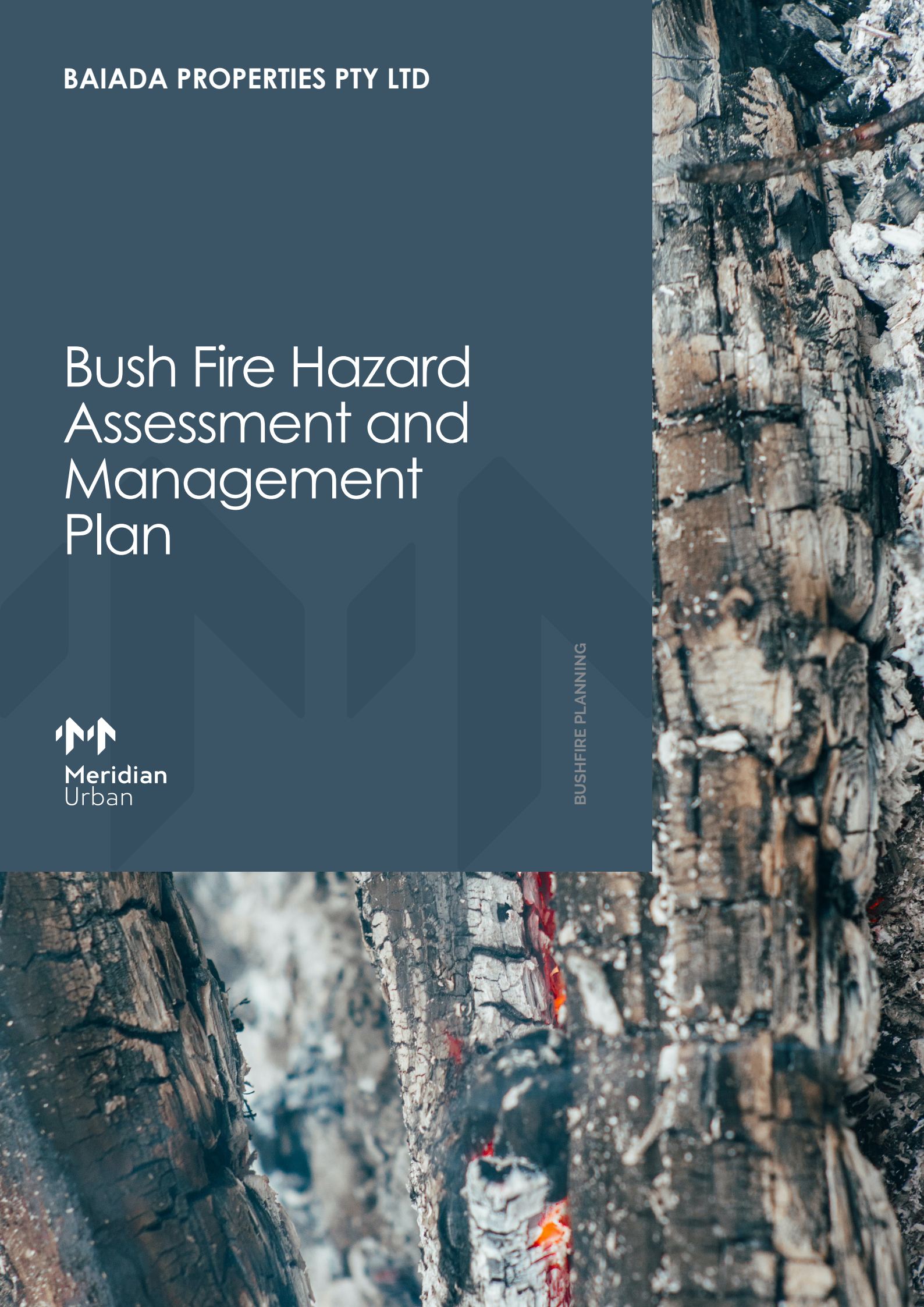
BAIADA PROPERTIES PTY LTD

Bush Fire Hazard Assessment and Management Plan

Meridian Urban

BUSHFIRE PLANNING



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Member Planning Institute of Australia
Member Fire Protection Association of Australia
Member International Association of Wildland Fire
Member Natural Hazard Mitigation Association (USA)
Member Association of Fire Ecology

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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This report is prepared for the benefit of the named Client only. No third party may rely upon any advice or work completed by Meridian Urban in relation to the services, including this report, except to the extent expressly agreed in writing by Meridian Urban.

It is acknowledged and agreed that the site may be subject to a degree of bush fire hazard. The client acknowledges and agrees that Meridian Urban has not created or contributed to the creation or existence of this hazard and the Client indemnifies Meridian Urban for claims arising out of or resulting from a bush fire event except to the extent attributable to the negligence of Meridian Urban.

The Client agrees that the Consultant shall have no liability in respect of any damage or loss incurred as a result of bush fire.

Baiada Properties Pty Ltd

Bush Fire Hazard Assessment and Management Plan

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1 Introduction

This Bush Fire Hazard Assessment and Management Plan (BFHAMP) report is commissioned by PSA Consulting on behalf of Baiada Properties Ltd in support of an application under the *Environment Planning and Assessment* (EP&A Act) 1979 to the Department of Planning, Industry and Environment for an intensive livestock agriculture use for 40 poultry sheds across four (4) separate farms and associated residential (manager's) dwellings in Grenfell. The subject site is formally described as Lot 1 on DP1022013, Lots 1-3 on DP1206485, and Lot 22 on DP866857 within the shire of Weddin, approximately 190 kilometres north of Wagga Wagga and 135 kilometres south west of Orange. This report is a response to the bush fire protection requirements of the Planning Secretary's Environmental Assessment Requirements (SEARs) issued on 26th February 2021 (SSD-13855453) by the New South Wales Rural Fire Service.

The nature of this assessment focuses on the compliance of the proposed development with regard to relevant bush fire protection provisions, policy and legislation including the Weddin Local Environmental Plan (LEP) and Development Control Plan (DCP), the Planning for Bush Fire Protection (PBP) 2019 statutory guideline, and the *Rural Fires Act 1997*. The report also has regard to other instruments including the National Construction Code and Building Code of Australia, as well as AS3959-2018 – Construction of Buildings in Bushfire Prone Areas which outlines the national building construction specifications for land situated within bush fire prone areas, or alternatively the NASH Standard of Steel Framed Construction in Bushfire Areas.

This BFHAMP is prepared by a qualified and experienced BPAD Level 3 practitioner (No. 33131).

The focus of this assessment report remains two-fold, both with respect to the statutory planning and building requirements as they apply in this case pursuant to all relevant policies, standards and regulation, and also end-user consideration and the protection of the operation. This report identifies the hazard profile relevant to the subject site and provides recommendations for a range of mitigation measures which seek to limit exposure of the development to an appropriate level.

This assessment report aims to mitigate the risk of bush fire threat and the impact of bush fire attack which includes:

- direct flame contact
- ember and firebrand attack
- radiant heat
- fire-driven wind.

Building loss is typically associated with one or more forms of bush fire attack, the most common being the combined effects of radiant heat and ember attack. Danger to human and animal life is also associated with these forms of bush fire attack, in addition to smoke emission.

This assessment does not seek to remove the threat of bush fire risk, but provide detailed sitting, layout, building and / or servicing information to assist in guiding combined efforts to manage the potential threat of this risk.

1.1 Summary of site details

Site Address	Gooloogong Road, Grenfell
RP Description	Lot 1 on DP1022013 Lots 1-3 on DP1206485 Lot 22 on DP866857
Site Area	722ha approx.
Local Government	Weddin Shire
LEP	Weddin Local Environment Plan 2011 Weddin Shire Council Development Control Plan 2014
Zoning	RU1
Tenure	Freehold
Current Land Use	Rural
Proposed Land Use	Intensive livestock agriculture (poultry farm)
Fire Authority	Cowra, Koorawatha and Goolagong (and Grenfell Fire and Rescue)

2 Site and Locality Context

The subject site is located on the eastern side of Gooloogong Road in the regional NSW area of Grenfell. Measuring approximately 722 hectares, the land is currently used for agricultural purposes.

The land gently slopes from south west to north east, with the highest point of the site being 460m above sea level in the north-eastern corner, while the lowest point in 340m along Wallah Wallah Creek. Munjal Hill located directly north of the subject site, and Rocky Hill and Conimbla National Park are situated beyond Adelargo Road to the east, which is characterised by steeper terrain. The land consists largely of grasslands with pockets of trees primarily lining Wallah Wallah Creek and the Gooloogong Road. Bushland borders the northern area of the subject site signifying the base of Munjal Hill and along the north eastern border, both acting as a vegetated wind break. Adjacent to the site on the west across from Gooloogon Road is also bushland which predominately follows the Warraderry Creek. The allotment is improved by several small dam across the site, contour benches and access tracks and trails. Several dwelling and sheds are also situated across the subject site.

Surrounding land uses are also rural in nature. North west of the site is where Wallah Wallah Creek deviates from Warraderry Creek that originates north of the subject site and spans along the western border across from Gooloogong Road. Wallah Wallah Creek traverses the middle of the site while being fed by several smaller tributaries and continues south of the subject site. Land to the north-north-east of the subject site is predominately bushland. West of Gooloogong Road, land is largely used for livestock grazing, as is land directly south of the subject site.

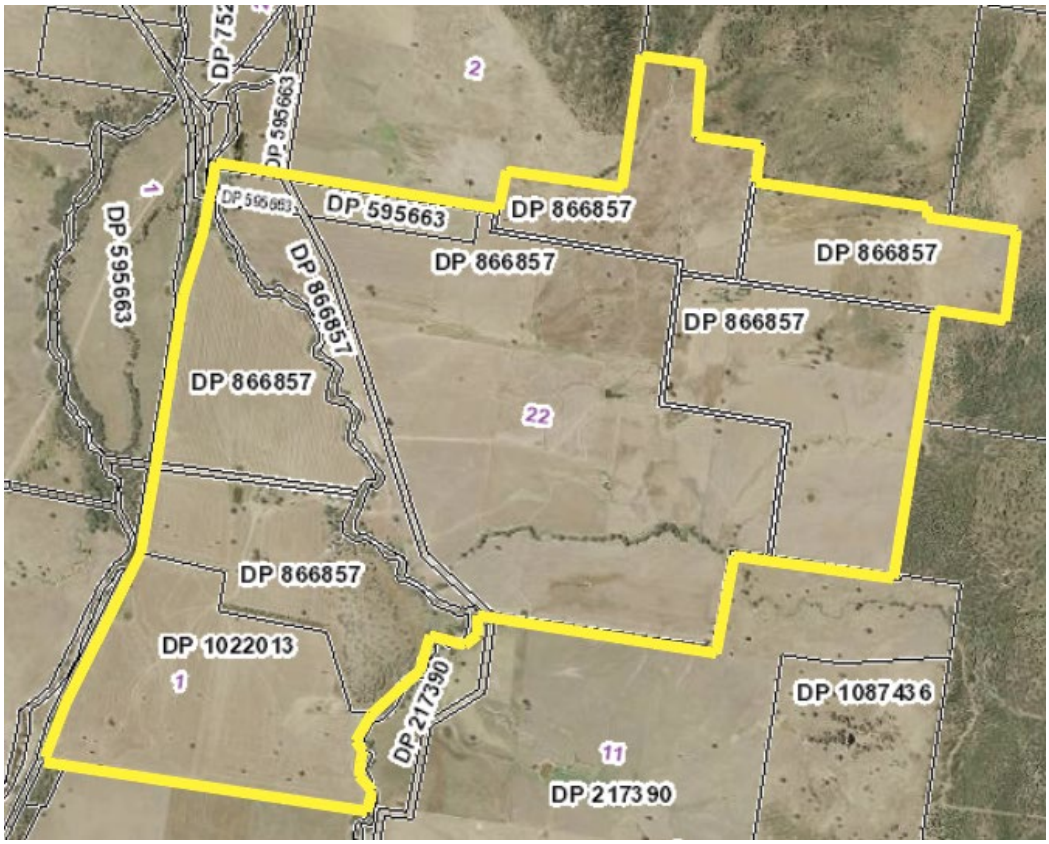

Figure 2-1 - Site locality and context (Source: NSW Government)

3 Proposed Development

The proposed development involves an intensive livestock agriculture use for the purposes of a new poultry farm consisting of 40 rearing sheds across four separate farms at a capacity of 153,000 birds for Farms 1 and 4, and 132,000 birds for Farms 2 and 3. This totals to an operational capacity of 570,000 birds across the entire site, refer to the proposed site layout plan at the figure below.

The proposed poultry operation is accessed via Gooloogong Road via a proposed central access road located across Lots 3, 4 and 5 on DP1210276 with a 40m gate setback from Gooloogong Road. There are four (4) farms situated across the site with Farm 1 situated in the south of Lot 1 of DP1022013. The three (3) other farms are situated on Lot 22 on DP866857 with Farm 2 in the centre, Farm 3 in the west and Farm 4 in the north area of the site, across Wallah Wallah Creek. Each farm is serviced by its own access road which connects with the central driveway from Gooloogong Road, with the exception of Farms 2 and 3. The access roads measure a minimum of 7 metres in width.

At the frontage of each farm is carparking, two (2) rural workers dwellings (manager residences), an employee amenities building, services facilities, eight (8) 250,000 litre steel tanks (total of 2 megalitres per farm), two storage areas containing six (6) silos, and a LPG gas facility with four (4) tanks. At the rear of each farm is a loading area, an egg packing room, enclosed biosecurity access and two storage areas that contain four (4) silos each. The employee amenities building featured at each farm will house an outdoor eating area, cleaning facility, laundry, kitchen, office, storage room and several showers and bathrooms. The building services facility will accommodate the main switchboard, fire pumps and water pumps.

The poultry farm buildings on site are proposed to be constructed of fire resistant materials including custom orb metal roofs, wall cladding constructed of Colorbond (amenities buildings), Colourbond raked ceiling (egg packing room), PIR panels (egg packing room, enclosed access section to sheds and amenities buildings) and a combination of concrete and Colorbond (sheds, and amenities buildings). PIR panels are insulated wall panels which are also fire retardant.

The residence buildings will be of slab on ground construction, including brick fascia and Colorbond roof sheeting.

Refer to proposed site layout plans below.

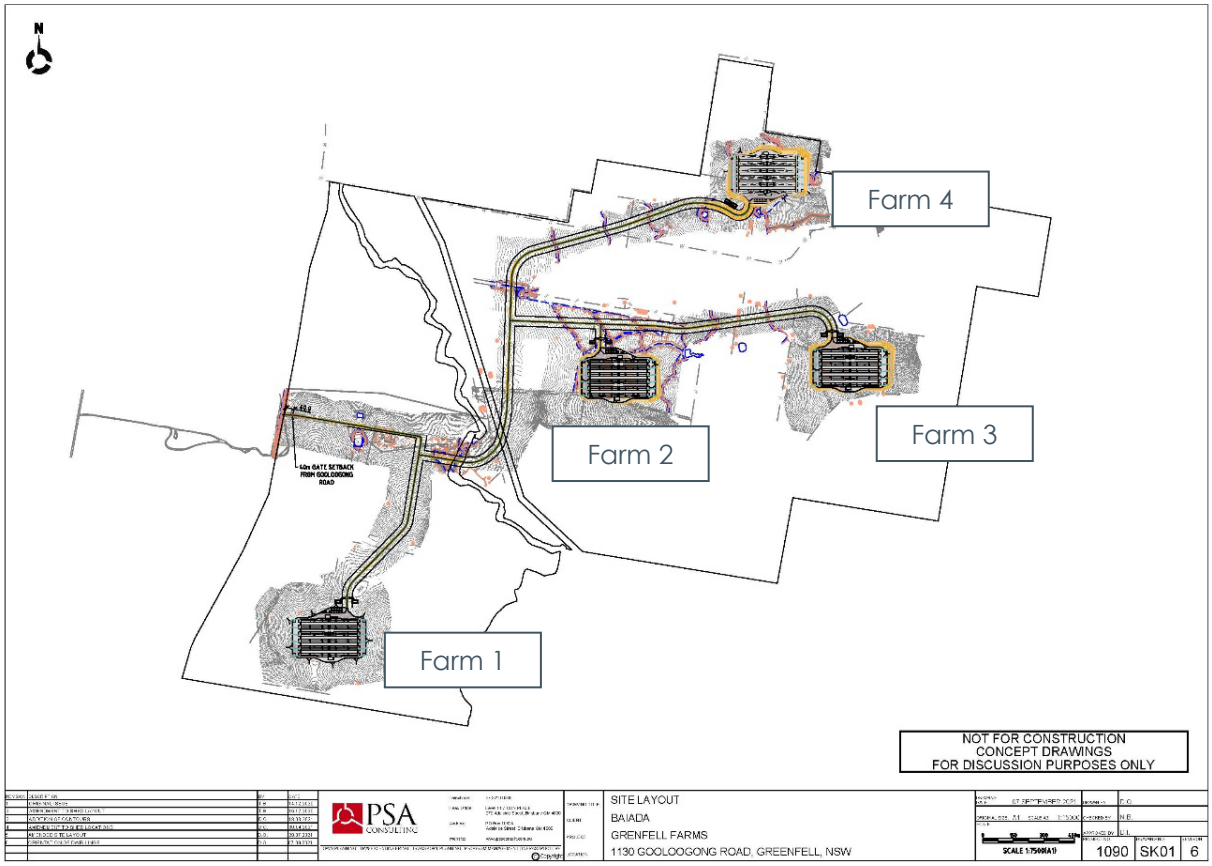

Figure 3-1 - Proposed site layout (Source: PSA Consulting Pty Ltd)

4 Bush Fire Prone Land Designation

Properties which are considered to be at risk of potential bush fire attack are identified by the local bush fire prone land map which is generally prepared by local government and certified by the Commissioner of the NSW RFS.

The NSW Government ePlanning Spatial Viewer provides the relevant bush fire prone land map for Weddin, which identifies portions of the subject land in the north, north west and along the western border as Vegetation Buffer, with small pockets of Category 1 Vegetation. These pockets of Category 1 Vegetation constitute 'high' bush fire risk and consists of grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands.

The Weddin Bush Fire Prone Land Map was published in 2014, prior to the introduction of Category 3 mapping requirements pursuant to PBP 2019. Councils now have five (5) years to incorporate Category 3 into their respective bush fire prone land maps. The NSW RFS response to the bush fire protection requirements of the SEARs indicates that assessment of Category 3 vegetation (grassland) is required in this case, in addition to surrounding Category 1 vegetation.

Having regard to the above, the subject site largely reflects grasslands and cropping lands. Whilst tree specimens flank the Wallah Wallah Creek corridor, this corridor remains less than 50m in width and thus, is not mapped as a hazard source.

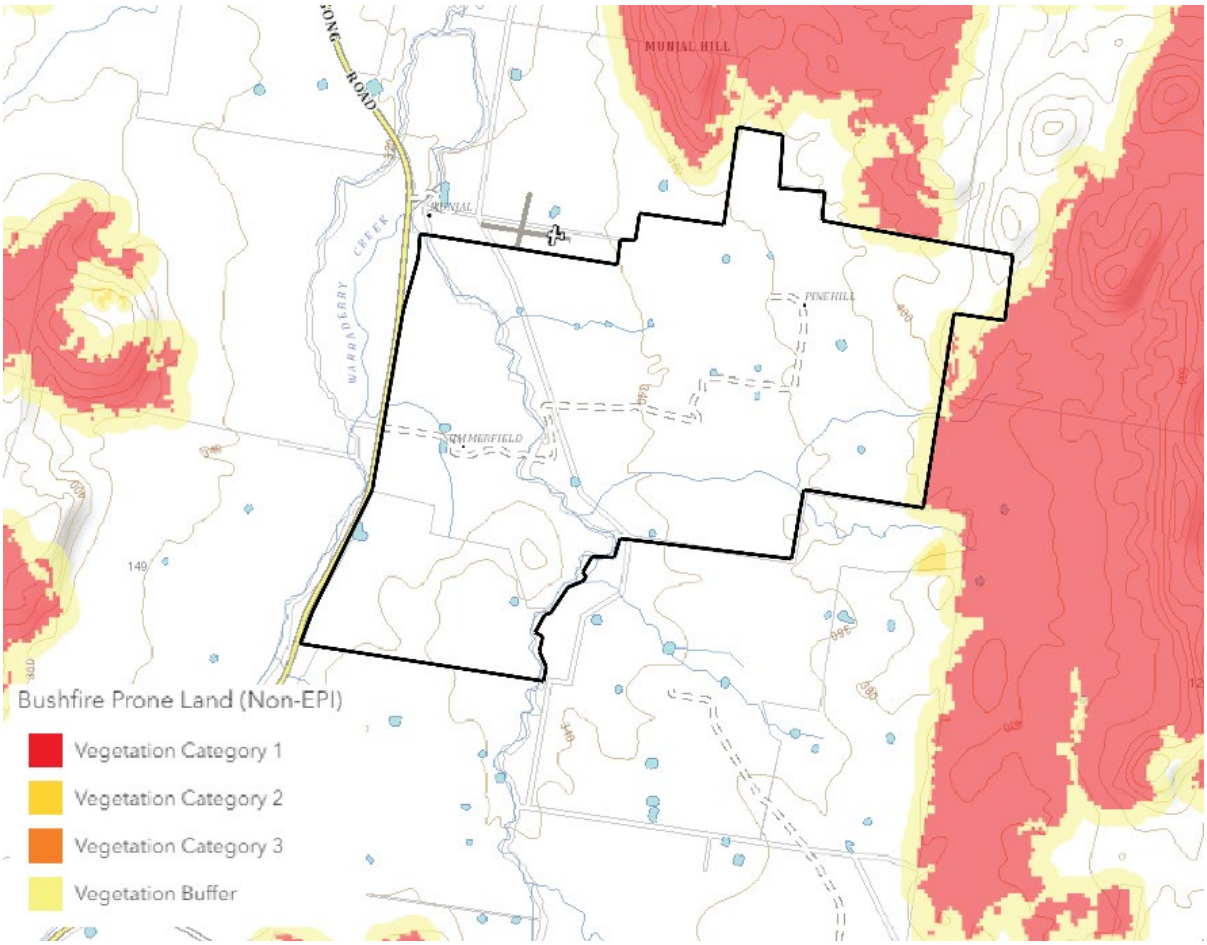

Figure 4-1 - Bush Fire Prone Land Map (Non-EPI) (Source: NSW Government)

4.1 Regulatory and assessment context

The following section outlines the relevant regulatory and statutory context relevant to the proposed development.

4.1.2 Rural workers dwellings component

The two (2) residential buildings at each farm site are defined as 'rural workers dwellings' pursuant to Section 8.2 'Other residential development' of PBP 2019. Bush fire protection measures specified by PBP for new rural workers dwellings include Asset Protection Zones (APZs), Bush Fire Attack Level (BAL) construction, installation of utilities that include water supply for fire-fighting, landscaping provisions, and access requirements.

4.1.2 Poultry operation

The proposed development, being an intensive livestock agriculture use for the purposes of a poultry farm operation, constitutes 'other development' as per Section 8.3 of PBP 2019. Section 8.3 specifies a range of provisions for a breadth of land uses. Development for the purposes of intensive livestock agriculture is identified as 'other non-residential development' and provisions for buildings of class 5 to 8 under the National Construction Code (NCC) are outlined.

The NCC itself does not prescribed any bush fire specific performance requirements for these classes of buildings and as such, neither AS 3959-2019 or the NASH Standard are considered to constitute deemed to satisfy provisions. Notwithstanding, PBP 2019 prescribes that compliance with either AS3959 or the NASH Standard is required in order to meet the aims and objectives of PBP 2019.

The objectives required to be met for the purposes of the proposed poultry farm operation relate to access, water supply and services, and emergency and evacuation planning, and include:

- to provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;
- to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;
- to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and
- provide for the storage of hazardous materials away from the hazard wherever possible.

Further, PBP 2019 notes the general fire safely construction provisions of the NCC are taken as acceptable solutions however, construction requirements for bush fire protection will need to be considered on a case-by-case basis.

4.2 Weddin LEP and DCP

The Weddin LEP 2011 and Weddin Shire Council DCP 2014 remain the relevant planning instruments for the local government area. The LEP does not provide any additional provisions for consideration in relation to bush fire beyond provisions for bush fire hazard reduction work.

The DCP provides an additional item relating to bush fire protection, beyond that contemplated by PBP 2019. This being in relations to services, requiring an additional 20,000 litres of water storage to be provided for bush fire fighting purposes.

In response to the above items, it is noted the proposed development seeks to provide a total static on-site water supply of two (2) megalitres per farm which will provide for the facility operations as well as its firefighting needs. Further detail is provided at Section 6 of this report.

5 Bush Fire Hazard Assessment

5.1 Methodology

The following assessment was carried out in accordance with the provisions of Appendix 1 – Site Assessment Methodology of PBP 2019.

A range of data and instruments have been utilised to perform a desktop analysis to complement available site data. These instruments include:

- local bush fire hazard mapping;
- proposal plans and supporting documentation;
- aerial imagery;
- Mid Lachlan Valley Bush Fire Risk Management Plan;
- PBP 2019; and
- AS3959-2009 – Construction of Buildings in Bushfire Prone Areas.

5.2 Fire weather

In terms of assessment methodology, it is noted the Fire Danger Index (FDI) relative to the locality being within the Lower Central West Plains region, is calculated at 80 based upon an estimated 2 per cent AEP (1:50 year ARI) event with a flame temperature of 1,090k and wind speeds of an assumed 45km/hr.

5.3 Mid Lachlan Valley Bush Fire Risk Management Plan

The Mid Lachlan Valley Bush Fire Risk Management Plan (BFRMP) was prepared by the Mid Lachlan Valley Bush Fire Management Committee in 2016 and includes the local government areas of Forbes, Lachlan, Parkes and Weddin.

The BFRMP notes the typical climate conditions of the region vary with hot dry summers and cool to cold winters with moist south to southwest winds.

Prevailing weather conditions associated with bush fires region consists of very high daytime temperatures, strong north to north westerly winds and very low humidity. Dry lightning storms also frequent the region mainly occurring during the bush fire season generally occurring from October to March.

There are several main sources of ignitions in the region. These being:

- lightning storm activity;
- farm machinery, slashing/cutting operations and harvest operations;
- vehicle accidents and exhausts coming in contact with vegetation along major roads, mostly along the Newell Highway;
- power lines clashing and equipment failure;
- incidents associated with storage of hay, including spontaneous combustion; and
- irresponsible activity during adverse fire weather, particularly welding and grinding.

5.4 Vegetation classification and fuel loads

Vegetation classification is important for a number of reasons, namely it indicates the level of fire intensity and fire behaviour associated with specific species of vegetation and it also indicates the fuel loads which may exist in certain locations. It stands to reason that different

vegetation groups yield very different fire behaviour and intensity attributes by virtue of their characteristics and fuel load output (Hines et al., 2010). The vegetation communities within 140m of the site form the basis of this assessment, as per Appendix 1 of PBP 2019.

The Bush Fire Prone Land Map identifies Category 1 vegetation to the north west and west of the site, forming part of adjacent bushland. The northern-most farm is approximately 95m from the site boundary which adjoins vegetation to the north west. The other three (3) farms are more than 140m from classified vegetation but remain surrounded by either cropping or grazing land which is capable of sustaining grass fire.

Pursuant to Appendix 1 of PBP 2019, the vegetation within 140m of the overall development site is largely grasslands interspersed with areas of dry forests, agricultural, and grassy as well as rocky hill woodlands. The riparian corridor along Warraderry Creek, external to the site, is defined as grassy woodlands, while the bushland in the sites north, north east, east and south east are a mixture of woodlands and forests. It is noted that the riparian corridor spanning Wallah Wallah Creek is categorised as grassy woodlands but is a narrow, meandering corridor at less than 50m in width.

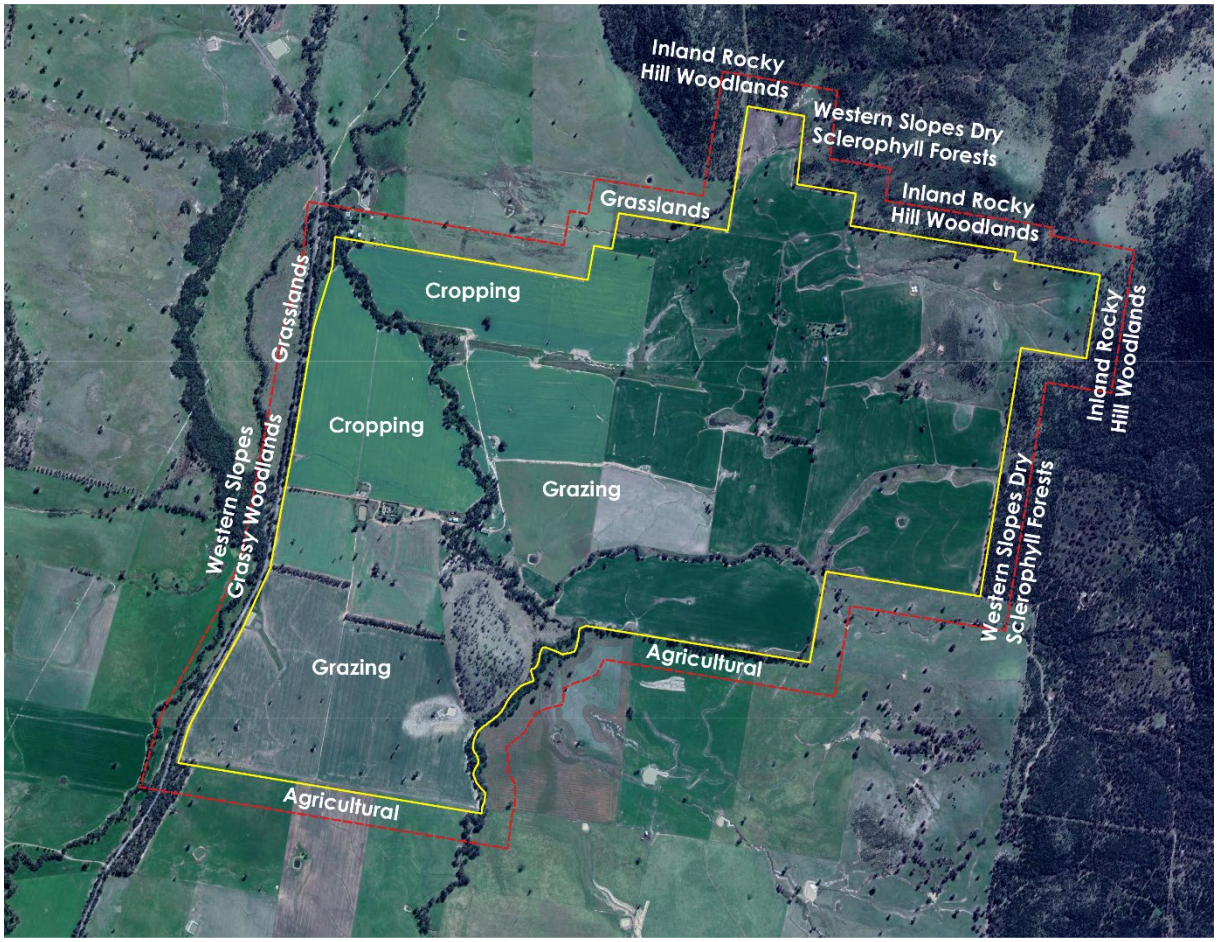

Figure 5-1 – 140m vegetation assessment polygon around area of development (Source: Google Satellite, n.d.)

Cropping and grazing land which both surrounds and occupies site has the potential to support grass fire under certain conditions subject to management regimes, rainfall and growth rates, drought and curing.

As demonstrated at the figure above, the 140 metre assessment area is largely void of woodland and forest vegetation. However, it does adjoin such areas to the north, east and west. On this basis, the vegetation classification relevant to the development area of the site is identified as '**grassland**' as per PBP 2019, with an area of '**woodland**' approximately 95m from the northern most farm. Refer to images below.

Figure 5-2 – South view along the proposed access track to proposed Farm 1 (Source: OzArk Environment & Heritage)

Figure 5-3 – North view across proposed Farm 2 (Source: OzArk Environment & Heritage)

Figure 5-4 – Southeast view across from proposed Farm 3 (Source: OzArk Environment & Heritage)

Figure 5-5 – West view across proposed Farm 4 (Source: OzArk Environment & Heritage)

5.5 Effective slope analysis

Effective slope relates to the topography of vegetation beneath classified vegetation, as this influences fire speed and rate of spread - namely, that the speed of fire doubles for every 10 degrees incline as a general rule.

An effective slope analysis has been undertaken for the rural workers dwellings and each of the four (4) poultry farms.

From a broad perspective, the area surrounding the site is characterised as comprising vast, flat valley plains which transition to slightly undulating topography to the east and west as part of the Warraderry Range.

5.5.1 Rural workers dwellings

For the western residential dwelling of Farm 1, there is a gentle downslope to the north west of the site with a maximum slope of 2.9° within 150 metres of the dwelling. For the eastern residential dwelling, there is a gentle downslope to the south, south east with a maximum gradient of 2.5° within 150 metres of the dwelling.

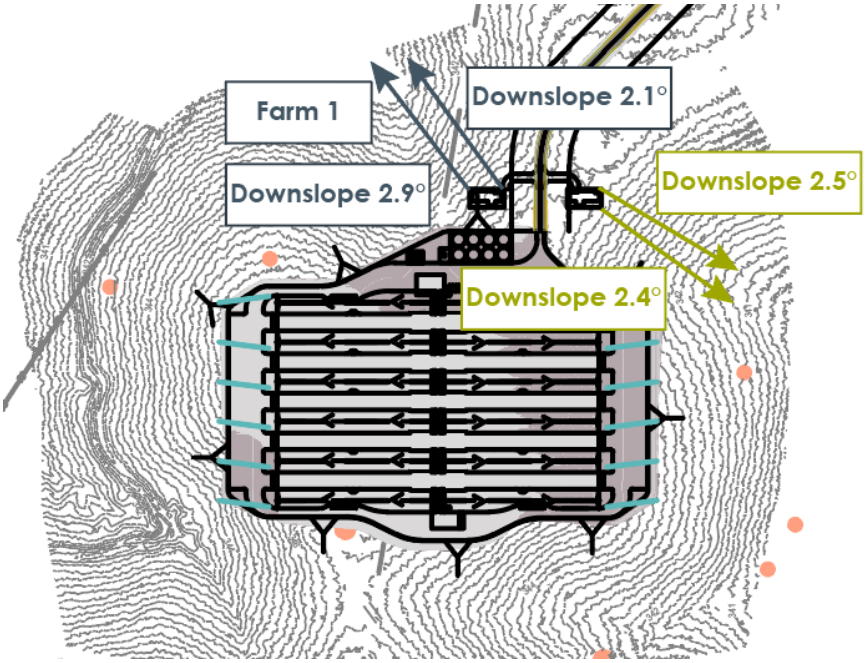

Figure 5-6 Farm 1 dwelling effective slope assessment (Source: PSA Consulting)

For Farm 2, land to the east is entirely upslope. The downslopes to the west and south west measure between 1.6° and 1.9° respectively.

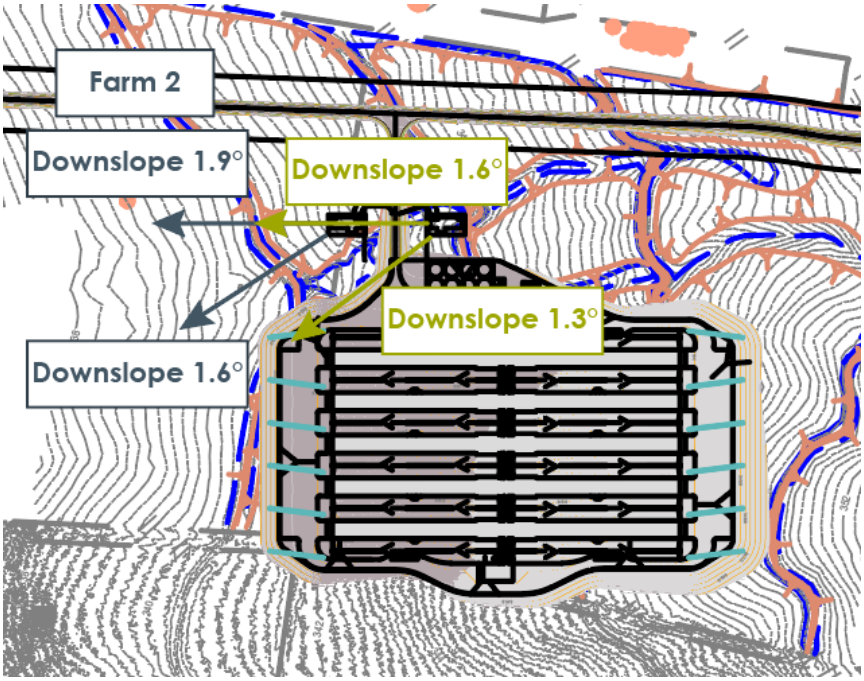

Figure 5-7 Farm 2 dwelling effective slope assessment (Source: PSA Consulting)

For Farm 3, land to the east is entirely upslope. The downslopes to the west and south west measure between 3.1° and 3.9° respectively.

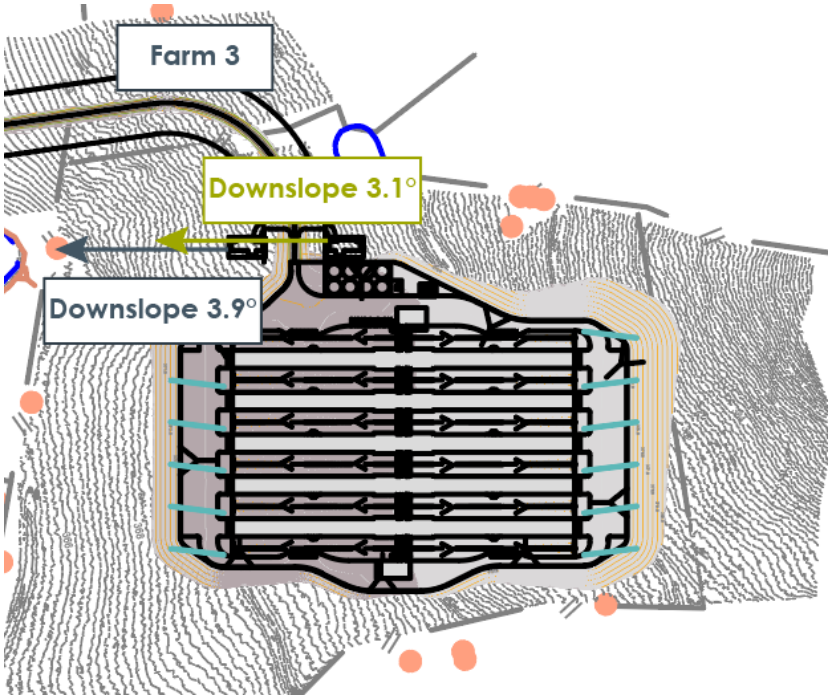

Figure 5-8 Farm 3 dwelling effective slope assessment (Source: PSA Consulting)

For Farm 4, which is the northern most farm on the site, land to the north and west is entirely upslope. The maximum downslope for each dwelling is to the south-west, with effective slope gradients measuring between 1.5° and 2.9° downslope.

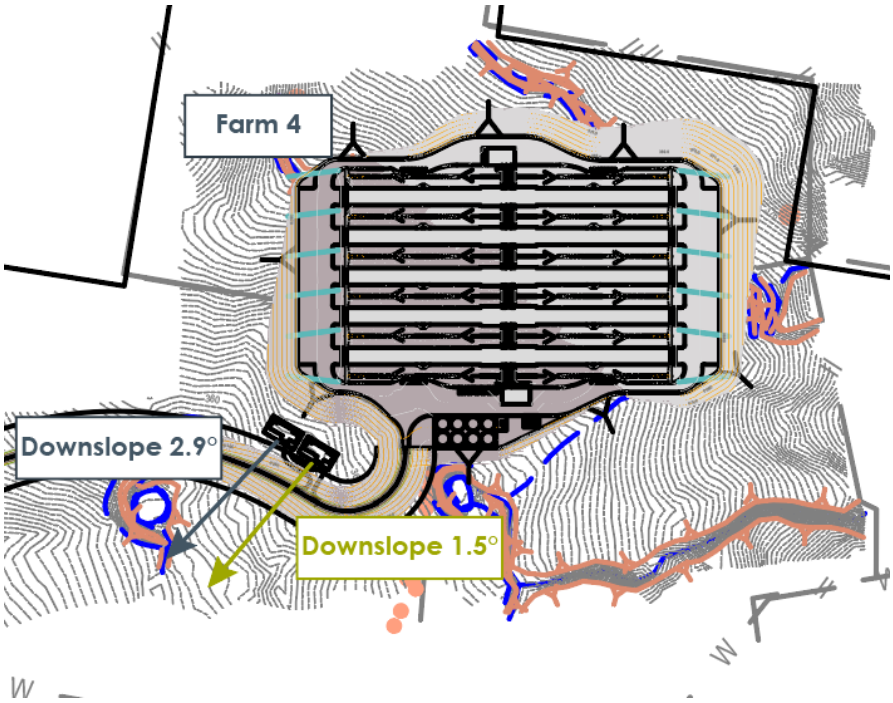

Figure 5-9 Farm 4 dwelling effective slope assessment (Source: PSA Consulting)

5.5.2 Poultry Farms

The subject land generally comprises flat plains and gentle undulating slopes. The land rises to the foothills of surrounding topography to the north east and west, dipping to broad plains around Wallah Wallah Creek. A low crest is present at the site of Farm 1 which slopes gently towards Wallah Wallah Creek to the north east.

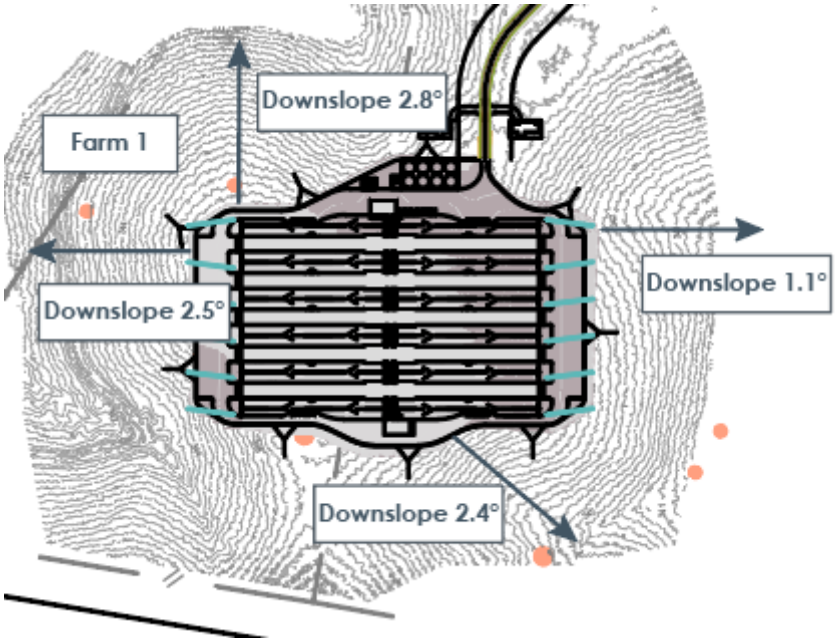

Figure 5-10 Farm 1 150m effective slope assessment (Source: PSA Consulting)

The effective slopes relating to Farm 2 were measured in multiple directions, with land to the west entirely upslope. Land to the south is occurs on a cross slope but remains generally downslope, with overall downslopes measuring between 1.7° and 2.0°.

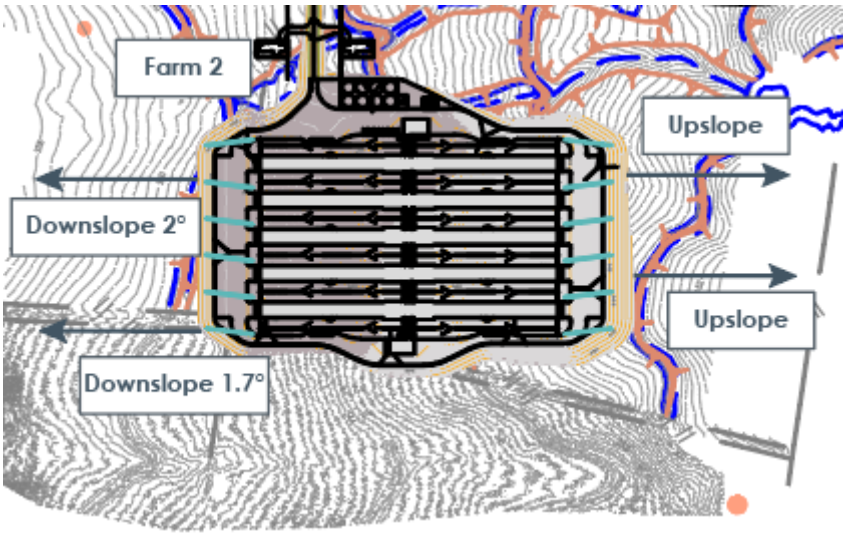

Figure 5-11 Farm 2 150m effective slope assessment (Source: PSA Consulting)

For Farm 3, land to the north and west is generally upslope. The maximum downslope gradient to the west and south west measures 2.3°, with a cross slope to the south but also on a downslope trajectory to the south-west.

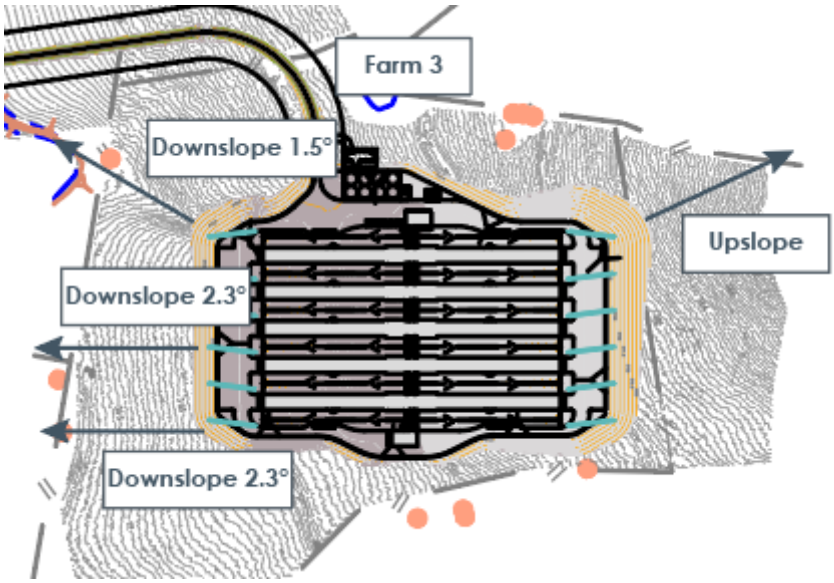

Figure 5-12 Farm 3 150m effective slope assessment (Source: PSA Consulting)

Land to the north and east of Farm 4 is entirely upslope. Downslopes are present to the east, south east and south, with a maximum downslope gradient of 2.8°.

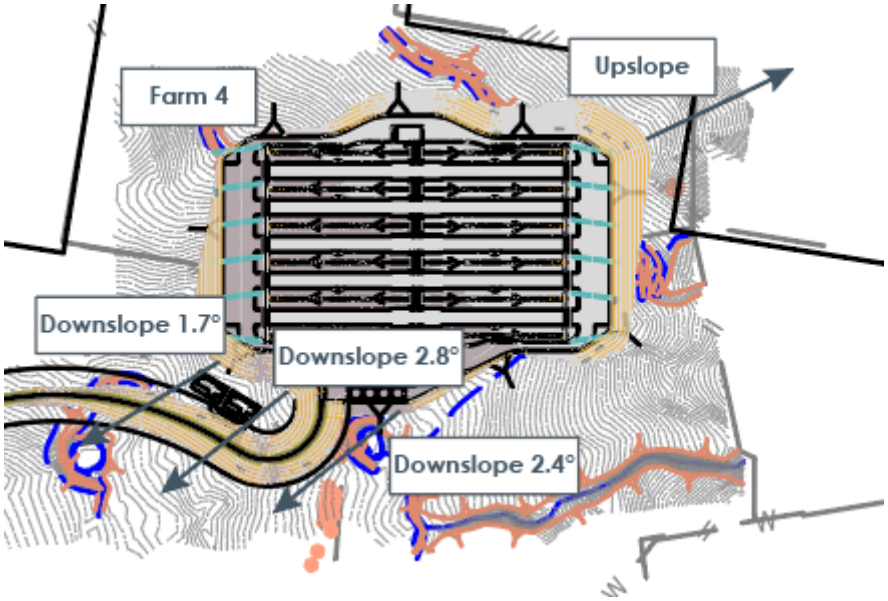

Figure 5-13 Farm 4 150m effective slope assessment (Source: PSA Consulting)

5.6 Bush fire behaviour assessment

The proposed development, being an intensive livestock agriculture use in a rural area is not immune to bush fire risk. The site is situated in a cleared valley between the slopes of the Warraderry Range which comprises woodland and forest vegetation. The nearest farm, being Farm 4 at the northern most area of the site, is some 95m from this vegetation. To this end, hazard relative to the farms, rural workers dwellings, ancillary facilities and the subject site more broadly is that of grass fire. Grass fires are fast moving and can lead to damage and loss of equipment, sheds, buildings and other assets. In the case of the proposed poultry farm operation, the protection of the birds as a key economic asset, and from a humane perspective, is also a relevant consideration.

It is possible that grass fire could advance toward the operation from almost any direction, but dry north to north westerly winds are more likely, noting the fire wind observations of the Mid Lachlan Valley BFRMP. From this direction, grass fire is likely to advance towards all four (4) farms through the valley.

The pockets of semi-arid trees across the broader subject site and to the immediate west may generate localised instances of increased fire intensity however, these pockets are not sufficiently substantial to warrant a change in vegetation classification over the broader prevailing vegetation communities.

It is noted that the Warraderry Creek corridor, classified as grassy woodlands, is present to the immediate west of the subject site on the opposite side of Gooloogong Road, and opposite the proposed access driveway. Fire in this location may include increased intensity, and will need to be considered as part of the site evacuation procedures.

On the basis of the above, the subject site and proposed development is able to employ bush fire protection measures to enhance the resilience of the operation to the potential impact of grass fire and these are identified at Section 6 of the report, and in the bush fire management plan at **Appendix A**.

6 Bush Fire Protection Measures

The bush fire risk and hazard context associated with the subject site requires a number of bush fire protection measures as identified by Section 8.3 of PBP 2019.

The below provisions should be read in conjunction with the bush fire management plan for each farm provided at **Appendix A**. An assessment of the rural workers dwellings against the Chapter 7 provisions of PBP 2019 is included at **Appendix B**.

6.1 Access and egress roads

Access and egress (road) networks are significant in terms of a range of aspects of bush fire prevention and ability for firefighting. It must cater for emergency access and egress in times of potential bush and grass fire events.

The proposed poultry farm operation is to be accessed via a central access road from Gooloogong Road with three (3) farms accessed to the north, north-east and a further one to the south. The central access driveway is a proposed 7 metres in width. Each farm has loop road around the sheds, at the top of earthworks batters. The width of the loop roads vary but are a minimum of 7m metres.

The property access requirements for residential and rural residential subdivisions provide a reasonable yardstick for assessment and compliance for a facility such as a poultry farm operation in a rural area. These provisions are assessed via the following table.

Table 1 - Property access compliance assessment

PBP 2019 property access requirements	Compliance statement
Minimum 4m carriageway width	The proposed minimum access road dimension is 7 metres.
In forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay	Not applicable.
A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches	Complies, there are no trees which branches which will overhang the internal access road network.
Provide a suitable turning area in accordance with Appendix 3	The proposed access road network is designed to facilitate articulated vehicles and thus complies with the minimum requirements of Appendix 3.
Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress	As above.
The minimum distance between inner and outer curves is 6m	The proposal complies.
The crossfall is not more than 10 degrees	The proposal complies.
Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads	The proposal complies.

PBP 2019 property access requirements	Compliance statement
A development comprising more than three dwellings has access by dedication of a road and not by right of way.	Not applicable. The proposed residential uses constitute rural workers dwellings and is not associated with any residential subdivision.

The provisions of PBP 2019 identify minimum 4 metre internal road widths are required to enable vehicle and fire appliance passing, which the proposed development meets and exceeds. In addition, loop access roads are provided around the proposed poultry farm sheds, providing an internal road network of through roads which will not require fire appliances to use reverse gear unless desired.

The site is accessed via Gooloogong Road which is a rural road of sealed construction which links with New Forbes Road approximately 4 kilometres to the north and the Mid Western Highway at Grenfell approximately 10.6 kilometres to the south.

The broader subject site is also traversed by a series of internal access trails which will remain in situ following development.

6.2 Asset protection zones, defensible space and associated BALs

An asset protection zone (APZ) is an area which surrounds a building or asset which is intended to be managed in perpetuity in a no or low fuel condition to aid in the protection of buildings from the effects of flame contact, radiant heat exposure and to assist in the protection of residents. It also offers defensible space for firefighters to work in relative safety from radiant heat exposure.

The APZ dimensions usually also relate to a corresponding bush fire attack level (BAL) pursuant to AS3959.

6.2.1 Rural workers dwellings

As per the PBP 2019, the rural workers dwellings must meet the residential requirements of Chapter 7. In this case, Table 7.9a identifies a minimum 20m APZ is required. Refer to **Appendix B** for the compliance statement of the Chapter 7 performance criteria and acceptable solutions for residential infill development.

Having regard to Table A1.12.6 of PBP 2019 for BAL requirements in FDI 80 areas, the minimum distance required to achieve BAL-12.5 is 23m, where downslopes do not exceed 5°.

To this end, a minimum 23m APZ is provided for all proposed rural workers dwellings, achieving a maximum BAL-12.5 construction requirement.

Refer to the bush fire management plan for each farm at **Appendix A** for further detail.

6.2.2 Poultry farms

For 'other development' PBP 2019 does not prescribe a minimum APZ dimension. Rather, it notes the general fire safety requirements of the NCC are accepted as adequate for the purposes of bush fire protection, though measures over and above may be provided.

Notwithstanding the above, PBP 2019 requires the consideration of a managed hazard-separation area for firefighting purposes referred to as 'defendable space', as per the aim and objectives of PBP 2019 set out at Section 1.1. Defensible space is an area between buildings and the hazard source which is capable of providing a relatively safe environment in which firefighters can undertake operations to defend an asset or structure. The defensible space dimension is defined by the ability to gain access around an asset, building or structure and conduct defensive firefighting operations.

The APZ / defensible space surrounding each of the four (4) poultry farms comprises the loop road and earthworks batter. The distances for each vary, as a result of slope, and are identified on the bush fire management plan for each farm at **Appendix A**. The loop roads measure a minimum of 7m which widen out in areas around the sheds. Combined with the slope batters (which vary in width), the APZs / defensible space around the sheds provide adequate space to conduct firefighting operations around the structures of the proposed development.

Additional defensible space areas are required around the amenities, services, water tanks and LPG gas facilities. The APZs for these facilities must measure a minimum dimension of 6 metres, and a minimum of 10 metres around the LPG tanks. A radiant heat shield of besa block construction is also required around the LPG tanks.

Refer to the bush fire management plan for each farm at **Appendix A** for further detail.

6.3 Emergency and evacuation

PBP 2019 identifies at Section 8.3 the requirement for suitable emergency and evacuation arrangements.

The proposed poultry farm operation will employ a workforce of 50 persons working full time, responsible for the management of 570,000 birds across the site.

The first element of consideration in relation to emergency and evacuation arrangements is the road network which is considered above, and exceeds the minimum design requirements set out by PBP 2019. The internal road network not only doubles as defensible space for firefighting operations and limits the distance to which grass fire might occur adjacent to the buildings, it also provides a direct linkage to Gooloogong Road which enables access and egress to/from both the north and south. This provides multiple opportunities for access and egress, depending on the location of the grass fire threat and wind conditions of the day.

In the event of emergency, evacuation of employees from the site may be required in which case, the internal and external road network are capable of facilitating such activities provided departure is decided in sufficient time to enable safe evacuation.

It is not envisaged that the birds occupying the site are reasonably able to be evacuated. However, from a humane perspective the combined bush fire protection measures of defensible space and building construction are intended to offer protection in the event of grass fire. In the event of fire, it is also likely to water supply available on site would be deployed for firefighting purposes and to protect the structural assets which inherently seeks to protect the occupant birds also.

The NSW RFS provides a document 'A guide to developing a bush fire emergency management and evacuation plan' which the facility operators may choose to prepare. Whilst this is not mandated by this assessment, it is recommended.

6.4 Water supply, utilities and services

The four (4) poultry farms have a uniformed operation supplied by eight (8) 250,000 litre steel water tanks (totalling 2 megalitres capacity per farm). This is intended to service both day-to-date farm operations as well as the facility's firefighting water supply.

In terms of the recommendations of this assessment:

1. a 6 metre defensible space area is provided around the tanks.
2. each tank is to facilitate fire appliance access by providing an outlet within 4 metres of the standing position of a Category 1 tanker, which is likely to pull up on the central access road. The outlet is to be fitted with a 65mm metal Storz outlet with gate or ball valve.

3. the tanks are to be topped up to full capacity at the start of each regulated fire season and water levels observed throughout each fire season to ensure sufficient firefighting capacity is maintained for the duration of the season.

4. Ensure the fire safety provisions of the NCC are implemented and consider the ability for fire fighting equipment provided on site to protect the entirety of each building (i.e. hoses are located and can stretch the perimeter around buildings, etc.).

For electricity supply, PBP 2019 notes the following provisions:

- where practicable, electrical transmission lines are underground; and
- where overhead, electrical transmission lines are proposed as follows:
    - lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and
    - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.

The proposed development is recommended to comply with the above provisions, noting these provisions relate to residential and special fire protection purposes rather than 'other development' However, in a rural context, liability for ignition from electricity supply on freehold land is the responsibility of the landholder and as such, appropriate steps should be taken in perpetuity (i.e. annual checks and maintenance) to limit the hazard posed by electricity supply.

6.5 Hazardous materials

In relation to the four (4) LPG tanks, a 10 metre defensible space area is to be provided. The LPG tanks are also required to be shielded by a masonry (i.e. besa block) radiant heat screen at a height of 1.5m or otherwise sufficiently high to screen the height of the tanks, in a manner outlined by the bush fire management plan at **Appendix A**. Plastic gas fittings are not acceptable in a grass fire hazard area and are not to be used.

Other hazardous materials storage (i.e. fuel, chemicals, etc.) should be located on-site in a building at a minimum 20 metre distance from any surrounding grass fire hazard source with a maximum radiant heat flux exposure of 12.5 kW/m2.

6.6 Other recommended bush fire protection measures

Other bush fire protection elements which relates specifically to this proposal are outlined below.

6.6.1 Building construction

All buildings on site are proposed to be constructed of fire resistant materials including:

- Colorbond metal deck roofs, custom orb roofing and Colourbond raked ceiling (egg packing room);
- wall cladding constructed of Colorbond (amenities buildings), PIR panels (egg packing room, enclosed access section to sheds and amenities buildings) and a combination of concrete and Colorbond (sheds, amenities buildings, and environmental waste tank). PIR panels are insulated wall panels which are also fire retardant; and
- slab on ground, brick veneer and Colorbond roofing for the rural workers dwellings which also must comply with the BAL-12.5 construction requirements of AS3959.

Thus, the majority of built form structures will be constructed using fire-resistant materials and thermal / insulated materials which not only serve to protect the buildings themselves but the birds which will occupy the facility.

6.6.2 Landscaping

It is noted the farm APZs / defensible space areas include the earthworks batters. To this end, landscaping of the batters around each farm must be provided in a manner which does not inadvertently increase the fuel load or fire hazard relative to the proposed development.

All APZs, including batters around each farm, must comply with the **'inner protection zone'** landscaping provisions of PBP 2019 which provides suitable guidance in relation to an appropriate approach to landscaping in this location. To this end, the following is recommended:

Trees

- tree canopy cover should be less than 15 per cent at maturity;
- trees at maturity should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above the ground;
- tree canopies should be separated by 2 to 5m; and
- preference should be given to smooth barked and evergreen trees.

Shrubs

- 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

- grass 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.

6.6.3 Fire trails and firebreaks

The site layout does not warrant the provision for any additional fire trails or firebreaks however, maintenance and ongoing management of the existing trail and track network across the property is recommended. This is especially applicable to the areas of the site where there are clusters of trees or adjacent bushland as is the case along the northern, eastern and western boundaries.

7 Summary Conclusions and Recommendations

This report considers the bush fire exposure and protection measures required for a proposed intensive livestock agriculture activity involving a poultry farming operation at Gooloogong Road, Grenfell. Based upon a range of analysis methodologies, protection measures are identified for incorporation as part of the proposed development to aid in the defence against grass fire with respect to classifiable vegetation surrounding the development site.

Based on this assessment, a range of protection measures have been derived, illustrated by the bush fire management plan at **Appendix A**. These are summarised as follows:

1. Construction of the rural workers dwellings is to comply with BAL-12.5 specifications and be provided with an APZ measuring 23m in width, as set out by the bush fire management plan at **Appendix A**.
2. Internal road network design and dimensions comply with those set out by the bush fire management plan at **Appendix A**.
3. Defensible space areas are provided which comply with those illustrated by the bush fire management plan at **Appendix A**.
4. Consider the preparation of a bush fire emergency management and evacuation plan to support the safe operation of the facility.
5. The static water supply for the facility meets the following recommendations of this assessment:
    a. a 6 metre defensible space area is provided around the tanks.
    b. each steel tank is to facilitate fire appliance access by providing an outlet within 4 metres of the standing position of a Category 1 tanker, which is likely to pull up on the central access road. The outlet is to be fitted with a 65mm metal Storz outlet with gate or ball valve.
    c. the tanks are to be topped up to full capacity at the start of each regulated fire season and water levels observed throughout each fire season to ensure sufficient firefighting capacity is maintained for the duration of the season.
    d. ensure the fire safety provisions of the NCC are implemented and consider the ability for fire fighting equipment provided on site to protect the entirety of each building (i.e. hoses are located and can stretch the perimeter around buildings, etc.).
6. In relation to the LPG tank, a 10 metre defensible space area is to be provided. The LPG tanks are also required to be shielded by a masonry (i.e. besa block) radiant heat screen at a height of 1.5m or otherwise sufficiently high to screen the height of the tanks, in a manner outlined by the bush fire management plan at **Appendix A**. Plastic gas fittings are not acceptable in a grass fire hazard area and are not to be used.
7. Provide electricity supply in a manner which complies with the requirements of PBP 2019 and undertake annual checks and maintenance to limit the ignition hazard posed by electricity supply.
8. Ensure APZs (including earthworks batters) are landscaped to limit fire potential and comply with the 'inner protection zone' provisions of PBP 2019.
9. Continue to maintain the existing trail and track network across the broader subject site.

It is significant to note that bush and grass fire remains a natural process which is endemic to the Australian landscape and is subject to a range of contributing factors which are variable on a daily basis. As such, it is extremely difficult to predict the behaviour and

intensity of a fire event at any given time. On this basis, it remains incumbent upon the facility operators to implement the recommendations of this assessment, utilise local knowledge of grass fire behaviour and implement practices and procedures that ensure operators and site-based staff remain aware of fire danger ratings, ignitions in the area and their options in the event of a grass fire to ensure the preservation of both life and property.

APPENDICES

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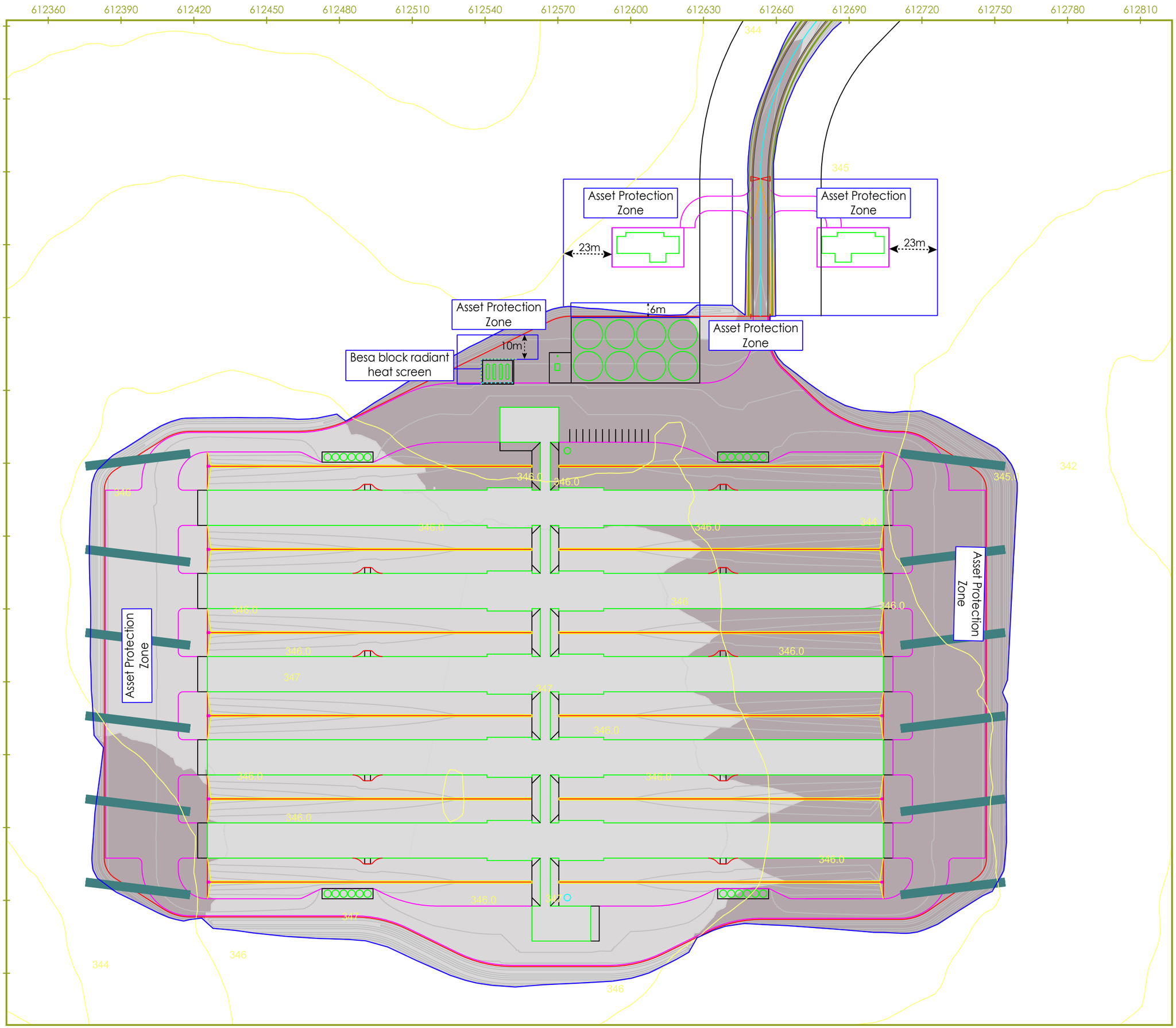
Appendix A - Bush Fire Management Plans

GRENFELL BUSH FIRE

FARM 1 BMP

LEGEND

- Proposed development
- APZ
- Besa block radiant heat screen
- Drainage pipes



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Project No: 21-020 Map No: 1 o f 4

Coordinate System: GDA 2020 MGA Zone 55
Printed at: A3
Creation Date: 07/10/2021

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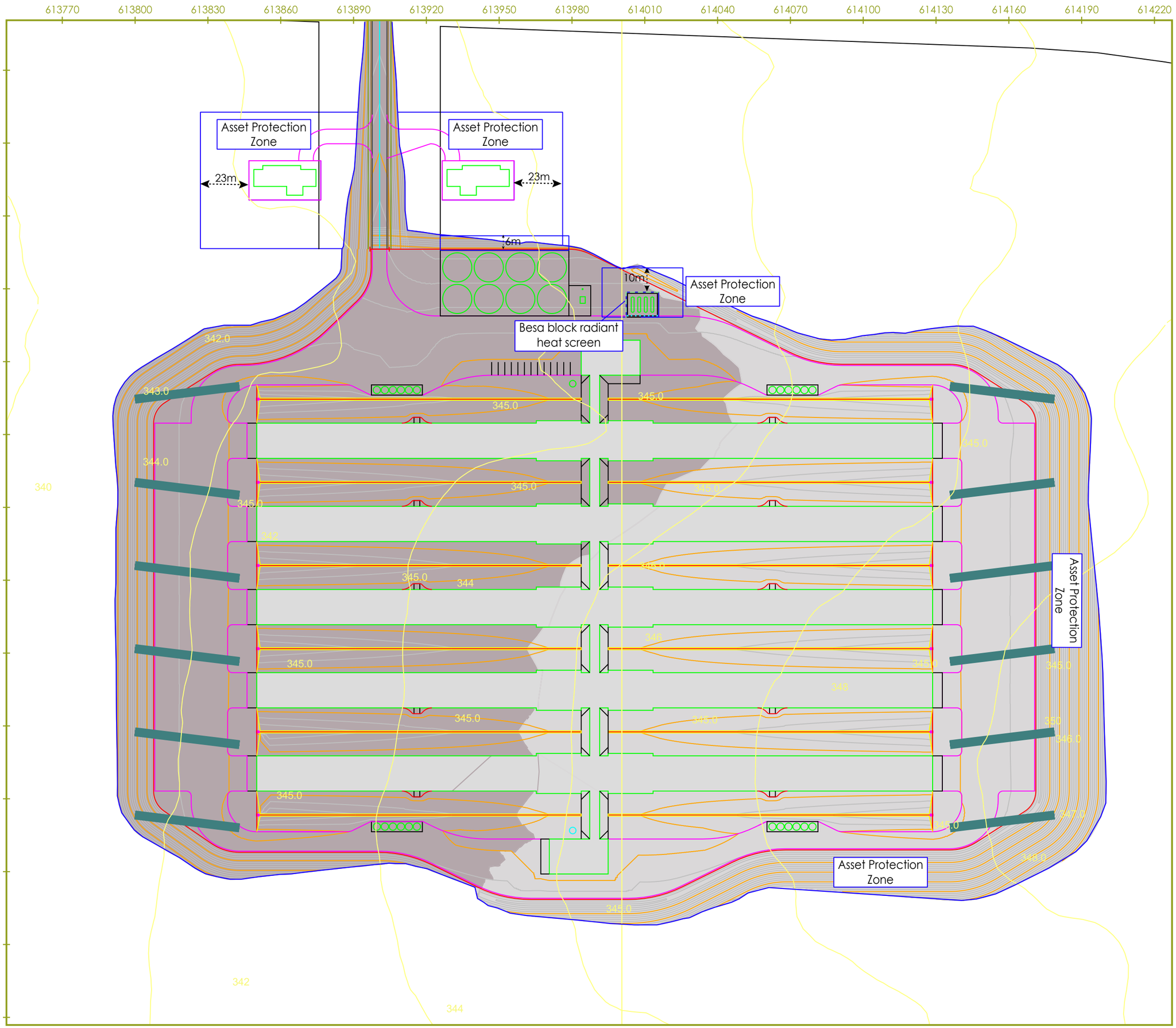
GRENFELL BUSH FIRE

FARM 2 BMP

LEGEND

- Proposed development
- APZ
- Besa block radiant heat screen
- Drainage pipes



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Project No: 21-020 Map No: 2 o f 4

Coordinate System: GDA 2020 MGA Zone 55
Printed at: A3
Creation Date: 07/10/2021

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GRENFELL BUSH FIRE

FARM 3 BMP

LEGEND

- Proposed development
- APZ
- Besa block radiant heat screen
- Drainage pipes

Asset Protection Zone

23m

Asset Protection Zone

23m

6m

Asset Protection Zone

10m

Besa block radiant heat screen

Asset Protection Zone

Asset Protection Zone

Asset Protection Zone

0 20 40 60 80 m

Project No: 21-020 Map No: 3 of 4

Coordinate System: GDA 2020 MGA Zone 55
Printed at: A3
Creation Date: 07/10/2021

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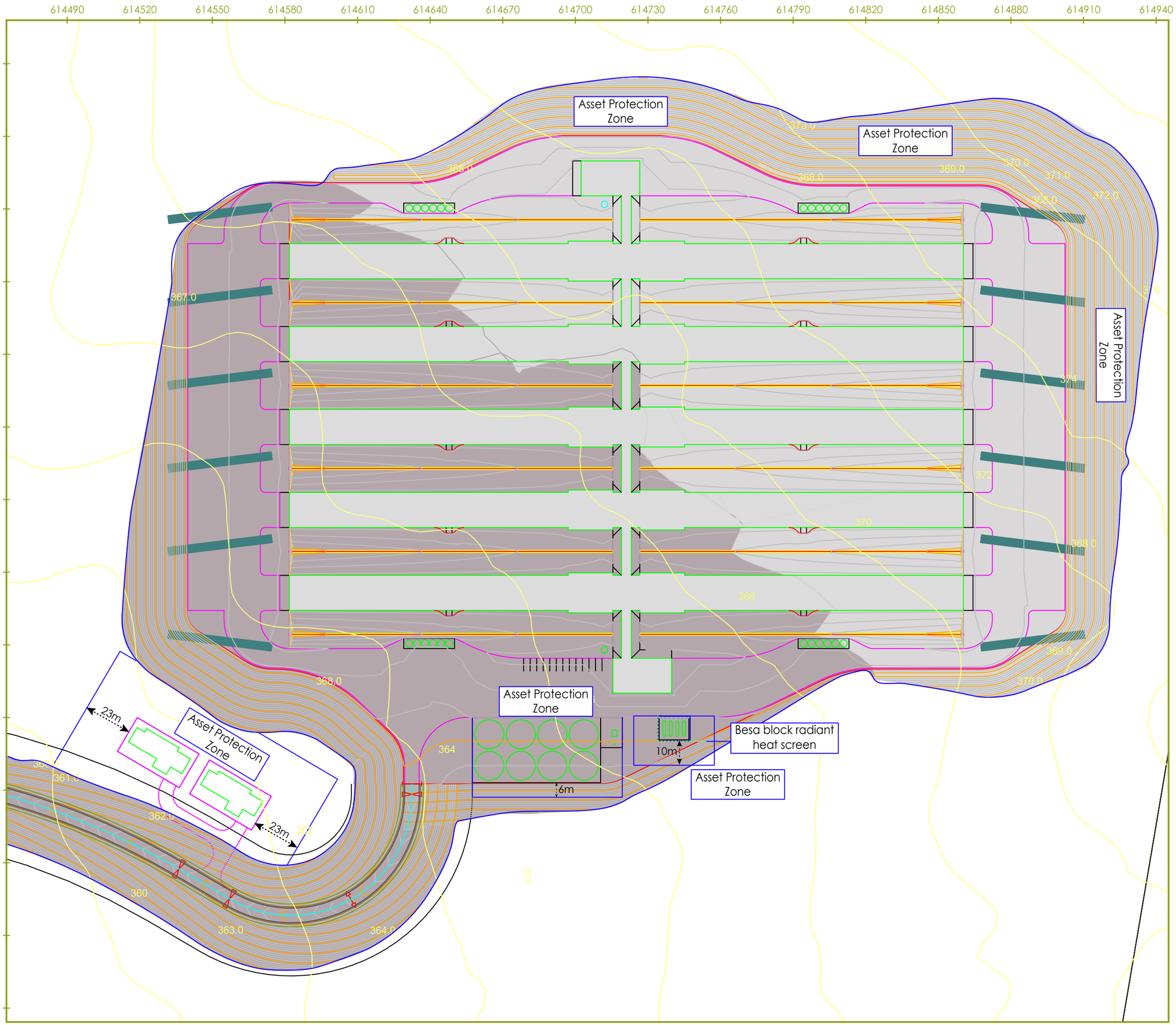
GRENFELL BUSH FIRE

FARM 4 BMP

LEGEND

- Proposed development
- APZ
- Besa block radiant heat screen
- Drainage pipes



Project No: 21-020 Map No: 4 o f 4

Coordinate System: GDA 2020 MGA Zone 55
Printed at: A3
Creation Date: 07/10/2021

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Appendix B - Compliance statement for rural workers dwellings

Performance criteria	Acceptable solutions	Compliance statement
Asset protection zones		
APZs are provided commensurate with the construction of the building; and A defendable space is provided.	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.	**Complies** A 23m APZ is provided for each rural workers dwelling which limits the BAL construction requirements to a maximum of BAL-12.5 across the site.
APZs are managed and maintained to prevent the spread of a fire to the building.	APZs are managed in accordance with the requirements of Appendix 4 of PBP.	**Complies** The proposal will comply as required.
the APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are wholly within the boundaries of the development site. APZ are located on lands with a slope less than 18 degrees.	**Complies** The proposal complies as required
Home-based child care: the building must not be exposed to radiant heat levels exceeding 29kW/m² (1090K).	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.	Not applicable
Access		
firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	property access roads are two-wheel drive, all weather roads.	**Complies** The proposal complies as required
the capacity of access roads is adequate for firefighting vehicles.	the capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.	**Complies** The proposal will comply as required.
there is appropriate access to water supply.	hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	**Complies** The site is serviced by static water supplies, with access available to each tank.
firefighting vehicles can access the dwelling and exit the property safely.	at least one alternative property access road is provided for individual dwellings or groups of dwellings that are located more than 200 metres from a public through road;	**Complies** Refer to the assessment provided at Section 6.1.

Performance criteria	Acceptable solutions	Compliance statement
	There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: • minimum 4m carriageway width; • in forest, woodland and heath situations, rural property roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m, at the passing bay; • a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; • property access must provide a suitable turning area in accordance with Appendix 3; • curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; • the minimum distance between inner and outer curves is 6m; • the crossfall is not more than 10 degrees; • maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and • a development comprising more than three dwellings has formalised access by	

Performance criteria	Acceptable solutions	Compliance statement
	dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.	
Water supplies		
an adequate water supply is provided for firefighting purposes.	reticulated water is to be provided to the development, where available; and a static water supply is provided where no reticulated water is available.	**Complies** The rural workers dwellings are supported by static water supplies available for each farm
water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.	fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005; hydrants are not located within any road carriageway; and reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	Not applicable
flows and pressure are appropriate.	fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	Not applicable
the integrity of the water supply is maintained.	all above-ground water service pipes external to the building are metal, including and up to any taps.	**Complies** The proposal will comply as required.
a static water supply is provided for firefighting purposes in areas where reticulated water is not available.	where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d; a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet; ball valve and pipes are adequate for water flow and are metal;	**Complies** The proposal will comply as required.

Performance criteria	Acceptable solutions	Compliance statement
	supply pipes from tank to ball valve have the same bore size to ensure flow volume; underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; a hardened ground surface for truck access is supplied within 4m; above-ground tanks are manufactured from concrete or metal; raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959); unobstructed access can be provided at all times; underground tanks are clearly marked; tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; all exposed water pipes external to the building are metal, including any fittings; where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.	
Electricity services		
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; and where overhead, electrical transmission lines are proposed as follows: • lines are installed with short pole spacing (30m), unless crossing gullies,	**Complies** The proposal will comply as required.

Performance criteria	Acceptable solutions	Compliance statement
	gorges or riparian areas; and • no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.	
Gas services		
location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and 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 10m 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.	**Complies** The proposal will comply as required.
Construction standards		
the proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and construction provided in accordance with the NCC and as modified by section 7.5 (please see advice on construction in the flame zone).	**Complies** A 23m APZ is provided for each rural workers dwelling which limits the BAL construction requirements to a maximum of BAL-12.5 across the site.
proposed fences and gates are designed to minimise the spread of bush fire.	fencing and gates are constructed in accordance with section 7.6.	**Complies** The proposal will comply as required.
proposed Class 10a buildings are designed to minimise the spread of bush fire.	Class 10a buildings are constructed in accordance with section 8.3.2.	**Complies** The proposal will comply as required.
Home-based child care: the proposed building can withstand bush fire attack in the form of wind, localised smoke,	an APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1 of this document around the entire building or structure; and	Not applicable

Performance criteria	Acceptable solutions	Compliance statement
embers and expected levels of radiant heat.	the existing dwelling is required to be upgraded to improve ember protection. This is to be achieved by enclosing or covering openings with a corrosion-resistant steel, bronze or aluminium mesh with a maximum aperture of 2mm. Where applicable this includes the openable portion of the windows, vents, weepholes and eaves, but does not include roof tile spaces. Weather strips, draught excluders or draught seals shall be installed at the base of side hung external doors as per AS 3959. The subfloor space must be enclosed.	
Landscaping		
landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	compliance with the NSW RFS 'Asset protection zone standards' (see Appendix 4); a clear area of low-cut lawn or pavement is maintained adjacent to the house; fencing is constructed in accordance with section 7.6; and trees and shrubs are located so that: • the branches will not overhang the roof; • the tree canopy is not continuous; and • any proposed windbreak is located on the elevation from which fires are likely to approach.	**Complies** The proposal will comply as required.
Emergency management		
Home-based child care: a bush fire emergency and evacuation management plan is prepared.	a Bush Fire Emergency Management and Evacuation Plan is prepared by the operator consistent with the NSW RFS publication: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan, and the AS 3745:2010.	Not applicable

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