

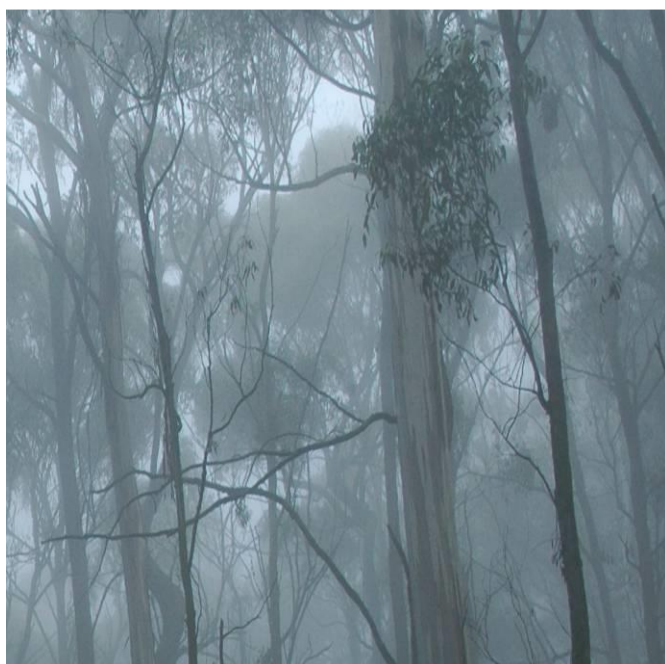


Glenlee Rezoning Proposal

Bushfire Assessment

Prepared for
Michael Brown Planning Strategies Pty Ltd

24 February 2014 updates 29 April 2016



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1 Introduction

1.1 Background

Eco Logical Australia Pty Ltd (ELA) was contracted by Michael Brown Planning Strategies to prepare a bushfire assessment for proposed rezoning of lands at Glenlee in south-western Sydney (**Figure 1**).

A previous bushfire assessment of this site and additional areas to the immediate north was undertaken in 2009 by Bushfire & Environmental Services Pty Ltd (since merged with ELA). A revised assessment is required to address a change in the proposed rezoning area.

1.2 The site

The boundary of the proposed rezoning site has been altered since the earlier assessment was carried out with the overall area reduced. The current proposed rezoning site boundary is illustrated in **Figure 1**. The proposed rezoning site is located within both the Camden Local Government Area and the Campbelltown Local Government Area and covers an area of approximately 105 hectares.

The site is situated between the Nepean River and the Australian Botanic Gardens on the west and northeast respectively. The Spring Farm Material Resource Recovery Park operated by Sita is located to the north. The Menangle Park urban release area is located to the south and southeast of the study site with proposed rural lands immediately south and employment land to the east of the study site.

The study site is located within the Nepean River catchment, and drains in part to the east and to the south into a substantially modified drainage line (known as Caleys Creek) before entering the Nepean River. Most of the study area has been previously cleared and modified, with the following operations current:

- Coal storage and coal reject emplacement filling by Sada Services Pty Ltd
- Composting and recycling of organic materials operated by Camden Soil Mix
- Truck and machinery storage facility on a portion of the northern lands operated by TRN Group Earthmoving.

Native vegetation within the study site is confined primarily to that within the riparian zone adjacent to the Nepean River (River-flat Eucalypt Forest) and an area of woodland regrowth in the northwest (Cumberland Plain Woodland). Other vegetation within the site consists primarily of exotic grasslands used to stabilise sides of the emplacement area, dense African Olive shrubland, and two small areas of exotic woodland.

1.3 The rezoning proposal

The proposal is to rezone the site for future industrial uses (Zone IN1 – General Industrial) to include a wide range of industrial and warehouse land uses. Non-developable or environmentally constrained land will be rezoned for environmental protection and rehabilitation (Zone E3 – Environmental Management)..

1.4 Purpose of the assessment

The Director General Requirements (DGRs) for the Gateway Determination require that information regarding “bushfire hazard management” for the planning proposal is placed on public exhibition. This document provides the required information.

This report provides the technical detail necessary to guide the project planning process and assist other environmental planning analysis to facilitate an understanding of the capability of the site to support future development as identified. Specifically, this report provides the following:

- A bushfire assessment prepared in accordance with Planning for Bushfire Protection (NSW Rural Fire Service 2006) to a level of detail appropriate for a rezoning (revisions and plan iterations will be required at subsequent planning levels)
- Detailed information on the provision and management of Asset Protection Zones
- A guide on the requirements for access in bushfire prone areas which includes road layout, design and construction standards
- A guide on the requirements for services in bushfire prone areas which includes the provision of a reticulated water supply and the location and installation of hydrants, and electricity and gas.

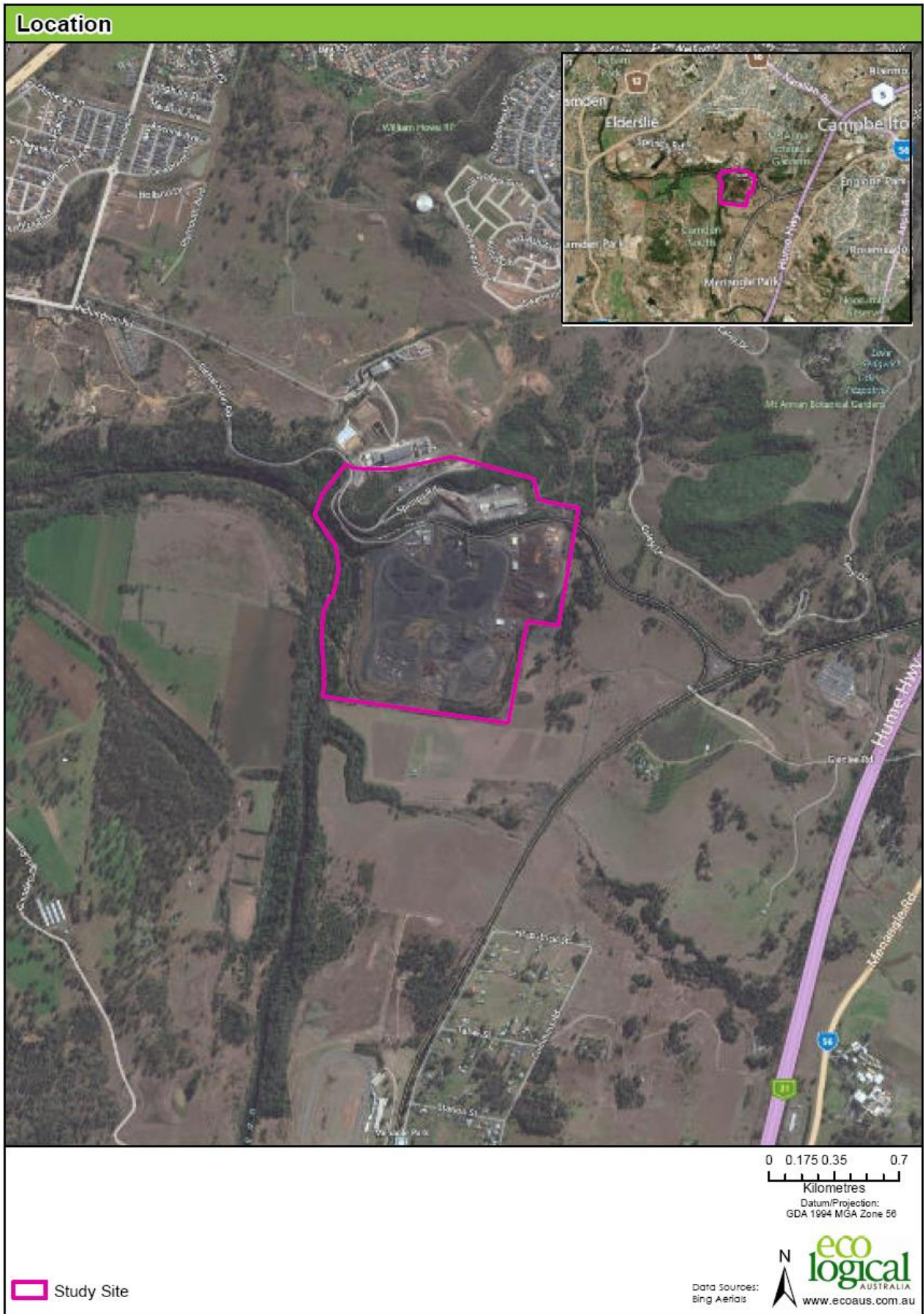


Figure 1: Location

2 Bushfire assessment requirements

Campbelltown City Council and Camden Council identify the Glenlee site as 'bushfire prone land'. In NSW, bushfire prone lands are those identified that could support a bushfire or are potentially likely to be subject to bushfire attack and are generally lands that contain or are within 100 m of significant stands of bushland. Development proposed for such lands requires an assessment against the provisions within the document *Planning for Bushfire Protection* (NSW Rural Fire Service 2006), referred to as PBP throughout this report.

When investigating the capability of bushfire prone land to be rezoned for future development, local councils must have regard to s.117 (2) Direction 4.4 – 'Planning for Bush Fire Protection' of the *Environmental Planning and Assessment Act 1979*. The objectives of Direction 4.4 are:

- *To protect life, property and the environment from bushfire hazards, by discouraging the establishment of incompatible land uses in bushfire prone areas; and*
- *To encourage sound management of bushfire prone areas.*

Direction 4.4 instructs councils on the bushfire matters which need to be addressed when drafting LEPs. This includes:

- Consultation with the Commissioner of the NSW Rural Fire Service (RFS) under s.62 of the EPA Act, and take into account any comments so made
- Draft LEPs shall have regard to Planning for Bushfire Protection 2006 (PBP)
- Compliance with numerous bushfire protection provisions where development is proposed.

After the rezoning stage, future subdivision of land and the construction of buildings also require an assessment against PBP. These assessments are based on a final development application for these uses.

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 types expected within the future zones. As such the Asset Protection Zone and building construction requirements of PBP and AS 3959 *Construction of buildings in bushfire-prone areas* 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 buildings proposed are accepted by PBP and RFS as acceptable solutions for the protection of occupants and the building from bushfires. However the aim and objectives of PBP still apply in relation to other matters of access, the provision of water and other services, emergency planning and landscaping.

3 Bushfire hazard

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as Asset Protection Zone location and dimension. The following sub-sections provide a detailed account of the vegetation communities (bushfire fuels) and the topography (effective slope) that combine to create the bushfire hazard that may affect bushfire behaviour at the site.

This assessment is based on an assessment of the likely future vegetation coverage as determined by the Flora and Fauna Rezoning Assessment ELA (2013) and the Riparian Corridor Study (Aecom 2013) and Visual and Landscape Assessment (Musecape 2014). The future vegetation is discussed in Section 3.1 below. Some of the current bushland areas will contribute to the future bushfire hazard, however this hazard will be significantly added to, particularly in the way of connectivity between remnants and along drainage lines and embankments. The increase in hazard is not significant enough to preclude development or pose a future hazard that cannot be addressed by typical bushfire protection planning precautions as outlined within PBP.

Following on from above, the concept of bushfire risk as influenced by fire history and current and past bushfire issues has little bearing on the determination of bushfire protection strategies for rezoning and future development at this site. This is due to a different future vegetation layer and the fact that PBP assesses bushfire protection based purely on vegetation and slope (i.e. hazard and not risk), making the assumption that a fire may occur in any patch of bushland at a worst-case scenario (based on a set design fire).

3.1 Vegetation communities influencing fire behaviour

The proposed development site has a unique vegetation and bushfire environment, and the resultant environment will be a combination of retained and created or enhanced vegetation corridors. The site can be divided into three distinct areas and can be viewed in **Figure 2**.

- Firstly, Shales Hill Woodland remnants interspersed with African Olive dominated scrub within the northern part of the site
- Secondly, the riparian corridor of the Nepean to the west consists of a highly disturbed remnant of River-flat Eucalypt Forest
- Thirdly, an artificial embankment created out of coal refuse forming the western, southern and eastern boundaries of the primary future development site will be revegetated achieving a corridor approximately 80 m in width (and may include complementary works on the adjoining property to the south). Although the revegetation and landscaping along the artificial embankments will be limited due to poor substrate and steep slopes, where possible it is proposed to create and manage this corridor using CPW species (Shale Hills Woodland) as found on nearby surrounding hills.

All future vegetation communities adjoining the proposed industrial zone is categorised as ‘Woodland’ for the purposes of applying PBP.

3.2 Slopes influencing fire behaviour

The vegetation at the Glenlee site is on terrain best described as moderate to very steep embankments surrounding the developable areas. The location of the range of slopes can be viewed in **Table 2** and **Figure 3**.



Figure 2: Existing vegetation communities

4 Bushfire Protection Measures

PBP requires the assessment of a suite of bushfire protection measures that in total afford an adequate level of protection. The measures required to be assessed for rezoning are listed in **Table 1** below and are discussed in detail in the remainder of this section. This section demonstrates that the study area can accommodate the required bushfire protection measures and achieve the Direction 4.4 objectives and RFS requirements.

Table 1: PBP bushfire protection measures

Bushfire Protection Measure	Considerations
Asset Protection Zones (APZ)	Location and dimension of APZ setbacks from vegetation including prescriptions of vegetation management within the APZ.
Access	Assessment to include access and egress in and out of a developable area such as alternate access, operational response and evacuation options. APZ perimeter access to be considered as is design standards of public roads.
Water supply and other utilities	List requirements for reticulated water supply and hydrant provisions, and any static water supplies for fire fighting.

4.1 Asset Protection Zones (APZ)

4.1.1 APZ location and dimension

PBP does not prescribe specific APZ dimensions for industrial development. However, it does have some considerations in the objectives, namely to prevent direct flame contact and material ignition to the structure and afford occupants of any building protection from exposure to a bush fire. It is assumed that the general fire safety requirements required under the BCA for industrial development will adequately protect development from bushfire. PBP also requires the provision of a defensible space (access) between the development and the hazard which would in itself act as a minor APZ.

Given that the future building types, design and construction standards are unknown at the rezoning stage for the range of building types that could be expected at the site in the future, it is recommended and considered best practice that the ILP be designed to accommodate an APZ of a dimension compliant with the PBP Acceptable Solutions for residential development. An APZ of this size will ensure that the development will not experience direct flame contact (in accordance with PBP methodology) and therefore satisfy the aim and objectives of PBP. A design solution can be developed at later stages in the planning process (e.g. subdivision or development application) to reduce the APZ based on known design and construction.

Table 2 below lists the recommended APZ for the combinations of predominant vegetation and slopes discussed in Section 3. The APZs are indicated on **Figure 3**. The rezoning has the capability to incorporate the recommended APZs.

Table 2: PBP bushfire protection measures

Location (refer to Figure 4)	Slope class of most influence ¹	Predominant vegetation community ²	Recommended APZ
Interface A North	Upslope	Woodland	10 m
Interface B North east	Downslope 15 - 18°	Woodland	30 m
Interface C East	Downslope 5 - 10°	Woodland	20 m
Interface D East, south and west	Downslope 15 - 18°	Woodland	30 m

Existing land practices across the site and surrounds appear to have influenced the topography and slopes. Any cut and fill proposed by future development may influence the slope and is to be considered in the planning and design stages.

4.1.2 APZ perimeter access

The bushland/development interface areas identified in **Table 2** above are to contain a form of perimeter access linked to the internal road network. This access may be in the form of a public perimeter road or property access road, or may be a relatively short section of interface without a road but within close proximity to an access point where fire tankers can stand and base fire attack and suppression operations.

The development has the potential to provide a perimeter road and is to be considered in the planning and design of future development.

Section 4.2 of this report provides further road design and construction information for roads.

4.1.3 APZ management

The APZs will be contained within the subject land and are to be landscaped and managed so that:

- No tree or tree canopy is to occur within 2 - 5 m of future rooflines
- The presence of a few shrubs or trees in the APZ is acceptable provided that they are well spread out, do not form a continuous canopy, and are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission
- Any landscaping or plantings should preferably be low flammability species such as local rainforest species
- The ground fuel is to be maintained to less than 4 tonnes per hectare of fine fuel (4 t/ha is equivalent to a 1 cm thick layer of leaf litter and fine fuel means any dead or living vegetation of less than 6 mm in diameter, e.g. twigs less than a pencil in thickness).



Figure 3: APZ Locations (refer to Table 2 for descriptions)

4.2 Access

PBP requires an access design that enables safe evacuation away from an area whilst facilitating adequate emergency and operational response to the area requiring protection. The following sections present the bushfire planning requirements for access in bushfire prone land.

4.2.1 Safe access and egress

All bushfire prone areas should have an alternate access or egress option. This is usually achieved by providing more than one public road into and out of a precinct. The need for an alternative road and its location depends on the bushfire risk, the density of the development, and the chances of the road being cut by fire. The site has two access points to the surrounding developed area and therefore satisfies PBP.

4.2.2 Perimeter roads

Depending on the bushfire risk, all bushland interface areas containing an APZ for a significant bushfire hazard should feature a perimeter public road within the APZ. It is acceptable for some areas not to have a perimeter road or have a perimeter trail instead. These areas should have some other access strategy such as trails or regular access points including access to a hydrant network.

The design details (PBP acceptable solutions) of public perimeter roads are listed in Section 4.2.3 below.

4.2.3 Road design and construction standards

Public roads are to comply with the PBP acceptable solution design standards as listed in **Table 3** on the following page. Future industrial development subdivision within the site will be able to comply with these standards.

Table 3: Design and construction for public roads (RFS 2006; pg 21)

Performance Criteria	Acceptable Solutions
<ul style="list-style-type: none"> Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources) 	<ul style="list-style-type: none"> Public roads are two-wheel drive, all weather roads
<ul style="list-style-type: none"> Public road widths and design that allows safe access for firefighters while residents are evacuating an area 	<ul style="list-style-type: none"> Urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with PBP Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle) The perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas Traffic management devices are constructed to facilitate access by emergency services vehicles Public roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard Curves of roads (other than perimeter roads) are a minimum inner radius of six metres Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient There is a minimum vertical clearance to a height of four metres above the road at all times
<ul style="list-style-type: none"> The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles 	<ul style="list-style-type: none"> The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating
<ul style="list-style-type: none"> Roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered 	<ul style="list-style-type: none"> Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression Public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression
<ul style="list-style-type: none"> There is clear access to reticulated water supply 	<ul style="list-style-type: none"> Public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression
<ul style="list-style-type: none"> Parking does not obstruct the minimum paved width 	<ul style="list-style-type: none"> Parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement . No services or hydrants are located within the parking bays Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road

Curve radius (inside edge)	Swept path width	Single lane width	Two way width
< 40 m	3.5 m	4.5 m	8.0 m
40 – 69 m	3.0 m	3.9 m	7.5 m
70 – 100 m	2.7 m	3.6 m	6.9 m
> 100 m	2.5 m	3.5 m	6.5 m

4.3 Water supply and other utilities

4.3.1 Water supply and hydrants

Future development is to be serviced by reticulated water infrastructure suitable for fire fighting purposes. The furthest point from any future buildings to a hydrant is to be less than 90 m (with a tanker parked in-line) in accordance with *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (Standards Australia 2005). The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to use a ring main system for areas with perimeter roads
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005
- 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
- The PBP provisions of parking on public roads are met.

4.3.2 Electrical and Gas Supplies

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies
- No part of a tree should be closer to a powerline than the distance specified in *Vegetation Safety Clearances* issued by Energy Australia (NS179, April 2002).

Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2008 The storage and handling of LP gas* (Standards Australia 2008).

5 Conclusion

5.1 Statement of capability

This bushfire assessment demonstrates that the Glenlee site is capable of accommodating future industrial development with the aim and objectives of PBP and the appropriate bushfire protection measures.

5.2 Recommendations and conclusion

The recommendations of this bushfire assessment are located within Section 4 – Bushfire Protection Measures. They include the provision of Asset Protection Zones, adequate access, water supply for fire fighting, and the installation of utilities.

This bushfire assessment demonstrates that the subject land is capable of accommodating future industrial development with the appropriate bushfire protection measures and bushfire planning requirements prescribed by s.117 (2) Direction 4.4 – ‘Planning for Bush Fire Protection’ (EP&A Act) and *Planning for Bushfire Protection* (RFS 2006).



David Peterson

Principal Bushfire Consultant

FPAA BPAD Certified Practitioner No. BPD-PA-18882

6 References

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Michael Brown
Michael Brown Planning Strategies Pty Ltd

Ref/Job No: 16SUT_4232

9 November 2016

Dear Michael,

RE: Bushfire Protection Assessment Addendum – Glenlee Rezoning Proposal

Eco Logical Australia (ELA) prepared a Bushfire Assessment (Ref 13SYDPLA_0009) to support a Planning Proposal to rezone land at Glenlee for future industrial uses (Zone IN1 – General Industrial) to include a wide range of industrial and warehouse land uses.

The Planning Proposal for the rezoning was referred to the NSW Rural Fire Service (RFS) as part of the consultation process. The RFS supported the proposal and provided general comments on the Planning Proposal (Referenced D16/0672 dated 23 October 2015) to be considered for future development. It is understood Council has requested a response to these comments in respect to the necessary Asset Protection Zones required to prevent direct flame contact as follows:

In this regard, the NSW RFS has considered the vegetation as Forested Wetland (i.e. river-flat forest or weed infested woodland) with an effective downslope in excess of 15 degrees which requires a minimum APZ of 45 m from the environmental zones. Sections with an effective upslope requires a minimum APZ of 15m.

In this instance the Bushfire Assessment identifies residential APZ for the development based on the predominant vegetation having a 'grassy woodland' structure and associated fuel loads. ELA stands by this assessment of 'grassy woodland' based on fuel loads within the River-flat eucalypt forest (in its natural state) not exceeding the 10/15 t/ha maximum fuel loads identified by PBP. This is based on extensive experience with this vegetation community in the Camden and Campbelltown local government areas, advice from ecologists on the vegetation community, and recent discussions and onsite meetings with the RFS about this formation.

Notwithstanding the above, for industrial development *Planning for Bush Fire Protection 2006 (PBP)* states 'the general fire safety construction provisions (of the BCA) are taken as acceptable solutions, and the aim and objectives of PBP apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management'. If the aim and objectives cannot be met, then the construction requirements for bushfire protection will need to be considered on a case-by-case basis.

The aim of PBP is 'to use the NSW development assessment system to provide for the protection of human life (including firefighters) and the minimise impacts on property from the threat of bush fire, while having due regard to development potential, on-site amenity and protection of the environment'.

To support this, the objectives of PBP are to:

- (i) *Afford occupants of any building adequate protection from exposure to a bush fire;*
- (ii) *Provide for a defensible space to be located around buildings;*
- (iii) *Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;*
- (iv) *Ensure safe operational access and egress for emergency service personnel and residents is available;*
- (v) *Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and*
- (vi) *Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).*

A response to the above objectives in respect to the proposed rezoning and how compliance is achieved is provided below;

- (i) Future industrial buildings will meet or exceed the construction requirements of AS3959, providing occupants with protection from exposure to a bushfire.
- (ii) A defensible space of 10-30 m (dependent on effective slope) is proposed around future industrial buildings. This meets or exceeds the generally accepted minimum defensible space of 10 m by the RFS.
- (iii) A separation distance of 10-30 m (as outlined in the Bushfire Assessment) is proposed between buildings and the bushfire hazard to reflect the predominant vegetation and effective slopes and prevent direct flame contact. This combined with non-combustible construction materials (e.g. concrete/masonry and steel walls) of the future industrial buildings will prevent material ignition.
- (iv) Access and egress will be dealt with when the land is developed as the design is conceptual at the rezoning stage. Perimeter road/trail access can be provided for at the subdivision/development stage when detailed design is undertaken.
- (v) Ongoing management of the APZ will be determined at subdivision/development staged and can be conditioned as part of any consent.
- (vi) Utility services will be dealt with when the land is developed as the design is conceptual at the rezoning stage. Adequate water, electricity and gas supplies can be provided for at the subdivision/development stage when detailed design is undertaken.

Conclusion

The response to the RFS comments above clearly demonstrates that the development is capable of complying with the aim and objectives of PBP through the bushfire protection measures outlined in the Bushfire Assessment (Ref 13SYDPLA_0009).

If you require further information in relation to this matter please contact Danielle Meggos on the above number.

Yours sincerely,



Danielle Meggos

Bushfire Consultant

FPAA BPAD Certified Practitioner No. BPAD37742-L2

