WLPP No.	3
DA No.	DA-2018/1583
Proposal	Residential - multi dwelling housing containing four (4) dwellings
Property	62 Nottingham Street, BERKELEY
Applicant	MMJ Wollongong
Responsible Team	Development Assessment and Certification - City Centre Team (NL)

ASSESSMENT REPORT AND RECOMMENDATION

Executive summary

Reason for consideration by Wollongong Local Planning Panel - Recommendation

The proposal has been referred to LPP for advice pursuant to clause 2.19(1)(c) of the Environmental Planning and Assessment Act 1979, under Clause 1(a) of Council's draft submissions policy. The application is the subject of five or more unique submissions by way of objection being a Class 2 -9 building under the Building Code of Australia (BCA) and including, mixed use developments, multi dwelling housing, retail and commercial, industrial, motels, hospitals, clubs etc. and has a construction cost greater than $1 million

Proposal

The proposal is for construction of a multi-dwelling housing development comprised of 4, two storey dwellings each with double garages.

Permissibility

Multi-dwelling housing is permitted with consent in the R2 Low Density Residential zone.

Consultation

The proposal was notified in accordance with Council's Notification Policy and received five submissions. This is discussed at section 1.3 of this report.

Main issues

The primary issues with the proposal are as follows:

- The proposal comprises two storey dwellings on a battle-axe block contrary to Wollongong Development Control Plan 2009 which recommends only single storey development on battle-axe blocks.
- The proposal does not comply with the side setback controls for the second storey.
- The adjoining lots within the subdivision and the locality are characterised by low density residential development and proposal represents a notable change in that context.
- The proposal seeks to build outside of the nominated building envelope on the title.
- The site gains access from a right of way shared with 5 other properties and there is concern amongst other lots benefitted by the right of way that the site will adversely impact the functioning of the right of way and can't be adequately serviced.

RECOMMENDATION

It is recommended the application be granted conditional approval.

1 APPLICATION OVERVIEW

1.1 PLANNING CONTROLS

The following planning controls apply to the proposal:

State Environmental Planning Policies:

- SEPP No. 55 – Remediation of Land
- SEPP (Building Sustainability Index: BASIX) 2004

Local Environmental Planning Policies:

- Wollongong Local Environmental Plan (WLEP) 2009

Development Control Plans:

- Wollongong Development Control Plan 2009

Other policies:

- Wollongong City Wide Development Contributions Plan 2018

1.2 DETAILED DESCRIPTION OF PROPOSAL

The proposal comprises the following:

Site preparation

- Removal of a number of trees
- Bulk earthworks.

Building details

- Four two storey, three bedroom dwellings each with double garage.

Traffic, parking and servicing

- One visitor car parking space
- One motorbike space
- 3 bicycle parking spaces
- Dedicated concrete emergency services and waste servicing parking pad.

1.1 BACKGROUND

The application was lodged on 12 December 2018 following refusal of DA-2016/1821 on 13 September 2017 for reasons relating to bushfire management and waste servicing. That proposal was for 6, 2 storey dwellings each with double garages.

A review of determination (RD-2016/1821/A) was subsequently lodged with Council however was not able to be determined within the 6 month period for a review. Whilst that application was not ultimately determined, concern was raised with the applicant during the assessment of the review regarding the suitability of a 6 dwelling development for the site in regard to the topography and context.

1.2 SITE DESCRIPTION

The site is located at 62 Nottingham Street, Berkeley and the title reference is Lot 7 DP 1008877.

The site is approximately 120m deep and approximately 45m wide at the frontage and approximately 17m wide at the rear.

There is a fall of approximately 30m from the northern rear part of the site towards the street.

The site is one of 6 battle-axe lots sharing access from an approximately 15m wide common access handle. The driveway within the access handle is of variable width containing a widened area in the middle to allow passing of vehicles.

Within the subdivision, lot 6 contains a dual occupancy approved under DA-2015/1584 and lot 9 contains a dwelling with a secondary dwelling approved under DA-2017/1447. The other lots within the subdivision contain single dwellings and associated outbuildings.

The locality more broadly is characterised by low density residential development.

Property constraints

Council records identify the land as being impacted by the following constraints:

- Acid sulphate soils: The land is identified as being impacted by class 5 acid sulfate soils. No concerns are raised in this regard as detailed at clause 7.5 of WLEP 2009.
- Bushfire: A bushfire assessment report was provided from a level 3 accredited BPAD consultant and reviewed by the Rural Fire Service who provided recommended conditions of consent.
- Unstable land – variable risk: Council's Geotechnical Officer has reviewed the proposal and supporting geotechnical report and has not raised any concerns subject to conditions of consent.
- Natural Resource – Biodiversity: The rear portion of the site zoned E3 is identified as natural resource sensitivity – biodiversity. The building footprint is located well clear of this area. This is discussed further at clause 7.2 of WLEP 2009.
- There are a number of restrictions identified on the Deposited Plan as follows:
  - Right of carriageway running along the southern portion of the site adjacent to the access shared access handle. The building footprint is outside of this area.
  - Easement for drainage along the southern boundary adjacent to the access handle: This is unaffected by the proposal.
  - Restriction on the use of land – building envelope: The restricted building envelope runs parallel to the side boundaries and approximately 70m into the site. The proposal seeks to extend the building footprint and works outside of the nominated building envelope towards the side boundaries at the front site. The majority of the restricted building envelope remains undeveloped.
  - Restriction on the use of land – remnant dry rainforest: An area in the middle of the site is identified as remnant dry rainforest. The proposal seeks to vary this restriction and remove the trees that are located within that area. An Arborist Report and Vegetation Management Plan have been provided with the application and reviewed by Council's Environment and Landscape Officers who recommended conditions of consent.
  - The rear portion of the site zoned E3 has a restriction on the use of land. The building footprint and works do not extend into that area.

1.3 SUBMISSIONS

The application was notified in accordance with WDCP 2009 Appendix 1: Public Notification and Advertising. Submissions from five adjoining properties were received and the issues identified are discussed below.

Figure 1: Notification map

Table 1: Submissions

Concern	Comment
The proposal exceeds the maximum no. of dwellings that can be put on the land	There are no restrictions on the 88B or Deposited plan or within Council controls that limit the number of dwellings that can be built on lot 7.
Impact of additional traffic on shared driveway in terms of safety and access.	The proposed development will increase traffic movements into and out of the site. The number of traffic movements is however considered acceptable with respect to the site characteristics and accessway. There are sufficient sight distances. The driveway has the capacity to cater for increased volume in terms of road width and passing opportunities.
The proposal will result in a decrease in property values.	This is not a matter for consideration under the development application.

Concern	Comment
Lack of pedestrian access along driveway	There is no formal pathway adjacent to the driveway providing pedestrian access from within the subdivision to Nottingham Street. There is however the opportunity for that to be provided however this is not considered to be necessary in order for the current application to be supported.
The development will restrict access for emergency services and cause conflicts in the right of way.	There is sufficient passing opportunity within the access handle for emergency services. The development additionally provides an emergency vehicle parking area within lot 7 separate from the shared driveway.
Construction vehicles will block the right of way.	A Construction Traffic Management Plan has been prepared demonstrating that construction vehicles will be accommodated on site with no obstruction of the shared driveway. Conditions of consent are also recommended in this regard.
The proposal will result in unauthorised works within the right of way.	The site benefits from the right of way and connection of services is not expected to result in works on other properties.
The proposal will impact essential utilities such as reducing water pressure and fluctuating electricity.	Specific issues relating to water pressure are a matter for Sydney Water and Endeavour Energy.
No suitable waste servicing arrangements.	A designated waste collection area has been provided within the subject lot and it has been demonstrated that a waste collection vehicle can manoeuvre into and out of the site in a forwards direction.
Cumulative impacts of other lots also proposing similar development.	Any future proposal on other lots within the subdivision would similarly be subject to a full assessment against the applicable controls. It is noted that each lot benefitting from the right of way were developed in a similar fashion to the current proposal, there may be a need to modify the driveway width and number of passing opportunities. It is not reasonable to restrict the current development on what may or may not happen in future on adjoining lots.
How is the applicant able to widen the access way without consultation/consent of other land owners in the subdivision.	The widening of the access way occurs within the subject lot and is to be undertaken to provide a dedicated service area for waste and emergency vehicles within lot 7.
How will fire trucks and ambulances access the site.	See above.

Concern	Comment
Privacy impacts	There are no overlooking issues to properties to the east and west of the site due to the sunken nature of the POS areas to the rear and separation of the balcony areas at the front to those properties. The proposal will overlook properties to the south from the balconies however these are reasonably distant and from secondary POS areas. Those balconies are to be provided with solid/frosted balustrades and there is opportunity for the adjoining properties to grow screening hedges if required to mitigate overlooking further.
Traffic noise impacts on properties adjoining the right of way.	The number additional traffic movements into and out of the driveway is not considered to be excessive.
There are too many units and it will look out of place.	Context and setting is discussed at section 2.6 of this report.
Concern around increased crime	The proposal is considered to be satisfactory in respect of those principles of Crime Prevention Through Environmental Design.
Concern over liability for damage to the common driveway and associated infrastructure through construction vehicles and ongoing waste servicing for the development once built.	A condition of consent is recommended in regard to damage to the right of way to be rectified by the developer. The proponent has provided detail of the driveway concrete depth indicating that it is sufficient to take the load of a waste collection vehicle.
Non-compliance with the restrictions on the land including the restricted building envelope, site setbacks, height and excavations.	The proponent seeks to vary the building envelope control and restriction on the use of land identified on the Deposited Plan as remnant dry rainforest. Justification has been provided in respect of the restriction on the use of land in the form of an arborist report and vegetation management plan. Whilst the building footprint does extend beyond the building envelope on the DP, a large portion of the building envelope to the rear will remain undeveloped. The proposed variations are considered acceptable with respect to the likely impacts and proposed revegetation of the site.
How will the reciprocal right of carriageway be managed with 4 additional owners in respect of maintenance/repair costs	This is considered to be a civil matter.

Concern	Comment
How will the proposed 4 dwellings be managed e.g. strata or body corporate	The proposal does not involve strata subdivision. That may be a future outcome however it is not considered to be a relevant consideration for the merit of the current application.
Trees in the access handle would require removal to accommodate larger vehicle access.	The driveway width is considered sufficient to accommodate a medium rigid vehicle without the need for removal of trees.
Offsite parking and traffic safety impacts to Nottingham Street	The proposal provides the necessary resident and visitor car parking spaces required by the DCP. See above for discussions regarding traffic safety.
Insufficient visitor car parking on site	The proposal provides the necessary number of visitor car parking spaces.
The proposed does not address placement of letterboxes/s including Aust Post's policies on provision and restricted terms of access.	Letterboxes are to be located close to the end of the shared accessway adjacent to the street.
The proposal does not support the true and accurate variable dimensions of the Reciprocal Right of Carriageway.	The plans appear to be accurately drawn.
The proposed does not show that significant works would have to be undertaken to accommodate the proposal. Including relocation of stormwater drains and associated works.	From the documentation provided, it would not be necessary to relocate infrastructure.
Insufficient facilties for fire fighting vehicles	The RFS have reviewed the proposal and supporting Bushfire Report and were satisfied with the proposal subject to conditions of consent.
The proposed multi dwelling development by situation also creates unequal rights and does not meet any adaptability or disables adaptability requirements.	The proposal is required to comply with the relevant BCA requirements with respect to accessibility. The development is not of a scale that requires an adaptable dwelling.
The driveway will be damaged by the additional traffic.	The additional traffic movements are not considered to be of a scale that would place significant strain on the driveway.
The letter provided by Remondis refers to an indemnity form that would need to be signed by the owners. Would this require the signature of all owners benefitting from the right of access?	The responsibility of indemnification for any waste contractor employed to service the proposed development will solely fall on the owners of the subject site. No other properties benefitting from the ROC will be required to provide indemnity.
The proposal will result in a detrimental visual impact.	See section 2.6 for a discussion around visual impacts and the context.

1.4 CONSULTATION

1.4.1 INTERNAL CONSULTATION

Council's Landscape, Environment, Stormwater, Traffic and Geotechnical Officers have reviewed the proposal and have given satisfactory referrals subject to conditions of consent.

1.4.2 EXTERNAL CONSULTATION

Rural Fire Service

The Rural Fire Service were referred the application under Section 4.14 of the Environmental Planning and Assessment Act 1979 and have provided recommended conditions of consent.

2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 – 4.15 EVALUATION

Section 4.14 of the Act

4.14 Consultation and development consent—certain bush fire prone land

The application was accompanied by a bush fire report which was forwarded to the RFS who have reviewed the proposal and have given a satisfactory referral subject to conditions of consent.

2.1 SECTION 4.15(1)(A)(1) ANY ENVIRONMENTAL PLANNING INSTRUMENT

2.1.1 STATE ENVIRONMENTAL PLANNING POLICY NO. 55 – REMEDIATION OF LAND

A desktop audit of previous land uses does not indicate any historic use that would contribute to the contamination of the site. No concerns are raised in regard to contamination as relates to the intended use of the land and the requirements of clause 7.

2.1.2 STATE ENVIRONMENTAL PLANNING POLICY (BUILDING SUSTAINABILITY INDEX: BASIX) 2004

The proposal is BASIX affected development to which this policy applies. In accordance with Schedule 1, Part 1, 2A of the Environmental Planning and Assessment Regulation 2000, a BASIX Certificate has been submitted in support of the application demonstrating that the proposed scheme achieves the BASIX targets.

The BASIX certificate was issued no earlier than 3 months before the date on which the development application was lodged.

2.1.3 WOLLONGONG LOCAL ENVIRONMENTAL PLAN 2009

Part 2 Permitted or prohibited development

Clause 2.2 – zoning of land to which Plan applies

The zoning map identifies the land as being zoned R2 Low Density Residential.

Clause 2.3 – Zone objectives and land use table

The objectives of the zone are as follows:

- *To provide for the housing needs of the community within a low density residential environment.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*

The proposal is medium density in character however the built form is considered acceptable in relation to adjoining development. The proposal is broadly satisfactory with regard to the above objectives.

The land use table permits the following uses in the zone.

Attached dwellings; Bed and breakfast accommodation; Boarding houses; Boat launching ramps; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling

houses; Environmental facilities; Exhibition homes; Exhibition villages; Group homes; Health consulting rooms; Home-based child care; Hospitals; Hostels; Information and education facilities; Jetties; ***Multi dwelling housing****; Neighbourhood shops; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Residential flat buildings; Respite day care centres; Roads; Semi-detached dwellings; Seniors housing; Shop top housing; Signage; Veterinary hospitals*

The proposal is categorised as a *multi-dwelling housing* as defined below and is permissible in the zone with development consent.

Clause 1.4 Definitions

Multi-dwelling housing means 3 or more dwellings (whether attached or detached) on one lot of land, each with access at ground level, but does not include a residential flat building.

Part 4 Principal development standards

Clause 4.3 Height of buildings

The proposed maximum building height is ~7.5m which complies with the maximum 9m permitted for the site.

Clause 4.4 Floor space ratio

Maximum FSR permitted for the zone:	0.5:1
Site area*:	~3,856m²
GFA:	~486
FSR:	486 /3,856 m² = 0.126:1

**Excluding the E3 portion of the site*

Part 7 Local provisions – general

Clause 7.1 Public utility infrastructure

The site is already serviced by electricity, water and sewerage services. Conditions will be imposed upon the development consent requiring approval from the relevant authorities for the connection of electricity, water and sewerage services to the site.

Clause 7.2 Natural resource sensitivity – biodiversity

The rear of the site is identified as being affected by "Natural Resource Sensitivity – Biodiversity" specifically the Powerful Owl. This area aligns with the restriction as to user on the deposited plan and the proposed building footprint is well outside of the area identified in the map.

The application was referred to Council's Environment Officer to assess likely impacts of the proposal in this regard and no concerns were raised.

Clause 7.5 Acid Sulfate Soils

Council mapping identifies the site as potentially containing class 5 acid sulfate soils. Development consent would not be required under subclause (2) as the proposal does not involve works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land. A

Clause 7.6 Earthworks

The proposal comprises minor earthworks to facilitate a level building platform. Subject to conditions, the earthworks are not expected to have a detrimental impact on environmental functions and processes, neighbouring uses or heritage items and features surrounding land.

The proposal and supporting geotechnical report have as been reviewed by Council's Geotechnical Engineer and no concerns were raised subject to conditions of consent.

Clause 7.14 Minimum site width

A minimum site width of 18m is required for multi-dwelling development. The site complies (the building footprint is located on land between approximately 45m and 37m wide).

2.2 SECTION 4.15(1)(A)(II) ANY PROPOSED INSTRUMENT

None applicable.

2.3 SECTION 4.15(1)(A)(III) ANY DEVELOPMENT CONTROL PLAN

2.3.1 WOLLONGONG DEVELOPMENT CONTROL PLAN 2009

The development has been assessed against the relevant chapters of WDCP2009 and found to be satisfactory. A full compliance table can be found at Attachment 4 to this report and variations are discussed below:

CHAPTER A1 – INTRODUCTION

The proposal seeks variations to the requirement for development on battle axe blocks to be single storey, a variation to the first floor setback to side boundaries, and a minor variation to the side boundary landscaped area. These items are discussed below in respect of the requirements of clause 8 of this chapter.

8 Variations to development controls in the DCP

Two-storey development on battle-axe block

(a) The control being varied;

Chapter B1, 4.1 Number of Storeys: Dwelling houses on battle-axe allotments are restricted to 1 storey unless it can be demonstrates that the proposed development achieves the objectives in Clause 4.1.1 and complies with the maximum height maps in the LEP.

(b) The extent of the proposed variation and the unique circumstances as to why the variation is requested;

The proposal involves four two storey dwellings on a battle-axe block.

The site is large, albeit constrained, and setbacks to adjoining development are generous.

The site has a significant fall which makes achieving a single storey built form challenging.

(c) Demonstrate how the objectives are met with the proposed variations;

The objectives of the control are as follows:

a) *To encourage buildings which integrate within the streetscape and the natural setting whilst maintaining the visual amenity of the area.*

   Development on adjoining lots is all comprised of single dwellings and associated outbuildings. The proposal will represent a significant change in that context. Notwithstanding this, the development is permitted in the zone and is otherwise satisfactory with regard to the applicable planning controls.

b) *To minimise the potential for overlooking on adjacent dwellings and open space areas.*

   The dwellings will be significantly higher than development on adjoining lots to the south. There will be overlooking to those properties from the south facing balconies of development. There is however a setback of over 20m from the balconies of the development to the property boundary and an additional approximately 10-15m further to the dwellings on those lots. In this

respect there is a significant separation between the development and adjoining land which is considered to mitigate privacy impacts. If this remained a concern, it is considered that landscape screening could be planted that would further mitigate these impacts.

c) *To ensure that development is sympathetic to and addresses site constraints.*

The site is impacted by geotechnical, environmental and topographical constraints. These are considered to have been suitably addressed in the proposal. A geotechnical report found no conditions that would preclude the development. Cut and fill is not unreasonable given the steep slope. A vegetation management plan has been submitted which is considered to provide an improved landscape outcome for the site.

d) *To encourage split level stepped building solutions on steeply sloping sites.*

As noted above, the built form is stepped up the slope where possible.

e) *To encourage a built form of dwellings that does not have negative impact on the visual amenity of the adjoining residences.*

The development will be a significant change to the visual appearance of the site as viewed by adjoining residents. Notwithstanding, there are large setbacks between adjoining dwellings and there is also the opportunity for boundary landscaping which would partially screen the development.

f) *To ensure ancillary structures have appropriate scale and are not visually dominant compared to the dwelling.*

N/A

g) *To ensure appropriate correlation between the height and setbacks of ancillary structures.*

N/A

h) *To encourage positive solar access outcomes for dwellings and the associated private open spaces.*

The proposal will not overshadow adjoining properties.

(d) Demonstrate that the development will not have additional adverse impacts as a result of the variation.

Likely impacts are discussed at point c) and are considered acceptable.

<u>Side boundary landscaping</u>

(a) The control being varied;

Chapter B1, 5.8 Landscaping Requirements: 1.5 metre wide landscaping bed provided along the side and rear boundaries of the site.

(b) The extent of the proposed variation and the unique circumstances as to why the variation is requested;

The boundary landscaping is provided in accordance with this control except adjacent to a single visitor car parking space on the eastern boundary. There are no unique circumstances for the variation however it is considered relatively minor in the context of the size of the development and extent of landscaping provided.

(c) Demonstrate how the objectives are met with the proposed variations;

The objectives of this control as follows:

(a) To preserve and retain existing native trees and vegetation and encourage the planting of additional native vegetation.

(b) To enhance the appearance of housing through integrated landscape design.

(b) To improve the visual amenity by increasing the volume of substantial vegetation in urban areas.

(c) To reduce impervious areas on sites and increase soft landscape screening between side orientations of residential developments.

The development is considered satisfactory with regard to these objectives. The overall landscaped area is generous and above the minimums required by Council. The location of the variation is suitable screened with other planting and is set below the level of the adjoining lot which will largely screen the visitor car parking space.

(d) Demonstrate that the development will not have additional adverse impacts as a result of the variation.

There are not considered to be any significant adverse impacts arising from the variation that would otherwise not be there if the development was fully compliant.

<u>First floor setback</u>

(a) The control being varied;

Chapter B1, 5.4 Side and Rear Setbacks: Side setbacks to be 0.8 x ceiling height.

(b) The extent of the proposed variation and the unique circumstances as to why the variation is requested;

Unit 1 side setback

Ceiling height 6.4m

Setback required: 5.12m; Proposed setback: 3.745m.

Unit 4 side setback:

Ceiling height ~7m

Setback required: 5.6m; Proposed setback: 4.5m

There are no unique circumstances that give rise to the variation however the variation is considered minor in the context of distances to adjoining development and likely impacts.

(c) Demonstrate how the objectives are met with the proposed variations;

The objectives of the control are as follows:

(a) To provide adequate setbacks from boundaries and adjoining dwellings to retain privacy levels, views, sunlight and daylight access and to minimise overlooking.

(b) To provide appropriate separation between buildings to achieve the desired urban form.

(c) To optimise the use of land at the rear of the property and surveillance of the street at the front of the property.

(d) To minimise overshadowing of adjacent properties and private or shared open space.

The variation is not considered to result in adverse impacts in respect of privacy, views, sunlight and daylight access or overlooking above and beyond that of a complying built form.

The separation from the existing built form on adjoining lots is generous and further considered acceptable in relation to potential future development on adjoining lots.

(d) Demonstrate that the development will not have additional adverse impacts as a result of the variation.

The proposal is acceptable with regard to the likely impacts and the variations are not considered to result in notable impacts above that of a compliant form.

2.3.2 WOLLONGONG CITY WIDE DEVELOPMENT CONTRIBUTIONS PLAN 2018

The estimated cost of works is $100,000 and a 1% levy is applicable under this plan.

2.4 SECTION 4.15(1)(A)(IIIA) ANY PLANNING AGREEMENT THAT HAS BEEN ENTERED INTO UNDER SECTION 7.4, OR ANY DRAFT PLANNING AGREEMENT THAT A DEVELOPER HAS OFFERED TO ENTER INTO UNDER SECTION 7.4

There are no planning agreements entered into or any draft agreement offered to enter into under S7.4 which affect the development.

2.5 SECTION 4.15(A)(IV) THE REGULATIONS (TO THE EXTENT THAT THEY PRESCRIBE MATTERS FOR THE PURPOSES OF THIS PARAGRAPH)

92 What additional matters must a consent authority take into consideration in determining a development application?

N/A

93 Fire safety and other considerations

N/A

94 Consent authority may require buildings to be upgraded

N/A

2.6 SECTION 4.15(1)(B) THE LIKELY IMPACTS OF DEVELOPMENT

Context and Setting:

The other lots within the subdivision are single dwellings with the exception of Lot 6 which contains a dual occupancy approved under DA-2015/1584 and lot 9 which contains a dwelling with a secondary dwelling approved under DA-2017/1447. The broader locality is low density residential, primarily characterised by single dwellings however a dual occupancy has also recently been constructed at 74 Nottingham Street. The proposal would be a notable change in that respect.

The planning principle in Project Venture Developments v Pittwater Council [2005] NSWLEC 191 provides guidance to assessing the compatibility of the proposal with the context and setting.

Under this principle, the two major aspects of compatibility are noted to be physical impact and visual impact. In assessing each of these it is recommended the following questions be asked:

- Are the proposals physical impacts on surrounding development acceptable?
- Is the proposals appearance in harmony with the buildings around it and the character of the street?

Physical impacts from the development include matters such as overshadowing, overlooking, views, traffic and noise.

The development will not result in overshadowing of adjoining development.

Given the significant fall in the locality, there will be some overlooking of properties to the south from the development. The separation distances are however generous and there is considered to be opportunity for boundary landscape screening to be planted if required to mitigate this further.

The proposal is not considered to detract from significant views however will be a notable visual change to the character of the immediate locality. This in itself is not however considered to be substantial. Adjacent dwellings have in the subdivision have expansive views out towards the lake that will be unaffected by the development. Those dwellings located to the south could plant vegetative screening that would provide relief from this and also have aspect towards the lake.

In regard to traffic impacts, the right of way is of a size that can cater for the additional traffic movements which are not expected to result in significant adverse safety impacts. The development complies with the required resident and visitor car parking for this type of development. Waste servicing is proposed from a dedicated servicing bay at the front of the site which will ensure the right of way remain unobstructed.

Acoustic impacts would generally relate to traffic noise given the large separation of the dwellings from other dwellings on adjoining sites. The additional traffic generation along the right of is not considered to be significant.

In regard to the appearance of the development being in harmony with the buildings around it and the character of the street, this includes bulk and scale and aesthetics.

Whilst the proposal is considered to be a notable change, the development is within the allowable height and FSR for the site. The development is generally considered to have been designed to respond to the site constraints and not to be of excessive bulk.

It is noted that the proposal varies the control requiring the development to be only single storey on a battle-axe lot however the significant grade of the site presents challenges to meeting this requirement. The variation to this control is also considered to be acceptable with regard to chapter A1 of the DCP as detailed in the body of this report.

Setbacks to the boundaries do not comply with the multi-dwelling controls however the variations are considered acceptable given the size of the site and separation to adjoining development as discussed at Chapter A1 above.

The visual impacts are also considered to be acceptable. Dwellings located within the subdivision are significantly higher with their primary aspect towards the lake which will be unaffected by the development. Residential properties to the south of the development will be able to view the development from their rear yards however there is the opportunity for landscaped screening to mitigate this and their southerly aspect towards the lake is also unaffected. There are also large setbacks to those dwellings.

Access, Transport and Traffic:

The development provides the requisite resident and visitor car parking.

Manoeuvring areas are provided to ensure vehicles can enter and exit the site in a forwards direction.

Waste servicing will be via a private contractor and dedicated parking bay has been provided on site to allow waste vehicles to collect bins. That parking bay can also be utilised by emergency services vehicles including fire trucks.

Traffic generation is acceptable and is not expected to compromise the safe and efficient functioning of the shared accessway or to result in significant acoustic impacts to residents adjoining the accessway.

Public Domain:

N/A

Utilities:

The proposal is not envisaged to place an unreasonable demand on utilities supply and the development is considered to be readily connected to the relevant services.

Heritage:

No heritage items will be impacted by the proposal.

Other land resources:

The proposal is considered to contribute to orderly development of the site and is not envisaged to impact upon any valuable land resources.

Water:

The site is presently serviced by Sydney Water, which can be readily extended to meet the requirements of the proposed development. The proposal is not envisaged to have unreasonable water consumption.

Soils:

Satisfactory.

Air and Microclimate:

The proposal is not expected to have any negative impact on air or microclimate.

Flora and Fauna:

A satisfactory Vegetation Management Plan has been submitted which outlines how the large rear portion of the site will be revegetated and managed. No adverse impacts are expected on significant fauna.

Waste:

A condition is proposed that an appropriate receptacle be in place for any waste generated during the construction.

Energy:

Satisfactory BASIX certificates have been submitted.

Noise and vibration:

Conditions of consent are recommended regarding construction works and measures to be implemented to mitigate impacts on adjoining land.

Natural hazards:

There are no natural hazards affecting the site that would prevent the proposal.

Technological hazards:

There are no technological hazards affecting the site that would prevent the proposal.

Safety, Security and Crime Prevention:

The proposal is acceptable in regard to the principles of CPTED.

Social Impact:

The proposal is not expected to result in unacceptable social impacts.

Economic Impact:

The proposal is not expected to create any negative economic impact.

Site Design and Internal Design:

The application does not vary any development standards and is acceptable with regard to Council's development control plan.

A condition is proposed that all works are to be in compliance with the Building Code of Australia.

Construction:

Conditions of consent are proposed in relation to construction impacts such as hours of work, erosion and sedimentation controls, works in the road reserve, excavation, demolition and use of any crane, hoist, plant or scaffolding.

Cumulative Impacts:

The proposal is considered acceptable in regard to cumulative impacts.

2.7 SECTION 4.15(1)(C) THE SUITABILITY OF THE SITE FOR THE DEVELOPMENT

Does the proposal fit in the locality?

The proposal is considered appropriate with regard to the zoning of the site and is not expected to have unacceptable adverse impacts on the amenity of the locality or adjoining developments.

Are the site attributes conducive to development?

The design is considered to suitably address the site constraints.

2.8 SECTION 4.15(1)(D) ANY SUBMISSIONS MADE IN ACCORDANCE WITH THIS ACT OR THE REGULATIONS

Five submissions were received as discussed at 1.3 of this report.

2.9 SECTION 4.15(1)(E) THE PUBLIC INTEREST

The application is not expected to have any unreasonable impacts on the environment or the amenity of the locality. It is considered appropriate with consideration to the zoning and the character of the area and is therefore considered to be in the public interest.

3 CONCLUSION

This application has been assessed as satisfactory having regard to the Heads of Consideration under Section S4.15(1) of the Environmental Planning and Assessment Act 1979, the provisions of Wollongong Local Environmental Plan 2009 and all relevant Council DCPs, Codes and Policies. The application involves a variation to Wollongong Development Control Plan 2009 with regard to two storey development on battle-axe blocks and side boundary setbacks and landscaping. The variations have been adequately justified and are supportable in this instance. Internal and external referrals are satisfactory and submissions have been considered in the assessment. It is considered that the proposed development has otherwise been designed appropriately given the nature and characteristics of the site and is unlikely to result in significant adverse impacts on the character or amenity of the surrounding area.

4 RECOMMENDATION

It is recommended that the development application be approved subject to appropriate conditions of consent.

5 ATTACHMENTS

1 Aerial photograph

2 WLEP 2009 zoning map

3 Plans

4 WDCP Compliance table

5 Bushfire conditions

6 Vegetation Management Plan

7 Arborist Report

8 Traffic Impact Report

9 Construction Traffic Management Plan

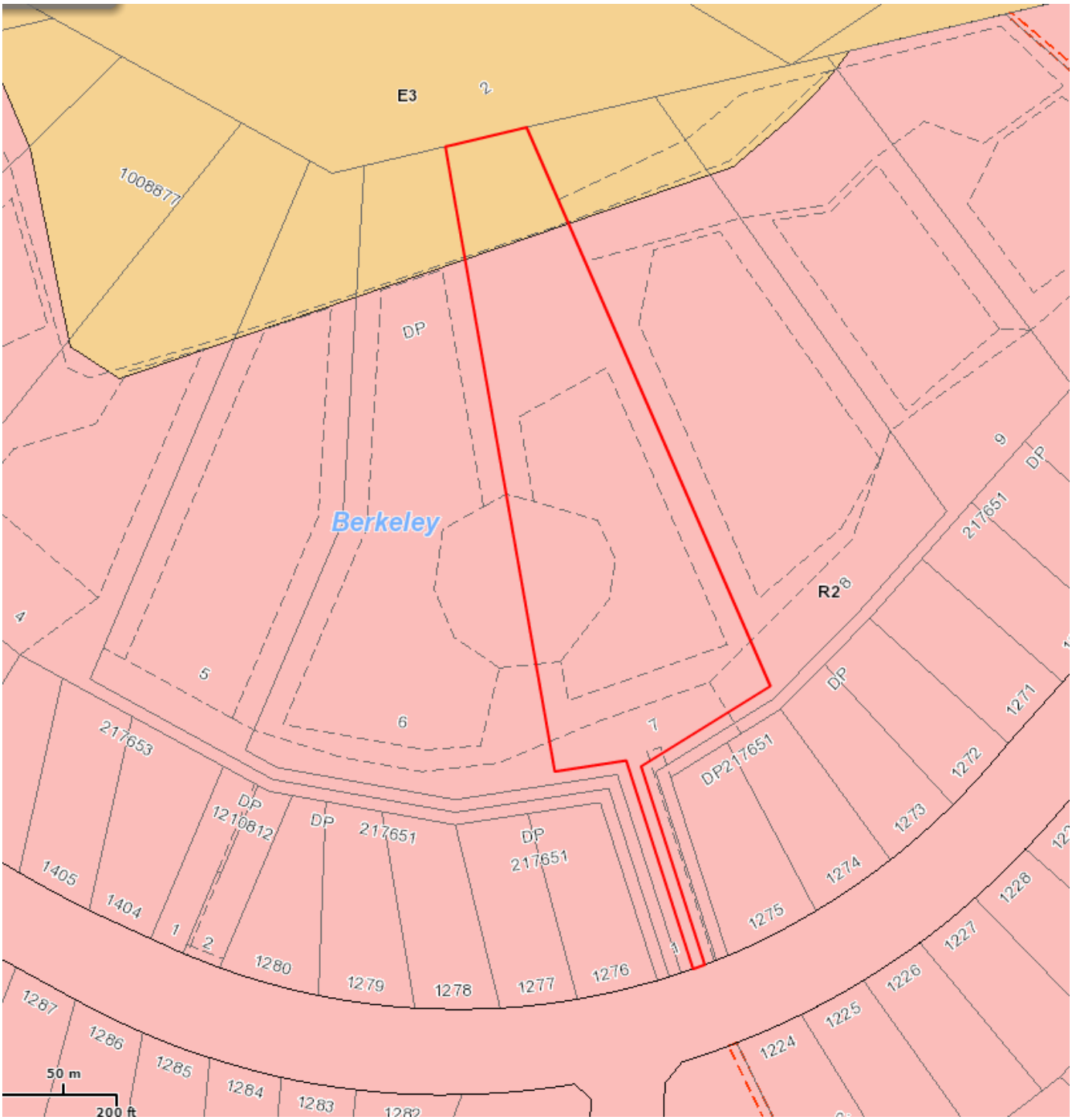
10 Draft consent

DA-2018/1583

Attachment 1 – Aerial photograph

DA-2018/1583

Attachment 2 – WLEP 2009 zoning map



ISSUE 'F'
13/5/2019

LUXLIVING
HOMES

PROPOSED MULTI-UNIT DEVELOPMENT

for

LUXLIVING HOMES

at

62 NOTTINGHAM STREET, LOT 7 IN DP 1008877, BERKELEY

ISSUE	DATE	ISSUE NOTE	BY
F	13/5/19	DEVELOPMENT APPLICATION	P.S.

PROJECT
PROPOSED MULTI UNIT DEVELOPMENT

ADDRESS
LOT 7 IN DP 1008877, 62 NOTTINGHAM STREET, BERKELEY.

CLIENT
LUXLIVING HOMES

ABN 5588 2399 320

STRUCTURAL ENGINEERS &
PECORP DESIGN
BUILDING DESIGNERS

2/238 COWPER STREET
WARRAWONG, 2502
PH:42751999 FAX:42751933
PO BOX 47 WARRAWONG 2502

PROJECT #	20160059
DWG STATUS	F
DWG DATE	13/5/19
CAD FILE NAME	LUX LIVING 20160059-PSE
PLOT DATE	13/5/19
ORIGINAL SHEET SIZE	A1
SCALE @ A1	1:300
DRAWN P.S. CHKD	P.S.

REVISION
20160059

SHEET 1 OF 13

BUSH FIRE REQUIREMENTS

Fascia boards & Soffits:- there are no construction requirements for fascia boards &/or soffit linings within AS3959-2009 BAL-12.5 & BAL-19 &/or Appendix 3 of Planning for Bushfire Protection (2010). *Note*: Joints in eave linings may be sealed with plastic joining strips. Gaps are not to exceed ***3.0mm***.

Fascia boards (BAL-29):- Fascia boards need to be metal or bushfire resisting timbers (See Appendix **F** of AS3959-2009). Metal fascia boards will need to be fixed at ***450mm centre***.

Soffit lining and adequate protection of the joint (BAL-29):- The soffit (or eaves lining) will need to be fibre cement with a minimum 4.5 mm thickness or bushfire-resisting timber (See Appendix **F** of AS3959-2009). The joint system for these linings are normally plastic and this is acceptable. Gaps are not to exceed ***3.0mm***.

Garage Door (BAL-12.5, 19 & 29):- The garage doors need to be non-combustible or bushfire-resisting timbers (See Appendix **F** of AS3959-2009). Panel lift doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm. Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door.

Fascia boards & Soffits:- there are no construction requirements for fascia boards &/or soffit linings within AS3959-2009 BAL-12.5 & BAL-19 &/or Appendix 3 of Planning for Bushfire Protection (2010). *Note*: Joints in eave linings may be sealed with plastic joining strips. Gaps are not to exceed ***3.0mm***.

Fascia boards (BAL-29):- Fascia boards need to be metal or bushfire resisting timbers (See Appendix **F** of AS3959-2009). Metal fascia boards will need to be fixed at ***450mm centre***.

Roof Vents/Penetrations (BAL-12.5, 19 & 29):- Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors, shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to seal the penetration shall be non-combustible. *Note:* Vent pipes made from PVC are permitted.

Decking/Verandah (BAL-12.5, 19 & 29): - Support posts, bearers, joists & decking/trafficable surfaces to all verandahs/decks etc are required to be from non-combustible materials *or* ***fire resisting timber*** (as per AS3959-2009 appendix F or see 6.0 Bushfire Resisting Timbers). The timbers in the decking maybe spaced, the perimeter of the area beneath the deck must not be enclosed or access to the space beneath the deck impeded. The timber flooring/frame must be separated from the remainder of the building in a manner that will not spread fire into the building.

Seal roof and wall intersections (ALL BAL's):- The roof and wall intersections are to be adequately sealed to protect the roof space from possible ember attack (gaps not to exceed 2.0mm). There are a variety of materials that will achieve this level of performance including sarking or non-combustible mineral wool.

Sarking beneath the roof:- flame retardant sarking will need to be installed beneath the roof tiles. Sarking must have a Flammability index of not more than 5. Sarking must be installed to cover the entire roof area including the ridge & so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys etc.

Vents in the external wall to be spark proofed (BAL-12.5 & 19):- The weep holes/vents in the external wall will need to be adequately spark proofed using corrosion resistance metal gauze screens with a maximum aperture of 2.0 mm, except where they are less than 3 mm or are located in an external wall of a subfloor space.

Vents in the external wall to be spark proofed (BAL-29):- The weep holes/vents in the external wall will need to be adequately spark proofed using corrosion resistance metal gauze screens with a maximum aperture of 2.0 mm, except where they are less than 3 mm.+

Side Hinged doors (BAL-19):- The external doors will need to be protected by a tight fitting corrosion resistant metal screen door to the outside face. The screen door will need to be fitted with corrosion resistant steel, bronze or aluminium mesh with a maximum aperture of 2.0mm. *Note:* Gaps around screens are not to exceed 3.0mm when closed;
OR
Doors & Jambs are to be from non-combustible materials or bushfire-resisting timbers;
OR
Fully framed glazed doors, where the framing is made from a fire resisting timber species as specified & listed within the report or Appendix **F** of AS3959-2009 & ***5mm toughened glass***. Weather strips, draught excluders or draught seals shall be installed at the base of all side-hung external doors.

Side Hinged doors (BAL-29):- The external doors will need to be protected by a tight fitting corrosion resistant metal screen door to the outside face. The screen door will need to be fitted with corrosion resistant steel, bronze or aluminium mesh with a maximum aperture of 2.0mm. *Note:* Gaps around screens are not to exceed 3.0mm when closed;
OR
Doors & Jambs are to be from non-combustible materials or bushfire-resisting timbers;
OR
Fully framed glazed doors, where the framing is made from a fire resisting timber species as specified & listed within the report or Appendix **F** of AS3959-2009 & ***6mm toughened glass***. Weather strips, draught excluders or draught seals shall be installed at the base of all side-hung external doors.

External Balustrade/Handrails (BAL-12.5, 19 & 29): - Those parts of the handrails &/or balustrades less than 125 mm from any glazing or any combustible wall shall be from non-combustible materials or bushfire resisting timbers or a combination of both.

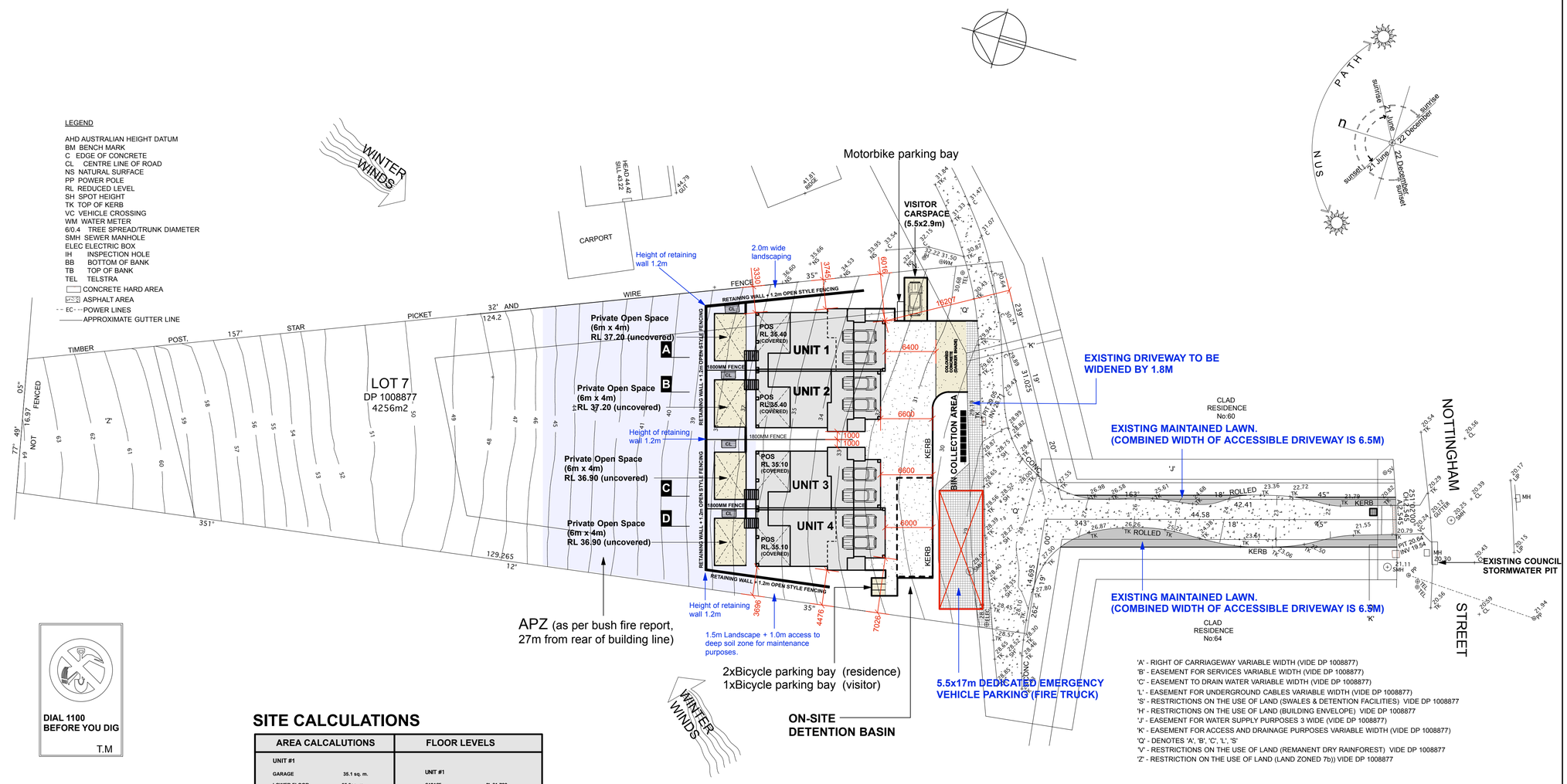
Window design (BAL 19:- Window frames shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009) for window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame. Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal. All glazing to be from ***5mm toughened glass***. The ***openable*** portions of ***all windows*** will need to be protected with aluminium, bronze or stainless steel gauze screens with a maximum aperture of 2.0 mm.

Window design (BAL 29):- Window frames shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The windows will require all glazing to be from ***5mm toughened glass***. Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal. The ***openable*** portions of all ***windows*** are to be protected with a metal or bushfire resisting timber framed screen fitted with bronze or stainless steel gauze screens with a maximum aperture of 2.0 mm. Gaps around screens are not to exceed 3.0mm when fitted. *Note:* The openable portions of windows can be screened internally or externally.

Glazed doors (BAL 19):- Doors/frames/jambs etc shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The doors will require all glazing to be from ***5mm toughened glass***. Door shall be tight-fitting in the frames. We note there is ***no requirement*** to provide screen doors for this development. *Note:* However, if screened, we recommend screens comply with AS3959-2009 Clause 6.5.1A.

Glazed doors (BAL 29):- Doors/frames/jambs etc shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The doors will require all glazing to be from ***5mm toughened glass***. Externally fitted hardware that supports the doors in their functions of opening and closing, shall be metal. Door shall be tight-fitting in the frames. We note there is ***no requirement*** to provide screen doors for this development. *Note:* However, if screened, we recommend screens comply with AS3959-2009 Clause 7.5.1A.

ALL DIMENSIONS ARE TO BE VERIFIED ON SITE PRIOR TO WORK COMMENCING.



DIAL 1100 BEFORE YOU DIG T.M

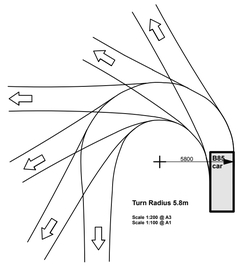
SITE CALCULATIONS

AREA CALCALUTIONS		FLOOR LEVELS	
UNIT #1		**UNIT #1**	
GARAGE	35.1 sq. m.	GARAGE	RL 31.700
LOWER FLOOR	55.6sq. m.	LOWER FLOOR	RL 35.500
UPPER FLOOR	65.8sq. m.	UPPER FLOOR	RL 38.500
TOTAL	121.4 sq. m.		
UNIT #2		**UNIT #2**	
GARAGE	35.1 sq. m.	GARAGE	RL 31.700
LOWER FLOOR	55.6sq. m.	LOWER FLOOR	RL 35.500
UPPER FLOOR	65.8sq. m.	UPPER FLOOR	RL 38.500
TOTAL	121.4 sq. m.		
UNIT #3		**UNIT #3**	
GARAGE	35.1 sq. m.	GARAGE	RL 31.500
LOWER FLOOR	55.6sq. m.	LOWER FLOOR	RL 35.200
UPPER FLOOR	65.8sq. m.	UPPER FLOOR	RL 38.200
TOTAL	121.4 sq. m.		
UNIT #4		**UNIT #4**	
GARAGE	35.1 sq. m.	GARAGE	RL 31.500
LOWER FLOOR	55.6sq. m.	LOWER FLOOR	RL 35.200
UPPER FLOOR	65.8sq. m.	UPPER FLOOR	RL 38.200
TOTAL	121.4 sq. m.		

SITE	**4256sq. m.**
TOTAL AREA	**485.6**
FLOOR SPACE RATIO	**0.114:1 (TOTAL SITE)**
FLOOR SPACE RATIO	**0.125:1 (EXCLUDING E2 ZONE)**

SITE PLAN
SCALE 1:300

TURNING CIRCLES.
Scale 1:100



DIAL 1100 BEFORE YOU DIG T.M

ISSUE	DATE	ISSUE NOTE	BY
F	13/5/19	DEVELOPMENT APPLICATION	P.S.

PROJECT
PROPOSED MULTI UNIT DEVELOPMENT

ADDRESS
LOT 7 IN DP 1008877, 62 NOTTINGHAM STREET, BERKELEY.

CLIENT
LUXLIVING HOMES

ABN 5588 2399 320
STRUCTURAL ENGINEERS &
PECORP DESIGN
BUILDING DESIGNERS
2/238 COWPER STREET WARRAWONG, 2502
PH:42751999 FAX:42751933
PO BOX 47 WARRAWONG 2502

PROJECT #	20160059	DWG STATUS	F
DWG DATE	13/5/19	CAD FILE NAME	LUX LIVING 20160059-PSE
PLOT DATE	13/5/19	REVISION	
ORIGINAL SHEET SIZE	A1		20160059
SCALE @ A1	1:300		SHEET 2 OF 13
DRAWN P.S.	CHKD P.S.		

SITE ANALYSIS PLAN

NOT TO SCALE

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DRAWN P.S.	CHKD P.S.

NOTE:- RESTRICTION MARKED 'V'-RESTRICTIONS ON THE USE OF LAND (REMANENT DRY RAINFOREST) VIDE DP 1008877 TO BE REMOVED FROM TITLE

ORIGINAL SITE SURVEY

NOTE:

* THE TITLE BOUNDARY DIMENSIONS AND AREAS SHOWN HEREON ARE DETERMINED BY TITLE DEED ONLY AND ARE SUBJECT TO FINAL SURVEY
* ADJOINING BUILDINGS, RIDGES AND GUTTER POSITIONS ARE APPROXIMATE ONLY
* ONLY VISIBLE SERVICES WERE LOCATED AT TIME OF SURVEY IT IS RECOMMENDED THAT ALL RELEVANT AUTHORITIES BE NOTIFIED PRIOR TO ANY WORKS BEING COMMENCED ON SITE. WE STRONGLY SUGGEST THAT YOU DIAL 1100 BEFORE YOU DIG
* TREE SPREAD AND TRUNK DIAMETERS SHOWN IN THIS PLAN ARE INDICITIVE ONLY
* CONTOURS HAVE BEEN INTERPOLATED FROM SPOT HEIGHTS TAKEN AND ARE INDICITIVE ONLY
* DO NOT SCALE OF THIS PLAN. WHERE CLEARANCES ARE CRITICAL THEY SHOULD BE CONFIRMED BY A FURTHER BOUNDARY SURVEY
*
* THIS NOTE IS AN INTEGRAL PART OF THIS PLAN

ORIGINAL SITE SURVEY

SCALE 1:300

'A' - RIGHT OF CARRIAGEWAY VARIABLE WIDTH (VIDE DP 1008877)
'B' - EASEMENT FOR SERVICES VARIABLE WIDTH (VIDE DP 1008877)
'C' - EASEMENT TO DRAIN WATER VARIABLE WIDTH (VIDE DP 1008877)
'L' - EASEMENT FOR UNDERGROUND CABLES VARIABLE WIDTH (VIDE DP 1008877)
'S' - RESTRICTIONS ON THE USE OF LAND (SWALES & DETENTION FACILITIES) VIDE DP 1008877
'H' - RESTRICTIONS ON THE USE OF LAND (BUILDING ENVELOPE) VIDE DP 1008877
'J' - EASEMENT FOR WATER SUPPLY PURPOSES 3 WIDE (VIDE DP 1008877)
'K' - EASEMENT FOR ACCESS AND DRAINAGE PURPOSES VARIABLE WIDTH (VIDE DP 1008877)
'Q' - DENOTES 'A', 'B', 'C', 'L', 'S'
'V' - RESTRICTIONS ON THE USE OF LAND (REMANENT DRY RAINFOREST) VIDE DP 1008877
'Z' - RESTRICTION ON THE USE OF LAND (LAND ZONED 7b)) VIDE DP 1008877

NEW WAY SURVEYING
LAND, ENGINEERING &
CONSTRUCTION SURVEYORS
15 PLUMWOOD CRESCENT, CORDEAUX HEIGHTS
MOB:0430 051242 FAX:(02) 42 725 902
EMAIL:darko@newwaysurveying.com.au
INTERNET: www.newwaysurveying.com.au

SCALE BAR 0 5 10 15 25		SCALE 1:250 (ON A1)	DRAWN DR	CLIENT PECORP DESIGN	
DATUM	A.H.D.	SUBURB BERKELEY	SURVEYED AM	DESCRIPTION DETAIL AND CONTOUR PLAN OVER LOT 7 IN DP 1008877 LOCATED AT No:62 NOTTINGHAM STREET, BERKELEY	
ORIGIN OF LEVELS AND SOURCE	SSM 121628 SCIMS (13/01/2014)	L.G.A. WOLLONGONG	CHECKED AM		
CONTOUR INTERVAL	1m	SHEET NO. OF SHEETS	DATE: 11/01/2014	ISSUE NO: A	SURVEYORS REFERENCE 14007

NEW WAY SURVEYING NWS

DIAL 1100 BEFORE YOU DIG
T.M

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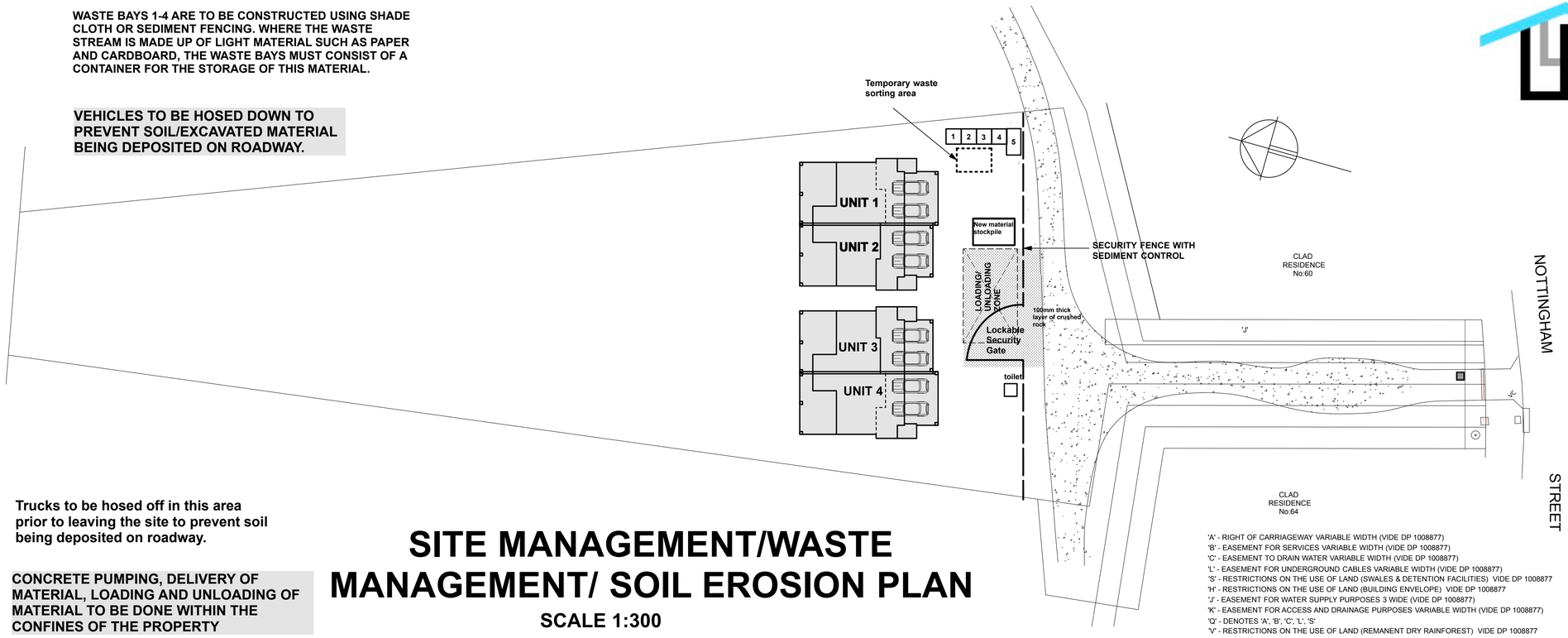
DRAWN P.S.	CHKD P.S.		

WASTE BAYS 1-4 ARE TO BE CONSTRUCTED USING SHADE CLOTH OR SEDIMENT FENCING. WHERE THE WASTE STREAM IS MADE UP OF LIGHT MATERIAL SUCH AS PAPER AND CARDBOARD, THE WASTE BAYS MUST CONSIST OF A CONTAINER FOR THE STORAGE OF THIS MATERIAL.

VEHICLES TO BE HOSED DOWN TO PREVENT SOIL/EXCAVATED MATERIAL BEING DEPOSITED ON ROADWAY.



Trucks to be hosed off in this area prior to leaving the site to prevent soil being deposited on roadway.

CONCRETE PUMPING, DELIVERY OF MATERIAL, LOADING AND UNLOADING OF MATERIAL TO BE DONE WITHIN THE CONFINES OF THE PROPERTY

SITE MANAGEMENT/WASTE MANAGEMENT/ SOIL EROSION PLAN

SCALE 1:300

'A' - RIGHT OF CARRIAGEWAY VARIABLE WIDTH (VIDE DP 1008877)
'B' - EASEMENT FOR SERVICES VARIABLE WIDTH (VIDE DP 1008877)
'C' - EASEMENT TO DRAIN WATER VARIABLE WIDTH (VIDE DP 1008877)
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'Z' - RESTRICTION ON THE USE OF LAND (LAND ZONED 7b)) VIDE DP 1008877

Lockers

Product Range

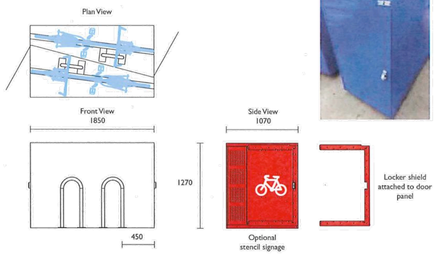
1300 780 450

BLHS2
High Security
Upgrade

Locker shield	Prevents forced entry with leverage tools.
U-rail security	Our BR475B is supplied and installed inside the locker allowing cyclists to use their own locking devices to provide additional security.
T handle	Vandal resistant, spring loaded handle locates flush when not in use, minimising possible vandalism

Suitable for use in locations where vandal resistance might be required

HIGH SECURITY UPGRADE



Material Specifications (General)

Material	1.6mm Galvabond® sheet
Inclusions	Reinforced door & roof stiffeners, clothes / helmet hooks, 3-way secure locking, security camera access
Finish	Galvanised or powder coated in a range of colours

DIAL 1100
BEFORE YOU DIG
T.M

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CLIENT
LUXLIVING HOMES

ABN 5588 2399 320
STRUCTURAL ENGINEERS &
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BUILDING DESIGNERS
2/238 COWPER STREET WARRAWONG, 2502
PH:42751999 FAX:42751933
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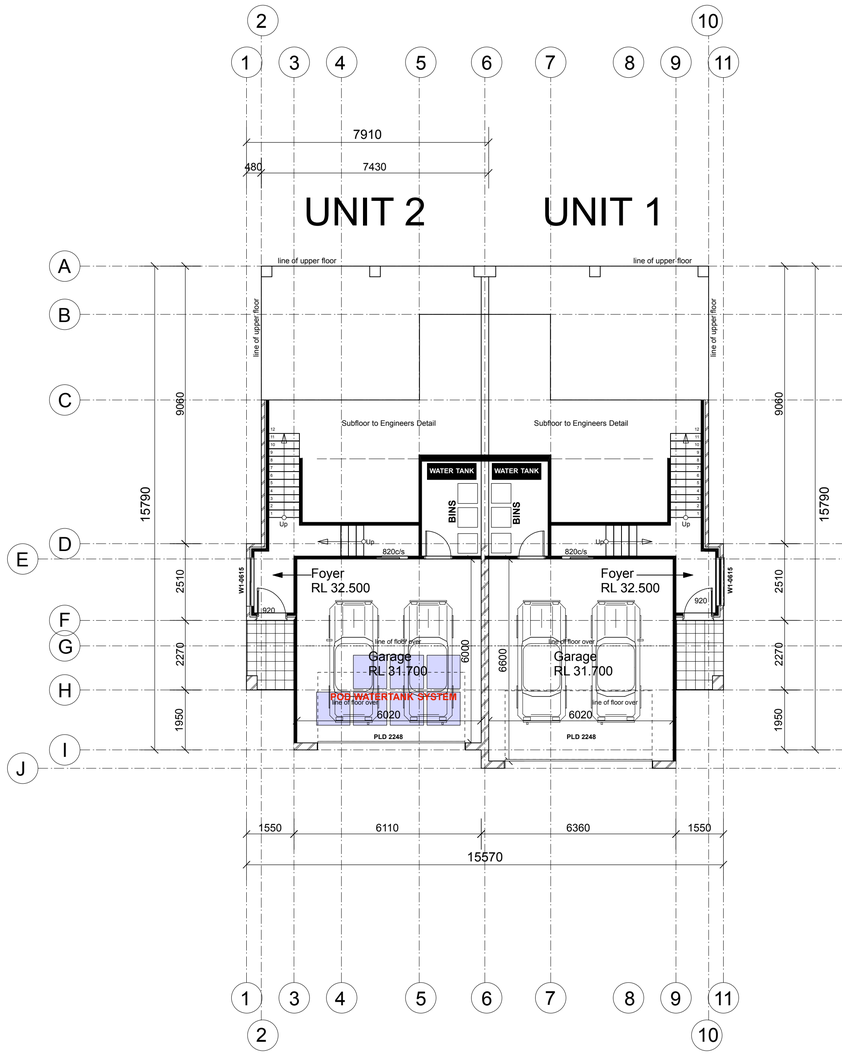
DRAWN	P.S.
CHKD	P.S.
SHEET	5 OF 13

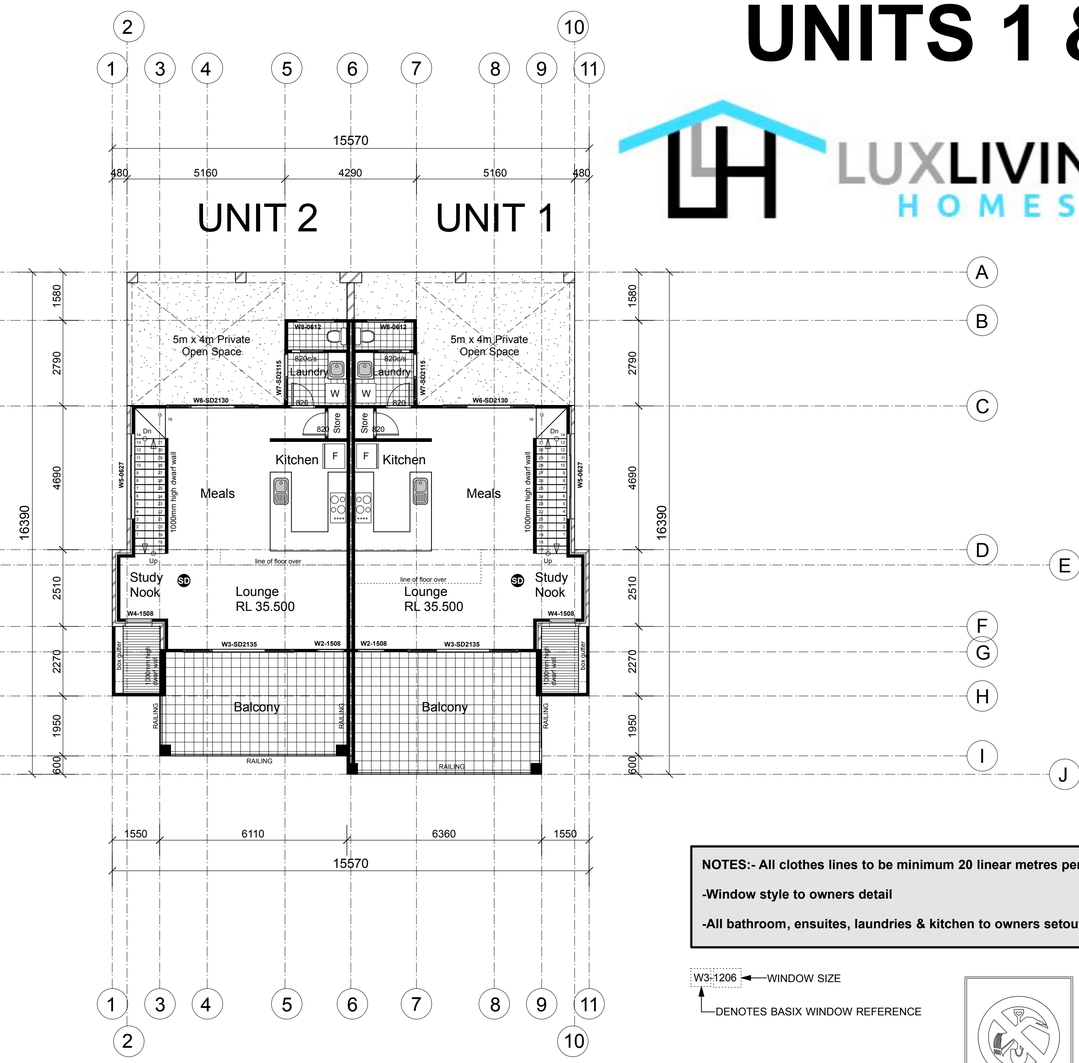
UNITS 1 & 2

LUXLIVING HOMES



ground floor plan

SCALE 1:100



lower floor plan

SCALE 1:100

NOTES:- All clothes lines to be minimum 20 linear metres per dwelling.

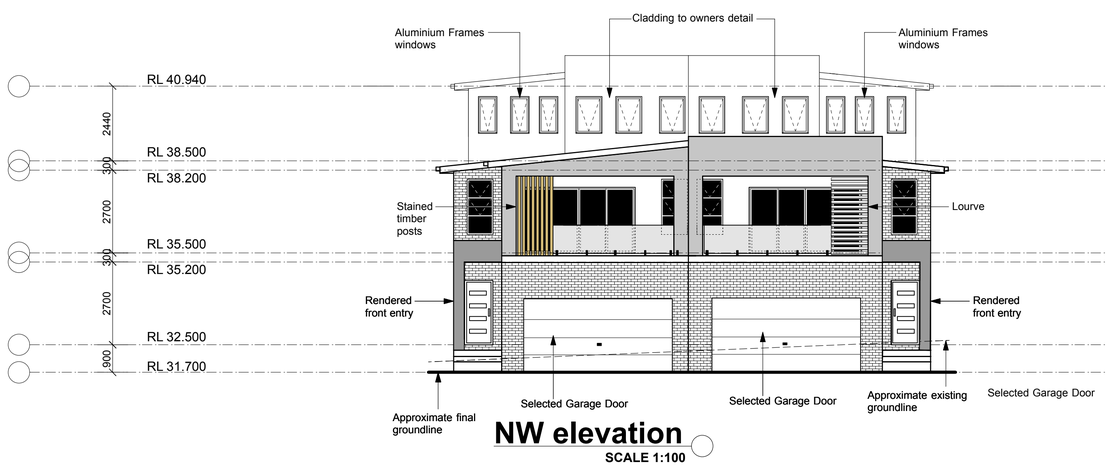
-Window style to owners detail

-All bathroom, ensuites, laundries & kitchen to owners setout

W3-1206 ← WINDOW SIZE

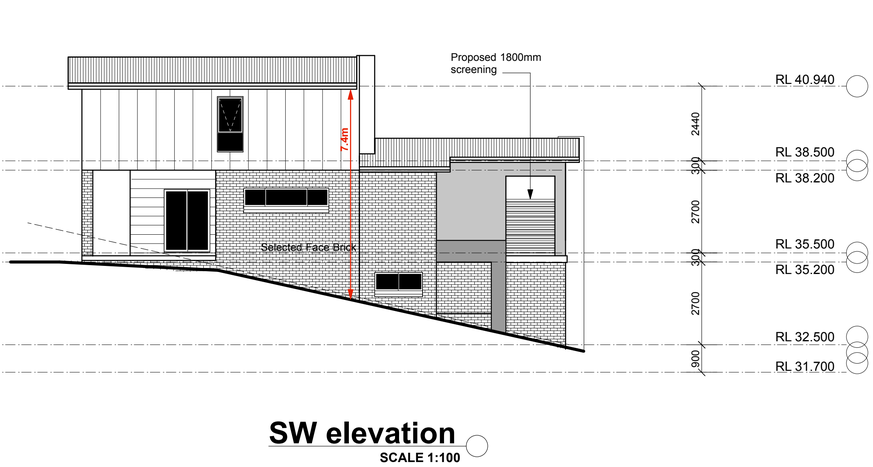
└ DENOTES BASIX WINDOW REFERENCE

DIAL 1100
BEFORE YOU DIG
T.M



NW elevation

SCALE 1:100



SW elevation

SCALE 1:100

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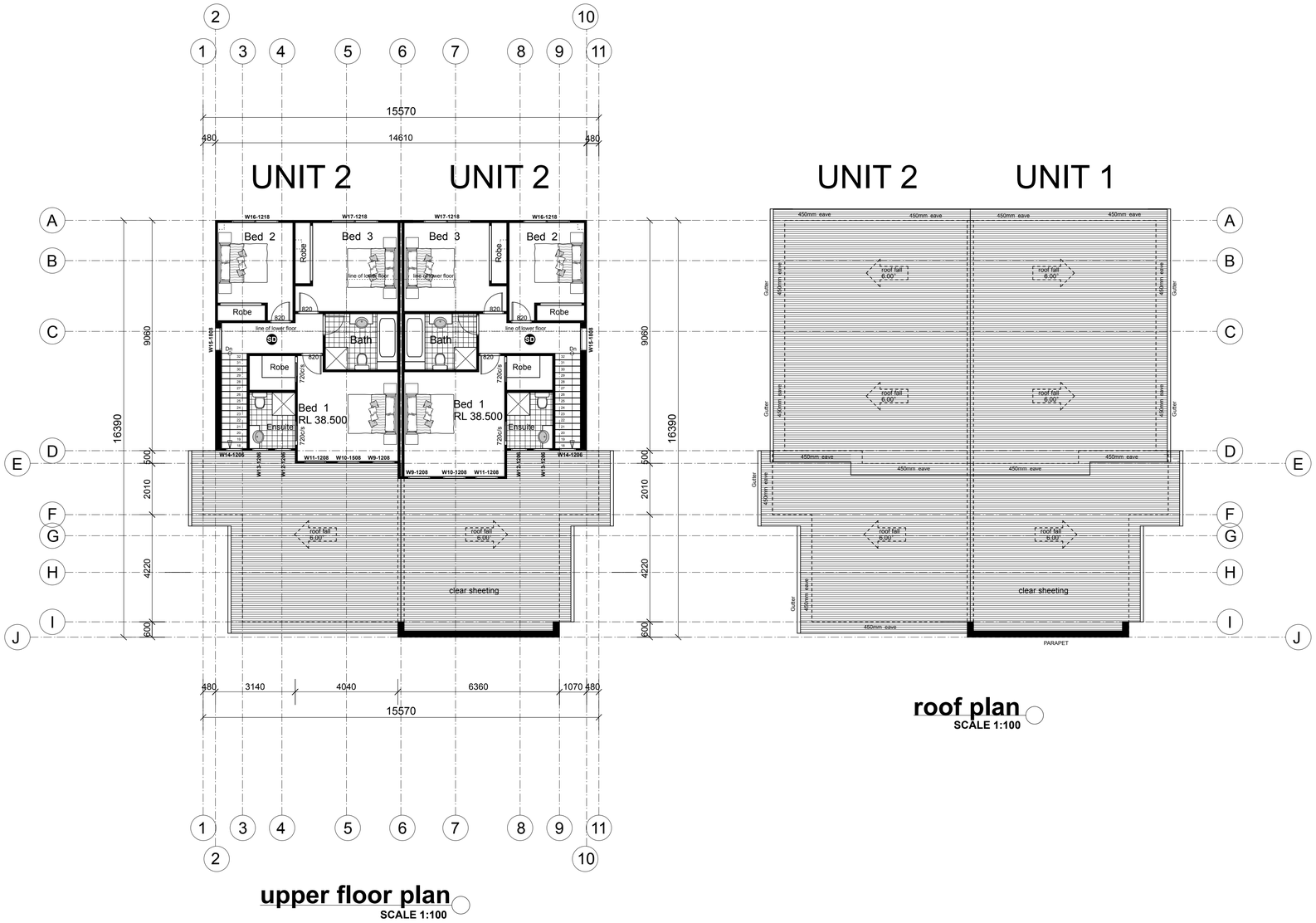
DRAWN P.S.	CHKD P.S.		

UNITS 1 & 2



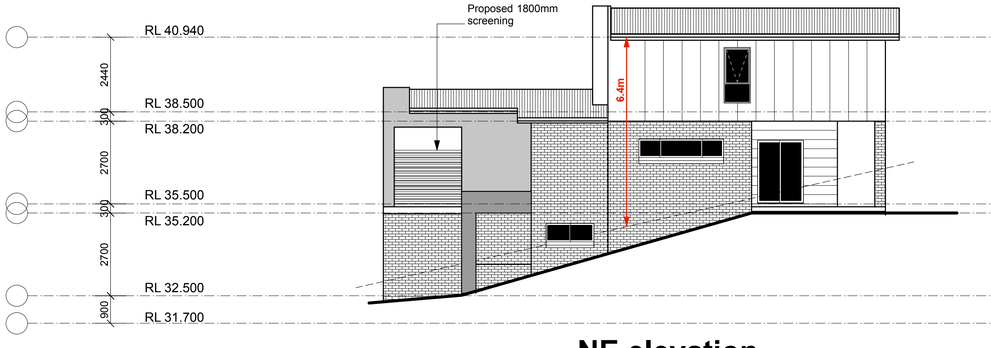
roof plan
SCALE 1:100

upper floor plan
SCALE 1:100

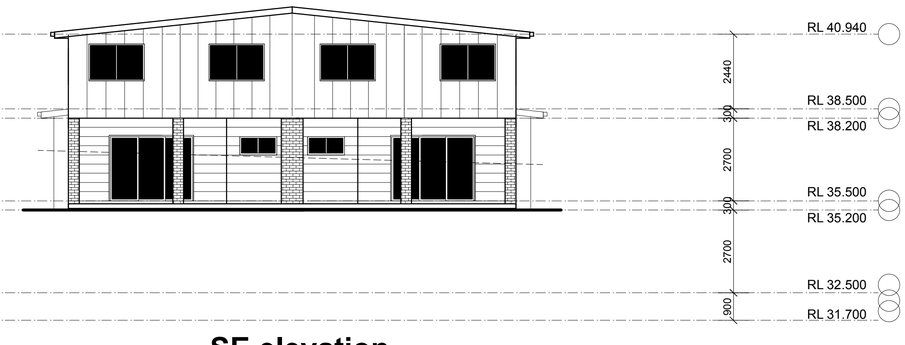
COLOUR SCHEME

ROOF-*BASALT*	
FASCIA-BASALT	
GUTTER-BASALT	
CLADDING-DULUX NATURAL WHITE	
WINDOWS-SURFMIST	
GARAGE DOORS-SURFMIST (PANEL LIFT)	
BRICKS-GREY	

LUXLIVING HOMES



NE elevation
SCALE 1:100



SE elevation
SCALE 1:100

ISSUE	DATE	ISSUE NOTE	BY
F	13/5/19	DEVELOPMENT APPLICATION	P.S.

PROJECT
PROPOSED MULTI UNIT DEVELOPMENT

ADDRESS
LOT 7 IN DP 1008877, 62 NOTTINGHAM STREET, BERKELEY.

CLIENT
LUXLIVING HOMES

ABN 5588 2399 320
STRUCTURAL ENGINEERS &
PECORP DESIGN
BUILDING DESIGNERS
2/238 COWPER STREET
WARRAWONG, 2502
PH:42751999 FAX:42751933
PO BOX 47 WARRAWONG 2502

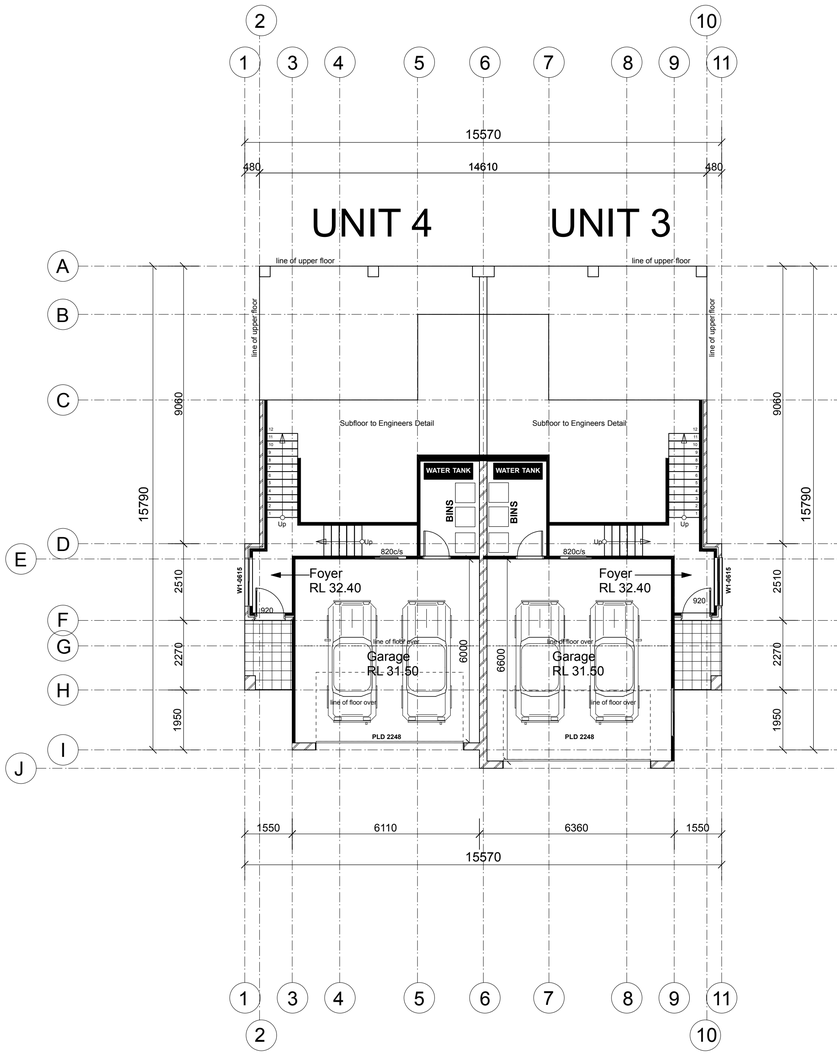
PROJECT #	20160059	DWG STATUS	F
DWG DATE	13/5/19	CAD FILE NAME	LUX LIVING 20160059-PSE
PLOT DATE	13/5/19	REVISION	20160059
ORIGINAL SHEET SIZE	A1		
SCALE @ A1	1:300		
DRAWN P.S.	CHKD P.S.		SHEET 7 OF 13

UNITS 3-4

LUXLIVING HOMES

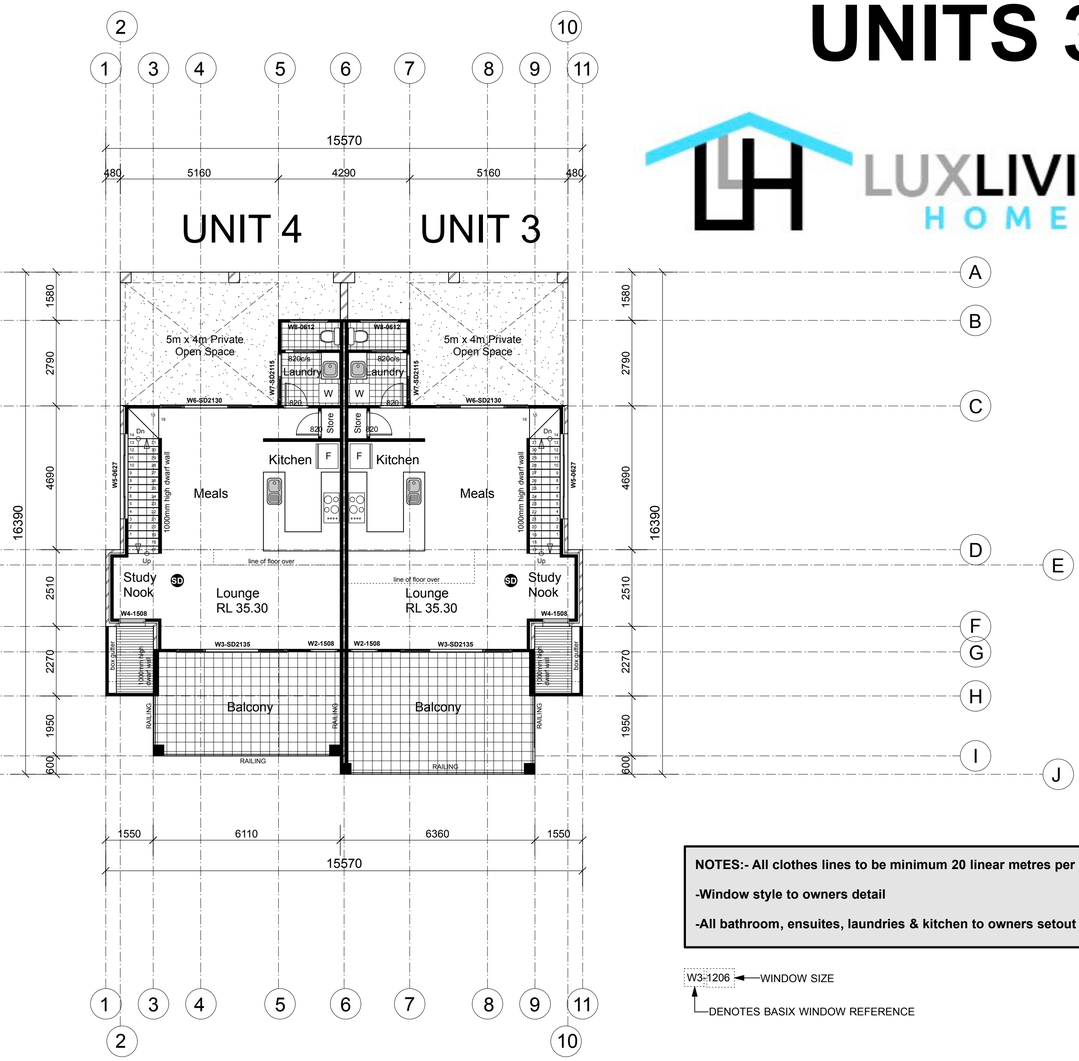
COLOUR SCHEME

ROOF-*BASALT*	
FASCIA-BASALT	
GUTTER-BASALT	
CLADDING-DULUX NATURAL WHITE	
WINDOWS-SURFMIST	
GARAGE DOORS-SURFMIST (PANEL LIFT)	
BRICKS-GREY	



ground floor plan

SCALE 1:100



lower floor plan

SCALE 1:100

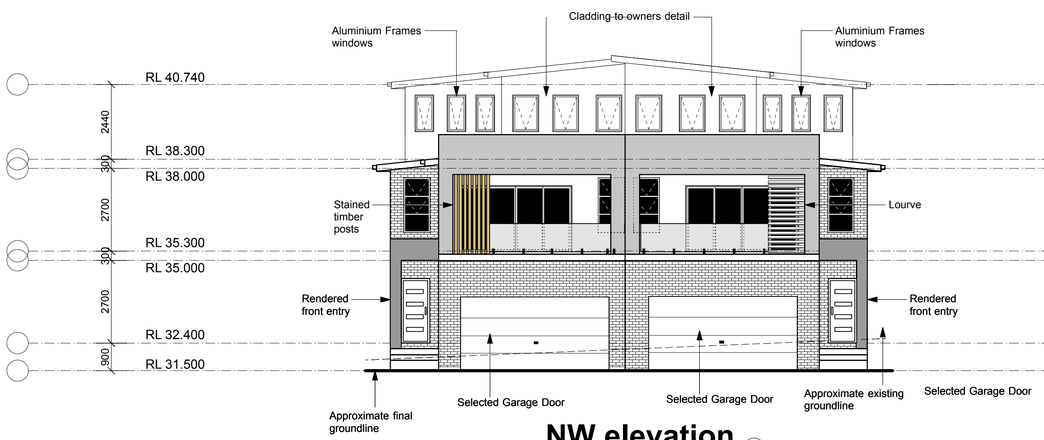
NOTES:- All clothes lines to be minimum 20 linear metres per dwelling.

-Window style to owners detail

-All bathroom, ensuites, laundries & kitchen to owners setout

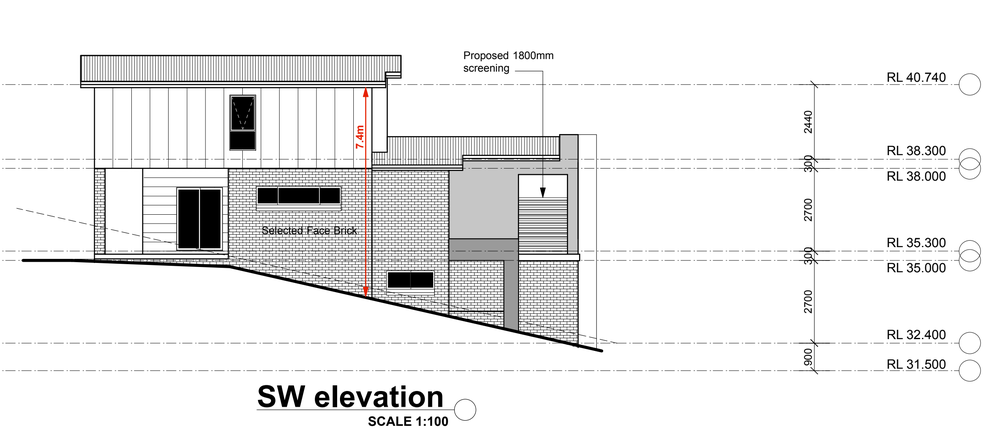
W3-1206 ← WINDOW SIZE

DENOTES BASIX WINDOW REFERENCE



NW elevation

SCALE 1:100



SW elevation

SCALE 1:100

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PROJECT
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CLIENT
LUXLIVING HOMES

ABN 5588 2399 320

STRUCTURAL ENGINEERS &
PECORP DESIGN
BUILDING DESIGNERS

2/238 COWPER STREET WARRAWONG, 2502
PH:42751999 FAX:42751933
PO BOX 47 WARRAWONG 2502

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REVISION	
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SCALE @ A1	1:300
DRAWN	P.S.
CHKD	P.S.

20160059

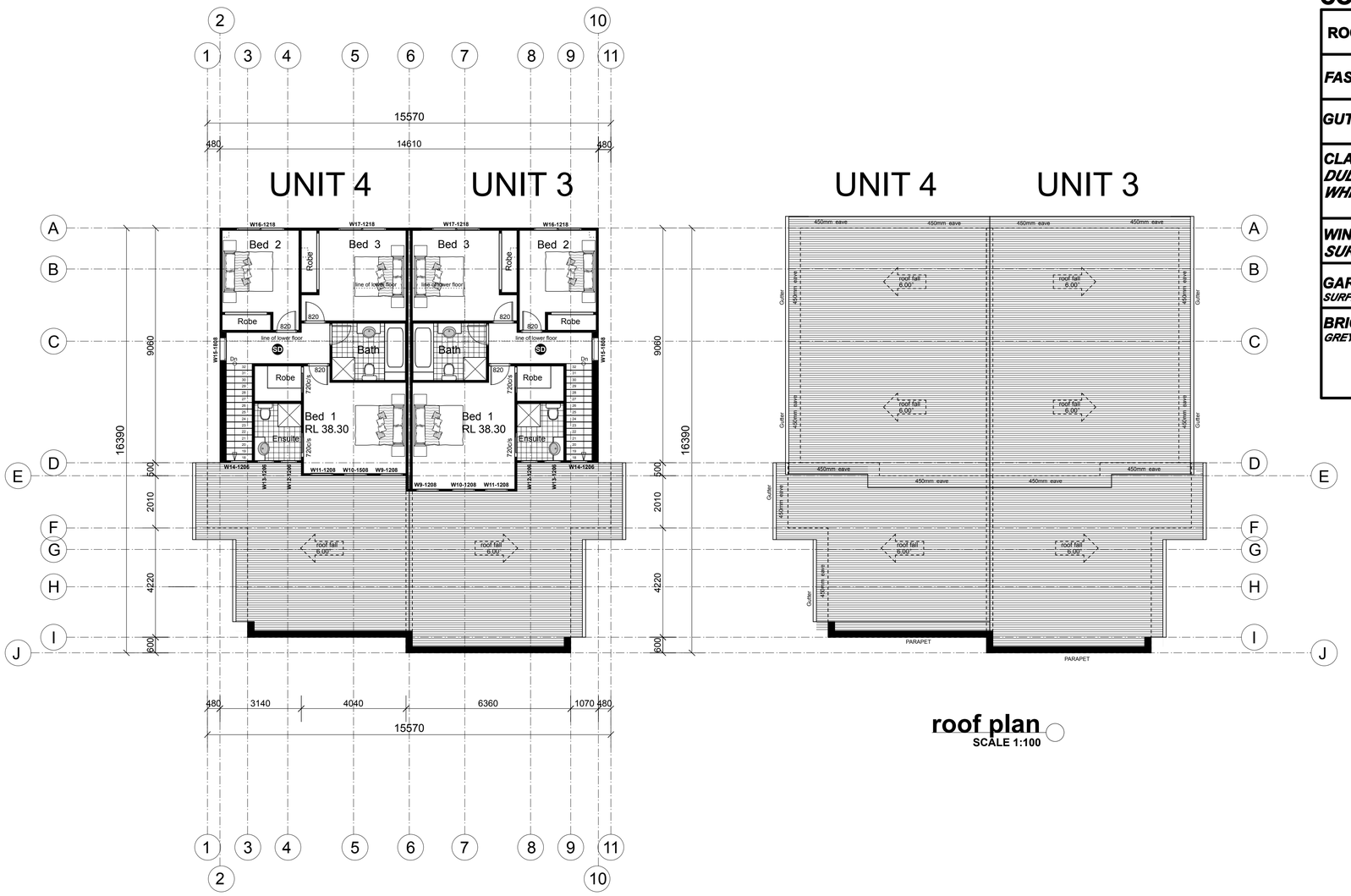
SHEET 8 OF 13

UNITS 3-4

COLOUR SCHEME

ROOF-*BASALT*	
FASCIA-BASALT	
GUTTER-BASALT	
CLADDING-DULUX NATURAL WHITE	
WINDOWS-SURFMIST	
GARAGE DOORS-SURFMIST (PANEL LIFT)	
BRICKS-GREY	

LUXLIVING HOMES



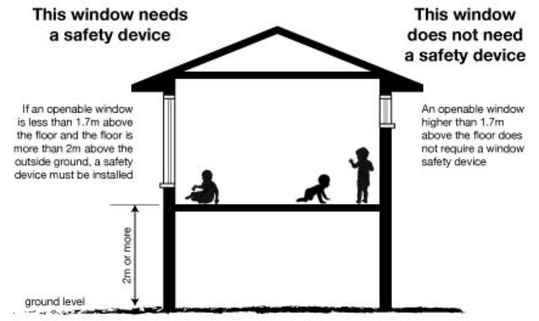
roof plan
SCALE 1:100

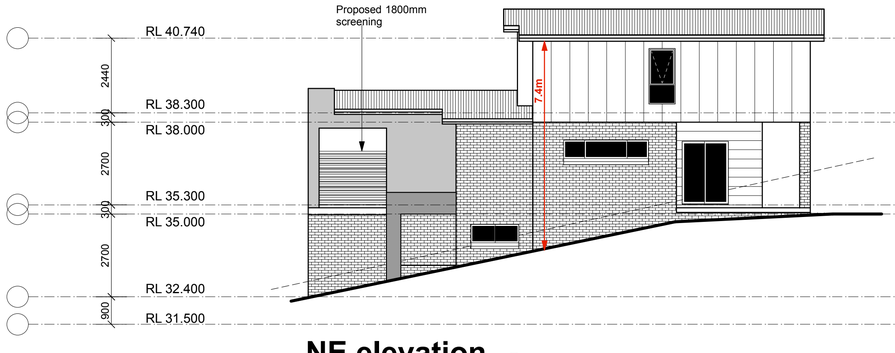
upper floor plan
SCALE 1:100

An openable window will need a safety device installed if:

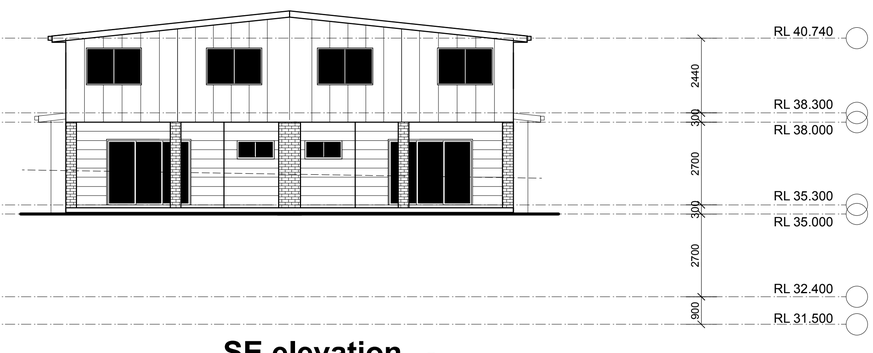
1. the lowest part of the window is less than 1.7m above the floor; and
2. the internal floor under the window is 2m or more above the outside surface.

The safety devices must be able to limit the maximum window opening to 12.5cm, must be robust, and must be childproof. Suitable window safety devices would include window locks or safety screens, but not ordinary insect screens.





NE elevation
SCALE 1:100



SE elevation
SCALE 1:100

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PROJECT
PROPOSED MULTI UNIT DEVELOPMENT

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CLIENT
LUXLIVING HOMES

ABN 5588 2399 320
STRUCTURAL ENGINEERS &
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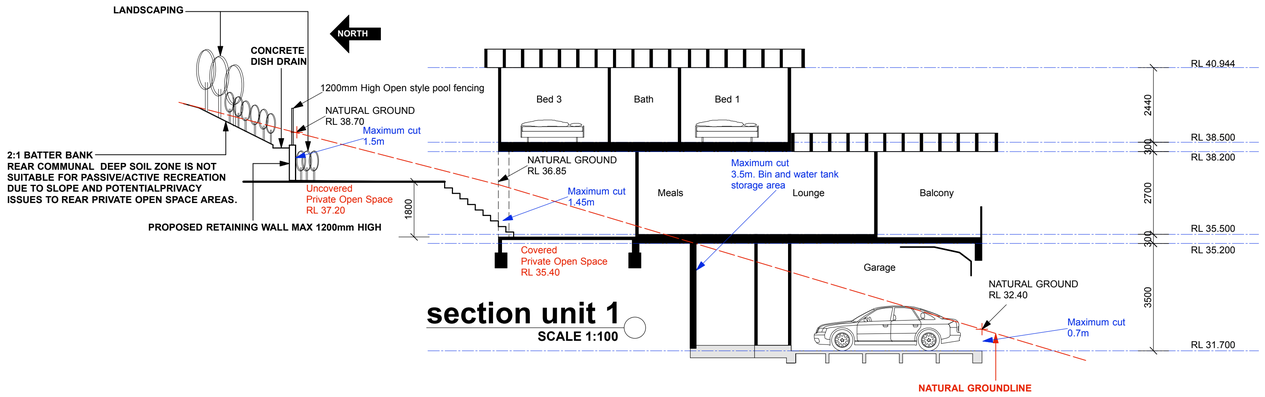
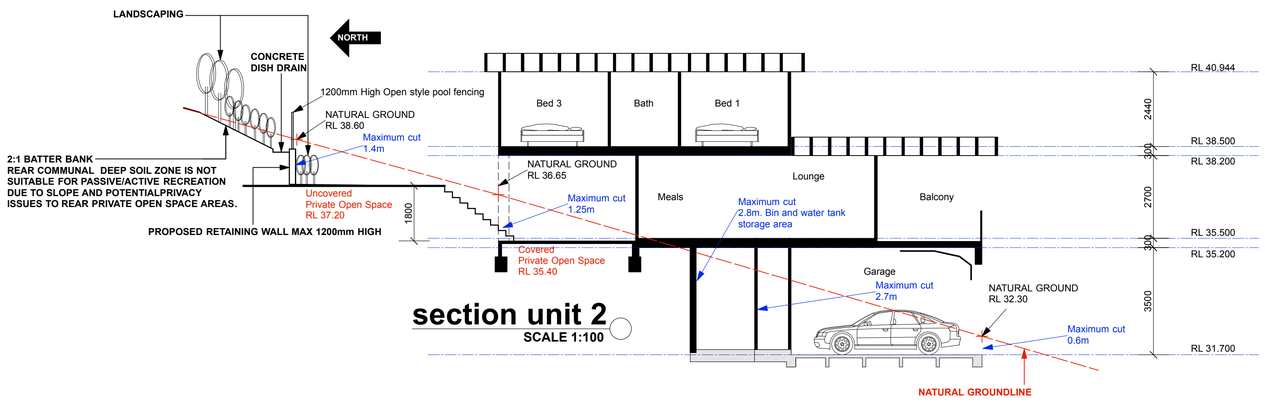
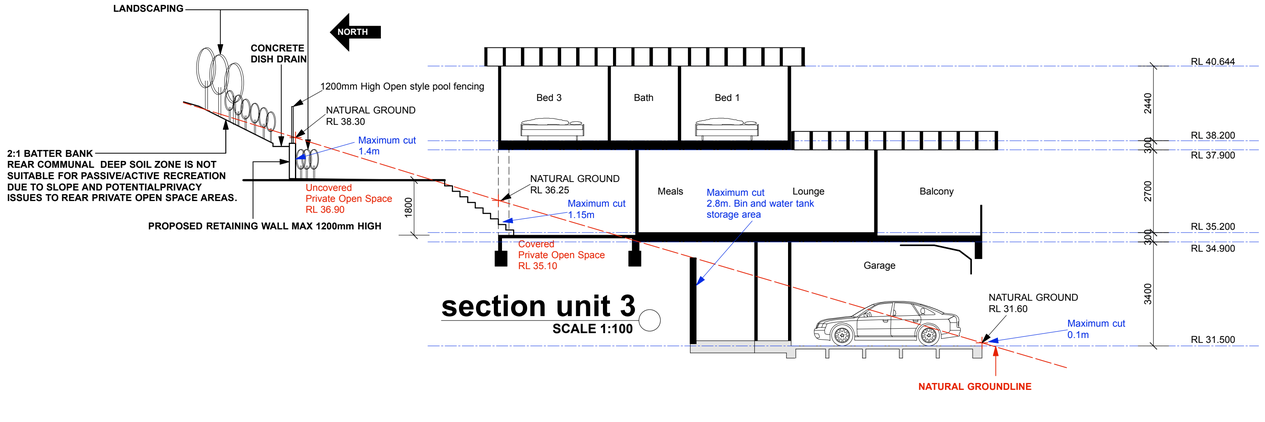
ORIGINAL SHEET SIZE	A1		
SCALE @ A1	1:300		
DRAWN P.S.	CHKD P.S.		SHEET 9 OF 13



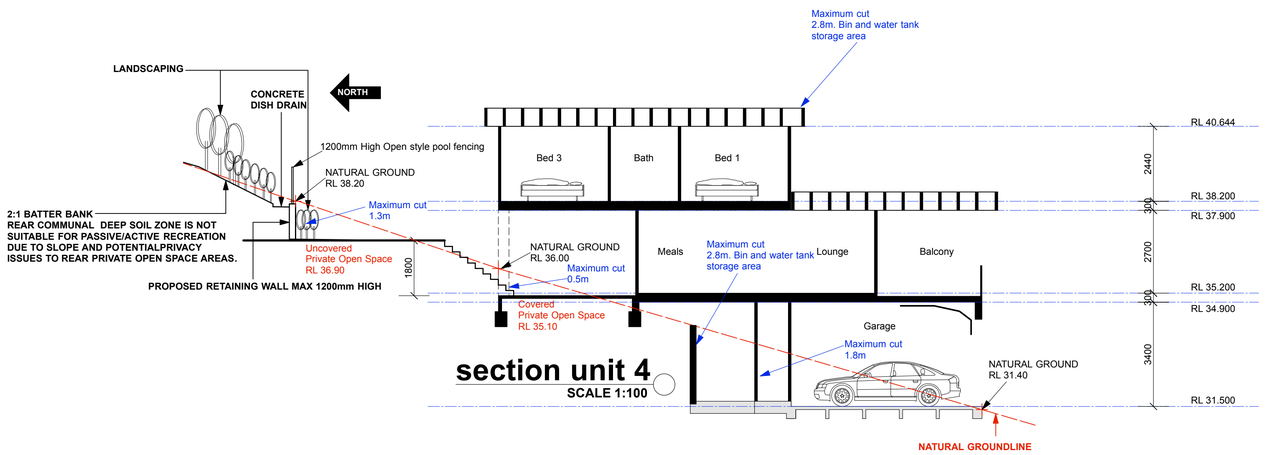
section unit 1
SCALE 1:100



section unit 2
SCALE 1:100



section unit 3
SCALE 1:100



section unit 4
SCALE 1:100

BUSH FIRE REQUIREMENTS

Fascia boards & Soffits:- there are no construction requirements for fascia boards &/or soffit linings within AS3959-2009 BAL-12.5 & BAL-19 &/or Appendix 3 of Planning for Bushfire Protection (2010). *Note:* Joints in eave linings may be sealed with plastic joining strips. Gaps are not to exceed ***3.0mm***.

Fascia boards (BAL-29):- Fascia boards need to be metal or bushfire resisting timbers (See Appendix **F** of AS3959-2009). Metal fascia boards will need to be fixed at ***450mm centre***.

Soffit lining and adequate protection of the joint (BAL-29):- The soffit (or eaves lining) will need to be fibre cement with a minimum 4.5 mm thickness or bushfire-resisting timber (See Appendix **F** of AS3959-2009). The joint system for these linings are normally plastic and this is acceptable. Gaps are not to exceed ***3.0mm***.

Garage Door (BAL-12.5, 19 & 29):- The garage doors need to be non-combustible or bushfire-resisting timbers (See Appendix **F** of AS3959-2009). Panel lift doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm. Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door.

Fascia boards & Soffits:- there are no construction requirements for fascia boards &/or soffit linings within AS3959-2009 BAL-12.5 & BAL-19 &/or Appendix 3 of Planning for Bushfire Protection (2010). *Note:* Joints in eave linings may be sealed with plastic joining strips. Gaps are not to exceed ***3.0mm***.

Fascia boards (BAL-29):- Fascia boards need to be metal or bushfire resisting timbers (See Appendix **F** of AS3959-2009). Metal fascia boards will need to be fixed at ***450mm centre***.

Roof Vents/Penetrations (BAL-12.5, 19 & 29):- Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors, shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to seal the penetration shall be non-combustible. *Note:* Vent pipes made from PVC are permitted.

Decking/Verandah (BAL-12.5, 19 & 29): - Support posts, bearers, joists & decking/trafficable surfaces to all verandahs/decks etc are required to be from non-combustible materials *or* ***fire resisting timber*** (as per AS3959-2009 appendix F or see 6.0 Bushfire Resisting Timbers). The timbers in the decking maybe spaced, the perimeter of the area beneath the deck must not be enclosed or access to the space beneath the deck impeded. The timber flooring/frame must be separated from the remainder of the building in a manner that will not spread fire into the building.

Seal roof and wall intersections (ALL BAL's):- The roof and wall intersections are to be adequately sealed to protect the roof space from possible ember attack (gaps not to exceed 2.0mm). There are a variety of materials that will achieve this level of performance including sarking or non-combustible mineral wool.

Sarking beneath the roof:- flame retardant sarking will need to be installed beneath the roof tiles. Sarking must have a Flammability index of not more than 5. Sarking must be installed to cover the entire roof area including the ridge & so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys etc.

Vents in the external wall to be spark proofed (BAL-12.5 & 19):- The weep holes/vents in the external wall will need to be adequately spark proofed using corrosion resistance metal gauze screens with a maximum aperture of 2.0 mm, except where they are less than 3 mm or are located in an external wall of a subfloor space.

Vents in the external wall to be spark proofed (BAL-29):- The weep holes/vents in the external wall will need to be adequately spark proofed using corrosion resistance metal gauze screens with a maximum aperture of 2.0 mm, except where they are less than 3 mm.+

Side Hinged doors (BAL-19):- The external doors will need to be protected by a tight fitting corrosion resistant metal screen door to the outside face. The screen door will need to be fitted with corrosion resistant steel, bronze or aluminium mesh with a maximum aperture of 2.0mm. *Note:* Gaps around screens are not to exceed 3.0mm when closed;
OR
Doors & Jambs are to be from non-combustible materials or bushfire-resisting timbers;
OR
Fully framed glazed doors, where the framing is made from a fire resisting timber species as specified & listed within the report or Appendix **F** of AS3959-2009 & ***5mm toughened glass***. Weather strips, draught excluders or draught seals shall be installed at the base of all side-hung external doors.

Side Hinged doors (BAL-29):- The external doors will need to be protected by a tight fitting corrosion resistant metal screen door to the outside face. The screen door will need to be fitted with corrosion resistant steel, bronze or aluminium mesh with a maximum aperture of 2.0mm. *Note:* Gaps around screens are not to exceed 3.0mm when closed;
OR
Doors & Jambs are to be from non-combustible materials or bushfire-resisting timbers;
OR
Fully framed glazed doors, where the framing is made from a fire resisting timber species as specified & listed within the report or Appendix **F** of AS3959-2009 & ***6mm toughened glass***. Weather strips, draught excluders or draught seals shall be installed at the base of all side-hung external doors.

External Balustrade/Handrails (BAL-12.5, 19 & 29): - Those parts of the handrails &/or balustrades less than 125 mm from any glazing or any combustible wall shall be from non-combustible materials or bushfire resisting timbers or a combination of both.

Window design (BAL 19:- Window frames shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009) for window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame. Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal. All glazing to be from ***5mm toughened glass***. The ***openable*** portions of ***all windows*** will need to be protected with aluminium, bronze or stainless steel gauze screens with a maximum aperture of 2.0 mm.

Window design (BAL 29):- Window frames shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The windows will require all glazing to be from ***5mm toughened glass***. Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal. The ***openable*** portions of all ***windows*** are to be protected with a metal or bushfire resisting timber framed screen fitted with bronze or stainless steel gauze screens with a maximum aperture of 2.0 mm. Gaps around screens are not to exceed 3.0mm when fitted. *Note:* The openable portions of windows can be screened internally or externally.

Glazed doors (BAL 19):- Doors/frames/jambs etc shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The doors will require all glazing to be from ***5mm toughened glass***. Door shall be tight-fitting in the frames. We note there is ***no requirement*** to provide screen doors for this development. *Note:* However, if screened, we recommend screens comply with AS3959-2009 Clause 6.5.1A.

Glazed doors (BAL 29):- Doors/frames/jambs etc shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The doors will require all glazing to be from ***6mm toughened glass***. Externally fitted hardware that supports the doors in their functions of opening and closing, shall be metal. Door shall be tight-fitting in the frames. We note there is ***no requirement*** to provide screen doors for this development. *Note:* However, if screened, we recommend screens comply with AS3959-2009 Clause 7.5.1A.

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F	13/5/19	DEVELOPMENT APPLICATION	P.S.

PROJECT
PROPOSED MULTI UNIT DEVELOPMENT

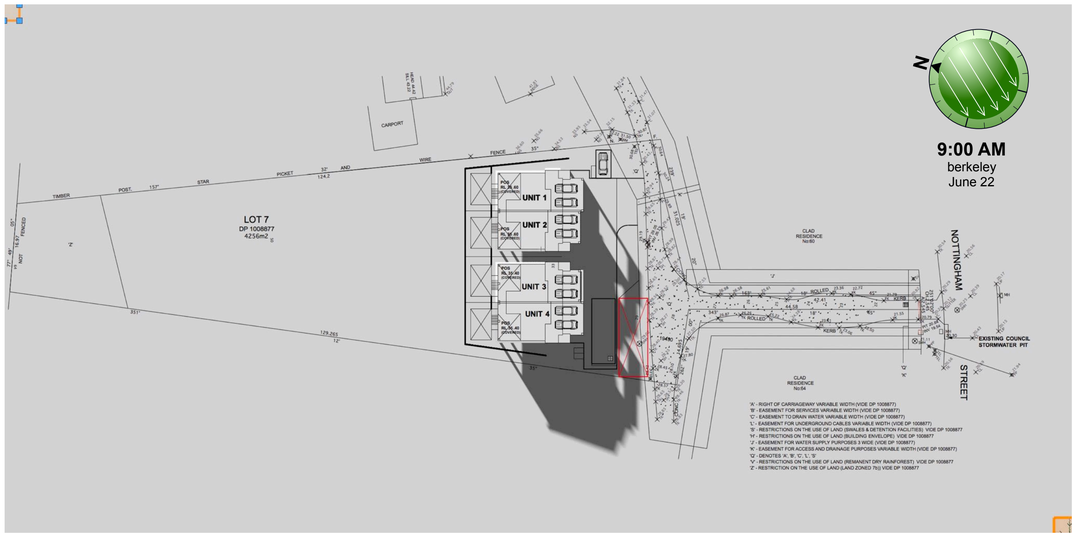
ADDRESS
LOT 7 IN DP 1008877, 62 NOTTINGHAM STREET, BERKELEY.

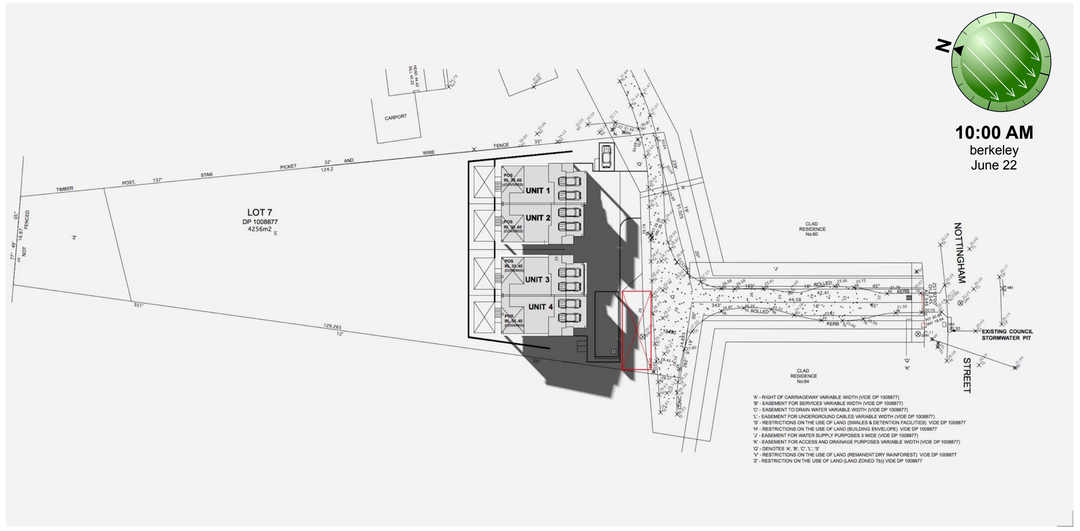
CLIENT
LUXLIVING HOMES

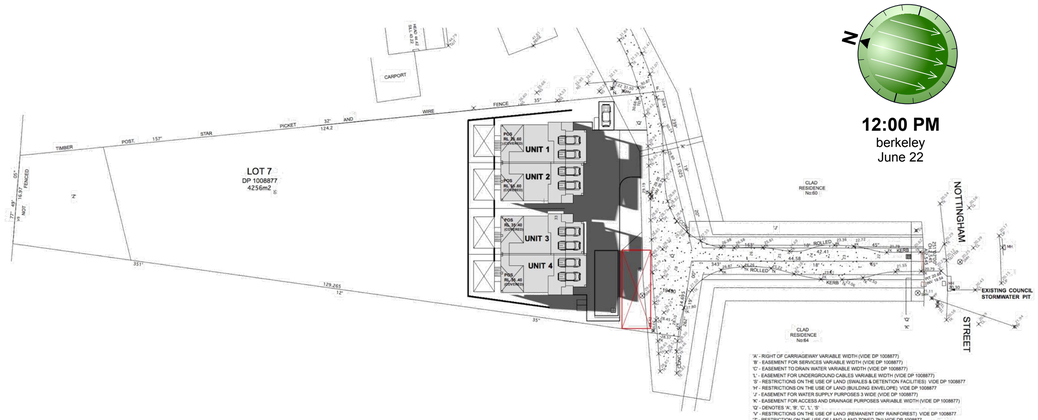
ABN 5588 2399 320
STRUCTURAL ENGINEERS &
PECORP DESIGN
BUILDING DESIGNERS
2/238 COWPER STREET WARRAWONG, 2502
PH:42751999 FAX:42751933
PO BOX 47 WARRAWONG 2502

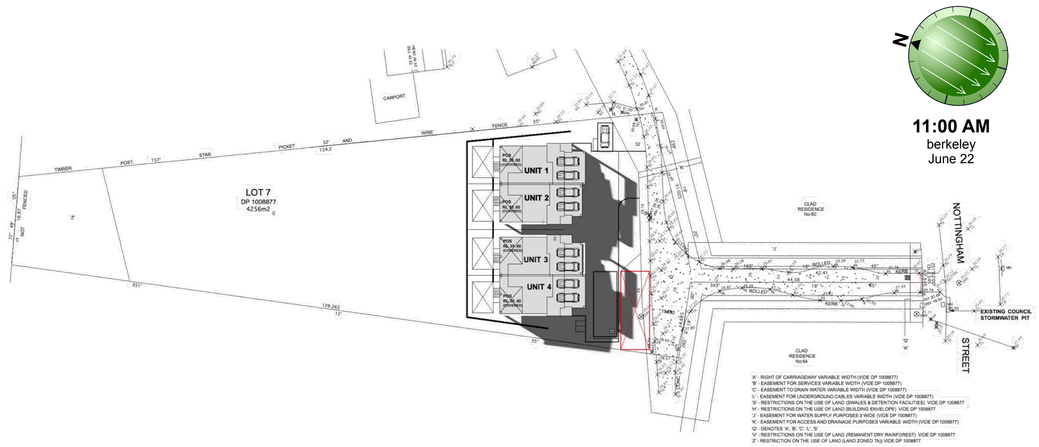
PROJECT #	20160059	DWG STATUS	F
DWG DATE	13/5/19	CAD FILE NAME	LUX LIVING 20160059-PSE
PLOT DATE	13/5/19	REVISION	
ORIGINAL SHEET SIZE	A1		20160059
SCALE @ A1	1:300		SHEET 10 OF 13
DRAWN P.S.	CHKD P.S.		

JUNE 22nd SHADOW DIAGRAMS









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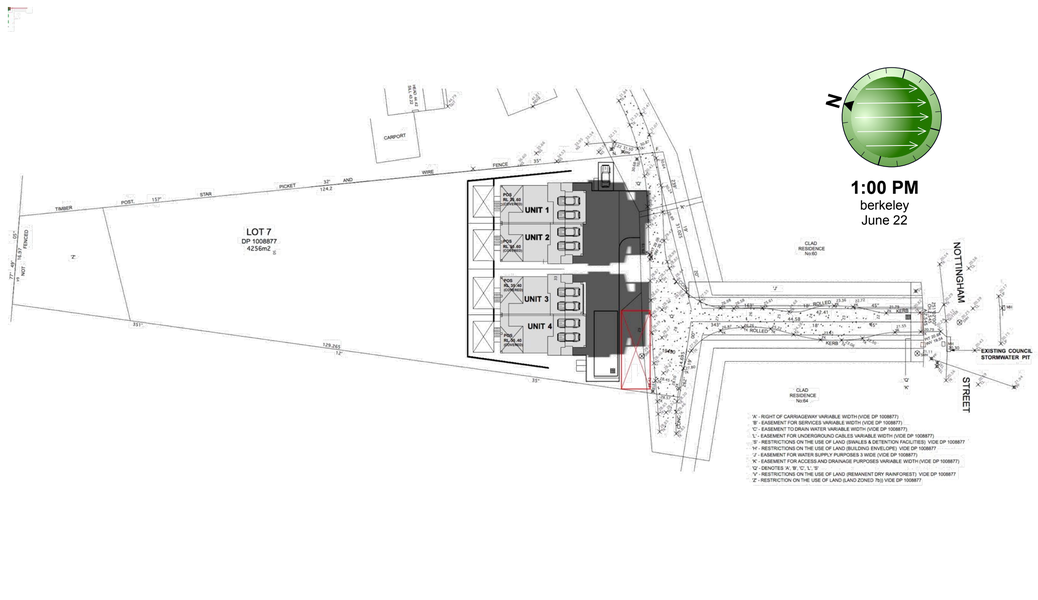

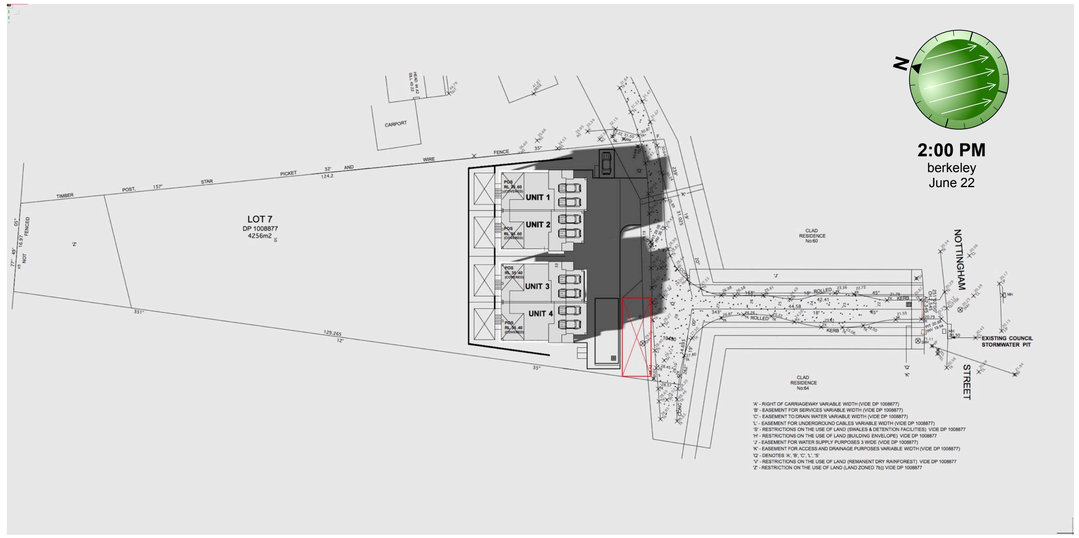

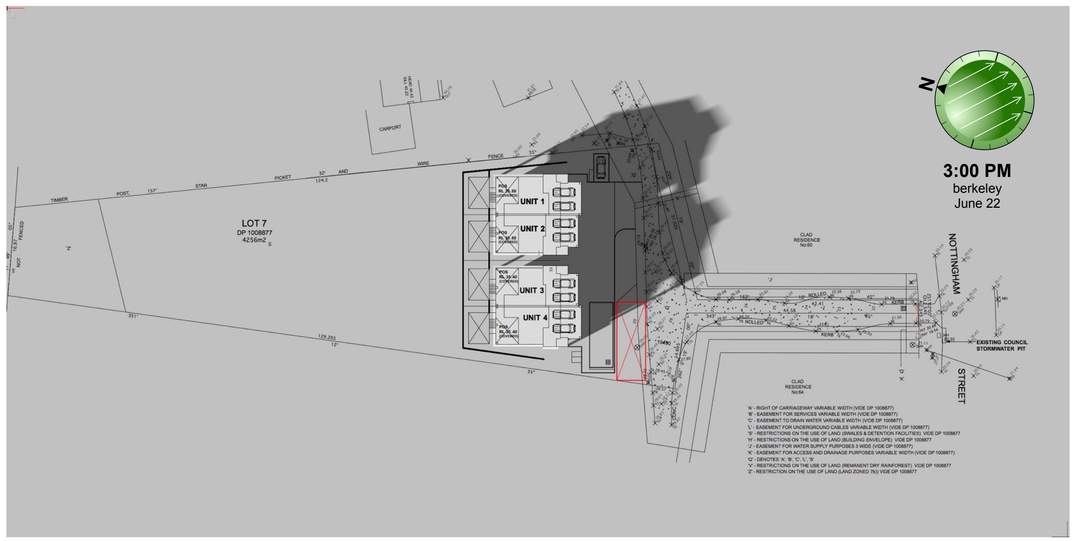

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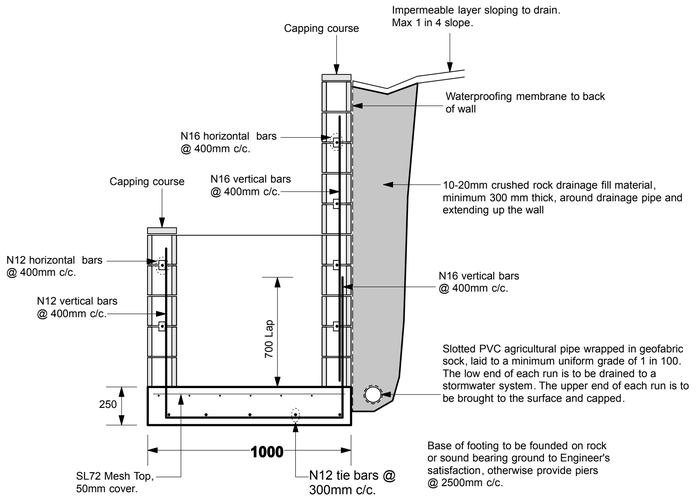
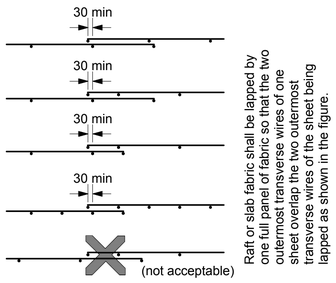
DRAWN P.S.	CHKD P.S.	SHEET 12 OF 13	



TYPICAL GARDEN RETAINING WALL.

Scale:1-20



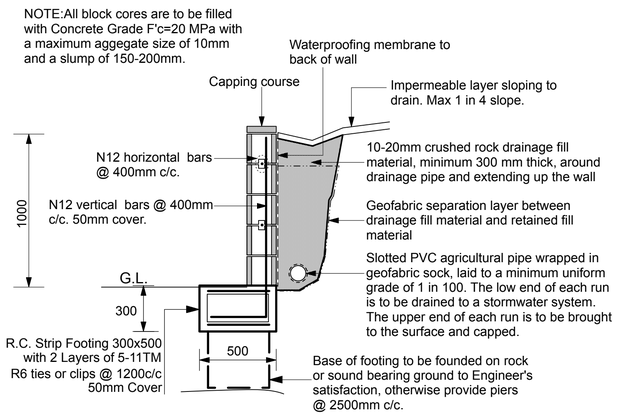
SLAB MESH LAP DETAILS.

Scale: 1-10

TYPICAL BRICK RETAINING WALL (1000<H≤1500).

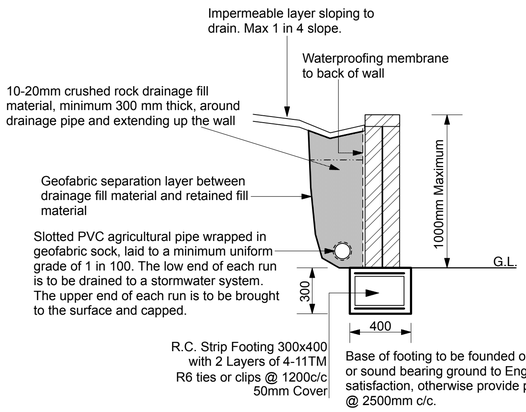
Scale:1-20

NOTE:All block cores are to be filled with Concrete Grade F'c=20 MPa with a maximum aggegate size of 10mm and a slump of 150-200mm.



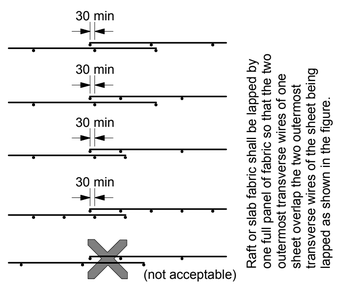
TYPICAL REINFORCED MASONRY RETAINING WALL (H≤1000).

Scale:1-20



TYPICAL BRICK RETAINING WALL (H≤1000).

Scale:1-20



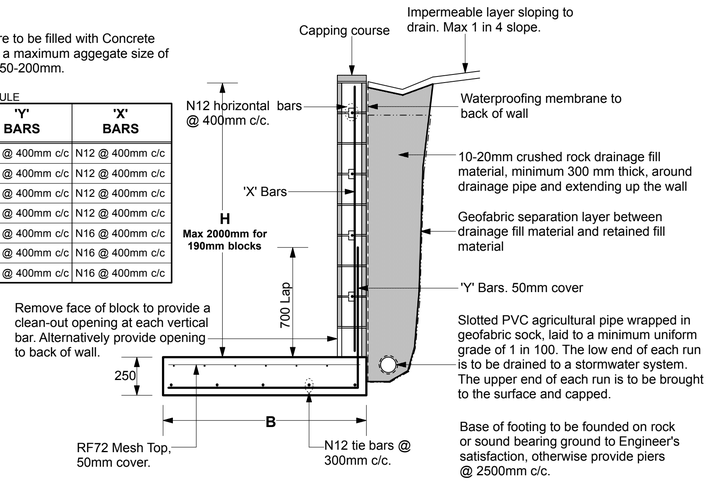
SLAB MESH LAP DETAILS.

Scale: 1-10

NOTE:All block cores are to be filled with Concrete Grade F'c=20 MPa with a maximum aggegate size of 10mm and a slump of 150-200mm.

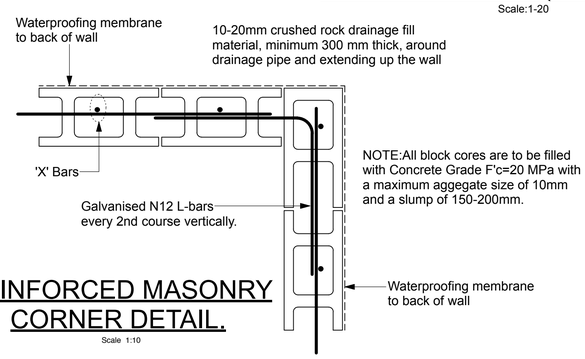
REINFORCEMENT SCHEDULE

HEIGHT (H)	BASE (B)	'Y' BARS	'X' BARS
900	650	N12 @ 400mm c/c	N12 @ 400mm c/c
1000	700	N12 @ 400mm c/c	N12 @ 400mm c/c
1200	800	N12 @ 400mm c/c	N12 @ 400mm c/c
1400	1000	N12 @ 400mm c/c	N12 @ 400mm c/c
1600	1100	N16 @ 400mm c/c	N16 @ 400mm c/c
1800	1200	N16 @ 400mm c/c	N16 @ 400mm c/c
2000	1400	N16 @ 400mm c/c	N16 @ 400mm c/c



TYPICAL REINFORCED MASONRY RETAINING WALL (800≤H≤2000).

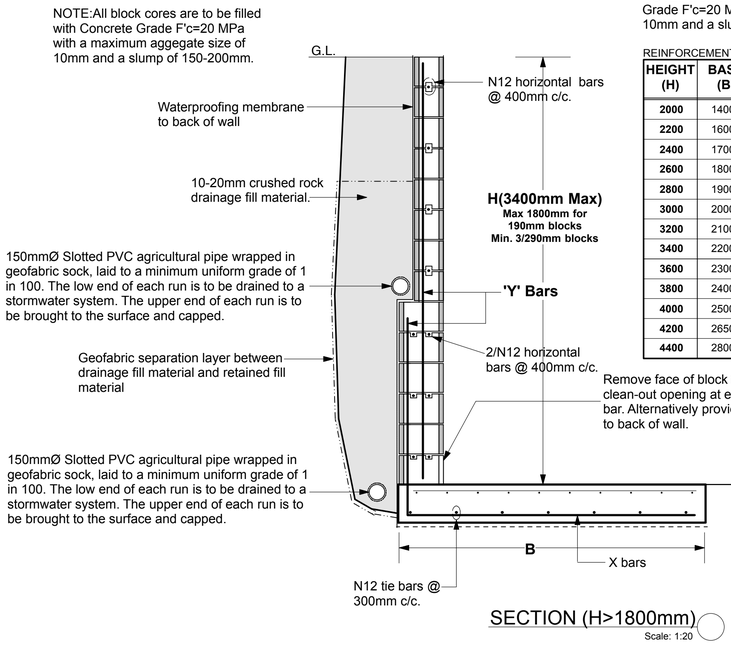
Scale:1-20



REINFORCED MASONRY CORNER DETAIL.

Scale 1:10

NOTE:All block cores are to be filled with Concrete Grade F'c=20 MPa with a maximum aggegate size of 10mm and a slump of 150-200mm.



SECTION (H>1800mm)

Scale: 1:20

NOTE:All block cores are to be filled with Concrete Grade F'c=20 MPa with a maximum aggegate size of 10mm and a slump of 150-200mm.

REINFORCEMENT SCHEDULE

HEIGHT (H)	BASE (B)	'Y' BARS	'X' BARS
2000	1400	N16 @ 400mm c/c	N12 @ 400mm c/c
2200	1600	N16 @ 400mm c/c	N12 @ 400mm c/c
2400	1700	N16 @ 400mm c/c	N12 @ 400mm c/c
2600	1800	N16 @ 400mm c/c	N12 @ 400mm c/c
2800	1900	N20 @ 400mm c/c	N16 @ 400mm c/c
3000	2000	N20 @ 400mm c/c	N16 @ 400mm c/c
3200	2100	N20 @ 200mm c/c	N16 @ 400mm c/c
3400	2200	N20 @ 200mm c/c	N16 @ 400mm c/c
3600	2300	N12 @ 200mm c/c	N16 @ 400mm c/c
3800	2400	N20 @ 200mm c/c	N16 @ 400mm c/c
4000	2500	N20 @ 200mm c/c	N16 @ 400mm c/c
4200	2650	N20 @ 200mm c/c	N16 @ 400mm c/c
4400	2800	N20 @ 200mm c/c	N16 @ 400mm c/c

NOTE:X-BARS ARE DUAL FOR 290MM BLOCKS

ISSUE	DATE	ISSUE NOTE	BY
F	13/5/19	DEVELOPMENT APPLICATION	P.S.

PROJECT
PROPOSED MULTI UNIT DEVELOPMENT

ADDRESS
LOT 7 IN DP 1008877, 62 NOTTINGHAM STREET, BERKELEY.

CLIENT
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PECORP DESIGN
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PROJECT #	20160059	DWG STATUS	F
DWG DATE	13/5/19	CAD FILE NAME	LUX LIVING 20160059-PSE
PLOT DATE	13/5/19	REVISION	
ORIGINAL SHEET SIZE	A1		20160059
SCALE @ A1	1:300		SHEET 13 OF 13
DRAWN	P.S.	CHKD	P.S.

BUSH FIRE REQUIREMENTS

Fascia boards & Soffits:- there are no construction requirements for fascia boards &/or soffit linings within AS3959-2009 BAL-12.5 & BAL-19 &/or Appendix 3 of Planning for Bushfire Protection (2010). *Note*: Joints in eave linings may be sealed with plastic joining strips. Gaps are not to exceed ***3.0mm***

Fascia boards (BAL-29):- Fascia boards need to be metal or bushfire resisting timbers (See Appendix **F** of AS3959-2009). Metal fascia boards will need to be fixed at ***400mm centre***

Soffit lining and adequate protection of the joint (BAL-29):- The soffit (or eaves lining) will need to be fibre cement with a minimum 4.5 mm thickness or bushfire-resisting timber (See Appendix **F** of AS3959-2009). The joint system for these linings are normally plastic and this is acceptable. Gaps are not to exceed ***3.0mm***

Garage Door (BAL-12.5, 19 & 29):- The garage doors need to be non-combustible or bushfire-resisting timbers (See Appendix **F** of AS3959-2009). Panel lift doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm. Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door.

Fascia boards & Soffits:- there are no construction requirements for fascia boards &/or soffit linings within AS3959-2009 BAL-12.5 & BAL-19 &/or Appendix 3 of Planning for Bushfire Protection (2010). *Note*: Joints in eave linings may be sealed with plastic joining strips. Gaps are not to exceed ***3.0mm***

Fascia boards (BAL-29):- Fascia boards need to be metal or bushfire resisting timbers (See Appendix **F** of AS3959-2009). Metal fascia boards will need to be fixed at ***400mm centre***

Roof Vents/Penetrations (BAL-12.5, 19 & 29):- Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors, shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to seal the penetration shall be non-combustible. *Note:* Vent pipes made from PVC are permitted.

Decking/Verandah (BAL-12.5, 19 & 29):- Support posts, bearers, joists & decking/trafficable surfaces to all verandahs/decks etc are required to be from non-combustible materials *or* ***fire resistive timber*** (as per AS3959-2009 appendix F or see 6.0 Bushfire Resisting Timbers). The timbers in the decking maybe spaced, the perimeter of the area beneath the deck must not be enclosed or access to the space beneath the deck impeded. The timber flooring/frame must be separated from the remainder of the building in a manner that will not spread fire into the building.

Seal roof and wall intersections (ALL BALs):- The roof and wall intersections are to be adequately sealed to protect the roof space from possible ember attack (gaps not to exceed 2.0mm). There are a variety of materials that will achieve this level of performance including sarking or non-combustible mineral wool.

Sarking beneath the roof:- flame retardant sarking will need to be installed beneath the roof tiles. Sarking must have a Flammability index of not more than 5. Sarking must be installed to cover the entire roof area including the ridge & so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys etc.

Vents in the external wall to be spark proofed (BAL-12.5 & 19):- The weep holes/vents in the external wall will need to be adequately spark proofed using corrosion resistance metal gauze screens with a maximum aperture of 2.0 mm, except where they are less than 3 mm or are located in an external wall of a subfloor space.

Vents in the external wall to be spark proofed (BAL-29):- The weep holes/vents in the external wall will need to be adequately spark proofed using corrosion resistance metal gauze screens with a maximum aperture of 2.0 mm, except where they are less than 3 mm.+

Side Hinged doors (BAL-19):- The external doors will need to be protected by a tight fitting corrosion resistant metal screen door to the outside face. The screen door will need to be fitted with corrosion resistant steel, bronze or aluminium mesh with a maximum aperture of 2.0mm. *Note:* Gaps around screens are not to exceed 3.0mm when closed;
OR
Doors & Jambs are to be from non-combustible materials or bushfire-resisting timbers;
OR
Fully framed glazed doors, where the framing is made from a fire resisting timber species as specified & listed within the report or Appendix **F** of AS3959-2009 & ***6mm toughened glass*** Weather strips, draught excluders or draught seals shall be installed at the base of all side-hung external doors.

Side Hinged doors (BAL-29):- The external doors will need to be protected by a tight fitting corrosion resistant metal screen door to the outside face. The screen door will need to be fitted with corrosion resistant steel, bronze or aluminium mesh with a maximum aperture of 2.0mm. *Note:* Gaps around screens are not to exceed 3.0mm when closed;
OR
Doors & Jambs are to be from non-combustible materials or bushfire-resisting timbers;
OR
Fully framed glazed doors, where the framing is made from a fire resisting timber species as specified & listed within the report or Appendix **F** of AS3959-2009 & ***6mm toughened glass*** Weather strips, draught excluders or draught seals shall be installed at the base of all side-hung external doors.

External Balustrade/Handrails (BAL-12.5, 19 & 29):- Those parts of the handrails &/or balustrades less than 125 mm from any glazing or any combustible wall shall be from non-combustible materials or bushfire resisting timbers or a combination of both.

Window design (BAL 19):- Window frames shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009) for window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame. Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal. All glazing to be from ***6mm toughened glass*** The ***openable*** portions of ***all windows*** will need to be protected with aluminium, bronze or stainless steel gauze screens with a maximum aperture of 2.0 mm.

Window design (BAL 29):- Window frames shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The windows will require all glazing to be from ***6mm toughened glass*** Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal. The ***openable*** portions of all ***windows*** are to be protected with a metal or bushfire resisting timber framed screen fitted with bronze or stainless steel gauze screens with a maximum aperture of 2.0 mm. Gaps around screens are not to exceed 3.0mm when fitted. *Note:* The openable portions of windows can be screened internally or externally.

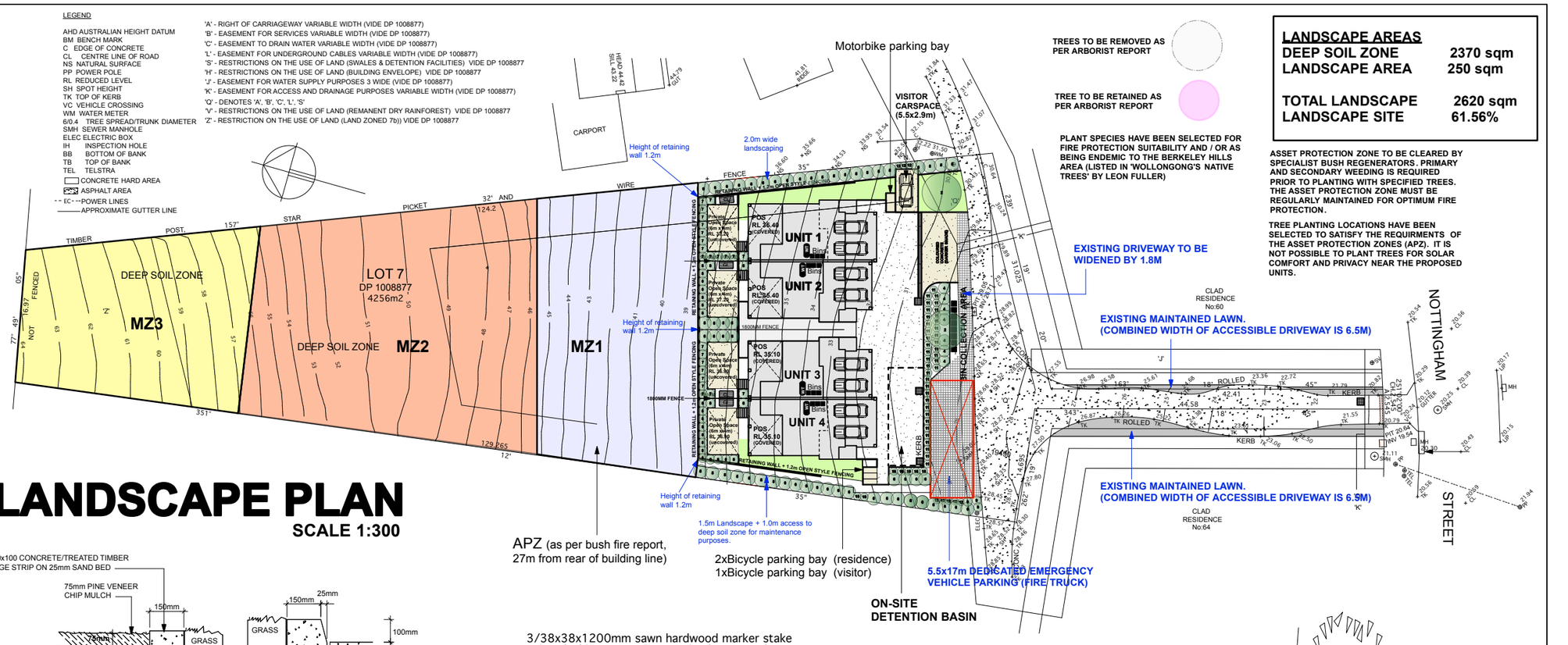
Glazed doors (BAL 19):- Doors/frames/jambs etc shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The doors will require all glazing to be from ***6mm toughened glass*** Door shall be tight-fitting in the frames. We note there is ***no requirement*** to provide screen doors for this development. *Note:* However, if screened, we recommend screens comply with AS3959-2009 Clause 6.5.1A.

Glazed doors (BAL 29):- Doors/frames/jambs etc shall be metal or from bushfire resisting timbers (See Appendix **F** of AS3959-2009). The doors will require all glazing to be from ***6mm toughened glass*** Externally fitted hardware that supports the doors in their functions of opening and closing, shall be metal. Door shall be tight-fitting in the frames. We note there is ***no requirement*** to provide screen doors for this development. *Note:* However, if screened, we recommend screens comply with AS3959-2009 Clause 7.5.1A.

LEGEND

AHD AUSTRALIAN HEIGHT DATUM
BM BENCH MARK
C EDGE OF CONCRETE
CL CENTRE LINE OF ROAD
NS NATURAL SURFACE
PP POWER POLE
RL REDUCED LEVEL
SH SPOT HEIGHT
TK TOP OF KERB
VC VEHICLE CROSSING
WM WATER METER
6/0.4 TREE SPREAD/TRUNK DIAMETER
SMH SEWER MANHOLE
ELEC ELECTRIC BOX
IH INSPECTION HOLE
BB BOTTOM OF BANK
TB TOP OF BANK
TEL TELSTRA
CONCRETE HARD AREA
ASPHALT AREA
EC POWER LINES
APPROXIMATE GUTTER LINE

'A' - RIGHT OF CARRIAGEWAY VARIABLE WIDTH (VIDE DP 1008877)
'B' - EASEMENT FOR SERVICES VARIABLE WIDTH (VIDE DP 1008877)
'C' - EASEMENT TO DRAIN WATER VARIABLE WIDTH (VIDE DP 1008877)
'L' - EASEMENT FOR UNDERGROUND CABLES VARIABLE WIDTH (VIDE DP 1008877)
'S' - RESTRICTIONS ON THE USE OF LAND (SWALES & DETENTION FACILITIES) VIDE DP 1008877
'H' - RESTRICTIONS ON THE USE OF LAND (BUILDING ENVELOPE) VIDE DP 1008877
'J' - EASEMENT FOR WATER SUPPLY PURPOSES 3 WIDE (VIDE DP 1008877)
'K' - EASEMENT FOR ACCESS AND DRAINAGE PURPOSES VARIABLE WIDTH (VIDE DP 1008877)
'Q' - DENOTES 'A', 'B', 'C', 'L', 'S'
'V' - RESTRICTIONS ON THE USE OF LAND (REMANENT DRY RAINFOREST) VIDE DP 1008877
'Z' - RESTRICTION ON THE USE OF LAND (LAND ZONED 7b)) VIDE DP 1008877



TREES TO BE REMOVED AS PER ARBORIST REPORT

TREE TO BE RETAINED AS PER ARBORIST REPORT

PLANT SPECIES HAVE BEEN SELECTED FOR FIRE PROTECTION SUITABILITY AND / OR AS BEING ENDEMIC TO THE BERKELEY HILLS AREA (LISTED IN 'WOLLONGONG'S NATIVE TREES' BY LEON FULLER)

LANDSCAPE AREAS

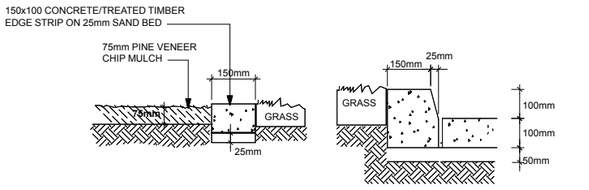
DEEP SOIL ZONE	2370 sqm
LANDSCAPE AREA	250 sqm
TOTAL LANDSCAPE	2620 sqm
LANDSCAPE SITE	61.56%

ASSET PROTECTION ZONE TO BE CLEARED BY SPECIALIST BUSH REGENERATORS. PRIMARY AND SECONDARY WEEDING IS REQUIRED PRIOR TO PLANTING WITH SPECIFIED TREES. THE ASSET PROTECTION ZONE MUST BE REGULARLY MAINTAINED FOR OPTIMUM FIRE PROTECTION.

TREE PLANTING LOCATIONS HAVE BEEN SELECTED TO SATISFY THE REQUIREMENTS OF THE ASSET PROTECTION ZONES (APZ). IT IS NOT POSSIBLE TO PLANT TREES FOR SOLAR COMFORT AND PRIVACY NEAR THE PROPOSED UNITS.

LANDSCAPE PLAN

SCALE 1:300



DETAIL: CONCRETE EDGE STRIP & KERB

PLANTING DETAILS

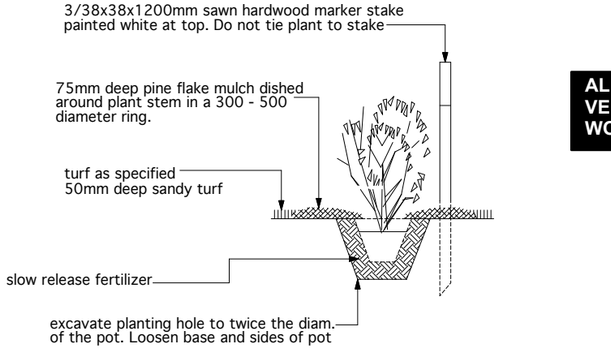
1- PLANT MATERIAL. Shall be pest and desease free and of correct shape and form. Plants should be well advanced in the growing container but not potbound.
2- STAKING Shall be hardwood timber stakes measuring 38x38x1500mm, three stakes per tree. Jute webbing or similar should be used to fix tree species to the stakes.
3- MULCHING. Is to be placed in all areas of planting to a depth of 75mm. Mulch should be of shredded cypress pine flake or similar. A consistent depth of mulch is to be maintained for a period of 12 months following initial landscape installation.

MAINTENANCE PROGRAMME

4- WATERING. Planted areas shall be watered regularly to ensure continuous and healthy growth. Water shall be frequently applied in the initial period following planting to the extent that healthy plant growth continues and establishment is rapid. Water shall be made available to all new plantings on as need basis, this is a climate dependant variable.
5- TURF. If required should be quality kikuyu, buffalo or varietal couch grass that is weed, pest and desease free. Turf shall be maintained at regular intervals with fornightly cutting in the growing season and monthly cutting in the cool season months for the maintenance period. Cutting height shall ensure that turf is not scalped or damaged by mowing.
6- MAINTENANCE PERIOD. Shall be for a period of 12 months commencing from completion of initial landscape works.

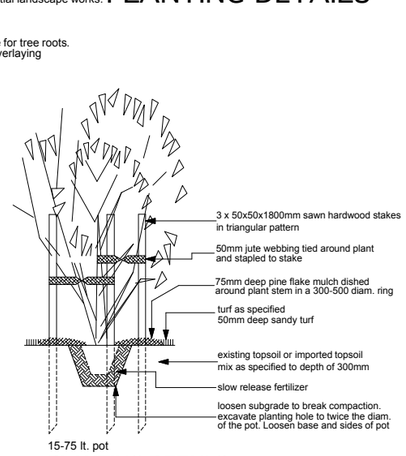
DRIVEWAY DETAIL

4- CROSSOVER. Crossover to be constructed with porous bitumen so that water remains available for tree roots. DRIVEWAY PARKING AREA. To be constructed with 50mm depth of compacted deco-granite overlaying 100mm of compacted roadbase. Roadbase to be compacted in 2 x 50mm layers. All works within TPZ (tree protection zone) to be supervised by project arborist.



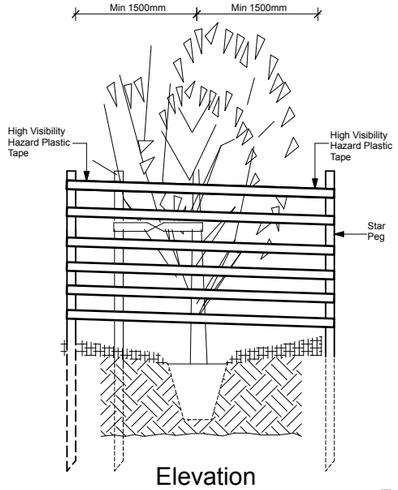
PLANTING DETAILS

150-200mm pot.
: lawn areas

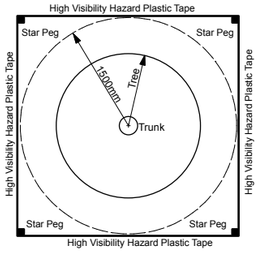


15-75 lt. pot

PLANTING DETAILS

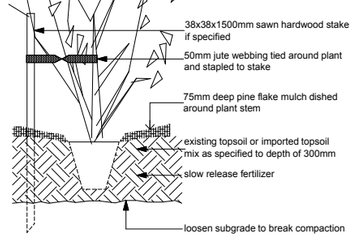


Elevation



Plan view

Protection of street tree detail



PLANTING DETAILS

: garden areas

ALL DIMENSIONS ARE TO BE VERIFIED ON SITE PRIOR TO WORK COMMENCING.

DIAL 1100 BEFORE YOU DIG
T.M

LANDSCAPE PLANTING SCHEDULE(EXCLUDING MZ1-MZ3)

BOTANIC NAME	COMMON NAME	(H) x (W)	SIZE	QTY	STAKING
2 Brachychiton acerifolium	Illawarra Flame Tree	10 m x 5 m	75 litre	2	YES
4 Doryanthes excelsa	Gymea Lily	1.5 m x 1.5 m	200 mm	7	NO
5 Syzygium 'Cascade'	Cascade Lily Pily	2.5 m x 1.5 m	200 mm	23	NO
6 Syzygium australe 'Resilience'	Resilience Lily Pily	3 m x 1.5 m	200 mm	34	NO
7 Lomandra longifolia	Mat Rush	1.5 m x 1.5 m	200 mm	23	NO
8 Callistemon viminalis 'Slim'	Slim Bottlebrush	2.5 m x 1.5 m	200 mm	23	NO
9 Dianella revoluta	Spreading Flax Lily	0.6 m x 1 m	200 mm	3	NO
10 Cissus antartica	Water Vine	0.6 m x 1 m	200 mm	8	NO
11 Acacia cognata 'Limelight'	Dwarf Acacia form	0.8 m x 0.8 m	200 mm	38	NO
12 Lomandra 'Tanika'	Tanika Lomandra	0.8 m x 0.8 m	200 mm	8	NO

Zone		Trees	Shrubs	Ground covers	Total
Zone 1	870 square metres	17	0	0	17
Zone 2	930 square metres	93	186	930	1209
Zone 3	520 square metres	52	104	259	414
Zone 4		0	0		0
Total		162	290	1189	1641

MZ1-MZ3 PLANT SCHEDULE

ISSUE	DATE	ISSUE NOTE	BY
F	13/5/19	DEVELOPMENT APPLICATION	P.S.

PROJECT
PROPOSED MULTI UNIT DEVELOPMENT

ADDRESS
LOT 7 IN DP 1008877, 62 NOTTINGHAM STREET, BERKELEY.

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PROJECT #	MS2017029	DWG STATUS	F
DWG DATE	13/5/19	CAD FILE NAME	MS2017046-PSE
PLOT DATE	13/5/19	REVISION	
ORIGINAL SHEET SIZE	A1		MS2017046
SCALE @ A3 1:200 SCALE @ A1 1:100			
DRAWN	P.S.	DESIGNED	M.S.

SHEET 1 OF 2

Vegetation management actions and performance criteria

Management action	Management zone	Responsibility	Task / performance criteria	Timing
Define property boundary and install vegetation exclusion fencing	All Zones	Construction contractor / Vegetation management consultant	Vegetation exclusion fencing is to be installed as per the specifications above (Section 6.2.2).	• Prior to vegetation removal of earthworks.
Bush regeneration (primary and secondary weed control)	All Zones	Bush Regeneration contractor	Primary and secondary weed control works are to include the following actions: • All priority, environmental, vine and woody weeds within the APZ are to undergo primary treatment within 4 weeks of the commencement of the vegetation management program. • Where possible, exotic vines should be treated 2-4m outside the APZ to create a buffer to protect regenerating native flora and plantings (See Revegetation Works below) • Secondary treatments are to be ongoing as required over the next 8 weeks following completion of primary treatment works. • Commencement of maintenance works will occur once mature exotic species have been reduced to 5% Projected Foliage Cover (PFC). This is expected to be 12 weeks (3 months) after commencement of primary weed control works. • All mature priority weeds are to be successfully treated within the VMP area prior to commencement of the maintenance period.	• From the outset of vegetation management program. • As specified adjacent.
APZ establishment and maintenance	MZ1	Bush Regeneration contractor	All mature priority weeds are to be successfully treated within the VMP area prior to commencement of the maintenance period. The MZ is to be slashed twice yearly to maintain low fuel loads. The maintenance of the APZ is to be undertaken for perpetuity.	• From the outset of vegetation management program.
VMP area erosion control	All zones	Bush Regeneration contractor	Following primary and secondary weed control and APZ vegetation removal installation of erosion controls will be necessary if vegetation cover is lacking. Recommended erosion controls include terracing made from cut vegetation, and or the installation of coir logs across the slope.	• As required immediately following vegetation removal.
Revegetation	All zones	Bush Regeneration contractor	Following primary and secondary weed control, revegetation is to be undertaken to ensure sufficient vegetation cover exists to prevent soil erosion. All installed plants are to be propagated from locally sourced seed stock collected within a 5 kilometre radius of the study area, and selected from the list for contained in Appendix 3 of this VMP. • Revegetation works are not to compromise the ongoing integrity of the APZ and will consist predominantly of canopy species only.	• Immediately following successful completion of secondary weed control.
Planting maintenance	All zones	Bush Regeneration contractor	• Installed plantings are to be maintained with key elements of water, prevention of predation and suppression of smothering weeds. • There will be a maximum loss of 20% of the original planting numbers for an individual species. • A minimum of 80% survivorship for each species is to be maintained. • Replacement planting is to be carried out throughout the maintenance period to sustain the 80% survival rate at the completion of the maintenance period. • Losses of greater than 20% of originally installed plantings may have the maintenance period extended until survival rates have been achieved.	• Commences immediately following final installation of all plants. • Minimum weekly watering over 8 weeks in summer, or 3 weeks in winter, immediately following installation. • Watering visits to continue as required to plant establishment. • Weed removal as required to the completion of the maintenance period.
Bush regeneration maintenance	MZ 2 and MZ 3	Bush Regeneration contractor	• All mature priority weeds are to be successfully treated prior to commencement of maintenance period. • Seedlings of priority species are to be continually suppressed to a level of <5% Projected Foliage Cover (PFC) where they occur in the seed bank below mature specimens, and <1% PFC across remainder of the VMP area. • Works to be undertaken utilising best practice bush regeneration techniques. • Less than 5% exotic species FPC to be achieved over the entire VMP area after 12 months of maintenance works. • Continual suppression at <5% for the remaining 24 months of the maintenance period (24 month total maintenance period).	• The maintenance period will run for a 36 month term following successful secondary weed control and/or installation of final plantings (whichever is later). • The commencement of this maintenance period may be adjusted if there are delays beyond the contractor's control. • Commencement and completion dates of the maintenance period will be determined by the Vegetation management consultant, following consultation with Council, the contractor and Principle.

Table 9 Vegetation management actions - Monitoring

Management action	Specification / Requirement
Ecological Monitoring Framework	Ecological Monitoring works are to be undertaken by the Vegetation Management Consultant. Monitoring surveys will assess the success of weed removal, plant growth and natural regeneration, and will be undertaken as follows; • Prior to commencement of works to gather baseline data. • Followed by a survey every six (6) months to gather ecological monitoring data on the progress of the project, commencing at the start of the maintenance period with a final survey and report at the completion of the 24 month program. Each six month survey should be accompanied by brief correspondence with the Bush Regeneration contractor and the proponent / project manager regarding the progress of the vegetation management works, and highlight any areas of concern / merit. • Vegetation monitoring reports are to be prepared at 6 monthly intervals over the duration of the VMP. • Achievement of performance criteria will be updated in each preceding report as milestones are achieved. • These reports are to be submitted to Wollongong Council. The restoration zones will be monitored in terms of vegetation condition and the achievement of performance criteria. Monitoring activities are to include: • Establishing a minimum of one photo-point per management zone in representative locations (Figure 2) (Appendix 5). • Assessment of weed control works including priority and woody weed control, and weed density surrounding plantings, via monitoring techniques such as weed density mapping, and quadrat / transect surveys. • Identification and assessment of any natural regeneration of native plant species. • Assessment of the success rate of plantings and assessment of plant replacement requirements, and convey any need to Bush Regeneration contractor. • Assessment of the site for evidence of herbivory and erosion. Monitoring works will also provide the following certifications to the proponent / project manager, and then on to Council: • Certification that the planting is at the required densities. • Certification of commencement of maintenance period, i.e. all primary secondary and revegetation works have been completed to acceptable standards. • Final certification that the targets of the vegetation management works have been achieved.

Table 10 Three year action plan for vegetation management

Actions	Timeframe			
	Establishment phase	Year 1	Year 2	Year 3
Engage licensed seed collectors to collect seed	■			
Organise nursery to propagate revegetation plants from collected seed	■			
Install exclusion fencing along vegetation clearance boundary	■			
Implement primary weed removal		■		
Implement secondary weed removal			■	■
Maintenance weeding			■	■
Revegetation			■	■
Remove litter and general rubbish	■	■	■	■
Photo point monitoring and annual reporting	■	■	■	■

Table 13 Recommended species planting list of PCT 1300 : Whalebone Tree - Native Quince dry subtropical rainforest

Botanical name	Common name	Percentage of mix %
Trees (10 -20 +m)		
Alphitonia excels	Red Ash	12
Brachychiton acerifolius	Illawarra Flame tree	12
Ficus rubiginosa	Rusty Fig	12
Pittosporum undulatum	Sweet Pittosporum	12
Acacia maidenii	Maiden's Wattle	12
Guioa semiglauca	Guioa	12
Ficus coronata	Sandpaper Fig	12
Streblus brunonianus	Whalebone Tree	12
Shrubs		
Breynia oblongifolia -	Coffee Bush	20
Clerodendrum tomentosum	Hairy Clerodendrum	20
Elaeodendron australe		20
Pittopsorum revolutum	Large Fruited Pittosporum	20
Notelaea venosa	Veined Mock-olive	20
Ground covers		
Carex longebrachiata		12
Oplismenus imbecillis -	Basket Grass	12
Pseuderanthemum variabile	Pastel Flower	12
Dianella caerulea	Blue Flax-lily	12
Entolasia marginata	Bordered Panic	12
Entolasia stricta	Wiry Panic	12
Lomandra longifolia	Spiny-headed Mat Rush	12
Microlaena stipoides var. *stipoides*	Weeping grass	12

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F	13/5/19	DEVELOPMENT APPLICATION	P.S.

PROJECT
PROPOSED MULTI UNIT DEVELOPMENT

ADDRESS
LOT 7 IN DP 1008877, 62 NOTTINGHAM STREET, BERKELEY.

CLIENT
LUXLIVING HOMES

LANDSCAPE DESIGN
MARK SPENCE DIP. HORT BA.ENV.SC

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PO Box 739 Wollongong 2520
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PROJECT #	MS2017029	DWG STATUS	F
DWG DATE	13/5/19	CAD FILE NAME	MS2017046-PSE
PLOT DATE	13/5/19	REVISION	
ORIGINAL SHEET SIZE	A1	MS2017046	
SCALE @ A3 1:200 SCALE @ A1 1:100		SHEET 2 OF 2	
DRAWN P.S.	DESIGNED M.S.		

LEGEND

AHD AUSTRALIAN HEIGHT DATUM
BM BENCH MARK
C EDGE OF CONCRETE
CL CENTRE LINE OF ROAD
NS NATURAL SURFACE
PP POWER POLE
RL REDUCED LEVEL
SH SPOT HEIGHT
TK TOP OF KERB
VC VEHICLE CROSSING
WM WATER METER
6/0.4 TREE SPREAD/TRUNK DIAMETER
SMH SEWER MANHOLE
ELEC ELECTRIC BOX
IH INSPECTION HOLE
BB BOTTOM OF BANK
TB TOP OF BANK
TEL TELSTRA
CONCRETE HARD AREA
ASPHALT AREA
EC POWER LINES
APPROXIMATE GUTTER LINE

'A' - RIGHT OF CARRIAGEWAY VARIABLE WIDTH (VIDE DP 1008877)
'B' - EASEMENT FOR SERVICES VARIABLE WIDTH (VIDE DP 1008877)
'C' - EASEMENT TO DRAIN WATER VARIABLE WIDTH (VIDE DP 1008877)
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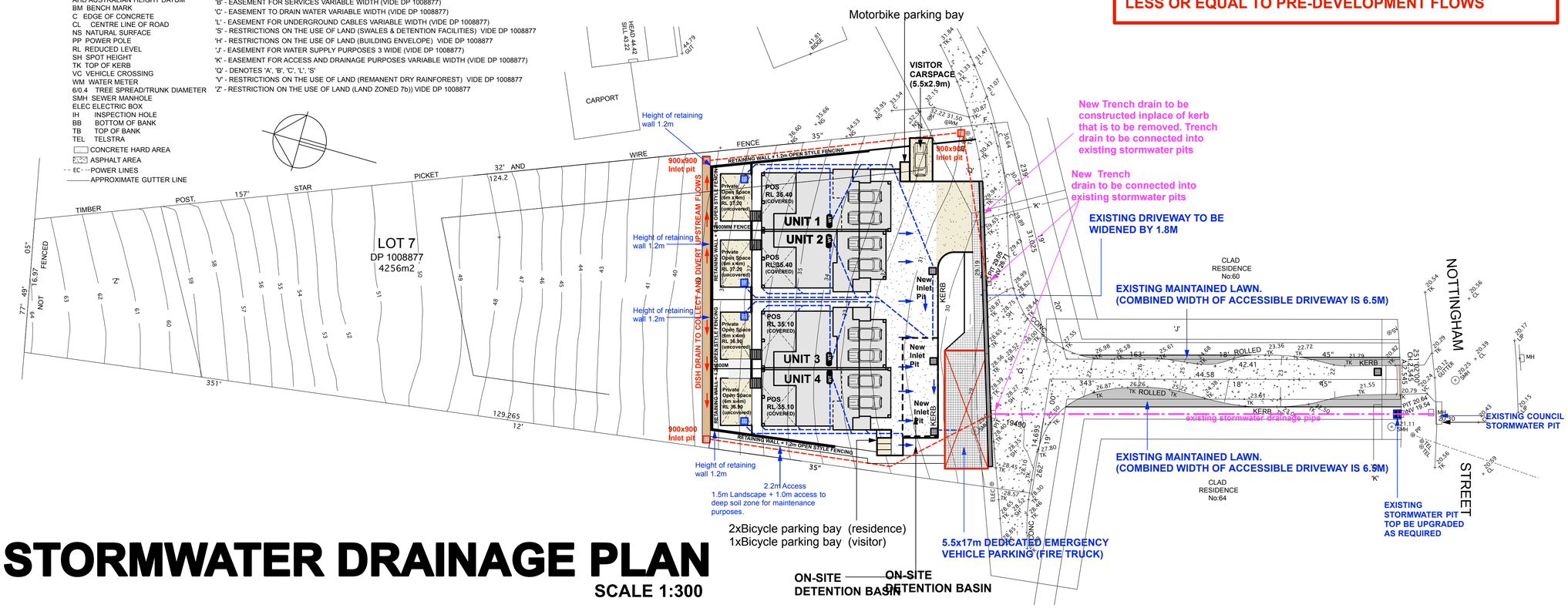
'Q' - DENOTES 'A', 'B', 'C', 'L', 'S'
'V' - RESTRICTIONS ON THE USE OF LAND (REMANENT DRY RAINFOREST) VIDE DP 1008877
'Z' - RESTRICTION ON THE USE OF LAND (LAND ZONED 7b)) VIDE DP 1008877

NOTE:- POST DEVELOPMENT FLOWS FROM SITE WILL BE LESS OR EQUAL TO PRE-DEVELOPMENT FLOWS



STORMWATER DRAINAGE PLAN

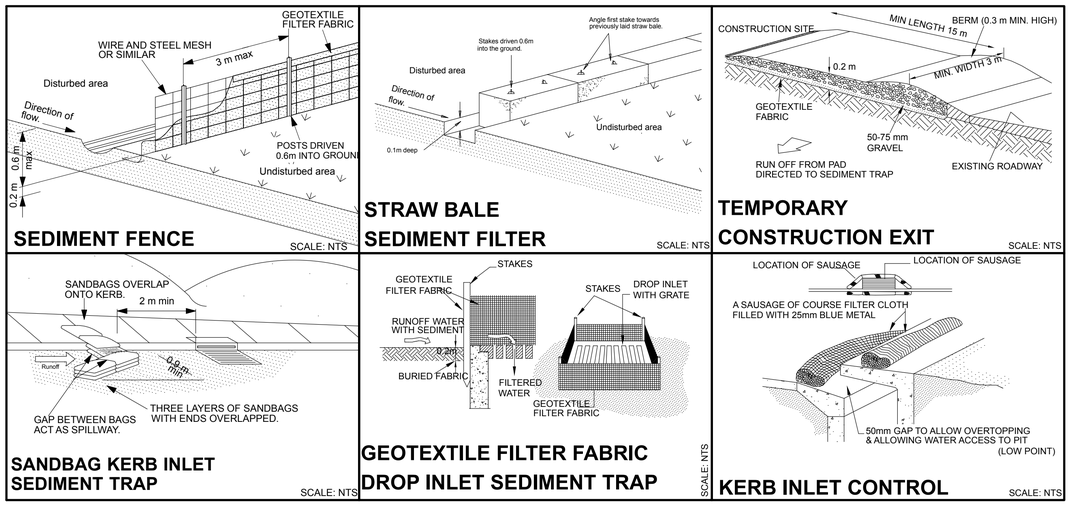
SCALE 1:300

LEGEND

= BUILDING LINE
* RL 15.60 = DESIGN LEVELS
= DOWNPIPES
= STORMWATER PIPES
DP--Q20=2.40 L/S = 1 IN 20 YEAR FLOWS FOR DOWNPIPES (INTENSITY 200MM/HR)
TD--Q20=2.40 L/S = 1 IN 20 YEAR FLOWS FOR TRENCH DRAIN (INTENSITY 200MM/HR)
overflow = OVERFLOW PATH
spreader = DOWNPIPE SPREADER
= ROOF LINE
= ROOF FALL
= PAVEMENT FALL
= 450x450 Inlet Pit
= PAVEMENT EDGE
Pavement Edge: Fall ← Conc Paving | Grass
= 100mm STANDUP KERB
Grass | Fall → Conc Paving

ALL DIMENSIONS ARE TO BE VERIFIED ON SITE PRIOR TO WORK COMMENCING.

entry into property



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CLIENT
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ABN 5588 2399 320
STRUCTURAL ENGINEERS &
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BUILDING DESIGNERS
2/238 COWPER STREET WARRAWONG, 2502
PH:42751999 FAX:42751933
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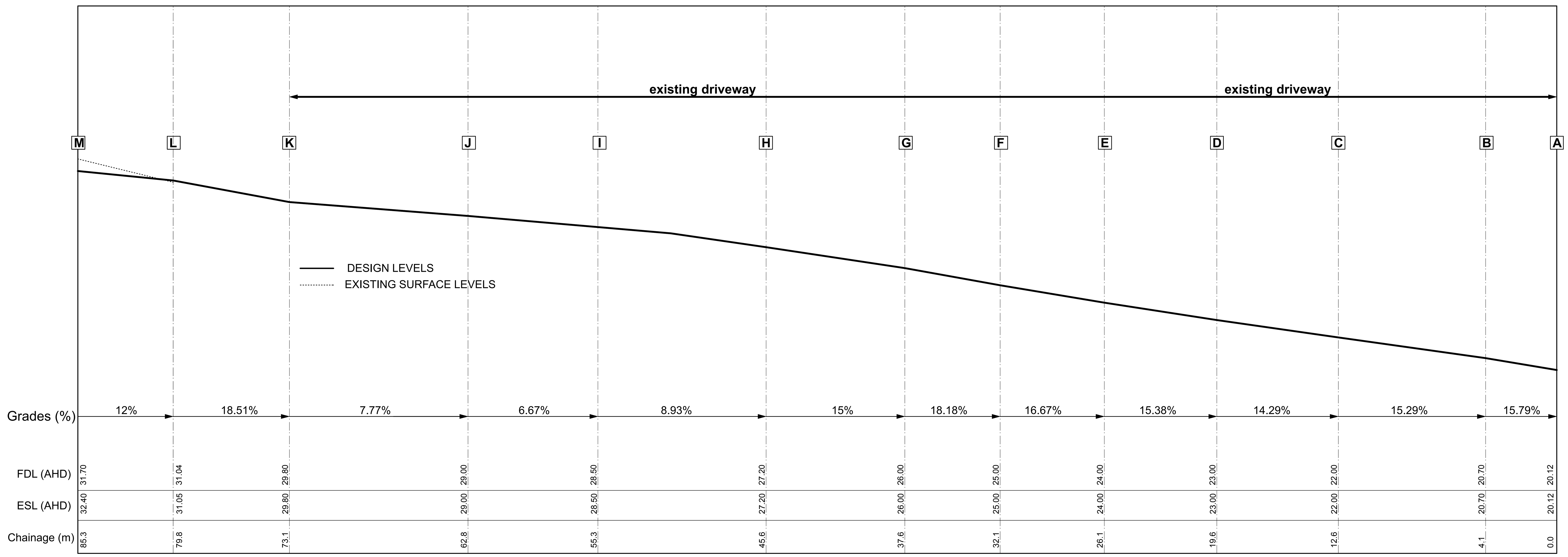
PROJECT #	20160059
DWG STATUS	F
DWG DATE	13/5/19
CAD FILE NAME	LUX LIVING 20160059-PSE
PLOT DATE	13/5/19
REVISION	20160059
ORIGINAL SHEET SIZE	A1
SCALE @ A1	1:300
DRAWN	P.S.
CHKD	P.S.
SHEET	1 OF 3



ALL DIMENSIONS ARE TO BE VERIFIED ON SITE PRIOR TO WORK COMMENCING.

FDL (AHD)=Final Design Levels (AHD)
ESL (AHD)=Existing Surface Levels (AHD)

DRIVEWAY LONGSECTION

Scale :150

LEGEND

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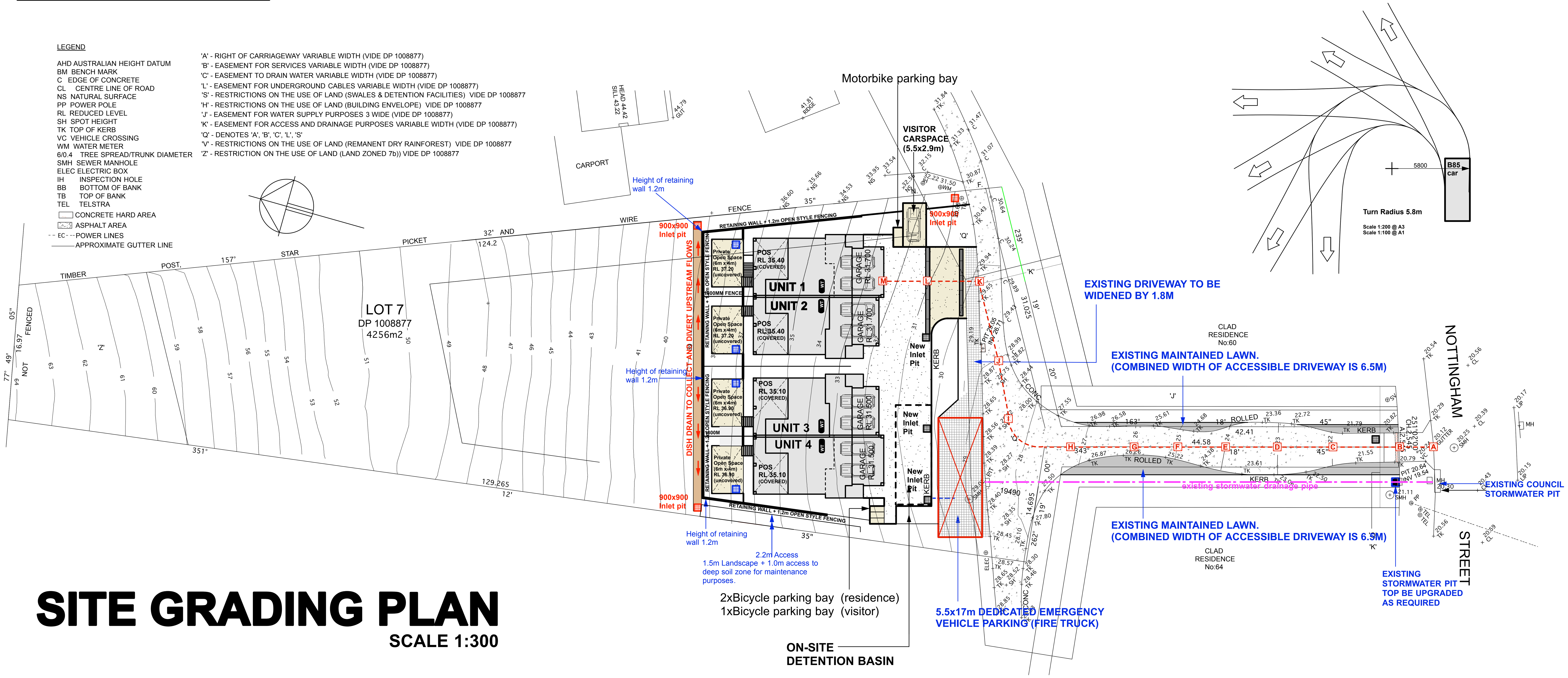

SITE GRADING PLAN

SCALE 1:300

DIAL 1100 BEFORE YOU DIG

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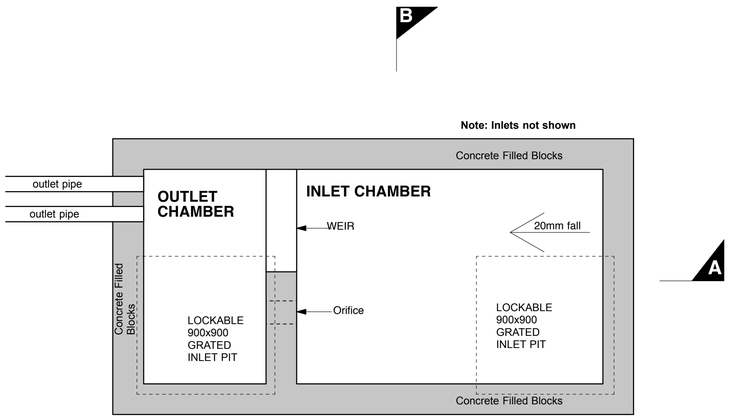
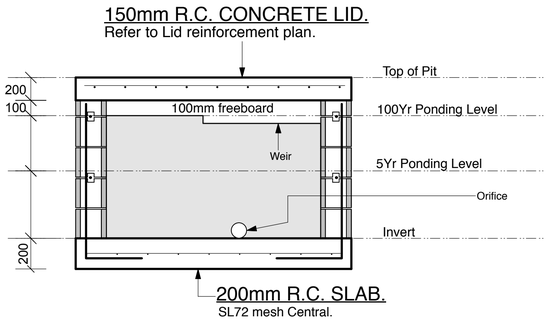
PLOT DATE 13/5/19
REVISION
ORIGINAL SHEET SIZE A1
SCALE @ A1 1:300
DRAWN P.S. CHKD P.S.
20160059
SHEET 2 OF 3



STORMWATER DETENTION BASIN-PLAN

NTS



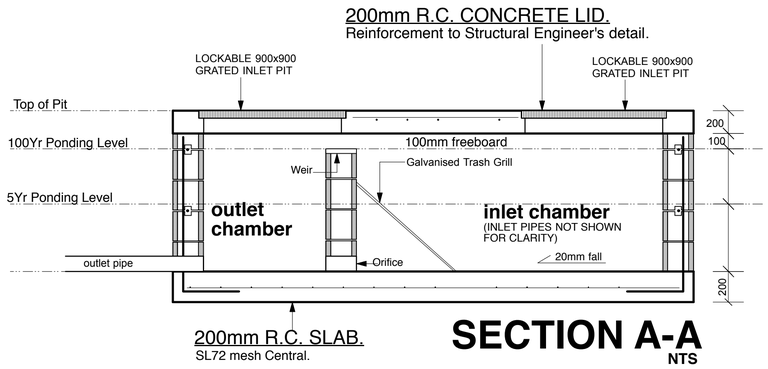
SECTION B-B

SCALE 1:20

GUTTERS & DOWNPIPES (min 6000mm^2)

Table 2
Gutter areas and downpipes

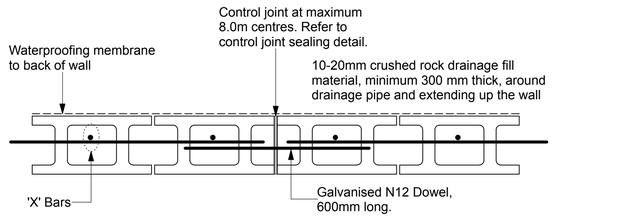
	Slotted	Effective cross-section#	Minimum standard downpipe sizes to suit gutters (Gutter gradient ≥ 1:500) Round (diameter)	Rectangular or square
	yes/no	mm²	mm	mm
QUAD Hi-front	yes	5225	90	100 x 50
QUAD Hi-front	no	5809	90	100 x 50
QUAD Low-front	no	6165	90	100 x 50
SHEERLINE	yes	7600	100	100 x 75
SHEERLINE	no	8370	§	100 x 75
TRIMLINE	yes	6244	90	100 x 50
TRIMLINE	no	7800	100	100 x 75
HALF ROUND 100	no	4300	75	100 x 50*
HALF ROUND 125	no	6300	90	100 x 50*
HALF ROUND 150	no	9200	§	100 x 75*
HALF ROUND 200	no	14500	§	§
HALF ROUND 250	no	24500	§	§
HALF ROUND 300	no	35300	§	§



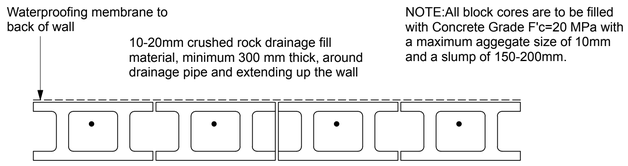
SECTION A-A

NTS

THE ON-SITE DETENTION FACILITY HAS BEEN DESIGNED TO WITHSTAND LOADINGS OCCURING FROM ANY COMBINATION OF HYDROSTATIC, EARTH AND BUOYANCY FORCES.



EVEN COURSE (WITH N12 HORIZONTAL BARS).

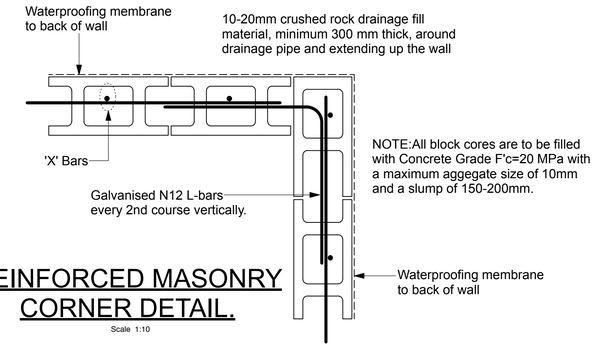


NOTE:All block cores are to be filled with Concrete Grade F'c=20 MPa with a maximum aggegate size of 10mm and a slump of 150-200mm.

ODD COURSE (WITHOUT N12 HORIZONTAL BARS).

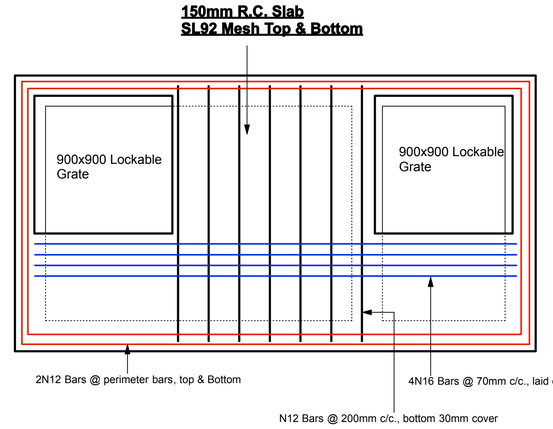
REINFORCED MASONRY CONTROL JOINT DETAIL.

Scale 1:10



REINFORCED MASONRY CORNER DETAIL.

Scale 1:10

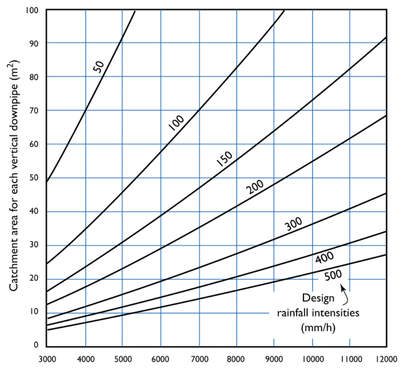


OSD LID REINFORCEMENT DETAIL

NTS

GUTTER CALCULATIONS

Figure 1
Cross-sectional area of eaves gutters required for various roof catchment areas (where gradient of gutter 1:500 and steeper).
(Adapted from AS 3500.3: 2003)



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SCALE @ A1	1:300		
DRAWN P.S.	CHKD P.S.		SHEET 3 OF 3

ATTACHMENT 4 – WDCP 2009 COMPLIANCE TABLE

CHAPTER A2 – ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Development controls to improve the sustainability of development throughout Wollongong are integrated into the relevant chapters of this DCP.

Generally speaking, the proposal is considered to be consistent with the principles of Ecologically Sustainable Development

CHAPTER B1 – RESIDENTIAL DEVELOPMENT

4.0 General Residential controls

Controls/objectives	*Comment*
4.11 Storage Facilities	
• $10m^3/5m^2$	Provided
4.12 Site Facilities	
• Letterboxes are in an accessible location	Letterboxes are proposed on the eastern side of the ROC, adjacent to the Nottingham Street frontage.
4.13 Fire Brigade Servicing	
1. All dwellings, particularly dual occupancy and dwellings on battle axe allotment must be located within 60m of a fire hydrant, or the required distance as required by Australian Standard AS2419.1. Provision must be made so that Fire and Rescue NSW vehicles can enter and leave the site in a forward direction where: a) Fire and Rescue NSW cannot park their vehicles within the road reserve due to the distance of hydrants from dwellings and/or restricted vehicular access to hydrants; and b) The site has an access driveway longer than 15m. 2. For developments where a fire brigade vehicle is required to access the site, vehicular access, egress and manoeuvring must be provided on the site in accordance with the Fire and Rescue NSW Code of Practice – Building Construction - NSWFB Vehicle Requirements.	A hydrant is located at the t-intersection of the access handle. A parking area is provided within the subject lot allowing fire fighting vehicles to pull up outside of the shared driveway. This also allows vehicles to exit the site in a forwards direction. The RFS have reviewed the submitted documentation and provided conditions of consent. One of the conditions stipulated that where the access recommendations were not able to be complied with in full, that a suitable traffic assessment be provided justifying any deviations. Bitzios Consulting were engaged to undertake that assessment. Their report confirmed the provision of a dedicated service vehicle parking bay, measuring 5.5m by 17m, which ensures accessibility to reticulated water for fire suppression without blocking the carriageway. Further, the ROC driveway was found to conform to the acceptable solution of the RFS Guide.

Controls/objectives	*Comment*
4.14 Services	
1. Applicants shall contact service authorities early in the planning stage to determine their requirements regarding conduits, contributions, layout plans, substations and other relevant details.	It is unlikely a substation will be required for the development. It is considered the development can be readily connected to the necessary utilities.
2. Consideration shall be given to the siting of any proposed substation during the design stage, to minimise its visual impact on the streetscape. Any required substation must not be located in a prominent position at the front of the property.	
3. Water, sewerage, gas, underground electricity and telephone are to be provided to the proposed development by the developer in accordance with Council and servicing authority requirements.	
4. Developments must be connected to a reticulated sewerage scheme.	
5. Where a reticulated scheme is not available, an on-site sewage management system will be required in accordance with the On-site Sewage Management System chapter in Part E of the DCP. The full details of the proposed on-site sewage management system must be provided with the Development Application. A section 68 approval will also be required under the Local Government Act 1993 in these instances.	
4.16 View sharing	
(a) To encourage view sharing from adjoining or nearby properties, public places, and new development.	The proposal is not expected to impact on any significant views.
(b) To protect and enhance significant view corridors from public places.	
(c) To encourage the siting and design of new buildings which open up significant views from public areas.	

Controls/objectives	*Comment*
4.17. Retaining walls	
1. A retaining wall or embankment should be restricted to a maximum height above or depth below natural ground level of no more than: (a) 600mm at any distance up to 900mm setback from any side or rear boundary; or (b) 1 metre, if the toe of the retaining wall or embankment is setback greater than 900mm from any side or rear boundary. Note: Council may consider a variation to the abovementioned maximum height / depth of a retaining wall, in cases where the subject site is steeply sloping and the proposed retaining wall is setback more than 1 metre from any side or rear common property boundary. Additionally, appropriate structural design details will be required and in some cases appropriate landscape buffer screen planting may be required, where necessary.	Retaining walls in excess of 1m are proposed. The site has significant fall and walls are setback appropriate distances from side boundaries.
2. Any retaining wall over a meter in height must be designed by an Engineer.	Satisfactory
3. Within areas of suspected slope instability or subject to known slope instability, Council may also require a report prepared by a suitably qualified geotechnical and structural engineer relating to the proposed retaining wall. Council will assess the suitability of any retaining within these areas, based upon the findings and recommendations contained in the report.	A Geotechnical Report has been provided and reviewed by Council's Geotechnical Officer. The proposal was found to be satisfactory subject to conditions of consent.
4. To limit the overall height impact, terracing of retaining walls is required, limiting the maximum vertical rise of a retaining wall to 1 metre, with a minimum horizontal setback of 1 metre.	Retaining walls within the development are up to 1.8m in height. The proposal does however include terracing and battered slopes to minimise the extent of any single retaining wall where possible.
5. Any retaining wall with a vertical height exceeding 1 metre in any one vertical rise must be supported by appropriate justification demonstrating how the proposal meets the objectives above.	The 1.8m retaining wall between the secondary and primary POS area is not considered to significantly compromise the amenity of the dwellings. Due to the steep grade of the site, this is difficult to avoid in providing a usable area.
6. Balustrading will be required in accordance with the Building Code of Australia, to ensure the safety of the public, where the retaining wall adjoins a public place and where there is a change in level greater than 1 metre to the surface beneath.	It is recommended that clear glass balustrade be provided atop the wall to minimise overshadowing to the POS below.
7. Open window face type retaining walls must not be permitted within 1.5 metres of an adjoining property boundary. These include crib block and similar type walls that permit the free flow of solid material through the	Satisfactory.

Controls/objectives	*Comment*
wall.	
8. A fence and any associated retaining wall located within the setback area from a primary road shall be restricted to: (a) A maximum 1.2 metre height above existing ground level, and (b) An open style for at least 50 per cent of the upper 2/3 of the area of the fence, and (c) Any brick or other solid portion of the fence above 600mm being not more than 250mm wide.	N/A
9. The fence or the fence and associated retaining wall on a sloping site may be stepped, provided the height of each step is not more than: (a) 1.6 metres above existing ground level if it is located within a setback area from a primary road, or (b) 2.2 metres above existing ground level for side or rear boundaries (where it is behind the front building line).	N/A

5.0 Attached dwellings and multi -dwelling housing

Controls/objectives	*Comment*
<u>5.1 Minimum Site Width Requirement</u>	
18m	Complies
<u>5.2 Number of Storeys</u>	
2 storey maximum	Complies
<u>5.3 Front Setbacks</u>	
N/A	
<u>5.4 Side and Rear Setbacks</u>	
Side/rear setback: 0.8 x ceiling height	See variation discussion at Chapter A1.
<u>5.5 Building Character and Form</u>	
Articulate and fragment building walls that address the street and add visual interest.	N/A – no street frontage
Avoid expanses of any single material.	Satisfactory
Utilise high quality and durable materials and finishes.	Satisfactory
Entrances must be visible at eye level from the street and well lit.	Satisfactory
For those dwellings adjacent to the street frontage, the habitable rooms must face the street.	Satisfactory
Ensure entrances can accommodate the movement of furniture.	Satisfactory

Controls/objectives	*Comment*
Air conditioning units must not be visible from the street. Space shall be allocated and shown on plans for air conditioning units in order to demonstrate that this can be achieved.	Satisfactory
All residential buildings must be designed with building frontages and entries clearly addressing the street frontage.	Complies
Where garages are proposed on the front elevation they must be articulated, unless it can be demonstrated that the garages will not visually dominate the streetscape appearance of the building.	Satisfactory
<u>5.6 Access / Driveway Requirements</u>	
(a) Paving colour, texture and material should be sympathetic with the character of the precinct and reflect a pleasant visual appearance.	Either not applicable or complies.
(b) Provide driveways to parking areas from lanes and secondary streets rather than the primary road or street, wherever practicable.	
(c) The number of access points to a development must be kept to a minimum.	
(d) Locate driveways taking into account any services within the road reserve, such as power poles, drainage inlet pits and existing street trees.	
(e) Long straight driveways should be avoided because these adversely dominate the streetscape and landscape. Curved driveways are more desirable. Landscaping between the buildings and the driveways is encouraged to soften the appearance of the hard surface.	
(f) All driveways must be located a minimum of 6 metres from the perpendicular of any intersection of any two roads.	
(g) Any driveway servicing a residential development is to be setback a minimum of 1.5m from any side property boundary.	
(h) Driveways are to be a maximum of 6m in width.	
(i) The design of driveway and crossovers must be in accordance with council's standard vehicle entrance designs.	
All vehicles within a multi dwelling development must provide vehicular manoeuvring areas to all parking spaces so vehicles do not need to make more than a single point turn to leave the site in a forward direction	Complies
Driveway grades, vehicular ramp width/grades and passing bays must be in accordance with the relevant Australian Standard, being AS 2890.1.	Complies
3m minimum driveway width	Complies

Controls/objectives	*Comment*
5.7 Car Parking Requirements	
On site car parking must be positioned to minimise impacts on the streetscape. Car parking must be located behind the building setback and be screened from view with well designed structures and vegetation. Car parking may also be located within a basement.	Satisfactory
car parking areas:	
• located close to entrances and access ways	Y
• Secure and accessible	Y
• clearly defined areas for visitor parking and disabled parking	Y
• provide parking for cars, motorcycles and bicycles in accordance with Chapter E3.	Y
5.8 Landscaping Requirements	
• A minimum of 30% of the total site area must be provided as landscaped area.	Y
• A minimum of two semi mature medium – large trees (minimum pot size 45L) are to be provided onsite in the landscaped area or deep soil zone and at least 3m from any existing or proposed dwelling, building or structure on the lot.	Y
• 1.5 metre wide landscaping bed provided along the side and rear boundaries of the site	The proposal varies this control at two small points. The variation is discussed at Chapter A1 above.
• landscaping must be integrated with the stormwater management controls	Satisfactory.
• appropriate species selected	Satisfactory
• Identify and retain where possible existing mature trees.	Trees have been identified for removal. An arborist report submitted in this regard has been reviewed by both environment and landscape officers and has been supported given the significant landscaping and compensatory planting proposed under the DA.
• Garden beds to be mulched and be separated from driveways or open space areas by an appropriate border or edge.	Y
• The width of the landscape bed does not include kerbs or other hard borders or edges.	Satisfactory
• Where driveways are located parallel to a property boundary, a minimum 1.5m landscape strip is required adjacent to the driveway	Satisfactory

Controls/objectives	*Comment*
• Landscaping to separate driveways from dwellings is also required to minimise the expanse of hardstand surfaces, define dwellings from common driveway areas and to promote variation in the alignment of driveway areas.	Satisfactory
• Manoeuvring areas immediately adjacent to the living/dining rooms of dwellings is not permitted.	Satisfactory
5.9 Deep Soil Planting	
• Half the landscaped area to be deep soil	Complies
• Minimum dimension of 6m	Complies
• Must be contiguous	Complies
• Not to contain structures	Complies
• Densely planted	Complies
5.10 Communal Open Space	
N/A	
5.11 Private Open Space	
• minimum dimension of 4 metres x 5 metres	Complies
• separated from boundaries by at least 1.5 metres with a vegetated landscaping bed	Complies
• minimum of 70% must receive a minimum of three hours of direct sunlight between 9.00am and 3.00pm on June 21	Complies
• must not extend forward of the front building setback by greater than 900mm.	N/A
• sited in a location, which provides privacy, solar access, and pleasing outlook and has a limited impact upon adjoining neighbours.	Satisfactory
• direct extensions of the living areas	Complies
• define private open space through use of planting, fencing or landscaping features.	Complies
• Screen private open space where appropriate to ensure privacy	Complies
• Balconies not to address side setbacks	Complies

Controls/objectives	*Comment*
5.12 Solar Access Requirements	
1. Windows to living rooms of adjoining dwellings must receive 3 hours of sunlight between 9.00am and 3.00pm on 21 June.	Satisfactory
2. At least 50% of the private open areas of adjoining residential properties must receive at least 3 hours of sunlight between 9.00am and 3.00pm on June 21.	
3 The primary balcony of at least 70% of the dwellings within a multi dwelling housing development shall receive a minimum of three hours of direct sunlight between 9.00am and 3.00pm on June 21.	
4. Windows to north facing living rooms for each of the subject dwellings in the development must receive at least 3 hours of sunlight between 9.00am and 3.00pm on 21 June.	
5. At least 50% of the private open space area for each of the subject dwellings in the development must receive at least 3 hours of sunlight between 9.00am and 3.00pm on 21 June.	
6. Shadow diagrams will be required for hourly intervals between 9.00 am and 3.00 pm for the 21 June winter solstice period which show the extent of overshadowing upon dwellings and rear private open space areas of adjoining dwellings. In certain cases, Council may require additional hourly interval shadow diagrams for the equinox period where it is necessary to determine the full extent of overshadowing upon the dwelling and / or private open space area of an adjoining property.	
5.13 Additional Control for Multi Dwelling Housing - Dwelling Mix and Layout	
N/A	
5.14 Additional Control for Multi Dwelling Housing - Adaptable Housing	
N/A	
5.15 Additional Control for Multi Dwelling Housing – Crime Prevention through Environmental Design	
See Chapter E2	

CHAPTER D1 – CHARACTER STATEMENTS

Berkeley

This chapter does not contain any specific controls relating to the built form other than that moderately pitched roof forms are preferred. The proposal is considered satisfactory with regard to the desired future character under this chapter.

CHAPTER E2: CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN

No concerns are raised in regard to the principles of CPTED.

CHAPTER E3: CAR PARKING, ACCESS, SERVICING/LOADING FACILITIES AND TRAFFIC MANAGEMENT

6 Traffic impact assessment and public transport studies

6.1 Car Parking and Traffic Impact Assessment Study

A traffic impact assessment was submitted with the proposal which reviewed the following:

- public transport, pedestrian and cycling networks and connectivity within vicinity of the site;
- traffic generation and the distribution onto the external road network;
- car parking requirements in accordance with Council's DCP and Australian Standards (AS2890);
- on-site parking layout for general traffic and service vehicle manoeuvring, including swept path checks using AutoTURN software; and
- site access location and form in accordance with AS2890, Council's DCP and the IPWEA Standard Drawings.

The traffic impact assessment has been reviewed by Council's Traffic Officer who has not raised any concerns subject to conditions of consent.

6.2 Preliminary Construction Traffic Management Plan

A Construction Traffic Management Plan has been provided that has some detail of how the construction stage of the development would be managed. Additionally, conditions of consent are recommended with respect to maintaining access for all adjoining properties during construction and requiring the developer to rectify any damage to the accessway during construction.

7 Parking demand and servicing requirements

Multi-dwelling development

Double garages are provided for each dwelling as well as one visitor space and one motorcycle space in accordance with this chapter.

Bicycles can readily be accommodated within the dwellings in the subfloor space

8 Vehicular access

Driveway grades and sight distances are satisfactory.

9 Loading / unloading facilities and service vehicle manoeuvring

The development complies with AS 2890.2.

Waste servicing will occur from the service bay within the site.

10 Pedestrian access

No pedestrian pathway is proposed to the development from Nottingham Street however the accessway is considered to be sufficiently large that this could be provided in future if required.

11 Safety & security (Crime Prevention through Environmental Design) measures for car parking areas

The proposal is satisfactory with regard to the principles of CPTED.

CHAPTER E6: LANDSCAPING

The proposal includes a Landscape Concept Plan prepared by a Registered Landscape Architect or eligible for registration with the Australian Institute of Landscape Architects.

The Landscape Plan is consistent with the Vegetation Management Plan, bushfire conditions and drainage plan and conditions of consent are recommended in this regard.

CHAPTER E7: WASTE MANAGEMENT

- A Site Waste Minimisation and Management Plan has been provided
- Waste bin locations are shown on the plan and suitable path of travel to collection area is provided.
- Servicing is proposed to be via a medium rigid vehicle and to occur on-site. A dedicated loading area is proposed and swept paths have been provided indicating forwards entry and egress can be achieved without obstructing the right of carriageway.

CHAPTER E12 GEOTECHNICAL ASSESSMENT

The application has been reviewed by Council's Geotechnical Engineer in relation to site stability and the suitability of the site for the development. Appropriate conditions have been recommended.

CHAPTER E14 STORMWATER MANAGEMENT

Council's Stormwater Officer has reviewed the proposal and has recommended conditions of consent regarding stormwater disposal.

CHAPTER E16 BUSHFIRE MANAGEMENT

The site is identified as being bushfire affected due to the reserve area located at the rear of the site.

The application was referred to the RFS pursuant to section 4.14 of the Act.

Section 4.14 of the Act states:

(1) Development consent cannot be granted for the carrying out of development for any purpose (other than a subdivision of land that could lawfully be used for residential or rural residential purposes or development for a special fire protection purpose) on bush fire prone land (being land for the time being recorded as bush fire prone land on a relevant map certified under section 10.3 (2)) unless the consent authority:

(a) is satisfied that the development conforms to the specifications and requirements of the version (as prescribed by the regulations) of the document entitled Planning for Bush Fire Protection prepared by the NSW Rural Fire Service in co-operation with the Department (or, if another document is prescribed by the regulations for the purposes of this paragraph, that document) that are relevant to the development (the relevant specifications and requirements), or

(b) has been provided with a certificate by a person who is recognised by the NSW Rural Fire Service as a qualified consultant in bush fire risk assessment stating that the development conforms to the relevant specifications and requirements.

The application was accompanied by a Bushfire report prepared by a level 3 BPAD certified consultant.

That report was also sent to the RFS for comment and they have provided recommended conditions of consent.

Of particular note in the RFS recommendations was the following:

- *A traffic assessment prepared by a suitably qualified person is provided to the satisfaction of the consent authority, that demonstrates how the proposed access arrangements provide for public road widths and design to enable safe access for firefighters while residents are evacuating the area.*
- *The traffic assessment must clearly identify the extent to which the proposed access arrangements conforms with, or deviates from, the acceptable solutions for public access roads as set out in section 4.1.3(1) of 'Planning for Bush Fire Protection 2006'.*

A traffic assessment prepared by Bitzios Consulting has been provided which includes an assessment of the conformity or deviation of the proposed development to the 'Planning for Bush Fire Protection 2006' guide.

CHAPTER E17: PRESERVATION AND MANAGEMENT OF TREES AND VEGETATION

The objectives of this chapter are as follows:

(a) Protect trees within the City of Wollongong Local Government Area.

(b) Protect and enhance native vegetation, habitat for native fauna and biodiversity.

(c) Protect and enhance native vegetation for its scenic values and to retain the unique visual identity of the landscape.

(d) Conserve trees of ecological, heritage, aesthetic and cultural significance.

(e) Conserve significant stands of remnant vegetation.

(f) Manage non-native vegetation in accordance with its cultural heritage and landscape significance.

(g) Ensure that any new development considers and maximises the protection of existing vegetation in the site planning, design, development, construction and operation of the development.

(h) Identify trees and other vegetation that may be pruned or removed without the necessity for a Tree Management Permit or development consent.

This Chapter of the DCP should be read in conjunction with clauses 5.9 Preservation of trees or vegetation, 5.10 Heritage conservation, 5.11 Bush fire hazard reduction work and 7.2 Natural resource sensitivity – biodiversity of Wollongong Local Environmental Plan 2009.

The proposal has been assessed in respect of the relevant LEP controls and a Vegetation Management Plan has been provided for the large rear landscaped area. The application has been reviewed by Council's Landscape and Environment Officers who were satisfied with regard to these matters and conditions of consent have been recommended.

CHAPTER E19 EARTHWORKS (LAND RESHAPING WORKS)

Conditions of consent are recommended with regard to earthworks.

CHAPTER E22 SOIL EROSION AND SEDIMENT CONTROL

Conditions of consent are recommended in regard to appropriate sediment and erosion control measures to be in place during works.

All communications to be addressed to:

Headquarters
4 Murray Rose Ave
Sydney Olympic Park NSW 2127

Telephone: 1300 NSW RFS
e-mail: records@rfs.nsw.gov.au

Headquarters
Locked Bag 17
Granville NSW 2142

Facsimile: 8741 5433

The General Manager
Wollongong City Council
Locked Bag 8821
WOLLONGONG DC NSW 2500

Your Ref: DA-2018/1583
Our Ref: D19/41 DA19010816856
BB

ATTENTION: Nigel Lamb

18 January 2019

Dear Sir / Madam

Development Application - 62 Nottingham Street Berkeley 2506

I refer to your correspondence dated 3 January 2019 seeking advice regarding bush fire protection for the above Development Application in accordance with Section 4.14 of the 'Environmental Planning and Assessment Act 1979'.

The New South Wales Rural Fire Service (NSW RFS) has considered the information submitted and provides the following recommended conditions:

Asset Protection Zones

The intent of measures is to provide sufficient space and maintain reduced fuel loads so as to ensure radiant heat levels of buildings are below critical limits and to prevent direct flame contact with a building. To achieve this, the following conditions shall apply:

1. At the commencement of building works, and in perpetuity, the area around the proposed buildings shall be managed as outlined within section 4.1.3 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones' as follows:

- North: Inner Protection Area (IPA) for a distance of 27 metres; and,
- All other directions: IPA to the property boundaries.

Water and Utilities

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building. To achieve this, the following conditions shall apply:

2. The provision of water, electricity, and gas shall comply with section 4.1.3 of 'Planning for Bush Fire Protection 2006'.

Access

The intent of measures for public roads is to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area. To achieve this, the following conditions shall apply:

3. The common access driveway (including the nominated turning area) shall be upgraded to comply with the following minimum standards under section 4.1.3(1) of 'Planning for Bush Fire Protection 2006':

- Roads are two–wheel drive, all weather roads.
- Roads widths to comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle).
- Any traffic management devices are constructed to facilitate access by emergency services vehicles.
- Roads have a cross fall not exceeding 3 degrees.
- The nominated turning area shall comply with AS 2890.2–2002 for medium rigid vehicles.
- Curves of roads are a minimum inner radius of six metres.
- The minimum distance between inner and outer curves is six metres.
- Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.
- There is a minimum vertical clearance to a height of four metres above the road at all times.
- The capacity of road surfaces is sufficient to carry fully loaded firefighting vehicles of 15 tonnes.
- Roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.

OR

4. A traffic assessment prepared by a suitably qualified person is provided to the satisfaction of the consent authority, that demonstrates how the proposed access arrangements provide for public road widths and design to enable safe access for firefighters while residents are evacuating the area.

- The traffic assessment must clearly identify the extent to which the proposed access arrangements conforms with, or deviates from, the acceptable solutions for public access roads as set out in section 4.1.3(1) of ‘Planning for Bush Fire Protection 2006’.

Design and Construction

The intent of measures is that buildings are designed and constructed to withstand the potential impacts of bush fire attack. To achieve this, the following conditions shall apply:

5. New construction shall comply with Sections 3 and 5 (BAL 12.5) Australian Standard AS3959-2009 'Construction of buildings in bush fire-prone areas' or NASH Standard (1.7.14 updated) ‘National Standard Steel Framed Construction in Bushfire Areas – 2014’ as appropriate and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection 2006'.

Landscaping

6. All landscaping within the site shall comply with the principles of Appendix 5 of ‘Planning for Bush Fire Protection 2006’.

Should you wish to discuss this matter please contact Bradley Bourke on 1300 NSW RFS.

Yours sincerely

Martha Dotter
Acting Team Leader, Development Assessment and Planning

For general information on bush fire protection please visit www.rfs.nsw.gov.au

62 Nottingham Street, Berkeley
Vegetation Management Plan

FINAL REPORT

Prepared for MMJ Real Estate

10 May 2019

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Document information

Report to:	MMJ Real Estate
Prepared by:	Tobias Scheid Paul Price
Biosis project no.:	29598
File name:	29598.Nottingham.Street.VMP.FIN.20190408
Citation:	Biosis 2019.Nottingham Road VMP for MMJ Real Estate. Authors: Scheid T and Price P, Biosis Pty Ltd, Wollongong Project no. 29598

Document control

Version	Internal reviewer	Date issued
Draft version 01	Rebecca Dwyer	28/03/2019
Final Version 01	Paul Price	08/04/2019
Final Version 02	Paul Price	09/05/2019
Final Version 03	Paul Price	10/05/2019

Acknowledgements

Biosis acknowledges the contribution of the following people and organisations in undertaking this study:

- MMJ Real Estate: Luke Rollinson
- Department of the Environment and Energy for access to the Protected Matters Search Tool of the Australian Government.
- NSW Office of Environment and Heritage for access to the BioNet Atlas of NSW Wildlife.

Biosis staff involved in this project were:

- Paul Price (Field investigation)
- Anne Murray (mapping)

Contents

Tables

Figures

Plates

Glossary

BC Act	*NSW Biodiversity Conservation Act 2016*
Biosecurity Act	*Biosecurity Act 2015*
DBH	Diameter at breast height
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GIS	Geographic Information System
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type
study area	62 Nottingham Road, Berkeley
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan
WoNS	Weeds of national significance

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by MMJ Real Estate to develop a Vegetation Management Plan (VMP) to accompany a Development Application (DA-2018/1583) for a proposed multi dwelling housing development located within Lot 7 DP 1008877, 62 Nottingham Street, Berkeley (the study area).

The project has been assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) with Wollongong City Council (Council) as the Consent Authority. The VMP has been prepared in accordance with the condition requirements provided by Wollongong City Council, to satisfy a request for additional information from Council dated 25 January 2019.

The proposed development will be undertaken in the southern section of the property (the subject site), in land zoned R2 Low Density Residential. The northern section of the property is zoned E3 Environmental Management and is also mapped as *Natural resource sensitivity –biodiversity* by the Wollongong Local Environment Plan 2009 (WLEP) (WCC 2009). The VMP will cover the areas north of the proposed development and include the northern Asset Protection Zone (APZ) as a part of its prescribed management actions. (Figure 1).

1.2 Description of VMP area

The study area is located approximately 7.5 kilometres south-west of the Wollongong CBD. The study area covers approximately 0.42 hectares of private land, of which the VMP area encompasses 0.23 hectares (Figure 1).

The VMP area occurs within:

- Sydney Basin Bioregion (Illawarra Subregion)
- Lake Illawarra / Port Hacking River Catchment Area
- South East Local Land Services (LLS) Management Area.
- Wollongong City Council Local Government Area (LGA).
- Land zoned predominantly R2 Low Density Residential with a small E3 Environmental Management area under the Wollongong Local Environmental Plan 2009.

The VMP area is currently mapped as regenerating Acacia scrub and exotic grasslands (Biosis 2015) and, within the far northern portions of the VMP area, as *Natural Resources Sensitivity –Biodiversity corridor* under the Wollongong Local Environmental Plan 2009 (WCC 2009).

No hollow-bearing trees were identified within the study area.

Regional soil landscape mapping indicates that the study area occurs on the Berkeley soil landscape of the Wollongong Port Hacking 1:100 000 sheet (Hazelton and Tille 1990). The Berkeley soils landscape is characterised by shallow friable brownish black clay loam. Moderately to strongly pedal clay loam to fine sandy clay loam topsoil.

The surrounding land use consists of medium density residential subdivisions to the south of the VMP area and portions of patchy native/non-native vegetation within a power line easement and mapped E3

Environmental management corridor The E3 corridor to the north has been subject to historic clearing which is likely responsible for the high weed influence and patchy regeneration of native species to the north of the study area.

1.3 Potential ecological impacts

Key aspects of the proposed works that could result in potential ecological impacts include:

- Clearing of native vegetation and habitat.
- Invasion of exotic species, weeds, pests and pathogens.
- General earth vegetation resulting in disturbance of soils, erosion, and the mobilisation of sediment.

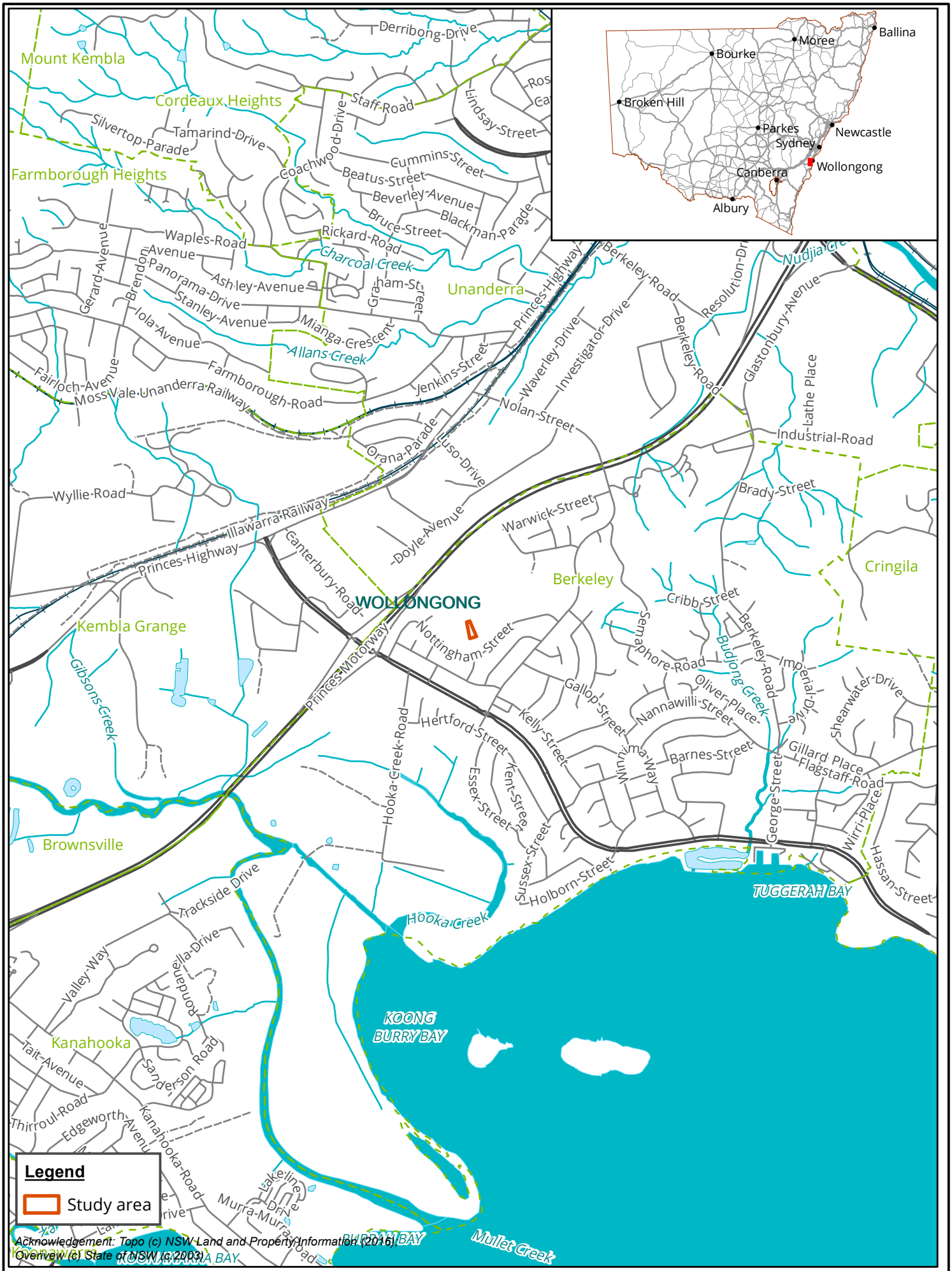


Figure 1 Location of the study area

biosis
Biosis Pty Ltd
Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 29598
Date: 07 March 2019,
Checked by: PP, Drawn by: AEDM, Last edited by: amurray
Location:P:\29500s\29598\Mapping\

0 250 500 750 1,000
Metres
N
Scale 1:25,000 @ A4, GDA 1994 MGA Zone 56

2 VMP scope and objectives

2.1 Scope

The scope of this VMP is to develop a framework for the management of vegetation to be retained, vegetation to be removed, and the ongoing management of weeds within the study area. The VMP will also outline ongoing management actions required for successful establishment of native plants within the VMP area, and actions to protect the surrounding vegetation from future impact.

The maintenance period will run for a minimum of three years or until the objectives and performance criteria outlined in this VMP are met.

2.2 Objectives

The specific objectives for the implementation of this VMP are to:

- Outline the management requirements for any vegetation to be retained, including details on tree and vegetation protection measures e.g. fencing, APZ implementation and management.
- Outline rehabilitation details, including identification of flora species and sources, and measures for the management and maintenance of rehabilitated areas (including the duration of the implementation of such measures).
- Provide schedules for inspection, monitoring, management and corrective actions.
- Describe weed management activities.
- Incorporate a seed collection and revegetation strategy.
- Review flora species lists of *PCT 1300: Whalebone Tree - Native Quince dry subtropical rainforest* community and identify a suite of flora species suitable for revegetation works within the VMP area.
- Describe planting density and composition for revegetation works within the VMP area.
- Provide schedules for inspection, monitoring, management and corrective actions.

3 Methods

3.1 Desktop research

A review of all available design plans and reports relating to the site and adjacent areas was conducted, as well as relevant legislation, recent vegetation mapping and other documentation relevant to the current project, including;

- Relevant reports:
  - Wollongong LGA Bioregional Assessment (Part I): *Native Vegetation of the Illawarra Escarpment and Coastal plain* (NPWS 2002b).
  - Proposed townhouse development: 62 Nottingham Road Berkeley. *Preliminary Flora and Fauna Assessment* (Biosis 2015).
- Proposed Site Plans (PECORP Design 2019).
- Wollongong Local Environmental Plan (WLEP 2009a).
- Wollongong Development Control Plan (WDCP 2009b).
- The Native Vegetation of the Illawarra Escarpment and Coastal Plain (NPWS 2002a).
- Department of the Environment and Energy (DEE) Protected Matters Search Tool for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Office of Environment and Heritage (OEH) NSW BioNet, the database for the Atlas of NSW Wildlife, for matters protected under the *Biodiversity Conservation Act 2016* (BC Act).

3.2 Site assessment

A general flora and fauna site survey of the study area was conducted on 01 March 2019 by a qualified and experienced Restoration Ecologist, Paul Price. The study area was surveyed using random meander methods. This involved:

- The identification of native and exotic plant species, according to *Field Guide to the Native Plants of Sydney* (Robinson 2003) and the *Flora of NSW* (Harden 1992, 1993, 2000, 2002), with reference to recent taxonomic changes.
- The identification and mapping of plant communities according to the structural definitions of Native Vegetation of the Illawarra Escarpment and Coastal Plain (NPWS 2002b).
- Targeted searches for plant species of conservation significance according to the 'random meander' method (Cropper 1993).
- Identifying fauna habitats, assessing their condition and assessing their value to threatened fauna species.
- Observations of animal activity and searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches and diggings).
- An assessment of the natural resilience of the vegetation of the VMP area.

- Determination of appropriate rehabilitation and bush regeneration techniques for the native vegetation of the site.

The conservation significance of plant species and plant communities was determined according to:

- BC Act for significance within NSW.
- EPBC Act for significance within Australia.

3.3 Limitations

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as species dormancy, seasonal conditions, and ephemeral status of waterbodies and migration and breeding behaviours of some fauna. In many cases these factors do not present a significant limitation to assessing the overall ecological values of a site.

The study area was surveyed in 2015 by Biosis and did not identify the presence of threatened biota and confirmed that the study area provided no suitable habitat for threatened flora which had the potential to occur on the basis of habitat in the local area, these species included:

- White-flowered Wax Plant *Cynanchum elegans* (Endangered species under BC Act and EPBC Act)
- Rainforest Senna *Senna acclinus* (Endangered species under BC Act).
- Scrub Ironwood *Gossia acmenoides.*(Endangered population under BC Act)

Additional field survey by Biosis on 01 March 2019 confirmed the absence of above threatened flora and noted that the site lacked suitable habitat to support such species.

4 Site description

4.1 Vegetation communities

The VMP area contains two Plant Community Types (PCT's) / vegetation communities:

- Acacia scrub
- Mixed scrub and exotic grassland

Acacia Scrub

The Acacia scrub within the VMP area was found to be in low condition, lacking regeneration of native canopy and native midstory species. The canopy, whilst limited, was represented by Black Wattle Acacia *mearnsii,* and one Forest Red Gum *Eucalyptus tereticornis.* The taller midstorey was represented by occasional Sweet Pittosporum *Pittosporum undulatum*, Large Leaf Privet *Ligustrum lucidum* and Small Leaf Privet *Ligustrum sinense*. While areas of the lower midstorey is dominated by Lantana *Lantana camara* and Crofton Weed *Ageratina adenophora*. Where native groundcover was present, the native species include Basket Grass *Oplismenus aemulus*, *Carex longebrachiata* and *Lachnagrostis filiformis.* The remaining groundcover included exotic species such as Kikuyu Grass *Cenchrus clandestinus*, Catsear *Hypochaeris radicata,* Plantain *Plantago lanceolata* and Panic Veldt Grass *Ehrharta erecta.*

Mixed scrub and exotic grassland

This vegetation type is found to be a mosaic of exotic and native low growing shrubs, with significant areas of exotic grasses and pasture weeds. One isolated Coast White Box *Eucalyptus quadrangulata* is present in the north eastern corner of the property. Occasional taller shrubs and small trees present included Sweet Pittosporum, Large Leaf Privet and Small Leaf Privet. The low scrubs included Fireweed Groundsel *Senecio linearifolius*, Crofton Weed, Narrow-leaf Cotton Bush, Cassia *Senna pendula* var. *glabrata,* Moth Vine *Araujia sericifera* and Chinese Honeysuckle *Lonicera japonica.* Areas of closed exotic grassland included Kikuyu, *Carex longebrachiata,* Cocks Foot *Dactylis glomerata,* Rhodes Grass *Chloris gayana*, *Verbena* sp., Paddy Lucerne *Sida rhombifolia,* and Spear Thistle *Cirsium vulgare.*

A flora species list is provided as Appendix 1.

4.2 Fauna habitats

A range of fauna habitat features were present throughout the study area. No hollow bearing trees were identified within the VMP area during the field investigation. Habitat within the VMP area provides potential habitat for native fauna, the study area is considered unlikely to contain breeding habitat for threatened fauna given the absence of important habitat features. The habitat features relevant to each fauna group are identified in Table 1 below.

Table 1 Key fauna habitat features present across the study area

Habitat features	Fauna species
Vegetated areas	Foraging Microchiropteran bats and owls species.
Leaf litter/woody debris	Foraging resources for birds, mammals, frogs and reptiles.

4.3 Threatened species habitats

Threatened species habitat within the VMP area is considered to be highly limited due to the past disturbance factors such as vegetation clearance, exotic species invasion and the close proximity to residential dwellings. However, the vegetation directly north of the VMP area has semi contiguous linkages to the north and east has the potential to support a number of locally occurring threatened species.

Review of the OEH Bionet Atlas (OEH 2016) and the DoE Protected Matters Search Tool (DoE 2016) found records of three threatened flora species and nine threatened fauna species as previously recorded, or predicted to occur, within a five kilometre radius of the study area. Of these locally occurring threatened species the following are considered most likely to occur within the VMP area:

- Downy Wattle *Acacia pubescens* (Vulnerable, BC Act and EPBC Act).
- *Epacris purpurascens* var *purpurascens* (Vulnerable, BC Act).
- *Persoonia mollis* subsp. *mollis* (Endangered, BC Act and EPBC Act).
- Eastern False Pipistrelle *Falsistrellus tasmaniensis* (Vulnerable, BC Act).
- Little Bentwing-bat *Miniopterus australis* (Vulnerable, BC Act).
- Eastern Bentwing-bat *Miniopterus schreibersii oceanensis* (Vulnerable, BC Act).
- Eastern Freetail-bat *Mormopterus norfolkensis* (Vulnerable, BC Act).
- Dusky Woodswallow *Artamus cyanopterus cyanopterus* (Vulnerable, BC Act).
- Greater Broad-nosed Bat *Scoteanax rueppellii* (Vulnerable, BC Act)
- Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* (Vulnerable, BC Act).
- Powerful Owl *Ninox strenua* (Vulnerable, BC Act).
- Masked Owl *Tyto novaehollandiae* (Vulnerable, BC Act).

Fauna species are considered likely to occur on a transient basis only, during foraging activities or movement through the broader landscape. The VMP area is considered unlikely to support suitable breeding habitat for these species.

4.4 Priority and environmental weeds

Seven weed listed as a priority weed in the Wollongong Local Government Area (LGA) under the NSW *Biosecurity Act 2015* (Biosecurity Act) were recorded within the VMP area, and landowners and occupiers are under legal obligations to manage such species in line with the General Biosecurity Duty which states:

> *All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.*

All seven priority weed species are also considered to be Weeds of National Significance (WoNS) (Table 2).

Table 2 Priority weeds and WoNS recorded within the study area

Scientific name	Common name	General Biosecurity Duty	WoNS
Asparagus asparagoides	Bridal Creeper	**Prohibition on dealings** Must not be imported into the State or sold	Yes
Asparagus aethiopicus	Ground Asparagus	**Prohibition on dealings** Must not be imported into the State or sold	Yes
Asparagus plumosus	Climbing Asparagus Fern	**Prohibition on dealings** Must not be imported into the State or sold	Yes
Chrysanthemoides monilifera* subsp. *rotundata.	Bitou Bush	**Prohibition on dealings** Must not be imported into the State or sold	Yes
Lantana camara	Lantana	**Prohibition on dealings** Must not be imported into the State or sold	Yes
Rubus fruticosus	Blackberry	**Prohibition on dealings** Must not be imported into the State or sold	Yes
Senecio madagascariensis.	Fireweed	**Prohibition on dealings** Must not be imported into the State or sold	Yes

5 Vegetation management

5.1 General approach

This VMP provides a prioritised succession of restoration works that have considered a long term commitment to biodiversity management and time frames for the reinstatement of important ecological values. The key to prioritising areas for restoration and the order of which works should be undertaken are the established principles of 'retain, regenerate and revegetate'. Inherent in this approach is the need to work from areas of more resilient bushland to areas of more degraded bushland (Buchanan 1989; DEC 2005).

5.2 Vegetation management zones

The ecological assessment completed by Biosis (2019) has been used to delineate the Vegetation Management Zones to which this VMP will apply. The delineation of Vegetation Management Zones was determined based on various site attributes identified during the field investigation, including:

- Future land use (retain or remove).
- Vegetation community type.
- Resilience within the overstorey, shrub storey and understorey.
- Level of recruitment of exotic species (including priority weeds).

Using these attributes, three management zones have been identified within the VMP area (Table 3). The location and extent of each zone is provided in Figure 2 with corresponding summary of the management requirements for each zone provided in Table 3 below.

Table 3 Management zones

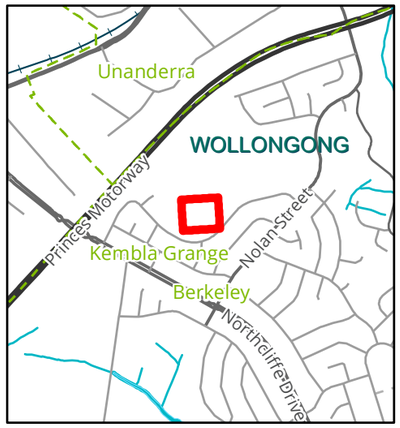
Management zone	Area (ha)	Description
Management Zone 1(MZ1)	0.087	MZ 1 is currently mapped as Acacia scrub/Mixed scrub and exotic grasslands (Biosis 2015) and will form a part of the VMP area Inner protection zone (IPZ). Activities within the MZ will include the treatment of all of exotic weed species with scope to implement a revegetation program in coordination with the legislative requirement in the establishment and maintenance of the proposed IPZ. As such, no shrubs or native ground covers will be planted within the MZ. It is anticipated that the ground layer will remain exotic for ease of management i.e. regular mowing /slashing. All weed control is to be undertaken using industry approved best practice techniques in bush regeneration and weed control. All biomass generated from the weed control program is to be removed from site. Additional activities within the management will include : • Soil stabilisation with coir logs in area of high erosion potential areas to eliminate any instability. • Slashing of exotic and annual grass species - to maintain current vegetative cover • Installation of horticultural turf species i.e. Kikuyu Grass (where applicable). • Rubbish and accumulated biomass removal (where applicable).

Management zone	Area (ha)	Description

		APZ requirements are to be undertaken in accordance with the Bushfire Assessment report (BAR) (SET Consultants 2018). As such, the following aspects the BAR are to be adhered to :
		• Existing larger trees (at least 150mm in diametre measured at chest height) may remain within the APZ provided that:
		  ○ They do not occur within 4 metres of a building.
		  ○ Lower limbs are removed.
		  ○ Shrubs beneath the trees are removed.
		  ○ Crowns do not form a continuous canopy.
		• Smaller trees, shrubs, fallen trees, tree limbs and stumps are to be removed.
		• The presence of a few shrubs is acceptable provided that they are at least 10m from the structure, are well spread out, do not form a contiguous pathway to the proposed buildings and do not constitute more than 5% of the total APZ area.
		• Vegetable gardens or fruit trees may be located within the APZ. Any other gardens should not occupy more that 5% of the APZ and only contain low flammability species.
		• A minimal ground fuel is to be maintained to include either mowed grass, paving, concrete, bare ground or less than 4 tonnes per hectare of fine fuel.
		• Any proposed structures within the APZ are to be non-combustible.
		• Any structures storing combustible materials such as firewood must be sealed to prevent entry of burning debris.
		• Gutters, roofs and roof gullies shall be kept free of leaves and other debris.
		• The maintenance of the APZ to be maintained for perpetuity.
		
		Suggested control methods for weed species is provided as Table 12
		All plant species for the revegetation of MZ1 are provided as Table 13
		Trees deemed unsuitable for installation within the MZ are indicated (*) within the table.

Management Zone 2: (MZ2)	0.093	MZ 2 is currently mapped as Acacia scrub/Mixed scrub and exotic grasslands and will form a part of the VMP area revegetation area. Activities within the MZ will include the treatment of all of exotic weed species with scope to implement a full revegetation program utilising native species associated with Plant Community Type (PCT) 1300: *Whalebone Tree - Native Quince dry subtropical rainforest on dry fertile slopes, southern Sydney Basin Bioregion*. All weed control is to be undertaken using industry approved best practice techniques in bush regeneration and weed control. All biomass generated from the weed control program is to be removed from site. Additional activities within the management will include : • Soil stabilisation with coir logs in area of high erosion potential areas to eliminate any instability. • Rubbish and accumulated biomass removal (where applicable) Suggested control methods for weed species is provided as Table 12 All plant species for the revegetation of MZ2 are provided as Table 13
Management Zone 3: (MZ3)	0.052	MZ 3 is currently mapped as Acacia scrub/Mixed scrub and exotic grasslands and will form a part of the VMP area revegetation area. MZ 3 also forms a part of the mapped WCC Natural Resources Sensitivity –Biodiversity corridor (WCC 2009).

Management zone	Area (ha)	Description
		Activities within the MZ will include the treatment of all of exotic weed species with scope to implement a supplementary revegetation as a result of the moderate densities of native flora regenerating within the ground layer stratum. All weed control is to be undertaken using industry approved best practice techniques in bush regeneration and weed control. All biomass generated from the weed control program is to be removed from site. Additional activities within the management will include : • Soil stabilisation with coir logs in area of high erosion potential areas to eliminate any instability. • Rubbish and accumulated biomass removal (where applicable) Suggested control methods for weed species is provided as Table 12 All plant species for the revegetation of MZ3 are provided as Table 13.



Legend

- Study area
- Development footprint
- APZ
- Proposed photo monitoring point

Management zones

- MZ1
- MZ2
- MZ3

Figure 2 Vegetation management zones

0 5 10 15 20 25

Metres
Scale: 1:500 @ A3
Coordinate System: GDA 1994 NSW Lambert

N

biosis
Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 29598
Date: 25 March 2019,
Checked by: PP, Drawn by: AEDM, Last edited by: amurray
Location:P:\29500s\29598\Mapping
29598_F2_MgmtZones

6 Specific management actions

6.1 Construction activities

6.1.1 Site inductions

Site supervisors are required to identify all potential environmental impacts and implement and maintain control measures, procedures and constraints accordingly, and these should be documented as part of a Construction Environmental Management Plan (CEMP) or similar. Site specifics include the presence of threatened species habitat and locally significant vegetation communities. General site inductions must also include strict hygiene protocols to reduce the potential the introduction of invasive flora and fauna species or disease into the protected vegetation on the VMP area.

6.1.2 Exclusion fencing

The extent of ecologically sensitive areas located adjacent to the works areas will be shown on relevant Sensitive Site maps and physically delineated on site using protective fencing and signposting. Prior to the commencement of earthworks, exclusion fencing is to be installed along the boundaries of vegetated areas to be retained. The alignment of this fencing is to be in accordance with the Australian Standard *Protection of Trees on Development Sites (AS4970-2009)* and incorporate the relevant tree protection zones for trees and vegetation to be retained.

The fencing should be constructed of, as a minimum, capped star pickets and high visibility para webbing and have appropriate signage stating that it is an environmentally sensitive area to inform and educate construction personnel. Exclusion zones are to be clearly marked and labelled on design drawings issued for construction and should be displayed in prominent places and provided in site inductions. A register of sensitive area maps will be maintained.

No storage of materials or machinery is to be undertaken within exclusion zones or retained vegetation, no preparation of chemicals or concrete to be mixed in these areas, or adjacent, and care to avoid the compaction of soils to be observed.

6.1.3 Erosion and sediment controls

Earthworks are not to commence until sediment and erosion controls have been installed as per an approved Erosion and Sediment Control Plan / Soil and Water Management Plan. Erosion and sediment control is to be observed and monitored for the entire construction phase of the development. All objectives and measures outlined within *Landcom Managing Urban Stormwater: Soils and Construction* (2004), this VMP and any Sediment and Erosion Control Plan prepared for the development are to be enforced.

6.2 APZ establishment and maintenance

All APZ works are to be undertaken in accordance *Planning for Bushfire Protection 2006* and the *NSW Rural Fire Service Appendix 3: Planning for Bushfire Protection (2010)*. As such, the APZ should be established from the commencement of building works and maintained for perpetuity.

The Inner protection zone (Management Zone 1) is to provide a tree canopy cover less than 15% and any tree canopies must be located greater than two metre from any part of the proposed dwelling roofline. Garden beds of flammable shrubs should not be located under trees and should be no greater than ten metres from an exposed window or door. Trees should have lower limbs removed up to a height of two metres above ground.

Vegetation within the APZ should be managed in accordance with APZ specifications for the purposes of limiting the travel of a fire, reducing the likelihood of direct flame contact and removing additional hazards or ignition sources. The following outlines some general vegetation management principles for APZs:

- Discontinuous shrub layer (clumps or islands of shrubs not rows)
- Vertical separation between vegetation stratums
- Tree canopies not overhanging structures
- Maintain low ground covers by mowing/whipper snipper/slashing.

The control of weed species within the management zones will assist with the required APZ maintenance

6.3 Rehabilitation works

6.3.1 Seed collection

When native vegetation is lost as a result of project works, revegetation may be necessary to reinstate native vegetation and habitat in the project area. The purpose of revegetation for this project includes:

- Creating buffer zones around retained native vegetation to protect it from edge effects.
- Maintaining soil stability
- Creating or maintaining habitat corridors to help facilitate the movement of flora and fauna species.
- Maintaining native seed banks, local provenance of species endemic to the area and genetic diversity.

Time should be allocated to seed collection for the project to allow for seasonal variations in seed production. Depending on timing, this may include collecting seed up to 12 months in advance of revegetation works. Collection of additional seed from the adjoining retained vegetation may be required (depending on seasonal variations in seed production) to ensure adequate genetic diversity is maintained. Seed collection methods is provided in Appendix

Seed collection is to be carried out in accordance with the Florabank Guidelines, by experienced and licenced seed collectors/ecologists. Seed collection from a Threatened Ecological Community also requires a licence under the NSW *National Parks and Wildlife Act 1974*.

6.3.2 Weed management

This proposed works have the potential to introduce and promote weeds and pathogens in the development footprint as well as in the surrounding area. Environmental weeds are exotic species considered either a high risk of dispersing and becoming established in adjacent native vegetation, or have the potential to cause significant ecological harm. Recommended methods for control of environmental weeds recorded on site, along with priority species, are outlined in Appendix .

6.3.3 Natural regeneration

Encouraging the natural regeneration of pre-existing vegetation is an effective form of site restoration as:

- Seeds and propagules exist within the seed bank.
- Species of local provenance are better adapted to the environmental conditions in the area.
- Re-establishment of the community will follow natural patterns of re-colonisation and succession.
- Soil fauna, fungal and microbial populations that are essential to a healthy plant growing environment are already present.

Some practical and cost-effective management actions that can be used to encourage natural regrowth and regeneration include:

- Disturbing the soil surface.
- Removing weed infestations.
- Creating canopy gaps.
- Watering.

The applicability of any of the above management actions will be dependent on the pre-existing vegetation and local conditions. Natural regeneration and encouragement of natural regrowth will be most effective in MZ3. Appropriate monitoring and management of this zone must be carried out as actions such as soil disturbance and canopy gaps may also result in the establishment of weed populations.

6.3.4 Revegetation

Revegetation is required within all management zones and to be undertaken in general accordance with the specifications outlined below. A recommended species list for revegetation is provided in Appendix . The recommended planting list is based on species that are characteristic of PCT *1300: Whalebone Tree - Native Quince dry subtropical rainforest on dry fertile slopes, southern Sydney Basin Bioregion*. Additionally they are species that are easily propagated and established from readily available local provenance seed.

Active revegetation should, where possible, be carried out in a manner that avoids structured plantings in straight lines and achieves a more randomised pattern.

All plants to be installed as part of the required revegetation works are to be either as hikos and/or enviro-cells sized pots. Advanced stock are not to be used for rehabilitation purposes and do not compensate for multiple plantings within the VMP area. A recommended species list and percentage of species per stratum is provided as Appendix 4.

6.3.5 Plant numbers and densities

The following is a guide to inform the revegetation densities:

- (MZ1): Trees are to be installed at a rate of one plant per fifty square metres.
- (MZ2): Trees are to be installed at a rate of one plants per ten square metres, shrubs are to be installed at a rate of one plants per five square metres and ground covers installed at a rate of one plant per square metre.
- MZ3: Trees are to be installed at a rate of one plants per ten square metres, shrubs are to be installed at a rate of one plants per five square metres and ground covers installed at a rate of one plant per two square metres.

The proposed planting numbers per management zone are provided in Table 4.

Table 4 Planting numbers

Zone	Trees	Shrubs	Ground covers	Total
Zone 1	17	0	0	17
Zone 2	93	186	930	1209
Zone 3	52	104	259	414
Zone 4	0	0		0
Total	162	290	1189	1641

An estimated 1641 plants are to be installed as part of the proposed VMP works. In the event of plant loss, a nominated replacement of 10% of the total plants installed (164) has been included in the VMP costing schedule (Table 9).

6.3.6 Fertilising

At the time of planting fertiliser is be applied to each plant in the form of a native slow release product with an N: P: K ratio similar to that of 21.8: 0.7: 7.2. Water crystals may also be used to reduce the incidence of death amongst establishing plants. Such an additive will also reduce initial water costs during the establishment phase of the VMP implementation.

6.3.7 Watering

Watering of the supplementary planting works will be undertaken to ensure that an adequate survival and establishment rate is achieved. Watering is to abide by any local authority water restrictions or guidelines.

Watering of all supplementary planting will occur at the time of the planting itself during the construction phase, to minimise shock on the tubestock in their new conditions. Watering of stock during the construction will be on an as required basis.

During the three - six month establishment period, the frequency of watering to achieve plant establishment will depend on the prevailing climatic conditions at the time of planting and thereafter. Watering will generally be carried out in the cooler hours of the day (morning or afternoon), and will be frequent enough to prevent wilting of plants. Tubestock is to be watered prior to planting as well as immediately after planting installation.

During the establishment phase the following watering program is recommended (dependent on weather) (Table 5).

Table 5 Watering program

Weeks 1 - 8	Months 2 - 4	Months 5 - 6
Once a day	Once a week	Once a fortnight

The necessity for watering during the above program will be dependent upon rainfall. The frequency of watering will be gradually reduced as the plantings mature and it is anticipated that after period of 4 – 6 months the planting will be sufficiently established such that supplementary watering will no longer be required.

Planting areas are to be monitored during the extended maintenance period to ensure that climatic conditions are not affecting the newly planted tube stock. If climate or environmental conditions are affecting the tube stock a watering program may be reinstated pending the approval by the land owner.

6.3.8 Pest control

Predation by native macropods, introduced herbivores (deer, rabbits and hares), insect pests and infection caused by plant diseases/pathogens can have an adverse effect on the establishment of plantings by defoliating, damaging, removing or killing young plants. To minimise the loss of plants through predation and/or disease, all new plantings will be protected by:

- Use of black plastic rigid mesh tree guards, which would be reused on new plantings once the initial planted specimens mature.
- Installation of a three strand wire exclusion fence around MZ 2 and 3.

6.4 Maintenance

Maintenance works will commence following the implementation of weed control and revegetation activities and will continue for a period of 36 months from commencement of the VMP maintenance period. It is anticipated that the maintenance activities will occur quarterly during cooler months and bi-monthly in the warmer months. Required works and indicative effort are outlined in Table 6.

Table 6 Indicative maintenance works summary

Maintenance activity	Minimum effort	Frequency	Responsibility
Spot spraying of annual and perennial weeds	Two person days, Monthly	Quarterly in cooler months, monthly in warmer months	Land manager/bush regeneration contractor
Checking and repairing tree guards/fencing	One person day, 5 times per year	Bi-annually	Land manager
Watering	As required	Only during excessively hot periods of summer	Land manager/bush regeneration contractor
Replacement planting of tubestock	As required	Annual checks and planting	Land manager/bush regeneration contractor
APZ maintenance	Twice per annum	Spring and Autumn	Land manager/bush regeneration contractor

7 Cost

7.1 Preliminary civil works

Costs associated with the clearing of vegetation and site establishment have not been included in the budget. It is anticipated that the client will liaise with a chosen civil contractor to complete the required works.

7.2 Seed collection

The collection of native seed is included into the costing. This price includes the suggested collection post vegetation clearance. Details are provided in Appendix 2.

7.3 Erosion control, exclusion fencing and signage

The cost associated with the installation and maintenance the coir logs and exclusion fencing have not been included into the costing.

7.4 VMP works

The total cost for the implementation of the VMP, including an eight month establishment phase and the required three year maintenance period is $44,092 (ex GST). A breakdown of costs per year is provided as Table 7. All costs are indicative only and are prone to fluctuation.

Table 7 VMP implemenation costing

Task	Year 1 Establishment phase	Year 2	Year 3	Year 4	Year 5	Total
Preliminary works						
Seed Collection	$1,231					$1,231
Rubbish removal	$500					$500
Weed Control						
Primary	$5,938	$0	$0	$0		$5,938
Secondary	$4,344	$0	$0	$0		$4,344
Maintenance		$4,636	$4,636	$4,636		$13,908
Revegetation						
Revegetation	$6,771					$6,771
Replacement planting		$677				$677
Watering	$1,308					$1,308
Direct seeding	$0					$0
Monitoring	$2,353.80	$2,354	$2,354	$2,354		$9,415
Total	$22,445	$7,667	$6,990	$6,990	$0	$44,092

8 Vegetation management actions

Table 8 Vegetation management actions and performance criteria

Management action	Management zone	Responsibility	Task / performance criteria	Timing
Define property boundary and install vegetation exclusion fencing	All Zones	Construction contractor / Vegetation management consultant	Vegetation exclusion fencing is to be installed as per the specifications above (Section 6.2.2).	• Prior to vegetation removal of earthworks.
Bush regeneration (primary and secondary weed control)	All Zones	Bush Regeneration contractor	Primary and secondary weed control works are to include the following actions: • All priority, environmental, vine and woody weeds within the APZ are to undergo primary treatment within 4 weeks of the commencement of the vegetation management program. • Where possible, exotic vines should be treated 2-4m outside the APZ to create a buffer to protect regenerating native flora and plantings (See Revegetation Works below) • Secondary treatments are to be ongoing as required over the next 8 weeks following completion of primary treatment works. • Commencement of maintenance works will occur once mature exotic species have been reduced to 5% Projected Foliage Cover (PFC). This is expected to be 12 weeks (3 months) after commencement of primary weed control works. • All mature priority weeds are to be successfully treated within the VMP area prior to commencement of the maintenance period.	• From the outset of vegetation management program. • As specified adjacent.
APZ establishment and maintenance	MZ1	Bush Regeneration contractor	All mature priority weeds are to be successfully treated within the VMP area prior to commencement of the maintenance period. The MZ is to be slashed twice yearly to maintain low fuel loads. The maintenance of the APZ is to be undertaken for perpetuity.	• From the outset of vegetation management program.

Management action	Management zone	Responsibility	Task / performance criteria	Timing
VMP area erosion control	All zones	Bush Regeneration contractor	Following primary and secondary weed control and APZ vegetation removal installation of erosion controls will be necessary if vegetation cover is lacking. Recommended erosion controls include terracing made from cut vegetation, and or the installation of coir logs across the slope.	• As required immediately following vegetation removal.
Revegetation	All zones	Bush Regeneration contractor	Following primary and secondary weed control, revegetation is to be undertaken to ensure sufficient vegetation cover exists to prevent soil erosion. All installed plants are to be propagated from locally sourced seed stock collected within a 5 kilometre radius of the study area, and selected from the list for contained in Appendix 3 of this VMP. • Revegetation works are not to compromise the ongoing integrity of the APZ and will consist predominantly of canopy species only.	• Immediately following successful completion of secondary weed control.
Planting maintenance	All zones	Bush Regeneration contractor	• Installed plantings are to be maintained with key elements of water, prevention of predation and suppression of smothering weeds. • There will be a maximum loss of 20% of the original planting numbers for an individual species. • A minimum of 80% survivorship for each species is to be maintained. • Replacement planting is to be carried out throughout the maintenance period to sustain the 80% survival rate at the completion of the maintenance period. • Losses of greater than 20% of originally installed plantings may have the maintenance period extended until survival rates have been achieved.	• Commences immediately following final installation of all plants. • Minimum weekly watering over 8 weeks in summer, or 3 weeks in winter, immediately following installation. • Watering visits to continue as required to plant establishment. • Weed removal as required to the

Management action	Management zone	Responsibility	Task / performance criteria	Timing
				completion of the maintenance period.
Bush regeneration maintenance	MZ 2 and MZ 3	Bush Regeneration contractor	• All mature priority weeds are to be successfully treated prior to commencement of maintenance period. • Seedlings of priority species are to be continually suppressed to a level of <5% Projected Foliage Cover (PFC) where they occur in the seed bank below mature specimens, and <1% PFC across remainder of the VMP area. • Works to be undertaken utilising best practice bush regeneration techniques. • Less than 5% exotic species FPC to be achieved over the entire VMP area after 12 months of maintenance works. • Continual suppression at <5% for the remaining 24 months of the maintenance period (24 month total maintenance period).	• The maintenance period will run for a 36 month term following successful secondary weed control and/or installation of final plantings (whichever is later). • The commencement of this maintenance period may be adjusted if there are delays beyond the contractor's control. • Commencement and completion dates of the maintenance period will be determined by the Vegetation management consultant, following consultation with Council, the contractor and Principle.

Table 9 Vegetation management actions - Monitoring

Management action	Specification / Requirement
Ecological Monitoring Framework	Ecological Monitoring works are to be undertaken by the Vegetation Management Consultant. Monitoring surveys will assess the success of weed removal, plant growth and natural regeneration, and will be undertaken as follows; • Prior to commencement of works to gather baseline data. • Followed by a survey every six (6) months to gather ecological monitoring data on the progress of the project, commencing at the start of the maintenance period with a final survey and report at the completion of the 24 month program. Each six month survey should be accompanied by brief correspondence with the Bush Regeneration contractor and the proponent / project manager regarding the progress of the vegetation management works, and highlight any areas of concern / merit. • Vegetation monitoring reports are to be prepared at 6 monthly intervals over the duration of the VMP. • Achievement of performance criteria will be updated in each preceding report as milestones are achieved. • These reports are to be submitted to Wollongong Council. The restoration zones will be monitored in terms of vegetation condition and the achievement of performance criteria. Monitoring activities are to include: • Establishing a minimum of one photo-point per management zone in representative locations (Figure 2) (Appendix 5). • Assessment of weed control works including priority and woody weed control, and weed density surrounding plantings, via monitoring techniques such as weed density mapping, and quadrat / transect surveys. • Identification and assessment of any natural regeneration of native plant species. • Assessment of the success rate of plantings and assessment of plant replacement requirements, and convey any need to Bush Regeneration contractor. • Assessment of the site for evidence of herbivory and erosion. Monitoring works will also provide the following certifications to the proponent / project manager, and then on to Council: • Certification that the planting is at the required densities. • Certification of commencement of maintenance period, i.e. all primary secondary and revegetation works have been completed to acceptable standards. • Final certification that the targets of the vegetation management works have been achieved.

9 Schedule of works

The VMP will be undertaken in general accordance with the schedule of works provided below and the relevant specifications provided. The responsibility for completing the actions within the schedule of works will be attributed to the principal bush regeneration contractor that is engaged to complete the work.

Table 10 Four year action plan for vegetation management

Actions	Timeframe			
	Establishment phase	Year 1	Year 2	Year 3
Engage licensed seed collectors to collect seed	■			
Organise nursery to propagate revegetation plants from collected seed	■			
Install exclusion fencing along vegetation clearance boundary	■			
Implement primary weed removal		■		
Implement secondary weed removal			■	■
Maintenance weeding			■	■
Revegetation			■	■
Remove litter and general rubbish	■	■	■	■
Photo point monitoring and annual reporting	■	■	■	■

10 Adaptive management

An adaptive management approach is to be employed in respect of the works forming part of this VMP. An adaptive management approach involves an integrated process of monitoring, reviewing and then responding to the health and condition of the plantings as well as the status of the weed species to identify any alterations to the design and maintenance of works that may be required to ensure the objectives of the VMP are achieved.

For example, the application rates for fertiliser and the watering schedule should be flexible in responding to the health and vigour of the plantings and changing climatic conditions. Monitoring the plantings will also allow for a review of the selected species to enable changes in the species composition of the supplementary planting if it is determined that a particular species or stock sourced from a certain location is not performing adequately. The supplementary planting species, planting densities and planting patterns nominated within this VMP may be subject to change and review if certain species are unavailable or are performing inadequately. The weed control works are also to be reviewed and appropriate changes implemented accordingly, if required. By example, if the nominated weed suppression schedule is not achieving the Performance Indicators specified, the frequency of weed suppression activities should be increased accordingly.

It is important to note that any changes should comply with the aims of this VMP and any licensing or approval conditions issued before implementation. An Adaptive Management Statement (or similar) will be prepared and signed by both parties prior to implementation of any adaptive management actions.

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Appendices

Appendix 1 Flora species list

Flora species recorded from the VMP area

Status – EPBC Act: CE – Critically Endangered EN – Endangered VU – Vulnerable	**Status – BC Act:** E1 – endangered species (Part 1, Schedule 1) E2 – endangered population (Part 2, Schedule 1) E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V – vulnerable (Part 1, Schedule 2)
Status – Exotic # – Native species outside natural range * – priority weed species declared under the Biosecurity Act	

Table 11 Flora species recorded from the VMP area

Scientific name	Common name	Commonwealth status	NSW status
Native species			
Acacia longifolia	Sydney Golden Wattle	-	-
Acacia mearnsii	Black Wattle	-	-
Carex inversa	Knob Sedge	-	-
Carex longebrachiata	-	-	-
Clerodendrum tomentosum	Hairy Clerodendrum	-	-
Commelina cyanea	Native Wandering Jew	-	-
Cyperus gracilis	Slender Tick-trefoil	-	-
Dianella caerulea subsp caerulea	Flax Lily	-	-
Dichondra repens	Kidney Weed	-	-
Eucalyptus quadrangulata	Thin-leaved Stringybark	-	-
Eucalyptus tereticornis	Forest Red gum	-	-
Glycine clandestina	Small-leaf glycine	-	-
Geranium homeanum			
Guioa semiglauca	Guioa	-	-
Grevillea robusta#	Silky Oak		
Lachnagrostis filiformis	Blown Grass		
Lomandra longifolia	Spiny Matt Rush		
Microlaena stipoides	Weeping Grass	-	-
Oplismenus aemulus	Basket Grass	-	-
Pittosporum undulatum	Sweet Pittosporum	-	-
Senecio hispidulus	Hill Fireweed		

Scientific name	Common name	Commonwealth status	NSW status
Senecio linearifolius	Fireweed Groundsell		
Streblus brunonianus	Whalebone Tree	-	-
Exotic species			
		-	-
Acetosa sagittata	Turkey Rhubarb		
Ageratina adenophora	Crofton Weed		
Araujia sericifera	Moth Vine		
*Asparagus aethiopicus**	Ground Asparagus		
*Asaparagus asparagoides**	Bridal Creeper		
*Asparagus plumosus**	Climbing Asparagus		
Bidens pilosa	Cobblers Pegs	-	-
Briza subaristata			
Bromus catharticus	Prairie Grass	-	-
Cenchrus clandestinus	Kikuyu	-	-
Chrysanthemoides monolifera subsp. *rotundata.**	Bitou Bush		
Chloris gayana	Rhodes Grass	-	-
Cirsium vulgare	Scotch Thistle	-	-
Conyza bonariensis	Fleabane	-	-
Ehrharta erecta	Panic Veldt Grass	-	-
Eragrostis curvula	African Love Grass	-	*
Foeniculum vulgare	Fennel		
Gomphocarpus fruticosus	Cotton Bush	-	-
Hypochaeris radicata	Catsear	-	-
*Lantana camara**	Lantana	-	*
Ligustrum lucidum	Large Leaf Privet	-	-
Ligustrum sinense	Small Leaf Privet		
Lonicera japonica	Japanese Honey Suckle		
Paspalum dilatatum	Paspalum	-	-
Phytolacca octandra	Ink weed	-	-
Rubus fruticosus sp. *Agg**	Blackberry	-	-
*Senecio madagascariensis**	Fireweed	-	*
Senna pendula var. glabrata	Cassia		
Sida rhombifolia	Paddys Lucerne	-	-
Sporobolus africanus	Parramatta Grass	-	*

Appendix 2 Seed collection and propagation methods

Seed collection methods

To minimise negative impacts associated with seed collection, no more than 10% of the total seed available at the site (and from individual plants) should be collected in any one year (Ralph 1993). However, this is not applicable in the project footprint where all native vegetation is to be cleared. If seed is collected from adjoining retained areas however, the 10% rule applies. General considerations for seed collection include:

- Ensure seed is collected from as many individual plants as possible to maximise genetic diversity.
- Ensure seed is collected from stands or groups of plants rather than isolated plants, even if they carry large amounts of seed.
- Neighbouring plants are likely to be related so ensure that seed is collected from plants across the entire area.
- Approximately equal amounts of seed from each plant should be collected.
- Ensure seed is collected from various parts of the plant (not just those easily accessible).
- Label each batch of seed collected with:
  - Species.
  - Location.
  - Date collected and collector's name.
  - Number of plants collected from.
  - Details on position in the landscape, percentage of seed ripe, soil type, and other relevant details.

Seed may be collected from tall trees by utilising fallen limbs and branches, or using a long-handled pruner. Seed on small trees and shrubs can be collected using secateurs or pruners, hand-picked, or the branches hand-stripped. A drop-sheet or tarpaulin under the plant can be used to catch fallen seeds and fruit when branches are shaken. For species which release their seed very quickly upon ripening (such as wattles and bush-peas), it may be worthwhile to tie paper bags or nylon stockings around the branches before the seed pods ripen (OEH 2011).

Timing of seed collection

Timing of seed collection is a critical consideration. Timing is mostly dependant on when the seed matures and how long the seed remains on the plant after maturity. The peak seed collection period in NSW usually occurs from October to December. Although seed ripens generally the same time each year, seasonal variations and local climatic factors and conditions may lead to variations in timing from year to year (Ralph 1993).

Key indications of seed maturity include:

- Colour changes of fruits, seed heads or cones.
- Seed or fruit hardness.
- Dryness of fruits.
- Ease of removal.
- Opening of fruits.

Another consideration of seed collection is that many plants flower over a long period of time and therefore contain seeds of varying maturity. It is important to only collect the mature seed and a second or third visit to the plant may be required to allow time for all seed to mature.

Propagation

A nursery, local to the VMP area should be sourced at least 6 months to 12 months prior to construction and provided with the proposed planting list in Table 13, so that seed can be sourced and propagated for revegetation works on site. Seed collection should follow the procedure outline above.

All plants shall be true to scheduled nomenclature, well formed, hardened off and disease free nursery stock.

They shall be container grown in potting soil with a firmly established root system but with no large roots growing out of the container. No plant shall be pot bound.

The condition of plant stock should encourage future growth that is strong and typical of the species. Correct nursery/growing practices shall help ensure the long-term health and viability of the plant stock on site after planting.

The Bush Regeneration Contractor shall allow for an independent Horticultural certification of all stock prior to delivery to site that confirms the following:

- Stock is disease free and healthy.
- Rootball has adequately grown into the container appropriate to the specified size.
- Stock shows no evidence of spirally, being pot bound, or other undesired outcomes of growth at the nursery.

Appendix 3 Weed management measures

Standard methods

General weed management measures that should be undertaken prior to and during revegetation works:

- Use a range of weed management methods such as slashing or mowing (physical and mechanical control) as well as a range of herbicides (to avoid herbicide resistance).
- Mow/slash areas infested with weeds before they seed (avoiding native vegetation).
- Employ appropriate vehicle hygiene such as:
  - Clean machinery, vehicles and footwear before moving to a new location.
  - Securely cover loads of weed-contaminated material.
  - Dispose of weed contaminated soil at an appropriate waste management facility.
  - Remove weeds immediately and dispose of without stockpiling.
  - Separate weeds from native vegetation to be mulched – do not use weeds for mulch.
  - Minimise soil disturbance in weed infested areas.

Weed control methods adopted in the implementation of this VMP are based on a combination of the current site management, bush regeneration industry standards and botanical knowledge of the weeds. Techniques and methods recommended in following sections such as 'hand weeding' are described in detail in various publications such as *Recovering Bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland.* (DEC 2005). The publication *New South Wales Weed Control Handbook: A guide to weed control in non-crop, aquatic and bushland situations, 7th Edition* (DPI, 2018) provides descriptions on general and standard weed control methods.

Application of herbicide during weed control works will depend on species targeted and the growing situation. For example the selection of a herbicide and the application method for a particular species or class of plant will be determined by factors such as the degree of infestation of target species, limiting damage to off target native flora and preventing herbicides entering waterways. The DPI (2018) document cited above should be referred to as guide for specific herbicides, record keeping and herbicide application techniques.

Use of herbicides must be according to the NSW *Pesticides Act 1999*, Material Safety Data Sheets and labelling instructions for specific trade name herbicides and off label use permits registered with the APVMA. The use of herbicide as part of this VMP will be limited to direct application to cut stumps and spot spraying. Any contractors using herbicides on the site must be trained and appropriately qualified to do so (ChemCert Level 2 or equivalent for subordinates and ChemCert Level 3 or equivalent for supervisors).

Slashing can be used to prevent weeds from flowering and setting seed. This method can be undertaken with a tractor and slashing implement or by using a hand held brush cutter (DPI, 2018). In addition DEC (2005) have highlighted that slashing or mowing can also be used in bushland areas (with grassy native understorey) as an initial or holding treatment to reduce weed mass. This allows for more efficient follow up as fast growing reshooting weeds can be spot sprayed with herbicide among areas of native grasses and herbs. DEC (2005) also suggest that to effectively control exotic annual herbs and grasses, mowing or slashing must be done at least monthly in summer (possibly more frequently if conditions are warm and wet and weed growth is accelerated). For perennial weeds which mature in mid to late summer, mowing or slashing may be reduced to two to three times each season, with the final treatment being applied late in the season ideally

before fruit ripens and seed becomes viable (DEC, 2005). Further simple techniques for reducing the potential for assisting the dispersal of weed species as a result of slashing are to:

- Slash from areas of dominated by native species to more degraded areas dominated by introduced species.
- Shake or wash down slashing implements in disturbed and managed areas prior to use in more intact areas.

In summary it is recommended that a combination of reducing the height and number of occasions slashing occurs and appropriate weed hygiene protocols be implemented.

Species specific control for priority and environmental weeds recorded within the VMP area are provided in Table 12.

Table 12 Priority and environmental weed management measures

Botanical name	Common name	Initial treatment	Follow up control
Annual weed species	Various	Hand remove Or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100)	Monitor for seedlings. Hand remove and/or remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water
Ageratina adenophora	Crofton Weed	Cut and paint stems with 'neat' 360g/L Glyphosate based herbicide to reduce collateral damage to natives and riparian areas Or Chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100)	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water prior to flowering. A DPI approved biocontrol (Rust) may be applied to assist in control of large and remote locations.
Araujia sericifera	Moth Plant	Hand remove Or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100). May require the use of a penetrant for effective kill rate. Fruits to be disposed off-site	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water
Asparagus aethiopicus	Ground Asparagus Fern	Hand remove in area of high regeneration potential ensure that all fruiting bodies and central 'rhizome' has been removed and disposed offsite. Aerial tubers do not require removal and can act as a preventative measure against soil erosion. Large infestations to be chemically treated (spray) with a Metsulfuron-methyl 600 g/kg based herbicide at a diluted rate of 1 –2 g per 10 L of water plus a non-ionic surfactant. As per APVMA approved Off label permit PER9907.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water. All seeds and biomass are to be disposed offsite.
Bidens pilosa	Cobblers Pegs	Hand remove Or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100)	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.

Botanical name	Common name	Initial treatment	Follow up control
***Bryophyllum* spp.**	Mother of Millions	Hand remove in area of high regeneration potential ensuring that all propagules and fruiting bodies been removed and disposed offsite Or chemically whilst flowering using either a Fluroxypyr 200 g/L based herbicide at a diluted rate 600 mL per 100 L of water, or a a Triclopyr 300 g/L + Picloram 100 g/L based herbicide e.g Grazon® DS, at a diluted rate of 500 mL per 100 L of water. Both chemical application will require the addition of a surfactant.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water. All biomass is to be disposed offsite.
Cirsium vulgare	Spear Thistle	Flowering and fruiting bodies to be removed to reduce seed dispersal. Hand remove Or Chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100)	Germination is promoted via disturbance e.g soil movement, fire. Monitor for seedlings. Treat prior to flower and seed set
Chloris gayana	Rhodes Grass	Hand remove Or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100). May require brushcutting or slashing to promote new growth prior to application.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water
Conyza bonariensis	Fleabane	Hand remove in area of high regeneration potential. Flowers and seeds to be removed and disposed of site. Remaining biomass can be composted on site on. Larger infestations can be chemically treated using a a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water. Treatment prior to flowering to reduce seed set is recommended.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
Gomphocarpus fruticosus	Narrow-leaved Cotton Bush	Cut/paint, stems with 'neat' 360g/L Glyphosate based herbicide (Off label permit : PER9907)	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water

Botanical name	Common name	Initial treatment	Follow up control
Lantana camara	Lantana	Small or isolated infestations: Hand remove or Cut and paint stems with 'neat' 360g/L Glyphosate based herbicide in areas of high regeneration potential. Large infestations: can be cleared/treated in a mosaic pattern to reduce impacts to wildlife and the incidence of mass germination of secondary weed species. Can be chemically treated (foliage spray) via the use of a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water or a broadleaf selective herbicide such as a Metsulfuron-methyl 600 g/kg based herbicide.	Hand remove seedlings/shooting nodes or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
Ligustrum sinense	Small Leaf privet	Cut/paint, Fill/drill and apply 'neat' 360g/L Glyphosate based herbicide during growing season. Larger specimens may produce vegetative suckers in response treatments.	Hand remove seedlings/shooting nodes or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
Lonicera japonica	Japanese Honeysuckle	Cut/paint, scrape/paint and apply 'neat' 360g/L Glyphosate based herbicide to actively growing stems in areas of in areas of high regeneration potential. Larger infestations can be chemically treated by the use of a using a Metsulfuron-methyl 600 g/kg based product at a dilution rate of 10–20g in 100L of water. A surfactant may be required (off label permit: PER9907).	Hand remove seedlings/shooting nodes or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
Ochna serrulata	Ochna, Mickey Mouse Bush	Small specimens may be manually removed. Established specimens can be either scaped/ painted using a 'neat' Glyphosate 360g/L based product or foliage spray using of a Glyphosate 360g/L and Metsulfuron-methyl 600g/kg based herbicides at a dilution rate of 200mL glyphosate plus 1.5g metsulfuron methyl per 10L of water (off label permit: PER9907).	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.

Botanical name	Common name	Initial treatment	Follow up control
Rubus fruticosus aggregate	Blackberry	Dig out single plants (biomass to remain on site) or scape and paint using a 'neat' 360g/L Glyphosate based herbicide (off label permit: PER9907). Chemically treat larger infestations using either a 360g/L Glyphosate based herbicide at a diluted rate of 10–13mL per 1L of water or a APVMA approved broad leaf selective herbicide applied at the registered rate. Slashing may be require to gain access and stimulate new growth.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
Senna pendula* var *glabrata	Cassia	Cut/paint, scrape/paint and apply 'neat' 360g/L Glyphosate based herbicide to actively growing stems in areas of in areas of high regeneration potential (off label permit : PER9907).	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.

Appendix 4 Recommended planting species list

Table 13 Recommended species planting list of PCT 1300 : Whalebone Tree - Native Quince dry subtropical rainforest

Botanical name	Common name	Percentage of mix %
Trees (10 -20 +m)		
Alphitonia excels	Red Ash *	20
Brachychiton acerifolius	Illawarra Flame tree	20
Acacia maidenii	Maiden's Wattle *	20
Guioa semiglauca	Guioa	20
Streblus brunonianus	Whalebone Tree	20
Shrubs		
Breynia oblongifolia -	Coffee Bush	20
Clerodendrum tomentosum	Hairy Clerodendrum	20
Elaeodendron australe		20
Pittopsorum revolutum	Large Fruited Pittosporum	20
Notelaea venosa	Veined Mock-olive	20
Ground covers		
Carex longebrachiata		12
Oplismenus imbecillis -	Basket Grass	12
Pseuderanthemum variabile	Pastel Flower	12
Dianella caerulea	Blue Flax-lily	12
Entolasia marginata	Bordered Panic	12
Entolasia stricta	Wiry Panic	12
Lomandra longifolia	Spiny-headed Mat Rush	12
Microlaena stipoides var. *stipoides*	Weeping grass	12

* Trees deemed unsuitable for installation within MZ 1

Appendix 5 Photos points

Plate 1: Photo point 1 - Management zone 1 (APZ)

Plate 2: Photo point 2 - Management zone 2

Plate 3: Photo point 3 – Management zone 3

ALLIED TREE CONSULTANCY
Level 5 and 8 Arboriculturist

Arboricultural Impact Assessment Report

For the site address
Lot 7 (D.P. 1008877),
No. 62 Nottingham Street
BERKELEY NSW

Prepared for
Lux Living Homes
C/- MMJ Wollongong

AUTHOR
Warwick Varley

STATUS
Final November 2018

REFERENCE D3591

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1.0 Introduction

1.1 The following Arborist report has been requested by *MMJ Real Estate Wollongong*, for the trees located within the area of proposed works, being Lot 7, No. 62 Nottingham St. Berkeley. This development includes tree removal and construction of a residential dwelling development consisting of four units. This report includes ten trees located on and adjacent to the lot and discusses the viability of these trees based on the proposed works.

1.2 This report will address for these trees, the:

- species' identification, location, dimensions, and condition;
- SULE (Safe Useful Life Expectancy) and STARS (Significance of a Tree Assessment Rating System) rating;
- discussion and impact of the proposed works on each tree;
- recommendations for the removal, retention and/or pruning;
- tree protection zones and protection specifications for trees recommended for retention.

1.3 The subject site resides within Berkeley for this reason, Wollongong City Council is the consenting authority for any tree works recommended in this report.

2.0 Standards

2.1 Allied Tree Consultancy provides an ethical and unbiased approach to all assignments, possessing no association with private utility arboriculture or organisations that may reflect a conflict of interest.

2.2 This report must be made available to all contractors during the tendering process so that any cost associated with the required works for the protection of trees can be accommodated.

2.3 It is the responsibility of the project manager to provide the requirements outlined in this report relative to the Protection Zones, Measures (Section 7.0) and Specifications (Section 8.0) to all contractors associated with the project before the initiation of work.

2.4 All tree-related work outlined in this report is to be conducted in accordance with the:

- Australian Standard – AS4373; Pruning of Amenity Trees.
- Guide to Managing Risks of Tree Trimming and Removal Work[1].
- All tree works must be carried out at a tertiary level (minimum Certificate-level 3) qualified and experienced (minimum five years) arboriculturist.

[1] Safe Work Australia; July 2016; Guide to Managing Risks of Tree Trimming and Removal Work, Australia

- For any works in the vicinity of electrical lines, the arboriculturist must possess the ISSC26 endorsement (Interim guide for operating cranes and plant in proximity to overhead powerlines).

2.5 As a minimum requirement, all trees recommended for retention in this report must have removed all dead, diseased, and crossing limbs and branch stubs to be pruned to the branch collar. This work must comply with the local government tree policy (Wollongong City Council) and Section 2.4.

2.6 Any tree stock subject to conditions for works carried out in this report must be supplied by a registered Nursery that adheres to the AS 2303; 2015[2].

- All tree stock must be of at least 'Advanced' size (minimum 75lt) unless otherwise requested.
- All tree stock requested must be planted with adequate protection. This may include tree guards (protect stem and crown) and if planted in a lawn area, a suitable barrier (planter ring) of an area, at least, $1m^2$ to prevent grass from growing within the area adjacent to the stem.

3.0 Disclosure Statement

Trees are living organisms and, for this reason, possess natural variability. This cannot be controlled. However, risks associated with trees can be managed. An arborist cannot guarantee that a tree will be safe under all circumstances, nor predict the time when a tree will fail. To live or work near a tree involves some degree of risk, and this evaluation does not preclude all the possibilities of failure.

4.0 Methodology

4.1 The following tree assessment was undertaken using criteria based on the guidelines laid down by the International Society of Arboriculture.

4.2 The format of the report is summarised below;

4.2.1 **Plan 1;** Tree Location Relative to Site: This is an unscaled plan reproduced from the Survey Plan as referenced in Section 4.4.1, depicting the area of assessment.

4.2.2 **Table 1;** This table compiles the tree species, dimensions**,** brief assessment (history, structure, pest, disease or any other variables subject to the tree), significance, allocation of the zones of protection (i.e., Tree Protection Zone[3] ;TPZ and Structural Root Zone; SRZ) for each tree illustrated in Plan 1, Section 5.0. All measurements are in meters. An 'Action' is included and provides the nomination for retention/removal based on the tree location relative to the proposed design (drawing set, Section 4.4.2).

[2] Australian Standard; 2015, AS2303, Tree stock for landscape use, Australia

[3] *Australian Standard, 4970; 2009* – Protection of Trees on Development Sites, Australia

4.2.3 Discussion relating to the site assessment and proposed works regarding the trees.

4.2.4 Protection Specification; This Section (Section 8.0) details the requirements for that area designated as the Tree Protection Zone (TPZ), for those trees recommended for retention.

4.3 The opinions expressed in this report, and the material, upon which they are based, were obtained from the following process and data supplied:

4.3.1 Site assessment on the 8th September 2016 using the method of the Visual Tree Assessment[4]. This has included a Level 2 risk assessment, being a *Basic Assessment*[5]. The assessment has been conducted by Warwick Varley[6] on behalf of *Allied Tree Consultancy*.

4.3.2 Trees included in this report are those that are 3m or greater in height.

4.3.3 All measurements, unless specified otherwise are taken from the tree centre.

4.3.4 The data contained in this report has formed part of an initial Arborist Report by Allied Tree Consultancy, referenced D2906, dated 27th October 2016.

4.3.5 Raw data from the preliminary assessment including the specimen's dimensions was compiled by the use of a diameter tape, height clinometer, angle finder, compass, steel probes, Teflon hammer, binoculars and recording instruments.

4.4 Documentation provided

The following documentation has been provided to Allied Tree Consultancy and utilised within the report.

4.4.1 Surveyor
Drawn by: *New Way Surveying*
Date: 11 January 2014
Reference: 14007
Drawing No: Sheet 1 of 1
Note 1: See Section 4.5.1

4.4.2 Design
Drawn by *Pecorp Design*
Date: 14 November 2018

[4] Mattheck, C. Breloer, H.,1994, The Body Language of Trees – A handbook for failure analysis The Stationary Office, London
[5] Dunster J.A., 2013, Tree Risk Assessment Manual, International Society of Arboriculture, 2013, USA
[6] Consulting Arborist, Graduate Certificate and Diploma of Arboriculture (level 8 and 5)

Revision: 20160059
Drawing No: 1-11
Note 2: See Section 4.5.2

4.4.3 Stormwater
Drawn by *Pecorp Design*
Date: 14 November 2018
Revision: 20160059
Drawing No: 1-3
Note 2: See Section 4.5.2

4.4.4 Document
Bushfire Assessment Report
Author: *APZA Services*
Date: 24 February 2016
16 pages

4.5 Limitations of the assessment/discussion process

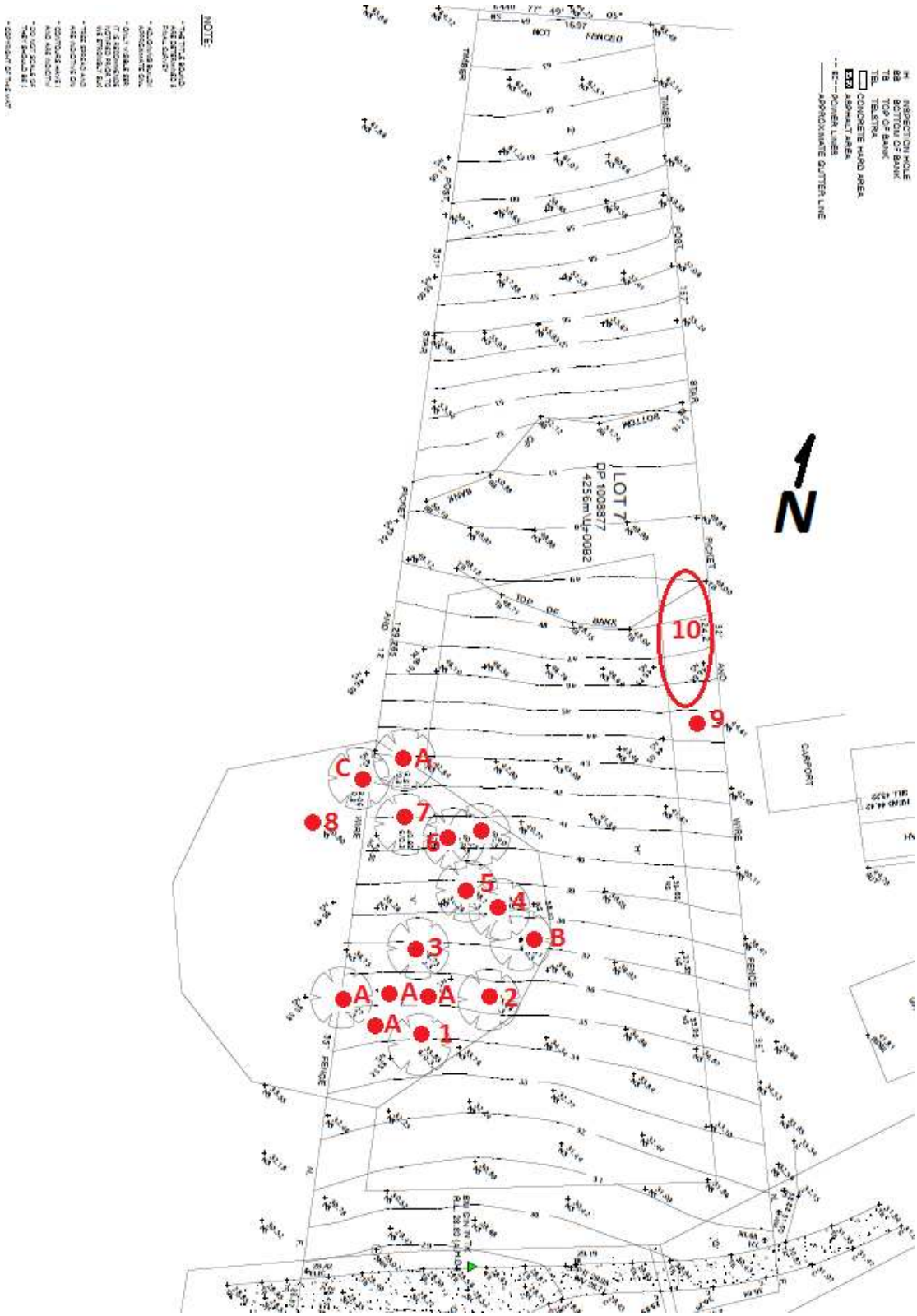
4.5.1 Trees no. 8, 9 and 10 have been omitted from the plans provided, however, are required for inclusion because they conform to the definition of a prescribed tree within the local government tree policy. The tree location has been plotted onto the Plan 1 by *Allied Tree Consultancy*. The tree location was established by measuring from known points and scaling onto the drawing. *Allied Tree Consultancy* is not a registered surveyor and, however, the accuracy of the survey is attempted; the true position of the trees may marginally deviate. Any such deviation provides the potential for changing the actual impact (encroachment) provided to a tree.

4.5.2 The trees have not been included within all drawings, therefore have been transposed onto the required drawings by *Allied Tree Consultancy*. The tree location was established by scaling from the survey drawing. Therefore discrepancies that can affect the actual impact on the trees can occur.

4.5.3 The assessment has considered only those target zones that are apparent to the author and the visually apparent tree conditions, during the time of assessment.

4.5.4 Any tree regardless of apparent defects would fail if the forces applied to exceed the strength of the tree or its parts, for example, extreme storm conditions.

5.0 Plan 1; Area of assessment illustrating tree location



Not to scale

Source: Adapted from *New Way Surveying*, sheet 1 of 1, see Section 4.4.1

6.0 Table 1 – Tree Species Data

Terminology/references provided in Appendix A.

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Crown Ratio	SULE Rating	STARS Rating	TPZ	SRZ
1	*Acacia mearnsii* Black Wattle	7	0.38	5 x 6	O	C	E	F	**C4**	**LOW**	-	-
Assessment		This tree provides poor form and normal vitality.									REMOVE See Section 7.1.3	
2	*Acacia mearnsii* Black Wattle	9	0.40	7 x 9	O	C	Sym.	F	**C4**	**LOW**	-	-
Assessment		This tree provides poor form and normal vitality.									REMOVE See Section 7.1.3	
3	*Acacia mearnsii* Black Wattle	7	0.32	3 x 4	O	C	Sym.	F	**C4**	**LOW**	-	-
Assessment		This tree provides poor form and normal vitality.									REMOVE See Section 7.1.3	
4	*Acacia mearnsii* Black Wattle	6	0.38	4 x 4	O	C	E	P	**C4**	**LOW**	-	-
Assessment		This tree provides poor form and normal vitality.									REMOVE See Section 7.1.3	
5	*Eucalyptus amplifolia* Cabbage Gum	7	0.26	3 x 3	Y	D	Sym.	F	**A1**	**MEDIUM**	**3.1**	**2.0**
Assessment		This tree provides form typical for the species and normal vitality.									REMOVE See Section 7.1.4	

Tree No.	Botanical Name Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Crown Ratio	SULE Rating	STARS Rating	TPZ	SRZ
6	*Acacia mearnsii* Black Wattle	7	0.33	5 x 4	O	C	S	P	**C4**	**LOW**	**4.0**	**2.2**
Assessment		This tree provides poor form and normal vitality.									RETAIN/REMOVE See Section 7.1.1	
7	*Acacia mearnsii* Black Wattle	5	0.30	3 x 6	O	C	S	P	**C4**	**LOW**	**3.9**	**2.1**
Assessment		This tree provides poor form and normal vitality.									RETAIN/REMOVE See Section 7.1.1	
8	*Eucalyptus amplifolia* Cabbage Gum	9	0.25	3 x 3	Y	F	Sym.	F	**A1**	**MEDIUM**	**3.0**	**1.7**
Assessment		This neighbouring tree is located at No. 62E Nottingham Street. Tree provides form typical of the species and normal vitality.									RETAIN See Section 7.1.1	
9	*Acacia mearnsii* Black Wattle	9	0.23	6 x 8	M	C	S	F	**A3**	**LOW**	**3.0**	**1.7**
Assessment		This tree is located on the eastern boundary fence near the neighbour's carport. Tree provides poor form and normal vitality. Central leader has torn out at 7m.									RETAIN/REMOVE See Section 7.1.1	
10	*Acacia mearnsii* Black Wattle	4 - 9	0.15 – 0.25	12 x 4	M - O	I	Sym.	P – F	**A3/4**	**LOW**	**3.0**	**1.7**
Assessment		This group of trees is located on the eastern boundary fence. Some species provide typical habit, and others have poor form and multiple branch failures.									RETAIN/REMOVE See Section 7.1.1	

A. Incomplete identification of species due to insufficiently available plant material
B. Diameter taken below 1.4m due to low stem bifurcation
C. estimate due to the overgrown area and/or limited access

D. deciduous species, void of foliage at the time of assessment
E. Level 3 assessment required to determine the accurate rating

7.0 Site Assessment

The area of assessment comprises a long narrow trapezium shaped lot. The lot has a relatively steep gradient with a southern aspect. The battleax lot is serviced by concrete drive. The lot is a recent subdivision from pastoral land and has not been built on in the past. The lot contains no structures and has a four strand wire fence dividing the area from a lot containing a dwelling on the eastern side. The site has formed a portion of rural land and has been cleared in the past. The ground cover is exotic grasses and weeds. The trees are all regrowth, and pioneering species, presenting similar age and divided into three species. The trees labeled as A, B and C that have been included on the survey drawing (plan 1) however have not been included in this assessment because of the failure to conform to the description of a prescribed tree based on the Wollongong Councils DCP.

Tree A: trees that occur on the lot proposed for development and are exempt species[7].

Tree B: dead trees

Tree C: removed since survey conducted

7.1 Proposed development

The proposed development consists of tree removal and the construction of a residential dwelling development consisting of six units, drive access, and drainage infrastructure. The lot is located within a bushfire zone and will require conforming to the Planning for Bushfire Protection[5]. This report discusses the impact of the proposed design on the trees.

Assumption 1: The excavation required for the retaining walls will need to be further from the outside edge of the proposed wall to allow for construction of the wall, waterproofing and drainage, therefore, the actual cut has been assumed within this report to be up to 500mm from the line indicating the location of the retaining wall. All calculations for the encroachment of any zone of protection (TPZ, SRZ) has been based on this assumption.

This report discusses the impact of the proposed design on the trees. Ten (10) trees have been listed within this report based upon the vicinity of the lot. This has included neighbouring trees where any part of the zones of protection (TPZ, SRZ) to encroach into the lot. Recommendations based on the tree significance and condition, together with the impact on these trees regarding the development for this lot follow;

7.1.1 Trees and zones of protection (TPZ/SRZ) outside of the proposed design

Trees no. 6, 7, 8, 9 and 10

None of the proposed works conflict with the location of these trees or respective zones of protection. These trees can be retained without impact by the proposed design.

[7] Wollongong City Council, Wollongong Development Control Plan, 2009, Chapter E17; Preservation & Management of Trees and Vegetation, Appendix 1: Exempt Tree Species List, page 20

Trees no. 6, 7, 9 and 10

This tree group had several trees of poor form and varying stages of senescence and based on the related risk, and where the neighbours property is the target zone, some should be removed with consideration of the entire group. The risk is not imminent, although the life expectancy is limited.

7.1.2 Trees providing a limited useful life expectancy

Trees no. 1, 2, 3, 4, 6, 7 and 10

These trees provide poor form. They are within senescence or encroaching senescence and have borer infestations of varying amounts and branch failures. They all pose a limited life expectancy, and some provide an existing risk for failure. As a consequence, they provide low significance and could be removed due to the low amenity value and limited useful life expectancy.

7.1.3 Trees directly conflicting with the design

Trees no. 1, 2, 3 and 4

These trees are located in the footprint of the proposed design and would require removal based on this premise alone. The conflict is the Units 3 and 4.

7.1.4 Trees subject to a major encroachment

Tree no. 5

This tree is not directly located in the footprint of the proposed design, however, located close and adjacent to the design and subject to a *major encroachment*, that is, in excess of 10% of the TPZ. The extent and type of encroachment for this tree are discussed and the relative implications.

Encroachment: 30%[8]; based on drawing 1 of 2, the encroachment consists of excavation for the retaining wall at the rear of the units and dish drain that extends flush with the top of the wall. This will present excessive root removal (TPZ and SRZ) that would unlikely to sustain the tree, as well as restrict future root growth for stability. The maturity of this tree will encroach onto the buffer required for sustaining bushfire protection.

7.2 Planning for Bushfire Protection

An Asset Protection Zone has been nominated for this proposal. Therefore, the recommendations provided within this report regarding the management of the trees for Bushfire protection has been based on the entire lot having been classed as an Inner Protection Zone. That is the lot has had the following criteria addressed so that the provision of protection stipulated in the document; Planning for Bushfire Protection[5].

- A canopy cover of no more than 15% can exist over the area of the lot.
  The canopy cover provided by the existing trees conforms, therefore based on the nominated tree removal, the design will conform to the required coverage of 15%.

[8] Based on Assumption 1

- A discontinuous canopy is required for those trees within the area of the Inner Protection Zone.
  The canopy cover provided by the existing trees conforms, therefore based on the nominated tree removal, the design will conform to the required discontinuous canopy.

- A canopy should not overhang between 2 – 5m of a dwelling.
  Based on the nominated tree removal, no part of a tree will overhang or be within 5m of the proposed design.

7.3 Protection measures

Based on the nominated tree removal, no protection measures will be required.

7.4 Compensatory Planting

Based upon the proposed tree loss relative to the existing tree number in the lot, and the size of the proposed lot relative to the scale of the proposed development. Compensatory planting is recommended to be included in the landscape plan. At least eight (8) trees are recommended to be included in the landscape plan for this lot. The tree stock must be indigenous to the Illawarra and be of at least 'Advanced' size (minimum 75 lt) and must be supplied by a registered Nursery that adheres to the Australian Standard 2303[9]. Trees must be planted with adequate protection. This may include tree guards (protect stem and crown) and if planted in a lawn area, a suitable barrier (planter ring) of an area at least 1m^2 to prevent grass from growing within the area adjacent to the stem.

8.0 Protection Specification

The retention and protection of trees provide for the requirement of the Tree Protection Zone (TPZ) to conform to the conditions outlined below. These conditions provide the limitations of work permitted within the area of the Tree Protection Zone (TPZ) and must be adhered to unless otherwise stated.

1. Foundation/footing types should not be strip type, but utilise footing types that are sympathetic towards retaining root system that is, screw, pier, etc. Slab on the ground can be accommodated in some circumstances and will be nominated by the project arborist. The extent of encroachment will be dependent upon the tree species, soil type (texture and profile) and gradients.

2. Subsurface utilities can extend through the TPZ and Structural Root Zone (SRZ), however, are limited to the method of installation. That is under boring is permitted, however trenching is limited and depends on the proposed route within the TPZ. No trenching is permitted within the area of the TPZ unless stipulated by the project arborist.

3. Crown pruning can be accommodated, however, must conform to the AS 4373; *Pruning of Amenity Trees*, and not misshape the crown nor remove

[9] Standards Australia, AS 2303: 2015, Tree stock for landscape use

in excess of 10-15% of the existing crown, pending on the species, and vitality. The opportunity for, type and proportion of pruning will be required to be nominated by the project arborist.

4. Soil levels within the TPZ must remain the same. Any excavation within the TPZ must have been previously specified and allowed for by the project arborist:

   a) So it does not alter the drainage to the tree.

   b) Under specified circumstances,

   - Added fill soil does not exceed 100mm in depth over the natural grade. Construction methodologies exist that can allow grade increases in excess of 100mm, via the use of an impervious cover, an approved permeable material or permanent aeration system or other approved methods.

   - Excavation cannot exceed a depth of more than 50mm within the area of the TPZ, not including the SRZ. The grade within the SRZ cannot be reduced without the consent from a project arborist.

5. No form of material or structure, solid or liquid, is to be stored or disposed of within the TPZ.

6. No lighting of fires is permitted within the TPZ.

7. All drainage runoff, sediment, concrete, mortar slurry, paints, washings, toilet effluent, petroleum products, and any other toxic wastes must be prevented from entering the TPZ.

8. No activity that will cause excessive soil compaction is permitted within the TPZ. That is, machinery, excavators, etc. must refrain from entering the area of the TPZ unless measures have been taken, and with consultation with the project, arborist to protect the root zone.

9. No site sheds, amenities or similar site structures are permitted to be located or extend into the area of the TPZ unless the project arborist provides prior consent.

10. No form of construction work or related activity such as the mixing of concrete, cutting, grinding, generator storage or cleaning of tools is permitted within the TPZ.

11. No part of any tree may be used as an anchorage point, nor should any noticeboard, telephone cable, rope, guy, framework, etc. be attached to any part of a tree.

12. (a) All excavation work within the TPZ will utilise methods to preserve root systems intact and undamaged. Examples of methods permitted are by hand tools, hydraulic, or pneumatic air excavation technology.

(b) Any root unearthed which is less than 50mm in diameter must be cleanly cut and dusted with a fungicide, and not allowed to dry out, with minimum exposure to the air as possible.

(c) Any root unearthed which is greater than 50mm in diameter must be located regarding their directional spread and potential impact. A project arborist will be required to assess the situation and determine future action regarding retaining the tree in a healthy state.

Project Arborist: person nominated as responsible for the provision of the tree assessment, arborist report, consultation with stakeholders, and certification for the development project. This person will be adequately experienced and qualified with a minimum of a level 5 (AQF); Diploma in Horticulture (Arboriculture)[10].

[10] Based upon the definition of a 'consulting arborist' from the AS 4970; Protection of trees on development sites; 2009, section 1.4.4, p 6.

9.0 Summary of tree impact

Based on the design supplied, the following summary provides the impacts imposed on the trees included in this report.

9.1 Trees no. 6, 7, 8, 9 and 10

These trees can be retained relative to the nominated zones of protection (TPZ, SRZ) and based on the requirements of the Protection Specification, section 8.0. The proposed design does not adversely affect these trees. The following conditions are required for specific trees;

9.1.1 Trees no. 6, 7, 9 and 10

These trees present a limited lifespan and degrees of risk for partial/complete failure. Consideration for removal based on compensatory planting is proposed.

9.2 Trees no. 1, 2, 3, 4 and 5

The proposed design will require the removal of these trees. These trees are not considered to pose sufficient significance to modify the design.

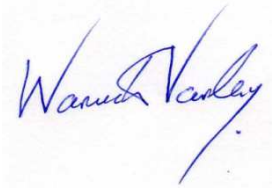
9.3 Compensatory Planting

Based upon the proposed tree loss relative to the existing tree number in the lot, and the size of the proposed lot relative to the scale of the proposed development. Compensatory planting is recommended to be included in the landscape plan. At least eight (8) trees are recommended to be included in the landscape plan for this lot. The tree stock must be indigenous to the Illawarra and be of at least 'Advanced' size (minimum 75 lt) and must be supplied by a registered Nursery that adheres to the Australian Standard 2303[11]. Trees must be planted with adequate protection. This may include tree guards (protect stem and crown) and if planted in a lawn area, a suitable barrier (planter ring) of an area at least $1m^2$ to prevent grass from growing within the area adjacent to the stem.

[11] Standards Australia, AS 2303: 2015, Tree stock for landscape use, Australia

The opinions expressed in this report by the author have been provided within the capacity of a Consulting Arborist. Any further explanation or details can be provided by contacting the author.

DATED: 23rd November 2018



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10.0 Appendix A- Terminology Defined

Height
Is a measure of the vertical distance from the average ground level around the root crown to the top surface of the crown, and on palms - to the apical growth point.

DBH
Diameter at Breast Height – being the stem diameter in meters, measured at 1.4m from ground level, including the thickness of the bark.; Mult. refers to multiple stems, that is in excess of 4 stems.

Crown Spread
A two-dimension linear measurement (in metres) of the crown plan. The first figure is the north-south span, the second being the east-west measurement.

Age
Is the estimate of the specimen's age based upon the expected lifespan of the species. This is divided into three stages.

Young (Y)	Trees less than 20% of life expectancy.
Mature (M)	Trees aged between 20% to 80% life expectancy.
Over-mature (O)	Trees aged over 80% of life expectancy with probable symptoms of senescence.

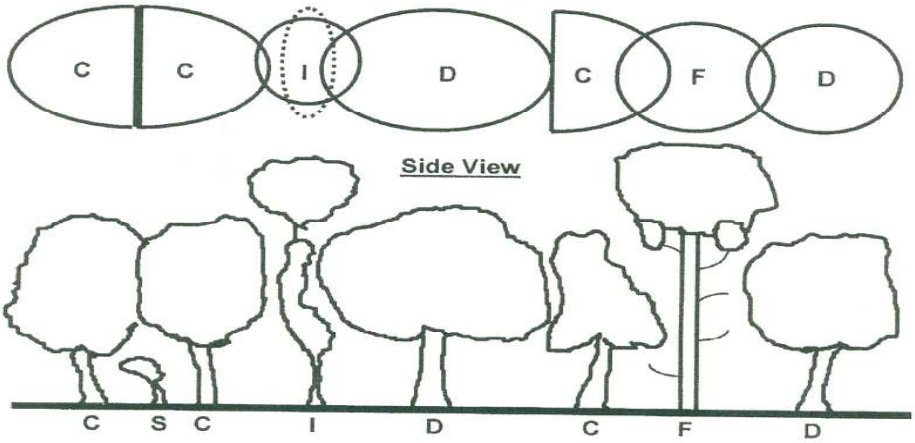
Crown Aspect
In relation to the root crown, this refers to the aspect the majority of the crown resides in. This will be either termed Symmetrical (Sym.) where the centre of the crown resides over the root crown or the cardinal direction the centre of the crown is biased towards, being either North (N), South (S), East (E) or West (W).

Vitality Rating
Is a rating of the health of the tree, irrespective and independent of the structural integrity, and defined by the 'ability for a tree to sustain its life processes' ((Draper, Richards, 2009). This is divided between three variables, and based on the assessment of symptoms including, but not limited to; leaf size, colour, crown density, woundwood development, adaptive growth formation, and epicormic growth.
A: Normal vitality, typical for the species
B: Below average vitality, possibly temporary loss of health, partial symptoms.
C: Poor vitality; obvious decline, potentially irreversible

Crown Class
Is the differing crown habits as influenced by the external variables within the surrounding environment. They are:

D	– *Dominant*	Crown is receiving uninterrupted light from above and sides, also known as emergent.
C	– *Codominant*	Crown is receiving light from above and one side of the crown.
I	– *Intermediate*	Crown is receiving light from above but not the sides of the crown.
S	– *Suppressed*	Crown has been shadowed by the surrounding elements and receives no light from above or sides.
F	– *Forest*	Characterised by an erect, straight stem (usually excurrent) with little stem taper and virtually no branching over the majority of the stem except for the top of the tree which has a small concentrated branch structure making up the crown.

Top View



D C, I & S, and side view, after (Matheny, N. & Clark, J. R. 1998, Trees Development, Published by International Society of Arboriculture, P.O. Box 3129, Champaign IL 61826-3129 USA, p.20, adapted from the Hazard Tree Assessment Program, Recreation and Park Department, City of San Francisco, California).

Levels of assessment

Level 1: Limited visual: a visual tree assessment for the purpose of managing large populations of trees within a limited time span and in order to identify obvious faults which would be considered imminent.

Level 2: Basic assessment: a standard performed assessment providing for a detailed visual assessment including all parts of the tree and surrounding environment and via the use of simple tools.

Level 3: Advanced assessment: specific type assessments conducted by either arborist who specialise with specific areas of assessment or via the use of specialised equipment. For example, aerial assessment by use of an EWP or rope/harness, or decay detection equipment.

All other definitions are referenced from;

Draper D.B., Richards P.A., 2009, Dictionary for Managing Trees in Urban Environments CSIRO Pub., Australia

Significance Rating, Significance of a Tree Assessment Rating System (S.T.A.R.S), IACA, 2010[12]

Tree Significance – Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vitality;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vitality;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vitality;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences,

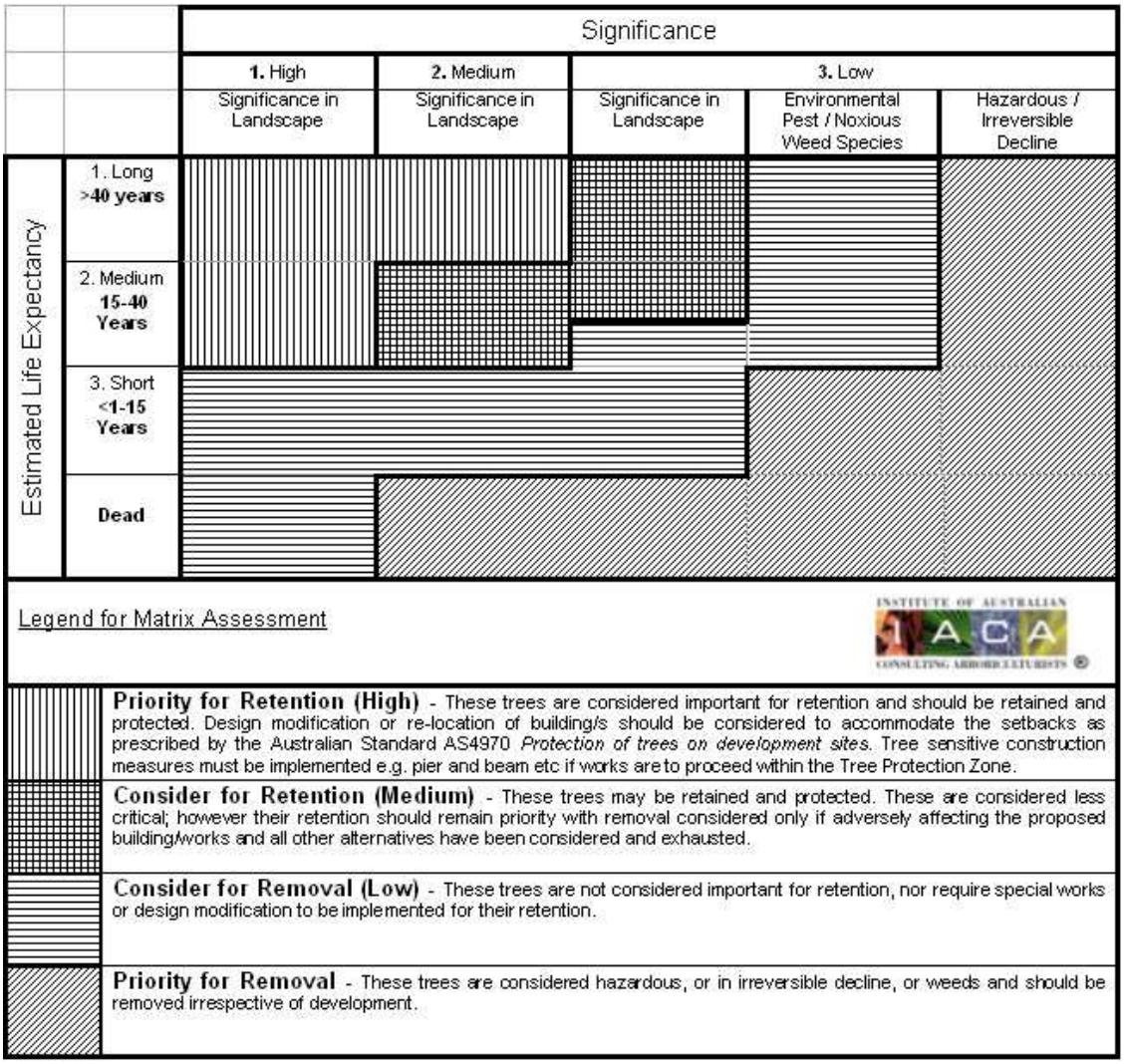
[12] IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.
Environmental Pest / Noxious Weed Species
- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.
Hazardous/Irreversible Decline
- The tree is structurally unsound and/or unstable and is considered potentially dangerous, - The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short-term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g.

Table 3; Tree Retention Value – Priority Matrix.



Safe Useful Life Expectancy – S.U.L.E (Barell 1995)

	1. Long	2. Medium	3. Short	4. Removal	5. Moved or Replaced
	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 15 – 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 5 – 15 years with an acceptable level of risk.	Trees that should be removed within the next 5 years.	Trees which can be reliably moved or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live between 15 and 40 years.	Trees that may only live between 5 and 15 more years.	Dead, dying, suppressed or declining trees through disease or inhospitable conditions.	Small trees less than 5m in height.
B	Trees that could be made suitable for retention in the long term by remedial tree care.	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through instability on recent loss of adjacent trees.	Young trees less than 15 years old but over 5m in heights
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.	Trees that may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been pruned to artificially control growth.
D		Trees that could be made suitable for retention in the medium term by remedial tree care.	Trees that require substantial remedial tree care and are only suitable for retention in the short term.	Damaged trees that are clearly not safe to retain.	
E				Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings.	
F				Trees that are damaging or may cause damage to existing structures within 5 years.	
G				Trees that will become dangerous after removal of other trees for reasons given in (A) to (F).	

TPZ; Tree Protection Zone
Is an area of protection required for maintaining the trees vitality and long-term viability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to unless otherwise stated.

The size of the Tree Protection Zone (TPZ) has been calculated from the *Australian Standard, 4970; 2009* – Protection of Trees on Development Sites

The TPZ does not provide the limit of root extension, however, offers an area of the root zone that requires predominate protection from development works. The allocated TPZ can be modified by some circumstances; however will require compensation equivalent to the area loss, elsewhere and adjacent to the TPZ.

SRZ; Structural Root Zone
Is the area around the tree containing the woody roots necessary for stability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to unless otherwise stated.

Protection Measures
These are required for the protection of trees during demolition/construction activities.
Protective barriers are required to be installed before the initiation of demolition and/or construction and are to be maintained up to the time of landscaping.

62 NOTTINGHAM STREET, BERKELEY

TRAFFIC IMPACT ASSESSMENT

FOR

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Project No: P3922 Version No: 002 Issue date: 12th December 2018

DOCUMENT CONTROL SHEET

Issue History

Report File Name	Prepared by	Reviewed by	Issued by	Date	Issued to
P3922.001R 62 Nottingham Street Berkeley TIA Report - DRAFT	S. Koskela	L. Johnston	L. Johnston	23/11/2018	Luke Rollinson MMJ Real Estate luke.rollinson@mmj.com.au
P3922.001R 62 Nottingham Street Berkeley TIA Report	S. Koskela	L. Johnston	L. Johnston	23/11/2018	Luke Rollinson MMJ Real Estate luke.rollinson@mmj.com.au
P3922.002R 62 Nottingham Street Berkeley TIA Report	S. Koskela	L. Johnston	L. Johnston	12/12/2018	Luke Rollinson MMJ Real Estate luke.rollinson@mmj.com.au

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Appendices

1. INTRODUCTION

1.1 BACKGROUND

Bitzios Consulting was commissioned by LuxLiving Homes Pty Ltd to undertake a traffic impact assessment (TIA) for the proposed Attached Dwelling development to be located at 62 Nottingham Street, Berkeley. The subject site location is shown in Figure 1.1.

SOURCE: Nearmap

Figure 1.1: Subject Site Location

1.2 PROPOSED DEVELOPMENT

The proposed development consists of four (4) attached dwellings accessed from an existing Right of Way easement connected to Nottingham Street. Detailed development plans are attached at **Appendix A**.

1.3 SCOPE

The scope of this assessment is as follows:

- assessment of the public transport, pedestrian and cycling networks and connectivity within vicinity of the site;
- estimation of development's traffic generation and the distribution onto the external road network;
- assessment of the development's car parking requirements in accordance with Council's DCP and Australian Standards (AS2890);
- assessment of the on-site parking layout for general traffic and service vehicle manoeuvring, including swept path checks using AutoTURN software; and
- assessment of the site access location and form in accordance with AS2890, Council's DCP and the IPWEA Standard Drawings.

2. EXISTING CONDITIONS

2.1 ROAD NETWORK

Details for the road network are provided in Table 2.1.

Table 2.1: Surrounding Road Network

Road Name	Jurisdiction	Hierarchy	Lanes	Divided	Posted Speed	Comments
Nottingham Street	Council	Local Street	2	No	50km/h	*Local street providing direct access to the subject site*
Nolan Street	Council	Local Collector	2	No	50km/h	*Minor north-south collector road through Berkeley*
Northcliffe Drive	RMS	Arterial	4	Yes	70km/h	*East-west arterial road connecting the Princes Motorway with Port Kembla*

2.2 ALTERNATE TRANSPORT

2.2.1 Public Transport

The development is located approximately 400m away (i.e. within walking distance) from the nearest public bus stop. The two (2) bus routes that operate at this location access several heavy rail stations. Table 2.2 summarises the bus routes that service the nearest stop. The location of bus stops surrounding the subject site are shown in Figure 2.1.

Table 2.2: Available Bus Services

Bus Service #	Route	Peak Frequency
34	Wollongong to Warrawong via Unanderra	30 minutes
43	Port Kembla to Dapto	60 minutes

SOURCE: Nearmap

Figure 2.1: Surrounding Public Transport Facilities

2.2.2 Active Transport

Active transport facilities are non-existent along the subject site frontage, however there are existing pedestrian pathways located on Northcliffe Drive and Nolan Street. Northcliffe Drive and Nolan Street also have wide parking lanes on both sides, which are able to be used by cyclists.

3. TRAFFIC ASSESSMENT

Traffic generation rates for the proposed development were sourced from the Roads and Maritime Services (RMS) Guide to Traffic Generating Developments. The rates applicable to the proposed development and resultant traffic generation and provided in Table 3.1.

Table 3.1: Development Traffic Generation

Land Use	Source	Quantity	Peak Hour Trip Rate	Peak Trips
Medium-density residential	RMS	4 units	0.65	**2.6**

The development is anticipated to generate in the order of (3) trips during each peak hour, with a total of 26 trips daily.

Due to the nature of residents primarily leaving in the morning and returning in the evening, the IN:OUT trip distribution is expected to be 30%:70% during the AM peak, and 60%:40% during the PM peak. The resultant trip distribution is provided in Table 3.2.

Table 3.2: Development Traffic Distribution

Land Use	AM Split %		PM Split %		AM Split Trips		PM Split Trips	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Medium-density residential	30	70	60	40	**1**	**2**	**2**	**1**

This traffic distribution equates to up to one (1) vehicle every 30 minutes in each direction during each peak period. As such, the development is expected to have a negligible impact on the surrounding road network.

4. PARKING ASSESSMENT

4.1 CAR PARKING PROVISION ASSESSMENT

Table 4.1 details the car parking requirements and provision for the proposed development in accordance with Council's DCP.

Table 4.1: Car Parking Requirement and Provision

Land Use	Quantity	Type	Car Parking Rate	Parking Required	Parking Supplied
Attached Dwelling	4 units	Resident	2 spaces per unit (>110m^2)	8	8
		Visitor	0.2 spaces per unit	1	1
			Total Provision	**9**	**9**

As shown in Table 4.1, nine (9) car parking spaces are proposed as part of the development, which meets the requirements of Council's DCP.

4.2 MOTORCYCLE PARKING PROVISION ASSESSMENT

Table 4.2 details the motorcycle parking requirement and provision for the proposed development in accordance with Council's DCP.

Table 4.2: Motorcycle Parking Requirement and Provision

Land Use	Quantity	Motorcycle Parking Rate	Parking Required	Parking Supplied
Attached Dwelling	4 units	1 space per 15 units	1	1

As shown in Table 4.2, one (1) motorcycle parking space is proposed as part of the development, which meets the requirements of Council's DCP.

4.3 BICYCLE PARKING PROVISION ASSESSMENT

Table 4.3 details the car parking requirements and provision for the proposed development in accordance with Council's DCP.

Table 4.3: Bicycle Parking Requirement and Provision

Land Use	Quantity	Type	Bicycle Parking Rate	Parking Required	Parking Supplied
Attached Dwelling	4 units	Resident (Class B)	1 space per 3 units	2	2
		Visitor (Class C)	1 space per 12 units	1	0
			Total Provision	**3**	**3**

As shown in Table 4.3, two (2) resident bicycle parking spaces are proposed as part of the development, which meets the requirements of Council's DCP. The visitor bicycle parking space has not been provided.

5. ACCESS ASSESSMENT

5.1 DRIVEWAY CROSSOVER DESIGN

The proposed development includes one (1) all-movements vehicular crossover (two-way) connecting to the Right of Way easement. Details of the proposed access are summarised in Table 5.1.

Table 5.1: Vehicular Access Details

Design Element	Details
Access Facility Category	Type 1 as per AS2890.1 (i.e. User Class 1 and 2, < 25 car parking spaces and local road frontage).
Crossover Form	Existing crossover to remain.
Pedestrian Sight Line Triangle	A pedestrian sight line triangle is achieved on the egress side of the driveway at 2m along the property boundary and 2.5m into the site as per Figure 3.3 in AS2890.1.

As shown in Table 5.1, the proposed vehicular access generally complies with the relevant requirements of AS2890.1.

5.2 INTERNAL GEOMETRIC ASSESSMENT

The on-site parking geometric layout has been assessed against Council's DCP and the relevant sections of AS2890 with key features outlined in Table 5.2.

Table 5.2: On-Site Parking Geometric Layout Assessment

Design Element	Requirement	Provision	Compliant
Residential car parking bays (User Class 1A)	2.4m x 5.4m	2.6m x 5.4m	Yes
Residential visitor car parking bays (User Class 2)	2.5m x 5.4m	2.9m x 5.5m	Yes
Car parking aisle width	5.8m wide plus an additional 0.3m for single sided parking aisles bounded by a solid wall	Min. 6.4m wide in all locations	Yes
Visitor car parking accessibility	Visitor car parking shall be freely accessible at all times	Visitor car parking is freely accessible	Yes
Resident car parking accessibility	Garage shall be accessible with a vehicle already parked	Refer **Appendix B**	Yes

As demonstrated in Table 5.2, the on-site parking geometric layout generally complies with the relevant requirements of Council's DCP and Australian Standards AS2890.

6. SERVICING ASSESSMENT

6.1 SERVICING

A site visit undertaken on Tuesday 14th March 2017 observed that an MRV successfully manoeuvred up the existing access driveway, performed a three-point turn, and egressed back down the driveway. The three-point turn manoeuvre has been captured in Figure 6.1 to Figure 6.3.

Figure 6.1: MRV – Commencing First Turn Point

Figure 6.2: MRV – Commencing Second Turn Point (Reverse Manoeuvre)

Figure 6.3: MRV – Commencing Third Turn Point

As demonstrated above, the grade of the existing access driveway is considered acceptable for an MRV to perform a three-point turn to service the proposed development.

A dedicated parking space for servicing is proposed as part of the development. Swept paths attached at **Appendix B** demonstrate the ability for an MRV to manoeuvre into the dedicated space.

6.2 REFUSE COLLECTION

A letter from waste collection contractor (Remondis) is attached at **Appendix C**, which confirms the contractors are able to enter the private Right of Way to service the wheelie bins, on the condition an indemnity form is signed and submitted by the owners of the property.

7. SUMMARY AND CONCLUSIONS

The key findings of the traffic impact assessment for the proposed Attached Dwelling development to be located at 62 Nottingham Street, Berkeley are as follows:

- the proposed development has generally good public and active transport connectivity to the surrounding area;
- the expected traffic generated by the proposed development is expected to have a negligible impact on the surrounding road network;
- the proposed car, motorcycle and resident bicycle parking provisions meet the requirements of Council's DCP. A visitor bicycle parking space has not been provided;
- the proposed access and layout arrangements are generally complies with the requirements of Council's DCP and AS2890;
- an MRV is able to successfully manoeuvre up the existing access driveway, perform a three-point turn, and egress back down the driveway; and
- the waste collection contractor is able to service the site via the Right of Way easement, on the condition an indemnity form is signed and submitted by the owners of the property.

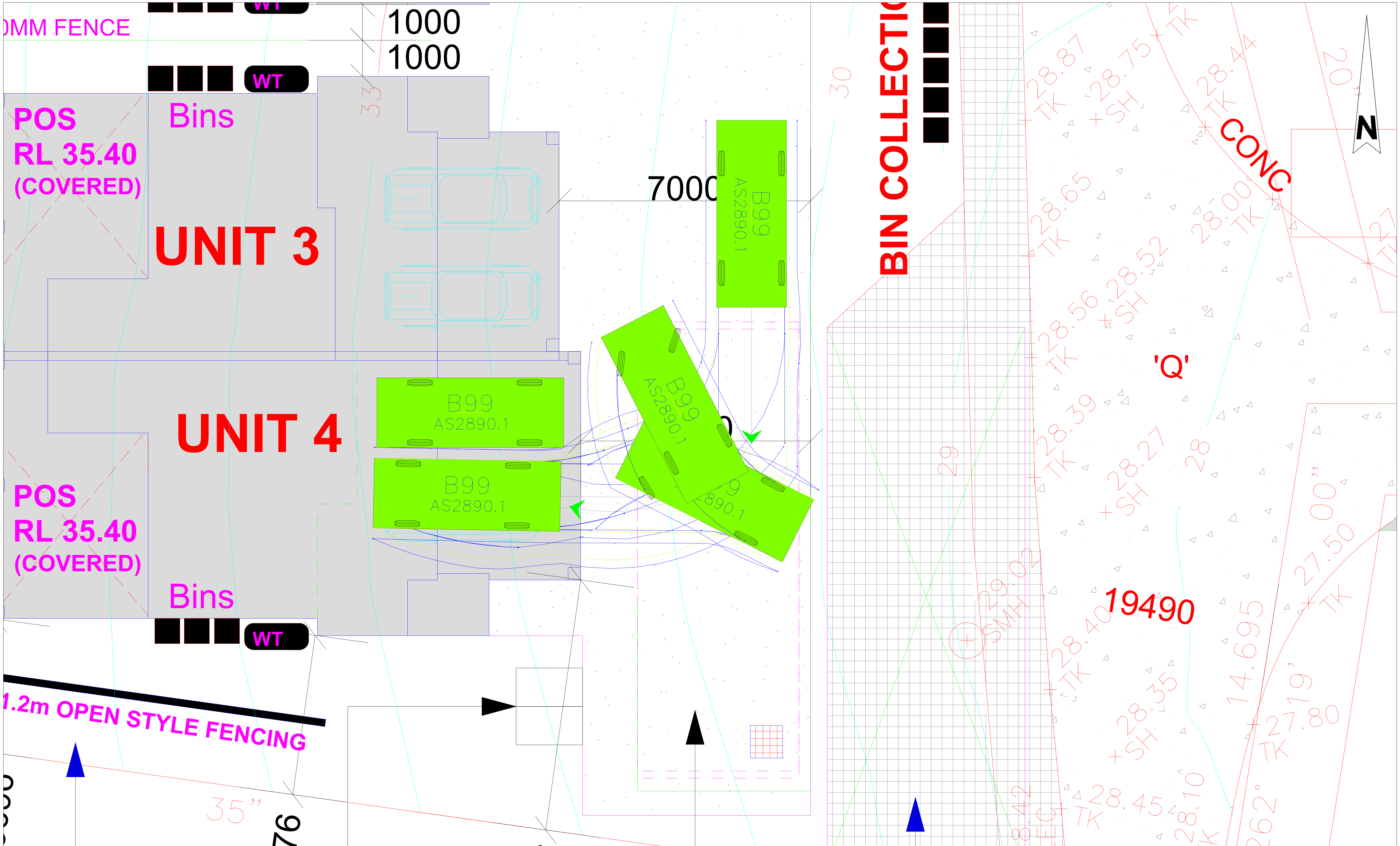
Based on the above assessment, it is concluded that there are no significant traffic or transport impacts associated with the proposed development to preclude its approval and relevant conditioning based on relevant transport planning grounds.

APPENDIX A

DETAILED DEVELOPMENT PLANS

APPENDIX B

SWEPT PATHS



BITZIOS consulting

Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Final Issue	S.K	22/11/18

Scale @ A3 0 1.0 2.0 3.0 4.0 5.0 1:100

Project: 62 Nottingham Street, Berkeley

Title: Swept Paths - B99 Driveway Manoeuvre

Design	Drawn	Checked
S.K	S.K	L.J
FOR INFORMATION ONLY		Date 22/11/2018
Project Number P3922	Sheet Number 1	Issue 001

)MM FENCE

1000

1000

WT

Bins

POS
RL 35.40
(COVERED)

UNIT 3

7000

B99
AS2890.1

UNIT 4

POS
RL 35.40
(COVERED)

Bins

WT

1.2m OPEN STYLE FENCING

35”

BIN COLLECTIO

CONC

'Q'

19490

N

REVISIONS			
Issue	Revisions/Descriptions	Drawn	Date
001	Final Issue	S.K	22/11/18

BITZIOS consulting

Scale @ A3 0 1.0 2.0 3.0 4.0 5.0 1:100

Project: 62 Nottingham Street, Berkeley

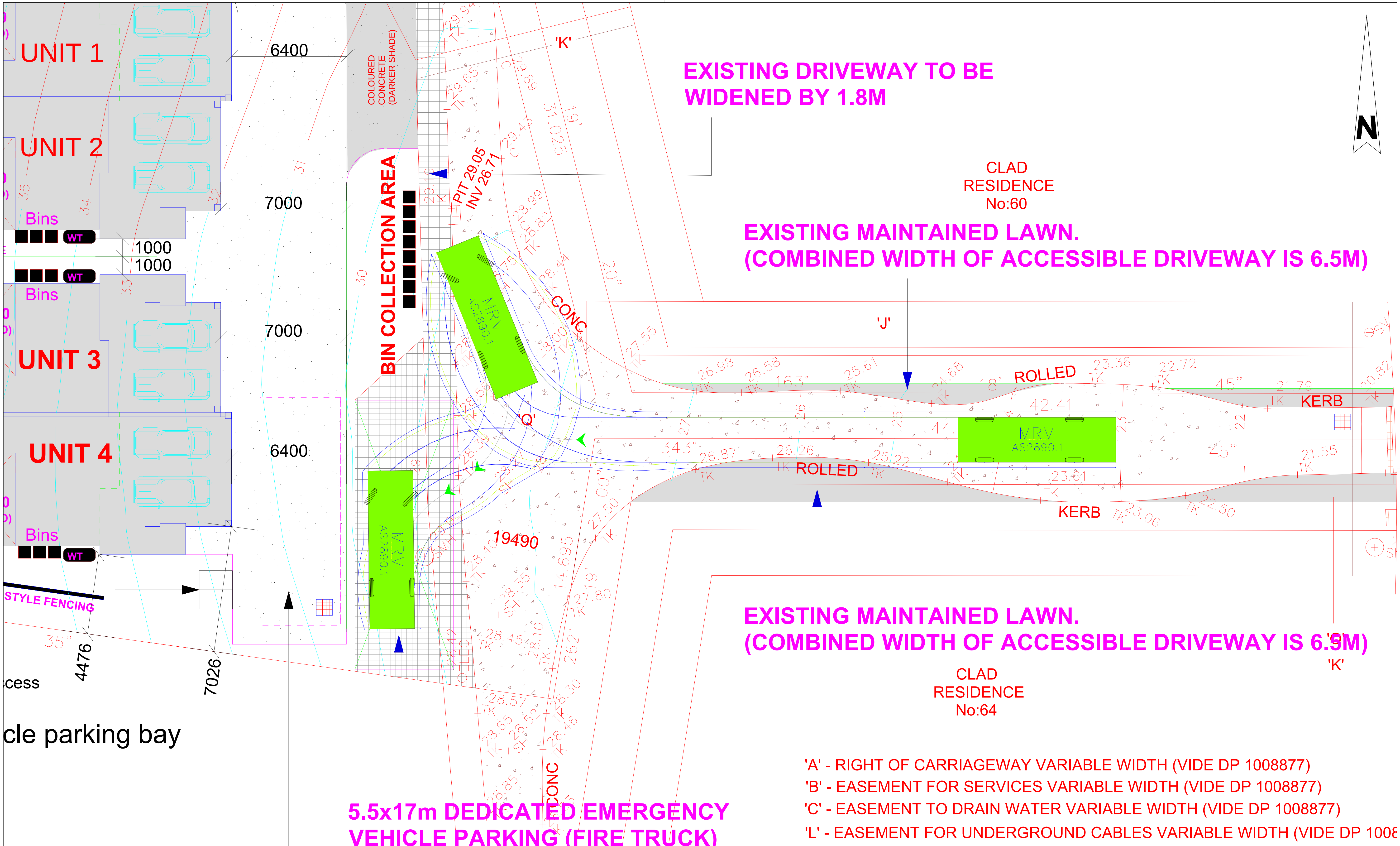
Title: Swept Paths - B99 Driveway Manoeuvre

Design	Drawn	Checked
S.K	S.K	L.J

FOR INFORMATION ONLY

Date: 22/11/2018

Project Number	Sheet Number	Issue
P3922	2	001


UNIT 1
UNIT 2
UNIT 3
UNIT 4
Bins
Bins
Bins
WT
6400
7000
1000
1000
7000
6400
4476
7026
COLOURED CONCRETE (DARKER SHADE)
BIN COLLECTION AREA
PIT 29.05
INV 26.71
'K'
EXISTING DRIVEWAY TO BE WIDENED BY 1.8M
CLAD RESIDENCE No:60
EXISTING MAINTAINED LAWN. (COMBINED WIDTH OF ACCESSIBLE DRIVEWAY IS 6.5M)
'J'
CONC
ROLLED
KERB
MRV AS2890.1
'Q'
ROLLED
KERB
19490
EXISTING MAINTAINED LAWN. (COMBINED WIDTH OF ACCESSIBLE DRIVEWAY IS 6.5M)
'K'
CLAD RESIDENCE No:64
STYLE FENCING
cess
cle parking bay
5.5x17m DEDICATED EMERGENCY VEHICLE PARKING (FIRE TRUCK)
'A' - RIGHT OF CARRIAGEWAY VARIABLE WIDTH (VIDE DP 1008877)
'B' - EASEMENT FOR SERVICES VARIABLE WIDTH (VIDE DP 1008877)
'C' - EASEMENT TO DRAIN WATER VARIABLE WIDTH (VIDE DP 1008877)
'L' - EASEMENT FOR UNDERGROUND CABLES VARIABLE WIDTH (VIDE DP 1008
N

BITZIOS consulting

REVISIONS

Issue	Revisions/Descriptions	Drawn	Date
001	Final Issue	S.K	22/11/18

Scale @ A3 0 2 4 6 8 10 1:200

Project: 62 Nottingham Street, Berkeley

Title: Swept Paths - 8.8m MRV

Design	Drawn	Checked
S.K	S.K	L.J
FOR INFORMATION ONLY		Date 22/11/2018
Project Number P3922	Sheet Number 3	Issue 001

APPENDIX C

WASTE COLLECTION LETTER

REMONDIS Australia Pty Ltd // 264 Nolan Street // Unanderra NSW 2526 // Australia

8 August 2014

Peter Stevanovski
PECORP DESIGN
peter@pecorpdesign.com.au

Dear Peter

I write in reference to the prosed development at Lot 7 Nottingham Street Berkeley and confirm we are able to enter the promises to service the wheelie bins as long as an indemnity from is signed by the owners and submitted to us.

Regards

Theo Feros

42720316

62 Nottingham Street Berkeley

Construction Traffic Management Plan

LuxLiving Homes Pty Ltd

12 April 2019

Gold Coast
Suite 26, 58 Riverwalk Avenue
Robina QLD 4226

P: (07) 5562 5377

Brisbane
Level 2, 428 Upper Edward Street
Spring Hill QLD 4000

P: (07) 3831 4442

Sydney
Studio 203, 3 Gladstone Street
Newtown NSW 2042
P: (02) 9557 6202

W: www.bitziosconsulting.com.au **E: admin@bitziosconsulting.com.au**

Document Issue History

Report File Name	Prepared	Reviewed	Issued	Date	Issued to
P3922.001R 62 Nottingham Street Berkeley CTMP Report - DRAFT	S.Koskela	L.Johnston A.Giyahi	L.Johnston	12/04/2019	Luke Rollinson – MMJ Real Estate luke.rollinson@mmj.com.au
P3922.002R 62 Nottingham Street Berkeley CTMP Report	S.Koskela	L.Johnston A.Giyahi	L.Johnston	12/04/2019	Luke Rollinson – MMJ Real Estate luke.rollinson@mmj.com.au

CONTENTS

Tables

Figures

Appendices

1. INTRODUCTION

Bitzios Consulting has been engaged by LuxLiving Homes Pty Ltd to prepare a Construction Traffic Management Plan (CTMP) to manage construction traffic impacts of the construction works at the proposed medium-density residential development located at 62 Nottingham Street, Berkeley. The site location is shown in Figure 1.1. This CTMP contains as much detail as is currently available or estimated for the construction works. Details should be updated as needed prior to commencement of construction.

Source: Neamap

Figure 1.1: Site Location

2. EXISTING TRAFFIC CONDITIONS

2.1 Road Network

2.1.1 Nottingham Street

Nottingham Street is a residential collector road under the jurisdiction of Wollongong City Council (Council). Its primary function is as a perimeter road for the subdivision, connecting Northcliffe Drive to the west and Nolan Street to the east. There are three (3) other junctions along Nottingham Street with side roads of lower-order hierarchy, which are internal to the subdivision. Unrestricted parking is available on both sides of the road. Nottingham Street provides a single travel lane in each direction with a sign-posted speed limit of 50km/h fronting the subject site.

2.1.2 Nolan Street

Nolan Street is a residential collector road under Council jurisdiction, which connects to Nottingham Street via an all-movements, priority-controlled T-intersection. Its primary function is to connect the surrounding residential and industrial developments to Northcliffe Drive to the south and Princes Highway to the north. Nolan Street provides a single travel lane in each direction with a sign-posted speed limit of 50km/h fronting the Nottingham Street residential subdivision.

2.1.3 Northcliffe Drive

Northcliffe Drive is a four-lane, two-way major road that connects to Nottingham Road, although this access is restricted to left-in left-out only. Its primary function is as a major transport corridor operated by Roads and Maritime Services (RMS), between Warrawong and Port Kembla to the east with Princes Motorway to the west. Northcliffe Drive has a sign-posted speed limit of 70km/h fronting the Nottingham Street residential subdivision.

2.1.4 Princes Motorway

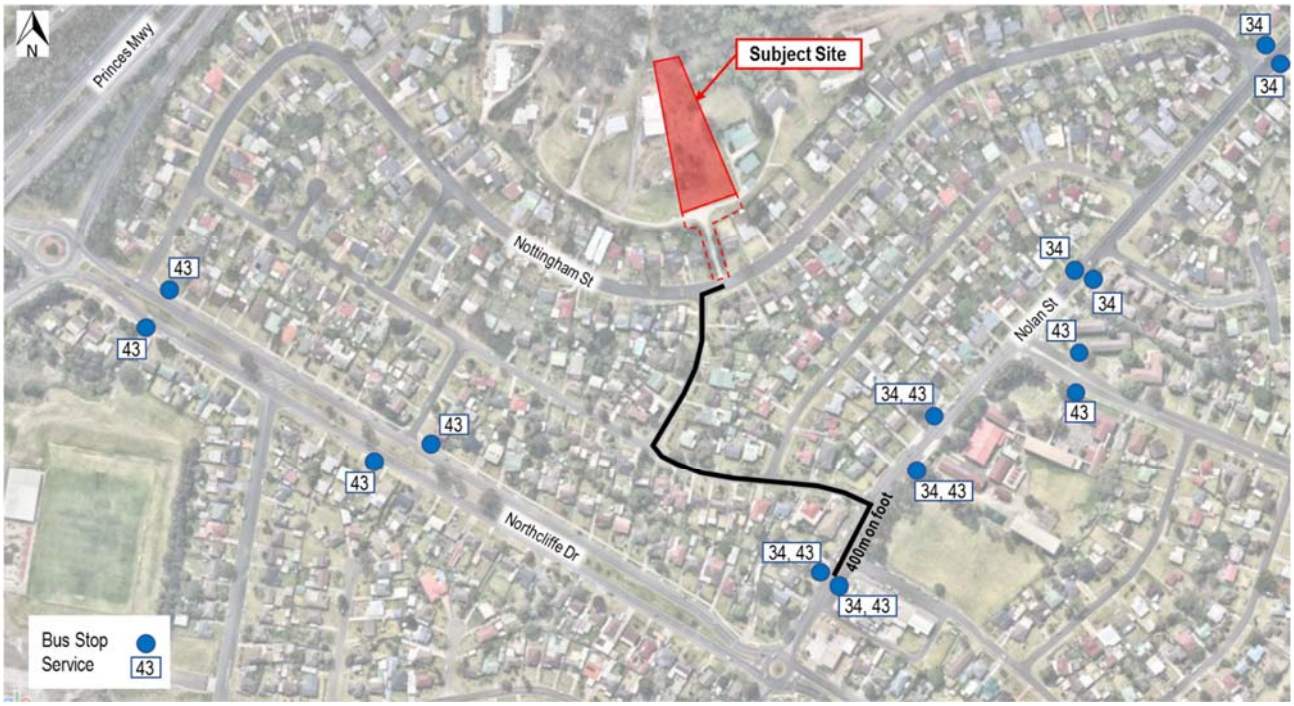
Princes Motorway is a four-lane, two-way motorway operated by RMS, which functions as the major north-south route along the east coast and the main freight route connecting Sydney and Wollongong. Princes Motorway has a sign-posted speed limit of 100km/h.

2.2 Parking

Unrestricted kerbside parking is available on Nottingham Street and surrounding local streets. From site observations during the middle of a weekday, this parking was observed to have generally low utilisation. No public off-street parking facilities are available in the immediate area.

2.3 Alternate Transport

The extent of bus stop facilities within walking distance of the site is shown in Figure 2.1.



Source: Nearmap

Figure 2.1: Surrounding Public Transport Connectivity

Figure 2.1 shows there are two (2) bus stops approximately 400m away on foot. A summary of service details that access these stops is provided in Table 2.1.

Table 2.1: Bus Service Details

Route Number	Route	Peak Frequency
34	Wollongong to Warrawong via Unanderra	30 minutes
43	Port Kembla to Dapto	60 minutes

Active transport facilities are non-existent along the subject site frontage, however there are existing pedestrian pathways located along Northcliffe Drive and Nolan Street. Northcliffe Drive and Nolan Street also have wide parking lanes on both sides which are able to be used by cyclists.

3. PROPOSED CONSTRUCTION

3.1 Construction Activities

At this stage of development, the CTMP details the following assumed construction activities:

Site Establishment

- Delivery of formwork and small plant
- Estimated duration: one (1) week

Demolition and Excavation

- Demolition of existing structures
- Excavation for sub-level structure
- Estimated duration: two (2) weeks

Material Delivery

- Delivery of materials for storage on-site until required for construction
- Estimated duration: Ongoing.

Concrete Pour

- Delivery and pumping of concrete for driveway, slabs and ancillary uses
- Estimated duration: four (4) weeks

3.2 Construction Hours

Construction activities are to be undertaken during Council's standard construction hours:

- Monday – Friday; 7:00AM – 5:00PM
- Saturday; 8:00AM – 4:00PM
- No work to be undertaken on Sundays or public holidays.

Generally, no work would be undertaken on Sundays and / or public holidays without prior Council approval.

4. CONSTRUCTION VEHICLE ROUTES

Vehicle haulage routes are indicated in Figure 4.1, noting it is expected that most haulage vehicles will travel from Wollongong/Sydney or Port Kembla. All construction and delivery vehicles shall access Nottingham Street via Nolan Street or Northcliffe Drive such that vehicles are not required to undertake U-turn movements at the Princes Motorway / Northcliffe Drive or Northcliffe Drive / Nolan Street roundabouts.

Source: Nearmap

Figure 4.1: Proposed Haulage Routes

5. CONSTRUCTION WORKS MANAGEMENT

5.1 Large Vehicles

The use of large vehicles (vehicles over 7.5m in length) will be reserved for the delivery of materials, concrete and plant, and works related to demolition and excavation to minimise heavy vehicle impacts on the local road network. Only essential light vehicles will be allowed on-site.

5.2 Traffic Management and Control

This is indicated on the traffic control plan (TCP) prepared for Nottingham Street, which is attached at **Appendix A**.

5.3 Staging

Staging of vehicles and construction works are to be coordinated such that vehicle queuing does not occur on Nottingham Street. Construction and delivery vehicles are expected to arrive prior to the morning commuter peak, and between the morning and afternoon peaks.

A traffic impact assessment (TIA) is not required for construction works, noting that the nature of construction activities is temporary.

Traffic generated by construction activities includes construction worker light vehicles (including utility vans), as well as heavy vehicles for periodic delivery and removal of materials, Vehicle types and sizes would vary depending on the required use, including:

- Medium rigid vehicles to deliver excavation equipment
- Large trucks to transport plant to and from the site

- Large trucks to transport spoil and deliveries during construction
- Concrete trucks and line trucks.

Due to the type of construction and development size, a manageable number of heavy vehicle trips per day is expected. Peak hours are expected to have five (5) to ten (10) vehicles entering the site, with one (1) to two (2) vehicles being construction and delivery vehicles and the remainder being workers' vehicles. Five (5) to ten (10) deliveries per day are expected. The overall traffic impacts arising from the development during construction are anticipated to have minimal impacts on the operational capacity of the road network in the vicinity of the site. Additionally, it is recommended that the emergency vehicle parking bay is constructed in the first instance so that heavy vehicles can stand on-site within the right-of-carriageway without affecting the ingress and egress operations of the surrounding dwellings.

Furthermore, the arrival and departure of construction vehicles are to be staged such that there is no queuing on Nottingham Street or any other public roads. If there is to be a large number of deliveries, including sequential concrete deliveries, these are to be coordinated in advance to reduce cumulative congestion impacts to the road network.

6. CONSTRUCTION WORKER TRAVEL

Construction workers are expected to travel to the site by car or light vehicle. Some worker parking is expected to be located on-site so that contractors can access vehicles and tools without having to walk 50m to and from the Nottingham Street frontage. There are no public off-street car parking areas nearby.

Workers can use bus services located approximately 400m away from the site, however it is expected that construction workers are more likely to use car-share than public transport.

7. CLOSURES

7.1 Road Closures

There will be no road closures during construction.

7.2 Footpath Closure

There will be no road or footpath closures during construction. As such, there have been no potential safety issues identified that would prevent pedestrians crossing Nottingham Street to avoid the site.

7.3 Traffic Control Plans

Prior to implementation, construction traffic management measures will require the preparation of approved detailed TCPs. Each TCP should be prepared in accordance with the RMS (formerly RTA) Traffic Control at Work Sites manual. The TCP should include details of construction signage and the proposed location and duty of traffic controllers.

It is expected that all TCPs will be implemented during off-peak periods to minimise traffic impacts.

One (1) TCP is proposed to manage traffic conditions during construction, to control the arrival and departure of construction vehicles (modified TCP 195). This TCP has been prepared to warn drivers that construction vehicles are using the road near the site, and is attached at **Appendix A**. The TCP has been reviewed and approved by A. Giyahi (Design and Inspect Traffic Control Plans, Certification Number SOC 154273).

8. CONSTRUCTION VEHICLES

8.1 Vehicle Types

The vehicles expected to service the site throughout the construction period are indicated in Table 8.1.

Table 8.1: Expected Vehicles Types and Dimensions

Vehicle Type	Typical Dimensions
Heavy rigid trucks	Three-axle rigid truck – length: 12.5m maximum
Medium rigid trucks	Two or three-axle rigid truck – length: 8.8m maximum
Concrete delivery trucks	Three or four-axle rigid truck – length: 8m
Concrete line pump trucks	Three or four-axle rigid truck – length: 8m
Tipper trucks	Three-axle rigid truck – length: 8m, capacity: $10m^3$
Light vehicles	Assorted – length: 7.5m maximum

8.2 Vehicle Frequency

The expected number and frequency of worker, construction and delivery vehicles servicing the site is indicated in Table 8.2.

Table 8.2: Expected Vehicle Frequency

Activity	Vehicle Type	Total Number of Trips	Expected Frequency
Site establishment	Medium rigid trucks Tipper trucks Light vehicles	6 medium rigid trucks 4 tipper trucks 6 light vehicles	2 trips per vehicle (to be completed in one day)
Demolition and excavation	Medium rigid trucks Tipper trucks Light vehicles	10 medium rigid trucks 20 tipper trucks 80 light vehicles	7-8 trips per week (rigid and tipper) 10 trips per week (light vehicles)
Material delivery	Medium rigid trucks Tipper trucks Light vehicles	20 medium rigid trucks 40 tipper trucks 160 light vehicles	10 trips per week (rigid and tipper) 10 trips per week (light vehicles)
Concrete pour	Concrete trucks Concrete line pump trucks Light vehicles	20 concrete trucks 2 concrete line pump trucks 160 light vehicles	2-4 trips per week (concrete trucks) 10 trips per week (light vehicles)

9. STANDING OF VEHICLES

All construction and delivery vehicles will stand on-site or in the depot. No heavy vehicles shall stand on any roads surrounding the site. The standing location of light vehicles is dependent on construction operations; however, it is expected that most light vehicles will stand on-site also.

There is an existing in-ground fire hydrant, shown in Figure 9.1, located adjacent to the driveway turning head, directly opposite the subject site. There shall be no standing of vehicles over or near this fire hydrant to allow access for fire-fighting purposes if required.

Figure 9.1: Fire Hydrant Location

10. On-Site Traffic

Light vehicles required on-site shall gain access from Nottingham Street via the existing right-of-carriageway. It is expected that heavy vehicles will enter in a forward direction, turn around at the T-head within the right-of-carriageway, and exit in a forward direction.

A swept path analysis was undertaken using an 8.8m medium rigid vehicle (MRV) for the completed development, which demonstrated this vehicle is able to enter in a forward gear, turn around within the right-of-carriageway and exit in a forward gear. This swept path is attached at **Appendix B**.

11. Works Zone

No works will be undertaken outside the site boundary.

12. On-Site Plant

Details regarding on-site plant are unknown at this stage of the CTMP, until a contractor is appointed.

13. Crane Use

Details regarding the use of cranes are unknown at this stage of the CTMP, until a contractor is appointed.

14. On-Site Storage

Details regarding on-site storage are unknown at this stage of the CTMP, until a contractor is appointed.

15. Oversize Vehicle Use

It is expected that no oversize vehicles will be located on Council land or used as part of construction activities.

16. Excavation Operations

Excavations are only to be undertaken during the standard construction hours as specified in Section 3.2.

17. Tree Protection

The removal of trees on-site is subject to the NSW Biodiversity Conservation Act as well as Council requirements. Trees on public land will not be affected by the works and thus tree protection zones are not required.

Appendix A: Traffic Control Plan

Notes:

1. All lanes and road layouts must be verified on-site prior to the implementation of traffic control plans
2. See the Traffic control at work sites technical manual, section 7.7 for signs for depots, stockpiles, quarries and gravel pits etc.
3. Signs are to be positioned where they will not be obscured by trees, parked vehicles or other obstructions
4. Signs are to be positioned where they will not obscure other signs
5. All signs should be size A.

The Traffic Manager should:

1. Make the decision on the use of this traffic control plan during construction works
2. Install and remove traffic control signs and devices as required
3. Periodically review traffic conditions and the traffic control plan
4. Ensure signs are in good condition
5. Ensure sight distances are maintained for pedestrians at all times.

Designed in accordance with:

1. TCP 195 (modified).

N

BITZIOS consulting

Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	First Issue	S.K	12/04/19

APPROVED
ALEX GIYAHI

DESIGN AND INSPECT TRAFFIC CONTROL PLANS
CERTIFICATION NO. SOC 154273

Scale @ A3 0 10 20 30 40 50 1:1000

Project
62 NOTTINGHAM STREET BERKELEY

Title
TRAFFIC CONTROL PLAN -
VEHICLE INGRESS AND EGRESS

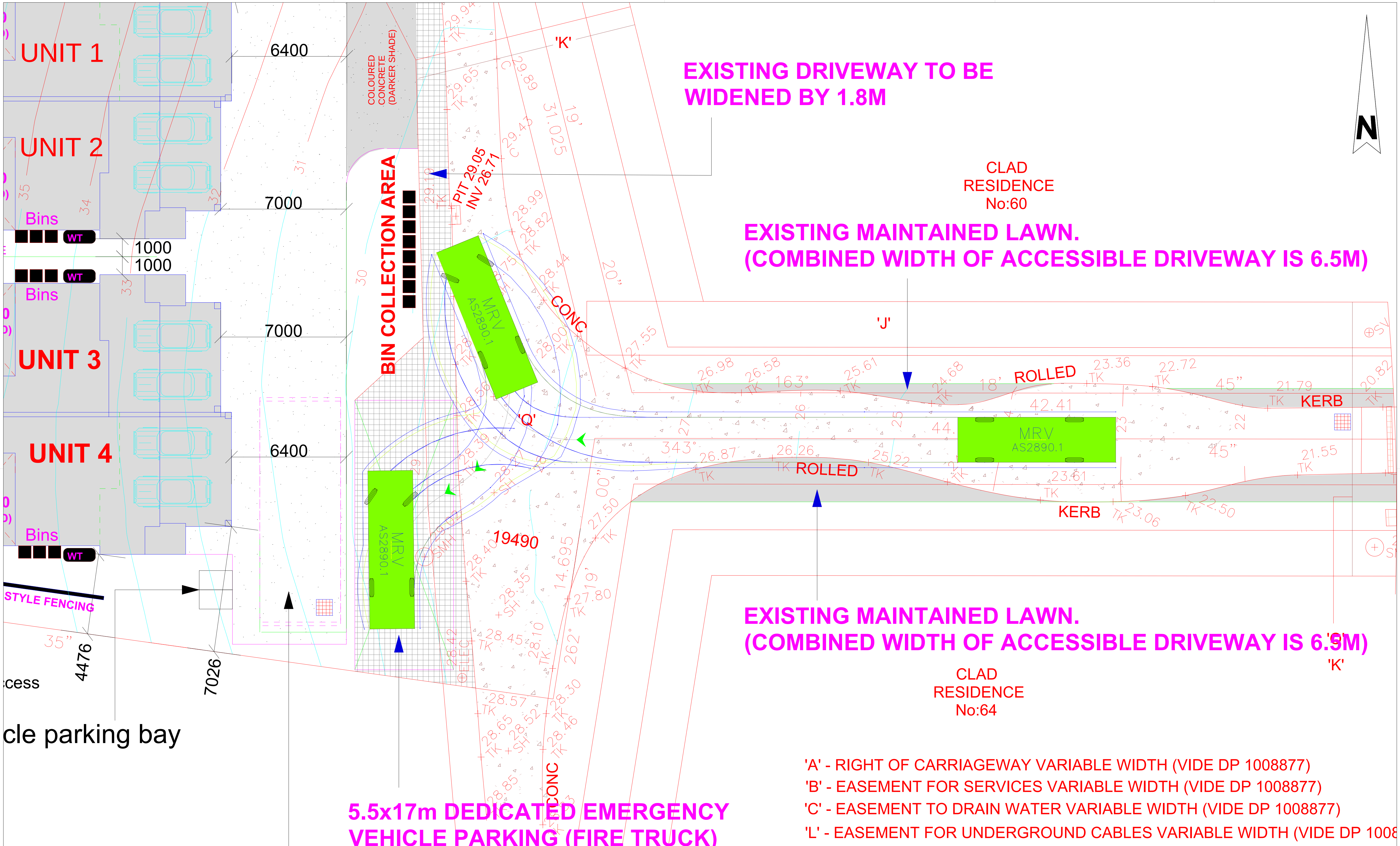
Design	Drawn	Checked
S.K	S.K	A.G

FOR CONSTRUCTION

Date 12/04/2019

Project Number	Sheet Number	Issue
P3922	1	001

Appendix B: Swept Path Assessment


UNIT 1
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STYLE FENCING
cess
cle parking bay
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19490
MRV
AS2890.1
EXISTING DRIVEWAY TO BE WIDENED BY 1.8M
CLAD RESIDENCE No:60
EXISTING MAINTAINED LAWN. (COMBINED WIDTH OF ACCESSIBLE DRIVEWAY IS 6.5M)
EXISTING MAINTAINED LAWN. (COMBINED WIDTH OF ACCESSIBLE DRIVEWAY IS 6.5M)
CLAD RESIDENCE No:64
5.5x17m DEDICATED EMERGENCY VEHICLE PARKING (FIRE TRUCK)
'A' - RIGHT OF CARRIAGEWAY VARIABLE WIDTH (VIDE DP 1008877)
'B' - EASEMENT FOR SERVICES VARIABLE WIDTH (VIDE DP 1008877)
'C' - EASEMENT TO DRAIN WATER VARIABLE WIDTH (VIDE DP 1008877)
'L' - EASEMENT FOR UNDERGROUND CABLES VARIABLE WIDTH (VIDE DP 1008
N

BITZIOS consulting

REVISIONS

Issue	Revisions/Descriptions	Drawn	Date
001	Final Issue	S.K	22/11/18

Scale @ A3 0 2 4 6 8 10 1:200

Project: 62 Nottingham Street, Berkeley

Title: Swept Paths - 8.8m MRV

Design	Drawn	Checked
S.K	S.K	L.J

FOR INFORMATION ONLY

Date 22/11/2018

Project Number	Sheet Number	Issue
P3922	3	001

DA-2018/1583

Attachment 10 – Draft conditions

Approved Plans and Specifications

1 The development shall be implemented substantially in accordance with the details and specifications set out on:

Site Plan 20160059 sheet 2-F dated 13 May 2019 prepared by Pecorp Design

Units 1 & 2 Ground Floor Plan, Lower Floor Plan, NW Elevation and SW Elevation Plan 20160059 sheet 6-F dated 13 May 2019 prepared by Pecorp Design

Units 1 & 2 Upper Floor Plan, Roof Plan, NE Elevation and SE Elevation Plan 20160059 sheet 7-F dated 13 May 2019 prepared by Pecorp Design

Unit 3-4 Ground Floor Plan, Lower Floor Plan, NW Elevation and SW Elevation Plan 20160059 sheet 8-F dated 13 May 2019 prepared by Pecorp Design

Unit 3-4 Upper Floor Plan, Roof Plan, NE Elevation and SE Elevation Plan 20160059 sheet 9-F dated 13 May 2019 prepared by Pecorp Design

Section Plan 20160059 sheet 10-F dated 13 May 2019 prepared by Pecorp Design

and any details on the application form, and with any supporting information received, except as amended by the conditions specified and imposed hereunder.

General Matters

2 **Geotechnical**

a All work is to be in accordance with the geotechnical recommendations contained in the report dated 5 November 2018 by Douglas Partners and any subsequent geotechnical report required to address unanticipated conditions encountered during construction.

b Hard bedrock where encountered will be difficult to excavate. Alternative excavation methods should be considered to minimise noise and vibration.

c Foundation systems are to be designed for Class P soils with all footings to be founded at least 500mm within the underlying weathered bedrock as recommended by the geotechnical consultant.

d Articulation jointing is to be provided in masonry construction as recommended by the geotechnical consultant.

e All excavations for foundations are to be inspected by the geotechnical consultant and certified that the ground has been suitably prepared for the placement of footings.

3 **Bushfire Protection**

Asset Protection Zones

The intent of measures is to provide sufficient space and maintain reduced fuel loads so as to ensure radiant heat levels of buildings are below critical limits and to prevent direct flame contact with a building. To achieve this, the following conditions shall apply:

a At the commencement of building works, and in perpetuity, the area around the proposed buildings shall be managed as outlined within section 4.1.3 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones' as follows:

- North: Inner Protection Area (IPA) for a distance of 27 metres; and,
- All other directions: IPA to the property boundaries.

Water and Utilities

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building. To achieve this, the following conditions shall apply:

b The provision of water, electricity, and gas shall comply with section 4.1.3 of 'Planning for Bush Fire Protection 2006'.

Access

The intent of measures for public roads is to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area. To achieve this, the following conditions shall apply:

c The common access driveway (including the nominated turning area) shall be upgraded to comply with the following minimum standards under section 4.1.3(1) of 'Planning for Bush Fire Protection 2006':

- Roads are two–wheel drive, all weather roads.
- Roads widths to comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle).
- Any traffic management devices are constructed to facilitate access by emergency services vehicles.
- Roads have a cross fall not exceeding 3 degrees.
- The nominated turning area shall comply with AS 2890.2–2002 for medium rigid vehicles.
- Curves of roads are a minimum inner radius of six metres.
- The minimum distance between inner and outer curves is six metres.
- Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.
- There is a minimum vertical clearance to a height of four metres above the road at all times.
- The capacity of road surfaces is sufficient to carry fully loaded firefighting vehicles of 15 tonnes.
- Roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.

OR

d A traffic assessment prepared by a suitably qualified person is provided to the satisfaction of the consent authority, that demonstrates how the proposed access

arrangements provide for public road widths and design to enable safe access for firefighters while residents are evacuating the area.

- The traffic assessment must clearly identify the extent to which the proposed access arrangements conforms with, or deviates from, the acceptable solutions for public access roads as set out in section 4.1.3(1) of 'Planning for Bush Fire Protection 2006'.

Design and Construction

The intent of measures is that buildings are designed and constructed to withstand the potential impacts of bush fire attack. To achieve this, the following conditions shall apply:

e New construction shall comply with Sections 3 and 5 (BAL 12.5) Australian Standard AS3959-2009 'Construction of buildings in bush fire-prone areas' or NASH Standard (1.7.14 updated) 'National Standard Steel Framed Construction in Bushfire Areas – 2014' as appropriate and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection 2006'.

Landscaping

f All landscaping within the site shall comply with the principles of Appendix 5 of 'Planning for Bush Fire Protection 2006'.

4 **Vegetation Management Plan Reporting**

Annual reports on the progress of the implementation of the Vegetation Management Plan (VMP) prepared by Biosis dated 10 May 2019 shall be submitted to Council's City Strategy Division within one (1) month after each year of implementation and until the end of the maintenance period as specified in the VMP.

5 **Building Work - Compliance with the Building Code of Australia**

All building work must be carried out in compliance with the provisions of the Building Code of Australia.

6 **Maintenance of Access to Adjoining Properties**

Access to all properties not the subject of this approval must be maintained at all times and any alteration to access to such properties, temporary or permanent, must not be commenced until such time as written evidence is submitted to Council or the Principal Certifying Authority indicating agreement by the affected property owners.

7 **Occupation Certificate**

An Occupation Certificate must be issued by the Principal Certifying Authority prior to occupation or use of the development. In issuing an Occupation Certificate, the Principal Certifying Authority must be satisfied that the requirements of section 6.9 of the Environmental Planning and Assessment Act 1979, have been complied with as well as all of the conditions of the Development Consent.

8 **Tree Retention/Removal**

This consent permits the removal of trees numbered 1, 2, 3, 4, 5, 6, 7, and 10 as indicated on the Arboricultural Impact Assessment Report dated November 2018 prepared by Allied Tree Consultancy. No other trees shall be removed without prior written approval of Council.

Prior to the Issue of the Construction Certificate

9 **Revised Vegetation Management Plan**

A revised Vegetation Management Plan (VMP) shall be submitted to the Principal Certifying Authority, prior to the release of the Construction Certificate. The VMP shall be revised to ensure the resultant planting in and the management of the VMP area is entirely compatible with the Rural Fire Service's requirements as stated in its letter dated 18 January 2019 and attached to this consent.

10 **Present Plans to Sydney Water**

Approved plans must be submitted online using Sydney Water Tap, available through www.sydneywater.com.au to determine whether the development will affect Sydney Water's sewer and water mains, stormwater drains and/or easements, and if further requirements need to be met.

The Certifying Authority must ensure that Sydney Water has issued an approval receipt prior to the issue of a Construction Certificate.

Visit www.sydneywater.com.au or telephone 13 20 92 for further information.

11 **Endeavour Energy Requirements**

The submission of documentary evidence from Endeavour Energy to the Principal Certifying Authority is required confirming that satisfactory arrangements have been made with Endeavour Energy for the provision of electricity supplies to the development, prior to the release of the Construction Certificate.

Note: Applications should be made to Customer Connections – South Coast, Endeavour Energy PO Box 811 Seven Hills NSW 1730.

12 **Telecommunications**

The submission of documentary evidence from an approved telecommunications carrier to the Principal Certifying Authority confirming that underground telecommunication services are available for this development is required prior to the issue of the Construction Certificate.

13 **Car Parking and Access**

The development shall make provision for a total of 9 car parking spaces, 1 motorbike space, 2 secure (Class B) residential bicycle spaces and 1 visitor (Class C) bicycle space. This requirement shall be reflected on the Construction Certificate plans. Any change in the above parking numbers shown on the approved DA plans shall be dealt with via a section 96

modification to the development. The approved parking spaces shall be maintained to the satisfaction of Council, at all times.

14 The parking dimensions, internal circulation, aisle widths, kerb splay corners, head clearance heights, ramp widths and grades of the car parking areas are to be in conformity with the current relevant Australian Standard AS2890.1, except where amended by other conditions of this consent. Details of such compliance are to be reflected on the Construction Certificate plans.

15 The depth and location of all services (ie gas, water, sewer, electricity, telephone, traffic lights, stormwater, etc) must be ascertained and reflected on the Construction Certificate plans and supporting documentation.

16 **Landscaping**

The submission of a final Landscape Plan will be required in accordance with the requirements of Wollongong City Council DCP 2009 Chapter E6, Landscape Plan MS2017029 dated 13 May 2019 prepared by Mark Spence, the bushfire conditions contained in this consent and the Vegetation Management Plan for the approval by the Principal Certifying Authority, prior to the release of the Construction Certificate.

17 The submission of certification from a suitably qualified and experienced landscape designer and drainage consultant to the Principal Certifying Authority prior to the release of the Construction Certificate, confirming that the landscape plan and the drainage plan are compatible.

18 The implementation of a landscape maintenance program in accordance with the approved Landscape Plan for a minimum period of 12 months to ensure that all landscape work becomes well established by regular maintenance. Details of the program must be submitted with the Landscape Plan to the Principal Certifying Authority prior to release of the Construction Certificate.

19 **Engineering Plans and Specifications - Retaining Wall Structures Greater than One (1) Metre**

The submission of engineering plans and supporting documentation of all proposed retaining walls greater than 1m to the Principal Certifying Authority for approval prior to the issue of the Construction Certificate. The retaining walls shall be designed by a suitably qualified and experienced civil and/or structural engineer. The required engineering plans and supporting documentation shall include the following:

a A plan of the wall showing location and proximity to property boundaries;
b An elevation of the wall showing ground levels, maximum height of the wall, materials to be used and details of the footing design and longitudinal steps that may be required along the length of the wall;
c Details of fencing or handrails to be erected on top of the wall;
d Sections of the wall showing wall and footing design, property boundaries and backfill material. Sections shall be provided at sufficient intervals to determine the impact of the wall on existing ground levels. The developer shall note that the retaining wall and footing structure must be contained wholly within the subject property;

e The proposed method of subsurface and surface drainage, including water disposal;
f Reinforcing and joining details of any bend in the wall;
g The assumed loading used by the engineer for the wall design.
h Flows from adjoining properties shall be accepted and catered for within the site. Finished ground and top of retaining wall levels on the boundary shall be no higher than the existing upslope adjacent ground levels.

20 Bicycle parking facilities must have adequate weather protection and provide the appropriate level of security as required by the current relevant Australian Standard AS2890.3 - Bicycle Parking Facilities. This requirement shall be reflected on the Construction Certificate plans.

21 **Property Addressing Policy Compliance**

Prior to the issue of any construction certificate, the developer must ensure that any site addressing complies with Council's **Property Addressing Policy** (as amended). Where appropriate, the developer must also lodge a written request to Council's **Infrastructure Systems & Support – Property Addressing (propertyaddressing@wollongong.nsw.gov.au),** for the site addressing prior to the issue of the construction certificate. Please allow up to 3-5 business days for a reply. Enquiries regarding property addressing may be made by calling 4227 8660.

22 **Roofwater Drainage**

All roof gutters, downpipes, pits, and pipelines draining roof areas and other impervious surfaces with no deliberate overflow path to the on-site stormwater detention (OSD) facility, shall be designed to cater for a 1 in 100 year ARI storm event in accordance with AS 3500.3 – Plumbing and Drainage (Stormwater Drainage). Details of gutter/downpipe/pipeline sizes and locations shall be reflected on the Construction Certificate plans.

23 **Stormwater Drainage Design**

A detailed drainage design for the development must be submitted to and approved by the Principal Certifying Authority prior to the release of the Construction Certificate. The detailed drainage design must satisfy the following requirements:

a Be prepared by a suitably qualified civil engineer in accordance with Chapter E14 of Wollongong City Council's Development Control Plan 2009, Subdivision Policy, conditions listed under this consent, and generally in accordance with the concept stormwater drainage plan lodged for development approval, prepared by Pecorp Design, Project No. 20160059, CAD File Name LUX LIVING 20160059-PSE, issue F dated 13 May 2019.
b Include details of the method of stormwater disposal. Stormwater from the development must be piped to the existing stormwater drainage system within the accessway.
c Engineering plans and supporting calculations for the stormwater drainage system are to be prepared by a suitably qualified engineer and be designed to ensure that stormwater runoff from upstream properties is conveyed through the site without adverse impact on the development or adjoining properties. The plan must indicate the method of disposal of all stormwater and must include rainwater tanks, existing ground levels, finished surface levels on all paved areas, estimated flow rates, invert levels and sizes of all pipelines.

d Overflow paths shall be provided to allow for flows of water in excess of the capacity of the pipe/drainage system draining the land, as well as from any detention storage on the land. Blocked pipe situations with 1 in 100 year ARI events shall be incorporated in the design. Overflow paths shall also be provided in low points and depressions. Each overflow path shall be designed to ensure no entry of surface water flows into any building and no concentration of surface water flows onto any adjoining property. Details of each overflow path shall be shown on the detailed drainage design.

24 **Dilapidation Survey**

A dilapidation survey and report shall be submitted to the Principal Certifying Authority.

The dilapidation survey and report shall accurately reflect the condition of shared accessway.

The report shall outline measures for the protection of the shared accessway during the works.

Any damage to the accessway caused by the developer during construction shall be repaired to the satisfaction of the Principal Certifying Authority prior to the issue of an Occupation Certificate.

25 **On-Site Stormwater Detention (OSD) Design**

The developer must provide on-site stormwater detention (OSD) storage for stormwater runoff from the development. The design and details of the OSD system must be provided in conjunction with the detailed drainage design and approved by the Principal Certifying Authority prior to the release of the Construction Certificate. The OSD design and details must satisfy the following requirements:

a Must be prepared by a suitable qualified engineer in accordance with Chapter E14 of the Wollongong DCP 2009.

b Must include details of the Site Storage Requirement (SSR) and Permissible Site Discharge (PSD) values for the site in accordance with Section 12.2.4 of Chapter E14 of the Wollongong DCP2009.

c The OSD facility must be designed to withstand the maximum loadings occurring from any combination of traffic (with consideration to residential and heavy vehicles), hydrostatic, earth, and buoyancy forces. Details must be provided demonstrating these requirements have been achieved.

d The OSD facility shall incorporate a minimum 900mm x 900mm square lockable grate for access and maintenance purposes, provision for safety, debris control screen, and a suitably graded invert to the outlet to prevent ponding.

e Must include discharge control calculations (i.e. orifice/weir calculations) generally in accordance with Section 12.2.6 and 12.5.4 of Chapter E14 of the Wollongong DCP2009.

f Details of the orifice plate including diameter of orifice and method of fixing shall be provided.

g Must include details of a corrosion resistant identification plaque for location on or close to the OSD facility. The plaque shall include the following information and shall be installed prior to the issue of the Occupation Certificate:

- The structure is an OSD facility, being part of the stormwater drainage network, and is not to be tampered with.

- Identification number DA-2018/1583.
- Any specialist maintenance requirements.

h Must include a maintenance schedule for the OSD system, generally in accordance with Chapter E14 of the Wollongong DCP2009.

26 **Designated Overland Flow Paths**

Details of each overland flow path located on the site, including the proposed dish drain upslope of the proposed dwellings, shall be provided with the detailed drainage design. Each overland flow path shall be capable of catering for the 1 in 100 year storm event flows from the contributing catchment area, and where required, direct these flows to the on-site stormwater detention facility. The overland flow path shall be free of any vegetation and/or structures that are likely to impede natural overland flow, or make provision for such obstructions, so there will be no adverse stormwater impacts upon the subject land and adjoining properties. Full Manning's calculations shall be provided on the capacity of each overland flow path. Details shall also be provided of measures to ensure that any overflows from the upslope dish drain and associated drainage pits will be contained within the subject site and conveyed to the concrete accessway in a controlled manner, ensuring no diversion of surface flows onto adjoining land and no entry of surface water flows into any building. These requirements shall be reflected on the Construction Certificate plans and supporting documentation.

27 **Scour Protection**

All surface flow paths (including swales, channels, and other dedicated overland flow paths) must be treated with appropriate scour/erosion protection measures designed in accordance with good engineering practice based on calculated 1 in 100 year ARI flow velocities. Details of the proposed scour/erosion protection measures shall be provided on the detailed drainage design and reflected on the Construction Certificate plans prior to the release of the Construction Certificate.

28 **Development Contributions**

Pursuant to Section 4.17 of the Environmental Planning and Assessment Act 1979 and the Wollongong City-Wide Development Contributions Plan (2018), a monetary contribution of $9,970.00 (subject to indexation) must be paid to Council towards the provision of public amenities and services, prior to the release of any associated Construction Certificate.

This amount has been calculated based on the estimated cost of development and the applicable percentage rate.

The contribution amount will be subject to indexation until the date of payment. The formula for indexing the contribution is:

Contribution at time of payment = $C x (CP2/CP1)

Where:

$C is the original contribution as set out in the Consent

CP1 is the Consumer Price Index; All Groups CPI; Sydney at the time the consent was issued

CP2 is the Consumer Price Index; All Groups CPI; Sydney at the time of payment

Details of CP1 and CP2 can be found in the Australian Bureau of Statistics website – Catalogue No. 6401.0 - Consumer Price Index, Australia.

The following payment methods are available:

METHOD	HOW	PAYMENT TYPE
Online	http://www.wollongong.nsw.gov.au/applicationpayments Your Payment Reference: 1065068	• Credit Card
In Person	Wollongong City Council Administration Building - Customer Service Centre Ground Floor 41 Burelli Street, WOLLONGONG	• Cash • Credit Card • Bank Cheque
PLEASE MAKE BANK CHEQUE PAYABLE TO: Wollongong City Council (Personal or company cheques are not accepted)		

A copy of the Wollongong City-Wide Development Contributions Plan (2018) and accompanying Fact Sheet may be inspected or obtained from the Wollongong City Council Administration Building, 41 Burelli Street, Wollongong during business hours or on Council's web site at www.wollongong.nsw.gov.au

Prior to the Commencement of Works

29 **Tree Removal**

Prior to removal, the trees approved for removal under this development consent shall be closely inspected for native vertebrate fauna occupation, and if occupied by native vertebrate fauna, then the NSW Wildlife Information, Rescue and Education Service (WIRES) shall be contacted for advice (phone 1300 094 737)

30 **Appointment of Principal Certifying Authority**

Prior to commencement of work, the person having the benefit of the Development Consent and a Construction Certificate must:

a Appoint a Principal Certifying Authority (PCA) and notify Council in writing of the appointment irrespective of whether Council or an accredited private certifier is appointed; and

b notify Council in writing of their intention to commence work (at least two days notice is required).

The Principal Certifying Authority must determine when inspections and compliance certificates are required.

31 **Sign – Supervisor Contact Details**

Before commencement of any work, a sign must be erected in a prominent, visible position:

a stating that unauthorised entry to the work site is not permitted;
b showing the name, address and telephone number of the Principal Certifying Authority for the work; and
c showing the name and address of the principal contractor in charge of the work site and a telephone number at which that person can be contacted at any time for business purposes.

This sign shall be maintained while the work is being carried out and removed upon the completion of the construction works.

32 **Temporary Sediment Fences**

Temporary geotextile fabric sediment fences must be correctly installed on the site, prior to the commencement of any excavation or construction works in accordance with "Managing Urban Stormwater: Soils and Construction", 4th edition, Landcom, 2004. The temporary sediment fences shall be maintained throughout the entire excavation and construction phases of the development and until the site has become stabilised (includes landscaping).

33 **All-weather Access**

An all-weather stabilised access point must be provided to the site to prevent sediment leaving the site as a result of vehicular movement. Vehicular movement should be limited to this single accessway.

34 **Erosion Controls – Vehicular Entry/Exit Points**

The vehicular entry/exits to the site must be protected from erosion and laid with a surface material which will not wash into the street drainage system or watercourse.

35 **Sediment Control Measures**

Sediment-laden runoff from the site shall be controlled at all times subsequent to commencement of construction works. Sediment control measures shall be maintained at all times and checked for adequacy at the conclusion of each day's work, and after any rain event of 10 mm or more.

36 **Application for Occupation, Use, Disturbance or Work on Footpath/Roadway**

Any occupation, use, disturbance or work on the footpath or road reserve for construction purposes, which is likely to cause an interruption to existing pedestrian and/or vehicular traffic flows requires Council consent under Section 138 of the Roads Act 1993. An application must be submitted and approved by Council prior to the works commencing where it is proposed to carry out activities such as, but not limited to, the following:

a Digging or disruption to footpath/road reserve surface;

b Loading or unloading machinery/equipment/deliveries;

c Installation of a fence or hoarding;

d Stand mobile crane/plant/concrete pump/materials/waste storage containers;

e Pumping stormwater from the site to Council's stormwater drains;

f Installation of services, including water, sewer, gas, stormwater, telecommunications and power;

g Construction of new vehicular crossings or footpaths;

h Removal of street trees;

i Carrying out demolition works.

37 **Support for Neighbouring Buildings**

This consent requires the preservation and protection of neighbouring buildings from any damage and if necessary, requires the underpinning and support of any neighbouring building in an approved manner. The applicant or the contractor carrying out the work must at least seven days in advance of any excavation works below the level of the base of the footings of a building on an adjoining allotment, including a public road or place, give written notice of intention to carry out such works to the property owner of the affected adjoining building and furnish specific written details and supporting plans or other documentation of the proposed work.

The adjoining property owner of land is not liable for any part of the cost of work carried out for the purposes of this condition, whether carried out on the allotment of land being excavated or on the adjoining allotment of land.

During Demolition, Excavation or Construction

38 **Construction Traffic Management Plan**

Construction works are to be conducted in accordance with the Construction Traffic Management Plan dated 12 April 2019 prepared by Bitzios Consulting.

39 **Avoidance Harm to Fauna**

During tree removal works, all care shall be taken to avoid any harm to fauna.

40 **Vegetative Waste**

Vegetative waste shall be disposed of lawfully.

41 **Implementation of the Vegetation Management Plan**

The Vegetation Management Plan prepared by Biosis dated 10 May 2019 shall be implemented as described.

42 **Restricted Hours of Construction Work**

The developer must not carry out any work, other than emergency procedures, to control dust or sediment laden runoff outside the normal working hours, namely, 7.00 am to 5.00 pm, Monday to Saturday, without the prior written consent of the Principal Certifying Authority and Council. No work is permitted on public holidays or Sundays.

Any request to vary these hours shall be submitted to the **Council** in writing detailing:

a the variation in hours required (length of duration);
b the reason for that variation (scope of works);
c the type of work and machinery to be used;
d method of neighbour notification;
e supervisor contact number;
f any proposed measures required to mitigate the impacts of the works.

Note: The developer is advised that other legislation may control the activities for which Council has granted consent, including but not limited to, the Protection of the Environment Operations Act 1997.

43 **Site Management**

Stockpiles of sand, gravel, soil and the like must be located to ensure that the material:

a Does not spill onto the road pavement and
b is not placed in drainage lines or watercourses and cannot be washed into these areas.

44 Any waste material or construction material accidentally or otherwise spilled, tracked or placed on the road or footpath area during construction without the prior approval of Council's Regulation and Enforcement Division shall be immediately swept up, or immediately removed by "dry" methods. Collected material shall be disposed of in a way that prevents its mobilisation. Evidence that any approval to place material on the road or road reserve shall be available for inspection by Council officers on site at any time.

45 Drains, gutters, access ways and roadways must be maintained free of sediment and any other material.

46 Building operations such as brick cutting, the washing of tools or paint brushes, or other equipment and the mixing of mortar must not be carried out on the roadway or public footpath or any other locations which could lead to the discharge of materials into the stormwater drainage system or natural watercourse.

47 **Dust Suppression Measures**

Activities occurring during the excavation and construction phases of the development must be carried out in a manner that will minimise the generation of dust.

48 **Provision of Waste Receptacle**

The developer must provide an adequate receptacle to store all waste generated by the development, pending disposal. The receptacle must be regularly emptied and waste must not be allowed to lie or accumulate on the property other than in the receptacle. Consideration should be given to the source separation of recyclable and re-usable materials.

49 **Excess Excavated Material – Disposal**

Excess excavated material shall be classified according to the NSW Environment Protection Authority's Waste Classification Guidelines – Part 1: Classifying Waste (2014) prior to being

transported from the site and shall be disposed of only at a location that may lawfully receive that waste.

50 **Supervision of Engineering Works**

All engineering works associated with the development are to be carried out under the supervision of a practicing engineer.

51 **No Adverse Run-off Impacts on Adjoining Properties**

The construction of the development shall ensure there are no adverse effects to adjoining properties as a result of flood or stormwater run-off. Attention must be paid to ensure adequate protection for buildings against the ingress of surface run-off.

Allowance must be made for surface run-off from adjoining properties. Any redirection or treatment of that run-off must not adversely affect any other property.

Prior to the Issue of the Occupation Certificate

52 **Implementation of Vegetation Management Plan**

Certification shall be provided from a suitably qualified and experienced bush regenerator prior to issue of the Occupation Certificate to verify that works to implement at least the establishment phase of the Vegetation Management Plan (VMP) prepared by Biosis dated 9 May 2019 have been carried out in accordance with the VMP.

53 **Completion of Landscape Works**

The completion of the landscaping works as per the final approved Landscape Plan is required prior to the issue of Occupation Certificate.

54 **Drainage**

The developer must obtain a certificate of Hydraulic Compliance (using Council's M19 form) from a suitably qualified civil engineer, to confirm that all stormwater drainage and on-site detention works have been constructed in accordance with the approved plans. In addition, full works-as-executed plans, prepared and signed by a Registered Surveyor must be submitted. These plans and certification must satisfy all the stormwater requirements stated in Chapter E14 of the Wollongong DCP2009. This information must be submitted to the Principal Certifying Authority prior to the issue of the final Occupation Certificate.

55 **Restriction on Use – On-site Detention System**

The applicant must create a restriction on use under the Conveyancing Act 1919 over the on-site detention system. The following terms must be included in an appropriate instrument created under the Conveyancing Act 1919 for approval of Council:

"The registered proprietor of the lot burdened must not make or permit or suffer the making of any alterations to any on-site stormwater detention system on the lot(s) burdened without the prior consent in writing of the authority benefited. The expression 'on-site stormwater detention system' shall include all ancillary gutters, pipes, drains, walls, kerbs, pits, grates, tanks, chambers, basins and surfaces designed to temporarily detain stormwater

as well as all surfaces graded to direct stormwater to those structures.

Name of the authority having the power to release, vary or modify the restriction referred to is Wollongong City Council."

The instrument, showing the restriction, must be submitted to the Principal Certifying Authority for endorsement prior to the issue of the final Occupation Certificate and the use of the development.

56 **Retaining Wall Certification**

The submission of a certificate from a suitably qualified and experienced structural engineer or civil engineer to the Principal Certifying Authority is required, prior to the issue of the Occupation Certificate or commencement of the use. This certification is required to verify the structural adequacy of the retaining walls and that the retaining walls have been constructed in accordance with plans approved by the Principal Certifying Authority.

57 **Positive Covenant – On-Site Detention Maintenance Schedule**

A positive covenant shall be created under the Conveyancing Act 1919, requiring the property owner(s) to undertake maintenance in accordance with the Construction Certificate approved On-Site Stormwater Detention System and Maintenance Schedule (application number to be referenced).

The instrument, showing the positive covenant must be submitted to the Principal Certifying Authority for endorsement prior to the issue of the final Occupation Certificate and the use of the development.

58 **On-Site Detention – Structural Certification**

The submission of a certificate from a suitably qualified practising civil and/or structural engineer to the Principal Certifying Authority is required prior to the issue of the final Occupation Certificate. This certification is required to verify the structural adequacy of the on-site detention facility and that the facility has been constructed in accordance with the approved Construction Certificate plans.

59 **Positive Covenant – Vegetation Management Plan**

A positive covenant shall be created under the Conveyancing Act 1919 requiring the property owner(s) to carry out works described in the Vegetation Management Plan prepared by Biosis dated 9 May 2019.

The instrument showing the positive covenant must be submitted to the Principal Certifying Authority for endorsement prior to the issue of the final Occupation Certificate and the use of the development.

Operational Phases of the Development/Use of the Site

60 The dedicated 'Emergency Vehicle Parking Area' is to be appropriately signposted and kept free for that purpose at all times.

61 Waste collection is to be undertaken from the dedicated service bay on the site. Street collection is not permitted.

62 All vehicles must enter and exit the site in a forward direction.