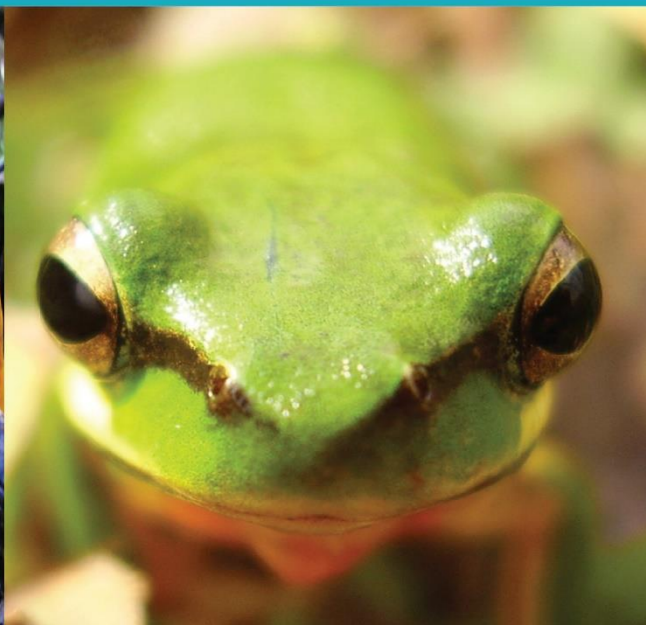




TRAVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY



BUSHFIRE PROTECTION ASSESSMENT

Proposed Boarding House and Subdivision (lot
amalgamation) Development

Lot 1216, DP 1183302 and section of Elizabeth
Walkway

189 Riverside Drive
Airds

Under Section 100B of the Rural Fires Act (1997)

20 December 2022

BUSHFIRE PROTECTION ASSESSMENT

Proposed Boarding House and Subdivision (lot amalgamation) Development

Lot 1216 DP 1183302 and section of Elizabeth Walkway, 189 Riverside Drive, Airds

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File:	20PIE07

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features is to be confirmed by a registered surveyor.

EXECUTIVE SUMMARY

This bushfire protection assessment has been undertaken for the proposed subdivision (amalgamation of lots) and development (Boarding House) of 189 Riverside Drive, Airds.

This assessment has found that bushfire can potentially affect the proposed development from the bushland vegetation surrounding the development, resulting in future buildings being exposed to potential radiant heat and ember attack.

The amalgamation of lots presents no additional bushfire threat to the future combined lot.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZs in accordance with the use of an alternative solution to determine minimum APZ and bushfire attack level (BAL) setbacks.
- Provision of access in accordance with the acceptable solutions outlined in *PBP 2019*;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *PBP 2019*;
- Future construction in compliance with the appropriate construction sections of *AS3959-2009*, and *PBP 2019*.

GLOSSARY OF TERMS

AHIMS	Aboriginal Heritage Information System
APZ	asset protection zone
AS1596	<i>Australian Standard – The storage and handling of LP Gas</i>
AS2419	<i>Australian Standard – Fire hydrant installations</i>
AS3745	<i>Australian Standard – Planning for emergencies in facilities</i>
AS3959	<i>Australian Standard – Construction of buildings in bushfire-prone areas 2018</i>
BAL	<i>bushfire attack level</i>
BCA	<i>Building Code of Australia</i>
BSA	bushfire safety authority
DA	development application
DLUP	Development Land Use Plan
EEC	Endangered ecological community
<i>EP&A Act</i>	<i>Environmental Planning & Assessment Act 1979</i>
<i>EP&A Regulation</i>	<i>Environmental Planning and Assessment Regulation 2000</i>
FFDI	forest fire danger index
IPA	inner protection area
LEP	Local Environmental Plan
LGA	local government area
m	metres
NCC	<i>National Construction Code</i>
OPA	outer protection area
<i>PBP 2019</i>	<i>Planning for Bush Fire Protection 2019</i>
<i>RF Act</i>	<i>Rural Fires Act 1997</i>
RFS	NSW Rural Fire Service
SFR	short fire run
SFPP	special fire protection purpose
<i>TBE</i>	<i>Travers bushfire & ecology</i>

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1. INTRODUCTION

Travers bushfire & ecology has been engaged to undertake a bushfire protection assessment for the proposed residential subdivision development (amalgamation of lots) and infill development (Boarding house) located at Lot 1216 DP 1183302, Airs. The proposed development is identified as bushfire prone on the *Campbelltown City Council* bushfire prone land map (refer Figure 1-1). This triggers a formal assessment by Council in respect of the NSW Rural Fire Service (RFS) policy against the provisions of *Planning for Bush Fire Protection (PBP)*.



Figure 1-1 – Bushfire Prone Land Map

(Source: Planning Portal, 2022)

1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- review the bushfire threat to the landscape
- undertake a bushfire attack assessment in accordance with *PBP*
- provide advice on mitigation measures, including the provision of asset protection zones (APZs), construction standards and other specific fire management issues
- review the potential to carry out hazard management over the landscape.

1.2 Proposed development

The current proposal involves the amalgamation of a section of Elizabeth walkway which divides Lot 84 DP 609357 and Lot 1216 DP 1183302 into Lot 1216 DP 1183302. The amalgamated section of the walkway involves only that area abutting the western boundary of Lot 1216 DP 1183302.

Subsequent to the amalgamation of the walkway section into Lot 1216 DP 1183302, construction of a boarding house is proposed.

The amalgamation of Lot 1216 DP 1183302 and the walkway and the construction of the boarding house will be submitted as separate Development applications.

Schedule 1 shows the proposed development and bushfire protection measures, including APZs, incorporating the surrounding land uses.

1.3 Information collation

Information sources reviewed for the preparation of this report include the following:

- Crawford Architects. Dwg. ref – A701 04, dated 4/10/2022
- *NearMap* aerial photography
- Topographical maps DLPI of NSW 1:25,000
- *Australian Standard 3959 Construction of buildings in bushfire-prone areas (2018)*
- *Planning for Bush Fire Protection 2019 (PBP)*

An inspection of the proposed development site and surrounds was undertaken by Tony Hawkins on the 9th of December, 2021 to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

1.4 Site description

The development is located at 189 Riverside Drive, Airds, and includes Lot 1216 DP 1183302 and a section of Elizabeth walkway.

The development site is located within the local government area (LGA) of Campbelltown City Council, directly adjacent to Tharawal Aboriginal Corporation and North West of Georges River Parkland Reserve (refer Figure 1-3). The entire site is zoned R2 Low Density Residential.



Figure 1-3 – Aerial appraisal

(Source: NearMap, 2022)

1.5 Legislation and planning instruments

Is the site mapped as bushfire prone?	Yes
Proposed development type	Amalgamation of lots and boarding house
Is the development considered integrated for the purposes of Section 100B of the <i>Rural Fires Act 1997</i> ?	Yes
Is the proposal located in an Urban Release Area as defined under Clause 273 of the EP&A Regulations?	No
Zoning	R2 – Low Density Residential
Significant environmental features	Not known
Details of any Aboriginal heritage	Not known – refer to Appendix 2
Does the proposal rely on an alternative solution?	Yes



Figure 1-4 – Land Zoning

(Source: Planning Portal, 2022)

2. BUSHFIRE THREAT ASSESSMENT

To assess the bushfire threat and to determine the required width of an APZ for a development, an assessment of the potential hazardous vegetation and the effective slope within the vegetation is required. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

2.1 Hazardous fuels

PBP guidelines require the identification of the predominant vegetation formation in accordance with David Keith (2004) if using the simplified acceptable solutions in *PBP* 2019, or alternatively the vegetation class if adopting the comprehensive vegetation fuel loads (as allowable when undertaking an assessment under Method 2 of AS3959). The hazardous vegetation is calculated for a distance of at least 140m from a proposed building envelope.

The vegetation posing a bushfire threat to the proposed development includes:

Table 2-1 - Vegetation

<i>Vegetation community</i>	<i>Vegetation formation</i>	<i>Vegetation classification</i>	<i>Comprehensive fuel loads (t/ha)</i>	<i>Acceptable solution fuel loads (t/ha) (PBP 2019)</i>
Red Bloodwood – Grey Gum (PCT 1790)	Dry Sclerophyll Forest (shrubby)	Sydney Hinterland Dry Sclerophyll Forest	21.3/27.42	22/36.1

As detailed in Table 2-2, an alternative solution (adopting comprehensive fuel load (Column 4 above) has been used.

2.2 Effective slope

The effective slope (post earthworks) has been assessed for up to 100m from the development site. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

The effective slope within the hazardous vegetation is described in detail within Table 2-2 below.

2.3 Bushfire attack assessment

The following assessment has determined the APZ and BAL levels via the following approaches;

- Table A1.12.2 & A1.12.5 of *PBP 2019*;
- Appendix B Method 2 (alternative solution) of *AS3959 Construction of buildings in bushfire prone areas* (2018); and

A fire danger index (FDI) of 100 has been used to calculate bushfire behaviour on the site based on its location within the Greater Sydney region. Table 2-2 provides a summary of the bushfire attack assessment based on residential development and the methodologies identified above.

Table 2-2 – Bushfire attack assessment

<i>Aspect</i>	<i>Vegetation Formation</i>	<i>Effective Slope</i>	<i>Minimum APZ required</i>	<i>APZ provided</i>	<i>BAL Rating</i>
North	Low threat vegetation	N/A	N/A	N/A	N/A
East	Low threat vegetation	N/A	N/A	N/A	N/A
South	Dry Sclerophyll Forest (shrubby)	1° Downslope	29m	67.7	BAL-12.5 (recommended) BAL-LOW (46.1m)
South West	Low threat vegetation*	N/A	N/A	N/A	N/A

Note 1: To identify minimum BAL setbacks for the property Flamesol calculator was used as an alternative solution, the results are displayed below.

Note 2*: There is a small patch of remnant vegetation to the south west of the site within Kevin Wheatley Reserve that will soon be removed for a new subdivision development, thus removing the threat. (See DA submission, 497/2017/DA-SW).



Calculated January 20, 2022, 9:05 am (MDc v.4.9)

South

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.97 km/h
Vegetation classification	Forest	Flame length	22.59 m
Understorey fuel load	23.1 t/ha	Flame angle	49 °, 56 °, 62 °, 66 °, 68 ° & 77 °
Total fuel load	27.42 t/ha	Elevation of receiver	8.52 m, 9.359999999999999 m, 9.970000000000001 m, 10.32 m, 10.47 m & 11 m
Vegetation height	n/a	Fire intensity	42,076 kW/m
Effective slope	1 °	Transmissivity	0.861, 0.84, 0.8139999999999999, 0.791, 0.78 & 0.727
Site slope	0 °	Viewfactor	0.6069, 0.4534, 0.306, 0.2068, 0.1682 & 0.0451
Flame width	60 m	Minimum distance to < 40 kW/m ²	18.1 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	23.3 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	31.3 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	40.6 m
		Minimum distance to < 10 kW/m ²	46.1 m

Rate of Spread - Mearthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Figure 2-1- Flamesol Calculations

2.4 Amalgamation of lots

The amalgamation of Lot 1216 DP 1183302 and a section of Elizabeth walkway creates no additional bushfire threat to the site.

No additional services, access or additional protection measures are required.



Figure 2-2 - Remnant vegetation to south west of site to be removed for new subdivision development (top row)
Riparian corridor to south of site (bottom row)

3. SPECIFIC PROTECTION ISSUES

3.1 Asset protection zones (APZs)

Table 3.1 outlines the proposal's compliance with the performance criteria for APZs.

Table 3-1 – Performance criteria for asset protection zones (PBP 2019 guidelines pg. 43)

<i>Performance criteria</i>	<i>Acceptable solutions</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
Potential building footprints will not be exposed to radiant heat levels exceeding 29kW/m ²	APZs are provided in accordance with Tables A1.12.2 and A1.12.5 based on the FFDI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Refer Section 2.3. APZ is encompassed entirely on the Riverside Drive
APZs are managed and maintained to prevent the spread of a fire towards the building	APZs are managed in accordance with the requirements of Appendix 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The APZ consists of landscaped areas, roads and turfed areas.
The APZ is provided in perpetuity	APZs are wholly within the boundaries of the development site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	APZ is encompassed entirely on Riverside Drive
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	The APZ is located on lands with a slope of less than 18°	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. All slopes are less than 18 degrees.
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions	Landscaping is in accordance with Appendix 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be a condition of consent
	Fencing is constructed in accordance with section 7.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be a condition of consent (see Note 1 below).

Note 1: Section 7.6 of PBP states that all fences in bush fire prone areas should be made of either hardwood or non-combustible material. However, in circumstances where the fence is within 6m of a building or in areas of BAL 29 or greater, they should be made of non-combustible material only.

3.2 Building protection

Building construction standards for proposed future construction located within 100m of bushfire prone land are to be applied in accordance with *AS3959 Construction of buildings in bushfire prone areas (2018)* and Section 7.5 of *Planning for Bush Fire Protection 2019*. Building construction standards have been outlined within Table 2-2.

With consideration of the residual risk posed to the site, a construction standard of BAL 12.5 is recommended.

3.3 Hazard management

APZs are required to be managed as an IPA in accordance with RFS guidelines *Standards for Asset Protection Zones* (RFS, 2005), with landscaping design to comply with Appendix 4 of *PBP*. Appendix 2 provides maintenance advice for vegetation within the APZ.

The proposed APZs comprise public roadways and land under control of the proponent.

3.4 Access for firefighting operations

As depicted below, there is no new road network proposed or required for these two lots, with infrastructure and access available from Riverside Drive.

The proposal's compliance with the acceptable solutions outlined in *PBP 2019* is detailed within Table 3-2 below.

Table 3-2 – Performance criteria for access within Residential Subdivisions (*PBP 2019*) Guidelines pg. 44)

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
ACCESS (GENERAL REQUIREMENTS)	Firefighting vehicles are provided with safe, all-weather access to structures.	Property access roads are two-wheel drive, all-weather roads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies.
		Perimeter roads are provided for residential subdivisions of three or more allotments.	N/A	N/A	Complies.
		Subdivisions of three or more allotments have more than one access in and out of the development.	N/A	N/A	Complies.
		Traffic management devices are constructed to not prohibit access by emergency services vehicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
		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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. All roads are sealed.
		All roads are through roads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
		Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200m in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
		Where kerb and guttering are provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.	N/A	N/A	No perimeter road required.
		Where access / egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.	N/A	N/A	Complies
		One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All roads are two (2) way.

<i>Performance criteria</i>		<i>Acceptable solution</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
	The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges / causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges / causeways are to clearly indicate load rating.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
		Hydrants are provided in accordance with AS 2419.1:2005.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
		There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Reticulated water is provided.

<i>Performance criteria</i>		<i>Acceptable solution</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
PERIMETER ROADS	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational	Are two-way sealed roads.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies.
		Minimum 8m carriageway width kerb to kerb.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. All roads (existing) are minimum 8m.
		Parking is provided outside of the carriageway width.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies.
		Hydrants are located clear of parking areas.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be a condition of consent.

Performance criteria	Acceptable solution	Acceptable solution	Performance solution	Comment
environment for emergency service personnel during firefighting and emergency management on the interface.	There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies.
	Curves of roads have a minimum inner radius of 6m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
	The maximum grade road is 15° and average grade is 10°.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
	The road crossfall does not exceed 3°.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies

Performance criteria	Acceptable solution	Acceptable solution	Performance solution	Comment
NON-PERIMETER ROADS	Minimum 5.5m carriageway width kerb to kerb.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. All roads (existing) are minimum 8m.
	Parking is provided outside of the carriageway width.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies. Parking is provided outside of the 5.5m carriageway width.
	Hydrants are located clear of parking areas.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
	Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
	Curves of roads have a minimum inner radius of 6m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
	The road crossfall does not exceed 3°.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies

	<i>Performance criteria</i>	<i>Acceptable solution</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
PROPERTY ACCESS	Firefighting vehicles can access the dwelling and exit the property safely.	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	All allotments are provided with direct frontage to the public road system. No further requirements are necessary.

3.5 Water supplies

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of bushfire. Table 3-3 outlines the proposal's compliance with the acceptable solutions for reticulated water supply.

Table 3-3 – Performance criteria for reticulated water supplies (PBP guidelines pg. 47)

<i>Performance criteria</i>	<i>Acceptable solutions</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
Adequate water supplies are provided for firefighting purposes.	Reticulated water is to be provided to the development, where available.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Reticulated water is available to the development.
	A static water supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed	N/A	N/A	Reticulated water is available to the development.
	Static water supplies shall comply with Table 5.3d.	N/A	N/A	
Water supplies are located at regular intervals.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005.	<input type="checkbox"/>	<input type="checkbox"/>	Complies. Hydrants are exiting and located in Riverside Drive.
The water supply is accessible and reliable for	Hydrants are not located within any road carriageway.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
firefighting operations.	Reticulated water supply to urban subdivisions uses a ring main system for areas for areas with perimeter roads.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complies
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Above ground water storage tank shall be of concrete or metal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.

3.6 Gas

The intent of measures is to locate gas so as not to contribute to the risk of fire to a building. Table 3-4 outlines the required acceptable solutions for gas supply.

Table 3-4 – Performance criteria for gas supplies (PBP Guidelines pg. 47)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Location of gas services will not lead to the ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas bottles are to be installed and maintained in accordance with AS/NZS 1596 (2014), the requirements of relevant authorities and metal piping is to be used.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	All fixed gas cylinders are to be kept clear of flammable materials to a distance of 10m and shielded on the hazard side.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Connections to and from gas cylinders are metal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Polymer sheathed flexible gas supply lines are not used.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.
	Above ground gas service pipes are metal, including and up to any outlets.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be made a condition of consent.

3.7 Electricity

The intent of measures is to locate electricity so as not to contribute to the risk of fire to a building. Table 3-5 outlines the required acceptable solutions for the subdivision's electricity supply.

Table 3-5 – performance criteria for electricity services (PBP guidelines pg. 47)

<i>Performance criteria</i>	<i>Acceptable Solutions</i>	<i>Acceptable solution</i>	<i>Performance solution</i>	<i>Comment</i>
Location of electricity services limit the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Transmission lines already in place Underground.
	Where overhead electrical transmission lines are proposed: lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.	N/A	N/A	Transmission lines already in place Underground.

3.8 Cultural heritage

A search of the Aboriginal Heritage Information Management System (AHIMS) carried out on 19 January 2022 showed records of no cultural heritage sites located within or near (200m) the subject site.

3.9 Environmental values

Vegetation mapping of the site shows no significant environmental values.

4. CONCLUSION & RECOMMENDATIONS

4.1 Conclusion

This bushfire protection assessment has been undertaken for the proposed amalgamation of lots (Lot 1216/DP11833020 and a section of Elizabeth walkway) and the construction of a boarding house at 189 Riverside Drive, Airds.

This assessment has found that bushfire can potentially affect the proposed development from the bushland vegetation to the south of the development resulting in future buildings being exposed to potential radiant heat and ember attack.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZs in accordance with the use of an alternative solution to determine minimum APZ and bushfire attack level (BAL) setbacks.
- Provision of access in accordance with the acceptable solutions outlined in *PBP 2019*;
- Water, electricity and gas supply to comply with the acceptable solutions outlined in *PBP 2019*;
- Future construction to comply with the appropriate construction sections of *AS3959-2018*, and *PBP 2019*.

The following recommendations are provided to ensure that the development is in accordance with, or greater than, the requirements of *PBP*.

Recommendations

Recommendation 1 - The development is as generally indicated on the attached SCHEDULE 1 - Plan of Bushfire Protection Measures .

Recommendation 2 - APZs are to be provided to the proposed development as outlined in Table 2-2 and as generally depicted within SCHEDULE 1.

Recommendation 3 - Access is to comply with the acceptable solutions outlined in Section 5.3.2 of *Planning for Bush Fire Protection 2019*.

Recommendation 4 - Building construction standards for the proposed construction within 100m of bushfire prone land are to be applied in accordance with *AS3959 Construction of buildings in bushfire prone areas (2018)*, and *Planning for Bush Fire Protection 2019*. The recommended construction standard is minimum BAL 12.5.

Recommendation 5 - Water, electricity and gas supply is to comply with Section 5.3.3 of *Planning for Bush Fire Protection 2019*.

Recommendation 6 - Fencing is to comply with Section 7.6 of PBP. All fences in bush fire prone areas should be made of either hardwood or non-combustible material. However, in circumstances where the fence is within 6m of a building or in areas of BAL 29 or greater, they should be made of non-combustible material only.

5. REFERENCES

- Australian Building Codes Board (2010) – *Building Code of Australia, Class 1 and Class 10 Buildings Housing Provisions Volume 2.*
- Chan, K.W. (2001) – *The suitability of the use of various treated timbers for building constructions in bushfire prone areas.* Warrington Fire Research.
- Councils of Standards Australia AS3959 (2018) – *Australian Standard Construction of buildings in bush fire-prone areas.*
- Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT.* The Department of Environment and Climate Change.
- Rural Fire Service (2019) - *Planning for bushfire protection – a guide for councils, planners, fire authorities and developers.* NSW Rural Fire Service.
- Tan, B., Midgley, S., Douglas, G. and Short (2004) - *A methodology for assessing bushfire attack.* RFS Development Control Service.

SCHEDULE 1. PLAN OF BUSHFIRE PROTECTION MEASURES

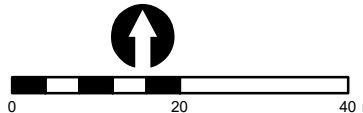


DISCLAIMER: CAD not georeferenced & has been aligned to georef CAD 4289DT01e1-Model_v2000.dwg verification required prior to finalisation

Legend

- Site boundary (source - LPI)
- Asset Protection Zone (APZ)
- Cadastre (source:LPI 2020)
- Plant Community**
- Contour 1m (source - LiDAR)
- Sydney Hinterland Dry Sclerophyll Forests

Aerial source: Nearmap



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

PROJECT & MXD REFERENCE
189 Riverside Drive, Airs
20PIE07_BF001

DATE & ISSUE NUMBER
3/01/2023
Issue 1
KM

SCALE & COORDINATE SYSTEM
1:900 @A3
GDA 1994 MGA Zone 56

TITLE
Schedule 1 - Bushfire Prevention Measures

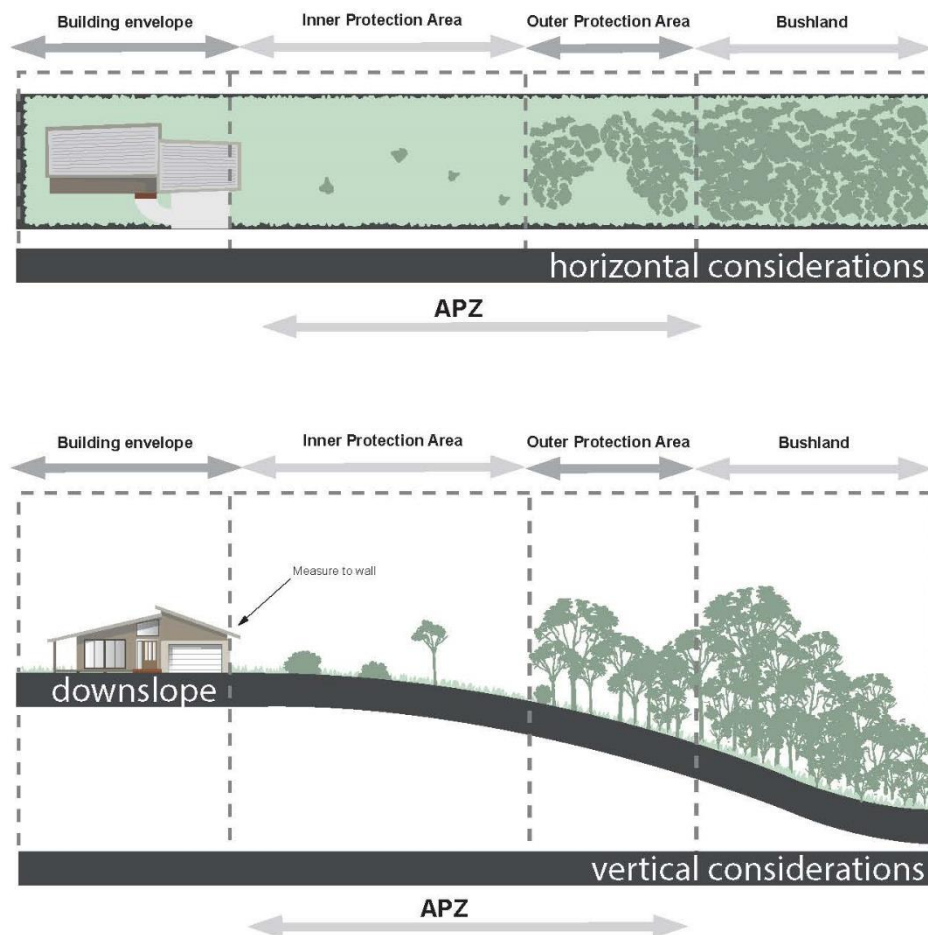
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APPENDIX 1. MANAGEMENT OF ASSET PROTECTION ZONES

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 4 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. The property is to be managed to IPA standards only. A typical APZ is graphically represented below.



APZs and progressive reduction in fuel loads

(Source: *PBP*, 2019)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought regarding vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following table adapted from *PBP 2019* provides maintenance advice for vegetation within the IPA and OPA. The APZ is to be maintained in perpetuity and maintenance should be undertaken regularly, particularly in advance of the bushfire season

	Inner Protection Area	Outer Protection Area
Trees	<ul style="list-style-type: none"> ➤ Tree canopy cover should be less than 15% at maturity; ➤ Trees at maturity should not touch or overhang the building; ➤ Lower limbs should be removed up to a height of 2m above the ground; ➤ Tree canopies should be separated by 2 to 5m; and ➤ Preference should be given to retaining smooth barked and evergreen trees. 	<ul style="list-style-type: none"> ➤ Tree canopy cover should be less than 30%; and ➤ Canopies should be separated by 2 to 5m.
Shrubs	<ul style="list-style-type: none"> ➤ Large discontinuities or gaps in the vegetation should be provided to slow down or break the progress of fire towards buildings; ➤ Shrubs should not be located under trees; ➤ Shrubs should form less than 10% ground cover; and ➤ Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation. 	<ul style="list-style-type: none"> ➤ Shrubs should not form a continuous canopy; and ➤ Shrubs should form less than 20% of ground cover.
Grass and Leaf Litter	<ul style="list-style-type: none"> ➤ Grass should be kept mown to a height of less than 100mm; and ➤ Leaves and other debris should be removed 	<ul style="list-style-type: none"> ➤ Grass should be kept mown to a height of less than 100mm; and ➤ Leaf and other debris should be removed.
	All Management Zones	
Weeds	<ul style="list-style-type: none"> ➤ All weeds should be removed in accordance with best practice guidelines, and measures taken to prevent their further spread 	
Landscaping	<ul style="list-style-type: none"> ➤ Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways; ➤ Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come into contact with the building; ➤ When considering landscape species consideration needs to be given to estimated size of the plant at maturity; ➤ Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies; ➤ Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown; ➤ Avoid planting of deciduous species that may increase fuel at surface / ground level (i.e., leaf litter); ➤ Avoid climbing species to walls and pergolas; ➤ Locate combustible materials such as woodchips / mulch, flammable fuel stores away from the building; ➤ Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and ➤ Use of low flammability vegetation species. 	

APPENDIX 2. AHIMS SEARCH



AHIMS Web Services (AWS) Search Result

Your Ref/PO Number : 189 Riverside Drive

Client Service ID : 652774

Morgan Jeffery

Date: 19 January 2022

52 The Avenue

Kariong New South Wales 2099

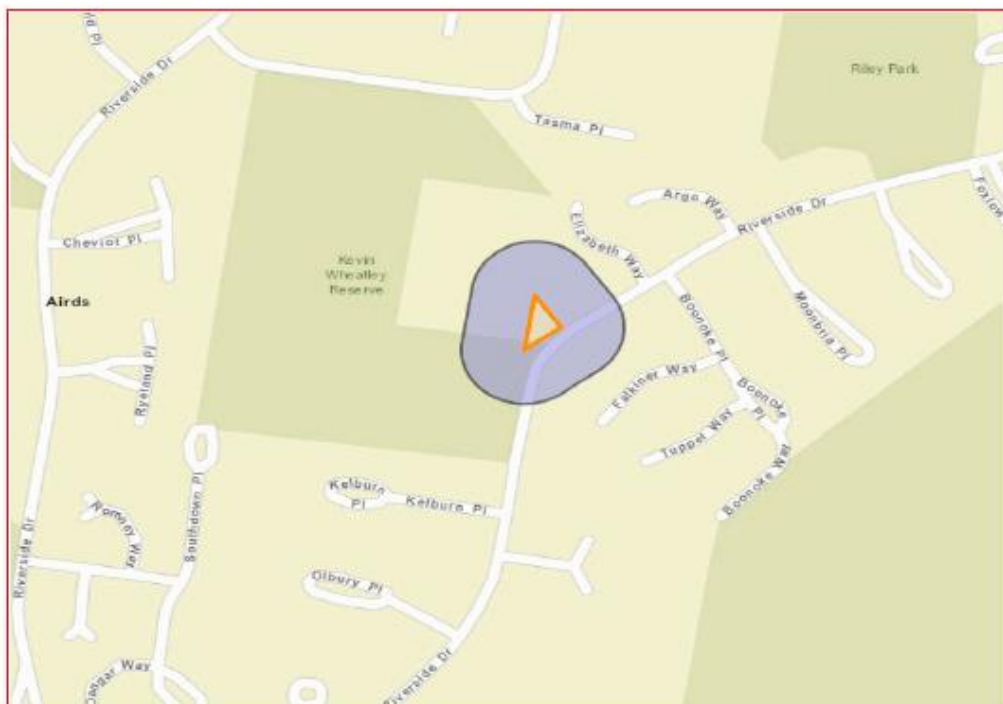
Attention: Morgan Jeffery

Email: mjeffery@traverseecology.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 84, DP:DP609357, Section : - with a Buffer of 50 meters, conducted by Morgan Jeffery on 19 January 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *



AHIMS Web Services (AWS) Search Result

Your Ref/PO Number : 189 Riverside Drive

Client Service ID : 652780

Morgan Jeffery

Date: 19 January 2022

52 The Avenue

Kariong New South Wales 2099

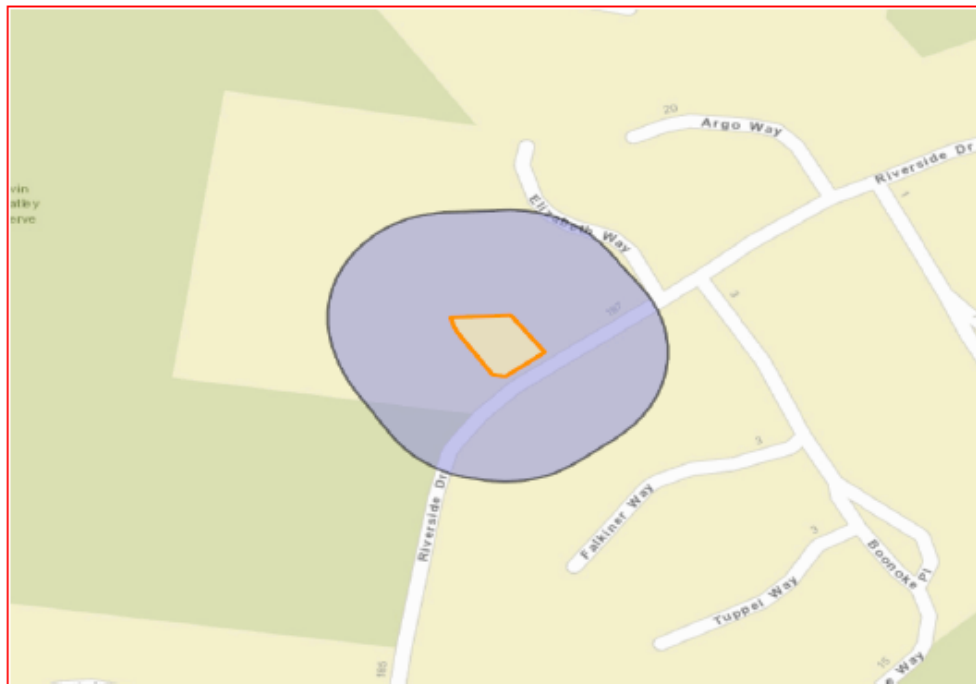
Attention: Morgan Jeffery

Email: mjeffery@traverseecology.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 1216, DP:DP1183302, Section : - with a Buffer of 50 meters, conducted by Morgan Jeffery on 19 January 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

APPENDIX 3. CLIENT SUPPLIED PLANS

NOTIFICATION PLANS

BOARDING HOUSE DEVELOPMENT

189 RIVERSIDE DR, AIRDS, NSW 2560 LOT: 1216 / DP: 1183302 / DP: 609357



01 RIVERSIDE DRIVE PERSPECTIVE

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ISSUE	DATE	AMENDMENTS
06	22.12.07	DA ISSUE
07	22.11.16	DA ISSUE
08	22.10.04	DA ISSUE
05	22.07.25	REVISED DA ISSUE



CLIENT
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LOCKED BAG 5022

PARRAMATTA NSW 2124
P: 1800 738 718

PROJECT
**BOARDING HOUSING
DEVELOPMENT**
LOT: 1216 / DP: 1183302
189 RIVERSIDE DR, AIRDS, NSW 2560

TITLE
NOTIFICATION COVER

SCALE
N/A

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DRAWN
CHECKED
DATE
STATUS

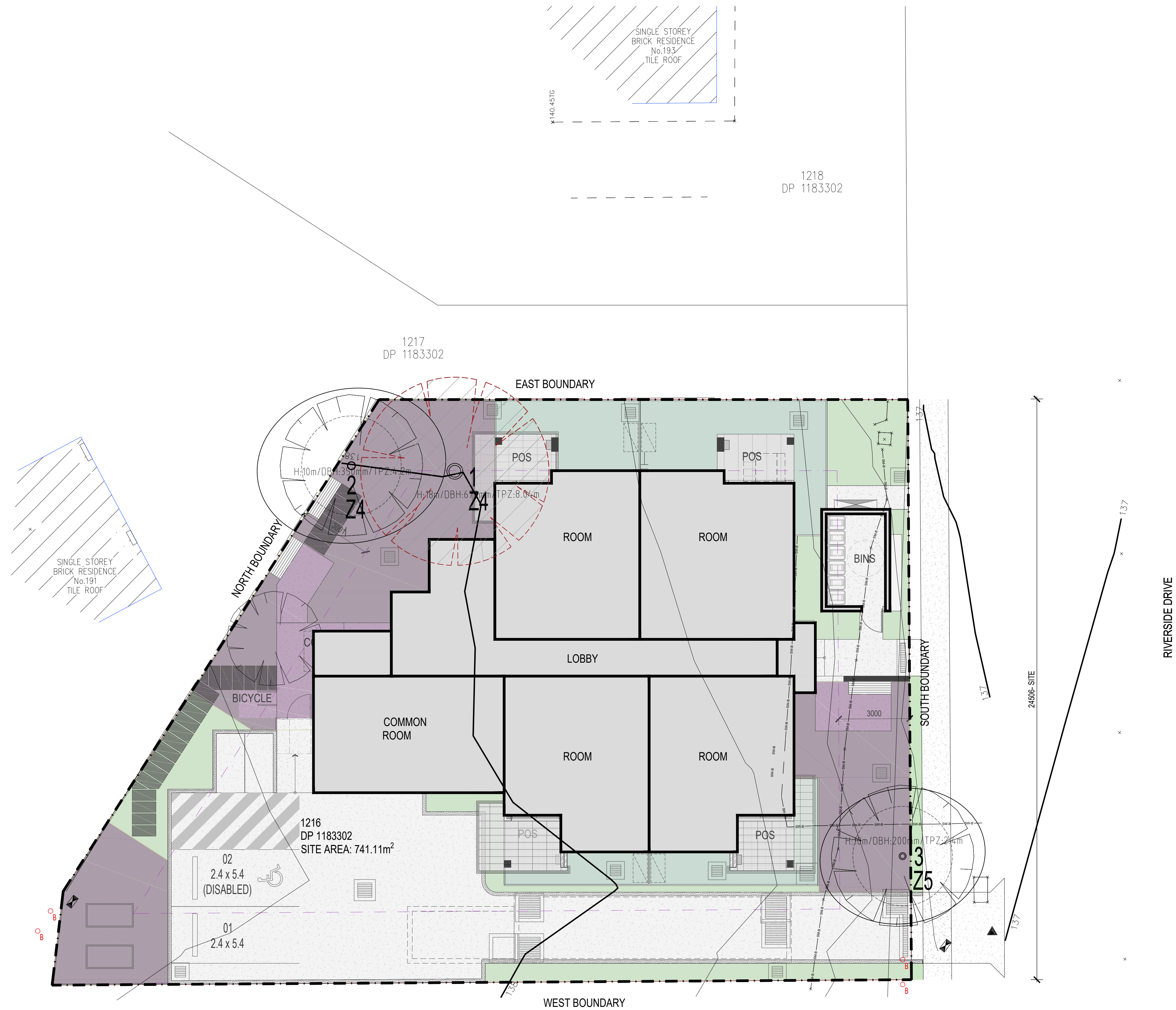
PROJECT NUMBER
20035

DRAWING NUMBER
A700

ISSUE
08

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- LEGEND - TREE
- TREE: EXISTING TO BE REMOVED
 - TREE: EXISTING TO BE RETAINED
 - PROPOSED LANDSCAPING
- PRIVATE OPEN SPACE (LANDSCAPED)
LANDSCAPE
COMMUNAL OPEN SPACE
CARPARK
PATHWAY

01 GROUND FLOOR PLAN

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02	22.05.18	REVISED DA ISSUE
01	22.04.13	DA ISSUE

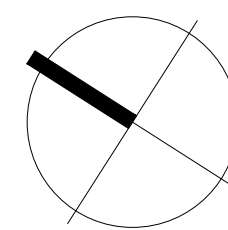


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PROJECT
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DEVELOPMENT
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189 RIVERSIDE DR, AIRDS, NSW 2560

TITLE
NOTIFICATION PLAN



SCALE
1:100 @ A1 / 1:200 @ A3

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DATE
STATUS

CHECKED
OCT 2022
CONSTRUCTION

PROJECT NUMBER
DRAWING NUMBER

20035

A701

ISSUE

04

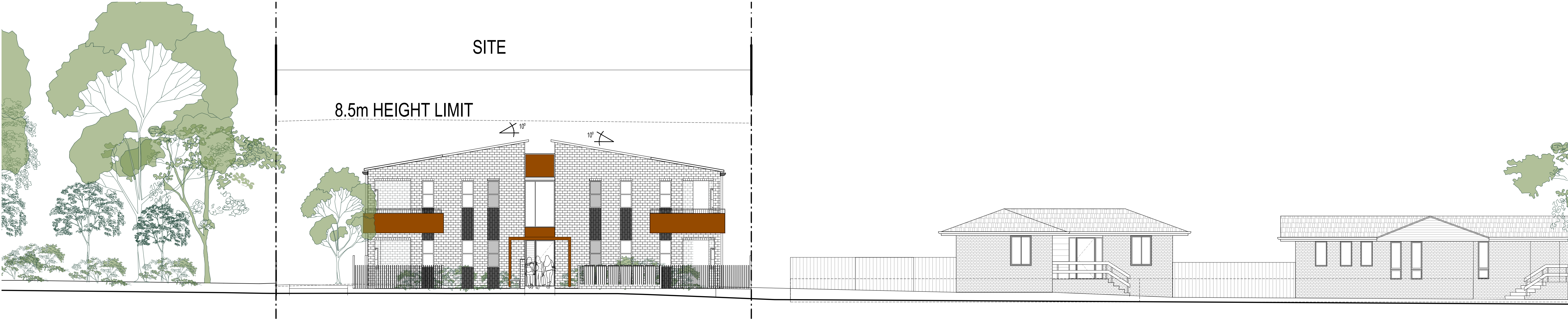


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NOTIFICATION PLANS

BOARDING HOUSE DEVELOPMENT

189 RIVERSIDE DR, AIRDS, NSW 2560 LOT: 1216 / DP: 1183302 / DP: 609357



01 STREETVIEW ELEVATION - RIVERSIDE DRIVE
1:100

DEVELOPMENT DATA				
SITE AREA PROPOSED (sqm)	741.11			
PROPOSED GFA (sqm)	411.07			
NUMBER OF DWELLINGS	8 rooms - 8 Studios (100%)			
BUILDING HEIGHT	Housing SEPP	9m	7.64m	
LOT SIZE	Housing SEPP	600sqm	741.11sqm	
FSR	Campbelltown LEP		0.55:1	0.55
PARKING	Housing SEPP	Accessible	8 x 0.2 = 1.6 car spaces	2 spaces
MOTORCYCLE	Housing SEPP		8 / 5 = 2 motorcycle spaces (Min. 1 motorcycle space per 5 rooms)	2 spaces
BICYCLE	Housing SEPP		8 x 1.0 = 8 bicycle spaces (Min. 1 bicycle space per room)	8 spaces
SETBACKS	Campbelltown Sustainable City DCP Vol.1 (Boarding houses s.17.2.3)	Front Setback	5.5m	3.91m
		Side Setback	0.9m (ground) 1.5m (above ground level) (Note: Min. 1.5m MDH* under DCP Vol.2 s.7.7)	1.5m
		Rear Setback	5m (ground) 10m (above ground level) (Note: Min. 4m MDH* under DCP Vol.2 s.7.7)	4m

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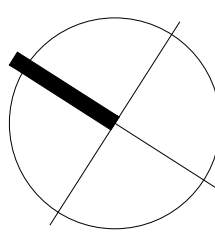
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03	22.07.14	REVISED DA ISSUE
02	22.06.18	REVISED DA ISSUE
01	22.04.13	DA ISSUE
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PROJECT
BOARDING HOUSING DEVELOPMENT
LOT: 1216 / DP:1183302
189 RIVERSIDE DR, AIRDS, NSW 2560

TITLE
DEVELOPMENT DATA



SCALE
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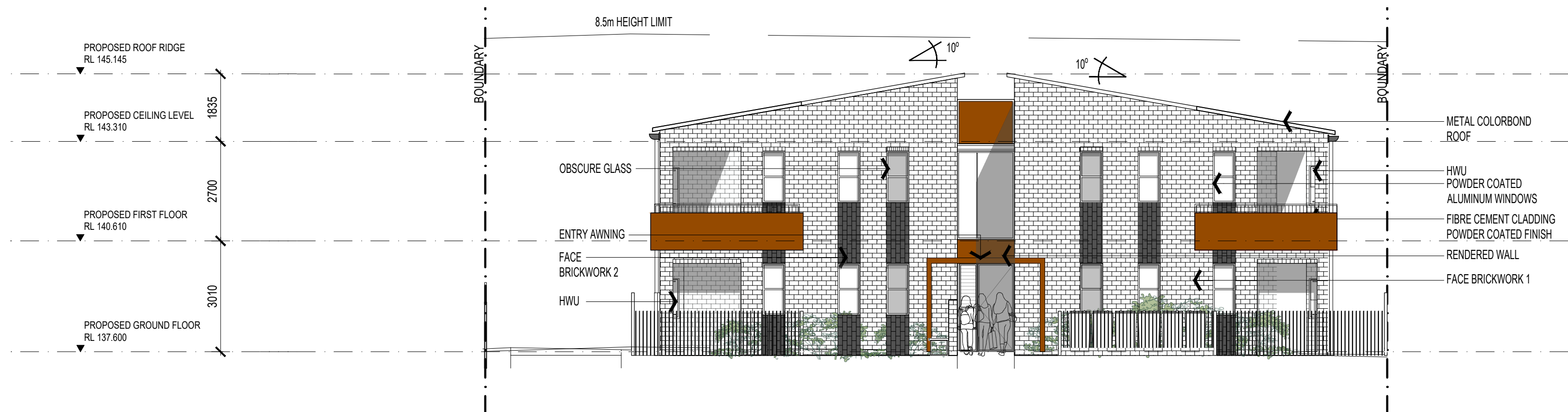
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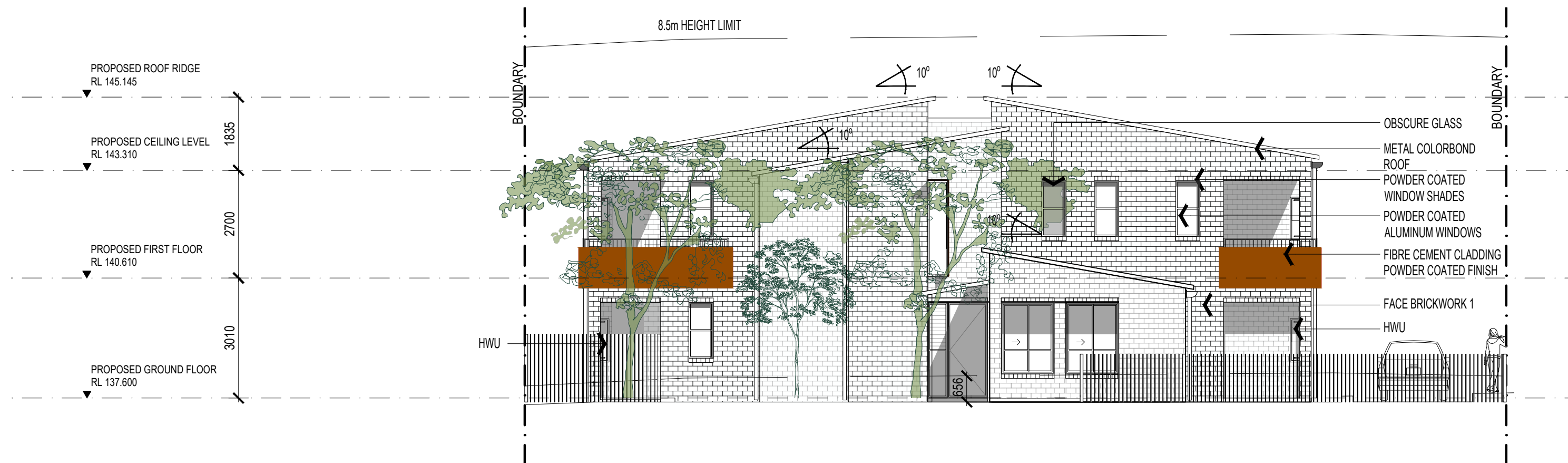
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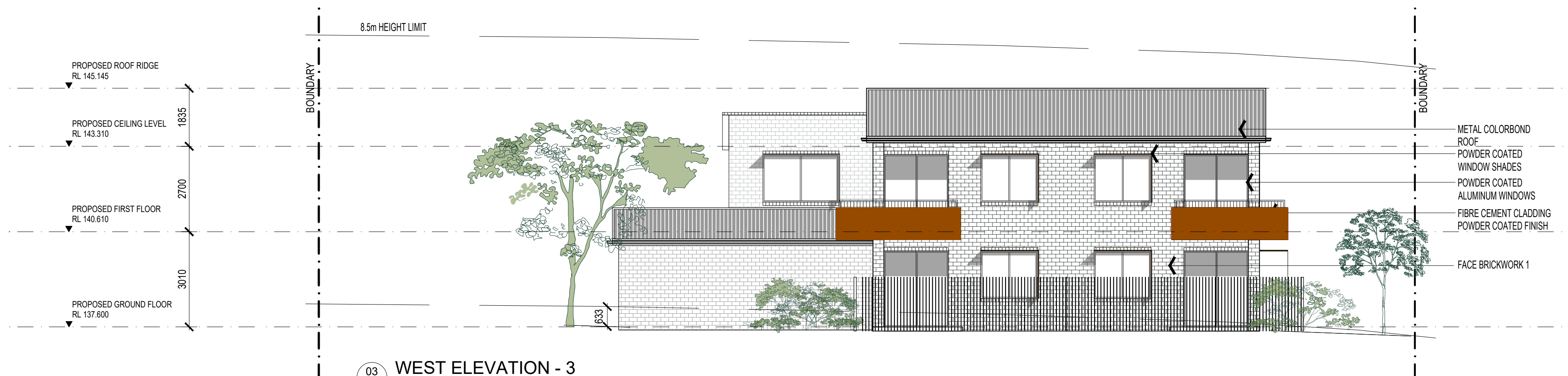




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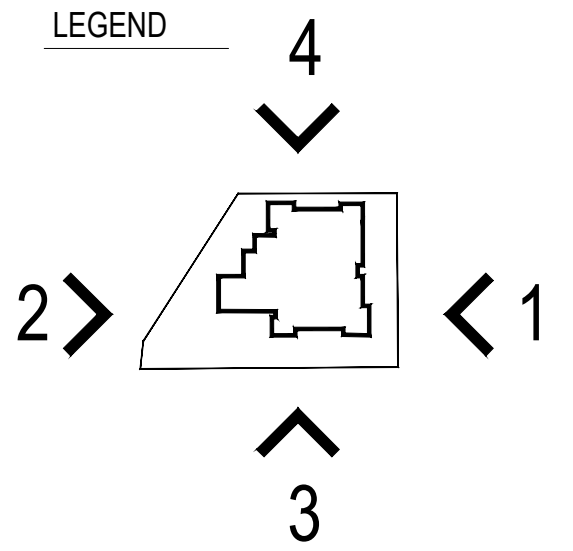
02 NORTH ELEVATION - 2



03 WEST ELEVATION - 3



04 EAST ELEVATION - 4



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05	22.07.25	REVISED DA ISSUE
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03	22.05.31	REVISED DA ISSUE
02	22.05.18	REVISED DA ISSUE
01	22.04.13	DA ISSUE



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PROJECT
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DEVELOPMENT**
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189 RIVERSIDE DR, AIRDS, NSW 2560

TITLE
NOTIFICATION ELEVATIONS

SCALE
1:100 @ A1

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CHECKED JC
DATE OCT 2020
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PROJECT NUMBER
20035

DRAWING NUMBER
A703

ISSUE
07





EXTERNAL FINISHES

ELEMENTS	MATERIALS	CODE	FINISHES / COLOUR / MANUFACTURER
ROOF	METAL CLADDING	MC-1	FIELDERS SHADOWLINE 305 OR SIMILAR COLORBOND COLOUR: DUNE MATT
FACIA, GUTTER / DOWNPIPE	METAL CLADDING	MC-2	FIELDERS OR SIMILAR COLORBOND COLOUR: MONUMENT MATT
WALLS	BRICK	BF-1	AUSTRAL BRICKS - NUBRIK ARTISAN - AURORA OR SIMILAR
	BRICK	BF-2	AUSTRAL BRICKS - METALLIX - BLACKSTONE OR SIMILAR
	RENDER	CF-1	DULUX COLOUR: TERRAIN
WINDOW AND DOORS	ALUMINIUM FRAME WITH STANDARD LAMINATED GLASS TO BCA & BASIX	AF-1	COLORBOND COLOUR: MONUMENT MATT
FENCING	STEEL FENCING	FF-1	COLORBOND FENCING COLOUR : DUNE
WINDOW SHADES AND AWNING	ALUMINIUM AWNING	SF-1	HEKA HOODS CORE SERIES COLORBOND COLOUR : TERRAIN
WINDOW SHADES AND AWNING	FIBRE CEMENT CLADDING	FC-1	POWDER COATED FINISH COLORBOND COLOUR : TERRAIN

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01	22.04.13	DA ISSUE
ISSUE	DATE	AMENDMENTS

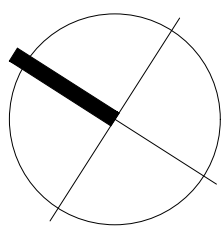


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PROJECT
**BOARDING HOUSING
DEVELOPMENT**
LOT: 1216 / DP:1183302
189 RIVERSIDE DR, AIRDS, NSW 2560

TITLE
**NOTIFICATION
FINISHES SCHEDULE**



SCALE
1:100 @ A1

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20035

A704

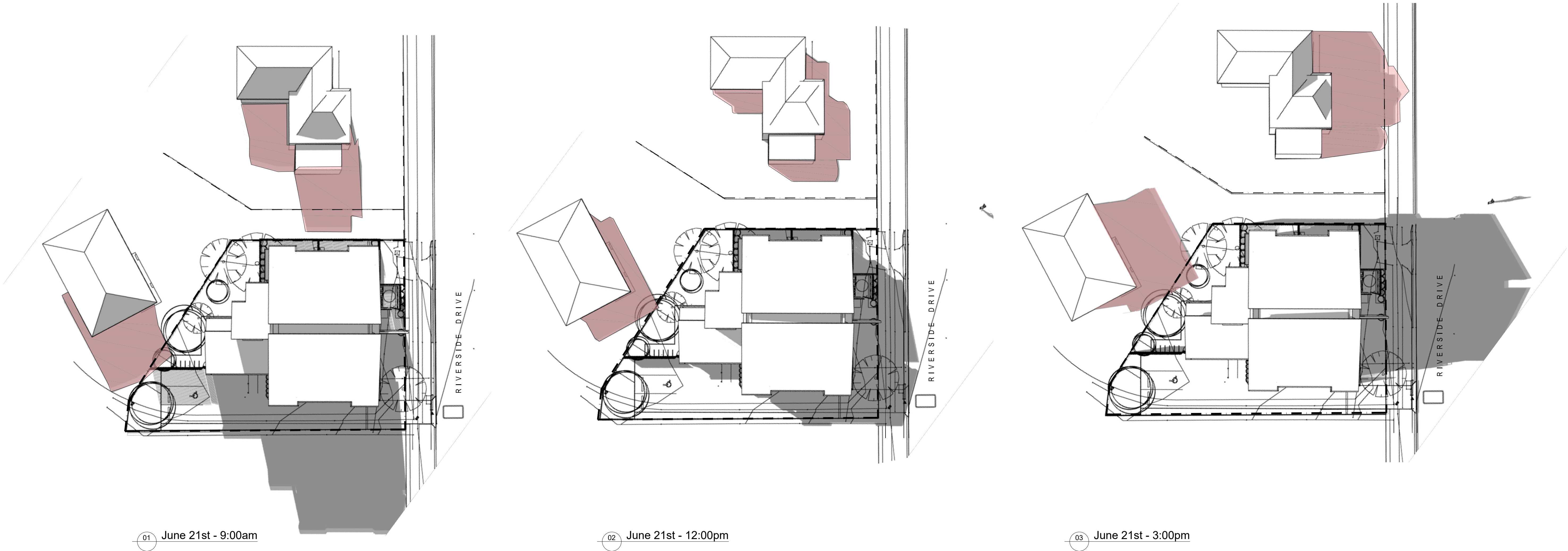
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07



LEGEND

SHADOWS CAST BY NEIGHBOURING BUILDINGS

SHADOWS CAST BY PROPOSED DEVELOPMENT



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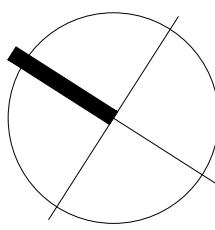
PROJECT

**BOARDING HOUSING
DEVELOPMENT**
LOT: 1216 / DP:1183302

189 RIVERSIDE DR, AIRDS, NSW 2560

TITLE

SHADOW DIAGRAMS



SCALE

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OCT 2020

STATUS
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PROJECT NUMBER

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DRAWING NUMBER

A705

ISSUE

06

