.95	83.88	
20	94	126.2	151.46	86.21	
21	91	122.2	153.96	86.53	
22	88	118.2	155.97	86.37	
23	86	115.5	159.36	87.58	
24	84	112.8	162.42	88.47	
25	82	110.1	165.16	89.03	
26	80	107.4	167.58	89.28	
27	78	104.7	169.67	89.19	
28	76	102.0	171.44	88.79	
29	75	100.7	175.23	90.40	
30	73	98.0	176.44	89.44	
32	70	94.0	180.47	89.12	
34	68	91.3	186.27	90.57	CRITICAL
36	65	87.3	188.52	88.47	

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	38	63	84.6	192.87	88.47
	40	61	81.9	196.58	87.83
	45	57	76.5	206.65	87.02
	50	53	71.2	213.50	83.00
(hours)	55	49.5	66.5	219.34	77.96
1	60	46.6	62.6	225.26	73.01
1.25	75	40.2	54.0	242.90	58.03
1.5	90	35.5	47.7	257.41	39.91
1.75	105	31.9	42.8	269.85	19.73
2	120	29.1	39.1	281.33	-1.42
2.25	135	26.8	36.0	291.48	-23.89
2.5	150	24.9	33.4	300.91	-47.09
2.75	165	23.3	31.3	309.73	-70.89
3	180	21.9	29.4	317.59	-95.66



Orifice Flow Calculation

Hydrostatic Head	1.5	m (difference upstream/ downstream)
Required Flow	0.0725	m3/sec
Cd	0.65	
Hole width	0.02	m (if Rectangular)
Hole Ht	1.028	m (if rectangular)
Hole Dia	0.162	m - ORIFICE RESTRICTION

Print Date : 31/07/2018

WGA

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Job Number ADL189138
Designer WRS
Date JULY 2018
Page Number SWC1

CONCEPTUAL STORMWATER DETENTION CALCS FOR 76 MAGILL ROAD, NORWOOD.

Following meeting with Scott Dearman and Mark Thomson at City of Norwood Payneham St Peters, we understand strict, strong detention measures are required to limit the site output – due largely to significant flooding issues further west along Magill Rd (sag past Sydenham Rd particularly)

"First to Fifth Creeks 1 in 100 year Flood Inundation Maps" indicate no flooding currently threatens or enters the project site property

- Post-Development 100 year ARI events are to be detained all the way back to that outflow occurring in a Pre-Development 5 year ARI event

PRE-DEVELOPMENT

Site Area total, incl. future separate units is 12840 m²

Site currently in mostly roofed (commercial or industrial) with concrete pavements making up the balance.

$C_{W\,pre} = 0.985$ $\quad I^{5yr}_{10min} = 60.1$ mm/hr

CRITICAL 5 YEAR OUTFLOW $\quad Q^{5yr}_{pre\ 10min} = (0.985 \times 60.1 \times 12840) / 3600$

$= 211.1$ L/sec

CONT

∴ LIMIT POST-DEVELOPMENT OUTFLOW TO 211.1 L/sec
— IF IT CAN BE SPREAD ACCORDINGLY.

POST-DEVELOPMENT

Overall Post-Development site areas (including separate units) is expected to be

- 9500 m² roof C = 1.0
- 800 m² garden C = 0.1
- 2540 m² pavement C = 0.9

$C_W = 0.924$ accordingly

Refer to SWC4

→ If all contained V = 183.7 m² required.

However, much of this will require pumping from tanks below Basement level, so take westernmost and easternmost units out to Stephen St. system directly. Central section of 4 units over 405m² to be connected and detained via surface area's system

Others — westernmost (20 residences) — 1945m² and easternmost (9 residences + roadway) — 1080m² to go out ~~&~~ Separated to main building May, be difficult to detain effectively

∴ A = 3025m², C_W = 0.9, I = 136.3 mm/h (100yr, 10 min)

$Q_{10}^{100} = (0.9 \times 136.3 \times 3025)/3600 = 103$ L/sec

going out directly.

∴ 211.1 allowable less 103
= 108.1 L/sec maximum to be discharged from other area (ie — the balance)

Remaining Area = 12840 − 3025 = 9815 m²

Remaining Surfaces −

6800 Roof	C = 1.0	(2700 in units)
475 Garden	C = 0.10	(325 in units)
2540 Pavement	C = 0.9	(Uncharged)

⇒ $C_W = 0.930$

Refer to Sheet SWC5 for resultant detention capacity required for the remaining area — using this proposed outflow method.

∴ DETENTION CAPACITY REQUIRED = 211.85 m³
OUTFLOW MAXIMUM = 108.1 L/SEC.

PROVIDE MOSTLY WITHIN SUB-BASEMENT TANKS WITH PUMP (MULTIPLE) OUTFLOWS TO BOX DRAIN OUTLETS TO MAGILL ROAD. SPREAD OVER 6 OUTLETS

BASEMENT GRADED ACCORDINGLY TO ALLOW SOME TEMPORARY STORAGE MAY PROVIDE AN OPPORTUNITY WHEN DESIGN PLANS ARE MORE ADVANCED.

⇒ REFER TO CONCEPT CIVIL PLAN

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Basic Stormwater Detention Assessment

Title: 76 Magill Road Apartments - overall

Job No: ADL189138 **Page: SWC4**

Area	12840	m²
Coeff Permeability	0.924	
Time of conc.	10	min
ARI Storm	100 Year	
Max Outflow Qp	211.1	l/sec

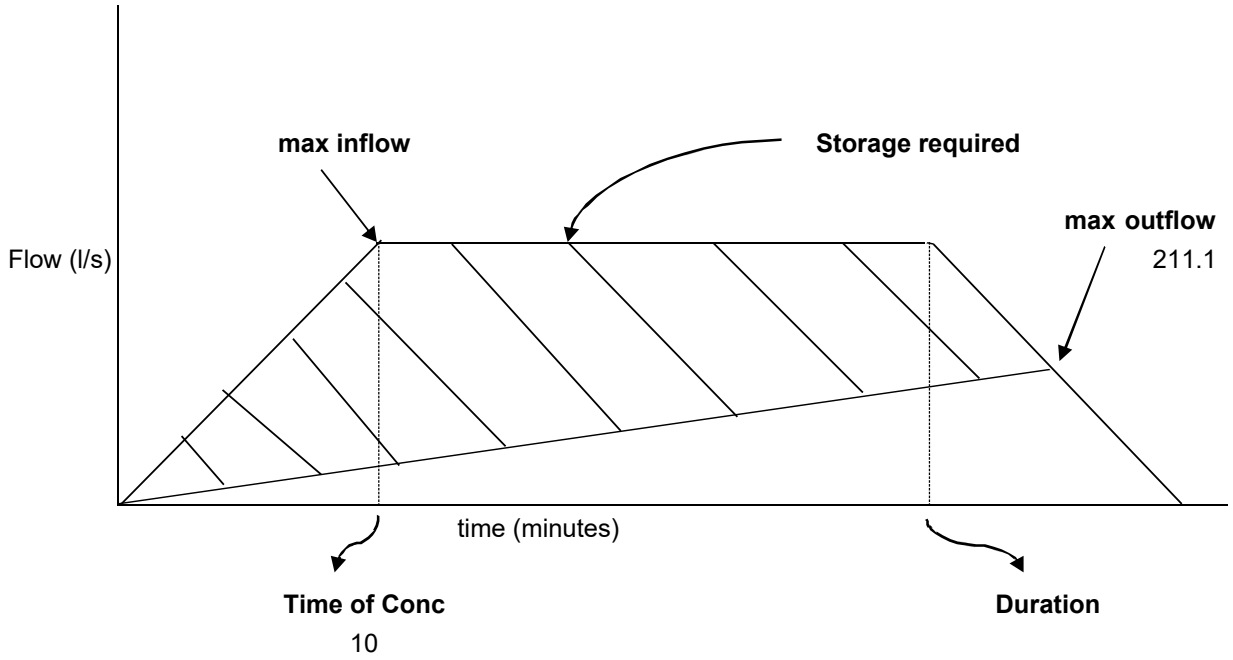
Location: Norwood

Duration min	Intensity mm/hr	Inflow rate Ip l/sec	Inflow Vol Vi m3	Max Storage Smax m3	
5	186	613.0	183.89	88.90	
5.5	178	586.6	193.58	95.42	
6	172	566.8	204.06	102.74	
6.5	166	547.1	213.36	108.86	
7	161	530.6	222.85	115.19	
7.5	156	514.1	231.35	120.52	
8	151	497.6	238.87	124.87	
8.5	147	484.5	247.07	129.91	
9	143	471.3	254.49	134.16	
9.5	139	458.1	261.11	137.62	
10	136	448.2	268.92	142.26	
11	129	425.1	280.59	147.59	
12	124	408.7	294.23	154.91	
13	119	392.2	305.90	160.24	
14	114	375.7	315.59	163.59	
15	110	362.5	326.26	167.94	
16	106	349.3	335.36	170.70	
17	103	339.4	346.24	175.24	
18	99	326.3	352.37	175.04	
19	96	316.4	360.67	177.01	
20	94	309.8	371.74	181.75	
21	91	299.9	377.87	181.55	
22	88	290.0	382.82	180.16	
23	86	283.4	391.12	182.13	
24	84	276.8	398.64	183.31	
25	82	270.2	405.36	183.70	CRITICAL
26	80	263.6	411.29	183.30	
27	78	257.1	416.43	182.11	
28	76	250.5	420.78	180.13	
29	75	247.2	430.08	183.09	
30	73	240.6	433.04	179.72	
32	70	230.7	442.93	176.94	
34	68	224.1	457.17	178.51	
36	65	214.2	462.70	171.38	

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	38	63	207.6	473.38	169.40
	40	61	201.0	482.48	165.83
	45	57	187.8	507.19	158.88
	50	53	174.7	524.00	144.02
(hours)	55	49.5	163.1	538.34	126.69
1	60	46.6	153.6	552.87	109.56
1.25	75	40.2	132.5	596.17	57.87
1.5	90	35.5	117.0	631.77	-1.53
1.75	105	31.9	105.1	662.32	-65.98
2	120	29.1	95.9	690.49	-132.80
2.25	135	26.8	88.3	715.41	-202.88
2.5	150	24.9	82.1	738.54	-274.74
2.75	165	23.3	76.8	760.20	-348.08
3	180	21.9	72.2	779.48	-423.79



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Basic Stormwater Detention Assessment

Title: 76 Magill Road Apartments - less units

Job No: ADL189138 **Page: SWC5**

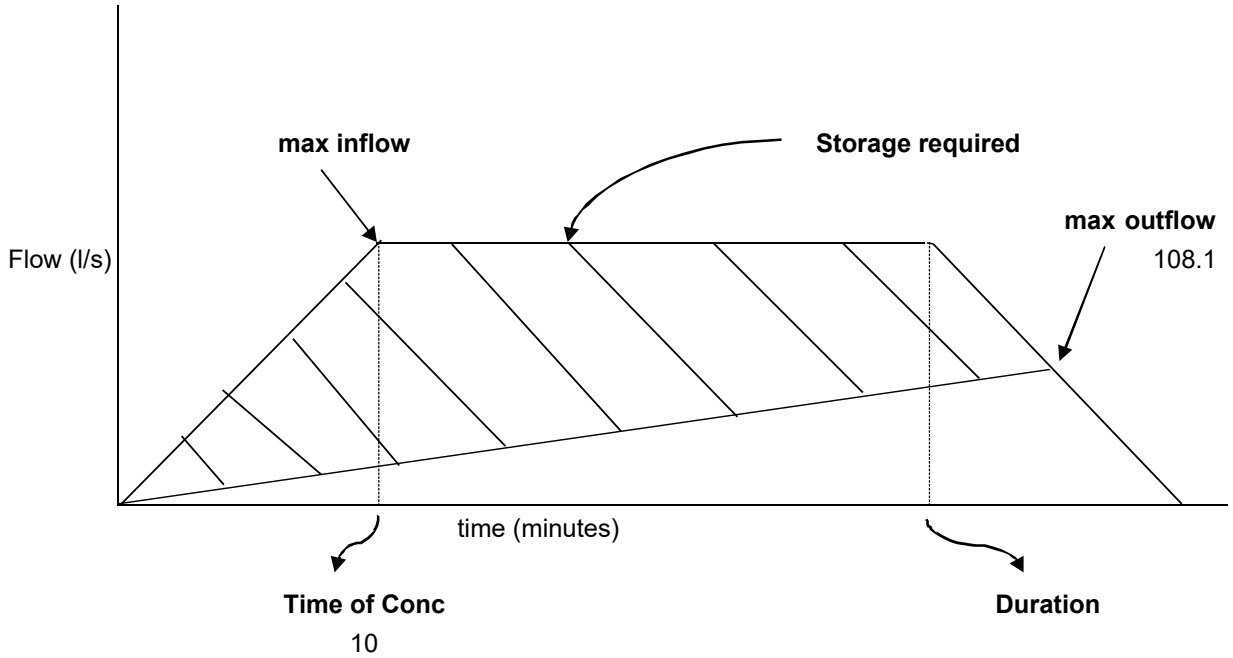
Area remaining 9815 m²
Coeff Permeability 0.93
Location: Norwood
Time of conc. 10 min
ARI Storm 100 Year
Max Outflow Qp 108.1 l/sec

Duration min	Intensity mm/hr	Inflow rate Ip l/sec	Inflow Vol Vi m3	Max Storage Smax m3
5	186	471.6	141.48	92.84
5.5	178	451.3	148.94	98.67
6	172	436.1	157.00	105.11
6.5	166	420.9	164.15	110.64
7	161	408.2	171.45	116.32
7.5	156	395.5	178.00	121.24
8	151	382.9	183.78	125.40
8.5	147	372.7	190.09	130.09
9	143	362.6	195.79	134.18
9.5	139	352.4	200.89	137.65
10	136	344.8	206.90	142.04
11	129	327.1	215.88	147.77
12	124	314.4	226.37	155.03
13	119	301.7	235.35	160.76
14	114	289.1	242.80	164.97
15	110	278.9	251.02	169.94
16	106	268.8	258.02	173.70
17	103	261.2	266.38	178.82
18	99	251.0	271.10	180.30
19	96	243.4	277.49	183.44
20	94	238.3	286.01	188.72
21	91	230.7	290.73	190.19
22	88	223.1	294.53	190.75
23	86	218.1	300.92	193.90
24	84	213.0	306.70	196.44
25	82	207.9	311.87	198.37
26	80	202.8	316.44	199.69
27	78	197.8	320.39	200.40
28	76	192.7	323.74	200.50
29	75	190.2	330.89	204.41
30	73	185.1	333.17	203.45
32	70	177.5	340.78	204.57
34	68	172.4	351.73	209.04
36	65	164.8	355.99	206.81

Print Date : 24/07/2018

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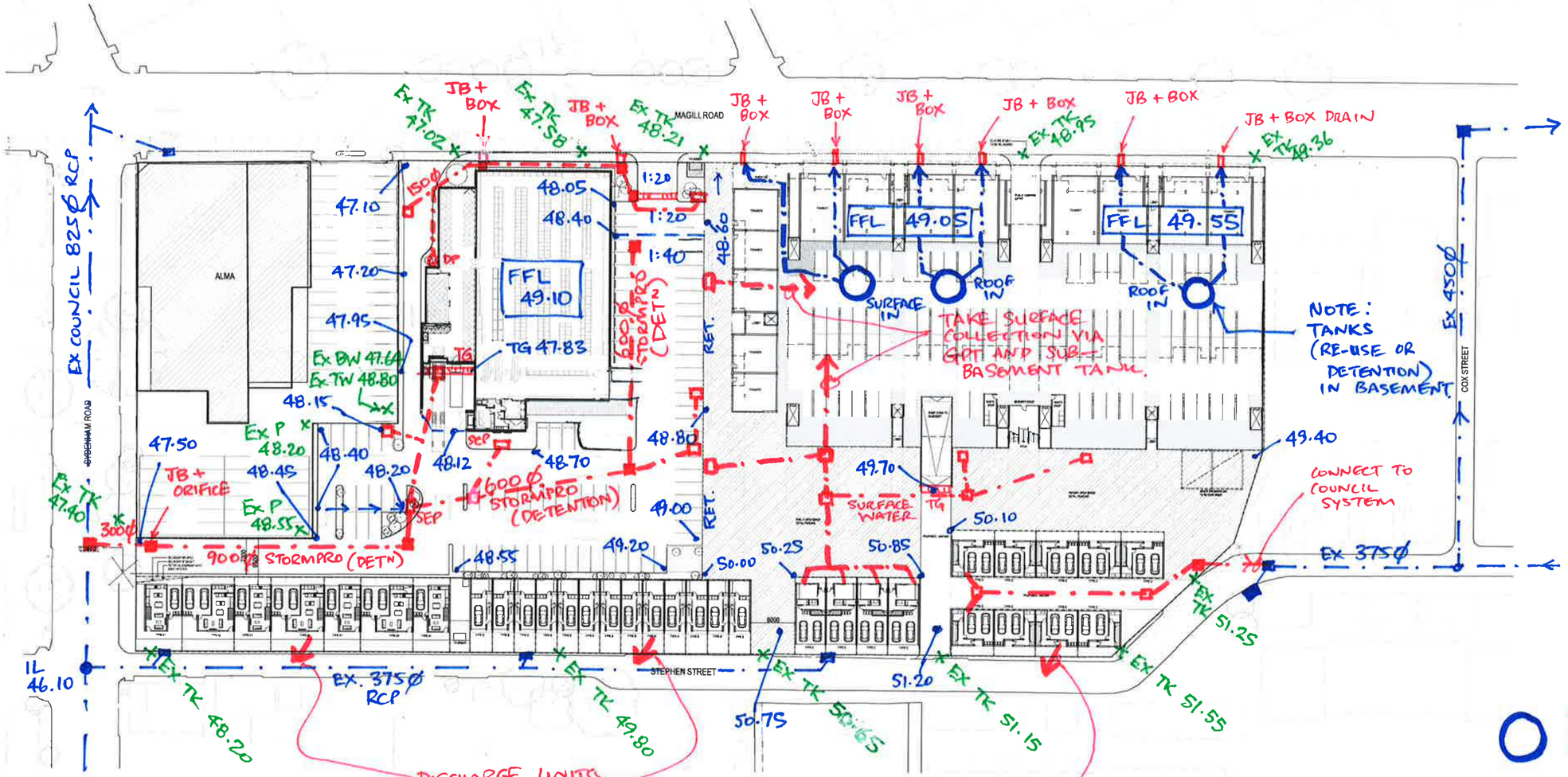
	38	63	159.7	364.21	208.54	
	40	61	154.7	371.20	209.05	
	45	57	144.5	390.22	211.85	CRITICAL
	50	53	134.4	403.15	208.57	
(hours)	55	49.5	125.5	414.18	203.39	
1	60	46.6	118.2	425.36	198.35	
1.25	75	40.2	101.9	458.68	183.02	
1.5	90	35.5	90.0	486.06	161.76	
1.75	105	31.9	80.9	509.57	136.62	
2	120	29.1	73.8	531.25	109.66	
2.25	135	26.8	68.0	550.42	80.18	
2.5	150	24.9	63.1	568.21	49.33	
2.75	165	23.3	59.1	584.87	17.35	
3	180	21.9	55.5	599.71	-16.46	



APPENDIX G

SITE CIVIL CONCEPT

CIVIL CONCEPT



GROUND FLOOR PLAN
1500 @ A1

PRELIMINARY
13/07/18

HASSELL select architects tectvs

REV	DATE	DESCRIPTION

FOR APPROVAL ONLY
NOT FOR CONSTRUCTION

PROJECT: 76 MAGILL ROAD NORWOOD
CLIENT: ALDI | CA CA
DRAWING: GROUND FLOOR PLAN
SCALE: AS SHOWN
DATE: JULY 2018
PROJECT NO: 28055
DWG NO: P01
REVISION: 0.3
CHECKED: FB
DRAWN: mcf

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LUCID CONSULTING AUSTRALIA

FORMER CAROMA SITE REDEVELOPMENT

76 MAGILL ROAD, NORWOOD

SITE SERVICES INFRASTRUCTURE REPORT

Date: 30 July 2018

Document Number: LCE12541-002B

DOCUMENTATION ISSUE REGISTER

REVISION	DESCRIPTION	DATE ISSUED	ENGINEER	REVIEWED
-	Site Services Infrastructure Report	19 July 2018	PC	-
A	Site Services Infrastructure Report	27 July 2018	PC	-
B	Site Services Infrastructure Report	30 July 2018	PC	-

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2. ELECTRICAL INFRASTRUCTURE 3
2.1 EXISTING SA POWER NETWORK SERVICES 3
2.2 PROPOSED MODIFICATIONS TO SA POWER NETWORKS INFRASTRUCTURE 7
3. COMMUNICATIONS INFRASTRUCTURE 10
3.1 COMMUNICATION SERVICES 10
4. SEWER INFRASTRUCTURE 11
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5. DOMESTIC COLD WATER INFRASTRUCTURE 12
5.1 EXISTING DOMESTIC COLD WATER INFRASTRUCTURE 12
6. NATURAL GAS INFRASTRUCTURE 13
7. FIRE SERVICES INFRASTRUCTURE 14
APPENDIX A 15

1. INTRODUCTION

The purpose of this report is to provide preliminary information in relation to the Services Utilities infrastructure located adjacent the subject development site, and to confirm that sufficient investigations have been carried out with the Services Utilities to verify that sufficient capacity is available or can be made available to service the proposed redevelopment of the former 'Caroma' site at 76 Magill Road, Norwood.

The proposed redevelopment of the former 'Caroma' site at 76 Magill Road Norwood is a joint venture between CACA Nominees Pty Ltd and ALDI Stores. The overall site redevelopment will comprise an ALDI Store, a Mixed-Use Residential/Commercial development, both fronting Magill Road and a mix of Torrens and Community Title townhouses at the rear of the site off Stephen Street. The ALDI Store and Residential/Commercial Mixed-Use sites will be configured as individual Torrens Title allotments, with both sites to be provided with access off Magill Road and Stephen Street at the rear.

The overall site redevelopment will be undertaken in stages as follows;

Stage 1 – Proposed ALDI Store and the rear Torrens Title Townhouses

Stage 2 – Western half of the Mixed-Use Residential/Commercial development plus 4 x Torrens Title Townhouses.

Stage 3 – Eastern half of the Mixed-Use Residential/Commercial development plus Community Title Townhouse development on eastern side of Stephen Street.

This report assesses the following key issues;

- Capacity of existing Services Utilities infrastructure to cater for the overall site redevelopment.
- Modifications/upgrade required to existing Services Utilities infrastructure to cater for the site redevelopment and to establish suitably sized services connections to the site.
- Assess the opportunities to share infrastructure between the adjacent developments

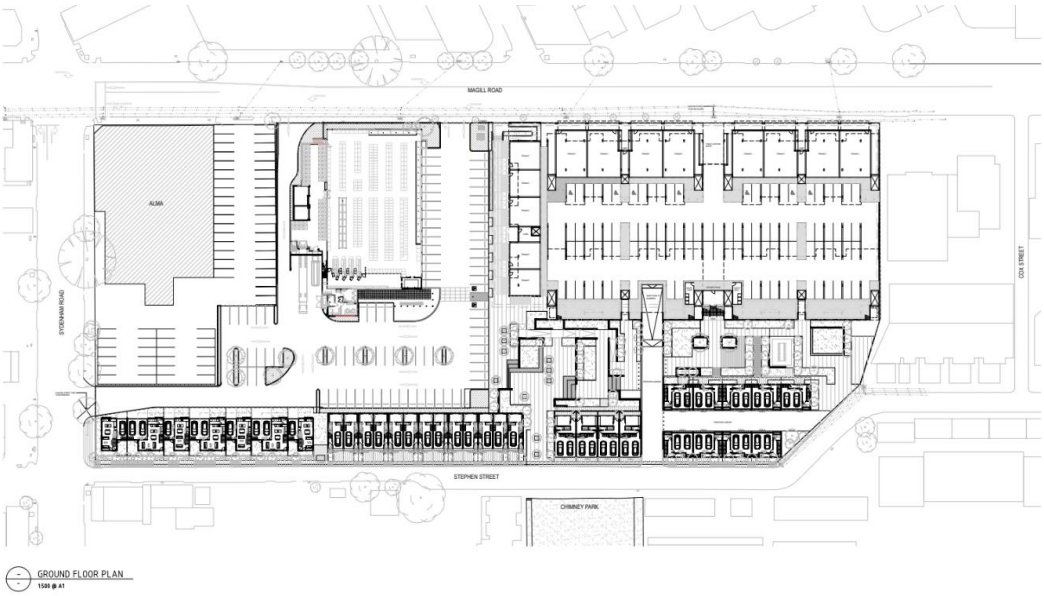


Fig 1 – 'Caroma' Site Redevelopment Proposed Site Plan

(image courtesy of TECTVS Architectss)

2. ELECTRICAL INFRASTRUCTURE

2.1 EXISTING SA POWER NETWORK SERVICES

2.1.1 EXISTING SITE POWER SUPPLY

The 'Caroma' site comprises 3 x existing SAPN Transformers of which 2 are positioned within close proximity to each other off Magill Road, and the third located within an on-site transformer room located off Stephen Street. Refer **Appendix A** for Option 1 - *Electrical Services Infrastructure Site Plan* for the entire 'Caroma' site redevelopment indicating the location of all existing transformers which are to be made redundant and location of proposed new transformers

SAPN have confirmed that the Magill Road transformers are both 1Mva capacity transformers *(SAPN Identification No. TX 35905 and TX18925)* and are dedicated to the site, with the exception of transformer ID No TX18925 which provides a high voltage connection facility, with an outgoing high voltage feed providing a service connection to a transformer *(Identification TX No 24913)* located on a retail site on the northern side of Magill Road directly opposite the proposed ALDI development.



Fig 2 – Google Streetview image of the Magill Road transformers. The 2nd transformer is setback into the building behind the chainmesh gates to right of image.

Both above referenced transformers positioned off Magill Road, derive a dedicated high voltage feed (dedicated feed per each transformer) off a stobie pole (*reference stobie pole No 5 – refer Section 2.1.2 below)* positioned to the west of the transformers and directly in front of the ALDI development site.

The above-mentioned transformers will be made redundant as part of the overall site redevelopment works. SAPN works will include reconfiguring of the existing high voltage infrastructure to maintain supply to the existing transformer TX24913 located on the northern

side of Magill Road. Refer *Section* 2.2.2 for details of the proposed new site power supply arrangement including associated high voltage modifications.

As mentioned above, the existing 'Caroma' site comprises a third transformer which is located within an on-site transformer room at the rear of the site, off Stephen Street. Refer **Fig 3 -*Google Streetview*** below for image of the Transformer Room external façade.

SAPN have confirmed that this transformer *(identification No TX 116)* is a 2Mva transformer which derives a high voltage feed from overhead lines in Sydenham Road, and also includes an out-going low voltage feed to serve customers along Sydneham Road.



Fig 3 – Google Streetview image of the Stephen Street Transformer Room

This transformer will require abolishment as part of the overall site redevelopment. SAPN have confirmed that the existing outgoing service to customers on Sydneham Road will need to be maintained and therefore a suitably sized replacement transformer will need to be established within close proximity to the redundant transformer to provide the new feed to the existing service connection.

In collaboration with SAPN and CACA Nominees Pty Ltd, a suitable location for a new 500Kva transformer has been agreed on the proposed 'Green Space' in between 2 groups of the Torrens Title townhouses, just west of the existing transformer. The new transformer will derive its high voltage feed via a cut-in and re-diversion of the existing high voltage feed serving the redundant transformer.

The new transformer off Stephen Street will also provide a new connection to the existing low voltage service to customers on Sydenham Road. The new transformer will also provide a low voltage service to the proposed new residential townhouses proposed to be constructed along Stephen Street by CACA Nominees Pty Ltd.

2.1.2 EXISTING OVERHEAD LINES EXISTING BUILDING SUPPLY – MAGILL ROAD

Overhead high voltage(11Kv) and low voltage cables run directly adjacent the entire length of the former 'Caroma' site. As mentioned above, Stobie No 5 (refer **Fig 4**) is positioned directly in front of the proposed ALDI development and comprises 2 x high voltage over/under connections which provide a feed to the transformers currently serving the 'Caroma' site that will become redundant.

With reference to **Figure 4** – survey photo of Stobie Pole No 5, the bare cables associated with the existing high voltage connections present a potential high voltage cable proximity issue to the ALDI building, however given that the redundant transformers are being removed, this risk need not be further considered.

With reference to **Figure 4**, the set-out of the proposed ALDI building on the site will still need to maintain the minimum set-back and clearance from the high voltage terminals (surveyed at 1090mm from site front boundary) and nearest high voltage line (Surveyed at 2.49m from site front boundary) The reference standard published by the Office of the Technical Regulator and titled "*Building Safely Near Power lines*" stipulates a minimum setback dimension from bare 11Kv cables or equipment of 3.1m.

Taking the HV terminal at the top of the stobie pole as worst case, the proposed ALDI building will be set back a minimum of 2010mm from the front boundary to achieve the minimum set back dimension of 3.1m. As mentioned above, the bare conductive loops in the photo can be ignored as they will be removed.

The main overhead cables fixed to Stobie Pole 5 are installed on an alley arm which extends the high voltage cables away from the boundary with closest conductor aligned 2.49m from the boundary. With the proposed Aldi building set-back, the resultant clearance from the nearest conductor is in excess of the minimum stipulated horizontal clearance from 11kv high voltage cables of 3.1m. Also refer to *Section 2.2 - Proposed SA Power Networks Supply*.

In total there are 4 stobie poles postioned in front of the Caroma site. The remaining 3 stobie poles are postioned in front of the Mixed Use Residential/Commercial site. Whilst Stobie Poles 3 and 4 are also provided with alley arms the easternmost Stobie Pole (reference Stobie Pole No 2 – **Fig 5**) is not fitted with an alley arm hence presents the worse case for proximity of high voltage cables to buildings. Accordingly the set back of the apartment building has been determined based on the nearest high voltage cable/equipment of 760mm from the boundary to achieve the required minimum of 3.1m clearance.

Addtionally, Stobie pole No 3 has been indentified as clashing with a vehicular exit from the proposed ground floor carpark of the Mixed-Use Residential/Commercial building. Discussions have been undertaken with SAPN in relation to relocating this stobie pole west to clear the driveway.

In addtion to the requirement for buildng minimum clearance proximity requirementts near power lines, the Office of the Techanical Regulator also monitors and regulates working safely near power lines. Accordingly, the constructability issues will need to be considered. Where applicable, delivery and erection of large precaast panels in the vicinity of overhead lines is particulalry problematic . In the case of the Caroma site redevelopment site, rear site access off Stephen Street is available for both the Aldi and the Mixed Use developent sites hence expect that constructability issues relating to overhead power lines can be mitigated.

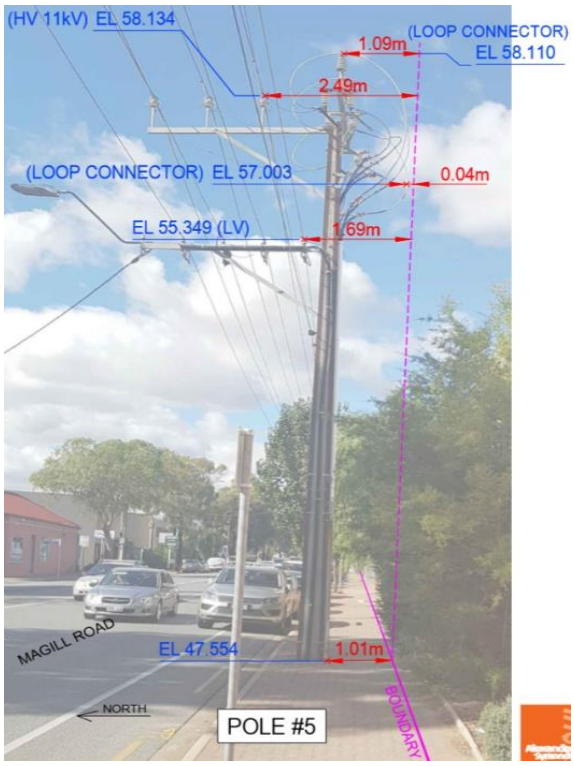


Figure 4 – Reference Stobie Pole No 5
(image courtesy of Alexander Symonds Surveyors)

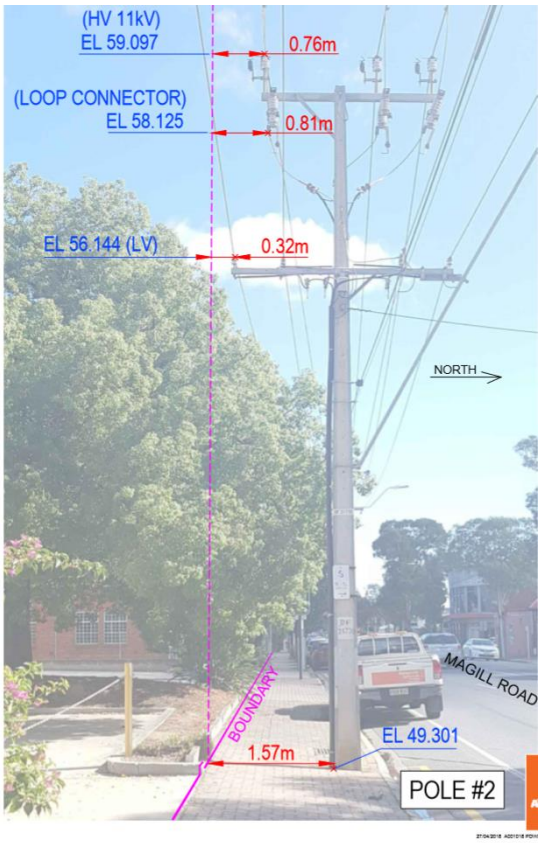


Figure 4 – Reference Stobie Pole No 2
(image courtesy of Alexander Symonds Surveyors)

2.2 PROPOSED MODIFICATIONS TO SA POWER NETWORKS INFRASTRUCTURE

2.2.1 ABOLISHMENT WORKS

With reference to *Section 2.1.1 Existing Site Power Supply*, the site comprises 3 x SAPN transformers which will require abolishment to suit the site redevelopment including reconfiguring of site land titles. Refer **Appendix A** for details on location of existing site transformers.

Prior to commencing any demolition works on the site it is recommended that an application be made with SAPN to disconnect any physical connections to the former 'Caroma' site within the transformer cubicles.

The staging of the abolishment of the Stephen Street transformer including demolition of the associated transformer room and establishment of the new transformer is reliant on the extent of Stage 1 demolition works and/or the timing for construction for the proposed Torrens Title residential townhouses being constructed by CACA Nominees Pty Ltd which will derive a low voltage feed from the new transformer.

As previously mentioned, abolishment of the existing Stephen Street transformer cannot occur until the proposed new 500Kva transformer is established and the existing high and low voltage feeds to/from the existing transformer are rediverted to the new transformer.

A possible location for the new transformer has been identified just west of the existing transformer within planned 'green space' in between 2 groups of proposed townhouses.

For the 2 x transformers positioned off Magill Road, these may only be removed after the new 1.5MVa transformer is established on the ALDI site. As part of this works, the high voltage feed serving the transformer on the Retail site on the northern side of Magill Road, which is currently arranged as loop-in/loop-out connection from one of the transformers to be made redundant, will be re-connected in a similar configuration to the new site transformer. The existing high voltage feed extends directly past the location of proposed new site transformer; hence the high voltage joint will be undertaken in vicinity of the new transformer.

2.2.2 NEW SITE POWER SUPPLY

<u>OPTION 1</u>

When considering options for providing power to the overall development, it has been resolved with SAPN that the most cost-effective solution is to establish a single 1.5Mva transformer with 2 x outgoing feeds to independently service both the proposed ALDI Store and the Mixed-Use Residential/Commercial developments.

As mentioned previously the Torrens and Community Title townhouses will each derive a power supply connection from a new low voltage supply derived from the proposed new 500kva transformer to be established off Stephen Street.

The abolishment works associated with the existing transformers will form a shared responsibility between the 2 major site stakeholders.

The below summarises the benefits presented by the proposed power supply solution;

- By abolishing the 2 x transformers on Magill Road, and relinquishing the high voltage connections on the stobie pole (no 5) adjacent the ALDI building, removes the proximity

issue of bare high voltage cabling which is currently very close to the front boundary of the proposed ALDI development.

- The proposed solution also includes the establishment of a new stobie pole in vicinity of the proposed new shared site transformer which allows the installation of a new high voltage over/under connection to feed the new 1.5Mva transformer without re-introducing a HV proximity issue on the stobie pole positioned directly in front of the proposed ALDI building.

- The new 1.5Mva transformer also allows a connection facility to allow a high voltage loop-in/loop-out feed to re-connect to the underground high voltage feed to the existing transformer on the northern side of Magill Road.

In summary the proposed power supply solution for the commercial aspects of the development comprises the establishment of a new 1.5Mva transformer in the garden bed adjacent the eastern boundary at the front of the proposed ALDI development. The 1 x 1.5Mva transformer will have sufficient capacity to service both the ALDI and Mixed-Use Residential/Commercial development site.

As previously described, the new transformer will derive its high voltage feed from a proposed new stobie pole to be positioned within close proximity of the proposed new transformer.

SAPN have confirmed that the 1.5Mva transformer can be configured with a fused connection to service the ALDI development and a circuit breaker to service the Mixed-Use Residential/Commercial development.

Refer **Figure 6** below depicting the conceptual arrangement for the proposed shared power supply connection to the site.

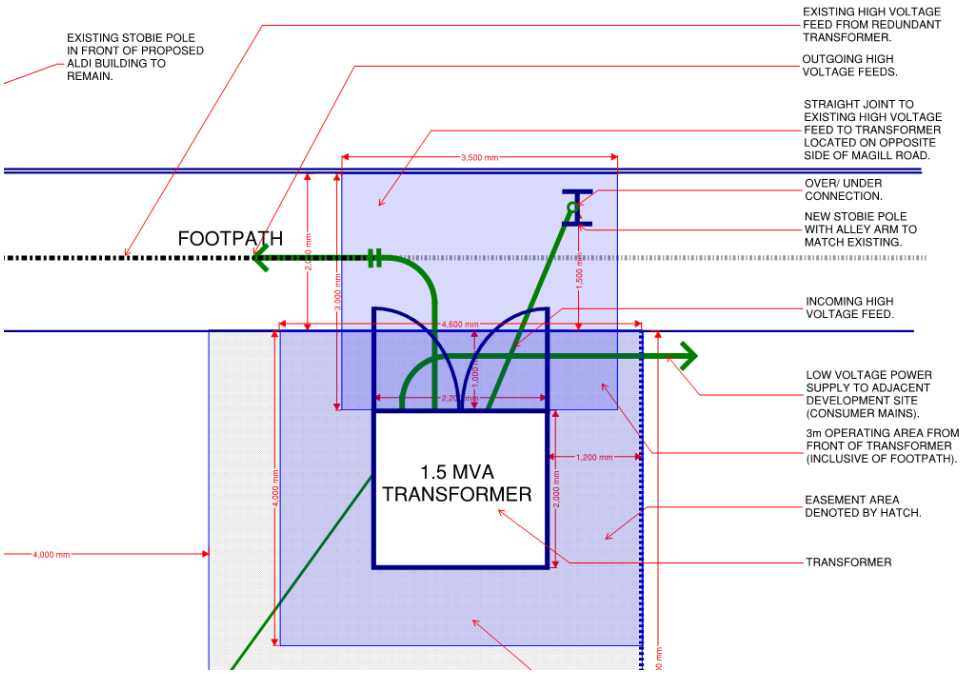


Figure 6 – Option 1 - Proposed Power Supply Arrangement
(Refer Appendix B for full version of layout)

OPTION 2

Discussions with CACA Nominees Pty Ltd indicates that undergrounding the overhead lines positioned directly in front of the Mixed-Use Residential/Commercial development is being considered. SAPN have confirmed that the underground option will require that a switching cubicle be established, which would need to be positioned adjacent the proposed site transformer. Refer Figure 7 below for the associated equipment arrangement relating to the undergrounding option.

It should however be noted that whilst this option is being considered, due to the significant cost involved in undergrounding the high and low voltage cabling for the entire length of the site's Magill Road street frontage, it is highly unlikely that it will be economically feasible to implement.

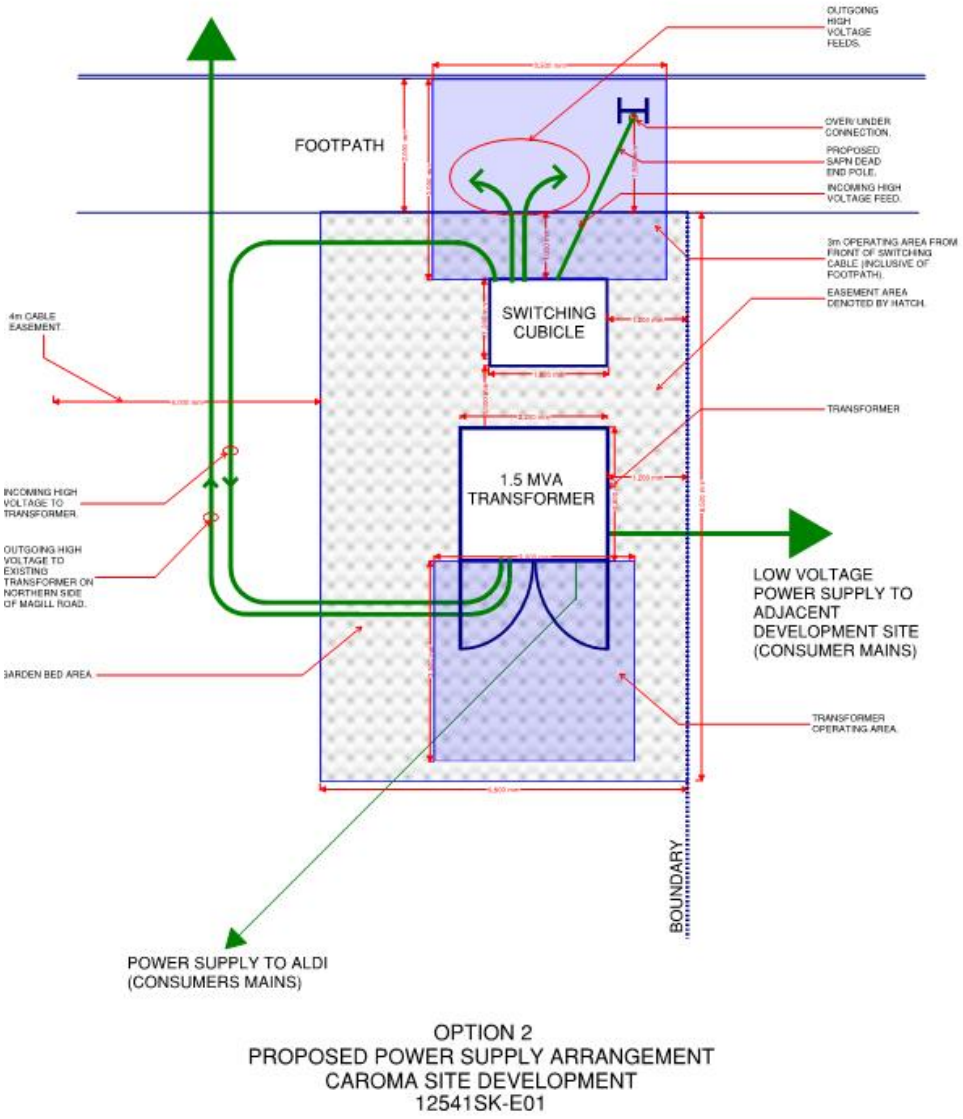


Figure 7 – Option 2 - Proposed Power Supply Arrangement based on undergrounding o/head powerlines to the east of ALDI development

3. COMMUNICATIONS INFRASTRUCTURE

3.1 COMMUNICATION SERVICES

This overall site redevelopment will be serviced by the NBN Network. NBN have advised that the nearest fibre connection will be derived from the corner of Elizabeth Street and the Parade, Norwood and extend to connection points along Stephen Street.

NBN have confirmed that the proposed staging of the overall site redevelopment is suitable for their purposes and that an NBN connection can be provided to suit the staging.

Previous preliminary feasibility investigations were based on servicing the site redevelopment from Magill Road which would have involved backhaul charges in addition to the standard connection fee of $400 per customer. Following review of current masterplan drawings for the site redevelopment, it was resolved in coordination with Jim Kellett and Jodie Lunn from NBN, that the entire site redevelopment could be serviced from Stephen Street which would reduce the extent of fibre cabling required and as a result, no backhaul charges would be applicable.

The first stage of development will comprise the construction of the ALDI supermarket and most of the townhouses along Stephen Street. Whilst no backhaul charges apply to extending the fibre network to the corner of Sydenham Road, the Residential Townhouse developer (CACA Nominees Pty Ltd) would be required to undertake a pit and pipe design for the conduit access in Stephen Street, as per residential sub division requirements.

The residential townhouses would be serviced via pits providing fibre connections to up to 5 dwellings whereas the ALDI and the Mixed-Use Residential/Commercial development would each be provided with a dedicated connection pit. The final location of NBN connection pits would be coordinated with NBN during the final pit and pipe shop drawing process.

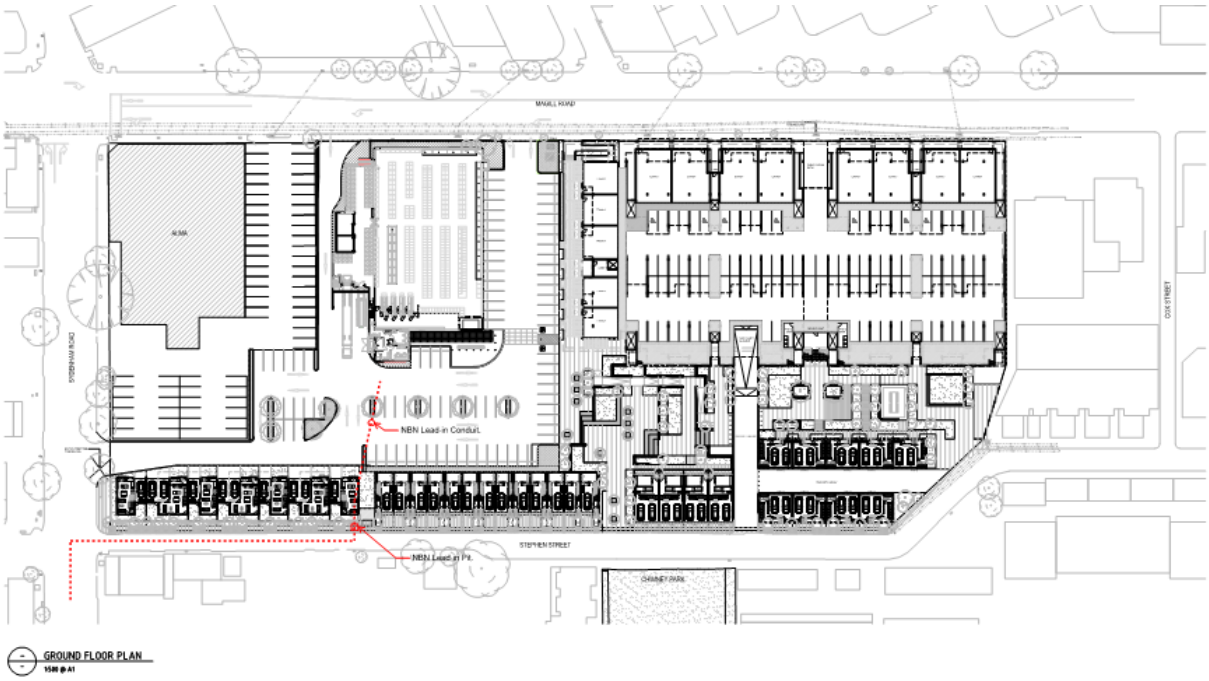


Figure 8 - Proposed NBN connection point to ALDI

4. SEWER INFRASTRUCTURE

4.1 EXISTING SEWER INFRASTRUCTURE

SA Water Corporation have undertaken an evaluation of their infrastructure in vicinity of the development site and confirmed that there is sufficient capacity to cater for the site redevelopment.

The Aldi and Mixed-Use Residential/Commercial development will be connected to infrastructure in Magill Road whereas the residential Torrens and Community Title townhouses in Stephen Street will derive their sewer connection (1 per each Torrens Title and the Community lot) from the SAWC sewer drain in Stephen Street.

A 300mm VC sewer drain is located in Magill Road, adjacent the development site. There are currently multiple sewer connections located directly adjacent both the ALDI and Mixed-Use development sites of which suitably sized connections will be retained for re-use and/or new connections established to suit the final design.

Redundant sewer connections will be disconnected.

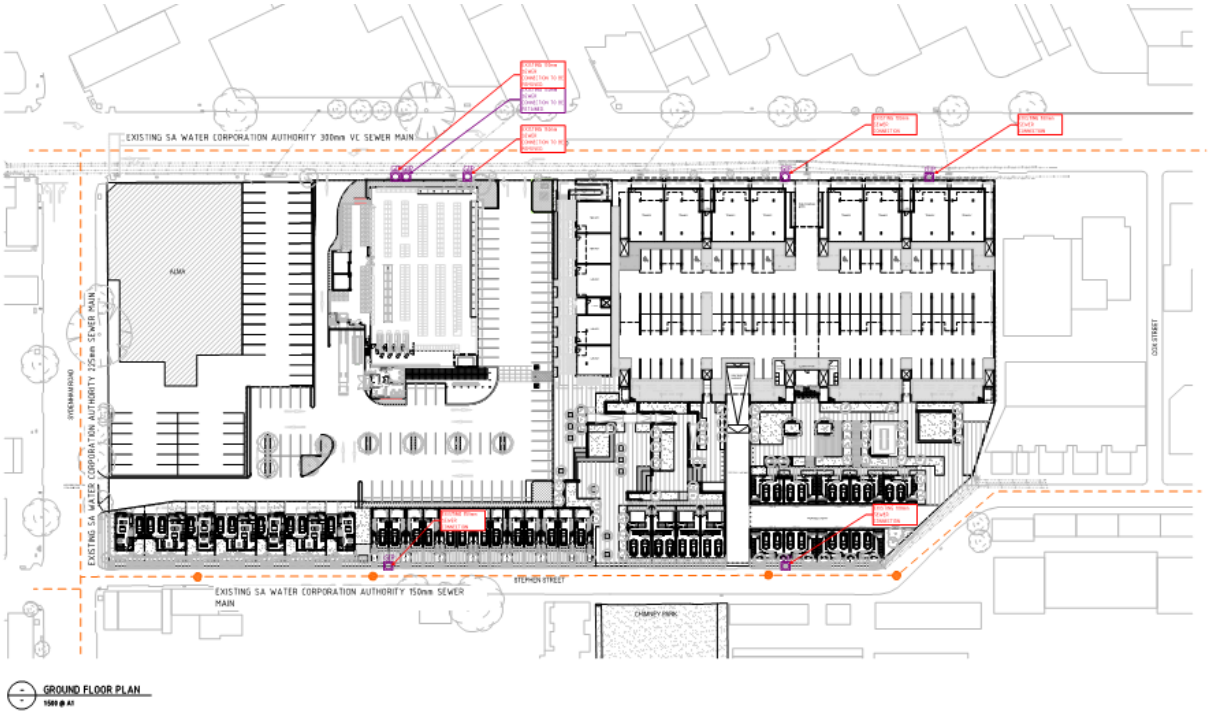


Figure 9 – location of existing sewer connections

5. DOMESTIC (POTABLE) COLD WATER INFRASTRUCTURE

5.1 EXISTING DOMESTIC COLD WATER INFRASTRUCTURE

A 150mm towns mains is located in Magill Road, directly adjacent the site.

There are multiple water meter connections on the site.

Preliminary investigations with SA Water have determined that the following water meter connections are suitable for re-use;

- 32mm water meter positioned in a cast iron footpath box adjacent the ALDI development site.
- 2 x 50mm water meter connections adjacent the Mixed-Use development site

Redundant water meter connections will be disconnected.

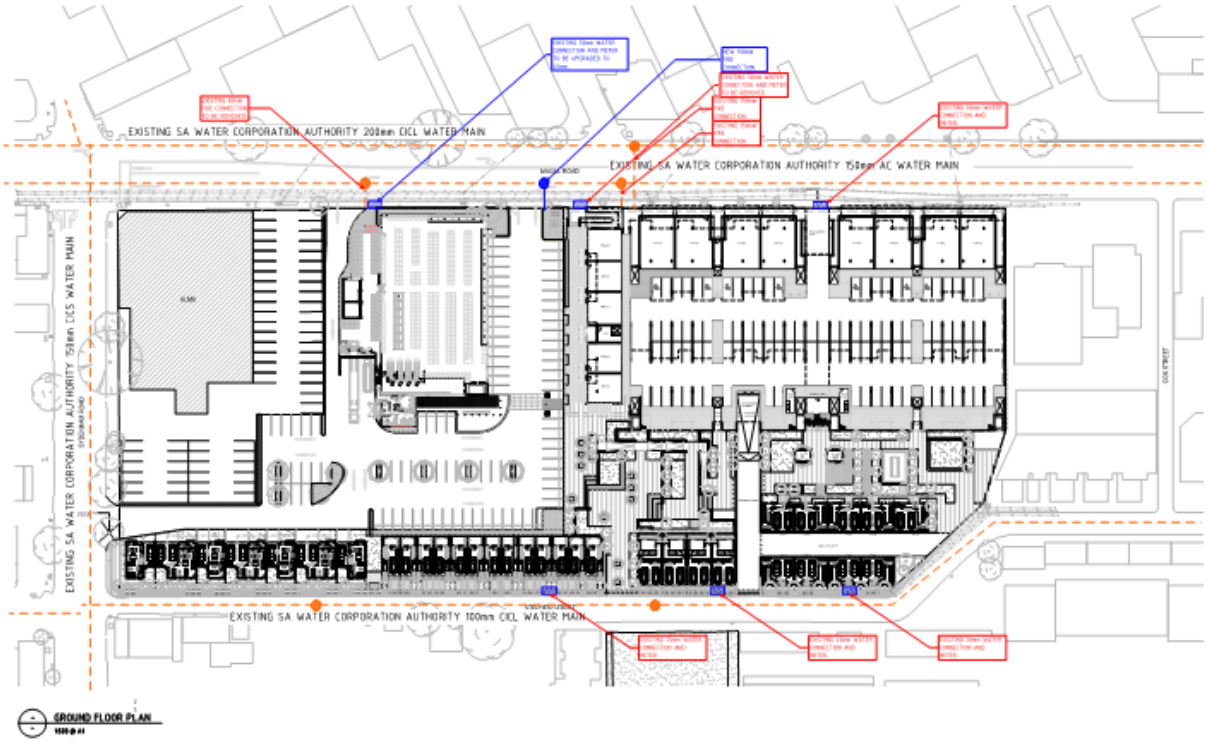


Figure 10 – location of existing water meter connections

6. NATURAL GAS INFRASTRUCTURE

Medium pressure gas mains are positioned in both Magill Road and Stephen Street.

There is no requirement for a natural gas connection to the ALDI development.

The Mixed-Use Residential/Commercial development will require multiple gas meters to service the apartment central hot water systems and individual gas meters to food preparation tenancies. APA will provide a single tapping to the gas meter manifold which will connect to the final required number of gas meters which will be positioned within a vented gas meter enclosure recessed into the façade of the Mixed-Use building at ground level.

The residential Torrens and Community Title townhouses will derive their natural gas connections from the Stephen Street gas mains.

APA have confirmed that there is sufficient capacity in their infrastructure to service the development.

An existing natural gas connection is provided to the former 'Caroma' site. This connection will be disconnected to suit the demolition staging.

7. FIRE SERVICES INFRASTRUCTURE

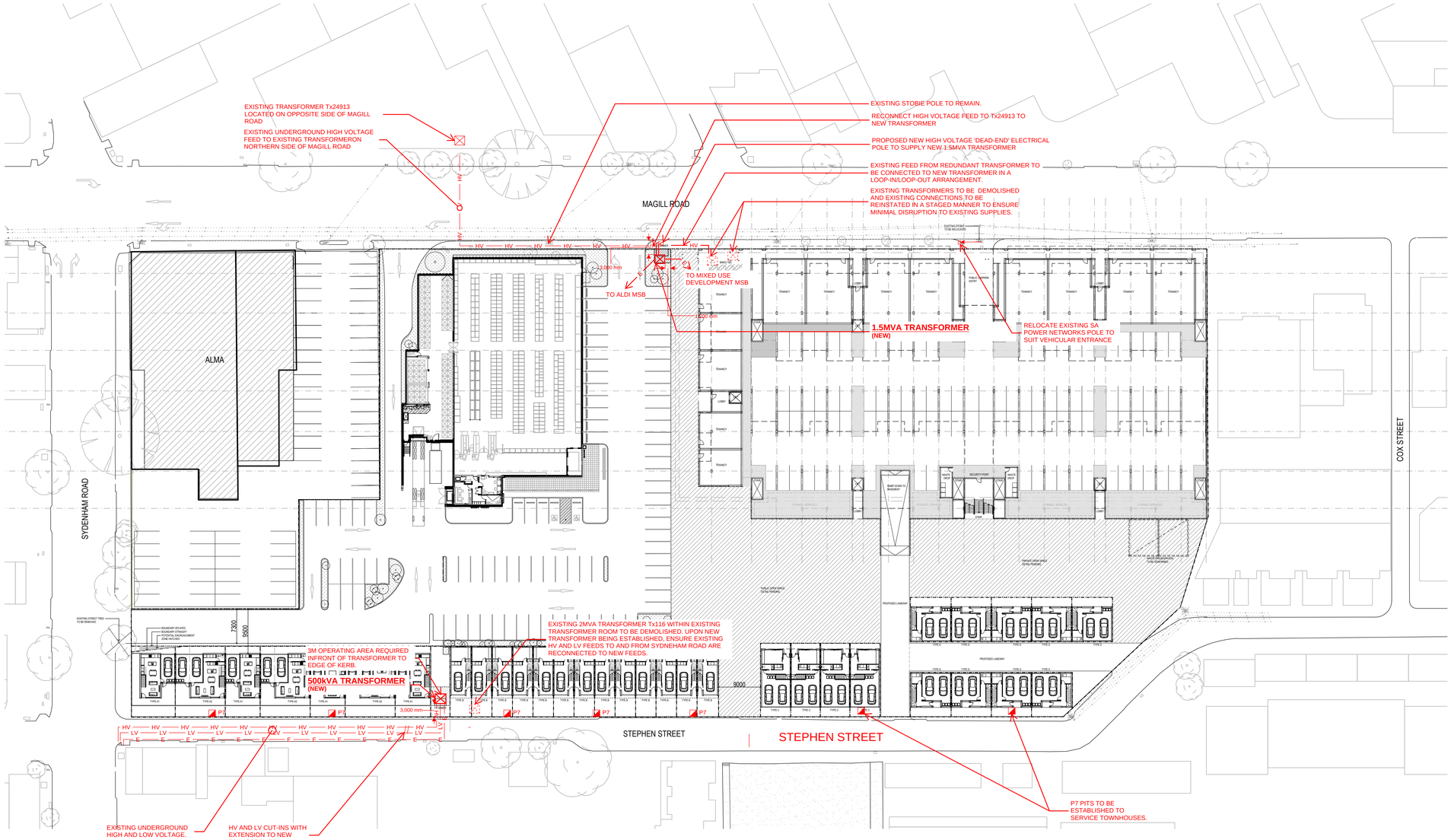
A 150mm towns mains is located in Magill Road, directly adjacent the site.

There are multiple existing fire connections afforded to the site.

An existing 80mm fire service connection is positioned adjacent the proposed ALDI development. This connection size does not meet current requirements and will require upgrade to a minimum 100mm fire service connection which will be dedicated to the proposed ALDI development. The 100mm fire service connection to the proposed ALDI development will service 3 x external site fire hydrants.

An existing 150mm fire service connection is located adjacent the proposed Mixed-Use Residential/Commercial development. This connection will be retained and provide the fire service connection to the combined hydrant & sprinkler system which will serve the development. A SAMFS booster facility will also be established off Magill Road which will derive its feed from the existing fire service connection.

APPENDIX A



GROUND FLOOR PLAN
1:500 @ A1

LUCID
CONSULTING AUSTRALIA
Level 3/169, Pirie St Adelaide SA 5000
Phone: (08) 8407 9700
Email: adelaide@lucidconsulting.com.au

Title: LCE12541-ESK01
Project: CAROMA SITE
Engineer: CB
Date: 19.07.18
Revision: A

PRELIMINARY
13/07/18

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REV | DATE | DESCRIPTION

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PROJECT: 76 MAGILL ROAD NORWOOD
CLIENT: ALDI | CA CA
DRAWING: GROUND FLOOR PLAN
NORTH
SCALE: AS SHOWN
DATE: JULY 2018
PROJECT NO: 28055
DWG NO: P01
REVISION: 0.3
CHECKED: FB
DRAWN: mdf

ESD and Sustainability Consultants
Master Planning
Resource Management
Strategic Advice
Governance
Advocacy

76 Magill Road

(former Caroma Site)

Sustainability Strategy

Preliminary

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green building council australia
MEMBER 2017-2018

Document Control

Issue	Date	Change	Checked	Approved
1	1/5/2018	First Draft issue	DD	PD
2	9/5/2018	DA Issue	DD	PD
3	8/6/2018	Updated DA issue	DD	PD
4	17/7/2018	Updated following design development	DD	PD
5	23/7/2018	Daylight access section added, PV sizes added	DD	PD
6	30/7/18	Updated with Architect comments	DD	PD
7	31/7/2018	Updated with Aldi comments	DD	PD
8	31/7/2018	Updated with Aldi comments	DD	PD

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1 Introduction

This report proposes the Sustainability Strategies and ESD initiatives which will be applied to the redevelopment of the former Caroma Site at 76 Magill Road, in order to reduce the development's impact on the environment in both construction and operation.

The proposed development includes a combination of apartment living and townhouses, public open space, and retail, including an ALDI Supermarket.

This report follows the development of the master plan and building designs by the integrated design team lead by Tectvs Architects and Select Architects, using computer building simulation design techniques to optimise the built form.

This report has been prepared Paul Davy, a Director of consultancy firm dsquared. Paul has over 30 years' experience in the UK, Europe, Asia and Australia as an engineering, ESD, and sustainability consultant. Paul holds IEng and MCIBSE Accreditation, is a Green Star Certified Assessor, a Green Building Council of Australia Teaching Faculty Member, an Ambassador for the Living Futures Institute of Australia, a WELL Accredited Professional, and a member of the South Australian Government ODASA Design Review Panel.

"A Place for Wellness"

The sustainability vision for the development is to create *a place designed for wellness*, *where the residents can be healthy*, *and* are helped by the built environment to *feel good*.

Drawing on the initiatives and concepts of the International Well Building Institute, the development will offer every opportunity for the residents to experience:



A Healthy Mind

- extensive access to outside views, landscaping, and nature
- community-orientated master planning
- opportunities for shared activities in communal spaces



A Healthy Body

- promotion of cycling
- easy connectivity to local shops by foot
- open and safe access through the development



Thermal Comfort

- NatHERS ratings 20% better than code
- high performance facades and thermal insulation
- computer optimised façade design



Daylight *see section 3*

- high quality daylight to all levels
- high quality daylight to all communal spaces
- shading to reduce solar loads, meaning clearer glass



Connectivity

- natural ventilation
- views to outside
- views through communal areas

Images courtesy of the International Well Building Institute

3 Daylight Access Assessment of Apartments

We have undertaken a computer modelling simulation of the daylight access in the apartments.

The modelling has been undertaken in accordance with the GBCA Recognised Provider – Daylight Simulation standards, using the Green Star Design & As-Built Daylight Credit as the benchmark.

The simulation uses a performance glass with a VLT of 50%, and is a worst case scenario model using a uniform overcast sky as the daylight source. A clear sky will result in a significantly improved result. The simulation ignores the borrowed light available from the link corridors, which have overhead daylight access.

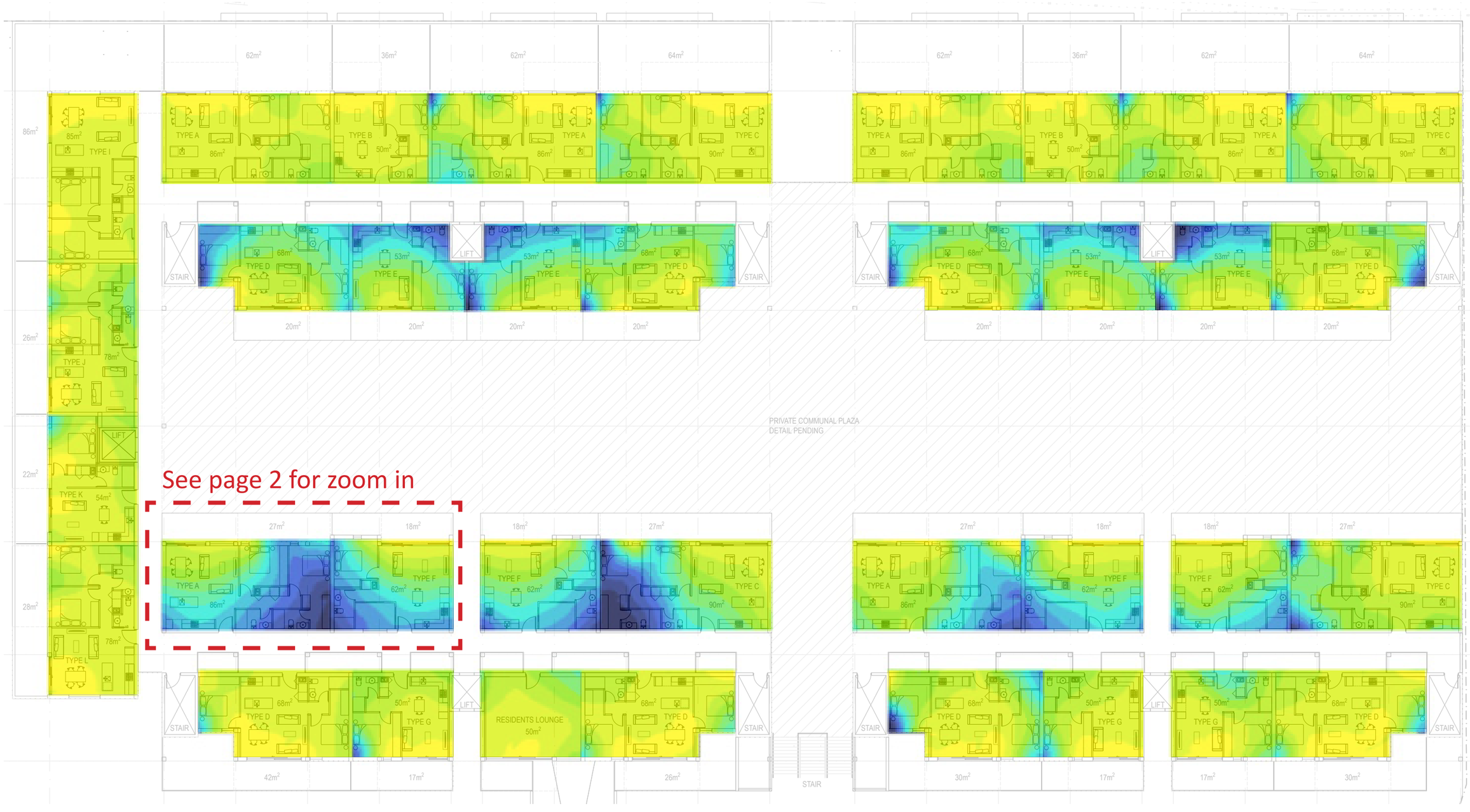
The Green Star criteria is based on lighting autonomy, with 1 point awarded where at least 40% of the living and bedroom space has a daylight autonomy level of at least 160 Lux for 80% or more of the occupied hours, and 2 points awarded where at least 60% of the space has this level of daylight autonomy. Toilets, laundry, bathrooms, stores and robes are excluded from the eligible area.

The modelling results indicate that all apartments are compliant for the full 2 points, except for apartment type A and F that sit in the south west corner, facing the courtyard, at levels 1, 2, and 3. These still have 40% of the floor space over 160 Lux so would get 1 point. These apartments at level 4, 5, and 6 comply for 2 points.

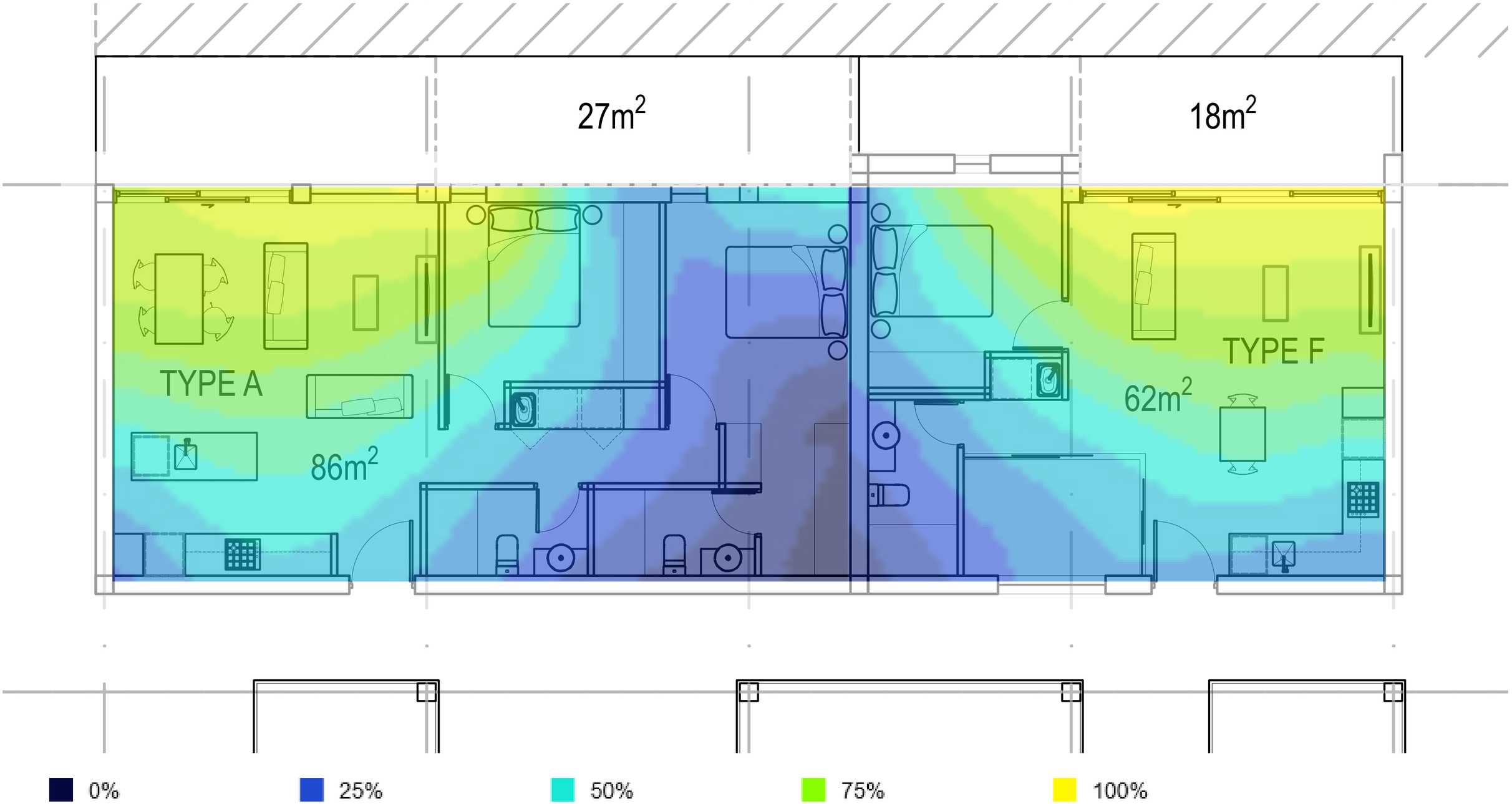
Images generated from the daylight model are included overleaf and demonstrate the extent and quality of daylight autonomy provided by the proposed design.

76 Magill Road_Daylight Analysis

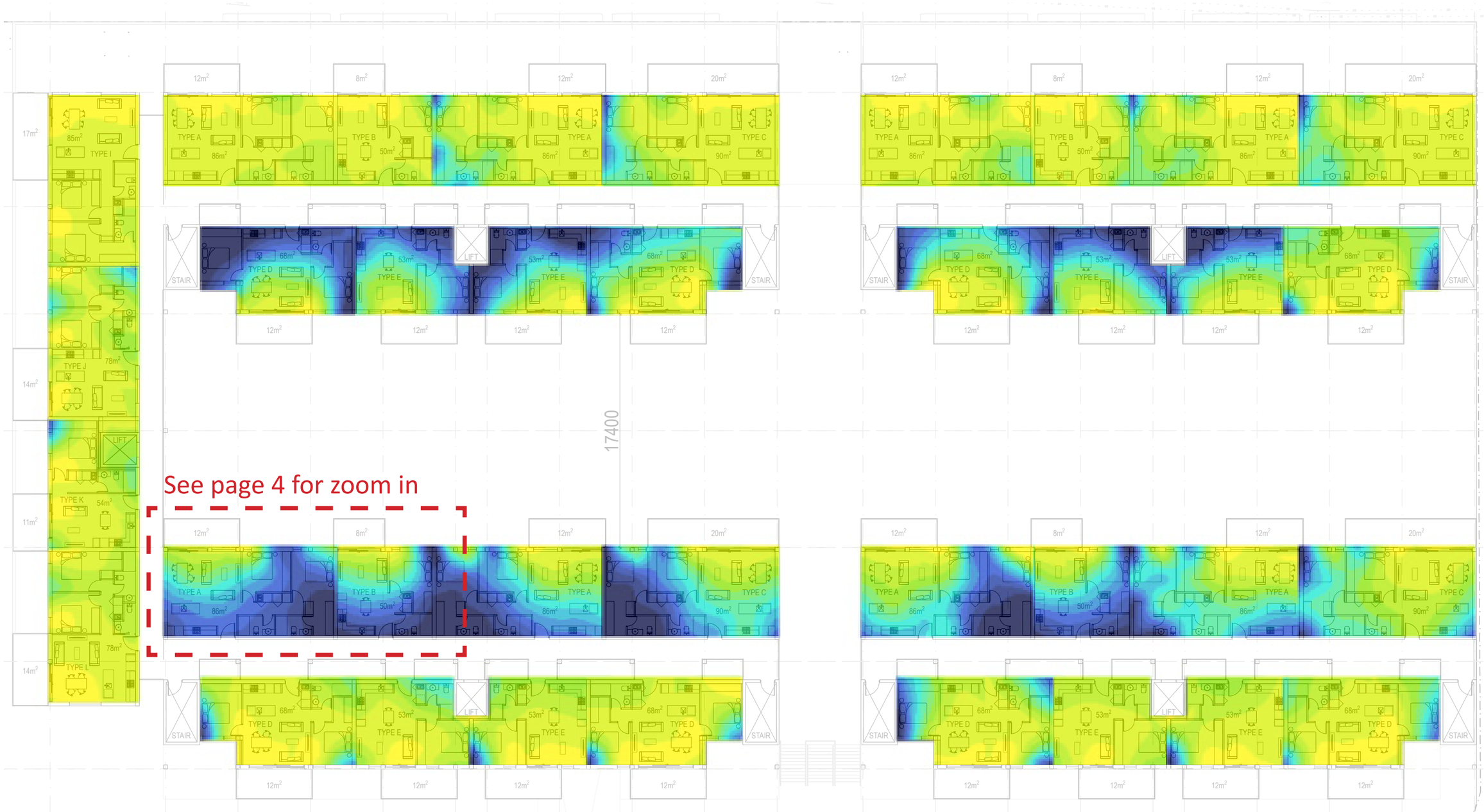
Level 1 - Area Above 160 lux



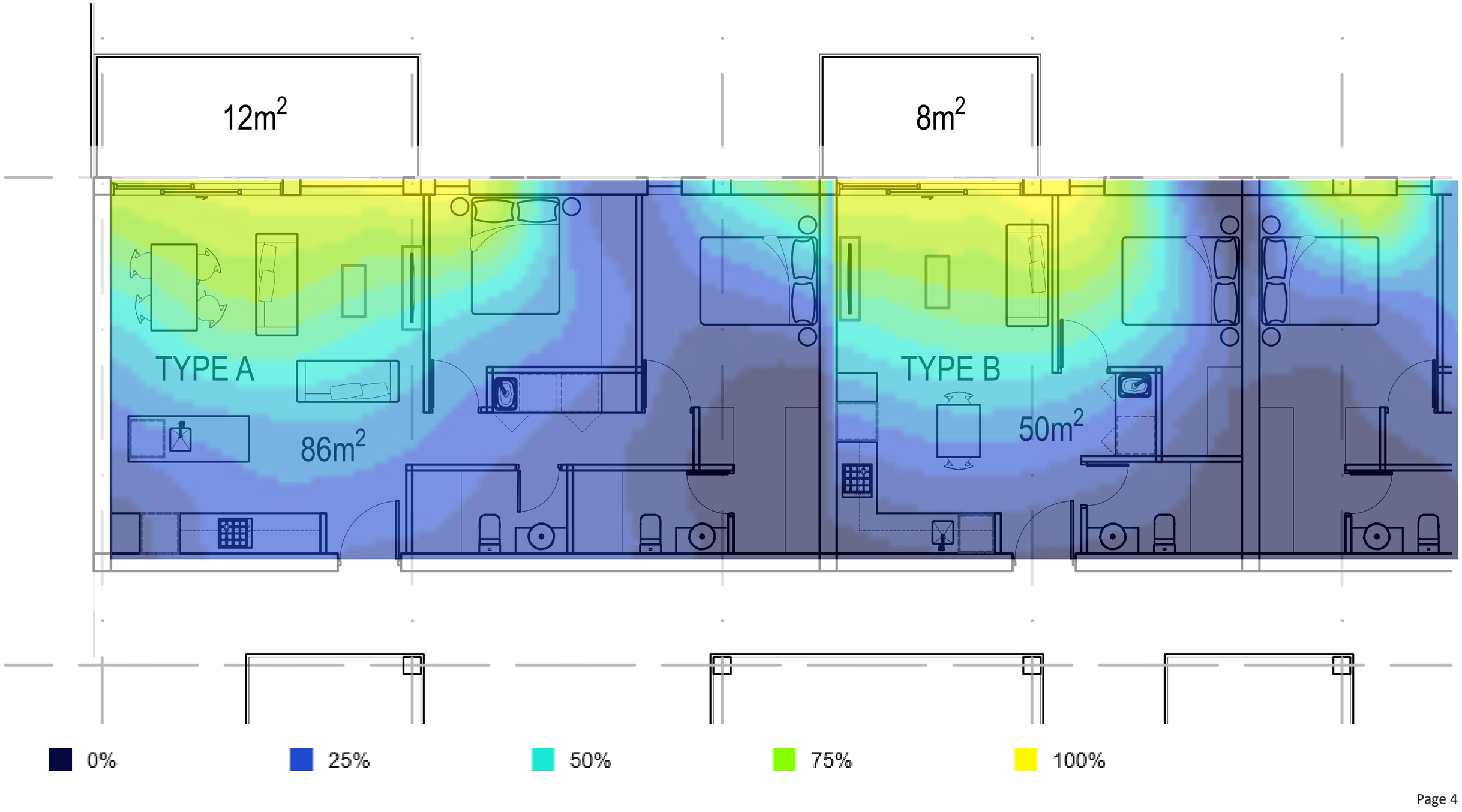
Level 1 - Unit Zoom In



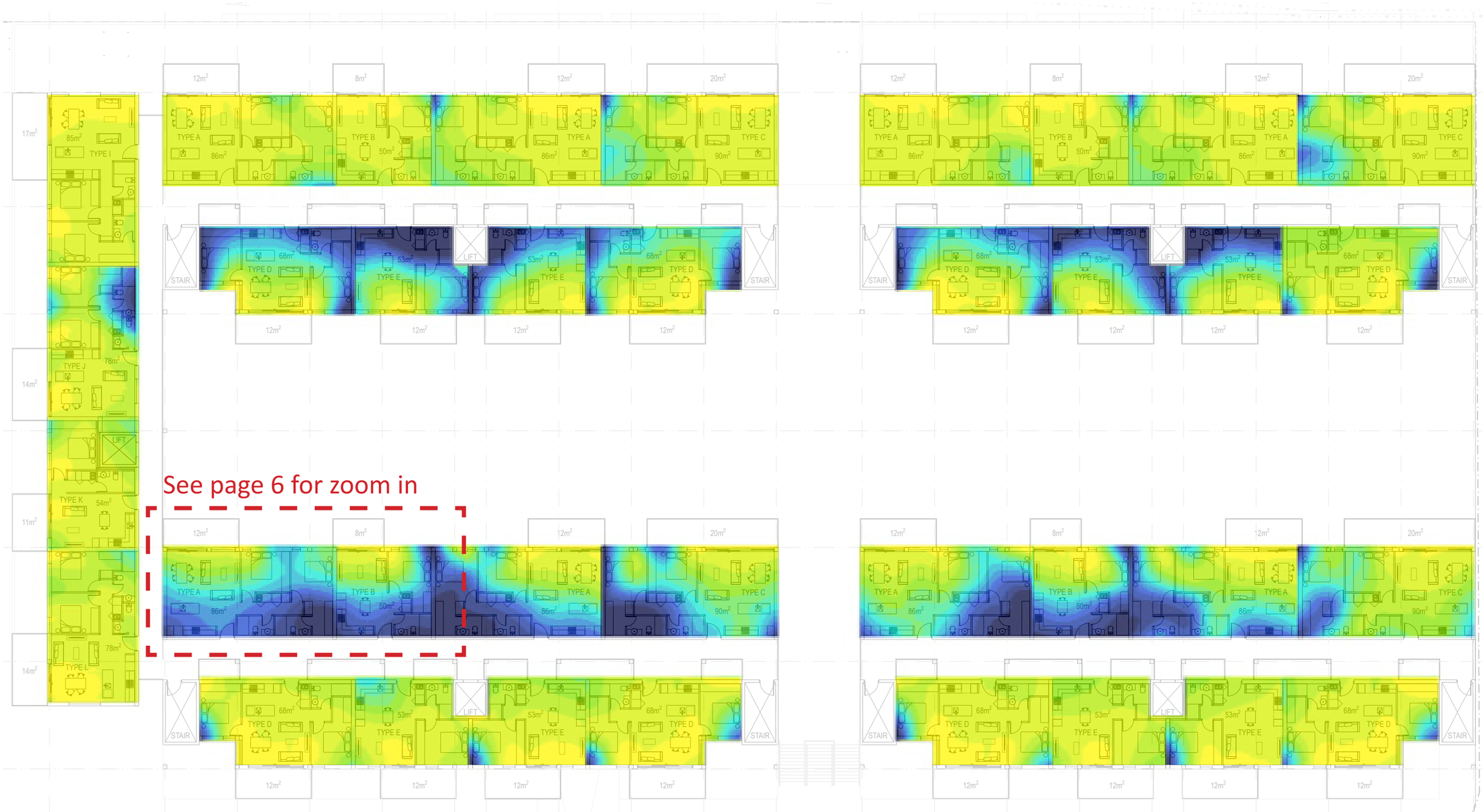
Level 2 - Area Above 160 lux



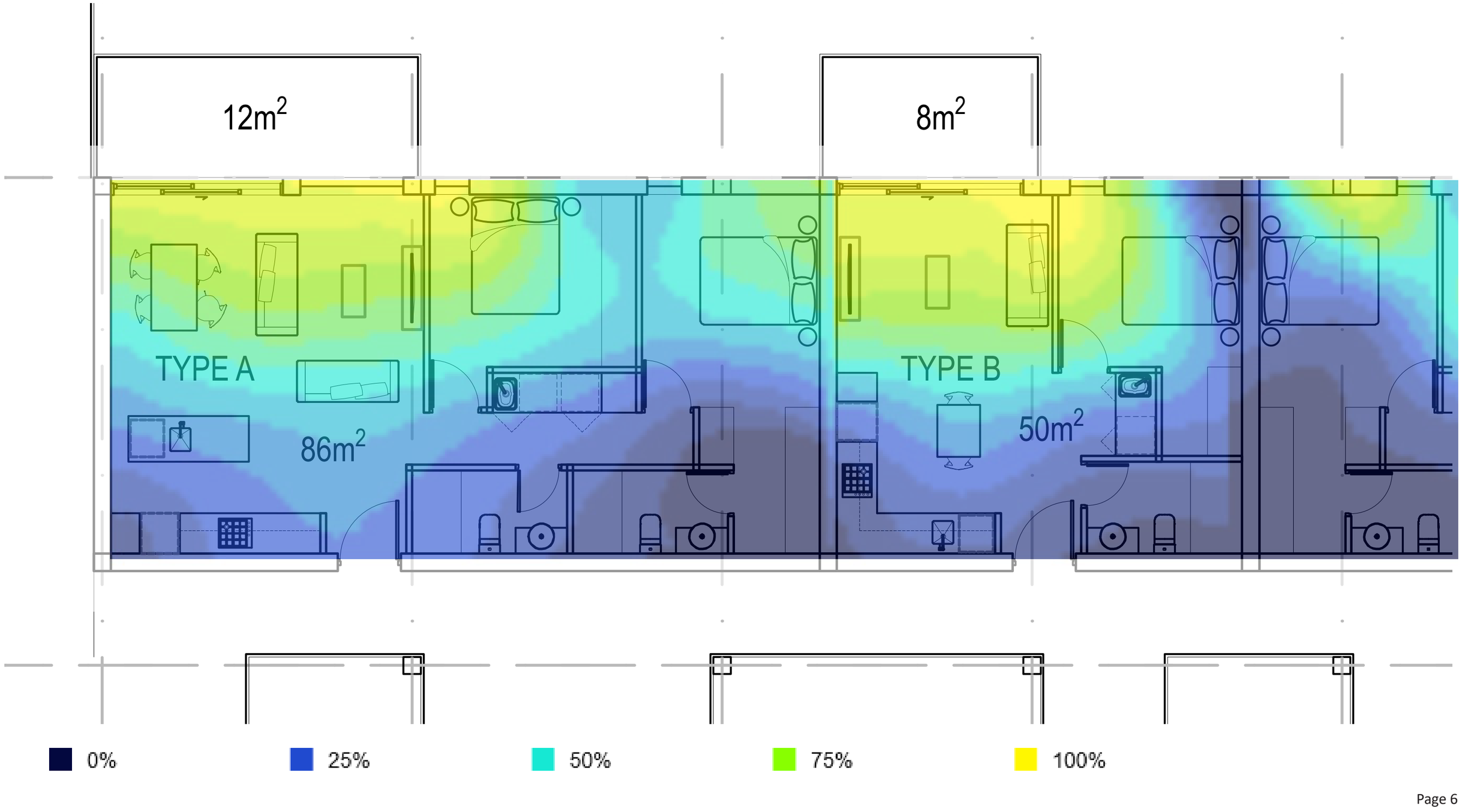
Level 2 - Unit Zoom In



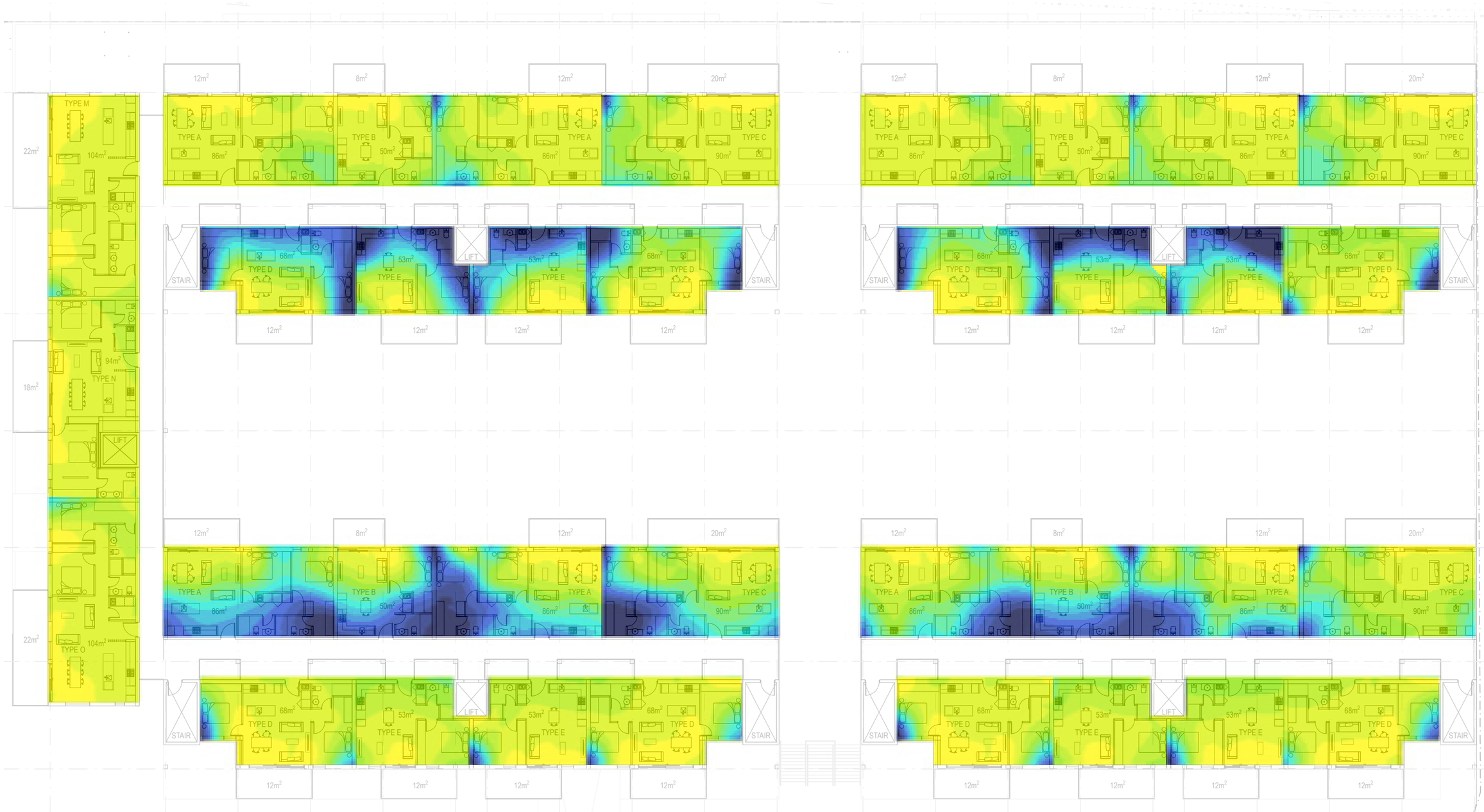
Level 3 - Area Above 160 lux



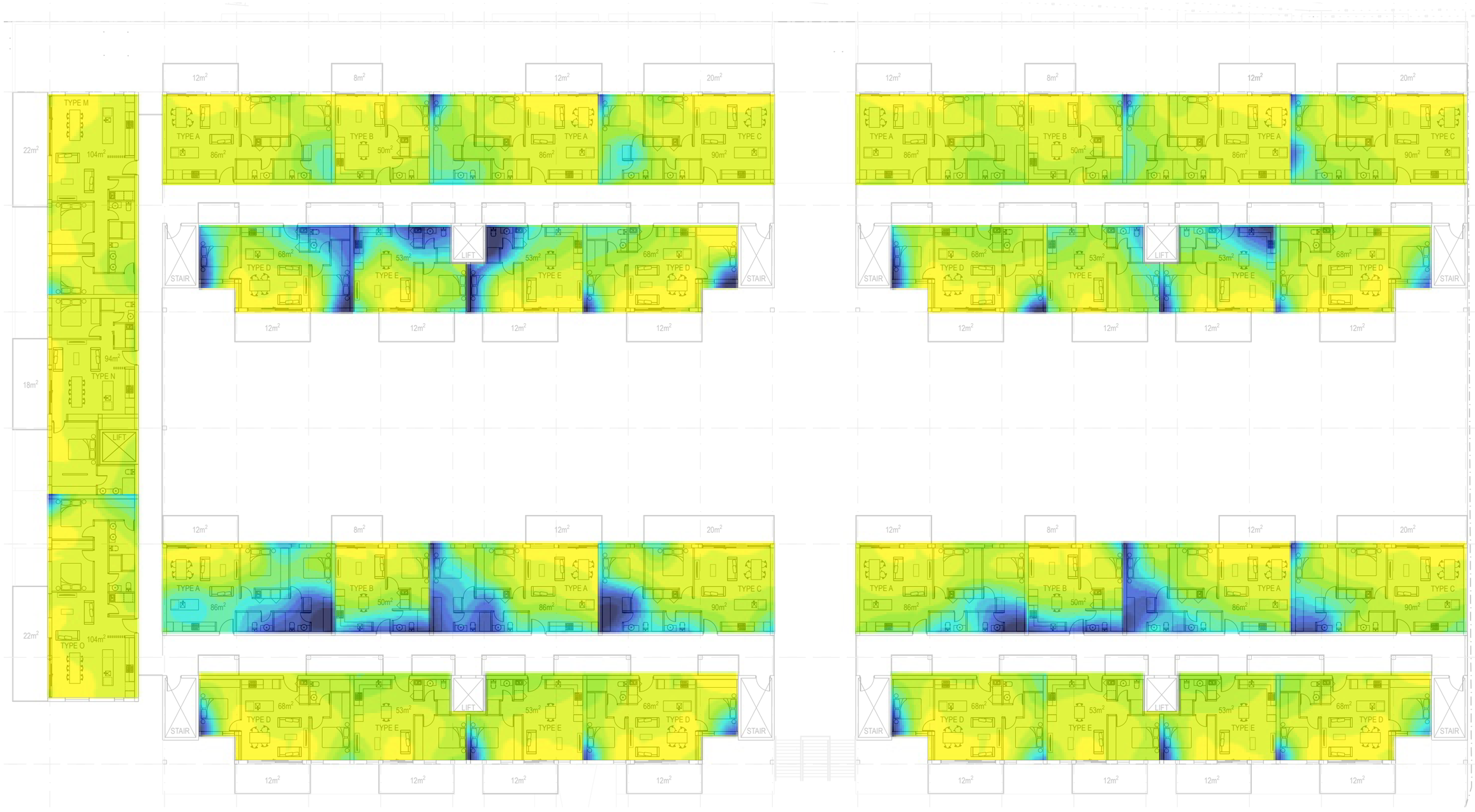
Level 3 - Unit Zoom In



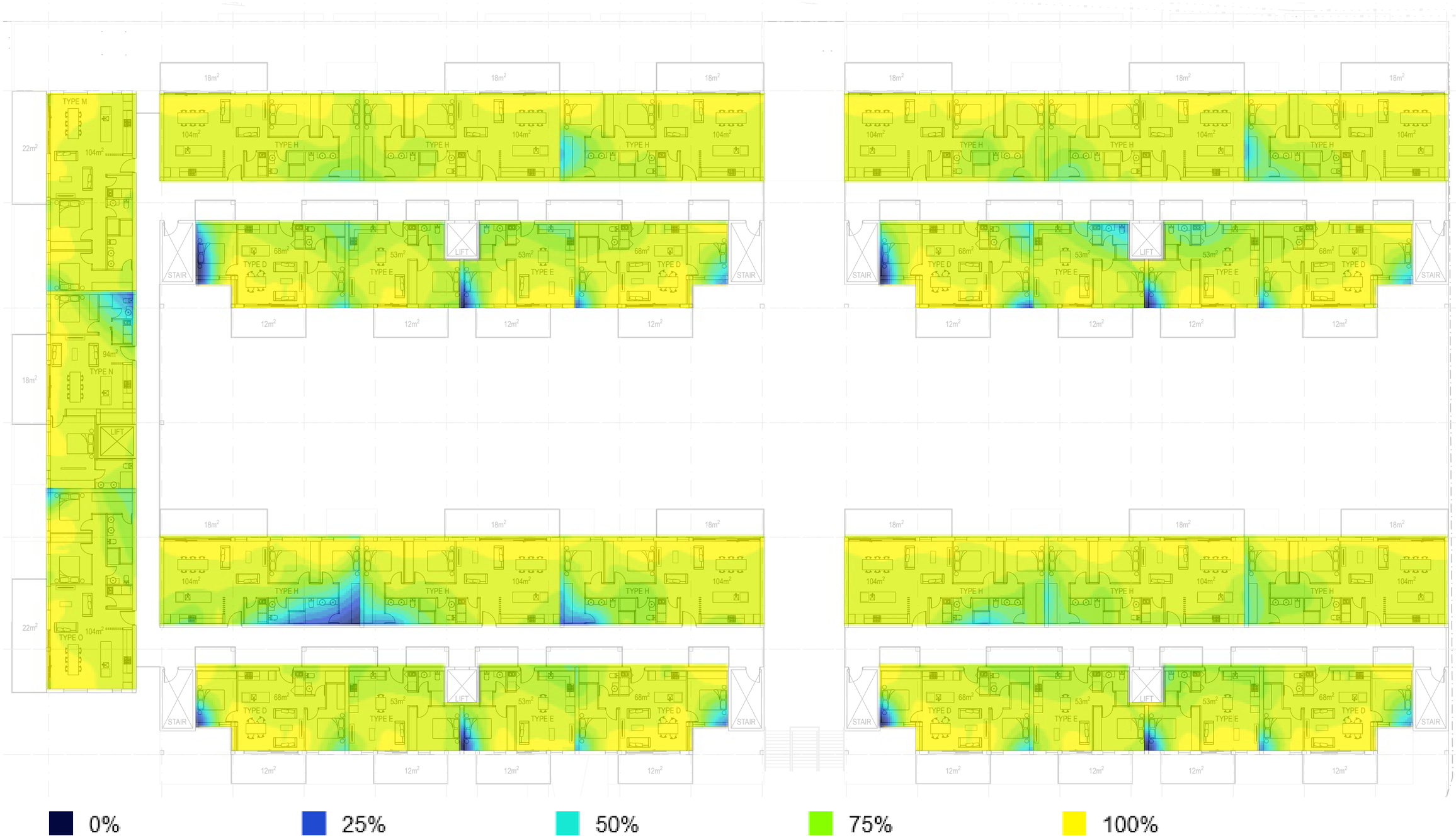
Level 4 - Area Above 160 lux



Level 5 - Area Above 160 lux



Level 6 - Area Above 160 lux



4 Sustainability Initiatives

4.1 Community and Social Sustainability

The following social sustainability initiatives are included:

1. The site layout is designed around a courtyard and open space layout to maximise community connection, and views from and to dwellings to provide transparency and a visual connection between residents and the community and environment.
2. The building design allows for connection the local environment through passive design and landscaping, and allowing residents and the general public to connect to nature and to adjust how they live in their dwellings according to the seasons.
3. Provision of a mixed-use site, with retail adjacent to the residential development, reduces the need for car journeys and provides a community within the development.
4. Provide easily accessible communal areas to both residents and visitors to the building.
5. Utilise courtyard space for edible plants, vegetable gardens, fruit trees, alongside areas for socialising and rest.
6. Providing bicycle storage facilities for apartment residents and visitors, with a minimum of one secure rack provided per apartment. Additional racks will be provided for visitors at ground floor level.
7. Providing infrastructure for the future charging or electric vehicles.

4.2 Energy

The following Energy initiatives are included:

1. The residential building design allows for the full natural ventilation of all dwellings though openable doors and windows.
2. All residential common areas at Ground level and above will be naturally ventilated and provided with daylight access.
3. Glazing to be performance glass with optimised external shading specific to each orientation.
4. Selection of energy efficient lighting fittings (LED) with automated lighting control systems.
5. Zoning the air conditioning systems into functional areas and providing automatic and manual controls. All air conditioning units will be inverter controlled and rated to the highest available Energy Star rating. All units can be operated in fan mode providing low energy air circulation.
6. Solar PV arrays of total capacity 95kW will be installed on the roofs of the apartment buildings, providing sufficient generated power to offset 30% of the common area power demand.
7. Solar PV arrays of total capacity 99kW will be installed on the roof of the Aldi Supermarket.
8. The Town Houses will be designed to allow the installation of up to 3kW of Solar PV on the rooftops, as a cost option for purchasers, allowing the Town Houses to be zero net carbon for energy if required. The installation of a battery storage unit, again as a purchaser cost option, will facilitate the town houses being self-sufficient for energy.
9. Extensive metering and sub-metering for apartment energy management, connected to a fully integrated Energy Management System.

10. An embedded network will be used in the apartment buildings with electricity being supplied via an inset network, so that residents can benefit from the option of reduced electricity supply rates, and the ability to share renewable energy from the building solar PV array.
11. Demand controlled car park ventilation systems with inverter controlled variable speed fans and carbon monoxide sensor control.
12. Using light coloured external finishes (in particular roof coverings) to reflect heat and reduce solar gain, and reduce the heat island effect.
13. Using zero ODP refrigerants and insulation.
14. Designing and certifying the apartments and town houses to achieve an energy performance at least 20% better than current Building Code minimum NatHERS rating of 6 Stars average, representing a dwelling average NatHERS Rating of 7 Stars.
15. Using gas for hot water supply (with solar boost) and gas cooktops where appropriate in order to reduce peak electricity demands and reduce the overall development carbon footprint.
16. Providing apartment owners with retractable clothes racks in their apartments, to minimise electric clothes drier use. These facilities will also minimise the incidence of clothes drying on exposed balconies.

4.3 Water

The following Water initiatives are included as part of the residential development:

1. Water efficient fittings with the minimum WELS ratings:
    - Taps 6 Stars
    - WCs 4 Stars
    - Showers 3 Stars
2. Selecting water efficient white goods within one Star rating of the highest available rating.
3. Selecting appropriate landscape planting to minimise irrigation water use.
4. Stormwater systems designed such that historic peak stormwater outflows should not be exceeded, and all stormwater is appropriately treated before discharge to sewer. If required by Council, water storage may be provided and utilised as a shared resource for irrigation to landscaping.
5. Providing the firefighting systems with a test water recycling facility.

4.4 Waste

The following Waste initiatives are included:

1. Construction waste will be minimised through efficient design techniques including standardisation and wherever practicable off-site pre-fabrication. A minimum 90% diversion from landfill rate will be targeted.
2. Provisions will be made for the location and use of separate bins for general, organic and recyclable waste, in accordance with advice from Chris Colby (Waste Management specialist).
3. The development will incorporate ventilated and weather proof storage facilities for the collection and disposal of general, recyclable, organic waste, and bulky waste, which will be separated on site to facilitate ease of disposal for recycling.
4. Waste management operations for the ALDI supermarket will be in accordance with the ALDI waste management statement. ALDI's waste management strategy includes the minimisation of packaging and food preparation waste on site, and the recycling of waste materials off-site.

4.5 Indoor Environment Quality

The following Indoor Environment Quality initiatives are included:

1. Using paints, sealants, adhesives, carpets, coverings and furniture which have low off-gassing properties (low VOC, low formaldehyde).
2. Maximising access to daylight to all residential areas whilst minimising glare.
3. All dwellings will be fully naturally ventilated.
4. All residential common areas at ground level and above will be fully naturally cross ventilated.

4.6 Construction

The development will seek to select locally sourced materials wherever viable.

The following Construction initiatives are included for the residential development:

1. Select recycled and recovered materials wherever viable, particularly sourced from the local area in order to build in a recognition of the local area and heritage.
2. Select materials with a comparatively low embodied energy/carbon profile e.g. timber in preference to steel, where practicable.
3. Select building materials with a recycled material content e.g. thermal insulation, reinforcement bar, fly ash in concrete, recycled content floor coverings, where viable.
4. Using off site pre-fabrication techniques to reduce on site construction time, waste, and greenhouse gas emissions, wherever practicable.

5 Benchmarking

5.1 Green Star

Benchmarking for the residential part of this project (excluding Aldi) will be simplified to providing a self-assessed rating against the Green Star Design & As-Built v1.2 tool.

Whilst an official rating is not being sought, Green Star reviews will be carried out throughout the project, with an audit report provided by dsquared.

The Green Star rating tool by the Green Building Council of Australia (GBCA) is the most widely recognised sustainability assessment tool in Australia. A Green Star certification provides a third party verification of the sustainability performance of a project. It is assessed at both Design (voluntary) and As-Built (mandatory) stages of a project, providing the ability to track sustainability performance throughout the project.

The tool covers the following key topics:

- Management
- Indoor Environment Quality
- Energy
- Water
- Transport
- Materials
- Ecology
- Emissions
- Innovation

The design team will target a 5 Star Green Star self-assessed rating to benchmark the building against 'Australian Leadership' in sustainable design.

5.2 NatHERS

Preliminary modelling has been undertaken using AccuRATE software to BDAV standards in order to establish the expected apartment and town house NatHERS rating.

The residential development benchmarks at an expected average 7 Star NatHERS rating, demonstrating a 20% improvement over the NCC/BCA minimum requirement of 6 Star average.

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76 Magill Road

Acoustic Assessment

A180159RP1 Revision F

Tuesday, 31 July 18

Resonate

Document Information

Project	76 Magill Road	
Client	Buildtec Group	
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Revision Table

Report revision	Date	Comments
0	18 April 2018	First Issue
A	14 May 2018	Revised
B	8 June 2018	Revised site layout
C	26 July 2018	Final Draft
D	27 July 2018	Preliminary
E	30 July 2018	Preliminary - Revised site layout
F	31 July 2018	Preliminary – Response to Select Architects Review

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Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Day	Between 7 am and 10 pm as defined in the Noise EPP
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of that sound level.
dB(A)	Units of the A-weighted sound level.
Facade sound reduction	means the reduction in external to internal sound level provided by the *building envelope*.
Floor area	means, in relation to a room, the area of the room measured within the finished surfaces of the walls, and includes the area occupied by any cupboard or other built-in furniture, fixture or fitting.
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second.
Indicative noise level	Indicative noise level determined under clause 5 of the Noise EPP.
L_{90}	Noise level exceeded for 90 % of the measurement time. The L_{90} level is commonly referred to as the background noise level.
L_{eq}	Equivalent Noise Level—Energy averaged noise level over the measurement time.
L_{max}	The maximum instantaneous noise level.
Night	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the Noise EPP
Noise source	Premises or a place at which an activity is undertaken, or a machine or device is operated, resulting in the emission of noise
R_W	Weighted Sound Reduction Index—means a measure of the sound attenuation performance of a building element, measured in controlled conditions in a laboratory.
R_W+C_{tr}	means a weighted sound reduction index with spectrum adaptation placing greater emphasis on low frequency performance.
Separation distance	means the shortest distance (to the nearest metre), from an existing or future *designated sound source* to the nearest exposed point of the *building envelope* bounding a *habitable room*.
Sound Exposure Category (SEC)	means the degree to which a *habitable room* within a building is likely to be affected by external sound received by the *building envelope*.

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1 Introduction

This report outlines the preliminary external noise intrusion and environmental noise emission assessment for the proposed residential development at 76 Magill Road, Norwood. It details the indicative acoustic requirements and recommended conceptual construction requirements for this proposed development.

The acoustic requirements are based on:

- Norwood Payneham and St Peters Council Development Plan (consolidated 19 December 2017)
- Minister's Specification SA 78B *Construction Requirements for the Control of External Sound*

The main acoustic issues addressed in this report are:

- facade construction to control traffic noise, music and patron noise from the Alma Tavern, and noise from the proposed ALDI supermarket; and
- environmental noise emissions from external mechanical plant and vehicle movements associated with the development.

This assessment does not address noise emissions from the ALDI site, other than in relation to noise intrusion to residences within the site. We understand that noise emissions from the ALDI to receivers outside the site has been addressed by Sonus.

2 Proposed development

The proposed development is located at 76 Magill Road, Norwood, in the block bounded by Magill Road, Sydenham Street and Stephen Street as shown in Figure 1 below. The proposed development will consist of terraced housing, apartments, and retail including an ALDI Supermarket.

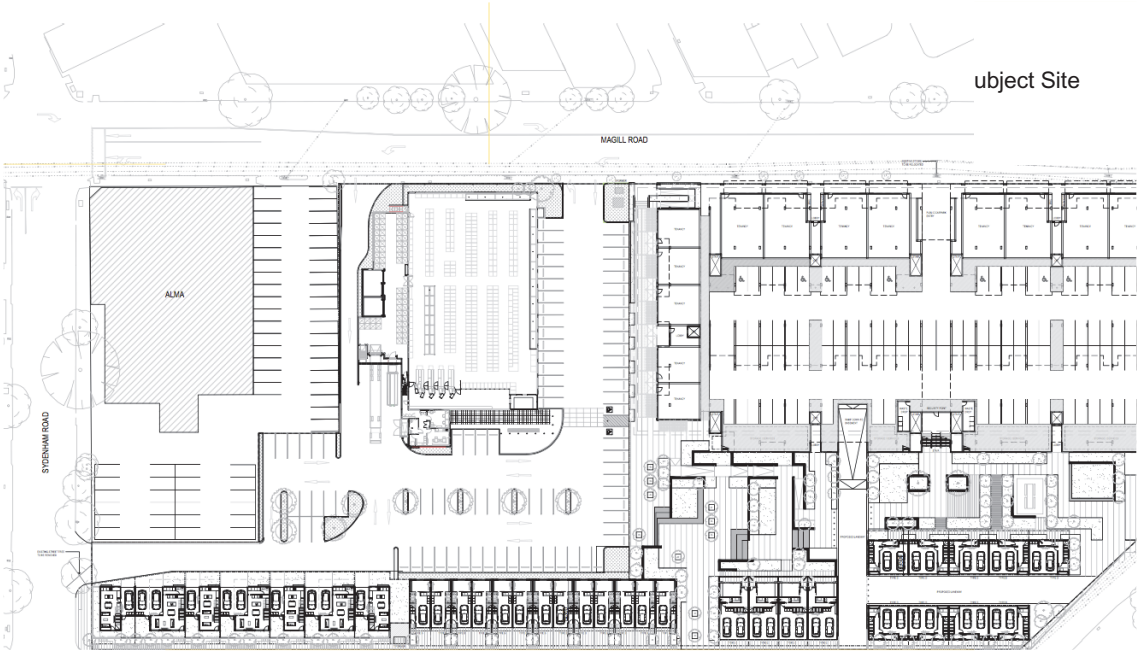


Figure 1 Proposed site location and layout

3 Development plan

The proposed development is located within the Norwood Payneham and St Peters Council Area and the development needs to have regard to the Council Development Plan.

The proposed site is located in the Urban Corridor Zone (High Street Policy Area H). The land uses principally promoted in the Urban Corridor Zone are residential and commercial. Objective 7 for this zone is that *"Noise and air quality impacts are mitigated through appropriate building design and orientation".* The Desired Character for this zone also includes the following statement:

> *The residential component of all buildings will be designed having regard to the amenity of the occupants and will ensure that individual units have reasonable access to light, ventilation and views. Noise attenuation and air emission control measures will be included in the design of residential units where there is the potential for acceptable noise and air emissions levels to be exceeded.*

Land adjacent to the site is zoned Urban Corridor, Business, Residential, Mixed Use, or Light Industrial as shown in Figure 2 below.

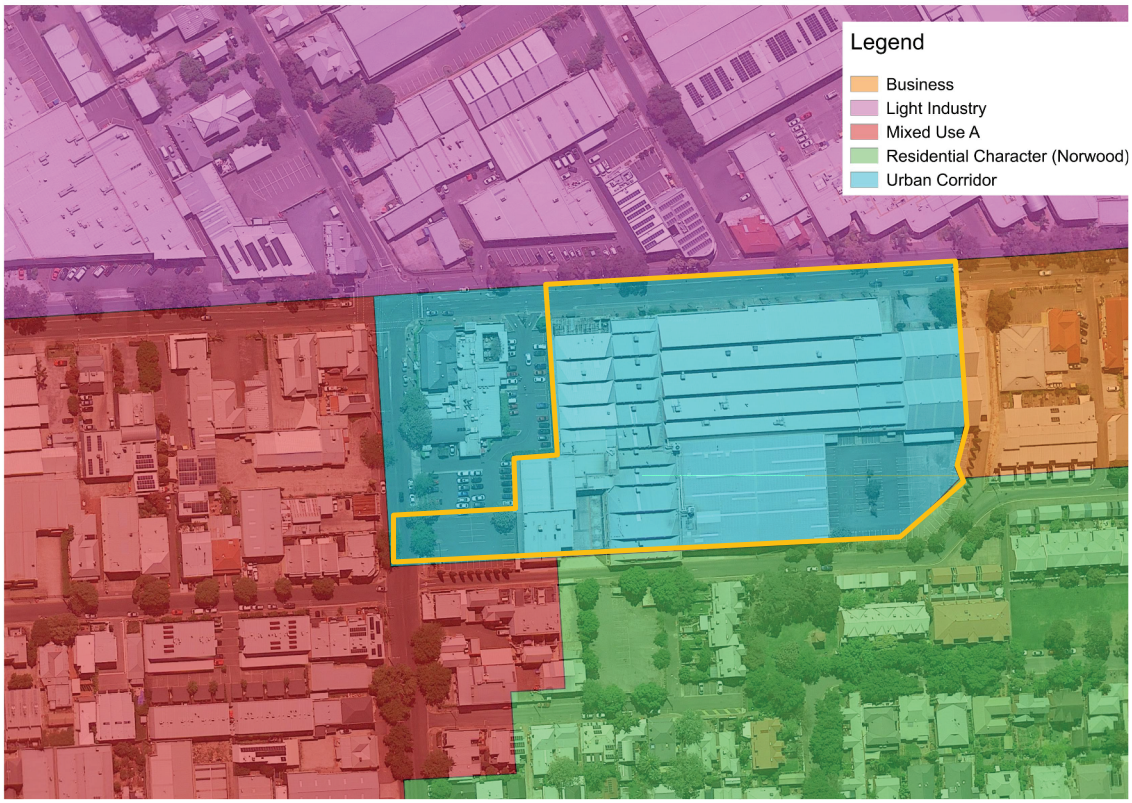


Figure 2 Zoning of the site and surrounding area

There are no relevant Principles of Development Control (PDCs) relating to noise for the above Zones. However, the following council wide PDCs for interfaces between land uses; residential development; and centres, shops and businesses apply as follows:

Interface between land uses

80 Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:

(a) …
(b) noise;
(c) vibration;
(d) …

81 Residential development adjacent to a non-residential land use or zone or within a non-residential zone should be located, designed and sited in a manner which:

(d) protects residents from any adverse effects of non-residential activities; and
(e) minimises negative impact on existing and potential future land uses considered appropriate in the locality.

…

84 Non-residential development on land abutting a residential zone or within a residential zone should be designed to minimise noise impacts and achieve adequate levels of compatibility between existing and proposed uses.

85 Sensitive land uses which are likely to conflict with the continuation of lawfully existing developments and land uses considered appropriate for the zone should not be developed.

86 Development that emits noise (other than music noise) should include noise attenuation measures that achieve the relevant *Environment Protection (Noise) Policy* criteria when assessed at the nearest existing noise sensitive premises.

87 Development with the potential to emit significant noise (e.g. industry) should incorporate noise attenuation measures that prevent noise from causing unreasonable interference with the amenity of noise sensitive premises.

Residential development

273 Residential buildings (or the residential floors of mixed use buildings) should have habitable rooms, windows and balconies designed and positioned with adequate separation and screening from one another to provide visual and acoustic privacy and allow for natural ventilation and the infiltration of daylight into interior and outdoor spaces.

One way of achieving this is to ensure any habitable room windows and/or balconies are separated by at least 6 metres from one another where there is a direct 'line of sight' between them and be at least 3 metres from a side or rear property boundary. Where a lesser separation is proposed, alternative design solutions may be applied (such as changes to orientation, staggering of windows or the provision of screens or blade walls, or locating facing balconies on alternating floors as part of double floor apartments), provided a similar level of occupant visual and acoustic privacy, as well as light access, can be demonstrated.

Centres, shops and business

293 The location and design of centres and shopping development should ensure that all sources of noise, including refrigeration and air conditioning equipment, garbage collection and car parking, do not cause excessive or disturbing noise at neighbouring properties.

308 Development within business, centre and shopping zones should conform to the following design principles:

(a) …
(d) Development should not cause nuisance or hazard arising from:
  (ii) …
  (iii) excessive noise
  (iv) ….
(e) …

Noise and air emissions overlay

The site is also located in a 'Designated Area' and adjacent to a 'Designated Road: Type B road' in the Noise and Air Emissions overlay in the Development Plan. Relevant Objectives and Principles of Development Control for sites affected by the overlay are:

> **Objective 1:** Protect community health and amenity from adverse impacts of noise and air emissions.
>
> **PDC 1** Noise and air quality sensitive development located adjacent to high noise and/or air pollution sources should:
>
> (a) shield sensitive uses and areas through one or more of the following measures:
>
> (i) placing buildings containing less sensitive uses between the emission source and sensitive land uses and areas;
>
> (ii) within individual buildings, place rooms more sensitive to air quality and noise impacts (e.g. bedrooms) further away from the emission source;
>
> (iii) erecting noise attenuation barriers provided the requirements for safety, urban design and access can be met;
>
> (b) use building design elements such as varying building heights, widths, articulation, setbacks and shapes to increase wind turbulence and the dispersion of air pollutants provided wind impacts on pedestrian amenity are acceptable;
>
> (c) locate ground level private open space, communal open space and outdoor play areas within educational establishments (including childcare centres) away from the emission source.

Application of Minister's Specification SA 78B *Construction Requirements for the Control of External Sound* is triggered based on the above and application of this specification will demonstrate compliance with the PDCs relating to noise ingress.

Noise emissions from mechanical plant and vehicle movements associated with the development should be assessed in accordance with the SA Environmental Protection (Noise) Policy (the Noise EPP). Compliance with the noise goals within the Noise EPP will demonstrate compliance with the relevant PDCs relating to noise emissions received at neighbouring noise sensitive premises.

Application of the National Construction Code (NCC) Part F5 *'Sound Transmission and Insulation'* during the design and construction of the development will ensure that the intent of PDC 273 is achieved in relation to acoustic privacy.

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4 Environmental Protection (Noise) Policy

The noise goals in the Noise EPP are based on the zoning of the development and the closest noise affected premises in the relevant development plan. The land uses primarily promoted by the zones are used to determine the environmental noise criteria with the indicative noise factors shown in Table 1.

Table 1 Excerpt from Noise EPP—Table 2(subclause(1)(b))

Land use category	Indicative noise factor dB(A)	
	Day (7 am to 10 pm)	Night (10 pm to 7 am)
Rural living	47	40
Residential	52	45
Rural industry	57	50
Light industry	57	50
Commercial	62	55
General industry	65	55
Special industry	70	60

As noted in Section 3, the development is located in the Urban Corridor Zone, while the most affected noise sensitive premises are located in the Urban Corridor, Business, Light Industry, Mixed Use A, or Residential Character (Norwood) Zones. The following land uses are primarily promoted in each zone are as shown in Table 2.

Table 2 Land use promoted in each zone

Zone	Land use primarily promoted
Urban Corridor	Commercial and residential
Business	Commercial
Light Industry	Light industry
Mixed Use A	Commercial and residential
Residential Character (Norwood)	Residential

Environmental noise criteria for the Urban Corridor zone are the average of indicative noise factors for Commercial and Residential land use categories. For receivers in other zones, the criteria are the average of indicative noise factors for the relevant land uses, and the averaged criteria for the Urban Corridor zone

In accordance with Part 5 of the Noise EPP, the relevant criteria for this development will be the relevant indicative noise factors less 5 dB(A). The application of Part 5 results in the following environmental noise criteria.

Table 3 Environmental noise criteria by receiver zone

Receiver zone	Noise criteria, dB(A)	
	Day (7 am to 10 pm)	Night (10 pm to 7 am)
Urban Corridor	52	45
Business	55	48
Light Industry	52	45
Mixed Use A	52	45
Residential Character (Norwood)	50	43

Penalties can also be applied to a noise source for a variety of characteristics, such as impulsive, low frequency, modulating or tonal characters. For a characteristic penalty to be applied to a noise source is must be fundamental to the impact of the noise and dominate the overall noise impact. Application of the characteristic penalty is discussed in the noise emission assessment.

We note that under Part 5, Clause 20(6) of the Noise EPP, exceedance of the recommended criterion does not necessarily mean action is required under the Noise EPP. Some of the following matters should be considered when considering action:

- the amount by which the criterion is exceeded (in dB(A))
- the frequency and duration for which the criterion is exceeded
- the ambient noise that has a noise level similar to the predicted noise level
- the times of occurrence of the noise source
- the number of persons likely to be adversely affected by the noise source and whether there is any special need for quiet.

5 Environmental noise assessment

Noise sources associated with the proposed development include external mechanical plant and vehicle movements.

5.1 Mechanical Plant

It is expected that noise emissions from external mechanical plant can meet the relevant criteria in Section 4 with standard mitigation measures, for example location of significant plant items away from noise sensitive receivers where practicable, the use of low-noise plant, and/or acoustic screens.

5.2 Vehicle movements

The peak daytime and night time 15 minute volumes of vehicles associated with the development (excluding ALDI) have been provided by GTA consultants as detailed in Table 4 below.

Table 4 Peak 15 minute vehicle movements

Site access location	Peak 15 minute vehicle movements	
	Daytime (7am to 10pm)	Night time (10pm to 7am)
Sydenham Road	8	1
Magill Road (ALDI)	N/A(1)	N/A(1)
Magill Road (Public carpark access)	33	3
Stephen Street – Western townhouses	3	1
Stephen Street – Private basement access	26	3
Stephen Street – Eastern townhouses	2	0

(1) Noise from vehicles associate with ALDI are assessed by Sonus.

Heavy commercial vehicles (HCV) associated with refuse collection and delivery to commercial tenancies are also required. In a worst case 15 minute period only one HCV is expected. We recommend that any heavy vehicle movements (other than those associated with ALDI) are limited to the daytime hours of 7am to 10pm where practicable.

Based on the above, noise emissions from vehicles associated with the proposed development are expected to comply with the daytime and night time noise criteria described in Section 4.

6 Minister's Specification SA 78B

6.1 Road noise

The facades within the 'Designated Area' of the Development Plan are separated from Magill Road by approximately 5 m – 100 m. The relevant Sound Exposure Category (SEC), which determines the acoustic rating of the facade is based on distance from the road. For facades not directly exposed to the noise source, the SEC has been determined in accordance with SA 78B.

The SECs for the facades of the building are shown in mark-ups in Appendix A. Note that the minimum SEC for the facade of a building within a 'Designated Area' is SEC 1.

6.2 Music noise

Buildings in a mixed use land area that are exposed to music noise from an entertainment venue (such as the Alma Tavern) have an SEC of 5 within 65 m of the allotment boundary of the venue.

SA 78B requires that the level of attenuation provided by the *building envelope* and ventilation system against the intrusion of external airborne sound from music must be sufficient to maintain sound levels not exceeding suitable internal sound criteria obtained from either the council or the South Australian Environment Protection Authority. We note that the Norwood Payneham and St Peters Development plan does not contain relevant internal sound criteria.

Appropriate criteria can be found in the EPA Guideline *Music noise from indoor venues and the South Australian Planning System*. For encroaching residential development it is recommended that:

> *Noise from any music venue must not exceed 43dB L_{eq} in any one-third octave band between and including 31.5Hz and 125Hz when assessed **inside** a noise sensitive development, including a bedroom and living room of a residential or short term accommodation premises with windows closed.*

The level of exposure to music noise was determined based on noise measurements at the site between 10pm and 11:00pm on Saturday 21 July 2018. Noise was measured at the location shown in Figure 3, representative of the most exposed proposed residential façade within 65m of the Alma.

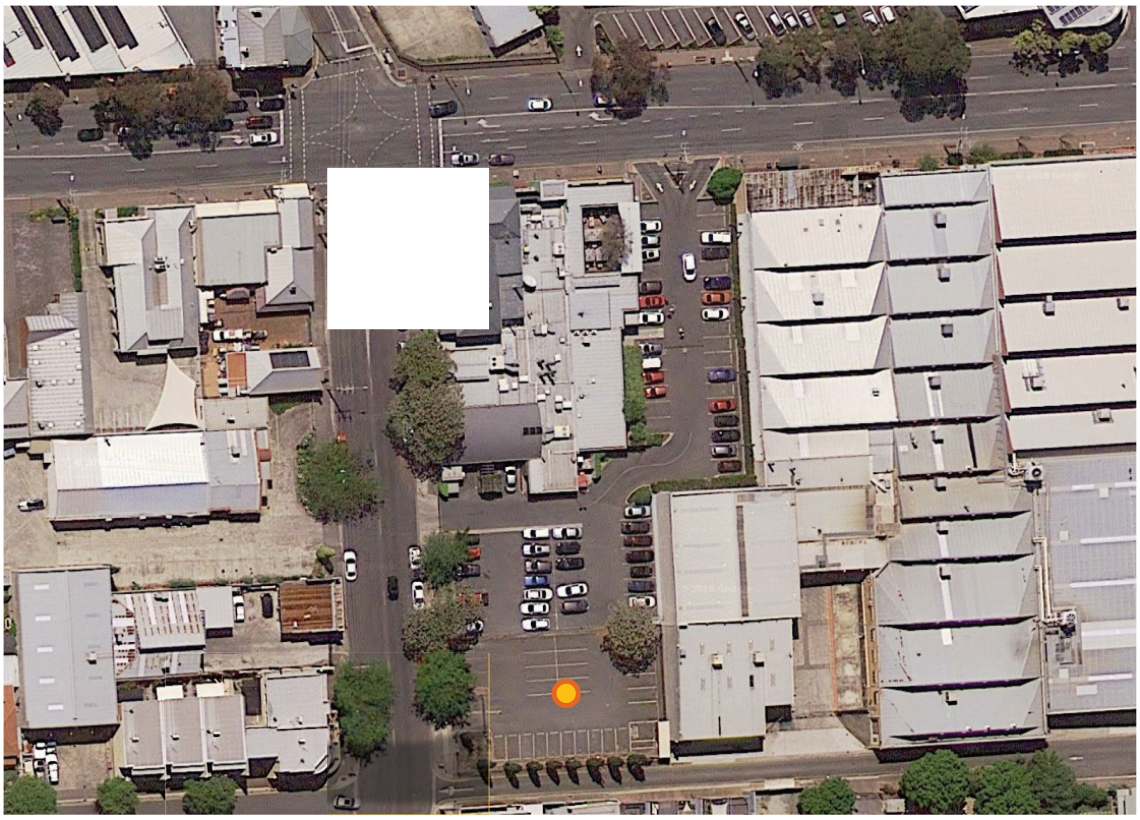


Figure 3: Music noise monitoring location

The highest measured noise levels (15 minute average) during monitoring are presented in Table 5. Whilst music noise was audible at the measurement location, noise from traffic on Magill Road and Sydenham Road, vehicles within the Alma car park, and noise from Alma patrons also contributed to the measured noise levels. Vehicle noise was generally the controlling noise source. It was not possible to separate the contribution of music to overall measured levels.

Table 5 Maximum measured noise levels during monitoring

Measured noise levels, dB L_{eq}								
Octave band centre frequency, Hz								
								58

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6.3 Sound insulation ratings

The appropriate sound insulation ratings for the different relevant SECs based on the *Deemed to Satisfy Provisions* of SA 78B are outlined in Table 6.

Table 6 Minimum acoustic requirements for habitable rooms

SEC	Building element	Location	Acoustic rating
1	External walls	All habitable rooms	$R_W + C_{tr} \geq 45$
	Windows & external glass doors	Refer to Table 7	
2	Ground floor	All habitable rooms	$R_W + C_{tr} \geq 50$
	External walls	All habitable rooms	$R_W + C_{tr} \geq 50$
	Windows & external glass doors	Refer to Table 7	
	External doors other than glass doors	All habitable rooms	$R_W \geq 27$
	Roof and ceiling	Bedrooms	$R_W + C_{tr} \geq 35$
3	Ground floor	All habitable rooms	$R_W + C_{tr} \geq 50$
	External walls	All habitable rooms	$R_W + C_{tr} \geq 50$
	Windows & external glass doors	Refer to Table 7	
	External doors other than glass doors	All habitable rooms	$R_W \geq 30$
	Roof and ceiling	Bedrooms	$R_W + C_{tr} \geq 40$
		All other habitable rooms	$R_W + C_{tr} \geq 35$
4	Ground floor	All habitable rooms	$R_W + C_{tr} \geq 50$
	External walls	All habitable rooms	$R_W + C_{tr} \geq 50$
	Windows & external glass doors	Refer to Table 7	
	External doors other than glass doors	All habitable rooms	$R_W \geq 30$
	Roof and ceiling	Bedrooms	$R_W + C_{tr} \geq 45$
		All other habitable rooms	$R_W + C_{tr} \geq 40$
5	Outside the scope of the *Deemed to Satisfy Provisions*		

The sound insulation ratings for windows and external glass doors are outlined in Table 7 based on the area of the window/glass door divided by floor area of the room.

Table 7 Minimum acoustic requirements for windows and external glass doors($R_W + C_{tr}$)

Room	Area of window and external glass doors as a percentage of the floor area of the room	Designated sound exposure category				
		1	2	3	4	5
Bedroom and attached non-habitable rooms	Not more than 20%	25	28	31	34	*
	More than 20% but not more than 40%	28	31	34	37(1)	*
	More than 40% but not more than 60%	31	34	37(1)	*	*

Room	Area of window and external glass doors as a percentage of the floor area of the room	Designated sound exposure category				
		1	2	3	4	5
	More than 60% but not more than 80%	34	37(1)	*	*	*
	More than 80%	37	*	*	*	*
Habitable rooms (other than bedrooms and enclosed kitchens) and attached non-habitable rooms	Not more than 20%	22	25	28	31	*
	More than 20% but not more than 40%	25	28	31	34	*
	More than 40% but not more than 60%	28	31	34	*	*
	More than 60% but not more than 80%	31	34	*	*	*
	More than 80%	34	*	*	*	*

Notes: (1) An $R_W + C_{tr}$ 37 rating is not specified in SA 78B; however, it is appropriate considering the incremental increase in ratings and SEC levels and the $R_W + C_{tr}$ 37 rating specified for SEC 1 bedrooms with a window area of more than 80% of the floor area.

* Windows and external glass doors are outside the scope of the Deemed-to-Satisfy provisions.

We note that SEC 5 does not necessarily entail a higher level of acoustic insulation compared to SEC 1-4. The requirements are based on the measured music noise spectra and predicted level at each facade, and may be more or less than other SECs.

6.4 Construction requirements

6.4.1 External walls

The external cladding material has not been finalised at this stage. Based on the Deemed-to-Satisfy provisions of SA 78B, the following constructions are appropriate:

- The construction techniques that are suitable for use in external applications specified in **Table 2** of **Specification F5.2** of the NCC; or

$R_w + C_{tr}$ 50 (SEC 2 – 4)

- Two leaves of 110mm clay brick masonry with –
  - a 50mm *cavity* between leaves; and
  - 50mm thick glass wool insulation with a density of 11kg/m^3 or 50mm thick polyester insulation with a density of 20 kg/m^3 in the *cavity*.
- Two leaves of 110mm clay brick masonry with –
  - a 50mm *cavity* between leaves; and
  - 50mm thick glass wool insulation with a density of 11kg/m^3 or 50mm thick polyester insulation with a density of 20 kg/m^3 in the *cavity*; and
  - one layer of 13mm plasterboard battened 50mm from the inside face.
- Single leaf of 90mm clay brick masonry with –
  - a row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; and
  - a *cavity* of 25mm between leaves; and
  - 75mm thick glass or mineral wool insulation with a density of 11kg/m3 or 75mm thick polyester insulation with a density of 14kg/m3, positioned between studs; and
  - one layer of 10mm plasterboard fixed to the inside face.
- Single leaf of 220mm clay brick masonry with –

- 13mm render on the outside face; and
- one layer of 13mm plasterboard fixed to the inside face.

$R_w + C_{tr}$ 45 (SEC 1)

- One row of 90mm studs at 600mm centres with –
  - resilient steel channels fixed to the outside of the studs; and
  - 9.5mm hardboard or 9mm fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside of the channels; and
  - 75mm thick glass or mineral wool insulation with a density of 11kg/m^3 or 75mm thick polyester insulation with a density of 14 kg/m^3 , positioned between the studs; and
  - two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.
- One row of 90mm studs at 600mm centres with –
  - resilient steel channels fixed to the outside of the studs; and
  - one layer of 19mm board cladding fixed to the outside of the channels and 6mm fibre cement sheets fixed to the inside of the channels; and
  - 75mm thick glass or mineral wool insulation with a density of 11kg/m^3 or 75mm thick polyester insulation with a density of 14 kg/m^3 , positioned between the studs; and
  - two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.

The above constructions are intended as examples of suitable systems. Alternative walls systems may be used where it can be demonstrated that the system meets the required rating.

6.4.2 External windows and doors

Indicative external window and door constructions are shown below in Table 8. Finalised constructions will be determined based on the window and floor areas of each habitable room. Note that acoustically equivalent constructions (such as thermal double glazing) can be adopted; however, the constructions are provided as a guide as to the types of constructions required.

Table 8 Indicative window and door constructions

Window or door construction	$R_W + C_{tr}$
Window construction	
3mm thick monolithic or laminated glass with sliding or double hung type opening	22
3mm thick monolithic or laminated glass with awning type opening	25
6mm thick monolithic or laminated glass with sliding or double hung type opening	28
6mm thick monolithic or laminated glass with awning type opening	31
10mm thick monolithic or laminated glass with awning type opening	34
Door construction	
5mm or 6mm thick monolithic or laminated glass sliding door	28

5mm or 6mm thick monolithic or laminated glass side-hung door	31
10mm thick monolithic or laminated glass sliding door	31
10mm thick monolithic or laminated glass side-hung door	34
40mm thick solid core door, side hinged	30

All openable windows and doors should have the following or acoustically equivalent seals:

- sliding doors are to have:
  - Schlegel Q-Lon T-Slot seals on the lock and mullion
  - Schlegel Fin-Seal on the rails
- windows awning style with rubber compression seals around the perimeter such as Schlegel Q-Lon T-Slot seals, or sliding with seals as indicated for the sliding doors
- hinged doors are to have:
  - high quality rubber contact seals for the head and the jambs acoustically equivalent to Kilargo IS1212/1515 or Raven RP120/150
  - dropdown seal at the bottom acoustically equivalent to Kilgaro IS8090si or Raven RP38.

6.4.3 Roof and ceiling

Typical constructions for roof and ceiling are as follows:

- Roof tiles or sheet metal roofing
- Minimum 165mm glass wool insulation with a minimum density of 7 kg/m^3 or minimum 185mm polyester insulation with a minimum density of 11 kg/m^3
- Plasterboard fixed to the underside of joists or trusses as detailed in Table 5 to meet the $R_w + C_{tr}$ requirement.

Table 9 Indicative upper floor ceiling construction

Ceiling construction	$R_w + C_{tr}$
1 x 10mm plasterboard	35
2 x 10mm plasterboard	40
1 x 16mm fire rated plasterboard	40
2 x 13mm fire rated plasterboard fixed to furring channels to the underside of the joists or trusses	45

6.4.4 Ventilation

Natural ventilation

In SEC 1 – 3 natural ventilation must be provided in accordance with the NCC. To meet this requirement, fresh air ventilation can be provided with operable windows.

6.4.5 Construction requirements for control of music noise

Indicative constructions are shown in Table 9 are suitable for the control of music noise to achieve the recommended criteria in the 63 and 125 Hz octave bands, for habitable spaces within 65m of the boundary of the Alma site. This applies to all Type A and most Type B townhouses.

We note that sound transmission data for typical construction materials is not generally available in the 31.5 Hz band, therefore it is not practicable to predict internal noise levels at this frequency. However we expect that control of noise at 63 Hz and above is expected to provide an acceptable internal acoustic environment, noting that significant bass noise was not observed from the Alma Tavern, and that other external noise sources (other than music) generally controlled the overall noise environment.

Table 10 Indicative façade construction requirements for the control of music noise for habitable spaces within 65 of the Alma Tavern.

Façade element	Construction requirement
Walls	Minimum $R_W + C_{tr}$ 45 walls, for example those described in Section 6.4.1.
Glazing	Minimum 10.38mm acoustic laminate
Roof and ceiling	Minimum $R_W + C_{tr}$ 40 roof and ceiling, for example those described in Section 6.4.3.

Alternative constructions may be adopted at the detailed design stage where it can be demonstrated that appropriate internal music noise levels can be achieved in habitable spaces.

7 Noise intrusion from other sources

Noise intrusion from sources other than road, rail and music noise sources is not specifically addressed in SA 78B. As such, noise intrusion from the proposed ALDI store and any other significant noise sources is assessed separately.

Advice from Sonus (received via email 10 April 2018) in relation to the ALDI is that:

> *…proposed residences should be designed to achieve the relevant internal noise criteria of the Environment Protection (Noise) Policy 2007, based on the following noise levels being experienced at any facades with line of sight to the ALDI delivery truck movements:*

	Noise Level in Octave Band Centre Frequency (dB(A))							***Total (dB(A))***
	63Hz	***125Hz***	***250Hz***	***500Hz***	***1000Hz***	***2000Hz***	***4000Hz***	
Average noise level (L_{Aeq}) during the day	*40*	*44*	*48*	*50*	*52*	*50*	*47*	*57*
Average noise level (L_{Aeq}) during the Night	*31*	*35*	*39*	*44*	*47*	*44*	*39*	*51*
Maximum (L_{Amax}) Noise Level	*56*	*66*	*68*	*68*	*75*	*73*	*66*	*79*

Further advice was provided by Sonus on 19 July 2018 is that ALDI delivery and refuse collection trucks will not use the Sydenham Road exit during night time hours (and will instead exit directly onto Magill Road), and that noise levels of 3 dB less than those given above are expected at the most distant Type B townhouses.

We note that the internal noise level criterion in the Noise EPP are based on AS/NZS 2107:2000, which does not contain criteria expressed in $L_{Amax.}$ A night time internal noise criteria of 50 dB(A) L_{Amax} within bedrooms is considered suitable based on only 1-2 truck delivery or refuse collection truck movements each night. We note that Sonus and Resonate are in agreement that achieving this internal level (in addition to Noise EPP criteria) will be sufficient to mitigate any adverse amenity effects resulting from night time ALDI delivery vehicle noise.

Based on the above, an external to internal noise reduction of 29 dB(A) is required for the most exposed proposed townhouse residences. With the adoption of SEC 1 façade construction as required by SA 78B, and any additional treatment as required for control of music noise (as described in Section 6.4.5), the above criteria are expected to be achieved without requiring any further treatment. We recommend that the treatment recommended in Section 6.4.5 is adopted for all Type A and B Townhouses and all west-facing apartments, unless a higher level of treatment is required for control of Magill Road traffic noise.

We expect that ALDI external plant noise can be mitigated at the noise source such that further facade mitigation is not required. We are not aware of any other significant industrial or other noise sources in the area surrounding the site.

8 National Construction Code

The residential elements of the proposed development will be classified as Class 2/3 under the NCC. Class 2/3 buildings must achieve the objectives outlined in Part F5 of the NCC *Sound Transmission and Insulation*. The acoustic requirements applicable to this development are outlined in Table 11.

Table 11 NCC requirements for Class 2 and 3 buildings

Building element	Description	Impact noise requirements	Airborne noise criteria
Floors	Separating sole-occupancy units and separating sole-occupancy units and a plant room, lift shaft, stairway, public corridor, public lobby or the like.	$L_{n,w} \leq 62$	$R_w + C_{tr} \geq 50$
Walls	Separating sole occupancy units	—	$R_w + C_{tr} \geq 50$
	Separating a habitable room of a sole occupancy unit from a bathroom, sanitary compartment, laundry or kitchen in an adjacent sole occupancy unit	Discontinuous construction(1)	$R_w + C_{tr} \geq 50$
	Separating a sole occupancy unit and a stairway, public corridor, public lobby or the like	—	$R_w \geq 50$
	Separating a sole occupancy unit and a plant room and lift shaft	Discontinuous construction(1)	$R_w \geq 50$
	A door between a sole occupancy unit and a stairway, public corridor, lobby or the like.	—	$R_w \geq 30$
Ducts, water supply, waste and soil pipes	A duct, soil, waste or water supply pipe located in a wall or floor cavity, serves or passes through more than one sole occupancy unit if the adjacent room is a habitable room (other than a kitchen)	—	$R_w + C_{tr} \geq 40$
	A duct, soil, waste or water supply pipe located in a wall or floor cavity, serves or passes through more than one sole occupancy unit if the adjacent room is a kitchen or any other room.	—	$R_w + C_{tr} \geq 25$
Stormwater pipes	If a storm water pipe passes through a habitable room (other than a kitchen).	—	$R_w + C_{tr} \geq 40$
	If a storm water pipe passes through a kitchen or any other room.	—	$R_w + C_{tr} \geq 25$
Services	A duct, soil, waste, water supply pipe and stormwater pipe located in a wall or floor cavity, serves or passes through more than one sole occupancy unit if the adjacent room is a habitable room (other than a kitchen(2))	—	$R_w + C_{tr} \geq 40$
	A duct, soil, waste, water supply pipe and stormwater pipe located in a wall or floor cavity, serves or passes through more than one sole occupancy unit if the adjacent room is a kitchen(2) or any other room.	—	$R_w + C_{tr} \geq 25$

Building element	Description	Impact noise requirements	Airborne noise criteria
Pumps	The point of connection between the service pipes in a building and any circulating or other pump.	A flexible coupling at the connection	—

(1) Discontinuous construction is defined such that walls are to have a minimum 20 mm gap between separate leaves. Cavity masonry walls are to have resilient wall ties or no wall ties. For other walls there are to be no mechanical linkages between wall leaves except at the wall periphery. A staggered stud wall is not deemed to be discontinuous.

(2) If the kitchen is open to the living area, the $R_w + C_{tr} \geq 40$ criterion is applicable rather than the $R_W + C_{tr} \geq 25$ criterion.

The proposed development will be designed and constructed to achieve the above requirements. Additional balcony screening or fins may be required in some locations to comply with Residential Development PDC 273.

9 Conclusion

An external noise intrusion and environmental noise emission assessment has been undertaken for the proposed mixed use development at 76 Magill Road. The assessment has taken into account the relevant noise requirements of the Norwood Payneham and St Peters Council Development Plan, Minister's Specification SA 78B and the SA Noise EPP.

Indicative facade treatments to mitigate Magill Road traffic noise and Alma Tavern music noise have been provided. Noise from loading dock activity and delivery/refuse collection vehicles associated with the proposed ALDI supermarket has also been considered, based on predicted external noise levels and other advice provided by Sonus. The mitigation required for control of external traffic and music noise (if applied to all Type A and B Townhouses, and all west-facing apartments) is sufficient to also control loading dock and delivery vehicle noise from the ALDI such that acceptable internal noise levels are achieved.

We note that alternative constructions may be adopted at the detailed design stage where it can be demonstrated that the relevant criteria can be achieved in habitable spaces.

The development will be designed to achieve the requirements of the NCC Part F5 in relation to acoustic separation between sole occupancy units.

Whilst mechanical plant selections and noise data are not available at this stage, it is expected that noise emissions from external mechanical plant associated with the development can meet the relevant criteria with standard mitigation measures as required.

Noise from vehicles associated with the development is expected to comply with the relevant noise limits at all locations. We recommend that heavy vehicle movements for refuse collection and deliveries (other than those associated with ALDI) are limited to daytime hours (7am to 10pm) only.

The objective noise criteria within the Norwood Payneham and St Peters Council Development Plan, Minister's Specification SA 78B and the SA Noise EPP can be achieved with the adoption of appropriate façade construction and environmental noise mitigation techniques.

Appendix A – Sound Exposure Category Mark-up

SA 78B Markup
Date: 23.07.2018
Revision: 0
Project: 76 Magill Road, Norwood
Project Number: A180159

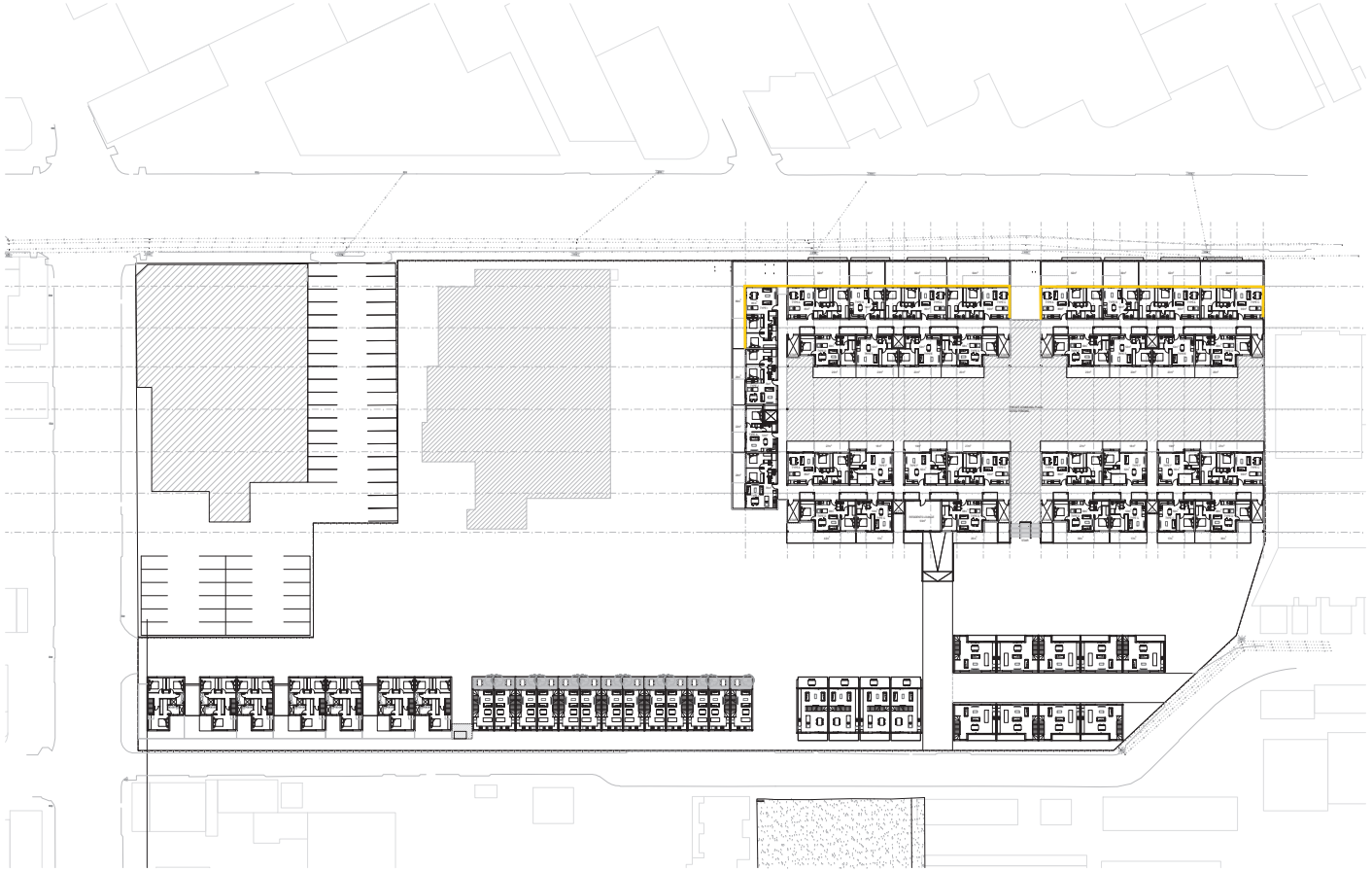
Resonate

LEVEL1

SEC 2

SEC 3

Note: All other habitable room external facades are SEC 1



LEVEL 1 FLOOR PLAN
1:500 @ A1

PRELIMINARY
13/07/18

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REV	DATE	DESCRIPTION

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PROJECT
76 MAGILL ROAD
NORWOOD

CLIENT
ALDI | CA CA

DRAWING
FIRST FLOOR PLAN

NORTH

PROJECT NO
28055

DWG NO
P03

SCALE
AS SHOWN

DATE
JULY 2018

REVISION	CHECKED	DRAWN
0.3	FB	mdf

SA 78B Markup
Date: 23.07.2018
Revision: 0
Project: 76 Magill Road, Norwood
Project Number: A180159

Resonate

LEVELS 2-5

SEC 2

SEC 3

Note: All other habitable room external facades are SEC 1



LEVEL 2 FLOOR PLAN
1:500 @ A1

PRELIMINARY
13/07/18

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PROJECT
76 MAGILL ROAD
NORWOOD

CLIENT
ALDI | CA CA

DRAWING
SECOND FLOOR PLAN

NORTH

PROJECT NO
28055

DWG NO
P04

SCALE
AS SHOWN

DATE
JULY 2018

REVISION	CHECKED	DRAWN
0.3	FB	mdf

SA 78B Markup
Date: 23.07.2018
Revision: 0
Project: 76 Magill Road, Norwood
Project Number: A180159

Resonate

LEVEL 6

SEC 2

SEC 3

Note: All other habitable room external facades are SEC 1



LEVEL 6 FLOOR PLAN
1:500 @ A1

PRELIMINARY
13/07/18

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PROJECT: 76 MAGILL ROAD NORWOOD
CLIENT: ALDI | CA CA

DRAWING: SIXTH FLOOR PLAN
SCALE: AS SHOWN
DATE: JULY 2018
NORTH

PROJECT NO: 28055
DWG NO: P08
REVISION: 0.3
CHECKED: FB
DRAWN: mdf

ALDI Norwood

Environmental Noise Assessment

July 2017

S4217.23C5

sonus.

Chris Turnbull
Principal
Email: ct@sonus.com.au
www.sonus.com.au

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INTRODUCTION

An environmental noise assessment has been made of the ALDI supermarket proposed on Magill Road, Norwood as shown in Appendix A.

The closest noise sensitive receivers to the proposed ALDI supermarket are the proposed residences on the same development site (as shown in Appendix A). Existing residences are also located to the south of the site, on the opposite side of Stephen Street.

The overall development is well considered from an environmental noise perspective with the ALDI supermarket located closest to the highest existing noise sources (Magill Road and the ALMA Hotel). This provides a greater distance between the proposed residential use to the south of the site and the existing noise sources. The proposed residences on the site (which will be designed to protect occupants from noise) also provide a barrier between the commercial activity at the ALDI supermarket and the closest existing residences on the opposite side of Stephen Street.

This assessment considers noise levels at the existing and proposed noise sensitive receivers from the following activity at the site:

- car park activity and vehicle movements;
- operation of mechanical plant;
- deliveries; and,
- rubbish collection.

The assessment has been based on the following:

- *Select Architects* drawings “SP03-1-P3” with project number “A1611”, dated 13 July 2018;
- the assumption that the ALDI supermarket will not trade before 7am or after 10pm;
- implementation of measures described in the ALDI SA, "Delivery and loading procedures" (such as turning off refrigeration and reversing beepers when delivering) to minimise the noise;
- low level exhausts and attenuated compressed air release on all trucks that attend the site; and,
- mechanical plant being located on the roof in the north western corner of the building.

This assessment summarises the prediction of noise from the proposed ALDI supermarket, compares the predictions with the relevant criteria, and provides recommendations for acoustic treatment to ensure that the noise from the proposal does not detrimentally affect the amenity of the locality.

CRITERIA

Development Plan

The proposed site (including the proposed residences on the same development site as the ALDI supermarket) is located within an Urban Corridor Zone, and the existing noise sensitive land uses on the opposite side of Stephen Street and Sydenham Road are located within two different types of zones, being a Mixed Use and a Residential Zone. The proposed site and the noise sensitive land uses are all located with the Norwood Payneham and St Peters Council Development Plan[1]. The Development Plan has been reviewed and the following provisions are considered relevant to the noise assessment.

Interface between Land Uses

OBJECTIVES

Objective 26: Development located and designed to minimise adverse impact and conflict between land uses.

Objective 27: Protect community health and amenity from the adverse impacts of development and support the continued operation of all desired land uses.

PRINCIPLES OF DEVELOPMENT CONTROL

80. *Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:*

...

(b) Noise;

....

84. Non-residential development on land abutting a residential zone or within a residential zone should be designed to minimise noise impacts and achieve adequate levels of compatibility between existing and proposed uses.

Noise Generating Activities

86. Development that emits noise (other than music noise) should include noise attenuation measures that achieve the relevant Environment Protection (Noise) Policy criteria when assessed at the nearest existing noise sensitive premises.

87. Development with the potential to emit significant noise (e.g. industry) should incorporate noise attenuation measures that prevent noise from causing unreasonable interference with the amenity of noise sensitive premises.

[1] Consolidated – 19 December 2017

Centres, Shops & Business

PRINCIPLES OF DEVELOPMENT CONTROL

293. The location and design of centres and shopping development should ensure that all sources of noise, including refrigeration and air conditioning equipment, garbage collection and car parking, do not cause excessive or disturbing noise at neighbouring properties.

308. Development within business, centre and shopping zones should conform to the following design principles:

…

(d) Development should not cause nuisance or hazard arising from:

…

(ii) excessive noise;

…

Environment Protection (Noise) Policy

Interface between Land Uses Principle of Development Control 86 makes reference to the Environment Protection (Noise) Policy. The current version is the Environment Protection (Noise) Policy 2007 (the Policy).

The Policy is based on the World Health Organisation Guidelines to prevent annoyance, sleep disturbance and unreasonable interference on the amenity of an area. Therefore, compliance with the Policy is considered to be sufficient to satisfy the provisions of the Development Plan relating to environmental noise.

Noise from Rubbish Collection

The Policy deals with rubbish collection by limiting the collection hours to the least sensitive period of the day. Division 3 of the Policy requires rubbish collection to only occur between the hours of 9am and 7pm on Sunday or public holiday, and between 7am and 7pm on any other day, except where it can be shown that the maximum (L_{max}) noise level from such activity is less than 60 dB(A).

Noise from all other Activity

The Policy sets goal noise levels based on the principally promoted land use in which the noise source (proposed ALDI supermarket) and noise sensitive receivers are located, and adjusts these noise levels based on the characteristics of the proposed noise sources and the existing acoustic environment in the vicinity.

For a development located in a zone that promotes a combination of residential and commercial uses, the following external goal noise levels apply to the existing residences:

	Average noise level (L_{Aeq}) during the day	Average noise level (L_{Aeq}) during the Night	Maximum (L_{Amax}) Noise Level
Existing residences in Residential Zone	45	38	60
Existing residences in Mixed Use Zone	47	40	-

For the proposed residences on same development site as the ALDI supermarket, the Policy provides an approach whereby the facade can be designed to achieve suitable internal noise levels. The Policy provides the appropriate noise criteria in these circumstances such that an appropriate level of amenity is achieved and the ALDI supermarket is protected from future complaint.

ASSESSMENT

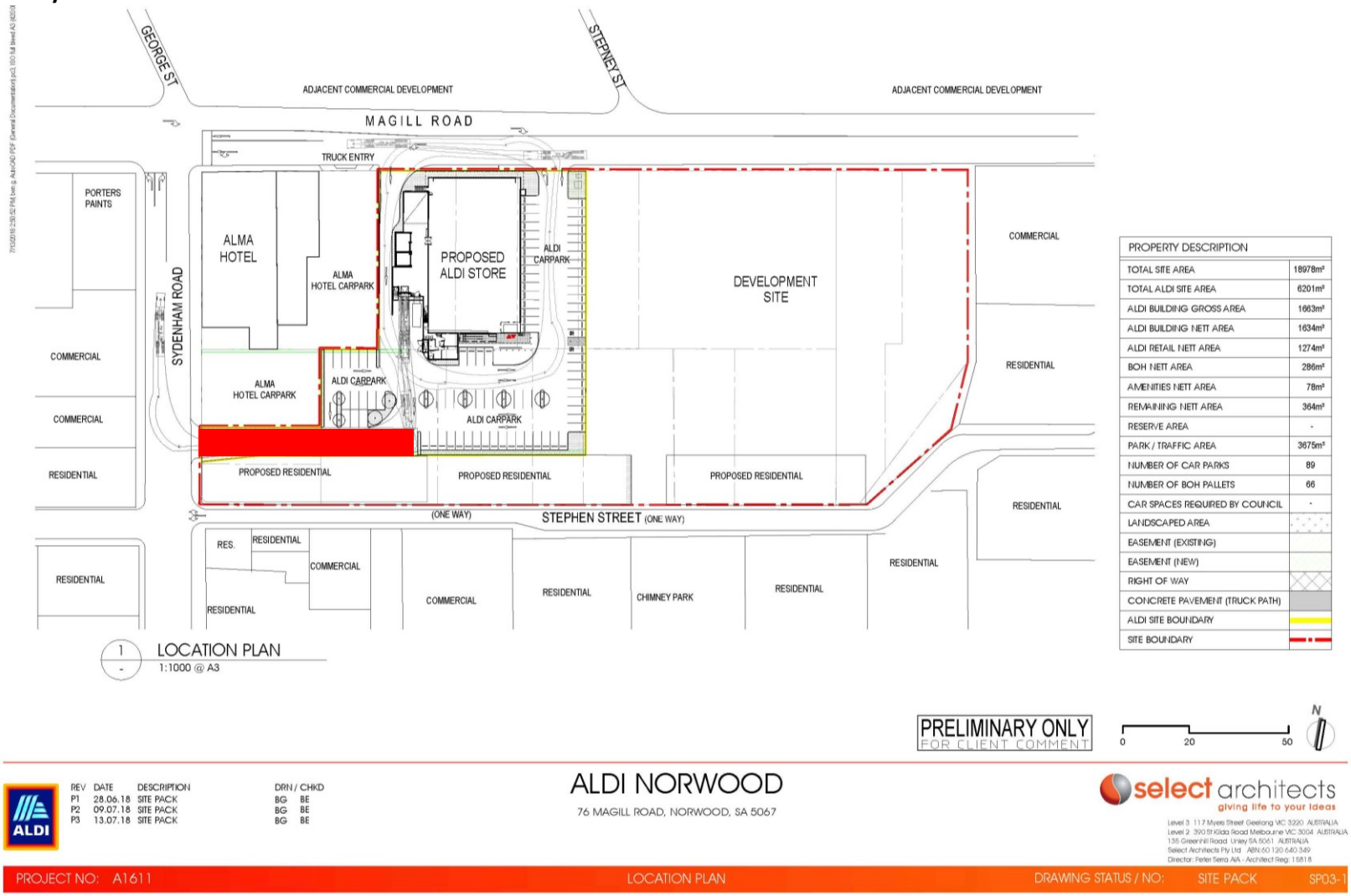
By providing the acoustic treatments detailed below, the noise levels at existing residences are predicted to achieve the assessment criteria:

- Restrict the operation of the compactor to the hours between 7am and 10pm.
- Restrict the hours of rubbish collection from the site and any use of the refuse area to the hours of Division 3 of the Environment Protection (Noise) Policy 2007. That is, only between the hours of 9am and 7pm on a Sunday or public holiday, and 7am and 7pm on any other day.
- Restrict the exit of trucks to Sydenham Road to the hours between 7am and 10pm. For truck deliveries outside of these hours, the truck should not enter the area shaded as red in Appendix A but rather exit the site directly onto Magill Road.

The proposed residences on same development site will be designed to achieve the relevant internal noise criteria of the *Environment Protection (Noise) Policy 2007*, based on the following external noise levels:

	Noise Level in Octave Band Centre Frequency (dB(A))							Total (dB(A))
	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	
Average noise level (L_{Aeq}) during the day	40	44	48	50	52	50	47	57
Average noise level (L_{Aeq}) during the Night	31	35	39	44	47	44	39	51
Maximum (L_{Amax}) Noise Level	56	66	68	68	75	73	66	79

Appendix A: Site Layout



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F: +61 8 8223 6248
admin@buildsurv.com.au
www.buildsurv.com.au

BuildSurv
Building Surveyors & Certifiers

BCA Advice

To:	Brian Emmett (Select Architects)	Page/s: (incl. this page)	4
CC:	Ben George (Select Architects), Andrew Woods (WGA), Pat Callisto (Lucid), Patrick Campbell (BCAE), Ashley Greiner (ALDI)		
Reference:	ALDI Norwood – Design Feasibility - BCA Comments		
File/Ref No.	2018.4018	Date:	29/07/2018

Hi Brian,

In reference to your email of the 30th of April, 2018 containing the Feasibility Plans for the new ALDI Norwood freehold store at Magill Road, Norwood. We have also received updated plans and details on the 27th of July, 2018.

In relation to the new store (excluding the Retail and Residential Development on the site) we can provide the following preliminary advice with regards to Building Code of Australia (BCA) Compliance.

Administration:

- We noted that the site has not yet been created as yet and there are existing buildings on the site which will need to be demolished. It is assumed that the application for the ALDI store will be on a clear site with the current site being cleared of all buildings and infrastructure and as such, our scope will be to assesses and grant Building Rules Consent for the new ALDI building only.

A Classification:

- The proposed building will be a Class 6 (shop/supermarket) building.

B Structure:

- As part of the Building Rules assessment we will require a footing design report and also structural calculations to conduct a 3rd party review of the design. This will need to be provided by WGA. They will also need to cover ancillary items (such as the effect of the demolition of the existing buildings on the foundation, the design for any retaining walls as required and, the roof loads for the solar panels).

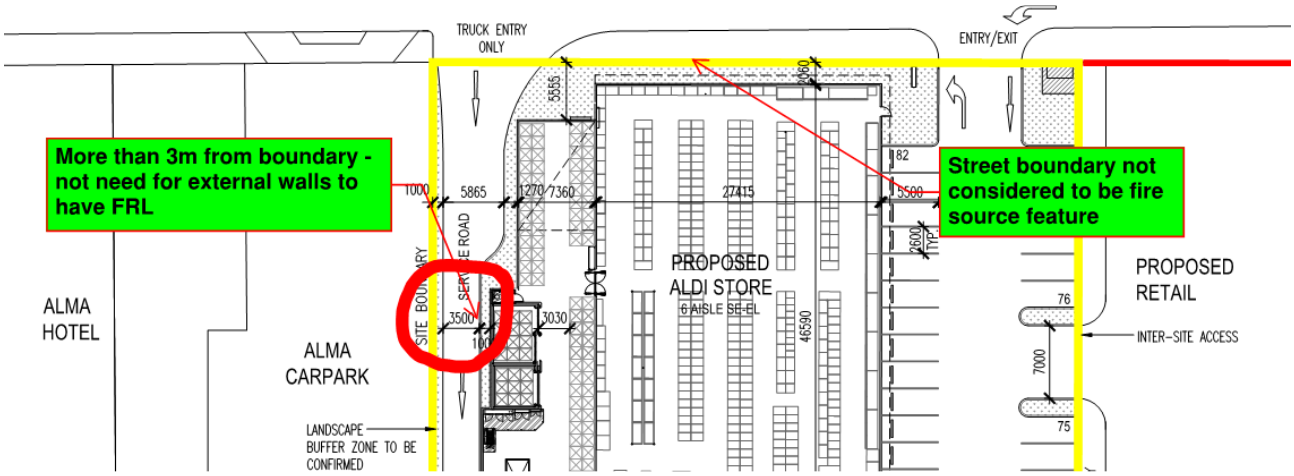
C Fire Resistance:

- The proposed building will be of Type C construction. The size of the building is less than the 2000 m2 permitted for a Class 6 building which complies.

- The preliminary plans indicate that the external walls will be greater than 3 metres from the western boundary (3.6m) and that the other walls are not exposed to any boundaries or other buildings (i.e. no fire source features). As such, the external walls and openings within will not be required to have any fire ratings (see diagram below).

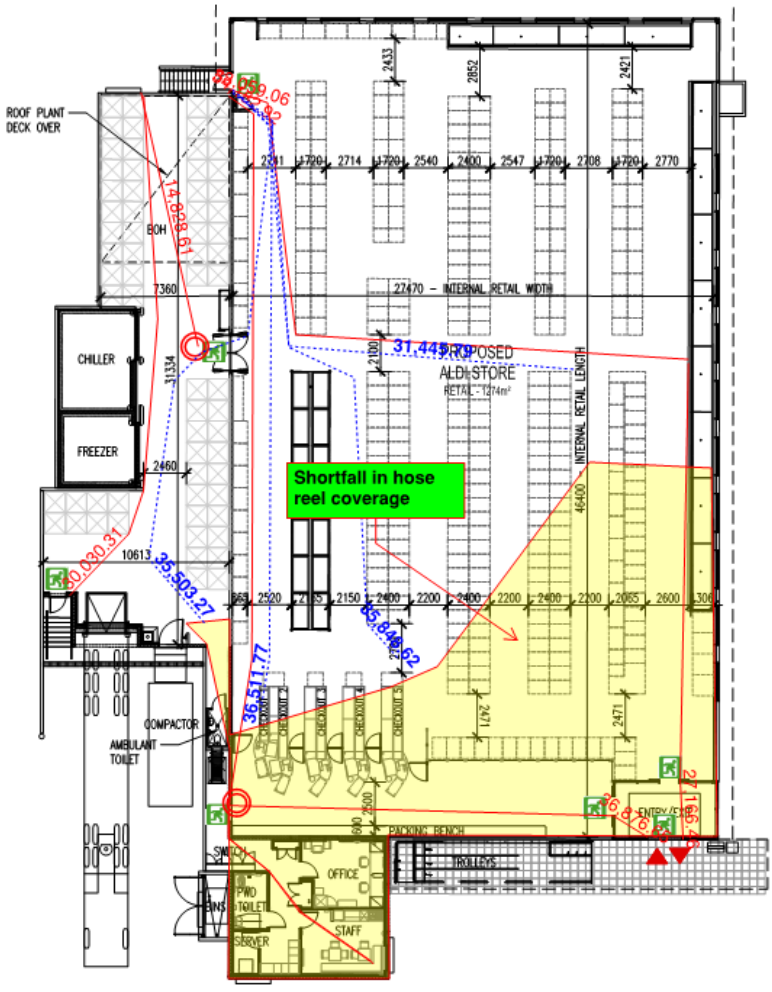
- As the building is single storey none of the internal wall or load bearing elements will be required to be fire rated.

- It is noted that the store will be a 6 isle non-generic store and that all surface linings and finishes will be as per the standard ALDI specification.



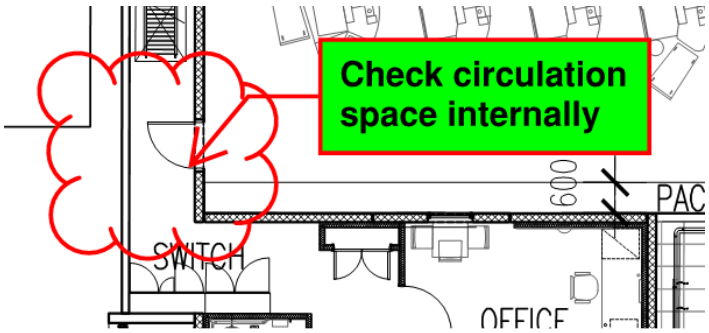
D Access and Egress:

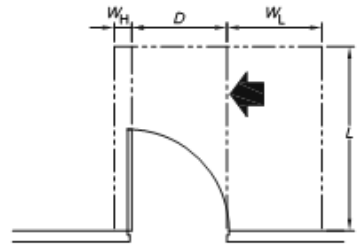
- The store will require 2 egress doors not more than 40m from any part of the store and not more than 60 m apart.
- As per the below and attached, we have assumed the egress paths out of the building which look to be less than 40m. The layout also complies with the distance between exit doors which is less than 60 m



- Disabled access is required to the building. The 2 allocated carparks comply (only 2 required) and, the placement of tactile indicators as shown on the floor plan is considered to generally comply (depth and distance from bollards to be confirmed). The path of travel from the carpark to the main entry will need to be at a gradient of 1:40 per permit access for a persons with a disability access.

- We noted that the access from the retail floor to the passage leading to the offices does not comply for disabled access. We would recommend that this area be reviewed to ensure compliance with the figure below by providing a passage width of at least 1670 to allow a person with a disability for the offices to travel back into the retail area.





Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1670	110	900
900	1670	110	900
950	1670	110	900
1000	1670	110	900

(f) Latch-side approach, door opens towards user

- As previously discussed with ALDI, we are assuming that the store can provide for 200 persons but, will never achieve this occupancy on a frequent basis and, that the AC system will be designed for less as directed by ALDI. A total of 200 persons will be reflected on the Certificate of Occupancy issued at the completion of the project.

E Services and Equipment:

- The building is required to be provided with a hydrant, hose reel and portable fire extinguishers.

- The services engineer will need to provide their location and evidence that the location of the hydrants and the flows and pressures comply with AS2419.1. The store is located in a SAMFS region.

- We observed that the current plan has a hose reel located at the rear exit which does not provide complete coverage to the floor area (refer yellow highlighted space on egress plan). This is a Generic Performance Solution and as such, we will need to submit the plans to the SAMFS for a Reg 28 comment **(see Performance Solutions below)**

- We have also noted on the egress plan above that there are some shortfalls in the store for hose reel coverage (as per shaded yellow parts). Its assusmed that this will be a Performance Solution pursued with the SAMFS **(see Performance Solutions below).**

F Health and Amenity:

- The store will need to have a unisex accessible sanitary facility in the staff area in addition to the drivers toilet shown. This has been shown on the current drawings. The toilet provisions will permit 20 employees.

J Energy Efficiency:

- The proposed building is in Climate zone 5 meaning that the following R-values to the conditioned spaces will need to be achieved for Deemed to Satisfy (DTS) BCA compliance:

    - Roof/Ceiling - R3.7 (assuming a medium roof colour – we can confirm value once selected)
    - Walls – R2.8 (or R1.4 using tilt-panel with furring channels only)

- If there are to be non-conditioned areas, the walls between conditioned and non-conditioned spaces will need to achieve a R-value of R1.8. The mechanical consultant will need to provide information about what areas are conditioned and non-conditioned.

- The services consultant will need to seek direction from ALDI whether a DTS approach or a performance solution using the JV3 method will be used to satisfy the Part J provisions of the BCA.

Performance solutions:

As part of our review the follow Performance provisions will need to be addressed as part of the design and documentation:

Relevant *Performance Requirement(s)*	Relevant *Deemed-to-Satisfy Provision(s)*	***Performance Solution(s)* Assessed** *(Building Solution* which complies with the *Performance Requirements)*
a) BCA-EP1.1	**BCA-E1.4**	To permit a shortfall in fire hose reel coverage.

These Performance Solutions will need to be justified by Service Engineer as part of the Fire Engineering Report which we will liaise with the SAMFS as part of the Reg 28 Submission once the hydrant performance information has been provided.

We hope that this report assists in the design feasibility and please do not hesitate to call me if you need to clarify the items above.

Regards,



Brett Fennell
Director
Building Surveyor and Private Certifier

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Katnich Dodd
Building Certifiers
Knowledgeable
Dependable

Buildtec
99 King William Street
Kent Town SA 5067

25 July, 2018

Attention: Daniel De Conno

Re: 76 Magill Road, Norwood – NCC – BCA – Vol1 – Initial Comments

Dear Daniel

This correspondence is to confirm that Katnich Dodd has been engaged as the Private Certifiers for the abovementioned project. To date we have undertaken a preliminary review of the planning documentation and feel that the building (subject to performance based alternate solutions to be further reviewed and supported by the SAMFS) will be able to satisfy the minimum requirements of the NCC BCA Vol 1 & Vol 2 with regards to a mixed use building of Class 2, 6 & 7a classifications as well as the Class 1 dwellings detached from the main complex.

The review has been based on the following documentation:

- 76 Magill Road Design Report Version 1 dated 23 Jul 2018, and
- Carom 76 Magill Road Norwood 28055 July 2018 DPC Issue V.0.4 dated 23 July 2018

This correspondence does not constitute a certificate of compliance with the Building Rules as it is to be considered only for the planning application process only.

Yours faithfully

Vic Barone 25 July, 2018
Certificate of Registration as a Private Certifier No. 057



©
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Directors
Ian Dodd: 0417 827 800
Peter Harmer: 0417 827 013
Vic Barone: 0433 457 588

54526-116823 L03 (Rev1)

30 July 2018

Mr Daniel De Conno
Development Director
Buildtec
Via email: dd@buildtec.com.au

Summary of Environmental Status of the Caca Portion of 76 Magill Road, Norwood, South Australia

Dear Daniel,

JBS&G Australia Pty Ltd (JBS&G) have undertaken a review of environmental works completed to date and provided a summary of the environmental status of the Caca portion of 76 Magill Road, Norwood, South Australia (the site). The Caca portion is defined as all Stages with the exception of Stage 1A shown in the attached plan (**Attachment A**).

The works undertaken at the site to date include desktop review of the history of the site[1], soil investigation[2,3,4], groundwater investigation[2,4,5] and soil vapour investigation[6]. These reports have been included as attachments to this letter.

Based on the environmental investigations completed to date (referenced above and included in **Attachment B** to **Attachment H**), significant contamination which would preclude the use of the site for the proposed use as a mixed-use development (including a shopping centre, low / medium / high density residential landuse and a park / recreational public use area) has not been identified, subject to the appropriate management of surface fill material.

It is noted preliminary classifications and volume estimates were calculated for the Caca portion of the site and provided to RenewalSA[7] for review along with soil data for the Caca portion of the site. Following review of this data, RenewalSA stated they will accept the entirety of the material described within JBS&G (2018), which includes all fill material and some natural soils across the Caca portion of the site. This proposed development measure (removal of these soils from site to the RenewalSA Soil Bank) will result in appropriate management of the surface fill material. Correspondence from RenewalSA regarding the soils is included in **Attachment I**.

1 *Preliminary Environmental Site Assessment, GWA Bathrooms and Kitchens, 76 Magill Road, Norwood, South Australia*, Noel Arnold & Associates, July 2011 (Noel Arnold & Associates 2011a).
2 *Environmental Assessment, 76 Magill Road, Norwood, South Australia,* Noel Arnold & Associates, November 2011 (Noel Arnold & Associates 2011b).
3 *Environmental Update Letter Report, 76 Magill Road, Norwood, South Australia,* Greencap, 23 December 2015 (Greencap 2015).
4 *Environmental Assessment, Caroma Manufacturing Facility, 76 Magill Road, Norwood, South Australia,* Progressive Risk Management (PRM), October 2016 (PRM 2016).
5 *Groundwater Assessment – 76 Magill Road, Norwood, South Australia (DRAFT),* LBWco Pty Ltd, 23 March 2018 (LBWco 2018).
6 *Results from Stage 1 Environmental Investigation (Vapour Screening) at 76 Magill Road, Norwood, South Australia,* JBS&G Australia Pty Ltd, 13 June 2017 (JBS&G 2017).
7 *Preliminary Soil Classification and Volume Estimates for the Caca Portion of 76 Magill Road, Norwood, South Australia,* JBS&G Australia Pty Ltd, 31 May 2018 (JBS&G 2018).

Should you require clarification, please contact the undersigned on 08 8431 7113 or by email klough@jbsg.com.au.

Yours sincerely:



Kate Lough
Associate Environmental Scientist
JBS&G Australia Pty Ltd

Reviewed/Approved by:



Will Ellis
Principal Engineer
JBS&G Australia Pty Ltd

Attachments

Attachment A – Site Development Stage Plan
Attachment B – Preliminary Environmental Site Assessment, GWA Bathrooms and Kitchens, 76 Magill Road, Norwood, South Australia, Noel Arnold & Associates, July 2011 (Noel Arnold & Associates 2011a)
Attachment C – Environmental Assessment, 76 Magill Road, Norwood, South Australia, Noel Arnold & Associates, November 2011 (Noel Arnold & Associates 2011b)
Attachment D – Environmental Update Letter Report, 76 Magill Road, Norwood, South Australia, Greencap, 23 December 2015 (Greencap 2015)
Attachment E – Environmental Assessment, Caroma Manufacturing Facility, 76 Magill Road, Norwood, South Australia, Progressive Risk Management (PRM), October 2016 (PRM 2016)
Attachment F – Groundwater Assessment – 76 Magill Road, Norwood, South Australia (DRAFT), LBWco Pty Ltd, 23 March 2018 (LBWco 2018)
Attachment G – Results from Stage 1 Environmental Investigation (Vapour Screening) at 76 Magill Road, Norwood, South Australia, JBS&G Australia Pty Ltd, 13 June 2017 (JBS&G 2017)
Attachment H – Preliminary Soil Classification and Volume Estimates for the Caca Portion of 76 Magill Road, Norwood, South Australia, JBS&G Australia Pty Ltd, 31 May 2018 (JBS&G 2018)
Attachment I – Correspondence from RenewalSA

Our ref: 170917 L04

26 July 2018

DELIVERING
ENVIRONMENTAL
SOLUTIONS

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Mr Nigel Uren
ALDI Stores
84 Gallipoli Drive
Regency Park SA 5010

Dear Nigel,

Proposed ALDI Store at 76 Magill Road, Norwood SA
Environmental Suitability of Land for Commercial Land Use

In April 2017, LBW co Pty Ltd (LBWco) was engaged by ALDI Stores to provide environmental review, assessment and advisory services regarding the acquisition and proposed retail redevelopment of a portion of the property at 76 Magill Road, Norwood SA. Extensive environmental investigations have been undertaken at the site by LBWco and others, which collectively constitute a Detailed Site Investigation consistent with the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 (as amended 2013) and provide a high confidence characterisation of the contamination status of the site. A summary listing of all known environmental assessment works to date for the above property is provided below.

1. A site history investigation in 2011 for GWA Bathrooms and Kitchens (Caroma)
2. A soil and groundwater investigation in 2011 for Caroma
3. An update letter report in 2015 for Renewal SA to compare the 2011 site data against current environmental risk screening criteria (ASC NEPM 1999, as amended 2013)
4. A soil and groundwater investigation in 2016 for Caroma and Renewal SA in respect of lease exit by Caroma
5. A soil vapour investigation in 2017 for Buildtec
6. An additional soil investigation of the ALDI portion of the site in 2017 for ALDI Stores
7. An additional groundwater investigation in 2017 for ALDI Stores

Refer to page 2 for a full reference list.

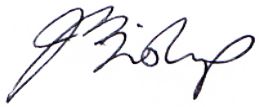
LBWco reviewed the reports produced by others for work items 1 – 5 and undertook work items 6 and 7. Based on the comprehensive assessment information available, LBW co concluded that there was no evidence of site contamination within the ALDI portion of the site that would preclude the proposed commercial land use and therefore no remediation is required to make the site suitable for ALDI's purpose.

Together with representatives of ALDI's joint venture partners, LBWco provided advice on the waste characteristics of the fill materials and soils that will be surplus to redevelopment needs onsite. The advice was considered by Renewal SA in regard to suitability of the waste soils to be transferred to Renewal SA's Soil Bank site at Gillman SA. Renewal SA confirmed to the joint venture that all surplus materials from the redevelopment works are acceptable to be transferred to the Soil Bank, where the materials will be beneficially and sustainably reused as Waste Derived Fill.

Prior to commencement of any redevelopment works onsite, LBWco will prepare (for ALDI's approval) a construction environmental management plan (CEMP) to guide the environmental management of the site works to help ensure the general environmental duty obligations of ALDI and its contractors are well considered and can be responsibly met.

Should you have any questions or require further clarification, please contact the undersigned on 8331 2417 or via email to jarrod.bishop@lbwco.com.au.

Yours sincerely
For LBW co Pty Ltd



Jarrod Bishop
Director | Senior Principal

References

1. Noel Arnold & Associates (2011a), Preliminary Environmental Site Assessment, GWA Bathrooms and Kitchens, 76 Magill Road, Norwood, South Australia. 13 July 2011.
2. Noel Arnold & Associates (2011b), Environmental Assessment, 76 Magill Road, Norwood, South Australia. 5 December 2011.
3. Greencap (2015), Environmental Update Letter Report, 76 Magill Road, Norwood, South Australia, Greencap, 23 December 2015.
4. Progressive Risk Management (2016), Environmental Assessment, Caroma Manufacturing Facility, 76 Magill Road, Norwood, South Australia. 16 October 2016.
5. JBS&G Australia Pty Ltd (2017), Results from Stage 1 Environmental Investigation (Vapour Screening) at 76 Magill Road, Norwood, South Australia. 13 June 2017.
6. LBW co Pty Ltd (2017), Environmental Due Diligence Assessment, 76 Magill Road, Norwood. Revision 1 (170917 R01 Rev01). 5 July 2017.
7. LBWco Pty Ltd (2018), Groundwater Assessment – 76 Magill Road, Norwood, South Australia (DRAFT). 23 March 2018.