APPLICATION ON NOTIFICATION – CATEGORY 2

Applicant:	Walpol Development Pty Ltd C\- Future Urban Group
Development Number:	211/M013/17
Nature of Development:	Demolish 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 cafe at ground floor
Type of development:	Merit
Zone / Policy Area:	Urban Corridor Zone / Boulevard Policy Area 34
Subject Land:	192 Anzac Highway, GLANDORE & portion (Right of Way) of 190 Anzac Highway, GLANDORE
Contact Officer:	Brett Miller
Phone Number:	8343 2988
Start Date:	19 January 2018
Close Date:	5 February 2018

During the notification period, hard copies of the application documentation can be viewed at the Department of Planning, Transport and Infrastructure, Level 5, 50 Flinders St, Adelaide, during normal business hours. Application documentation may also be viewed during normal business hours at the local Council office (if identified on the public notice).

Written representations must be received by the close date (indicated above) and can either be posted, hand-delivered or emailed to the State Commission Assessment Panel.

Any representations received after the close date will not be considered.

Postal Address:
The Secretary
State Commission Assessment Panel
GPO Box 1815
ADELAIDE SA 5001

Street Address:
Development Division
Department of Planning, Transport and Infrastructure
Level 5, 50 Flinders St
ADELAIDE SA 5000

Email Address: scapadmin@sa.gov.au

SOUTH AUSTRALIAN DEVELOPMENT ACT, 1993
REPRESENTATION ON APPLICATION – CATEGORY 2

Applicant:	Walpol Development Pty Ltd C\- Future Urban Group
Development Number:	211/M013/17
Nature of Development:	Demolish 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 cafe at ground floor
Type of development:	Merit
Zone / Policy Area:	Urban Corridor Zone / Boulevard Policy Area 34
Subject Land:	192 Anzac Highway, GLANDORE & portion (Right of Way) of 190 Anzac Highway, GLANDORE
Contact Officer:	Brett Miller
Phone Number:	8343 2988
Close Date:	5 February 2018

My name:_____

My phone number: _____

PRIMARY METHOD(s) OF CONTACT: Email address: _____

Postal address:_____

_____Postcode_____

<u>You may be contacted via your nominated PRIMARY METHOD(s) OF CONTACT if you indicate below that you wish to be heard in support of your submission.</u>

My interests are:
- ☐ owner of local property
- ☐ occupier of local property
- ☐ a representative of a company/other organisation affected by the proposal
- ☐ a private citizen

The address of the property affected is _____ Postcode _____

The specific aspects of the application to which I make comment on are:

_____

_____

_____

_____

_____

_____

_____

Should the State Commission Assessment Panel conduct a public hearing for this Development Application:

I
- ☐ **wish to be heard in support of my submission**
- ☐ **do not wish to be heard in support of my submission**

(Please tick one)

By
- ☐ **appearing personally**
- ☐ **being represented by the following person:**

(Please tick one)

Date _____ Signature _____

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide SA 5001 or scapadmin@sa.gov.au.

DEVELOPMENT APPLICATION FORM

PLEASE USE BLOCK LETTERS

COUNCIL: DAC

APPLICANT: WALPOL DEVELOPMENT PTY LTD

Postal Address: c/- FUTURE URBAN GROUP

GPO BOX 2403 ADELAIDE SA 5001

Owner: WALPOL DEVELOPMENT PTY LTD

Postal Address: AS ABOVE

BUILDER: TBA

Postal Address:

Licence No:

CONTACT PERSON FOR FURTHER INFORMATION

Name: MILLY NOTT (milly@futureurbangroup.com)

Telephone: 08 8221 5511 [work] 0450 965 858 [Ah]

Fax: [work] [Ah]

EXISTING USE: RESIDENTIAL

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: CONSTRUCT 8 STOREY BUILDING, COMPRISING RESIDENTIAL & CAFE A

LOCATION OF PROPOSED DEVELOPMENT: 192 ANZAC HIGHWAY, GLANDORE GROUN

House No: 192 Lot No: 10 Street: ANZAC HIGHWAY Town/Suburb: GLANDORE FLOOR

Section No [full/part] Hundred: ADELAIDE Volume: 5070 Folio: 580

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

LAND DIVISION:

Site Area [m²] Reserve Area [m²] No of existing allotments

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

BUILDING RULES CLASSIFICATION SOUGHT: Present classification:

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]: $ 6,000,000.00

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: 29 / 5 / 2017

11 December 2017

Level 1, 89 King William Street
GPO Box 2403
Adelaide SA 5001
PH: 08 8221 5511
W: www.futureurbangroup.com
E: info@futureurbangroup.com
ABN: 34 452 110 398

Mr Brett Miller
Team Leader – CBD & Inner Metro
Development Division
Department of Planning, Transport and Infrastructure
Level 5, 50 Flinders Street
ADELAIDE SA 5000

Dear Brett,

RESPONSE TO REQUEST FOR FURTHER INFORMATION AND REFERAL COMMENTS FOR 192 ANZAC HIGHWAY, GLANDORE (DA 211/M013/17)

On behalf of our client, Walpol Development Pty Ltd, we provide the following response to correspondence received from the agencies as listed below:

- The further information request made by the Department of Planning, Transport and Infrastructure (DPTI) administration received via email on Thursday, 27 July 2017;
- DPTI Traffic Operations referral response dated Thursday, 24 August 2017;
- West Torrens Council's referral response dated Tuesday, 18 July 2017; and
- The Office of Design and Architecture South Australia's (ODASA) referral response dated Wednesday, 5 July 2017.

Specifically, the request from DPTI seeks:

1. Revised shadow diagrams at a larger scale than those originally provided, including the adjoining building footprints, private yards and allotment boundaries to clearly depict the extent and potential impact of shadow cast from the proposed development;
2. Clarification as to whether or not the glazing within the north eastern elevation behind the screens is obscured. If not, demonstration that the proposed screen element provides a sufficient level of visual privacy for adjoining dwellings;
3. Updated planning report providing an assessment against the provisions of the City of West Torrens Development Plan consolidated 30 May 2017, as the Development Lodgement fees invoice was received and paid on Tuesday, 6 June 2017;
4. Either confirmation that the applicant has an interest in, or ownership of, the adjoining allotment to the south east, which incorporates the land contained within the Right of Way, or amend the plans by way of deleting the upper level canopies and the portion of the first floor which encroaches over the common boundary;
5. Confirmation that vehicles waiting to use the vehicle lift during the evening peak will not impact on traffic movements or result in blockages to the Right of Way; and
6. Confirmation that the waste collection vehicle has sufficient overhead clearance to allow for the loading of bins.

In addition, the DPTI raised the following matters for further comment:

- clarification is sought as to the applicant's ability to legally undertake works to amend the driveway and landscaping, and to utilise the Right of Way in the manner proposed;
- extent of overlooking from upper level habitable rooms and balconies into the adjoining dwellings to the south east, south west and north east;
- level of direct sunlight to the internal living areas and balconies of the southern apartments;
- impacts of the bulk and scale of the development on adjoining low scale residential development;
- reuse of stormwater onsite; and
- impacts of traffic noise from Anzac Highway upon the proposed apartments.

The referral response from DPTI Traffic Operations raised concern in relation to the following matters:

- the one-way flow of traffic through the car parking area should be reversed to reduce the likelihood of queues forming along Anzac Highway;
- waste loading should be amended to be provided within the development to allow service vehicles to stand wholly within the site, whilst enabling simultaneous two-way traffic within the Right of Way;
- confirmation in the form of turn path diagrams to show that the largest vehicle proposed to access the subject site will be able to enter and exit in a forward direction; and
- any vegetation will be low in height, and maintain adequate driver and pedestrian sight lines.

In their referral response, West Torrens Council raised concern in relation to the following aspects of the proposal:

- A shortfall of 10 carparking spaces (a demand of 40 spaces is generated, where 30 have been provided);
- Width of carparking spaces adjacent columns (spaces should be 2.4m in width clear of columns);
- Aisle widths should be increased from 6.0 metres to 6.1 metres;
- No disabled car parking space has been provided;
- The entrance to the Right of Way should be increased to 6 metres in width;
- Further information in relation to the function of the car lifts;
- Further information in relation to how the Right of Way is to be shared with other users;
- Confirmation of waste collection arrangements, including waste truck sizes, overhead clearances and confirmation from waste collection contractors in relation to vehicle availability;
- Confirmation that servicing of the café can be undertaken with car-size vehicles;
- Confirmation that the U-turn available in the median strip opposite the subject site will not be utilised by cars leaving the subject site;
- Further detail in relation to the outlet control measures from the proposed underground detention system;
- Further confirmation of the proposed stormwater quality improvement measures;

- Consideration of inclusion of a green roof to the proposed development; and
- Landscaping does not appear to have maximised opportunities for street interaction.

Finally, ODASA's referral response identified that the following elements of the proposal would benefit from further refinement:

- the form and massing to ensure a high level amenity is provided to residents and neighbours;
- floor to ceiling height of the Ground Level;
- front setback of the building above the podium;
- side setback to the southwestern boundary;
- material selection (durability and maintenance of painted materials);
- extension of the active use space (café) and meaningful sleaving of the Ground Level car parking area;
- provision of car parking spaces for visitors; and
- amended apartment layouts to relocate doorways entries.

Our response is set out below.

RESPONSE TO DPTI RFI:

1. SHADOW DIAGRAMS

As requested, the Shadow Diagrams have been amended by Piteo Design Architects to include the adjoining building footprints, private yards and allotment boundaries to more clearly depict the extent of overshadowing from the proposed development.

These amended plans have been enclosed with this response.

With reference to Zone PDC 15, the proposed development will only marginally overshadow allotments in the neighbouring Residential Zone after 12:00 noon on the 21 June. This being the case, existing development within the Residential Zone will still receive at least three hours of direct sunlight on between 9:00am and 3:00pm on 21 June.

Whilst we acknowledge that the proposed development will overshadow adjoining properties to some degree, these properties are located within the Urban Corridor Zone where higher densities are expected to result in a higher level of overshadowing. With specific reference to the residential flat building to the south west of the subject land, it should be noted that given the minimal setback of this building from the north eastern boundary, even a three storey building (the minimum building height envisaged for Urban Corridor Zone) would result in a similar degree of overshadowing.

In light of the above, the overshadowing resulting from the subject site is considered acceptable.

2. CLARIFICATION OF GLAZING ON THE NORTHEASTERN FACADE

Piteo Design Architects have confirmed that glazing behind the screens along the north eastern façade will not be obscured. This is considered to be appropriate as the perforated metal screening (as shown on the "Materiality and Texture" drawings prepared by Piteo Design Architects) will limit external views from the windows and balconies, and minimise direct overlooking.

The privacy of the neighbouring residents will be maintained by the proposed development, as the perforated screens are particularly effective in obscuring downward views due to the angle at which one's line of sight connects with the perforated holes in the screen. Whilst being effective in minimising overlooking, the screens will also afford the prospective occupants an adequate amount of sunlight and shade, as well as an acceptable outlook.

It is clear that the screens located in front of the unobscured windows along the north eastern façade will adequately address overlooking without compromising the internal amenity of, or outlook from, the apartments within the building.

3. UPDATED PLANNING REPORT

By way of background, the proposed development was electronically submitted to the Development Assessment Commission (now the State Commission Assessment Panel) on Monday, 29 May 2017. As the relevant lodgement fees were not paid until Tuesday, 6 June 2017, the relevant version of the West Torrens Council Development Plan for procedural and assessment purposes is the one which was consolidated on Tuesday, 30 May 2017.

The Planning Report which accompanied the development application at the time of lodgement has been amended, and provided to the assessing officer.

4. CANOPIES AND FIRST FLOOR OVER RIGHT OF WAY

The proposed development has been amended to delete the canopies overhanging the Right of Way, as shown in the amended drawings prepared by Piteo Design Architects (dated Wednesday, 27 September 2017 and enclosed with this letter).

5. CONFIRMATION OF ESTIMATED VEHCILE WAIT TIMES FOR THE CAR LIFT

GTA Traffic Consultants have provided comments in relation to the estimated wait times for the two proposed car lifts. Their response is attached for your consideration.

GTA have estimated that the average waiting time for a vehicle to be serviced by either car lift is 45 seconds with an expected queue of 0.8 vehicles (including the vehicle using the car lift). Respecting this, a delay of approximately 10 seconds is likely to be experienced by users (excluding the time using the facility). In addition to the above, GTA have also estimated that there is an 81.3 percent probability that there will be no queuing associated with the car lift at any one time.

GTA consider these wait times acceptable.

6. CONFIRMATION OF OVERHEAD CLEARANCE FOR WASTE VEHICLE

GTA consultants have confirmed that a standard rear-lift refuse collection vehicle requires a clearance height of 3.4 metres, therefore the height of 3.5 metres under the roller door will be sufficient for the smaller refuse collection vehicles.

7. MATTERS FOR FURTHER COMMENT

Right of Way

As stated on the Certificates of Title for the subject land (192 Anzac Highway) and the adjoining land to the south east (190 Anzac Highway), the land marked 'A' is "free and unrestricted". Respecting this, the land is able to be utilised in the manner proposed.

Extent of overlooking to the south east, south west and north east

The proposal utilises the following techniques to minimise direct overlooking:

- apartment balconies and windows along the south eastern and south western facades have been set back from the boundaries of the site to restrict downward views into neighbouring areas of private open space;
- obscure glass has been used on windows not located behind screens along the north eastern façade; and
- sliding perforated metal screening devices have been used along the south eastern façade to maintain amenity for the prospective occupants, whilst also protecting their privacy and the privacy of the neighbouring residents.

Further, we also note that the majority of properties to the south of the subject site include extensive verandah coverage, thereby preventing overlooking from the proposed development into the majority of private open spaces.

We believe that the proposed development adequately mitigates opportunities for overlooking.

Level of sunlight to southern apartments

Despite the fact that apartments facing south east will not receive direct northern light, the apartments are perfectly positioned to take advantage of direct morning sunlight rising in the east and will enjoy ambient lighting conditions throughout the rest of day. We note that sunlight during these morning hours is important, as this is the time when most of the occupants are likely to be home.

We are of the opinion that all apartments are well positioned to allow reasonable sunlight penetration throughout parts of the day.

Impacts of bulk and scale on adjoining low scale development

The proposed development moderates its bulk and scale on the adjoining lower scale development in the following ways:

- inclusion of a clearly defined two storey podium element (with upper levels set back 2.0 metres behind the street wall) that respects the scale of the existing adjoining buildings (Zone PDC 7);
- a podium which is designed to acknowledge existing development in the locality through its material composition, parapet heights, and use of solid and glass elements (Medium and High Rise Development PDC 1);
- landscaping in the form of 'medium' trees to the Anzac Highway frontage;
- variations in building materials and form, and use of projecting elements break up the building's overall bulk (Medium and High Rise Development PDC 4);
- textured brickwork, compatible colour palette, canopies, horizontal massing and privacy screens have been used to articulate the building and create visual interest at its upper levels (Zone PDC 8 and Design and Appearance PDC 1);
- a rear setback of 3.0 metres is proposed above Level 2, where the Development Plan requires 0.0 metres (Zone PDC 18); and
- a setback of 4.65 metres is proposed along 73.4 percent (8.6 metres) of the south western boundary of the subject site.

We are of the opinion that the eight storey height proposed, and indeed, envisaged for the subject site in accordance with Zone PDC 13, will be adequately managed through the above techniques.

Stormwater Reuse

In line with Natural Resources PDC 13, the proposed development seeks to reuse water on site through the incorporation of a large detention tank. Reuse of stormwater for irrigation of the landscaped areas is not necessary for this proposal, as durable plant species have been selected which do not require frequent watering, and will easily survive on natural rainfall alone. Respecting this, we have formed the opinion that the proposal adequately reuses stormwater onsite.

Impacts of traffic noise from Anzac Highway

As the subject site is located within an area to which the 'Noise and Emissions Overlay' applies, it is accepted that levels of noise at this location will generally be higher than in local streets of a residential area.

Notwithstanding this, we note that:

- the residential levels of the building will be set back 2.0 metres behind the podium;
- the external walls of the building use a mixture of sturdy materials; and
- the proposed glazing and insulation will comfortably exceed the requirements of the National Construction Code.

DPTI TRAFFIC OPERATIONS

1. QUEUING TO ANZAC HIGHWAY

In light of the suggestion made by DPTI Traffic Operations, the one way flow of traffic through the carpark has been reversed to reduce the likelihood of queuing affecting Anzac Highway. Further, GTA have identified that the distance between the entrance to the car lift and the car park access gate is approximately 12 metres, and considered sufficient to accommodate two waiting vehicles. In addition, there is adequate space for approximately five vehicles between the car lift and the Anzac Highway boundary. GTA have estimated that the probability of having five vehicles in a queue is in the order of 0.02 percent, and the probability of having more than five vehicles in a queue is in the order of 0.004 percent, therefore highly unlikely.

GTA consider the likelihood of queuing extending to Anzac Highway as very low.

2. WASTE COLLECTION

DPTI Traffic Operations have raised concerns in relation to the proposed waste collection arrangement resulting in the Right of Way being restricted to one lane during collection times. GTA have confirmed that they are comfortable with the proposal, as traffic volumes associated with the site are anticipated to be very low, and the first 6.0 metres of the driveway will remain to be two-way. GTA advise that the site will still operate in accordance with clause 3.2.2 of AS/NZ 2890.1.

GTA have undertaken a calculation of conflict in accordance with Austroad's Guide to Traffic Management to determine the likelihood of a conflict occurring as a result of this waste collection arrangement. This calculation (as detailed in GTA's response) identified that the likelihood of a conflict is 0.012 percent or 1 in 8476. This very low probability means that it is very unlikely that a conflict will occur between the two-way traffic.

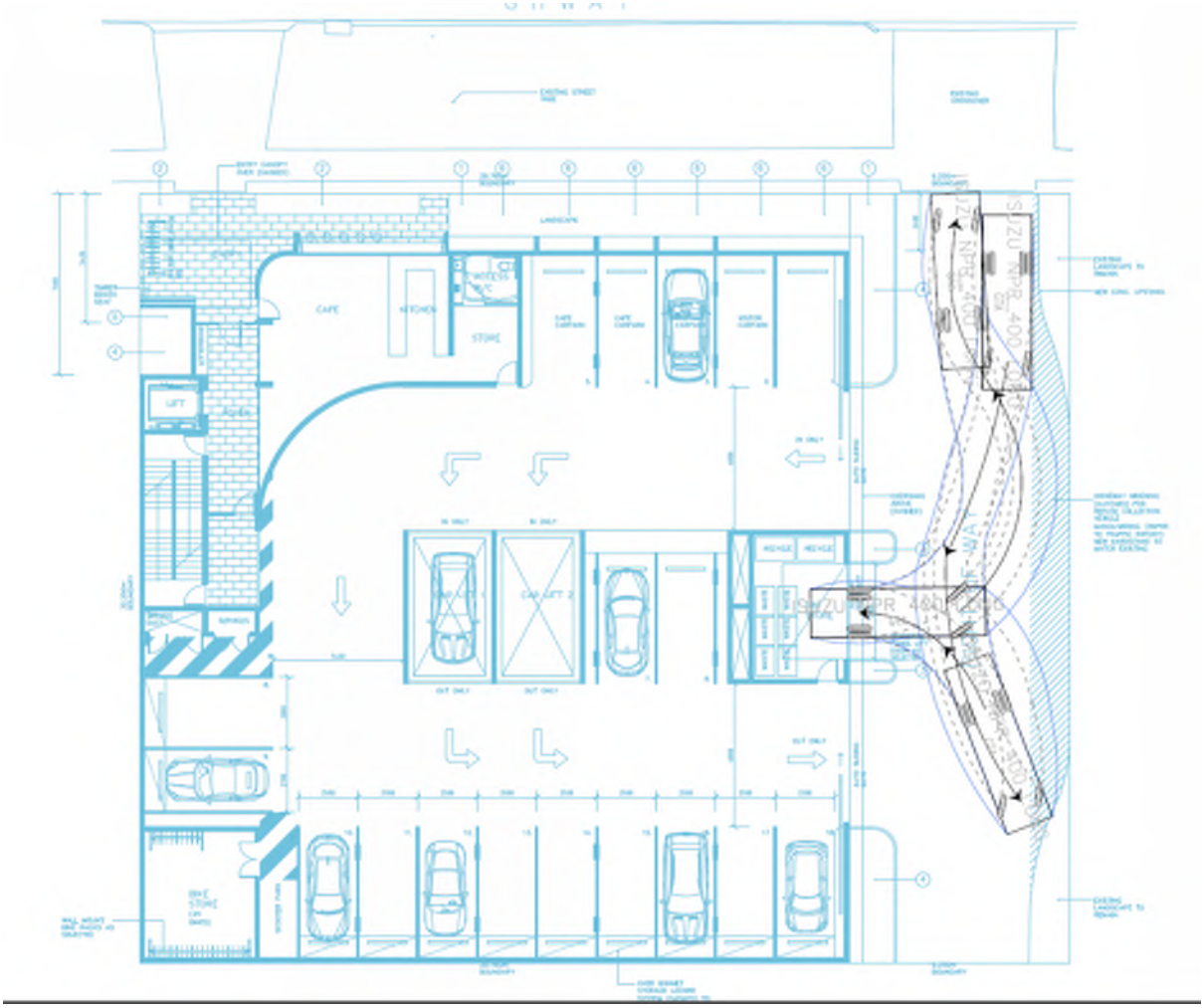
It is noted that this calculation is conservative and based on PM peak hour traffic. Further, GTA note that the conflict will only occur between vehicles entering the site, and the vehicles exiting 190 Anzac Highway, as vehicles exiting the subject site will be able to do so directly to Anzac Highway via the north eastern exit.

GTA consider that the proposed waste collection arrangement is acceptable.

3. CONFIRMATION VEHICLE MOVEMENTS

The largest vehicle proposed to access the subject site will be a 7.4 metre waste vehicle. The turning diagrams for this vehicle were provided in Figure 6.1 of the GTA Transport Impact Assessment provided to DPTI (dated 24 May 2017). This diagram has been extracted from the report and included overleaf for clarity. It clearly shows that a waste collection vehicle of 7.4 metres in length will be able to access and exit the site in a forward direction.

Figure 1 – *Turning path diagram for a 7.4 metre waste collection vehicle (prepared by GTA Traffic Consultants).*



4. LANDSCAPING

The landscaping proposed to be planted within close proximity to the crossover will be low-height shrubs such as "Lomandra Tanika" as indicated on the Ground Level floor plan prepared by Piteo Design Architects. These shrubs are anticipated to maintain adequate pedestrian and driver sightlines as noted by DPTI Traffic Operations.

COUNCIL REFERRAL RESPONSE

1. TRAFFIC

In their referral response, Council raised a number of concerns in relation to the proposed traffic arrangements. In light of these concerns, changes have been made to the proposed car park layout and site access. These changes include increasing the width of carparking spaces adjacent columns to 2.4 metres (clear of columns) and the aisle widths to 6.1 metres. These amendments have been shown on the updated plans enclosed with this response.

Council also questioned the feasibility of the proposed car lift arrangement. GTA have advised that the proposal will comfortably facilitate the two car lifts provided based on the specifications of the two different systems (Wohr and Nordic Elevators) available in Australia.

Council's Traffic Consultant, Mr Frank Siow noted that the proposed development has a shortfall of 10 car parking spaces, as the Development Plan car parking rate generates a demand for 50 spaces and 40 spaces had been provided. Further, no car parking spaces for people living with a disability were provided.

The theoretical car parking demand is divided as follows:

- 24 spaces for 2 bedroom apartments;
- 15 spaces for 3 bedroom apartments;
- 9 spaces for visitors; and
- 2 spaces for the café.

Through internal re-arranging of the car park, one additional car parking space has been provided on the second level for use by residents (and shown on the amended plans enclosed). The proposed development now allocates its 41 car parking spaces as follows:

- 37 spaces for the residential apartments (23 spaces on Level 1 and 14 spaces at Ground Level);
- two visitor spaces; and
- two spaces for the café.

This results in a shortfall of two resident spaces, and seven visitor spaces (nine in total). GTA previously provided advice that this shortfall in car parking spaces would not have an adverse impact on the traffic network for the following reasons:

- car parking spaces for the café and the residential visitors is able to be shared, as their peak times are complementary;
- on-street parking availability in Anzac Highway, Stuart Street and Beckman Street is high; and
- the subject site is within close proximity of frequent public transport services.

Council has formed the opinion that these three justifications for the car parking shortfall are not relevant. GTA stand by their previous comments, and have provided further justification in their response to Council (enclosed).

We summarise GTA's response below:

- Anzac Highway is serviced by a number of routes combining to provide a high frequency service (GoZone) with buses operating every 10-15 minutes during weekdays, every 30-60 minutes in the evenings, and every 15-60 minutes on the weekends;
- Beckman Street also includes public transport operating every 30 minutes on weekdays, and every 60 minutes in the evenings and weekends;
- The Adelaide to Glenelg tram line in located within 500 metres (less than 10 minutes walk) of the subject site and provides the most consistent and frequent public transport route (every 5-15 minutes during the day and every 20 minutes in the evenings);

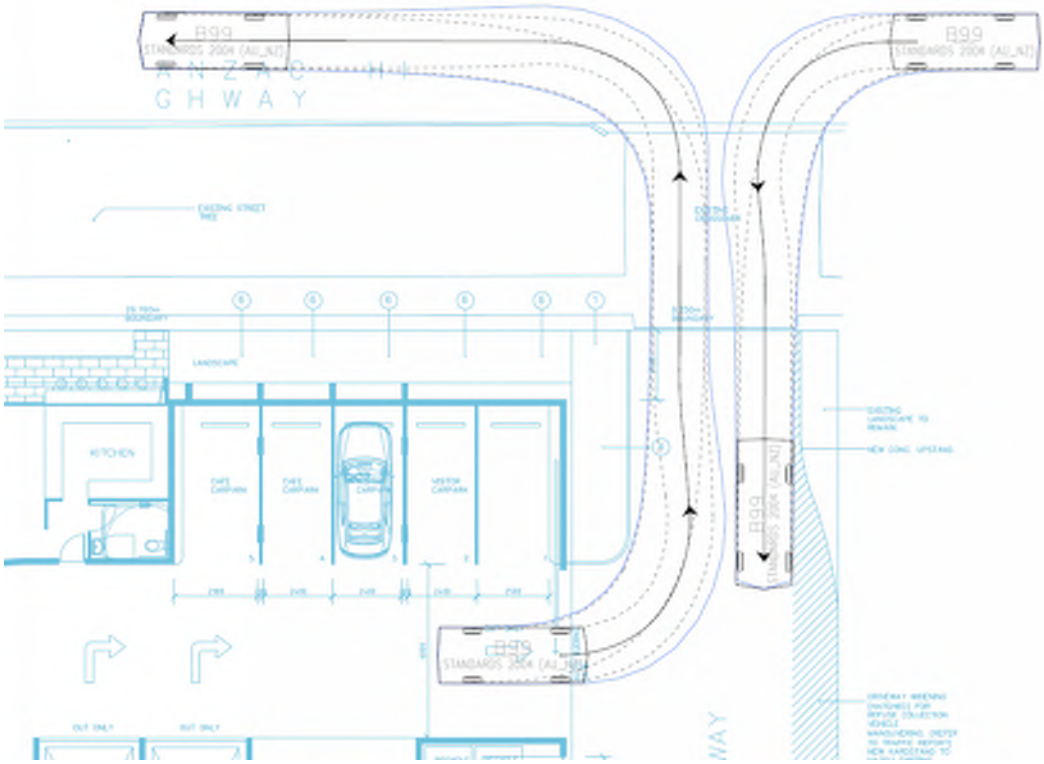
- The 30 Year Plan for Greater Adelaide 2017 specifies that "*walking catchments to fixed line transit stations should generally be within 800 metres*", therefore as the subject site is within 500 metres, it is considered to be an acceptable distance from the tram line;
- Following a car parking survey, GTA concluded that on-street parking demands on weekends and evenings are very low at only about 13 percent capacity, leaving around 56 on-street parking spaces available within close proximity of the subject site; and
- It is noted that the intention of the Urban Corridor Zone, within the context of the 30 Year Plan for Greater Adelaide, is to encourage less reliance on the use of the private car and increased use of alternate modes of transport such as walking, cycling and public transport.

GTA believes that the availability of two high frequency public transport options and the capacity of local on-street parking adequately offsets the parking shortfall of 9 car parking spaces, and is in keeping with the desired character of the Urban Corridor Zone.

GTA have also concluded that car parking spaces for people living with a disability are not required under the Building Code of Australia (BCA) for residential developments. Given the nature of the proposal, they have also advised that there will not likely be a demand for disabled car parking spaces.

Council also suggested that the width of the crossover to Anzac Highway be increased to 6.0 metres from its current width of 5.95 metres. GTA have not considered this necessary in this instance, as the existing width of the driveway is only marginally less than that which is envisaged and importantly, the crossover will still be of sufficient width to allow the simultaneous entry/exit of two vehicles. A diagram showing this movement has been extracted from the GTA report, and is included below.

Figure 2 – *Turning path diagram showing the simultaneous entry/exit movement of vehicles (prepared by GTA Traffic Consultants).*



GTA have also provided commentary in relation to the presence of the median opening opposite the site access. GTA have confirmed that due to the design of the median opening and regularity of traffic lights along Anzac Highway resulting in large gaps in traffic, south-west bound vehicles and those exiting the subject site are able to safety access the median opening and position themselves in the same way as a U-turn vehicle would.

GTA note that if this median opening were to be closed, this would affect the capacity of the intersection and potentially encourage drivers to undertake a U-turn at the traffic lights or make other unsafe manoeuvres.

GTA have also formed the opinion that north-east bound traffic using the median opening to complete a U-turn (or enter the proposed development) is a safety hazard. To overcome this issue, GTA suggest that the median opening be restricted to "No right turn or U-turn" for north-east bound traffic, and allow only south-west bound traffic, and vehicles exiting the subject site to utilise the median opening.

2. RIGHT OF WAY

Council have raised concerns as to the legal right of the applicant to use the Right of Way in the manner which is proposed. As mentioned above, the Right of Way (the land marked "A" on the certificate of title) is "free and unrestricted", and therefore is able to be utilised in the proposed way.

3. WASTE

Council have raised concern in relation to the feasibility of the proposed waste arrangement, with specific reference to the availability of the truck size proposed and the overhead clearances required for these vehicles.

GTA have confirmed that a due to the nature of the site, a standard waste collection vehicle (of 8.8 metres in length) can not be accommodated on-site, however smaller trucks (with smaller turning circles) are available from a number of contractor fleets such as Jeffries, East Waste and Solo Resource Recovery. GTA have advised that availability of these vehicles for all waste streams is only expected to increase, and as such, they are comfortable that the proposed waste arrangement is feasible for all waste streams.

4. CAFÉ SERVICING

Council suggested that servicing of the café should be restricted to "car-sized" vehicles only, to ensure that servicing can occur via the nominated café parking spaces. In light of this suggestion, GTA have confirmed that due to the size of the café, deliveries will be able to occur via light vehicles.

5. STORMWATER ARRANGEMENTS

Council raised concern in relation to the proposed stormwater outlet control measures and water quality improvements. MLEI Consulting Engineers have reviewed their initial advice, and provided the following additional comments:

- An "Ecosol Storm Pit 10L (Class 2)" filtration system will be installed to treat the water to a quality design standard specified in the State Government's Water Sensitive Urban Design Policy;
- A 10,000L capacity "DRAINWELL subsurface water management system" to achieve the required detention volume, based on the Council requirement of a pre-development runoff coefficient of 0.25;

- An 80.2mm diameter orifice plate will be installed at the outlet of the underground tank system to restrict flows to the calculated allowable discharge of 7.59L/s; and
- Water exiting the detention tank will enter a pump sump, and be pumped to a proposed junction box, where it is finally conveyed to a street kerb outlet on Anzac Highway.

We trust that the above information is adequate to resolve Council's concerns.

6. LANDSCAPING

Council have expressed that they do not believe the proposed landscaping maximises opportunities for street interaction. Further they believe that the proposed development presents a "great opportunity" to provide a green roof.

The landscaping, including a combination of trees, low-lying shrubs and grasses, and paved pathways connecting to the existing footpath, in our opinion, achieves the following:

- complements the built form, reduces the visual impact of the building, and enhances the appearance of the road frontages, adds to pedestrian amenity, minimises hard paved surfaces, and achieves a range of passive ESD initiatives (Landscaping, Fences and Walls PDC 1);
- the proposal includes six Chinese Pistachio trees along the northern boundary (adjacent Anzac Highway). These trees are classified as "medium trees" due to their potential height of up to 12 metres and canopy spread of up to 8 metres (Medium and High Rise Development PDC 23 and PDC 24); and
- 10 percent of the subject site is to be landscaped (Landscaping, Fences and Walls PDC 4).

It is clear that the landscaping proposed is appropriate.

We note that the inclusion of a green roof is "encouraged" for all new mixed use buildings. Whilst this option was explored by the applicant, it was not economically feasible.

ODASA REFERRAL RESPONSE

1. REVIEW OF FORM AND MASSING

In their referral response, ODASA express the view that the form and massing of the proposal requires further refinement to ensure a high level of amenity for future residents and neighbours.

We are of the opinion that the proposed development will achieve design excellence and a high level of amenity for the following reasons:

- along with creating activity by attracting residents, the community and visitors to the site, the proposed café, use of glazing and landscaping will assist in creating a human scale and a high pedestrian amenity (Design and Appearance PDC 16);
- a rear setback of 3 metres from Level 2 and above is included where a setback of nil is envisaged, (Zone PDC 18) so as to reduce the impact of the development on properties to the south east and "future proof" the amenity of future occupants of the proposed building;

- this human scale is further enhanced through the inclusion of variations in materials and form, building projections and elements that provide shelter. These also assist in breaking up mass and create a visually interesting building (Medium and High Rise Development PDC 4);
- textured brickwork, compatible colour pallets, canopies, horizontal massing and privacy screens have been used to articulate the building and create visual interest, whilst also assisting in reducing the overall massing of the development (Zone PDC 8 and Design and Appearance PDC 1);
- the building has been designed to respect the existing development in the locality through material selection, parapet heights, and the use of solid and glass (Medium and High Rise Development PDC 1);
- windows, balconies, and canopies have been located on all sides of the building to create a sense of depth (Medium and High Rise Development PDC 3);
- balconies have been adequately separated to achieve a high standard of internal amenity, located to provide ample sunlight/shading to the internal and external living areas (Medium and High Rise Development PDC 14);
- the proposed building height of eight storeys or 27.3 metres is envisaged by Zone PDC 13, and further, consultation has been undertaken with Adelaide Airport who have confirmed that the proposed building height will not impact upon airport operations; and
- high quality landscaping has been provided to the Anzac Highway façade of the development in order to complement the built form, reduce the visual impact of the building, and enhance the appearance of the road frontages. Further, the proposed landscaping will add to pedestrian amenity, minimise hard paved surfaces, and achieve a range of passive ESD initiatives (Landscaping, Fences and Walls PDC 1).

We believe it is clear that the proposed development has adequately addressed the relevant provisions in relation to form and massing.

2. FLOOR THE CEILING HEIGHT OF GROUND LEVEL

ODASA identified that the Ground Level floor to ceiling height of 3 metres is significantly less than the 4.5 metre minimum ground level height envisaged by the Development Plan. The floor the ceiling height at Ground Level has been increased to the envisaged height which resolves this concern.

3. FRONT SETBACK ABOVE PODIUM

ODASA noted that the setback of the upper storeys behind the podium was less than the 2 metres envisaged by the Development Plan. In light of these concerns, the applicant has sought to increase this setback to the required 2 metres.

Whilst the front setback of 2.4 metres at Ground Level remains short of the 3 metres envisaged by Zone PDC 16, we have formed the opinion that the setback achieves the intended outcomes of this provision. Specifically, the proposed setback achieves the following:

- assists in reducing the bulk and scale of the development on the pedestrian scale and amenity;
- allows sufficient space for meaningful landscaping to further assist in breaking up the bulk of the proposed building; and

- allows adequate space for interaction between the café and pedestrians on the footpath.

We believe that the front setback is acceptable in this instance.

4. SIDE SETBACK

ODASA advised that the encroachment of the lift and stair core into the envisaged side setback along the south-western boundary was not supportable due to its location adjacent existing residential properties.

The proposed development has been amended to reduce the extent of boundary development from approximately 11 metres, to 8.6 metres. The remainder of the building will be setback 4.65 metres, in excess of the 3 metre side setback envisaged.

Whilst the applicant sought to move this core off the boundary completely, it resulted in less efficient movements within the car parking areas and a setback of nil along the length of the rear boundary. Whilst no minimum rear setback is envisaged for development on the subject site (Zone PDC 18), this outcome is clearly less than ideal for neighbours of existing dwellings and future occupants of the proposed building.

Further, it is also noted that setting back the lift core and stairs 3 metres will result in a negligible change to overshadowing.

It is considered that the reduced length of the boundary development and additional setback of the building beyond the 3 metres envisaged along the south western boundary, is an acceptable outcome.

5. MATERIAL SELECTION

Upon receipt of ODASA's advice in relation to the durability and maintenance of painted materials, the applicant has removed these from the proposal. The material selection now includes only non-painted and robust materials which require little to no ongoing maintenance.

6. EXTENSION OF THE ACTIVE USE SPACE

ODASA supported the provision of an active use at Ground Level, however requested that the café layout be reviewed in order to maximise the amount of the visually permeable frontage. The applicant has adopted this suggestion, and included a servery to the front façade. This enables more than 50 percent of the ground floor frontage to become visually permeable, and will assist in further activating the subject site.

7. PROVISION OF CAR PARKING SPACES

ODASA also raised concern in relation to the shortfall of car parking spaces. This matter has been addressed above.

8. APARTMENT LAYOUTS

ODASA noted that the apartment layouts included doorways opposite one another, which does not reflect good practice in apartment living. In considering these comments, the applicant sought to amend the locations of the doorways, however it was determined that this would negatively impact the kitchen layouts and build efficiency.

Whilst not necessarily best practise, it is considered that the doorways in their proposed locations will not adversely impact the amenity of the apartments or hallways, and as such, are considered acceptable.

CONCLUSION

We trust that this submission adequately addresses the request for further information and responds appropriately to the issues raised.

In addition, we wish to confirm that the Applicant accepts the Department's determination that the proposal involves a Category 2 form of development for the purposes of public notification.

Should you wish to discuss any of the matters above further, you may contact the undersigned on (08) 8221 5511 or 0450 965 858.

Yours Sincerely

Milly Nott
Urban Planner

Encl. Amended Plans
GTA Response
MLEI Response

DRAWING SCHEDULE

FOR DEVELOPMENT PLAN CONSENT

project no.

drawing no.

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	20/04/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN
ARCHITECTS

01 Location

SITE ANALYSIS

project no.

drawing no.

PROPOSED MULTI-STOREY APARTMENT BUILDING DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO AND MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS SHOWN
issue date	30/01/2017
Revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN ARCHITECTS

02 Existing Site

project no.

drawing no.

PROPOSED MULTI-STOREY APARTMENT BUILDING DEVELOPMENT

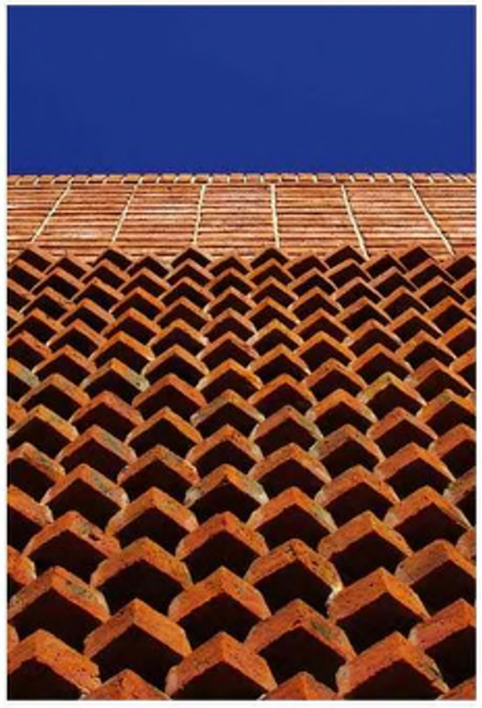
ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO AND MARIA POLYMENEAS

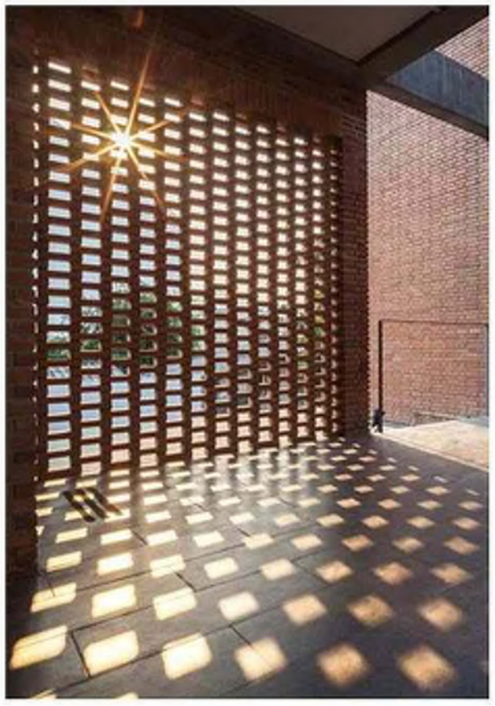
drawn	AC
checked	PP
scale	AS SHOWN
issue date	30/01/2017
Revision	

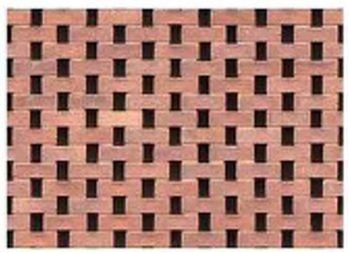
Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

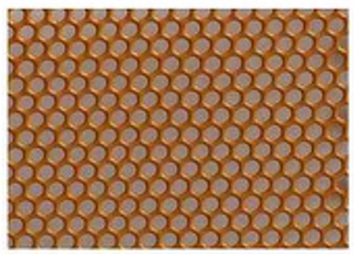
PITEODESIGN
ARCHITECTS







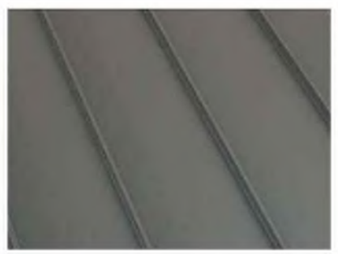
brick



perforated metal

clear glass

precast concrete



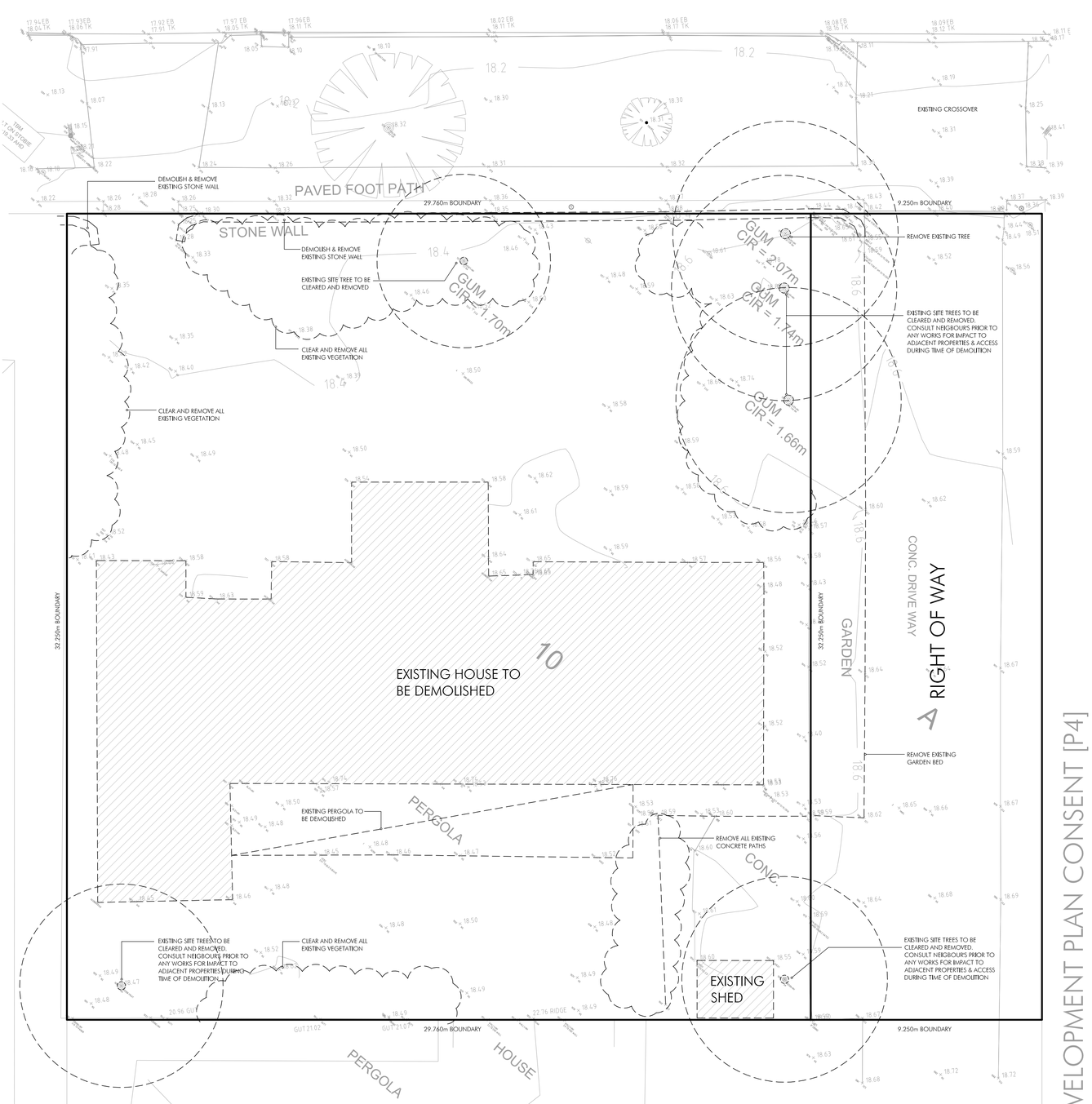
metal profile cladding

03 Materiality & Texture

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN
ARCHITECTS

SITE LOCTAION PLAN
1:250 @ A1, 1:500 @ A3



DEMOLITION PLAN
1:100 @ A1, 1:200 @ A3

FOR DEVELOPMENT PLAN CONSENT [P4]

project no.

drawing no. PA-00

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	20/04/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN ARCHITECTS

ANZAC HIGHWAY

1 LOMANDRA TANIKA

2 DANIELLA CAERULEA 'LITTLE JESS'

3 WESTRINGIA FRUTICOSA 'MUNDI'

4 PINNACLE SYZYGIUM AUSTRALE

5 WESTRINGIA 'AUSSIE BOX'

6 CHINESE PISTACHIO

PROPOSED GROUND LEVEL FLOOR PLAN
1:100 @ A1, 1:200 @ A3

AREAS- GROUND LEVEL	
CAFE/ TENANCY	68.60 sqm
FOYER/ STAIRS/ LIFT	57.86 sqm
CARPARK	729.50 sqm
TOTAL	855.96 sqm
TOTAL SITE AREA	959.76 sqm

AREAS- FIRST LEVEL	
FOYER/ STAIRS/ LIFT	21.70 sqm
CARPARK	835.40 sqm
TOTAL	857.10 sqm

AREAS- SECOND LEVEL	
APARTMENT 1	95.90 sqm
APARTMENT 2	95.10 sqm
APARTMENT 3	100.86 sqm
APARTMENT 4	96.12 sqm
APARTMENT 5	95.10 sqm
APARTMENT 6	100.86 sqm
COMMON/ STAIRS/ LIFT	75.43 sqm
TOTAL FLOOR AREA	659.37 sqm
* apartment areas include balconies	

SCHEDULE OF AREAS	
GROUND FLOOR	855.96 sqm
FIRST FLOOR	857.10 sqm
SECOND FLOOR	659.37 sqm
THIRD FLOOR	659.37 sqm
FOURTH FLOOR	659.37 sqm
FIFTH FLOOR	659.37 sqm
SIXTH FLOOR	659.37 sqm
SEVENTH FLOOR	659.37 sqm
TOTAL FLOOR AREA	5669.28 sqm
TOTAL SITE AREA	959.76 sqm
TOTAL APARTMENTS	36
TOTAL CARPARKS	41

DEVELOPMENT PLAN CONSENT RFI [P7]

project no.

drawing no. PA-01

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

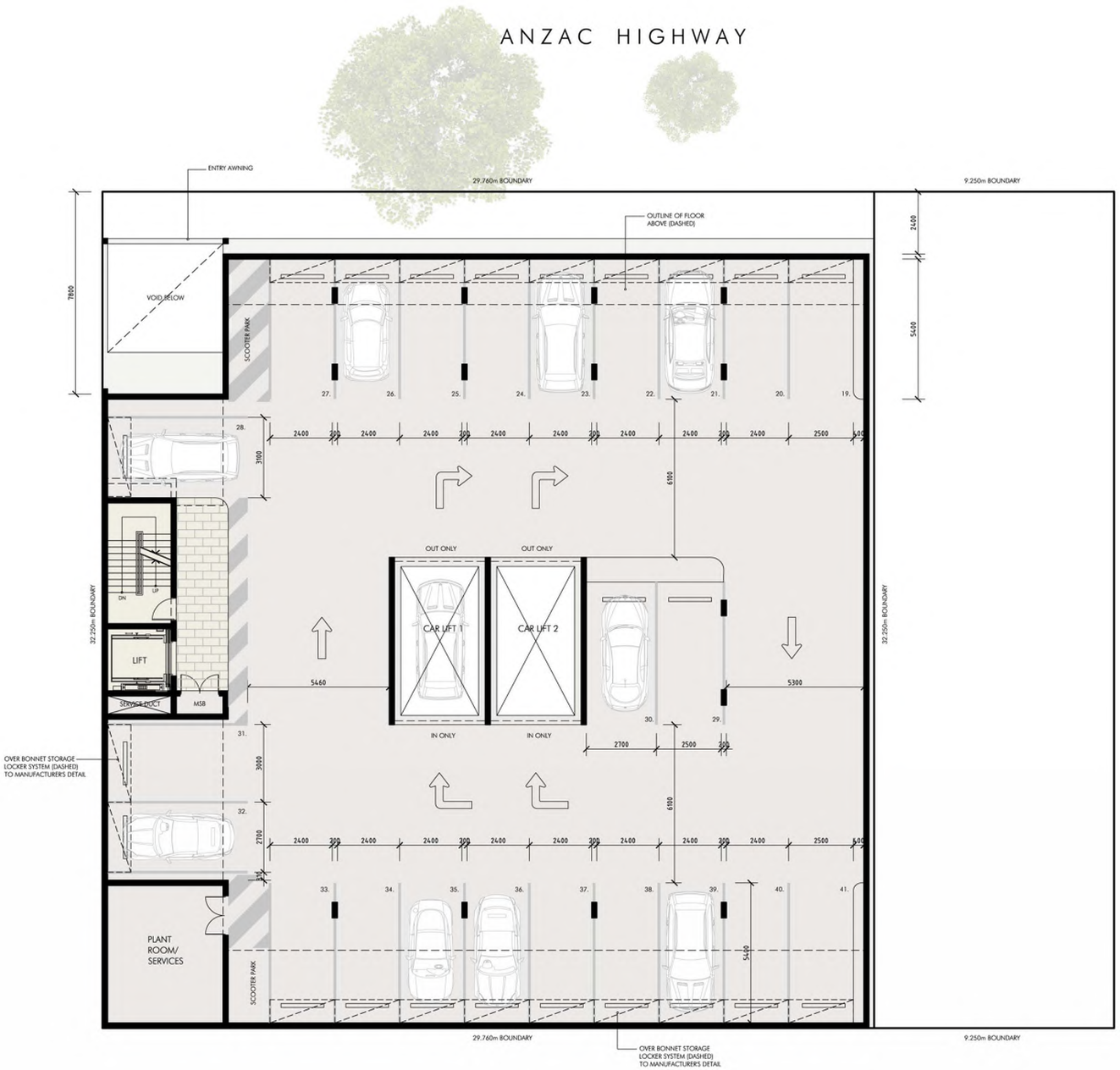
ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN ARCHITECTS



FIRST LEVEL FLOOR PLAN

1:100 @ A1, 1:200 @ A3

AREAS- GROUND LEVEL	
CAFE/ TENANCY	68.60 sqm
FOYER/ STAIRS/ LIFT	57.86 sqm
CARPARK	729.50 sqm
TOTAL	855.96 sqm
TOTAL SITE AREA	959.76 sqm

AREAS- FIRST LEVEL	
FOYER/ STAIRS/ LIFT	21.70 sqm
CARPARK	835.40 sqm
TOTAL	857.10 sqm

AREAS- SECOND LEVEL	
APARTMENT 1	95.90 sqm
APARTMENT 2	95.10 sqm
APARTMENT 3	100.86 sqm
APARTMENT 4	96.12 sqm
APARTMENT 5	95.10 sqm
APARTMENT 6	100.86 sqm
COMMON/ STAIRS/ LIFT	75.43 sqm
TOTAL FLOOR AREA	659.37 sqm
* apartment areas include balconies	

SCHEDULE OF AREAS	
GROUND FLOOR	855.96 sqm
FIRST FLOOR	857.10 sqm
SECOND FLOOR	659.37 sqm
THIRD FLOOR	659.37 sqm
FOURTH FLOOR	659.37 sqm
FIFTH FLOOR	659.37 sqm
SIXTH FLOOR	659.37 sqm
SEVENTH FLOOR	659.37 sqm
TOTAL FLOOR AREA	5669.28 sqm
TOTAL SITE AREA	959.76 sqm
TOTAL APARTMENTS	36
TOTAL CARPARKS	41

DEVELOPMENT PLAN CONSENT RFI [P7]

project no.

drawing no. PA-02

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

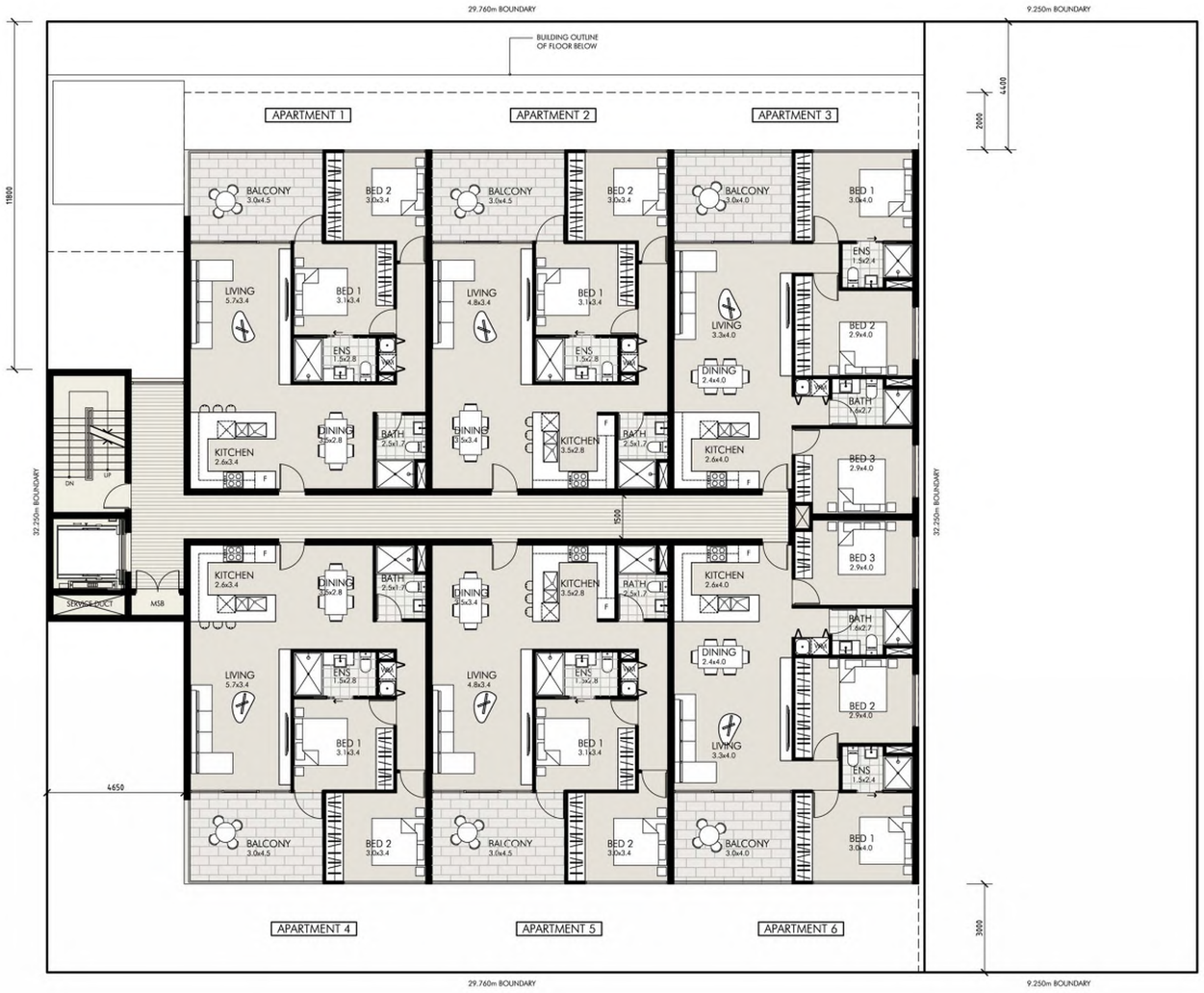
drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN ARCHITECTS

ANZAC HIGHWAY



LEVEL 2-7 FLOOR PLAN- APARTMENTS

1:100 @ A1, 1:200 @ A3

AREAS- GROUND LEVEL	
CAFE/ TENANCY	68.60 sqm
FOYER/ STAIRS/ LIFT	57.86 sqm
CARPARK	729.50 sqm
TOTAL	855.96 sqm
TOTAL SITE AREA	959.76 sqm

AREAS- FIRST LEVEL	
FOYER/ STAIRS/ LIFT	21.70 sqm
CARPARK	835.40 sqm
TOTAL	857.10 sqm

AREAS- SECOND LEVEL	
APARTMENT 1	95.90 sqm
APARTMENT 2	95.10 sqm
APARTMENT 3	100.86 sqm
APARTMENT 4	96.12 sqm
APARTMENT 5	95.10 sqm
APARTMENT 6	100.86 sqm
COMMON/ STAIRS/ LIFT	75.43 sqm
TOTAL FLOOR AREA	659.37 sqm
* apartment areas include balconies	

SCHEDULE OF AREAS	
GROUND FLOOR	855.96 sqm
FIRST FLOOR	857.10 sqm
SECOND FLOOR	659.37 sqm
THIRD FLOOR	659.37 sqm
FOURTH FLOOR	659.37 sqm
FIFTH FLOOR	659.37 sqm
SIXTH FLOOR	659.37 sqm
SEVENTH FLOOR	659.37 sqm
TOTAL FLOOR AREA	5669.28 sqm
TOTAL SITE AREA	959.76 sqm
TOTAL APARTMENTS	36
TOTAL CARPARKS	41

DEVELOPMENT PLAN CONSENT RFI [P7]

project no.

drawing no. PA-03

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

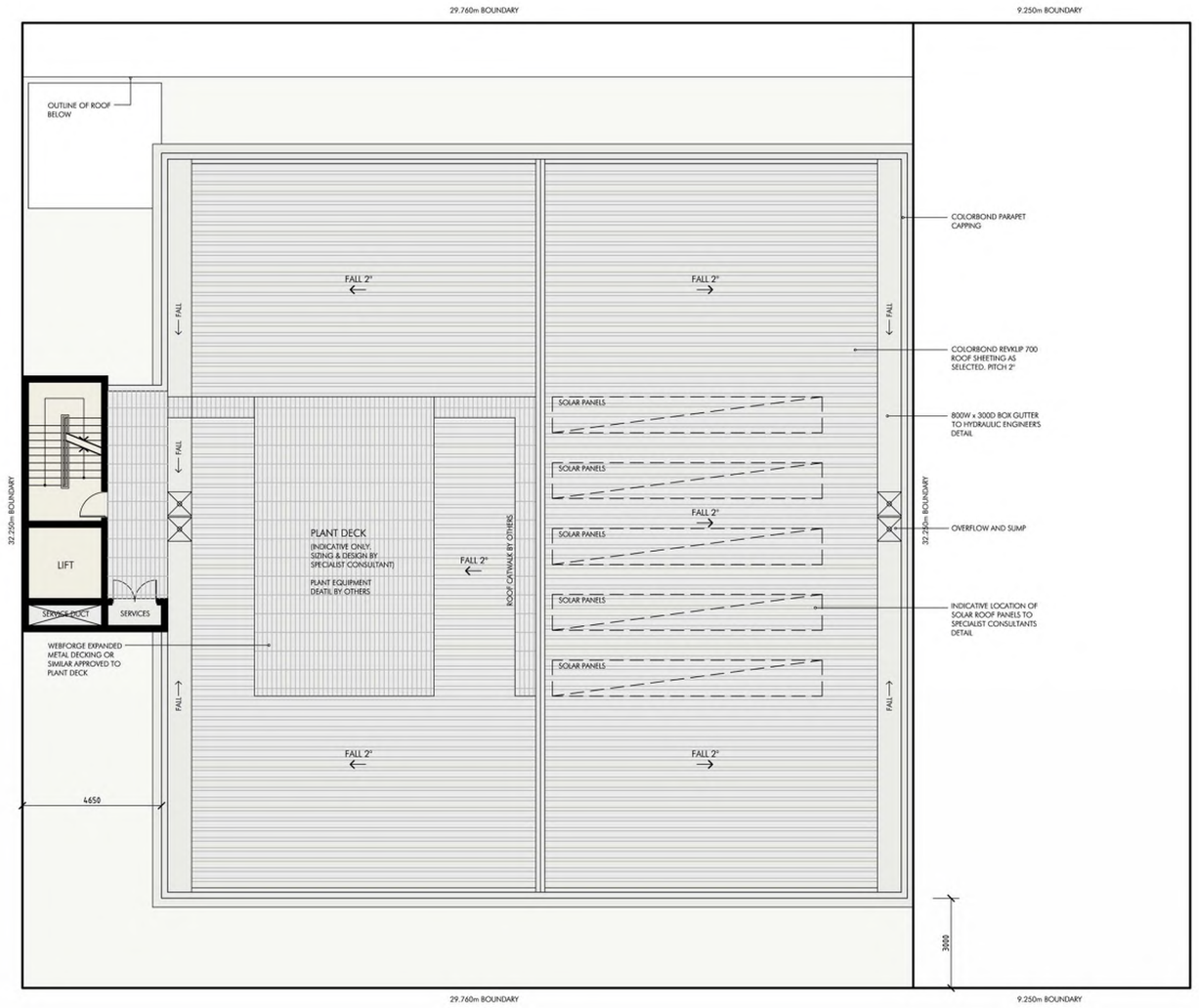
drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN ARCHITECTS

ANZAC HIGHWAY



ROOF PLAN
1:100 @ A1, 1:200 @ A3

DEVELOPMENT PLAN CONSENT RFI [P7]

project no.

drawing no.
PA-04

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN
ARCHITECTS

NORTH-WEST ELEVATION
1:100 @ A1, 1:200 @ A3

NORTH-EAST ELEVATION
1:100 @ A1, 1:200 @ A3

WALL FINISHES LEGEND & NOTES

PC	PRE-CAST CONCRETE BRICK VENEER PANEL. CLASS 1 FINISH. TBC
CM	'CEMINTEL SURROUND' WALL CLADDING. COLOUR- BASE BLACK NATURAL FINISH AS SELECTED. TBC
AX	JAMES HARDIE- SCYON AXON SMOOTH 133mm VERTICAL WALL CLADDING SYSTEM, INSTALLED TO MANUFACTURER'S DETAILS. PAINT FINISH AS SELECTED
Fb	FACE BRICK AS SELECTED
BR	HIT AND MISS FACE BRICK 'BREEZE WALL' AS SELECTED. INSTALLED TO MANUFACTURERS DETAILS
RD	RENDERED FINISH TO BLOCKWORK AS SELECTED. PAINT FINISH
TB	TIMBER COMPOSITE BATTEN SCREENING AS SELECTED. TBC
MC	'COR-TEN' STEEL CLADDING AS SELECTED
MP	'LOCKER GROUP WOVEN WIRE PERFORATED METAL SCREEN SLIDING PANELS AS SELECTED. INSTALLED TO MANUFACTURER'S DETAILS
B1	SEMI-FRAMELESS GLASS BALUSTRADE 1000mm HIGH AFL, INSTALLED TO MANUFACTURER'S DETAILS
OB	OBSCURE GLAZING 1700mm AFL MINIMUM UNO.

DEVELOPMENT PLAN CONSENT RFI [P7]

project no.

drawing no. PA-05

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN ARCHITECTS

SOUTH-EAST ELEVATION
1:100 @ A1, 1:200 @ A3

SOUTH-WEST ELEVATION
1:100 @ A1, 1:200 @ A3

WALL FINISHES LEGEND & NOTES	
PC	PRE-CAST CONCRETE BRICK VENEER PANEL. CLASS 1 FINISH. TBC
CM	CEMINTEL 'SURROUND' WALL CLADDING. COLOUR- BASE BLACK NATURAL FINISH AS SELECTED. TBC
AX	JAMES HARDIE- SCYON AXON SMOOTH 133mm VERTICAL WALL CLADDING SYSTEM, INSTALLED TO MANUFACTURER'S DETAILS. PAINT FINISH AS SELECTED
Fb	FACE BRICK AS SELECTED
BR	HIT AND MISS FACE BRICK 'BREEZE WALL' AS SELECTED. INSTALLED TO MANUFACTURERS DETAILS
RD	RENDERED FINISH TO BLOCKWORK AS SELECTED. PAINT FINISH
TB	TIMBER COMPOSITE BATTEN SCREENING AS SELECTED. TBC
MC	'COR-TEN' STEEL CLADDING AS SELECTED
MP	'LOCKER GROUP WOVEN WIRE PERFORATED METAL SCREEN SLIDING PANELS AS SELECTED. INSTALLED TO MANUFACTURER'S DETAILS
B1	SEMI-FRAMELESS GLASS BALUSTRADE 1000mm HIGH AFL. INSTALLED TO MANUFACTURERS DETAILS
OB	OBSCURE GLAZING 1700mm AFL MINIMUM UNO.

DEVELOPMENT PLAN CONSENT RFI [R7]

project no.

drawing no.
PA-06

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	19/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN
ARCHITECTS

PROPOSED STREETSCAPE ELEVATION

1:100 @ A1, 1:200 @ A3

DEVELOPMENT PLAN CONSENT - [P7]

project no.

drawing no. PA-07

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN
ARCHITECTS

june 21 - 9am

june 21 - 10am

SHADOW DIAGRAMS - JUNE 21 [P4]

project no. 1701

drawing no. PA-08

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

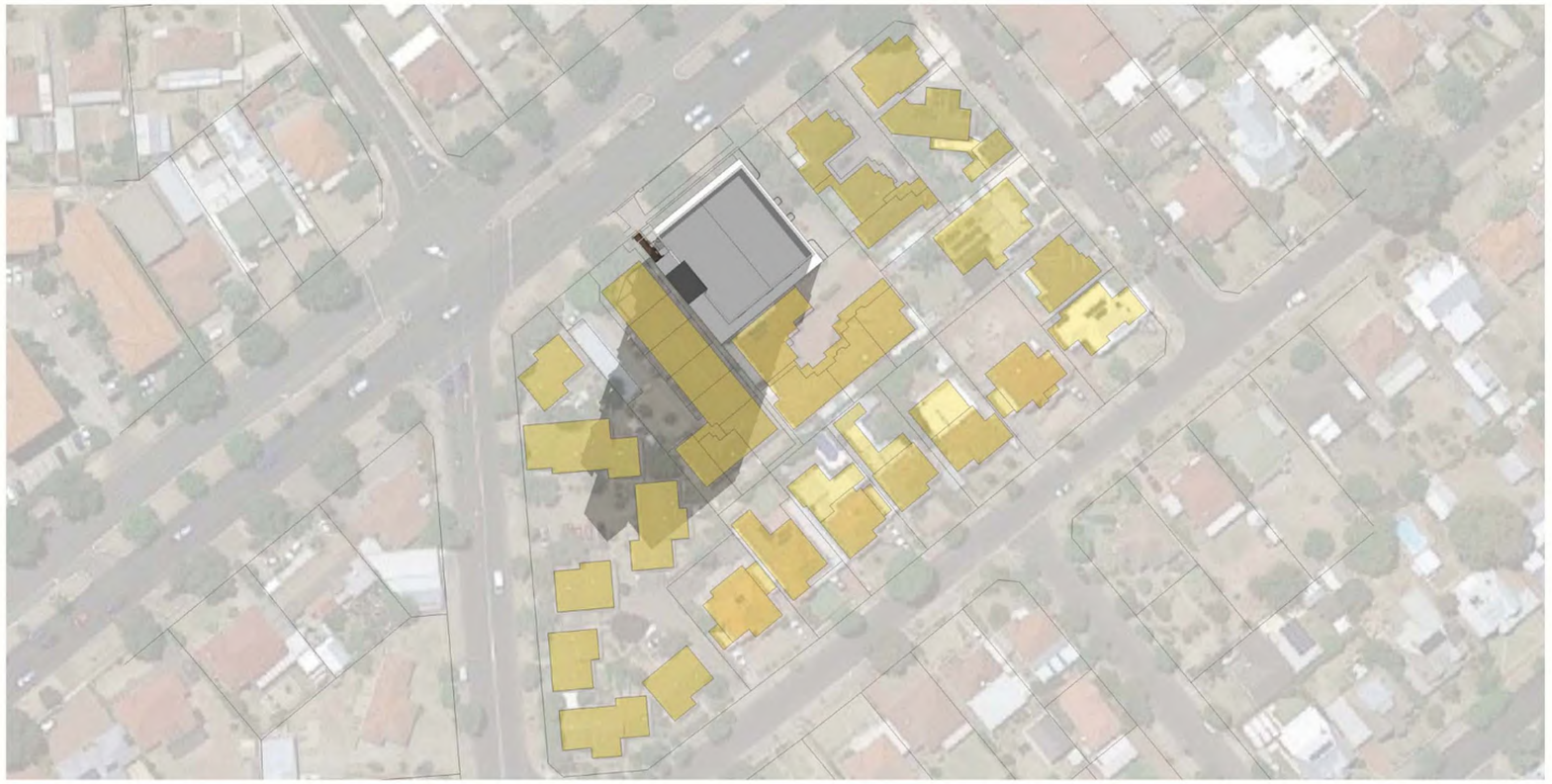
ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

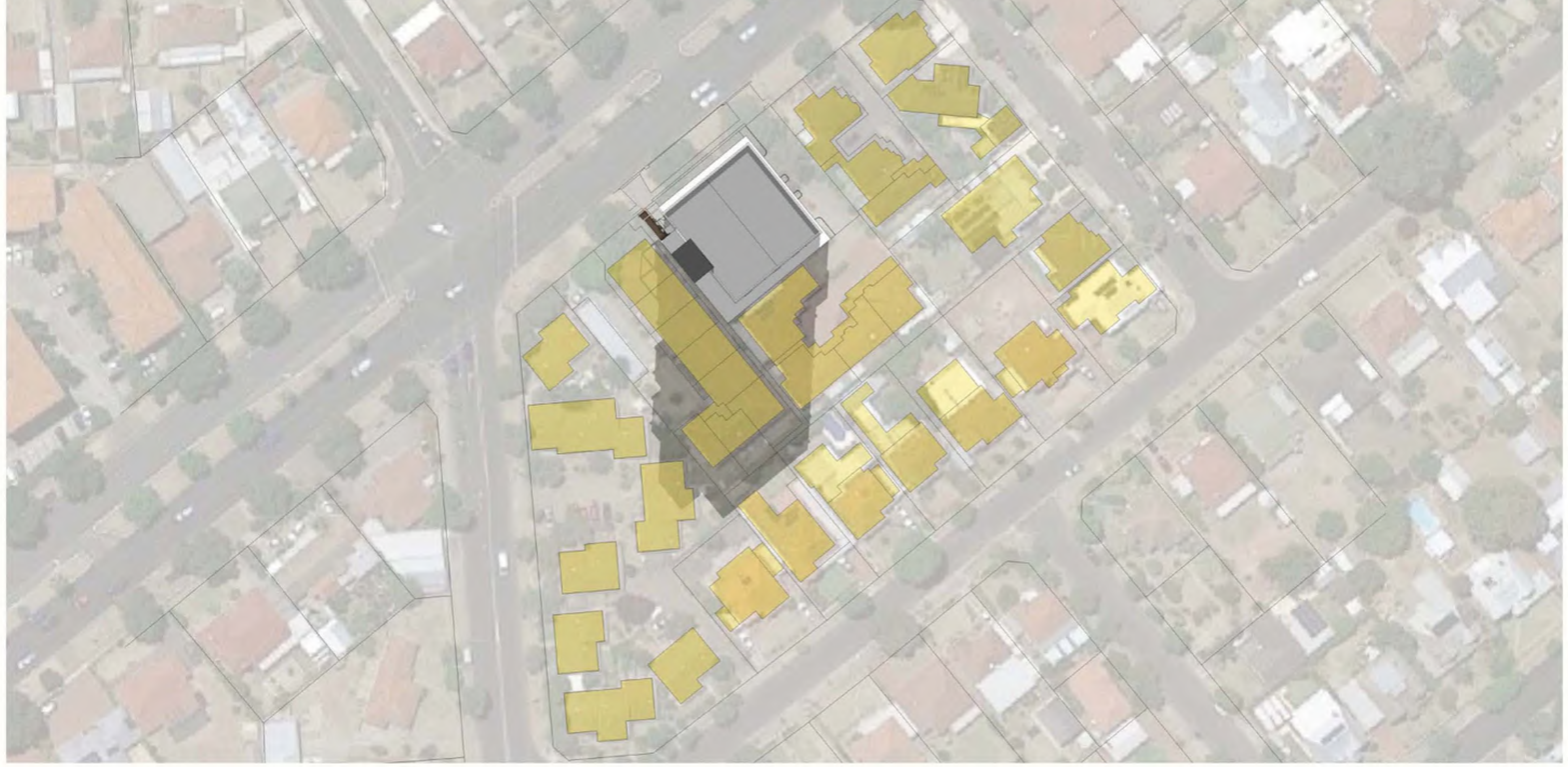
Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN
ARCHITECTS



june 21 - 11am



june 21 - 12pm

SHADOW DIAGRAMS - JUNE 21 [P4]

project no. 1701

drawing no. PA-09

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

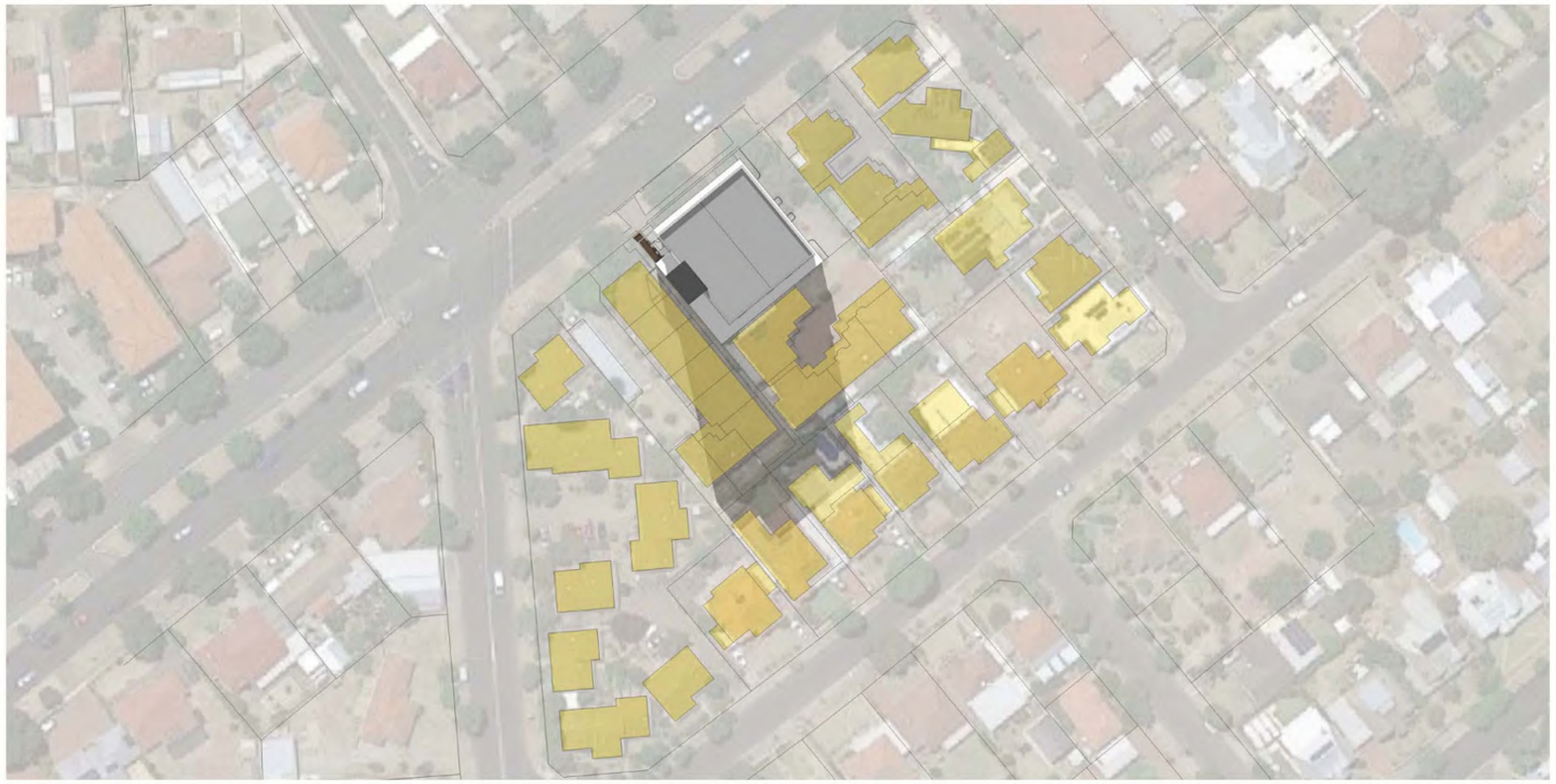
ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN ARCHITECTS



june 21 - 1pm

june 21 - 2pm

SHADOW DIAGRAMS - JUNE 21 [P4]

project no. 1701

drawing no. PA-10

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

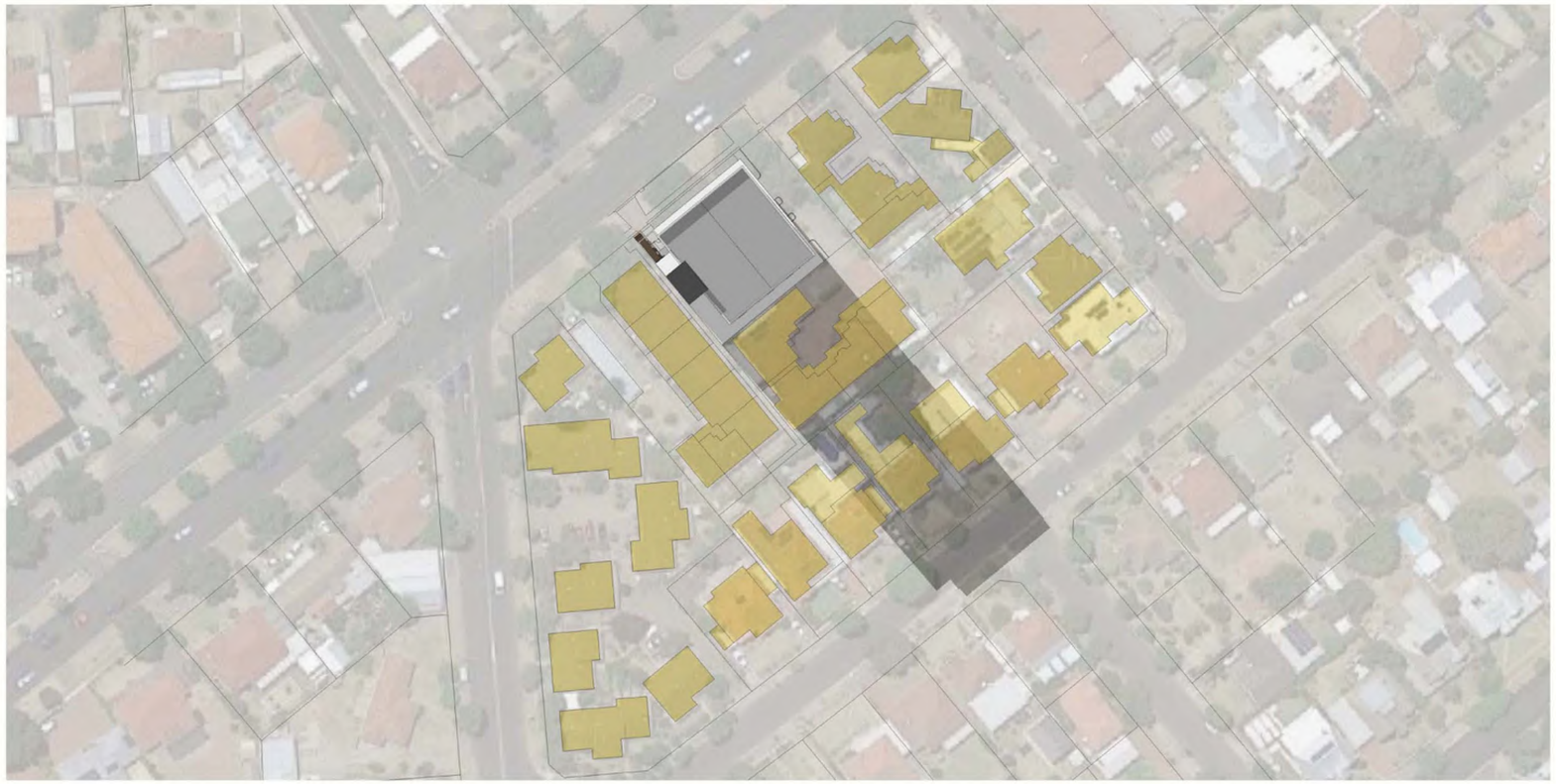
ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN ARCHITECTS



june 21 - 3pm

SHADOW DIAGRAMS - JUNE 21 [P4]

project no. 1701

drawing no. PA-11

amendments

PROPOSED MULTI-STOREY APARTMENT DEVELOPMENT

ADDRESS: 192 ANZAC HIGHWAY, GLANDORE SA 5037
FOR: ANGELO & MARIA POLYMENEAS

drawn	AC
checked	PP
scale	AS NOTED
issue date	27/09/2017
revision	

Member Australian Institute of Architects

p +61 8 8231 7550
w piteodesign.com.au
a 196Gilbert Street. Adelaide. 5000

PITEODESIGN
ARCHITECTS

Reference: #S104260

29 November 2017

Future Urban Group
Level 1/89 King William Street
ADELAIDE SA 5000

Attention: Ms Milly Nott (Urban Planner)

Dear Milly

RE: 192 ANZAC HIGHWAY – RESPONSE TO COUNCIL AND DPTI COMMENTS

Further to the recent referral responses from City of West Torrens (Council) and Department of Planning, Transport and Infrastructure (DPTI), this letter provides additional information in response to the comments raised. The comments raised by both Council and DPTI have been considered in conjunction and largely follow the headings used in the Council response.

Parking Assessment

Council and DPTI have noted that the proposed on-site parking provision is below the Development Plan requirements. As part of a review of the layout of the car park, one additional space has been created, resulting in an on-site provision of 41 spaces allocated as 37 resident spaces, 2 café spaces and 2 visitor spaces. This reduces the suggested shortfall to 9 spaces based on the Development Plan, which would relate to 2 resident spaces and 7 visitor spaces.

GTA does not consider that the parking shortfall is excessive given the intent of the Urban Corridor Zones within the context of the 30 Year Plan for Greater Adelaide is to encourage less reliance on the use of the private car and increase levels of walking, cycling and public transport use. Excessive car parking provision is likely to undermine such intents.

Furthermore, the site is well related to existing public transport opportunities that would support reduced car parking rates in the context of the conditions specified in Table WeTo/6 in the City of West Torrens Development Plan. Anzac Highway is serviced by a number of routes combining to provide a high frequency of service throughout the week, as defined by its GoZone status and the criteria specified in Table WeTo/6. Table 1 summarises the available bus services.

Table 1: Anzac Highway Bus Services

Services	Service Frequencies		
	Weekdays	Evenings	Weekends
245/248	15 minutes peak, 30 minutes off peak	60 minutes	60 minutes
262/263/265	<10 minutes peak, 15 minutes off peak	30 minutes	30 minutes
M44	Operates express	30 minutes	15 minutes Saturday, 30 minutes Sunday

There is also an additional service that operates on Beckman Street (route 241) providing half hourly weekday and hourly evening and weekend services.

VIC | NSW | QLD
ACT | **SA** | WA

Suite 4, Level 1,
136 The Parade
NORWOOD SA 5067

PO Box 3421
NORWOOD SA 5067

t// +618 8334 3600

www.gta.com.au

The site therefore clearly meets the criteria of access to a high frequency bus service.

The site is also located close to the Adelaide to Glenelg tram line with the nearest stop being Stop 8 at Beckman Street, approximately 500 metres from the site. The tram provides the most consistent and frequent public transport route within Adelaide's southern suburbs, as summarised below.

- Weekday peak hours – every 5 minutes
- Weekday daytime – every 10 minutes
- Saturday daytime – every 10 minutes
- Sunday daytime – every 15 minutes
- Evenings – every 20 minutes

Such a level of service will attract patronage from well beyond the 400m criteria identified in Table WeTo/6. This is confirmed in the 30 Year Plan for Greater Adelaide 2017 Update (page 46), which specifies that "*walking catchments to fixed line transit stations should generally be within 800m.*"

As the development site is approximately 500 metres from the tram stop, the site meets the access criteria specified in the 30 Year Plan. It is therefore considered appropriate for reduced parking provision to encourage use of such a frequent service within an easy (less than 10 minutes) walking distance.

To further support the basis for reduced on-site parking, GTA has completed a series of parking surveys on the local streets in vicinity of the site to assess the availability of on-street parking. Surveys were undertaken on a weekday morning and afternoon, evening and weekend to get a whole picture of on-street parking demands on surrounding streets. The surveys covered the sections of Anzac Highway, Beckman Street, Stuart Street and Waymouth Avenue which form the immediate local precinct. The dates and times of the parking surveys are summarised in Table 2.

Table 2: Dates and Times for on-street parking surveys

Time	Survey Date and Time
Weekday Morning	Tuesday 11:30AM 25/09/2017
Weekday Afternoon	Friday 3:30PM 22/09/2017
Weekday Evening	Thursday 7:30PM 21/09/2017
Weekend	Saturday 12PM 23/09/2017

The number of available parking spaces was identified on each of the local streets and number of parked cars recorded. The survey results for each street are summarised in Table 3.

Table 3: Number of Parked Cars on Street

Street Name	On-street spaces	Number of Parked cars			
		Morning	Afternoon	Evening	Weekend
Anzac Highway	6	0	0	0	0
Beckman Street	7	0	0	0	0
Waymouth Avenue	31	2	3	2	5
Stuart Street	20	14	14	6	3
Total	**64**	**16**	**17**	**8**	**8**
Occupancy Percentage		**25%**	**27%**	**13%**	**13%**

The survey results show that on-street parking demands on weekends and evenings are very low at only about 13% of the capacity. This leaves approximately 56 on-street parking spaces available for visitor parking within close proximity of the site. Weekends and evenings are the most likely periods when peak visitor parking demand would s occur. The provision of more than 50 on-street parking spaces would more than adequately accommodate the peak visitor demand.

Parking surveys on Friday afternoon at 3:30PM and Tuesday morning at 11:30AM indicate approximately 25% of the total parking spaces were occupied. Stuart Street is more heavily parked with 14 cars recorded, although this still leaves some spare capacity. Half of the 14 parked cars were present on both weekday survey days, indicating that these parked cars on Stuart Street are likely to be associated with local businesses or commuters, such as:

- Staff parking for kindergarten and other surrounding businesses; and
- Commuters accessing the frequent bus services on Anzac Highway.

Overall it is considered that there is "*generous on-street parking available and in convenient proximity*" as specified in criteria e) of the requirements for reduced parking provision. This conclusion would remain were the existing parking on Anzac Highway to be removed.

In summary, the availability of two high frequency public transport options and the capacity of local on-street parking is considered to adequately offset the parking shortfall of 9 spaces.

Parking Layout and Site Access

In response to the Council and DPTI comments, a number of alterations have been made to the proposed site layout.

As noted above, the revised internal layout of the car park has created one additional space, increasing the overall provision to 41 spaces.

The requirement to provide disabled parking within the Building Code of Australia (BCA) covers a number of land uses. However, this does not include residential development and therefore there is no BCA requirement for this site to provide a disabled parking space. Within Council's Development Plan, it is identified that "*development should provide off-street vehicle parking and specifically marked disabled car parking places to meet anticipated demand.*" Given the nature of the development, there is not anticipated to be a demand for disabled parking on this site.

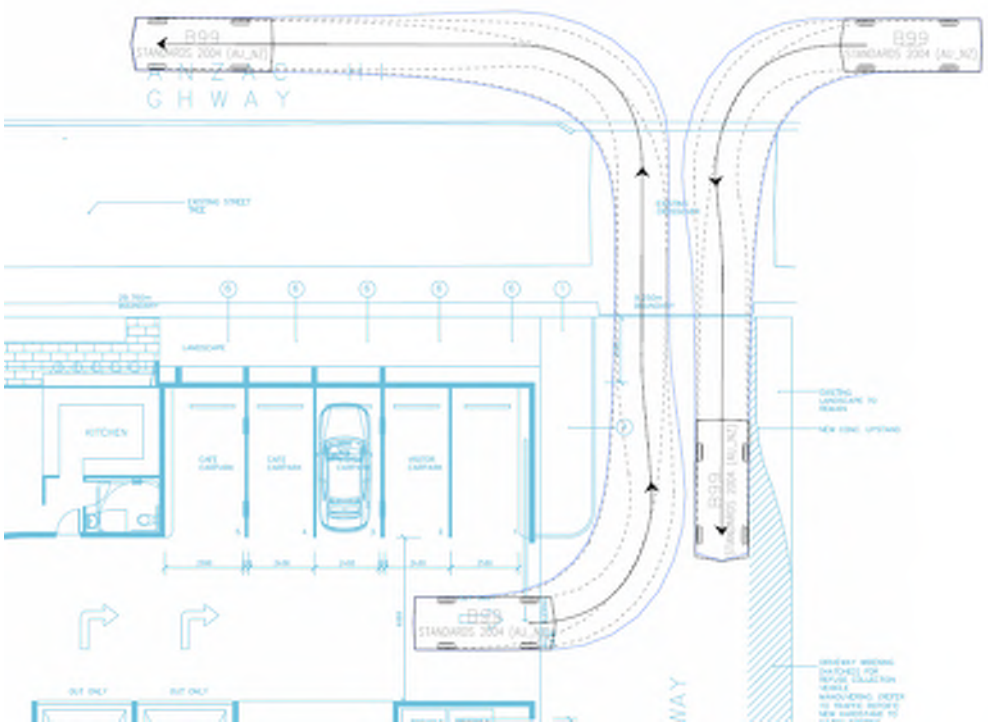
Council raised concerns regarding the proposed car parking space sizes located adjacent the proposed columns. It is noted that the clear width between the centreline of the parking space and the column is measured to be 2.4m wide. The site plans have been updated to reflect the clear space for the car parking spaces. The proposed column locations are located outside of the design envelope.

Council also raised issues surrounding the 6.0m aisle width behind the parking spaces. To allow for a 5.4m parking space and 5.8m aisle plus 300mm clearance to the refuse storage wall and car lifts, a total provision of 11.5m is required. The proposed plans provide a total of 11.5m allocation, showing 5.5m long parking spaces set within a 6.0m parking aisle. To meet the 6.1m parking aisle, the plans and column locations have been relocated to provide a 5.4m long parking space and a 6.1m parking aisle.

The proposed site access is identified as 5.95m wide between the existing walls. GTA acknowledges that a width of 6m is identified within the relevant Australian Standard for an access on to an arterial road serving more than 25 car parks.

However, it can be demonstrated that two vehicles can pass simultaneously through the existing access and this is shown in Figure 1.

Figure 1: B99 Simultaneous Movements at Site Access



DPTI also raised concerns regarding the potential for queuing of vehicles back onto Anzac Highway with proposed site entry being located towards the northern boundary. DPTI recommended that the flow though the site be reversed to allow for further queuing capacity between Anzac Highway and the site entrance. The plans have been changed to address this concern.

Notwithstanding the change to the site access and egress arrangements, a queuing analysis for the car park access gate and car lift was undertaken to demonstrate the probability of queuing over the property boundary.

The peak hour traffic generation identified in Table 7.1 and Figures 7.1 and 7.2 of the GTA TIA (dated 24 May 2017) has been used to assess the queuing probability based on the worst-case scenario during the PM peak hour, with 15 vehicles entering the car park.

Car Park Access Gate

The service time for the car park access gate has been assumed as 15 seconds per vehicle. Based on the above, there would be a 0.1 vehicle queue anticipated at the 95th percentile level. There is a 93.8% probability of no queuing occurring at all.

The distance from the car park access gate to the property boundary is approximately 22 metres and would accommodate 3 car spaces if estimated conservatively. The probability of having 3 vehicles queuing for the access door is 0.02%, and the probability of having more than 3 vehicles in the queue is 0.002%. The queuing analysis for the car park access gate therefore indicates that the probability of vehicles queuing over the property boundary line is extremely low.

Car Lift

The service time for each of the two car lifts has been conservatively estimated at around 90 seconds per vehicle. With two car lifts available, the average waiting time for a vehicle to be serviced by either car lift is 45 seconds. Queuing analysis shows that a queue of 0.8 vehicles, including the vehicle using the car lift, would be expected. Excluding the time using the facility, a delay of approximately 10 secs would be expected. The probability of zero queue to use the car lift is 81.3%.

The distance from the car park access gate to midpoint of the nearest car lift is approximately 12 metres, which could accommodate 2 vehicles. Therefore, a total of 5 vehicles can be accommodated from the car lift to the property boundary. The probability of having 5 vehicles in a queue is 0.02%, and the probability of having more than 5 vehicles in a queue is 0.004%. The queuing analysis for the car lift also shows that queuing over the property boundary is extremely unlikely.

GTA has reviewed the proposed layout of the two car lifts and this will comfortably facilitate two car lifts within the given footprint based on the specifications of two different systems (Wohr and Nordic Elevators) that are available within Australia.

The proposed footprint will provide a platform length of 6.45 metres and a pit width of 3.5 metres which exceed the minimum requirements. We would support the use of the available width of 3.5 metres as the entry door width would need to be 3 metres to facilitate access from the aisle width of 6 metres.

Waste Management and Loading

Council has raised concerns regarding the loading arrangements for the proposed café and recommended that loading be restricted to light vehicles only. It is anticipated that given the size of the proposed café, deliveries will be made by light vehicles, which will be accommodated in the café parking spaces.

Due to the nature of the site, a larger 8.8m refuse truck cannot be accommodated on site. GTA understands that the smaller vehicles are now available within a number of the private waste contractor fleets including Jeffries (specialist organic waste collection), East Waste and Solo Resource Recovery. The increasing levels of higher density development and initiatives such as laneway activation are requiring new approaches to waste collection and the increased availability of smaller vehicles within the waste collection fleets is anticipated to increase and fully support collection of all waste streams. The waste access layout is therefore proposed to operate

as previously proposed and is expected to be serviced by operators providing all collection services.

The proposed waste storage and collection area will provide a door height clearance of 3.5m. This exceeds the required height clearance of 3.4m for a standard refuse vehicle during a rear lift collection. The available height clearance will therefore more than adequately accommodate the proposed smaller refuse collection vehicle.

On the basis of the proposed operation, it is acknowledged that there will be short periods of time, when the waste vehicle is on site, that the access will be restricted to a single lane. However, as the first 6 metres of the driveway will remain clear of the waste vehicle and will continue as a two-way driveway and traffic volumes within the site are anticipated to be very low (below 30 movements in a peak hour), the site could operate with a single lane in accordance with clause 3.2.2 of AS/NZ 2890.1.

To further demonstrate the limited risk of impact arising from the waste vehicle, a calculation of conflict probability has been completed according to Austroad's Guide to Traffic Management.

For this site, the potential conflict would arise between vehicles seeking to enter the site and vehicles exiting the site from the existing properties to the rear. Vehicles existing the proposed development would not conflict with the waste vehicle as the car park exit is forward of the waste vehicle position.

The same peak hour traffic generation for the site used in the queuing assessment has also been used for the conflict analysis. This estimates 15 arriving vehicles into the car park. The same traffic generation rate has been applied to the units in the residential complex at the rear of the proposed site, assuming the units have up to two bedrooms. The peak hour traffic generation would be 2 trips per hour for the four units in the rear complex.

The distance of conflict length has been conservatively estimated at 20 metres, allowing a queuing area for both directions. The average vehicle speed in this area has been assumed to be approximately 10 km/h in a low speed car park environment.

The basis of the parameters and conflict calculations is summarised in table 4.

Table 4: Conflict Analysis around Waste Vehicle

Parameters	Incoming vehicles	Existing vehicles
Arrivals at conflict area in a peak hour	*15 veh/h*	*2 veh/h*
Distance of conflict length	*20 metres*	
Average vehicle speed through conflict area	*10 km/h*	*10 km/h*
Travel time through conflict area	7 sec	7 sec
Average vehicles in conflict area at any one time	0.030 veh	0.004 veh
Probability of a vehicle in the conflict area at any one time	2.96%	0.40%
Probability of opposing vehicles in the conflict area at any one time	0.012%	
	1 in 8476	

Using the above traffic generation numbers, the probability of opposing vehicles in the conflict area at any one time is estimated to be 0.012%, or 1 in 8476. This very low probability of conflict

indicates that when the refuse vehicle is parked at the bin storage, the likelihood of a conflict happening between two-way traffic is very low.

It should also be noted that the assessment has been based on the worst case PM peak hour traffic volumes. In practice waste collection is not likely to occur during this time period and therefore the risk of conflict will be further reduced through lower overall traffic volumes and lower volumes entering the site.

Traffic Impact

Council and DPTI have both raised concerns over the presence of the median opening opposite the site access. GTA had identified two crashes within our TIA that may be associated with this median opening, both of which were recorded as rear end crashes.

Access to the median opening from the south west bound carriageway is integrated within the right turn lane for the nearby signals and appears to be designed to accommodate u-turns. Due to the regularity of traffic signal intersections along Anzac Highway, traffic tends to be heavily platooned, resulting in large gaps when drivers could safely exit the site and access the median opening, positioning themselves in the same way as a u-turn vehicle would.

GTA does however concur with DPTI's assessment that drivers travelling north east bound seeking to use the median opening to enter the site (or perform a u-turn) could create a safety hazard as there is no deceleration or storage lane to accommodate such a movement. It is therefore considered that an appropriate solution would be to make the median opening no entry/no u-turn for vehicles travelling in a north east bound direction, but retain the median opening for vehicles travelling in a south west bound direction.

The proposed restriction can be safely accommodated at an existing u-turn facility located around 110 metres to the north. However, any restriction on the south west bound u-turn would result in vehicles having to travel through the adjacent traffic signal intersection, impacting on the capacity of the signals and potentially encouraging drivers to seek to make u-turns or other unsafe manoeuvres at the traffic signal intersection, as the next available u-turn facility is a further 270 metres beyond the traffic signal intersection.

I trust that this responds adequately to the issues raised. If any questions or require any further information, please contact me in our Adelaide office on (08) 8334 3600.

Yours sincerely

GTA CONSULTANTS

Paul Froggatt
Associate Director

CONSULTING
ENGINEERS

29th of September 2017 **Reference:** 2017-5777GL

Mr A & Mrs M Polymeneas
C/- Mr Paul Piteo – Piteo Design Architects
196 Gilbert Street,
ADELAIDE SA 5000
Email: paul@piteodesign.com.au

Dear Mr A & Mrs M Polymeneas,

DETAILED STORMWATER DRAINAGE ADVICE FOR THE PROPOSED DEVELOPMENT AT 192 ANZAC HIGHWAY, GLANDORE

MLEI have been engaged to assess the implications of a potential development at 192 Anzac Highway, Glandore and provide a detailed stormwater drainage assessment based on our findings.

Site Description

The subject site has an area of 959 square metres. It is bounded by neighbouring residential properties on both sides including the rear, and fronts to Anzac Highway. The existing site has a high point of 18.74m AHD (Australian Height Datum) located towards the rear of the property on the existing pergola, and gradually slopes towards the north western boundary.

The existing site is a residential property and consists of a combination of surfaces, including concrete, landscaped and roof areas. Details of the existing stormwater drainage system are unknown, and there does not appear to be a street kerb outlet at the front of the property on Anzac Highway, however a side entry pit (SEP) exists on the kerb adjacent to the existing driveway.

Proposed Development

The potential development comprises a multi-storey apartment building, including a 40 space car park over 2 levels, and a small café on the ground floor. The building will house a total of 36 apartments over 6 residential floors.

After discussions with a West Torrens City Council representative, it has been agreed that the proposal will consider the following;

- A pre-development runoff coefficient of 0.25 will be adopted for the 20 year average recurrence interval (ARI) storm event.
- The proposed stormwater system will be sized to serve the 20 ARI storm event.
- Water treatment to be in accordance with the State Government's Water Sensitive Urban Design Policy.

Pre-development Hydrology

It is assumed that rain falling onto the existing concrete surfaces will flow onto the adjacent landscaped areas which would primarily act as soakage. Any major overland stormwater flow will travel towards the north western corner of the property, this being the low point of the site as indicated by the site survey.

As mentioned above, there is no street kerb outlet and thus, it can only be speculated that stormwater captured on the roof of the dwelling is conveyed through the eaves gutters and discharged either directly into the SEP on Anzac Highway, into the DPTI owned underground stormwater system or onto the soakage areas within the site.

Based on the 20 year ARI storm event and an adopted runoff coefficient of 0.25, the pre-development site generates a peak stormwater flow of 8.07L/s.

Catchment Analysis

The proposed development was analysed as 2 separate catchment areas; a small paved area, treated as unrestricted, and the larger roof area. As shown on the architectural plans, majority of the property is covered by the roof and hence stormwater entering the carpark can be considered minimal. Grated inlet pits (GIP) have been included in the ground level carpark to eliminate the possibility of water pooling.

As per the requirement of Council, stormwater runoff from the carpark and roof area will pass through an 'Ecosol Storm Pit 10L (Class 2)' filtration system, where stormwater will be treated to the water quality standard specified in the State Government's Water Sensitive Urban Design Policy.

Given the council requirement of a pre-development runoff coefficient of 0.25, the 1 in 20 ARI storm detention volume required for the development is calculated by MLEI to be 9,543L. The catchment will utilise an approximate 10,000L capacity 'DRAINWELL subsurface water management system' to achieve the required detention volume. The detention system will be located under the ground level carpark. At the outlet of the underground tank system an 80.2mm diameter orifice plate will restrict flows to the calculated allowable discharge of 7.59L/s.

Water exiting the detention tank will enter a pump sump, and be pumped to a proposed JB located at the boundary of the property where it is finally conveyed to a street kerb outlet on Anzac Highway by means of gravity.

We trust that the detailed stormwater drainage advice has demonstrated a strategy to ensure the receiving stormwater drainage system is not adversely affected by the potential development at 192 Anzac Highway, Glandore.

If you have any queries regarding this letter, please contact the undersigned on 8231 2832 or by email agiannini@mlei.com.au

Kind Regards,

MLEI Consulting Engineers

Anthony Giannini B.E Hons. (Civil & Structural)
Graduate Civil Engineer

Enc:

- *Civil stormwater calculations*
- *MUSIC modelling report*

CONSULTING
ENGINEERS

CIVIL STORMWATER CALCULATIONS

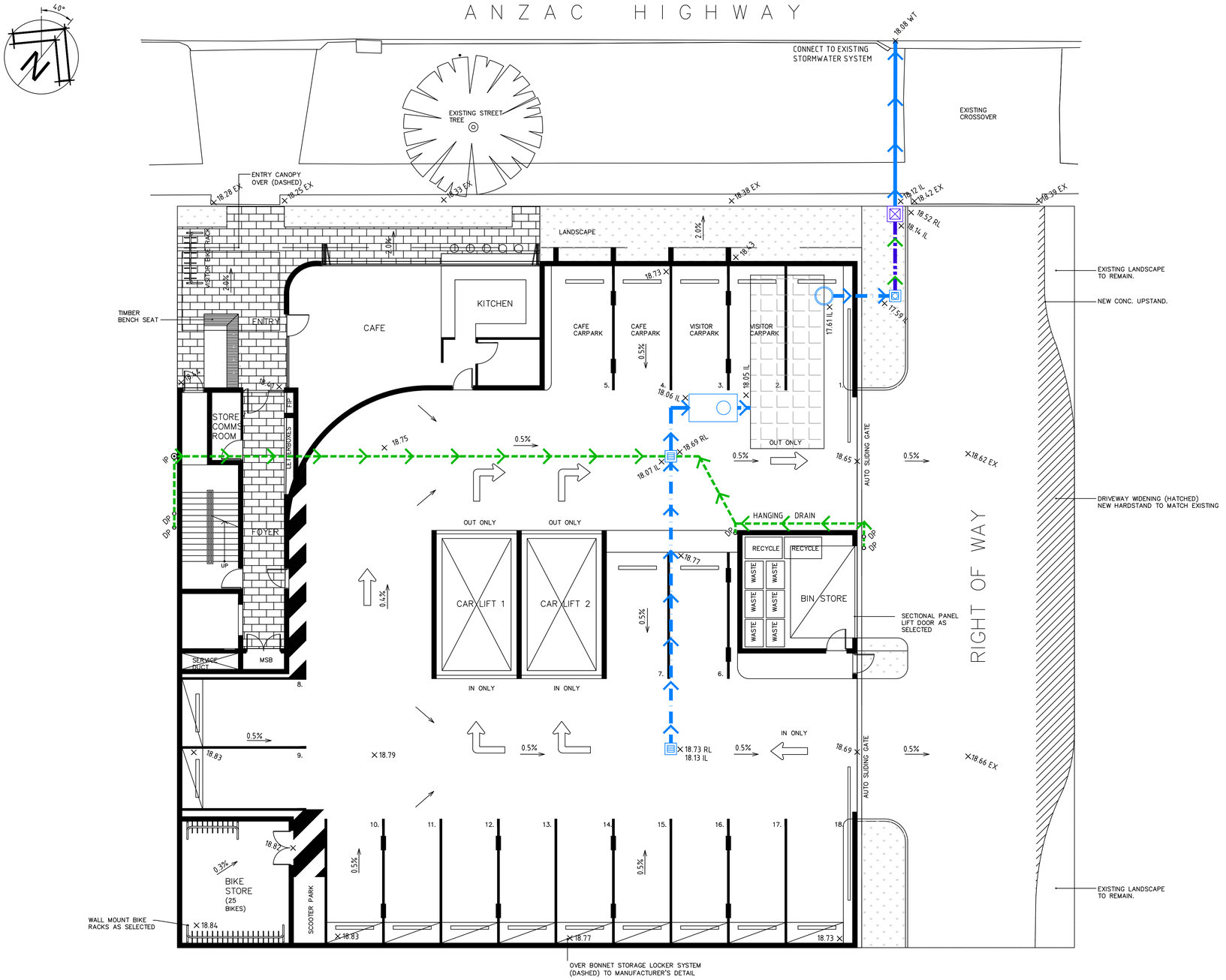
192 Anzac Highway, Glandore

Project reference: 2017-5777GL

ISSUE B

DATE: 29/09/2017

ADELAIDE: LEVEL 5, 19 GILLES STREET ADELAIDE SA / (08) 8231 2832
PORT LINCOLN: OFFICE 5, 12 LEWIS STREET PORT LINCOLN SA 5606 / (08) 8683 3884
WWW.MLEI.COM.AU / MLEI@MLEI.COM.AU / ABN: 29 125 240 459



LEGEND

- 1% — PROPOSED SURFACE GRADE AND DRAINAGE DIRECTION
- XXX.XXX — DESIGN SPOT LEVEL
- XXX.XXX EX — EXISTING SPOT LEVEL
- XXX.XXX WT — EXISTING WATERTABLE LEVEL
- DP — Ø90mm INDICATIVE DOWN PIPE (REFER ARCHITECTURAL DRAWING FOR SPECIFICATIONS)
- IP — INSPECTION POINT.
- Ø80.2mm ORIFICE PLATE
- PUMP & SUMP SYSTEM
- 300 SQ GRATED INLET PIT
- 450 SQ JUNCTION BOX
- Ø90mm uPVC SEALED ROOFWATER SYSTEM
- Ø150mm uPVC SURFACE STORMWATER SYSTEM. MIN. 0.5% GRADE
- uPVC RISING MAIN SYSTEM
- Ø150mm GRAVITY FED uPVC STORMWATER OUTLET TO COUNCIL KERB AND WATERTABLE. MIN. 0.5% GRADE
- ECOSOL STORMPIT 10L CLASS-2 OR APPROVED EQUIVALENT
- PROPOSED 10,000L DRAINWELL UNDERGROUND DETENTION SYSTEM
- PROPOSED PAVING

STORMWATER MANAGEMENT PLAN - GROUND FLOOR

SCALE 1:100

ISSUED FOR APPROVAL
NOT FOR CONSTRUCTION

AMENDMENTS

ISSUE	INITIAL	DESCRIPTION	DATE
A1	JSC	APPROVAL	04.17
A2	D.Y.	ISSUED FOR COUNCIL APPROVAL	09.17

mlei Consulting Engineers
TALENTED | APPROACHABLE | RESPONSIVE | PIONEERING
Level 5, 19 Gilles Street
Adelaide SA 5000
Telephone (08) 8231 2832
Facsimile (08) 8311 1742
www.mlei.com.au

PROJECT
192 ANZAC HIGHWAY, GLANDORE SA 5037

CLIENT
ANGELO & MARIA POLYMENEAS

DRAWING TITLE
STORMWATER MANAGEMENT PLAN - GROUND FLOOR

DRAFTER	ENGINEER	PROJECT MANAGER	MANAGER
JSC	CG	CG	NM

DATE	PROJECT NUMBER	DRAWING SCALE
APR 2017	2017-577GL	1:100

DRAWING NUMBER	SIZE	REV
C01	A1	A2

DO NOT SCALE FROM THIS DRAWING

mlei

CONSULTING ENGINEERS

Reference 2017-5777GL

Project 192 Anzac Highway, Glandore Checked by

Designer H.P Date 12/4/2017 Index 1

Council Requirements:

- pipes to be sized for 20 years ARI
- 20 years ARI of previous development = 20 years ARI of post development, where run off coefficient C=0.25 for previous development.
- Assume time of concentration t_c = 5 min.

Pre-development Flow:

Refer 'Pre-development Plan'

Using BOM-IFD, I_{10}^{1hr} = 26.0 mm/hr, I_{20}^{5min} = 121 mm/hr

$C_{10} = 0.1 + 0.0133 (I_{10}^{1hr} - 25)$ Eq. 14.12 ARR

$= 0.1 + 0.0133 (26.0 - 25)$

$= 0.1133$ — ①

$C_{20} = 0.25$ (for previous development)

$Q_{pre} = 0.278 \times C_{20} \times I_{20}^{t_c} \times A_{site}$, assume time of concentration t_c = 5 mins Eq. 5.1 ARR

$= 0.278 \times 0.25 \times 121 \times (959.76 \times 10^{-6})$

$= 8.071 \times 10^{-3}$ m³/s

$= 8.07$ L/s

Post - development Plan:

Refer 'Post-development Plan'

Unrestricted flow: (Allowing impervious surface area to drain unrestricted)

$S = 1.0$ (Impervious surface)

Using ①, $C'_{10} = 0.1133$

$C_{10} = 0.9(1.0) + 0.1133(1-1)$

$= 0.9$

$C_{20} = F_{20} \times C_{10}$ where $F_{20} = 1.05$ from Table 14.6 ARR

$= 1.05 \times 0.9$

$= 0.945$

Assume time of concentration, $t_c = 5$ mins

Using BOM-IFD, ${}^{5mins}_{20}I = 121$ mm/hr

$Q_{unrestricted} = 0.278 \times C_{20} \times {}^{5mins}_{20}I \times A_{imp}$

$= 0.278 \times 0.945 \times 121 \times (15.17 \times 10^{-6})$

$= 4.8223 \times 10^{-4}$ m³/s $= 0.4824$ L/s

∴ Allowable outflow, $Q_{allow} = Q_{pre} - Q_{unrestricted}$

$= 8.07 - 0.482$ (L/s)

$= 7.588$ L/s

Detained roof area:

$S = \frac{A_{roof}}{A_{site} - A_{imp}} = \frac{906.19}{959.76 - 15.17} = 0.959$

Using ①, $C'_{10} = 0.1133$

$C_{10} = 0.9(0.959) + 0.1133(1 - 0.959)$

$= 0.868$

$C_{20} = F_{20} \times C_{10}$
$= 1.05 \times 0.868$
$= 0.9114$

Assume time of concentration, t_c = 5 mins.

Area being detained = $A_{site} - A_{imp}$ = 959.76 − 15.17
= 944.59 m²

Detention Calculation:

Refer 'Detention Calculations' excel

Required detention volume of 9543 L

Round off to 10000 L, add another extra 1000 L for retained water

∴ Adopt a 110000 L RWT

Detention tank sizing:

Refer "Drainwell Modular detention cell brochure"

Individual unit:

Detention Volume: 0.132 m³

Total units required = Required detention volume ÷ detention per unit
= 11 ÷ (0.132 × 0.95)
= 87.72
≈ 88 units

Required unit arrangement:

Stormwater quality:

Refer 'post-development plan'

Carpark area of 906.19 m^2 to be treated. Assume t_c = 5mins,

Using BOM-IFD ${}^{5min}_{20}I$ = 121 mm/hr

Using ①, C'_{10} = 0.1133

$C_{10} = (0.9 \times 0.9) + 0.1133(1-0.9)$

$= 0.82133$

$C_{20} = F_{20} C_{10}$

$= 1.05 \times 0.82133$

$= 0.8624$

$Q_{20} = 0.278 \times C_{20} \times {}^{5min}_{20}I \times A_{carpark}$

$= 0.278 \times 0.8624 \times 121 \times (960.19 \times 10^{-6})$

$= 26.29$ L/S

∴ Peak flow off carpark Area is 26.29 L/S

Refer Figure 5.4.11.2(a), assuming a grade of 1%, pipe required is 300ϕ

However, the carpark is fully covered by the roof. Therefore there would be no rainwater or minor rainwater lands on the carpark.

∴ A pipe size of 100ϕ is adopted.

Refer 'Ecosol - table 10 high flow Ecosol GPT table'

∴ Required GPT size/model is GPT4200 with pipe size of 100ϕ

Site Detention Volume - 20 YEAR

Cro = Runoff Coefficient

		Area (m2)	tc (mins)	Cro			
ARI 20		944.59	5	0.9114			
Duration	mm/h	In flow L/s			Out flow allowed	Qin - Qout	Detentions size for that duration
5	121	28.9357829			7.5	21.4357829	6430.734871
6	112	26.78353459			7.5	19.28353459	6942.072451
7	106.3	25.42044399			7.5	17.92044399	7526.586475
8	100.7	24.08126726			7.5	16.58126726	7959.008284
9	95	22.71817666			7.5	15.21817666	8217.815396
10	89.3	21.35508606			7.5	13.85508606	8313.051635
11	86.6	20.70941156			7.5	13.20941156	8718.211632
12	83.8	20.0398232			7.5	12.5398232	9028.672704
13	81.1	19.39414871			7.5	11.89414871	9277.43599
14	78.4	18.74847421			7.5	11.24847421	9448.718337
15	75.7	18.10279972			7.5	10.60279972	9542.519745
16	72.9	17.43321135			7.5	9.933211352	9535.882897
17	70.2	16.78753686			7.5	9.287536857	9473.287594
18	67.5	16.14186236			7.5	8.641862363	9333.211352
19	64.7	15.472274			7.5	7.972273998	9088.392358
20	62	14.8265995			7.5	7.326599503	8791.919404
21	60.7	14.51571919			7.5	7.015719191	8839.806181
22	59.4	14.20483888			7.5	6.704838879	8850.38732
23	58	13.8700447			7.5	6.370044697	8790.661681
24	56.7	13.55916438			7.5	6.059164385	8725.196714
25	55.4	13.24828407			7.5	5.748284072	8622.426109
26	54.1	12.93740376			7.5	5.43740376	8482.349866
27	52.8	12.62652345			7.5	5.126523448	8304.967986
28	51.4	12.29172927			7.5	4.791729266	8050.105166
29	50.1	11.98084895			7.5	4.480848954	7796.677179
30	48.8	11.66996864			7.5	4.169968641	7505.943554
31	48.2	11.52648542			7.5	4.02648542	7489.262882
32	47.6	11.3830022			7.5	3.883002199	7455.364223
33	47.1	11.26343285			7.5	3.763432849	7451.59704
34	46.5	11.11994963			7.5	3.619949628	7384.69724
35	45.9	10.97646641			7.5	3.476466407	7300.579454
36	45.3	10.83298319			7.5	3.332983186	7199.243681
37	44.8	10.71341383			7.5	3.213413835	7133.778713
38	44.2	10.56993061			7.5	3.069930614	6999.441799
39	43.6	10.42644739			7.5	2.926447393	6847.886899
40	43	10.28296417			7.5	2.782964172	6679.114012
41	42.5	10.16339482			7.5	2.663394821	6551.951259
42	41.9	10.0199116			7.5	2.5199116	6350.177232
43	41.3	9.876428379			7.5	2.376428379	6131.185217
44	40.7	9.732945158			7.5	2.232945158	5894.975217
45	40.2	9.613375807			7.5	2.113375807	5706.114679
46	39.6	9.469892586			7.5	1.969892586	5436.903537
47	39	9.326409365			7.5	1.826409365	5150.474409
48	38.4	9.182926144			7.5	1.682926144	4846.827295
49	37.8	9.039442923			7.5	1.539442923	4525.962194
50	37.3	8.919873572			7.5	1.419873572	4259.620717
51	36.7	8.776390351			7.5	1.276390351	3905.754475
52	36.1	8.63290713			7.5	1.13290713	3534.670246
53	35.5	8.489423909			7.5	0.989423909	3146.368031
54	35	8.369854558			7.5	0.869854558	2818.328769
55	34.4	8.226371337			7.5	0.726371337	2397.025413
56	33.8	8.082888116			7.5	0.582888116	1958.504071
57	33.2	7.939404895			7.5	0.439404895	1502.764742
58	32.7	7.819835545			7.5	0.319835545	1113.027695
59	32.1	7.676352324			7.5	0.176352324	624.2872252
60	31.5	7.532869103			7.5	0.032869103	118.328769
							9543

ORIFICE DIAMETER CALCULATION

Roof Tank Dimensions (Indicative only)

Drainwell Module DW1592
8x8 module arrangement

Width (m)	Length (m)	*Height (m)*
8.305	3.2	*0.44*

Orifice Calculation

Gravity, g (m/s2)	Contraction coefficient, Cc	Orifice diameter, d (m)	Detention Volume, V (m3)	Height of water surface to orifice centre, h (m)	Discharge rate, Q (m3/s)
9.81	0.6	0.08020	9.543	0.319	0.007582692

Orifice diameter (mm) =	80.2

Intensity-Frequency-Duration Table

Location: 34.950S 138.575E Issued: 12/4/2017

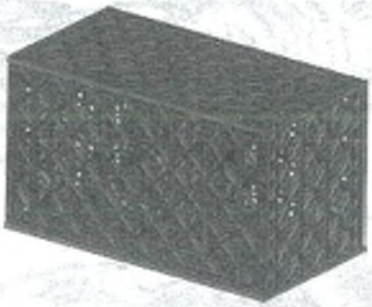
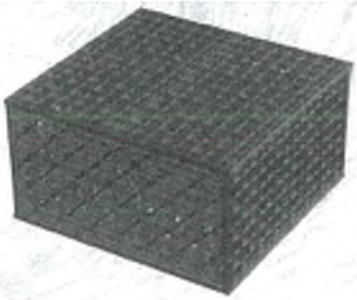
Rainfall intensity in mm/h for various durations and Average Recurrence Interval

Average Recurrence Interval

Duration	1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
5Mins	43.6	58.7	81.5	98.3	121	156	186
6Mins	40.6	54.7	75.7	91.3	112	144	172
10Mins	32.7	44.0	60.6	72.8	89.3	114	136
20Mins	23.2	31.1	42.5	50.8	62.0	78.8	93.4
30Mins	18.6	24.8	33.7	40.1	48.8	61.8	73.1
1Hr	12.3	16.3	22.0	26.0	31.5	39.6	46.6
2Hrs	8.00	10.6	14.1	16.5	19.9	24.9	29.1
3Hrs	6.22	8.21	10.8	12.7	15.2	18.9	22.1
6Hrs	4.03	5.30	6.91	8.03	9.57	11.8	13.7
12Hrs	2.58	3.37	4.35	5.03	5.96	7.32	8.45
24Hrs	1.59	2.07	2.65	3.05	3.61	4.41	5.07
48Hrs	.927	1.21	1.54	1.77	2.08	2.54	2.91
72Hrs	.661	.861	1.09	1.25	1.47	1.79	2.05

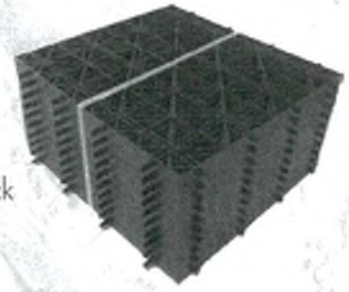
aw data: 16.98, 3.52, 0.89, 35, 6.6, 1.61, skew=0.58, F2=4.47, F50=14.98)

specifications

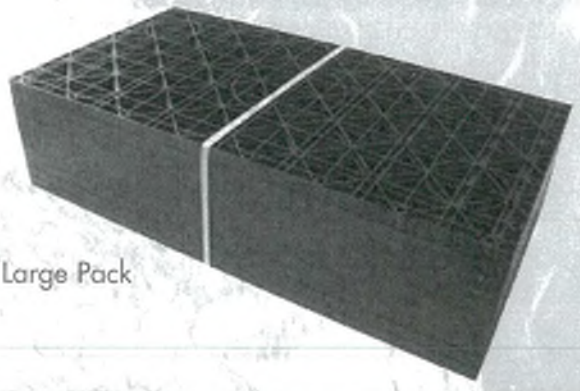
			
Drainwell™ Model		DW1592	DW1992
Dimensions (mm)	Length	755	755
	Width	400	800
	Height	440	440
Volume (m3)		.132	.264
Tanks per m3		7.5	3.7
Weight (Kg)	3 Panels	6.65	12.85
	4 Panels	7.3	14
	5 Panels	7.9	15.15
Maximum Load [Tons/m²]	3 Panels (1 Internal)	23.66 t/m²	9.45 t/m²
	4 Panels (2 Internal)	29.76 t/m²	9.61 t/m²
	5 Panels (3 Internal)	32.42 t/m²	16.20 t/m²
Internal Open Area		<95%	<95%
Polymer Type		Polypropylene UV Stabilised	
Service Temp		-20°C to 120°C	
Chemically inert and not affected by Moulds and Algae			

PALLET PACKAGING

Drainwell modules are delivered to site flat-pack on pallets. A forklift is required for unloading of pallets. A full pallet of Drainwell panels weighs approximately 600kg.



Small Pack



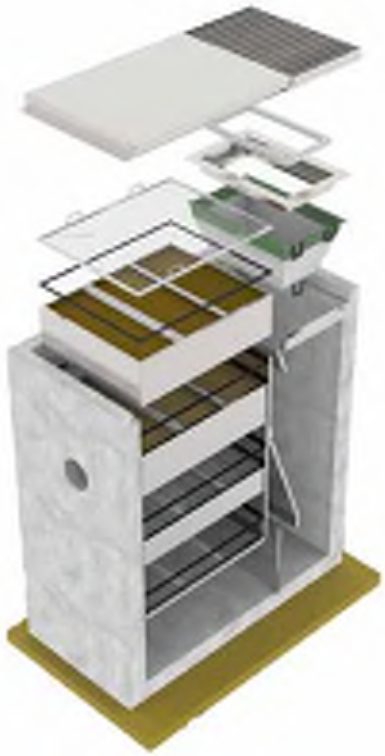
Large Pack

9.2 THE ECOSOL™ STORM PIT (CLASS 2) HYDRAULIC SPECIFICATION

This Ecosol™ Storm Pit (Class 2) is designed to treat stormwater runoff for typical urban catchments of 100 – 750m2 based on the product selection and on a 100% impervious catchment area. The system provides both primary and secondary treatment within the one compact underground device thereby reducing the space and cost of downstream tertiary treatment measures

ECOSOL™ STORM PIT - CLASS 2 (PRIMARY TREATMENT SYSTEM)											
Ecosol Product Code	Outlet Pipe Gradient (%)	Maximum Treatable Flow Rate (L/s) Outlet Pipe Diameters					Maximum By-Pass Flow Rates (L/s)				
		100mm	150mm	225mm	300mm	375mm	100mm	150mm	225mm	300mm	375mm
Ecosol™ Storm Pit 10L (Class 2)	0.5	4	11	11	11		4	11	32	68	
	1.0	5	11				5	15	45		
	2.0	7					7	22	63		
	5.0	11					12	34			
Ecosol™ Storm Pit 20L (Class 2)	0.5	4	11	22	22	22	4	11	32	68	124
	1.0	5	15	22			5	15	45	97	
	2.0	7	22				7	22	63		
	5.0	11					12	34	100		

Table 5 – Ecosol™ Storm Pit (Class 2) Hydraulic Specification



Ecosol™
WASTEWATER FILTRATION SYSTEMS

10.2 THE ECOSOL™ STORM PIT (CLASS 2) POLLUTANT REMOVAL EFFICIENCIES

ECOSOL™ STORM PIT - CLASS 2 (SECONDARY TREATMENT SYSTEM)	
Contaminant/Pollutant	Estimated Mean Pollutant Removal Efficiency (%)
PRIMARY TREATMENT CHAMBER[1]	
Gross Pollutants (>600µm)	100
Total Suspended Solids (TSS) (20 - 600µm)	41
SECONDARY TREATMENT CHAMBER[2,3]	
TSS	80
TN	63
Organic-N	37
PON	80
NOX	90
NH4-N	49
TP	90
Copper	90
Lead	90
Zinc	90
Cadmium	78
Total Petroleum/Hydrocarbon's	98

[1]Typical pollutant removal efficiencies based on results derived from the independently tested Ecosol™ Litter Basket and Ecosol™ Storm Pit (Class 1) published performance data.

[2]Typical nitrogen and phosphorous removal efficiencies derived from international work undertaken on the performance of porous polypropylene, Clinoptilolite, and laterite as per references described in section 3.0 of the product technical specification.

[3]Typical removal efficiencies derived from the Port of Townsville Pilot Program testing (Athanasiadis et al., 2014). The removal efficiency depends heavily on the arsenic speciation (arsenite or arsenate)

Table 8 – Ecosol™ Storm Pit (Class 2) Pollutant Removal Efficiencies.

Ecosol™
WASTEWATER FILTRATION SYSTEMS

Water Sensitive Urban Design - MUSIC Model Report

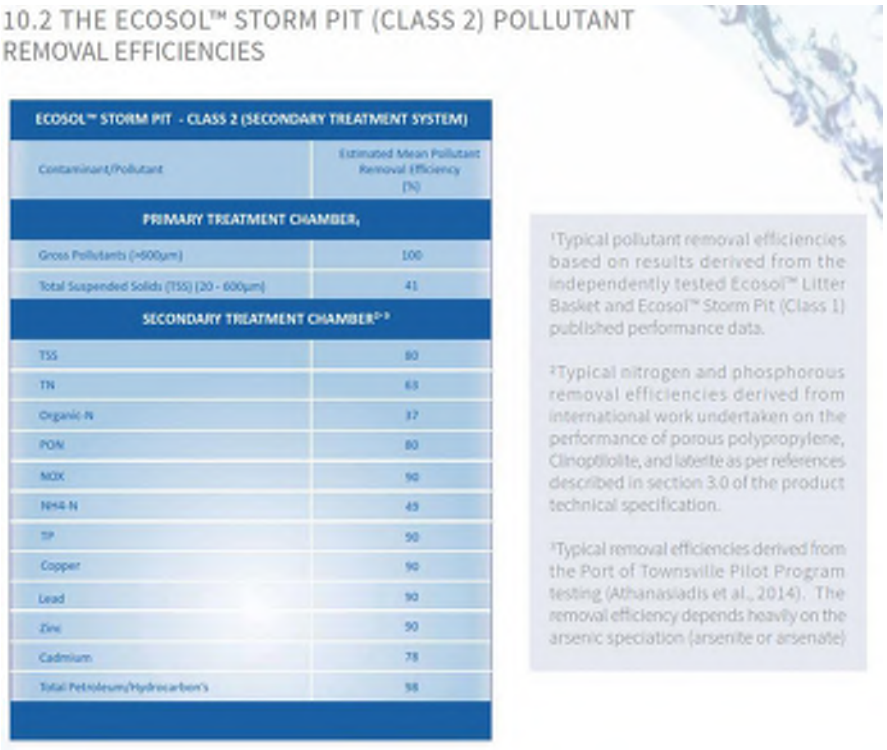
The City of West Torrens Council has requested the proposed development at 192 Anzac Highway to consider stormwater management systems to minimise the discharge of sediment, suspended solids, organic matter, nutrients, bacteria, litter and other contaminants into Council's receiving stormwater system. MLEI are providing MUSIC data with target requirements identified by the City of West Torrens Council. MLEI have used industry best practices in the assessment.

It is industry practice that the 3-month ARI rainfall event is being used for stormwater quality modelling; this is widely accepted as the catchment is considered sufficiently clean after a rain event of this nature.

The following target reduction requirements are in accordance with the State Government's Water Sensitive Urban Design Policy (2013):

- Suspended solids 80% reduction
- Total phosphorus 60% reduction
- Nitrogen 45% reduction
- Gross Pollutants 90% reduction

The industry recognised software package 'MUSIC' by eWater has been used to assess the reduction in pollutants for this development. Unless noted below as an input, the default data from eWater has been used in the assessment. Individual properties of proprietary water treatment facilities have been manually customised in the treatment train. Including within the model, the use of an Ecosol Storm Pit (Class 2) and the model has used published information from ECOSOL. The reduction capacities of the ECOSOL product are displayed in Figure 1.



10.2 THE ECOSOL™ STORM PIT (CLASS 2) POLLUTANT REMOVAL EFFICIENCIES

ECOSOL™ STORM PIT - CLASS 2 (SECONDARY TREATMENT SYSTEM)	
Contaminant/Pollutant	Estimated Mean Pollutant Removal Efficiency (%)
PRIMARY TREATMENT CHAMBER[1]	
Gross Pollutants (>500µm)	100
Total Suspended Solids (TSS) (20 - 600µm)	41
SECONDARY TREATMENT CHAMBER[2,3]	
TSS	80
TN	63
Organic N	37
PON	80
NOX	90
NH4-N	45
TP	90
Copper	90
Lead	90
Zinc	90
Cadmium	78
Total Petroleum/Hydrocarbon's	98

[1]Typical pollutant removal efficiencies based on results derived from the independently tested Ecosol™ Litter Basket and Ecosol™ Storm Pit (Class 1) published performance data.

[2]Typical nitrogen and phosphorous removal efficiencies derived from international work undertaken on the performance of porous polypropylene, Clinoptilolite, and laterite as per references described in section 3.0 of the product technical specification.

[3]Typical removal efficiencies derived from the Port of Townsville Pilot Program testing (Athanasiadis et al., 2014). The removal efficiency depends heavily on the arsenic speciation (arsenite or arsenate)

Figure 1 - Ecosol Storm Pit (Class 2) Pollutant Removal Efficiencies

The following reduction in pollutants shown in Figure 2 was achieved with the inclusion of the Ecosol Storm Pit (Class 2):

Figure 2 - Treatment Train Effectiveness at Receiving Node

Pollutant	CWTC Requirement	Treatment Train Effectiveness
Gross pollutants	90%	100%
Suspended solids	80%	85.4%
Total phosphorus	60%	67.7%
Total nitrogen	45%	59.7%

The achieved reductions are a betterment than the requirements outlined by the City of West Torrens Council and in the opinion of MLEI is an acceptable solution for this development.

192 ANZAC HIGHWAY, GLANDORE

PLANNING REPORT

Prepared for:
Walpol Development PTY LTD

Date:
27 July 2017

Proprietary Information Statement

The information contained in this document produced by Future Urban Group is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Future Urban Group undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.

Document Control

Revision	Description	Author	Date
V1	Draft	MN	18/05/17
V2	Draft Review	CV	18/05/17
V3	Final	CV	26/05/17
V4	Amendments	MN	27/07/17

CONTENTS

APPENDICES

FIGURES

1. INTRODUCTION

This planning statement has been prepared in support of a proposal to demolish all existing buildings on the subject site including the removal of one regulated tree and the construction of an eight-storey mixed-use building comprising ground floor cafe, two levels of car parking (40 car parking spaces), six levels of residential apartments (total of 36 apartments) and associated landscaping.

This development application also includes the following:

- Appendix 1 – Development Application form;
- Appendix 2 – Electricity Act Declaration;
- Appendix 3 – Certificate of title;
- Appendix 4 – Transport Impact Assessment prepared by GTA Consultants and dated 24 May 2017;
- Appendix 5 – Stormwater and Drainage Plan prepared by MLEI and dated 12 April 2017; and
- Appendix 6 – Proposed plans and drawings prepared by Piteo Design Architects dated 30 January 2017, 3 April 2017, 20 April 2017, 19 May 2017 and 6 July 2017.

As a result of the positive responses reflected in the design; the specialist reports; our site and locality inspection; and, our assessment of the proposal against the relevant provisions of the City of West Torrens Development Plan (consolidated 30 May 2017), we have formed the opinion that the proposal displays significant planning merit and therefore warrants Development Plan Consent.

2. PROPOSAL

The proposed development seeks to demolish all existing buildings on the subject site including the removal of one regulated tree and the construction of an eight-storey mixed-use building comprising ground floor cafe, two levels of car parking (40 car parking spaces), six levels of residential apartments (total of 36 apartments) and associated landscaping.

The proposal will be discussed in further detail below.

2.1 Ground Level and Level 1

The Ground Level of the proposed development will comprise of a cafe, parking facilities (provision of car, scooter and bicycle spaces), waste storage, plant/services, and landscaping. The café will be approximately 71 square metres in area and will be located adjacent to residential amenities such as the entry foyer, lift/stair access, and mailboxes.

Level 1 will include additional car parking spaces (accessible from Ground Level via a car lift), as well as a services/plant room.

One regulated Eucalyptus tree, with a circumference measuring 2.07 metres, is also proposed to be removed.

2.1.1 Parking and Access

A total of 40 car parking spaces have been provided for the proposed development. These spaces have been allocated as follows:

- two spaces for the cafe;
- two visitor spaces;
- 36 spaces for the residential apartments;

In addition, bicycle parking will be provided at ground level, and three scooter parks will be provided over the two levels (one on the ground level and two on Level 1). A total of 8 visitor bicycle parking spaces will be provided in the form of bike racks adjacent to the apartment foyer entrance, with an additional bicycle parking store room for residents in the south western corner of the carpark capable of accommodating up to 25 parking spaces.

The parking area will be accessible via a right-of-way over an existing driveway adjacent to the northeast boundary. Vehicles will enter the site in a forward direction through the entry-only auto sliding gate to the north east of the car parking area. They will then move in a one-way, anti-clockwise direction to a parking space on the ground floor, or take the car lift to access Level 1 parking. Vehicles are then able to exit the parking area via the exit-only auto sliding gates to the south east, to Anzac Highway in a forward motion.

2.1.2 Waste Facilities

Waste facilities for the proposed development are to be shared by the residential and commercial occupants of the building. Both users will be required to take their waste to the communal bin/waste storage area located in the carpark on the ground floor.

A private contractor will be engaged for waste collection. It is proposed that a small waste truck of 7.4 metres in length will be used to access the site and remove the waste generated by the residential and commercial land uses. The waste contractor will enter the site in a forward motion, and reverse partly into the bin store area via the roller door (2.8 metres in height), leaving a 3 metre clear width in the driveway for vehicles to pass. The contractor will then load the waste, and exit the site in a forward motion. Waste collection will be undertaken outside of peak periods, as is the existing arrangement with commercial and residential bins in the area.

The waste room is proposed to contain six 240L general waste bins and two 1100L recyclable waste bins. The size of the waste room and number of bins identified are adequate to service the development.

2.1.3 Landscaping

Extensive landscaping is proposed along the frontage of the site and along the north eastern boundary adjoining the right of way. This landscaping will feature a combination of trees and shrubbery (ranging between medium and small in size), the species of which are identified on the plans prepared by Piteo Design Architects and included in Appendix 6.

2.2 Level 2 to Level 7

Residential apartments are proposed to be located on Level 2 through to Level 7, and will include a combination of two and three bedroom apartments. Specifically, each floor will comprise of:

- Four, two bedroom and two bathroom apartments with floor areas ranging between 97.25 square metres and 98.31 square metres and balconies of 13.95 square metres; and
- Two, three bedroom and two bathroom apartments each with a floor area of 103.59 square metres and balconies of 12.4 square metres.

At these levels, the building will be setback 3.74 metres from the Anzac Highway frontage and 3 metres from the rear. The side setbacks will vary from between 0 metres and 4.85 metres.

2.3 Building Design

The proposed building is contemporary in design and appearance, featuring the following materials and colours:

- precast concrete panels;
- face brick walls;
- hit and miss face brick 'breeze wall';
- painted render finishing to blockwork;
- timber composite batten screening;
- 'Cor-ten' steel cladding;
- woven wire perforated metal screen sliding panels; and
- powder-coated aluminium privacy screens.

The material and colour palette together with the overall form of the building provide a district podium element and a simplistic robust tower above that is highly articulated and modulated through distinct precast concrete panels and screening elements. The depth/reveals created by the balcony elements also provides a play of shadow and light to create visual interest across the facades.

2.4 Environmental

2.4.1 Ecological Sustainable Development

The intent of the proposed ESD initiatives is to reduce the demands on active systems by enhancing the passive performance of the building. This includes optimising the network of installed systems with the development's built form, which importantly features interactive solar shading.

The design also features shading, insulation, natural light, ventilation and lifespan considerations including, but not limited to:

- solar panels on roof;
- energy efficient LED lighting;
- water saving fixtures and fittings
- high performance ceiling insulation; and
- low environmental impact by use of low embodied energy materials and finishes and low water usage features and plantings.

2.4.2 Noise

Given the nature of the proposed land uses, specific measures have been recommended to ensure that the dividing walls and floors between the apartments comply with the requirements of Building Code of Australia for sound insulation. This is considered to be adequate to both contain internal sounds and repel noise from traffic in the locality, including the proposed cafe.

2.4.3 Contamination

Given the existing and historical use of the site as a residential property, it is considered that there would be a very low risk of contamination being present which would pose unacceptable health or environmental risks to future residents, visitors, pedestrians and other users accessing the site.

2.5 Category of Development

The proposed development is designated as a Category 1 development, as it is a residential flat building which is not located adjacent to a Residential Zone or Historic Conservation Zone.

3. SITE AND LOCALITY

The subject site is located on the southern side of Anzac Highway between Stuart Street to the northeast and Beckman Street to the southwest. The site comprises of a single allotment, legally described as Allotment 10 in Certificate of Title 5070 Volume 580, otherwise known as 192 Anzac Highway, Glandore.

Figure 3.1 *Subject site*

The subject site has a frontage to Anzac Highway of 29.76 metres, a depth of 32.25 metres and an overall site area of 959.76 square metres.

The site has a legal right-of-way over an existing driveway adjacent to the northeast boundary.

The site is located wholly within Boulevard Policy Area 34 of the Urban Corridor Zone.

A single storey, detached dwelling and associated outbuildings exist on the site. Access to the site is gained via the right-of-way which is also used by the dwellings to the south east of the subject site.

There are four large Eucalyptus trees in the northern corner of the site, one of which is regulated.

The dwellings immediately surrounding the subject site are in the form of residential flat buildings, however the majority of the greater locality is dominated by single storey detached dwellings. To the southwest of the site on the opposite side of Anzac Highway is the Meridian Apartments development, which has a height of between 5 and 9 levels.

The Kurralta Central Shopping Centre is located within 200 metres to the north east of the subject site which includes a range of retail shops take away restaurants, supermarkets, pharmacy, banks and other services.

The subject site is highly accessibly by public transport, with the tram network located approximately 500 metres to the south, and numerous bus stops within 200 metres along both sides of Anzac Highway and Beckman Street.

Anzac Highway is a two-way arterial road which supports three vehicle lanes in both directions, separated by a raised median strip. The road reserve is approximately 40 metres wide with on-street car parking permitted outside of clearway times. Anzac Highway is restricted to 60 kilometres per hour and carries approximately 39,000 vehicles per day.

The median strip, as well as the verges on either side of the roadway are vegetated with lawns and large mature trees.

The site does not adjoin another Zone.

4. DEVELOPMENT ASSESSMENT

The proposed development is located within Boulevard Policy Area 34 of the Urban Corridor Zone as specified in the City of West Torrens Development Plan (consolidated version 30 May 2017).

Our planning assessment focuses on the matters which we consider most relevant in determining the merit, or otherwise, of the proposal, namely:

- Desired character;
- Building appearance and design;
- Setbacks;
- Apartment design;
- Parking, access and traffic;
- Crime prevention;
- Regulated Trees; and
- Environmental Considerations.

Our following assessment should be read in conjunction with the proposal plans and specialist reports accompanying the development application all included as appendices to this planning statement.

4.1 Desired Character

The desired character of the Urban Corridor Zone seeks to increase densities to within a medium to high range. As one of the key zones where change in built form is envisaged, buildings will be recognised for their design excellence. Development should focus on creating an interesting pedestrian environment and human scale at ground level through careful building articulation and fenestration, verandas, balconies, canopies and landscaping. Incorporation of mixed use buildings where non-residential land uses are located on the ground floor, and residential dwellings above is also encouraged.

Where a development adjoins a residential zone, a transition in building height is encouraged to minimise impacts on lower density environments. This can be achieved by concentrating the height, mass and intensity of the development to the road frontage, varying building heights and providing adequate side and rear setbacks.

The proposed development seeks to construct 36 residential apartments on the subject site, and equates to a high density development which is anticipated in the Boulevard Policy Area 34.

The proposed development is located within a section of Anzac Highway which will experience significant change transforming the existing low density character and scale to a much higher density and scale. The proposal is consistent with the desired character in this regard.

In order to effectively manage the height of the building in its current lower scale context, the proposal has been designed to achieve a human scale through building articulation, a defined podium element, high quality landscaping, and an activated ground level café tenancy. The site is also physically separated from the Residential Zone by some 30 metres. As such, a transition in building height is not necessary in this instance. To respect the existing lower scale development to the south, the building is setback 3 metres from the rear boundary between Levels 2 to 7 with a highly articulated façade to mitigate any impacts the higher scale may present upon the locality and the Residential Zone further south and east.

Respecting the above, we have formed the opinion that the proposed development is consistent with the desired character for Boulevard Policy Area 34 and Urban Corridor Zone.

4.2 Building Appearance and Design

Boulevard Policy Area 34

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.*

Urban Corridor Zone

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 13 *Except where airport building height restrictions prevail or the interface height provisions require a lesser height, building heights (excluding any rooftop mechanical plant or equipment) should be consistent with the following parameters:*

Policy area	Minimum building height (above natural ground height)	Maximum building height (above natural ground height)
Boulevard Policy Area 34	3 storeys, or 4 storeys for land facing the Adelaide Park Lands.	Allotments abutting **Residential Character Glandore Policy Area 24**, and allotments between Syme Street and South Road: 3 storeys and 12.5 metres All other allotments: 8 storeys and up to 32.5 metres

Design and Appearance

PDC 1	*Buildings should reflect the desired character of the locality while incorporating contemporary designs that have regard to the following:* *(a) building height, mass and proportion* *(b) external materials, patterns, colours and decorative elements* *(c) roof form and pitch* *(d) façade articulation and detailing* *(e) verandas, eaves, parapets and window screens.*
PDC 15	*Building design should emphasise pedestrian entry points to provide perceptible and direct access from public street frontages and vehicle parking areas.*
PDC 16	*In mixed use and medium and high density residential areas, development facing the street should be designed to provide interesting and pedestrian friendly street frontages by:* *(a) including features such as frequent doors and display windows, retail shopfronts and/or outdoor eating or dining areas* *(b) minimising the frontage for fire escapes, service doors, plant and equipment hatches* *(c) avoiding undercroft, semi-basement or ground floor vehicle parking that is visible from the primary street frontage* *(d) using colour, vertical and horizontal elements, roof overhangs and other design techniques to provide visual interest and reduce massing.*
PDC 18	*Multi level vehicle parking areas within buildings should be designed, sited and screened from public view by an appropriate combination of built form, landscaping and/or visual art while still allowing for natural ventilation within these structures.*

Medium and High Rise Development (3 or more storeys)

PDC 1	*Buildings should be designed to respond to key features of the prevailing local context within the same zone as the development. This may be achieved through design features such as vertical rhythm, proportions, composition, material use, parapet or balcony height, and use of solid and glass.*
PDC 3	*Windows and doors, awnings, eaves, verandas or other similar elements should be used to provide variation of light and shadow and contribute to a sense of depth in the building façade.*

PDC 4 *Buildings should:*

(a) achieve a comfortable human scale at ground level through the use of elements such as variation in materials and form, building projections and elements that provide shelter (for example awnings, verandas, and tree canopies)

(b) be designed to reduce visual mass by breaking up the building façade into distinct elements

(c) ensure walls on the boundary that are visible from public land include visually interesting treatments to break up large blank facades.

PDC 6 *Materials and finishes should be selected to be durable and age well to minimise ongoing maintenance requirements. This may be achieved through the use of materials such as masonry, natural stone, prefinished materials that minimise staining, discolouring or deterioration, and avoiding painted surfaces particularly above ground level.*

PDC 7 *Balconies should be integrated into the overall architectural form and detail of the development and should:*

(a) utilise sun screens, pergolas, louvres and openable walls to control sunlight and wind

(b) be designed and positioned to respond to daylight, wind, and acoustic conditions to maximise comfort and provide visual privacy

(c) allow views and casual surveillance of the street while providing for safety and visual privacy of nearby living spaces and private outdoor areas

(d) be of sufficient size, particularly depth, to accommodate outdoor seating.

PDC 11 *To contribute to direct pedestrian access and street level activation, the finished ground level of buildings should be no more than 1.2 metres above the level of the footpath, except for common entrances to apartment buildings which should be at ground level or universally accessible.*

PDC 14 *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.

PDC 23 *Deep soil zones should be provided to retain existing vegetation or provide areas that can accommodate new deep root vegetation, including tall trees with large canopies.*

One way of achieving this is in accordance with the following table:

Site area	Minimum deep soil area	Minimum dimension	Tree/ deep soil zones
<300m^2	10m^2	1.5 metres	1 small tree / 10m^2 deep soil
300-1500m^2	7% site area	3 metres	1 medium tree / 30m^2 deep soil
>1500m^2	7% site area	6 metres	1 large or medium tree / 60m^2 deep soil
Tree size and site area definitions			
Small tree	< 6 metres mature height and < less than 4 metres canopy spread		
Medium tree	6-12 metres mature height and 4-8 metres canopy spread		
Large tree	12 metres mature height and > 8 metres canopy spread		
Site area	The total area for development site, not average area per dwelling		

PDC 24 *Deep soil zones should be provided with access to natural light to assist in maintaining vegetation health.*

Residential Development

PDC 30 *Site facilities for group dwellings, multiple dwellings and residential flat buildings should include:*

(a) mail box facilities sited close to the major pedestrian entrance to the site

(b) bicycle parking for residents and visitors (for developments containing more than 6 dwellings)

(c) household waste and recyclable material storage areas away from dwellings.

Landscaping, Fences and Walls

PDC 1 *Development should incorporate open space and landscaping and minimise hard paved surfaces in order to:*

(a) complement built form and reduce the visual impact of larger buildings (eg taller and broader plantings against taller and bulkier building components)

(b) enhance the appearance of road frontages

(c) screen service yards, loading areas and outdoor storage areas

(d) *minimise maintenance and watering requirements*

(e) *enhance and define outdoor spaces, including car parking areas*

(f) *maximise shade and shelter*

(g) *assist in climate control within and around buildings*

(h) *minimise heat absorption and reflection*

(i) *maintain privacy*

(j) *maximise stormwater reuse*

(k) *complement existing vegetation, including native vegetation*

(l) *contribute to the viability of ecosystems and species*

(m) *promote water and biodiversity conservation.*

PDC 4	*A minimum of 10 per cent of a development site should be landscaped. The development site refers to the land which incorporates a development and all the features and facilities associated with that development, such as outbuildings, driveways, parking areas, landscaped areas, service yards and fences. Where a number of buildings or dwellings have shared use of such features and facilities, the development site incorporates all such buildings or dwellings and their shared features and facilities.*

As discussed in the previous section, the Urban Corridor Zone seeks development which exhibits design excellence. In the pursuit of design excellence, the relevant provisions encourage:

- non-residential development at the ground and first floor and residential development above, and wholly residential buildings;
- buildings which are designed to respond to key features of existing development in the locality, by way of vertical rhythm, composition, material use, parapet or balcony height, and use of solid and glass;
- a pedestrian scale at street level by including a clearly defined podium and distinct landscaped edge;
- levels above the defined podium or street wall setback a minimum of 2 metres from that wall;
- a well articulated design through variations in forms, materials, openings and colours;
- a building height that does not impact upon Adelaide Airport operations;
- building designs that emphasise pedestrian entry points to provide perceptible and direct access from public street frontages and vehicle parking areas;
- an active street frontage including features that attract people to the locality such as frequent doors and display windows, retail shopfronts and/or outdoor eating or dining areas;
- using colour, vertical and horizontal elements, roof overhangs and other design techniques to provide visual interest and reduced massing;

- above-ground parking areas within buildings to be designed, sited and screened from public view by an appropriate combination of built form, landscaping and/or visual art while still allowing for natural ventilation;
- adequate separation between habitable room windows and balconies from other buildings to provide visual and acoustic privacy for dwelling occupants and allow the infiltration of daylight into interior and outdoor spaces;
- ensure living rooms have, at a minimum, an attractive short and/or long range visual outlook;
- site facilities such as mail box facilities, bicycle parking for residents and visitors and adequate household waste and recyclable material storage areas away from dwellings; and
- landscaping to minimise hard paved surfaces in order to complement built form and reduce the visual impact of larger buildings, enhance the appearance of road frontages and parking/service areas as well as achieving a range of passive ESD initiatives.

We are of the opinion that the proposed development achieves design excellence for the following reasons:

- the inclusion of the café tenancy on the ground level creates an active frontage with upper level residential land uses (Policy Area PDC 1);
- along with creating activity by attracting residents, the community and visitors to the site, the proposed café, use of glazing and landscaping will assist in creating a human scale and a high pedestrian amenity (Design and Appearance PDC 16);. This, along with the inclusion of
- this human scale is further enhanced through the inclusion of variations in materials and form, building projections and elements that provide shelter. These also assist in breaking up the building mass and create a visually interesting building (Medium and High Rise Development PDC 4);
- the building features a clearly defined, two storey podium (Zone PDC 7);
- although the levels above the podium are not setback 2 metres (1.34 metre setback proposed), we have formed the opinion that the podium reads as a district element to satisfy the intent of Zone PDC 7. The proposed development also includes high quality landscaping, canopies, glazing and active land uses at ground level to contribute positively to the pedestrian scale and amenity. Further, the bulk of the second level expressed through the brickwork patination defines the podium;
- textured brickwork, compatible colour pallets, canopies, horizontal massing and privacy screens have been used to articulate the building and create visual interest, whilst also assisting in reducing the overall massing of the development (Zone PDC 8 and Design and Appearance PDC 1);
- the building has been designed to respect the existing development in the locality through material selection, parapet heights, and the use of solid and glass (Medium and High Rise Development PDC 1);
- materials and finishes (such as the brickwork, precast concrete and steel) selected are durable and require little maintenance (Medium and High Rise Development PDC 6);
- balconies have been adequately separated to achieve a high standard of internal amenity, located to provide ample sunlight/shading to the internal and external living areas (Medium and High Rise Development PDC 14)*;*

- windows, balconies, and canopies have been located on all sides of the building to create a sense of depth (Medium and High Rise Development PDC 3);
- the proposed building height of eight storeys or 27.3 metres is envisaged by Zone PDC 13, and further, consultation has been undertaken with Adelaide Airport who have confirmed that the proposed building height will not impact upon airport operations;
- the void in the western corner of Level 1 creates a two storey space which is complemented by the curved wall of the café to clearly define the entrance to the building (Design and Appearance PDC 15);
- the proposed development has located the parking facilities behind the active use of the café, and articulated these parking levels whilst also permitting natural ventilation of the area. The upper level carpark is also screened to an acceptable level through a permeable brick patination (Design and Appearance PDC 18);
- mail box facilities have been conveniently located in the foyer entrance to the apartments on the ground floor. Further, bicycle parking has been provided and the waste storage area has been separated from any sensitive areas (Residential Development PDC 30);
- the finished ground level will be less than 1.2 metres above the level of the footpath (Medium and High Rise Development PDC 11);
- high quality landscaping has been provided to the Anzac Highway façade of the development in order to complement the built form, reduce the visual impact of the building, and enhance the appearance of the road frontages. Further, the proposed landscaping will add to pedestrian amenity, minimise hard paved surfaces, and achieve a range of passive ESD initiatives (Landscaping, Fences and Walls PDC 1);
- the proposal includes six Chinese Pistachio trees along the northern boundary (adjacent Anzac Highway). These trees are classified as "medium trees" due to their potential height of up to 12 metres and canopy spread of up to 8 metres (Medium and High Rise Development PDC 23 and PDC 24); and
- 10 percent of the subject site is proposed to be landscaped (Landscaping, Fences and Walls PDC 4).

Respecting the above, we have formed the opinion that the proposed development has satisfied the relevant provisions in relation to design and appearance.

4.3 Setbacks

Urban Corridor Zone

PDC 16 *Buildings (excluding verandas, porticos and the like) should be set back from the primary road frontage in accordance with the following parameters:*

Policy area	Minimum setback from the primary road frontage where it is Port Road, Anzac Highway or Henley Beach Road	Minimum setback from the primary road frontage in all other cases
Boulevard Policy Area 34	No minimum at Port Road 3 metres at Anzac Highway	2 metres

PDC 18 *Buildings (excluding verandahs, porticos and the like) should be set back in accordance with the following parameters:*

Designated area	Minimum setback from rear allotment boundary	Minimum setback from side boundaries (where not on a street boundary)
Boulevard Policy Area 34	3 metres where the subject land directly abuts an allotment of a different zone 0 metres in all other cases, except where the development abuts the wall of an existing or simultaneously constructed building on the adjoining land.	For allotments with a frontage width of 20 metres or less: no minimum up to a height of 2 storeys and 3 metres above this height. For allotments with a frontage width of more than 20 metres: 3 metres.

Design and Appearance

PDC 3 *Where a building is sited on or close to a side boundary, the side boundary wall should be sited and limited in length and height to minimise:*

(a) the visual impact of the building as viewed from adjoining properties

(b) overshadowing of adjoining properties and allow adequate sun light to neighbouring buildings.

PDC 20 *Except in areas where a new character is desired, the setback of buildings from public roads should:*

(a) be similar to, or compatible with, setbacks of buildings on adjoining land and other buildings in the locality

(b) contribute positively to the function, appearance and/or desired character of the locality.

Upon our review of the Development Plan there are a range of quantitative and qualitative provisions that guide building setbacks for the proposed development. PDC's 16 and 18 in the Urban Corridor Zone list the quantitative requirements for front, side and rear setbacks as follows:

- Setback from Anzac Highway – 3 metres;
- Rear setback – 0 metres; and
- Side setbacks – 3 metres.

The proposed development includes the following setbacks:

- Setback from Anzac Highway:
  - » Ground Level to Level 1 – 2.4 metres; and
  - » Level 2 to Level 7 – 3.74 metres.

- Rear setback:
  - Ground Level to Level 1 – 0 metres; and
  - Level 2 to Level 7 – 3 metres.
- Side setbacks:
  - North eastern boundary – 0 metres; and
  - South western boundary –
    - Ground Level to Level 1 – 0 metres; and
    - Level 2 to Level 7 – between 0 metres and 4.85 metres.

In relation to the front setback, adequate separation is achieved between the building and Anzac Highway to allow for the provision of meaningful and high quality landscaping and activation. The building setback and design of the ground level interface will contribute positively to the pedestrian experience along Anzac Highway and will assist in creating a human scale. The proposed landscaping will also assist in breaking up the bulk of the proposed building and provide a further screening measure to what we consider a well-designed above ground car park level.

In relation to side setbacks, the proposed building is sited on the right-of-way boundary. Whilst this setback does not satisfy the 3 metre guideline, the fact that the right-of-way cannot be built upon will ensure that the amenity of occupants will be maintained and future development on the opposite side of the right-of-way will not be restricted.

The building is sited on southwest boundary and adjoins ground level private open space areas of single storey flats. Recognising the materiality of the boundary wall and the intent of Design and Appearance PDC 3, we are of the opinion that the extent of boundary development will mitigate visual and overshadowing impacts.

It is also important to note that the proposed boundary development is unlikely to result in any greater degree of visual or overshadowing impacts than if the envisaged setbacks were adopted. As such, we consider the extent of side boundary development reasonable in the context of the Urban Corridor Zoning of the subject and adjacent sites.

Notwithstanding the above, the building is setback a greater distance to its rear between Levels 2 to 7 where no setback is envisaged. In our opinion, the provision of this setback to the rear off-sets the encroachment within the southwest side setback on the basis that it responds to the existing lower scale development and Residential Zone some 30 metres to the south and east.

Overall, we have formed the opinion that the proposed setbacks will contribute positively to the function, appearance and desired character of the locality.

4.4 Apartment Design

Medium and High Rise Development (3 or more storeys)

PDC 6 *Buildings comprising more than 10 dwellings should provide a variety of dwelling sizes and a range in the number of bedrooms per dwelling.*

PDC 7 *Balconies should be integrated into the overall architectural form and detail of the development and should:*

(a) utilise sun screens, pergolas, louvres and openable walls to control sunlight and wind

(b) be designed and positioned to respond to daylight, wind, and acoustic conditions to maximise comfort and provide visual privacy

(c) allow views and casual surveillance of the street while providing for safety and visual privacy of nearby living spaces and private outdoor areas

(d) be of sufficient size, particularly depth, to accommodate outdoor seating.

PDC 15 *Living rooms should have a satisfactory short range visual outlook to public or private open space.*

PDC 19 *Multi-storey buildings should include a variety of internal designs that will facilitate adaptive reuse, including the conversion of ground floor residential to future commercial use (i.e. by including floor to ceiling heights suitable for commercial use).*

PDC 25 *Dwellings should provide a covered storage area of not less than 8 cubic metres in one or more of the following areas:*

(a) in the dwelling (but not including a habitable room)

(b) in a garage, carport, outbuilding or an on-site communal facility and be conveniently located and screened from view from streets and neighbouring properties.

Residential Development

PDC 9 *Residential development should provide a high quality living environment by ensuring the following minimum internal floor areas (including internal storage areas but not including balconies and car parking):*

(a) studio (where there is no separate bedroom): 37 square metres

(b) 1 bedroom dwelling/apartment: 50 square metres

(c) 2 bedroom dwelling/apartment: 75 square metres

(d) 3+ bedroom dwelling/apartment: 100 square metres.

PDC 18 *Private open space (available for exclusive use by residents of each dwelling) should be provided for each dwelling and should be sited and designed:*

(a) to be accessed directly from the internal living areas of the dwelling

(b) to be generally at ground level (other than for residential flat buildings) and to the side or rear of a dwelling and screened for privacy

(c) *to take advantage of, but not adversely affect, natural features of the site*

(d) *to minimise overlooking from adjacent buildings*

(e) *to achieve separation from bedroom windows on adjoining sites*

(f) *to have a northerly aspect to provide for comfortable year round use*

(g) *not to be significantly shaded during winter by the associated dwelling or adjacent development*

(h) *to be partly shaded in summer*

(i) *to minimise noise or air quality impacts that may arise from traffic, industry or other business activities within the locality*

(j) *to have sufficient area and shape to be functional, taking into consideration the location of the dwelling, and the dimension and gradient of the site.*

PDC 22 *Dwellings located above ground level should provide private open space in accordance with the following table:*

Dwelling type	Minimum area of private open space
Studio (where there is no separate bedroom)	No minimum requirement
1 bedroom dwelling	8 square metres
2 bedroom dwelling	11 square metres
3+ bedroom dwelling	15 square metres

Medium to high residential developments should provide a variety of apartment types which are adaptable and of high amenity (PDC 6, and 8). The level of amenity is determined through the provision of adequate internal areas that maximise natural light and ventilation, private open space and storage.

The area of each two bedroom apartment and associated balcony, exceeds the prescribed minimum areas and each apartment is afforded with an attractive view or outlook. The three bedroom apartments exceed the minimum prescribed internal areas, however fall short in the provision of private open space by some 2.6 square metres. Whilst these areas fall short of the prescribed minimum, the areas are well dimensioned to provide a functional area of high amenity to future apartment occupiers. As such, we do not consider the shortfall fatal in this instance.

The internal and external storage areas for each apartment exceed the minimum prescribed areas for all apartment types.

Furthermore, the design of the building, and the orientation and configuration of apartment layouts achieve all relevant passive design principles with natural daylight and ventilation to all habitable rooms, high quality views or outlooks, and high quality external spaces.

All dwellings will be designed in accordance with Minister Specification SA 78B Construction requirements for the control external sound. Accordingly, we believe the proposal achieves the relevant provisions of the Development Plan.

4.5 Parking, Access and Traffic

Urban Corridor Zone

PDC 6 *Vehicle parking should be located to the rear of development or not be visible from public land along the primary road frontage.*

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 22 *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.*

Transportation and Access

PDC 43 *On-site visitor parking spaces should be sited and designed to:*

(a) not dominate internal site layout

(b) be clearly defined as visitor spaces not specifically associated with any particular dwelling

(c) be accessible to visitors at all times.

PDC 44 *On-site vehicle parking should be provided having regard to:*

(a) the number, nature and size of proposed dwellings

(b) proximity to centre facilities, public and community transport within walking distance of the dwellings

(c) the anticipated mobility and transport requirements of the likely occupants, particularly groups such as aged persons.

The Urban Corridor Zone seeks to preserve the amenity, function and safety of Anzac Highway by encouraging development which provides vehicle access from side streets, rear access ways, or coordinated through-property access rights of way. Further, parking areas should be located to the rear of the development and not be visible from public land. Multi-level parking structures should aim to contribute positively to the streetscape by way of design (height, massing and scale), façade treatments, and by enhancing active frontages through provision of commercial land uses along ground floor frontages.

A Transport Impact Assessment has been prepared by GTA Consultants and is submitted with the report at Appendix 4. The report identifies that of a total of 40 proposed car parking spaces, 36 are allocated for residential use, two for visitors and two for the café tenancy. In addition, three scooter parks are provided, along with a large ground floor bicycle store room (4.4 metres by 5 metres) and an outdoor bicycle rack for visitors.

With reference to *Table WeTo/6 - Off Street Vehicle Parking Requirements* for Urban Corridor Zone, GTA confirms that whilst the proposal meets the required number of parking spaces for the café, there is an overall shortfall of ten spaces for residential use, seven of which are required for visitors.

Despite this shortfall, we and GTA consider the provision of one car parking space per apartment acceptable, given the Urban Corridor Zone is in a designated area under Table WeTo/6. The proximity of the subject site to frequent public transport, Kurralta Park Central Shopping Centre, and the provision of a large number of bicycle parking spaces on the ground floor are all factors supporting a reduced car parking rate. Further, GTA acknowledge and accept that the parking spaces allocated for the café could also be used as additional visitor parking outside of the café's operational hours. This is consistent with Zone PDC 22. Notwithstanding, GTA also consider there to be adequate on-street car parking available (outside of clearway times) on Anzac Highway and in the neighbouring street network.

In relation to the provision of bicycle parking, GTA have concluded that the required 9 bicycle spaces for residents and 4 for visitors can be more than accommodated within the bicycle parking facilities located on the ground floor.

GTA have also assessed the car parking layout, and have determined it to be generally compliant with the relevant Australian standards. As recommended by GTA, carpark number 1 has been changed to a resident car parking space, and car park 8 has been amended to be a width of 3 metres.

Waste vehicle movements have also been assessed, and it has been concluded that there is adequate manoeuvrability and overhead space for the truck to enter, load, unload, and exit the site in a forward direction.

Overall, GTA have concluded that the proposed development is not expected to compromise the function or safety of Anzac Highway or the subject site, and that the supply of both car and bicycle parking is acceptable. As such, we have formed the opinion that the proposed development satisfies the relevant provisions in relation to parking, traffic and access.

4.6 Crime Prevention

Crime Prevention

Objective 1	*A safe, secure, crime resistant environment where land uses are integrated and designed to facilitate community surveillance.*
PDC 1	*Development should be designed to maximise surveillance of public spaces through the incorporation of clear lines of sight, appropriate lighting and the use of visible permeable barriers wherever practicable.*
PDC 2	*Buildings should be designed to overlook public and communal streets and public open space to allow casual surveillance.*
PDC 3	*Development should provide a robust environment that is resistant to vandalism and graffiti.*
PDC 6	*Landscaping should be used to assist in discouraging crime by:* *(a) screen planting areas susceptible to vandalism* *(b) planting trees or ground covers, rather than shrubs, alongside footpaths*

(c) *planting vegetation other than ground covers a minimum distance of two metres from footpaths to reduce concealment opportunities.*

PDC 7 *Site planning, buildings, fences, landscaping and other features should clearly differentiate public, communal and private areas.*

PDC 10 *Development should avoid pedestrian entrapment spots and movement predictors (eg routes or paths that are predictable or unchangeable and offer no choice to pedestrians).*

The Development Plan seeks to maximise safety by encouraging clear lines of sight, appropriate lighting and the use of visibly permeable barriers (Crime Prevention PDC 1). Crime Prevention PDC 2 also states that buildings should overlook public and communal areas, and PDC 6 describes how landscaping could be utilised to discourage crime.

The proposal has been designed with a focus on creating a high quality experience at a pedestrian level and as such, fundamental considerations have been made in relation to ensuring pedestrian safety. The landscaping, building entrances, lighting, use of high quality materials, and casual surveillance permitted through the proposed design is anticipated to create an environment which deters crime.

In our opinion the proposed development achieves the intent of the Development Plan provisions through the following:

- promoting natural surveillance of the public realm (Anzac Highway) from upper level balconies and the café on ground level;
- arranging living areas and designing windows and balconies/terraces to overlook the public realm and/or the right-of-way;
- ensuring clear lines of sight are provided at locations at ground level with direct sightlines capable of being achieved between Anzac Highway and the foyer, and into the cafe;
- avoiding any opportunities for concealment;
- providing separate doors and lift access to the residential apartments to restrict public access, and promoting territoriality or sense of ownership through the clear delineation;
- adequate and consistent lighting of building entrances, parking and pedestrian areas to avoid the creation of shadowed areas;
- only trees and ground covers have been included alongside the footpath, to reduce opportunities for vandalism or concealment; and
- the use of robust and durable design features to discourage vandalism.

As such, we have formed the opinion that the proposal satisfies the relevant crime prevention provisions.

4.7 Regulated Trees

Objective 2 *Development in balance with preserving regulated trees that demonstrate one or more of the following attributes:*

(a) *significantly contributes to the character or visual amenity of the locality*

(b) *indigenous to the locality*

(c) *a rare or endangered species*

(d) *an important habitat for native fauna.*

PDC 2 *A regulated tree should not be removed or damaged other than where it can be demonstrated that one or more of the following apply:*

(a) *the tree is diseased and its life expectancy is short*

(b) *the tree represents a material risk to public or private safety*

(c) *the tree is causing damage to a building*

(d) *development that is reasonable and expected would not otherwise be possible*

(e) *the work is required for the removal of dead wood, treatment of disease, or is in the general interests of the health of the tree.*

The Development Plan seeks to preserve trees which provide important aesthetic and/or environmental benefit, except where the tree exhibits any of the following (with reference to Regulated Trees PDC 2):

- the tree is diseased and its life expectancy is short;
- the tree represents a material risk to public or private safety;
- the tree is causing damage to a building;
- development that is reasonable and expected would not otherwise be possible; and
- the work is required for the removal of dead wood, treatment of disease, or is in the general interests of the health of the tree.

The proposed development seeks to remove one regulated tree, measuring 2.07 metres in circumference. It is not feasible to retain the tree without detrimentally compromising its health, or restricting the reasonable development of the site in the context of the desired character of the Urban Corridor Zone. The proposed development is consistent with the desired character for the Zone/Policy Area and will provide a landscaping scheme that will increase the number of trees and contribute to a high quality streetscape appearance. As such, we believe it is acceptable to consider the proposal as "reasonable and expected" development in the context of the Urban Corridor Zone.

In light of the above, and respecting Regulated Trees PDC 2, the tree warrants removal due to its position on the subject site preventing "reasonable and expected" development.

4.8 Environmental

4.8.1 Overshadowing

Urban Corridor Zone

PDC 15 *To minimise overshadowing of sensitive development outside of the zone, buildings should ensure that:*

a) *north-facing windows to habitable rooms of existing dwellings in adjacent zones receive at least 3 hours of direct sunlight over a portion of their surface between 9.00 am and 3.00 pm on 21 June*

b) *ground level open space of existing residential buildings in adjacent zones receive direct sunlight for a minimum of 2 hours between 9.00 am and 3.00 pm on 21 June to at least the smaller of the following:*

i. *half of the existing ground level open space*

ii. *35 square metres of the existing ground level open space (with at least one of the area's dimensions measuring no less than 2.5 metres).*

Residential Development

PDC 11 *Development should ensure that north-facing windows to habitable rooms of existing dwelling(s) on the same allotment, and on adjacent allotments, receive at least 3 hours of direct sunlight over a portion of their surface between 9.00 am and 5.00 pm on the 21 June.*

The most relevant provision in relation to overshadowing is Zone PDC 15, which suggests that development should minimise overshadowing of sensitive development outside of the zone. In winter, the proposed development will only marginally overshadow allotments in the neighbouring Residential Zone after 12:00 noon on the 21 June. This being the case, existing development within the Residential Zone will still receive at least three hours of direct sunlight on the 21 June.

We acknowledge that the proposed development will overshadow the neighbouring sites to some degree, however these dwellings are also located within the Urban Corridor Zone where higher densities are expected to result in a higher level of overshadowing. With specific reference to the residential flat building to the south west of the subject land, it should be noted that given the minimal setback of this building from the north eastern boundary, even a three storey building (the minimum building height envisaged for Urban Corridor Zone) would result in a similar degree of overshadowing.

In light of the above, the overshadowing resulting from the subject site is considered acceptable.

4.8.2 Overlooking

Design and Appearance

PDC 10 *Development should minimise direct overlooking of the habitable rooms and private open spaces of dwellings through measures such as:*

(a) appropriate site layout and building orientation

(b) off-setting the location of balconies and windows of habitable rooms with those of other buildings so that views are oblique rather than direct to avoid direct line of sight

(c) building setbacks from boundaries (including building boundary to boundary where appropriate) that interrupt views or that provide a spatial separation between balconies or windows of habitable rooms

(d) *screening devices (including fencing, obscure glazing, screens, external ventilation blinds, window hoods and shutters) that are integrated into the building design and have minimal negative effect on residents' or neighbours' amenity.*

Medium and High Rise Development (3 or more stories)

PDC 13 *The visual privacy of ground floor dwellings within multi-storey buildings should be protected through the use of design features such as the elevation of ground floors above street level, setbacks from street and the location of verandas, windows, porticos or the like.*

One way of achieving this is for ground floor levels for multi storey residential developments to be raised by up to 1.2 metres (provided access is not compromised where relevant).

Design techniques such as offsetting balconies and windows, varying setbacks, and using screening devices are identified in Design and Appearance PDC 10 as suitable ways of minimising overlooking.

The proposal utilises some of these techniques where required. This, along with the existing built form and overall separation distances between the proposal and existing developments in the locality, results in overlooking impacts which are not unreasonable.

4.8.3 Energy Efficiency

Energy Efficiency

PDC 1 *Development should provide for efficient solar access to buildings and open space all year around.*

PDC 2 *Buildings should be sited and designed:*

(a) *to ensure adequate natural light and winter sunlight is available to the main activity areas of adjacent buildings*

(b) *so that open spaces associated with the main activity areas face north for exposure to winter sun.*

PDC 3 *Development should facilitate the efficient use of photovoltaic cells and solar hot water systems by:*

(a) *taking into account overshadowing from neighbouring buildings*

(b) *designing roof orientation and pitches to maximise exposure to direct sunlight.*

Medium and High Rise Development (3 or more storeys)

PDC 20 *Multi-storey buildings should:*

(a) minimise detrimental micro-climatic and solar access impacts on adjacent land or buildings, including effects of patterns of wind, temperature, daylight, sunlight, glare and shadow

(b) incorporate roof designs that enable the provision of rain water tanks (where they are not provided elsewhere), photovoltaic cells and other features that enhance sustainability.

Development is encouraged to be designed and sited to allow year-round solar access to buildings and open space both on the subject site, and neighbouring allotments. Further, multi-storey buildings should seek to reduce their detrimental micro-climatic impacts through building design, and also include sustainable initiatives such as solar hot water and photovoltaic cells.

The proposal has been designed to reduce reliance on active systems through the provision of the following ESD initiatives:

- solar panels on roof;
- energy efficient LED lighting;
- water saving fixtures and fittings
- high performance ceiling insulation; and
- low environmental impact by use of low embodied energy materials and finishes and low water usage features and plantings.

Together with the passive design features previously identified, we have formed the opinion that the above initiatives satisfy the Development Plan requirements. As such, we believe the proposal exceeds the standard in relation to energy efficiency and sustainable design.

4.8.4 Waste

Medium and High Rise Development (3 or more storeys)

PDC 26 *Development should provide a dedicated area for the on-site collection and sorting of recyclable materials and refuse, green organic waste and wash-bay facilities for the ongoing maintenance of bins. This area should be screened from view from public areas so as to not to detract from the visual appearance of the ground floor.*

PDC 27 *Where the number of bins to be collected kerbside is 10 or more at any one time, provision should be made for on-site commercial collection.*

Waste

PDC 1 *Development should be sited and designed to prevent or minimise the generation of waste (including wastewater) by applying the following waste management hierarchy in the order of priority as shown below:*

(a) *avoiding the production of waste*

(b) *minimising waste production*

(c) *reusing waste*

(d) *recycling waste*

(e) *recovering part of the waste for re-use*

(f) *treating waste to reduce the potentially degrading impacts*

(g) *disposing of waste in an environmentally sound manner.*

PDC 6 *Development that involves the production and/or collection of waste and/or recyclable material should include designated collection and storage area(s) that are:*

(a) *screened and separated from adjoining areas*

(b) *located to avoid impacting on adjoining sensitive environments or land uses*

(c) *designed to ensure that wastes do not contaminate stormwater or enter the stormwater collection system*

(d) *located on an impervious sealed area graded to a collection point in order to minimise the movement of any solids or contamination of water*

(e) *protected from wind and stormwater and sealed to prevent leakage and minimise the emission of odours*

(f) *stored in such a manner that ensures that all waste is contained within the boundaries of the site until disposed of in an appropriate manner.*

The Development Plan encourages developments where the number of bins to be collected kerbside is 10 or more at any one time to provide for on-site commercial collection. This dedicated area should be screened and separated from sensitive areas to avoid negative impacts, sealed to contain waste materials and odours, and conveniently located for collection.

The proposed development provides a communal waste storage area on the ground level. This area has been conveniently located for residents and the café tenancy, whilst also being accessible for the waste collection vehicle. GTA Traffic Consultants have assessed the swept path for a waste collection vehicle of 7.4 metres in length, and have concluded that there is adequate overhead space and manoeuvring area for a truck to enter the site in a forward direction, collect waste, and then exit in a forward motion.

The bin storage area will be sited on an impervious sealed area graded to a collection point in order to minimise the movement of any solids or contamination of water. Waste will be separated, stored and collected on site in general and recycling waste bins. This is considered practical, and acceptable for the building.

We have formed the opinion that the proposed waste arrangements are appropriate for the proposed development.

4.8.1 Stormwater

Natural Resources

PDC 5 *Development should be designed to maximise conservation, minimise consumption and encourage re-use of water resources.*

PDC 6 *Development should not take place if it results in unsustainable use of surface or undergroundwater resources.*

PDC 8 *Water discharged from a development site should:*

(a) be of a physical, chemical and biological condition equivalent to or better than its pre-developed state

(b) not exceed the rate of discharge from the site as it existed in pre-development conditions.

PDC 9 *Development should have adequate provision to control any stormwater over-flow runoff from the site and should be sited and designed to improve the quality of stormwater and minimise pollutant transfer to receiving waters.*

PDC 10 *Development should include stormwater management systems to mitigate peak flows and manage the rate and duration of stormwater discharges from the site to ensure the carrying capacities of downstream systems are not overloaded.*

PDC 13 *Stormwater management systems should:*

(a) maximise the potential for stormwater harvesting and reuse, either on-site or as close as practicable to the source

(b) utilise, but not be limited to, one or more of the following harvesting methods:

i. the collection of roof water in tanks

ii. the discharge to open space, landscaping or garden areas, including strips adjacent to car parks

iii. the incorporation of detention and retention facilities

iv. aquifer recharge.

PDC 14 *Where it is not practicable to detain or dispose of stormwater on site, only clean stormwater runoff should enter the public stormwater drainage system.*

Stormwater should be managed in developments to maximise conservation, minimise consumption and encourage the re-use of water resources. There should be adequate provision to control over-flow runoff, minimise pollutant transfer, mitigate peak flows and manage the rate and duration of stormwater discharges.

A Stormwater and Drainage Plan has been prepared by MLEI and is included at Appendix 5. MLEI's findings conclude that the 11,000L underground detention tank will be adequate to control and manage the discharge of the peak flows. This will ensure that the pre-development flow rates are achieved.

Respecting the above, the proposal is considered to adequately satisfy the relevant stormwater management provisions.

5. CONCLUSION

In our opinion, the proposal satisfies the majority of the Development Plan provisions and represents a form of development that is envisaged within the Urban Corridor Zone and specifically, in the Boulevard Policy Area 34. Of particular note, the proposal:

- provides an overall building appearance and design that represents architectural merit in its entire presentation including at pedestrian level;
- respects the existing development in the locality through the inclusion of a 2 storey podium element, careful material selection, and use of solid and glass;
- is sited such that the building height, bulk, scale and mass that will not present any unreasonable impacts upon surrounding properties;
- provides high quality apartments which exceed the prescribed minimum internal areas with each apartment afforded with large balconies and an attractive view or outlook;
- provides apartment layouts which achieve all relevant passive design principles with natural daylight and ventilation to all habitable rooms, including shading;
- provides sufficient car and bicycle parking plus scooter parking;
- allows safe, convenient and effective movement for all vehicle types and pedestrians;
- provides for a safe and effective waste management plan;
- creates a safe, secure and crime resistant environment;
- incorporates a number of energy efficiency features;
- provides an acceptable stormwater management plan;
- presents no unreasonable overshadowing, overlooking, or visual impacts upon the surrounding area; and
- contributes to a range of housing types within close proximity to public transport links.

Accordingly, we believe the Development Assessment Commission should grant Development Plan Consent.

APPENDIX 1. DEVELOPMENT APPLICATION FORM

APPENDIX 2. ELECTRICITY ACT DECLARATION FORM

APPENDIX 3. CERTIFICATE OF TITLE

APPENDIX 4. TRANSPORT IMPACT ASSESSMENT

PREPARED BY GTA CONSULTANTS

APPENDIX 5. STORMWATER AND DRAINAGE PLAN

PREPARED BY MLEI

APPENDIX 6. PROPOSED PLANS AND DRAWINGS

PREPARED BY PITEO DESIGN ARCHITECTS

FJ & F Portelli Pty Ltd ACN 083 287 898 trading as

Port Adelaide Conveyancers

251 St. Vincent Street
PO Box 3029
Port Adelaide 5015
Ph: 08-8447-4255 Fax 08-8341-1179 LTO DX 58054

ABN No: 39 083 287 898

FRANCES PORTELLI
Registered Conveyancer
JOHN RADOVANOVIC
Consultant

File ref: F14500

29 March, 2016

Walpol Development Pty. Ltd. ATF Walpol Trust
12 Allandale Avenue
Glen Osmond SA 5064

Dear Maria and Tony

Purchase of 192 Anzac Highway Glandore
Cert. of Title : Volume 5070 Folio 580

We have pleasure in enclosing photocopies of the Certificate of Title for your purchase of the above property showing your name/s as registered proprietor/s. The ANZ BANKING GROUP LTD will of course hold your title as security until your loan is fully repaid.

We hope that should you be in a buying or selling situation in the future whether it be land, home or business, that you remember and recommend us to act on your behalf.

Wishing you all the best.

Yours faithfully
Port Adelaide Conveyancers
MEMBER AIC & REI

Frances Portelli CPC
Email: frances@portadelaideconveyancers.com.au
Encl:

Government of South Australia
Department of Planning, Transport and Infrastructure

Product	Register Search
Date/Time	29/03/2016 02:47PM
Customer Reference	F14500 Walpol Dev
Order ID	20160329008490
Cost	$27.25

The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.

Registrar-General

Certificate of Title - Volume 5070 Folio 580

REAL PROPERTY ACT, 1886
South Australia

Parent Title(s)	CT 4318/372
Dealing(s) Creating Title	CONVERTED TITLE
Title Issued	30/04/1992
Edition	7
Edition Issued	29/03/2016

Estate Type

FEE SIMPLE

Registered Proprietor

WALPOL DEVELOPMENT PTY. LTD. (ACN: 610 061 768)
OF 270 GRANGE ROAD FLINDERS PARK SA 5025

Description of Land

ALLOTMENT 10 DEPOSITED PLAN 19964
IN THE AREA NAMED GLANDORE
HUNDRED OF ADELAIDE

Easements

TOGETHER WITH FREE AND UNRESTRICTED RIGHT(S) OF WAY OVER THE LAND MARKED A

Schedule of Dealings

Dealing Number	Description
12484104	MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD. (ACN: 005 357 522)

Notations

Dealings Affecting Title

NIL

Priority Notices

NIL

Notations on Plan

NIL

Registrar-General's Notes

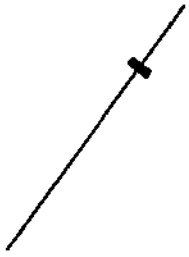
NIL

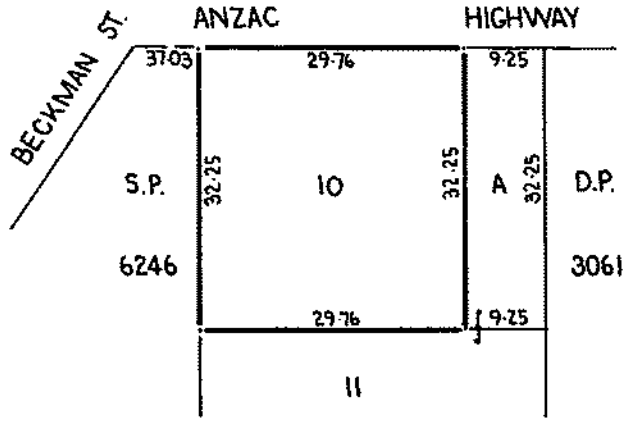
Administrative Interests

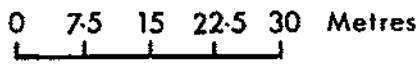
NIL

* Denotes the dealing has been re-lodged.

Product	Register Search
Date/Time	29/03/2016 02:47PM
Customer Reference	F14500 Walpol Dev
Order ID	20160329008490
Cost	$27.25







Government of South Australia
Department of Planning, Transport and Infrastructure

Product	Register Search
Date/Time	29/03/2016 02:47PM
Customer Reference	F14500 Walpol Dev
Order ID	20160329008490
Cost	$27.25

The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.

Registrar-General

Certificate of Title - Volume 5070 Folio 580

REAL PROPERTY ACT, 1886 South Australia

Parent Title(s)	CT 4318/372
Dealing(s) Creating Title	CONVERTED TITLE
Title Issued	30/04/1992
Edition	7
Edition Issued	29/03/2016

Estate Type

FEE SIMPLE

Registered Proprietor

WALPOL DEVELOPMENT PTY. LTD. (ACN: 610 061 768)
OF 270 GRANGE ROAD FLINDERS PARK SA 5025

Description of Land

ALLOTMENT 10 DEPOSITED PLAN 19964
IN THE AREA NAMED GLANDORE
HUNDRED OF ADELAIDE

Easements

TOGETHER WITH FREE AND UNRESTRICTED RIGHT(S) OF WAY OVER THE LAND MARKED A

Schedule of Dealings

Dealing Number	Description
12484104	MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD. (ACN: 005 357 522)

Notations

Dealings Affecting Title

NIL

Priority Notices

NIL

Notations on Plan

NIL

Registrar-General's Notes

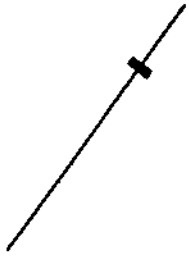
NIL

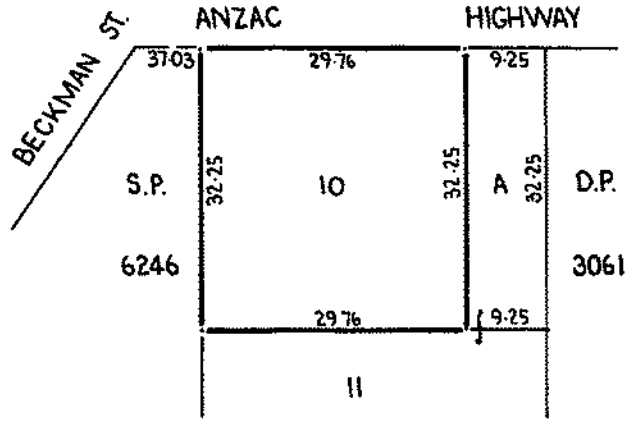
Administrative Interests

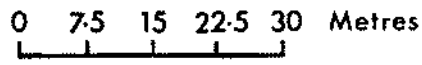
NIL

* Denotes the dealing has been re-lodged.

Product	Register Search
Date/Time	29/03/2016 02:47PM
Customer Reference	F14500 Walpol Dev
Order ID	20160329008490
Cost	$27.25







GTAconsultants

192 Anzac Highway Glandore
Transport Impact Assessment

Client // Angelo & Maria Polymeneas
Office // SA
Reference // S104260
Date // 24/05/2017

192 Anzac Highway

Glandore

Transport Impact Assessment

Issue: A 24/05/2017

Client: Angelo & Maria Polymeneas
Reference: S104260
GTA Consultants Office: SA

Quality Record

Issue	Date	Description	Prepared By	Approved By	Signed
A	24/05/2017	Final	Paul Froggatt	Paul Froggatt	

GTAconsultants
Melbourne | Sydney | Brisbane
Canberra | Adelaide | Perth
Gold Coast | Townsville

Table of Contents

Figures

Tables

1. Introduction

1.1 Background

A development application is currently being sought for a proposed residential development on land located at 192 Anzac Highway, in Glandore. The proposed development incorporates residential dwellings, a ground floor cafe and associated under croft car parking.

GTA Consultants was commissioned by Angelo and Maria Polymeneas in April 2017 to prepare a transport impact assessment of the proposed development.

1.2 Purpose of this Report

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

i existing traffic and parking conditions surrounding the site;
ii walking, cycling and public transport facilities in the vicinity of the site;
iii parking demand likely to be generated by the proposed development;
iv suitability of the proposed parking in terms of supply (quantum) and layout;
v traffic generation characteristics of the proposed development;
vi proposed access arrangements for the site;
vii transport impact of the development proposal on the surrounding road network.

1.3 References

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

- West Torrens Council Development Plan (consolidated 05 May 2016)
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2002
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- plans for the proposed development prepared by Piteo Design Architects
- traffic and car parking surveys undertaken by GTA Consultants as referenced in the context of this report
- various technical data as referenced in this report
- an inspection of the site and its surrounds
- other documents as nominated.

2. Existing Conditions

2.1 Subject Site

The subject site is located at 192 Anzac Highway in Glandore. The site of approximately 1,045sq.m has a frontage of approximately 34 metres to Anzac Highway.

The site is located within an Urban Corridor zone in Policy Area 34 (Boulevard) and is currently occupied by a single storey residential building.

The surrounding properties include a mix of residential land uses. The notable exceptions include the Kurralta Park shopping centre approximately 200 metres northeast of the subject site.

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

Figure 2.1: Subject Site and its Environs

(PhotoMap courtesy of NearMap Pty Ltd)

2.2 Road Network

2.2.1 Adjoining Roads

Anzac Highway

Anzac Highway is an arterial road aligned in an approximately northeast to southwest direction. It is a two way road configured with 3 vehicle lanes in each direction, separated by a raised median. The approximately 27 metre wide dual carriageway is set within an approximately 40 metre wide road reserve. Kerbside parking is permitted outside of clearway times.

Anzac Highway is subject to a posted speed limit of 60 km/h and carries approximately 39,000 vehicles per day[1].

Other Roads

Other roads within the vicinity of the site include Beckman Street, Gray Street, and Stuart Street.

2.2.2 Surrounding Intersections

The following intersections currently exist in the vicinity of the site:

- Anzac Highway/Gray Street/Beckman Street (signalised)
- Anzac Highway/Stuart Street (unsignalised).

2.2.3 Crash Data

The reported crash history for the roads and intersections adjoining the subject site has been sourced from the Department of Planning, Transport and Infrastructure for the most recent five year period (2011-2015). Figure 2.2 shows the recorded crashes in the vicinity of the subject site.

Figure 2.2: 2011-2015 Crash Data

Analysis of the above crash data does not indicate a pattern of crashes adjacent the subject site that would be impacted by the subject site.

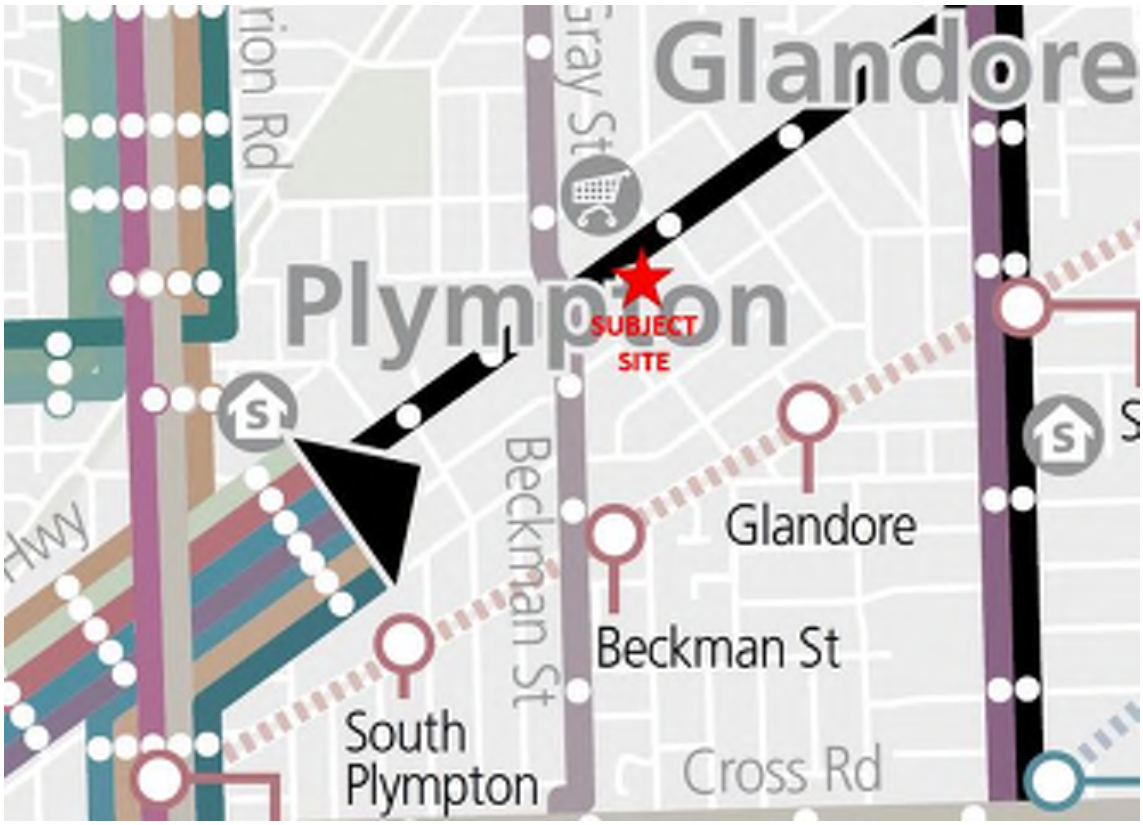
[1] DPTI Annual Average Daily Traffic Estimates dated 14 September 2015

2.3 Sustainable Transport Infrastructure

2.3.1 Public Transport

Figure 2.3 shows the subject site in relation to existing public transport routes within its vicinity.

Figure 2.3: Public Transport Map



The bus routes that service the stops along Anzac Highway travel to Marion, Warradale, Oaklands Park, Adelaide CBD and Glenelg.

In addition to road based public transport, the Beckman Street tram stop on the Adelaide Entertainment Centre to Glenelg line is located approximately 480 metres from the site.

2.3.2 Pedestrian Infrastructure

Pedestrian paths are located on either side of Anzac Highway, Gray Street and Beckman Street in the vicinity of the subject site. Pedestrian crossing facilities are provided at the signalised intersection of Anzac Highway/Gray Street/Beckman Street.

2.3.3 Cycle Infrastructure

Bike lanes are marked on street on both sides of Anzac Highway in the vicinity of the subject site. The Mike Turtur Bikeway is also located close to the site alongside the tram line and accessible via Beckman Street.

3. Development Proposal

3.1 Land Uses

The proposal includes the construction of an 8-story building incorporating a ground floor café (approximately 60m^2), 6 levels of residential units (total of 36 residential apartments, 24 two bedroom and 12 three bedroom) and two levels of car parking on the ground and first floor.

3.2 Car Parking

The proposed development includes some 36 car parking spaces for residents, 2 visitor parking spaces and 2 café staff parking spaces. 3 scooter parks are also proposed, with 1 available on the ground floor and 2 on the first floor.

3.3 Vehicle Access

Vehicle access will be via an existing Right of Way along the eastern boundary of the site, providing access to and from Anzac Highway.

3.4 Bicycle Facilities

A bicycle storage room will be included on the ground floor, accessible via the ground floor car park.

3.5 Pedestrian Facilities

Pedestrian access to the subject site will be directly via the Anzac Highway footpath.

3.6 Refuse Collection

Refuse collection will take place on site using a private waste contractor arrangement.

4. Car Parking

4.1 Development Plan Car Parking Requirements

Statutory car parking rates are set out in *Table WeTo/6* of the West Torrens Development Plan. The car parking requirements applicable to the proposed development (in the Boulevard Policy Area 34 within the Urban Corridor Zone) are as follows:

Residential Development

0.25 space per studio (no separate bedroom)

0.75 space per 1 bedroom dwelling

1 space per 2 bedroom dwelling

1.25 spaces per 3 + bedroom dwelling

Plus 0.25 visitor spaces per dwelling

Non-Residential Development

Minimum of 3 spaces per 100 square metres of gross leasable floor area

Maximum of 5 spaces per 100 square metres of gross leasable floor area

An assessment of the development plan car parking requirements is set out in Table 4.1.

Table 4.1: Development Plan Car Parking

Use	No. of Dwellings/GLFA	Development Plan Rate	Development Plan Parking Rate
Residential – 2 Bedroom	24 Dwellings	1 per dwelling	24
Residential – 3 Bedroom	12 Dwellings	1.25 per dwelling	15
Residential – Visitor	36 Dwellings	0.25 per dwelling	9
Café	60 square metres	3 per 100 square metres	2
TOTAL			**50 spaces**

Based on the above, the proposed development has a car parking requirement of 39 resident car parking spaces, 9 visitor car parking spaces and 2 café car parking space.

Designated disabled parking spaces are not required given the primarily residential nature of the development.

4.2 Adequacy of Parking Supply

The proposed 2 parking spaces for the café meet the car parking requirement, assessed against the development plan.

36 car parking spaces are proposed for resident parking, which is a shortfall from the development plan by 3 spaces in relation to the 3 bedroom dwellings. One space is provided per dwelling, which is considered appropriate due to the close proximity to public transport (bus and tram), local facilities (Kurralta Park) and the Mike Turtur bikeway.

Visitors would be accommodated by the 2 visitor parking spaces in the development, and on-street along Anzac Highway outside of clearway times and on Stuart Street and Beckman Street. To provide additional Visitor parking, the café parking spaces could be timed and adequately signed to provide café parking during café operating hours, and visitor parking outside of the

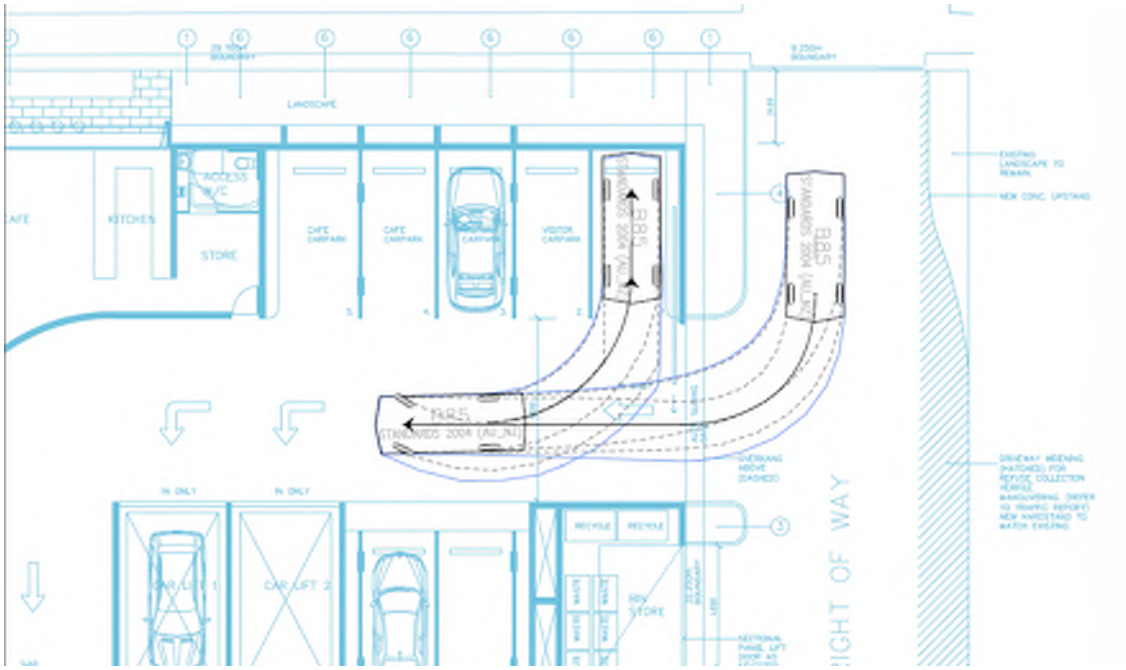
marked hours. GTA considers this approach to visitor parking to be appropriate given the existing low demand for on-street parking and the proximity of the site to frequent public transport.

4.3 Car Parking Layout

The proposed car parking layout has been assessed against the relevant Australian Standard / New Zealand Standard for Off-street Car Parking 2890.1:2004, and found to be generally compliant. Some of the key design features are described below:

- 90 degree angled car parking spaces are typically 2.4m wide and 5.5m long, set within a minimum 5.8m wide aisle, which meets the requirements as specified for a User Class 1A parking facility.
- 1 metre blind aisle extensions are provided where required (providing scooter parks in these locations) with the exception of space 1. Swept path assessments show that a vehicle can enter and exit the first floor space 1 using a reverse entry, forward exit manoeuvre without the blind aisle extension. This manoeuvre is shown in Figure 4.1. The space is designated as a resident parking space which is considered to be appropriate due to the reverse entry manoeuvre.

Figure 4.1: Swept Path Assessment of Space 1 Level 1



- A 5.8 metre wide access driveway, which exceeds the minimum width for a category 1 access facility (user class 1A, 25 to 100 parking spaces, local road frontage).
- The aisle servicing parks 8 and 9 does not meet user class 1A.
  - Increasing park 8 to 3.0 m wide allows for ingress and egress to the park, as shown in Figure 4.2 and Figure 4.3.

Figure 4.2: Park 8 Vehicle Ingress

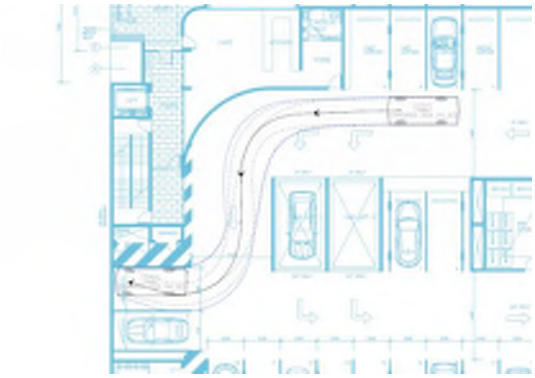
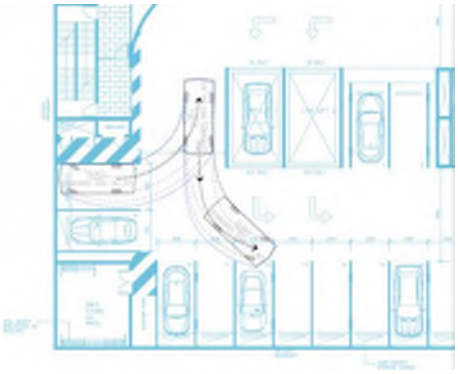


Figure 4.3: Park 8 Vehicle Egress



- Vehicles are able to enter and exit park 9 with no alterations. Ingress and egress is shown in Figure 4.4 and Figure 4.5.

Figure 4.4: Park 9 Vehicle Ingress

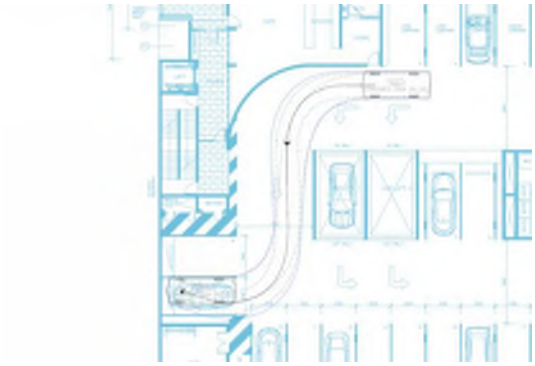
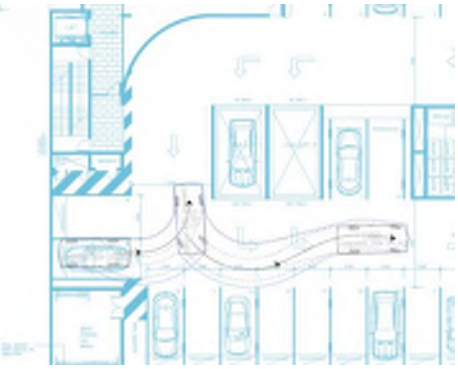


Figure 4.5: Park 9 Vehicle Egress



- Scooter parks are provided on both the ground floor and the first floor of the development. The diagonal line marking adjacent to the door minimises the possibility of obstruction, with the scooter parking located behind, towards the rear of the park, as shown in Figure 4.6 and Figure 4.7.

Figure 4.6: Ground Floor Scooter Park

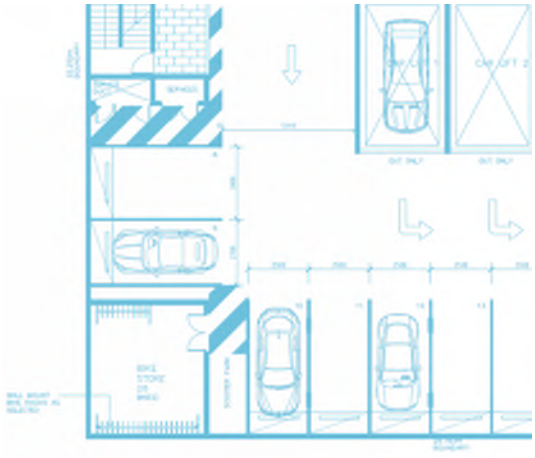
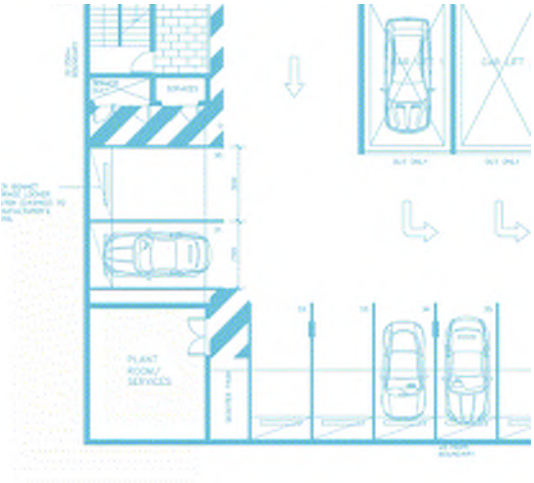


Figure 4.7: First Floor Scooter Park



5. Sustainable Transport Infrastructure

5.1 Bicycle End of Trip Facilities

Statutory bicycle parking rates have been sourced from *Table WeTo/7* of the West Torrens Development Plan. The rates applicable to the proposed development are as follows;

Residential (resident) *1 space for every 4 dwellings*

Residential (visitor) *1 for every 10 dwellings*

Based on the above the proposed development should provide 9 bicycle parking spaces for residents and 4 spaces for visitors based on the development plan rates, for a total of 13 spaces.

The proposed development includes a large bicycle storage facility, which will be capable of accommodating the development plan bicycle parking requirements for residents.

Visitors will be able to utilise a bicycle storage rack located at the building main entrance, with the ability to store more than the development plan requirement.

Therefore, the bicycle parking provision of the development is considered appropriate for the subject site.

5.2 Walking and Cycling Network

The proposed development will provide direct pedestrian access to the footpaths on Anzac Highway. Cyclists will be able to directly access the bicycle lanes or footpaths on Anzac Highway via the Right of Way crossover.

5.3 Public Transport

The site is accessible by public transport as discussed in Section 2.3.1.

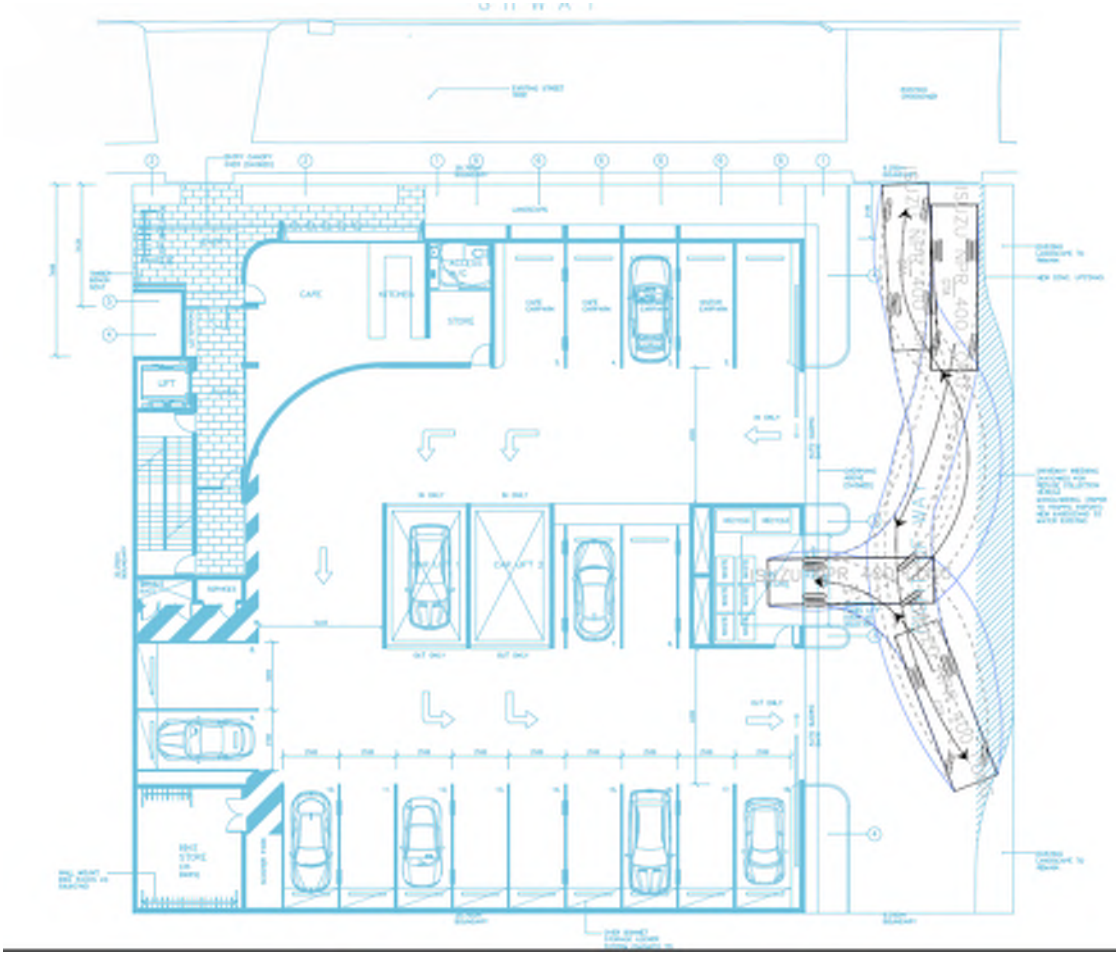
6. Refuse and Loading

6.1 Refuse Collection Arrangements

Refuse collection will be carried out internally to the site by a private contractor. The use of the small refuse vehicles up to 7.4m in length will be specified to the contractor, Vehicles of this size are readily available to be used for sites of this nature.

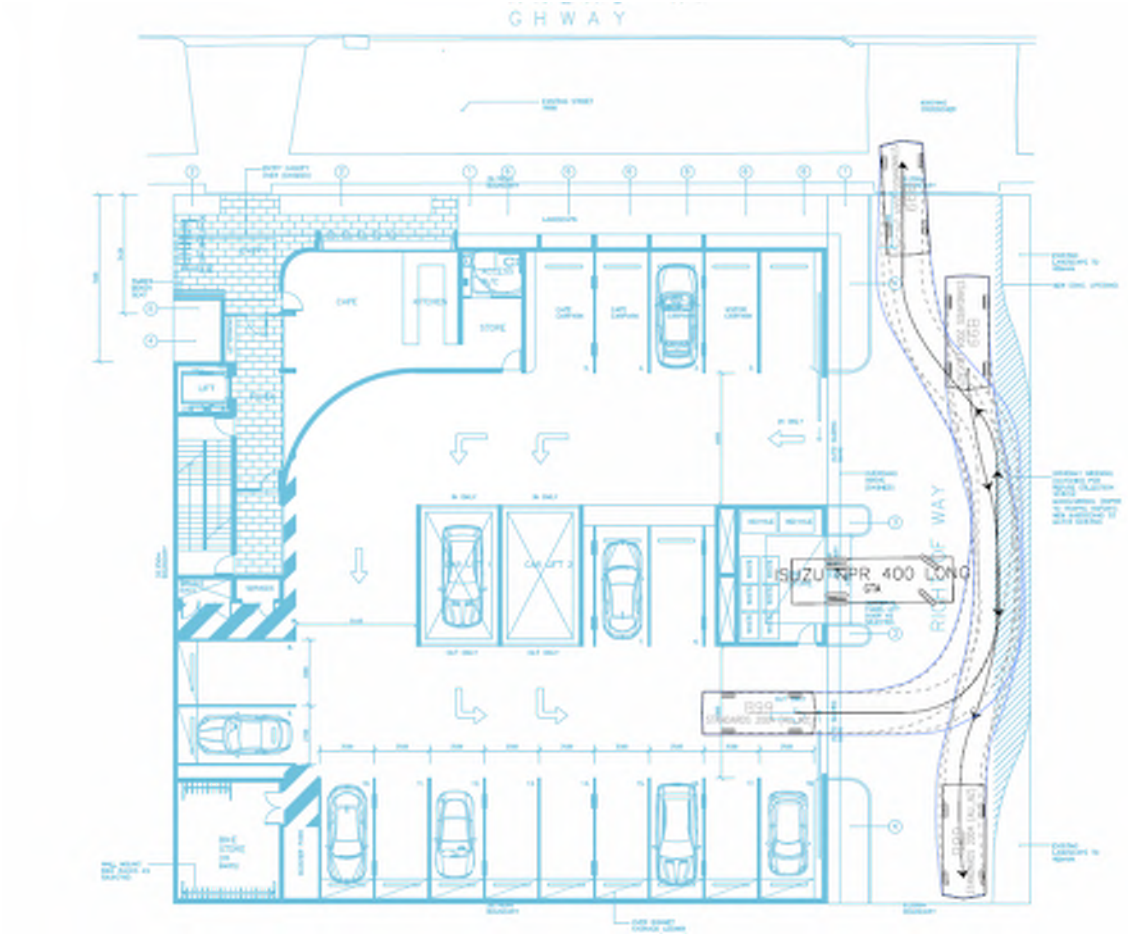
Using the smaller refuse vehicle will enable forward entry and exit via the ROW access. The refuse vehicle will partially reverse in to the bin store area which will have an entry height clearance of 2.8m. The entry and exit swept paths for a 7.4m Refuse Vehicle are shown in Figure 6.1.

Figure 6.1: 7.4m Refuse Vehicle Access



Access to the ROW and the entrance and exit from the site are not impacted during refuse collection. There is adequate aisle width to accommodate a B99 to manoeuvre around the refuse vehicle. These swept paths are shown in Figure 6.2 below.

Figure 6.2: B99 Access During Refuse Collection



6.2 Loading Arrangements

Given the residential nature of the development, loading requirements will be infrequent. It is anticipated that any loading requirements can be accommodated along Stuart Street, Anzac Highway outside clearway time periods or via a vehicle parking in the driveway.

7. Traffic Impact Assessment

7.1 Traffic Generation

7.1.1 Design Rates

Traffic generation rates applicable to the proposed development have been sourced from the RTA NSW *'Guide to Traffic Generating Developments'* (2002), henceforth referred to as the RTA Guide. The rates applicable to the proposed development are as follows;

Medium Density	*Daily Vehicle Trips*	*4-5 trips per dwellings*
Residential Flat Building	*Peak Hour Vehicle Trips*	*0.4-0.5 trips per dwelling*
Restaurant	*Daily Vehicle Trips*	*60 per 100 square metres*
	Peak Hour Vehicle Trips	*5 per 100 square metres*

For the residential development, GTA has worked on the conservative high range rate of 5 daily vehicle trips per dwelling and 0.5 vehicle trips in a peak hour period.

Table 7.1 has been prepared to indicate the anticipated daily traffic generation from the proposed development.

Table 7.1: Traffic Generation Estimates

Use	Number of Dwellings/GLFA	Traffic Generation Rate		Traffic Generation	
		Peak Hour	Daily	Peak Hour	Daily
Residential	36 units	0.5 trips/dwelling	5 trips/dwelling	18 trips/hour	180 trips/day
Café	60m^2	5 trips/100m^2	60 trips/100m^2	3 trips/hour	36 trips/day
TOTAL				21 trips/hour	216 trips/day

Table 7.1 indicates that the site could potentially generate a daily total of 216 vehicle trips from the development and 21 vehicle trips in a peak hour period. This does not take into account the traffic that would have been generated by the existing site, or that the site is located close to frequent bus and tram services towards the CBD.

7.1.2 Distribution and Assignment

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

i configuration of the arterial road network in the immediate vicinity of the site;
ii existing operation of intersections providing access between the local and arterial road network;
iii distribution of households in the vicinity of the site;
iv surrounding employment centres, retail centres and schools in relation to the site;
v configuration of access points to the site.

Having consideration to the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed:

- INBOUND:
  - Anzac Highway northeast 80% (left turn into site)
  - Anzac Highway southwest 20% (utilising U-turn median gap to east of site to access site via left turn entry)
- OUTBOUND:
  - Anzac Highway northeast 50% (left turn exit across all lanes to utilise median gap immediately adjacent site)
  - Anzac Highway southwest 50% (left turn exit – may use U-turn facilities further west on Anzac Highway to turn around)

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) for the residential development has been assumed as 20:80 inbound to outbound in the AM peak hour and 80:20 in PM peak hour, with 50:50 assumed across the day. The café has been assumed as 80:20 inbound to outbound in the AM peak hour and 20:80 in PM peak hour, with 50:50 assumed across the day.

Based on the above, Figure 7.1 and Figure 7.2 have been prepared to show the estimated marginal increase in turning movements in the vicinity of the subject property following full site development.

Figure 7.1: AM Peak Hour Site Generated Traffic Volumes

Figure 7.2: PM Peak Hour Site Generated Traffic Volumes

7.2 Traffic Impact

Against existing traffic volumes on Anzac Highway in the vicinity of the site, the additional traffic generated by the proposed development (up to 216 vehicles each day and 21 vehicles in a peak hour period) is not expected to compromise the safety or function of this road. This additional volume also does not take into account the traffic that would have been generated by the dwelling that previously occupied the site.

8. Conclusion

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

i The proposed development generates a parking requirement of 36 resident parking space, 9 visitor parking spaces and 2 café parking spaces based on the development plan rates.

ii The proposed supply of 2 spaces meets the development plan requirement for the cafe parking component.

iii 36 car parking spaces are proposed for the residential component of the development, which equates out to one space for dwelling. This is considered appropriate due to the close proximity to public transport, Mike Turtur bikeway and local facilities (Kurralta Park).

iv 2 visitor car parking spaces are proposed, with the remaining visitor parking provision to be catered for on-street on Beckman Street, Stuart Street and Anzac Highway outside of clearway times and use of the café parking spaces when the café is not open.

v The proposed parking layout is generally consistent with the dimensional requirements as set out in the Australian/New Zealand Standards for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009).

vi A large bicycle storage room is proposed on the ground floor, which will be able to meet the development plan bicycle parking requirement.

vii The site is well located in relation to existing frequent tram and bus services and the Mike Turtur bikeway and shared path that runs alongside the tram line.

viii Refuse collection arrangements are to be completed by a private contractor, with vehicles up to a 7.4m Refuse Vehicle specified for use. Access for other vehicles on the ROW is maintained during refuse collection.

ix Any occasional loading requirements can be accommodated on site, on Stuart Street or Anzac Highway outside clearway times.

x The site is expected to generate up to 21 and 216 vehicle movements in any peak hour and daily respectively.

xi There is adequate capacity in the surrounding road network to cater for the traffic generated by the proposed development.

Melbourne

A Level 25, 55 Collins Street
PO Box 24055
MELBOURNE VIC 3000
P +613 9851 9600
E melbourne@gta.com.au

Brisbane

A Level 4, 283 Elizabeth Street
BRISBANE QLD 4000
GPO Box 115
BRISBANE QLD 4001
P +617 3113 5000
E brisbane@gta.com.au

Adelaide

A Suite 4, Level 1, 136 The Parade
PO Box 3421
NORWOOD SA 5067
P +618 8334 3600
E adelaide@gta.com.au

Townsville

A Level 1, 25 Sturt Street
PO Box 1064
TOWNSVILLE QLD 4810
P +617 4722 2765
E townsville@gta.com.au

Sydney

A Level 6, 15 Help Street
CHATSWOOD NSW 2067
PO Box 5254
WEST CHATSWOOD NSW 1515
P +612 8448 1800
E sydney@gta.com.au

Canberra

A Tower A, Level 5,
7 London Circuit
Canberra ACT 2600
P +612 6243 4826
E canberra@gta.com.au

Gold Coast

A Level 9, Corporate Centre 2
Box 37, 1 Corporate Court
BUNDALL QLD 4217
P +617 5510 4800
F +617 5510 4814
E goldcoast@gta.com.au

Perth

A Level 2, 5 Mill Street
PERTH WA 6000
P +618 6169 1000
E perth@gta.com.au

mlei

CONSULTING ENGINEERS

Reference 2017-5777GL

Project 192 Anzac Highway, Glandore Checked by

Designer H.P Date 12/4/2017 Index 1

Council Requirements:

- pipes to be sized for 20 years ARI
- 20 years ARI of previous development = 20 years ARI of post development, where run off coefficient C=0.25 for previous development.
- Assume time of concentration t_c = 5 min.

Pre-development Flow:

Refer 'Pre-development Plan'

Using BOM-IFD, I_{10}^{1hr} = 26.0 mm/hr, I_{20}^{5min} = 121 mm/hr

$C_{10} = 0.1 + 0.0133 (I_{10}^{1hr} - 25)$ Eq. 14.12 ARR

$= 0.1 + 0.0133 (26.0 - 25)$

$= 0.1133$ — ①

$C_{20} = 0.25$ (for previous development)

$Q_{pre} = 0.278 \times C_{20} \times I_{20}^{t_c} \times A_{site}$, assume time of concentration t_c = 5 mins Eq. 5.1 ARR

$= 0.278 \times 0.25 \times 121 \times (959.76 \times 10^{-6})$

$= 8.071 \times 10^{-3}$ m³/s

$= 8.07$ L/s

Post - development Plan:

Refer 'Post-development Plan'

Unrestricted flow: (Allowing impervious surface area to drain unrestricted)

$S = 1.0$ (Impervious surface)

Using ①, $C'_{10} = 0.1133$

$C_{10} = 0.9(1.0) + 0.1133(1-1)$

$= 0.9$

$C_{20} = F_{20} \times C_{10}$ where $F_{20} = 1.05$ from Table 14.6 ARR

$= 1.05 \times 0.9$

$= 0.945$

Assume time of concentration, $t_c = 5$ mins

Using BOM-IFD, ${}^{5mins}_{20}I = 121$ mm/hr

$Q_{unrestricted} = 0.278 \times C_{20} \times {}^{5mins}_{20}I \times A_{imp}$

$= 0.278 \times 0.945 \times 121 \times (15.17 \times 10^{-6})$

$= 4.8223 \times 10^{-4}$ m³/s $= 0.4824$ L/s

∴ Allowable outflow, $Q_{allow} = Q_{pre} - Q_{unrestricted}$

$= 8.07 - 0.482$ (L/s)

$= 7.588$ L/s

Detained roof area:

$S = \frac{A_{roof}}{A_{site} - A_{imp}} = \frac{906.19}{959.76 - 15.17} = 0.959$

Using ①, $C'_{10} = 0.1133$

$C_{10} = 0.9(0.959) + 0.1133(1 - 0.959)$

$= 0.868$

$C_{20} = F_{20} \times C_{10}$
$= 1.05 \times 0.868$
$= 0.9114$

Assume time of concentration, t_c = 5 mins.

Area being detained = $A_{site} - A_{imp}$ = 959.76 − 15.17
= 944.59 m²

Detention Calculation:

Refer 'Detention Calculations' excel

Required detention volume of 9543 L

Round off to 10000 L, add another extra 1000 L for retained water

∴ Adopt a 110000 L RWT

Detention tank sizing:

Refer "Drainwell Modular detention cell brochure"

Individual unit:

Detention Volume: 0.132 m³

Total units required = Required detention volume ÷ detention per unit
= 11 ÷ (0.132 × 0.95)
= 87.72
≈ 88 units

Required unit arrangement:

Stormwater quality:

Refer 'post-development plan'

Carpark area of 906.19 m^2 to be treated. Assume t_c = 5mins,

Using BOM-IFD ${}^{5min}_{20}I$ = 121 mm/hr

Using ①, C'_{10} = 0.1133

$C_{10} = (0.9 \times 0.9) + 0.1133(1-0.9)$

$= 0.82133$

$C_{20} = F_{20} C_{10}$

$= 1.05 \times 0.82133$

$= 0.8624$

$Q_{20} = 0.278 \times C_{20} \times {}^{5min}_{20}I \times A_{carpark}$

$= 0.278 \times 0.8624 \times 121 \times (960.19 \times 10^{-6})$

$= 26.29$ L/S

∴ Peak flow off carpark Area is 26.29 L/S

Refer Figure 5.4.11.2(a), assuming a grade of 1%, pipe required is 300ϕ

However, the carpark is fully covered by the roof. Therefore there would be no rainwater or minor rainwater lands on the carpark.

∴ A pipe size of 100ϕ is adopted.

Refer 'Ecosol - table 10 high flow Ecosol GPT table'

∴ Required GPT size/model is GPT4200 with pipe size of 100ϕ

Intensity-Frequency-Duration Table

Location: 34.950S 138.575E Issued: 12/4/2017

Rainfall intensity in mm/h for various durations and Average Recurrence Interval

Average Recurrence Interval

Duration	1 YEAR	2 YEARS	5 YEARS	10 YEARS	20 YEARS	50 YEARS	100 YEARS
5Mins	43.6	58.7	81.5	98.3	121	156	186
6Mins	40.6	54.7	75.7	91.3	112	144	172
10Mins	32.7	44.0	60.6	72.8	89.3	114	136
20Mins	23.2	31.1	42.5	50.8	62.0	78.8	93.4
30Mins	18.6	24.8	33.7	40.1	48.8	61.8	73.1
1Hr	12.3	16.3	22.0	26.0	31.5	39.6	46.6
2Hrs	8.00	10.6	14.1	16.5	19.9	24.9	29.1
3Hrs	6.22	8.21	10.8	12.7	15.2	18.9	22.1
6Hrs	4.03	5.30	6.91	8.03	9.57	11.8	13.7
12Hrs	2.58	3.37	4.35	5.03	5.96	7.32	8.45
24Hrs	1.59	2.07	2.65	3.05	3.61	4.41	5.07
48Hrs	.927	1.21	1.54	1.77	2.08	2.54	2.91
72Hrs	.661	.861	1.09	1.25	1.47	1.79	2.05

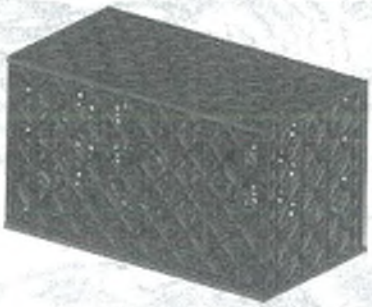
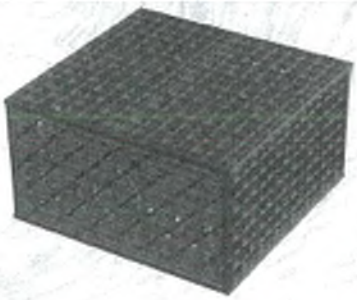
aw data: 16.98, 3.52, 0.89, 35, 6.6, 1.61, skew=0.58, F2=4.47, F50=14.98)

Site Detention Volume - 20 YEAR

Cro = Runoff Coefficient

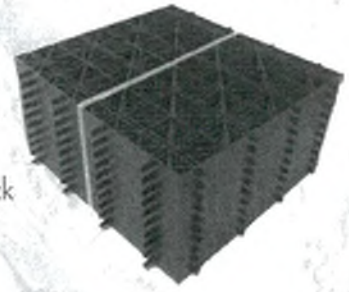
		Area (m2)	tc (mins)	Cro			
ARI 20		944.59	5	0.9114			
Duration	mm/h	In flow L/s			Out flow allowed	Qin - Qout	Detentions size for that duration
5	121	28.9357829			7.5	21.4357829	6430.734871
6	112	26.78353459			7.5	19.28353459	6942.072451
7	106.3	25.42044399			7.5	17.92044399	7526.586475
8	100.7	24.08126726			7.5	16.58126726	7959.008284
9	95	22.71817666			7.5	15.21817666	8217.815396
10	89.3	21.35508606			7.5	13.85508606	8313.051635
11	86.6	20.70941156			7.5	13.20941156	8718.211632
12	83.8	20.0398232			7.5	12.5398232	9028.672704
13	81.1	19.39414871			7.5	11.89414871	9277.43599
14	78.4	18.74847421			7.5	11.24847421	9448.718337
15	75.7	18.10279972			7.5	10.60279972	9542.519745
16	72.9	17.43321135			7.5	9.933211352	9535.882897
17	70.2	16.78753686			7.5	9.287536857	9473.287594
18	67.5	16.14186236			7.5	8.641862363	9333.211352
19	64.7	15.472274			7.5	7.972273998	9088.392358
20	62	14.8265995			7.5	7.326599503	8791.919404
21	60.7	14.51571919			7.5	7.015719191	8839.806181
22	59.4	14.20483888			7.5	6.704838879	8850.38732
23	58	13.8700447			7.5	6.370044697	8790.661681
24	56.7	13.55916438			7.5	6.059164385	8725.196714
25	55.4	13.24828407			7.5	5.748284072	8622.426109
26	54.1	12.93740376			7.5	5.43740376	8482.349866
27	52.8	12.62652345			7.5	5.126523448	8304.967986
28	51.4	12.29172927			7.5	4.791729266	8050.105166
29	50.1	11.98084895			7.5	4.480848954	7796.677179
30	48.8	11.66996864			7.5	4.169968641	7505.943554
31	48.2	11.52648542			7.5	4.02648542	7489.262882
32	47.6	11.3830022			7.5	3.883002199	7455.364223
33	47.1	11.26343285			7.5	3.763432849	7451.59704
34	46.5	11.11994963			7.5	3.619949628	7384.69724
35	45.9	10.97646641			7.5	3.476466407	7300.579454
36	45.3	10.83298319			7.5	3.332983186	7199.243681
37	44.8	10.71341383			7.5	3.213413835	7133.778713
38	44.2	10.56993061			7.5	3.069930614	6999.441799
39	43.6	10.42644739			7.5	2.926447393	6847.886899
40	43	10.28296417			7.5	2.782964172	6679.114012
41	42.5	10.16339482			7.5	2.663394821	6551.951259
42	41.9	10.0199116			7.5	2.5199116	6350.177232
43	41.3	9.876428379			7.5	2.376428379	6131.185217
44	40.7	9.732945158			7.5	2.232945158	5894.975217
45	40.2	9.613375807			7.5	2.113375807	5706.114679
46	39.6	9.469892586			7.5	1.969892586	5436.903537
47	39	9.326409365			7.5	1.826409365	5150.474409
48	38.4	9.182926144			7.5	1.682926144	4846.827295
49	37.8	9.039442923			7.5	1.539442923	4525.962194
50	37.3	8.919873572			7.5	1.419873572	4259.620717
51	36.7	8.776390351			7.5	1.276390351	3905.754475
52	36.1	8.63290713			7.5	1.13290713	3534.670246
53	35.5	8.489423909			7.5	0.989423909	3146.368031
54	35	8.369854558			7.5	0.869854558	2818.328769
55	34.4	8.226371337			7.5	0.726371337	2397.025413
56	33.8	8.082888116			7.5	0.582888116	1958.504071
57	33.2	7.939404895			7.5	0.439404895	1502.764742
58	32.7	7.819835545			7.5	0.319835545	1113.027695
59	32.1	7.676352324			7.5	0.176352324	624.2872252
60	31.5	7.532869103			7.5	0.032869103	118.328769
							9543

specifications

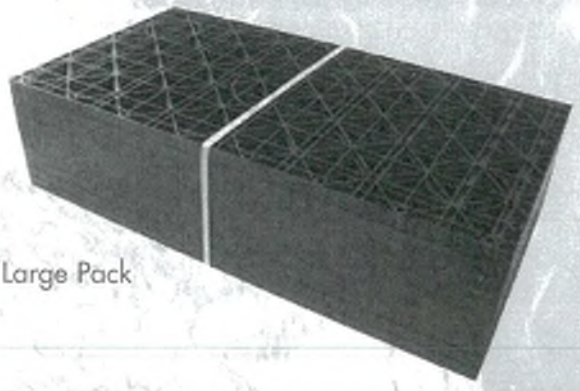
			
Drainwell™ Model		DW1592	DW1992
Dimensions (mm)	Length	755	755
	Width	400	800
	Height	440	440
Volume (m3)		.132	.264
Tanks per m3		7.5	3.7
Weight (Kg)	3 Panels	6.65	12.85
	4 Panels	7.3	14
	5 Panels	7.9	15.15
Maximum Load [Tons/m²]	3 Panels (1 Internal)	23.66 t/m²	9.45 t/m²
	4 Panels (2 Internal)	29.76 t/m²	9.61 t/m²
	5 Panels (3 Internal)	32.42 t/m²	16.20 t/m²
Internal Open Area		<95%	<95%
Polymer Type		Polypropylene UV Stabilised	
Service Temp		-20°C to 120°C	
Chemically inert and not affected by Moulds and Algae			

PALLET PACKAGING

Drainwell modules are delivered to site flat-pack on pallets. A forklift is required for unloading of pallets. A full pallet of Drainwell panels weighs approximately 600kg.



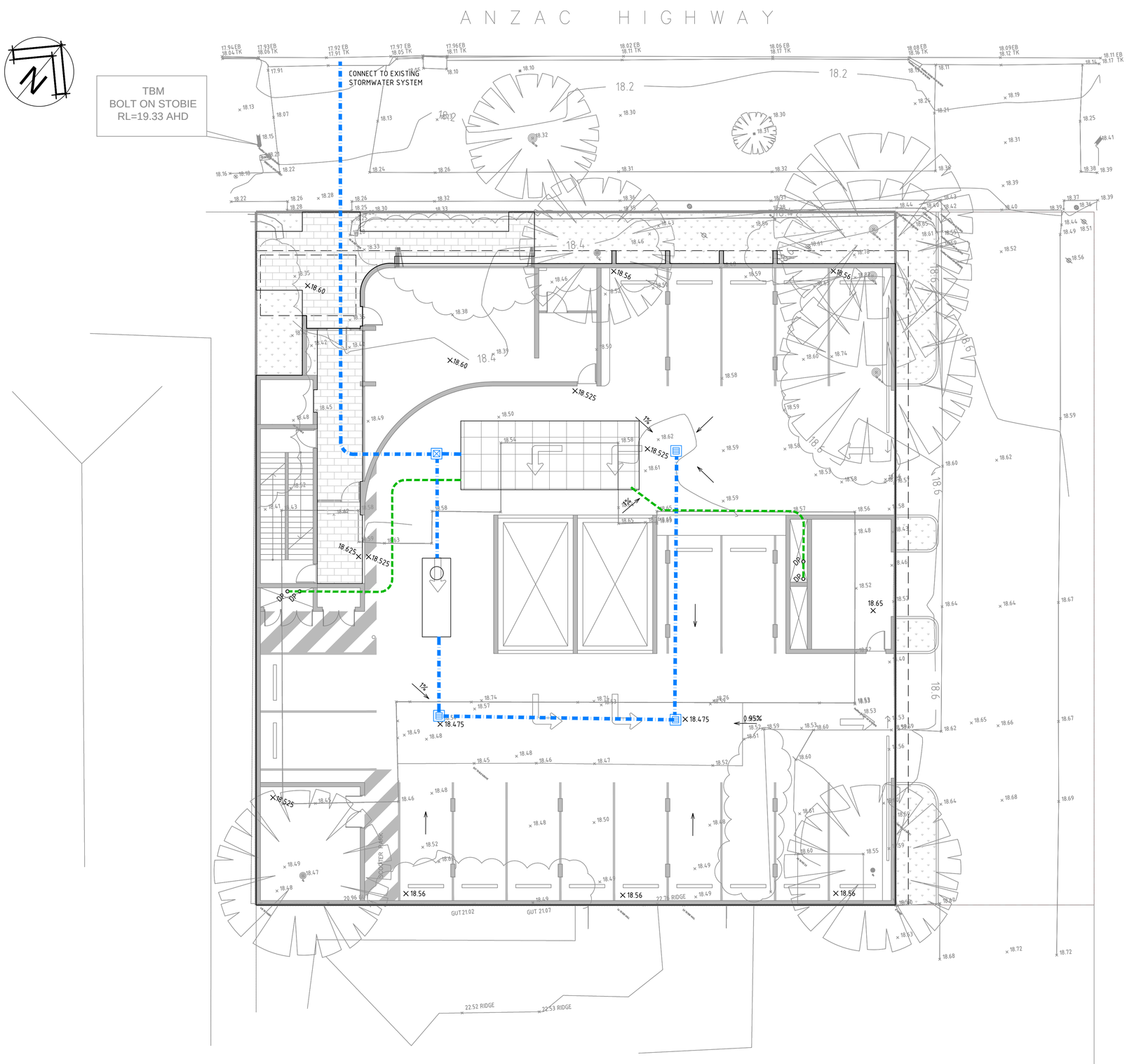
Small Pack



Large Pack

HIGH FLOW ECOSOL™ GPT - TREATABLE FLOW RATES (L/s)																	
Ecosol GPT product code	Gradient	Outlet pipe Diameters (mm)															
		100	150	225	300	375	450	525	600	750	900	1050	1200	1350	1500	1650	1800
GPT 4200	0.5%	4	14	21	26	31											
	1.0%	6	15	22	28	33											
	2.0%	9	16	25	32	37											
	5.0%	10	20	33	43	51											
GPT 4300	0.5%	20	21	50	79	99	116	120	120								
	1.0%	21	23	57	82	103	120	120	120								
	2.0%	23	29	60	87	110	120	120	120								
	5.0%	27	34	67	101	120	120	120	120								
GPT 4450	0.5%			52	93	121	143	163	182	212	240						
	1.0%			60	98	126	150	171	190	223	252						
	2.0%			69	105	137	164	188	209	246	260						
	5.0%			79	124	167	205	239	260	260	260						
GPT 4600	0.5%				120	175	222	260	294	354	403	450					
	1.0%				134	185	231	272	308	371	425	470					
	2.0%				142	197	249	295	336	408	469	470					
	5.0%				161	231	299	363	421	470	470	470					
GPT 4750	0.5%						224	263	298	358	410	456	497	536			
	1.0%						236	278	315	381	437	486	531	573			
	2.0%						258	307	350	427	491	549	601	650			
	5.0%						319	391	457	571	669	730	730	730			
GPT 4900	0.5%								395	487	564	634	695	753	807	855	
	1.0%								417	515	600	674	741	803	860	913	
	2.0%								459	574	673	758	836	908	973	1036	
	5.0%								579	753	900	1030	1050	1050	1050	1050	
GPT 41050	0.5%									622	733	831	916	996	1070	1141	1204
	1.0%									657	777	881	977	1062	1143	1217	1287
	2.0%									726	867	989	1098	1198	1291	1378	1430
	5.0%									929	1139	1323	1430	1430	1430	1430	1430
GPT 41200	0.5%										907	1041	1158	1264	1367	1456	1544
	1.0%										961	1103	1230	1347	1455	1554	1647
	2.0%										1066	1231	1382	1515	1639	1756	1866
	5.0%										1375	1625	1849	1870	1870	1870	1870
GPT 41350	0.5%											1261	1416	1556	1681	1802	1916
	1.0%											1337	1501	1653	1791	1924	2045
	2.0%											1483	1681	1854	2016	2171	2310
	3.0%											1630	1858	2061	2247	2370	2370
GPT 41500	0.5%												1684	1861	2023	2175	2323
	1.0%												1782	1974	2153	2315	2467
	2.0%												1981	2206	2418	2604	2778
	3.0%												2180	2441	2677	2902	2930
GPT 41800	0.5%													2506	2759	2978	3190
	1.0%													2647	2919	3170	3394
	2.0%													2936	3251	3540	3801
	3.0%													3222	3586	3916	4210

Table 10



LEGEND

- 18.60× DESIGN SPOT LEVEL
- 300 SQ GRATED INLET PIT
- 300 SQ JUNCTION BOX
- 1% PROPOSED SURFACE GRADE AND DRAINAGE DIRECTION
- PROPOSED 11000L CRATE UNDERGROUND DETENTION TANK
- ECOSOL GPT 4200 OR APPROVED EQUIVALENT
- 150mmØ uPVC WET SURFACE STORMWATER SYSTEM. MIN. 1% GRADE
- 150mmØ GRAVITY FED uPVC STORMWATER OUTLET TO COUNCIL KERB AND WATERTABLE. MIN. 0.5% GRADE
- 90mmØ uPVC SEALED ROOFWATER SYSTEM
- DP ○ INDICATIVE 90mmØ DOWN PIPE (REFER ARCHITECTURAL DRAWING FOR SPECIFICATIONS)
- PROPOSED PAVING
- LANDSCAPE/SOAKAGE AREA
- EXISTING PAVING

TOTAL SITE AREA = 959.76 m2
TOTAL ROOF AREA = 906.19m2
TOTAL IMPERVIOUS SURFACE AREA = 15.17m2

STORMWATER MANAGEMENT PLAN - GROUND FLOOR

SCALE 1:100

ISSUED FOR APPROVAL
NOT FOR CONSTRUCTION

AMENDMENTS

ISSUE	INITIAL	DESCRIPTION	DATE
A1	JSC	APPROVAL	DATE

mlei Consulting Engineers
TALENTED | APPROACHABLE | RESPONSIVE | PIONEERING
Level 5, 19 Gilles Street
Adelaide SA 5000
Telephone (08) 8231 2832
Facsimile (08) 8311 1742
www.mlei.com.au

PROJECT
192 ANZAC HIGHWAY,
GLANDORE SA 5037

CLIENT
ANGELO & MARIA
POLYMENEAS

DRAWING TITLE
STORMWATER MANAGEMENT
PLAN - GROUND FLOOR

DRAFTER	ENGINEER	PROJECT MANAGER	MANAGER
JSC	CG	CG	NM

DATE	PROJECT NUMBER	DRAWING SCALE
APR 2017	2017-577GL	1:100

DRAWING NUMBER	SIZE	REV
C1	A1	A1

DO NOT SCALE FROM THIS DRAWING