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Bushfire Protection Assessment

The Gables New Primary School

School Infrastructure NSW (SINSW) on behalf of the NSW
Department of Education (DoE)

DOCUMENT TRACKING

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LIMITATIONS

The bushfire protection measures recommended in this report do not completely remove the risk to life and property, and they do not guarantee that a development will not be impacted by a bushfire event. This is substantially due to the degree of vegetation management, the unpredictable nature and behaviour of fire, and extreme weather conditions.

Acknowledgements

This document has been prepared by Eco Logical Australia Pty Ltd with assistance from School Infrastructure NSW (SINSW).

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Template 2.8.1

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Abbreviations

Abbreviation	Description
APZ	Asset protection zone
BAL	Bushfire Attack Level
BFPL	bush fire prone land
BFSA	Bush Fire Safety Authority
COLA	Covered Outdoor Learning Areas
DoE	NSW Department of Education
EFSG	Educational Facilities Standards and Guidelines
ELA	Eco Logical Australia Pty Ltd
FDI	Fire Danger Index
GIS	Geographic information system
ha	hectares
IPA	Inner Protection Area
LGA	Local Government Area
m	metres
NCC	National Construction Code 2022
PBP	'Planning for Bush Fire Protection 2019' and 'Appendix B of Addendum to Planning for Bush Fire Protection 2022'
REF	Review of Environmental Factors
RFS	NSW Rural Fire Service
SFPP	Special fire protection purpose
SINSW	School Infrastructure NSW

1. Introduction

This Bushfire Protection Assessment has been prepared by Eco Logical Australia (ELA) on behalf of the NSW Department of Education (the **Applicant**) to assess the potential environmental impacts that could arise from the development of The Gables New Primary School at Lot 301 DP 1287967 on Fontana Drive, Gables (the **site**).

This report has been prepared to assess the proposed development against *Planning for Bush Fire Protection* (RFS 2019), specifically Chapter 6 and *Appendix B of Addendum to Planning for Bush Fire Protection* (RFS 2022), collectively referred herein to as ‘PBP’.

This report accompanies a Review of Environment Factors that seeks approval for the construction and operation of a new primary school at the site, which involves the following works:

- Construction of school buildings, including learning hubs, a school hall and an administration and library building.
- Construction and operation of a public preschool.
- Delivery of a sports court and fields.
- Construction of car parking, waste storage and loading area.
- Associated site landscaping and open space improvements.
- Associated off-site infrastructure works to support the school, including (but not limited to) services, driveways and pedestrian crossings.

For a detailed project description, refer to the Review of Environmental Factors prepared by Ethos Urban.

1.1 Site Description

The site is located on Cataract Road, Gables, within The Hills Local Government Area (LGA), approximately 50 km northwest of the Sydney CBD and 10 km north of the Rouse Hill Town Centre. It comprises one lot, legally described as Lot 301 DP 1287967, that measures approximately 2.2 ha in area. The site is bound by Pennant Way to the north, Cataract Road to the east, Fontana Drive to the west and a vacant lot to the south.

An aerial image of the site is shown in Figure 1.



Figure 1: Site Aerial (Source: Nearmap, edits by Ethos Urban)

1.2 Statement of Significance

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the proposed development, it is determined that:

- *The extent and nature of potential impacts are low, and will not have significant adverse effects on the locality, community and the environment;*
- *Potential impacts can be appropriately mitigated or managed to ensure that there is minimal effect on the locality, community.*

2. Review of Environmental Factors (REF) Requirements

Table 1 below details the REF deliverable requirements (SINSW identified) and the relevant section of the report it is addressed.

Table 1: Review of Environmental Factors (REF) Requirements

Item	REF Requirement	Relevant Section of Report
1.0	Where mapped as bush fire prone land (BFPL) or a site is adjacent to a potential unmanaged bush fire vegetation / hazard, a Bushfire Risk Assessment Report is required; and	Section 3.1 and Section 4
2.0	Is to detail proposed bush fire protection measures and demonstrates compliance with Planning for Bush Fire Protection (NSW RFS, 2019 or equivalent).	Section 5

3. Property and Proposal

Table 2 identifies the site and outlines the type of development proposed.

Table 2: Site and development proposal summary

Street address:	1 Pennant Way, Gables
Postcode:	2765
Lot/DP no:	Lot 301 DP 1287967
Local Government Area:	The Hills Shire Council
Fire Danger Index (FDI)	100
Current land zoning:	R4 High Density Residential
Type of development proposed:	Educational establishment, which is special fire protection purpose (SFPP)

3.1 Description of Proposal

The proposed development is for construction of a new primary school and pre-school herein referred to as 'site' and shown in Figure 2. The proposed development comprises:

- A primary school accommodating 1,000 students and 68 staff members;
- A preschool accommodating 60 students and 6 staff members (1 staff per 10 students) .

The proposal does not include construction of any public road infrastructure and is bound by Pennant way to the north, Cataract Road to the east and Fontana Drive to the west, as shown in Figure 2 and Figure 4.

The proposed development is located on land partially mapped as bush fire prone land (BFPL) as shown in Figure 3.

3.2 Assessment Process

Being a special fire protection purpose (SFPP) development on BFPL, the proposal was assessed in accordance with PBP. This report demonstrates that the proposal, together with the recommendations within this report address the relevant specifications and requirements under PBP.

This assessment is based on the following information sources:

- Background documentation provided by School Infrastructure NSW (SINSW);
- Information contained within the site plan from Architectus (Project No. 210463.01 Revision A.02 dated 8 November 2024 [Figure 2]); and
- Geographic information system (GIS) analysis including online spatial resources (i.e. Google Earth, SIX Maps, Nearmap and the NSW Government Planning Portal).

Table 3 identifies the bushfire protection measures assessed and whether an acceptable or performance solution is being proposed.

Table 3: Summary of Bush Fire Protection Measures assessed

Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5.1

Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Landscaping	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.2
Construction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.3
Access	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5.4
Water supply	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.5
Electricity services	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.6
Gas services	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.7
Emergency management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.8



Figure 2: Site Plan (Source: Architectus)



Figure 3: Bush Fire Prone Land (BFPL) (Source: RFS 2024)

4. Bushfire Hazard Assessment

4.1 Process

The site assessment methodology from Appendix 1 of PBP has been used in this assessment to determine the required APZ and construction requirements.

Figure 4 and Table 4 show the effective slope and predominant vegetation representing the highest bushfire threat potentially posed to the development from various directions.

4.2 Vegetation Assessment

In accordance with PBP, the predominant vegetation has been assessed for a distance of at least 140m from the site in all directions.

The predominant vegetation has been determined from Nearmap Imagery (2024), the Vegetation Management Plan (VMP; CE 2020) and the landscape plan prepared for Gables Precinct C (AECOM 2019).

4.3 Slope Assessment

In accordance with PBP, the slope that would most significantly influence fire behaviour is determined over a distance of 100m from the boundary of the proposed development under the classified vegetation.

The effective slope has been determined from 2 m contour data.

4.4 Summary of Assessment

As shown in Figure 4, the bushfire prone vegetation within 140 m of the site is located within the riparian corridor to the east which is currently being revegetated in accordance with the approved VMP (CE 2020). Revegetation will consist of Cumberland Plain Woodland which is classified ‘woodland’ under PBP. The effective slope under this hazard falls within the PBP slope category of ‘>0-5 degrees downslope’.

The determined APZ (Table 4 and Figure 4) utilises the approved and secured APZ for the parent subdivision and is based on a short fire run (SFR) model as detailed in Section 5.1.

In all other directions there are managed lands consisting of existing residential development, public road infrastructure and public recreation land. The land to the north-west is cleared for future residential development (DA 885/2024/ZB), is well maintained (regularly slashed), devoid of native grasses and used for bulk earthworks for surrounding subdivisions as such, is considered ‘managed land’ in accordance with A1.10(4) of PBP.

Table 4: Bushfire hazard assessment and APZ requirements

Direction from site	Slope	Vegetation	SFPP APZ	RFS Approved SFPP APZ (D19/245)	Comment
North-east	>0-5° downslope	Woodland	50 m	28 m	Majority of APZ accommodated within Cataract Road outside of the riparian corridor and site boundary. APZ approved under BFSa (D19/245), refer Section 5.1.

Direction from site	Slope	Vegetation	SFPP APZ	RFS Approved SFPP APZ (D19/245)	Comment
East	>0-5° downslope	Woodland	50 m	25 m	As above.
All other directions	Managed land				

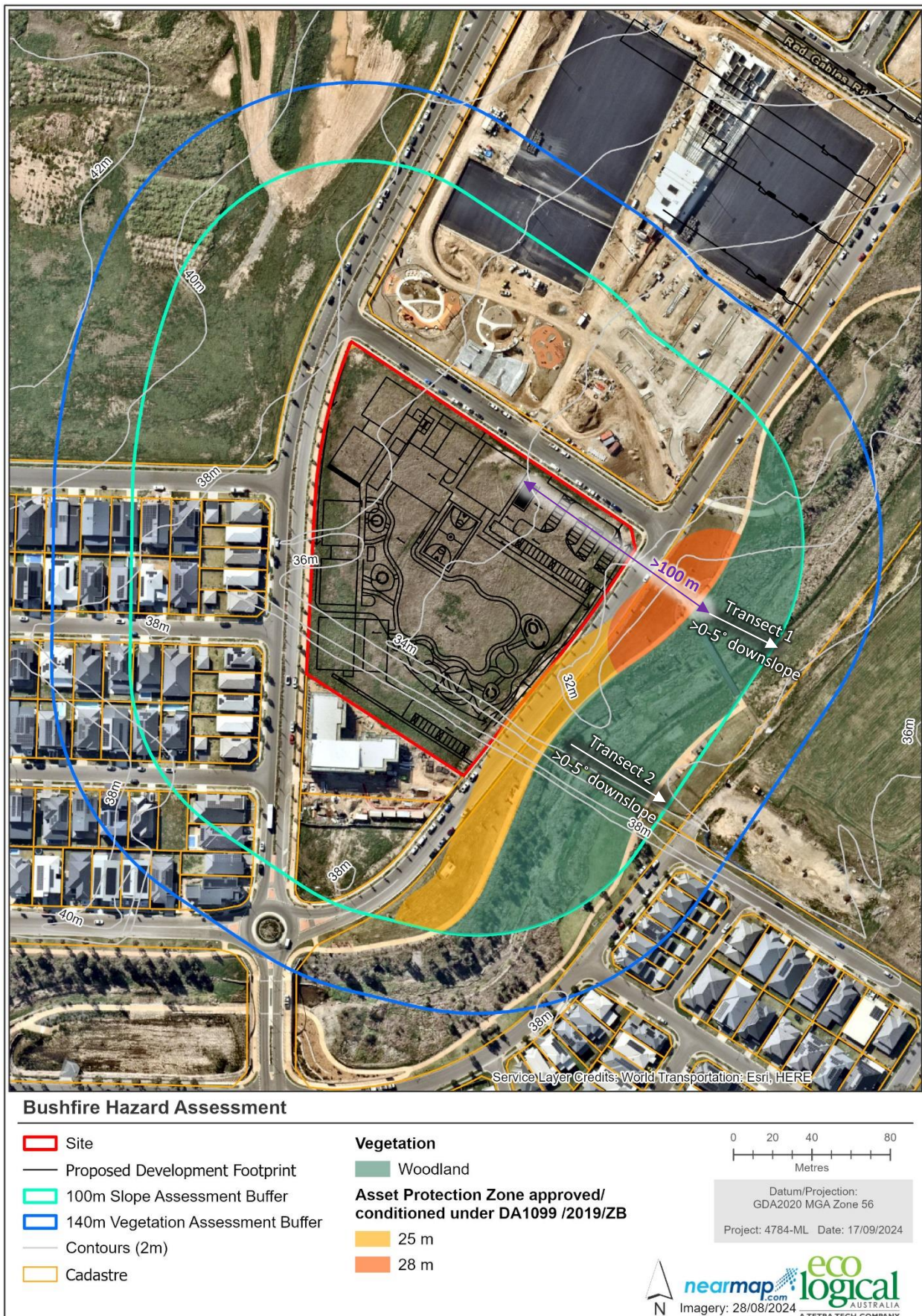


Figure 4: Bushfire hazard assessment (Source: ELA)

5. Bushfire Protection Measures

5.1 Asset Protection Zones

Table 4 shows the dimensions of the required APZ and where relevant, information on how the APZ is to be provided is included. The footprint of the APZ is also shown on Figure 4.

The parent subdivision was granted consent by The Hills Shire Council 8 September 2020 (DA1099/2019/ZB [as amended]) which included the NSW Rural Fire Service (RFS) Bush Fire Safety Authority (BFSA) dated 17 May 2019 (D19/245) and associated General Terms of Approval (GTA). The bushfire assessment report (Peterson Bushfire 2019) prepared to support the DA utilised a SFR model to determine the required APZ for the future SFPP development on the site. The GTA issued by RFS supported the identified APZ dimensions from the SFR model and conditioned a 25-28 m APZ be registered under an 88b instrument in accordance with the *Conveyance Act 1919*.

ELA have reassessed the SFR modelling as part of the bushfire hazard assessment (refer Appendix B) which is generally in line with the previous assessment (Peterson Bushfire 2019), 88b instrument and parent subdivision approval (DA1099/2019/ZB [as amended]), although results in a slightly smaller APZ of 22-25 m. Nonetheless, as a conservative approach, this assessment has relied upon the approved and secured APZ.

The compliance of the proposed APZ with Section 6.8.1 of PBP is documented in Table 5.

Table 5: APZ requirements and compliance (adapted from Table 6.8a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
Radiant heat levels of greater than 10kW/m ² (calculated at 1200K) will not be experienced on any part of the building	The building is provided with an APZ in accordance with Table A1.12.1 in Appendix 1 of PBP.	Complies APZ determined using SFR model approved under BFSA (D19/245) and is shown in Table 4 and Figure 4. This APZ is currently secured by an 88b and in place.
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 less than 18 degrees.	Complies APZ is not located on slopes greater than 18°.
APZs are managed and maintained to prevent the spread of fire to the building.	The APZ is managed in accordance with the requirements of Appendix 4 of PBP;	To comply APZ to be managed in accordance with PBP. Fuel management specifications provided in Appendix A.
	APZs are wholly within the boundaries of the development site; and	Satisfies Performance Criteria APZ located within development site, public road infrastructure and riparian corridor (refer Section 4.4).
The APZ is provided in perpetuity.	Other structures located within the APZ need to be located further than 6 m from the refuge building.	Not applicable No refuge buildings proposed.

5.2 Landscaping

The compliance of the proposed landscaping with Section 6.8.1 of PBP is documented in Table 6.

Table 6: Landscaping requirements and compliance (adopted from Table 6.8a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
Landscaping is 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 of PBP; and	To comply APZ / Landscaping is to be designed and managed in accordance with PBP. Landscaping specifications provided in Appendix A (Appendix A).
	Fencing is constructed in accordance with Section 7.6 of PBP.	To comply Fencing to be constructed in accordance with Section 7.6 of PBP (see Section 5.3.1 for further details).

5.3 Construction Standards

The compliance of construction with Table 2 of Appendix B of Addendum to PBP (Appendix B) is documented in Table 7.

Table 7: Construction requirements and compliance (adopted from Table 2 of PBP Addendum)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
The proposed building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	A construction level of BAL-19 or greater under AS 3959 and Section 7.5 of PBP is applied.	To comply

5.3.1 Fences and Gates

To comply with Section 7.6 of PBP, all fencing and gates are to be constructed of hardwood or non-combustible material. Where fencing is within 6 m of a building, they should be made of non-combustible material only.

5.4 Access

The proposal does not include construction of any public road infrastructure and is bound by the current road network of Pennant Way (north), Cataract Road (east) and Fontana Drive (west), as shown in Figure 2. Vehicular access to the school carparking will be from Cataract Road, with pedestrian access provided from Pennant Way, Cataract Road and Fontana Drive.

A summary of the compliance assessment with PBP can be found in Table 8.

Due to a limited developable area, the site is not capable of accommodating a road design meeting all the acceptable solutions from Table 3 from Appendix B of Addendum to PBP within its boundary. The proposal has been designed to capitalise on the surrounding existing public road infrastructure and is capable of achieving two out of five acceptable solutions. The assessment of the design is document in Table 8: and the performance solution is detailed in Section 5.4.1.

Table 8: SFPP Class 9 access requirements (adapted from Table 3 of Addendum to PBP)

Performance Criteria	Acceptable Solutions	Compliance notes
The intent may be achieved where:		
Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	Vehicular access must be capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building; and	Satisfies Performance Criteria. Refer performance solution in Section 5.4.1 below.
	Must have a minimum unobstructed width of 6 m with no part of its furthest boundary more than 18 m from the building and in no part of the 6 m width be built upon or used for any purpose other than vehicular or pedestrian movement; and	Satisfies Performance Criteria. Refer performance solution in Section 5.4.1 below.
	Must provide reasonable pedestrian access from the vehicular access to the building; and	Complies <ul style="list-style-type: none"> • Pedestrian access network (≥ 1.5 m wide) provided throughout the site (see Figure 5) connecting buildings to internal carparking (east), Pennant Way (north) and Fontana Drive (west). • There is another pedestrian walkway along the southern boundary connecting the preschool with Cataract Road.
	Must have a load bearing capacity and unobstructed height to permit the operation and passage of fire fighting vehicles; and	To comply Carparking to provide minimum 15t capacity which is suitable for Cat 1 tanker.
	Must be wholly within the allotment except that a public road complying with above may serve as the vehicular access or part thereof.	Satisfies Performance Criteria. Refer performance solution in Section 5.4.1 below.

5.4.1 Access Performance Solution

The PBP performance criteria for SFPP Class 9 access requirements is:

Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.

The following attributes of the proposed development are considered adequate to meet this performance criteria:

Firefighting vehicles are provided with safe, all-weather access to structures:

Established public road infrastructure:

- Buildings along the northern boundary (Administration, Hall, Covered Outdoor Learning Area [COLA] and canteen) can be accessed by firefighting vehicles from Pennant Way which is a two-lane 10 m wide non-perimeter road. Buildings are setback from the property boundary 5.3 m (Figure 2).
- Buildings along the eastern boundary (Administration, General learning and preschool) can be access by firefighting vehicles from Fontana Drive which is two-lane sub arterial road. Buildings have a maximum 18 m setback to the road (Figure 2).

Internal access:

- In addition to the external access, the hall will be accessed via the internal carparking within the east of the site off Cataract Road. The carparking provides 6 m wide aisles which are approximately 18 m from the eastern elevation (Figure 2). As noted in Table 8 above, the carparking should have minimum 15t capacity to provide for a Cat 1 tanker.
- Additionally, safe pedestrian access/egress for firefighting and emergency personnel during operations is provided by the pathway network throughout the site ($\geq 1.5\text{m}$ non-combustible) connecting all buildings to each other, the internal carparking and the public road network to the north (Pennant Way) and west (Fontana Drive). Another pedestrian walkway is provided along the southern boundary connecting the proposal preschool to Cataract Road in the east (Figure 5).
- All other buildings can be accessed via the existing external public road infrastructure as described above thus, further internal vehicular access is not considered necessary.

Other site attributes:

- To ensure a safe operational environment for firefighting personnel, the landscaping within the site will be designed and managed in accordance with acceptable solutions of PBP as identified in Table 6.
- The external (within the site) and internal (within the buildings) fire hydrants will be provided to achieve coverage in accordance with AS2419:2021 (SA 2021) and Educational Facilities Standards and Guidelines (EFSG; DoE n.d.) requirements (Figure 6). The hydrant booster is located to the north-west corner of the site adjacent a hardstand area suitable for Cat 1 fire tanker.

Firefighting vehicles are provided with safe, all-weather access to hazard vegetation:

- The bushfire hazard does not abut the proposed development as such, firefighting vehicles will not need to enter the development to access the bushfire hazard and will use the existing public road infrastructure (Cataract Road).

- Cataract Road to the east was constructed under the parent subdivision approval (DA1099/2019/ZB [as amended]) and provides the defensible space between the proposed school and bushfire hazard. The bushfire hazard is of remnant nature surrounded by residential development and managed public open space. This, combined with the narrow width (maximum 60 m) limits fire development and length of potential fire run as such, it is considered lower risk and a reliable indicator Cataract Road is unlikely to be impacted or cut by fire. Furthermore, this road does not service any residential properties, therefore is less likely to become congested during an emergency evacuation of the broader Gables suburb.

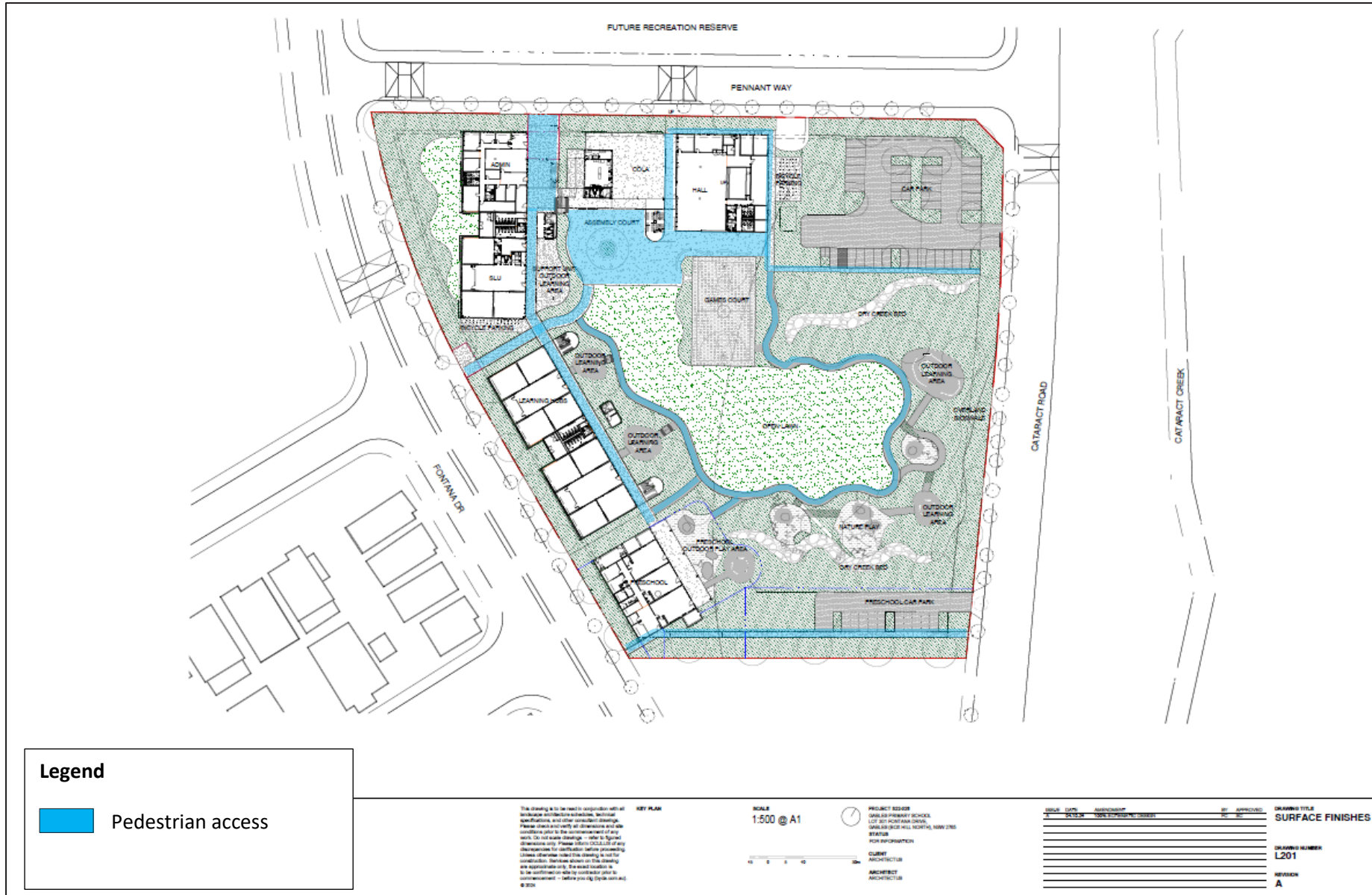


Figure 5: Pedestrian Access (Source: Oculus and ELA)

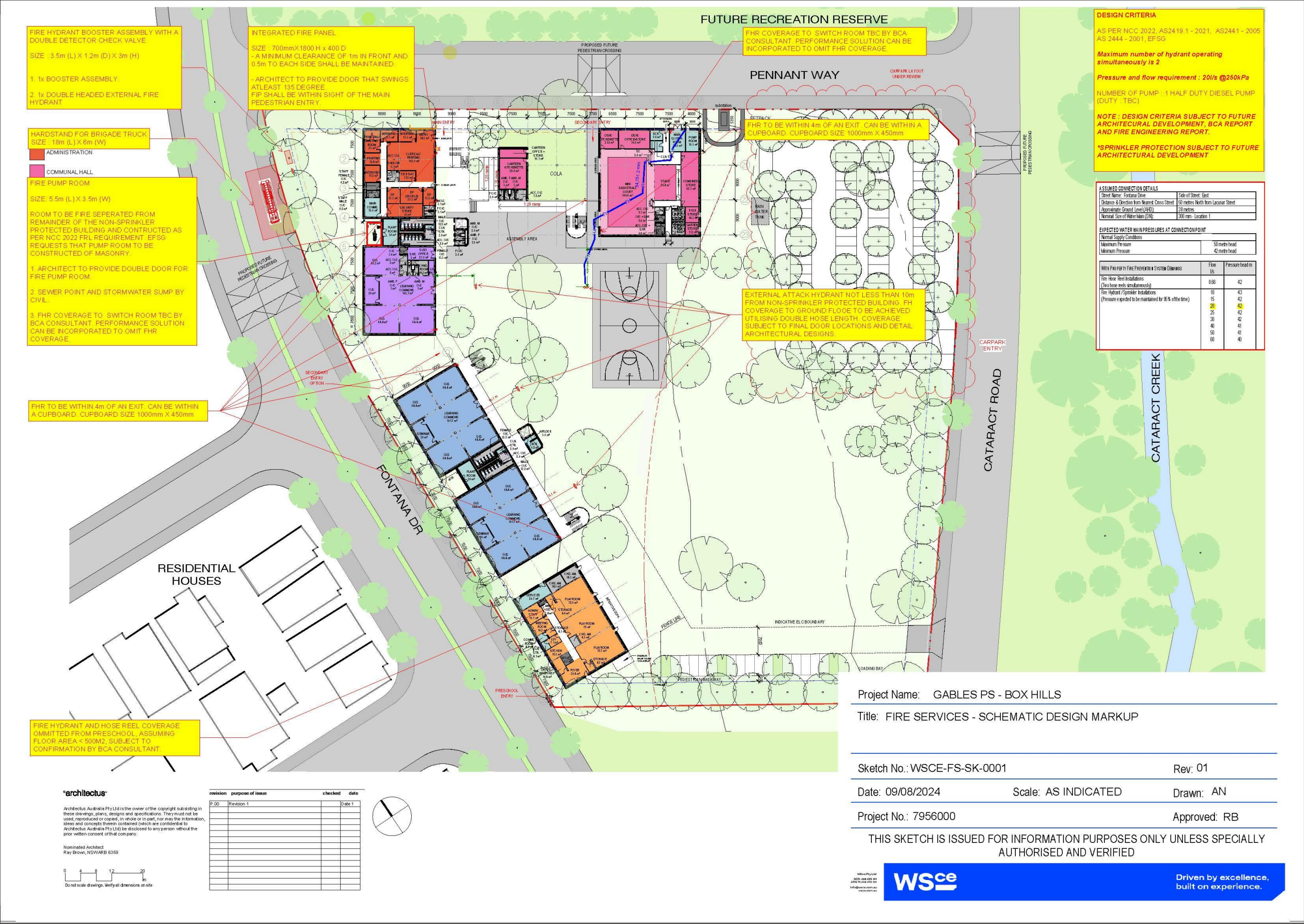


Figure 6: Fire Hydrant – Schematic (Source: WSce)

5.5 Water Supplies

The compliance of the proposed water supply with Table 4 of Appendix B of Addendum to PBP is documented in Table 9.

Table 9: Water supply requirements (adapted from Table 4 of Addendum to PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
An adequate water supply for firefighting purposes is installed and maintained.	Reticulated water is to be provided to the development, where available; and	Complies Proposal serviced by a reticulated water supply.
	Water for firefighting purposes must be made available and consist of: <ul style="list-style-type: none"> • A fire hydrant system installed in accordance with AS2419.1; or • Where no reticulated water is available, a static water supply consisting of tanks, swimming pools, dams or the like, or a combination of these, together with suitable pumps, hoses and fittings, determined in consultation with NSW RFS that; • is capable of providing the required flow rate for a period of not less than 4 hours; or • has a volume of 10,000 litres for each occupied building. 	To comply Fire hydrants will be provided to achieve coverage in accordance with AS2419:2021 (Figure 6).

5.6 Electricity Services

The compliance of the proposed supply of electricity services with Section 6.8.3 of PBP is documented in Table 10.

Table 10: Assessment of requirements for the supply of electricity services (adapted from Table 6.8c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	Where practicable, electrical transmission lines are underground;	Complies Electricity services to the site are located underground.
	Where overhead, electrical transmission lines are proposed as follows: <ul style="list-style-type: none"> • Lines are installed with short pole spacing (30 m), 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 Guide for the Management of Vegetation in the Vicinity of Electricity Assets (ISSC3 2016). 	Not applicable

5.7 Gas Services

The compliance of the proposed supply of gas services (reticulated or bottle gas) with Section 6.8.3 of PBP is shown in Table 11.

Table 11: Assessment of requirements for the supply of gas services (adapted from Table 6.8c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	<ul style="list-style-type: none"> • Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 – The Storage and handling of LP gas, the requirements of relevant authorities, and metal piping is used; • All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 m and shielded on the hazard side; • Connections to and from gas cylinders are metal; • Polymer-sheathed flexible gas supply lines are not used; and • Above-ground gas service pipes are metal, including and up to any outlets. 	<p>To comply (if installed)</p> <p>The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and Table 6.8c of PBP.</p>

5.8 Emergency and Evacuation Planning

Assessment of compliance of the proposed emergency and evacuation planning with Section 6.8.4 of PBP is shown in Table 12.

Table 12: Assessment of emergency requirements (adopted from Table 6.8d of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
A bushfire emergency and evacuation management plan is prepared	Bush fire emergency management and evacuation plan is prepared consistent with the:	To comply
	The NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan (RFS 2014);	
	NSW RFS Schools Program guide (RF n.d);	
	Australian Standard AS 3745:2010 Planning for emergencies in facilities (SA 2020); and	
	Australian Standard AS 4083:2010 Planning for emergencies – Health care facilities.	Not applicable
	The bushfire emergency and evacuation management plan should include a mechanism for the early relocation of occupants. Note: A copy of the bush fire emergency management plan should be provided to the Local Emergency Management Committee for its information prior to occupation of the development.	To comply
Appropriate and adequate management arrangements are established for consultation and implementation of the bush fire emergency and evacuation management plan.	An Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual; and	To comply
	Detailed plans of all emergency assembly areas including 'on-site' and 'off-site' arrangements as stated in AS 3745:2010 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.	To comply

6. Conclusion

The proposed development has been assessed against the specifications and requirements within PBP, as outlined in Table 13 below which details how the proposal complies with or deviates from PBP

Table 13: Development Bushfire Protection Solutions and Recommendations

Bushfire Protection Measures	Recommendations	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	APZ dimensions are detailed in Table 4 and shown in Figure 4. Identified APZ to be maintained in perpetuity to the specifications detailed in Appendix A.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5.1
Landscaping	Landscaping within the site to meet the requirements of PBP listed in Appendix A.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.2
Construction	The proposed development is to be constructed to BAL-19 based on the construction specifications detailed in AS 3959-2018, including additional ember provisions detailed in section 7.5 of PBP as required.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.3
Access	No new public roads proposed. Performance solution addresses PBP requirements.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5.4
Water supply	Reticulated water supply to meet PBP acceptable solution specifications for a SFPP Class 9 development.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.5
Electricity service	No requirements as electricity supply located underground.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.6
Gas service	Gas services (if installed) are to be installed and maintained in accordance with AS/NZS 1596:2014 (SA 2014).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.7
Emergency Management	Bushfire Emergency Management and Evacuation Plan to be completed prior to occupation of the building.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.8

7. Mitigation Measures

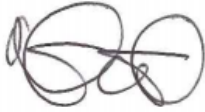
Table 14 below details the proposed bushfire mitigation measures required at design, construction and operation stages.

Table 14: Proposed Bushfire Mitigation Measures

Project Stage Design (D) Construction (C) Operation (O)	Bushfire Protection Measure	Mitigation Response	Relevant Section of Report
D / C / O	APZ	Prior to construction, DoE must ensure the identified APZ (Table 4 and shown in Figure 3) is maintained to the specifications detailed in Appendix A. During operation, DoE must ensure APZ are managed in perpetuity.	5.1
D / O	Landscaping	Prior to occupation, DoE must ensure landscaping within the site is designed to meet the requirements of PBP listed in Appendix A.	5.2
D / C / O	Construction Standards	Prior to occupation, DoE are to ensure the buildings are designed and constructed to the relevant NCC requirements including BAL-19 based on the construction specifications detailed in AS 3959-2018 and additional ember provisions detailed in section 7.5 of PBP as required. At commencement of construction and during operation, DoE to ensure fencing is within 6 m of a building, they will be made of non-combustible material only.	5.3
N/A	Access	No response required as provided by existing public road network.	5.4
D / C / O	Water Supplies	Prior to construction, DoE to ensure fire hydrants are provided in accordance with AS2419:2021.	5.5
N/A	Electricity Services	No response required as electricity supply located underground.	5.6
D / C / O	Gas Services	Prior to construction, DoE to ensure gas services (if installed) are installed and maintained in accordance with AS/NZS 1596:2014.	5.7
O	Emergency Management	Prior to operation of each stage, DoE to prepare an emergency management plan meeting DoE emergency management policy and requirements. As subsequent stages are constructed and prior to occupation of subsequent stages, DoE must update the emergency management plan accordingly.	5.8

8. Recommendations

It is recommended that the proposed development be approved with consent conditions based on the findings in Table 13.



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Appendix A - Asset Protection Zone Standards


The following management specifications apply to the identified APZ in Figure 4 which is to be maintained in perpetuity. The maintenance requirements must be undertaken on an annual basis (as a minimum) and prior to the commencement of the bushfire season.

Further details on APZ implementation and management can be found on the NSW RFS website (<https://www.rfs.nsw.gov.au/resources/publications>).

Table 15: APZ management specifications

Vegetation Strata	Inner Protection Area (IPA)
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 ground; • Canopies should be separated by 2 to 5m; and • Preference should be given to smooth barked and evergreen trees.
Shrubs	<ul style="list-style-type: none"> • Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided; • Shrubs should not be located under trees; • Shrubs should not form more 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.
Grass	<ul style="list-style-type: none"> • Should be kept mown (as a guide grass should be kept to no more than 100mm in height); and • Leaves and vegetation debris should be removed.

Appendix B – ELA Bushfire Attack Assessor Results

 NBC Bushfire Attack Assessment Report V4.1 <small>AS3959 (2018) Appendix B - Detailed Method 2</small> Print Date: 4/09/2024 Assessment Date: 4/09/2024	
Site Street Address:	Gables Primary School - 23HUS4784, Box Hill
Assessor:	Bruce Horkings; Eco Logical Australia (ELA)
Local Government Area:	The Hills Alpine Area: No
Equations Used	
Transmissivity: Fuss and Hammins, 2002 Flame Length: RFS PBP, 2001/Vesta/Catchpole Rate of Fire Spread: Noble et al., 1980 Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005 Peak Elevation of Receiver: Tan et al., 2005 Peak Flame Angle: Tan et al., 2005 Short Fire Run - Methodology for Assessing Bush Fire Risk for Low Risk Vegetation May 2019; NSW RFS	
Run Description:	SFR - T1
<u>Vegetation Information</u>	
Vegetation Type:	Coastal Valley Grassy Woodland
Vegetation Group:	Woodlands
Vegetation Slope:	8 Degrees Vegetation Slope Type: Downslope
Surface Fuel Load(t/ha):	10 Overall Fuel Load(t/ha): 18.07
Vegetation Height(m):	0.9 Only Applicable to Shrub/Scrub and Vesta
<u>Site Information</u>	
Site Slope:	0 Degrees Site Slope Type: Level
Elevation of Receiver(m):	Default APZ/Separation(m): 22
<u>Fire Inputs</u>	
Veg./Flame Width(m):	20.5 Flame Temp(K): 1200
<u>Calculation Parameters</u>	
Flame Emissivity:	95 Relative Humidity(%): 25
Heat of Combustion(kJ/kg)	18600 Ambient Temp(K): 308
Moisture Factor:	5 FDI: 100
<u>Program Outputs</u>	
Level of Construction:	BAL 12.5 Peak Elevation of Receiver(m): 4.07
Radiant Heat(kW/m2):	9.89 Flame Angle (degrees): 71
Flame Length(m):	8.62 Maximum View Factor: 0.108
Rate Of Spread (km/h):	2.08 Inner Protection Area(m): 22
Transmissivity:	0.837 Outer Protection Area(m): 0
Fire Intensity(kW/m):	19457
<u>Short Fire Run Calculations</u>	
Fire Run(m):	56 Length to Breadth Ratio: 2.82
Full Ellipse Length(m):	69.81 Headfire Backfire Ratio: 29.85
Travel Duration (mins):	1.61 Total Ellipse Length(m): 57.88
ROS and H/B Ratio:	35.9

Run Description: SFR - T2	
<u>Vegetation Information</u>	
Vegetation Type:	Coastal Valley Grassy Woodland
Vegetation Group:	Woodlands
Vegetation Slope:	8 Degrees
Surface Fuel Load(t/ha):	10
Vegetation Height(m):	0.9
Vegetation Slope Type:	Downslope
Overall Fuel Load(t/ha):	18.07
	Only Applicable to Shrub/Scrub and Vesta
<u>Site Information</u>	
Site Slope:	0 Degrees
Elevation of Receiver(m):	Default
Site Slope Type:	Level
APZ/Separation(m):	25
<u>Fire Inputs</u>	
Veg./Flame Width(m):	27.09
Flame Temp(K):	1200
<u>Calculation Parameters</u>	
Flame Emissivity:	95
Heat of Combustion(kJ/kg)	18600
Moisture Factor:	5
Relative Humidity(%):	25
Ambient Temp(K):	308
FDI:	100
<u>Program Outputs</u>	
Level of Construction:	BAL 12.5
Radiant Heat(kW/m2):	9.53
Flame Length(m):	8.62
Rate Of Spread (km/h):	2.08
Transmissivity:	0.829
Fire Intensity(kW/m):	19457
Peak Elevation of Receiver(m):	4.12
Flame Angle (degrees):	73
Maximum View Factor:	0.103
Inner Protection Area(m):	25
Outer Protection Area(m):	0
<u>Short Fire Run Calculations</u>	
Fire Run(m):	74
Full Ellipse Length(m):	69.81
Travel Duration (mins):	2.13
ROS and H/B Ratio:	35.9
Length to Breadth Ratio:	2.82
Headfire Backfire Ratio:	29.85
Total Ellipse Length(m):	76.48

