# DEVELOPMENT APPLICATION FORM

PLEASE USE BLOCK LETTERS

**COUNCIL:** West Torrens

**APPLICANT:** Feasible Developments P/L

Postal Address: 237/585 Lt Collins St

Melbourne VIC 3000

**Owner:** _____

Postal Address: _____

_____

**BUILDER:** TBA

_____

Postal Address: _____

_____

_____ Licence No: _____

**CONTACT PERSON FOR FURTHER INFORMATION**

Name: Greg Shaw

Telephone: 0458888051 [work] _____ [Ah]

Fax: _____ [work] _____ [Ah]

**EXISTING USE:** Residential Housing

**FOR OFFICE USE**

Development No:_____

Previous Development No:_____

Assessment No:_____

| | |
|---|---|
| ☐ Complying | Application forwarded to DA |
| ☐ Non Complying | Commission/Council on |
| ☐ Notification Cat 2 | / / |
| ☐ Notification Cat 3 | Decision: _____ |
| ☐ Referrals/Concurrences | Type: _____ |
| ☐ DA Commission | Date: / / |

| | Decision required | Fees | Receipt No | Date |
|---|---|---|---|---|
| Planning: | | | | |
| Building: | | | | |
| Land Division: | | | | |
| Additional: | | | | |
| **Development Approval** | | | | |

**DESCRIPTION OF PROPOSED DEVELOPMENT:** 8 Story , 75 Residential Apartment Complex, 4 retail spaces.

**LOCATION OF PROPOSED DEVELOPMENT:** 200&202 Anzac Highway Plympton

House No: _____ Lot No: ____ Street: _____ Town/Suburb: _____

Section No [full/part] _____ Hundred: _____ Volume: _____ Folio: _____

Section No [full/part] _____ Hundred: _____ Volume: _____ Folio: _____

**LAND DIVISION:**

Site Area [$m^2$] 1900 Reserve Area [$m^2$] _____ No of existing allotments 2

Number of additional allotments [excluding road and reserve]: 0 Lease: **YES** ☐ **NO** ☑

**BUILDING RULES CLASSIFICATION SOUGHT:** Unkown Present classification: NA

If Class 5,6,78 or 9 classification is sought, state the proposed number of employees: Male: _____ Female: _____

If Class 9a classification is sought, state the number o persons for whom accommodation is provided: _____

If Class 9b classification is sought, state the proposed number of occupants of the various spaces at the premises: _____

**DOES EITHER SCHEDULE 21 OR 22 OF THE DEVELOPMENT REGULATIONS 2008 APPLY?** **YES** ☐ **NO** ☐

**HAS THE CONSTRUCTION INDUSTRY TRAINING FUND ACT 2008 LEVY BEEN PAID?** **YES** ☐ **NO** ☑

**DEVELOPMENT COST** [do not include any fit-out costs]: $ 15,000,000

I acknowledge that copies of this application and supporting documentation may be provided to interested persons in accordance with the Development Regulations 2008.

**SIGNATURE:** _____ Dated: 19 / 07 / 2018

_____

DEVELOPMENT REGULATIONS 2008
Form of Declaration (Schedule 5 clause 2A)

Government of South Australia

**To:**

**From:** Greg Shaw

**Date of Application:** 19/ 07/ 2018

**Location of Proposed Development**: _____

House No: 200&202 Lot No: _____ Street: Anzac Highway

Town/Suburb: Plympton

Section No (full/part): _____ Hundred: _____

Volume: _____ Folio: _____

**Nature of Proposed Development:** 8 Story Residential Building consisting of 75 Apartments & 4 retail.

**I** Greg Shaw **being the applicant/ a person acting on behalf of the applicant (delete the inapplicable statement) for the development described above declare that the proposed development will involve the construction of a building which would, if constructed in accordance with the plans submitted, not be contrary to the regulations prescribed for the purposes of section 86 of the Electricity Act 1996. I make this declaration under clause 2A(1) of Schedule 5 of the Development Regulations 2008.**

**Signed:** _____ **Date:** 19/ 07/ 2018

Government of South Australia

**Note 1**

This declaration is only relevant to those development applications seeking authorisation for a form of development that involves the construction of a building (there is a definition of 'building' contained in section 4(1) of the Development Act 1993), other than where the development is limited to –

a) an internal alteration of a building; or
b) an alteration to the walls of a building but not so as to alter the shape of the building.

**Note 2**

The requirements of section 86 of the Electricity Act 1996 do not apply in relation to:

a) an aerial line and a fence, sign or notice that is less than 2.0 m in height and is not designed for a person to stand on; or
b) a service line installed specifically to supply electricity to the building or structure by the operator of the transmission or distribution network from which the electricity is being supplied.

**Note 3**

Section 86 of the Electricity Act 1996 refers to the erection of buildings in proximity to powerlines. The regulations under this Act prescribe minimum safe clearance distances that must be complied with.

**Note 4**

The majority of applications will not have any powerline issues, as normal residential setbacks often cause the building to comply with the prescribed powerline clearance distances. Buildings/renovations located far away from powerlines, for example towards the back of properties, will usually also comply.

Particular care needs to be taken where high voltage powerlines exist; or where the development:

- is on a major road;
- commercial/industrial in nature; or
- built to the property boundary.

**Note 5**

An information brochure: 'Building Safely Near Powerlines' has been prepared by the Technical Regulator to assist applicants and other interested persons.

This brochure is available from council and the Office of the Technical Regulator. The brochure and other relevant information can also be found at **sa.gov.au/energy/powerlinesafety**

**Note 6**

In cases where applicants have obtained a written approval from the Technical Regulator to build the development specified above in its current form within the prescribed clearance distances, the applicant is able to sign the form.

| | |
|---|---|
| **Product** | Title Details |
| **Date/Time** | 19/07/2018 09:11PM |
| **Customer Reference** | GS |
| **Order ID** | 20180719010395 |
| **Cost** | $10.20 |

# Certificate of Title

| | |
|---|---|
| **Title Reference** | CT 5720/177 |
| **Status** | CURRENT |
| **Easement** | NO |
| **Owner Number** | 7110718* |
| **Address for Notices** | UNIT 108, 41 NOTT ST PORT MELBOURNE, VIC 3207 |
| **Area** | 760M² (APPROXIMATE) |

# Estate Type

FEE SIMPLE

# Registered Proprietor

CAZNA HIGHWAY NO.1 PTY. LTD. (ACN: 625 228 702)
OF UNIT 108 41 NOTT STREET PORT MELBOURNE VIC 3207

# Description of Land

ALLOTMENT 63 FILED PLAN 8115
IN THE AREA NAMED PLYMPTON
HUNDRED OF ADELAIDE

# Last Sale Details

| | |
|---|---|
| **Dealing Reference** | TRANSFER (T) 12907104 |
| **Dealing Date** | 13/04/2018 |
| **Sale Price** | $1,225,000 |
| **Sale Type** | FULL VALUE / CONSIDERATION AND WHOLE OF LAND |

# Constraints

**Encumbrances**

NIL

**Stoppers**

NIL

# Valuation Numbers

| Valuation Number | Status | Property Location Address |
|---|---|---|
| 2133828003 | CURRENT | 200 ANZAC HIGHWAY, PLYMPTON, SA 5038 |

# Notations

## Dealings Affecting Title

NIL


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## Notations on Plan

NIL

## Registrar-General's Notes

NIL

## Administrative Interests

NIL



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| | |
|---|---|
| **Product** | Title Details |
| **Date/Time** | 19/07/2018 09:16PM |
| **Customer Reference** | GS |
| **Order ID** | 20180719010399 |
| **Cost** | $10.20 |

# Certificate of Title

| | |
|---|---|
| **Title Reference** | CT 5167/321 |
| **Status** | CURRENT |
| **Easement** | NO |
| **Owner Number** | 71107171 |
| **Address for Notices** | UNIT 108, 41 NOTT ST PORT MELBOURNE, VIC 3207 |
| **Area** | 1109M² (CALCULATED) |

# Estate Type

FEE SIMPLE

# Registered Proprietor

CAZNA HIGHWAY NO.2 PTY. LTD. (ACN: 625 228 720)
OF UNIT 108 41 NOTT STREET PORT MELBOURNE VIC 3207

# Description of Land

ALLOTMENT 2 DEPOSITED PLAN 29643
IN THE AREA NAMED PLYMPTON
HUNDRED OF ADELAIDE

# Last Sale Details

| | |
|---|---|
| **Dealing Reference** | TRANSFER (T) 12907122 |
| **Dealing Date** | 13/04/2018 |
| **Sale Price** | $850,000 |
| **Sale Type** | FULL VALUE / CONSIDERATION AND WHOLE OF LAND |

# Constraints

**Encumbrances**

NIL

**Stoppers**

NIL

# Valuation Numbers

| Valuation Number | Status | Property Location Address |
|---|---|---|
| 2133827254 | CURRENT | 202 ANZAC HIGHWAY, PLYMPTON, SA 5038 |

# Notations

## Dealings Affecting Title

NIL


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## Notations on Plan

NIL

## Registrar-General's Notes

NIL

## Administrative Interests

NIL



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Director / Graphic Designer
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judd@capsuleprojects.net.au

12th July 2018

Attn: Ben Scholes
Project Officer
Inner Metropolitan Development Assessment
Planning and Development
Department of Planning, Transport and Infrastructure
via email - benjamin.scholes@sa.gov.au

Ben,

RE: Development Application – 200-202 Anzac Highway, Plympton

Further to our recent discussion we hereby wish to advise of our intention to lodge a development application for our proposed apartment development at 200-202 Anzac Highway, Plympton.

A copy of all documents can be obtained here:
https://www.dropbox.com/sh/tunou9xulahils0/AABvLS9zlCSOFn0R6pz-8JKMa?dl=0

Please be advised that all correspondence and invoicing should be directed to the Applicant as follows:

Attn: Mr. Greg Shaw
Gardman Trust Pty Ltd
41 Nott Street
Port Melbourne
VIC 3207

Email – greg@vivedevelopments.com.au
Phone – 0458 888 051

Yours Faithfully

Anthony Giordano
B.Arch (Hons.) Grad. Dip. Bldg. Surv.

A list of all the documents is as follows:

A – ARCHITECTURAL

Architectural Drawings- Capsule Projects

| | | | |
|---|---|---|---|
| A17.02 | P1.1 | Title Page | D |
| | P1.2 | Locality Details | D |
| | P1.3 | Site Plan | D |
| | P1.4 | Lower Ground | D |
| | P1.5 | Ground | D |
| | P1.6 | First | D |
| | P1.7 | Second | D |
| | P1.8 | Third | D |
| | P1.9 | Fourth | D |
| | P1.10 | Fifth | D |
| | P1.11 | Sixth | D |
| | P1.12 | Seventh | D |
| | P1.13 | Eighth | D |
| | P1.14 | Roof | D |
| | P1.15 | North Elevation | D |
| | P1.16 | South Elevation | D |
| | P1.17 | East Elevation | D |
| | P1.18 | West Elevation | D |
| | P1.19 | Section X.X | D |
| | P1.20 | Section Y.Y | D |
| | P1.21 | Section Z.Z | D |
| | P1.22 | 3D Perspectives 1 | D |
| | P1.23 | 3D Perspectives 2 | D |
| | P1.24 | 3D Perspectives 3 | D |
| | P1.25 | 3D Perspectives 4 | D |
| | P1.26 | Material Palette & Balcony Detai | D |
| | P1.27 | Shadow Analysis - 21st December | D |
| | P1.28 | Shadow Analysis - 21st June | D |

3D IMAGES – Vive Developments

File 1, 2, 3, 4, 5 and 6

B – PLANNING

Planning Report – Tract Consultants

C – AERONAUTICAL

Aeronautical impact assessment – Landrum and Brown

Crane Report – Capsule Projects

D – TRAFFIC

Traffic and Parking impact assessment- Austwide

E – WASTE

Waste Management plan- Austwide

F – LANDSCAPING

Final Landscape Concepts – Jensen +

G – ACOUSTICS

Environmental Noise Assessment- Resonate

H – STORMWATER

TMK Consulting Engineers

Civil Plan – Ground Floor
Civil Plan – Lower Ground Floor
Civil Plan – Levels 1, 2, 3 & 4
Civil Plan – Levels 5, 6, 7 & 8
Civil Plan – Roof Plan

Tract
Landscape Architects
Urban Designers
Town Planners



# Town Planning Report

## Planning Permit Application of a 9 storey mixed use building

*200-202 Anzac Highway, Plympton*

Prepared on behalf of Luxehaus Developments Pty Ltd

0317-0290 - R01 00 2018-07-02

Level 6, 6 Riverside Quay
SOUTHBANK VIC 3006
Phone: (03) 9429 6133
www.tract.com.au

# Overview

## Background

| | |
|---|---|
| Applicant | Luxehaus Developments |
| Address | 200-202 Anzac Highway, Plympton |
| Lot Description | Lot 63 in Filed Plan 8115 and Lot 2 in Deposited Plan 29643. |

## Relevant Planning Controls

| | |
|---|---|
| General Section | Building Near Airfields<br>Crime Prevention<br>Design and Appearance<br>Energy Efficiency<br>Interface between Land Uses<br>Landscaping, Fences and Walls<br>Medium and High Rise Development (3 or more storeys)<br>Natural Resources<br>Orderly and Sustainable Development<br>Residential Development<br>Transportation and Access<br>Waste |
| Zone | Urban Corridor Zone |
| Policy Area | Boulevard Policy Area 34 |
| Overlays | Affordable Housing<br>Development Constraints<br>Noise and Air Emissions<br>Strategic Transport Routes |

## Permit Application Details

| | |
|---|---|
| Description of Proposal | Demolition of existing buildings on the Site and the construction of a 9 storey mixed use building comprising residential apartments, basement car parking and ground floor café and shop tenancies |
| Type of Development | Merit |
| Category of Development | Category 1 |

## Quality Assurance - Report Record

| | |
|---|---|
| Project Name | 200-202 Anzac Highway, Plympton |
| Document Number | R01 |
| Revision (see below) | 00 |
| Prepared By | DH |
| Reviewed By | LC |
| Approved By | LC |
| Date of Issue | 2018-07-02 |

| Revision Status- all revisions must be identified by the following information | |
|---|---|
| Revision Number | 00 |
| Description of Revision | N/A |
| Prepared By | N/A |
| Reviewed By | N/A |
| Pages Revised | N/A |

# Contents


1 Introduction 3

1.1 The Project Team 3
1.2 Pre-Lodgement Process 3
1.3 Report Structure 4

2 Site & Surrounds 5

2.1 Site Description 5
2.2 Site Context 5
2.3 Urban Corridor Zone Approvals - Anzac Highway 6

3 Proposal 9

3.1 Overview 9
3.2 The Proposed Built Form 9
3.3 Commercial and Communal Areas 10
The proposed commercial uses are limited to the following: 10
3.4 Apartment Design 11
3.5 Access and Car and Bike Parking 11
3.6 Waste Management 11
3.7 Landscaping 11
3.8 Stormwater Management 12

4 Relevant Development Plan Policy 13

4.1 General Section 13
4.2 Zone Section (Urban Corridor Zone) 14
4.2.1 Relevant Objectives 14
4.2.2 Desired Character 15
4.2.3 Principles of Development Control 16
4.3 Policy Area Section (Boulevard Policy Area 34) 17
4.3.1 Relevant Objectives 17
4.3.2 Desired Character 17
4.3.3 Principles of Development Control 18
4.4 Overlays 18

5 Planning aSSESSMENT 19

5.1 Introduction / Overview 19
5.2 Is the proposed built form consistent with the desired future character sought within the Urban Corridor Zone and Boulevard Policy Area 34? 19
5.3 Does the proposed development exhibit Design Excellence? 20
5.4 Does the proposal respond to the Overlays affecting the Site? 21
5.4.1 Affordable Housing Overlay 22
5.4.2 Development Constraints Overlay 22
5.4.3 Noise and Air Emissions Overlay 22

| | | |
|---|---|---|
| 5.4.4 | Strategic Transport Routes Overlay | 22 |
| 5.5 | Does the proposal create any unreasonable off-site amenity impacts? | 23 |
| 5.5.1 | Visual Impact | 23 |
| 5.5.2 | Overlooking and Equitable Development | 23 |
| 5.5.3 | Overshadowing | 24 |
| 5.6 | Are the proposed apartments designed with an adequate level of on-site amenity for future occupants? | 24 |
| 5.7 | Does the proposal provide adequate access, car parking, bicycle parking facilities and waste management arrangements? | 24 |
| 5.7.1 | Vehicle Access and Traffic | 24 |
| 5.7.2 | Car Parking | 25 |
| 5.7.3 | Bicycle Parking | 25 |
| 5.7.4 | Waste Management Arrangements | 26 |
| 5.8 | Does the proposal provide an appropriate landscaping response? | 26 |
| 5.9 | Does the proposal employ Crime Prevention through Urban Design (CPTED) Principles? | 26 |
| 5.10 | Does the proposal incorporate environmentally sustainable design principles? | 26 |
| 5.10.1 | Energy Efficiency | 26 |
| 5.10.2 | Stormwater Management | 27 |
| 5.10.3 | Construction Initiatives | 27 |
| **6** | **Conclusion** | **28** |

# 1 INTRODUCTION

This report has been prepared by Tract Consultants Pty Ltd on behalf of Luxehaus Developments to support an application for Development Plan Consent for the proposed development at 200-202 Anzac Highway, Plympton (the 'Site').

The proposal involves the demolition of existing buildings on the Site and the construction of a nine storey mixed use building comprising residential apartments, basement car parking and ground floor café and shop tenancies.

The proposal represents a high-quality architectural resolution that blends high-quality materiality with a curvilinear and sculptural form. Capsule Projects have designed the proposed built form with a robust and attractive appearance that would make a strong positive contribution to the preferred character sought along this section of Anzac Highway and Urban Corridor Zone more generally. The building provides for great levels of internal amenity for future occupants and seeks to respect the amenity on adjacent land through recessive form at the rear of the Site.

## 1.1 The Project Team

The project team for this development proposal consists of:

- **Luxehaus Developments** – Developer
- **Capsule Projects** – Architects and Project Management
- **Tract Consultants** – Town Planning
- **Jensen Plus** – Landscape Architects
- **AusWide Consulting** – Traffic and Waste engineering
- **TMK Consulting Engineers** – Stormwater Management
- **Landrum & Brown** - Aeronautical consultants
- **Resonate Acoustics** – Acoustic Engineer

## 1.2 Pre-Lodgement Process

In order to shape the application, the following pre-lodgement meetings have been held for the project:

- Pre-Lodgement Panel Meeting (DPTI) #1 – 3 September 2017
- Design Review Session (ODASA) – 6 December 2017
- Pre-Lodgement Panel Meeting (DPTI) #2 – 6 April 2018

A number of design changes have been made to positively respond to the feedback provided at these meetings, including:

- Front boundary setbacks increased, east boundary reduced (building edge proposed on the allotment boundary).

- Reorienting apartments from predominately east-west to a selection facing ANZAC Highway and the south to improve resident amenity and allow for more articulation as suggested by the Design Review panel.
- Elimination of internal light courts and provide natural light access via recessed windows to saddleback bedrooms
- Internal corridors widened and references to external form have been incorporated in the intended interior treatments.
- Increases to balcony sizes
- Secure bicycle parking to be incorporated at the rear of site adjacent service / bin storage area.
- Café moved to western side, attention given to more legible connection between lobby and stairwell on ground level.

## 1.3 Report Structure

This report describes the Site and its context (**Chapter 2**), details the proposal (**Chapter 3**), identifies relevant planning policy and provisions (**Chapter 4**), and assesses the proposal against this planning framework (**Chapter 5**) to form its conclusions and recommendations (**Chapter 6**).

# 2 SITE & SURROUNDS

## 2.1 Site Description

The Site is located at 200-202 Anzac highway, Plympton, which is located on the south eastern side of Anzac Highway and approximately 60 metres south west from the intersection with Beckman/Gray Streets.

The Site comprises of the two land parcels, legally described as:

- Lot 63 in Filed Plan 8115, Certificate of Title Volume 5720 Folio 177 (200 Anzac Highway).
- Lot 2 in Deposited Plan 29643, Certificate of Title Volume 5167 Folio 321 (202 Anzac Highway).

No easements or Land Management Agreements are registered on the titles.

Lot 63 is a rectangular shaped lot with a frontage width of 22.86 metres, a depth of approximately 34 metres and an area of approximately 792m$^2$. Lot 2 is an irregularly shaped lot with a frontage of 21.54 metres, a varied depth between 34 and 53 metres and an area of 1958m$^2$.

Cumulatively, the Site has a frontage to Anzac Highway of approximately 44 metres and area of approximately 1901m$^2$.

Each lot is currently occupied by a single storey detached dwelling accessed via a single width crossover from Anzac Highway. Limited vegetation exists within the garden areas of each dwelling.

The Site topography is generally flat with a level change of no greater than 500mm measured between front and rear boundaries of the Site.

The adjoining nature strip to the Site contains two mature Claret Ash trees, which are protected with a local heritage listing. A bus stop is located within nature strip adjacent Lot 63. Overhead powerlines also run parallel with the Site frontage.

Refer to **Figure 1** - Aerial Plan.

## 2.2 Site Context

The Site is located 3.5 kilometres south west of the Adelaide central business district. The Site is also located approximately 300 metres southwest of the Kurralta Central Shopping Centre, which comprises a range of retail premises and approximately 300 metres south of Weigall Oval Reserve.

The Site enjoys excellent access to public transport with a bus stop located immediately adjacent the Site along Anzac Highway. A City-Glenelg tram route stop is also located approximately 400 metres south of the Site.

The site interfaces are described below:

- **Northeast** – 198 Anzac Highway is occupied by a single storey detached dwelling on a lot with similar characteristics of Lot 63 of the Site. Vehicle access and car parking structures of this land are located adjacent the northeast boundary of the Site. Further northeast is a vacant, irregular shaped corner lot

known as 196 Anzac Highway, with frontage to Beckman Street. The Beckman Street intersection is signalised.

- **Southeast** – 2A, 4 and 6 Beckman Street adjoin the southeast side of the Site. 2A and 4 Beckman Street are occupied by single storey detached dwellings, while 6 Beckman Street is occupied by 3 single storey group dwellings.
- **Southwest** – land at 204 Anzac Highway is occupied by a single storey building used as a veterinary clinic (consulting rooms). Car parking is located within the front and rear setbacks of this land.
- **Northwest** – the Anzac Highway (arterial road) carriageway is located immediately northwest, which is approximately 42 metres in width. A central median is flanked by three laneways on each side. The nature strips are well vegetated, including various mature trees. The Claret Ash trees within the carriageway are local heritage listed. On-street car parkng is available on either side outside clearway times. The opposite side of Anzac Highway is characterised by a range of detached dwellings and multi-storey residential flat buildings. 197-203 Anzac Highway is occupied by residential flat buildings comprising 5-8 storeys.

Refer to **Figure 2** – Context Plan.

## 2.3 Urban Corridor Zone Approvals - Anzac Highway

Development Applications have been made at following sites within the Urban Corridor Zone associated with Anzac Highway:

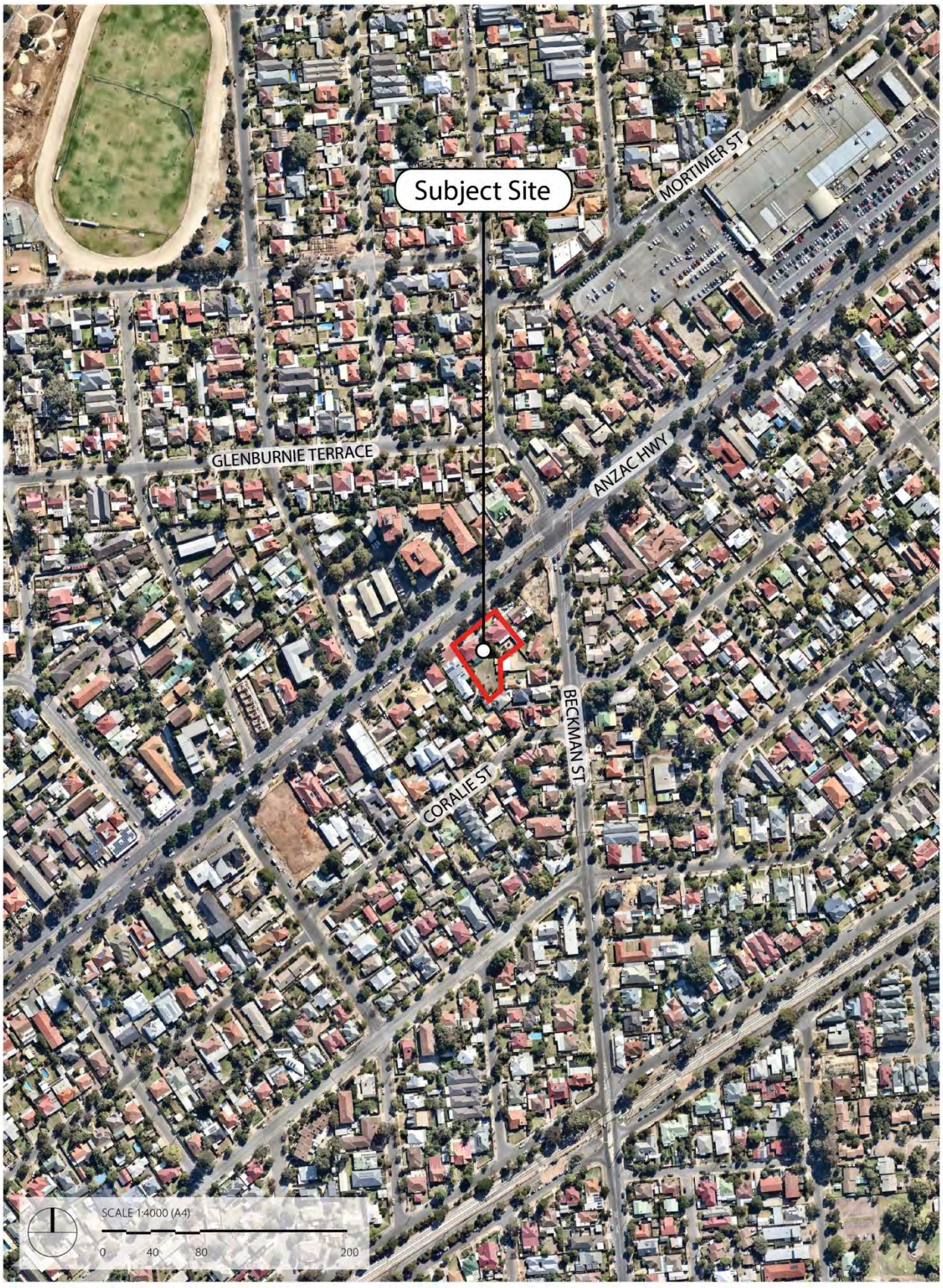
- 81 Anzac Highway, Ashford – Construction of a three storey residential flat building containing five dwellings.
- 99 Anzac Highway, Ashford – Demolition of existing office and construction of five storey residential flat building comprising 26 dwellings (not yet under construction)
- 192 Anzac Highway, Glandore – Demolition of existing buildings on Site, removal of one regulated tree and the construction of an 8 storey mixed use building comprising 36 residential apartments, two levels of car parking and a café at ground level (Decision pending)
- 214 Anzac Highway, Plympton – Construction of a 3 storey residential flat building containing eight dwellings (not yet under construction)
- 2 Selby Street, Kurralta Park – Construction of two (2) three storey residential flat buildings (not yet under construction).




**Aerial Plan**
200-202 Anzac Highway,
Plympton SA

PROJECT_DRG NO 0317-0290-20_D001-00 REV 00 DRWN MM CHKD DH APPROV LC DATE 14.05.2018 Tract

*Figure 1 – Aerial Plan*




**Context Plan**

200-202 Anzac Highway, Plympton SA

PROJECT_DRG NO 0317-0290-20_D002-00 REV 00 DRWN MM CHKD DH APPROV LC DATE 14.05.2018 Tract

*Figure 2 – Context Plan*

# 3 PROPOSAL

## 3.1 Overview

The proposed development seeks Development Plan Consent for the construction of a high quality nine (9) storey mixed-use building. The proposal is shown on Drawing no.s 17.02-P1.1 to 17.02-P1.28, prepared by Capsule Projects and comprises the following key elements:

- Two levels of car parking, including basement level, comprising a total of 85 car spaces
- Ground floor café and two (2) shop tenancies
- 75 x Residential apartments on upper floors, including:
  - 8 x 1 bedroom apartments.
  - 59 x 2 bedroom apartments.
  - 8 x 3 bedroom apartments.
- Communal outdoor recreation areas on the 3rd, 6th and 8th Floor
- Communal internal function and recreation areas are provided on the 8th floor.

## 3.2 The Proposed Built Form

The proposed 9 storey building has been designed with a single storey podium featuring staggered setbacks ranging from 3.5 to 6 metres from Anzac Highway. The podium is built to the side boundaries and setback 2 metres from the rear boundary. A canopy between 1.2 and 2 metres deep projects forward of front building line.

The apartment floors above the podium have been setback between 3 and 4.4 metres from side boundaries and a minimum of 3 metres from the rear boundary. Upper floor balconies are setback between 1.9 and 3.6 metres from the canopy structure that projects at ground level. The southern (rear) side of the building has been designed with recessive setbacks above the Second Floor to reduce amenity impacts to adjoining properties to the south and respond to the irregular shape of the Site.

The ground floor podium is to be constructed with masonry to complement the materiality found throughout the local area. The retail tenancies at ground floor provide a strong active frontage to Anzac Highway with extensive glazing. Car parking has been sleeved behind these tenancies to ensure they do not detract from the appearance of the land when viewed from Anzac Highway. Upper level apartments are accessed from Anzac Highway via a lobby positioned centrally across the podium façade.

The upper apartment levels feature undulating balcony elements that emphasises a 'horizontal' massing and 'sculptural' appearance to the building. The buildings is also to be constructed with high quality external materials and finishes, including:

- Textured and curved brickwork to canopy structure at podium level.
- An interplay between digitally printed pattern on glass and perforated steel balcony balustrades to upper levels.
- Black lightweight cladding with black aluminium framed glazing to upper levels.
- Black Steel framed windows and doors at ground level.
- Use of green roof planter boxes integral to the building design.



## 3.3 Commercial and Communal Areas

The proposed commercial uses are limited to the following:

*Ground Floor Level:*

- Café tenancy with a floor area of approximately 115 square metres and alfresco seating opportunities within the front setback
- Two shop tenancies with a combined floor area of 216 square metres. The tenancies are joined by common partition and have the potential to be combined into one tenancy if the market requires.

The communal areas for occupants of the building are summarised below:

*Third Floor:*

- The third floor includes a communal outdoor terrace of approximately 88 square metres at the southern end of the building.

*Sixth Floor:*

- The third floor includes a communal outdoor terrace of approximately 129 square metres at the southern end of the building.

*Eighth Floor:*

The eight storey includes communal function and recreation areas for residents of the building comprising:

- Entry via lobby and central lift core.
- Floor area of approximately 258 square metres, excluding balcony areas.
- Outdoor terraces with a combined area of 167 square metres.
- Potential use of the internal areas until 12am seven days per week.
- Music to be at background levels if external doors and windows are open.

## 3.4 Apartment Design

The internal design of apartments has been influenced by a market demand within this location for dwellings which accommodate smaller families, households looking to downsize in the local area and other share house arrangements. The dwelling layouts include one, two and three bedroom schemes with generous internal spaces and small / low maintenance areas of private open space in the form of external balconies. All primary balcony areas have a minimum width of at least 1.35 metres and a minimum area of at least 8 square metres.

All habitable rooms are designed to ensure that optimum amenity is received both in terms of access to daylight, cross ventilation and overall outlook from the apartments.

## 3.5 Access and Car and Bike Parking

The proposal seeks to remove the existing crossovers taken from Anzac Highway and the construction of a new double width crossover on the western side of the Site frontage.

The accessway services two levels of car parking, including one basement level. The development would provide for a total of 85 car spaces, including 16 car stacker spaces and two accessible car spaces provided at ground level car parking area. It is expected that car parking associated with the commercial tenancies would be provided at ground level.

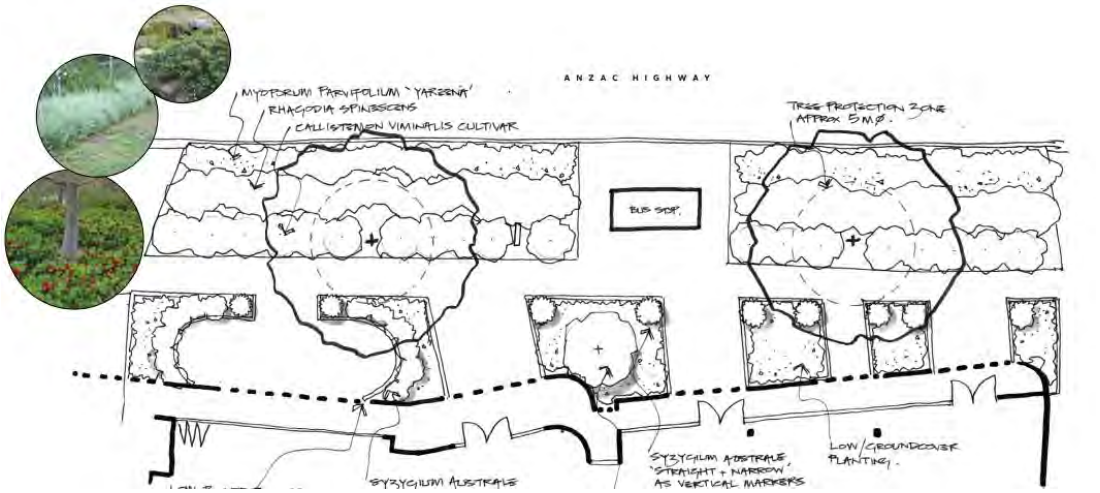
Various dedicated bike parking areas are provided on the ground floor level and basement level for both visitors and residents of the Site. The development includes six bike parks for residential visitors at ground level behind and at least 20 secure bike parking spaces on the ground level and basement level.

## 3.6 Waste Management

Waste storage and loading areas is provided at the southern end of the building and deliberately separated from vehicle parking areas to avoid conflict. The waste collection is proposed by a private contractor. Each residential floor also incorporates storage areas for refuse, recycling and green waste bins.

## 3.7 Landscaping

A landscape plan has been prepared by Jensen Plus. The proposal incorporates landscaping within the front setback to Anzac Highway and the rear setback from southern boundaries.
Feature landscaping is also proposed on the communal outdoor areas at 3rd and 6th floors and the recreation area terraces on the 8th floor.



## 3.8 Stormwater Management

A stormwater management has been prepared by TMK Consulting Engineer and shown in drawing numbers 1804138-C1/PA to 1804138-C5/PA. Key components of the strategy include:

- 2 x 6000 litre stormwater detention tanks located at ground level, adjoining the rear of the Site, connected to balcony and roof area drainage outlets. Overflow to be discharged to Anzac Highway.
- Provision of a sump pump contained within a 280 litre pumping chamber, located within the northeastern side of the basement level.
- Provision of 'Escol Storm Pit – Class 2' pollutant separator or similar within the eastern corner of the basement.

# 4 RELEVANT DEVELOPMENT PLAN POLICY

The Site is located within the City of West Torrens and is affected by the provisions of the West Torrens Development Plan (the 'Development Plan'). This section identifies the provisions of the Development Plan that are relevant to the Site and an assessment of the proposed development.

## 4.1 General Section

The following General Section policies are relevant to assessment of the proposed development:

- **Building Near Airfields** – The Objective of this policy promotes *development that ensures the long-term operational, safety, commercial and military aviation requirements of airfields (airports, airstrips and helicopter landing sites) continue to be met.*
- **Crime Prevention** – The Objective of this policy promotes *a safe, secure, crime resistant environment where land uses are integrated and designed to facilitate community surveillance.*
- **Design and Appearance** – The Objective of this policy seeks *development of a high design standard and appearance that responds to and reinforces positive aspects of the local environment and built form.*
- **Energy Efficiency** – The Objective of this policy seeks *development designed and sited to conserve energy and that provides for on-site power generation.*
- **Interface between Land Uses** – This policy section seeks *development located and designed to minimise adverse impact and conflict between land uses and the protection of community health and amenity from adverse impacts of development.*
- **Landscaping, Fences and Walls** – The Objective of this policy seeks *the amenity of land and development enhanced with appropriate planting and other landscaping works, using locally indigenous plant species where possible.*
- **Medium and High Rise Development (3 or more storeys)** – The Objectives of this policy include:
  - *Medium and high rise development that provides housing choice and employment opportunities.*
  - *Residential development that provides a high standard of amenity and adaptability for a variety of accommodation and living needs.*
  - *Development that is contextual and responds to its surroundings, having regard to adjacent built form and character of the locality and the Desired Character for the Zone and Policy Area.*
  - *Development that integrates built form within high quality landscapes to optimize amenity, security and personal safety for occupants and visitors.*
  - *Development that enhances the public environment, provides activity and interest at street level and a high quality experience for residents, workers and visitors…*
  - *Buildings designed and sited to be energy and water efficient.*
- **Natural Resources** – The relevant Objectives include:
  - *Retention, protection and restoration of the natural resources and environment.*
  - *Protection of the quality and quantity of South Australia's surface waters, including inland, marine and estuarine and underground waters.*

- *Development consistent with the principles of water sensitive design.*
- *Development sited and designed to:*
  - *protect natural ecological systems*
  - *achieve the sustainable use of water*
  - *protect water quality, including receiving waters*
  - *reduce runoff and peak flows and prevent the risk of downstream flooding*
  - *minimise demand on reticulated water supplies*
  - *maximise the harvest and use of stormwater*
  - *protect stormwater from pollution sources.*
- *Storage and use of stormwater which avoids adverse impact on public health and safety.*

- **Orderly and Sustainable Development** – The Objectives include:
  - *Orderly and economical development that creates a safe, convenient and pleasant environment in which to live.*
  - *Development occurring in an orderly sequence and in a compact form to enable the efficient provision of public services and facilities.*
  - *Development that does not jeopardise the continuance of adjoining authorised land uses.*
  - *Development that does not prejudice the achievement of the provisions of the Development Plan.*
  - *Urban development located only in zones designated for such development.*
- **Residential Development** – The relevant Objectives of this policy include:
  - *Safe, convenient, pleasant and healthy-living environments that meet the full range of needs and preferences of the community.*
  - *An increased mix in the range and number of dwelling types available within urban boundaries to cater for changing demographics, particularly smaller household sizes and supported accommodation.*
  - *Medium and high density residential development in areas close to activity centres, public and community transport and public open spaces.*
  - *The revitalisation of residential areas to support the viability of community services and infrastructure.*
  - *Affordable housing, student housing and housing for aged persons provided in appropriate locations.*
- **Transportation and Access** – The relevant Objectives of this policy include:
  - *Development that:*
    - *provides safe and efficient movement for all transport modes*
    - *ensures access for vehicles including emergency services, public infrastructure maintenance and commercial vehicles*
    - *provides off-street parking*
    - *is appropriately located so that it supports and makes best use of existing transport facilities and networks*
    - *provides convenient and safe access to public transport stops.*
  - *Provision of safe, pleasant, accessible, integrated and permeable pedestrian and cycling networks that are connected to the public transport network.*
- **Waste** – The Objectives of this Policy include:
  - *Development that, in order of priority, avoids the production of waste, minimises the production of waste, reuses waste, recycles waste for reuse, treats waste and disposes of waste in an environmentally sound manner.*
  - *Development that includes the treatment and management of solid and liquid waste to prevent undesired impacts on the environment including, soil, plant and animal biodiversity, human health and the amenity of the locality.*

## 4.2 Zone Section (Urban Corridor Zone)

The Site is located within the Urban Corridor Zone (UCZ) as shown on *Zone Map WeTo/13.*

### 4.2.1 Relevant Objectives

The relevant Objectives of the UCZ include:

1. *A mixed use zone accommodating a range of compatible non-residential and medium and high density residential land uses orientated towards a high frequency public transport corridor.*

2. *Integrated, mixed use, medium and high rise buildings with ground floor uses that create active and vibrant streets with residential development above.*
3. *A mix of land uses that enable people to work, shop and access a range of services close to home.*
4. *Adaptable and flexible building designs that can accommodate changes in land use and respond to changing economic and social conditions.*
5. *A built form that provides a transition down in scale and intensity at the zone boundary to maintain the amenity of residential properties located within adjoining zones.*
6. *A safe, comfortable and appealing street environment for pedestrians that is sheltered from weather extremes, is of a pedestrian scale and optimises views or any outlook onto spaces of interest.*
7. *Noise and air quality impacts mitigated through appropriate building design and orientation.*
8. *To identify and remediate contaminated land appropriate for its intended use.*
9. *Development that contributes to the desired character of the zone.*

### 4.2.2 Desired Character

The Desired Character statement for the UCZ states (emphasis added):

*This zone will contain an innovative mix of medium density (45-70 dwellings per hectare) and high density (70-200 dwellings per hectare) residential development, together with community and employment land uses, along the Port Road, Anzac Highway, Richmond Road and Henley Beach Road corridors. The combination of land uses will vary within these corridors. Some locations will contain a genuine land use mix with ground floor shops, restaurants and offices, and upper level residential, while other areas will give primacy to residential development. Other parts of the zone will have a strong employment focus.*

*The function of main roads in the zone, particularly Port Road, Richmond Road and Anzac Highway, as major transport corridors will be protected by providing access to allotments from secondary road frontages and rear access ways as much as possible. Parking areas will be consolidated, shared (where possible) and screened from the street or public spaces. Allotments with car parking fronting Port Road, Anzac Highway, Richmond Road and Henley Beach Road will be redeveloped with built form closer to the road and reconfigured car parking areas.*

*As one of the key zones in the City of West Torrens where there will be transformation in built form, new buildings will be recognised for their design excellence. These buildings will establish an interesting pedestrian environment and human-scale at ground level through careful building articulation and fenestration, verandas, balconies, canopies and landscaping. In general, the greatest height, mass and intensity of development will be focussed at the main road frontage. Buildings of 3 or more storeys will be the predominant built form. It is for these reasons that dwellings other than detached dwellings will be the predominant form of residential development.*

*Overlooking, overshadowing and noise impacts will be moderated through careful design. Impacts on adjoining zones where development is lower in scale and intensity will be minimised through transition of building heights and setbacks, judicious design and location of windows and balconies, and the use of landscaping. The transition of building heights and setbacks, and judicious design is especially important adjacent Character Policy Areas, including those Character Policy Areas at Glandore and Ashford. The use of blank walls in these transitional areas, especially at the rear and side of allotments, will be avoided. Plant and service equipment will be enclosed and screened from view from the street and neighbouring allotments.*

*Where buildings are set back from main roads, landscaping will contribute to a pleasant pedestrian environment and provide an attractive transition between the public and private realm. Large scale development in the zone will facilitate the establishment of areas of communal and public open space, and create links with existing movement patterns and destinations in the zone. Front fencing in the zone will be kept low and/or visually permeable.*

*Some parts of the zone, including allotments in Thebarton and Keswick, are potentially contaminated because of previous and current industrial activities. In these circumstances, development is expected to occur on a precautionary basis if site contamination investigations identify potential site contamination, particularly where it involves sensitive uses such residential development...*

*Noise and air amenity with the zone is not expected to be equivalent to that expected from living in a purely residential zone.*

### 4.2.3 Principles of Development Control

The relevant Principles of Development Control (PDC) within the UCZ include:

*Land Use*

- **PDC 1** – We note that 'dwelling'(s) and, office and shop or groups of shops are envisaged uses within the Zone

*Form and Character*

- **PDC 4** - Development should be consistent with the desired character for the zone (See Section 4.2.2).
- **PDC 6** – Vehicle parking should be located to the rear of development or not be visible from public land along the primary road frontage.

*Design and Appearance*

- **PDC 7** - Buildings should maintain a pedestrian scale at street level, and should:
  - (a) include a clearly defined podium, or street wall with a parapet, and a maximum building height of 2 storeys from natural ground level
  - (b) have levels above the defined podium or street wall setback a minimum of 2 metres from that wall.
- **PDC 8** - Buildings on allotments with a frontage greater than 10 metres should be well articulated through variations in forms, materials, openings and colours.
- **PDC 9** - Buildings should be designed to:
  - (a) enable suitable sunlight access to public open space
  - (b) overlook or orientate towards public open space and defined pedestrian and cycle routes.
- **PDC 10** - To maintain sight lines between buildings and the street, and to improve safety through passive surveillance, solid fencing should not be constructed between the front building line and the primary or secondary street.
- **PDC 11** - Development should minimise the number of access points onto an arterial road, by providing vehicle access:
  - (a) from side streets or rear access ways
  - (b) via co-ordinated through-property access rights of way or common rear vehicle parking areas.
- **PDC 12** - Vehicle access points on side streets and rear access ways should be located and designed to:
  - (a) minimise the impacts of headlight glare and noise on nearby residents
  - (b) avoid excessive traffic flows into residential streets.

*Building Envelope*

- **PDC 13** - Except where airport building height restrictions prevail, the interface height provisions require a lesser height, building heights (excluding any rooftop mechanical plant or equipment) should be consistent with the following parameters:
  - Boulevard Policy Area 34 – 8 storeys and up to 32.5 metres
- **PDC 15 and 16** – these PDC's relate to Interface Height Provisions. As the Site does not adjoin a Zone boundary, these controls are not relevant to an assessment of the proposal.
- **PDC 17** - Buildings (excluding verandahs, porticos and the like) should be set back from the primary road frontage in accordance with the following parameters:
  - Boulevard Policy Area 34: 3 metre setback at Anzac Highway
- **PDC 19** - Buildings (excluding verandahs, porticos and the like) should be set back in accordance with the following parameters for Boulevard Policy Area 34:
  - No minimum from a rear boundary where it does not adjoin another Zone.
  - 3 metre side boundary setback, where the frontage exceeds 20 metres.

*Vehicle Parking*

- **PDC 20** - Development should provide off-street vehicle parking and specifically marked accessible car parking places to meet anticipated demand in accordance with *Table WeTo/6 - Off Street Vehicle Parking Requirements for Designated Areas*.
- **PDC 21** - Loading areas and designated parking spaces for service vehicles should:
  - (a) be provided within the boundary of the allotment
  - (b) not be located where there is parking provided for any other purpose.
- **PDC 22** - Vehicle parking spaces and multi-level vehicle parking structures within buildings should:

- (a) enhance active street frontages by providing land uses such as commercial, retail or other non-car park uses along ground floor street frontages
- (b) complement the surrounding built form in terms of height, massing and scale
- (c) incorporate facade treatments along major street frontages that are sufficiently enclosed and detailed to complement neighbouring buildings consistent with the desired character of the locality.

- **PDC 23** - In mixed use buildings, the provision of vehicle parking may be reduced in number and shared where the operating hours of commercial activities complement the residential use of the allotment.

## 4.3 Policy Area Section (Boulevard Policy Area 34)

The Site is located within Boulevard Policy Area 34 as shown on *Policy Area Map WeTo/13*.

### 4.3.1 Relevant Objectives

The relevant Objectives of the Boulevard Policy Area 34 include:

1. *Medium and high rise development framing the street, including mixed use buildings that contain shops, offices and commercial development at lower floors with residential land uses above.*
2. *A uniform streetscape edge established through a largely consistent front setback and tall, articulated building façades.*
3. *Development that does not compromise the transport functions of the road corridor.*
4. *Development that contributes to the desired character of the policy area.*

### 4.3.2 Desired Character

The Desired Character statement for Boulevard Policy Area 34 states:

*The policy area will contain a mix of land uses that complement the function of Port Road as a strategic transport route linking central Adelaide with the north western suburbs, and Anzac Highway linking central Adelaide with Glenelg.*

*The redevelopment of existing commercial and industrial allotments into medium-to-high scale, mixed-use development will occur. Where development has a mix of land uses, non-residential activities such as shops, offices and consulting rooms will be located on lower levels with residential land uses above. In order to achieve the desired transformation of the policy area, dwellings other than detached dwellings will be the predominant form of residential development.*

*A mix of complementary land uses will assist in extending the usage of the policy area beyond normal working hours to enhance its vibrancy and safety.*

*Development will take place at medium and high densities, at a scale that is proportionate to the width of Port Road and Anzac Highway respectively. To achieve this, development will take place on large, often amalgamated allotments. Vehicle access points will be located off side streets and new rear laneways where possible, so that vehicle flows, safety and efficient pedestrian movement along Port Road and Anzac Highway are maintained.*

*Pedestrian areas will be enhanced to maximise safety and strong links will be made between development and tram stops along Port Road, and Bonython Park.*

*While the use and address of buildings will be designed to be easily interpreted when driving in a vehicle, the footpath will be sheltered with awnings, verandas and similar structures.*

*Buildings of up to eight storeys will have a strong presence to Port Road and Anzac Highway. At lower levels, buildings will have a human scale through the use of design elements such as balconies, verandas and canopies. Development on corner allotments will enhance the gateway function of such corners by providing strong, built-form edges combined with careful detailing at a pedestrian scale to both street frontages.*

*Podium elements, where higher floors of the building are set back further than lower level floors, may be used to improve air quality (through greater air circulation), as well as enhancing solar access, privacy and outlook for both the residents of the building and neighbours.*

*Buildings along Port Road will have zero setback from the front boundary in order to establish a strong and imposing presence to the road, while short front setbacks along Anzac Highway will allow for some landscaping to contribute to a more open landscaped character.*

*On-site vehicle parking will not be visible from Port Road and Anzac Highway, by locating parking areas behind building façades and shielding under croft parking areas with landscaping and articulated screens.*

### 4.3.3 Principles of Development Control

The relevant Principles of Development Control (PDC) within the Boulevard Policy Area 34 include:

*Land Use*

- **PDC 1** - Development should predominantly comprise mixed use buildings, with non-residential development at the ground and first floor and residential development above, and wholly residential buildings.
- **PDC 2** - Residential Development should create a medium-to-high density urban environment incorporating residential flat buildings and dwellings in mixed-use buildings, and not lower density residential development such as detached dwellings.

*Form and Character*

- **PDC 3** - Development should be consistent with the desired character for the policy area.
- **PDC 4** - Shops or groups of shops contained in a single building should have a gross leasable area of less than 2000 square metres.
- **PDC 5** - The ground floor of buildings should be built to dimensions including a minimum floor to ceiling height of 4**.**5 metres to allow for adaptation to a range of land uses including retail, office and residential without the need for significant change to the building.
- **PDC 6** - A minimum of 50 per cent of the ground floor primary frontage of buildings should be visually permeable, transparent or clear glazed to promote active street frontages and maximise passive surveillance.

## 4.4 Overlays

The Site is affected by the following Overlays:

- **Affordable Housing Overlay** – The Site is located within the Affordable Housing Designated Area
- **Development Constraints Overlay** – The Site is located in the Airport Building Height Zone C
- **Noise and Air Emissions Overlay** – The Site is located in the Noise and Air Emissions Designated Area and adjoins a Designated Road (Type B Road)
- **Strategic Transport Routes Overlay** - The Site is located within a Strategic Transport Routes Designated Area

# 5 PLANNING ASSESSMENT

## 5.1 Introduction / Overview

The proposed multi-storey mixed use building raises the following key planning questions:

- Is the proposed built form consistent with the desired future character sought within the Urban Corridor Zone and Boulevard Policy Area 34?
- Does the proposed development exhibit Design Excellence?
- Does the proposal respond to the Overlays affecting the Site?
- Does the proposal create any unreasonable off-site amenity impacts?
- Are the proposed apartments designed with an adequate level of on-site amenity for future occupants?
- Does the proposal provide adequate access, car parking, bicycle parking facilities and waste management arrangements?
- Does the proposal provide an appropriate landscaping response?
- Does the proposal employ Crime Prevention Through Urban Design (CPTED) Principles?
- Does the proposal provide an appropriate energy efficiency and stormwater management solution?

An assessment of each of these considerations against the relevant provisions of the West Torrens Development Plan is provided below.

## 5.2 Is the proposed built form consistent with the desired future character sought within the Urban Corridor Zone and Boulevard Policy Area 34?

The 30 Year Plan for Greater Adelaide (and its update in 2017) seeks a new urban form that includes more intensive forms of urban development along main road corridors, such as Anzac Highway. By developing a more intensive form of development within area Urban Corridor Zone, including the Site, Greater Adelaide will be able to create a more compact urban form for the remainder of the city and its region and reduce further urban sprawl.

The proposal is considered to positively contribute to the built form transformation and desired character sought in both the Urban Corridor Zone and the Boulevard Policy Area 34 through the construction of nine storey, mixed use development. From a land use perspective, the proposal is of a high density residential use comprising 75 apartments on a Site just shy of 2000m$^2$. The proposal incorporates a mix of one, two and three bedroom dwellings to positively contribute to housing diversity. The retail uses proposed at ground level are modest in size (less than 400 cumulative square metres) but provide a strong activation to the frontage of the Site with glazing shop fronts.

The proposed building height of 9 storeys exceeds the recommended storey limit within the Zone by one storey but only exceeds the maximum envisaged height by approximately 200mm. On balance, the proposed height is considered more than acceptable due to the proposal providing a strong presentation to Anzac Highway and exhibiting strong attention to design excellence, which is discussed further in Section 5.3 below. This is seen through a strong podium design language at ground level and highly articulated 'tower' form for the upper levels. It is important to note that the proposal would complement the building height approved on land at 192 Anzac Highway, Glandore.

The Site is separated from the Residential Zone to the south by at least 40 metres and therefore the transitionary building height requirements outlined in PDC's 15 and 16 of the Urban Corridor Zone are not applicable to the proposed development. Nevertheless, the land immediately south contains a low-scale character and would likely be developed with a less intensity and height than the Site. The proposal has still sought to respect this interface by increasing rear boundary setbacks as the building progressively increases in height. This design approach is further discussed in Section 5.5.

## 5.3 Does the proposed development exhibit Design Excellence?

A key outcome sought within the Urban Corridor Zone is for new development to achieve 'design excellence'. This is naturally a subjective matter, however, both the General and Zone sections Development Plan contain a raft of relevant planning policies seeking a high standard of design and appearance for development. Having regard to the relevant provisions closely, it is considered that the proposed development exhibits a strong sense of design excellence for the following reasons:

- The proposed building (excluding the canopy) features a shallow staggered setback from Anzac Highway ranging between 3.5 and 6 metres to allow for meaningful landscaping opportunities that will enhance the appearance of the development when viewed from Anzac Highway.
- Additional landscaping opportunities are provided adjacent the rear boundary at ground level and through 'green' roof terraces and integrated balcony planter boxes.
- The proposal features non-residential land use (café and two shop fronts) at ground level to provide a strong connection and activated (approximately 50% glazing) frontage to Anzac Highway.
- The proposed single storey podium is clearly defined through materiality and provides a human scale to the adjoining pedestrian environment.
- A canopy projecting forward of the podium level ensures that external weather protection is provided to user's of the building. The textured brickwork to provide visual interest and reference the materiality of original housing stock within the surrounding area.
- The upper levels containing apartments have been setback at least 2 metres from the podium canopy alignment to enhance the human scale of the podium.
  Note: Whilst Zone PDC 7 requires a 2 metre setback for upper levels measured from the podium wall, it is considered that the projecting podium canopy form and materiality ensure that the podium element is clearly distinguishable from upper levels with the setbacks currently proposed. Furthermore, the 'open' nature of the balconies provide further merit for variations to the quantitative requirements of PDC 7.

- The curved balcony elements that surround the upper levels are highly integrated into the building composition. Not only do the balconies provide significant articulation and depth to the building façade but also emphasise a horizontal massing and create a 'sculptural' appearance to the building.
- The horizontal massing of the building façade is complemented by subtle vertical expressions provided by balcony breaks on all four elevations.
- The use of high quality mix of external materials and finishes, including digitally printed glass and perforated metal balcony balustrades, will set a high standard for new development along this section of Anzac Highway.
- The entry to upper level apartments is clearly distinguished from Anzac Highway via centrally located and glazed lobby and sheltered by the podium canopy.
- The proposed car parking, waste and loading areas have been positioned behind the ground level lobby, café and shop tenancies fronting Anzac Highway and provided in a basement level to ensure they do not detract from the appearance of the development.

- The proposed upper level windows and balconies fronting Anzac Highway will afford significant passive surveillance over the adjoining public realm area.
- The upper levels have been setback a minimum of 3 metres from the side boundaries to ensure the preferred pattern of space between buildings is maintained along this section of Anzac Highway.
- The podium floor to floor height is 4.5 metres to allow for potential adaptation to a range of future uses if required without significant change to the building.
- The contemporary architectural form proposed is consistent with a new built form character sought within the Urban Corridor Zone and other recently approved mixed use developments along Anzac Highway.
- Plant equipment and service areas have been sited centrally within the building to ensure they are screened from the public realm.
- The building has sought to minimise the risk of wind tunnelling effects along Anzac Highway by providing at the following:
  - A single storey podium base aligned to the street.
  - Provision of a substantial canopy/verandah projecting forward of the podium.
- A high quality landscape response is incorporated as part of the proposed development. The landscape plan prepared by Jensen Plus features an attractive treatment within the front setback together with communal outdoor terrace areas.

Having regard to the comments, it is considered that the proposal displays a high level of consistency with the relevant provisions relating to the design and appearance of buildings.



## 5.4 Does the proposal respond to the Overlays affecting the Site?

The Site is affected by four (4) Overlays identified in the Development Plan. An assessment against the requirements of each of these Overlays is provided below.

### 5.4.1 Affordable Housing Overlay

The Site is located within the Affordable Housing Designated Area.

There is potential for the 8 x one bedroom apartments to be offered as affordable housing. However, at this stage the proponent has not considered entering a formal agreement.

### 5.4.2 Development Constraints Overlay

The Site is located in the Airport Building Height Zone C of the Development Constraints Overlay.

An Aeronautical impact Assessment for the proposed building has been prepared by Landrum & Brown and included with the application material. The assessment concludes the proposed building would not adversely impact the aviation sector and that the maximum height of 50.7 metres AHD:

- *will infringe the Inner Horizontal Surface of the Adelaide Airport Obstacle Limitation Surfaces (OLS) by 2.2 m however, due to the limited use of circling approaches, will not present a significant hazard to flight operations;*
- *will not infringe the OLS of any other airport;*
- *will not infringe the Adelaide Airport PANS OPS surfaces, or the PANS OPS surfaces for any other airport in the vicinity;*
- *will not infringe the BRA for any navigation aid;*
- *will not infringe the ATC Surveillance system clearance planes nor impact upon ATC surveillance services; and*
- *is unlikely to infringe the RTCC protection surface above the site. Airservices Australia will confirm upon assessment.*

Having regard to the above, it is considered the General Section provisions relating to 'Building Near Airfields' are satisfied, due to the long tem operational safety and viability of the Adelaide Airport would not be compromised.

### 5.4.3 Noise and Air Emissions Overlay

The Site is located in the Noise and Air Emissions Designated Area and adjoins a Designated Road (Type B Road).

An Environmental Noise Assessment has been prepared for the development by Resonate acoustic engineers. The assessment concludes that the :

- *Facade noise mitigation treatments detailed in this report are suitable to attenuate noise intrusion from traffic on Anzac Highway into the residences in accordance with Minister's Specification SA 78B*
- *Music noise from the Level 8 function space will comply with the Development Plan and EPA guidelines provided music is limited to background levels when external doors and windows are open.*
- *Noise from vehicles accessing the car park will comply with the Noise EPP criteria provided a minimum 1.8m high fence is constructed on the western boundary adjacent to the car park access. Noise from vehicles accessing the site is expected to be significantly less than noise from traffic on Anzac Highway.*
- *External mechanical plant will be designed and treated at detailed design stage to achieve appropriate levels at the most affected receptors in accordance with the requirements of the Environment Protection (Noise)Policy 2007.*

Given the above conclusions, it is considered that the proposed development positively responds to the requirements of the Noise and Air Emissions Overlay.

### 5.4.4 Strategic Transport Routes Overlay

The Site is located within a Strategic Transport Routes Designated Area.

The proposal has respected the policy ambitions of this Overlay by: limiting vehicle access to Anzac Highway to a single point on the north western side of the Site frontage. Furthermore, the proposed development incorporates appropriate street setbacks to ensure that an accessible path can be provided continuously around the existing bus shelter adjoining the Site frontage.

## 5.5 Does the proposal create any unreasonable off-site amenity impacts?

### 5.5.1 Visual Impact

As previously discussed the setback requirements from the rear boundary are not applicable as the Site does not adjoin a residential zone. Notwithstanding this, the development has adopted recessive rear boundary setbacks to acknowledge the irregular shape of the Site and that future development to the south is likely to require a more tempered building form due to residential zone interfaces. The recessive nature of these setbacks would naturally assist in minimising visual amenity impacts to adjoining properties (see image below for reference).

The proposed development also responds to the side boundary setback requirements of the Urban Corridor Zone by providing at least 3 metre setbacks to external walls from both side boundaries above the podium level. Importantly, the proposed side boundary setbacks above the podium are considered to contribute to the preferred pattern of space between buildings envisaged along Anzac Highway.

The undulating balcony design also features on all four elevations to ensure each elevation is highly articulated and provides strong visual interest.



### 5.5.2 Overlooking and Equitable Development

The Development Plan requires development to minimise direct overlooking of habitable room windows and private open space of dwellings. PDC 14 for Medium and High Rise Development (3 or more storeys) goes further to state:

> *"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."*

All adjoining properties to the Site can be described as low scale and low density residential properties. These properties include private open space areas in close proximity to the Site boundaries, together with a number of habitable room windows. Given all adjoining Sites are also located within the Urban Corridor Zone, it is reasonable to expect that these Sites will one day be developed with a more robust and intensive development in response to the Zone Objectives.

With the exception of a small balcony corner section of the three bedroom apartment typology and southern most apartments at first and second floors, the proposed balconies and windows have generally been designed with a minimum setback of 3 metres from side and rear boundaries. The proposed

boundary setbacks are considered to be appropriate assuming future development on adjoining Sites would also incorporate a 3 metre boundary setback to create a cumulative visual separation of 6 metres.

#### 5.5.3 Overshadowing

PDC 15 of the Urban Corridor Zone seeks development that should minimise overshadowing of sensitive development outside of the Zone. The overshadowing diagrams included in the architectural set of plans confirms that only a very minor increase in shadow would be experienced by the existing dwelling at 10 Beckman Street to the south. The extent of additional shadow would be significantly less than the maximum allowance set out in PDC 11 for Residential Development.

There would be an inevitable increase in overshadowing to immediately adjoining properties to the Site. However, the Zone objectives envisage that these properties would also be developed for high density residential development and also create their own amenity and overshadowing impacts. It is important to note that greater rear setbacks could be proposed for the development due to the lack of rear setback requirements, which would further increase overshadowing impacts. Accordingly, the proposed overshadowing impacts are considered to be entirely reasonable.

### 5.6 Are the proposed apartments designed with an adequate level of on-site amenity for future occupants?

Various requirements for apartment design are outlined Medium and High Rise Development (3 or more storeys) and Residential Development general sections of the Development Plan. Having regard to the relevant policies, it is considered that the proposed apartments have been designed to be highly functional and with an appropriate level of amenity for the following reasons:

- High internal living environments are provided for each apartment through the following:
  - Typical floor to ceiling heights of 3 metres.
  - Open plan living, kitchen and meals areas with direct access to external balcony areas.
  - All habitable rooms having access to external windows to allow for natural daylight access.
  - Main bedroom with minimum dimensions of 3 metres x 3 metres (excluding storage).
  - Internal floor areas are no less than 5 square metres from the prescribed minimum floor areas for the proposed two and three bedroom apartments respectively. The proposed one bedroom apartments satisfy the internal area requirements. The minor shortfall from these spatial requirements is appropriately justified due to the provision of 258 square metres of communal internal area on the eighth level.
- Each apartment is afforded an external outlook and an attractive view.
- Each apartment has at least a north, east or west aspect to maximise daylight access. External windows are protected from overhangs of balconies from levels above.
- Each one bedroom apartment is provided with a balcony area of at least 8 square metres, two bedroom apartment with 9 square metres and three bedroom apartments with 26 square metres. Some minor variations are sought from the quantitative area and dimension requirements. However, the variations are justified through the generous provision of high quality communal open spaces areas on the third, sixth and eight floors.
- Each apartment will have access to 8 cubic metres of externally accessible storage area, in addition to storage area provided internally and conveniently located at the level of each corresponding apartment.
- The apartments are to be constructed in accordance with the recommendations of the Acoustic Report included with the application material.

### 5.7 Does the proposal provide adequate access, car parking, bicycle parking facilities and waste management arrangements?

#### 5.7.1 Vehicle Access and Traffic

A double width vehicle crossover to the Site is to be proposed from the north western side of the Site frontage. The crossover is provided with a sight distance to the east of 100 metres, which exceeds the necessary Australian Standards. Importantly, vehicle access being limited to one consolidated point responds positively to a number of Development Plan policies which seek to limit vehicle access along arterial roads.

The Traffic Impact Assessment (TIA) included with the application material confirms that the proposed development would generate minimal additional traffic during the weekday AM and PM peak periods. The total daily traffic generation from the proposed development is estimated as 808 trips per day (or 1.1 per minute). The TIA concludes that these trips can be appropriately accommodated at the nearby intersections without affecting the function of the surrounding road network.

### 5.7.2 Car Parking

The proposed ground level and basement level car parking areas incorporate a total of 85 car spaces, including 16 car stacker spaces and two accessible car spaces. As a whole, the proposed development results in a shortfall of 15 car spaces from the car parking requirements detailed in Table WeTo/2 (Off-Street Vehicle Parking Requirements). The TIA supports a reduction from the quantitative car parking requirements for the proposed development for the following reasons:

- The proposed Site is very well located to public transport services with frequent bus and tram services within a short distance from the site.
- It is considered that at least two of the residential tenants would not require a parking space
- A number of the clients of the Café and the two commercial tenancies would walk or cycle from the neighbouring sites or the residents on site. This would further reduce the parking demand and hence the expected parking shortfall.
- The parking survey results show that on Wednesday and Saturday, the minimum number of vacant spaces on street was 40-42, which is more than sufficient to cater for the parking shortfall of 15 spaces for the proposed development, without any significant effect on the existing users of the surveyed on-street parking areas.

The TIA also confirms that the design of the proposed car parking spaces, access configurations, ramp gradients and obstruction clearances meet or exceed the requirements set out in AS/NZS 2890.1-2004 Standard.

### 5.7.3 Bicycle Parking

PDC 20 of the Transportation and Access policy section requires development to encourage and facilitate cycling as a mode of transport by incorporating end of journey facilities, including:

- showers, changing facilities and secure lockers
- signage indicating the location of bicycle facilities
- bicycle parking facilities provided at the rate set out in **Table WeTo/7** - Off-street Bicycle Parking Requirements for Urban Corridor Zone.

The proposed development incorporates opportunities for over 25 bike parking spaces in accordance with the bike parking rates outlined in Table WeTo/7.

Residential visitor bike parking is located adjacent the eastern boundary of the Site at ground level. Given these spaces are likely to be used for short term periods, the open air nature of these spaces is considered to be appropriate. Secure and undercover bike parking for residents is proposed adjacent the waste storage area at ground level and the western side of the basement level. Furthermore, toilets that can be used as change rooms are provided at ground level behind proposed tenancies 1 and 2.

Given the above, it is considered that the proposed bike parking facilities are appropriate and would effectively promote the use of bicycles as a mode transport.

### 5.7.4 Waste Management Arrangements

Waste storage and loading areas is provided at the southern end of the building and deliberately separated from vehicle parking areas to avoid conflict. Each residential floor also incorporate storage areas for refuse, recycling and green waste bins. A Waste Management Plan has been included with the application material, which confirms that all waste generated from the Site would be collected by a private contractor. The TIA also includes swept path assessments that show that waste vehicles can enter and exit the Site appropriately.

## 5.8 Does the proposal provide an appropriate landscaping response?

A landscape plan has been prepared by Jensen Plus and included with the application material.

PDC 23 of the Medium and High Rise Development (3 or more storeys) section seeks the provision of deep soil areas that can accommodate new deep root vegetation, including tall trees with large canopies.

The proposed development incorporates deep soil areas with a width of approximately 3.5 metres between the ground level waste storage and bike parking areas and the eastern boundary towards the rear of the Site. The landscape concept prepared by Jensen Plus includes the planting of various *Pyrus ussuriensis* - Manchurian Pear trees which can have a mature height of 9 metres and width of 7 metres. These trees fall under the definition of a 'medium' tree under PDC 23 and therefore the quantitative requirements of this provision would be satisfied, while from a qualitative perspective these trees would soften the appearance of the development when viewed from adjoining properties to the south.

The front setback does not incorporate any deep rooted soil opportunities. Notwithstanding this, the front setback is to include principally low ground cover plantings highlighted with feature shrubs and a Manchurian pear tree. This landscaping treatment is considered to enhance the appearance of the development from the public realm, while also maintaining good sight lines. A hedge is proposed to the café alfresco area to improve amenity for patrons, due to the arterial nature of the road.

The proposed communal outdoor terraces on 3rd, 6th and 8th floors are also to include formal landscaping to provide amenity to occupants, soften the appearance of the development and respond to the requirements of PDC 21 which seek green roofs.

## 5.9 Does the proposal employ Crime Prevention through Urban Design (CPTED) Principles?

A number of Crime Prevention policies are contained with the general section of the Development Plan, which seek a safe, secure and crime resistant environment where land uses are integrated and designed to facilitate community surveillance.

The proposal has been designed with a highly 'activated' frontage setting to Anzac Highway through glazed shopfronts and lobby areas. The pedestrian accessways from Anzac Highway to the proposed development are clearly delineated through the use of high quality paving materials and clearly defined raised planter bed. These treatments also emphasise the 'private' nature of the Site. The use of groundcovers and feature small tree and shrubs have been incorporated in the garden beds adjacent Anzac Highway to maximise pedestrian sightlines and minimise potential for vandalism. Nigh time lighting and CCTV cameras orientated toward the Site frontage are also expected to be used to deter crime.

The upper residential levels have been designed with balconies and extensive glazing orientated toward Anzac Highway to provide strong casual surveillance opportunities over the adjoining public realm areas and vehicle accessway.

Accordingly, it is considered that the proposed development is consistent with the intent of the policies relating to Crime Prevention.

## 5.10 Does the proposal incorporate environmentally sustainable design principles?

There are a number of policies relating to environmentally sustainable design, energy efficiency and stormwater management (including WSUD principles) within the Development Plan. The manner in which the proposal responds to these policies is discussed below.

### 5.10.1 Energy Efficiency

The proposal has been designed with a range of environmentally sustainable design principles. The key features of the proposed development include, but are not limited to, the following:

- Passive design - each elevation and the building orientation has been considered separately and glazing and facade treatments optimised, with external shading used to minimise summer solar gains.
- All dwellings will be provided with operable windows and doors to allow full natural ventilation as required by the occupants.
- Glazing to be double glazed with large overhangs from balcony above.
- Selection of energy efficient lighting fittings (LED) with automated lighting control systems to common areas.
- Air conditioning using high efficiency ducted reverse cycle systems. Ensure fan setting to allow distribution of air without heating/cooling energy use when not needed.
- Centralised hot water generated by a gas boosted system.
- Induction cooktops.
- Energy efficient dishwasher and internal clothes drying space.
- Demand controlled car park ventilation systems with inverter controlled variable speed fans and carbon monoxide sensor control.
- Using light coloured external finishes (in particular roof coverings) to reflect heat and reduce solar gain, and reduce the heat island effect.
- Using zero ODP refrigerants and insulation.
- Photo Voltaic panels on roof to power common areas.
- Provide a battery connection to support use of renewable energy to common areas.
- Infrastructure will be included to allow for connection to an embedded network if deemed beneficial to future residents.
- Using paints, sealants, adhesives, carpets, and other coverings which have low off-gassing properties (low VOC, low formaldehyde).

### 5.10.2 Stormwater Management

Stormwater management plans have been prepared by TMK Consulting Engineers and shown in drawing numbers 1804138-C1/PA to 1804138-C5/PA. Key components of the strategy include:

- 2 x 6000 litre stormwater detention tanks located at ground level, adjoining the rear of the Site, connected to balcony and roof area drainage outlets. Overflow to be discharged to Anzac Highway.
- Provision of a sump pump contained within a 280 litre pumping chamber, located within the northeastern side of the basement level.
- Provision of 'Escol Storm Pit – Class 2' pollutant separator or similar within the eastern corner of the basement.

Having regard to the above, it is considered that the proposed development is consistent with the relevant policies relating to stormwater management.

### 5.10.3 Construction Initiatives

The proponent is committed to selecting locally sourced materials and materials that have a comparatively low embodied energy and carbon profile where viable. Materials with a recycled content are also to be used wherever viable.

A commitment has also been made that a minimum of construction waste (including demolition but excluding soil, contaminated waste and green waste) is diverted from landfill.

The proponent is also investigating the use of cross laminated timber construction for all residential levels, which is a renewable material and associated with various environmental, aesthetic and economic benefits.

# 6 CONCLUSION

Having regard to the relevant provisions of the West Torrens Development, it is considered that the proposed nine storey mixed use building is an appropriate form of development within the Urban Corridor Zone and Boulevard Policy Area 34 for the following reasons:

- The proposed high density residential component of the development would contribute positively to the housing diversity within an area well serviced by public transport.
- The commercial tenancies at ground level will provide strong activation to the public realm.
- The proposed built form is generally consistent with the maximum building height envisaged along this section of Anzac Highway within the Urban Corridor Zone.
- The proposed built form exhibits design excellence which is emphasised by a highly articulated and sculptural building appearance, the use of high quality external materials and finishes and meaningful landscaping.
- The Site is well-separated from nearby residential zoned land and as such no unreasonable amenity impacts are expected to occur from the development.
- The proposed apartments have been designed with excellent amenity and are further supplemented with high quality communal internal and outdoor areas located throughout the building.
- The proposed building setbacks respond to the requirements of the Urban Corridor Zone and would allow for the future equitable development of adjoining land.
- The proposed car and bicycle parking appropriately caters for the expected demand generated by the proposed residential and commercial uses.
- A range of environmentally sustainable design principles have been adopted by the development.

Accordingly, we request that the State Planning Commission grant Development Plan Consent.

# Aeronautical Impact Assessment

# Building Development
# 200-202 Anzac Highway
# Plympton, SA

Client

## Capsule Projects

LB00166

Final
14 June 2018

Landrum & Brown Worldwide (Aust) Pty Ltd, 2018

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# Contents


**1 Introduction ..... 4**

1.1 The Development ..... 4

**2 Prescribed Airspace ..... 4**

2.1 Overview ..... 4

2.2 Obstacle Limitation Surfaces ..... 5

2.2.1 Cranes ..... 6

2.2.2 Infringement of the OLS ..... 6

2.2.2.1 Infringement of the Inner Horizontal Surface – ICAO Document References ..... 6

2.3 PANS OPS ..... 6

2.3.1 Examination of Circling Approaches ..... 8

**3 ATC Surveillance System Performance ..... 8**

**4 Navigation Aid Performance ..... 9**

**5 Roof Top Exhaust Plumes ..... 9**

**6 Obstacle Lighting ..... 9**

**7 Conclusion ..... 9**

**Appendix A – Site Layout Diagrams**

**Appendix B – Assessment Methodology**

**Appendix C – Glossary of Terms and Abbreviations**

# 1 Introduction

## 1.1 The Development

Capsule Projects has tasked Landrum & Brown Worldwide (Australia) Pty Ltd to prepare an Aeronautical Impact Assessment (AIA) for a proposed building development at 200-202 Anzac Highway, Plympton, South Australia.

The development is located approximately 3.3 km from the Aerodrome Reference Point (ARP) for Adelaide Airport and comprises a building with a maximum height of 50.7 m AHD, including all vents, antennae and lift overrun.




**Figure 1: Location in relation to the ARP at Adelaide Airport**

Figure 1 shows the location of the development in relation to Adelaide Airport, and Table 1 identifies the MGA 94 coordinates of the building corners.

| Northern corner | Eastern corner | Southern corner | Western corner |
|---|---|---|---|
| E 277454<br>N 6128768 | E 277470<br>N 6128748 | E 277444<br>N 5128725 | E 277430<br>N 6128746 |

**Table 1: MGA 94 coordinates of the proposed building**

# 2 Prescribed Airspace

## 2.1 Overview

Prescribed Airspace for an airport is the airspace above any part of an Obstacle Limitation Surface (OLS), a PANS OPS (Procedures for Air Navigation Services – Aircraft Operations) surface for the airport, and the Radar Terrain Clearance Chart (RTCC) protection surfaces.

The OLS are conceptual surfaces associated with runways that are designed to protect aircraft operations from unrestricted obstacle growth. The OLS comprises the following:

- outer horizontal surface (OHS);
- conical surface;

- inner horizontal surface (IHS);
- approach surface;
- inner approach surface;
- transitional surface;
- inner transitional surface;
- baulked landing surface; and
- take-off climb surface.

The PANS OPS surfaces are designed to guarantee an obstacle free path to and from a runway, with a prescribed minimum obstacle clearance above the obstacles or terrain, for the safety of aircraft operations in Instrument Meteorological Conditions (IMC).

The RTCC provides ATC with minimum heights at which they can provide surveillance services to aircraft in the area around major airports.

Infringement by a building or crane through the OLS requires the approval of the Civil Aviation Safety Authority (CASA) and the Department of Infrastructure, Regional Development and Cities (DIRDC) where the airport is on federally leased land. Adelaide is a federally leased airport.

Infringement of PANS OPS or RTCC protection surfaces are not supported by the aviation authorities.

## 2.2 Obstacle Limitation Surfaces

The OLS extends to a maximum distance of 15 km from the ARP of Adelaide Airport. The lowest OLS is the Inner Horizontal Surface (IHS) for Adelaide Airport at a height of 48.5m AHD.

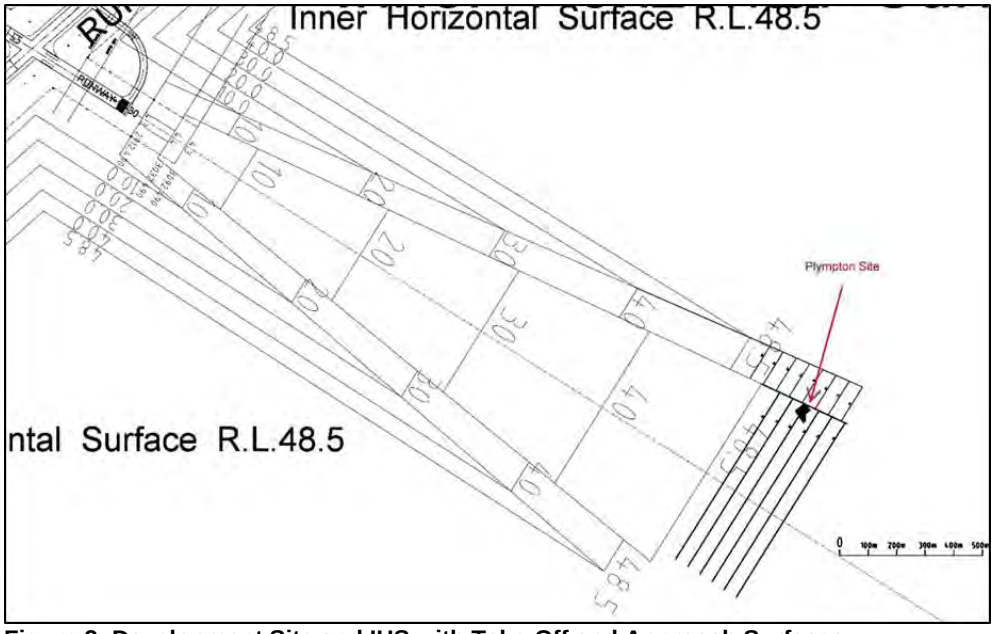



**Figure 2: Development Site and IHS with Take-Off and Approach Surfaces**

The development site is located within the lateral boundaries of the Approach Surface for Runway 30 and the Take-Off Climb Surface for Runway 12. These surfaces are sloped above the site.

At a height of 50.7 m AHD, the development does not infringe either of these surfaces. Approval for the infringement of the IHS must be sought from Adelaide Airport Limited (AAL).

Table 2 shows the OLS elevations with the clearances in green and the infringements in red.

| OLS Surface | Surface height at western corner of site in m AHD | Impact of building at 50.7 m AHD | Surface height at northern corner of site in m AHD | Impact of building at 50.7 m AHD |
|---|---|---|---|---|
| Runway 30 Approach Surface | 53.66 | 2.96 | 54.1 | 3.4 |
| Runway 12 Take-off Climb surface | 51.55 | 0.85 | 53.3 | 2.6 |
| Inner Horizontal Surface | 48.5 | 2.2 | 48.5 | 2.2 |

**Table 2: OLS Surface Elevations**

### 2.2.1 Cranes

Capsule Projects sought early advice from Adelaide Airports Limited regarding the possible impact of construction cranes at the Anzac Highway site on operations at Adelaide Airport.

In response, they have developed a complementary construction methodology incorporating lightweight building materials which eliminate the need for large capacity cranes. This methodology will accompany an application to AAL for infringement of the IHS by the building.

### 2.2.2 Infringement of the OLS

The Inner Horizontal Surface was originally established by ICAO to restrict obstacle growth in the vicinity of airports, and to protect the obstacle clearance of aircraft circling the airport in less than visual flight conditions prior to landing.

As the lowest applicable PANS OPS surface of 83.4 m AHD includes the protection of circling approaches, it is considered that the infringement of the IHS by the building by 2.2 m will not affect the safety and regularity of aircraft operations at Adelaide Airport.

ICAO has acknowledged the limitations imposed by the current OLS layout, and has formed the OLS TASK FORCE to review and update the OLS and align them with the PANS OPS surfaces. ICAO recognises the economic balance required between terrestrial infrastructure requirements of growing cities and efficiency and safety of flight operations.

#### 2.2.2.1 Infringement of the Inner Horizontal Surface – ICAO Document References

ICAO Airport Services Manual Part 6 - Control of Obstacles states in Para 1.2.2.4:

> *In assessing the operational effect of proposed new construction, tall structures would not be of immediate significance if they are proposed to be located in:*
>
> *a) An area already substantially obstructed by terrain or existing structures of equivalent height*
>
> *b) An area which would be safely avoided by prescribed procedures associated with navigational guidance where appropriate*

The Inner Horizontal Surface can be infringed in accordance with the recommendations of ICAO Doc ANNEX 14 Volume 1 Aerodrome Design and Operations, Para 4.2.20, which states:

> *New objects or extensions of existing objects should not be permitted above the Conical Surface and the Inner Horizontal Surface except when, in the opinion of the appropriate authority, an object would be shielded by an existing immovable object, or after an aeronautical study it is determined that the object would not adversely affect safety or significantly affect the regularity of operations of aeroplanes.*

## 2.3 PANS OPS

An assessment of the PANS OPS surfaces confirms that the development does not infringe any of the PANS OPS surfaces at Adelaide Airport.

The PANS OPS surfaces related to Parafield Airport have been assessed to be well above the maximum proposed height of this development.

A Radar Terrain Clearance Chart (RTCC) protection surface exists above the site. This surface relates to the lowest level that aircraft are able to descend to whilst under the direction of ATC.

The lowest RTCC surface overhead the development site is estimated at 152 m, based on a 1500 ft minimum vectoring altitude, and taking into consideration the built-up areas of the Adelaide suburbs, and hills to the south and west of the site. The RTCC levels for Adelaide are not publicly available. Airservices Australia will be able to provide details of these surfaces during their assessment of this project.

Table 3 shows the lowest PANS OPS surface height above the development site for each airport and the clearance (in green) or infringement (in red) of the building on each surface.

| Airport | PANS OPS surface | Surface Height (m AHD) | Building 50.7 m AHD |
|---|---|---|---|
| Adelaide | RWY 30 RNAV-Z Final Approach Segment | 83.4 | 32.7 |
| Parafield | 10 nm Minimum Sector Altitude (MSA) | 853.3 | 802.6 |

**Table 3: PANS OPS Surface Heights and result**




**Figure 3: PANS OPS Surface above Development Site**

### 2.3.1 Examination of Circling Approaches

The development site at 200-202 Anzac Highway, Plympton, is located beneath the CAT A/B and CAT C/D IFR circling areas for Adelaide Airport. An assessment was conducted to confirm that there would be no changes required to the published circling minimum altitudes to accommodate a building to a maximum height of 50.7 m AHD.

The aircraft category (CAT) depends on a number of aircraft performance parameters, as published in the ICAO PANS OPS.

Table 4 depicts the applicable circling area protection surface heights and the clearance (in green) or infringement (in red) of the building on each surface.

| Aircraft Category | Minimum Circling Altitude (feet AMSL) | Circling Area Limit from threshold (nautical miles) | Minimum Obstacle Clearance (feet) | PANS OPS Surface height (m AHD) | Building 50.7 m AHD |
|---|---|---|---|---|---|
| **A and B** | 900 | 2.66 | 295 | 184.4 | 133.7 |
| **C and D** | 1000 | 5.28 | 394 | 184.7 | 134 |

**Table 4: Circling Area PANS OPS heights**

Note: The Aeronautical Information Publication (AIP) publishes all distances in nautical miles, and altitudes in feet for instrument flight procedures. Displays to pilots are in the same format.

# 3 ATC Surveillance System Performance

This assessment identified two radars supporting ATC services in the Adelaide area in relative proximity to the proposed development. These are a Terminal Area Radar (TAR) located at Adelaide Airport and one Route Surveillance Radar (RSR) at Summertown, in the Adelaide Hills.

Table 5 illustrates that the development will not infringe the ATC Surveillance System Performance.

| Surveillance System | Distance from development | Distance in metres | Antenna Elevation (m AHD) | Plane Elevation at development site (m AHD) Distance x Tan 0.5° + TAR elevation | Infringement result for building height of 50.7 m AHD |
|---|---|---|---|---|---|
| **Adelaide Airport TAR** | 3 km south | 2870 | 27.72 | 52.8 | 2.1 m clearance |
| **Summertown RSR** | 33 km SW | 14100 | 655.25 | 778.3 | 727.6 m clearance |

**Table 5: Impact of development on ATC Surveillance System Performance**

# 4 Navigation Aid Performance

There are a number of navigation aids installed at Adelaide Airport, including ILS, VOR and DME.

The Building Restricted Areas (BRA) describe a sensitive zone that exists around the navigation aid antenna sites. The development limitations within the BRA are specified in the Airservices Australia document *Navigation Aid Building Restricted Areas and Siting Guidance AEI-7.1613 Issue 2.*

For the Localiser antenna, the BRA consists of an area with a lateral limit of 1000 m either side of the runway centerline and a slope of 2 degrees above the horizontal from the top of the antenna, along the runway centerline.

For the Glide path antenna, the BRA consists of an area with a lateral limit of 350 m and a slope of 2 degrees above the horizontal from the top of the antenna, along the runway centerline.

Table 6 confirms that the proposed development at 200-202 Anzac Highway will not have an impact the BRAs at Adelaide Airport.

| Navigation Aid | BRA Lateral Dimensions (metres) | BRA Vertical Dimensions (degrees above the horizontal) | Distance to Development (m) | Result |
|---|---|---|---|---|
| **Adelaide VOR/DME** | 1500 | 2 | 3711 | No infringement |
| **RWY 23 ILS LOC** | 1000 | 2 | 4289 | No infringement |
| **RWY 23 Glide Path** | 350 | 2 | 2577 | No infringement |

**Table 6: Building Restricted Area Assessment**

# 5 Roof Top Exhaust Plumes

Exhaust plumes in excess of 4.3 m/s can create sufficient turbulence to upset the stability of aircraft during the take-off and landing phases of flight.

Roof top exhaust plume rises in excess of 4.3 m/s must be referred to CASA for their assessment of risk to aircraft operations.

# 6 Obstacle Lighting

Obstacle lighting for the building, if required by CASA, should be in accordance with the Manual of Standards Part 139 – Aerodromes, Chapter 9.4 *Obstacle Lighting*.

Suitable shields may be installed to prevent disturbance to the community, however the lights must remain visible above a horizontal plane.

# 7 Conclusion

Recognition of the significance of the aeronautical protection surfaces has enabled Capsule Projects to design a building development that will not adversely impact the aviation sector.

The proposed building at 200 Anzac Highway, Plympton, to a maximum height of 50.7 m AHD:

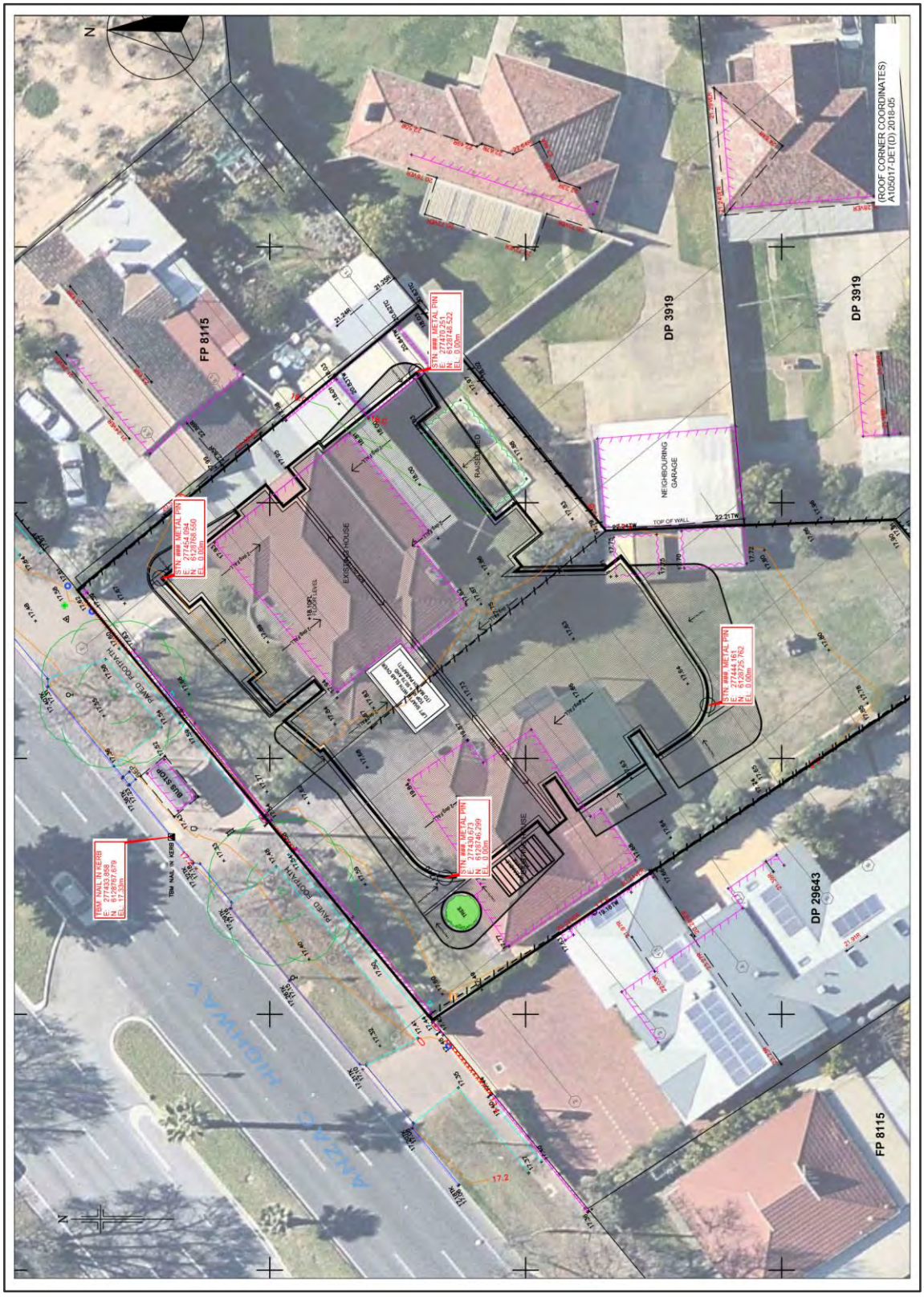
- will infringe the Inner Horizontal Surface of the Adelaide Airport OLS by 2.2 m however, due to the limited use of circling approaches, will not present a significant hazard to flight operations;
- will not infringe the OLS of any other airport;

- will not infringe the Adelaide Airport PANS OPS surfaces, or the PANS OPS surfaces for any other airport in the vicinity;
- will not infringe the BRA for any navigation aid;
- will not infringe the ATC Surveillance system clearance planes nor impact upon ATC surveillance services; and
- is unlikely to infringe the RTCC protection surface above the site. Airservices Australia will confirm upon assessment.

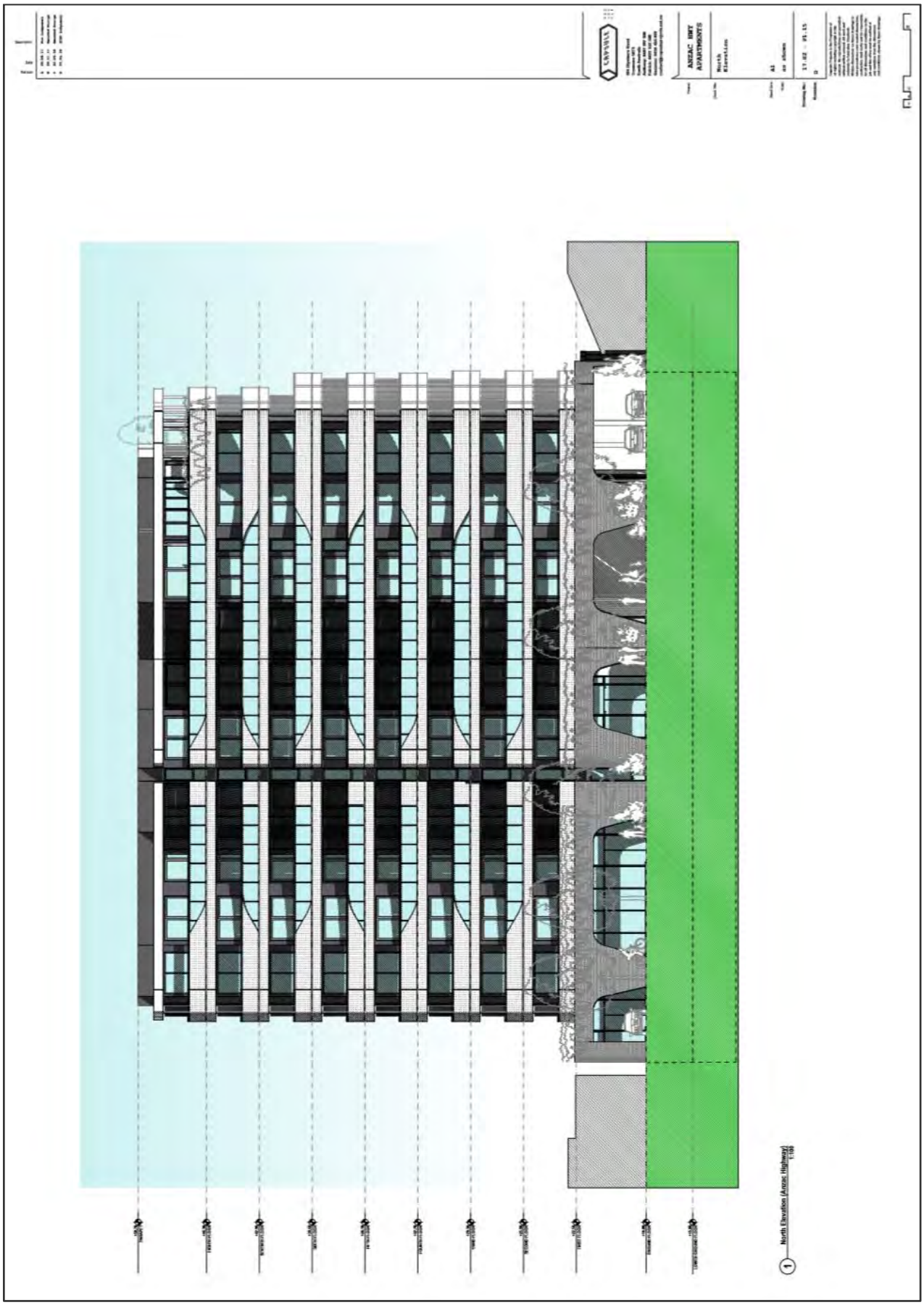
Subsequent to the grant of any approval for this development, a detailed application to CASA, Airservices Australia, and Adelaide Airport will need to be made for the cranes (temporary obstacles) required during the building process.

# Appendix A

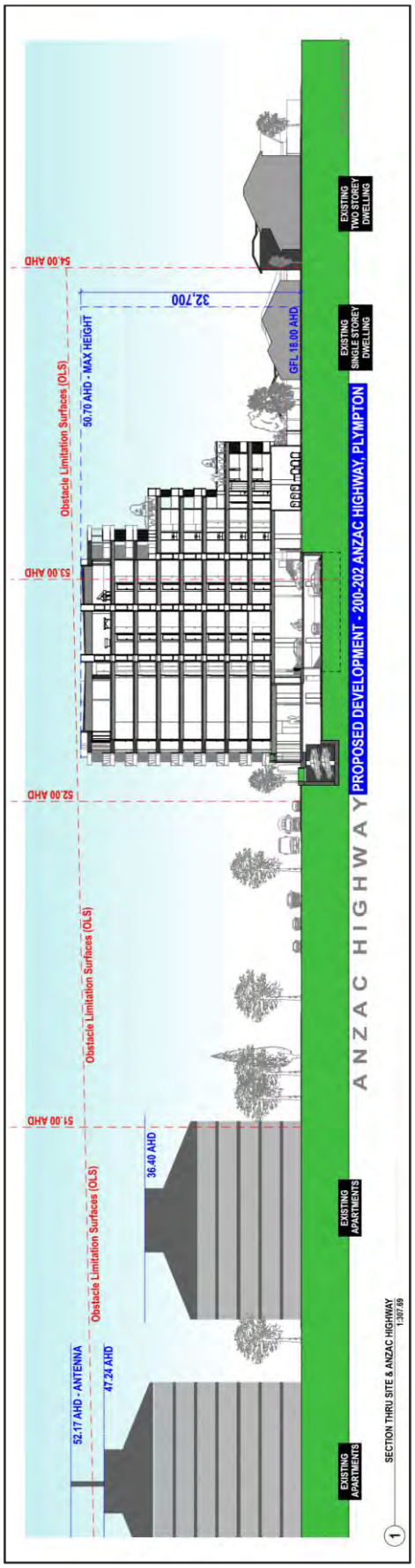
## Site Layout




**Site Layout**
**Source: Capsule Projects**




**Site North Elevation**
**(Source: Capsule Projects)**




**Section through Site and Anzac Highway (Source Capsule Projects)**

# Appendix B

# Assessment Methodology

In preparing aeronautical impact assessments associated with airport safeguarding and protection, it is necessary to observe the requirements of the relevant aviation authorities including:

- The Department of Infrastructure and Regional Development (DIRD);
- The Civil Aviation Safety Authority of Australia (CASA);
- Airservices Australia (ASA);
- Airport Operators; and
- Department of Defence where appropriate.

The *Airports Act 1996* and *Airports (Protection of Airspace) Regulations 1996* prescribes the volumes of airspace surrounding Federally Leased Airports that protect aircraft operations into those airports, in order to ensure the safety and regularity of airline and other flight operations.

Adelaide Airport's Prescribed Airspace comprises:

- Obstacle Limitation Surfaces (OLS) that restrict obstacle growth in the vicinity of takeoff and landing paths; and
- PANS OPS surfaces that provide a buffer between flight paths and terrain or obstacles.

Relevant Acts and Regulations applicable to developments near airports and air traffic routes were referenced during this assessment.

The major relevant documents include:

- The Airports Act 1996, Airports (Protection of Airspace) Regulations 1996;
- Civil Aviation Safety Regulation (CASR) Part 139 Manual of Standards – Aerodromes;
- Aeronautical Information Publication (AIP);
- Airservices Australia's Airways Engineering Instruction – Navigation Aid Building Restricted Areas and Siting Guidance (BRA);
- International Civil Aviation Organisation (ICAO) DOC 8168 Procedures for Air Navigation – Aircraft Operations (PANS OPS); and
- Adelaide Airport Limited Master Plan 2014.

A Glossary of Aeronautical Terms and Abbreviations is shown at Appendix C.

# Appendix C

## Glossary of Aeronautical Terms and Abbreviations

To facilitate the understanding of aviation terminology used in this report, the following is a glossary of terms and acronyms that are commonly used in aeronautical impact assessments and similar aeronautical studies.

**AC** (Advisory Circulars) are issued by CASA and are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means, of complying with the *Regulations*.

**Aeronautical study** is a tool used to review aerodrome and airspace processes and procedures to ensure that safety criteria are appropriate.

**AIPs** (Aeronautical Information Publications) are publications promulgated to provide operators with aeronautical information of a lasting character essential to air navigation. They contain details of regulations, procedures and other information pertinent to flying and operation of aircraft. In Australia, AIP is issued by Airservices Australia on behalf of CASA.

**Air routes** exist between navigation aid equipped aerodromes or waypoints to facilitate the regular and safe flow of aircraft operating under IFR.

**Airservices Australia** is the Australian government-owned corporation providing safe and environmentally sound air traffic management and related airside services to the aviation industry.

**Altitude** is the vertical distance of a level, a point or an object, considered as a point, measured from mean sea level.

**ATC** (Air Traffic Control) service is a service provided for the purpose of:

a. preventing collisions:
    1. between aircraft; and
    2. on the manoeuvring area between aircraft and obstructions; and
b. expediting and maintaining an orderly flow of air traffic.

**CASA (**Civil Aviation Safety Authority) is the Australian government authority responsible under the *Civil Aviation Act 1988* for developing and promulgating appropriate, clear and concise aviation safety standards. As Australia is a signatory to the ICAO *Chicago Convention,* CASA adopts the standards and recommended practices established by ICAO, except where a difference has been notified.

**CASR** (Civil Aviation Safety Regulations) are promulgated by CASA and establish the regulatory framework *(Regulations)* within which all service providers must operate.

***Civil Aviation Act 1988*** (the Act) establishes the CASA with functions relating to civil aviation, in particular the safety of civil aviation and for related purposes.

**ICAO** (International Civil Aviation Organization) is an agency of the United Nations which codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth. The ICAO Council adopts standards and recommended practices concerning air navigation, its infrastructure, flight inspection, prevention of unlawful interference, and facilitation of border-crossing procedures for international civil aviation. In addition, the ICAO defines the protocols for air accident investigation followed by transport safety authorities in countries signatory to the Convention on International Civil Aviation, commonly known as the *Chicago Convention*. Australia is a signatory to the *Chicago Convention.*

**IFR** (Instrument Flight Rules) are rules applicable to the conduct of flight under IMC. IFR are established to govern flight under conditions in which flight by outside visual reference is not safe. IFR flight depends upon flying by reference to instruments in the flight deck, and navigation is accomplished by reference to electronic signals. It is also referred to as, “a term used by pilots and controllers to indicate the type of flight plan an aircraft is flying,” such as an IFR or VFR flight plan. Pilots must hold IFR qualifications and aircraft must be suitably equipped with appropriate instruments and navigation aids to enable flight in IMC.

**IMC** (Instrument Meteorological Conditions) are meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, less than the minimum specified for visual meteorological conditions.

**LSALT** (Lowest Safe Altitudes) are published for each low level air route segment. Their purpose is to allow pilots of aircraft that suffer a system failure to descend to the LSALT to ensure terrain or obstacle clearance in IMC where the pilot cannot see the terrain or obstacles due to cloud or poor visibility conditions. It is an altitude that is at least 1,000 feet above any obstacle or terrain within a defined safety buffer region around a particular route that a pilot might fly.

**MOS** (Manual of Standards) comprises specifications (Standards) prescribed by CASA, of uniform application, determined to be necessary for the safety of air navigation.

**NOTAMs** (Notices to Airmen) are notices issued by the NOTAM office containing information or instruction concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to persons concerned with flight operations.

**Obstacles.** All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight.

**OLS (**Obstacle Limitation Surfaces) are a series of planes associated with each runway at an aerodrome that defines the desirable limits to which objects may project into the airspace around the aerodrome so that aircraft operations may be conducted safely.

**PANS OPS** (Procedures for Air Navigation Services - Aircraft Operations) is an Air Traffic Control term denominating rules for designing instrument approach and departure procedures. Such procedures are used to allow aircraft to land and take off under Instrument Meteorological Conditions (IMC) or Instrument Flight Rules (IFR). ICAO document 8168-OPS/611 (volumes 1 and 2) outlines the principles for airspace protection and procedure design which all ICAO signatory states must adhere to. The regulatory material surrounding PANS OPS may vary from country to country.

**PANS OPS Surfaces.** Similar to an Obstacle Limitation Surface, the PANS OPS protection surfaces are imaginary surfaces in space which guarantee the aircraft a certain minimum obstacle clearance. These surfaces may be used as a tool for local governments in assessing building development. Where buildings may (under certain circumstances) be permitted to infringe the OLS, they cannot be permitted to infringe any PANS OPS surface, because the purpose of these surfaces is to guarantee pilots operating under IMC an obstacle free descent path for a given approach.

**Prescribed airspace** is an airspace specified in, or ascertained in accordance with, the Regulations, where it is in the interests of the safety, efficiency or regularity of existing or future air transport operations into or out of an airport for the airspace to be protected. The prescribed airspace for an airport is the airspace above any part of either an OLS or a PANS OPS surface for the airport and airspace declared in a declaration relating to the airport.

**Radar Terrain Clearance Chart (RTCC)** is a chart that provides air traffic controllers with the lowest usable altitude that they can vector an aircraft using prescribed surveillance procedures within controlled airspace. There is a protection surface below this usable altitude which is shown in airport master plans.

**Regulations** (Civil Aviation Safety Regulations)

**VFR** (Visual Flight Rules) are rules applicable to the conduct of flight under VMC. VFR allow a pilot to operate an aircraft in weather conditions generally clear enough to allow the pilot to maintain visual contact with the terrain and to see where the aircraft is going. Specifically, the weather must be better than basic VFR weather minima. If the weather is worse than VFR minima, pilots are required to use instrument flight rules. Pilots must be specifically qualified and aircraft specifically equipped to enable flight in IMC,

**VMC** (Visual Meteorological Conditions) are meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, equal or better than specified minima.

# Abbreviations

Abbreviations used in this report, and the meanings assigned to them for the purposes of this report are detailed in the following table.

| Abbreviation | Meaning |
|---|---|
| AC | Advisory Circular (document support CAR 1998) |
| ACFT | Aircraft |
| AD | Aerodrome |
| ADS-B | Automatic Dependent Surveillance - Broadcast |
| AHD | Australian Height Datum |
| AIP | Aeronautical Information Publication |
| Airports Act | Airports Act 1996, as amended |
| AIS | Aeronautical Information Service |
| ALT | Altitude |
| AMSL | Above Mean Sea Level |
| APARs | Airports (Protection of Airspace) Regulations, 1996 as amended |
| ARP | Aerodrome Reference Point |
| AsA | Airservices Australia |
| ATC | Air Traffic Control(ler) |
| ATM | Air Traffic Management |
| BRA | Building Restricted Area |
| CAO | Civil Aviation Order |
| CAR | Civil Aviation Regulation |
| CASA | Civil Aviation Safety Authority |
| CASR | Civil Aviation Safety Regulation |
| Cat | Category |
| DAP | Departure and Approach Procedures (charts published by AsA) |
| DER | Departure End of (the) Runway |
| DME | Distance Measuring Equipment |
| Doc nn | ICAO Document Number nn |
| DIT | Department of Infrastructure and Transport. (Formerly Dept. of Infrastructure, Transport, Regional Development and Local Government and Department of Transport and Regional Services (DoTARS)) |
| DOTARS | See DIT above |
| ELEV | Elevation (above mean sea level) |
| ENE | East North East |
| ERSA | Enroute Supplement Australia |
| FAF | Final Approach Fix |
| FAP | Final Approach Point |

| Abbreviation | Meaning |
|---|---|
| ft | feet |
| GBAS | Ground Based Augmentation System (satellite precision landing system) |
| GNSS | Global Navigation Satellite System |
| GP | Glide Path |
| IAS | Indicated Airspeed |
| ICAO | International Civil Aviation Organisation |
| IHS | Inner Horizontal Surface, an Obstacle Limitation Surface |
| ILS | Instrument Landing System |
| ISA | International Standard Atmosphere |
| km | kilometres |
| kt | Knot (one nautical mile per hour) |
| LAT | Latitude |
| LLZ | Localizer |
| LONG | Longitude |
| m | metres |
| MAPt | Missed Approach Point |
| MDA | Minimum Descent Altitude |
| MGA94 | Map Grid Australia 1994 |
| MOC | Minimum Obstacle Clearance |
| MOS | Manual of Standards, published by CASA |
| MSA | Minimum Sector Altitude |
| MVA | Minimum Vector Altitude |
| NASAG | National Airports Safeguarding Advisory Group |
| NDB | Non Directional Beacon |
| NE | North East |
| NM | Nautical Mile (= 1.852 km) |
| nnDME | Distance from the DME (in nautical miles) |
| NNE | North North East |
| NOTAM | NOtice to AirMen |
| OAS | Obstacle Assessment Surface |
| OCA | Obstacle Clearance Altitude |
| OCH | Obstacle Clearance Height |
| OHS | Outer Horizontal Surface |
| OIS | Obstacle Identification Surface |
| OLS | Obstacle Limitation Surface |
| PANS OPS | Procedures for Air Navigation Services – Aircraft Operations, ICAO Doc 8168 |
| PBN | Performance Based Navigation |

| Abbreviation | Meaning |
|---|---|
| PRM | Precision Runway Monitor |
| QNH | An altimeter setting relative to height above mean sea level |
| REF | Reference |
| RL | Relative Level |
| RNAV | aRea NAVigation |
| RNP | Required Navigation Performance |
| RPA | Rules and Practices for Aerodromes<br>— replaced by the MOS Part 139 — Aerodromes |
| RPT | Regular Public Transport |
| RTCC | Radar Terrain Clearance Chart |
| RWY | Runway |
| SFC | Surface |
| SID | Standard Instrument Departure |
| SOC | Start Of Climb |
| STAR | STandard ARrival |
| SGHAT | Solar Glare Hazard Analysis Tool |
| TAR | Terminal Approach Radar |
| TAS | True Air Speed |
| THR | Threshold (Runway) |
| TNA | Turn Altitude |
| TODA | Take-Off Distance Available |
| $V_n$ | aircraft critical Velocity reference |
| VOR | Very high frequency Omni directional Range |
| WAC | World Aeronautical Chart |

CAPSULE PROJECTS

# PROPOSED APARTMENT DEVELOPMENT FOR VIVE DEVELOPMENTS 200-202 ANZAC HIGHWAY, PLYMPTON SA



# Construction Methodology and Staging for Crane Operations

## June 2018

| ISSUE | A | AUTHOR | AG | DATE | 14/6/2018 |
|---|---|---|---|---|---|

TABLE OF CONTENTS

1.0 INTRODUCTION AND PURPOSE 3

2.0 KEY PARAMETERS 4

3.0 BUILDING STRUCTURE 5

4.0 CONSTRUCTION METHODOLOGY AND STAGING 6

6.0 CONCLUSION 8

ATTACHMENT A 9

ATTACHMENT B 10

## 1.0 INTRODUCTION AND PURPOSE

This paper details the building structure, construction methodology, staging and working heights of truck mounted mobile cranes proposed for the development of an apartment building at 200-202 Anzac Highway, Plympton for Vive Developments.

This report offers an alternative to the originally proposed tower crane proposal which would have significantly penetrated the RWY 30 Approach surface and IHS. Preliminary negotiations with Adelaide Airport concluded that an approval of such temporary penetrations by the crane to be highly unlikely.

This report has been prepared by Capsule Projects in collaboration with United Cranes to support the Aeronautical Impact Assessment by Landrum & Brown. This construction methodology focuses on the working heights during construction activities and the methods adopted to ensure that the construction may progress safely, without breach of limitations.

It should be noted final details of crane locations and movements will depend on further liaison with SAPN (powerlines proximity and / or tagging), DPTI (temporary removal of bus stop) and structural engineer (temporary propping of basement / ground floor.

## 2.0 KEY PARAMETERS

The key parameters for the project and the development site are as follows:

- The site is located at 200-202 Anzac Highway, Plympton
- The RL of top of building parapet is 50.7m AHD
- The lift overrun will be contained under this parapet height
- Roof mounted photovoltaic panels, sewer vents, antennae, etc will all be contained under the parapet height of 50.7m AHD.
- The PANS OPS levels covering the site is 83.4m AHD.
- The OLS Inner Horizontal Surface (IHS) level covering the site is 48.5m AHD.
- The building height of 50.7 m will penetrate the IHS surface of 48.5 m by 2.2 m.
- OLS Approach and Take-off Climb Surfaces: 51.55 m to 52.6 m AHD over almost all of the site area, and rising to 54.15 m AHD in the north east corner.

## 3.0 BUILDING STRUCTURE

The design proposal consists of a basement and ground floor area containing carpark, commercial spaces, main entry lobby and ancillary use areas. The first floor up to the seventh floor contain between 9 and eleven apartments based on the same basic layout with a central double lift core. Two fire isolated stairs are located in accordance with the requirements of the NCC. The uppermost (eight) floor contains 5 apartments top the east and a common recreation space to the west. The building form is quite consistent with some 'stepping' down to the rear (southern boundary.

The intention for this project is for the basement and first floor to be constructed from traditional reinforced concrete structure up to the first floor slab. From there the structure for the apartments will utilise cross laminated timber panels for the majority of the construction. Cross Laminated Timber (CLT) is an engineered wood product, similar to extremely large plywood, used for pre-fabricated structural applications.

Due to the precise nature of the high quality product - installation sequencing, crane calculations, all logistics and even delivery can be pre-planned, and the risk of errors on site is significantly reduced. The inherent bracing of the structure using CLT means that half of the building may be erected to full height at one time – rather than floor by floor. The panels are lightweight – a mere 20 per cent the weight of concrete – eliminating the need for large capacity cranes.

## 4.0 CONSTRUCTION METHODOLOGY AND STAGING

This methodology focuses on the construction activities and logistics that are impacted by the height restrictions across the site and to demonstrate the detailed planning required to ensure that these height restrictions are not breached.

As previously mentioned, the inherent bracing of the structure using CLT means that half of the building may be erected to full height at one time – rather than floor by floor.

A dedicated loading bay will be established along Anzac highway directly in front of the building which will allow full size semi-trailers to be utilised for deliveries.

With this in mind the intention is for the project to be erected in two stages split along the main apartment corridor that runs east west in front of the lifts.

**Stage 1**
The first stage would involve the truck mounted crane located on the Ground Floor slab fully within the site working approximately along Grid 3 – as per Appendix A. This will allow the crane to erect the entire building to the south, up to the slab of the eighth floor.

- During this process it is envisaged that the maximum height that the crane boom will reach is 43.91m AHD.

- During this process it is envisaged that the maximum amount of time that the crane boom will be required is 2 weeks per floor.

The structure of the eighth floor is to be constructed using using minimal panels (stair and lift cores)and traditional timber wall and roof framing such that packs of materials need only be landed on the eighth floor at 46.3m AHD.

- During this process it is envisaged that the maximum height that the crane boom will reach is 46.91m AHD.

- During this process it is envisaged that the maximum amount of time that the crane boom will be required is 2 weeks.

Overall no penetration of the IHS is required during Stage 1 of the construction

**Stage 2**
The second main stage of erection will repeat the above process for the remainder of the building with the crane being located approximately (mobile crane) along the front boundary of the property to erect the remainder of the building up to the eighth floor - as per Appendix B.

- During this process it is envisaged that the maximum height that the crane boom will reach is 52.27m AHD.

- During this process it is envisaged that the maximum amount of time that the crane boom will be required is 2 weeks per floor.

Similarly to previous - the structure of the eighth floor is to be constructed using minimal panels (stair and lift cores) and traditional timber wall and roof framing such that packs of materials need only be landed on the eighth floor at 46.3m AHD.

- During this process it is envisaged that the maximum height that the crane boom will reach is 55.27m AHD.

- During this process it is envisaged that the maximum amount of time that the crane boom will be required is 2 weeks.

Overall penetration of the IHS is required during Stage 2 of the construction. This is likely to occur as the construction begins to top out for the last 2-3 floors. Given a period of 2 weeks per floor, we can assume approximately a 6 week period over which intermittent penetration of the IHS will be required. This can be carefully co-ordinated (i.e during curfew and landings) with Adelaide Airport to eliminate any disruptions.

**Scaffold and temporary works**

External scaffolding would not be required to extend past the height of the building parapet. It is also important to note that CLT structures require much less temporary propping for slabs, hence less crane lifts for formwork.

**Waste**

Due to the precise nature of the construction using CLT panels- there will be less waste created by the build. In any case, chutes will transport building waste to bins on Ground level.

**Demobilisation**

Using a mobile crane means that demobilisation procedure for the crane will be almost negligible. In fact, the mobile crane will offer the most flexible solution for the erection of the structure and associated works.

From the above we may note that the mobile crane used to erect a CLT structure will be the most agile and responsive solution for working on this site. It will allow the building to be fully erected in stages at a relatively brisk pace when compared with other more traditional methods.

During preliminary negotiations with Adelaide Airport we have noted that it will be possible for crane lifts that penetrate the IHS to occur during curfew times and possibly between aircraft movements. These would obviously require further consideration and have the construction team to coordinate with the airport.

## 6.0 CONCLUSION

The use of lightweight cross laminated timber panels will allow the construction of the proposed building using truck mounted mobile cranes, in two stages, to the uppermost flor slab with minimal penetration of the critical heights across the site. The eighth floor may be erected using minimal panels (stair and lift cores) and traditional timber wall and roof framing reducing the number of crane lifts.

- Overall - during these processes it is envisaged that the maximum height that the crane boom will reach is 55.27m AHD. It should be noted that this is only during the later stages of Stage 2 of construction.

- It is envisaged that the maximum amount of time that the crane boom will be required to be above the IHS is intermittently over a 6 week period

During preliminary negotiations with Adelaide Airport we have noted that it will be possible for crane lifts that penetrate the IHS to occur during curfew times and possible between aircraft movements. These would obviously require the construction team to coordinate with the airport.

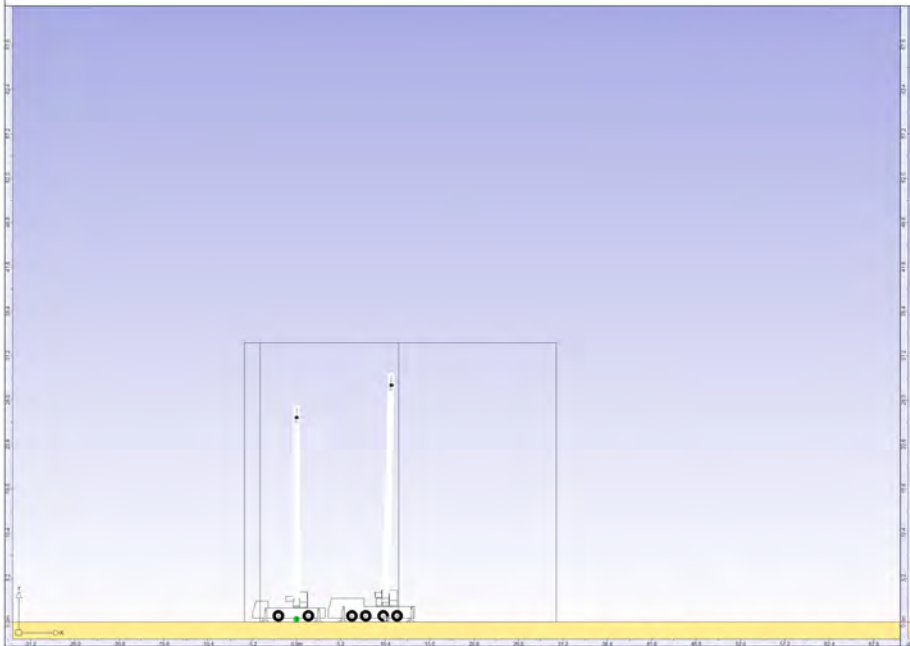
Further development of this plan with Adelaide Airport, SAPN (powerlines proximity and / or tagging), DPTI (temporary removal of bus stop) , structural engineer (temporary propping of basement / ground floor) and other stakeholders will ensure a safe and effective construction period to satisfy all objectives

**ATTACHMENT A**

STAGE 1 CRANE LOCATION BY UNITED CRANES

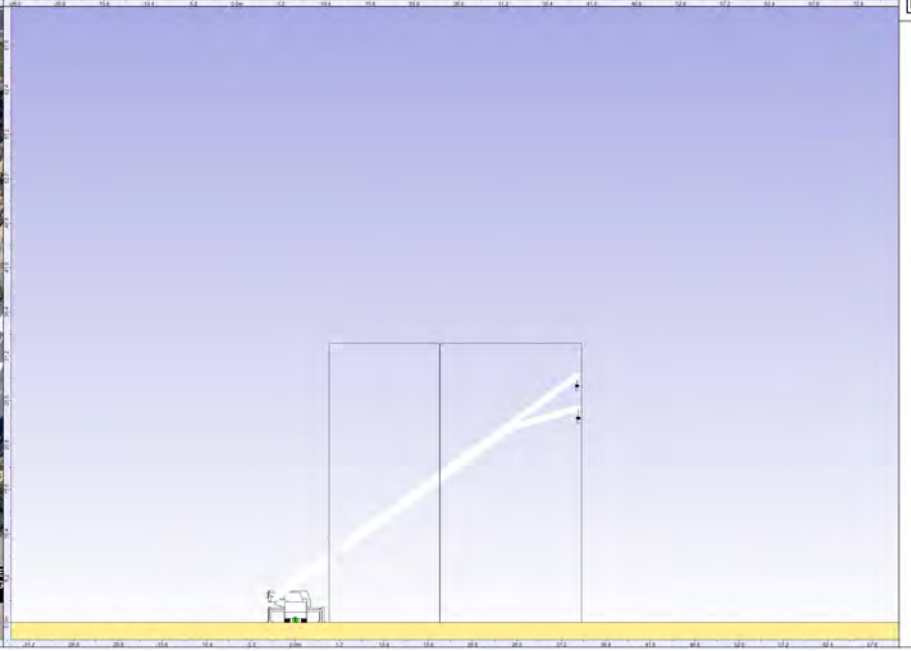
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| Project: ANZAC HIGHWAY | | |
| Service: CRANE HIRE | | |
| Customer: GIORDANO CONSTRUCTION | Contact Partner: ANTHONY | |
| Street: 200 ANZAC HIGHWAY | | |
| City: PLYMPTON | | |
| Telephone | Mobile | |
| Facsimile | Email | |







United CRANES & RIGGING

Radius/Radius height
33.16 m 25.13 m

Crane 1

Terex-Demag
AC 40/2 L

Boom extension
34.1 m
35.8°
8.0 m 20.0°

Counterweight
5.5t

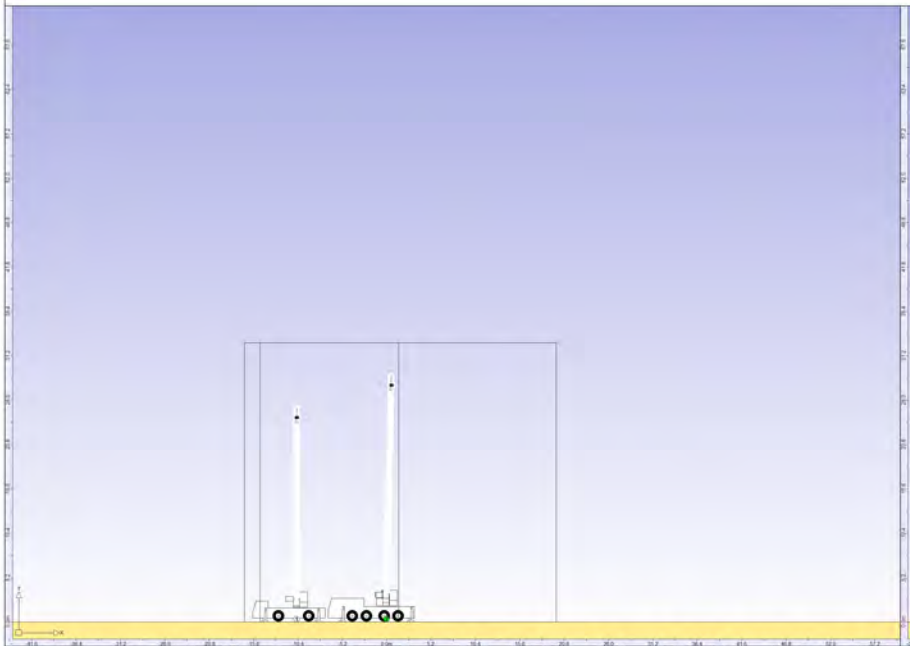
5.95 m
360°

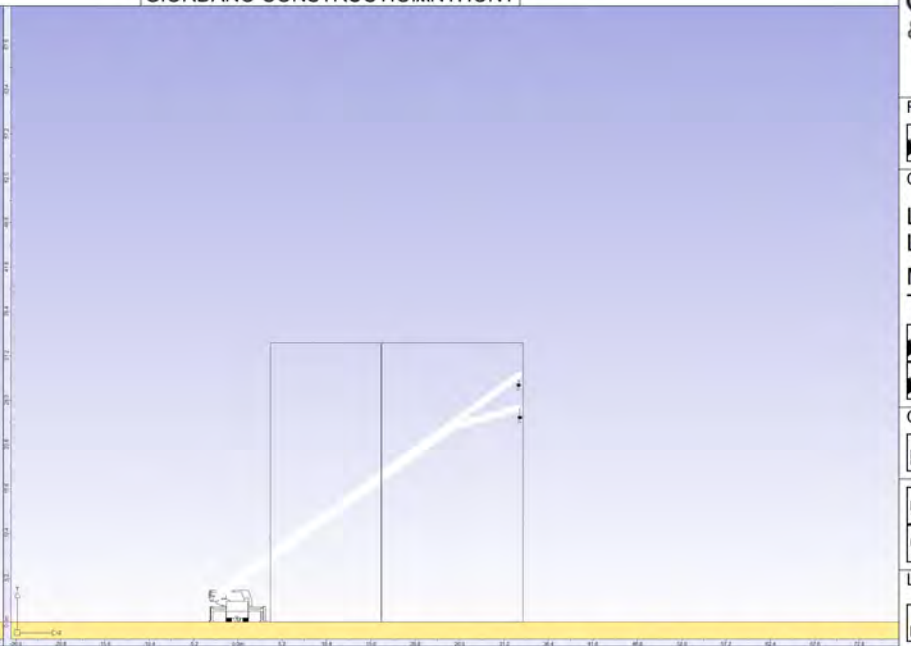
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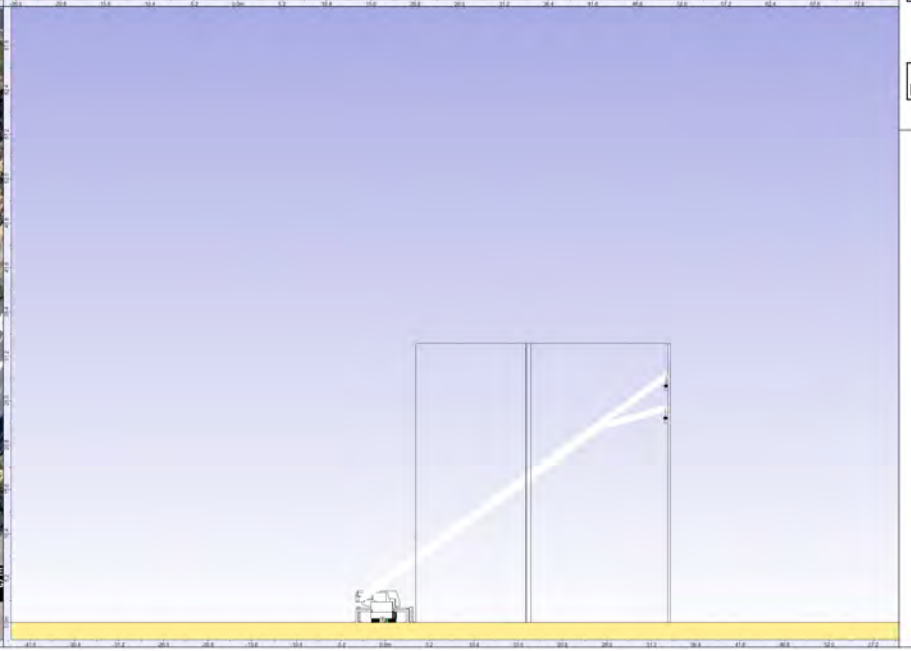
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|---|---|---|---|
| G 1 | | | 200 ANZAC HIGHWAY |
| Project | | | City |
| ANZAC HIGHWAY | | | PLYMPTON |
| Service | | | Telephone / Mobile |
| CRANE HIRE | | | |
| Customer | | Contact Partner | Facsimile / Email |
| GIORDANO CONSTRUCTION | | ANTHONY | |

United CRANES & RIGGING







Radius/Radius height
32.92 m 28.91 m

Crane 2

Liebherr
LTM 1070-4.2

Main boom
T

43.3 m
35.8°

Counterweight
14.5t

6.30 m
360°

Load EN 13000

max: 2.17t
0.00t Load
+0.11t Hook

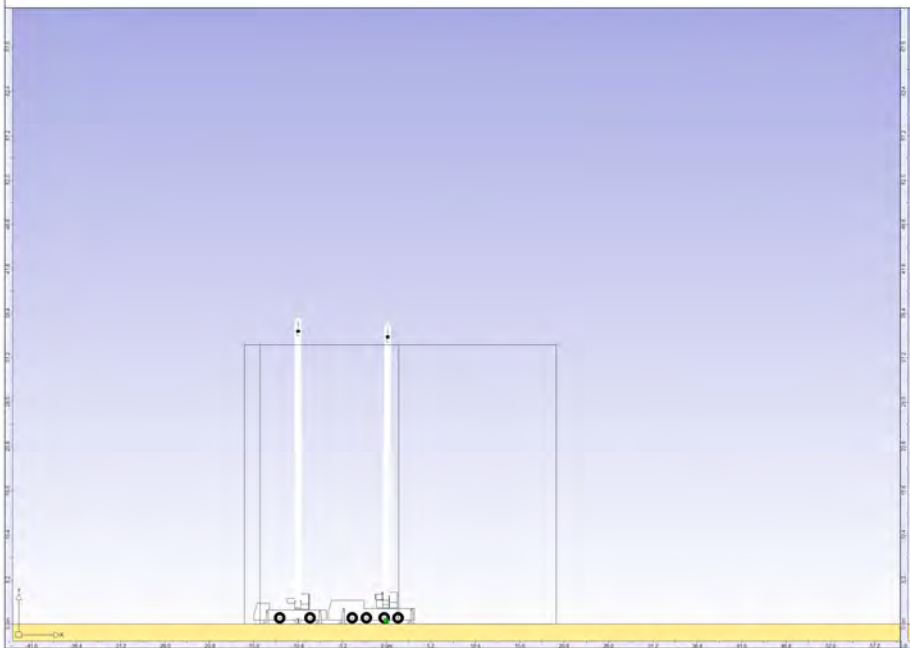
is: 0.11t
5.1% of max

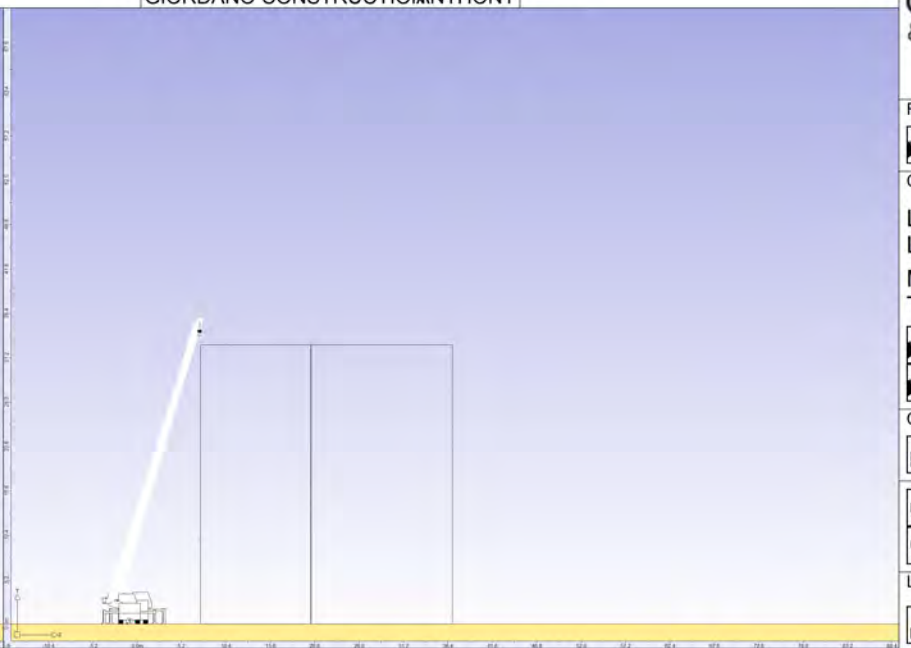
**ATTACHMENT B**

STAGE 2 CRANE LOCATION BY UNITED CRANES

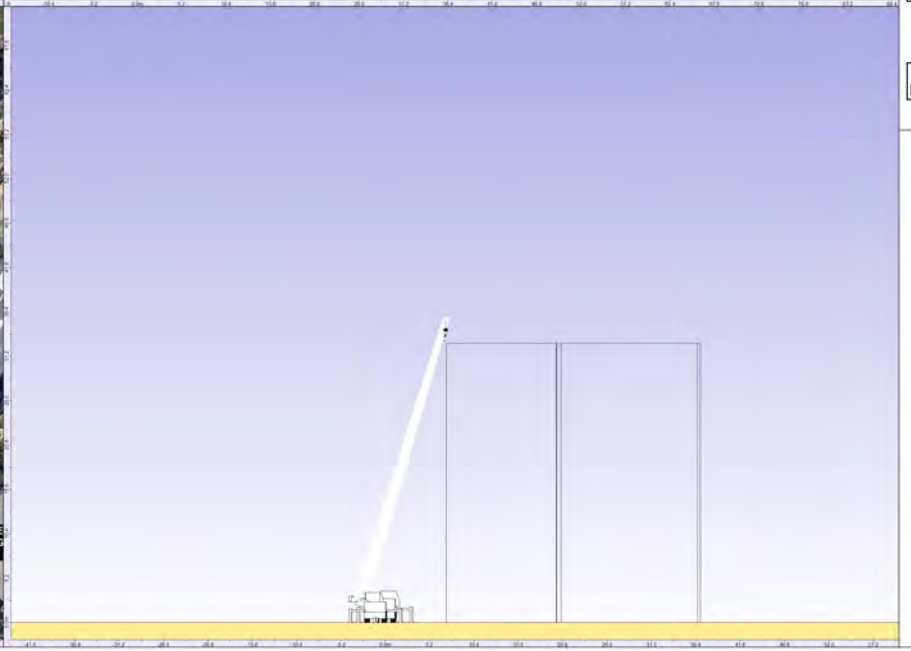
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| Service: CRANE HIRE | | |
| Customer: GIORDANO CONSTRUCTION | Contact Partner: ANTHONY | |
| Street: 200 ANZAC HIGHWAY | | |
| City: PLYMPTON | | |
| Telephone | Mobile | |
| Facsimile | Email | |







United CRANES & RIGGING

Radius/Radius height
6.87 m 34.79 m

Crane 2
Liebherr
LTM 1070-4.2
Main boom
T
32.5 m
73.8°

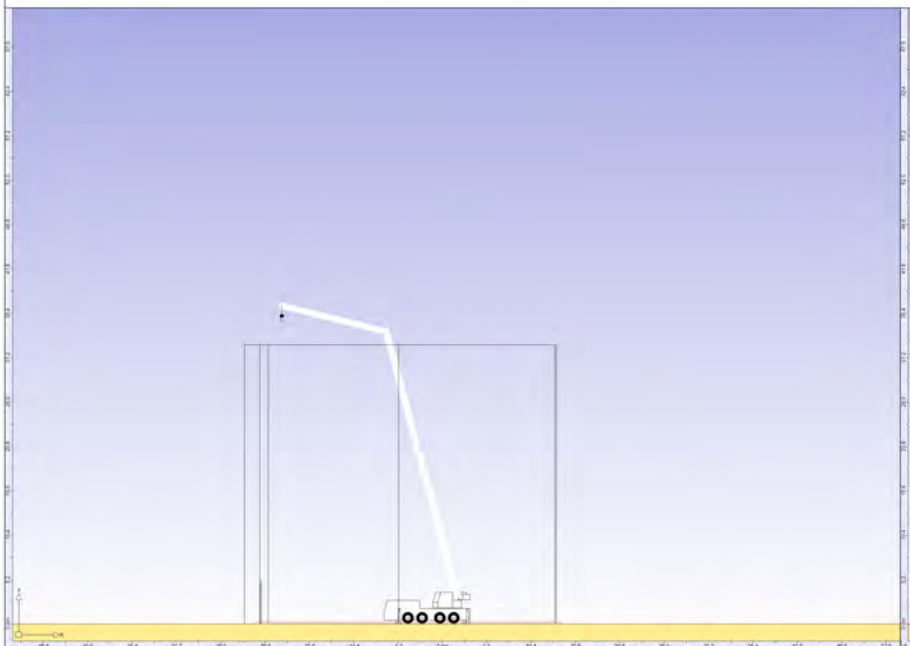
Counterweight
14.5t

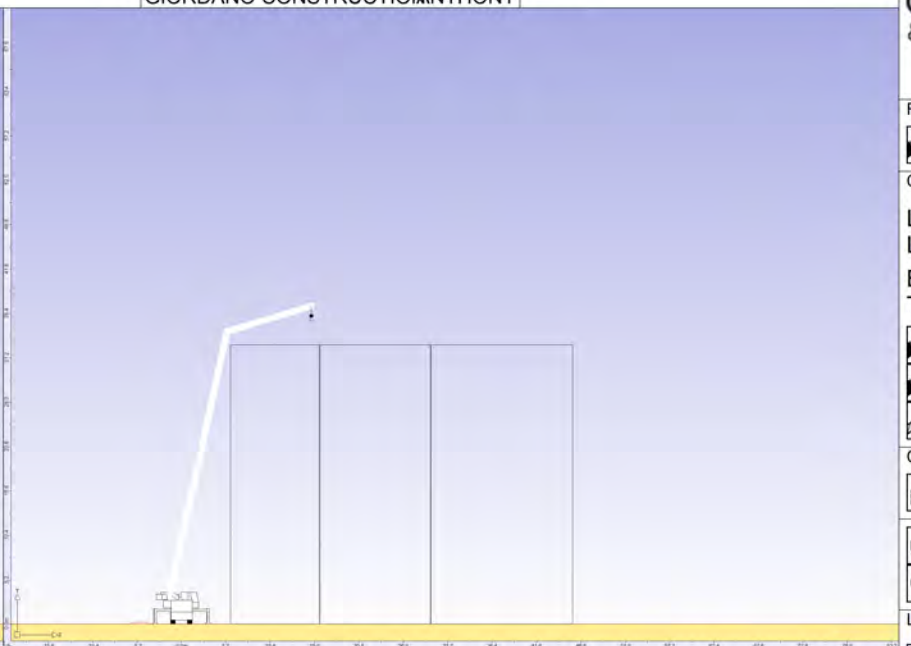
6.30 m
360°

Load EN 13000
max: 19.65t
0.00t Load
+0.11t Hook
is: 0.11t
0.6% of max

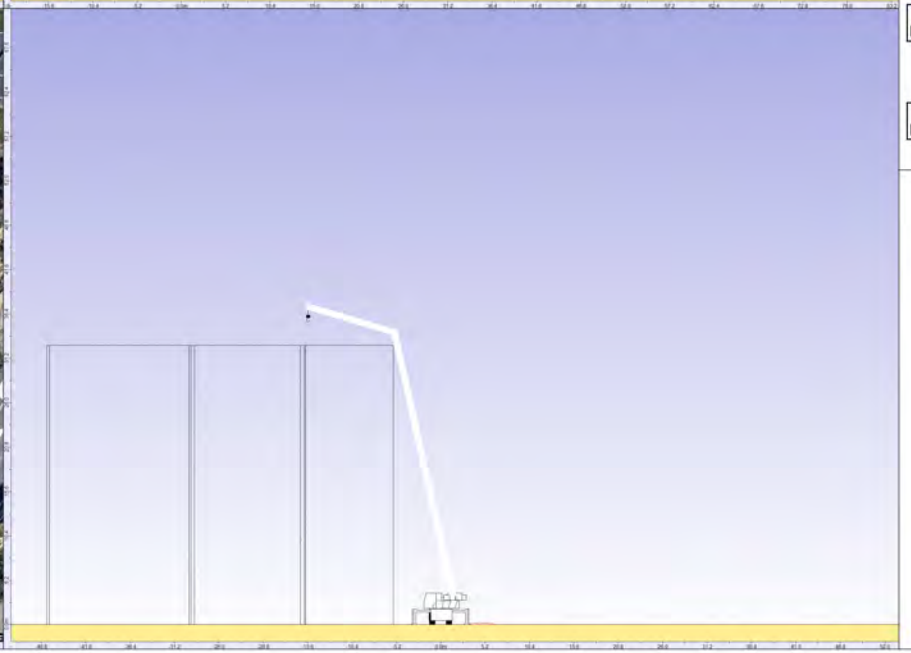
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| Project: ANZAC HIGHWAY | | |
| Service: CRANE HIRE | | |
| Customer: GIORDANO CONSTRUCTION | Contact Partner: ANTHONY | |
| Street: 200 ANZAC HIGHWAY | | |
| City: PLYMPTON | | |
| Telephone | Mobile | |
| Facsimile | Email | |







United CRANES & RIGGING

Radius/Radius height
24.2 m 37.27 m

Crane
Liebherr
LTM 1070-4.2

Boom extension
TK/TNZK
32.5 m
70.8°
16.0 m 60.0°

Counterweight
14.5t

6.30 m
360°

Load EN 13000
max: 2.10t
0.00t Load
+0.11t Hook
is: 0.11t
5.2% of max

# 4 views

| Project number | Order number | Offer number | Street |
|---|---|---|---|
| G 1 | | | 200 ANZAC HIGHWAY |
| Project | | | City |
| ANZAC HIGHWAY | | | PLYMPTON |
| Service | | | Telephone / Mobile |
| CRANE HIRE | | | |
| Customer | | Contact Partner | Facsimile / Email |
| GIORDANO CONSTRUCTION | | ANTHONY | |

United CRANES & RIGGING

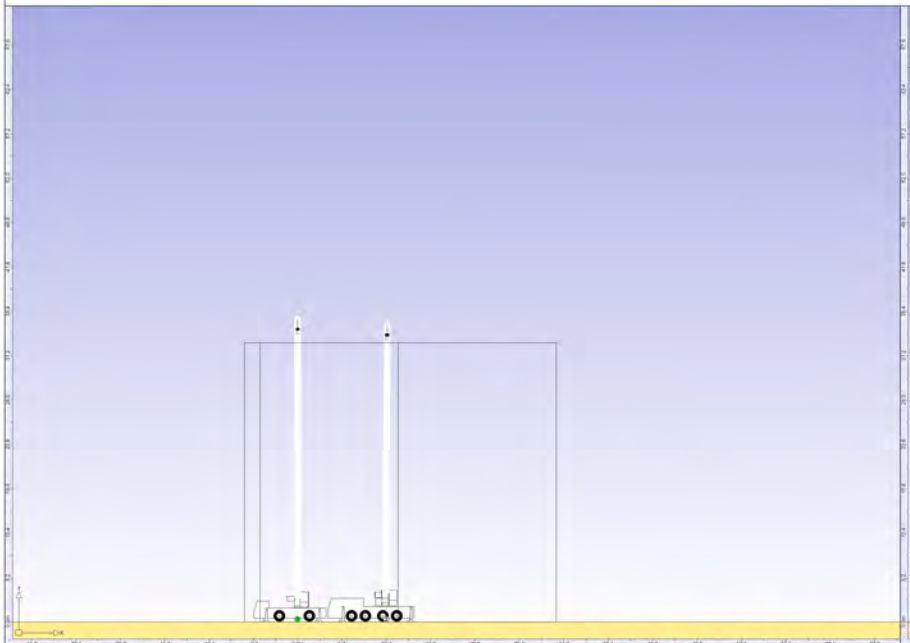
Radius/Radius height
8.22 m 35.47 m

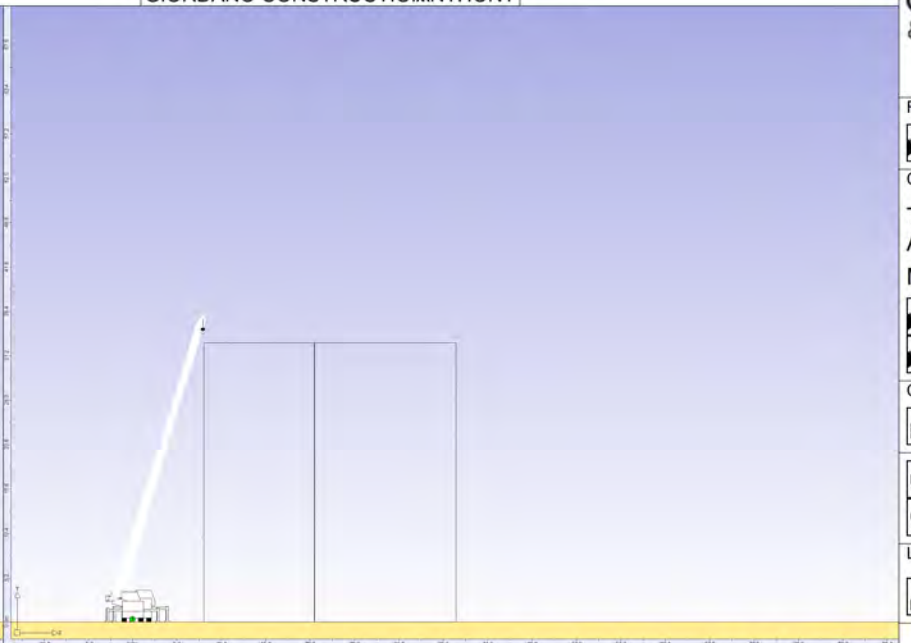
Crane 1
Terex-Demag
AC 40/2 L
Main boom
34.1 m
72.2°

Counterweight
5.5t

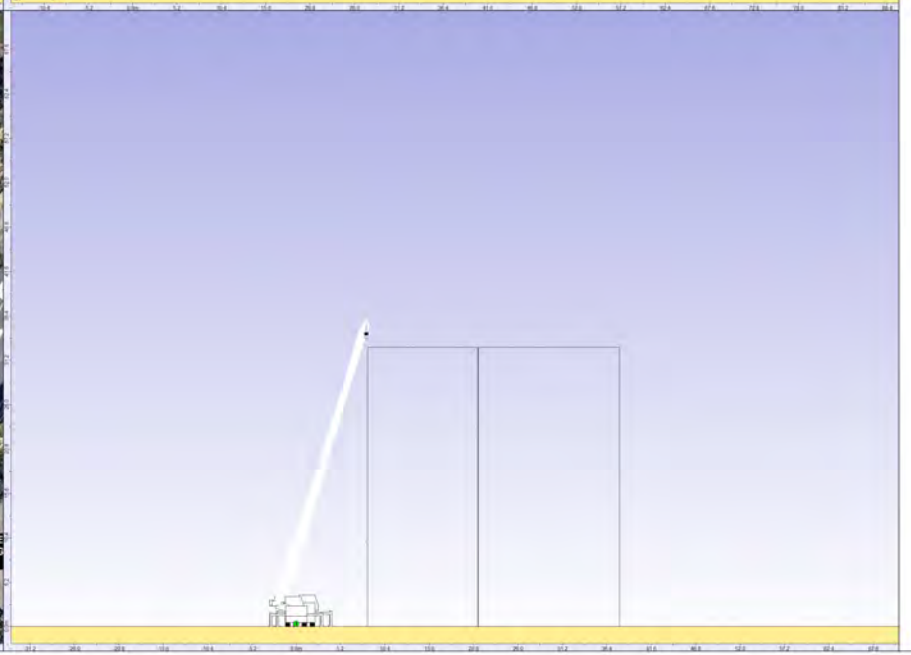
5.95 m
360°

Load DIN/ISO
max: 7.37t







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# TRAFFIC & PARKING IMPACT ASSESSMENT

## 200-202 Anzac Highway, Plympton SA 5038

*Mixed Use Development*

| | |
|---|---|
| Prepared for | Vive Developments |
| Date Prepared: | July 2018 |
| Revision: | 1.1 |
| City of West Torrens Council Application #: | TBA |

# INDEX


**Introduction** ..... **3**

**Background and Existing Conditions** ..... **3**

**Location and Land Use** ..... **3**

Figure 1: Location of the Subject Site on a Street Map ..... 4

Figure 2: Location of the Subject Site on Aerial View ..... 4

Figure 3: Street view of the frontage of the subject site from Anzac Highway ..... 5

**Public Transport** ..... **6**

**Tram Services** ..... **6**

Figure 4:Glenelg Tram Line Route Map ..... 6

Figure 5: Map of walk from Bus 263 stop to the site ..... 7

Table 1: Public transport GleneLG Tram Line service details ..... 7

**Bus Services** ..... **8**

Table 2: Public transport bus service details for Route 263 ..... 8

**Traffic Impacts of the Proposed Development** ..... **9**

Table 3: Calculation of trip generation from the proposed development ..... 9

**Car Parking Assessment** ..... **10**

**West Torrens Council DCP - Car Parking Requirements** ..... **10**

Table 4: Calculation of DCP Car Parking Requirement ..... 10

**Car Parking Surveys** ..... **11**

On-Street Parking Surveys ..... 11

Figure 6: Map showing extent of on-street parking surveys… ..... 11

Table 5: On-Street Parking Survey Results (Wednesday 1 November) ..... 12

Table 6: On-Street Parking Survey Results (Saturday 28 October) ..... 13

Table 7: Overall Summary of On-Street Parking Survey Results ..... 13

Survey Results ..... 14

**Car Park Certification** ..... **14**

Conclusion of CPC ..... 18

**Conclusions** ..... **19**

**Appendix A: Ground Floor of the Commercial developments and parking area** ..... **20**

**Appendix B: Lower Ground Floor plan of Proposed Car Park** ..... **21**

**Appendix C: Detail Dimensions Proposed Car Park.Spaces** ..... **22**

**Appendix D: Swept Path Diagrams** ..... **23**

# Introduction

AusWide Consulting was commissioned by Vive Developments prepare a Traffic & Parking Impact Assessment for the proposed Residential and Commercial development at 200&202 Anzac Highway in Plympton, South Australia.

The subject site is located at the southern side of Anzac Highway.
The proposed development consists of a 9 storey mixed use new building with associated car parking.

This report will assess the traffic impacts of this proposed development on the surrounding environment and the compliance of the proposed car parking with the Australian Standards and relevant clauses presented within the City of West Torrens Council Development Control Plan (DCP). In the course of preparing this assessment, the subject site and its environment have been inspected, plans of the development examined, and all relevant traffic data collected and analysed.

# Background and Existing Conditions

**Location and Land Use**

The subject site was previously occupied by two single storey residential buildings. The proposal involves demolition of the existing buildings for the construction of a 9 storey mixed use building with a Café and 2 Commercial tenancies on the ground level, 8 one bedroom dwellings, 59 two bedroom dwellings, 8 three bedroom dwellings and associated car parking. Car parking for a total of 85 spaces is proposed in the ground level and basement level.

The subject site fronts on Anzac Highway. The site is situated within an established residential area and it is zoned Urban Corridor Zone Boulevard Policy Area 34 in the West Torrens Council Planning Scheme 2017. The area in the vicinity of the subject site is primarily occupied by residential buildings adjacent to the subject site.

200-202 Anzac Highway is located at the southern side of Anzac Highway. There are many frequent bus and Tram services leaving from a short 1-minute walk from the site to Adelaide CBD, providing residents and businesses with direct access to Adelaide CBD and beyond.

**Figure 1** shows the site from the local road network from a street map perspective.
**Figure 2** presents an aerial photograph of the subject site and the surrounding areas.
**Figure 3** presents a Street View of the site as seen from Anzac Highway

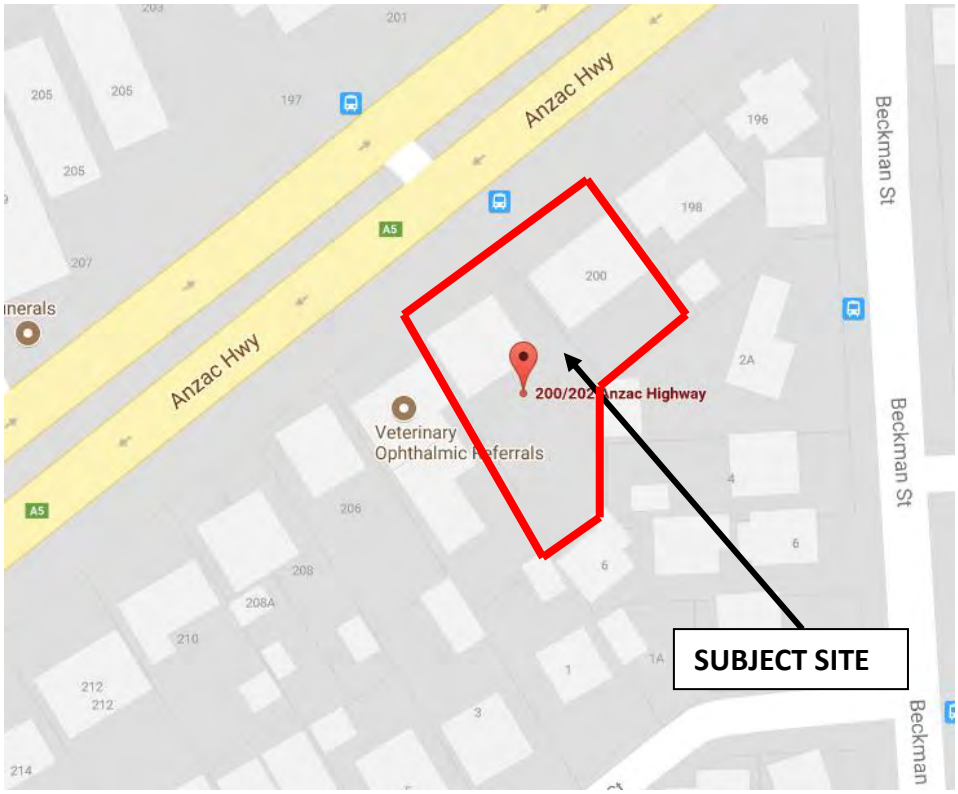



**Figure 1: Location of the Subject Site on a Street map**



**Figure 2: Location of the Subject Site on Aerial View**




**Figure 3: Street View of the site frontage from Anzac Highway**

## Public Transport

The subject site has convenient accessibility to a number of bus and tram services. **Figure 4** shows the Glenelg Tram line route map from Adelaide CBD to a stop at Beckham St, which is only an 8 min walk to the site.
Table 1 outlines the details of the Tram services available to and from the City.

### Tram Services

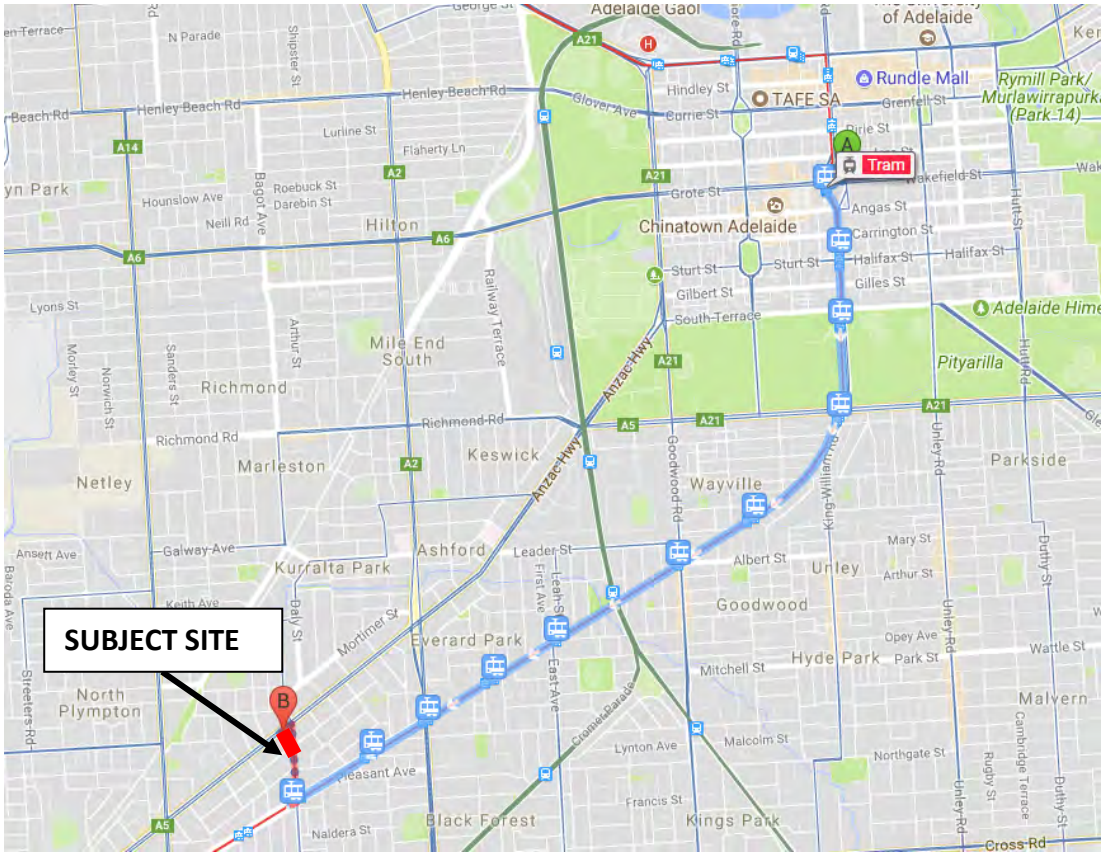



**Figure 4 is a map of the Glenelg Tram line to a stop at Beckham St close to the site**

**Table 1: Tram Service Details**

| Direction | Days and Time | No. of services | Tram frequency |
|---|---|---|---|
| City to Glenelg | Mon-Fri: 7am to 11.30pm | 105 | 1 tram/10min |
| | Sat: 7am to 11.30pm | 75 | 1 tram/14min |
| | Sun:7 am to 11.30pm | 53 | 1 tram/20min |
| Glenelg to City | Mon-Fri: 7am to 11.30pm | 105 | 1 tram/10min |
| | Sat: 7am to 11.30pm | 75 | 1 tram/14min |
| | Sun: 7 am to 11.30pm | 53 | 1 tram/20min |

**Bus Services**

There are 11 bus sroutes to and from the City which stop on Anzac Highway immediately outside the site or on the opposite side of the Highway. Figure 5 below shows the route map of four of these 11 bus routes. Table 2 below shows the service details of Bus Route 263 as a typical example.

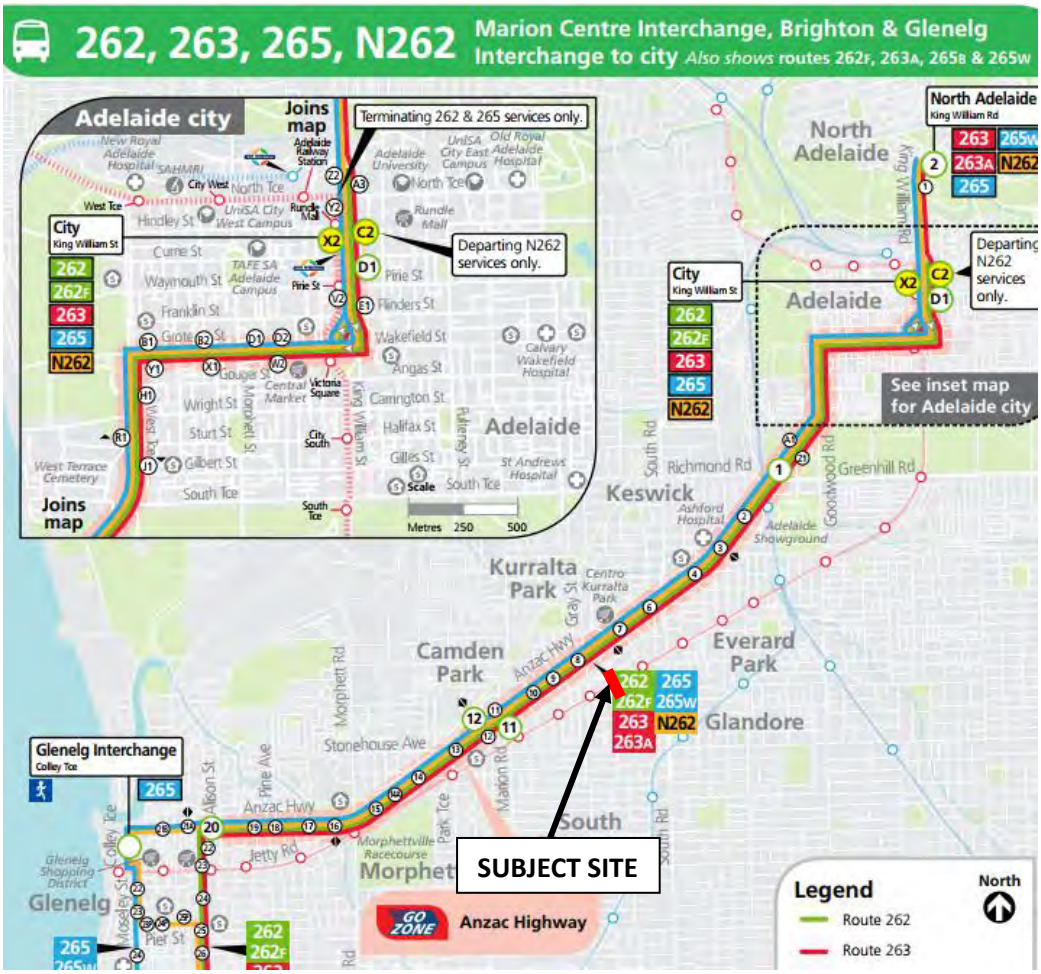



**Figure 5: Map of Bus Routes to and from the site**

**Table 2: Bus Service Details Route 263**

| Direction | Days and Time | No. of services | Train frequency |
|---|---|---|---|
| City to Marion Centre via Glenelg | Mon-Fri: 7am to 11.30pm | 66 | 1 Bus/16min |
| | Sat: 7am to 11.30pm | 66 | 1 Bus/16min |
| | Sun:7 am to 11.30pm | 63 | 1 Bus/15min |
| Marion Centre to City via Glenelg | Mon-Fri: 7am to 11.30pm | 66 | 1 Bus/16min |
| | Sat: 7am to 11.30pm | 66 | 1 Bus/16min |
| | Sun: 7 am to 11.30pm | 63 | 1 Bus/15min |

On average during week days there is one tram approximately every 10 mins arriving and departing from Adelaide CBD. During the weekend Trams run at 14 to 20 mins frequencies.

Bus services in the vicinity of the site have frequencies of 1 bus every 16 mins during the week and 1 bus every 15 mins in the weekend.

As per the details presented in the section above, it is clear that the subject site is serviced by frequent bus and tram services during weekdays and weekends, which are also easily accessible from the subject site

## Traffic Impacts of the Proposed Development

The proposed development at the subject site includes the construction of 75 apartments in the first 7 floors and 1 Café and 2 commercial tenancies on the ground floor. There are 22 car spaces in the ground level car park and 63 spaces in the lower ground level of the building.

The residential part of the subject site is categorised as residential development in Section 3.3.2 of NSW RTA Guide to Traffic Generating Development (2002) document. The following trip rates have been outlined in this document;

- **Medium density residential flat building development:**
  - Daily vehicle trips = 5.0 to 6.5 per dwelling unit
  - Weekday PM peak hour vehicle trips = 0.5 to 0.65 per dwelling unit

The calculation of peak hour trips and Daily trips from the apartment development and the Commercial unit are based on the NSW RTA rates is summarised in Table 3 below.

**Table 3: Calculation of Trip Generation from the proposed development**

| PROPOSED USE | RTA NSW TRIP RATES | | | |
|---|---|---|---|---|
| | **Peak Hour Trip Rate** | **Daily Trip Rate** | **No. of Peak Hour Trips using max. rate** | **No. of Daily Trips using max. rate** |
| 75 Dwelling Units | 0.5-0.65/ Dwelling | 5.0-6.5/Dwelling | 49 | 487 |
| Commercial unit 1, Cafe Total GFA=115.4m$^2$ | 5x100m$^2$ GFA | (60/100m$^2$) X GFA | 6 | 69 |
| Commercial unit 2 & 3, Total GFA=216.3m$^2$ | 58xGLFA/1000 GLFA=0.75x216.3=162m$^2$ | (121/100m$^2$) X GLFA | 9 | 196 |
| **TOTAL** | | | **64** | **752** |
| | **Equivalent total trips** | | **1 trip / min** | **1.0 trip/ min** |

**Total peak hour trips generated by the proposed development = 64 trips maximum**
**Total daily vehicle trips generated by the proposed development=752 trips maximum**

This number of trips during each peak hour is rather insignificant as it represents 1 vehicle every minute during each peak hour (assuming 100% in during the AM peak hour and 100% out during the PM peak hour.

The daily total traffic generated by this development at 752 trips equates to 1 vehicle trip every minute when averaged over a 12hour day. This would have a less than minor effect on the daily traffic already present on Anzac Highway and other nearby roads.

As such, it is clear that the additional development traffic represents a very small fraction of the existing traffic volumes and therefore the additional traffic generated from the proposal is unlikely to generate any material impact on the existing traffic operations in the vicinity.

## Car Parking Assessment

On site car parking has been proposed, at the subject site, on the ground level providing a total of 22 car spaces, and 47 car spaces plus 16 stacked spaces. A total of 85 spaces is proposed for the 75 residential units and the two commercial units on the Ground floor.

Full scale drawings of the proposed development are provided as part of the Development Application package and hence reference should be made to these drawings. Appendix A shows the Lower ground floor car park layout and Appendix B shows the ground floor plan and car park layout.

**City of West Torrens Council DCP - Car Parking Requirements**

The car parking requirements for Multi Dwelling developments and Shops are contained in Table 1 in Table WeTo/6 of the West Torrens Council Development Plan 2017.
Car parking provisions for residential and commercial development must be made as follows;

**Table 4: DCP Car Parking Requirements**

| Type of Development | Parking Requirement | Required Number of Spaces | Visitor Spaces Required |
|---|---|---|---|
| Commercial Units 2&3/ Office:<br>GFA=216.3m$^2$<br>Leasable area=0.75x GFA = 162m$^2$ | 3/100m$^2$ of Leasable area. | 4<br>3 Rounded down<br>(Considered as being used as Visitor spaces after office hours) | |
| Commercial Unit 1/ Cafe:<br>GFA=115.4m$^2$<br>Leasable area=0.75x GFA = 86m$^2$ | 3/100m$^2$ of Leasable area. | 2 | |
| 8x 1 bedroom units | 0.75/Unit | 6 | 1 |
| 59x 2 bedroom units | 1/ Unit | 59 | 15 |
| 8x 3 bedroom units | 1.25/Unit | 10 | 3 |
| **Total Spaces Required** | | **81 +** | **19** |

From Table 4 above, the total DCP parking requirement is 81 spaces for the Residential and Commercial Components plus 19 visitor spaces, making a total requirement of 100 spaces. It is proposed to provide 85 spaces in the two level carparks, including the 16 stacked spaces.

The proposed on-site spaces are less than the parking requirement for this development. There is a parking shortfall of 100-85=15 spaces for the overall development.

Considering the frequent bus services stopping right outside the site and the frequent Tram services from the City to Glenelg, some of the residents and office /Cafe customers would walk or choose public transport instead of driving. At least two of the apartments may not require a parking space. This would further reduce the actual parking demand on site

## Car Parking Observation Surveys

The site is located in an Urban Corridor Zone. On-Street car parking surveys were carried out mainly on Anzac Highway, Beckham St and James St. The survey included on-street parking within 250m from the site.

### On Street Car Parking Surveys

Figure 6 below shows the extent of the on-street parking surveys, which were carried out on the following busiest days and times of the proposed Commercial hours:

Wednesday 1st November: 8 am to 8pm

Saturday 28th October: 8 am to 8 pm

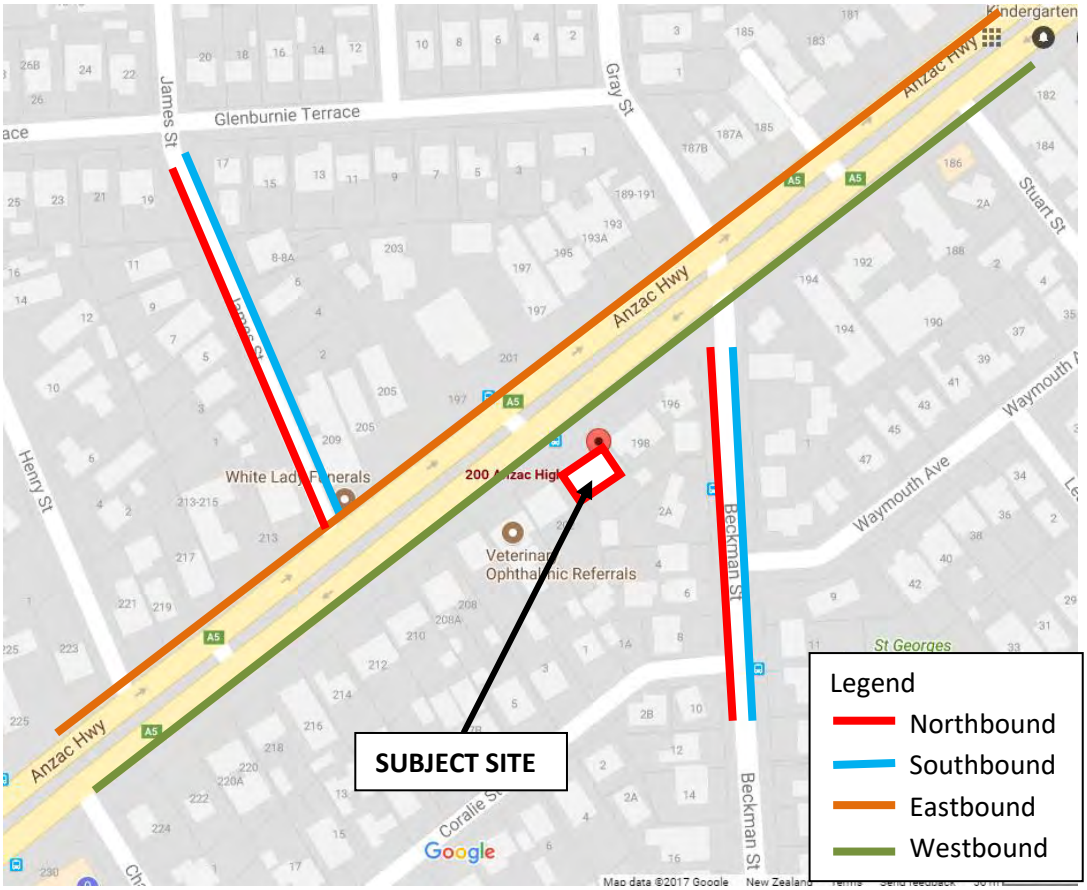



**Figure 6: Map showing the extent of the on-street parking surveys**

**Table 5: On-Street Parking survey results for Wednesday 1st November, 8 am to 8 pm**

| Road | Direction | Parking Control | Total Parking spaces | 8 am | 9 am | 10 am | 11 am | 12 pm | 1 pm | 2 pm | 3 pm | 4 pm | 5 pm | 6 pm | 7 pm | 8 pm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anzac Highway | Eastbound | **CW. 7.30 to 9am, M-F** | **32** | **CW** | **CW** | 17 | 18 | 19 | 15 | 14 | 14 | 14 | 16 | 19 | 12 | 8 |
| Anzac Highway | Westbound | **CW. 4.30 to 6pm, M-F** | **29** | 10 | 15 | 16 | 16 | 18 | 15 | 13 | 13 | **CW** | **CW** | 17 | 12 | 7 |
| James St | Northbnd & Southbnd | **No Control** | **21** | 7 | 10 | 11 | 12 | 13 | 11 | 10 | 9 | 10 | 10 | 12 | 9 | 5 |
| Beckham St | Northbnd & Southbnd | **No Control** | **19** | 6 | 9 | 10 | 11 | 11 | 10 | 9 | 8 | 9 | 9 | 11 | 8 | 5 |
| | **TOTAL** | | **101** | **23** | **34** | **54** | **57** | **61** | **51** | **46** | **44** | **33** | **35** | **59** | **41** | **25** |
| | **% Occupancy** | | | **33%** | **50%** | **54%** | **56%** | **60%** | **51%** | **46%** | **44%** | **46%** | **48%** | **58%** | **41%** | **25%** |
| | **Vacant Spaces** | | | **78** | **67** | **47** | **44** | **40** | **50** | **55** | **57** | **68** | **66** | **42** | **60** | **76** |

**Table 6: On-Street Parking survey results for Saturday 28th October, 8 am to 8 pm**

| Road | Direction | Parking Control | Total Parking spaces | 8 am | 9 am | 10 am | 11 am | 12 pm | 1 pm | 2 pm | 3 pm | 4 pm | 5 pm | 6 pm | 7 pm | 8 pm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anzac Highway | Eastbound | **CW. 7.30 to 9am, M-F** | **32** | 10 | 15 | 17 | 18 | 19 | 15 | 14 | 14 | 15 | 15 | 18 | 13 | 7 |
| Anzac Highway | Westbound | **CW. 4.30 to 6pm, M-F** | **29** | 9 | 14 | 15 | 16 | 17 | 15 | 13 | 12 | 13 | **14** | 16 | 11 | 7 |
| James St | Northbnd & Southbnd | **No Control** | **21** | 6 | 10 | 11 | 12 | 12 | 11 | 9 | 9 | 9 | 10 | 12 | 8 | 5 |
| Beckham St | Northbnd & Southbnd | **No Control** | **19** | 6 | 9 | 10 | 11 | 11 | 10 | 8 | 8 | 8 | 8 | 11 | 8 | 4 |
| | **TOTAL** | | **101** | **31** | **48** | **53** | **57** | **59** | **51** | **44** | **43** | **45** | **47** | **57** | **40** | **23** |
| | **% Occupancy** | | | **31%** | **48%** | **53%** | **56%** | **58%** | **51%** | **44%** | **43%** | **45%** | **47%** | **56%** | **40%** | **23%** |
| | **Vacant Spaces** | | | **70** | **53** | **48** | **44** | **42** | **50** | **57** | **58** | **56** | **54** | **44** | **61** | **78** |

**Table 7: Overall Summary of On-Street Parking surveys**

| Day | Time Period | On-Street Parking Surveys 101 Spaces | |
|---|---|---|---|
| | | Max. Occupancy % | Min. No. of Vacant spaces |
| Wednesday 1st November | 8 am to 8 pm | (61) 60% | 40 |
| Saturday 28th October | 8 am to 8 pm | (59) 58% | 42 |

**Survey Results**

From the overall summary of the parking surveys in Table 7 above, the maximum occupancy observed on-street was 60% on Wednesday and 59% on Saturday. The minimum number of vacant spaces was 40-42.

This significant total number of vacant spaces on-street (40-42) at peak occupancy times is more than sufficient to cater for the parking shortfall of 15 spaces.

## Car Park Certification

This section of the report will assess the compliance of the proposed car parking with the minimum requirements stipulated in Australian Standards AS/NZS 2890.1-2004, AS2890.2-2002 and West Torrens City Council DCP.

## Australian Standard compliance

This section will investigate the compliance of the proposed basement car parking spaces with the specific requirements outlined in AS/NZS 2890.1-2004, and the relevant West Torrens City Council DCP. The following shall be read in conjunction with the car parking layout plans submitted as part of the development application.

**Car Space Dimensions**

Car space dimensions and aisle widths have been provided in Appendix C1 & C2.

The following tables outline the minimum dimensional requirements for 90-degree angle parking. In accordance with the AS/NZS 2890.1-2004, the residential user class been adopted.

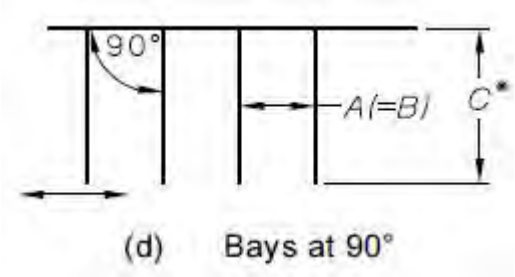



**Table 1: The minimum requirements for 90-degree angle parking**

| User class | A | C1 | C2 | C3 | Aisle Width |
|---|---|---|---|---|---|
| **Residential** | 2.4 | 5.4 | 4.8 | 5.4 | 5.8 |

C1 – where parking is to a wall or high kerb not allowing overhang.
C2 – where parking is to a low kerb which allows 600mm overhang in accordance with Clause 2.4.1 (a) (i) of AS2890.1-2004.
C3 – where parking is controlled by wheel stops installed at right angles to the direction of parking, or where the ends of parking spaces form a sawtooth pattern, e.g. as shown in the upper half of Figure 2.4 (b) of AS2890.1-2004.

**Table 2: Compliance of 90-degree angled parking with the Design Standard for Residential Parking**

| Component | Min Standard Dimension (m) | Dimension Provided (m) | Compliance/ Comments |
|---|---|---|---|
| Width | 2.4 | 2.5 | Compliant |
| Length | 5.4 | 5.4 | Compliant |
| Aisle Width | 5.8 | 6.0 | Compliant |

As per the information presented in the tables above, all dimensions of the proposed car bays were found to be in accordance with the relevant design standards.

**Accessible Car Spaces**

There are two accessible spaces provided at ground level in this residential/commercial development.
Their dimensions are width=2.8m
Length=5.4m
Aisle width= 6.0m
The accessible spaces comply with the design standards.

**Blind Aisles**
The blind aisle spaces on the ground floor car park and the lower ground floor have the aisle extended by at least 1 metre so they comply with the standards. Council's comment that space 22 should be made a turning bay is not justified.

**Access Ramps to the Car Park**
According to AS/NZS 2890.1-2004, basement ramps; it stipulates a minimum width of 6.0-9m for a two-way access ramp, with 300mm clearance on either side with high obstructions. It is noted that the existing right of way width at the 6000mm with required side clearances where it enters the site boundary.

The maximum gradient of the access ramp is 1:11.5 or (8.7%), which complies the grade maximum of 1:5 (20%).

The circulation ramps are 6m wide which complies with the standard with of 5.5m.

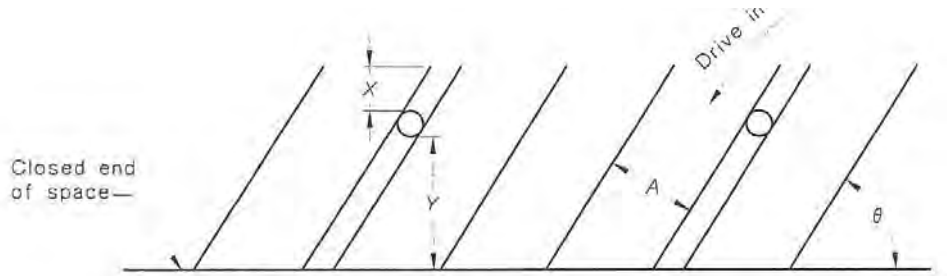
Therefore, in terms of ramps, this development is compliant with Australian Standards AS/NZS 2890.1-2004.

**Gradient of sloping car park floor**

The proposed sloping car park floor has a maximum gradient of 1:11.5 or (8.7%). This is slightly steeper than the standard maximum gradient of 1:16 or (6.25%). However, this is not considered to affect the safety or operation of the car park so it is considered to be compliant.

**Headroom**
To permit access for both cars and light vans, the height between the floor and an overhead obstruction shall be a minimum of 2200 mm. The floor to floor height is 3000mm of the lower ground floor, which allows for the minimum headroom and any building structures of 2.44m. The headroom for the ground floor is 5.4m. It is considered that the headroom provided complies with the Standard requirement.

**Column Location and Spacing**




*A* = parking space width (see Figure 2.2)

| Parking angle, θ, degrees | Dimensions, mm | |
|---|---|---|
| | *X*, min. | *Y*, min. |
| 30 | 375 | 1825 |
| 45 | 530 | 2581 |
| 60 | 650 | 3161 |
| 75 | 724 | 3526 |
| 90 | 750 | 3650 |

FIGURE 5.1 COLUMN LOCATION

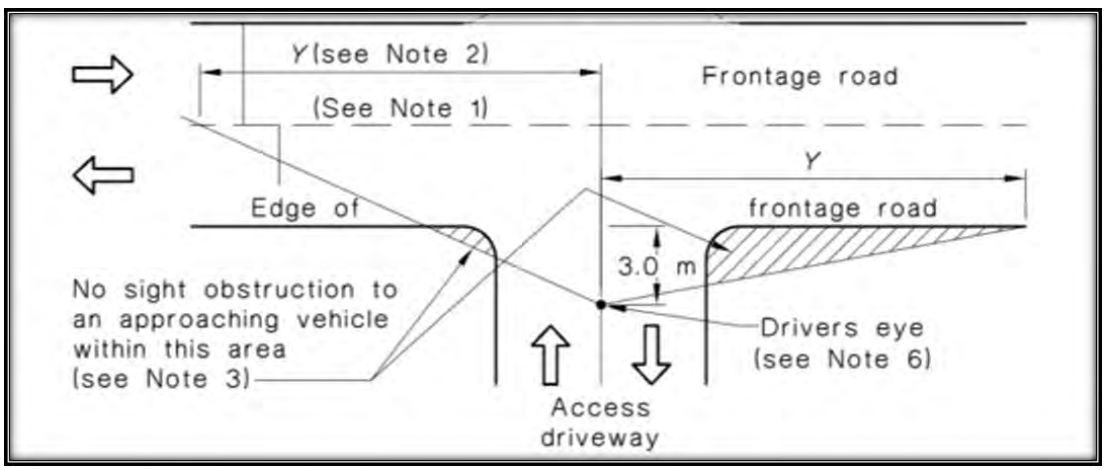
From the plans, column location X= 1080mm and Y= 4418mm. Therefore, the column location complies with the AS/NZS 2890.1-2004.

**Sight Distance for Vehicles**

The vehicle access to the site is from a two-way vehicle cross over from Anzac Highway at the western end of the site. Referring to Figure 3.3 of AS 2890.2:2004, it is recommended to leave the shaded area in the figure below (excerpt from AS 2890.2:2004) free of permanent obstacles for a length 'Y' of 35 [m].

**Sight Distance for Pedestrians**

The building line has been set back from the front boundary to provide clear visibility of pedestrians on the footpath.



| Frontage road speed (Note 4) km/h | Distance (Y) along frontage road m | | |
|---|---|---|---|
| | Access driveways other than domestic (Note 5) | | Domestic property access (Note 6) |
| | Desirable 5 s gap | Minimum SSD | |
| 40 | 55 | 35 | 30 |
| 50 | 69 | 45 | 40 |
| 60 | 83 | 65 | 55 |
| 70 | 97 | 85 | 70 |
| 80 | 111 | 105 | 95 |
| 90 | 125 | 130 | Use values from 2nd and 3rd columns |
| 100 | 139 | 160 | |
| 110 | 153 | 190 | |

The sight distances observed from the proposed vehicle access was 100m along Anzac Highway to the east because exiting vehicles only have to cross vehicles approaching from this direction. The sight distances from the vehicle crossings exceed the desirable sight distance of 83 m for a residential/commercial property access in a 60Km/hr speed zone from the table above.

**Swept Paths**

Swept path assessments have been undertaken to demonstrate the in and out manoeuvres of a Standard B85 vehicle template as outlined in AS/NZS 2890.1-2004 from space 22.

A swept path assessment has also been undertaken for the waste truck on the ground floor loading bay.

These swept paths are presented in **Appendix D** of this document. Based on these swept paths, it is noted that the anticipated manoeuvres by vehicles into and out of space 22 and the loading bay can be sufficiently accommodated within the proposed car parking design constraints.

## Conclusions

Based on the assessment presented in this report, it is considered that after an inspection the car parking design met or exceeded the relevant design standards presented in the City of West Torrens Council's DCP and AS/NZS 2890.1-2004.

**Report prepared by:**



Vadi Vencatachellum

**Traffic Engineer**

***BE Civil Engineering,* MIPENZ**

## Conclusion

Based on the assessment presented in this report, it is considered that:

- The proposed site is very well located to public transport services with frequent bus and tram services within a short distance from the site.
- The proposed site will generate additional, but very low levels of trips (1 trip per minute) in the weekday AM and PM peak hours. The daily traffic generation from the proposed development is 808 trips per day, which equates to 1.0 trip per minute. These trips can be accommodated at the nearby intersections without affecting intersection performance or increasing delays and queues.
- The car parking assessment indicates that the provision of 85 car parking bays, including 16 Stacked spaces for the proposed residential/commercial development leads to a parking shortfall of 15 spaces based on the West Torrens Council DCP parking requirement of 100 spaces.
- It is considered that at least two of the residential tenants would not require a parking space.
- A number of the clients of the Café and the two commercial tenancies would walk or cycle from the neighbouring sites or the residents on site. This would further reduce the parking demand and hence the expected parking shortfall.
- The Council requirement for Bicycle parking is 20 spaces and from the submitted plans, there are 20 Bicycle spaces proposed in this development, which therefore meet the Council requirements.
- The parking survey results show that on Wednesday and Saturday, the minimum number of vacant spaces on street was 40-42, which is more than sufficient to cater for the parking shortfall of 15 spaces for the proposed development, without any significant effect on the existing users of the surveyed on-street parking areas.
- The sight distance from the proposed vehicle crossing along Anzac Highway is 100m to the east, which exceeds the required distance of 83m from the AS/NZS 2890.1-2004 Standard.
- The sight distance for pedestrians has been increased above the minimum required by setting back the building frontage 3m from the boundary.
- Swept path diagrams show that the blind aisle space in the ground floor and lower ground car parks can manoeuvre to enter or exit these spaces. Similarly, the swept path assessment show that the waste vehicle can access and manoeuvre out of the loading bay.
- The car park certification confirms that the car park design meets or exceeds the AS/NZS 2890.1-2004 Standard.

There are many traffic engineering reasons why a planning permit for the proposed Residential/ Commercial development at 200- 202 Anzac Highway (Plympton) should be granted.

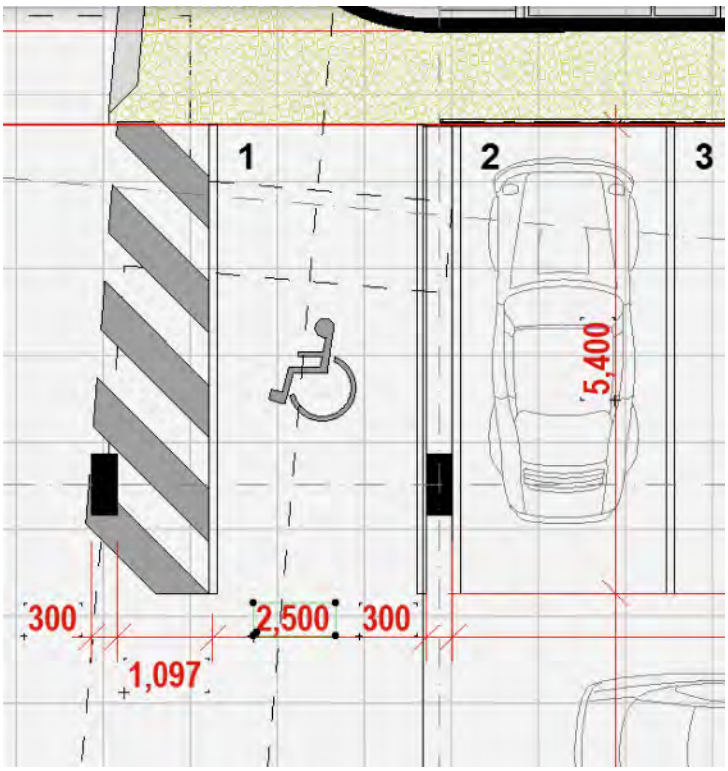
## Appendix A: Lower Ground Floor Plan of the Proposed Development & Parking layout



## Appendix B: Proposed Ground Floor Plan and Car Park



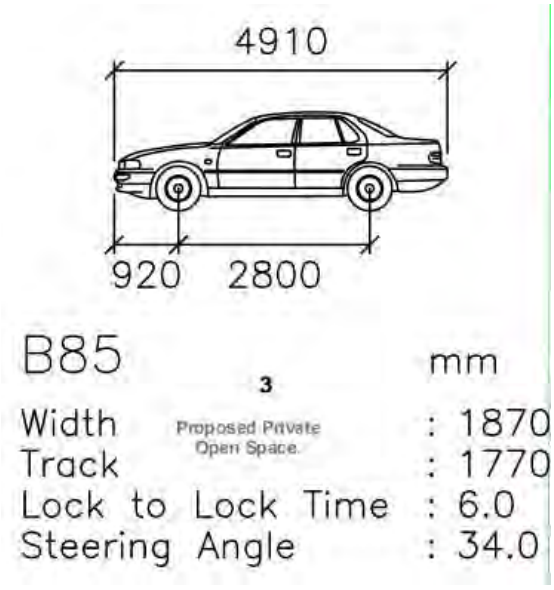
## Appendix C (C1): Detail dimensions of Disable Space

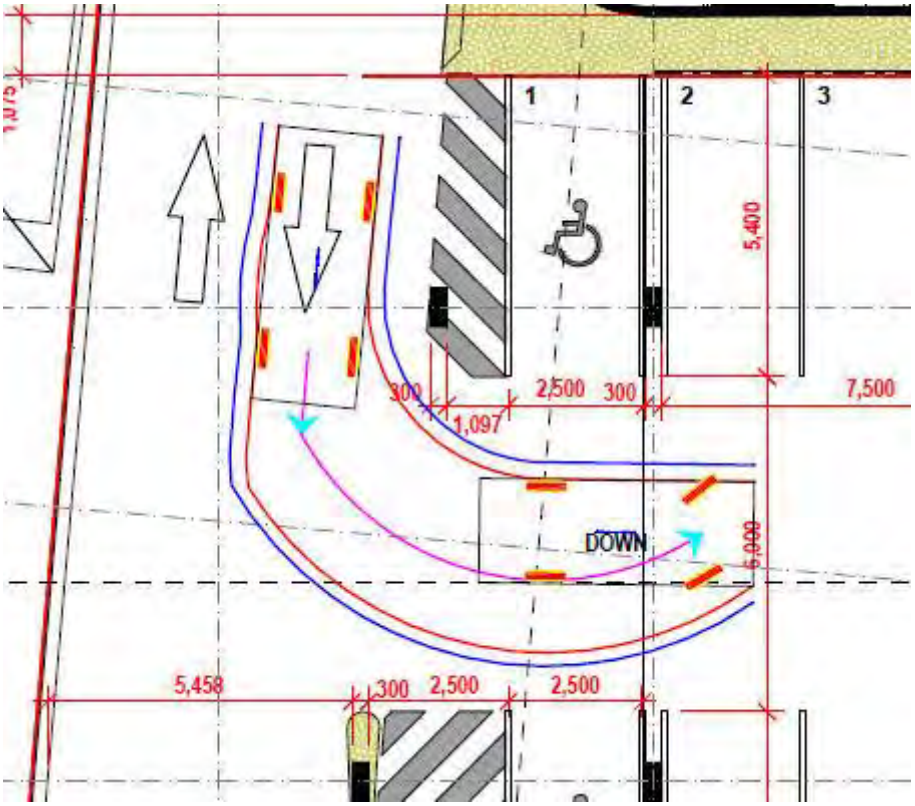


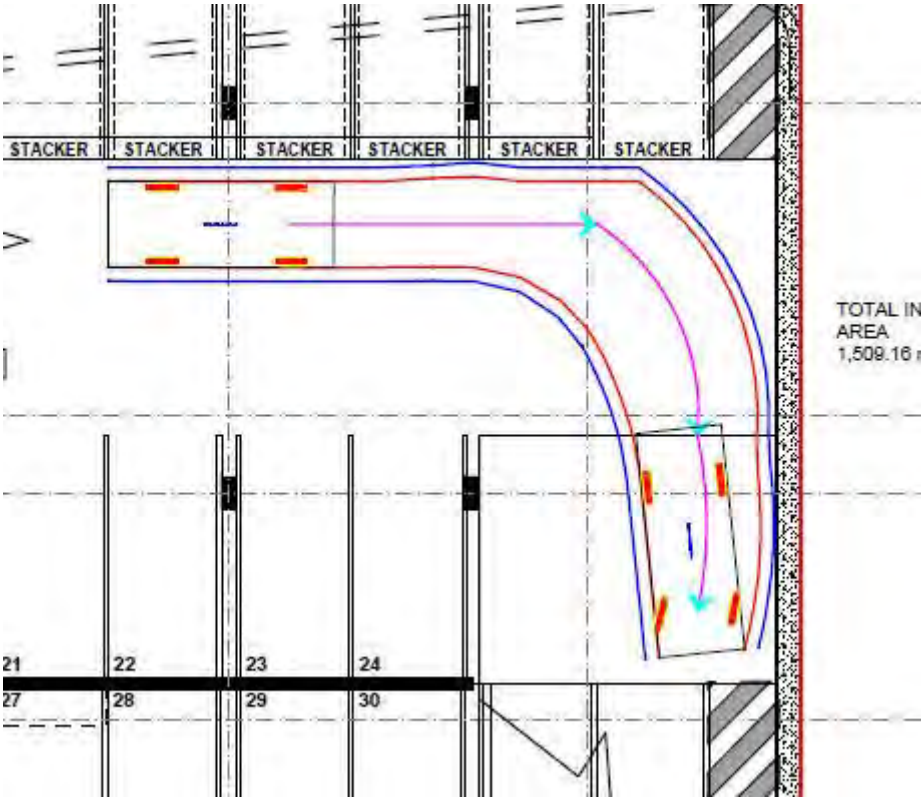

## (C2): Detail dimensions of parking bays and aisle width

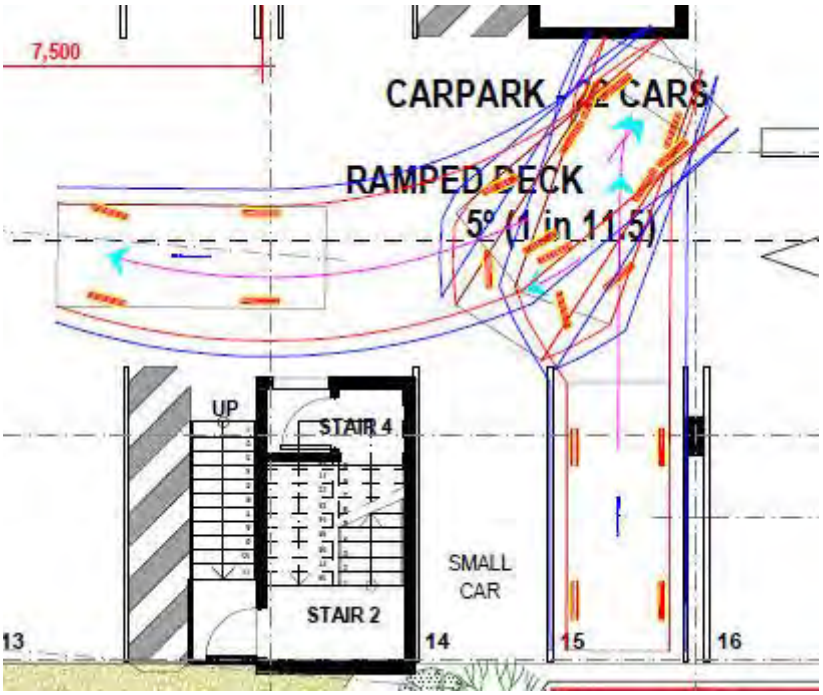


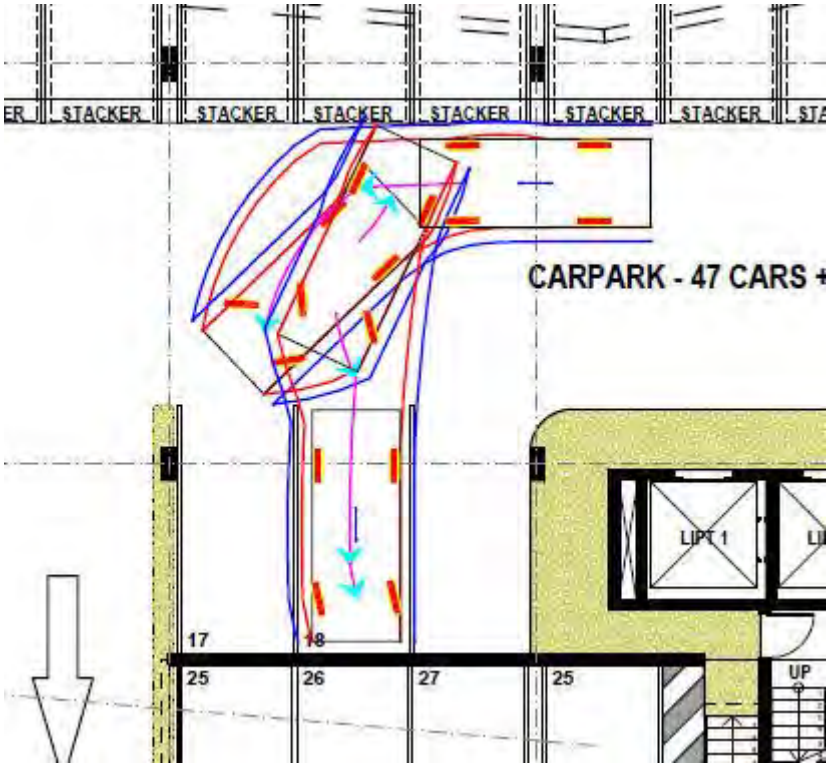
## Appendix D: Swept Path Diagrams



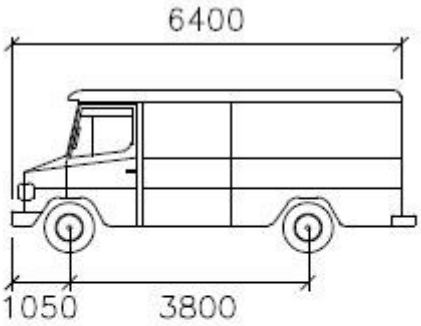

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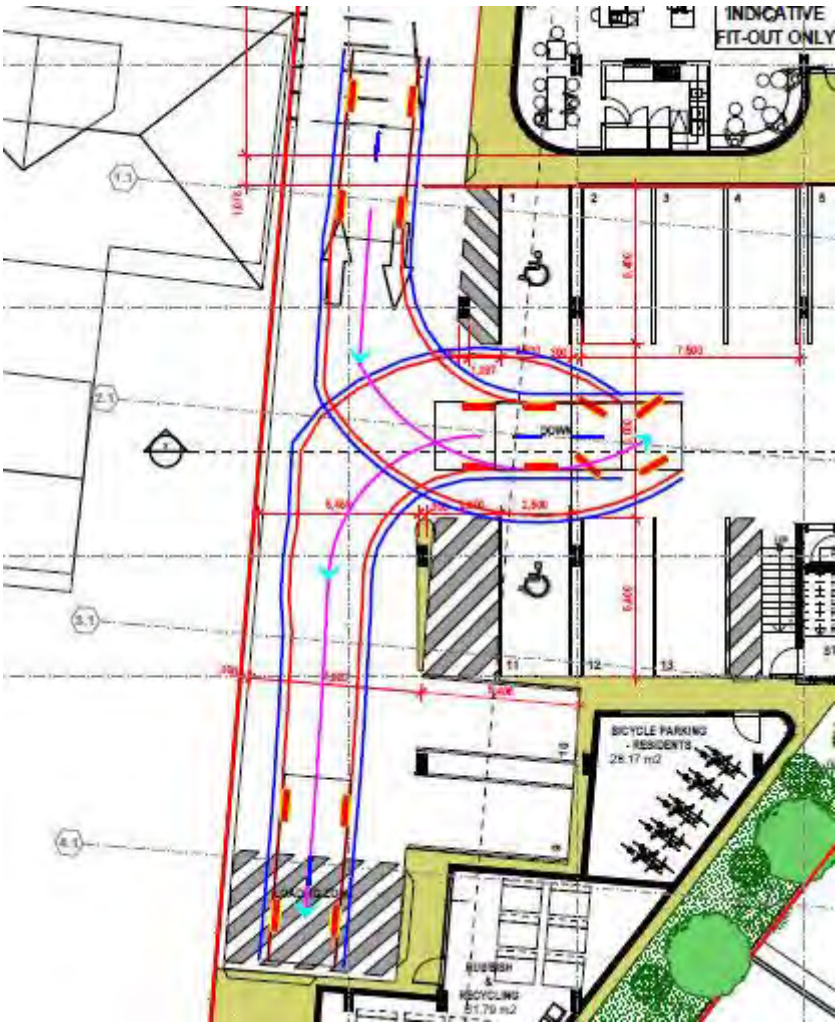

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| SRV | mm |
|---|---|
| Width | : 2300 |
| Track | : 2300 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 38.0 |



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ABN 18 162 361 042

# WASTE MANAGEMENT PLAN

## 200-202 Anzac Highway, Plympton SA 5038

*Mixed Use Development*

| | |
|---|---|
| Prepared for | Vive Developments |
| Date Prepared: | April 2018 |
| Revision: | 1.1 |
| City of West Torrens Council Application #: | TBA |

# INDEX


**1. Introduction ..... 3**

**2. Background and Existing Conditions ..... 3**

Figure 1: Location of the subject site ..... 4

Figure 2: Aerial View of the Subject Site ..... 4

**3. Proposed Development ..... 5**

**4. Anticipated Waste Generation, Storage and Collection ..... 5**

Waste Generation ..... 5

Table 1: General, Recycling & Organic Generation Rates ..... 5

Waste within Overall Development ..... 5

Waste Storage Areas ..... 6

Figure 3: Typical Dimensions of 1,100L & 240L MGB's ..... 7

Figure 4: Scaled Diagram of the Waste Storage Areas ..... 8

Figure 5: Typical Bin Tug ..... 9

**5. Waste Collection ..... 10**

Figure 6: Template of the Waste Collection Vehicle ..... 10

**6. Amenity ..... 11**

Noise ..... 11

Ventilation ..... 11

Cleaning Facilities ..... 11

Prevention of Vermin ..... 11

**7. Miscellaneous ..... 12**

Green Waste ..... 12

Hard Waste ..... 12

Communal Composting Facilities ..... 12

**Appendix A - Site Plans ..... 13**

# 1. Introduction

AusWide Consulting was commissioned by Vive Developments to prepare a Waste Management Plan (WMP) for approval of a proposed mixed use development at 200-202 Anzac Highway, Plympton SA.

The proposed development consists of;

75 Apartments being, 8 x 3 bedroom, 59 x 2 bedroom & 8 x 1 bedroom.
Café/Restaurant (115.42m$^2$), 2 x Office Spaces (216.32m$^2$) on the ground floor.

Recreation Area, Function Area, Wine Room and Outdoor Terrace (258.46m$^2$) on the 8$^{th}$ Floor.

In the course of preparing this WMP, the subject site and its environs have been inspected, plans of the development examined, and all relevant council requirements and documentation collected and analysed.

This WMP has been prepared based on the following information:

- Architectural Plans provided by Vive Developments (23/04/2018)
- ZWSA Better Practice Guide for South Australia

# 2. Background and Existing Conditions

The subject site is located at 200-202 Anzac Highway, Plympton SA, on the Southeast side of Anzac Highway and the nearby land uses are residential.

**Figure 1** provides an overview of the area and its surrounding land uses whilst **Figure 2** provides an aerial view of the immediate area surrounding the subject site.




***Figure 1: Location of the subject site***




***Figure 2: Aerial View of the Subject Site***

## 3. Proposed Development

The proposed development consists 76 Apartments, Café/Restaurant and Offices. The access to the proposed residential apartments, café/restaurant and offices will be provided via a paved walkway and driveway via Anzac Highway. The waste storage room for the residential apartments, café/restaurant and offices will be accessible via the concrete driveway on Anzac Highway (Refer: **Appendix A**).

## 4. Anticipated Waste Generation, Storage and Collection

Due to the café/restaurant, offices and number of apartments, along with the lack of kerb space, waste collection should be done by a private contractor. NOTE: The caretaker will be responsible for emptying the upper floor waste bins at least 3 times a week.

### Waste Generation

As per the ZWSA Better Practice Guide for South Australia,

The waste entitlement for (a) High Density Residential Dwelling per week is 30L of general waste per bedroom, 25L of recycling waste per bedroom plus 10L of organic waste per bedroom. (b) Café/Restaurant per day is 30L of general waste per $10m^2$, 30L of recycling waste per $10m^2$ plus 10L of organic waste per $10m^2$. (c) Offices or Consulting Rooms per week is 15L of general waste per $10m^2$, 15L of recycling waste per $10m^2$ plus 2.5L of organic waste per $10m^2$.

The following table illustrates the typical garbage, recycling and organic generation rates.

***Table 1: Typical Waste, Recycling & Organic Generation Rates for Residential, Café/Restaurant & Office***

| Land Use Type | Waste Resource Generation Rate | | | | |
|---|---|---|---|---|---|
| | General Waste | Recycling | Organics | Metric | Other |
| High Density Residential Dwelling | 30 | 25 | 10 | L/bedroom/wk | Hard and Electronic Waste $0.77m^3$/ household/year |
| Café/Restaurant | 30 | 20 | 40 | L/$10m^2$/day | |
| Offices or Consulting Rooms | 15 | 15 | 2.5 | L/$10m^2$/week | |

### Waste within Overall Development

***NOTE: (1)*** *The Recreation Area, Function Area, Wine Room and Outdoor Terrace (258.46m2) on the 8th Floor are for residents only and are not added additionally to the generation rate calculations, as the roof areas are covered by the residential generation rates.*
***(2)*** *Should the situation change, and the areas are made available to the commercial businesses on the ground floor to use for commercial purposes, then an adjusted WMP will have to be submitted to council.*

Using the garbage and recycling generation rates above, the following can be calculated;

***Apartments:***

- 8 x 3BR apartments x 30L of general waste per bedroom/week = 720L (uncompacted)
- 8 x 3BR apartments x 25L of recycling waste per bedroom/week = 600L (uncompacted)
- 8 x 3BR apartments x 10L of organics waste per bedroom/week = 240L (uncompacted)

- 59 x 2BR apartments x 30L of general waste per bedroom/week = 3,540L (uncompacted)
- 59 x 2BR apartments x 25L of recycling waste per bedroom/week = 2,950L (uncompacted)
- 59 x 2BR apartments x 10L of organics waste per bedroom/week = 1,180L (uncompacted)

- 8 x 1BR apartments x 30L of general waste per bedroom/week = 240L (uncompacted)
- 8 x 1BR apartments x 25L of recycling waste per bedroom/week = 200L (uncompacted)
- 8 x 1BR apartments x 10L of organics waste per bedroom/week = 80L (uncompacted)

***Café/Restaurant (115.42m$^2$):***

- Café/Restaurant x 30L of general waste per 10m$^2$/day = 2,423.82L week (uncompacted)
- Café/Restaurant x 20L of recycling waste per 10m$^2$/day = 1,615.88L week (uncompacted)
- Café/Restaurant x 40L of organics waste per 10m$^2$/day = 3,231.76L week (uncompacted)

***Offices (216.32m$^2$):***

- Office x 15L of general waste per 10m$^2$/week = 324.48L (uncompacted)
- Office x 15L of recycling waste per 10m$^2$/week = 324.48L (uncompacted)
- Office x 2.5L of organics waste per 10m$^2$/week = 54.08L (uncompacted)

***Weekly Residential Waste:***

*4,500L general waste, 3,750L recycling waste and 1,500L organics waste.*

***Weekly Café/Restaurant & Office Waste:***

*2,748.3L general waste, 1,940.76L recycling waste & 3,285.84L organics waste.*

**Waste Storage Areas**

There is 1 Communal Commercial/Residential Waste Area within the ground floor car park area. (Refer: **Figure 4**).

Based on the total waste generated by the development, the following Mobile Garbage Bins (MGBs) should be provided:

*Waste Storage Areas*

***Commercial & Residential Waste Area:***

- 6 x 1,100L & 3 x 240L General Waste MGBs – collected once a week.
- 5 x 1,100L & 1 x 240L Recycling MGBs – collected once a week.
- 4 x 1,100L & 2 x 240L Organics Waste MGBs – collected once a week.

***Upper Floor Waste Areas:***

- 1 x 240L General Waste MGBs – emptied at least 3 times a week.
- 1 x 240L Recycling MGBs – emptied at least 3 times a week.
- 1 x 240L Organics Waste MGBs – emptied at least 3 times a week.

The following figure illustrates the typical dimensions of the 1,100L & 240L MGBs mentioned above.

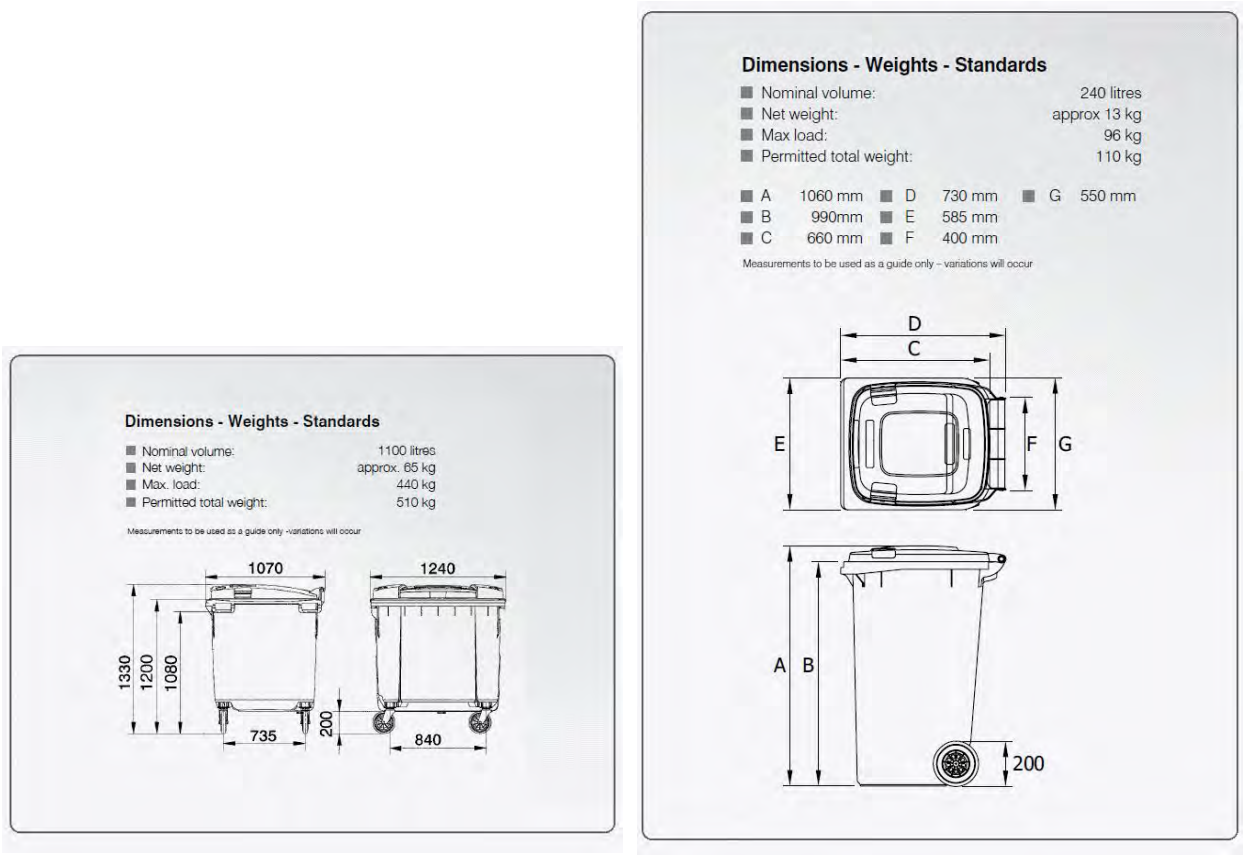
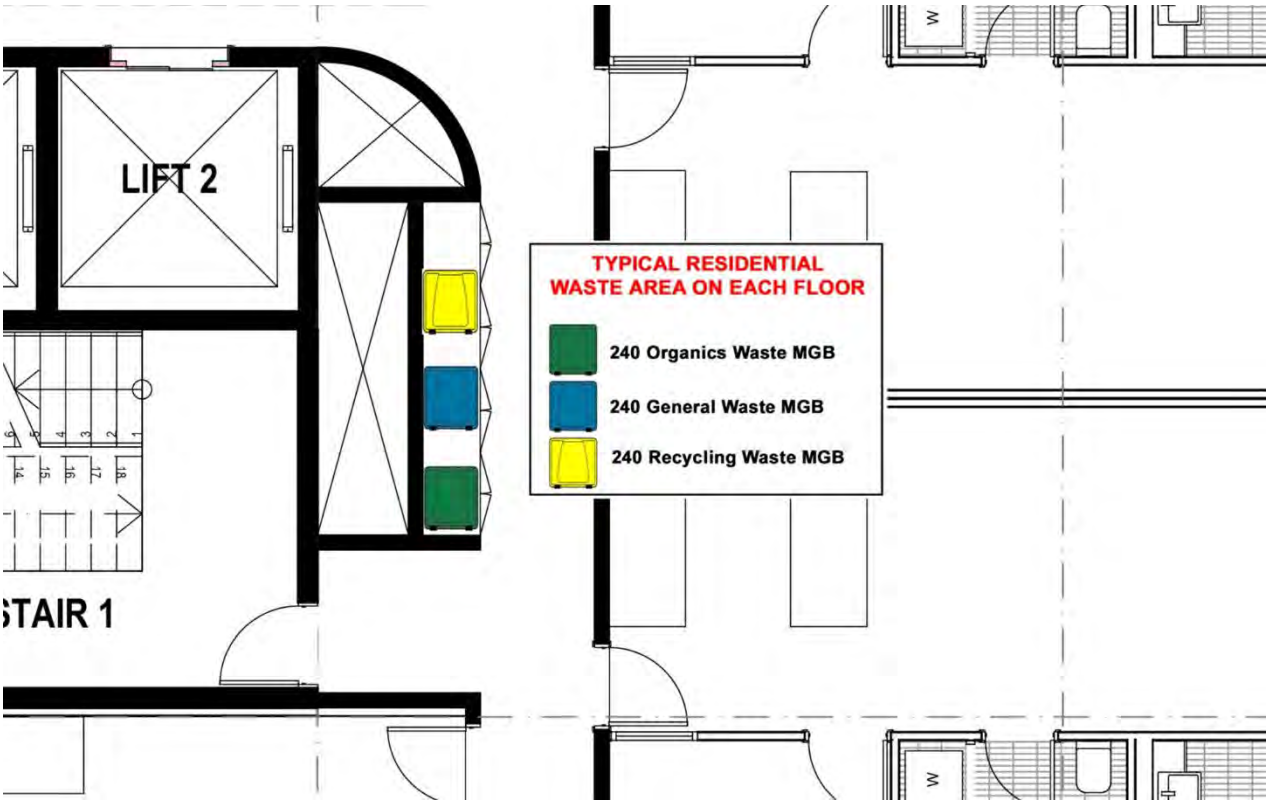



***Figure 3: Typical Dimensions of 1,100L & 240L MGBs***

The following figure illustrates a scaled diagram of the MGB's within the residential & commercial waste storage areas.



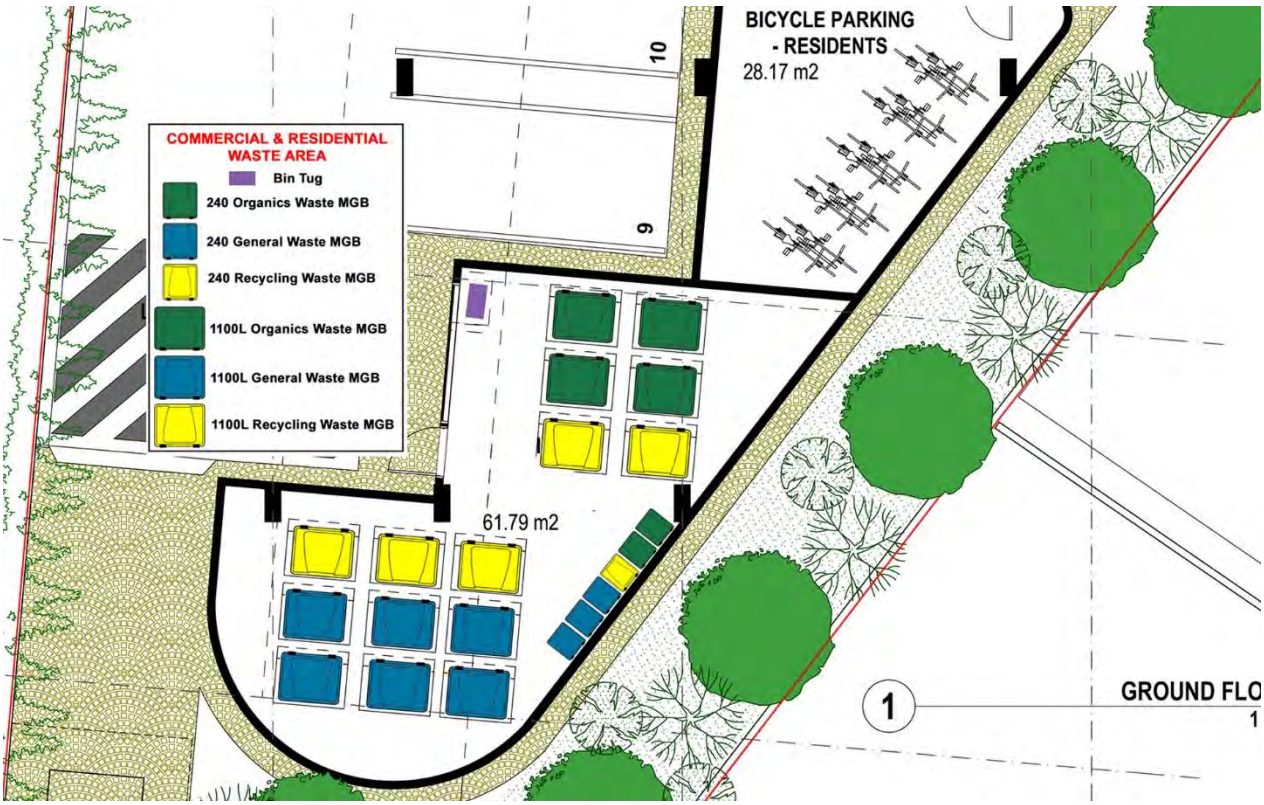




***Figure 4: Scaled Diagram of the Waste Storage Areas***




***Figure 5: Typical Bin Tug***

# 5. Waste Collection

The waste collection service for the proposed development will be provided by a private contractor.

The waste collection vehicle will enter the property via Anzac Highway and drive to the waste storage area on the ground floor, wheel the MGB's to/from the waste vehicle using the bin tug, empty the MGB's and then leave in a forward motion.

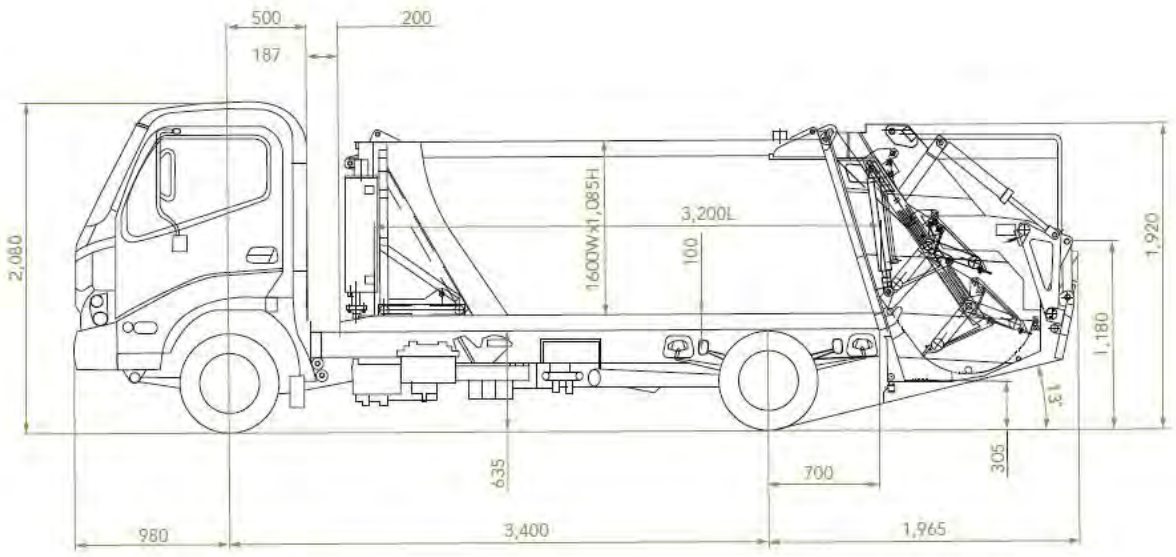



***Figure 6: Template of the Waste Collection Vehicle***

# 6. Amenity

### Noise

The only noise generated from the waste management at the property will be that of the waste management truck wheeling the MGB's to/from the waste vehicle and emptying the MGB's. Any other noise related to the waste management will be kept to a minimum.

### Ventilation

The waste bin area has ample ventilation.

### Security

All MGB's will be stored within the waste room on the ground floor which is secured.

### Cleaning Facilities

The private contractor is responsible for keeping the MGB's clean.

### Prevention of Vermin

The occupiers will be advised to not overfill the bins so that the lids are closed at all times. It is suggested to place rat traps in the corners of the waste storage areas.

# 7. Miscellaneous

**Green Waste**

Residents will tend to their own green waste using the organics waste bins. And any other common area green waste, will be handled by the private gardening contractor.

**Hard Waste**

All Hard Waste will be handled privately.

**Communal Composting Facility**

No consideration has been given to a communal composting facility. Residents wanting to compost some of their rubbish will be required to do so individually.

## Appendix A – Site Plans



# 200-202 Anzac Highway Plympton

## Environmental Noise Assessment

**A180287RP1 Revision 0**

**Thursday, 17 May 18**

**Document Information**

| | | |
|---|---|---|
| **Project** | 200-202 Anzac Highway Plympton | |
| **Client** | Luxe Haus Group | |
| **Report title** | Environmental Noise Assessment | |
| **Project Number** | A180287 | |
| **Author** | Carl Jungfer<br>Acoustic Consultant<br>p+61 8 8155 5888<br>m+61 416 338 397<br>carl.jungfer@resonate-consultants.com |  |
| **Reviewed by** | Nick Henrys | |

**Revision Table**

| Report revision | Date | Comments |
|---|---|---|
| 0 | 17 May 2018 | First issue |
| | | |
| | | |
| | | |
| | | |
| | | |

# 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. |
| Characteristic | Associated with a noise source, means a tonal, impulsive, low frequency or modulating characteristic of the noise that is determined in accordance with the Guidelines for the use of the Environment Protection (Noise) Policy (Noise EPP) to be fundamental to the nature and impact of the noise. |
| Continuous noise level | A-weighted noise level of a continuous steady sound that, for the period over which the measurement is taken using fast time weighting, has the same mean square sound pressure as the noise level which varies over time when measured in relation to a noise source and noise-affected premises in accordance with the Noise EPP |
| 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. |
| 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 |
| Quiet locality | A locality is a quiet locality if the Development Plan provisions that make land use rules for the locality principally promote land uses that all fall within either or both of the following land use categories: (a) Residential; (b) Rural Living; |

Resonate

# Table of Contents


1 Introduction ..... 1
2 Proposed development ..... 2
2.1 Function room operations ..... 2
3 Noise criteria ..... 3
3.1 Development plan ..... 3
3.1.1 Zoning ..... 3
3.1.2 Interface between land uses ..... 3
3.1.3 Residential development ..... 4
3.1 Air and noise overlay ..... 4
3.2 Environmental noise policy ..... 5
4 Noise monitoring ..... 6
4.1 Instrumentation ..... 6
4.2 Procedure ..... 7
4.3 Results ..... 7
5 Noise emission assessment ..... 8
5.1 Noise modelling ..... 8
5.2 Characteristic noise penalties ..... 8
5.3 Patron noise ..... 8
5.4 Music noise ..... 8
5.5 Mechanical services noise ..... 9
5.6 Vehicle noise ..... 9
6 Noise ingress assessment ..... 10
6.1 Minister's Specification SA 78B ..... 10
6.1.1 Sound insulation ratings ..... 10
6.1.2 Construction requirements ..... 11
External walls ..... 11
External windows and doors ..... 11
Roof and ceiling ..... 13
Ventilation ..... 13
7 Conclusions ..... 14
Appendix A–Wall, roof and window mark-ups ..... 15

# 1 Introduction

This report outlines the external noise intrusion environmental noise emission assessment for the proposed development of 200-202 Anzac Highway, Plympton. It details the acoustic requirements and recommended construction for the proposed development. The development is to include ground floor commercial spaces, 8 storeys of residential apartments, and a function space on level 8. The closest noise affected residential receptors are located to the south and north-east of the site.

The acoustic requirements are based on:

- West Torrens Council Development Plan (consolidated 30 May 2017)
- Minister's Specification SA 78B *Construction Requirements for the Control of External Sound*
- *Environment Protection (Noise) Policy 2007*.

The main acoustic issues addressed in this report are facade construction to control noise traffic noise, and noise emissions from vehicle movements, mechanical plant and the function centre.

# 2 Proposed development

The proposed development is located at 200-202 Anzac Highway, Plympton. The location of the site with respect to existing buildings and roads is shown in Figure 1.

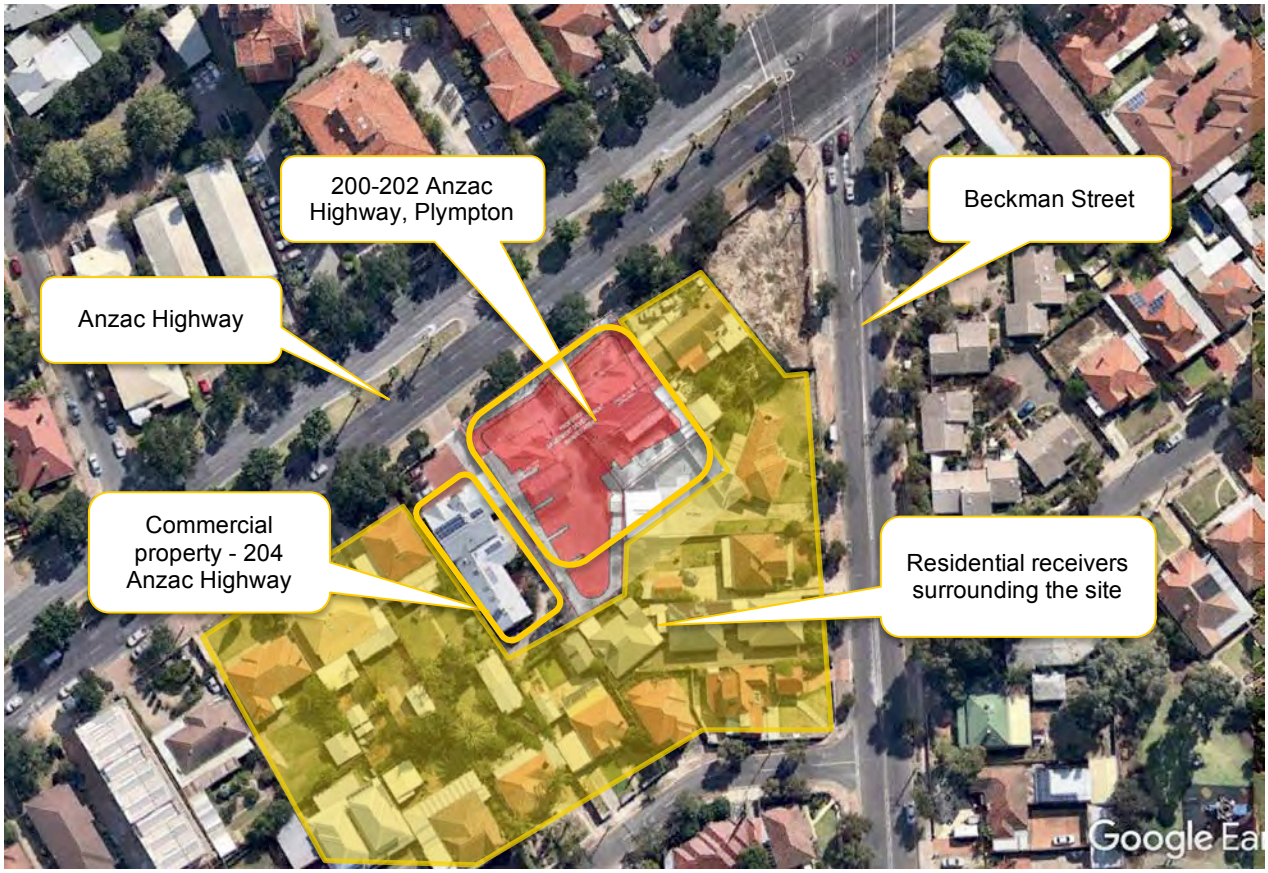



**Figure 1 Proposed site location with respect to existing buildings and roads**

The proposed development is mixed use with a commercial premises and car parking on the ground floor, and residences on the first to seventh floors with function centre and residences on the eighth floor. Noise sensitive receivers exist to the east south and west of the site. The nearest noise sensitive recievers to the north are a minimum of 50m away on the opposite side of Anzac Highway, A veterinary surgery is located to the immediate west of the site at 204 Anzac Highway,

## 2.1 Function room operations

there are to be function rooms on the 8th storey of the building the following times have been assumed for operation of the function area.

- Function space to potentially operate to approximately 12am.
- Live or amplified music may be played within the function rooms.

# 3 Noise criteria

## 3.1 Development plan

The proposed development is located within the West Torrens Council Area and the development should have regard to the West Torrens Council Development Plan.

### 3.1.1 Zoning

The proposed site of the redevelopment is located within an Urban Corridor Zone (Boulevard Policy Area 34). The closest receptors are located within the same zone.

The Land use principally promoted in the urban corridor zone are residential and commercial. There are no specific noise requirements for this zones relating to noise emissions.

### 3.1.2 Interface between land uses

There are some council wide objectives and PDCs that relate to noise, and they are included in 'Interface between Land Uses':

**Objectives:**

1 Development located and designed to minimise adverse impact and conflict between land uses.

2 Protect community health and amenity from adverse impacts of development.

3 Protect desired land uses from the encroachment of incompatible development.

**Principles of Development Control**

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

(a) …

(b) noise

(c) …

2 Development should be sited and designed to minimise negative impacts on existing and potential future land uses desired in the locality.

4 Residential development adjacent to non-residential zones and land uses should be located, designed and/or sited to protect residents from potential adverse impacts from non-residential activities.

5 Sensitive uses likely to conflict with the continuation of lawfully existing developments and land uses desired for the zone should be designed to minimise negative impacts.

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

**Noise Generating Activities**

8 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.

9 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.

10 Outdoor areas (such as beer gardens or dining areas) associated with licensed premises should be designed or sited to minimise adverse noise impacts on adjacent existing or future noise sensitive development.

11 Development proposing music should include noise attenuation measures that achieve the following desired noise levels:

| Noise level assessment location | Desired noise level |
|---|---|
| Adjacent existing noise sensitive development property boundary | Less than 8 dB above the level of background noise ($L_{90,15min}$) in any octave band of the sound spectrum.<br>and<br>Less than 5 dB(A) above the level of background noise ($LA_{90,15min}$) for the overall (sum of all octave bands) A-weighted level. |
| Adjacent land property boundary | Less than 65dB(Lin) at 63Hz and 70dB(Lin) in all other octave bands of the sound spectrum<br>or<br>less than 8 dB above the level of background noise ($L_{90,15min}$) in any octave band of the sound spectrum and 5 dB(A) overall (sum of all octave bands) A-weighted level. |

Environmental noise emissions at the planning stage are assessed in accordance with the *Environment Protection (Noise) Policy* 2007 (Noise EPP).

### 3.1.3 Residential development

There are additional Principles of Development Control relating specifically to noise in the development of residential builidngs.

**PDC 28** Noise generated by fixed noise sources such as air conditioning units and pool pumps should be located, designed and attenuated to avoid nuisance to adjoining landowners and occupiers.

**PDC 29** External noise and artificial light intrusion into bedrooms should be minimized by separating or shielding these rooms from:

(a) Active communal recreation areas, parking areas and vehicle access ways
(b) Service equipment areas and fixed noise sources on the same or adjacent sites.

## 3.1 Air and noise overlay

The proposed development and the closest noise sensitive receivers are located in the Urban Corridor Zone, and is located in the Boulevard Policy Area, within a 'Designated Area' adjacent to a 'Designated Road: Type B road' in the Noise and Air Emissions overlay in the West Torrens Council Development Plan. Relevant Objectives and Principles of Development Control for sites affected by the overlay are:

**OBJECTIVES**

**Objective 1:** Protect community health and amenity from adverse impacts of noise and air emissions.

**PRINCIPLES OF DEVELOPMENT CONTROL 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 SA 78B will demonstrate compliance with the PDCs relating to the Noise and Air Emissions overlay. The requirements of SA 78B are outlined in Section 5.

## 3.2 Environmental noise policy

Environmental noise emissions from the proposed development will have to comply with the *Environment Protection (Noise) Policy* 2007 (Noise EPP) and this is the most relevant guideline to address the requirements of the Development Plan.

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 stated in Section 3.1.1 The development and the most affected noise sensitive premises are located in the Urban Corridor Zone (Boulevard Policy Area 34), for which a mix of residential and commercial land uses are primarily promoted.

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

- 52 dB(A) during the day, 7 am to 10 pm
- 45 dB(A) at night, 10 pm to 7 am.

These criteria apply to noise from patrons associated with functions, vehicles, and mechanical plant.

Music noise should be assessed against the Development Plan noise limits, in accordance with the EPA guideline *'Music noise from indoor venues and the South Australian Planning System'*.

# 4 Noise monitoring

Background noise monitoring at the rear of 202 Anzac Highway, Plympton was undertaken from Monday, 7 May to Wednesday 9 May 2018 (The period of measurement was limited due to inclement weather, however, the recorded data is considered appropriate for the purpose of this assessment). The measurement location is shown in Figure 2 below. We note that measured noise levels in this location are expected to be representative of noise levels for receivers on Coralie and Beckham Street. Background noise levels for receivers fronting Anzac Highway are expected to be significantly higher. The application of music noise criteria based on measurements in this location therefore represents a conservative approach.




**Figure 2 Background noise monitoring location relative to existing buildings and roads**

## 4.1 Instrumentation

The noise measurements were taken with a calibrated Casella CEL-633 sound level meter, which is a Type 1 instrument suitable for field and laboratory use.

The sound level meter was calibrated both before and after the measurements using a Type 1 Brüel & Kjær 4231 sound level calibrator, and the calibration was found to have not drifted. Both the sound level meter and calibrator carry current calibration certificates from a NATA accredited laboratory. Copies of the calibration certificates are available on request.

## 4.2 Procedure

Noise measurements were undertaken in accordance with the following:

- The microphone of the sound level meter was at a height of approximately 1.2 metres above the ground.
- A windshield was used during all measurements.
- Noise measurements were logged in periods of 15 minutes length.

## 4.3 Results

Background spectral levels should be representative of operational hours for the function rooms. The function centre has been assumed to operate until 12 am. Based on the measured background noise levels, the $L_{10}$ music noise criteria as outlined in Tables 2 and 3 are applicable. The limits have been determined in accordance with the requirements of the West Torrens Development Plan and EPA Music Noise Guidelines, using the minimum measured background noise level in dB(A) $L_{90(15\ min)}$ for each time period.

**Table 2 Applicable music noise criteria before 10 pm**

| Noise level, dB $L_{10}$ | | | | | | | Total, dB(A) $L_{10}$ |
|---|---|---|---|---|---|---|---|
| Octave band centre frequency, Hz | | | | | | | |
| **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | |
| 50 | 46 | 44 | 42 | 46 | 40 | 27 | 45 |

**Table 3 Applicable music noise criteria 10 pm—12 am**

| Noise level, dB $L_{10}$ | | | | | | | Total, dB(A) $L_{10}$ |
|---|---|---|---|---|---|---|---|
| Octave band centre frequency, Hz | | | | | | | |
| **63** | **125** | **250** | **500** | **1000** | **2000** | **4000** | |
| 43 | 40 | 38 | 36 | 38 | 31 | 23 | 37 |

# 5 Noise emission assessment

## 5.1 Noise modelling

Noise emissions from site have been modelled in SoundPLAN Environmental Software v8.0 program, using the general prediction method. The model takes into consideration:

- attenuation of noise source due to distance
- barrier effects from buildings, topography and the like
- air absorption
- ground effects
- neutral meteorological conditions (zero wind and temperature gradients).

## 5.2 Characteristic noise penalties

Penalties to the source level should be applied in accordance with the Noise EPP to recognise annoyance associated with noise that is dominated by tonal, modulating, low frequency, or impulsive characteristics. A 5 dB(A) penalty is applied for one characteristic, an 8 dB(A) penalty is applied for two characteristics, and a 10 dB(A) penalty is applied for three or more characteristics.

For a characteristic penalty to be applied to a noise source it must be fundamental to the impact of the noise and dominate the overall noise impact.

Application of a characteristic penalty will depend on the received noise levels compared with the background noise levels to determine whether or not the character(s) are fundamental to the impact of the noise and dominate the overall noise impact. This is discussed in further detail below.

## 5.3 Patron noise

Patron noise from the function venue has been modelled based on up to 60 patrons in outdoor terrace areas speaking with raised voices. Patron noise is likely to have a modulating characteristic, attracting a 5 dB penalty in accordance with the Noise EPP. Predicted noise levels at the nearest noise sensitive receivers (with the addition of the penalty) are 41 dB(A) $L_{eq}$ or less, which is within daytime and night time Noise EPP criteria.

## 5.4 Music noise

Music noise emissions from the function space on Level 8 have been modelled based on the following scenarios:

- All external doors to function room closed (assuming 6.38mm laminate for all external glazing)
- All external doors open.

Based on the modelling, to achieve compliance with the music noise criteria, the internal music noise levels ($L_{10}$), within the function centre should be limited to the levels presented in Tables 4 and 5.

**Table 4 Maximum allowable internal music sound level spectra, before 10pm**

| Situation | Internal noise level limits , $L_{10}$, dB(Linear) | | | | | | | Overall dB(A) |
|---|---|---|---|---|---|---|---|---|
| | Octave band centre frequency, Hz | | | | | | | |
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | |
| Doors Open | 81 | 80 | 80 | 80 | 84 | 79 | 68 | 82 |
| Doors Closed | 97 | 99 | 103 | 106 | 115 | 110 | 105 | 102 |

**Table 5 Maximum allowable internal music sound level spectra, 10pm to 12am**

| Situation | Internal noise level limits , $L_{10}$, dB(Linear) | | | | | | | Overall dB(A) |
|---|---|---|---|---|---|---|---|---|
| | Octave band centre frequency, Hz | | | | | | | |
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | |
| Doors Open | 74 | 74 | 74 | 74 | 76 | 70 | 64 | 74 |
| Doors Closed | 90 | 93 | 97 | 100 | 107 | 101 | 101 | 94 |

The permitted internal noise levels allow for music at a background noise level when doors are open after 10pm, and music that is slightly above background noise levels prior to 10pm. When there is to be amplified music with intent to be the dominating soundscape (for example, a DJ or live band) the exterior doors to the function spaces are to be kept shut (except to allow for the timely entry and egress of patrons onto the terraces).

Any speakers to the outdoor terraces should be limited to background noise levels only.

## 5.5 Mechanical services noise

The main noise source for this development is the operation of external mechanical plant, potentially including air conditioning condenser units and pump equipment for the proposed pool (likely located on the roof). At this stage of the development process, detailed information on the air conditioning and pump equipment is not available. Sound power levels, noise attenuation and enclosures or barriers are to be determined during detailed design stage to ensure compliance with required noise emission levels.

During the detailed design phase, noise emissions from the external plant will be assessed and mitigation treatments adopted to ensure that noise emissions are limited to 52 dB(A) during the day (7 am to 10 pm) and 45 dB(A) at night (10 pm to 7 am) at the most affected residence, when assessed in accordance with the Noise EPP.

## 5.6 Vehicle noise

The proposed development includes spaces for approximately 100 cars in the lower ground and ground floor parking areas. It is assumed that up to 25 vehicles may enter or exit the carpark via the proposed access from Anzac Highway within a worst-case daytime 15-minute period; and up to 10 within worst-case night time15-minute period.

To ensure compliance with the Noise EPP criteria, we recommend that a minimum 1.8m high acoustic fence is erected along the western boundary adjacent to the car park access and extending to the proposed loading zone. The fence material should be minimum 6 kg/$m^2$ surface mass (for example 0.6 mm BMT colourbond or equivalent) and be constructed with no gaps between panel or at the base. We note that noise from vehicles accessing the carpark is expected to be significantly less than noise from traffic on Anzac Highway.

# 6 Noise ingress assessment

The primary concern with regard to noise ingress from external sources is traffic noise from Anzac Highway. Noise from this source has been assessed under Minister's Specification SA 78B due to the location of the site within a "designated area" in the Development Plan Air and Noise Emissions Overlay.

## 6.1 Minister's Specification SA 78B

The facades facing Anzac Highway have a separation distance of 10 – 52 m. The relevant Sound Exposure Category (SEC), which determines the acoustic rating of the façade is based on distance from the road. For facades not directly exposed to the noise source, the SEC and required acoustic rating for windows has been determined in accordance with SA 78B.

The relevant SECs for the development are shown in Table 6.

**Table 6 Relevant sound exposure categories based on separation distances for Type B Roads (50 – 60 km/hr)**

| Sound exposure category | Separation distance from road (m)(1) |
|---|---|
| No treatment required | > 60 m |
| 1 | 35 < 60 m |
| 2 | 20 < 35 m |
| 3 | 10 < 20 m |
| 4 | < 10 m |

(1) Distance from 3 m within the transport corridor boundary.

The SECs for the facades of the building are shown in mark-ups in Appendix A.

### 6.1.1 Sound insulation ratings

The appropriate sound insulation ratings for the different relevant SECs are outlined in Table 7.

**Table 7 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 8 | |
| 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 8 | |
| | 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 8 | |
| | External doors other than glass doors | All habitable rooms | $R_W \geq 30$ |

| SEC | Building element | Location | Acoustic rating |
|---|---|---|---|
| | Roof and ceiling | Bedrooms | $R_W + C_{tr} \geq 40$ |
| | | All other habitable rooms | $R_W + C_{tr} \geq 35$ |

The sound insulation ratings for windows and external glass doors are outlined in Table 8 based on the area of the window/glass door divided by floor area of the room.

**Table 8 Minimum acoustic requirements for windows and external glass doors**

| 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 | * | * |
| | More than 40% but not more than 60% | 31 | 34 | * | * | * |
| | More than 60% but not more than 80% | 34 | * | * | * | * |
| | 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 | 34 |
| | 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 | * | * | * | * |

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

### 6.1.2 Construction requirements

## External walls

The external walls are to be constructed from:

- 150 mm precast concrete
- 64 mm steel stud frame with 10 mm cavity to concrete
- R2.0 bulk insulation
- 10 mm plasterboard internal lining.

This construction will achieve the minimum $R_w + C_{tr} \geq 50$ airborne noise requirement for SEC 2 and 3 walls.

## External windows and doors

The required performance of the external windows and doors of the building have been determined using the deemed-to-satisfy method. Where the windows and external glass doors are outside the deemed-to-satisfy previsions of the Minister's Specification, the verification method has been used.

The recommended constructions for the external windows and doors are outlined in Table 9. Note that acoustically equivalent constructions (such as thermal double glazing) can be adopted; however, the constructions provided in Table 9 as a guide as to the types of constructions required.

Resonate

**Table 9 Example external window and door constructions**

| Location | Example external windows and doors construction | Acoustic criteria |
|---|---|---|
| **Sound Exposure Category 3** | | |
| Living/dining | • 12.5 mm VLam Hush glass, hinged windows and side doors<br>• proprietary acoustic sliding doors rated to meet required $R_w + C_{tr}$ | $R_w + C_{tr} \geq 37$<br>(60 – 80 % of floor area) |
| | • 10.5 mm VLam Hush glass, hinged windows and side hinged doors<br>12.5 mm VLam Hush glass sliding doors | $R_w + C_{tr} \geq 34$<br>(40 – 60 % of floor area) |
| Bedrooms | • 10 mm VFloat glass, 16 mm gap, 10.5 mm VLam Hush glass windows, fixed only<br>• proprietary acoustic sliding doors rated to meet required $R_w + C_{tr}$ | $R_w + C_{tr} \geq 40$<br>( ≥ 80 % of floor area) |
| | • 10.5 mm thick laminated glass fixed windows<br>• 12.5 mm VLam Hush glass, hinged windows and side doors | $R_w + C_{tr} \geq 37$<br>(40 – 60 % of floor area) |
| **Sound Exposure Category 2** | | |
| Living/dining | • 10.38 mm laminated glass sliding door<br>• for example Capral Genesis Sliding door with 6mm Finseal and small bulb seal | $R_w + C_{tr} \geq 31$<br>(40 – 60 % of floor area) |
| | • 6.38 mm laminated glass fixed or awning windows<br>• 6.38 mm laminated glass sliding door, for example Capral Genesis Sliding door with 6mm Finseal and small bulb seal | $R_w + C_{tr} \geq 28$<br>(20 – 40 % of floor area) |
| Bedrooms | • 12.5 mm VLam Hush glass, hinged windows and side doors<br>• proprietary acoustic sliding doors rated to meet required $R_w + C_{tr}$ | $R_w + C_{tr} \geq 37$<br>(60 – 80 % of floor area) |
| | • 10.5 mm VLam Hush glass, hinged windows and side hinged doors<br>• 12.5 mm VLam Hush glass sliding doors | $R_w + C_{tr} \geq 34$<br>(40 – 60 % of floor area) |
| **Sound Exposure Category 1** | | |
| Living/dining | • 6.38 mm laminated glass fixed or awning windows<br>• 6.38 mm laminated glass sliding door, for example Capral Genesis Sliding door with 6mm Finseal and small bulb seal | $R_w + C_{tr} \geq 28$<br>(40 – 60 % of floor area) |
| | • 4 mm glass windows<br>• 5 mm glass sliding door, for example, Capral 584 sliding door | $R_w + C_{tr} \geq 25$<br>(20 – 40 % of floor area) |
| Bedrooms | • 12.5 mm VLam Hush glass, hinged windows and side doors<br>• proprietary acoustic sliding doors rated to meet required $R_w + C_{tr}$ | $R_w + C_{tr} \geq 37$<br>( ≥ 80 % of floor area) |
| | • 10.5 mm VLam Hush glass, hinged windows and side hinged doors<br>• 12.5 mm VLam Hush glass sliding doors | $R_w + C_{tr} \geq 34$<br>(60 – 80 % of floor area) |
| | • 10.38 mm laminated glass sliding door<br>• for example Capral Genesis Sliding door with 6mm Finseal and small bulb seal | $R_w + C_{tr} \geq 31$<br>(40 – 60 % of floor area) |

All openable windows and doors are to 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.

## Roof and ceiling

To achieve the requirements of SA 78B the roof ceiling system for SEC 2 bedrooms must be of $R_W + C_{tr} \geq 35$ (shown in Table 7). This may be achieved using the following indicative roof construction:

- Metal deck roofing
- Pitched roof
- 1x10 mm plasterboard ceiling direct to underside of roof trusses
- Minimum 50 mm, 14 kg/m3 insulation over the ceiling.

## Ventilation

At this stage of design, no mechanical ventilation choices have been made, however, any proposed mechanical ventilation should not reduce the acoustic performance of the external facade and will therefore be in accordance with SA 78B.

# 7 Conclusions

An external noise intrusion and environmental noise emission assessment has been undertaken for the proposed mixed use development at 200-202 Anzac Highway Plympton. The assessment has taken into account the relevant noise requirements of the West Torrens Council Development Plan, Minister's Specification SA 78B, and the *Environment Protection (Noise) Policy 2007.*

This assessment has demonstrated the following:

- Facade noise mitigation treatments detailed in this report are suitable to attenuate noise intrusion from traffic on Anzac Highway into the residences in accordance with Minister's Specification SA 78B *Construction Requirements for the Control of External Sound*.
- Music noise from the Level 8 function space will comply with the Development Plan and EPA guidelines provided music is limited to background levels when external doors and windows are open.
- Noise from vehicles accessing the car park will comply with the Noise EPP criteria provided a minimum 1.8m high fence is constructed on the western boundary adjacent to the car park access. Noise from vehicles accessing the site is expected to be significantly less than noise from traffic on Anzac Highway.
- External mechanical plant will be designed and treated at detailed design stage to achieve appropriate levels at the most affected receptors in accordance with the requirements of the *Environment Protection (Noise) Policy 2007*.

On this basis the proposed mixed used development at 200-202 Anzac Highway will be able to operate within the noise requirements of the West Torrens Council Development Plan, Minister's Specification SA 78B, and the *Environment Protection (Noise) Policy 2007.*

# Appendix A–Wall, roof and window mark-ups

Mark-ups indicate the SECs of building facades and the required performance of windows and external doors of the proposed development. The construction of external walls is to be read from the mark-ups in conjunction with tables 3, 4 and 5.

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |

PROPOSED NEW CROSSOVER

EXISTING CROSSOVER TO BE REMOVED & VERGE REINSTATED

BUS STOP

STREET TREE

STOBIE POLE

FOOTPATH

ALFRESCO DINING

BICYCLE PARKING

LETTERBOXES

FIRE BOOSTER

CAFE

LOBBY

TENANCY 1

TENANCY 2

LIFT 1

LIFT 2

300

6,000

1,200

11,772

1,075

12,705

8.1

9.1

10.1

11.1

4,438

2,037

6,000

5,900

TOTAL INTERNAL GROUND FLOOR
447.47 m2

COMMERCIAL EAST
216.32 m2

COMMERCIAL WEST
115.42 m2

LOBBY GF
53.14 m2

1 2 3 4 5 6 7 8

SMALL CAR

BICYCLE PARKING - VISITORS

STAIR 1 UP

STAIR 3

MOTORCYCLE PARKING

UNISEX ACCESSIBLE

FEMALE AMBULANT

MALE AMBULANT

STAFF

PLANT

5,400

CARPARK - 22 CARS

RAMPED DECK
5° (1 in 11.5)

DOWN

11,400

UP

STAIR 4

STAIR 2

11 12 13 14 15 16 17 18 19 20 21 22

300

5,883

BICYCLE PARKING - RESIDENTS
28.17 m2

10

9

LOADING ZONE

RUBBISH & RECYCLING
61.79 m2

1 GROUND FLOOR
1:100


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Revision: C


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**RESONATE WALL AND WINDOW MARK-UP**
Date: 11.05.2018
Revision: 0
Project: 200-202 Anzac Highway Plympton
Project Number: A180287

Resonate

**Legend**

- SEC 1
- SEC 2
- SEC 3
- 31 Window Rw based on glazed area to floor ratio

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |

BALCONY L1.1 16.96 m2
BALCONY L1.2 8.80 m2
BALCONY L1.3 11.47 m2
BALCONY L1.4 9.19 m2
BALCONY L1.5 21.53 m2
APARTMENT L1.1 72.60 m2
APARTMENT L1.2 75.22 m2
APARTMENT L1.3 52.98 m2
APARTMENT L1.4 76.82 m2
APARTMENT L1.5 73.14 m2
VINE COVERED PERGOLA
LIFT 1
LIFT 2
LOBBY
ROOF
STAIR 1
STAIR 2
UTILITY - STORAGE 30.51 m2
PLANT 24.72 m2
BALCONY L1.8 14.43 m2
APARTMENT L1.8 76.52 m2
APARTMENT L1.7 74.99 m2
APARTMENT L1.6 96.78 m2
BALCONY L1.7 6.88 m2
BALCONY L1.6 24.45 m2
BALCONY L1.9 13.16 m2
APARTMENT L1.9 78.21 m2
BALCONY L1.10 11.79 m2
APARTMENT L1.10 76.76 m2
BALCONY L1.11 21.26 m2
APARTMENT L1.11 70.10 m2

TOTAL INTERNAL LEVEL 1
1,061.73 m2

1 FIRST FLOOR
1:100


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Revision: C

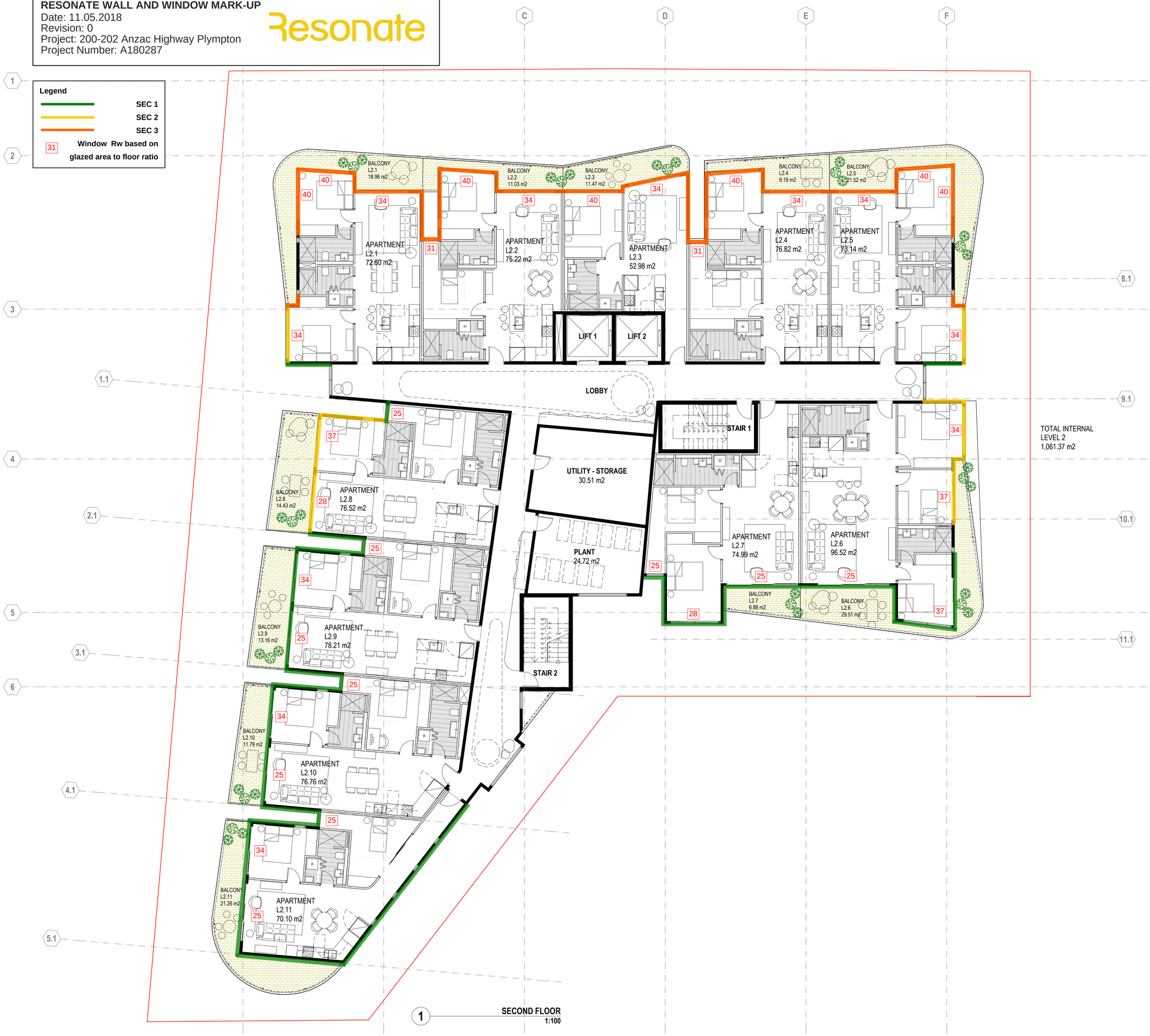

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Date: 11.05.2018
Revision: 0
Project: 200-202 Anzac Highway Plympton
Project Number: A180287

Resonate

**Legend**

- SEC 1
- SEC 2
- SEC 3
- 31 Window Rw based on glazed area to floor ratio




1 SECOND FLOOR
1:100

TOTAL INTERNAL
LEVEL 2
1,061.37 m2

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |


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**RESONATE WALL AND WINDOW MARK-UP**
Date: 11.05.2018
Revision: 0
Project: 200-202 Anzac Highway Plympton
Project Number: A180287

Resonate

**Legend**

- SEC 1
- SEC 2
- SEC 3
- 31 — Window Rw based on glazed area to floor ratio




TOTAL INTERNAL
LEVEL 3
994.17 m2

**1 THIRD FLOOR**
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |


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**RESONATE WALL AND WINDOW MARK-UP**
Date: 11.05.2018
Revision: 0
Project: 200-202 Anzac Highway Plympton
Project Number: A180287

Resonate

**Legend**

- SEC 1
- SEC 2
- SEC 3
- 31 Window Rw based on glazed area to floor ratio




TOTAL INTERNAL
LEVEL 4
994.40 m2

1 **FOURTH FLOOR**
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |


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**RESONATE WALL AND WINDOW MARK-UP**
Date: 11.05.2018
Revision: 0
Project: 200-202 Anzac Highway Plympton
Project Number: A180287

Resonate

**Legend**

- SEC 1
- SEC 2
- SEC 3
- 31 Window Rw based on glazed area to floor ratio




TOTAL INTERNAL
LEVEL 5
994.45 m2

1 FIFTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |


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Project: ANZAC HWY APARTMENTS

Sheet Title: Fifth

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.10

Revision: C


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**RESONATE WALL AND WINDOW MARK-UP**
Date: 11.05.2018
Revision: 0
Project: 200-202 Anzac Highway Plympton
Project Number: A180287

Resonate

**Legend**

- SEC 1
- SEC 2
- SEC 3
- 31 — Window Rw based on glazed area to floor ratio




1 SIXTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |


CAPSULE PROJECTS

194 Glynburn Road
Tranmere 5073
South Australia
Anthony: 0407 297 038
Patrick: 0421 332 508
Susanna: 0414 455 499
contact@capsuleprojects.net.au


Project: ANZAC HWY APARTMENTS

Sheet Title: Sixth

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.11

Revision: C

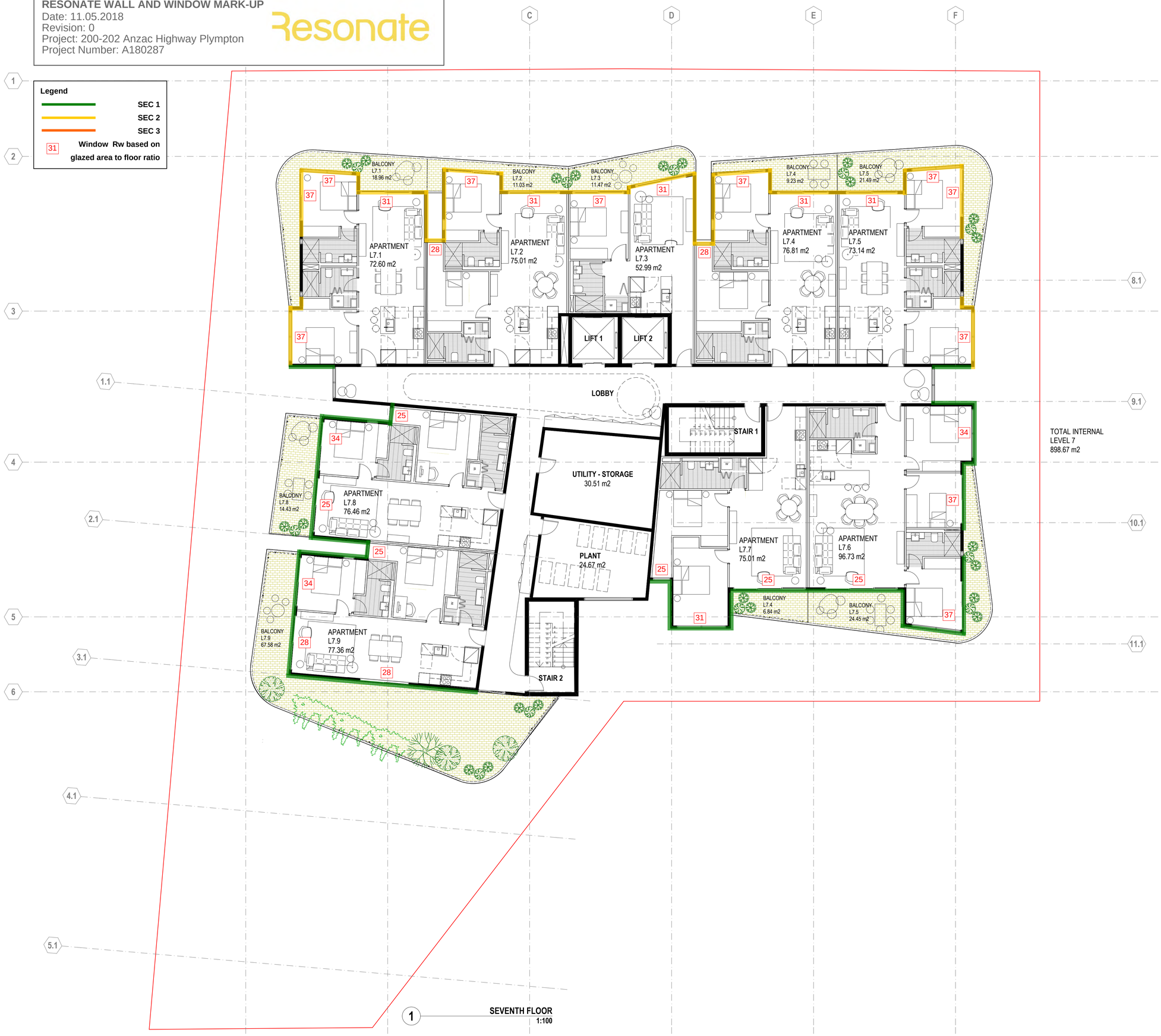

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**RESONATE WALL AND WINDOW MARK-UP**
Date: 11.05.2018
Revision: 0
Project: 200-202 Anzac Highway Plympton
Project Number: A180287

Resonate

**Legend**

- SEC 1
- SEC 2
- SEC 3
- 31 Window Rw based on glazed area to floor ratio




TOTAL INTERNAL
LEVEL 7
898.67 m2

1 SEVENTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |


CAPSULE PROJECTS

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Project: ANZAC HWY APARTMENTS
Sheet Title: Seventh
Sheet Size: A1
Scale: as shown
Drawing No.: 17.02 - P1.12
Revision: C

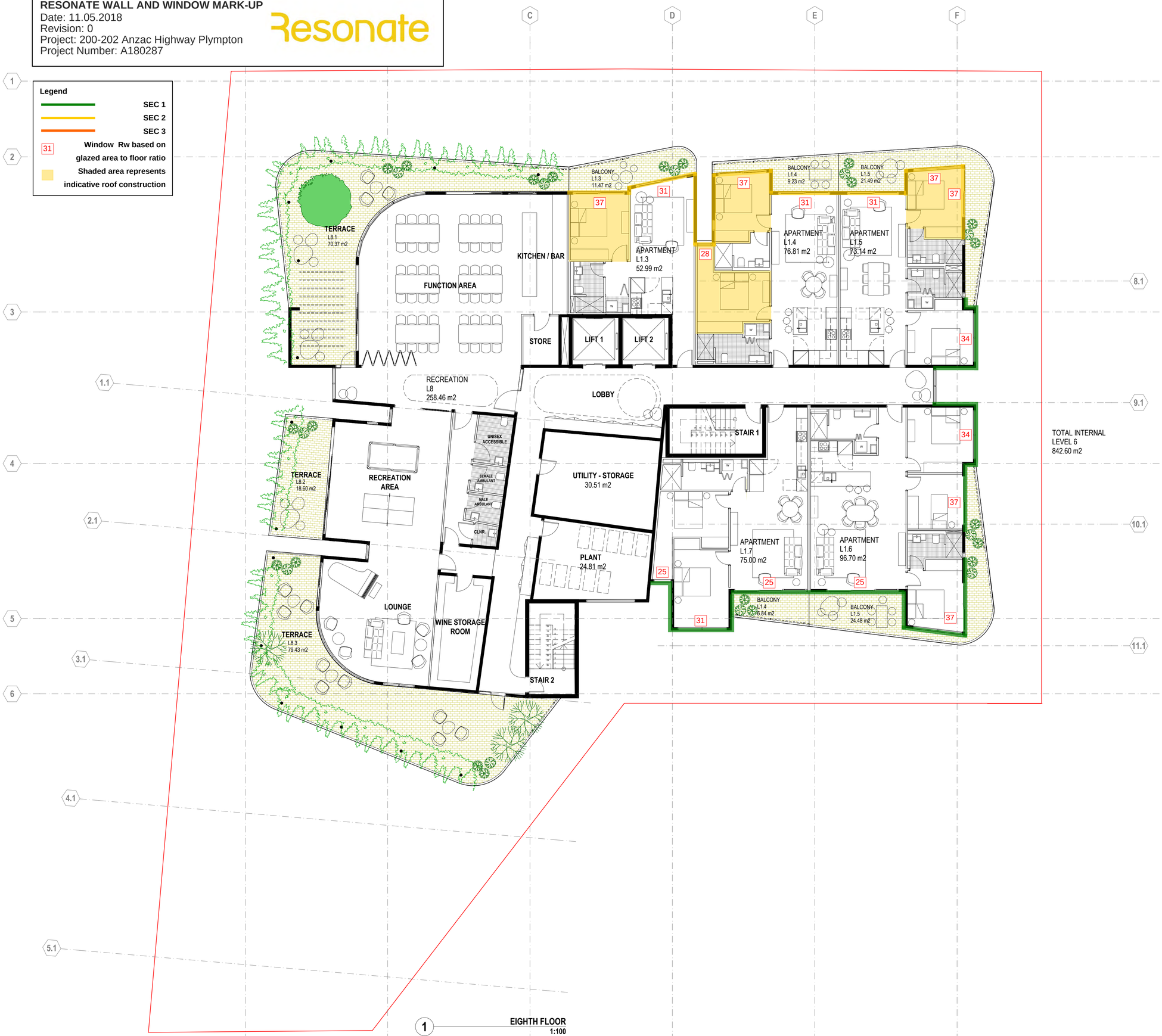

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**RESONATE WALL AND WINDOW MARK-UP**
Date: 11.05.2018
Revision: 0
Project: 200-202 Anzac Highway Plympton
Project Number: A180287

Resonate

**Legend**

- SEC 1
- SEC 2
- SEC 3
- 31 — Window Rw based on glazed area to floor ratio
- Shaded area represents indicative roof construction




1 EIGHTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |


CAPSULE PROJECTS

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Project: ANZAC HWY APARTMENTS

Sheet Title: Eighth

Sheet Size: A1

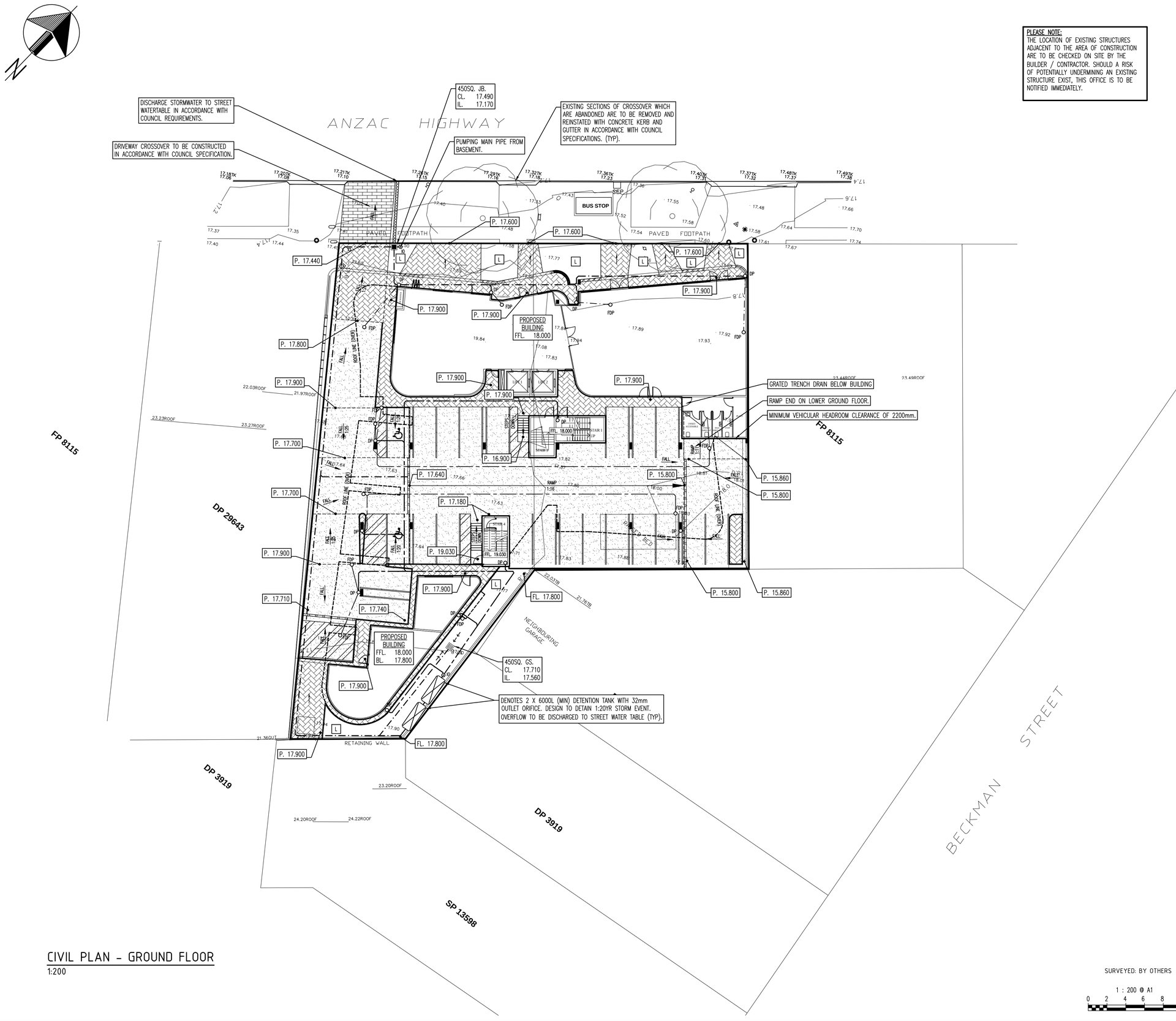
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Drawing No.: 17.02 - P1.13

Revision: C


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0 0.5 1.0 1.5 2.0 2.5




## CIVIL PLAN - GROUND FLOOR
1:200

**PLEASE NOTE:**
THE LOCATION OF EXISTING STRUCTURES ADJACENT TO THE AREA OF CONSTRUCTION ARE TO BE CHECKED ON SITE BY THE BUILDER / CONTRACTOR. SHOULD A RISK OF POTENTIALLY UNDERMINING AN EXISTING STRUCTURE EXIST, THIS OFFICE IS TO BE NOTIFIED IMMEDIATELY.

## LEGEND

- COUNCIL BLOCK PAVING
- SELECTED PEDESTRIAN BLOCK PAVING
- SELECTED PAVEMENT
- L — LANDSCAPING / GRASSED AREA
- x 99.99 — EXISTING SPOT LEVEL
- EXISTING CONTOUR
- 100 HIGH CONCRETE KERB
- PUMPING MAIN, AS PER SUMP PUMP SPEC.
- STORMWATER PIPE @ 1.0% MIN U.N.O.
- STORMWATER PIPE (SEALED) U.N.O.
- AG — AG. DRAIN WITH 16mm SCREENINGS
- RH — SELECTED RAINHEAD AND DOWNPIPE
- BS — BOX GUTTER WITH INTERNAL SUMP AND DOWNPIPE
- FDP — SELECTED FLYING DOWNPIPE (SEALED)
- DP — SELECTED DOWNPIPE
- IO — SURFACE INSPECTION OPENING
- (GIP) ø90 GRATED INLET PIT
- (GS) 450SQ. GRATED SUMP (UNO)
- (JB) 450SQ. JUNCTION BOX (UNO)
- GRATED TRENCH DRAIN
- GALVANISED BOX CULVERT
- 99.89 — DESIGN LEVEL
  - T.K. TOP OF KERB.
  - W.T. WATER TABLE.
  - P. PAVEMENT.
  - T.R.W. TOP OF RETAINING WALL.
  - B.R.W. BOTTOM OF RETAINING WALL.
  - C.L. COVER LEVEL
  - I.L. INVERT LEVEL
  - F.F.L. FINISHED FLOOR LEVEL
  - B.L. BENCH LEVEL
  - N.S. NATURAL SURFACE LEVEL

**NOTE:**
THIS IS A PLANNING DRAWING ONLY, FURTHER ENGINEERING DESIGN INCLUDING SPECIFICATIONS, SIZING AND STORMWATER INVERTS TO BE PROVIDED PRIOR TO BUILDING RULES ASSESSMENT AND CONSTRUCTION.

| No | REVISION | DRAWN | CHE'KD | DATE |
|---|---|---|---|---|
| PB. | FOR PLANNING APPROVAL | ALP | -- | 25.10.18 |
| PA. | FOR PLANNING APPROVAL | ALP | -- | 20.04.18 |

PROJECT
ANZAC HIGHWAY APARTMENTS
AT: 200-202 ANZAC HIGHWAY, PLYMPTON, SA.

DRAWING TITLE
CIVIL PLAN - GROUND FLOOR


Civil, Structural, Environmental, Geotechnical, Mechanical, Electrical, Fire, Hydraulics, Lifts, Green ESD
TMK CONSULTING ENGINEERS
Level 6, 100 Pirie Street, Adelaide SA 5000
Telephone 08 8238 4100
Facsimile 08 8410 1405
Berri Office: 25 Vaughan Terrace, Berri SA 5343

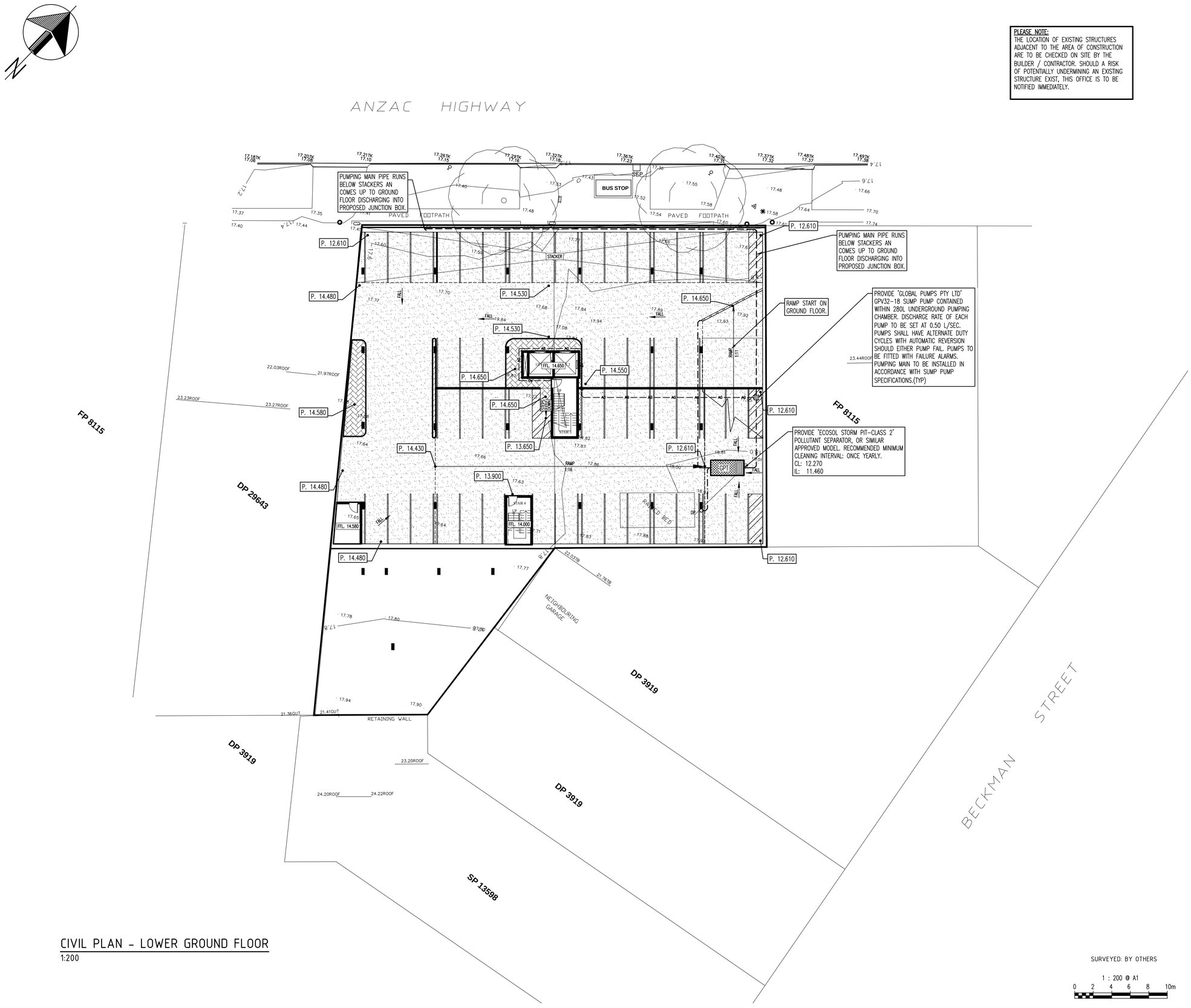

SURVEYED: BY OTHERS

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| SCALES | AS SHOWN |
| DRAWN | ALP |
| DATE | APR '18 |
| ENGINEER | ALP |
| CHECKED | -- |

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DRAWING No.
1804138-C1/PB




## CIVIL PLAN - LOWER GROUND FLOOR
1:200

**PLEASE NOTE:**
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## LEGEND

- COUNCIL BLOCK PAVING
- SELECTED PEDESTRIAN BLOCK PAVING
- SELECTED PAVEMENT
- L — LANDSCAPING / GRASSED AREA
- x 99.99 — EXISTING SPOT LEVEL
- EXISTING CONTOUR
- 100 HIGH CONCRETE KERB
- PUMPING MAIN, AS PER SUMP PUMP SPEC.
- STORMWATER PIPE @ 1.0% MIN U.N.O.
- STORMWATER PIPE (SEALED) U.N.O.
- AG — AG. DRAIN WITH 16mm SCREENINGS
- RH — SELECTED RAINHEAD AND DOWNPIPE
- BS — BOX GUTTER WITH INTERNAL SUMP AND DOWNPIPE
- FDP — SELECTED FLYING DOWNPIPE (SEALED)
- DP — SELECTED DOWNPIPE
- IO — SURFACE INSPECTION OPENING
- (GIP) ø90 GRATED INLET PIT
- (GS) 450SQ. GRATED SUMP (UNO)
- (JB) 450SQ. JUNCTION BOX (UNO)
- GRATED TRENCH DRAIN
- GALVANISED BOX CULVERT
- 99.99 — DESIGN LEVEL
  - T.K. TOP OF KERB.
  - W.T. WATER TABLE.
  - P. PAVEMENT.
  - T.R.W. TOP OF RETAINING WALL.
  - B.R.W. BOTTOM OF RETAINING WALL.
  - C.L. COVER LEVEL
  - I.L. INVERT LEVEL
  - F.F.L. FINISHED FLOOR LEVEL
  - B.L. BENCH LEVEL
  - N.S. NATURAL SURFACE LEVEL

**NOTE:**
THIS IS A PLANNING DRAWING ONLY, FURTHER ENGINEERING DESIGN INCLUDING SPECIFICATIONS, SIZING AND STORMWATER INVERTS TO BE PROVIDED PRIOR TO BUILDING RULES ASSESSMENT AND CONSTRUCTION.

SURVEYED: BY OTHERS

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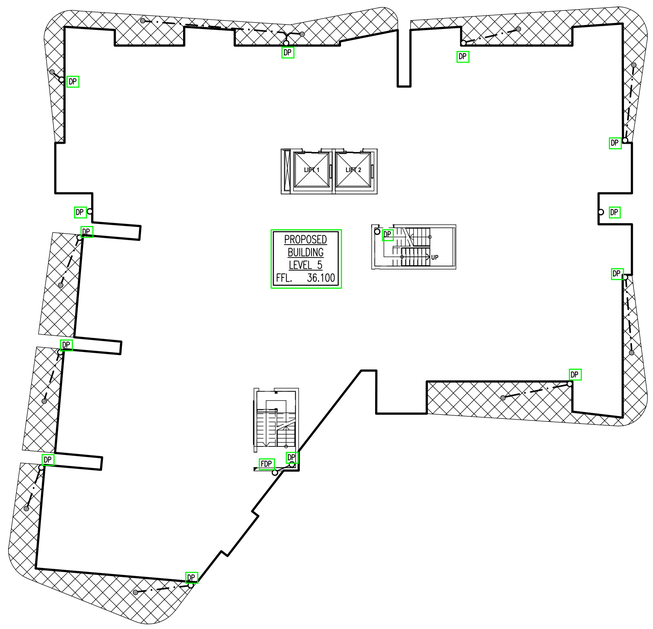
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|---|---|---|---|---|
| PB. | FOR PLANNING APPROVAL | ALP | -- | 25.10.18 |
| PA. | FOR PLANNING APPROVAL | ALP | -- | 20.04.18 |

PROJECT
ANZAC HIGHWAY APARTMENTS
AT: 200-202 ANZAC HIGHWAY,
PLYMPTON, SA.

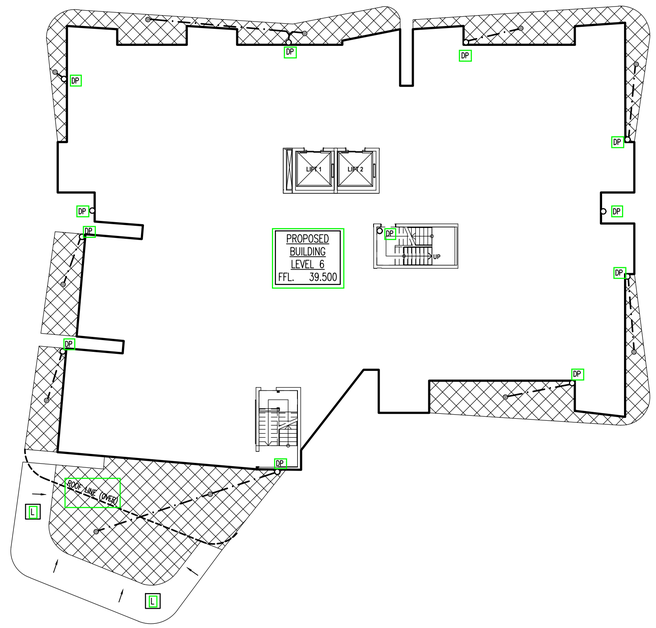
DRAWING TITLE
CIVIL PLAN - LOWER GROUND FLOOR


Civil, Structural, Environmental, Geotechnical, Mechanical, Electrical, Fire, Hydraulics, Lifts, Green ESD
Level 6, 100 Pirie Street,
Adelaide SA 5000
Telephone 08 8238 4100
Facsimile 08 8410 1405
Berri Office: 25 Vaughan Terrace,
Berri SA 5343
TMK CONSULTING ENGINEERS

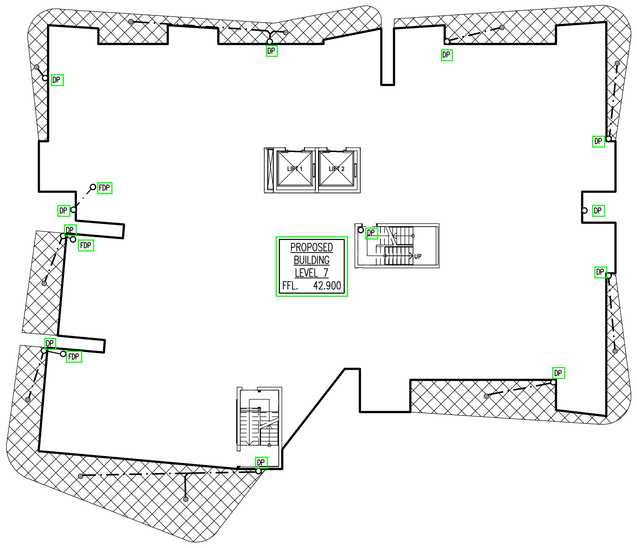

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| DATE: APR '18 | 1804138-C2/PB |
| ENGINEER: ALP | |
| CHECKED: -- | |



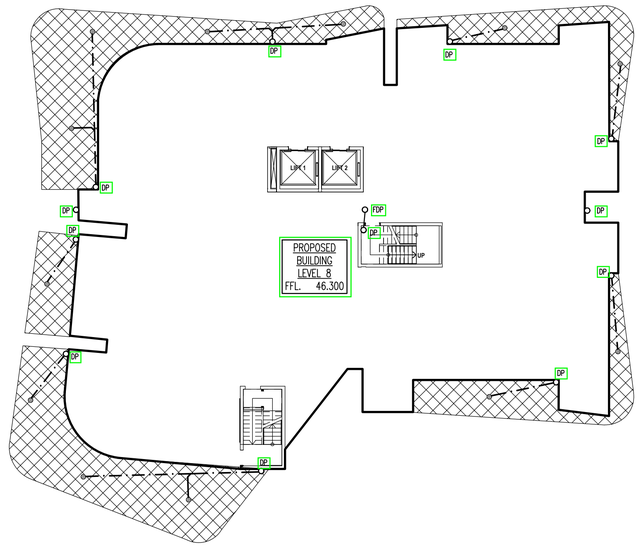

CIVIL PLAN - FIFTH FLOOR
1:200




CIVIL PLAN - SIXTH FLOOR
1:200




CIVIL PLAN - SEVENTH FLOOR
1:200




CIVIL PLAN - EIGHTH FLOOR
1:200

## LEGEND

- COUNCIL BLOCK PAVING
- SELECTED PEDESTRIAN BLOCK PAVING
- SELECTED PAVEMENT
- [L] LANDSCAPING / GRASSED AREA
- x 99.99 EXISTING SPOT LEVEL
- EXISTING CONTOUR
- 100 HIGH CONCRETE KERB
- PUMPING MAIN, AS PER SUMP PUMP SPEC.
- STORMWATER PIPE @ 1.0% MIN U.N.O.
- STORMWATER PIPE (SEALED) U.N.O.
- AG AG. DRAIN WITH 16mm SCREENINGS
- RH SELECTED RAINHEAD AND DOWNPIPE
- BS BOX GUTTER WITH INTERNAL SUMP AND DOWNPIPE
- FDP SELECTED FLYING DOWNPIPE (SEALED)
- DP SELECTED DOWNPIPE
- IO SURFACE INSPECTION OPENING
- (GIP) ø90 GRATED INLET PIT
- (GS) 450SQ. GRATED SUMP (UNO)
- (JB) 450SQ. JUNCTION BOX (UNO)
- GRATED TRENCH DRAIN
- GALVANISED BOX CULVERT
- 99.89 DESIGN LEVEL
  - T.K. TOP OF KERB.
  - W.T. WATER TABLE.
  - P.T. PAVEMENT.
  - T.R.W. TOP OF RETAINING WALL.
  - B.R.W. BOTTOM OF RETAINING WALL.
  - C.L. COVER LEVEL
  - I.L. INVERT LEVEL
  - F.F.L. FINISHED FLOOR LEVEL
  - B.L. BENCH LEVEL
  - N.S. NATURAL SURFACE LEVEL

**PLEASE NOTE:**
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| No | REVISION | DRAWN | CHE'KD | DATE |
|---|---|---|---|---|
| P.A. | FOR PLANNING APPROVAL | ALP | -- | 20.04.18 |

PROJECT
ANZAC HIGHWAY APARTMENTS
AT: 200-202 ANZAC HIGHWAY,
PLYMPTON, SA.

DRAWING TITLE
CIVIL PLAN - LEVELS 5, 6, 7, & 8

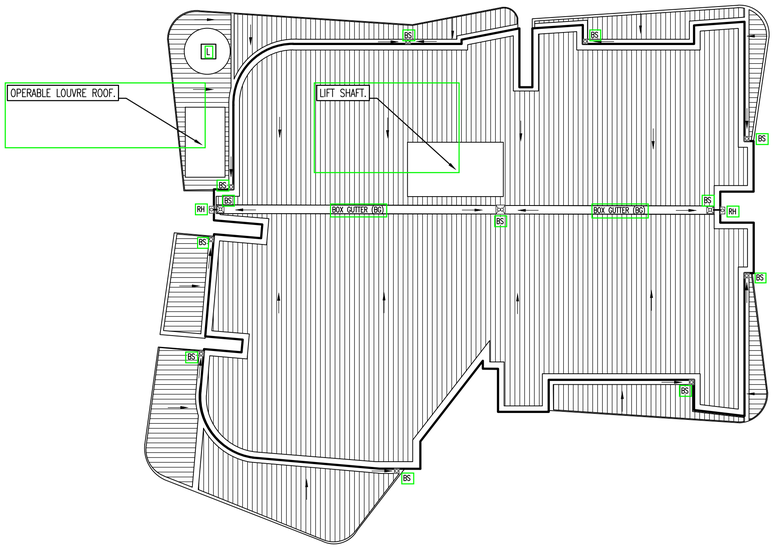
Civil, Structural, Environmental, Geotechnical, Mechanical, Electrical, Fire, Hydraulics, Lifts, Green ESD
Level 6, 100 Pirie Street,
Adelaide SA 5000
Telephone 08 8238 4100
Facsimile 08 8410 1405
Berri Office: 25 Vaughan Terrace,
Berri SA 5343
TMK CONSULTING ENGINEERS

SCALES AS SHOWN
DRAWN ALP
DATE APR '18
ENGINEER ALP
CHECKED --

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DRAWING No.
1804138-C4/PA

1 : 200 @ A1
0 2 4 6 8 10m




ROOF PLAN
1:200

## LEGEND

- COUNCIL BLOCK PAVING
- SELECTED PEDESTRIAN BLOCK PAVING
- SELECTED PAVEMENT
- L — LANDSCAPING / GRASSED AREA
- x 99.99 — EXISTING SPOT LEVEL
- EXISTING CONTOUR
- 100 HIGH CONCRETE KERB
- PUMPING MAIN, AS PER SUMP PUMP SPEC.
- STORMWATER PIPE @ 1.0% MIN U.N.O.
- STORMWATER PIPE (SEALED) U.N.O.
- AG — AG. DRAIN WITH 16mm SCREENINGS
- RH — SELECTED RAINHEAD AND DOWNPIPE
- BS — BOX GUTTER WITH INTERNAL SUMP AND DOWNPIPE
- FDP — SELECTED FLYING DOWNPIPE (SEALED)
- DP — SELECTED DOWNPIPE
- IO — SURFACE INSPECTION OPENING
- (GIP) ø90 GRATED INLET PIT
- (GS) 450SQ. GRATED SUMP (UNO)
- (JB) 450SQ. JUNCTION BOX (UNO)
- GRATED TRENCH DRAIN
- GALVANISED BOX CULVERT
- 99.89 — DESIGN LEVEL
  - T.K. TOP OF KERB.
  - W.T. WATER TABLE.
  - P.I. PAVEMENT.
  - T.R.W. TOP OF RETAINING WALL.
  - B.R.W. BOTTOM OF RETAINING WALL.
  - C.L. COVER LEVEL
  - I.L. INVERT LEVEL
  - F.F.L. FINISHED FLOOR LEVEL
  - B.L. BENCH LEVEL
  - N.S. NATURAL SURFACE LEVEL

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| No | REVISION | DRAWN | CHE'KD | DATE |
|---|---|---|---|---|
| PA | FOR PLANNING APPROVAL | ALP | -- | 20.04.18 |

PROJECT
ANZAC HIGHWAY APARTMENTS
AT: 200-202 ANZAC HIGHWAY,
PLYMPTON, SA.

DRAWING TITLE
CIVIL PLAN - ROOF PLAN

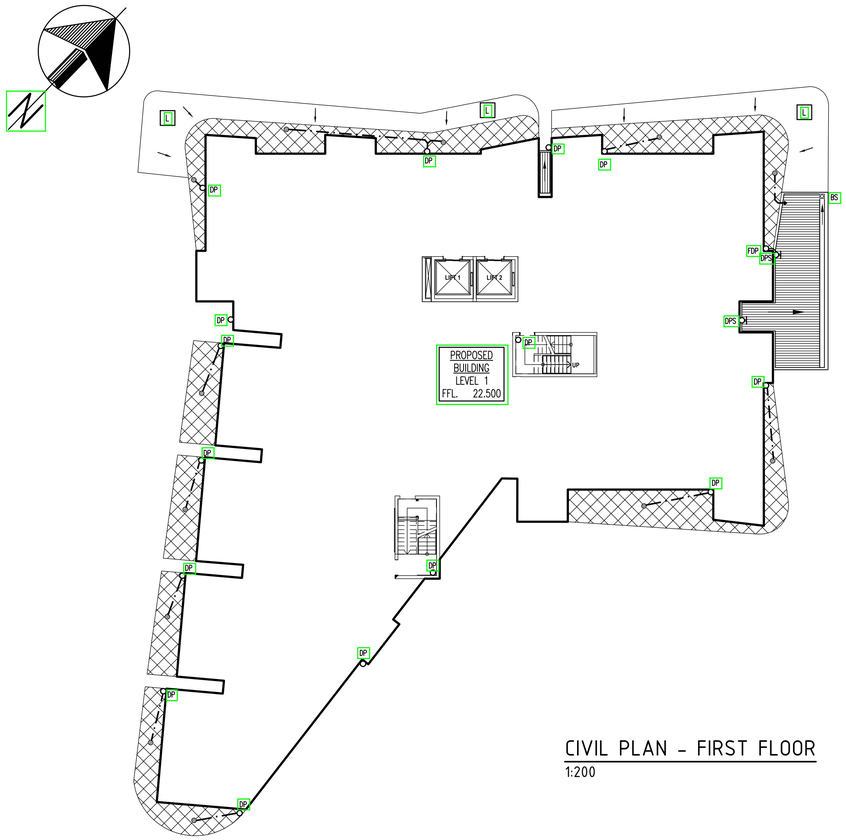

Civil, Structural, Environmental, Geotechnical, Mechanical, Electrical, Fire, Hydraulics, Lifts, Green ESD
Level 6, 100 Pirie Street,
Adelaide SA 5000
Telephone 08 8238 4100
Facsimile 08 8410 1405
Berri Office: 25 Vaughan Terrace,
Berri SA 5343


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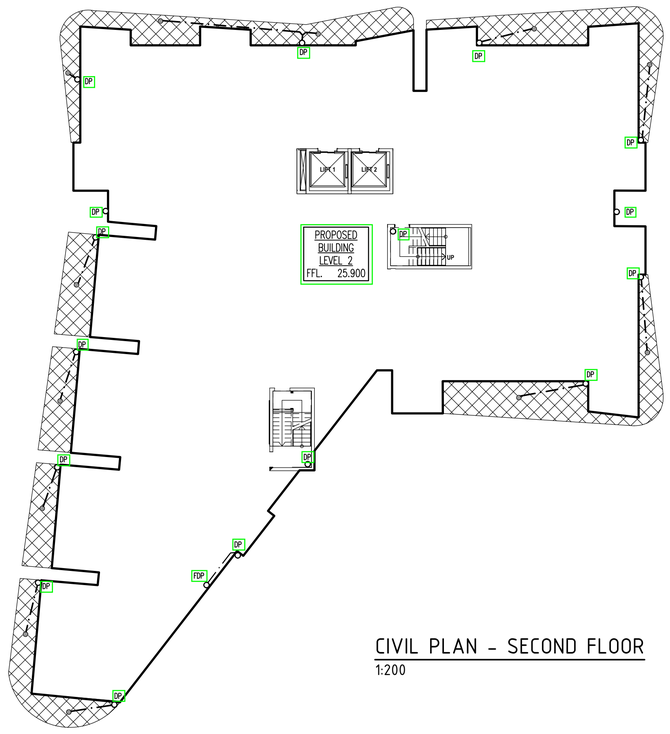
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DATE APR '18
ENGINEER ALP
CHECKED --

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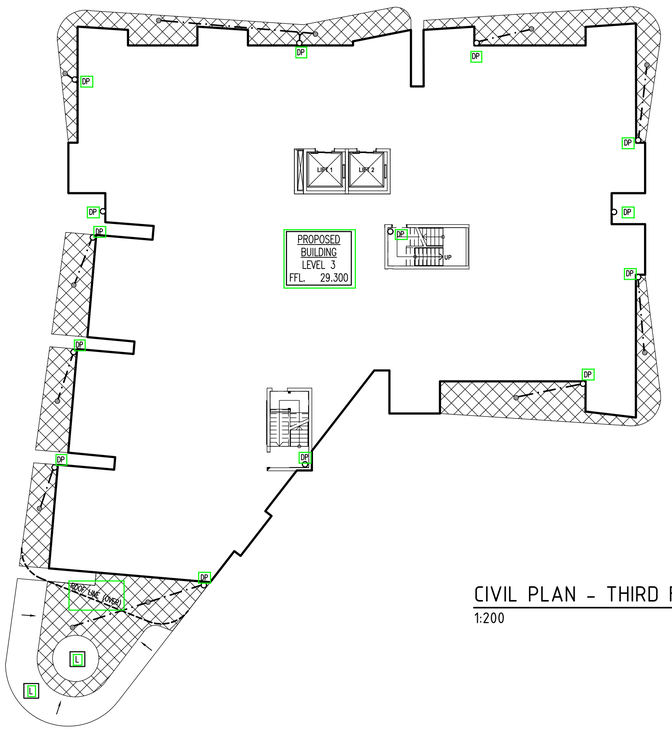
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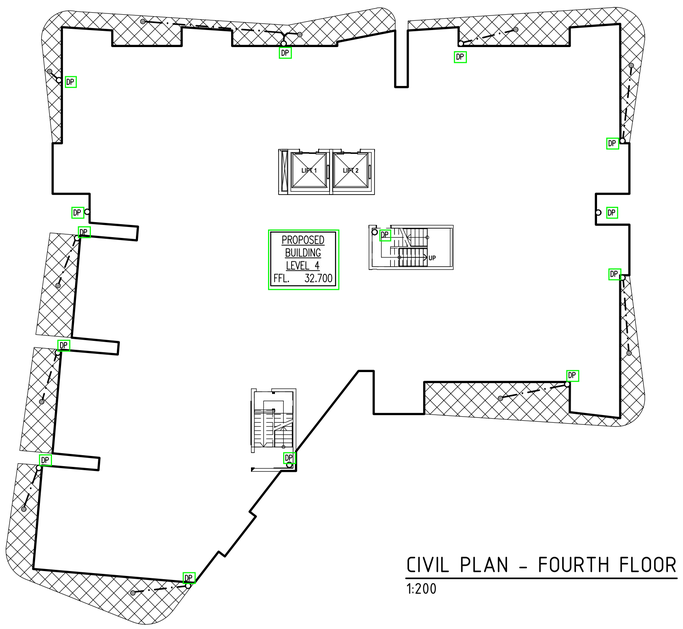

CIVIL PLAN - FIRST FLOOR
1:200




CIVIL PLAN - SECOND FLOOR
1:200




CIVIL PLAN - THIRD FLOOR
1:200




CIVIL PLAN - FOURTH FLOOR
1:200

## LEGEND

- COUNCIL BLOCK PAVING
- SELECTED PEDESTRIAN BLOCK PAVING
- SELECTED PAVEMENT
- L — LANDSCAPING / GRASSED AREA
- x 99.99 — EXISTING SPOT LEVEL
- EXISTING CONTOUR
- 100 HIGH CONCRETE KERB
- PUMPING MAIN, AS PER SUMP PUMP SPEC.
- STORMWATER PIPE @ 1.0% MIN U.N.O.
- STORMWATER PIPE (SEALED) U.N.O.
- AG — AG. DRAIN WITH 16mm SCREENINGS
- RH — SELECTED RAINHEAD AND DOWNPIPE
- BS — BOX GUTTER WITH INTERNAL SUMP AND DOWNPIPE
- FDP — SELECTED FLYING DOWNPIPE (SEALED)
- DP — SELECTED DOWNPIPE
- IO — SURFACE INSPECTION OPENING
- (GIP) ø90 GRATED INLET PIT
- (GS) 450SQ. GRATED SUMP (UNO)
- (JB) 450SQ. JUNCTION BOX (UNO)
- GRATED TRENCH DRAIN
- GALVANISED BOX CULVERT
- 99.89 — DESIGN LEVEL
- T.K. — TOP OF KERB.
- W.T. — WATER TABLE.
- P.T. — PAVEMENT.
- T.R.W. — TOP OF RETAINING WALL.
- B.R.W. — BOTTOM OF RETAINING WALL.
- C.L. — COVER LEVEL
- I.L. — INVERT LEVEL
- F.F.L. — FINISHED FLOOR LEVEL
- B.L. — BENCH LEVEL
- N.S. — NATURAL SURFACE LEVEL

**PLEASE NOTE:**
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| No | REVISION | DRAWN | CHE'KD | DATE |
|---|---|---|---|---|
| PA. | FOR PLANNING APPROVAL | ALP | -- | 20.04.18 |

PROJECT
ANZAC HIGHWAY APARTMENTS
AT: 200-202 ANZAC HIGHWAY,
PLYMPTON, SA.

DRAWING TITLE
CIVIL PLAN - LEVELS 1, 2, 3 & 4


Civil, Structural, Environmental, Geotechnical, Mechanical, Electrical, Fire, Hydraulics, Lifts, Green ESD
Level 6, 100 Pirie Street,
Adelaide SA 5000
Telephone 08 8238 4100
Facsimile 08 8410 1405
Berri Office: 25 Vaughan Terrace,
Berri SA 5343
TMK CONSULTING ENGINEERS


1 : 200 @ A1
0 2 4 6 8 10m

SCALES AS SHOWN
DRAWN ALP
DATE APR '18
ENGINEER ALP
CHECKED --

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DRAWING No.
1804138-C3/PA

# PROPOSED APARTMENT DEVELOPMENT FOR VIVE DEVELOPMENTS 200-202 ANZAC HIGHWAY, PLYMPTON SA

| Project | Drawing No: | Layout Name | Rev | 29/5/18 |
|---|---|---|---|---|
| | P1.1 | Title Page | D | |
| | P1.2 | Locality Details | D | |
| | P1.3 | Site Plan | D | |
| | P1.4 | Lower Ground | D | |
| | P1.5 | Ground | D | |
| | P1.6 | First | D | |
| | P1.7 | Second | D | |
| | P1.8 | Third | D | |
| | P1.9 | Fourth | D | |
| | P1.10 | Fifth | D | |
| | P1.11 | Sixth | D | |
| | P1.12 | Seventh | D | |
| | P1.13 | Eighth | D | |
| | P1.14 | Roof | D | |
| | P1.15 | North Elevation | D | |
| | P1.16 | South Elevation | D | |
| | P1.17 | East Elevation | D | |
| | P1.18 | West Elevation | D | |
| | P1.19 | Section X.X | D | |
| | P1.20 | Section Y.Y | D | |
| | P1.21 | Section Z.Z | D | |
| | P1.22 | 3D Perspectives 1 | D | |
| | P1.23 | 3D Perspectives 2 | D | |
| | P1.24 | 3D Perspectives 3 | D | |
| | P1.25 | 3D Perspectives 4 | D | |
| | P1.26 | Material Palette & Balcony Detail | D | |
| | P1.27 | Shadow Analysis - 21st December | D | |
| | P1.28 | Shadow Analysis - 21st June | D | |





3 PROPOSED DEVELOPMENT SITE AT 200-202 ANZAC HIGHWAY, PLYMPTON

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |
| D | 22.05.18 | SCAP Lodgement |


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Project: ANZAC HWY APARTMENTS

Sheet Title: Title Page

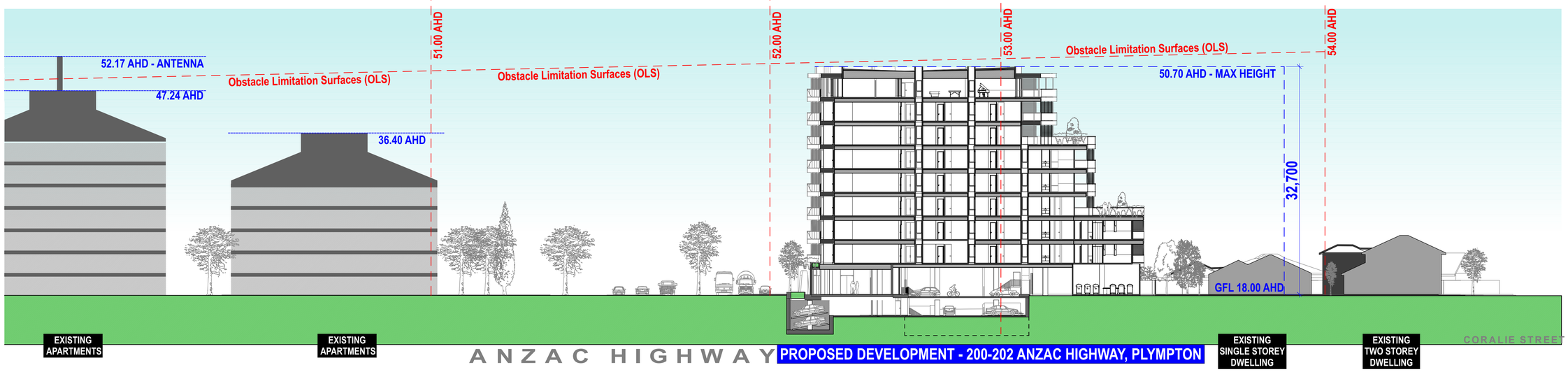
Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.1

Revision: D


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1 SECTION THRU SITE & ANZAC HIGHWAY
1:307.69




2 SITE LOCATION PLAN - 120m RADIUS




3 SITE LOCATION ANALYSIS

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
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Sheet Title: Locality Details

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Scale: as shown

Drawing No.: 17.02 - P1.2

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1 SITE PLAN
1:200

## KEY TO AREAS

| | | | | | |
|---|---|---|---|---|---|
| **Site Area** | 1958 sqm. | | | | |
| | | | **Commercial Tenancies** | | |
| | **Internal Area** | **Undercroft** | **Tenancy 1** | **Tenancy 2 & 3** | **Carparks** |
| **Lower Ground** | 1509.1 sqm. | - | - | - | 47 + 16 stackers |
| **Ground** | 447.5 sqm. | 614.5 sqm. | 115.4 sqm. | 216.3 sqm. | 22 |
| | | | **Apartments** | | |
| | **Internal Area** | **Balcony Area** | **3-bedroom** | **2 Bedroom** | **1-Bedroom** |
| **1st Floor** | 1065 sqm. | 161.9 sqm. | 1 | 9 | 1 |
| **2nd Floor** | 1065 sqm. | 161.9 sqm. | 1 | 9 | 1 |
| **3rd Floor** | 997 sqm. | 217.0 sqm. | 1 | 8 | 1 |
| **4th Floor** | 997 sqm. | 162.4 sqm. | 1 | 8 | 1 |
| **5th Floor** | 997 sqm. | 162.4 sqm. | 1 | 8 | 1 |
| **6th Floor** | 901 sqm. | 258 sqm. | 1 | 7 | 1 |
| **7th Floor** | 901 sqm. | 183.4 sqm. | 1 | 7 | 1 |
| **8th Floor** | 846 sqm. | 242 sqm. | 1 | 3 | 1 |
| **Roof** | 1,065 sqm. | | **8** | **59** | **8** |

| | |
|---|---|
| **TOTAL APARTMENTS** | **75** |
| **TOTAL INTERNAL AREA** | **9701.6 sqm.** |
| **TOTAL BALCONY AREA** | **1549.0 sqm.** |
| **TOTAL CARPARKS** | **85** |

| Revision | Date | Description |
|---|---|---|
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Sheet Title: Site Plan

Sheet Size: A1

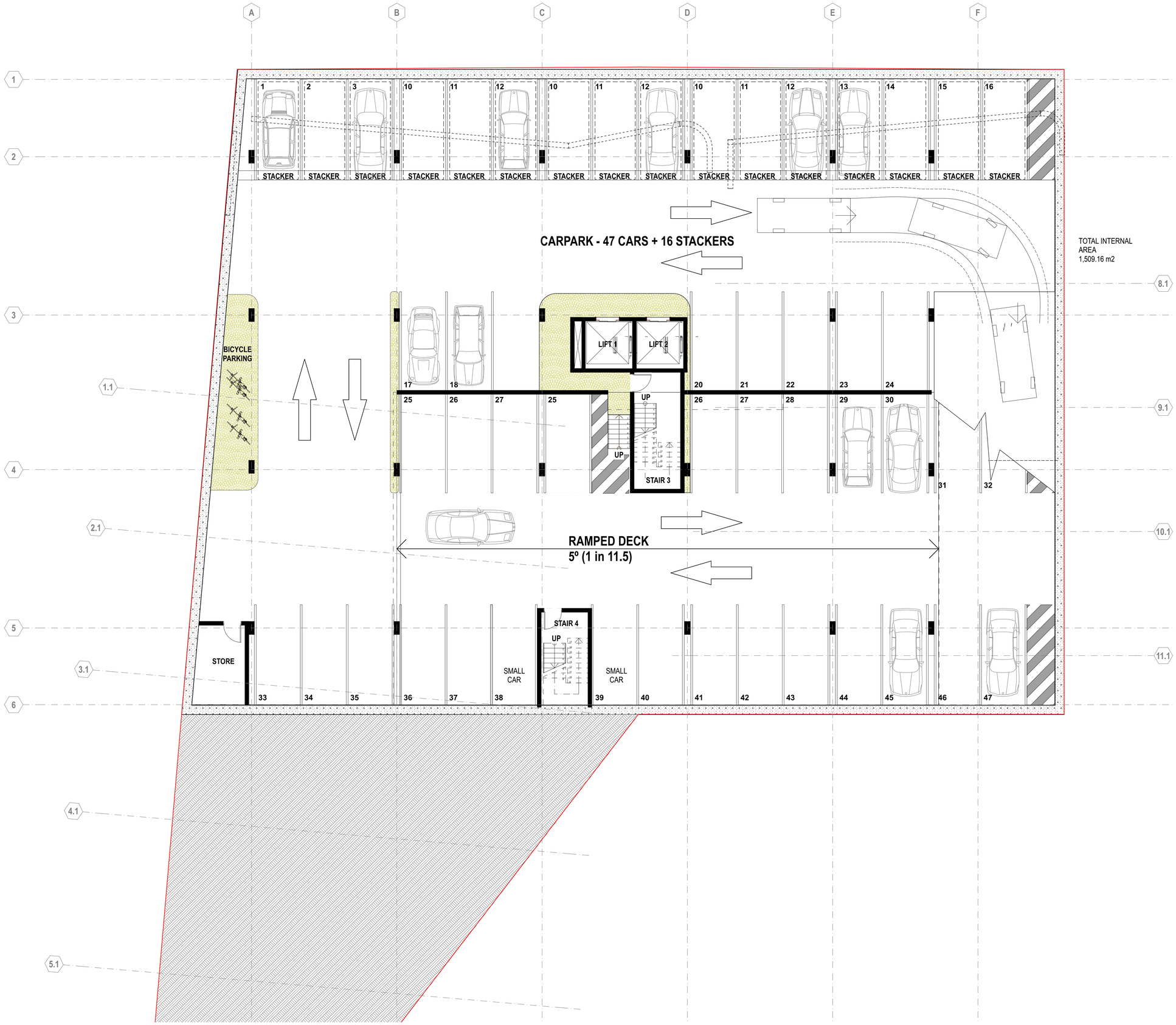
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0 1m 2m 5m




**01** LOWER GROUND FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
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Sheet Title: Lower Ground

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.4

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PROPOSED NEW CROSSOVER

EXISTING CROSSOVER TO BE REMOVED & VERGE REINSTATED

BUS STOP

STREET TREE

STOBIE POLE

FOOTPATH

EXISTING CROSSOVER TO BE REMOVED & VERGE REINSTATED

STREET TREE

ALFRESCO DINING

FIRE BOOSTER

LETTERBOXES

CAFE

INDICATIVE FIT-OUT ONLY

LOBBY

0.00

TENANCY 1

TENANCY 2

SAPN TRANSFORMER (Alternate Location)

LIFT 1

LIFT 2

PLANT

UNISEX ACCESSIBLE

FEMALE AMBULANT

MALE AMBULANT

STAFF

SMALL CAR

STAIR 1

UP

STAIR 3

MOTORCYCLE PARKING

CARPARK - 22 CARS

RAMPED DECK
5º (1 in 11.5)

DOWN

UP

STAIR 4

STAIR 2

SMALL CAR

BICYCLE PARKING - VISITORS

BICYCLE PARKING - RESIDENTS
28.17 m2

LOADING ZONE

RUBBISH & RECYCLING
61.79 m2

SAPN TRANSFORMER

TOTAL INTERNAL GROUND FLOOR
447.47 m2

COMMERCIAL EAST
216.32 m2

COMMERCIAL WEST
115.42 m2

LOBBY GF
53.14 m2

4,494

11,772

1,075

3,556

12,705

4,438

2,037

6,000

5,900

5,400

5,458

5,883

5,406

1,200

1,097

7,500

2,500

300

1 0. GROUND FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
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Project: ANZAC HWY APARTMENTS

Sheet Title: Ground

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.5

Revision: D


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1 FIRST FLOOR
1:100

N


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Sheet Title: First

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.6

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0 1m 2m 3m 4m 5m

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|---|---|---|
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1 **SECOND FLOOR**
1:100

TOTAL INTERNAL
LEVEL 2
1,064.77 m2


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Sheet Title: **Second**

Sheet Size: **A1**

Scale: **as shown**

Drawing No.: **17.02 - P1.7**

Revision: **D**


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0 1m 2m 3m 4m 5m




TOTAL INTERNAL
LEVEL 3
997.57 m2

1 THIRD FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
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Project: ANZAC HWY APARTMENTS

Sheet Title: Third

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.8

Revision: D


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TOTAL INTERNAL
LEVEL 4
997.84 m2

1 FOURTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
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Sheet Title: Fourth

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.9

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0 1m 2m 5m




TOTAL INTERNAL
LEVEL 5
997.85 m2

1 FIFTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
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Sheet Title: Fifth

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.10

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TOTAL INTERNAL
LEVEL 6
901.71 m2

1 SIXTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
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Sheet Title: Sixth

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.11

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0 1m 2m 5m




TOTAL INTERNAL
LEVEL 7
901.98 m2

1 SEVENTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
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Sheet Title: Seventh

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.12

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0 5 10 20




TOTAL INTERNAL
LEVEL 8
846.10 m2

1 EIGHTH FLOOR
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
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Project: ANZAC HWY APARTMENTS

Sheet Title: Eighth

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.13

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0 1m 2m 5m




| Revision | Date | Description |
|---|---|---|
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Sheet Title: Roof

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.14

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0 .25 .5 1.0




1 **North Elevation (Anzac Highway)**
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
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Project: **ANZAC HWY APARTMENTS**

Sheet Title: **North Elevation**

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.15

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0 05 10 50




1 **South Elevation**
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
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Project: **ANZAC HWY APARTMENTS**

Sheet Title: South Elevation

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.16

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0 05 10 50




1 **East Elevation**
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |
| D | 22.05.18 | SCAP Lodgement |

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Project: **ANZAC HWY APARTMENTS**

Sheet Title: **East Elevation**

Sheet Size: A1

Scale: as shown

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1 **West Elevation**
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
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| D | 22.05.18 | SCAP Lodgement |

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Project: **ANZAC HWY APARTMENTS**

Sheet Title: **West Elevation**

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.18

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0 1 2 3 4 5




1 **SECTION X.X**
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
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Project: **ANZAC HWY APARTMENTS**

Sheet Title: Section X.X

Sheet Size: A1

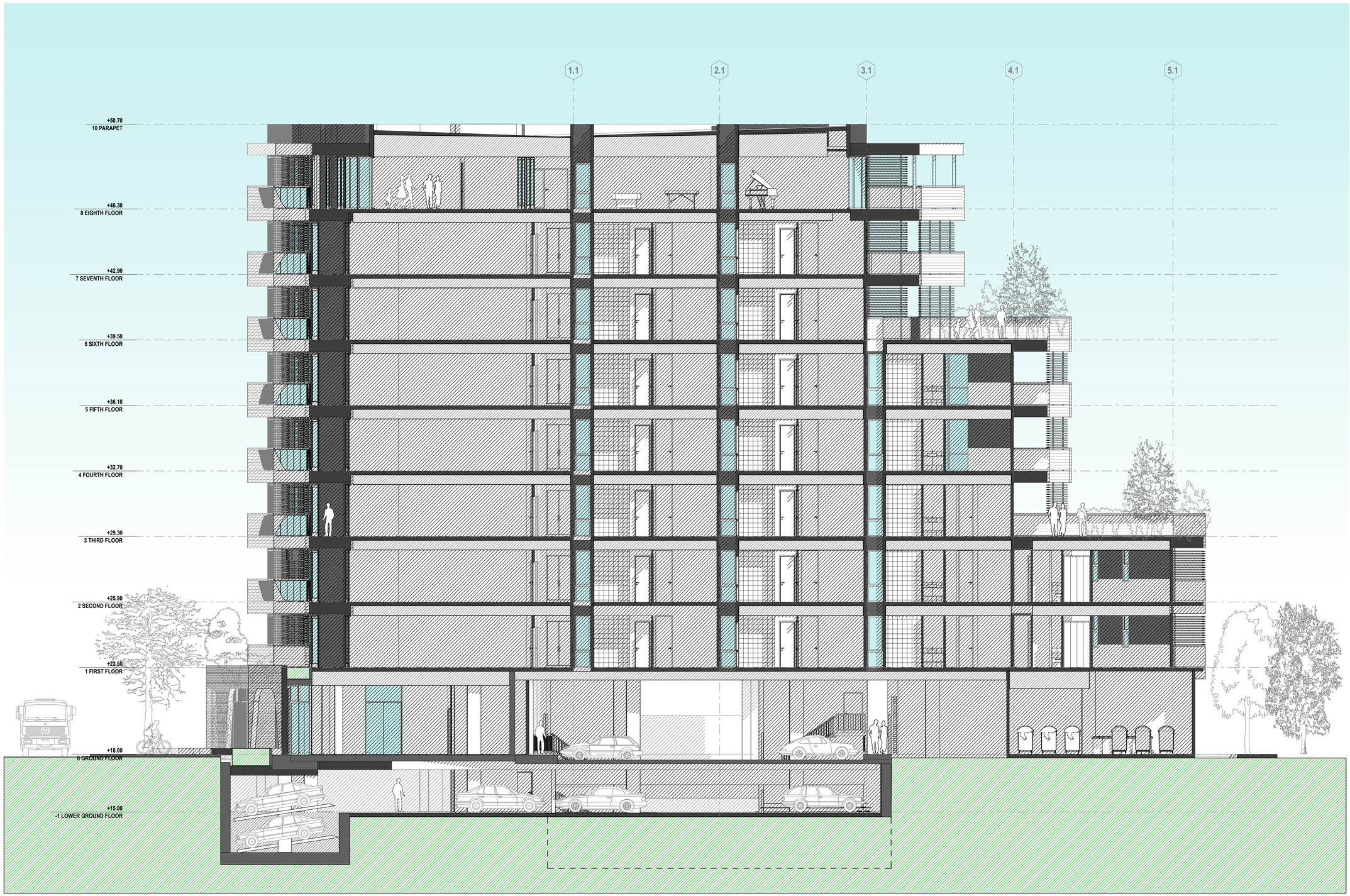
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0 5 10 20 50




1 SECTION Y.Y
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
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Project: ANZAC HWY APARTMENTS

Sheet Title: Section Y.Y

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.20

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0 5 10 15 20




1 **SECTION Z.Z**
1:100

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
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Project: **ANZAC HWY APARTMENTS**

Sheet Title: Section Z.Z

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.21

Revision: D

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0 .5 1.0 2.0









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Project: **ANZAC HWY APARTMENTS**

Sheet Title: **3D Perspectives 1**

Sheet Size: **A1**

Scale: **as shown**

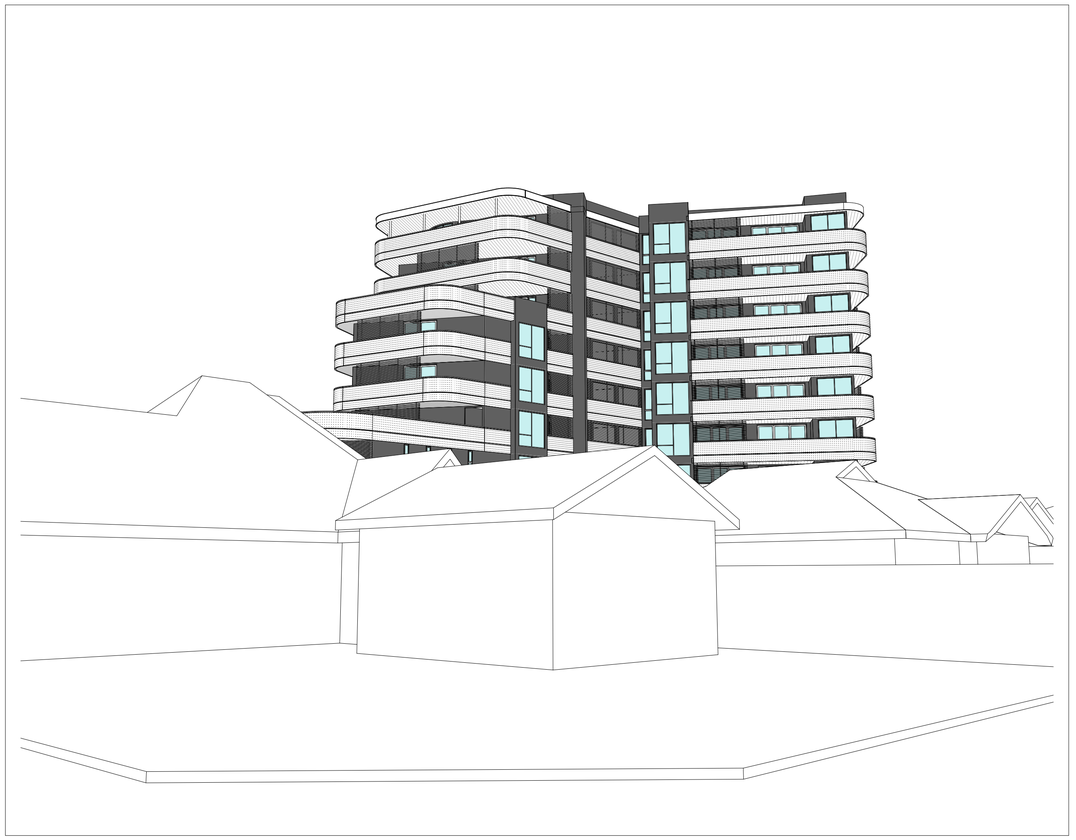
Drawing No.: **17.02 - P1.22**

Revision: **D**


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| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
| B | 20.11.17 | Amended Design |
| C | 22.03.18 | Amended Design |
| D | 22.05.18 | SCAP Lodgement |


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Susanna: 0414 455 499
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Project: **ANZAC HWY APARTMENTS**

Sheet Title: 3D Perspectives 2

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.23

Revision: D


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Project: **ANZAC HWY APARTMENTS**

Sheet Title: **3D Perspectives 3**

Sheet Size: **A1**

Scale: **as shown**

Drawing No.: **17.02 - P1.24**

Revision: **D**

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0 05 10 20





| Revision | Date | Description |
|---|---|---|
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Project: **ANZAC HWY APARTMENTS**

Sheet Title: 3D Perspectives 4

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.25

Revision: D

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0 10 20 30 40 50

feature landscaping to roof terrace





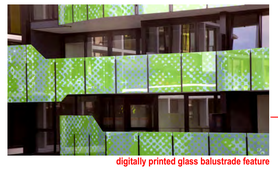
aluminium louvres



timber soffits



perforated steel balustrades



digitally printed glass balustrade feature

black lightweight cladding
w/black aluminium framed glazing







green roof / planter

integral landscaping

curved brickwork



textured brickwork



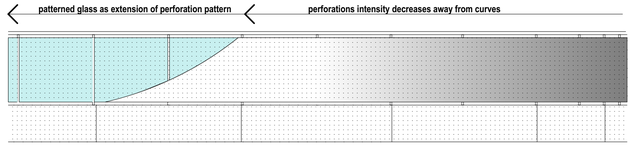
steel windows and doors at ground floor



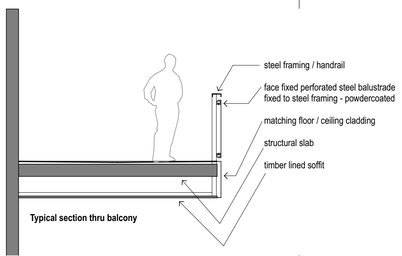
textured brickwork




1 Material Palette
1:100




2 Typical Balcony Detail
1:50




Typical section thru balcony

| Revision | Date | Description |
|---|---|---|
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Project: ANZAC HWY APARTMENTS

Sheet Title: Material Palette & Balcony Detail

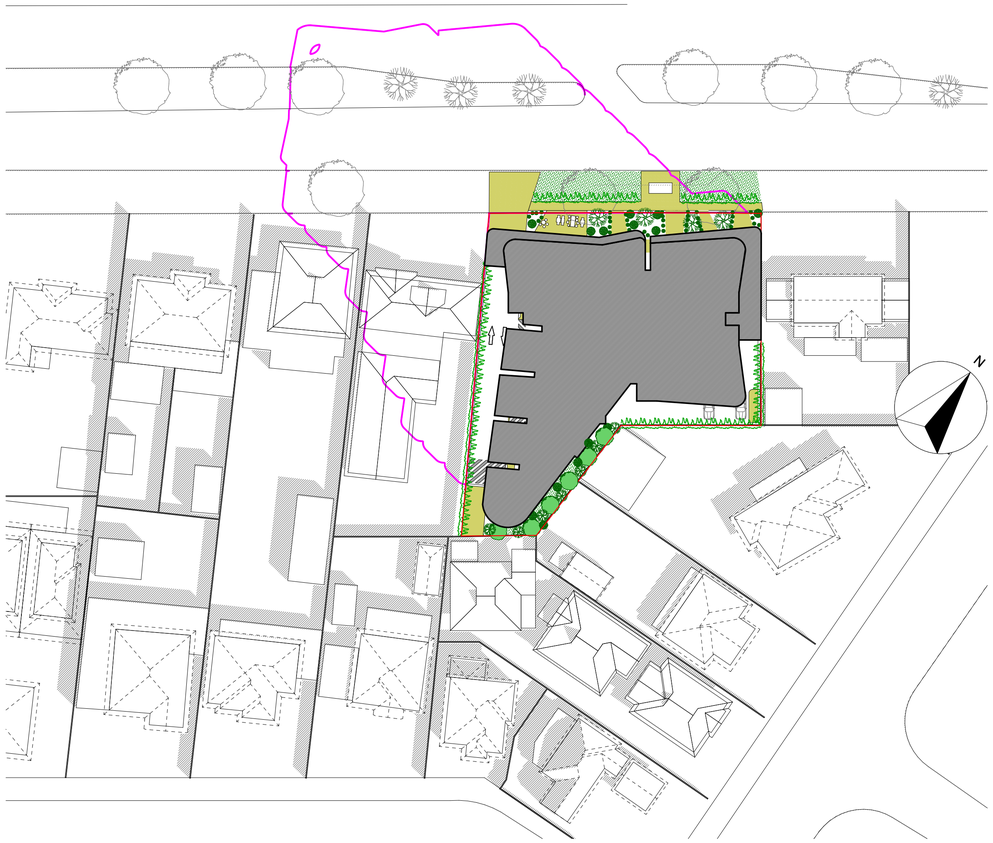
Sheet Size: A1

Scale: as shown

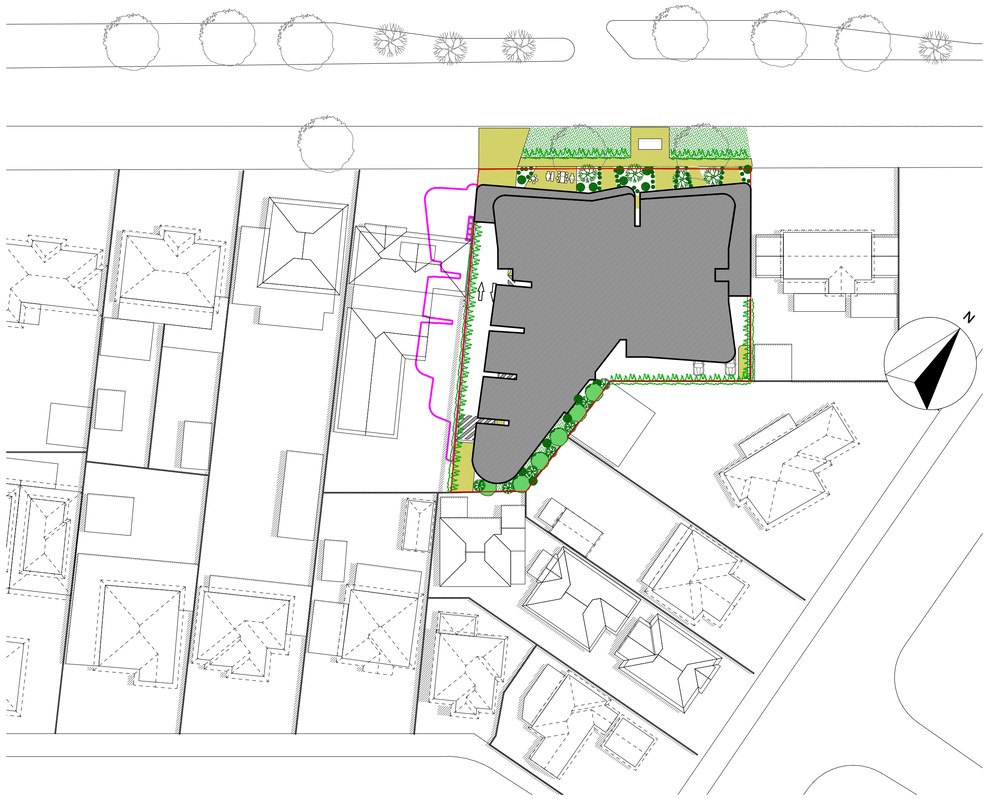
Drawing No.: 17.02 - P1.26

Revision: D

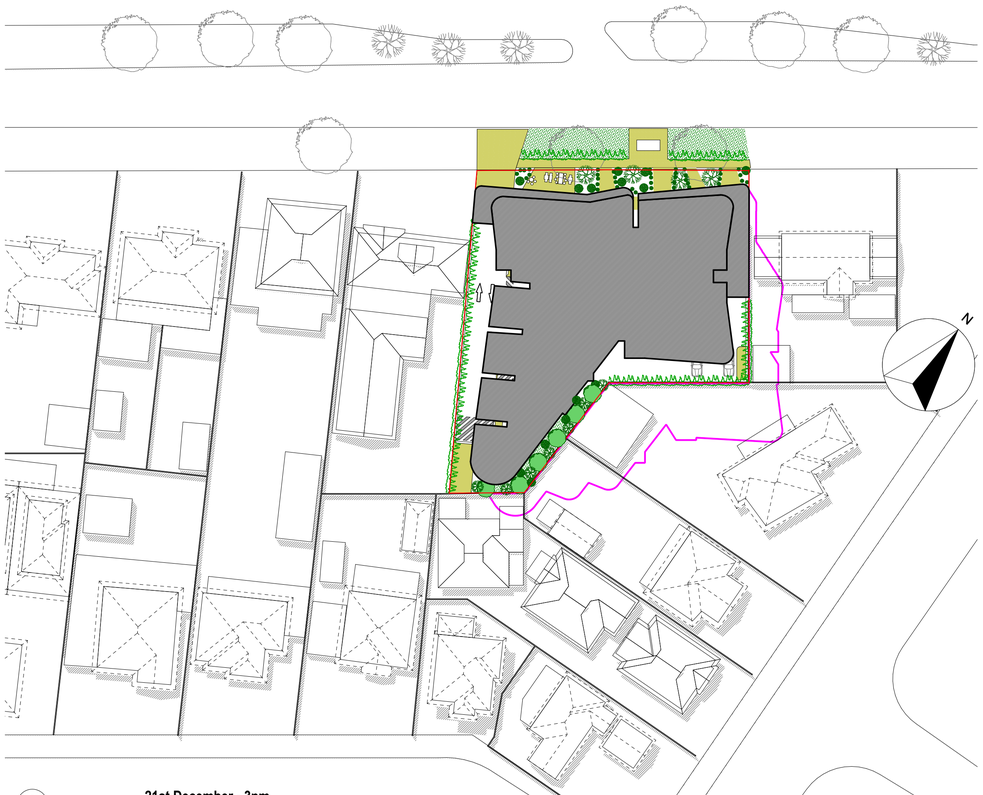
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1 21st December - 9am
1:500




2 21st December - 12 noon
1:500




3 21st December - 3pm
1:500

| Revision | Date | Description |
|---|---|---|
| A | 20.09.17 | Pre-Lodgement |
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Project: ANZAC HWY APARTMENTS

Sheet Title: Shadow Analysis - 21st December

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.27

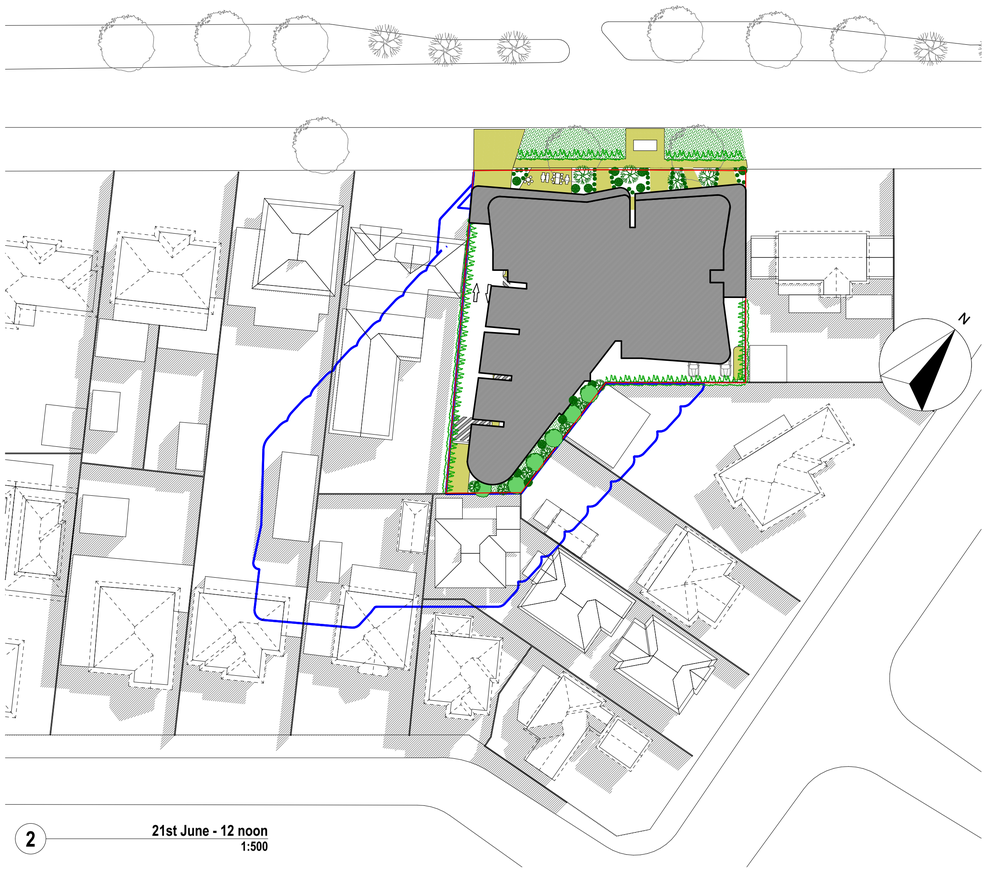
Revision: D

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0 5 10 20




1 21st June - 9am
1:500




2 21st June - 12 noon
1:500




3 21st June - 3pm
1:500

| Revision | Date | Description |
|---|---|---|
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Project: ANZAC HWY APARTMENTS

Sheet Title: Shadow Analysis - 21st June

Sheet Size: A1

Scale: as shown

Drawing No.: 17.02 - P1.28

Revision: D

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0 10 20 50