BUSHFIRE PLANNING AUSTRALIA

BUSHFIRE ASSESSMENT REPORT

MAITLAND MENTAL HEALTH REHABILITATION PROJECT

Bushfire Planning Australia

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Prepared for: NSW Health Infrastructure
Attention: Nicolas Di Condio

BPA Reference: 2251 Maitland Mental Health

Disclaimer and Limitation

This report is prepared for NSW Health Infrastructure (the 'Client') for the specific purposes of only for which it is supplied (the 'Purpose'). This report is not for the benefit of any other person; either directly or indirectly and is strictly limited to the purpose and the facts and matters stated in it and will not be used for any other application.

This report is based on the site conditions surveyed at the time the document was prepared. The assessment of the bushfire threat made in this report is made in good faith based on the information available to Bushfire Planning Australia at the time.

The recommendations contained in this report are considered to be minimum standards and they do not guarantee that a building or assets will not be damaged in a bushfire. In the making of these comments and recommendations it should be understood that the focus of this document is to minimise the threat and impact of a bushfire.

Finally, the implementation of the adopted measures and recommendations within this report will contribute to the amelioration of the potential impact of any bushfire upon the development, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

Document Status: 2251 Bushfire Assessment Report - MMH

Version	Status	Purpose	Author	Date
1	Draft	Draft for review	Stuart Greville	27 May 2024
2	Draft	Revised Draft for Client review	Stuart Greville	30 August 2024
3	Draft	Revised Draft for review	Stuart Greville	17 October 2024
4	Final	Final for submission	Stuart Greville	

Certification

As the author of this Bushfire Assessment Report, I certify this report provides the detailed information required by the NSW Rural Fire Service under Clause 45 of the Rural Fires Regulation 2022 and Appendix 2 of Planning for Bushfire Protection 2019.

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

Stuart Greville

Accredited Bushfire Practitioner
BPAD-26202

Date: 17 October 2024

In signing the above, I declare the report is true and accurate to the best of my knowledge at the time of issue.

Executive Summary

Introduction

This Bushfire Assessment Report (BAR) has been prepared by Bushfire Planning Australia (BPA) on behalf of Health Infrastructure (HI) to assess the potential environmental impacts that could arise from infrastructure works at 51 Metford Rd, Metford NSW 2323 (the site). The project is seeking approval for a Development Without Consent (REF) application under Part 5 of the EP&A Act.

This report has been prepared to demonstrate the proposed development satisfies the specifications and requirements of the NSW Rural Fire Service document Planning for Bushfire Protection 2019 (PBP 2019). This report accompanies a Review of Environmental Factors (**REF**) for the construction and operation of a new mental health services building within the Maitland Hospital campus, including:

- Site establishment
- Site preparation including earthworks;
- Construction of internal roads and addition of at-grade car parks;
- Construction of 2 storey mental health facility;
- 20 Medium Secure Forensic beds; 24 Low Secure Forensic beds; 20 Rehabilitation & Recovery General beds (64 beds total);
- Inground building services works and utility adjustments, including service diversions;
- Building foundation works;
- Tree removal;
- Associated landscaping;
- Bioretention basin.

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

Bushfire Hazard Assessment

The proposed use is considered a Special Fire Protection Purpose (SFPP) under the NSW Rural Fire Service (RFS) document Planning for Bushfire Protection 2019 (PBP 2019) as the building occupants may be more vulnerable to bushfire attack.

The primary objective for development exposed to a bushfire hazard is to protect human life (including fire fighters). This assessment will review the preferred option and design and consider the required bushfire mitigation measures the proposed building is able to afford acceptable levels of protection to the occupants of either building.

Based on the findings of the hazard assessment, a series of bushfire protection measures have been identified appropriate to the proposed land use to achieve an acceptable level of risk. In this instance the most effective bushfire protection measure is to ensure sufficient separation from the bushfire hazard which would require modifying at least 1 hectare of land to be managed as an Asset Protection Zone (APZ). The buffer of up to 50m from the outer elevation of the building to the nearest unmanaged vegetation shall be managed as an APZ. The APZ may contain roads, parking areas, service areas and can be designed to minimise disturbance to vegetation with the existing riparian zone.

The proposed development is able to comply with the remaining Acceptable Solutions applicable to a SFPP development required by PBP 2019; such as construction standards, access, water supply and emergency management. Furthermore, the proposed development is also able to comply with the Acceptable Solutions contained in Appendix B of PBP Addendum 2022.

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 have been assessed as low to moderate 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.

Recommendations

The BAR has been prepared in accordance with the Planning for Bushfire Protection 2019 (PBP 2019) and PBP Addendum 2022 published by the NSW Rural Fire Service (RFS).

The recommendations and mitigations are detailed in Table 6 in **Section 4. Conclusions & Recommendations** of this BAR.

Should the recommendations be implemented, any person evacuating a building will not be exposed to radiant heat levels greater than 10kW/m^2 and the existing bushfire risk should be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection (April 2024) and production (October 2024) and demonstrates the proposed development is able satisfies the relevant requirements and is able to meet the aims and objectives of Planning for Bushfire Protection 2019.

Abbreviations

Abbreviation	Description
APZ	Asset Protection Zone
AS2419-2005	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas 2018
BAR	Bushfire Assessment Report
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design (accreditation scheme)
BPA	Bushfire Prone Area (Also Bushfire Prone Land)
BPL	Bushfire Prone Land
BPLM	Bushfire Prone Land Map
BPM	Bushfire Protection Measures
DoE	Commonwealth Department of the Environment
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
FDI	Fire Danger Index
ha	hectare
HI	NSW Health Infrastructure
HNELHD	Hunter New England Local Health District
HNECH	Hunter New England Community Health
IPA	Inner Protection Area
LGA	Local Government Area
MCC	Maitland City Council
MMH	Maitland Hospital Mental Health
NCC: BCA	National Construction Standard: Building Code of Australia
OPA	Outer Protection Area
PBP 2019	Planning for Bushfire Protection
SEARs	Secretary's Environmental Assessment Requirements
SFPP	Special Fire Protection Purposes
SSDA	State Significant Development Application
SWMHIP	Statewide Mental Health Infrastructure Program

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1. Introduction

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This report has been prepared to demonstrate the proposed development satisfies the specifications and requirements of the NSW Rural Fire Service document Planning for Bushfire Protection 2019 (PBP 2019). This report accompanies a Review of Environmental Factors (**REF**) for the construction and operation of a new mental health services building within the Maitland Hospital campus, including:

- Site establishment
- Site preparation including earthworks;
- Construction of internal roads and addition of at-grade car parks;
- Construction of 2 storey mental health facility;
- 20 Medium Secure Forensic beds; 24 Low Secure Forensic beds; 20 High Support General beds (including high risk civil consumers) (64 beds total);
- Inground building services works and utility adjustments, including service diversions;
- Building foundation works;
- Tree removal;
- Associated landscaping;.
- Bioretention basin.

Refer to the Review of Environmental Factors prepared by Ethos Urban for a full description of works.

1.1. Site Description

The site is located at the Maitland Hospital Campus on Metford Road, Maitland, approximately 6.4km from the CBD of Maitland. The project site is located within the development parcel, legally described as Lot 73 DP 1256781, as identified in **Figure 1** below. The site is located to the east of the recently constructed Maitland Hospital.

Table 1: Site Description

Address	Maitland Hospital Campus, Metford Road, Metford
Title	Lot 73 DP1256781
LGA	Maitland City Council (MCC)
Land Use Zone	RU2 Rural Landscape
Bushfire Prone Land	Category 1 Vegetation Category 3 Vegetation Bushfire Buffer
Fire Danger Index (FDI)	100

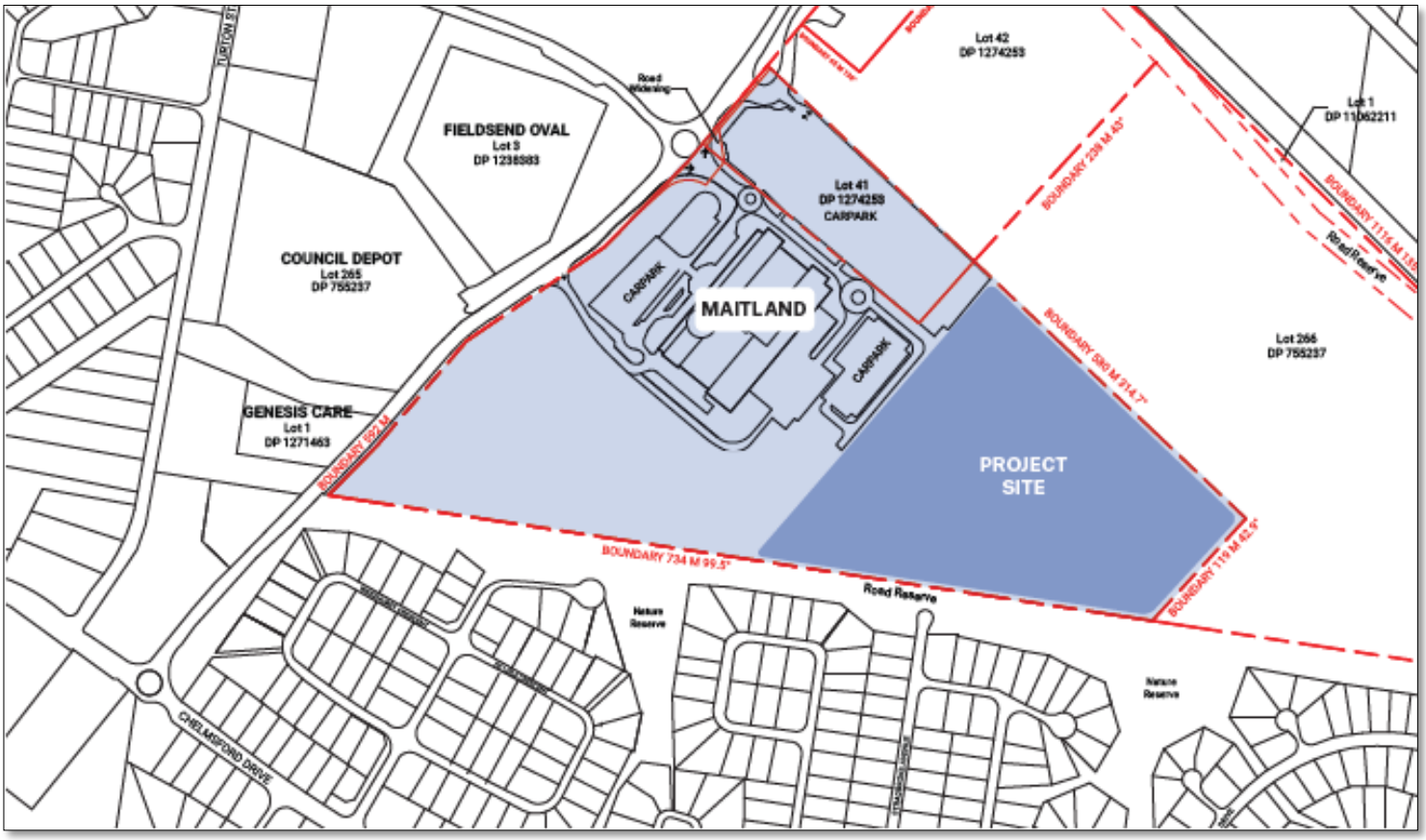

Figure 1: Project locational diagram (Bates Smart)

1.3. 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 have been assessed as low to moderate 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.

1.4. REF Deliverable Requirement

This BAR has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) (SSD-59254709). The SEARs relevant to this BAR are detailed in **Table 2**.

The BAR has been prepared in accordance with the Submission requirements detailed in Appendix A2.1 of PBP 2019.

Table 2: SEARs - Bushfire Risk Assessment

ITEM	REF Requirement	Relevant Section of Report
1.0	❑ Hazards & Risks - including: Identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a solar farm would cause bush fire and demonstrate compliance with *Planning for Bush Fire Protection 2019*.	Section 3 of this report contains a Bushfire Hazard Assessment. Section 4 demonstrates the Project is able to satisfy the Aims and Objectives of PBP 2019.

2. Bushfire Hazard Assessment

2.1. Aims and Objectives – Development on Bushfire Prone Land

The assessment aims to consider and assess the bushfire hazard and associated potential bushfire threat and to outline the minimum mitigative measures which would be required in accordance with the provisions of the New South Wales Rural Fire Service (RFS) publication *Planning for Bushfire Protection 2019* (PBP 2019) and the *Rural Fires Regulation 2022.*

This design review has been undertaken in accordance with clause 45 of the Rural Fires Regulation 2022. This review has also considered the aims and objectives of PBP 2019, being:

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

A compliance table demonstrating compliance with PBP 2019 is provided in **Appendix B**.

2.2. Bushfire Prone Land

Bushfire activity is prevalent in landscapes that carry fuel and the two predominant bushfire types are grassland and forest fires. Factors such as topographic characteristics and quantity of fuel loads influence the intensity and spread of fire. The scale of a bushfire hazard is tailored to the characteristics of the hazard, the size and characteristics of the affected population, types of land use exposed to bushfire, predicted development growth pressures and other factors affecting bushfire risk.

The Metford Triangle is exposed to a significant bushfire hazard, both within and surrounding site (**Figure 2**) and is considered a high-risk asset due to the geographic location, surrounding vegetation and terrain and competing land uses.

Project: Maitland Hospital
Job No: 2251

Figure 2

NSW Bush Fire Prone Land

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Subject Site
100m Buffer
140m Buffer

Bushfire Prone Land

Vegetation Category 1
Vegetation Category 2
Vegetation Category 3
Buffer

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
NSW Bush Fire Prone Land: NSW Rural Fire Service 2021
Aerial photo: NearMap 14/06/2022

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2.3. Hunter Bush Fire Risk Management Plan

The Rural Fires Act 1997 (RF Act) requires each bushfire management committee to prepare a bushfire risk management plan for a nominated area; commonly defined by local government area boundaries. The Hunter Bush Fire Management Committee developed the Hunter Bush Fire Risk Management Plan (BFRMP) which was endorsed on 16 September 2009. The BFRMP investigated the high-risk human settlements in the Maitland & Cessnock local government areas (LGA) and ranked them according to the assessed bushfire risk and the likely consequence of a bushfire attack.

BFRMPs are often not site specific, and individual sites or development do not have a statutory obligation to prepare a BFRMP, however it is often recommended as part of preparedness, a BFRMP is prepared. As the nMH was not constructed at the time the BFRMP was prepared, the site was still assessed by its previous use; being a quarry.

Any future updates of the BFRMP shall be updated to reflect the current land use.

2.4. Fire History and Likely Behaviour

Information on fire history is a useful factor in understanding fire frequency and bushfire risk. A review of available fire history data within and surrounding 2kms of the Maitland Hospital campus indicates there has been 3 fires, one large and two small fires, that have occurred in 2018, 2019 and 2013 respectively. These fires have historically followed the larger tracts of vegetation that surround the urban interface impacting from westerly winds (**Figure 3**).

There are no records of a fire within the Metford Triangle.

The main sources of ignition are fire escape from legal or illegal fires (mainly prior to the introduction of the bush fire danger period), arson, and arcing power lines.

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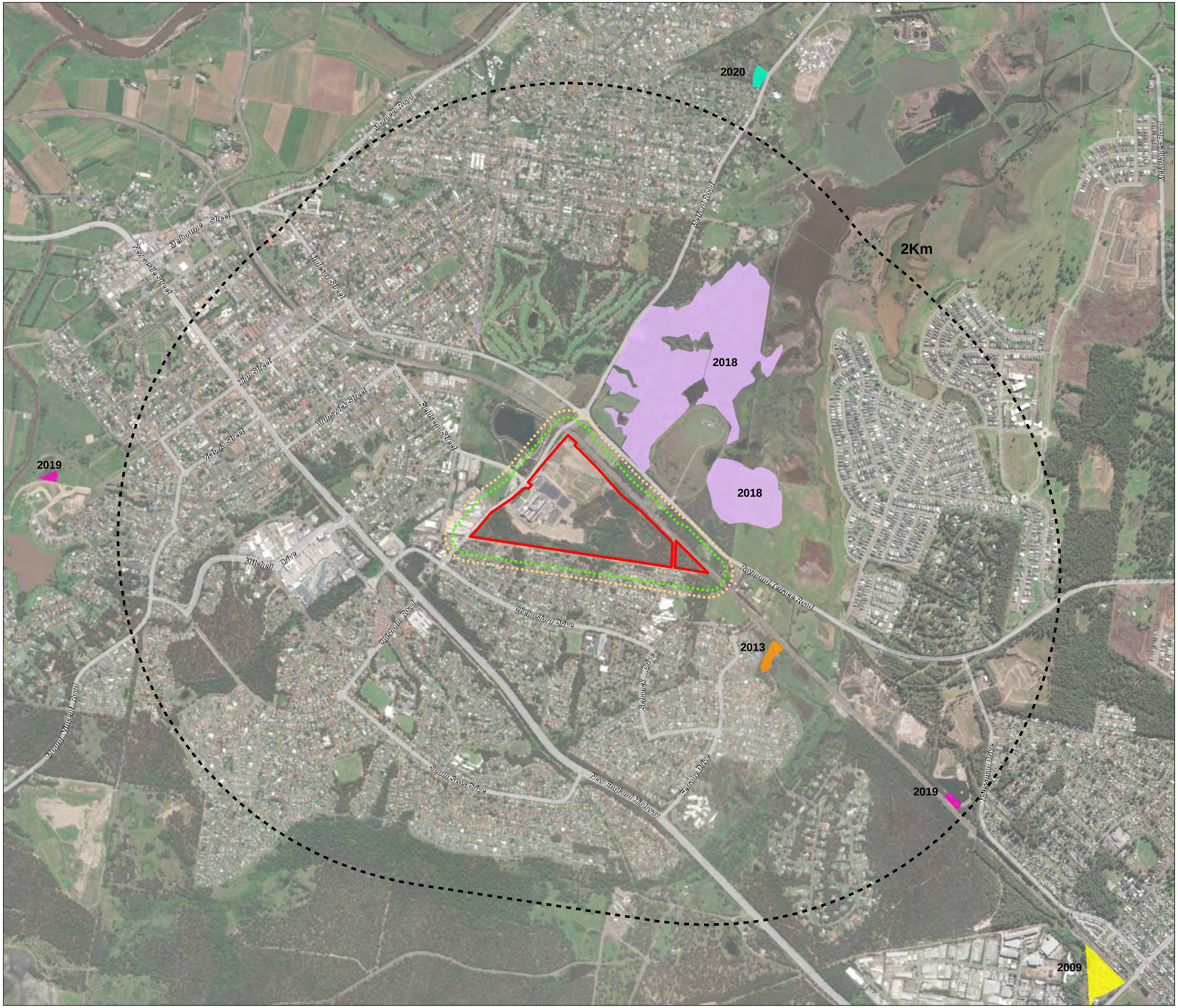
Figure 3

NSW State Fire History

BUSHFIRE PLANNING AUSTRALIA



Subject Site
100m Buffer
140m Buffer

Year of Fire
2009
2013
2018
2019
2020

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
NSW State Fire History: NSW Rural Fire Service 2022
Aerial photo: Maxar 2022

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The information shown on this plan may be insufficient for some types of design. GEOVIEW should be consulted as to the suitability of the information shown herein prior to the commencement of any works based on this plan.

This map is not guaranteed to be free from error or omission. GEOVIEW hereby disclaims liability for any act done or omission made on the basis of the information in this plan, and any consequences of such acts or omissions

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2.5. Specific Objectives for Special Fire Protection Purposes

The aims and objectives listed in section 1.1 of PBP 2019 remain applicable to SFPP developments, however further consideration has been given to SFPP developments due to the nature of these environments and the occupants they accommodate. Occupants of SFPP developments are generally more vulnerable to bushfire attack therefore specific objectives have been put in place to ensure greater protection is provided (section 6.2 PBP 2019). Specific objectives include:

- Minimise levels of radiant heat, localised smoke and ember attach through increased APZ, building design and siting;
- Provide for an appropriate operational environment for emergency service personnel during firefighting and emergency management;
- Ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development; and
- Ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.

As the Project is classified as a SFPP development, the specific objectives and acceptable solutions for a SFPP development have been considered.

2.6. National Construction Code 2022

The National Construction Code (NCC) provides a uniform set of technical provisions for the design, construction and performance of buildings. In NSW all new buildings and new building work must comply with the NCC. Accordingly, developments in bushfire prone areas must comply with both the requirements of PBP and the NCC.

The 2022 edition of the NCC contains amendments to its bushfire protection provisions that operate in conjunction with the bushfire protection measures in PBP 2019. This includes a suite of new provisions for Class 9 buildings in bushfire areas that accommodate certain types of vulnerable occupants; including provisions for the construction, separation and access requirements for certain Class 9 buildings. Class 9 buildings include SFPP developments; including the proposed MMH development.

2.6.1. Specification 43 - Bushfire protection for certain Class 9 buildings

The additional bushfire protection measures described in G5D4 are set out in Specification 43. The measures set out in Specification 43 are intended to operate in conjunction with other bushfire safety measures that lie outside the scope of the NCC; such as PBP 2019.

The additional measures include:

- S43C1 – Scope
- S43C2 – Separation from classified vegetation
- S43C3 – Separation between buildings
- S43C4 – Separation from allotment boundaries and carparking areas
- S43C5 – Separation from hazards
- S43C6 – Non-combustible path around building
- S43C7 – Access pathways
- S43C8 – Exposed external areas
- S43C9 – Internal tenability
- S43C10 – Building envelope
- S43C11 – Supply of water for fire-fighting purposes
- S43C12 – Emergency power supply
- S43C13 – Signage
- S43C14 – Vehicular access

An assessment and compliance with the additional requirements under Part G5 has not been completed as part of this report and is not required to be provided in a BAR under PBP 2019. It is also noted the RFS do not assess any matters associated with the NCC.

2.7. Planning for Bushfire Protection - Addendum 2022

To ensure the application of PBP is consistent with NCC 2022, the RFS prepared an Addendum to PBP 2019 to align with NCC 2022. The Addendum addresses the Class 9 Provisions in NCC 2022 within the context of PBP 2019, since these classes of buildings have been previously addressed as a SFPP developments in PBP 2019.

Additional Performance Criteria and Acceptable Solutions relevant to bushfire protection measures (BPMs) within PBP 2019 for SFPP Class 9 buildings have been introduced in the Addendum to ensure consistency with the relevant provisions of NCC 2022.

The NSW Variation to NCC 2022 immediately set asides some provisions of Specification 43; including S43C2 – Separation from classified vegetation. The minimum distances for APZs for SFPP development as prescribed in PBP 2019 prevail. As such, S43C2 does not apply to the Project.

2.8. Vegetation Assessment

Vegetation classification over the subject site and up to 140m surrounding the subject site has been carried out as follows:

- Aerial Photograph Interpretation to map the vegetation classification and extent;
- Reference to OEH State Vegetation Type mapping (**Figure 4**); and
- Site inspection 4 August 2022 and 26 April 2024 undertaken by Stuart Greville (BPA).

In accordance with PBP 2019, an assessment of the vegetation within and over a distance of 140m in all directions from the Metford Triangle was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the development footprint. The vegetation classification is based on Appendix 1 of PBP 2019; per Keith (2004). The unmanaged fuel loads detailed in the *Comprehensive Vegetation Fuel Loads* published by the RFS in March 2019 have been adopted for the purpose of assessing the bushfire hazard. The findings of the site inspection were compared to the Keith Vegetation Formations mapping provided by the NSW RFS. The inconsistencies between the mapping sources was quantified during the site inspection.

The outcomes of the field survey verified the differing vegetation composition and structure and mapped in **Figure 4**. Areas typically affected by the development footprint are excluded from the assessment, as it is assumed the vegetation in these areas will be removed or maintained in a low threat condition; including the new roads and service areas.

The dominant vegetation type identified as the primary bushfire hazard was found to be a *forest*; specifically the Hunter Macleay Dry Sclerophyll Forest. Areas of Coastal Floodplain Wetland (a sub-formation of a *forested wetland*) were present in the lower lying areas within the site; downstream (north) of the discharge points of the stormwater basins.

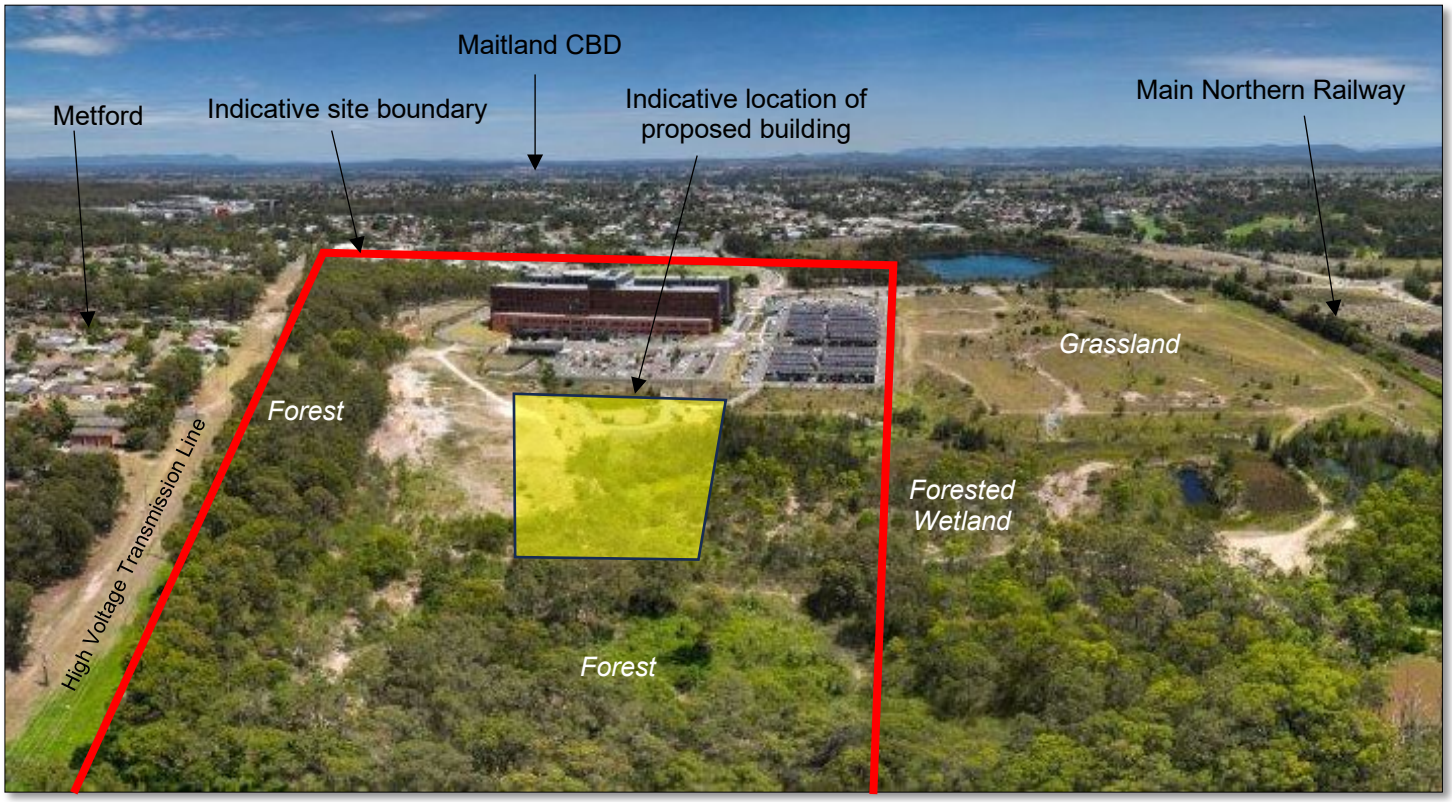

Plate 1: Maitland Hospital Campus looking west over bushfire hazard

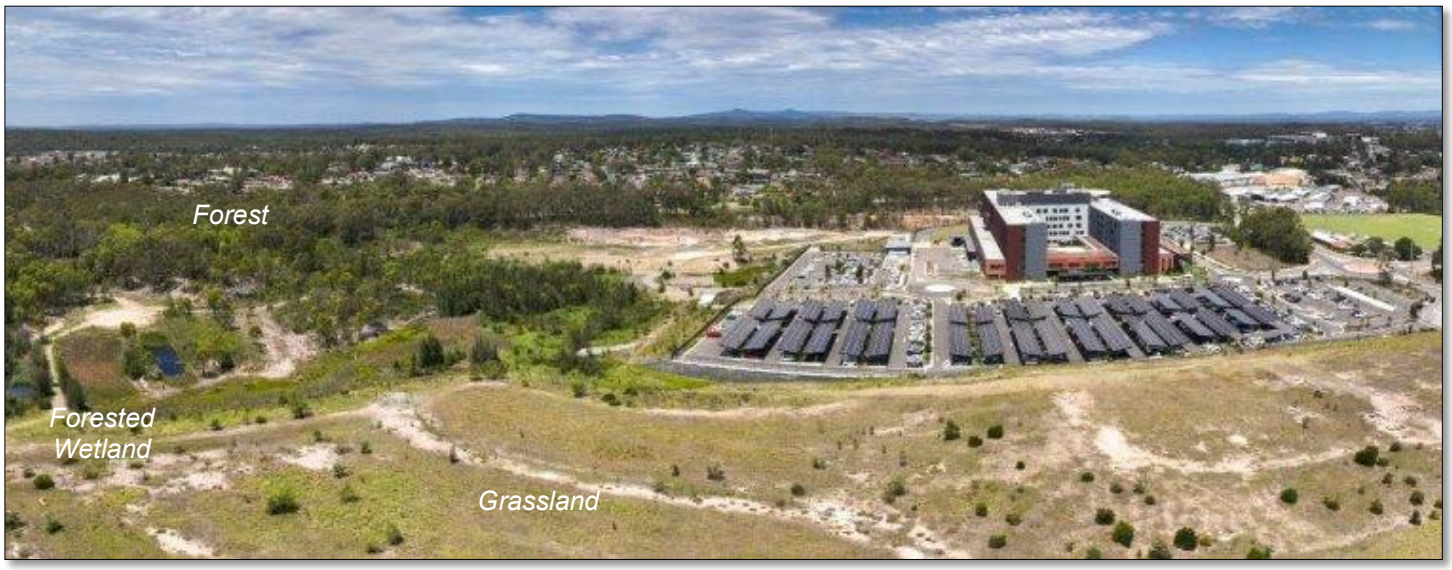

Plate 2: Looking south across the former brickworks toward Maitland Hospital

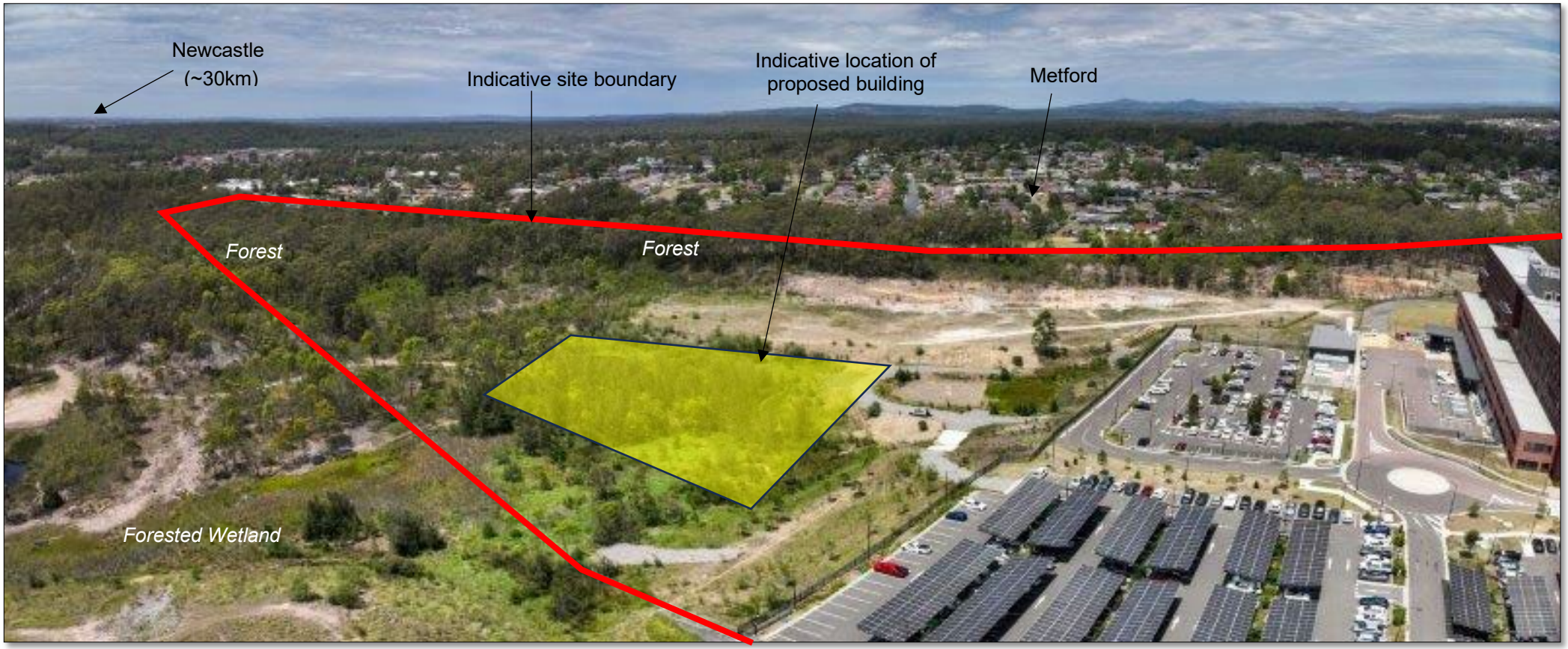

Plate 3: Proposed building located in disturbed land east of the existing car park

Plate 4: Primary bushfire hazard assessed as grassy forest located to the east of the proposed building

Plate 5: Bushfire hazard to the north of the development limited to a forested wetland

Plate 6: Former brickworks heavily disturbed including a permanently inundated wetland immediately north of the site

Plate 7: Coastal Floodplain Wetland (*forested wetland*) within Metford Triangle

Plate 8: Typical *Forest* vegetation along the southern and eastern boundaries

Plate 9: Disturbed former quarry – cleared of vegetation and classed as unmanaged *grassland*

Plate 10: Preferred site partially cleared land east of existing Maitland Hospital

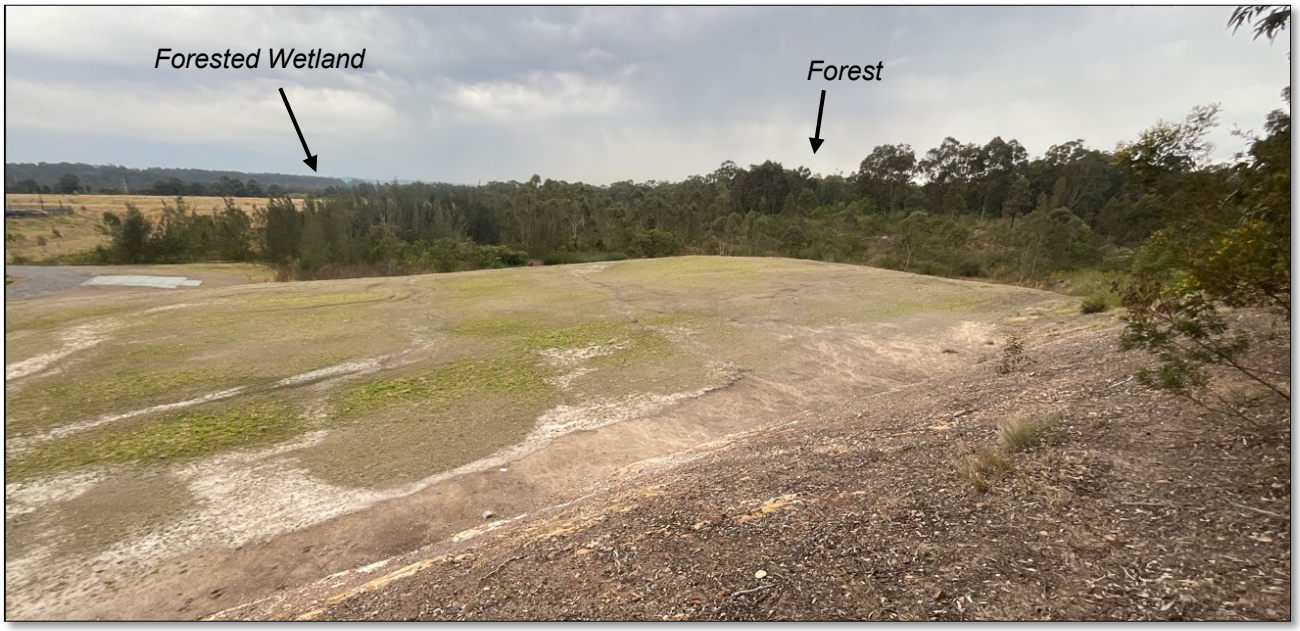

Plate 11: Preferred site adjoins *forest* and *forested wetland* bushfire hazardous vegetation

Project: Maitland Hospital
Job No: 2251

Figure 4

NSW State Vegetation Type (Class)

BUSHFIRE PLANNING AUSTRALIA

Subject Site

100m Buffer

140m Buffer

Vegetation Class

Coastal Floodplain Wetlands

Coastal Freshwater Lagoons

Hunter-Macleay Dry Sclerophyll Forests

Not native vegetation

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2019
NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022
Aerial Photo: NearMap 14/06/2022

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2.9. Slope Assessment

The slope assessment for the entire site was undertaken as follows:

- Review of LiDAR point cloud data - including DEM (**Figure 5**);
- Review of Slope Analysis (5 degree bands) (**Figure 6**); and
- Site inspection 4 August 2022 and 26 April 2024 undertaken by Stuart Greville (BPA).

An assessment of the slope over a distance of 140m in the hazard direction from the site boundary was undertaken. The effective slope was then calculated under the classified vegetation where there was a fire run greater than 50m using a Digital Elevation Model (DEM) dervied from recent LiDAR capture. The topography of the site has been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site.

The effective slope in all directions is shown in **Figure 7** and **Table 3.**

Project: Maitland Hospital
Job No: 2251

Figure 5

Digital Elevation Model

BUSHFIRE PLANNING AUSTRALIA

- Subject Site
- Contour (5m)
- Contour (1m)
- 100m Buffer
- 140m Buffer

Elevation (AHD)

High : 43m

Low : 1m

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

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File:2251-MaitlandHospital-Fig4-DEM-220721 Date: 21/07/2022

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Project: Maitland Hospital
Job No: 2251

Figure 6

Slope Analysis: LiDAR

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Subject Site
Contour (5m)
Contour (1m)
100m Buffer
140m Buffer

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Aerial Photo: Nearmap 14/06/2022
Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

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0 50 100 150 200 250
Meters

A3 Scale: 1:5,000

File:2251-MaitlandHospital-Fig5-SlopeLiDAR-220721 Date: 21/07/2022

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2.10. Significant Environmental Features

The recommended bushfire mitigation measures will be required to consider the potential impact on any significant environmental features and may require adjustment to minimise any adverse impact. Further detailed investigation will be required to determine the ecological impacts associated with the recommended APZs.

2.11. Threatened Species, populations or ecological communities

All bushfire mitigation measures; including APZs must consider the existing and potential biodiversity values to minimise impact where possible. An Ecological Constraints Assessment has been completed by Umwelt (Australia) Pty Ltd (dated November 2022).

2.12. Aboriginal Objects

A search of the AHIMS database (results contained in **Appendix C**) revealed there is one Aboriginal sites or places recorded within 200m of the subject site.

2.13. Bushfire Hazard Assessment Results

The dominant vegetation throughout the site and within 140m surrounding the site to east, south and north-west was identified as a *forest*; being the Hunter Macleay Dry Sclerophyll Forest. The *forest* vegetation, within the site was found to be greatest bushfire hazard.

To the north of the proposed building footprint, unmanaged *grassland* vegetation and weed infestation exists. Vegetation to the north/ north-east was identified as a *forested wetland*; namely Coastal Floodplain Wetland.

The final bushfire hazard assessment defining vegetation classifications and effective slope are detailed in **Table 3.** The results are presented in the Bushfire Hazard Assessment figure contained in **Figure 7**.

Table 3: Vegetation formations & Slope Analysis Results

Transect	Vegetation or Other Infrastructure	Vegetation Classification (PBP 2019)	Slope
T1	Forested wetland vegetation located from the building footprint towards the northern boundary of the proposed development site. Currently part of the existing drainage basin servicing the nMH. Proposed drainage/ bioretention basin to be located along this transect	*Forested Wetland* (Coastal Floodplain Wetland)	0.8° Downslope
T2	Unmanaged grassland within Lot 41 >60m from the building footprint located within the former brickworks/ quarry	*Grassland*	-3.7° Upslope
T3	Forested wetland vegetation located from the building footprint towards and beyond the northern boundary of the proposed development site. Currently part of the existing drainage basin servicing the nMH. Proposed drainage/ bioretention basin to be located along this transect	*Forested Wetland* (Coastal Floodplain Wetland)	0.6° Downslope
T4	Forested wetland vegetation located from the building footprint towards the northern boundary of the proposed development site. Currently part of the existing drainage basin servicing the nMH.	*Forested Wetland* (Coastal Floodplain Wetland)	0.8° Downslope
T5	Forested wetland vegetation located from the building footprint transitioning to *forest*	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	-2.9° Upslope
T6	Forested wetland vegetation transitioning to a forest @ 76m from building footprint	*Forested Wetland* (Coastal Floodplain Wetland)	-5.9° Upslope
T7	Remnant forest vegetation located greater than 76m from the building footprint	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	3.9° Downslope
T8	Cleared land south of the building footprint	Excluded	-6.0° Upslope
T9	Remnant forest vegetation located on the above the engineered batter located greater than 45m from the building footprint	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	-5.8° Upslope
T10	Cleared land south of the building footprint	Excluded	-8.8° Upslope
T11	Remnant forest vegetation located above the engineered batter located greater than 59m from the building footprint	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	-8.8° Upslope
T12	Cleared land south-west of the building footprint	Excluded	-4.2° Upslope
T13	Cleared land leading to nMH carpark	Excluded	-1.4° Upslope
T14	Unmanaged forested wetland within Lot 41 >60m from the building footprint located within the former brickworks/ quarry	*Forested Wetland* (Coastal Floodplain Wetland)	-0.1° Upslope
T15	Remnant forest vegetation located greater than 76m from the building footprint	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	3.9° Downslope

Project: Maitland Hospital
Job No: 2251

Figure 7

Slope & Vegetation Assessment

BUSHFIRE PLANNING AUSTRALIA

- Subject Site
- Proposed Maitland mental health project site
- 100m Buffer
- 140m Buffer
- Contour (5m)
- Contour (1m)
- Hospital Footprint
- Existing Development
- RL
- Downslope transect
- Upslope transect

Vegetation Class

- Drainage Basin. Coastal Floodplain Wetland
- Grassland
- Hunter - Macleay Dry Sclerophyll Forests
- Not native vegetation
- OHE Transmission Line easement (managed land)

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Aerial Photo: Nearmap 14/06/2022
NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 - Modified BPA 16/08/2024
Surface analysis: Derived from LiDAR - Newcastle 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

N W E S

0 20 40 60
Meters

A3 Scale: 1:1,500

File:2251-MaitlandHospital-Mental-Health-Fig6-SlopeVeg-240816 16/08/2024

3. Bushfire Protection Measures

This review has adopted the methodology to determine the appropriate Bushfire Protection Measures (BPMs) detailed in PBP 2019. As part of the BMP, the recommended BPMs demonstrate the aims and objectives of PBP 2019 have been satisfied; including the matters considered by the RFS necessary to protect persons, property and the environment from the danger that may arise from a bushfire. The BPMs may comprise, or contain a combination of:

- APZs;
- Access;
- Services;
- Construction;
- Landscaping; and
- Emergency Management

3.1. Asset Protection Zones

An APZ is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an inner protection area (IPA) and an outer protection area (OPA). In this instance the entire APZ and the balance of the development site shall be managed as an IPA.

3.1.1. Special Fire Protection Purposes

SFPP developments mean the occupants of the proposed development may be more vulnerable to bush fire attack and therefore may require greater protection from such threats as well as assisted evacuation. SFPPs include schools, seniors housing, child care centres, hospitals and tourist accommodation.

Section 6 of PBP 2019 provides protection measures for SFPP developments. In comparison to a standard residential development where radiant heat levels of no greater than 29kW/m^2 are acceptable, radiant heat levels of greater than 10kW/m^2 must not be experienced on any part of the building. To achieve radiant heat levels of less than 10kW/m^2, APZs of 67m or greater are typically required (based on Table A1.12.1 of PBP 2019) for *forest* vegetation.

Objectives for SFPP developments place emphasis on the space surrounding buildings (as defendable space and APZs) and less reliance on construction standards. SFPP developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bush fire threats. Areas of defendable space (APZs) surrounding SFPP buildings can extend up to 60m wide.

3.1.2. Determining the Appropriate Setbacks

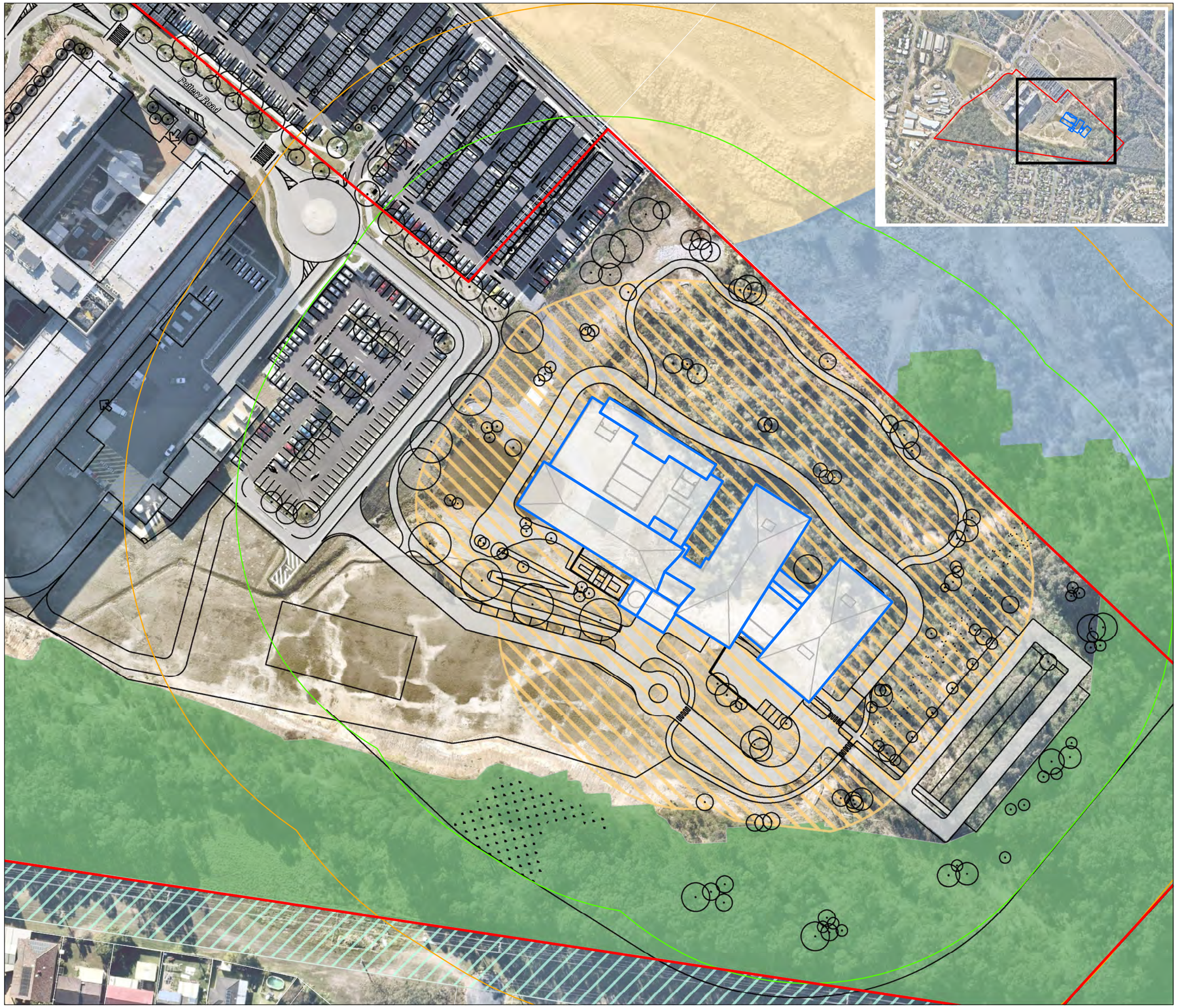
Based on the unique site characteristics identified by the BAR, the intensity of a bushfire event presented as the radiant heat exposure was calculated at several locations throughout the development site. To demonstrate compliance with the Acceptable Solutions for SFPP, as detailed in Table 6.8a of PBP 2019, the APZ requirements have been provided in accordance with Table A1.12.1 in Appendix 1 of PBP 2019.

It is recommended the APZs are provided in accordance with Table A1.12.1 where possible. It is noted the proximity to the northern boundary restricts a compliant APZ. Accordingly, a Performance Solution has been adopted to determine the radiant heat exposure the northern elevation may be exposed to. It was found that is all land between the proposed building and the northern boundarty is managed as an APZ, then no part of the proposed building will be exposed to radiant heat levels exceeding 10kW/m^2.

Refer to **Table 4** for the required APZs. The required APZs are also indicated in **Figure 8**.

Table 4: Recommended Asset Protection Zones

Transect	Vegetation Classification (PBP 2019)	Slope	APZ (PBP 2019 A1.12.1)	APZ (Method 2 @ 10kW/m²)
T1	*Forested Wetland* (Coastal Floodplain Wetland)	0.8° Downslope	**42m**	35m
T2	*Grassland*	-3.7° Upslope	36m	34m
T3	*Forested Wetland* (Coastal Floodplain Wetland)	0.6° Downslope	**42m**	34m
T4	*Forested Wetland* (Coastal Floodplain Wetland)	0.8° Downslope	**42m**	36m
T5	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	-2.9° Upslope	67m	**50m**
T6	*Forested Wetland* (Coastal Floodplain Wetland)	-5.9° Upslope	**34m**	25m
T7	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	3.9° Downslope	**79m**	57m
T8	Excluded	-6.0° Upslope	n/a	>100m
T9	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	-5.8° Upslope	**67m**	50m
T10	Excluded	-8.8° Upslope	n/a	>100m
T11	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	-8.8° Upslope	**67m**	50m
T12	Excluded	-4.2° Upslope	n/a	>100m
T13	Excluded	-1.4° Upslope	n/a	>100m
T14	*Forested Wetland* (Coastal Floodplain Wetland)	-0.1° Upslope	**34m**	25m
T15	*Forest* (Hunter Macleay Dry Sclerophyll Forest)	3.9° Downslope	**79m**	57m



Project: Maitland Hospital
Job No: 2251

Figure 8

Asset Protection Zone

BUSHFIRE PLANNING AUSTRALIA

- Subject Site
- Proposed Maitland mental health project site
- 100m Buffer
- 140m Buffer
- Asset Protection Zone

Vegetation Class

- Drainage Basin. Coastal Floodplain Wetland
- Grassland
- Hunter - Macleay Dry Sclerophyll Forests
- Not native vegetation
- OHE Transmission Line easement (managed land)

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2022
Aerial Photo: Nearmap 14/06/2022
Vegetation: NSW Department of Planning, Industry and Environment 2022 - Modified BPA 16/08/2024

N
W E
S

0 10 20 30 40 50 60
Meters

A3 Scale: 1:1,250

File:2251-MaitlandHospital-Mental-Health-Fig7-APZ-240920

Date: 20/09/2024

GEOVIEW
GIS & mapping solutions for infrastructure, town planning & environmental management

3.2. Access

In the unlikely event of a serious bushfire, it will be essential to ensure that adequate ingress / egress and the provision of defendable space are afforded in the layout.

The site is effectively bordered by two major state roads being New England Highway to the south and Raymond Terrace Road to the North. These two-road links provide primary access to the site from the regional precinct, connecting to the site via Chelmsford Road and Metford Road. The site is relatively well connected with frequent public transport accessibility and active transport connections.

Currently the nMH is accessible by the general public from the primary entry on Metford Road at the intersection (roundabout) with Fieldsend Street. A secondary driveway provides immediate access to the northern car park from Masonry Lane. A second access from Metford Road is dedicated for ambulance access only (public access is restricted) which is also connected to the internal road network including a service road to the rear of the nMH.

Plate 12: Main entrance to Maitland Hospital – intersection of Metford Road and Fieldsend Street

Plate 13: Secondary access from Metford Road restricted to ambulance use only

The proposed development will require an upgrade to the internal road network. All new internal property roads will be constructed in accordance with Table 6.8b of PBP 2019.

Whilst the existing hospital site is provided with a network of internal roads that separate the facility from the nearest bushfire hazard, a newly constructed perimeter road surrounds the entire development to provide separation from the bushfire hazard and to provide a defendable space for emergency services.

3.2.1. SFPP Development Access - PBP Addendum 2022

An additional specific requirement for certain Class 9 buildings; including the proposed development has been introduced to align with the NCC 2022. The 2022 Addendum to PBP 2019 requires firefighting vehicles to have safe, all-weather access to structures and hazardous vegetation. Table 3 of the 2022 Addendum outlines the Acceptable Solutions to meet the Performance Criteria.

Vehicular access to a Class 9 building is mandated to ensure firefighting vehicles can efficiently and quickly reach the building, crucial for effective bushfire response. This requirement is part of broader bushfire protection measures aimed at enhancing the safety of occupants and the structural integrity of buildings in bushfire-prone areas.

The Acceptable Solutions require vehicular access to be provided in a continuous direction around the entire building to provide access to structures and hazardous vegetation.

Although a continuous path of travel is unable to be provided around the entire building due to the change in elevation, 6m wide vehicular access is provided around the entire building within 18m as shown in **Figure 9**. Notwithstanding, the disconnected vehicular access, the provided access roads are able to comply with the Acceptable Solutions to ensure that firefighting vehicles are provided with safe, all-weather access around the entire building and the fire safety provisions including fire hydrants. To ensure safe access is provided for firefighters, a turning bay is provided to ensure vehicle movements are always in a forward direction.

3.3. Services - Water, Electricity and Gas

3.3.1. Water

A new reticulated water supply is able to be provided to the proposed development in accordance with the requirements of PBP 2019.

The proposed development will satisfy the Acceptable Solution under Table 6.8c PBP 2019 and Table 4 of Appendix B in Addendum 2022 to PBP 2019.

3.3.2. Water Supply - PBP Addendum 2022

Further to compliance with Table 6.8c of PBP 2019, the proposed additions are able to comply with Table 4 of PBP Addendum 2022 as a reticulated water supply is provided.

3.3.3. Electricity

The proposed development will be connected to an underground transmission line in accordance with the Acceptable Solutions outlined in PBP 2019.

The proposed development will be able to satisfy the Acceptable Solution under Table 6.8c PBP 2019.

3.3.4. Gas

There are no gas services for the proposed development. Any future gas services will be provided in accordance with the relevant standards as outlined in Table 6.8c PBP 2019.

3.4. Construction Standards

PBP 2019 requires all buildings proposed for use as a SFPP (Class 9 building) to be designed and constructed to withstand bushfire attack in the form of wind, embers, radiant heat and flame contact. Whilst the provision of APZs will ensure the proposed development is unlikely to be exposed to direct flame contact, or excessive levels of radiant heat, the building must be constructed to withstand ember attack. To achieve this, a construction level of BAL-12.5 under Australia Standard 3959-2018 Construction of buildings in bushfire prone areas (AS3959-2018) and section 7.5 of PBP 2019 is applied. Notwithstanding, NCC 2022 requires Class 9 buildings to constructed in accordance with BAL-19 or greater.

Building design and the materials used for construction of the proposed development should be chosen based on the information contained within AS3959-2018, and accordingly the designer/architect should be made aware of this recommendation.

The determinations of the appropriate bushfire attack level (BAL) is based on the maximum potential radiant heat exposure. BALs are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the BAL is derived by assessing the:

- Relevant FDI = *100*;
- Flame temperature = 1200*K*;
- Slope = variable;
- Vegetation classification = *forest*; and
- Building location.

The Detailed Method (Method 2) outlined in AS3959-2018 was used to calculate the Bushfire Attack Level (BAL) for the development. The NBC Bushfire Attack Assessor V4.1 was used to model the bushfire radiant heat exposure for confirmation of radiant exposure.

The BAL Assessor Report is contained in **Appendix D**.

3.4.1. Construction Standards - PBP Addendum 2022

In accordance with Table 2 of the PBP Addendum 2022, a construction level of BAL-19 is applied to all health care buildings. Accordingly, the Project is required to be constructed in accordance with Sections 3 and 6 of AS3959-2018.

3.5. Landscaping and Vegetation Management

In APZs and IPAs, the design and management of the landscaped areas in the vicinity of buildings have the potential to improve the chances of survival of people and buildings. Reduction of fuel does not require the removal of all vegetation. Trees and plants can provide some bushfire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns.

Generally landscaping in and around a bushfire hazard should consider the following:

- Priority given to retaining species that have a low flammability;
- Priority given to retaining species which do not drop much litter in the bushfire season and which do not drop litter that persists as ground fuel in the bush fire season;
- Priority given to retaining smooth barked species over stringy bark; and
- Create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.

Landscaping within APZs and IPAs should give due regard to fire retardant plants and ensure that fuel loads do not accumulate as a result of the selected plant varieties.

The principles of landscaping for bushfire protection aim to:

- Prevent flame impingement on buildings;
- Provide a defendable space for property protection;
- Reduce fire spread;
- Deflect and filter embers;
- Provide shelter from radiant heat; and
- Reduce wind speed.

Plants that are less flammable have the following features;

- High moisture content and high levels of salt;
- Low volatile oil content of leaves;
- Smooth barks without ‘ribbons’ hanging from branches or trunks; and
- Dense crown and elevated branches.

Avoiding understorey planting and regular trimming of the lower limbs of trees also assists in reducing fire penetration into the canopy. Rainforests species such as Syzygium and figs are preferred to species with high fine fuel and/or oil content. Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage ground fire to spread up to, and then through the crown of trees.

Consideration should be given to vegetation fuel loads present on site with particular attention to APZs. Careful thought must be given to the type and physical location of any proposed site landscaping. Inappropriately selected and positioned vegetation has the potential to ‘replace’ any previously removed fuel load.

Bearing in mind the desired aesthetic and environment sought by site landscaping, some basic principles have been recommended to help minimise the chance of such works contributing to the potential hazard on site.

Whilst it is recognised that fire-retardant plant species are not always the most aesthetically pleasing choice for site landscaping, the need for adequate protection of life and property requires that a suitable balance between visual and safety concerns be considered.

It is reiterated again that it is essential that any landscaped areas and surrounds are subject to ongoing fuel management and reduction to ensure that fine fuels do not build up.

Table 5: Characteristics of low flammability species

Plant attribute	Effect	Design measure
Foliage moisture content	Leaves with higher moisture content retard ignition and slow the rate of combustion	Select species with high leaf moisture content (e.g. rainforest species, succulents and semi-succulents)
Foliage volatile oil content	Foliage with higher volatile oil content ignite more readily and enhance ignition of surrounding vegetation, even though volatile oils themselves do not contribute significantly to total radiant heat	Select species with lower volatile oil content
Foliage mineral content	Foliage with higher mineral content tend to be less flammable (e.g. Amyema spp mistle- toes)	Species selection should favour species with higher leaf mineral content
Leaf fineness	The ratio of area-to-volume of leaves is one of the main factors affecting ease of ignition and intensity of burning. Finer leaves (greater area to volume ratio) tend to ignite and burn more easily than broader leaves	Species selection should favour broad-leafed species
Density of foliage and continuity of plant form	Species with continuous, denser foliage can act as a barrier to wind-borne embers and radiant heat; however, increased density can increase flammability. Species with open branching and low foliage density are less effective as a barrier, though can be less flammable	Select species on a case-by-case basis
Height of lowest foliage	Shrub and tree species with persistent low height foliage are more likely to be ignited by surface fires, allowing the spread of fires into the canopy above	Species selection should favour species which can be maintained or pruned to reduce persistent, near-ground foliage
Size of plant (volume and spread)	The effect of plant size varies according to volume or spread. Species with a greater spread tend to be more effective as a barrier to the diffusion of radiant heat than narrower trees with the same volume. Species with a greater volume can result in increased ember attack, radiation and flame if ignited. For example, narrow columnar trees are less effective as a barrier than wider trees with the same overall volume	Species selection should ensure plant size (volume and spread) does not increase ignition likelihood
Dead foliage on plant	Persistent dead leaves and woody twigs increase flammability	Species selection should favour species which have a low volume of persistent dead leaves and woody material or can be maintained or pruned to reduce persistent, dead leaves and woody material
Bark texture	Loose, flaky, stringy, papery or ribbon-like bark contribute to ladder fuels which: - can contribute to destructive crown fires - act as a potential source of flame, radiant heat and ember attack	Avoid species with persistent loose, flaky, stringy, papery or ribbon-like bark. Species selection should favour smooth-barked and tightly-held bark species
Potential available surface fuel	The availability of surface fuel is a function of volume (quantity) and fineness. The fireline intensity increases in proportion to available fine fuel quantity. Fine fuel includes dead fallen material such as leaves, bark, twigs and branches up to 6mm in diameter (forest) and grass greater than 5cm in height (grass- lands). Coarse fuel ignites less readily but may burn for longer	Species selection should favour species which do not contribute significantly to persistent, fine ground fuel

3.6. Emergency Management

There is a NSW Rural Fire Service station is located at 110 Mount Vincent Road, East Maitland, approximately 4.5kms (9 mins) drive away from the site (**Figure 10**). A NSW Fire and Rescue station is located at 1 Chelmsford Drive, Metford approximately 1.6km (4 mins) from the site (**Figure 11**). In an emergency, either or both of these services could attend the site.

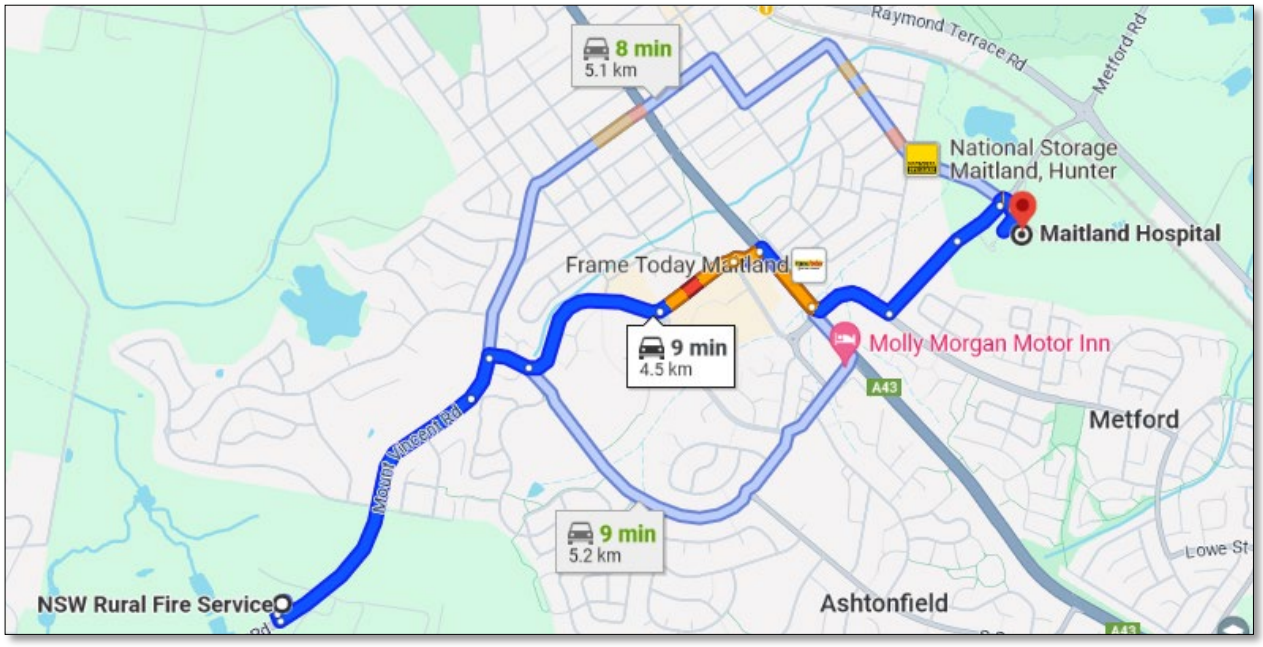


Figure 10: NSW Rural Fire Service - East Maitland

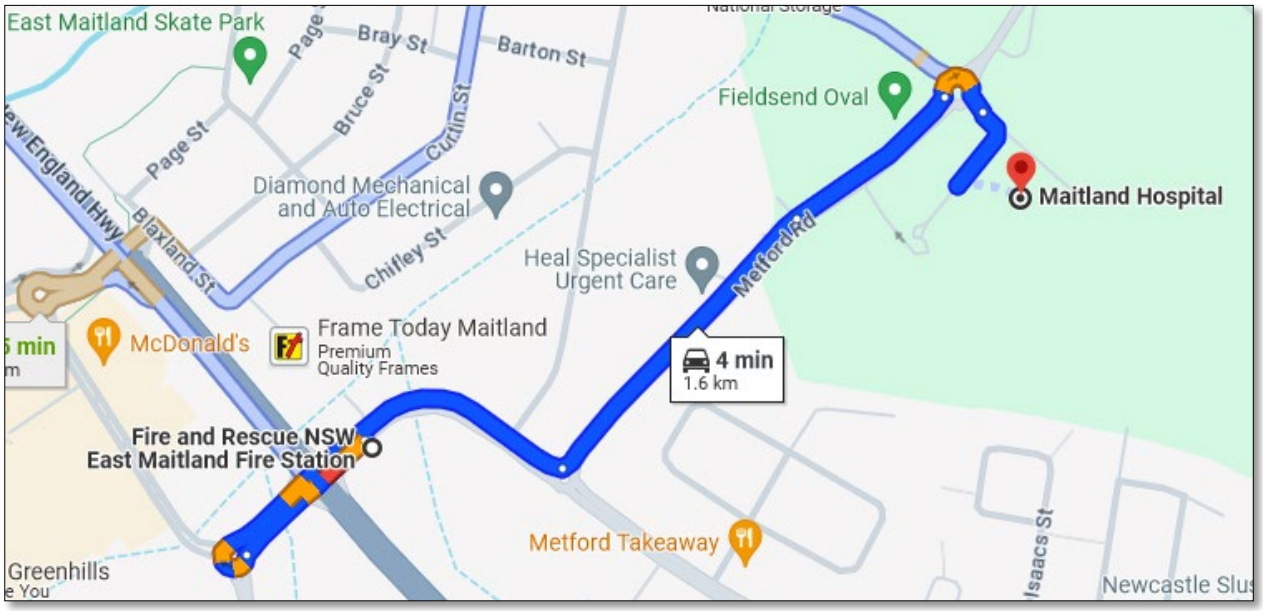


Figure 11: NSW Fire & Rescue Service - East Maitland

A comprehensive Bushfire Emergency Management Plan shall be developed prior to the facility commencing operating and be consistent with any existing emergency management plans already in place for the nMH.

The BEMP should aim to minimise disruption to critical services while protecting life, assets, and the surrounding environment. Key components include preparedness, early warning systems, communication, evacuation procedures, and post-incident recovery to maintain the continuity of essential services.

4. Conclusion and Recommendations

Bushfire Planning Australia has undertaken and completed a Bushfire Assessment Report for the proposed MMRH project.

Based on the findings of the hazard assessment, a series of bushfire protection measures have been identified appropriate to the proposed development to achieve an acceptable level of risk. In this instance the most effective bushfire protection measure is to ensure sufficient separation from the bushfire hazard which would require modifying at least 1 hectare of land. The buffer will be provided by an APZ up to 50m from the outer elevation of the building to the nearest unmanaged vegetation. The APZ may contain roads, parking areas, service areas and can be designed to minimise disturbance to vegetation with the existing riparian zone.

Aside from managing the bushfire hazardous vegetation, the proposed development is able to comply with the remaining Acceptable Solutions applicable to a SFPP development required by PBP 2019; such as construction standards, access, water supply and emergency management.

Further advice from RFS has been requested with regard to the application of NCC 2022 and where compliance is required with all clauses contained in Specification 43.

Recommendations

The following bushfire mitigation measures shall be applied to the proposed development:

1. All buildings to be used for a Special Fire Protection Purpose (SFPP) or associated uses are located to ensure they will not be exposed to radiant heat levels greater than 10kW/m^2;
2. An Asset Protection Zone (APZ) up to 50m should be provided within the site and managed as an Inner Protection Area; as shown in **Figure 8**. The APZs shall be managed in perpetuity as follows:
    i. Tree canopy cover shall be less than 15% at maturity;
    ii. Trees at maturity shall not touch or overhang buildings;
    iii. Lower limbs shall be removed up to a height of 4m above the ground;
    iv. Tree canopies shall be separated by 2m to 5m;
    v. Shrubs should not form more than 10% ground cover;
    vi. Shrubs shall not be located under trees;
    vii. Grass/ ground covers shall be kept mown and be no more than 100mm in height; and
    viii. Leaves and debris shall be removed regularly.

    Note: the APZ is measured from the surface fuel and not the tree canopy drip line.
3. The APZ needs to be established before any buildings are occupied. Surface fuel needs to be maintained frequently (< monthly) and an inspection of all trees within the APZ shall be carried out annually in August and April (pre and post bushfire season) to ensure vegetation remains in accordance with the requirements for APZs;
4. Any required water quality and stormwater detention basins are to be replanted using species type and density commensurate with a *freshwater wetland (Coastal Freshwater Lagoon)*, as described by PBP 2019;
5. The proposed internal roads are to be constructed in accordance with Table 6.8b of PBP 2019;
6. A 6m wide vehicular access road must be provided around the proposed building and shall be located no greater than 18m from the building as shown in the Architectural Plans prepared by Bates and Smart (**Figure 9**);
7. The proposed additions to the existing building are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing

and pressure shall comply with AS2419.1 2005 and section 6.8.3 of PBP 2019 and Table 4 of Appendix B of the PBP Addendum 2022;

8. The new facility shall be constructed in accordance with Section 3 and 6 of Australian Standard AS3959-2018 Construction of buildings in bushfire prone areas; being to a **BAL-19** standard. New construction must also comply with the construction requirements in Section 7.5 of PBP 2019;
9. The development shall comply with the National Construction Code; including the additional bushfire protection measures for Class 9 buildings including Part G5 (NCC 2022).
10. Landscaping shall be in accordance with Appendix 4 PBP 2019.
11. No hazardous or flammable materials are to be stored between any buildings and the bushfire hazards without being suitably enclosed to prevent air borne embers from direct contact;
12. A new or updated Bushfire Survival Plan and Emergency Management Plan shall be prepared in accordance with the RFS Guide to development a Bush Fire Emergency Management and Evacuation Plan; and

The above recommendations are summarised within **Table 6** Consolidated Summary of Mitigation Measures.

5. Mitigation Measures

Table 6: Consolidated Summary of Mitigation Measures

Project Stage *Design (D) Construction (C) Operation (O)*	Mitigation Measure	Relevant Section of Report
D/O	**Asset Protection Zones (Defendable Space)** 1. All buildings to be used for a Special Fire Protection Purpose (SFPP) or associated uses are located to ensure they will not be exposed to radiant heat levels greater than 10kW/m^2 2. An Asset Protection Zone (APZ) up to 50m should be provided within the site and managed as an Inner Protection Area; as shown in **Figure 8**. The APZs shall be managed in perpetuity as follows: a. Tree canopy cover shall be less than 15% at maturity; b. Trees at maturity shall not touch or overhang buildings; c. Lower limbs shall be removed up to a height of 4m above the ground; d. Tree canopies shall be separated by 2m to 5m; e. Shrubs should not form more than 10% ground cover; f. Shrubs shall not be located under trees; g. Grass/ ground covers shall be kept mown and be no more than 100mm in height; and h. Leaves and debris shall be removed regularly. Note: the APZ is measured from the surface fuel and not the tree canopy drip line. 3. The APZ needs to be established before any buildings are occupied. Surface fuel needs to be maintained frequently (< monthly) and an inspection of all trees within the APZ shall be carried out annually in August and April (pre and post bushfire season) to ensure vegetation remains in accordance with the requirements for APZs 4. Any required water quality and stormwater detention basins are to be replanted using species type and density commensurate with a *freshwater wetland (Coastal Freshwater Lagoon)*, as described by PBP 2019	Section 3.1
D/O	**Access** 5. The proposed internal roads are to be constructed in accordance with Table 6.8b of PBP 2019. 6. A 6m wide vehicular access road must be provided around the proposed building and shall be located no greater than 18m from the building.	Section 3.2
D/C/O	**Water and Services** 7. The proposed additions to the existing building are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the	Section 3.3

Project Stage *Design (D) Construction (C) Operation (O)*	Mitigation Measure	Relevant Section of Report
	development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and section 6.8.3 of PBP 2019 and Table 4 of Appendix B of the PBP Addendum 2022	
D/C/O	**Construction (BAL-19)** 8. The new facility shall be constructed in accordance with Section 3 and 6 of Australian Standard AS3959-2018 Construction of buildings in bushfire prone areas; being to a **BAL-19** standard. New construction must also comply with the construction requirements in Section 7.5 of PBP 2019 9. The development shall comply with the National Construction Code; including the additional bushfire protection measures for Class 9 buildings including Part G5 (NCC 2022).	Section 3.4
D/O	**Landscaping** 10. Landscaping shall be in accordance with Appendix 4 of PBP 2019.	Section 3.5
O	**Emergency Management** 11. No hazardous or flammable materials are to be stored between any buildings and the bushfire hazards without being suitably enclosed to prevent air borne embers from direct contact 12. A new or updated Bushfire Survival Plan and Emergency Management Plan shall be prepared in accordance with the RFS Guide to development a Bush Fire Emergency Management and Evacuation Plan	Section 3.6

The bushfire assessment report has been prepared in accordance with the Planning for Bushfire Protection 2019 (PBP 2019) published by the NSW Rural Fire Service (RFS).

Should the above recommendations be implemented, any person evacuating a building will not be exposed to radiant heat levels greater than 10kW/m^2 and the existing bushfire risk should be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection (April 2024) and production (October 2024) and demonstrates the proposed development is able satisfies the relevant requirements and is able to meet the aims and objectives of Planning for Bushfire Protection 2019.

6. References

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- Leonard, J and Opie, K, (2017) Estimating the potential bushfire hazard of vegetation patches and corridors. CSIRO
- NSW Rural Fire Service (2018). Pre-Release Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.
- Ramsay, GC and Dawkins, D (1993). Building in Bushfire-prone Areas – Information and Advice. CSIRO and Standards Australia.
- Standards Australia (2018). AS 3959 – 2018: Construction of Buildings in Bushfire-prone Areas.

Appendix A: Architectural Plans

LOT 266 DP 755237

MAINTENANCE TRACK

BIO-RETENTION BASIN

FENCE

MH.09.01
2

FIRE TRUCK ACCESS ROAD

WAYFINDING SIGNAGE PILLAR

OSED NEW FOOTPATH
ECTION TO EXISTING

OSED ROAD WIDENING
TRUCK PASSING

ACCESSIBLE FOOTPATH

RL:16.60

BIO-SWALE

RL:9.70

RL:10.10

RL:9.80

MH.09.01
4

PROPOSED MAITLAND
MENTAL HEALTH BUILDING

SEWER
PUMP AND
TANK

RL:10.60

SERVICES COMPOUND
LOWER GROUND

RL:10.30

FIRE TRUCK
TURNING BAY

GROUND
FFL 14.93

MAIN
ENTRY

FOOTPATH

3

MH.09.01

RL:14.50

ACCESSIBLE FOOTPATH

VISITOR PARKING AND DROP OFF

RL:14.70

RL:14.60

NEW WAYFINDING
SIGNAGE PILLAR

NEW WAYFINDING SIGNAGE PILLAR

PROPOSED NEW ROAD CONNECTION
TO POTTERY ROAD

BIO-SWALE

MH.09.01

RL:10.50

SECURE
VEHICLE
ENTRY

FOOTPATH

STAFF CAR
PARK

LOADING BAY
LOWER GROUND

RL:10.60

RAINWATER
TANKS

SECURE
BICYCLE
PARKING

RL:13.50

FENCE

FOOTPATH

Legend

- Proposed Development Zone
- Road, Hardstand and Parking (Review to Landscape Plan and Civil Site Plan)
- Access Road/Path (Compacted Gravel) (Refer to Landscape Plan)
- Pedestrian Footpath (Refer to Landscape Plan)
- Landscape Areas (Refer to Landscape Plan)
- Bioretention Basin / Bioswale Areas (Refer to Landscape Plan and Civil Site Plan)
- Fence (Refer to Landscape Plan)

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NSW Nominated Responsible Architects
Kellie Payne 6454. Philip Vivian 6696. Guy Lake 7119. Matt Allen 8498.

NSW GOVERNMENT Health
Hunter New England
Local Health District

NSW GOVERNMENT Health
Infrastructure

Current Revision Description

Data Issue Record
Current Revision released byMDT

Rev	Date	Description
07	13.12.24	REF Application
06	24.10.10	Issued for Review
05	24.09.26	Issued for Review
04	24.09.24	Issued for Review
03	24.08.30	Issued for Review
02	24.08.26	Issued for Review
01	24.08.02	Issued for Review

Project Title
SWMHIP - New Maitland Hospital Mental Health

First Nations Country
Wonnarua

Project Address
Metford Rd, Metford NSW 2323

Project No.
S12598

Drawing Title
Site
Proposed Site Plan

Phase
Design Development

Status
NOT FOR CONSTRUCTION

Scale
1 : 500 @ A1

Drawing no.
MH.01.03

Revision
07

Appendix B: Planning for Bushfire Protection 2019 & Addendum 2022 - Compliance Tables

Table 1: PBP 2019 – Aims and Objectives

Objectives	Satisfied	Comment
➢ Afford buildings and their occupants protection from exposure to a bush fire	✓	It is unlikely that any occupants will be directly exposed to a prolonged bushfire attack as the location of the final building will be sited in accordance with PBP 2019 and ensure the buildings is not exposed to unacceptable levels of radiant heat (<10kW/m^2).
➢ Provide for a defendable space to be located around buildings	✓	A compliant APZ can be provided in accordance with PBP 2019. Trafficable defendable space by way of formed driveway/ roads or the like shall be provided.
➢ Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings	✓	The proposed development will be separated from the nearest Category 1 bushfire prone vegetation by an APZ between 34m and 79m. The required APZ requires over 1 hectare of native vegetation to be modified and likely trigger a BDAR. The impact on biodiversity shall be assessed and a test of avoidance must be undertaken.
➢ Ensure that safe operational access and egress for emergency service personnel and residents is available	✓	Safe operational access will be provided included a 6m wide road that provides a continuous path of travel around the entire building.
➢ Provide for ongoing management and maintenance of BPMs	✓	HNELHD will be responsible in perpetuity to maintain all BPMs, including APZs.
➢ Ensure that utility services are adequate to meet the needs of firefighters	✓	The proposed building will be connected to all essential utility services to meet the needs of firefighters; including a reliable water supply.

Table 2: Performance Criteria and Acceptable Solutions for SFPP Developments (Chapter 6 PBP 2019)

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
6.8.1 ASSET PROTECTION ZONES Table 6.8a To provide suitable building design, construction and sufficient space to ensure that radiant heat levels at buildings does not exceed critical limits for firefighters and other emergency services personnel undertaking operations, including supporting or evacuating occupants.	Radiant heat levels of greater than 10kW/m^2 (1200K) are not experienced at any part of the building.	The building is provided with an APZ in accordance with Table A1.12.1. in Appendix 1.	✓ **PS**	It is unlikely that any occupants will be directly exposed to a prolonged bushfire attack as the location of the final building will be sited in accordance with PBP 2019 and ensure the buildings is not exposed to unacceptable levels of radiant heat (<10kW/m^2). The required APZ requires over 1 hectare of native vegetation to be modified and likely trigger a BDAR. The impact on biodiversity shall be assessed and a test of avoidance must be undertaken.
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	The APZ is not located on lands with a slope exceeding 18°	✓	All APZs are located on land with slopes 9° or less.
	APZs are managed and maintained to prevent the spread of a fire towards the building. The APZ is provided in perpetuity.	The APZ is managed in accordance with the requirements of Appendix 4 of PBP 2019 and is wholly within the boundaries of the development site.	✓	There are no exceptional circumstances that would require an APZ to be located external to the development site. There is sufficient managed land (and reduced threat vegetation) between the proposed buildings and the hazard to avoid requiring an APZ on adjoining private land.
		Mechanisms are in place to provide for the maintenance of the APZ over the life of the development.	✓	The manager (HNELHD) of the property will be responsible to maintain the recommended APZs.
		Other structures located within the APZ need to be located further than 6m from the refuge building.	✓	Any ancillary structures to the proposed development can be greater than 6m from the primary structure.
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.	Landscaping is in accordance with APZ standards (see Appendix 4). Fencing is constructed in accordance with section 7.6.	✓	The project Landscape Architects have been provided with the RFS guidelines for landscaping. Accordingly, all proposed landscaping has been designed in accordance with PBP 2019 requirements for landscaping and the APZ standards. No new fences will be constructed in the immediate vicinity of the proposed building.

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
CONSTRUCTION	The proposed building can withstand bush fire attack in the form of wind, smoke, embers, radiant heat and flame contact.	A construction level of BAL-12.5 under AS3959 or NASH and Table 6.8a is applied	✓	In accordance with NCC 2022, the proposed development will be constructed in accordance with Section 3 and 6 of AS3959-2018; being BAL-19; being a higher level of construction than BAL-12.5.
6.8.2 **ACCESS** **Table 6.8b** To provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area. **FIREFIGHTING VEHICLES**	Firefighting vehicles are provided with safe all-weather access to structures and hazard vegetation.	SFPP access roads are two-wheel drive, all-weather roads	✓	A new internal network of roads will be constructed throughout the site. A 6m wide access road will be constructed around the perimeter of the building between 10m and 30m.
		Access is provided to all structures and hazard vegetation.	✓	
		Traffic management devices are constructed to not prohibit access by emergency services vehicles.	✓	
		Access roads must provide suitable turning areas in accordance with Appendix 3.	✓	
ACCESS ROAD CAPACITY	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.	✓	All new roads will have sufficient capacity to carry fully loaded fire fighting vehicles.
ACCESS TO WATER	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	✓	A new water supply main will be located within the defendable space and multiple hydrants will be located directly adjacent to the proposed development.
		Hydrants are provided in accordance with AS2419.1:2005	✓	
		There is suitable access for Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	**N/A**	
PERIMETER ROADS	Perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	There are two-way sealed roads.	✓	The new internal road network; whilst not strictly perimeter roads, provide wide and open road carriageways that are buffered by a low fuel load vegetated buffer. All roads shall be 8m wide or greater, are two-way and have multiple connections to various areas of the nMH.
		8m carriageway width kerb to kerb.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating.	Minimum 5.5m width kerb to kerb.	✓	The new roads may be considered non-perimeter roads as they do not adjoin a property boundary (perimeter), however they are designed in accordance with the requirements for Perimeter Roads.
		Parking is provided outside of the carriageway.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and	✓	
6.8.3 SERVICES Table 6.8c To provide adequate services for water for the protection of buildings during and after the passage of a bushfire, and not to locate gas and electricity so as not to contribute to the risk of fire to a building. **WATER**	A water supply is provided for firefighting purposes	Reticulated water is to be provided to the development, where available	✓	A reticulated water supply is provided.
		A static water supply is provided where no reticulated water is available	**N/A**	
	Water supplies are located at regular intervals The water supply is accessible and reliable for firefighting operations	Fire hydrant spacing, design and sizing comply with AS2419.1:2005;	✓	A compliant network of hydrants will be provided.
		Hydrants are not located within any road carriageway;	✓	
		Reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.	✓	The existing water supply ring main will be augmented to include the proposed development.

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
	Flows and pressures are appropriate	Fire hydrant flows and pressures comply with AS2419.1:2005.	✓	
	The integrity of the water supply is maintained	All above ground water service pipes are metal, including and up to any taps.	**N/A**	
ELECTRICITY	Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	✓	An existing underground electricity service is provided to the site.
		Where overhead electrical transmission lines are proposed as follows: - lines are installed with short pole spacing (30 metres), 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	**N/A**	
GAS	Location 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 1596:2014 and the requirements of relevant authorities, metal piping is to be used.	✓	
		All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side;	✓	All tanked gas stored on site will be sited and secured with appropriate shielded from the bushfire hazard.
		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.	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
6.8.4 EMERGENCY MANAGEMENT PLANNING **Table 6.8d** To provide suitable emergency and evacuation arrangements for occupants of SFPP developments	A bush fire emergency and evacuation management plan is prepared.	Bush fire emergency management and evacuation plan is prepared consistent with the NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan; and AS3745:2010 Planning for emergencies in facilities.	✓	A Bushfire Management Plan is recommended to be prepared for the new use of the existing building. Alternatively, the existing BMP will need to be updated to address the new additions the improved road network.
		The emergency and evacuation management plan should include a mechanism for the early relocation of occupants.	✓	
	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 staff in developing and implementing an Emergency Procedures Manual.	✓	Where required, consultation with staff and residents will be undertaken during the preparation of the Bushfire Management Plan.
		Detailed plans of all emergency assembly areas including 'on-site' and 'off-site' arrangements as started in AS3745 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.	✓	

Table 3: Planning for Bushfire Protection 2019 - Addendum 2022

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution PS - Performance Solution	
Part 4: Asset Protection Zones	The minimum distances for Asset Protection Zones (APZs) for Special Fire Protection Purposes (SFPP) developments remain as prescribed in Table A1.12.1 of PBP 2019. Please note clause S43C2 *of Specification 43 of Volume One of NCC 2022* does not apply in relation to SFPP developments.		**PS**	An APZ of up to 79m is recommended in accordance with Performance Criteria for APZs outlined in Table 6.8a has been provided.
Appendix B: **Table 2: Construction Standards**	The proposed building can withstand bushfire attack in the form of wind, embers, radiant heat and flame contact.	A construction level of BAL-19 or greater under AS3959 and section 7.5 of PBP is applied.	✓	BAL-19 construction in accordance with Section 3 and 6 of AS3959-2018
Appendix B: **Table 3: Access**	Firefighting vehicles are provided with safe all weather access to structures and hazardous 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	✓	Complies A 6m wide access road is provided around the entire building.
		Must have a minimum unobstructed width of 6m with no part of its furthest boundary more than 18m from the building and is no part of the 6m width be built upon or used for any purpose other than vehicular or pedestrian movement; and	✓ **PS**	Partly Complies. The access road is 6m wide and for the majority of the road it is within 18m of the building. Several short sections are greater than 18m from the building, but no more than 30m. Performance Solution to demonstrate variation to the 18m maximum distance is acceptable.
		Must provide reasonable pedestrian access from the vehicular access to the building; and	✓	Complies
		Must have a load bearing capacity and unobstructed height to permit the operation and passage of fire fighting vehicles; and	✓	Complies
		Must be wholly within the allotment except that a public road complying with above may serve as the vehicular access or part thereof.	✓	Complies

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
			✓ - Acceptable Solution PS - Performance Solution	
Appendix B: **Table 4: Water Supply**	An adequate water supply for firefighting purposes is installed and maintained.	Reticulated water is to be provided to the development, where available; and	✓	A reticulated water supply is able to be provided. A new water supply main will be located within the defendable space and multiple hydrants will be located directly to the proposed development.
		Water for fire fighting purposed must be made available and consist of: ➢ 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	✓	

Appendix C: AHIMS Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 2251 MH Community Health

Client Service ID : 730904

Katrina Greville

21 Costata Crescent
Adamstown New South Wales 2289

Attention: Katrina Greville

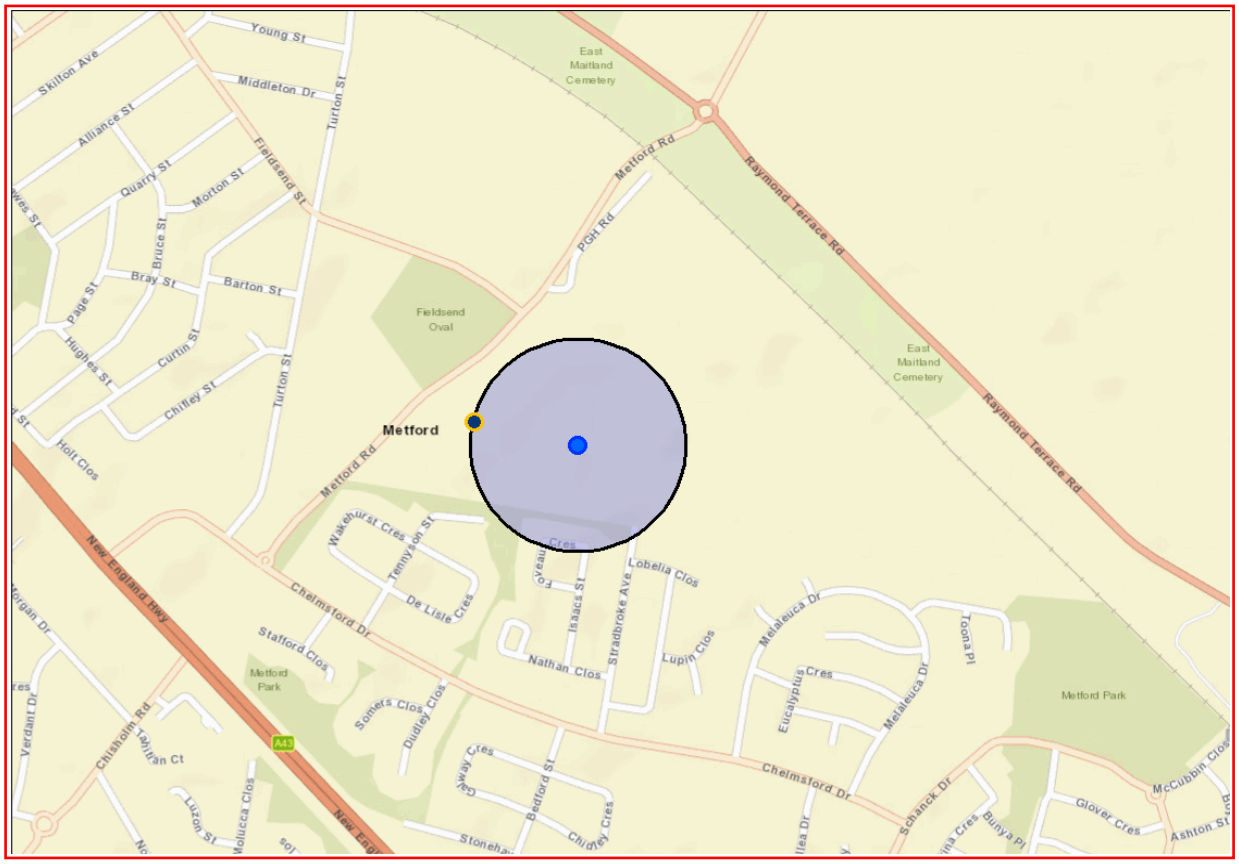
Email: klmukevski@bigpond.com

Date: 09 November 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 51 METFORD ROAD METFORD 2323 with a Buffer of 200 meters, conducted by Katrina Greville on 09 November 2022.

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



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

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

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Appendix D: NBC Bushfire Attack Assessor V4.1 Results

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 21/04/2023 **Assessment Date:** 4/04/2023

Site Street Address: 2251 Maitland Mental Health - Design Concept Report, Metford

Assessor: Stuart Greville; Bushfire Planning Australia

Local Government Area: Maitland **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

Run Description: T1

Vegetation Information

Vegetation Type: Coastal Floodplain Wetlands
Vegetation Group: Forested Wetlands
Vegetation Slope: 0.6 Degrees **Vegetation Slope Type:** Downslope
Surface Fuel Load(t/ha): 8.2 **Overall Fuel Load(t/ha):** 15.1
Vegetation Height(m): 0.9 Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees **Site Slope Type:** Downslope
Elevation of Receiver(m): Default **APZ/Separation(m):** 35

Fire Inputs

Veg./Flame Width(m): 100 **Flame Temp(K):** 1200

Calculation Parameters

Flame Emissivity: 95 **Relative Humidity(%):** 25
Heat of Combustion(kJ/kg 18600 **Ambient Temp(K):** 308
Moisture Factor: 5 **FDI:** 100

Program Outputs

Level of Construction: BAL 12.5 **Peak Elevation of Receiver(m):** 4.2
Radiant Heat(kW/m2): 9.94 **Flame Angle (degrees):** 82
Flame Length(m): 8.48 **Maximum View Factor:** 0.111
Rate Of Spread (km/h): 1.03 **Inner Protection Area(m):** 35
Transmissivity: 0.804 **Outer Protection Area(m):** 0
Fire Intensity(kW/m): 8001

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	10	14	21	30	35	6

Run Description: T2

Vegetation Information

Vegetation Type: Grassland

Vegetation Group: Grassland

Vegetation Slope: 3.7 Degrees

Vegetation Slope Type: Upslope

Surface Fuel Load(t/ha): 6

Overall Fuel Load(t/ha): 6

Vegetation Height(m): 0

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 34

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1200

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 130

Program Outputs

Level of Construction: BAL 12.5

Peak Elevation of Receiver(m): 3.76

Radiant Heat(kW/m2): 9.23

Flame Angle (degrees): 82

Flame Length(m): 7.59

Maximum View Factor: 0.103

Rate Of Spread (km/h): 13.09

Inner Protection Area(m): 34

Transmissivity: 0.806

Outer Protection Area(m): 0

Fire Intensity(kW/m): 40586

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	23	30	41	55	64	6

Run Description: T3 - T4

Vegetation Information

Vegetation Type: Coastal Floodplain Wetlands

Vegetation Group: Forested Wetlands

Vegetation Slope: 1.2 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 8.2

Overall Fuel Load(t/ha): 15.1

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 36

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1200

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 12.5

Peak Elevation of Receiver(m): 4.33

Radiant Heat(kW/m2): 9.9

Flame Angle (degrees): 81

Flame Length(m): 8.76

Maximum View Factor: 0.11

Rate Of Spread (km/h): 1.07

Inner Protection Area(m): 36

Transmissivity: 0.803

Outer Protection Area(m): 0

Fire Intensity(kW/m): 8340

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	11	15	21	30	36	6

Run Description: T5

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 0 Degrees

Vegetation Slope Type: Level

Surface Fuel Load(t/ha): 14

Overall Fuel Load(t/ha): 24.6

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 50

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1200

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 12.5

Peak Elevation of Receiver(m): 6.81

Radiant Heat(kW/m2): 9.97

Flame Angle (degrees): 79

Flame Length(m): 13.87

Maximum View Factor: 0.114

Rate Of Spread (km/h): 1.68

Inner Protection Area(m): 41

Transmissivity: 0.78

Outer Protection Area(m): 9

Fire Intensity(kW/m): 21353

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	17	22	32	43	50	6

Run Description: T6

Vegetation Information

Vegetation Type: Coastal Floodplain Wetlands

Vegetation Group: Forested Wetlands

Vegetation Slope: 7.7 Degrees

Vegetation Slope Type: Upslope

Surface Fuel Load(t/ha): 8.2

Overall Fuel Load(t/ha): 15.1

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 25

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1200

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 12.5

Peak Elevation of Receiver(m): 2.77

Radiant Heat(kW/m2): 9.88

Flame Angle (degrees): 83

Flame Length(m): 5.57

Maximum View Factor: 0.107

Rate Of Spread (km/h): 0.58

Inner Protection Area(m): 25

Transmissivity: 0.827

Outer Protection Area(m): 0

Fire Intensity(kW/m): 4513

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	3	8	13	20	25	6

Run Description: T7

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 3.7 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 14

Overall Fuel Load(t/ha): 24.6

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 57

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1200

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 12.5

Peak Elevation of Receiver(m): 8.34

Radiant Heat(kW/m2): 10.08

Flame Angle (degrees): 78

Flame Length(m): 17.05

Maximum View Factor: 0.117

Rate Of Spread (km/h): 2.17

Inner Protection Area(m): 47

Transmissivity: 0.771

Outer Protection Area(m): 10

Fire Intensity(kW/m): 27563

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	20	27	37	50	58	6

Run Description:	T8		
Vegetation Information			
Vegetation Type:	Coastal Floodplain Wetlands		
Vegetation Group:	Forested Wetlands		
Vegetation Slope:	3.7 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	8.2	**Overall Fuel Load(t/ha):**	15.1
Vegetation Height(m):	0.9	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	30
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K):**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Level of Construction:	BAL 12.5	**Peak Elevation of Receiver(m):**	3.36
Radiant Heat(kW/m2):	9.63	**Flame Angle (degrees):**	83
Flame Length(m):	6.77	**Maximum View Factor:**	0.106
Rate Of Spread (km/h):	0.76	**Inner Protection Area(m):**	30
Transmissivity:	0.815	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	5947		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	7	11	17	24	29	6

Run Description:	T9 & T10		
Vegetation Information			
Vegetation Type:	Hunter Macleay DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrub/Grass)		
Vegetation Slope:	5.8 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	14	**Overall Fuel Load(t/ha):**	24.6
Vegetation Height(m):	0.9	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	50
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K):**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Level of Construction:	BAL 12.5	**Peak Elevation of Receiver(m):**	5.09
Radiant Heat(kW/m2):	7.35	**Flame Angle (degrees):**	82
Flame Length(m):	10.27	**Maximum View Factor:**	0.084
Rate Of Spread (km/h):	1.13	**Inner Protection Area(m):**	42
Transmissivity:	0.779	**Outer Protection Area(m):**	8
Fire Intensity(kW/m):	14310		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	13	17	25	35	41	6