Bushfire Protection Assessment

Loreto Normanhurst School Campus

Concept Proposal & Boarding House

Prepared for
Loreto Normanhurst

10 January 2019

DOCUMENT TRACKING

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1 Property and proposal

1.1 Introduction

This report supports a State Significant Development Application (SSDA) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This application is SSD by way of clause 8 and schedule 1 under *State Environmental Planning Policy (State and Regional Development) 2011* on the basis that the development is for the purpose of an existing school and has a Capital Investment Value of more than $20 million.

Specifically, this application relates to a staged SSDA within the meaning of Section 4.12 of the EP&A Act, with this application being the Concept Proposal for a new site wide masterplan for the existing Loreto Normanhurst School at 91 – 93 Pennant Hills Road, Normanhurst. In addition, consent is also sought for the Stage 1 detailed design works for a new on campus student boarding facility, landscaping works, and some demolition works to the buildings between Mary Ward and existing dining room building and associated works to make good existing.

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project by DPE, ref no SEAR 8996 issued on 12 January 2018.

1.2 Background

1.2.1 Need for a Campus Masterplan

Loreto Normanhurst is an independent, Catholic day and boarding school for girls from Years 5 to 12. The existing school campus was established in 1897 and has evolved in an organic and ad-hoc manner across the span of a 120 years.

A new campus wide planning approach offers the opportunity to strategically review and plan for the campus' future in a sustainable and efficient manner such that the campus' unique aesthetic and ecological values are best preserved. The preparation of a campus wide masterplan is also consistent with the School's 'Loreto Normanhurst 2016 - 2020 Strategic Plan' which identified the need for a broader strategic plan to coordinate renewal and orderly development in a feasible and staged manner.

1.2.2 Early Learning Centre

A separate DA (D/1227/2018) has been submitted to Hornsby Shire Council on 23 November 2018 for an 80 place Early Learning Centre (ELC) building and the DA is currently under assessment. The ELC building is consistent with the overall concept masterplan, and was prepared concurrently with the final preferred campus masterplan. However, to meet the School's operational timeframe requirements for the ELC, a separate application was seen to be best pathway to allow the building to be built, fitout and operational by 2021.

1.2.3 The Site

Loreto Normanhurst is located within the suburb of Normanhurst on Sydney's Upper North Shore approximately 3km south of Hornsby and 25km north of Sydney CBD. The school is located in the local government area of Hornsby Shire Council, approximately 750m south of the Normanhurst Railway Station. The locational context of the site is illustrated at **Figure 1**.

The site comprises the existing campus grounds of the Loreto Normanhurst school at 91 – 93 Pennant Hills Road, Normanhurst. The northern part of the site accommodates much of the school's existing built form, while the rear extent consists of the school's sporting fields, and a portion of largely undeveloped land covered in remnant vegetation.

The campus itself is bound by Pennant Hills Road (to the north), Osborn Road (to the west) and Mount Pleasant Avenue (to the east). Detached dwellings on individual residential lots abut the southern boundary of the site. An aerial photograph of the site is provided at **Figure 2** below.

Figure 2 provides an aerial map of the site and its immediate surrounds.

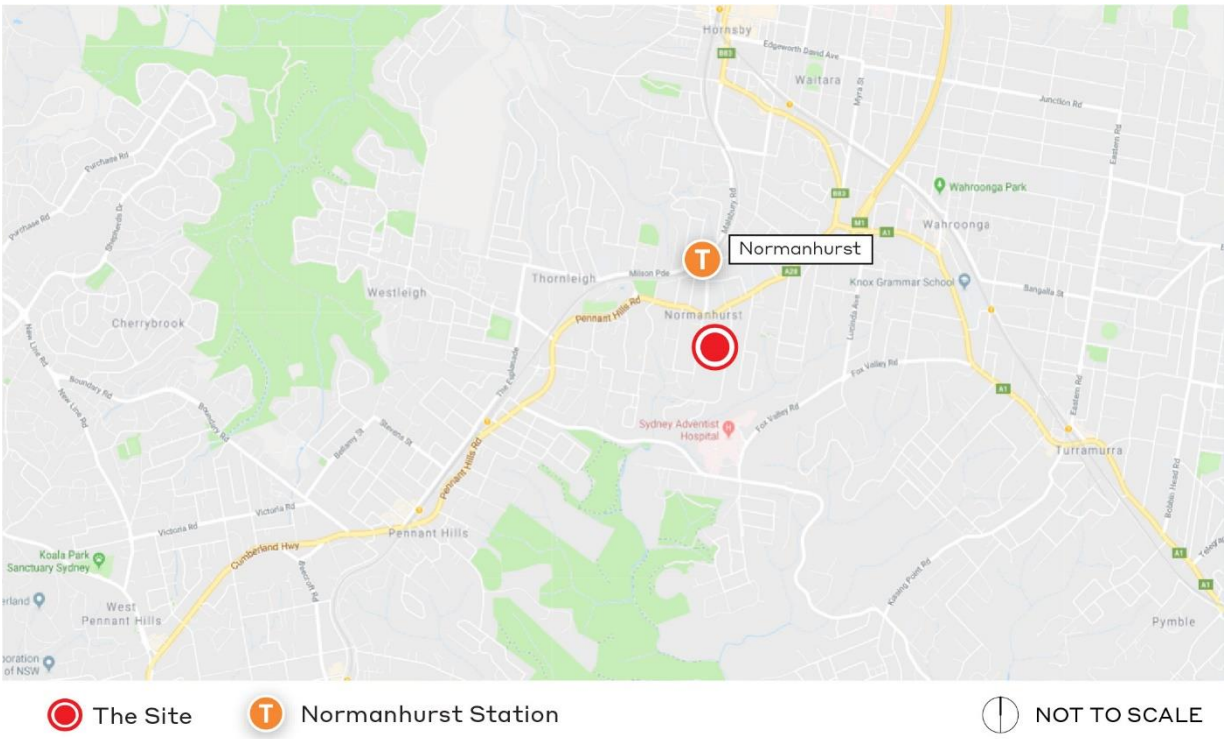

Figure 1: Loreto Normanhurst Campus Location Context Plan

Source: Ethos Urban

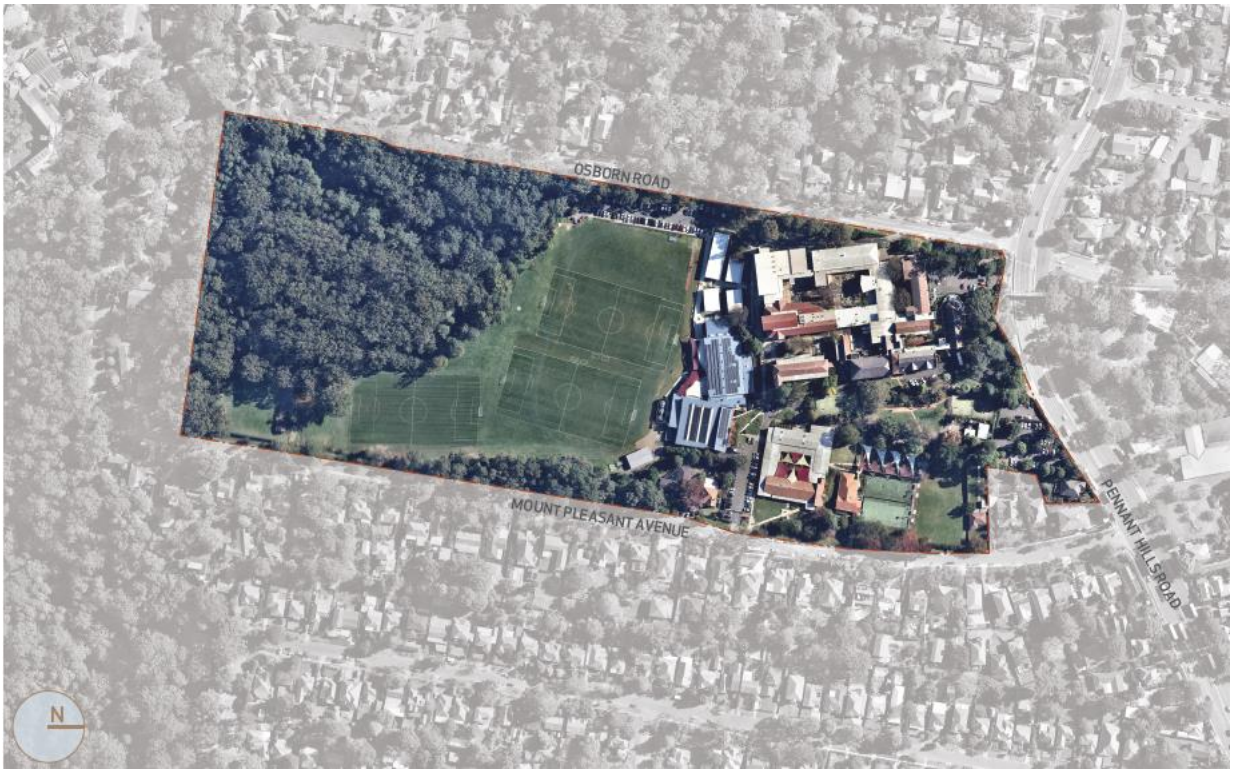

Figure 2: Aerial Image of Loreto Normanhurst Campus

Source: AJ+C Architects

1.2.4 Legal Description and Ownership

The campus comprises several allotments, the legal descriptions of which are provided in **Table 1** below. The existing campus has a site area of approximately 13.02ha. The site in its entirety is owned by the Trustees of the Loreto Property Association.

Table 1: Subject site summary

Address	Lot	Plan
16 Mount Pleasant Avenue	Lot 5	DP 1218765
	Lot 16	DP 6612
30 – 62 Mount Pleasant Avenue	Lots 20 – 23 and 25 – 36	DP 6612
	Lot 1	DP 34834
91 – 93 Pennant Hills Road	Lot 1	DP 114580
	Lot 3	DP 1217496
	Lot 1 – Lot 3	DP 1218765
	Lot B	DP327538
24 – 28 Mount Pleasant Avenue	Lot 1	DP 809066
6 Mount Pleasant Avenue	Lot C	DP 366271
14 Mount Pleasant Avenue	Lot 4	DP1218765
89 Pennant Hills Road	Lot 1	DP136156

1.2.5 Overview of Proposed Development

This application sets out a new campus masterplan for the existing school campus that will guide and shape the development of the school campus for the next 30 years. This SSDA also includes detailed plans for the first stage of the concept proposal (Stage 1 works). Accordingly, consent is sought for the following:

- The concept masterplan, including:
  - Establishment of 10 new building envelopes across the site for education and ancillary uses including student accommodation;
  - Increase of the student number cap by 850 students from 1150 to 2000 students;
  - The open space and landscape design;
  - Pedestrian and circulation arrangements, and
  - Associated car parking provision.

- Detailed consent for Stage 1 works, being:
  - Construction of a new 3 to 6-storey boarding house to accommodate up to 216 boarders.
  - Excavation works to accommodate partially underground carpark and dock facilities within the proposed footprint of the new boarding house facility;
  - Demolition works to buildings between Mary Ward and existing dining room building and associated works to make good existing;
  - Landscaping works and removal and replacement of approximately 50 trees of varying significance; and
  - Augmentation of connection of services and utilities

1.3 Bushfire Assessment Summary

This report was commissioned by Loreto Normanhurst to investigate the bushfire protection requirements associated with the proposed development at 91-93 Pennant Hills Rd, Pennant Hills (the subject land) (**Figure 3**). The proposal consists of ten developments which consist of a mix of Special Fire Protection Purpose, Class 5-8 and Class 10 buildings, and an outdoor education chapel space (no building):

1. Boarding House (SFPP)
2. Secondary School (SFPP)
3. Future Development (to be determined) (SFPP)
4. Primary School (SFPP)
5. Mary Ward Building (SFPP)
6. Gymnasium (SFPP)
7. Gonzaga Barry Centre auditorium (SFPP)
8. Under ground car park and above ground ‘all weather’ sports field (Class 5-8)
9. Mount Pleasant Pavilion (Class 10)
10. Outdoor bush chapel space (Outdoor Education)

This assessment considered the entire concept proposal and separately the boarding house. The site consists of the existing Primary School, Secondary School, Gym, Hall, Auditorium, Function Centre, Function Centre, Aquatic Centre, outdoor Chapel space, administration buildings with maintained gardens and carpark on the north and west (**Figure 3**).

1.4 Assessment process

Being a Special Fire Protection Purpose (SFPP) development, the integrated development proposal was assessed in accord with Section 100B of the *Rural Fires Act 1997* and '*Planning for Bush Fire Protection 2006' (RFS 2006*), herein referred to as PBP (See **Appendix A** for a summary of the assessment process). This development is considered SFPP Infill and is therefore assessed against Infill requirements of PBP.

This proposal includes buildings considered Class 5-8 and Class 10. As stated within Section 4.3.6.f of PBP, the Building Code of Australia (BCA) does not provide for any bushfire specific performance requirements for the development type proposed. As such the Asset Protection Zone and building construction requirements of PBP and AS 3959-2009 do not apply as deemed-to-satisfy provisions for bushfire protection. The general building fire safety provisions required by the BCA for the type of construction proposed are accepted by PBP and RFS as acceptable protection from bushfires. However, depending on the type of development, the aim and objectives of PBP may still apply in relation to other matters of access, the provision of water and other services, emergency planning and landscaping.

Assessment included a review of background documentation, design team consultation, GIS analysis and a site inspection on 5 December 2018.

Table 2 identifies the bushfire protection measures assessed and whether these involved acceptable or performance solutions.

Table 2: Summary of bushfire protection measures assessed

Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	☑	☐	3.1
Construction standard	☑	☐	3.3
Access	☑	☐	3.4
Water supply	☑	☐	3.5.1
Gas and electrical supplies	☑	☐	3.5.2
Emergency and Evacuation planning	☑	☐	5

1.5 Bush fire prone land status

The proposed additions are located within land classified as bush fire prone on Hornsby Shire Council's bush fire prone land (BFPL) map[1].

https://www.hornsby.nsw.gov.au/environment/flora-and-fauna/fire-management2/bushfire-prone-land-map

Figure 3: Location and Proposed Boarding House

2 Bushfire threat assessment

Figure 4 shows the concept plan and **Figure 5** shows the boarding house for the effective slope and predominant vegetation representing the highest bushfire threat potentially posed to the proposed development site from various directions.

The 'predominant vegetation' influencing fire behaviour approaching the subject land has been assessed strictly in accordance with the methodology specified within PBP.

As shown in **Figure 4** and **Figure 5**, the primary bushfire hazard affecting the proposed development is vegetation located on the south of the subject land. This area of vegetation is approximately 3.5 ha in size and consists of Turpentine Ironbark Forest vegetation (OEH, 2013). This vegetation is classified as 'Forest' by PBP. The slope of the vegetation falls to the south and is considered within the slope categories 'downslope >0-5 degrees' on the south east and 'downslope >5-10 degrees' on the south west. Where the vegetation meets the managed sports field, the slope is relatively flat and the land well maintained. This is shown in Appendix B.

In all other directions, there are managed lands in the form of existing residential properties.

Figure 4 and **Table 3** show the vegetation and slope information assessed. Where required additional information is provided within **Table 3** on why and how the chosen slope and vegetation has been calculated.

The site is located within the Local Government Area (LGA) of Hornsby Shire Council and has a Fire Danger Index (FDI) of 100.

Figure 4: Concept Plan-Bushfire hazard assessment and Asset Protection Zones (APZ)

Figure 5: Boarding House -Bushfire hazard assessment and Asset Protection Zones (APZ)

3 Bushfire protection measures

3.1 Asset Protection Zones (APZ)

Special Fire Protection Purpose (SFPP) developments are required to achieve the APZ performance criteria of '*radiant heat levels not greater than 10kW/m^2 to be experienced by occupants or emergency services workers entering or exiting the building'.* This development is considered SFPP and has been assessed using the APZ in Table A2.6 PBP (2006).

Table 3 shows the dimensions of the Asset Protection Zones (APZ) that are established in each of the transect line directions; and where relevant, information on how the APZ is to be maintained is included.

3.2 APZ maintenance plan

The APZ within the subject land is existing and is to be maintained, including future landscaping, to Inner Protection Area standards as follows:

- No tree or tree canopy is to occur within 2 m of the future building rooflines;
- The presence of a few shrubs or trees in the APZ is acceptable provided they:
  - Are well spread out and do not form a continuous canopy;
  - Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
  - Are located far enough away from the building so that they will not ignite future buildings by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species;
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (fine fuel means ANY dead or living vegetation of <6 mm in diameter e.g. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter); and
- Any structures storing combustible materials such as firewood (e.g. sheds) must be sealed to prevent entry of burning debris.

Further details on APZ implementation and management can be found on the NSW RFS website including:

https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf.

Table 3: Bushfire hazard assessment and APZ requirements

Building / Development	Direction	Slope[1]	Vegetation[2]	PBP required APZ (SFPP)[3]	Existing APZ	AS 3959-2009 Bushfire Attack Level (BAL)[4]	Comments
1- Boarding House	South	Downslope >0 to 5 degrees	Forest	70 m	113 m	BAL-LOW	APZ is existing and includes well maintained sports fields.
2-Secondary School	South	Downslope >5 to 10 degrees	Forest	85 m	156 m	BAL-LOW	APZ is existing and includes well maintained sports fields.
3-Future Development	South	Downslope >5 to 10 degrees	Forest	85 m	341 m	BAL-LOW	APZ is existing and includes well maintained sports fields.
4-Boarding	South	Downslope >0 to 5 degrees	Forest	70 m	212 m	BAL-LOW	APZ is existing and includes well maintained sports fields.
5- Mary Ward	South	Downslope >0 to 5 degrees	Forest	70 m	155 m	BAL-LOW	APZ is existing and includes well maintained sports fields.
6- Gymnasium	South	Downslope >0 to 5 degrees	Forest	70 m	127 m	BAL-LOW	APZ is existing and includes well maintained sports fields.
7-Gonzaga Barry Centre	South	Downslope >5 to 10 degrees	Forest	85 m	107 m	BAL 12.5	APZ is existing and includes well maintained sports fields.
8-Underground car park	South	Downslope >5 to 10 degrees	Forest	85 m	0 m	Not applicable	A defendable space of 10 m is required.
9- Pavilion	South	Downslope >0 to 5 degrees	Forest	70 m	71 m	Not applicable	APZ is existing and includes well maintained sports fields.
10-Outdoor Bush Chapel Space	South	Downslope >5 to 10 degrees	Forest	85 m	0 m	Not applicable	No building proposed only outdoor education space - outdoor education does not require APZ.
	All other directions		Managed Land, in the form of existing residential properties				

[1] Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.
[2] Predominant vegetation is identified, according to PBP and *"Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate".*
[3] Assessment according to table A2.6 of PBP (2006).
[4] Assessment according to AS 3959-2009 Table 2.4.2.

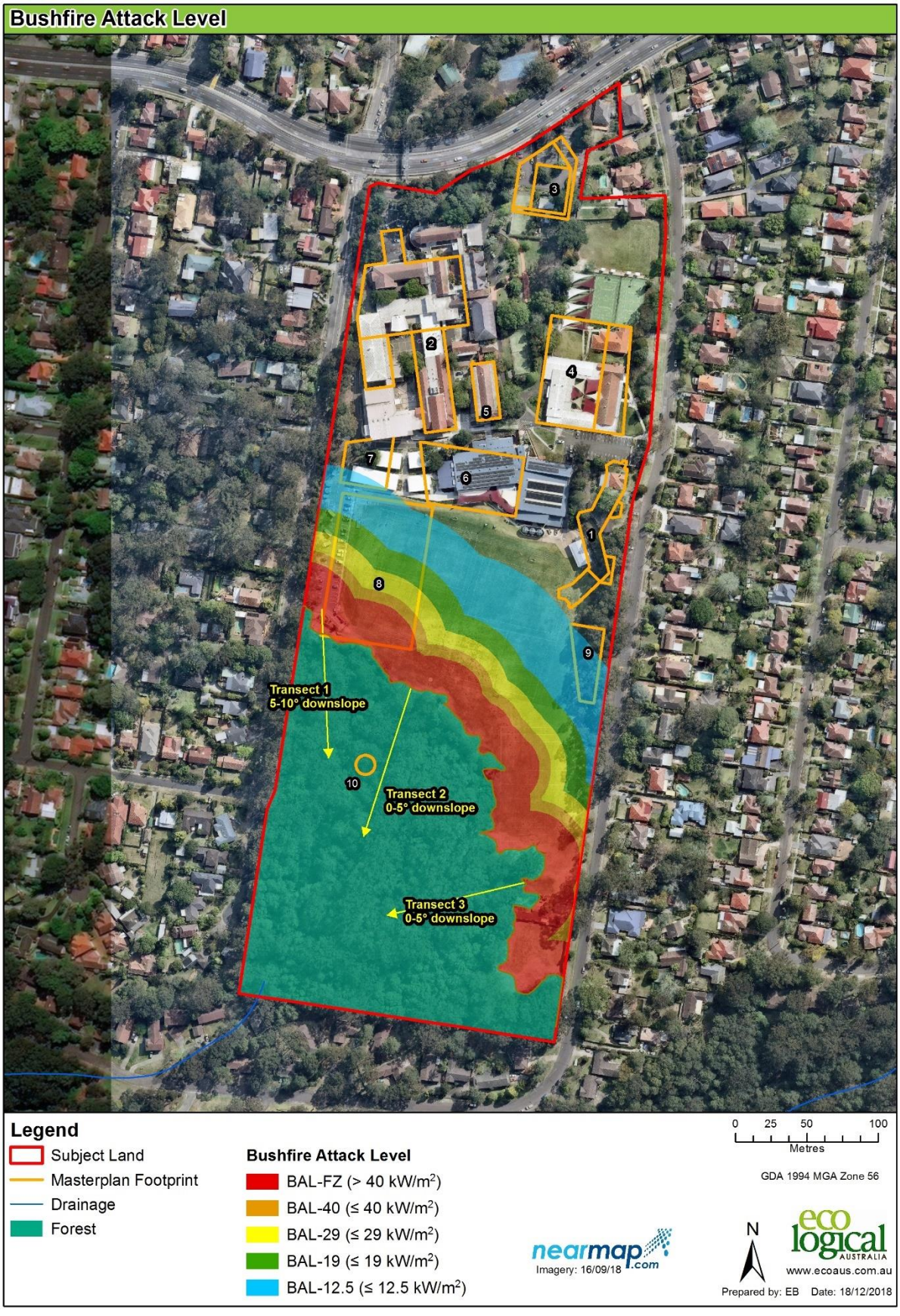

Figure 6: Concept Plan- Bushfire Attack Levels (BAL)

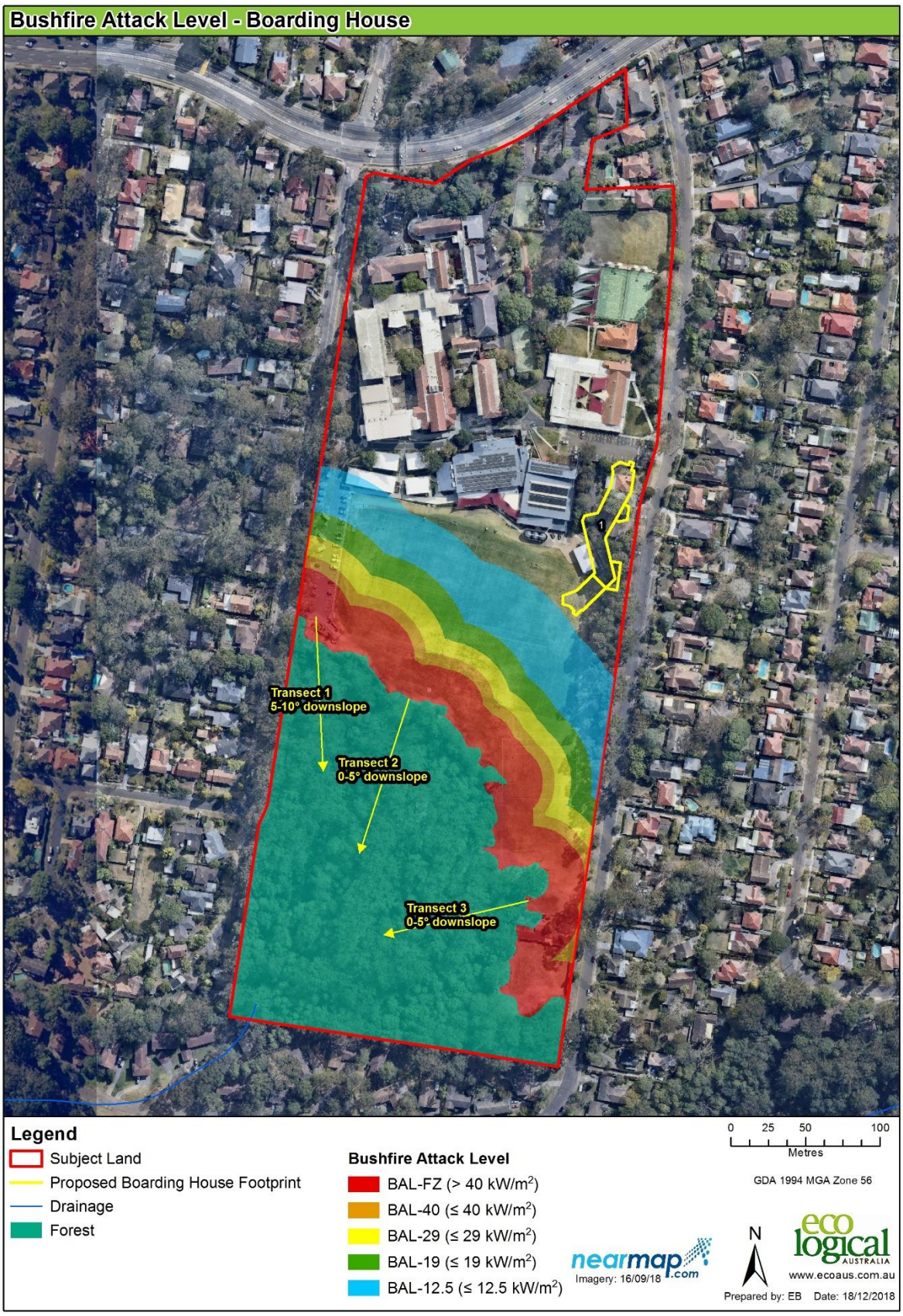

Figure 7: Boarding House- Bushfire Attack Levels (BAL)

3.3 Construction standard

The building construction standard is based on the determination of the Bushfire Attack Level (BAL) in accordance with Method 1 of *Australian Standard AS 3959-2009 'Construction of buildings in bushfire-prone areas'* (Standards Australia 2009). The BAL is based on known vegetation type, effective slope, and separation distance between the development and the bushfire hazard.

Based on the location of proposed development to the bushfire hazard (

Figure 6 and **Figure 7**), the following buildings can meet the construction standards:

- **BAL LOW**: Boarding House, Gymnasium, Mary Ward Building, Secondary School, Existing Boarding building and proposed future development building.
- **BAL 12.5:** Gonzaga Barry Centre auditorium

No construction standard applies for the Outdoor Bush Chapel for proposed outdoor education.

The Building Code of Australia (BCA) does not provide for any bushfire specific performance requirements for the development type proposed of Class 5-8 and Class 10. As such the building construction requirements of PBP and AS 3959-2009 do not apply as deemed-to-satisfy provisions for bushfire protection. The general building fire safety provisions required by the BCA for the type of construction proposed are accepted by PBP and RFS as acceptable protection from bushfires.

No construction requirements apply to the proposed **Class 7 Underground Carpark & Field** or **Class 10 Mount Pleasant Pavilion** where it can be demonstrated:

- A distance of not less than 10 m from any proposed school building is achieved;
- A wall that extends to the underside of a non-combustible roof covering and has an FRL of not less than 60/60/60 for loadbearing walls and -/60/60 for non-loadbearing walls when tested from the structure side. Any openings in the wall shall be protected in accordance with the following:
    - Doorways- by FRL -/60/30 self-closing fire doors
    - Windows – by FRL -/60/- fire windows permanently fixed in the closed position
    - Other openings – by construction with FRL of not less than -/60/-. NOTE: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with this item.
- A wall that extends to the underside of a non-combustible roof covering and is of masonry, earth wall or masonry-veneer construction with the masonry leaf of not less than 90 mm in thickness. Any openings in the wall shall be protected in accordance with the following:
    - Doorways- by FRL -/60/30 self-closing fire doors.
    - Windows – by FRL -/60/- fire windows permanently fixed in the closed position.
    - Other openings – by construction with FRL of not less than -/60/-. NOTE: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with this item.

It is important that the version of AS 3959-2009 applicable at the time of construction is consulted. Additionally, the NSW variation to the AS 3959-2009 as outlined in PBP 2010 Appendix 3 Addendum is to be applied.

3.4 Access

Public road access to the subject land is via Osborne Road, Mount Pleasant Avenue and Pennant Hills Road. This proposal does not involve new access roads.

There are no proposed changes to the looped internal road network for the school with the carpark and bus parking bays located in close proximity to Pennant Hills Road. The subject land has entry point on the south west, north west, north and east to existing car parks that are connected by a sealed internal road that is 3.5 m in width.

Access onto the western playing field from the western carpark on Osborne Road provides access directly to the hazard and to the looped internal road network. The sports field is currently used as carpark over flow, therefore providing existing suitable access and entry and exit points from the subject land. The proposal does not involve a perimeter road between the sports field and the hazard at the vegetation interface. This area is well maintained as an APZ as part of the playground and sports field area, is located on flat land, whilst providing walkway access into the vegetation. This area is not likely to be accessed during any advanced evacuation. The vegetation interface is shown in Appendix 2.

3.5 Services – Water, electricity and gas

3.5.1 Water

The subject land is serviced by reticulated water. Hydrants are located on Osborne Road and Mount Pleasant Avenue. Hydrants are located throughout the site at various intervals. The hydrant plan located on site at the western access entrance is shown in Appendix B. The proposed development will require upgraded reticulated hydrant network within the site to provide coverage to the new buildings.

The reticulated water supply should comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads;
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles;
- Hydrants are not located within any road carriageway;
- All above ground water and gas service pipes external to the building are metal, including and up to any taps; and
- The PBP provisions of parking on public roads are met.

3.5.2 Electricity & Gas services

Electricity supply is above ground and complies with PBP subject to no part of a tree being closer to a powerline than the distance specified in 'ISSC3 Guideline for the Management of Vegetation in the Vicinity of Electricity Assets' (Industry Safety Steering Committee 2016).

Gas services (reticulated or bottle gas) are compliant with Section 4.2.7 of PBP, subject to the following specifications:

- Any gas services are to be installed and maintained in accordance with Australian Standard AS/NZS 1596 *The storage and handling of LP Gas* (SA 2014). Metal piping is to be used;
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation;
- If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal; and
- Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used

4 Development Staging

The development is likely to commence in stages. This assessment does not propose any temporary measures for the staging of development. The APZ required is existing and is to be maintained for perpetuity.

5 Emergency and Evacuation Planning

The preparation of bushfire emergency procedures is the responsibility of Loreto Normahurst. As such, an emergency/evacuation plan is required consistent with the NSW Rural Fire Service 'Guide to developing a Bush Fire Emergency Management and Evacuation Plan' (RFS 2014).

A template for an Emergency Management and Evacuation Plan is available on the NSW Rural Fire Service website http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0003/29271/Bush-Fire-Emergency-Management-and-Evacuation-Plan.pdf

6 Assessment of environmental issues

An assessment of significant environmental features, threatened species or Aboriginal relics identified under the *Biodiversity Conservation Act 2016* or the *National Parks Act 1974* that will affect or be affected by the bushfire protection proposals in this report has not been undertaken as it is covered by other parts of the DA process. The APZ is existing. This assessment does not propose the clearing of vegetation for the purpose of APZ.

Department of Planning and Environment is the determining authority for this development; they will assess more thoroughly any potential environmental and heritage issues.

7 Conclusion

Proposed Buildings 1-9 of SFPP and Class 5-8 and Class 10 development and outdoor education complies with all the relevant acceptable solutions within 'Planning for Bush Fire Protection 2006', (see **Table 4**)

Table 4: Summary of bushfire protection measures assessed for Buildings 1-9

Bushfire Protection Measures	Complies	Requirements	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	☑	APZ dimensions are detailed in **Table 3** and **Section 3.1**.	☑	☐	3.1
APZ Maintenance plan	☑	Identified APZ to be maintained in perpetuity to the detailed specifications in **Section 3.2**.	☑	☐	3.2
Construction standard	☑	Construction Standard is outlined in **Section 3.3**. A maximum of **BAL 12.5** is achievable.	☑	☐	3.3
Access	☑	Access is outlined in **Section 3.4**.	☑	☐	3.4
Water supply	☑	Water supply is outlined in **Section 3.5.1**.	☑	☐	3.5.1
Electricity service	☑	Electricity supply located above ground.	☑	☐	3.5.2
Gas service	☑	Reticulated gas is not proposed. Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2014 'The storage and handling of LP Gas' (Standards Australia 2014).	☑	☐	3.5.2
Evacuation and Emergency Response Plan	☑	An Evacuation and Emergency Response Plan will need to be consistent with the RFS Guidelines for the preparation of the Emergency / Evacuation Plan.	☑	☐	5

8 Recommendations

It is recommended that the Special Fire Protection Purpose development be issued a Bush Fire Safety Authority.

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9 References

Industry Safety Steering Committee, 2016, *ISSC3 Guideline for the Management of Vegetation in the Vicinity of Electricity Assets*

Keith D, 2004, *Ocean Shores to Desert Dunes the native vegetation of New South Wales and the ACT,* Department of Environment and Conservation, Sydney.

NSW Rural Fire Service (RFS). 2006. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners* including the 2010 Appendix 3 Addendum. NSW Rural Fire Service, Homebush NSW

OEH, 2013, *The Native Vegetation of the Sydney Metropolitan Area, Version 2.0 Vegetation Community Profiles*

Standards Australia (SA). 2009. *Construction of buildings in bushfire-prone areas (including Amendments 1 – 3)*, AS 3959-2009. SAI Global, Sydney.

Standards Australia (SA). 2014. *The storage and handling of LP Gas*, AS/NZS 1596:2014. SAI Global, Sydney.

Standards Australia (SA). 2017. *Fire hydrant installations - System design, installation and commissioning*, AS 2419.1, Fourth edition 2005, SAI Global, Sydney.

Appendix A – Assessment process

Vegetation types

In accord with PBP the predominant vegetation class has been assessed for a distance of at least 140 m from the subject land in all directions.

Effective slope

In accord with PBP, the slope that would most significantly influence fire behaviour was determined over a distance of 100 m from the boundary of the proposed development where the vegetation was found.

Asset Protection Zone determination

Table A2.6 of PBP 2006 has been used to determine the width of required Asset Protection Zone (APZ) for the proposed development using the vegetation and slope data identified in **Section 3.1**.

Construction Standard determination

Table 2.4.2 of AS 3959-2009 has been used to determine the construction standard for the proposed additions.

Special Fire Protection Purpose

In accord with PBP, the proposed Infill SFPP has been assessed in accordance with section 4.2.5 for Infill Special Fire Protection Purpose (SFPP) developments.

Appendix B – Site Photos

Photo 1: View of Forest Vegetation and managed land on south east

Photo 2: View of managed land on south east providing suitable fire fighting access to the hazard

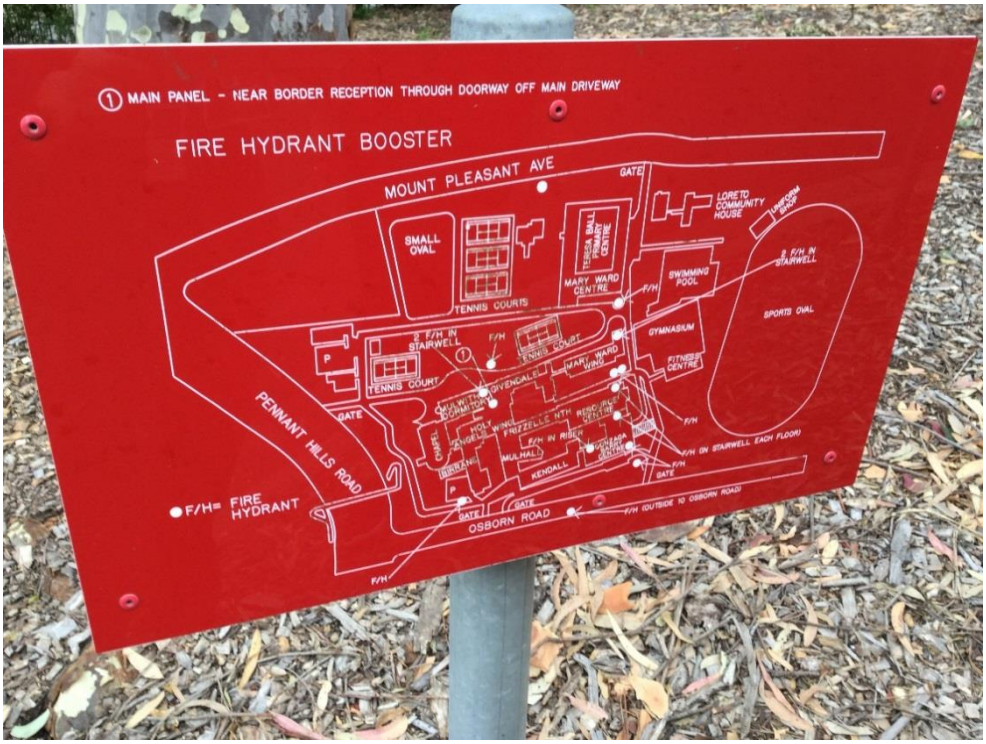

Photo 3: Plan of Hydrant locations throughout subject land

ecological AUSTRALIA

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AS/NZS 4801:2001 Occupational Health and Safety Management

ISO 9001 Quality Management

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