

Appendix P: Bushfire Management Plan



Metronet – Byford Station Precinct
George Street, Byford
Bushfire Management Plan

Date: 10 July 2023

Prepared For: Public Transport Authority

Linfire Ref: 20220601210METC-BMP-001_B

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Revision	Issue Date	Revision Description	Approved By
A	4 July 2023	Issued for Review	Linden Wears (Level 3 BPAD 19809)
B	10 July 2023	Issued for Review	Linden Wears (Level 3 BPAD 19809)



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1.0 Proposal details

1.1 Background

1.1.1 Proposed development

Metconnx, on behalf of Public Transport Authority (PTA; the Proponent) is lodging a Development Application (DA) in relation to proposed development of Byford Station Precinct which is part of the Metronet Stage 1 Byford Extension project, located primarily within Lot 101 (on DP 414922), Byford (the project area), located in the Shire of Serpentine-Jarrahdale (SSJ). While the station precinct is primarily in Lot 101, proposed public road extensions do extend into Lot 1 (on DP 65664) immediately to the west.

The Precinct Master Plan (see Figure 1) identifies that the proposed development will comprise the following elements:

- Station building and platform to the Metro line, including several services and cleaning enclosures on the platform
- Western station building, including kiosk, bike store, toilets, staff crib, store, services including electrical, mechanical infrastructure and fire tanks and pumps
- Australind platform for the Australind line
- Signalling Equipment Room (SER) within the rail reserve, to the east of the Metro line
- Bike Store enclosure
- Bus interchange including an interchange facilities building
- Kiss “n” Ride
- External canopies
- Western Power transformer and substation
- Multiple Use Corridor (MUC)
 - Includes a drainage swale which is to be subject to revegetation
- Irrigation tank adjacent to the MUC
- New public roads connecting the station precinct to the existing public road network, including Evans Way, Clara Street and Sansimeon Boulevard.
 - Other works are also being undertaken to the public road network as part of other packages of work for the BRE project, but these are outside of this DA.
- New public roads providing access to the station development, including Access Road A and Plaza Road
- New internal PTA roads within the station development (i.e. that are not gazetted public roads) including connection road between Access Road A and Plaza Road, the bus interchange loop road, and the Kiss ‘n; Ride road.
- Station carpark, including area of future carpark expansion in the west
 - Only a portion of the carpark is to be constructed as part of this DA, and the remainder will be landscaped until future carpark expansion occurs.
- Staff carpark
- Onsite managed landscaping, pathways, plaza’s around the station buildings
- Indicative Future Development lot including anticipated location of future public roads (developments not included in this DA).

Development of the train station will also involve concurrent construction of the Metronet railway track within the rail reserve. Construction of the rail alignment does not form part of this DA and it has been assumed that this will be completed prior to occupancy of the station and commencement of station operations.

1.1.2 BMP project area extent

The extent of the DA includes a number of new public roads (Evans Way, Clara Street and Sansimeon Boulevard), which connect the proposed station precinct to the existing public road network. While the proposed public roads offer significant community benefit to support future development in the local area, as well as improved emergency access in a bushfire emergency, the extent of the project area for the purposes of bushfire mapping in this BMP has been restricted to the station precinct containing the habitable buildings, as shown in Figure 2.

It is assumed that the proposed public roads will be completed prior to occupation of the station precinct, and the compliance of this is addressed in the BMP, however mapping bushfire impacts on these roads is not considered necessary given the lack of habitable development in these areas.

It is also noted that development of the future development lot identified to the south and west of the station carpark (see Figure 2) is also not included in the DA. Notwithstanding, given that habitable development will ultimately be proposed in this area by future landowners, it is considered prudent that this BMP reviews the bushfire impact on this area from the proposal, to ensure future bushfire compliance can eventually be achieved.

1.1.3 Train station operations

The station will be operated by PTA and will be manned at all times that it is open to the public.

1.1.4 Access

Vehicular access to the station precinct for the public will be via roads to be constructed as part of the proposed development as follows (see Figure 1):

- Extension of Clara Road further west along southern interface of station precinct, to new roundabout to the south-west.
- Extension of Evans Way south along the western extent of the station precinct, to the new roundabout.
- Extension of Sansimeon Boulevard east from its current termination north-west of the project area, to the new roundabout adjacent to the station precinct, and from there, further south to connect to the existing roundabout at Abernathy Road.

Entrances to the station precinct will be available from the new portions of Evans Way (via Access Road A) and from Clara Street (via Plaza Road).

Access Road A, Plaza Road and the internal PTA roads will be constructed within the station precinct as part of this DA, to provide vehicular access to the station carpark, staff carpark, Kiss 'n' Ride area and bus terminal. The road layout within the Future Development area is not yet finalised, and these roads are not proposed to be constructed as part of this DA.

Pedestrian access to the station will largely be via road crossings across Clara Street in the south-east, however a network of walking paths and crossings it to be constructed to the west as well.

1.1.5 Emergency management

Given the nature of the facility, this station has its own onsite fire hydrant system which consists of dedicated fire water tanks, pump room and booster connection located in the services enclosure

building. Emergency management provisions, including evacuation, are expected to be conducted in accordance with the PTA Emergency Management Manual (EMM). Linfire notes that while the PTA EMM details the response to a variety of onsite emergencies, including station fires, there isn't any specific information in the EMM relating to bushfire emergencies, which may require different responses and evacuation protocols to other emergencies. As outlined in Section 1.4, it is proposed that bushfire emergency management measures be incorporated into the PTA EMM to satisfy bushfire policy requirements.

1.2 Site description

The project area consists of vacant land that has an existing railway line (within the rail reserve) and been subject to historical clearing so is now predominantly unmanaged grassland, other than very small, isolated plots of treed vegetation constrained in rail and road reserves or along distinct drainage lines.

Land uses surrounding the project area include:

- Evans Way to the north, with existing residential development further to the north, other than small amounts of unmanaged vegetation within the rail reserve that splits Evans Way.
- George Street to the east, with existing commercial development within Byford townsite and South-West Highway further east.
- Unmanaged grassland vegetation to the south and south-west within Lots 1 and 9001 as well as Lot 103 Bushman Glyde.
 - It is understood future development is likely in these lots, however this is currently unconfirmed, and as such, this BMP assumes these will remain in their current vegetated stage.
- Residential subdivision to the west, that has cleared lots and public roads constructed, but is awaiting the construction of dwelling.
 - The cleared lots have a 17 m wide cleared interface with grassland to the east and south, presumably a staging buffer to manage bushfire impact, and also to act as a temporary emergency access way.

1.3 Habitable buildings and assets

Review of the proposed development has identified the following proposed habitable buildings and assets that Linfire considers requires protection from bushfire impact:

- Station building and services and cleaning enclosures along the platform
- Western station building
- Signalling Equipment Room (SER) building
- Bus Interchange facilities building

1.4 Purpose

The project area contains proposed habitable development located within a designated bush fire prone area that is subject to a BAL rating above BAL-Low. On this basis, this Bushfire Management Plan (BMP) has been prepared to address requirements under Policy Measures 6.2 and 6.5 of *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2017).

The proposed development is considered a vulnerable land use which triggers additional requirements under Policy Measure 6.6 of SPP 3.7. In accordance with Policy Measure 6.6.1 and

Section 5.5 of the Guidelines, development applications for vulnerable land uses require a Bushfire Emergency Evacuation Plan (BEEP) detailing the emergency management provisions for the facility, accompanies the BMP.

For this project, it is proposed that a BEEP is not prepared at this time, but is included as a future implementation measure within this BMP and conditioned as part of the DA approval. Linfire consider the most appropriate approach is to have the proposed bushfire emergency management arrangements for this station incorporated into the existing PTA Emergency Management Manual (EMM) to standardise the procedures across the Metronet network. To achieve this, there is a significant liaison process required with PTA and given occupation of the station by vulnerable occupants (i.e. the public) isn't likely until 2025, there is considerable time to define these bushfire emergency management arrangements. This BMP will provide some guidance in relation the overall strategy in order to provide decision-makers with some information regarding the anticipated emergency management measures. Notwithstanding, a standalone BEEP for the station may still be an option if this is PTA's preference, however it should be aligned with and referenced in the EMM.

1.5 Other plans/reports

There are no known bushfire reports or assessments that have been prepared previously for the project area.

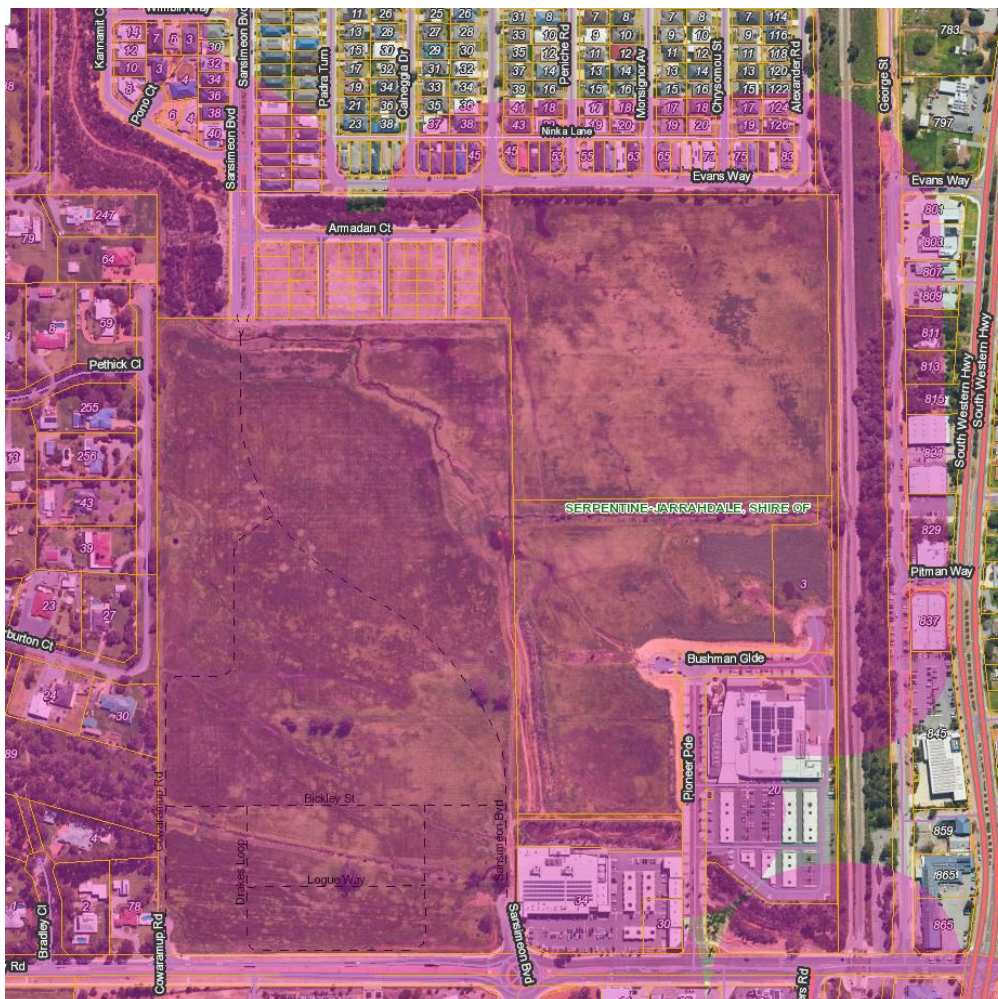


Plate 1: Map of Bush Fire Prone Areas (DFES 2023)

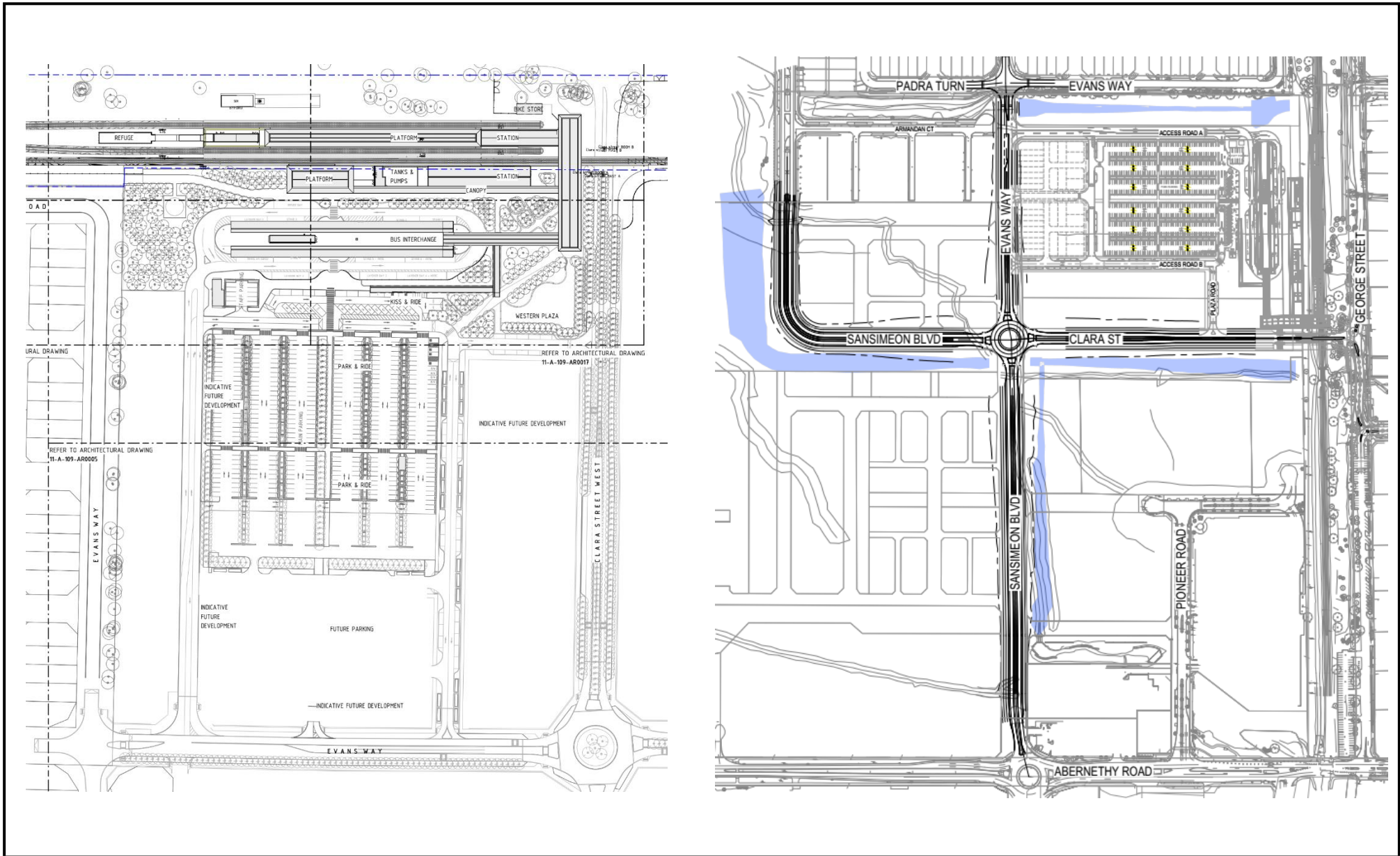
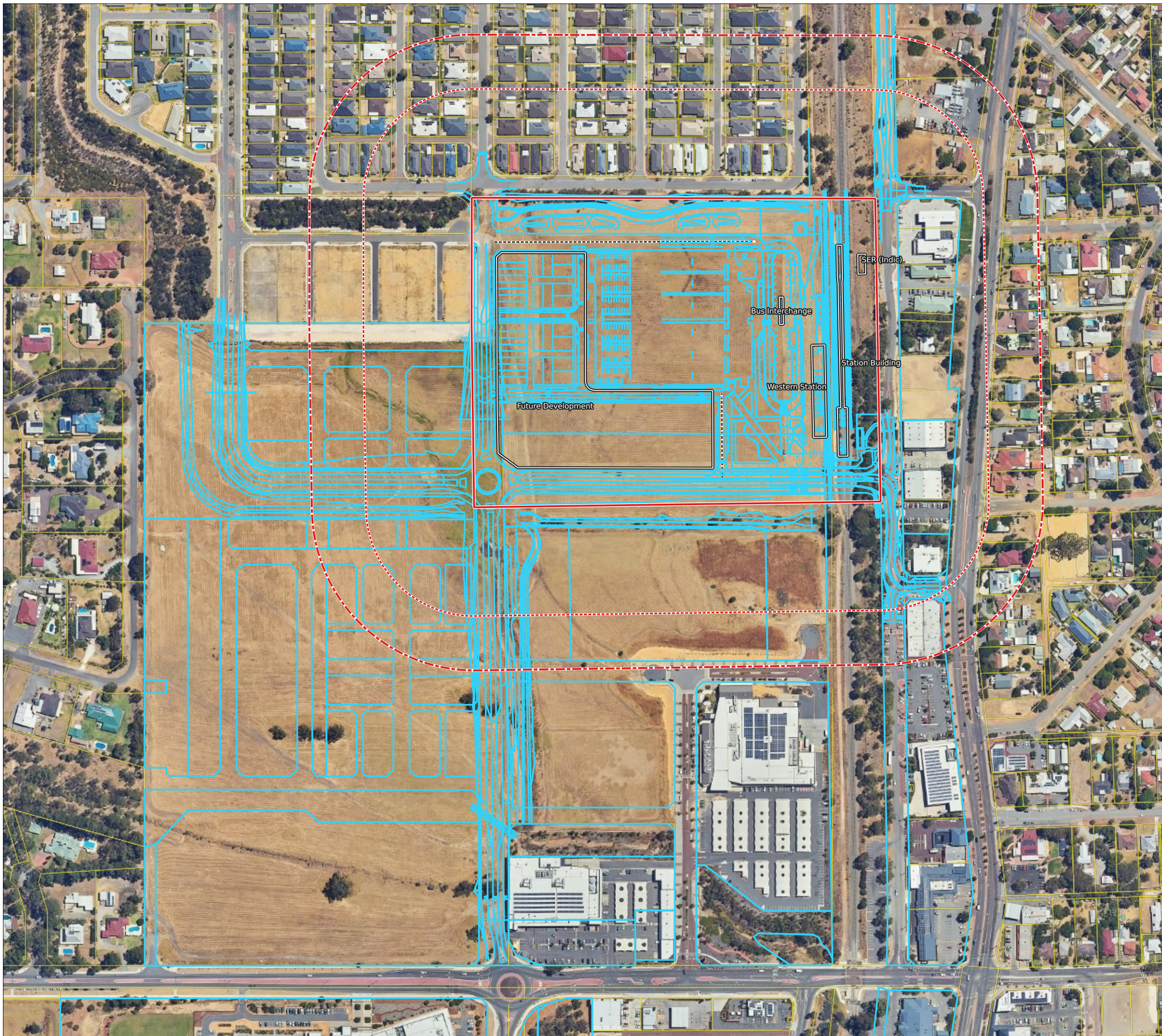


Figure 1: Development Plan





Legend

- Proposed Development
- - - - - Public Road
- Building Outline
- Project Area
- Assessment Area
- 100m
- 150m
- Cadastre

Scale 1:3,300



0 50 100 150 Metres



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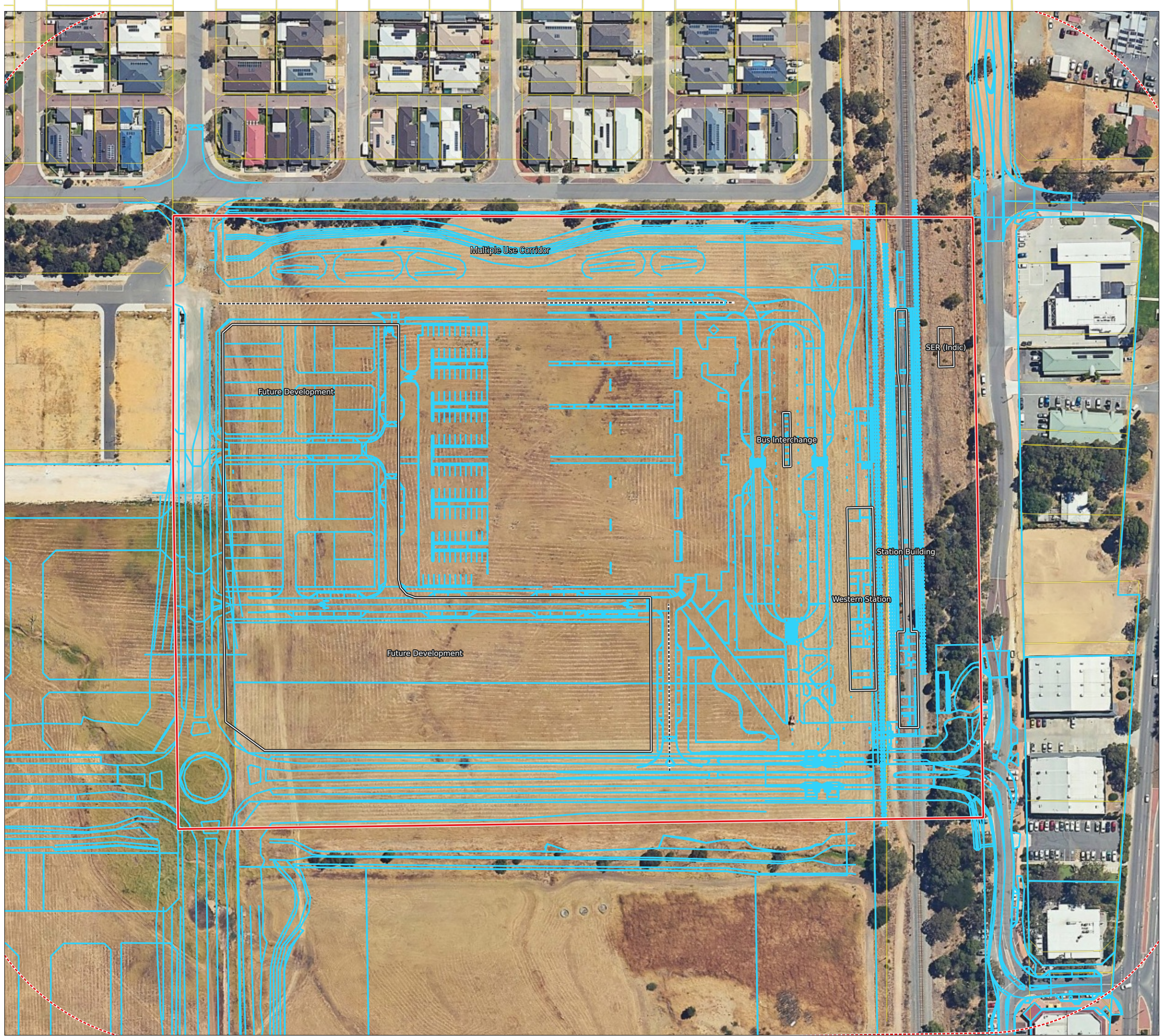
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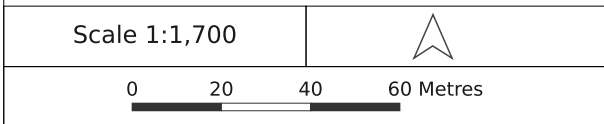
Figure 2: Site Overview

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Legend

- Proposed Development
- Public Road
- Building Outline
- Project Area
- Assessment Area
- 100m
- 150m
- Cadastre



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Figure 2: Site Overview (zoom)

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2.0 Environmental considerations

2.1 Native vegetation - modification and clearing

Much of the project area has been fully cleared of native vegetation, and is currently unmanaged shrubland regrowth or grassland. Some treed vegetation exists within the rail and road reserve directly to the east of the proposed station building, in addition to the south-east and north, while further away from proposed development, there are small forest plots within in localised drainage swales to the west and east. Some clearing of on-site vegetation is proposed to accommodate the proposed development, however the intent is to minimise tree clearing as much as practical.

A desktop assessment of publicly available environmental information has been conducted to identify any environmentally significant values within the project area and immediate surrounds that may be impacted by the proposed development. As demonstrated in Table 1, and by virtue of the site being largely cleared, there are no environmental values identified within or adjacent to the project area that are expected to be impacted by the development.

Linfire assumes that all relevant environmental and heritage studies and all required environmental approvals will be obtained prior to commencing any on-site vegetation modification or clearing required to construct the development or implement the onsite Asset Protection Zones.

Table 1: Summary of environmental values

Environmental value	Mapped as occurring within or adjacent to the project area		Description
	Within	Adjacent	
Environmentally Sensitive Area	✘	✘	The project area is not mapped as being within an Environmentally Sensitive Area (ESA). The nearest ESA is mapped as occurring approximately 300 m to the south-east of the project.
Swan Bioplan Regionally Significant Natural Area	✘	✘	The project area is not located within a Swan Bioplan Regionally Significant Natural Area.
Ecological linkages	N/A	N/A	This layer not publicly available at the time of document preparation.
Wetlands	✓	✓	The project area and adjacent land is mapped as Multiple Use wetland.
Waterways	✘	✘	No waterways or lakes have been formally identified within or adjacent to the project area.
Threatened Ecological Communities listed under the EPBC Act	✘ (?)	✘ (?)	This layer is currently publicly available at a very coarse level but suggests that Threatened Ecological Communities are unlikely to occur within the project area and in adjacent land, however this would require confirmation.
Threatened and priority flora	✘ (?)	✘ (?)	This layer is currently publicly available at a very coarse level but suggests that Threatened and Priority Flora are unlikely to occur within the project area and in adjacent land, however this would

Environmental value	Mapped as occurring within or adjacent to the project area		Description
	Within	Adjacent	
			require confirmation.
Fauna habitat listed under the EPBC Act	✓	✓	The project area and adjacent land is mapped as containing unconfirmed breeding areas for Carnaby's Black Cockatoo, but no other fauna habitats have been mapped
Threatened and priority fauna	✓ (?)	✓ (?)	This layer is currently publicly available at a very coarse level but suggests that Threatened and Priority Fauna potentially occur within the project area and in adjacent land, however this would require confirmation.
Bush Forever Site	✗	✗	No Bush Forever Area is mapped as occurring within or adjacent to the project area.
DBCA managed lands and waters (includes legislated lands and waters and lands of interest)	✗	✗	There are no DBCA managed or legislated land and waters within or adjacent to the project area.
Conservation covenants	✗	✗	No information has been provided by the Proponent regarding Conservation Covenants.
Aboriginal Heritage	✗	✓	The project area does not contain any Aboriginal Heritage Places. An 'Other Heritage Site' (ID 24991) is identified approximately 350 m to the south and south-west of the project area.
Crown Reserves	✗	✓	No Crown Reserves were identified within the project area. The nearest Crown Reserve is R 50666 to the north-west, within existing drainage swales.

2.2 Revegetation / Landscaping

A landscaping strategy has been developed for the proposed development across several scopes of work, which will accompany the DA submission.

The only proposed revegetation is to occur along proposed open drainage swales in the MUC in the northern part of the project area, although it is noted that the final revegetation extent and specification is yet to be finalised. On this basis, Linfire have assumed that revegetation in the swales will result in a Class A forest classification at maturity, which is consistent with existing swale regrowth to the west of Evans Way. While it is conservatively assumed that Class A forest is the mature vegetated state, should the design and/or ongoing management of the MUC drainage swale result in a different bushfire vegetation classification being applicable, the BAL impacts can be reviewed.

Landscaping within the station precinct itself will comprise a number of managed landscaping areas

including the following:

- Community space to the south and south-west of the station buildings, including the Welcome Gardens, Play Space, The Green and Bush Plaza areas, which are arranged as discrete areas consist of highly managed and irrigated landscaping with various non-vegetated play and recreation elements.
- Station precinct entrance landscaping to the south-east of the station building extending to the intersection of George Street and Clara Street. This is to consist of highly managed landscaping, which extends north along the rail reserve through the existing treed vegetation.
- Managed landscaping to the north of the Australind platform and bus interchange, along the Principle Shared Path and around the proposed water tank
- Managed landscaping along the northern verge of Access Road A and the MUC fringe
- Managed low threat landscaping within the carpark expansion area and within the median strips within the carpark
- Managed landscaping along all proposed public roads external to the precinct e.g. Clara Street, Evans Way and Sansimeon Boulevard

All the above landscaping is to be instated and managed as low threat vegetation which complies with provisions of *AS 3959-2018 Construction of buildings in bushfire prone areas* (AS 3959) Clause 2.2.3.2 (f) (see Appendix 3).

Following the implementation of the onsite landscaping as detailed above, sufficient permanent separation will exist from classified vegetation to the Western Station and bus interchange buildings such that no Asset Protection Zones are required to reduce BAL impacts.

Asset Protection Zones (APZs) are primarily required from habitable buildings which are exposed to unmanaged vegetation following completion of proposed onsite landscaping, and this only occurs to the north-east of the station building and around the SER building, which are exposed to unmanaged shrubland and forest vegetation from the north, east and south-east. Establishment and maintenance of nominated APZs will need to be in accordance with the APZ standards of the Guidelines (see Appendix 2) and AS 3959 Clauses 2.2.3.2 (e) and (f) (see Appendix 3).

This BMP assumes that the existing and proposed railway lines will be cleared and available prior to occupancy of the station, and that these will be maintained in a non-vegetated or low threat state for operation requirements. Additionally, the Future Development lot is also to be established and maintained in a non-vegetated or low threat state, until it is finally developed.

3.0 Bushfire assessment results

3.1 Assessment inputs

3.1.1 Vegetation classification

Linfire assessed classified vegetation and exclusions within 150 m of the project area through on-ground verification on 12 September 2022 in accordance with *AS 3959—2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016). Georeferenced site photos and a description of the vegetation classifications and exclusions, as they currently present, are contained in Appendix 1 and depicted in Figure 3 and Table 2.

The following vegetation classifications were identified during the site inspection within the project area and adjacent 150 m assessment area:

- Class A Forest
 - Within the existing rail reserve, to the north-east and south-east of the main station building, some which will be modified as part of the proposed landscaping strategy.
 - Within a narrow portion of George Street verge to the east of the project area, and while this might be modified and managed as part of future works, this BMP assumes it remains as currently presents.
 - Within existing drainage swales to the north and north-west of the project area, south of Evans Way and Padra Turn.
 - Within small, localised drainage swales to the east of George Street.
 - The revegetation of the MUC to the north of the carpark is also assumed to be Class A forest at maturity.
- Class C Shrubland
 - Occurs as regrowth vegetation to the north-east of the station building within the rail reserve.
 - Shrubland also extends further east into a narrow portion of George Street verge, and while this might be modified and managed as part of future works, this BMP assumes it remains as currently presents.
- Class G Grassland
 - Unmanaged grassland in previously cleared agricultural land, within and surrounding the project area, including the rail reserve to the south.

The project area and adjacent 150 m assessment area also contains land excluded from classification, including:

- vegetation that is more than 100 m from the proposed development area which is excluded under Clause 2.2.3.2 (a).
- existing non-vegetated areas and low threat vegetation including residential lots, roads and managed verges, cultivated gardens and the future rail alignment, excluded under Clauses 2.2.3.2 (e) and (f).
- areas of existing vegetation to be modified to non-vegetated areas and low threat vegetation as part of the proposed development in accordance with Clauses 2.2.3.2 (e) and (f) include:
 - the nominated APZs, which are to be managed in accordance with APZ standards of the Guidelines.

- areas of the station precinct that are not proposed for revegetation which are to be managed as non-vegetated elements or low threat vegetation (e.g. landscaping).

3.1.2 Effective slope

Linfire assessed effective slope under classified vegetation through on-ground verification on 12 September 2022 in accordance with AS 3959. Results were cross-referenced with Landgate 10 m contour data and are depicted in Table 2 and Figure 3.

Site observations indicate that land within the project area and adjoining 150 m assessment area is sloping from east to west, and is either predominantly flat/upslope or with a slight effective downslope of between 0-5° in relation to the project area.

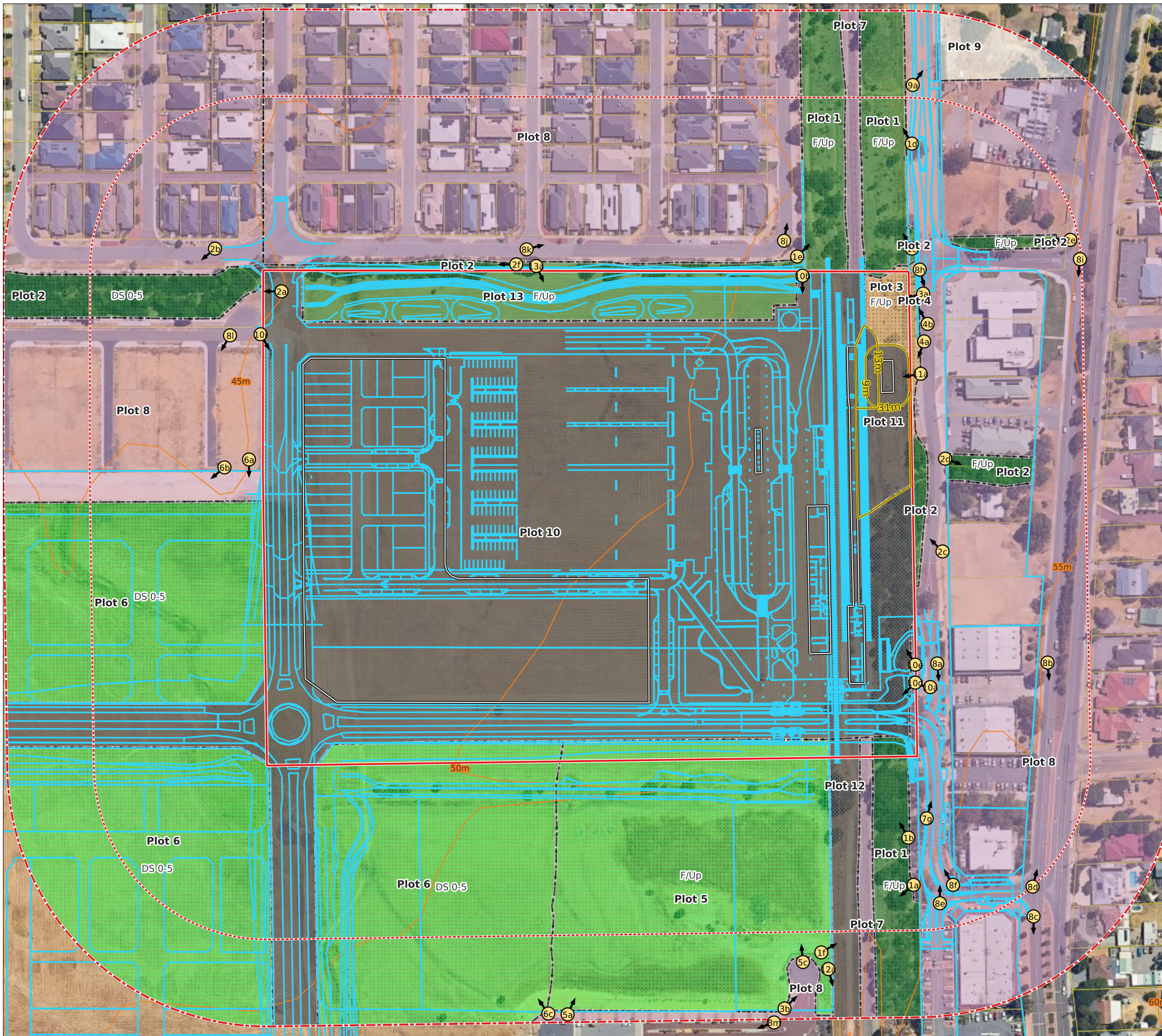
3.1.3 Summary of inputs

Table 2 illustrates the anticipated post-development vegetation classifications and exclusions following completion of development works and implementation of Asset Protection Zones and managed landscaping. The post-development vegetation classifications/exclusions and effective slope are summarised in Table 2.

















Table 2: Post-development vegetation classifications/exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Flat/upslope (0°)	Forest vegetation consisting of trees 10-30 m high with multi-layered shrubby understorey, located within the rail reserve.
2	Class A Forest	Flat/upslope (0°)	Forest vegetation consisting of trees 10-30 m high with multi-layered shrubby understorey, located within public road verges and drainage swales, outside the rail reserve.
3	Class C Shrubland	Flat/upslope (0°)	Shrubland vegetation (<2 m high) within the rail reserve
4	Class C Shrubland	Flat/upslope (0°)	Shrubland vegetation (<2 m high) within George Street verge, outside the rail reserve.
5	Class G Grassland	Flat/upslope (0°)	Unmanaged grassland >100 mm in height to the south of the project area.
6	Class G Grassland	Downslope >0–5°	Unmanaged grassland >100 mm in height to the south-west and west of the project area.
7	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated land along the existing railway line, in the rail reserve.
8	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated areas (e.g. buildings, paths, carpark, roads) and managed low threat landscaping (e.g. cultivated gardens and maintained lawns)

Vegetation plot	Vegetation classification	Effective slope	Comments
			within surrounding properties and lots. Includes currently cleared lots to the west and east, which appear to be maintained until future development.
9	Excluded – Clause 2.2.3.2 [a]	N/A	Vegetation further than 100 m from the project area.
10	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Land to be modified to non-vegetated state (buildings, paths, carpark, roads) or managed low threat landscaping, as part of the station development. This includes creation of onsite managed gardens around the station buildings and the new public roads proposed within, and around, the station precinct. Also includes the Future Development lot that are to be kept non-vegetated or in a low threat state until future development occurs.
11	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Land to be modified to non-vegetated state or managed low threat landscaping, within the Asset Protection Zone within the rail reserve, to the north-east of the station building.
12	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Land to be modified to non-vegetated state (or managed low threat landscaping) within the railway expansion works within the rail reserve (not included as part of DA). These works are expected to be conducted prior to the occupation of the station buildings.
13	Class A Forest	Flat/upslope (0°)	Future revegetation in northern MUC



Legend

-  Photo Location
-  Proposed Development
-  Contours
-  Building Outline
-  Project Area
- Assessment Area**
-  100m
-  150m
-  Cadastral
-  Vegetation Plot
- Classified Vegetation**
-  A. Forest
-  C. Shrubland
-  G. Grassland
-  Excluded Clause 2.2.3.2(a)
-  Excluded Clause 2.2.3.2(e&f)
-  Modified to non vegetated and low threat
-  Asset Protection Zone

Scale 1:2,100



0 30 60 90 Metres



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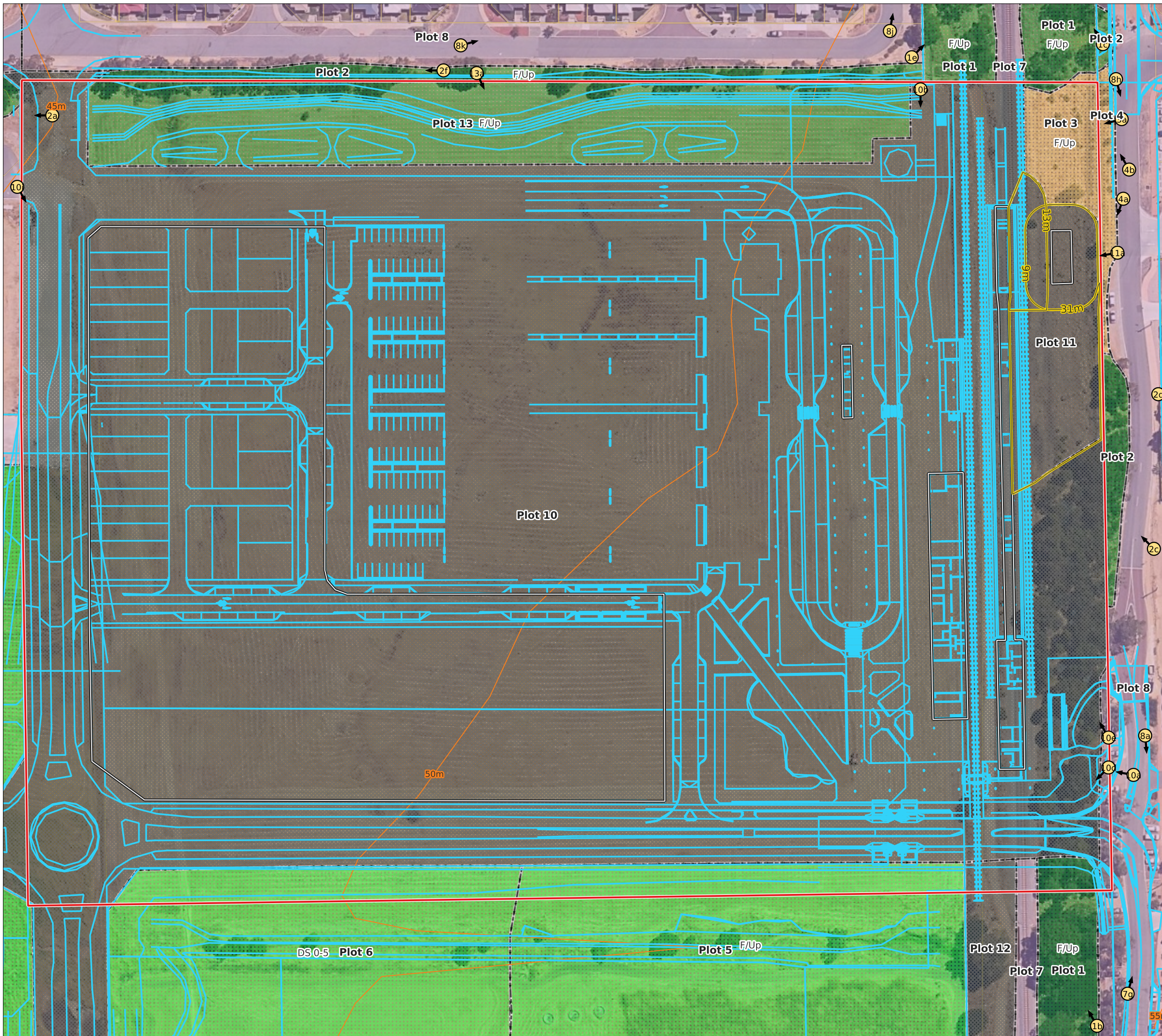
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Figure 3: Post-development vegetation and effective slope

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Legend

- Photo Location
- Proposed Development
- Contours
- Building Outline
- Project Area
- Assessment Area**
- 100m
- 150m
- Cadastral
- Vegetation Plot
- Classified Vegetation**
- A. Forest
- C. Shrubland
- G. Grassland
- Excluded Clause 2.2.3.2(e&f)
- Modified to non vegetated and low threat
- Asset Protection Zone

Scale 1:1,300

0 20 40 60 Metres

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Figure 3: Post-development vegetation and effective slope (zoom)

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3.2 Assessment outputs

3.2.1 Bushfire Attack Level (BAL) contour assessment

Linfire has undertaken a BAL contour assessment in accordance with Method 1 of AS 3959 for the project area (see Figure 4). The Method 1 procedure incorporates the following factors:

- state-adopted FDI 80 rating
- vegetation classification
- effective slope
- distance maintained between proposed development areas and the classified vegetation.

The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed future development and subsequently informs the standard of building construction and/or setbacks required for proposed habitable development to potentially withstand such impacts.

The BAL contours are based on:

- the vegetation classifications and effective slope observed at the time of inspection.
- consideration of the post-development conditions resulting from on-site clearing and landscaping and resultant exclusions and separation distances achieved in line with the development plan and Sections 2.2 and 3.1.1.
- ongoing management of on-site low-threat landscaping to enable exclusion as non-vegetated and low threat vegetation under Clauses 2.2.3.2 (e) and (f).
- proposed revegetation within open drainage swale within the MUC
- management of the Future Development lot to enable exclusion as non-vegetated and low threat vegetation under Clauses 2.2.3.2 (e) and (f).

The results of the BAL contour assessment for the current scenario are detailed in Table 3 and illustrated in Figure 4. Following implementation of low-threat/non-vegetated landscaping and Asset Protection Zones, the highest BAL applicable to the proposed habitable buildings and elements is BAL-29.

Table 3: BAL contour assessment results to proposed buildings and assets

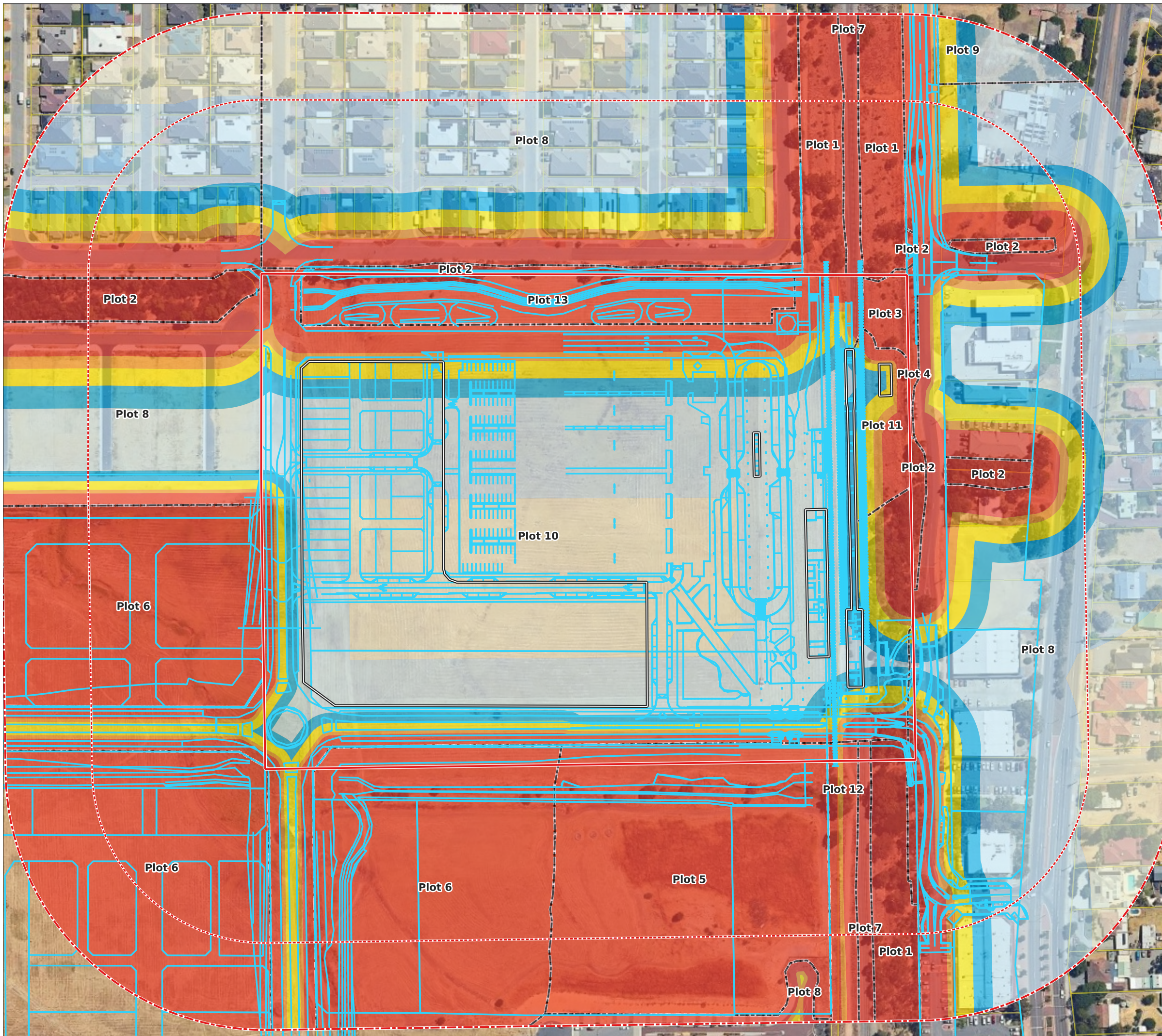
Method 1 BAL determination				
Plot	Vegetation classification	Effective slope	Separation distance	Highest BAL
1	Class A Forest	Flat/upslope (0°)	42 m	BAL-12.5
2	Class A Forest	Flat/upslope (0°)	26 m	BAL-29
3	Class C Shrubland	Flat/upslope (0°)	9 m	BAL-29
4	Class C Shrubland	Flat/upslope (0°)	10 m	BAL-29
5	Class G Grassland	Flat/upslope (0°)	34 m	BAL-12.5
6	Class G Grassland	Downslope >0-5°	>50 m	BAL-Low
7	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
8	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A

Method 1 BAL determination				
Plot	Vegetation classification	Effective slope	Separation distance	Highest BAL
9	Excluded – Clause 2.2.3.2 [a]	N/A	N/A	N/A
10	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
11	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
12	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
13	Class A Forest	Flat/upslope (0°)	38 m	BAL-19

Table 4 lists the BAL applicable to each individual building or element within the proposed development.

Table 4: BAL applicable to each building/element

Building / element	Initial BAL (no management)	Proposed vegetation management	Revised BAL
Station building	BAL-FZ	13 m to 31 m APZ to the north and north-east of the building, in combination with onsite low threat landscaping as proposed by landscaping strategy.	BAL-19
Signalling Equipment Room (SER) building	BAL-FZ	9 m APZ around perimeter of building, in combination with implementation of proposed development including onsite low threat landscaping as proposed by landscaping strategy.	BAL-29
Western Station building	BAL-12.5	Sufficient separation afforded from classified vegetation to achieve compliant BAL-29 impact, provided proposed development is implemented including onsite low threat landscaping as proposed by landscaping strategy.	BAL-12.5
Bus Interchange building	BAL-12.5		BAL-12.5



Legend

- Proposed Development
- Building Outline
- Project Area
- Assessment Area
- 100m
- 150m
- Cadastre
- Vegetation Plot
- BAL Contours
- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low

Scale 1:2,100



0 30 60 90 Metres



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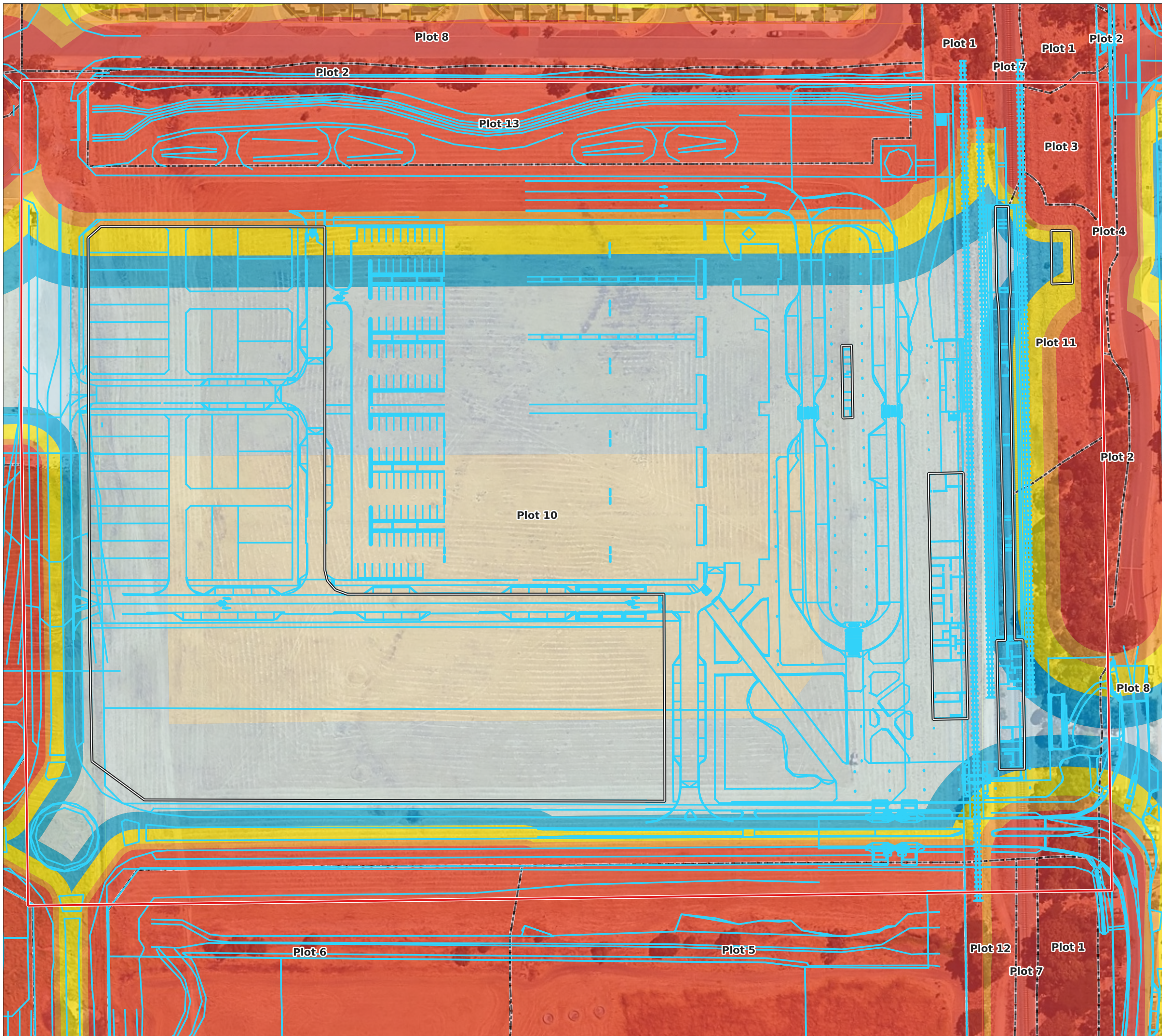
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Figure 4: BAL Contour Plan

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Legend

- Proposed Development
- Building Outline
- Project Area
- Assessment Area
- 100m
- 150m
- Cadastre
- Vegetation Plot
- BAL Contours
- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low

Scale 1:1,300



0 20 40 60 Metres



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Figure 4: BAL Contour Plan (zoom)

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4.0 Identification of bushfire hazard issues

4.1 Bushfire context

The project area is located within a predominantly built-up residential area in the centre of Byford townsite, with the nearest significant areas of remnant vegetation being within Brickwood Reserve and Briggs Park approximately 1 km south, as well as within Wugong Regional Reserve approximately 1.25 km to the east.

The nearest potential bushfire hazard is from isolated plots of forest and shrubland vegetation constrained in rail and road reserves or along distinct drainage lines to the north, east and south of the project area, while land to the south-west and west consists of vacant land that has been subject to historical clearing, so is now predominantly unmanaged grassland. Following completion of development, much of this vegetation will be modified to a non-vegetated or low threat state, with only minor amounts of forest and shrubland remaining post-development within in narrow plots, that are unlikely to achieve fully-developed bushfire behaviour.

There is still potential bushfire threat from unmanaged grassland to the south-west and south of the station precinct, where continuous fire runs could be up to 500 m which is sufficient to produce a steady state grassfire, however the proposed public roads and the design of the development is such that sufficient separation will be provided from proposed buildings by roads, onsite carparks and Future Development lot. It is also noted that the proposed public roads through this grassland, in addition to proximity to Byford townsite, will likely facilitate future development of some of these undeveloped areas which would eventually remove the grassland hazard, or at least significantly fragment it.

Based on the above, bushfire impact to the proposed development is expected to be limited to localised fire behaviour from isolated and narrow forest and shrubland vegetation that would be easily managed through a direct fire suppression response. Notwithstanding, the habitable elements of the station precinct will be further protected from potential bushfire impacts through the provision of APZs to achieve BAL-19 and separation afforded by the public road network and low threat/non-vegetated landscaping and will be voluntarily constructed to meet the assessed BAL rating, where practicable.

4.2 Bushfire hazard issues

Examination of the bushfire risk assessment (Section 3.0) has identified the following bushfire hazard issues:

1. Post-development in proximity to the proposed station building and SER building will result in these buildings being subject to potential impact from a fire occurring within the forest and shrubland type vegetation. Separation between the buildings and adjacent vegetation is required to be provided by APZs, low threat vegetation or permanent non-vegetated elements.
2. Appropriate vehicular access is required to the proposed development, to enable egress by onsite occupants and to facilitate access for the fire brigade and emergency services.
3. Access to a sufficient bushfire fighting water supply is required to limit travel times to water supplies for appliance refills.
4. The proposed development constitutes a vulnerable land use, due to the presence of the public who may not be familiar with the facility or what to do in a bushfire emergency, potential evacuation challenges associated with the station and platform design, need for provision of alternative transportation for passengers, and potential for occupants to have mobility or cognitive impairments.

4.3 Bushfire safety strategy

The following bushfire safety strategy is proposed to demonstrate compliance with the Bushfire Protection Criteria of the Guidelines and address the bushfire hazards identified above:

1. Create sufficient separation between proposed buildings and post-development classified vegetation, through use of appropriately sized APZs and/or onsite managed landscaping, to achieve BAL-29 or lower. Given the importance of the Station building and Western Station building, the decision has been made to implement voluntarily construct these buildings to the assessed BAL ratings (BAL-19 and BAL-12.5 respectively).
2. Provision of compliant vehicular access within, to and from the proposed development, consisting of public roads and private driveways, to enable occupant egress and facilitate firefighter access to the project area.
3. Provision of a secure bushfire fighting water supply through installation of the proposed on-site fire hydrant system to provide hydrant coverage to the station building. Static water tanks on the hydrant system will also enable refill of bushfire fighting appliances from the fire booster connection.
4. Ensure appropriate bushfire emergency management procedures are incorporated into the overarching PTA EMM, to enable onsite staff to appropriately manage a bushfire event impacting the proposed development including:
 - a. Monitoring of forecast Fire Danger Rating during bushfire season, and Total Fire Ban Days, to anticipate bushfire risk for the next day and consider pre-emptive actions.
 - b. Maintaining situational awareness during day in bushfire season by monitoring emergency services information
 - c. Emergency management procedures for bushfire events including ceasing train and bus services and evacuating the train station.

Based on the above, Linfire considers the bushfire hazards within and adjacent to project area and the associated bushfire risks are manageable through standard management responses outlined in the Guidelines. These responses will be factored into proposed development as early as possible at all stages of the planning process to ensure a suitable, compliant and effective bushfire management outcome is achieved for protection of future life, property and environmental assets.

5.0 Assessment against the bushfire protection criteria

5.1 Compliance table

An assessment against the bushfire protection criteria is provided in Table 5.

Table 5: Compliance with the bushfire protection criteria of the Guidelines

Bushfire protection criteria			Development response	
Performance Principle	Acceptable solutions	Planning Stage	Method of compliance	Proposed bushfire management measures
Element 1: Location				
<i>Intent: To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure</i>				
<p>Performance Principle P1</p> <p>The strategic planning proposal, subdivision and development application is located in an area where the bushfire hazard assessment is or will, on completion, be moderate or low, or a BAL-29 or below, and the risk can be managed.</p> <p>For unavoidable development in areas where BAL-40 or BAL-FZ applies, demonstrating that the risk can be managed to the satisfaction of the decision-maker.</p>	<p>A1.1 Development location</p> <p>The strategic planning proposal, subdivision and development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL-29 or below.</p>	All	Acceptable Solution	<p>The BAL contour map (see Figure 4) indicates that all proposed habitable buildings can be sited in an area of BAL-29 or lower, upon completion of development and implementation of the proposed Asset Protection Zones (APZs) and other onsite landscaping.</p> <p>The decision has been made to voluntarily incorporate the relevant AS 3959 construction measures into the Station building (and service enclosures) and the Western Station building, in accordance with the assessed BAL ratings (BAL-19 and BAL-12.5 respectively).</p>
Element 2: Siting and design of development				
<i>Intent: To ensure that the siting and design of development minimises the level of bushfire impact.</i>				
<p>Performance Principle P2</p> <p>The siting and design of the strategic planning proposal, subdivision or development application, including roads, paths and landscaping, is appropriate to the level of bushfire threat that applies to the site. The proposal incorporates a defensible space and significantly reduces the heat intensities at the building surface thereby minimising the bushfire risk to people, property and infrastructure, including compliance with AS 3959 if appropriate.</p>	<p>A2.1 Asset Protection Zone (APZ)</p> <p>Every habitable building is surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements:</p> <p>Width: Measured from any external wall or supporting post or column of the proposed building, and of sufficient size to ensure the potential radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29) in all circumstances.</p> <p>Location: the APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity (see explanatory notes)</p> <p>Management: the APZ is managed in accordance with the requirements of 'Standards for Asset Protection Zones' (see Guidelines Schedule 1).</p>	All	Acceptable Solution	<p>On completion of development, the non-vegetated elements and onsite landscaping proposed within the DA area (including new public roads), in addition to those existing in immediately adjoining properties and roads:</p> <ul style="list-style-type: none"> the Western Station building and bus interchange facilities building will be located in BAL-12.5 areas, and as such, don't require an Asset Protection Zone (APZ) to reduce the bushfire risk to an acceptable level. The Station building (including services enclosures on the platform) and the SER building will require APZs along the northern and north-eastern interfaces with unmanaged shrubland (as depicted on Figure 3), to reduce BAL impacts as follows: <ul style="list-style-type: none"> 13 m to 31 m APZ to achieve BAL-19 9 m APZ to achieve BAL-29 <p>The nominated APZs are to be implemented in accordance with Schedule 1 of the Guidelines (see Appendix 2). All proposed APZs are located within the station precinct bounds and are subject to ongoing maintenance by the Proponent.</p> <p>All proposed onsite landscaping within the project area, and outside the nominated APZs, is to be established and maintained by the Proponent in accordance with AS 3959 Clause 2.2.3.2 (f) (see Appendix 3).</p>
Element 3: Vehicular access				
<i>Intent: To ensure that the vehicular access serving a subdivision/ development is available and safe</i>				
<p>Performance Principle P3i</p> <p>The design and capacity of vehicular access and egress is to provide for the community to evacuate to a suitable destination before</p>	<p>A3.1 Public Roads</p> <p>The minimum requirements under this acceptable solution are applicable to all proposed and existing public roads.</p> <p>Public roads are to meet the minimum technical requirements in</p>	SP, Sb, Do	Acceptable Solution	<p>The proposed new public road network has been detailed in Section 1.1.4, with new public roads to be created as shown on Figure 1 and Figure 2. The two new public roads included in this DA, namely Access Road A and Plaza Road are at least 6 m wide and designated for two-way traffic, and will comply with the public road specifications from the Guidelines (see Appendix 4). Access Road B and any other public roads within the Future Development lot are</p>

Bushfire protection criteria			Development response	
Performance Principle	Acceptable solutions	Planning Stage	Method of compliance	Proposed bushfire management measures
a bushfire arrives at the site, allowing emergency services personnel to attend the site and/or hazard vegetation.	Table 6, Column 1. The trafficable (carriageway/pavement) width is to be in accordance with the relevant class of road in the Local Government Guidelines for Subdivisional Development (IPWEA Subdivision Guidelines), Liveable Neighbourhoods, Austroad standards and/or any applicable standards for the local government area.			not included in this DA, however would be expected to comply with the public road specifications, if they are to be gazetted public roads. All other roads within station precinct included in this DA (e.g. carpark, bus interchange and interconnection between Access Road A and Plaza Road) will be internal PTA roads compliant with the private driveway specifications. The existing public roads sighted during the inspection appeared compliant with public road specifications of the Guidelines and will be sufficient for emergency egress or firefighter access to the project area.
	<u>A3.2a Multiple access routes</u> Public road access is to be provided in two different directions to at least two different suitable destinations with an all-weather surface (two-way access). If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the road access is to be a maximum of 200 metres from the subject lot(s) boundary to an intersection where two-way access is provided. The no-through road may exceed 200 metres if it is demonstrated that an alternative access, including an emergency access way, cannot be provided due to site constraints and the following requirements are met: <ul style="list-style-type: none"> the no-through road travels towards a suitable destination; and the balance of the no-through road, that is greater than 200 metres from the subject site, is wholly within BAL-LOW, or is within a residential built-out area – Figure 23. 	SP, Sb, Do	<u>Acceptable Solution</u>	Following completion of the development, including the proposed new public roads (Access Road A and Plaza Road) and internal PTA roads within the station precinct as well as Evans Way, Clara Street and Sansimeon Boulevard, occupants can move through the station precinct and onto the public road network with the option of travelling to more than two different destinations: <ul style="list-style-type: none"> from the intersection of Access Road A with Evans Way, travel can be undertaken north along Evans into existing residential built-up area where egress is then available in multiple directions, or travel can be undertaken south on Evans Way to the new roundabout, where further travel is possible in all directions. From the intersection of Plaza Road and Clara Street, travel is possible east into Byford townsite, where travel is possible in multiple directions. In this regard, the proposed development is provided with at least two access routes which meets and exceeds the requirements of Acceptable Solution A3.2a. While not considered as part of this BMP, the development of the Future Development lot is likely to create additional access routes to, from and within the project area, which will supplement the access to the station precinct resulting from this DA. Additionally, the proposed new public roads (Evans Way, Clara Street and Sansimeon Boulevard) represent significant community benefit, by opening up previously undeveloped land, and creating a much more interconnected access network to existing and proposed development in the local area, which will be useful for existing residents and attending fire appliances, in a bushfire emergency.
	<u>A3.2b Emergency access way</u> <i>Where it is demonstrated that A3.2a cannot be achieved due to site constraints, or where an alternative design option does not exist, an emergency access way can be considered as an acceptable solution.</i> An emergency access way is to meet all the following requirements: <ul style="list-style-type: none"> requirements in Table 6, Column 2; provides a through connection to a public road; be no more than 500 metres in length; and must be signposted and if gated, gates must open the whole trafficable width and remain unlocked. 	SP, Sb, Do	<u>Not Applicable</u>	The proposed development does not require Emergency Access Ways (EAWs) to provide through access to a public road.
	<u>A3.3 Through roads</u> All public roads should be through-roads. No-through roads should be avoided and should only be considered as an acceptable solution where: <ul style="list-style-type: none"> it is demonstrated that no alternative road layout exists due to site constraints; and 	SP, Sb	<u>Acceptable Solution</u>	Following completion of the development, public road access to the station precinct will be provided by Evans Way, Clara Street and Sansimeon Boulevard, which will be interconnected to the existing public road network, and will form through roads compliant with A3.3. Within the station precinct, Access Road A and Plaza Road are public roads that are interconnected by the proposed internal road network within and to the east of the carpark, with Access Road A also continuing into the bus interchange. While both roads don't have a turning head, neither road actually terminates as is anticipated for a no-through road. There is

Bushfire protection criteria			Development response	
Performance Principle	Acceptable solutions	Planning Stage	Method of compliance	Proposed bushfire management measures
	<ul style="list-style-type: none"> the no-through road is a maximum length of 200 metres to an intersection providing two-way access, unless it satisfies the exemption provisions in A3.2a of this table. <p>A no-through road is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements of a public road (Table 6, Column 1); and turn-around area as shown in Figure 24 			a direct interconnection between the two public roads immediately east of the carpark, which is a 6 m wide, two-way road that is essentially compliant with the public road specifications anyway. On this basis, while the proposed public roads are not terminated with a turning head, the interconnected network with proposed internal PTA roads can be considered to represent a compliant through road arrangement suitable to avoid extended single direction travel, and therefore compliant with A3.3.
<p><u>Performance Principle P3ii</u></p> <p>The internal layout, design and construction of public and private vehicular access and egress in the subdivision / development allow emergency and other vehicles to move through it safely and easily.</p> <p>The design of vehicular access and egress provides:</p> <ul style="list-style-type: none"> access and egress for emergency service vehicles while allowing the community to evacuate; a defensible space for emergency services personnel on the interface between classified vegetation and development site; and hazard separation between classified vegetation and the subject site to reduce the potential radiant heat that may impact a lot(s). 	<p><u>A3.4a Perimeter Roads</u></p> <p>A perimeter road is a public road and should be provided for greenfield or infill development where 10 or more lots are being proposed (including as part of a staged subdivision) with the aim of:</p> <ul style="list-style-type: none"> separating areas of classified vegetation under AS3959, which adjoin the subject site, from the proposed lot(s); and removing the need for battle-axe lots that back onto areas of classified vegetation. <p>A perimeter road is to meet the requirements contained in Table 6, Column 1.</p> <p>A perimeter road may not be required where:</p> <ul style="list-style-type: none"> the adjoining classified vegetation is Class G Grassland; lots are zoned for rural living or equivalent; it is demonstrated that it cannot be provided due to site constraints; or all lots have frontage to an existing public road 	SP, Sb	<u>Not Applicable</u>	Perimeter road access is not required to be addressed at this planning stage, however it is noted that upon completion, the station precinct will have public roads providing separation from unmanaged vegetation on almost all interfaces, other than a narrow plot to the north, within the rail reserve. On this basis, the intent of A3.4a is considered to be met by the proposal.
<p><u>Performance Principle P3iii</u></p> <p>Vehicular access is provided which allows:</p> <ul style="list-style-type: none"> access and egress for emergency service vehicles; defensible space for emergency services personnel on the interface between classified vegetation and development; and hazard separation between classified vegetation and the site to reduce the potential radiant heat that may impact a lot(s). 	<p><u>A3.4b Fire service access route</u></p> <p><i>Where proposed lots adjoin classified vegetation under AS3959, and a perimeter road is not required in accordance with A3.4a, a fire service access route can be considered as an acceptable solution to provide firefighter access, where access is not available, to the classified vegetation.</i></p> <p>A fire service access route is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements in Table 6, Column 3; be through-routes with no dead-ends; linked to the internal road system at regular intervals, every 500 metres; must be signposted; no further than 500 metres from a public road; if gated, gates must open the required horizontal clearance and can be locked by the local government and/or emergency services, if keys are provided for each gate; and turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 metres. 	SP, Sb	<u>Not Applicable</u>	The proposed development does not require fire service access routes (FSARs) to achieve fire brigade access within and around the perimeter of the project area.
<p><u>Performance Principle P3iv</u></p> <p>Vehicular access is provided which allows emergency service vehicles to directly access all habitable buildings and water</p>	<p><u>A3.5 Battle-axe access legs</u></p> <p><i>Where it is demonstrated that a battle-axe cannot be avoided due to site constraints, it can be considered as an acceptable solution.</i></p> <p>There are no battle-axe technical requirements where the point the</p>	Sb	<u>Not applicable</u>	No battle-axe legs are proposed as part of the development and the project area is not serviced by an existing battle-axe.

Bushfire protection criteria			Development response	
Performance Principle	Acceptable solutions	Planning Stage	Method of compliance	Proposed bushfire management measures
supplies and exit the lot without entrapment	<p>battle-axe access leg joins the effective area of the lot, is less than 50 metres from a public road in a reticulated area.</p> <p>In circumstances where the above condition is not met, or the battle-axe is in a non-reticulated water area, the battle-axe is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements in Table 6, Column 4; and passing bays every 200 metres with a minimum length of 20 metres and a minimum additional trafficable width of two metres (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum six metres) 			
	<p><u>A3.6 Private driveways</u></p> <p>There are no private driveway technical requirements where the private driveway is:</p> <ul style="list-style-type: none"> within a lot serviced by reticulated water; no greater than 70 metres in length between the most distant external part of the development site and the public road measured as a hose lay; and accessed by a public road where the road speed limit is not greater than 70 km/h. <p>In circumstances where all of the above conditions are not met, or the private driveway is in a non-reticulated water area, the private driveway is to meet all the following requirements:</p> <ul style="list-style-type: none"> requirements in Table 6, Column 4; passing bays every 200 metres with a minimum length of 20 metres and a minimum additional trafficable width of two metres (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum six metres); and turn-around area as shown in Figure 28 and within 30 metres of the habitable building. 	Dd, Do	Acceptable Solution	<p>On completion of the development, the proposed internal PTA road network will comprise the following:</p> <ul style="list-style-type: none"> the two-way road connecting Access Road A to Plaza Road, the one-way road that loops through the Kiss 'n' Ride area the one-way road from the termination of Access Road A that loops through the bus interchange all internal access roads within the carpark. <p>The internal PTA road network will be constructed in accordance with technical requirements of the Guidelines for private driveways (see Appendix 4). Most proposed internal roads, including those in the carpark, will be at least 6 m in width, with the only exceptions being:</p> <ul style="list-style-type: none"> the loop road in the bus interchange which is 4 m wide in the long ends of the loop road, but widens to at least 8 m wide at the ends of the loop. The 4 m wide section is only 130 m long, and the widening at the ends would enable some room for overtaking, especially at the northern end. It is noted that this road is only for one-way use, and there is a specifically nominated parking space for DFES appliances near the booster connection on the eastern side of the loop road. the access road to the Kiss 'n' Ride area, which is 4 m wide and 100 m long, but is only for one-way access. <p>Based on the above, given the extent of 4 m sections of internal road is less than 200 m long, no passing bays are required within the development to achieve a compliance with the private driveway specifications. Similarly compliant turning arrangements are provided through loop roads and no dead-ends are proposed, and firefighting water supply around the proposed buildings is expected to be provided by the onsite fire hydrant system.</p> <p>Keys to any locked access gates are to be made available to onsite PTA staff and to local DFES brigades, to enable them to be unlocked in an emergency.</p>
Element 4: Water				
<i>Intent: To ensure that water is available to enable people, property and infrastructure to be defended from bushfire</i>				
No Performance Principle Applies	<u>A4.1 Identification of future water supply</u>	SP	Not applicable	Not applicable to this planning stage
<p><u>Performance Principle P4</u></p> <p>The subdivision, development or land use is provided with a permanent and secure water supply that is sufficient for firefighting purposes.</p> <p>Provide a permanent water supply that is:</p> <ul style="list-style-type: none"> sufficient and available for firefighting purposes; 	<p><u>A4.2 Provision of water for firefighting purposes</u></p> <p>Where a reticulated water supply is existing or proposed, hydrant connection(s) should be provided in accordance with the specifications of the relevant water supply authority. Where these specifications cannot be met, then the following applies:</p> <ul style="list-style-type: none"> The provision of a water tank(s), in accordance with the requirements of Schedule 2; and Where the provision of a strategic water tank(s) is applicable, 	Sb, Dd, Do	Acceptable Solution	<p>The proposed development is located within an existing reticulated area, with the nearby street hydrants being located on Amadan Court to the west, Evans Way and other public roads to the north, Bushman Glide to the south, and South Western Highway to the east. Additional street hydrants are also proposed along the new public roads (Evans Way, Clara Street and Sansimeon Boulevard) as part of these DA works.</p> <p>Whilst the project area is located near these existing and proposed street hydrants, the main bushfire fighting water supply is likely to be accessed from the dedicated fire hydrant system proposed for the development.</p>

Bushfire protection criteria			Development response	
Performance Principle	Acceptable solutions	Planning Stage	Method of compliance	Proposed bushfire management measures
<ul style="list-style-type: none"> constructed from non-combustible materials (e.g. steel), or able to maintain its integrity throughout a bushfire; and <p>accessible, with legal access for maintenance and re-filling by tankers and emergency service vehicles</p>	<p>then the following requirements apply:</p> <ul style="list-style-type: none"> land to be ceded free of cost to the local government for the placement of the tank(s); the lot or road reserve where the tank is to be located is identified on the plan of subdivision; tank capacity, construction, and fittings, provided in accordance with the requirements of Schedule 2; and a strategic water tank is to be located no more than 10 minutes from the subject site (at legal road speeds). <p>Where a subdivision includes an existing habitable building(s) that is to be retained, a water supply should be provided to this existing habitable building(s), in accordance with the requirements listed above.</p>			<p>The proposed development is to have an on-site fire hydrant system, designed, installed and maintained in accordance with the National Construction Code and relevant Australian Standards.</p> <p>The fire hydrant system is expected to include dedicated firewater storage tanks and duty/standby within the Western Station building, and a booster connection situated near the dedicated DFES appliance bay in the bus interchange, which is serviced by the internal loop road. Onsite fire hydrants will be sited throughout the development and will provide attending fire fighters with fire hydrant coverage of the railway station, including the platform.</p> <p>Given the onsite water storage (and infill) associated with the proposed wet fire systems, and the numerous existing and proposed street hydrants along public roads, the addition of any further firewater storage for bushfire fighting purposes is not considered necessary in this instance. Notwithstanding, the static firewater supply will be available for attending firefighters from the firewater storage tanks, via the booster connection. Appliance turnaround will be achieved using the loop road within the bus interchange.</p> <p>The firewater tank/s are to be installed, filled and maintained for the life of the project by the Proponent.</p>

* **Applicable Planning Stages** (SP - Strategic planning and structure plan where lot layout is unknown; Sb - Structure plan where lot layout is known and subdivision application; Dd – Development application for a single dwelling, ancillary dwelling or minor development; Do – Development application for any other development)

5.2 Bushfire management measures

The following bushfire management measures are required to be implemented by this BMP, and inform ongoing planning and building stages of the development, as well as increase the level of bushfire risk mitigation across the site. Where possible, these have been depicted on Figure 5.

5.2.1 *Vegetation modification and management*

The BAL contour assessment is reliant on all landscaping and revegetation being implemented in accordance with the endorsed Landscape Plan and in accordance with provisions with this BMP, including the following:

- Asset Protection Zones
- Onsite managed low threat landscaping
- Road verge fuel management
- Railway line vegetation management
- Onsite MUC revegetation
- Future Development lot

The establishment of the vegetation modification requirements, and all ongoing management, is to be conducted in accordance with this BMP, which is enforceable under the Shire firebreak notice (see Appendix 5).

5.2.1.1 Asset Protection Zones

Asset Protection Zones (APZs) have been nominated where proposed habitable buildings would be exposed to unmanaged vegetation following the completion of proposed onsite landscaping, to ensure sufficient separation is maintained commensurate with the required BAL impact. The following APZs will be required:

- **Station building (including service enclosures):** 13 m to 31 m wide APZ extending from the external walls, to the north and north-east as depicted on Figure 3, to achieve BAL-19 impact on the building.
- **SER building:** 9 m wide APZ extending from the external walls, around the entire perimeter of the building as depicted on Figure 3, to achieve BAL-29 impact on the building.

The nominated APZs are to be either non-vegetated surfaces, or managed vegetation compliant with Schedule 1 of the Guidelines (see Appendix 2), which can include slashing vegetation to less than 100 mm in height.

All nominated APZs are subject to regular ongoing management by the Proponent to ensure compliance in perpetuity, especially during bushfire season,

5.2.1.2 Onsite low threat landscaping

Landscaping within the station precinct itself will comprise a number of managed landscaping areas including the following:

- Community space (south and south-west of the station buildings)
 - Includes the Welcome Gardens, Play Space, The Green and Bush Plaza areas
 - These are arranged as discrete areas separated by pathways, and consist of highly managed and irrigated landscaping with various non-vegetated play and recreation elements.

- Station precinct entrance landscaping (south-east and east of the station building)
 - Consists of highly managed landscaping focussed on retention of existing trees within discrete beds, especially at the intersection of George Street and Clara Street, with hardscaping provided for pedestrian access.
 - Landscaping extends further north along the rail reserve, through the existing treed vegetation, where the focus has been on tree retention but with a highly managed understorey as follows:
 - Understorey vegetation to be completely removed and replaced with mulch, gravel or similar approved treatment.
 - Trees are to be underpruned to 2m AGL
 - All tree trunks are to be pruned to avoid overhanging the railway line
- Managed landscaping to the north of the Australind platform and bus interchange, along the Principle Shared Path and around the proposed water tank
 - Consists of managed landscaping with a focus on provision of some trees for screening purposes, however the understorey vegetation is to be limited to treatments such as mulch or gravel, or use of very low groundcovers (<300 mm high).
- Managed landscaping along the northern verge of Access Road A and into the MUC area
 - Consists of managed road verge trees and also managed low threat landscaping within the MUC area, to the extent depicted on Figure 3.
 - This managed landscaping is critical to ensure 21 m separation is achieved from Class A forest within the MUC swale, to the Future Development lot.
- Managed low threat landscaping within the median strips within the carpark
 - This landscaping is restricted to linear plots separated by non-vegetated carparking and roads, and will consist of trees in rows along the median strip, with an understorey of low groundcover species (<500 mm high).
- Managed low threat landscaping within the carpark expansion area
 - This area is to be landscaped on a temporary basis, until there is a need for expansion of the carpark at some future date. Notwithstanding, this area needs to be kept in a low threat or non-vegetated state, to avoid BAL-40/FZ impacts on any of the Future Development lot.
 - Will largely consist of managed gardens and low threat landscaping, however a row of trees proposed along the western extent of this area, where they will become future road verge trees once development occurs in the adjacent lot/s.
 - The understorey vegetation beneath these trees is to be limited to treatments such as mulch or gravel, or use of very low groundcovers (<300 mm high).
- Managed landscaping along proposed public roads is addressed in Section 5.2.1.3.

All the above landscaping is to be instated and managed as low threat vegetation which complies with provisions of *AS 3959-2018 Construction of buildings in bushfire prone areas* (AS 3959) Clause 2.2.3.2 (f) (see Appendix 3).

Implementation of the landscaping is to be undertaken by the Proponent, with ongoing management in low threat condition to be by the Proponent, unless agreed by the Shire that they will assume responsibility for the management of any specific areas.

Following the implementation of the onsite landscaping as detailed above, sufficient permanent separation will exist from classified vegetation to the Western Station and bus interchange buildings such that no Asset Protection Zones are required to reduce BAL impacts.

5.2.1.3 Road verge fuel management

Existing and proposed public road verges that have been excluded as low threat are to be managed to ensure the understorey and surface fuels remain in a low threat, minimal fuel condition in accordance with Clause 2.2.3.2 (f) of AS 3959 (see Appendix 3).

The proposed landscaping for the new public roads (e.g. Access Road A, Plaza Road, Clara Street, Evans Way and Sansimeon Boulevard) is to be primarily street trees arranged in linear rows, with understorey treatments to be very low understorey plantings or mulch/gravel etc. The rows of street trees are isolated in discrete beds, that are typically separated from other landscaping or vegetation by non-vegetated roads or paths.

Ongoing management of proposed public road verges is the responsibility of the Proponent, until handed over to the Shire, with management of any existing road verges to continue to be the responsibility of the Shire.

It is noted that several narrow plots of unmanaged vegetation exist in George Street verge directly to the east of the project area, which may be modified and managed as part of future works. This BMP has not assumed that this will occur, and that the forest and shrubland vegetation will remain as it currently presents, however should further landscaping design works occur over the George Street verge adjacent to the project area, such that classified vegetation would be modified and manage in a low threat state (or permanently removed), the BAL impacts and required separation distances can be reviewed by a BPAD Level 3 practitioner.

5.2.1.4 Railway line vegetation management

This BMP assumes that the existing and proposed railway lines will be cleared prior to occupancy of the station, and that these will be maintained in a non-vegetated or low threat state for operational requirements, on an ongoing basis.

5.2.1.5 Onsite MUC Revegetation

Proposed MUC revegetation to the north of the carpark and Future Development lot is assumed to be established as a Class A forest vegetation structure (as per AS 3959), which is similar to the state of the existing drainage swale further to the west, and the extent of this revegetation is to align with that depicted on Figure 3. It is particularly important that any forest revegetation of the MUC is to be kept at least 21 m from the proposed Future Development lot, to avoid any BAL-40/FZ impact on these future lots. The provision of the MUC revegetation, and ongoing management of its extent (i.e. to avoid future BAL-40/FZ impacts on adjacent development), is to be responsibility of the Proponent.

While it is assumed that the MUC will become Class A forest, should the design and/or ongoing management of the MUC drainage swale result in a different vegetation classification, the BAL impacts and required separation distances can be reviewed by a BPAD Level 3 practitioner.

5.2.1.6 Future Development Lot

The Future Development lot (including future roads) are to be established and maintained in a non-vegetated and/or low threat state by the Proponent, until sale of the lot/s, at which time the ongoing maintenance will be the responsibility of the future landowner.

5.2.2 Building construction standards

The proposed development does not include any Class 1, 2, or 3 residential buildings and associated Class 10a structures, and as such, there is no statutory requirement for proposed buildings to meet the construction requirements of AS 3959.

However, in recognition for the importance of the proposed infrastructure and potential bushfire risk to the project area, limited as it is, the Proponent has agreed to voluntarily incorporate the relevant AS 3959 construction measures where practical for buildings of this nature, into the following in accordance with the assessed BAL ratings:

- Station building (and service enclosures) to BAL-19 construction
- Western Station building to BAL-12.5 construction.

5.2.3 Vehicular access

Vehicular access is to comply with the bushfire Guidelines (detailed in Appendix 4) as follows:

- New public roads are to comply with the public road specifications, including the requirements of Table 6, Column 1 from the Guidelines
- New internal PTA roads (i.e. not gazetted public roads) are to comply with the private driveway specifications, including the requirements of Table 6, Column 4 from the Guidelines.

Keys to any locked access gates are to be made available to onsite PTA staff and to local DFES brigades, to enable them to be unlocked in an emergency.

5.2.3.1 Staging of access

If development (and therefore construction of vehicular access) is to occur on a staged basis, vehicular access arrangements will need to ensure that all occupiers and visitors are provided with compliant access at all stages. This can be achieved via construction of access in advance of stages or through provision of temporary compliant vehicular access including use of compliant temporary no-through roads and/or Emergency Access Ways, should it be required.

5.2.4 Vulnerable land use and recommended development condition

The proposed development constitutes a vulnerable land use. On this basis, a Bushfire Emergency Evacuation Plan (BEEP) is required to address the requirements of Policy Measure 6.6.1 of SPP 3.7.

The preference is that the BEEP is not prepared at this time but is included as a future implementation measure within this BMP and conditioned as part of the DA approval. Instead of producing a standalone BEEP for the station, the ideal approach is to incorporate the proposed bushfire emergency management arrangements for this station into the existing PTA Emergency Management Manual (EMM) to standardise the procedures. To achieve this, there is a significant liaison process to be undertaken with PTA and given occupation of the station by vulnerable occupants (i.e the public) is to be in 2024, there is considerable time to define these arrangements.

Based on the above, the following is proposed:

- The preparation, endorsement, and implementation of the bushfire emergency management arrangements (preferably within the PTA EMM) is specifically nominated as a condition of development approval (see Section 5.2.4.1)
- The bushfire emergency management arrangements consider the proposed philosophies outlined in Section 5.2.4.2, which have been included to provide some guidance about the overall strategy.

5.2.4.1 Recommended development condition

The following condition is recommended for the development application approval (subject to WAPC wording):

Bushfire emergency management procedures, detailing the management of vulnerable occupants

at the proposed station, is to be prepared, endorsed by WAPC and implemented prior to occupation by any vulnerable occupants (i.e. the public). The proposed emergency management procedures will preferably be incorporated into the overarching PTA Emergency Management Manual (EMM) as standardised procedures, however it may also be documented within a standalone BEEP for the station that is aligned with the EMM.

5.2.4.2 Indicative Bushfire Emergency Management Procedures

It is expected that the bushfire emergency management procedures or arrangements would consider the following, to be incorporated into the PTA EMM (or a standalone BEEP that aligns with the EMM):

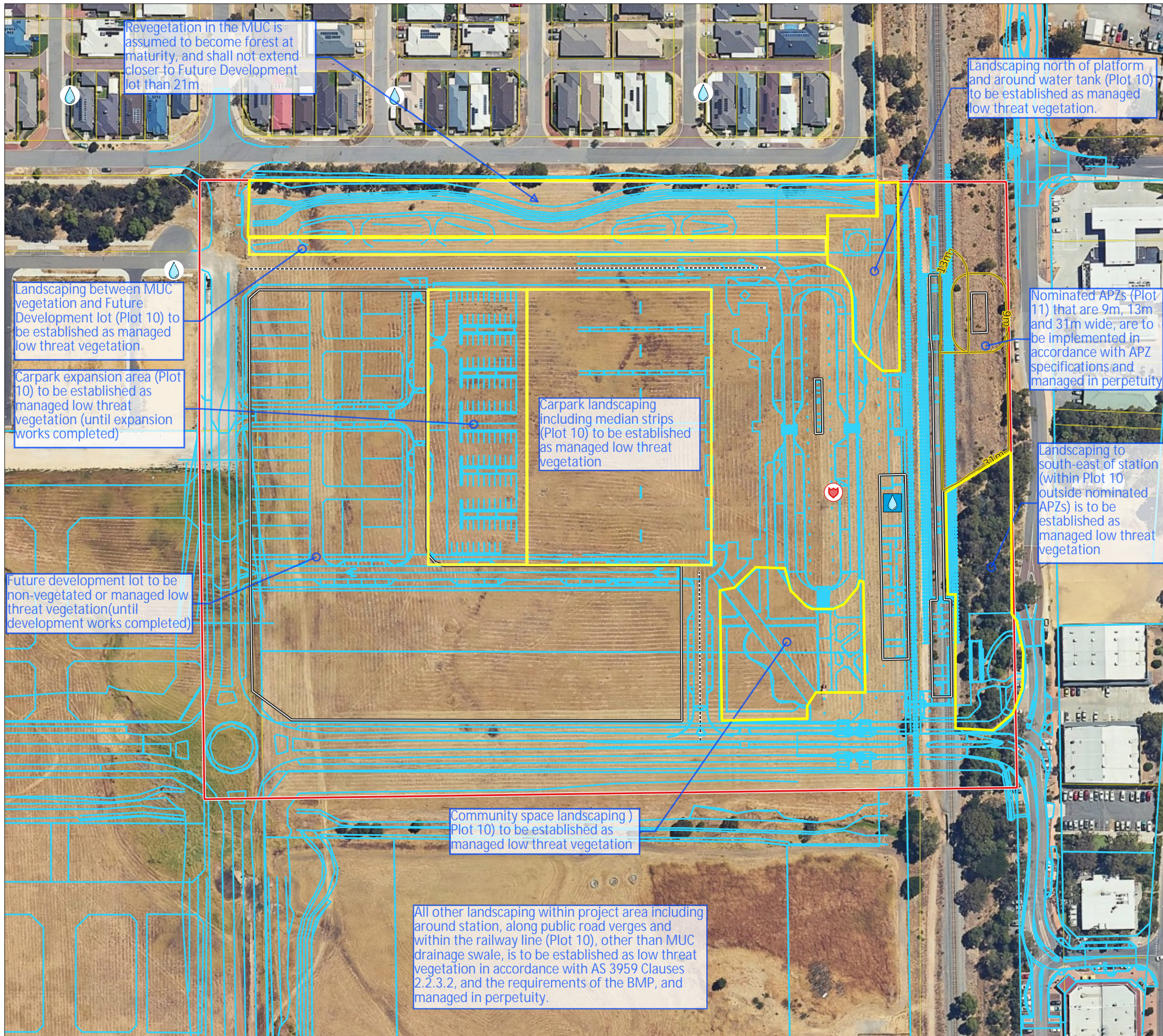
- Monitor the forecast Fire Danger Rating (FDR) each day (at 4pm) to enable consideration of any pre-emptive actions including
 - Heighten alertness for staff and public, including warnings when FDR is Extreme or Catastrophic
 - Consider adding extra staff to manage a bushfire emergency
 - Buses on standby for evacuation
 - DFES liaison
- Consider similar pre-emptive actions to the above, when a Total Fire Ban is declared and ensure no hot works or no other activities that may start a fire are conducted.
- Monitor emergency services information during the day (especially during bushfire season or days with elevated FDR) and conduct regular visual assessments, to maintain situation awareness during these days.
- Consider triggers for:
 - Alerting DFES
 - Ceasing train and bus services to train stations
 - Evacuating train station
 - This above would likely be station specific triggers
- Consider using Transperth buses for offsite evacuation of occupants
- Otherwise utilising the existing relevant PTA emergency management procedures and infrastructure as much as possible from the EMM, to manage bushfire emergencies.
- Ensure sufficient training for staff and regular exercise drills are conducted

5.2.5 BAL compliance and/or BAL assessment report

A BAL compliance and/or BAL assessment report may be prepared at the discretion of the City following completion of construction works and prior to issue of certificate of occupancy to validate and confirm the accuracy of the BAL contour assessment.

5.2.6 Compliance with annual firebreak notice

The Proponent or landowner is to comply with the current Shire of Serpentine-Jarrahdale annual firebreak notice as amended (refer Appendix 5).



Revegetation in the MUC is assumed to become forest at maturity, and shall not extend closer to Future Development lot than 21m

Landscaping north of platform and around water tank (Plot 10) to be established as managed low threat vegetation.

Landscaping between MUC vegetation and Future Development lot (Plot 10) to be established as managed low threat vegetation

Carpark expansion area (Plot 10) to be established as managed low threat vegetation (until expansion works completed)

Carpark landscaping including median strips (Plot 10) to be established as managed low threat vegetation

Nominated APZs (Plot 11) that are 9m, 13m and 31m wide, are to be implemented in accordance with APZ specifications and managed in perpetuity

Landscaping to south-east of station (within Plot 10 outside nominated APZs) is to be established as managed low threat vegetation

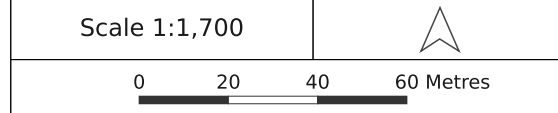
Future development lot to be non-vegetated or managed low threat vegetation (until development works completed)

Community space landscaping (Plot 10) to be established as managed low threat vegetation

All other landscaping within project area including around station, along public road verges and within the railway line (Plot 10), other than MUC drainage swale, is to be established as low threat vegetation in accordance with AS 3959 Clauses 2.2.3.2, and the requirements of the BMP, and managed in perpetuity.

Legend

- Street Hydrant
- Mitigation Measures**
- Onsite Fire Hydrant System Infrastructure
- Fire Booster
- Proposed Development
- Public Road
- Building Outline
- Project Area
- Cadastre
- Asset Protection Zone




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Public Transport Authority
 Metronet - Byford Station Precinct

Figure 5: Bushfire Management Measures

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6.0 Responsibilities for implementation and management of the bushfire measures

Implementation of the BMP applies to the Proponent and Shire to ensure bushfire management measures are adopted and implemented on an ongoing basis. A bushfire responsibilities table is provided in Table 6 to drive implementation of all bushfire management works associated with this BMP.

Table 6: Responsibilities for implementation and management of the bushfire measures

Implementation/management table	
<i>Decision maker – prior to development approval</i>	
No.	Implementation action
1a	Condition the preparation of the Bushfire Emergency Management Procedures for the station prior to occupation as part of the development approval
<i>Proponent – prior to development occupation</i>	
No.	Implementation action
2a	Establish the Asset Protection Zones (APZs) around nominated buildings to the dimensions and standards stated in the BMP (see Section 5.2.1.1) and Appendix 2.
2b	Establish low threat landscaping throughout the project area and along public roads, in accordance with provisions of this BMP (see Section 5.2.1.2 including: <ul style="list-style-type: none"> • Community space (south and south-west of the station buildings) including Welcome Gardens, Play Space, The Green and Bush Plaza areas. • Station precinct entrance landscaping (south-east and east of the station building) at the intersection of George Street and Clara Street, and north along the rail reserve, through existing treed area. • Managed landscaping to the north of the Australind platform and bus interchange, along the Principle Shared Path and around the proposed water tank • Managed landscaping along the northern verge of Access Road A and into the MUC area • Managed low threat landscaping within the median strips within the carpark • Managed low threat landscaping within the carpark expansion area
2c	Establish low threat landscaping along all proposed public roads in accordance with provisions of this BMP (see Section 5.2.1.3)
2d	Ensure the new railway lines are cleared to be in a non-vegetated state in accordance with this BMP (see Section 5.2.1.4).
2e	Establish MUC revegetation to the standard and extent stated within this BMP (see Section 5.2.1.5), including being no closer than 21 m to the Future Development lot (assuming Class A forest revegetation).
2f	Establish the Future Development lot in either a non-vegetated state, or as managed low threat landscaping, in accordance with this BMP (see Section 5.2.1.6)
2g	Construct the public road network to the relevant technical requirements under the Guidelines (refer to Appendix 4).
2h	Construct the private internal PTA road network to the relevant technical requirements under the Guidelines (refer to Appendix 4).
2i	Construct proposed onsite fire hydrant system for the proposed development as stated in this BMP.
2j	Incorporate AS 3959 BAL-19 construction measures for the Station building (and services enclosures) and BAL-12.5 construction measures for the Western station building, where practical for buildings of this nature.
2k	Develop the Bushfire Emergency Management Procedures for the station, ideally incorporated into

Implementation/management table	
	the PTA EMM, as documented in this BMP
2l	Comply with the Shire of Serpentine-Jarrahdale annual firebreak notice issued under s33 of the Bush Fires Act 1954.
2m	If required by the City, individual BAL assessment prior to issuing of building permits.
Proponent – ongoing	
<i>No.</i>	<i>Implementation action</i>
3a	Maintain the Asset Protection Zones (APZs) around nominated buildings to the dimensions and standards stated in the BMP (see Section 5.2.1.1) and Appendix 2.
3b	Maintain low threat landscaping throughout the project area in accordance with provisions of this BMP
3c	<p>Maintain low threat landscaping throughout the project area, in accordance with provisions of this BMP (see Section 5.2.1.2) including:</p> <ul style="list-style-type: none"> • Community space (south and south-west of the station buildings) including Welcome Gardens, Play Space, The Green and Bush Plaza areas. • Station precinct entrance landscaping (south-east and east of the station building) at the intersection of George Street and Clara Street, and north along the rail reserve, through existing treed area. • Managed landscaping to the north of the Australind platform and bus interchange, along the Principle Shared Path and around the proposed water tank • Managed landscaping along the northern verge of Access Road A and into the MUC area • Managed low threat landscaping within the median strips within the carpark • Managed low threat landscaping within the carpark expansion area <p>All ongoing maintenance is to be conducted by the Proponent, unless specifically negotiated to be undertaken by the Shire.</p>
	Maintain low threat landscaping along all proposed public roads in accordance with provisions of this BMP (see Section 5.2.1.3), until handover to the Shire
	Maintain the new railway lines are cleared to be in a non-vegetated state in accordance with this BMP (see Section 5.2.1.4).
	Maintain any MUC revegetation to the standard and extent stated within this BMP (see Section 5.2.1.5), including being no closer than 21 m to the Future Development lot (assuming Class A forest revegetation).
	Maintain the Future Development lot in either a non-vegetated state, or as managed low threat landscaping, in accordance with this BMP (see Section 5.2.1.6), until sale to future landowners.
3d	Maintain the public roads constructed as part of the development to the relevant technical requirements under the Guidelines, until ceded to the Shire, and the Shire to maintain thereafter.
3e	Maintain the private internal PTA road network to the relevant technical requirements under the Guidelines
3f	Maintain the onsite fire hydrant system in accordance with relevant Australian Standards and the standard stated in the BMP.
3g	Conduct ongoing review of the Bushfire Emergency Management Procedures to ensure they remain appropriate to the facility
3h	Comply with the Shire of Serpentine-Jarrahdale annual firebreak notice issued under s33 of the Bush Fires Act 1954.
Local government – ongoing management	
<i>No.</i>	<i>Implementation action</i>
4a	Maintain existing road verges in a low threat minimal fuel condition as per Clause 2.2.3.2 (f) of AS



Implementation/management table	
	3959.
4b	Maintain the public roads constructed as part of the development to the relevant technical requirements under the Guidelines, following handover from the Proponent.
<i>Future Landowner – ongoing management (following sale of lots)</i>	
<i>No.</i>	<i>Implementation action</i>
5a	Maintain the purchased Future Development lot in either a non-vegetated state, or as managed low threat landscaping, in accordance with this BMP (see Section 5.2.1.6).

7.0 References

Department of Fire and Emergency Services (DFES) 2023, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from:
<https://maps.slip.wa.gov.au/landgate/bushfireprone/>,

Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth.

Standards Australia (SA) 2018, *Australian Standard AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.

Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*, Western Australian Planning Commission, Perth.

Western Australian Planning Commission (WAPC) 2021, *Guidelines for Planning in Bushfire Prone Areas*, Version 1.4 December 2021, Western Australian Planning Commission, Perth.

Appendix 1 Vegetation plot photos and description



Photo ID: 1a



Photo ID: 1b



Photo ID: 1c



Photo ID: 1d



Photo ID: 1e



Photo ID: 1f

Plot number		Plot 1
Vegetation classification	Pre-development	Class A Forest
	Post-development	Class A Forest
Description / justification		Trees 10-30 m high at maturity, dominated by Eucalypts, multi-tiered structure comprising tall canopy layer, shrubby middle layer and grass/herb/sedge understorey



Photo ID: 2a



Photo ID: 2b



Photo ID: 2c



Photo ID: 2d



Photo ID: 2e



Photo ID: 2f

Plot number		Plot 1
Vegetation classification	Pre-development	Class A Forest
	Post-development	Class A Forest
Description / justification		Trees 10-30 m high at maturity, dominated by Eucalypts, multi-tiered structure comprising tall canopy layer, shrubby middle layer and grass/herb/sedge understory



Photo ID: 3a

Plot number		Plot 3
Vegetation classification	Pre-development	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Shrub vegetation less than 2 m high at maturity

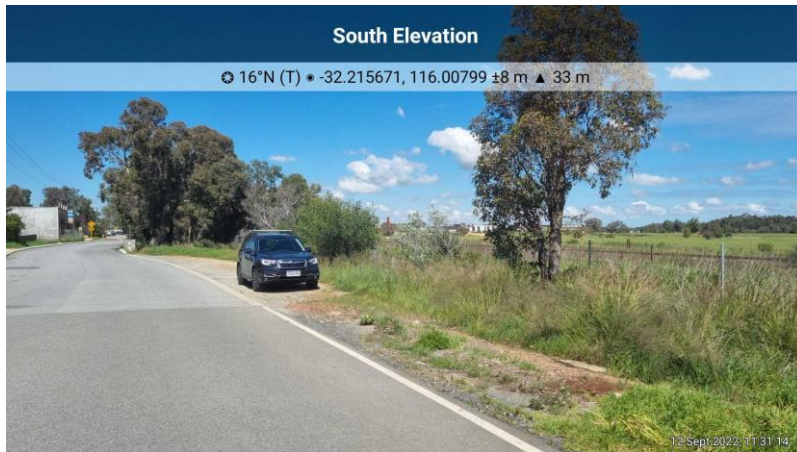


Photo ID: 4a

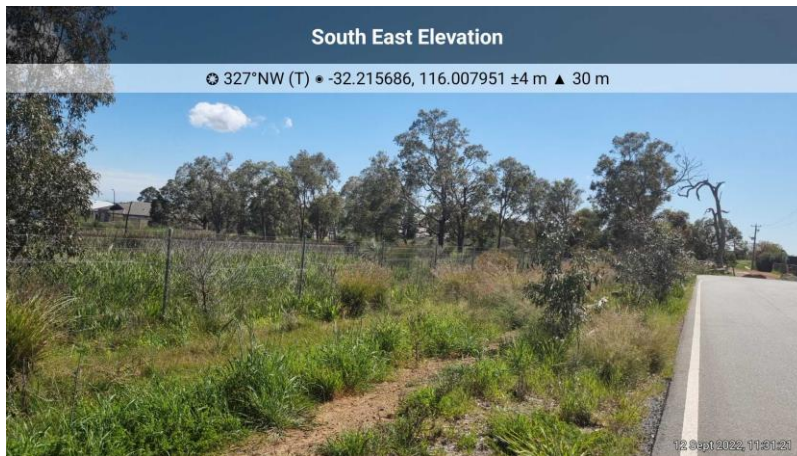


Photo ID: 4b

Plot number		Plot 4
Vegetation classification	Pre-development	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Shrub vegetation less than 2 m high at maturity



Photo ID: 5a



Photo ID: 5b



Photo ID: 5c

Plot number		Plot 5
Vegetation classification	Pre-development	Class G Grassland
	Post-development	Class G Grassland
Description / justification		Grassland greater than 100 mm in height

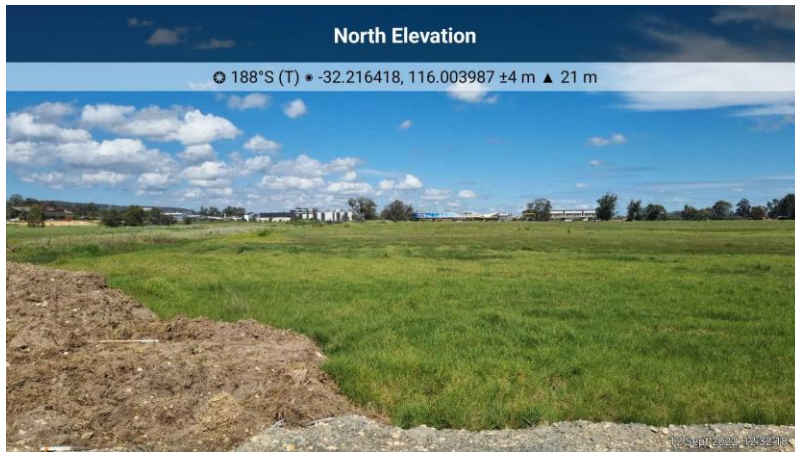


Photo ID: 6a



Photo ID: 6b



Photo ID: 6c

Plot number		Plot 6
Vegetation classification	Pre-development	Class G Grassland
	Post-development	Class G Grassland
Description / justification		Grassland at maturity, greater than 100 mm in height



Photo ID: 8a



Photo ID: 8b



Photo ID: 8c



Photo ID: 8d



Photo ID: 8e



Photo ID: 8f



Photo ID: 8g



Photo ID: 8h

Plot number		Plot 8
Vegetation classification	Pre-development	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
	Post-development	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
Description / justification		Low threat cultivated gardens and maintained lawns within surrounding properties and non-vegetated areas including roads, footpaths, driveways and building footprints



Photo ID: 8i



Photo ID: 8j



Photo ID: 8k



Photo ID: 8l



Photo ID: 8m

Plot number		Plot 8
Vegetation classification	Pre-development	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
	Post-development	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
Description / justification		Low threat cultivated gardens and maintained lawns within surrounding properties and non-vegetated areas including roads, footpaths, driveways and building footprints



Photo ID: 9a

Plot number		Plot 9
Vegetation classification	Pre-development	Excluded – Clause 2.2.3.2 [a]
	Post-development	Excluded – Clause 2.2.3.2 [a]
Description / justification		Vegetation further than 100 m from proposed development



Photo ID: 10a



Photo ID: 10b



Photo ID: 10c



Photo ID: 10d



Photo ID: 10e

Plot number		Plot 10
Vegetation classification	Pre-development	Class A Forest and Class G grassland
	Post-development	Modified to non-vegetated (exclusion 2.2.3.2 [e]) and/or low threat (exclusion 2.2.3.2 [f]) state
Description / justification		Vegetation to be modified to non-vegetated elements or low threat vegetation



Photo ID: 11a

Plot number		Plot 11
Vegetation classification	Pre-development	Class C Shrubland
	Post-development	Modified to non-vegetated (exclusion 2.2.3.2 [e]) and/or low threat (exclusion 2.2.3.2 [f]) state
Description / justification		Land to be modified to non-vegetated state or managed low threat landscaping as part of nominated Asset Protection Zone within the rail reserve, to the north-east of the station building



Photo ID: 12a

Plot number		Plot 12
Vegetation classification	Pre-development	Class G Grassland
	Post-development	Modified to non-vegetated (exclusion 2.2.3.2 [e]) and/or low threat (exclusion 2.2.3.2 [f]) state
Description / justification		Land to be modified to non-vegetated state (or managed low threat landscaping) within the railway expansion works within the rail reserve (not included as part of DA)



Photo ID: 13a

Plot number		Plot 13
Vegetation classification	Pre-development	Class G Grassland
	Post-development	Class A Forest
Description / justification		Future revegetation in northern MUC drainage swale

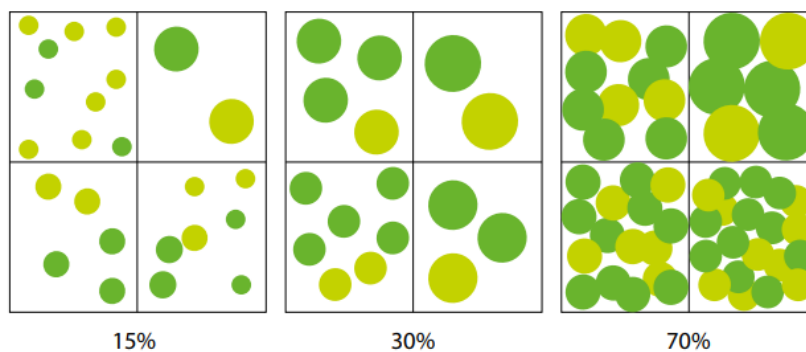
Appendix 2 APZ standards (Schedule 1 of the Guidelines)

An APZ is a low fuel area maintained around a habitable building to increase the likelihood that it will survive a bushfire, by providing a defensible space and reducing the potential for direct flame contact, radiant heat exposure and ember attack.

Vegetation management within an APZ should provide defensible space and be maintained to a low threat state, in perpetuity, in accordance with the requirements outlined in Schedule 1.

Schedule 1: Standards for Asset Protection Zones

- **Trees* (> 6 metres in height)**
 - Trunks at maturity should be a minimum distance of six metres from all elevations of the building.
 - Branches at maturity should not touch or overhang a building or powerline.
 - Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation.
 - Canopy cover within the APZ should be <15 per cent of the total APZ area.
 - Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ.



- **Shrub* and Scrub* (0.5 metres to 6 metres in height)**
 - Should not be located under trees or within three metres of buildings.
 - Should not be planted in clumps >5 square metres in area.
 - Clumps should be separated from each other and any exposed window or door by at least 10 metres.
 - Shrub and scrub >6 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height)**
 - Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above.
 - Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
 - Ground covers >0.5 metres in height are to be treated as shrubs
- **Grass**
 - Grass should be maintained at a height of 100 millimetres or less, at all times.
 - Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
- **Fine Fuel load (combustible dead vegetation mater <6 mm in thickness)****
 - Should be managed and removed on a regular basis to maintain a low threat state.
 - Should be maintained at <2 tonnes per hectare (on average).
 - Mulches should be non-combustible such as stone, gravel or crushed mineral earth or wood mulch

Schedule 1: Standards for Asset Protection Zones

>6 millimetres in thickness.

- **Defendable Space**
 - Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
- **Fences within the APZ**
 - Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959)
- **LPG Cylinders**
 - Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building.
 - The pressure relief valve should point away from the house.
 - No flammable material within six metres from the front of the valve.
 - Must sit on a firm, level and non-combustible base and be secured to a solid structure.

** Plant flammability, landscaping design and maintenance should be considered – refer to explanatory notes*

*** Fine fuel load should be maintained to less than two tonnes per hectare, however this is often a subjective assessment.*

E2 Plant flammability

There are certain plant characteristics that are known to influence flammability, such as moisture or oil content and the presence and type of bark. Plants with lower flammability properties may still burn during a bushfire event, but may be more resistant to burning and some may regenerate faster post-bushfire.

There are many terms for plant flammability that should not be confused, including:

- Fire resistant – plant species that survive being burnt and will regrow after a bushfire and therefore may be highly flammable and inappropriate for a garden in areas of high bushfire risk.
- Fire retardant – plants that may not burn readily or may slow the passage of a bushfire.
- Fire wise – plants that have been identified and selected based on their flammability properties and linked to maintenance advice and planting location within a garden.

Although not a requirement of these Guidelines, local governments may develop their own list of fire wise or fire retardant plant species that suit the environmental characteristics of an area. When developing a recommended plant species list, local governments should consult with ecologists, land care officers or environmental authorities to ensure the plants do not present a risk to endangered ecological communities, threatened, or endangered species or their habitat.

When selecting plants, private landholders and developers should aim for plants within the APZ that have the following characteristics:

- grow in a predicted structure, shape and height;
- are open and loose branching with leaves that are thinly spread;
- have a coarse texture and low surface-area-to-volume ratio;
- will not drop large amounts of leaves or limbs, that require regular maintenance;
- have wide, flat, and thick or succulent leaves;
- trees that have bark attached tightly to their trunk or have smooth bark;



- have low amounts of oils, waxes, and resins (which will often have a strong scent when crushed);
- do not produce or hold large amounts of fine dead material in their crowns; and/or
- will not become a weed in the area.

Refer to the WAPC Bushfire and Vegetation Fact Sheet for further information on clearing and vegetation management and APZ landscaping, design and plant selection reference material.

Appendix 3 Low Threat Vegetation (AS 3959 Clause 2.2.3.2)

2.2.3.2 Exclusions—*Low threat vegetation and non-vegetated areas*

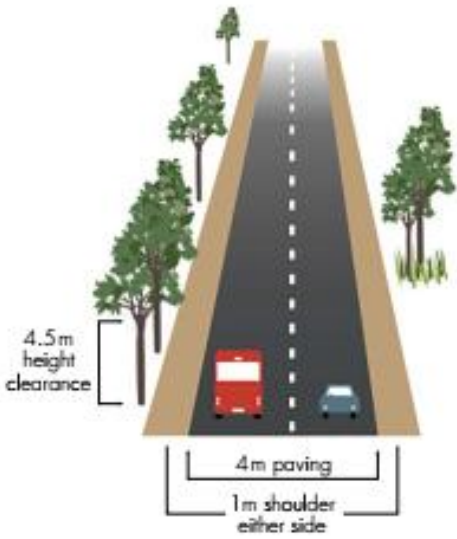
The following vegetation shall be excluded from a BAL assessment:

- (a) Vegetation of any type that is more than 100 m from the site.
- (b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.
- (c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.
- (d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.
- (e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.
- (f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

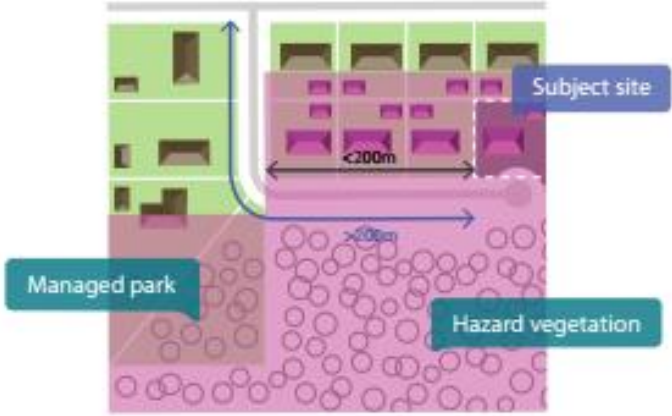
NOTES:

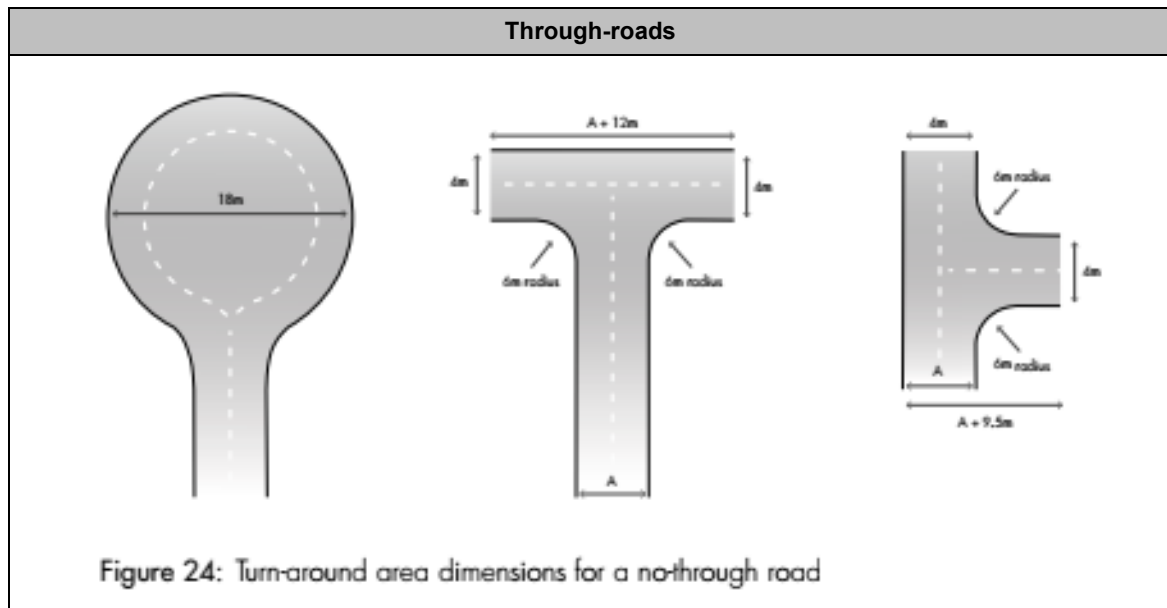
- 1 Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).
- 2 A windbreak is considered a single row of trees used as a screen or to reduce the effect of wind on the leeward side of the trees.

Appendix 4 Vehicular access technical standards of the Guidelines

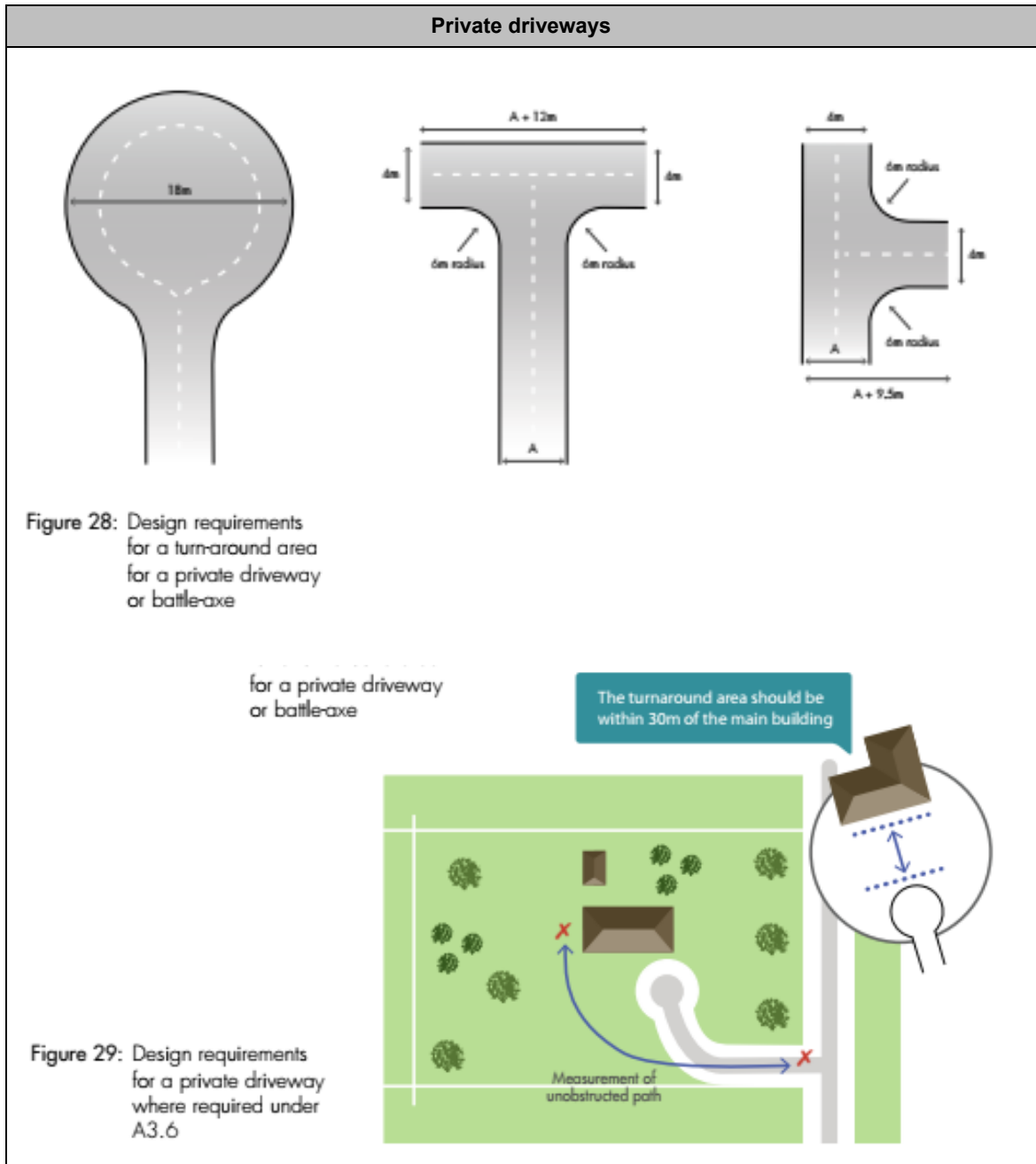
Public roads
Acceptable Solution A3.1
Public roads are to meet the minimum technical requirements in Table 6, Column 1.
Explanatory note E3.1
<p>These Guidelines do not prescribe values for the trafficable (carriageway/pavement) width of public roads as they should be in accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area.</p> <p>The IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards do not prescribe a horizontal clearance. However, it is recommended that a traversable verge is provided to allow for emergency services vehicles to stop and operate on the side of the public road, specifically where the public road may traverse large areas of classified vegetation.</p> <p>Where local government roads are proposed to be widened by the proponent, they must obtain approval from the local government</p>
 <p>The diagram illustrates a cross-section of a public road. It features a central paved carriageway with a dashed white line down the middle. On either side of the carriageway is a shoulder. A red bus is shown on the left shoulder, and a blue car is on the right shoulder. A vertical dimension line on the left indicates a 4.5m height clearance from the road surface to the top of the trees on the left side. A horizontal dimension line at the bottom indicates a 4m paving width for the carriageway and a 1m shoulder on either side.</p>
Figure 20: Example of a public road

Through-roads
Acceptable solution A3.3
<p>All public roads should be through-roads. No-through roads should be avoided and should only be considered as an acceptable solution where:</p> <ul style="list-style-type: none"> it is demonstrated that no alternative road layout exists due to site constraints; and the no-through road is a maximum length of 200 metres to an intersection providing two-way access, unless it satisfies the exemption provisions in A3.2a of this table. <p>A no-through road is to meet all the following requirements:</p>

Through-roads
<ul style="list-style-type: none"> • requirements of a public road (Table 6, Column 1); and • turn-around area as shown in Figure 24
<p>Explanatory note E3.3</p> <p>In bushfire prone areas, a proposed structure plan or subdivision that incorporates no-through roads should be avoided because they do not provide a connected and legible design that allows for easy access and egress by the community, residents and emergency services in the event of a bushfire. No-through roads also reduce the options available for access and egress in the event of a bushfire emergency.</p> <p>There will however be situations where a subject site is accessed via an existing or proposed no-through road and alternative access cannot be provided. In these situations, the proponent should demonstrate to the decision-maker, that all efforts have been made with the local government and/or adjoining landowners to secure alternative public road access or an emergency access way and that a redesign has been explored. The bushfire planning practitioner may need to develop a performance principle-based solution or address the non-compliance and demonstrate to the decisionmaker why discretion should be exercised in accordance with section 2.6 of these Guidelines.</p> <p>No-through roads will only be considered an acceptable solution where it is demonstrated by the proponent, to the satisfaction of the decision maker, that a no through-road cannot be avoided due to site constraints. For example, the internal road design of a structure plan or subdivision where site constraints, such as a water body or Bush Forever, prevent the ability to create a through-road and a no through road may be a more appropriate road layout.</p> <p>No-through roads should be a maximum of 200 metres from the lot(s) boundary to an intersection where two-way access is provided and may only exceed 200 metres if it meets the provisions which allow for no-through roads greater than 200 metres in A3.2a.</p>  <p>The diagram illustrates a site layout with a 'Subject site' (purple) and a 'Managed park' (green) separated by a road. A 'Hazard vegetation' area (pink with circles) is located below the road. A double-headed arrow indicates a distance of '<200m' between the subject site and the intersection. Another double-headed arrow indicates a distance of '>200m' between the intersection and the hazard vegetation. A blue arrow points from the intersection towards the subject site.</p> <p>Figure 23: Example of a site on a no-through road greater than 200 metres from the intersection, but within 200 metres of BAL-LOW</p>



Private driveways
Acceptable solution A3.6
<p>There are no private driveway technical requirements where the private driveway is:</p> <ul style="list-style-type: none"> • within a lot serviced by reticulated water; • no greater than 70 metres in length between the most distant external part of the development site and the public road measured as a hose lay; and • accessed by a public road where the road speed limit is not greater than 70 km/h. <p>In circumstances where all of the above conditions are not met, or the private driveway is in a non-reticulated water area, the private driveway is to meet all the following requirements:</p> <ul style="list-style-type: none"> • requirements in Table 6, Column 4; • passing bays every 200 metres with a minimum length of 20 metres and a minimum additional trafficable width of two metres (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum six metres); and • turn-around area as shown in Figure 28 and within 30 metres of the habitable building.
Explanatory note A3.6
<p>In areas serviced by reticulated water, where the road speed limit is not greater than 70 km/h, and where the distance from the public road to the further part of the habitable building is no greater than 70 metres, emergency service vehicles typically operate from the street frontage.</p> <p>In the event the habitable building cannot be reached by hose reel from the public road, then emergency service vehicles will need to gain access within the property. Emergency service vehicles will also need to gain access within the property, where access to reticulated water (fire hydrants) is not possible. In these situations, the driveway and battle-axe (if applicable) will need to be wide enough for access for an emergency service vehicle and a vehicle to evacuate.</p> <p>Turnaround areas should be available for both conventional two-wheel drive vehicles of residents and Type 3.4 fire appliances. Turn-around areas should be located within 30 metres of habitable buildings. Circular and loop driveway design may also be considered. Note that the design requirements for a turn-around area for a private driveway or battle-axe differ to a cul-de-sac.</p>



Technical requirement	1	2	3	4
	Public road	Emergency access way ¹	Fire service access routes ¹	Battle-axe and private driveways ²
Minimum trafficable surface (m)	In accordance with A3.1	6	6	4
Minimum horizontal distance (m)	N/A	6	6	6
Minimum vertical clearance (m)	4.5			



Technical requirement	1	2	3	4
	Public road	Emergency access way ¹	Fire service access routes ¹	Battle-axe and private driveways ²
Minimum weight capacity (t)	15			
Maximum grade unsealed road ³	As outlined in the IPWEA Subdivision Guidelines	1 in 10 (10%)		
Maximum grade sealed road ³		1 in 7 (14.3%)		
Maximum average grade sealed road		1 in 10 (10%)		
Minimum inner radius of road curves (m)		8.5		

Notes

¹ To have crossfalls between 3 and 6%

² Where driveways and battle-axe legs are not required to comply with the widths in A3.5 or A3.6, they are to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision.

³ Dips must have no more than a 1 in 8 (12.5% -7.1 degree) entry and exit angle



Appendix 5 Shire of Serpentine Jarrahdale Firebreak Notice

FIRST AND FINAL NOTICE

Fire Hazard Reduction Notice

Important: The works outlined below must be completed by 1 December 2022 and maintained in this state up to and including 31 May 2023.

Notice to all owners of land within the Shire of Serpentine Jarrahdale

Pursuant to Section 33 of the **Bush Fires Act 1954**, the Shire of Serpentine Jarrahdale (Shire) gives written notice to act as specified in this notice to land that you own and/or occupy, and with respect to any matter which is upon the land that you own and/or occupy within the Shire. Failure or neglect to comply with this notice is an offence and can result in a penalty of up to \$5,000. The Shire advises that its officers, servants, workmen, contractors, vehicles, machinery, and appliances (as the officers deem fit) may carry out the requisitions of this notice that are not complied with by the date specified above, and any costs and expenses incurred may be recovered from you as the owner and/or occupier of the land.

All land with an area greater than 25,000m² (2.5 hectares)

- Fire Breaks**
Install or upgrade a **3-metre-wide** by **4-metre-high clearance, bare mineral earth, continuous** (no dead ends) trafficable fire break as close as possible inside the entire perimeter of the land.
- Dead Flammable Material (DFM)**
Reduce and/or maintain all dead flammable material below 8 tonne per hectare (see definition *Fuel Load*).
- Slashing**
IF UNSTOCKED, Slash, mow, or trim grasses, to a height no greater than 50mm and remove cuttings/swath across the entire property.
- Asset Protection Zone**
Maintain a fuel reduced zone around all buildings and assets which extends 20 metres from the outermost point of all buildings and assets.
 - » Gutters, roofs, and walls of all buildings to be free of flammable matter and maintained.
 - » Fuel load within the 20-metre zone is reduced and maintained to no more than 2 tonne per hectare.
 - » Trees over 5 metres in height within the 20-metre zone to be under pruned up to 2 metres.
 - » Trees or shrubs within 2 metres of a building / asset shall be pruned to a height no greater than 2 metres and/or pruned away from the building / asset to a distance greater than 2 metres.

All land with a total area greater than 4,000m² (0.4ha) but less than 25,000m² (2.5ha)

- Fire Breaks**
Install or upgrade a **3-metre-wide** by **4-metre-high clearance, bare mineral earth, continuous** (no dead ends) trafficable fire break as close as possible inside the entire perimeter of the land.
- Dead Flammable Material (DFM)**
Reduce and/or maintain all dead flammable material below 8 tonne per hectare (see definition *Fuel Load*).
- Slashing**
Slash, mow, or trim dead grasses, dead shrubs, and dead plants to a height no greater than 50mm and remove cuttings/swath across the entire property.
- Asset Protection Zone**
Maintain a fuel reduced zone around all buildings and assets which extends 20 metres from the outermost point of all buildings and assets.
 - » Gutters, roofs, and walls of all buildings to be free of flammable matter and maintained.
 - » Fuel load within the 20-metre zone is reduced and maintained to no more than 2 tonne per hectare.
 - » Trees over 5 metres in height within the 20-metre zone to be under pruned up to 2 metres.
 - » Trees or shrubs within 2 metres of a building / asset shall be pruned to a height no greater than 2 metres and/or pruned away from the building / asset to a distance greater than 2 metres.

All land with a total area less than 4,000m² (0.4ha)

- Dead Flammable Material (DFM)**
Reduce and/or maintain all dead flammable material below 8 tonne per hectare (see definition FUEL LOAD).
- Slashing**
Slash, mow, or trim dead grasses, dead shrubs, and dead plants to a height no greater than 50mm and remove cuttings/swath across the entire property.
- Clean Gutter Debris**
Gutters, roofs, and walls of all buildings to be free of flammable matter and maintained.

Additional Works



Where a property is affected by an approved bushfire management plan, property owner and/or occupier must still comply with all requirements in this notice and with ALL additional requirements outlined within that plan.

You may be required to carry out further bushfire property preparedness works on your land to reduce any fire hazards considered necessary by a Fire Control Officer. If required, these will be outlined in a 'work order' and sent to the address of the owner.

Emergency Management Plans and Shire Approved Treatment Plans



All properties and/or land subject to a Bushfire Management Plan or an approved Bushfire Attack Level assessment (BAL), as a result of subdivision, development application or a Shire approved treatment plan, must comply with the listed requirements in their entirety. Compliance with any additional plans does not constitute compliance with this Notice.

Environmental Conditions



Any property subject to environmental value such as, but not limited to, Threatened Ecological Communities (TEC), Bush Forever sites, Declared Rare Flora and Fauna (DRF) sites should seek further information about what can or cannot be done prior to carrying out requirements under this Notice. Please contact the Shire's Emergency Services Team.

Fuel Dumps and Depots



Remove all flammable material within 10 metres of fuel dumps, fuel ramps or where fuel drums, whether containing fuel or not, are stored.



Campfires and Firepits

Campfires and firepits are NOT permitted at any time during the PROHIBITED Burning Period or at any other time where the fire danger rating is HIGH or above. Campfires and Firepits cannot be lit before 6pm, no more fuel can be added after 11pm, must be fully extinguished by midnight, must not be left unattended, must have an available method of extinguishment with you while burning and may not be lit on public land, unless purpose built campfire pits have been provided by the owner of the land and permission to use them has been given.

Haystacks



Clear and maintain a firebreak completely surrounding any haystack on the land, within 60 metres of the haystack.



Wood/Solid Fuel BBQs and Pizza Ovens



The use of wood/solid fuel BBQs and pizza ovens is permitted **except** for on days where the fire danger rating is HIGH or above. The use of any wood/solid fuel BBQ or pizza oven is prohibited during a TOTAL FIRE BAN.

Variation to the Fire Hazard Reduction Notice

If you consider it impractical to meet a requirement/s of this Notice, you may apply to the Shire for a variation no later than **1 October 2022**.

Note: A variation is not an exemption but an application to employ other methods of property preparedness to land that you own and/or occupy.

If your application is not granted you must comply with all requirements outlined in the Fire Hazard Reduction Notice 2022/2023. Variation request application forms are available before 1 October 2022 on the Shire's website at: www.sjshire.wa.gov.au/fem

Definitions

Fire Break:

A strip of land free of all flammable material with the intention of minimising the spread or extension of a bushfire and provide safe access on the property for emergency vehicles and other firefighting operations.

- » Clearance must be no less than 3-metres wide and 4-metres in height inside and along all boundaries (including boundaries adjacent to roads, rail and drain reserves and all public open space reserves).
- » Must not be more than 5-metres wide (further width extensions may be considered upon written application for approval to the Shire).
- » Maintained, reticulated living lawns are lawns considered to be kept completely green. Driveways may be acceptable in conjunction with, or in lieu of, mineral earth fire breaks. Contact the Shire's Emergency Services Team for further assistance.
- » Must have a corner turning radius of up to 12 metres.
- » Must be a mineral earth break with a continuous trafficable surface for a 4WD vehicle, be clear of any obstructions and must not terminate in a dead end.

Fuel Load:

Can be live and dead vegetation that accumulates over time. This Notice refers only to dead vegetation.

Fine fuels include:

Leaf litter, grasses, twigs (up to 6mm diameter), bark etc.

Heavy (coarse) fuels include:

Branches, logs, stumps etc.

- » A fuel load depth of 15mm (fine fuels) to the mineral earth is indicative of approximately 8 tonne per hectare. The more fuel load, the higher the flame height and increased fire intensity.
- » Mulch piles, stored firewood and burn piles can contribute to fuel loading on land and must be stored safely away from assets, removed from the property, or actioned as directed by a Fire Control Officer.

If you require any further information, please contact the Shire of Serpentine Jarrahdale Emergency Services Team on **(08) 9526 1111**, email esdepartment@sjshire.wa.gov.au or visit www.sjshire.wa.gov.au/fem

Paul Martin

Chief Executive Officer



Shire of
Serpentine
Jarrahdale

Shire of Serpentine Jarrahdale
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