APPENDIX 4

Bushfire Management Plan (JBS&G)

Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Mundijong Road, North East Baldivis

Suburb: Baldivis **State:** WA **P/code:** 6171

Local government area: City of Rockingham

Description of the planning proposal: District Structure Plan

BMP Plan / Reference Number: JBS&G64079-148433 **Version:** R01 Rev 0 **Date of Issue:** 18/04/2023

Client / Business Name: Stockland Development Pty Ltd

Reason for referral to DFES	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	☐	☑
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?	☐	☑
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	☐	☑
Strategic planning proposal (including rezoning applications)	☑	☐
Minor development (in BAL-40 or BAL-FZ)	☐	☑
High risk land-use	☐	☑
Vulnerable land-use	☐	☑

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?
The proposal is a District Structure Plan, which is a strategic planning proposal.

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Zac Cockerill	Level 2	BPAD37803	31/08/2023
Company		**Contact No.**	
JBS&G Australia Pty Ltd		(08) 9792 4797	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner **Date** 18/04/2023

Stockland Development Pty Ltd

Bushfire Management Plan (District Structure Plan)

North East Baldivis
WA

18 April 2023

JBS&G64079-148433 (Rev 0)

JBS&G Australia Pty Ltd

www.jbsg.com.au

Table of Contents

List of Tables

List of Figures

List of Plates

Appendices

1. Proposal details

1.1 Background

Stockland Development Pty Ltd (the Proponent) is currently at the District Structure Planning (DSP) stage of a proposed urban development within an area known as 'North East Baldivis' at Mundijong Road, Baldivis (hereon referred to as the project area) within the City of Rockingham. The project area is located approximately 35 km south of Perth CBD and is approximately 757.22 ha in area.

The DSP (Figure 1) depicts four indicative Local Structure Plan (LSP) areas containing a combination of the following land uses:

- residential
- employment
- neighbourhood centre
- local centre
- four primary school sites and a high school site
- areas of open space including multiple use (flood storage) areas, District Open Space and local reserves (for conservation and Public Open Space)
- public purpose areas (drains), powerline easement and roads.

JBS&G understands that rezoning of the project area under the Metropolitan Region Scheme (MRS) is expected to follow the DSP stage in the short term. Given the strategic nature of both DSP and MRS rezoning stages, this BMP has been prepared and is considered sufficient to address both planning stages.

1.2 Site description

The project area is situated within the City of Rockingham and contains various agricultural, commercial and tourism-based land uses amongst a predominantly cleared rural landscape with multiple wetland areas. The project area is surrounded by the following, as per Figure 2:

- Mundijong Road, Alcoa Wetlands and various rural/rural-residential properties to the south
- Telephone Lane, heavy freight rail line, Millar Road and existing residential/rural-residential development within City of Kwinana to the north
- existing rural properties and Duckpond Road within Shire of Serpentine-Jarrahdale to the east
- Kwinana Freeway and existing/proposed urban development within Millars Landing estate to the west.

The majority of the project area is designated as bushfire prone on the *Map of Bush Fire Prone Areas* (DFES 2021; see Plate 1).

1.3 Purpose

This Bushfire Management Plan (BMP) has been prepared to accompany submission of the DSP (and future MRS rezoning stage) and address requirements under Policy Measures 6.3 of *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) in accordance with *Guidelines for Planning in Bushfire-Prone Areas Version 1.4* (the Guidelines; WAPC 2021).

1.4 Other plans/reports

Other reports that have been prepared for the project area include:

- Environmental Assessment Report (Strategen-JBS&G 2020a; JBS&G 2023)
- Level 1 Fauna Survey and Black Cockatoo Habitat Assessment (Strategen-JBS&G 2020b)
- Due diligence Baldivis, Mundijong Road Baldivis (Strategen 2018a)
- Desktop study – odour and dust impacts Wellard Farms, Baldivis (Strategen 2018b).

Consistency has been maintained with the abovementioned reports where applicable. JBS&G is not aware of any other bushfire or environmental reports or assessments that have been prepared previously for the project area.

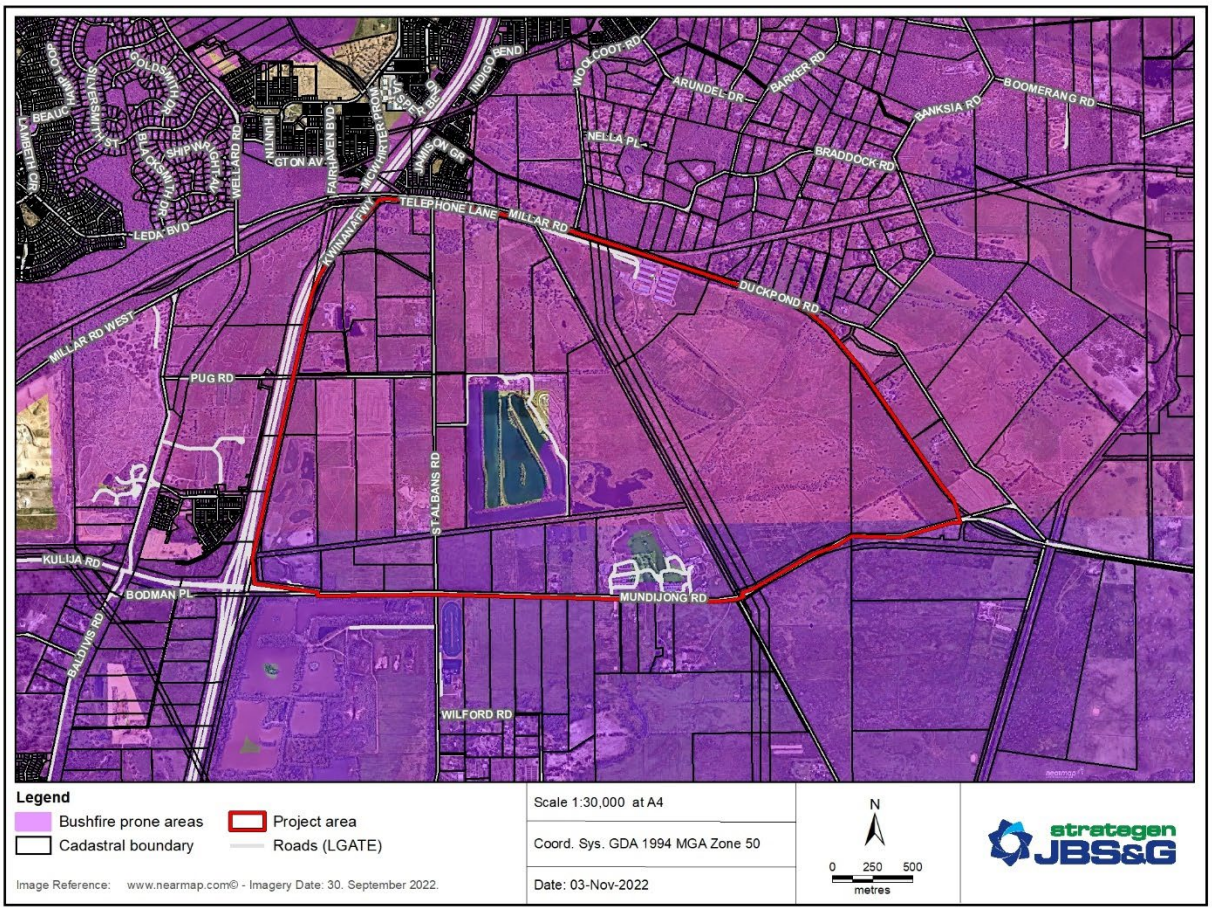
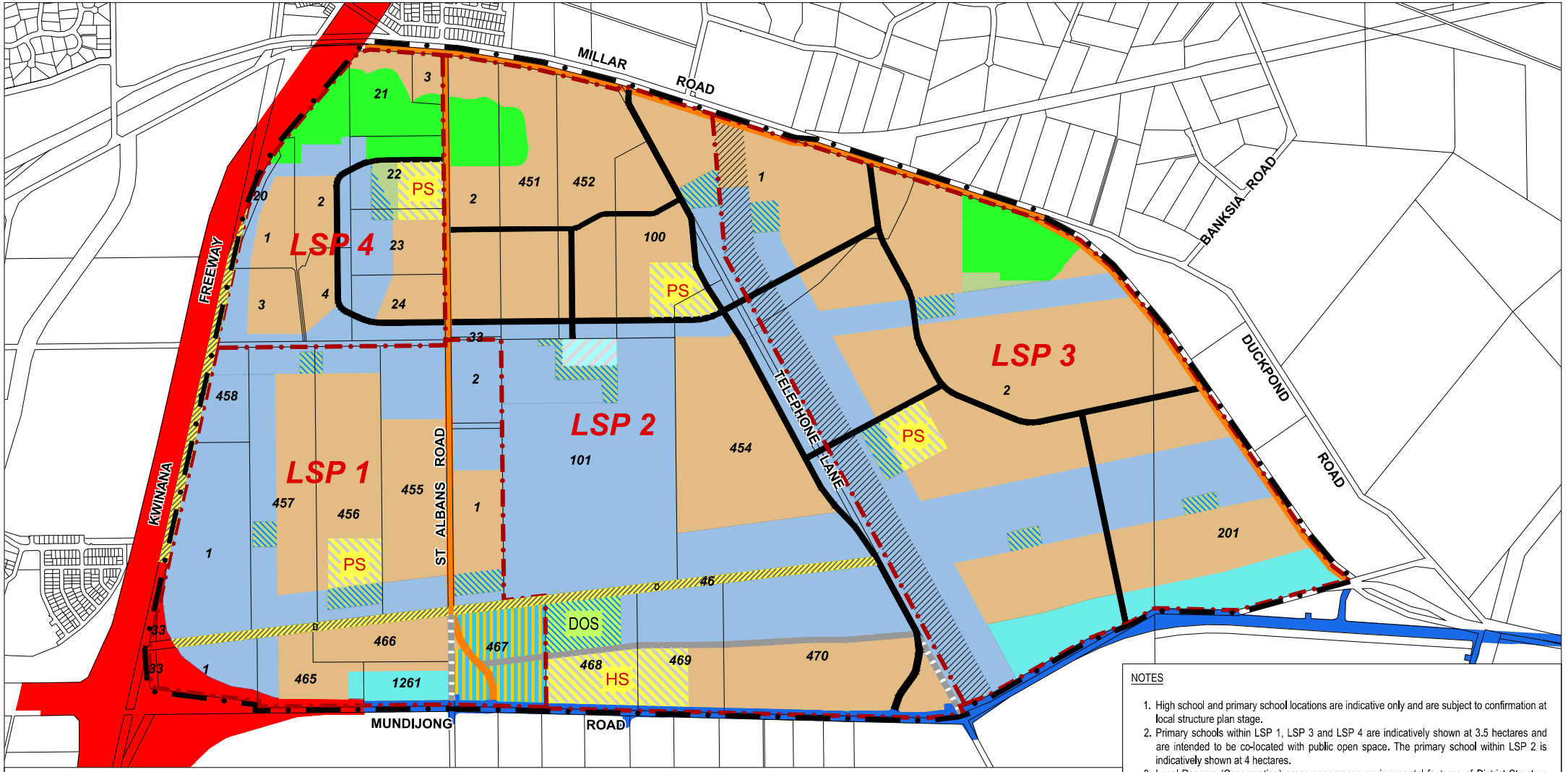


Plate 1: Map of Bush Fire Prone Areas (DFES 2021)



LEGEND

- District Structure Plan Boundary
- Indicative Local Structure Plan Boundary
- Residential
- Employment
- Neighbourhood Centre
- Local Centre
- Multiple Use (Flood Storage)
- PS — Indicative Primary School
- HS — Indicative High School
- DOS — District Open Space (within Multiple Use)
- Local Reserve (Conservation)
- Local Reserve (Public Open Space)
- Local Reserve (Public Open Space - within Multiple Use)
- D — Public Purpose : Drain
- Powerline Easement
- Primary Regional Road Reserve
- Other Regional Road Reserve
- Integrator Arterial B Road
- Neighbourhood Connector Road
- Local Road
- Interim Road

NOTES

1. High school and primary school locations are indicative only and are subject to confirmation at local structure plan stage.
2. Primary schools within LSP 1, LSP 3 and LSP 4 are indicatively shown at 3.5 hectares and are intended to be co-located with public open space. The primary school within LSP 2 is indicatively shown at 4 hectares.
3. Local Reserve (Conservation) areas encompass environmental features of District Structure Plan-level significance. The refinement and reservation of these areas, as well as other localised areas of open space, as restricted open space, unrestricted open space or other will be determined following environmental reporting at the local structure plan stage.
4. An area of District Open Space (DOS) is identified and will accommodate future active district recreation needs of the community. Opportunities to co-locate the DOS with the High School may be considered at the local structure plan stage. The acquisition and development of the DOS is to be provided for within the relevant Development Contribution Plan for the DSP area to ensure the equitable provision of open space.
5. Road hierarchies are subject to review and refinement at local structure plan stage based on the outcomes of subsequent traffic modelling incorporated into revisions to the DSP Traffic Impact Statement or subsequent Traffic Impact Assessments prepared in support of local structure plans.
6. Primary Regional Road and Other Regional Road reserves are shown as per the Metropolitan Region Scheme.

0 200 400 600 800 1km

CLE Town Planning + Design

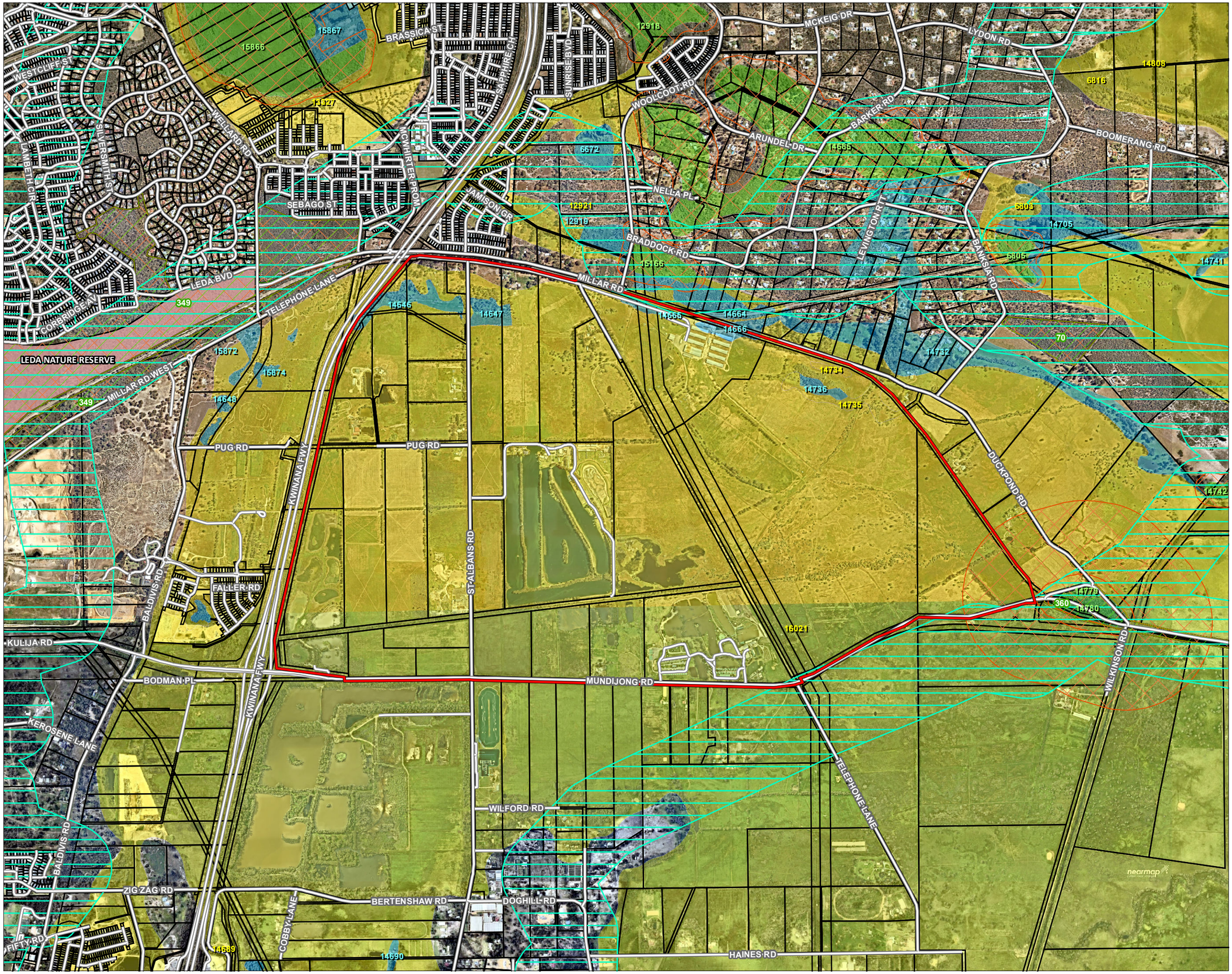
DISTRICT STRUCTURE PLAN MAP

Mundijong Road, Baldivis

DRAFT

plan no: **3097-142-01**
date: 14 December 2022
scale: 1:20,000 @ A4

N



Legend

- Project area
- Cadastral boundary
- Regional ecological linkages
- Bush Forever site (DPLH)
- Environmentally sensitive areas (DWER)

Geomorphic Wetlands

- Conservation
- Resource enhancement
- Multiple use

Legislated lands and waters (DBCA)

- Nature reserve
- Roads

strategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 03-Nov-2022
Drawn By: jcrute	Checked By: CT

Scale 1:20,000 at A3

0 250 500
metres

Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

SITE OVERVIEW

FIGURE: 2

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_02_A3_SiteOverview.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

2. Environmental considerations

2.1 Native vegetation - modification and clearing

A large proportion of the project area will be modified to a non-vegetated/low threat managed state as part of the proposed urban development, as depicted in Figure 1. This includes provision for residential, employment, neighbourhood/local centres, educational land uses, roads and areas of active open space, where the current vegetation extent will be removed to facilitate proposed urban development. A large proportion of the site is also expected to be retained or revegetated throughout areas of wetland retention, non-active POS and flood storage corridors, which may maintain or increase the current classified vegetation extent. Confirming the extent of proposed urban development versus vegetation retention/revegetation areas will be crucial in delivering compliant bushfire design as planning stages progress.

A search of publicly available environmental data has been undertaken below, along with review of the EAR (Strategen-JBS&G 2020a; JBS&G 2023) relating to the project area. This information is summarised in Table 1.

According to the JBS&G (2023) Environmental Assessment Report (EAR), the impacts associated with the proposed development include the removal of native vegetation and associated habitat disturbance to facilitate the development. However, most (more than 70%) of the vegetation within the project area has been previously classified as 'Completely Degraded' (Strategen 2018). The potential impact on fauna habitat, including foraging habitat of Black Cockatoo species, is not considered significant due to the degraded condition of the habitat-constituting vegetation (Strategen-JBS&G 2020a). Potential foraging habitat (32.63 ha, 5.5% of the project area) identified on the site has previously been considered representative of Poor quality, with some portions classified as Poor to Moderate quality habitat (Strategen-JBS&G 2020a). While several (13) potential breeding trees have previously been identified within the project area, no potential breeding hollows were identified (Strategen-JBS&G 2020a).

All relevant and necessary state/federal environmental and clearing approvals will be sought where required prior to undertaking any clearing works within the site.

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 south-eastern corner of the project area is intersected by an ESA, and the northern and north-western boundaries of the project area are adjacent to ESAs. The ESAs are potentially associated with geomorphic wetlands that intersect and are adjacent to the project area.
Swan Bioplan Regionally Significant Natural Area	✗	✗	N/A
Ecological linkages	✓	✓	The south-eastern and northern boundaries of the project area are adjacent to a Regional Ecological Linkage (ID: 1), potentially associated with the geomorphic wetlands that surround the project area.
Wetlands	✓	✓	The entire project area is classified as predominantly Palusplain Multiple Use Category Wetland (MUCW) (UFI: 16021), with various sections of the northern portion of the project area containing Resource Enhancement Category Wetlands (RECW) (UFIs: 14646; 14647; 14665; 14666; 14736). The south-eastern boundary of the project area is immediately adjacent to a Conservation Category Wetland (CCW) (UFI: 14780).

Environmental value	Mapped as occurring within or adjacent to the project area		Description
	Within	Adjacent	
			The western boundary of the project area is adjacent to various REC wetlands (UFIs: 14406; 15872; 15874). The northern and north-eastern boundaries of the project area are adjacent to a MUCW (UFI: 12921), RECWs (UFI: 12919; 14664; 14666; 14732) and CCWs (UFI: 14685; 15166). The MUCW that covers most of the project area extends past the boundaries of the project area, in all directions.
Waterways	✘	✓	The southern boundary of the project area is immediately adjacent to the Peel Inlet Management Area.
Threatened Ecological Communities listed under the EPBC Act	✓	✓	Portions of the northern, north-eastern, eastern and south-eastern boundaries of the project area are intersected by Threatened Ecological Communities (TECs). The northern and north-western boundaries of the project area are also adjacent to TECs.
Threatened and priority flora	✓	✓	The south-eastern portion of the project area boundary is intersected by Priority 4 flora species. The western boundary of the project area is adjacent to Priority 4 flora species.
Fauna habitat listed under the EPBC Act	Mapping not available	Mapping not available	Refer to EAR results.
Threatened and priority fauna	✓	✓	The central southern portion of the project area is mapped to contain Specially Protected – Migratory Bird. The north-western boundary of the project area is adjacent to Priority Fauna and Threatened – Endangered fauna. The northern boundary of the project area is adjacent to Threatened – Endangered fauna, Priority Fauna and Threatened – Vulnerable fauna.
Bush Forever Areas	✘	✓	The south-eastern corner of the project area is mapped adjacent east of Bush Forever Area No. 360. The north-western boundary of the project area is approximately 200 m from Bush Forever Area 349.
DBCA managed lands and waters (includes legislated lands and waters and lands of interest)	✘	✓	The north-western boundary of the project area is approximately 650 m from Leda Nature Reserve.
Conservation covenants	Mapping not available	Mapping not available	No conservation covenants are understood to exist over the project area.
Heritage Place	✓	✓	The north-western portion of the project area is intersected by Wally's Camp which is a Registered Site (No. 3568).

2.2 Revegetation / Landscape Plans

Significant open space is proposed throughout the site. The DSP (Figure 1) depicts a large proportion of this open space as multiple use (flood storage) and local reserves for wetland conservation, which may maintain or increase the current classified vegetation extent. Other areas such as local POS reserves and District Open Space may result in establishment of low threat vegetation and non-vegetated areas. Confirmation of low threat landscape treatments versus non-low threat landscape treatments, as well as areas of potential revegetation, will be crucial in delivering compliant bushfire design as planning stages progress, particularly at interfaces with proposed urban/habitable development. Landscape concepts/plans will need to be prepared to support future planning stages (i.e. Structure Plan and subdivision) to confirm vegetation classifications/exclusions throughout the open space areas of the site and inform development design responses where required.

3. Bushfire assessment results

3.1 Assessment inputs

3.1.1 Vegetation classification

3.1.1.1 Methodology

JBS&G assessed classified vegetation and exclusions within the project area and adjoining 150 m (the assessment area) through on-ground verification on 26 October 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 are contained in Appendix A. Vegetation classification results are outlined in Table 2 and Figure 3 (for current pre-development conditions).

3.1.1.2 Classification

The project area contains on-site vegetation in varying degrees of condition comprising:

- Class A Forest in areas of dense eucalyptus canopy with a three-tiered fuel profile, predominantly along roads, fence lines and small remnant pockets of planted/retained vegetation
- Class D Scrub in areas containing tall shrubs with a horizontal fuel profile between 2–6 m in height, particularly throughout wetland and creek/drainage line vegetation
- Class G Grassland in areas containing unmanaged grass/weeds greater than 100 mm in height, mainly throughout cleared rural areas.

Site observations indicate that the surrounding 150 m of land comprises a variety of classified vegetation, including:

- Class A Forest in areas of dense eucalyptus canopy with a three-tiered fuel profile associated with Kwinana Freeway reserve to the west; vacant land, road/rail reserves and rural/residential properties to the north; Alcoa Wetlands to the southwest, and road reserves and conservation vegetation to the east
- Class D Scrub in areas containing tall shrubs with a horizontal fuel profile between 2–6 m in height, particularly to the west and northwest within Kwinana Freeway reserve; and to the north within vacant and rural/residential properties
- Class G Grassland throughout cleared, agricultural land to the south and east; vacant and rural/residential properties to the east and northeast; and within road reserves of the Kwinana Freeway to the west and Millar Road to the north.

Land excluded from classification under Clauses 2.2.3.2 (e) and (f) was also identified throughout the assessment area comprising existing non-vegetation areas (i.e. buildings, roads, access tracks, sealed areas, etc) and low threat managed vegetation (managed gardens, urban streetscapes, managed urban POS, etc).

3.1.2 Effective slope

JBS&G assessed effective slope under classified vegetation within the assessment area through on-ground verification on 26 October 2022 in accordance with AS 3959. Results were cross-referenced with DPIRD 2m contour data and are depicted in Table 2 and Figure 3 (for current pre-development conditions).

According to the EAR (JBS&G 2023), topography of the site is low lying with elevation ranging from approximately 6 m Australian height datum (AHD) to 0 m.

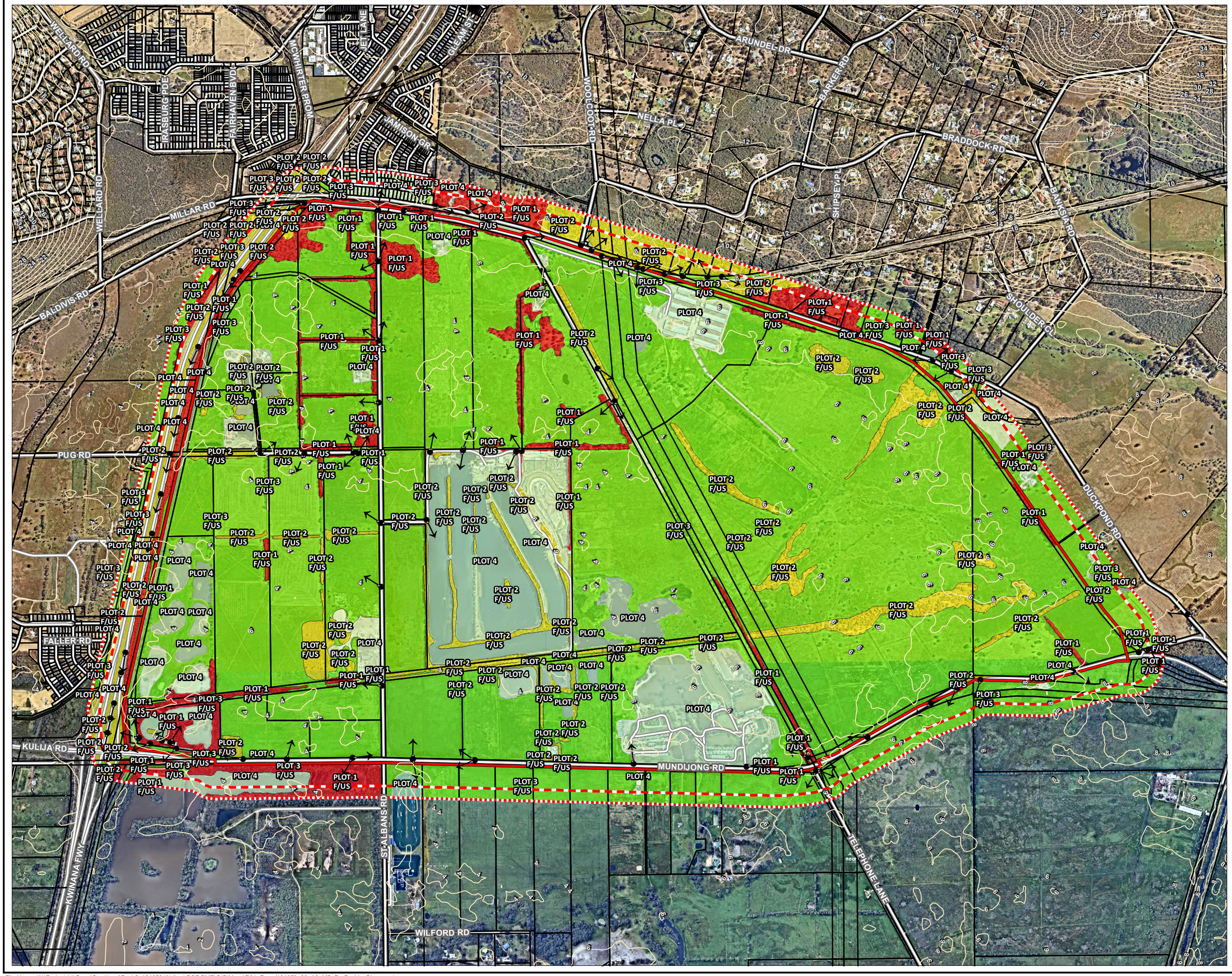
On this basis, all classified vegetation within the assessment area was found to be predominantly flat or upslope in relation to the project area.

3.1.3 Pre-development inputs

A summary of the assessed pre-development classified vegetation, exclusions and effective slope within the project area and adjacent 150 m are listed in Table 2 and illustrated in Figure 3.

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

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Flat/upslope (0°)	Forest vegetation within and outside of the project area, 10–30 m in height with a multi-tiered fuel structure.
2	Class D Scrub	Flat/upslope (0°)	Shrubs 2–6 m in height with a continuous horizontal fuel profile
3	Class G Grassland	Flat/upslope (0°)	Grassland greater than 100 mm in height.
4	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated areas (buildings, other infrastructure, roads, footpaths, access tracks, sealed areas, etc) and low threat managed vegetation (managed gardens, urban streetscapes, etc).

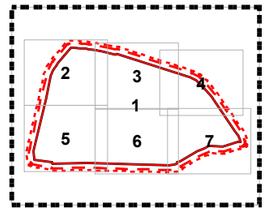


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Vegetation classification

- Class A Forest
- Class D Scrub
- Class G Grassland
- Clause 2.2.3.2 (e) & (f)
- Photo point directions
- Topographic contours (mAHD)
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:15,000 at A3

0 100 200
metres

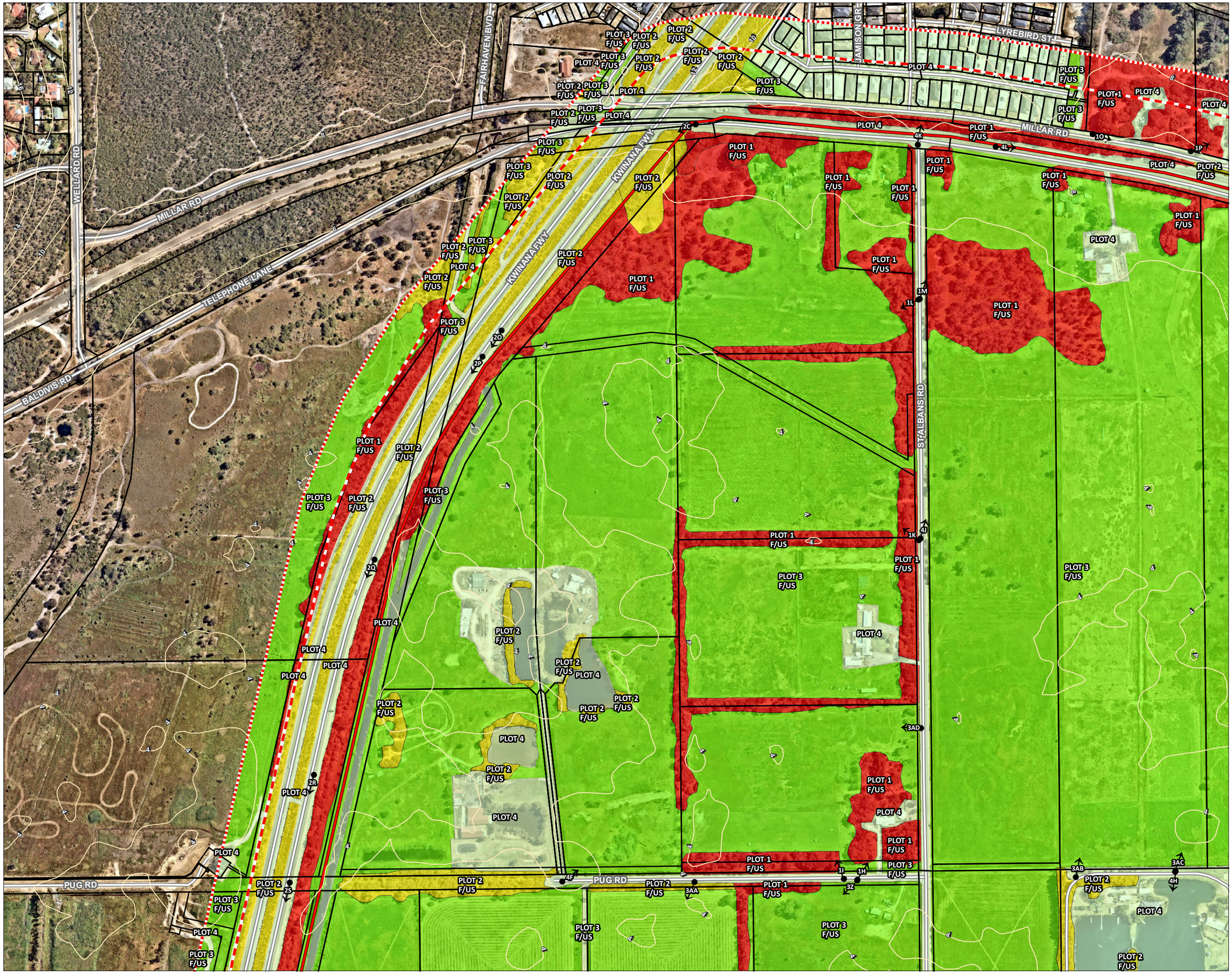
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE: 3 - Page 1 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_03_A3_MB_PreDevVegClass.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.



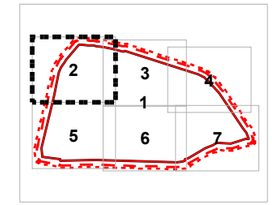
Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Vegetation classification

- Class A Forest
- Class D Scrub
- Class G Grassland
- Clause 2.2.3.2 (e) & (f)

- Photo point directions
- Topographic contours (mAHD)
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

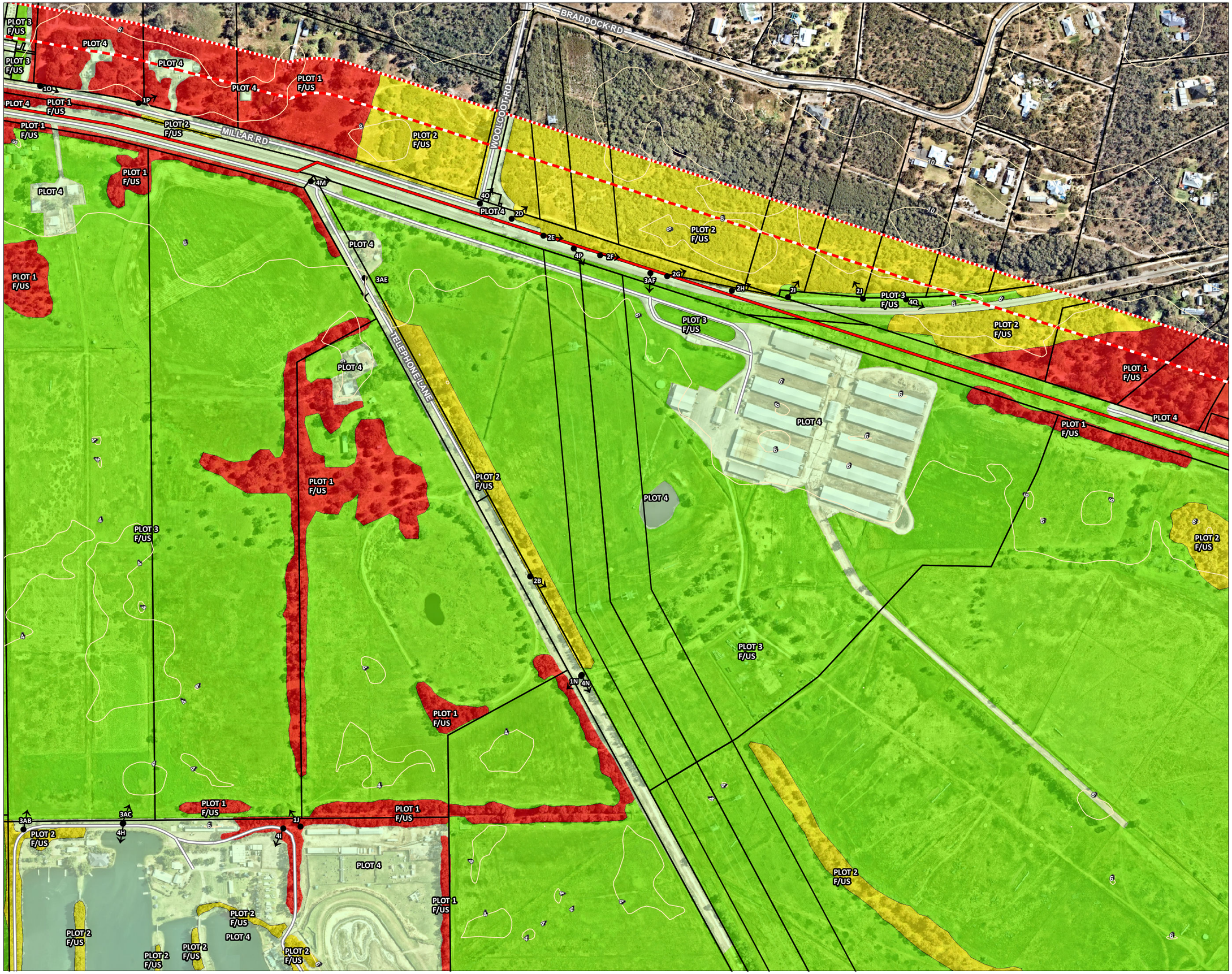
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE: 3 - Page 2 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_03_A3_MB_PreDevVegClass.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

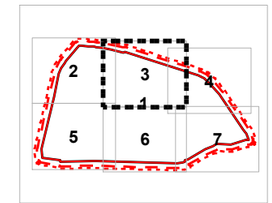


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Vegetation classification

- Class A Forest
- Class D Scrub
- Class G Grassland
- Clause 2.2.3.2 (e) & (f)
- Photo point directions
- Topographic contours (mAHD)
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

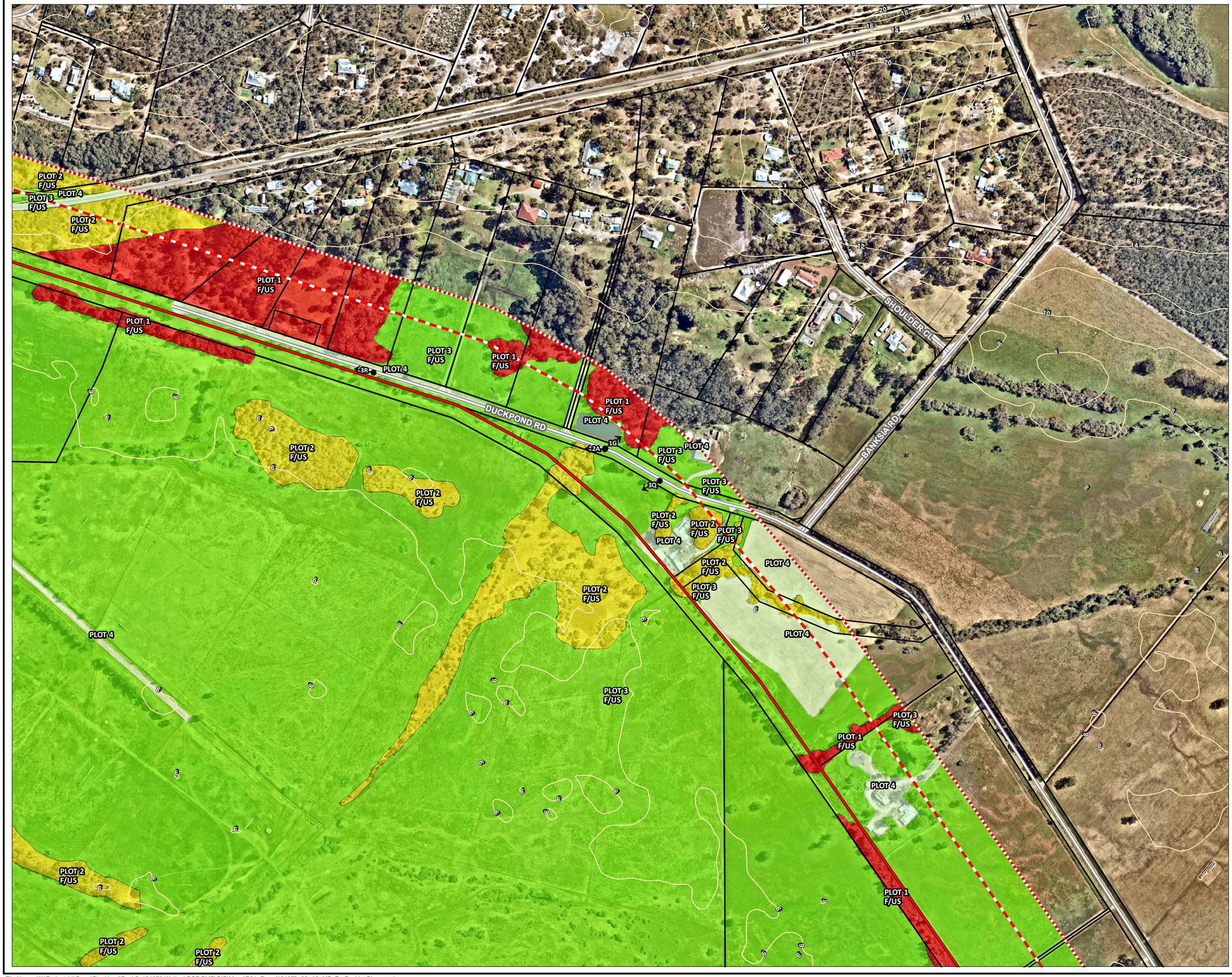
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE: 3 - Page 3 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_03_A3_MB_PreDevVegClass.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

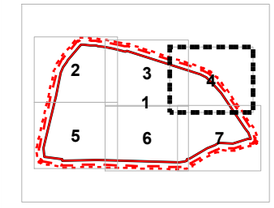


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Vegetation classification

- Class A Forest
- Class D Scrub
- Class G Grassland
- Clause 2.2.3.2 (e) & (f)
- Photo point directions
- Topographic contours (mAHD)
- Roads



strategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE: 3 - Page 4 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_03_A3_MB_PreDevVegClass.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

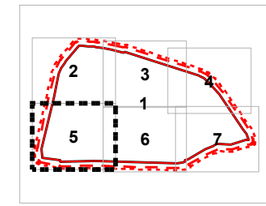
Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Vegetation classification

- Class A Forest
- Class D Scrub
- Class G Grassland
- Clause 2.2.3.2 (e) & (f)

- Photo point directions
- Topographic contours (mAHD)
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

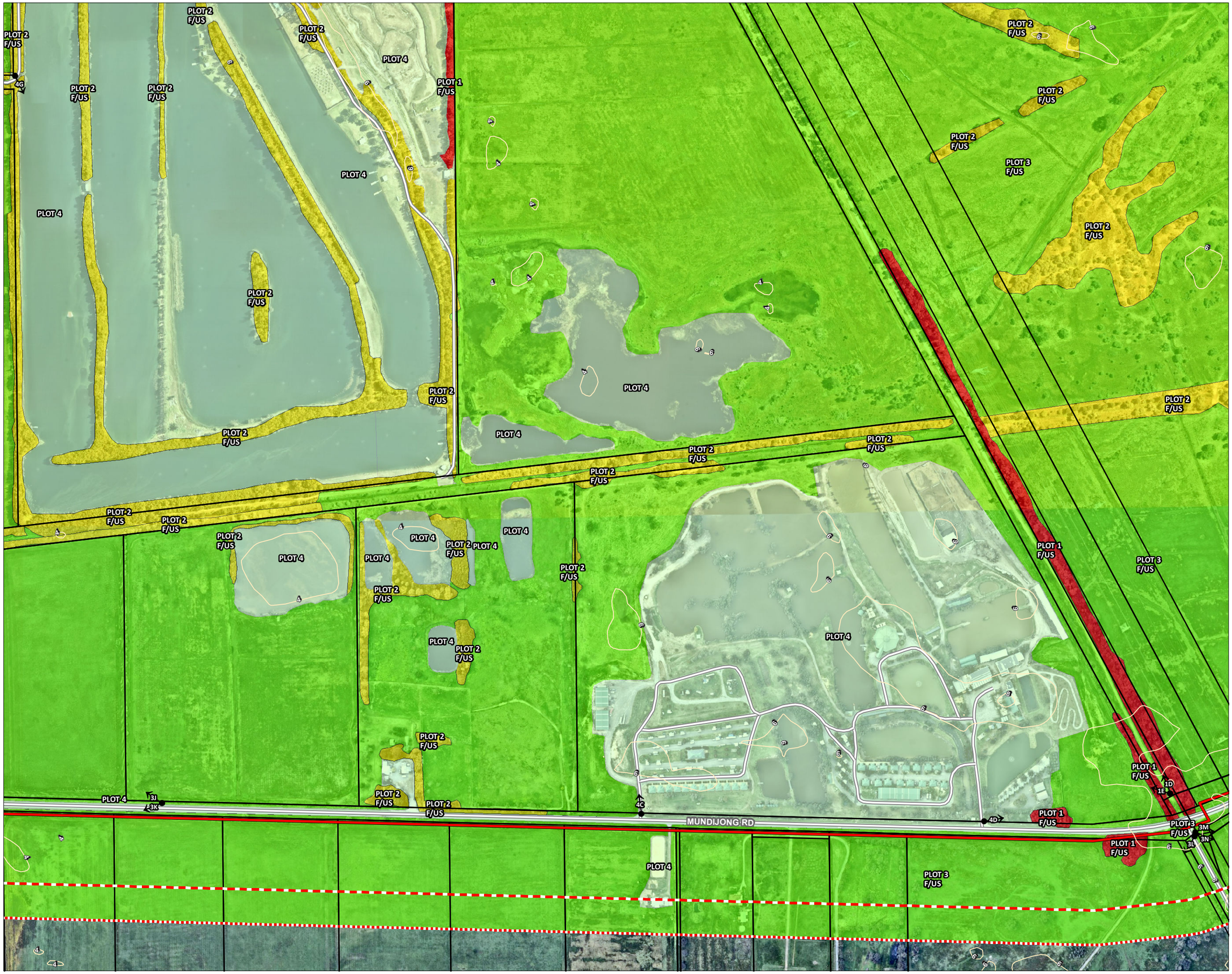
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE: 3 - Page 5 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_03_A3_MB_PreDevVegClass.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

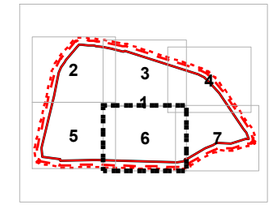


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Vegetation classification

- Class A Forest
- Class D Scrub
- Class G Grassland
- Clause 2.2.3.2 (e) & (f)
- Photo point directions
- Topographic contours (mAHD)
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

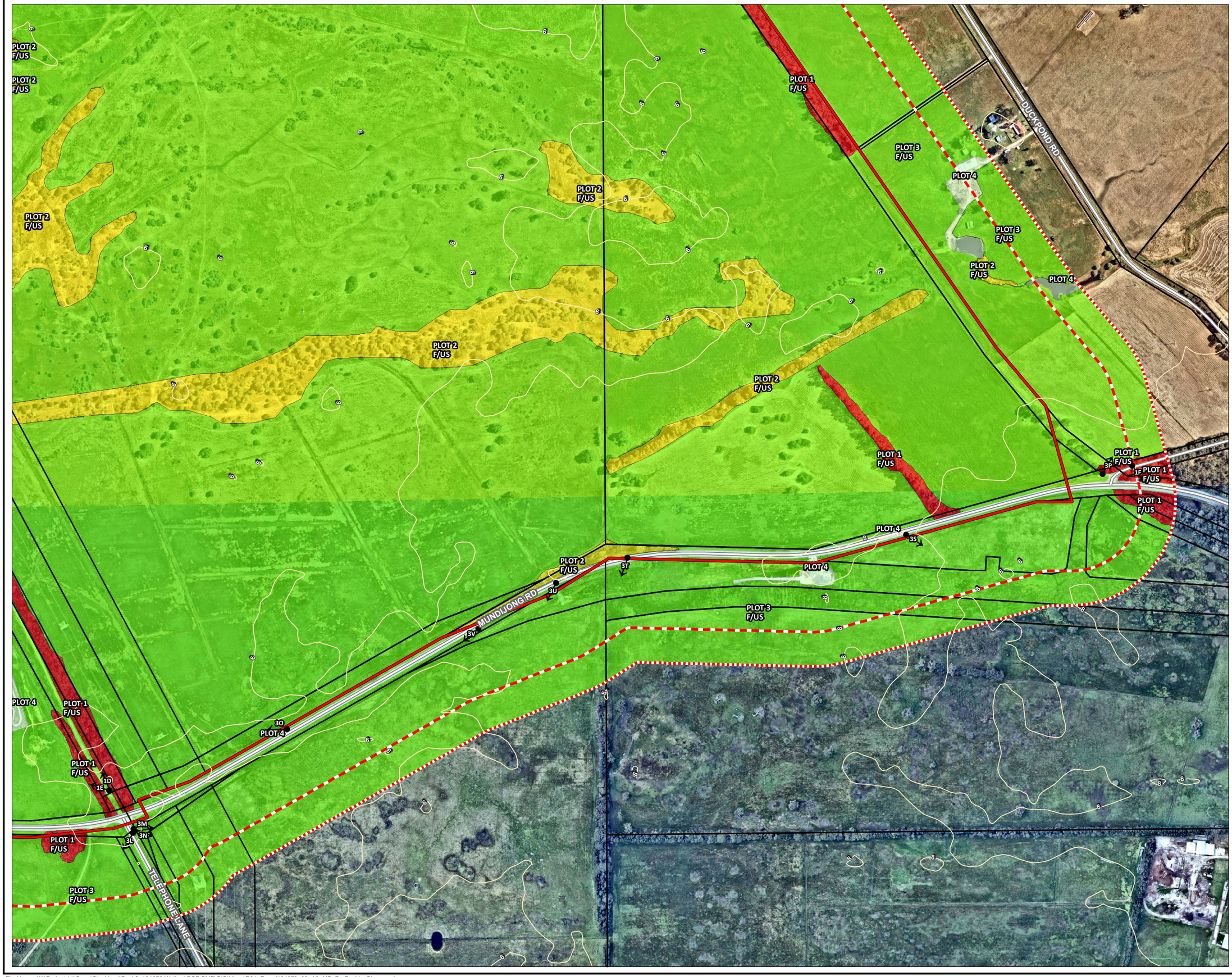
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE: 3 - Page 6 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_03_A3_MB_PreDevVegClass.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

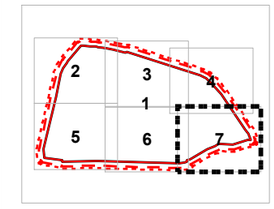


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Vegetation classification

- Class A Forest
- Class D Scrub
- Class G Grassland
- Clause 2.2.3.2 (e) & (f)
- Photo point directions
- Topographic contours (mAHD)
- Roads



strategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE: 3 - Page 7 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_03_A3_MB_PreDevVegClass.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

3.2 Assessment outputs

3.2.1 Bushfire Hazard Level (BHL) assessment

Pre-development vegetation extents have been assigned a bushfire hazard level in accordance with the methodology detailed in Appendix Two of the Guidelines as outlined in Table 3.

Table 3: Bushfire hazard levels and characteristics

Bushfire hazard level	Characteristics*
Extreme	• Class A Forest • Class B Woodland (05) • Class D Scrub • Any classified vegetation with a greater than 10° slope.
Moderate	• Class B Low woodland (07) • Class C Shrubland • Class E Mallee/Mulga • Class G Grassland, including sown pasture and crops • Class G Grassland: Open woodland (06), Low open woodland (08), Open shrubland (09) • Vegetation that has a low hazard level but is within 100 metres of vegetation classified as a moderate or extreme hazard, is to adopt a moderate hazard level.
Low	• Low threat vegetation may include areas of maintained lawns, golf courses, public recreation reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks • Managed grassland in a minimal fuel condition (insufficient fuel is available to significantly increase the severity of the bushfire attack). For example, short-cropped grass to a nominal height of 100 millimetre • Non-vegetated areas including waterways, roads, footpaths, buildings and rock outcrops.
*Vegetation classifications from AS 3959-2018 Table 2.3.	

3.2.1.1 Pre-development BHLs

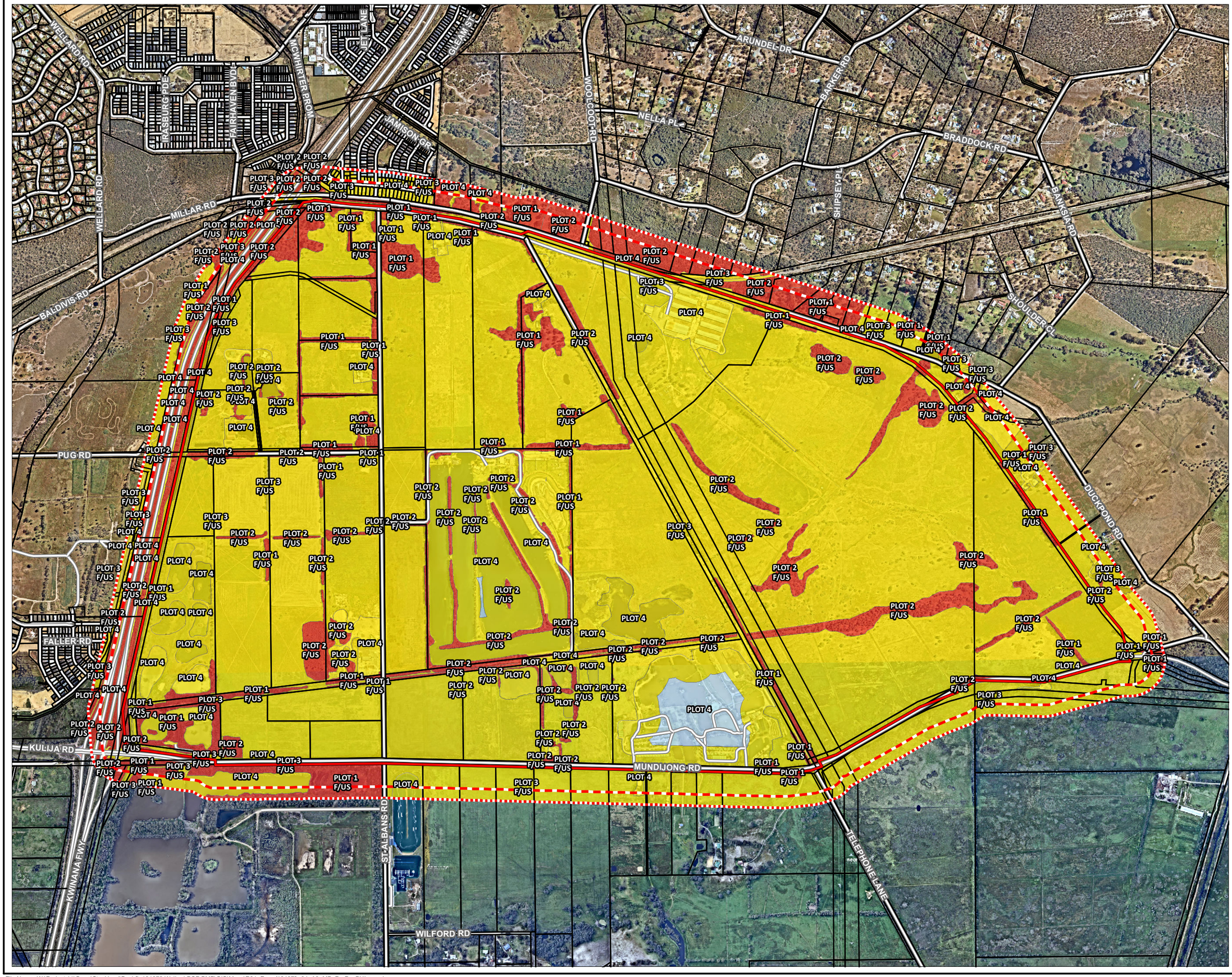
The pre-development bushfire hazard levels have been mapped within the project area and adjacent 150 m. The bushfire hazard levels have been assessed on the basis of the vegetation discussed in Section 3.1.3 (i.e. the current pre-development extent of vegetation within and surrounding the project area).

The pre-development BHL assessment (refer to Figure 4) indicates that based on the existing vegetation, the project area contains land with a combination of:

- Low BHL (approximately 1.4% of project area)
- Moderate BHL (approximately 88.3% of project area)
- Extreme BHL (approximately 10.3% of project area).

The significant extent of Moderate BHL land contained within the project area, equating with the significant extent of Class G grassland vegetation (i.e. cleared rural land), implies that the proposed extent of urban development intensification can be readily catered for on site within the current bushfire risk context.

Whilst Extreme BHL vegetation occupies 10.3% of the project area, this occurs primarily along narrow linear infrastructure corridors including roads, fences, drainage lines and easements with reduced bushfire behaviour potential. This presents a more manageable bushfire risk context compared to if the Extreme BHL vegetation was retained within large tracts of intact bushland.

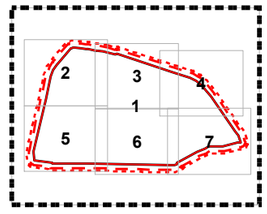


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Hazard level

- Extreme
- Moderate
- Low
- Roads



strategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:15,000 at A3

0 100 200
metres

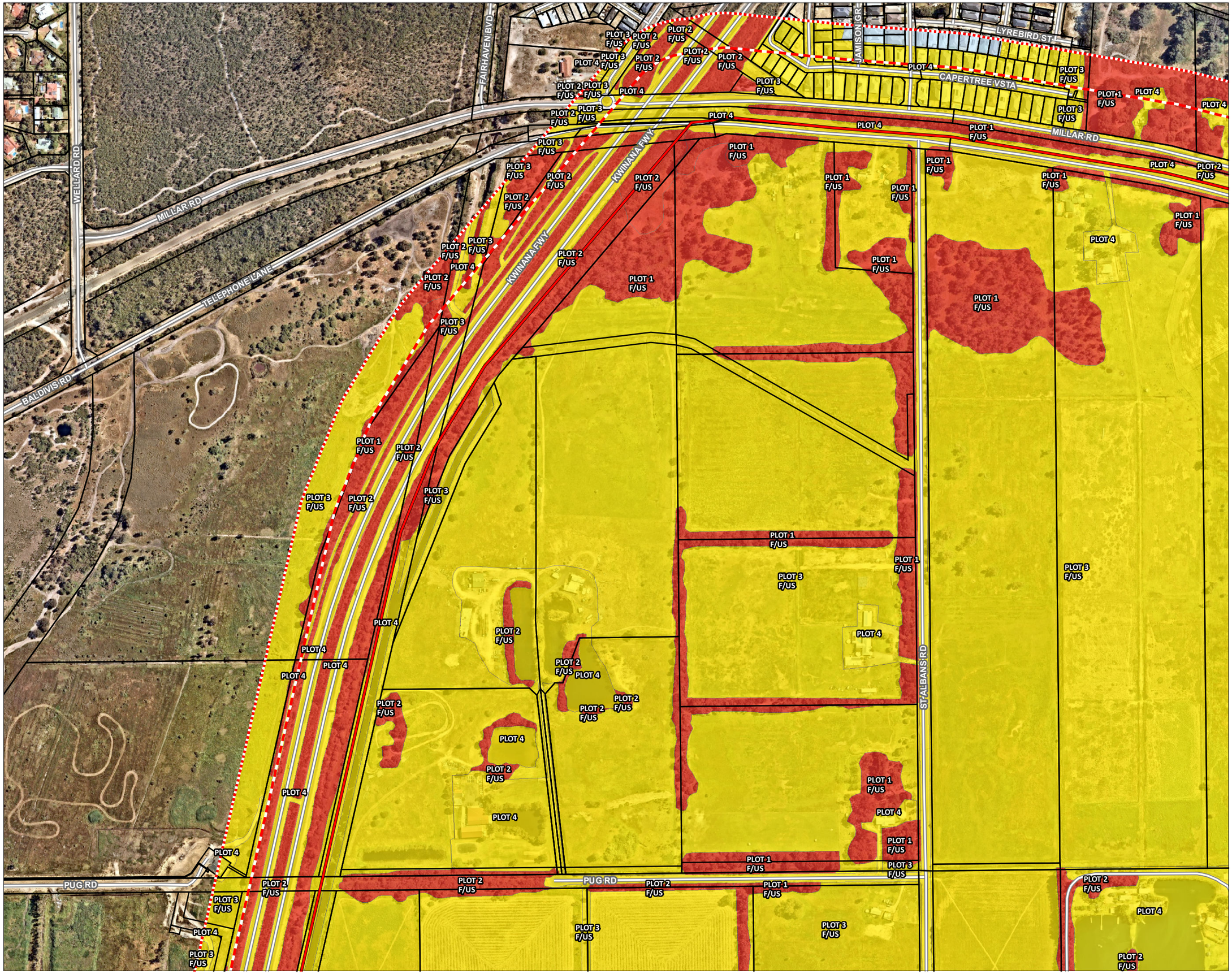
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT BUSHFIRE HAZARD LEVELS

FIGURE: 4 - Page 1 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_04_A3_MB_PreDevBHLs.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

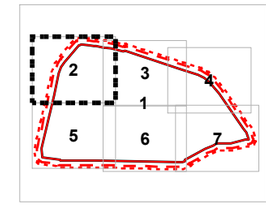


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Hazard level

- Extreme
- Moderate
- Low
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

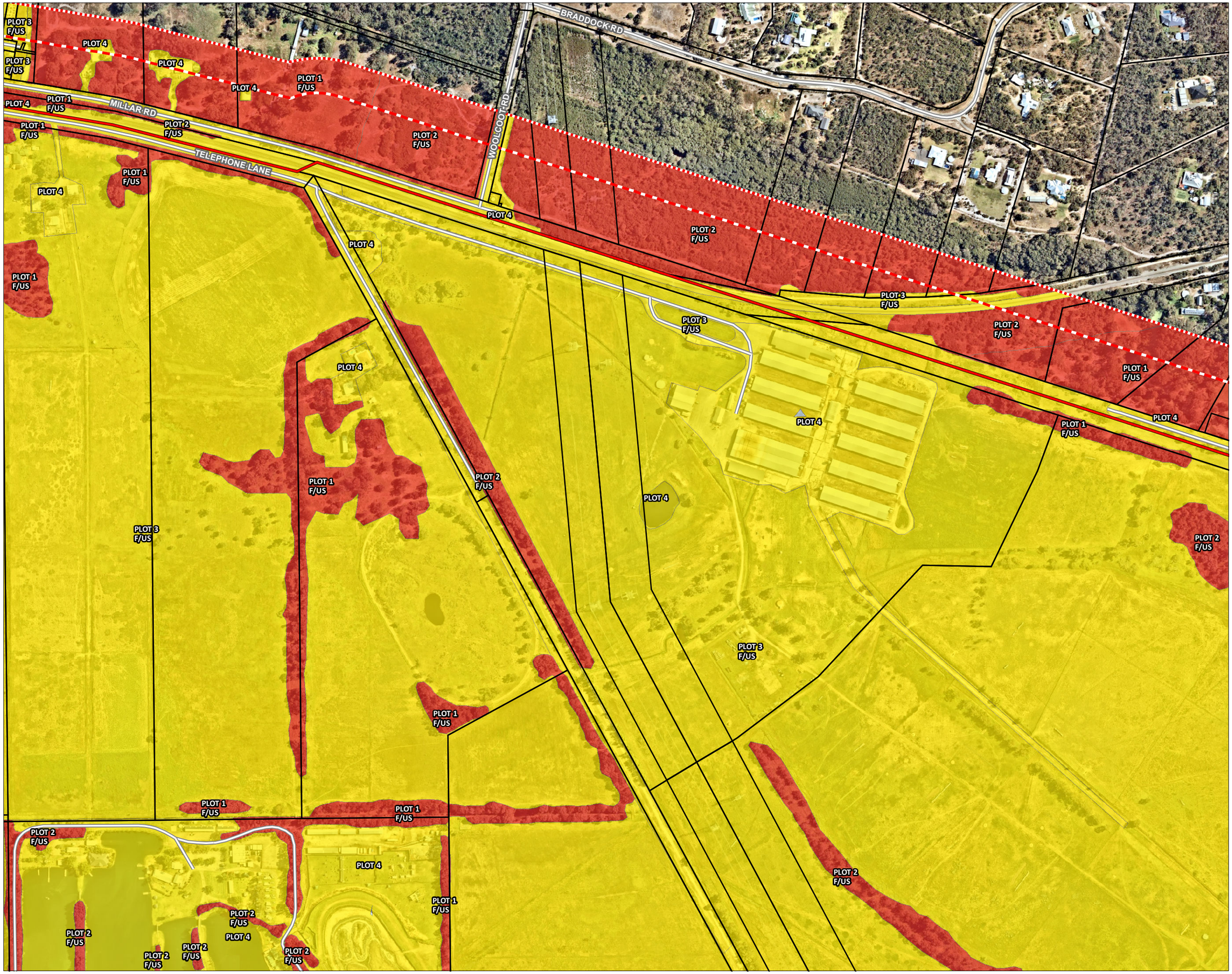
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT BUSHFIRE HAZARD LEVELS

FIGURE: 4 - Page 2 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_04_A3_MB_PreDevBHLs.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

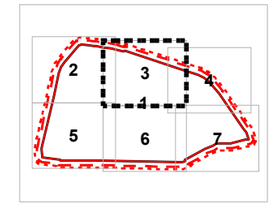


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Hazard level

- Extreme
- Moderate
- Low
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

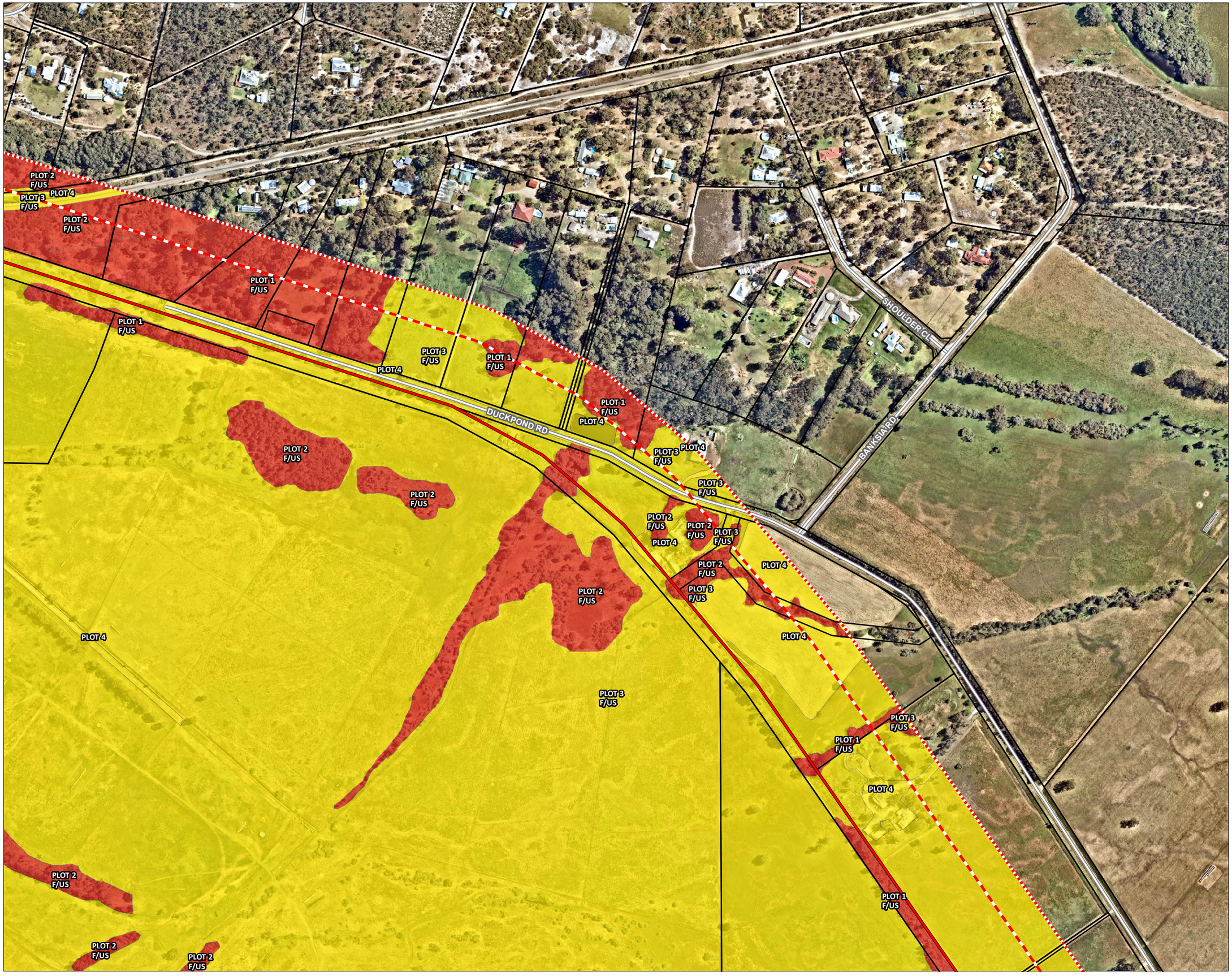
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT BUSHFIRE HAZARD LEVELS

FIGURE: 4 - Page 3 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_04_A3_MB_PreDevBHLs.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

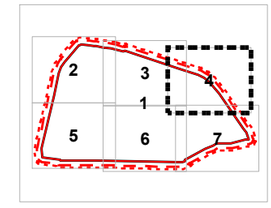


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Hazard level

- Extreme
- Moderate
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

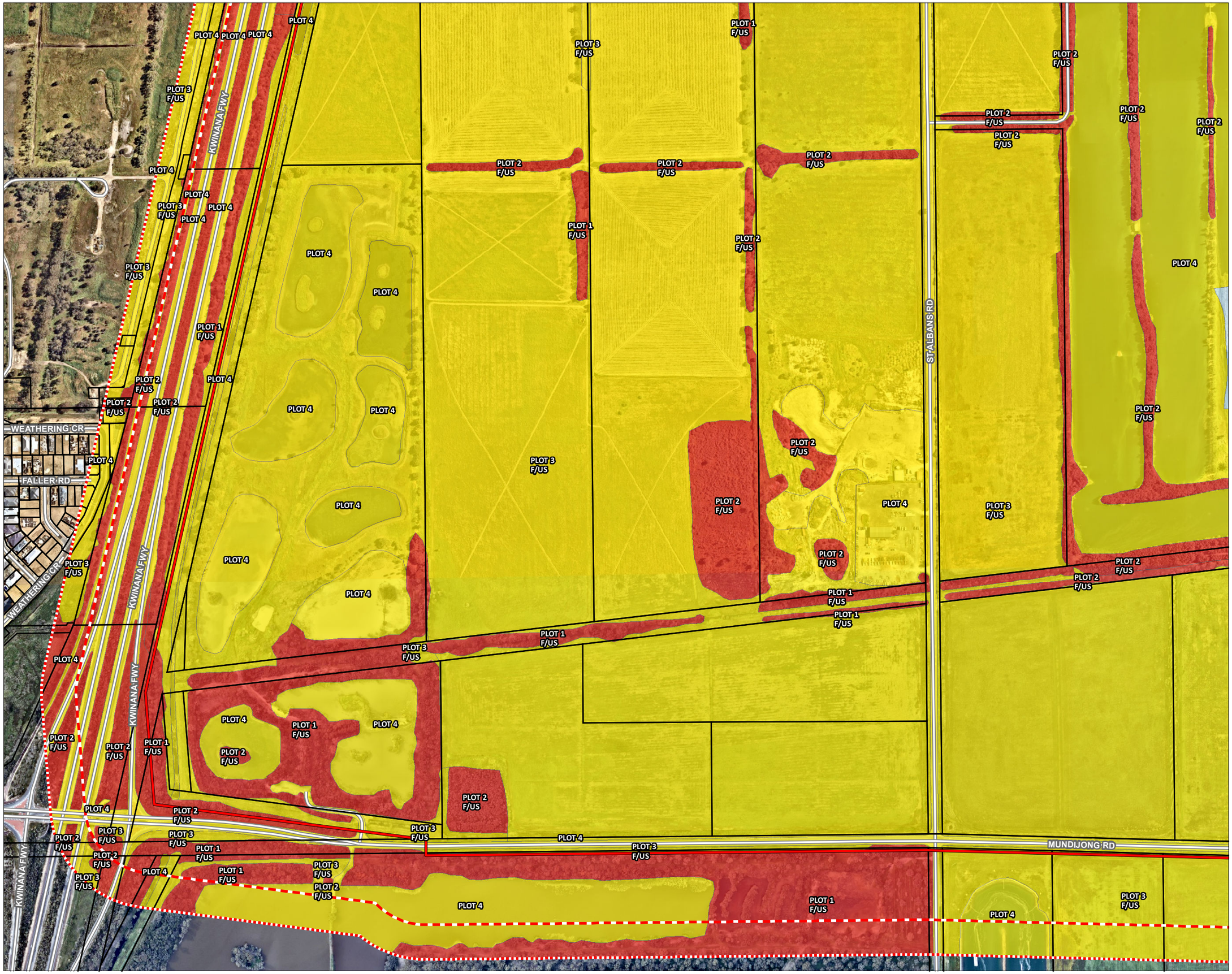
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT BUSHFIRE HAZARD LEVELS

FIGURE: 4 - Page 4 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_04_A3_MB_PreDevBHLs.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

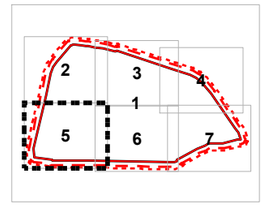


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Hazard level

- Extreme
- Moderate
- Low
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

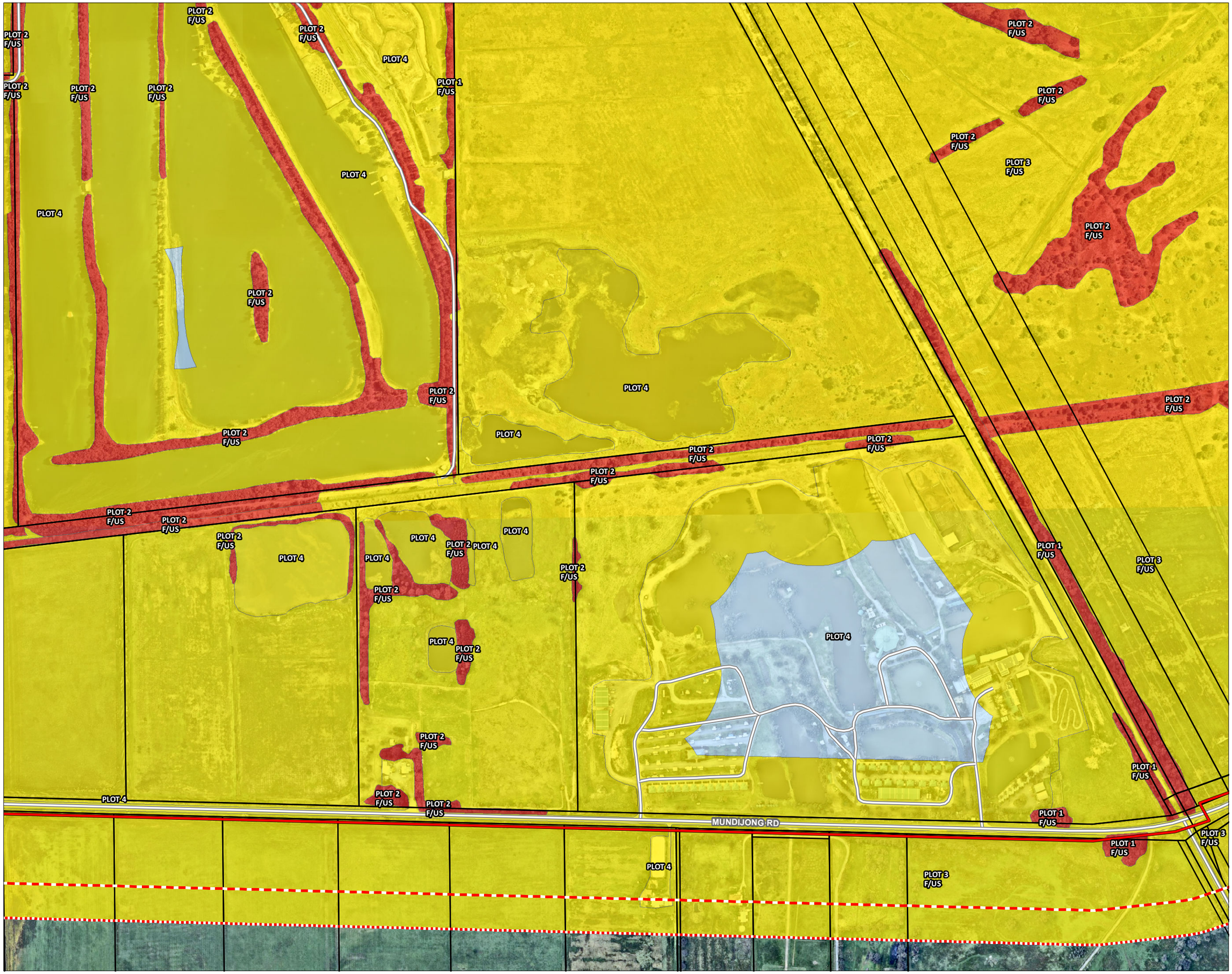
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT BUSHFIRE HAZARD LEVELS

FIGURE: 4 - Page 5 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_04_A3_MB_PreDevBHLs.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

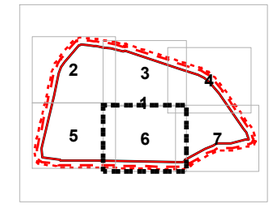


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Hazard level

- Extreme
- Moderate
- Low
- Roads



strategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

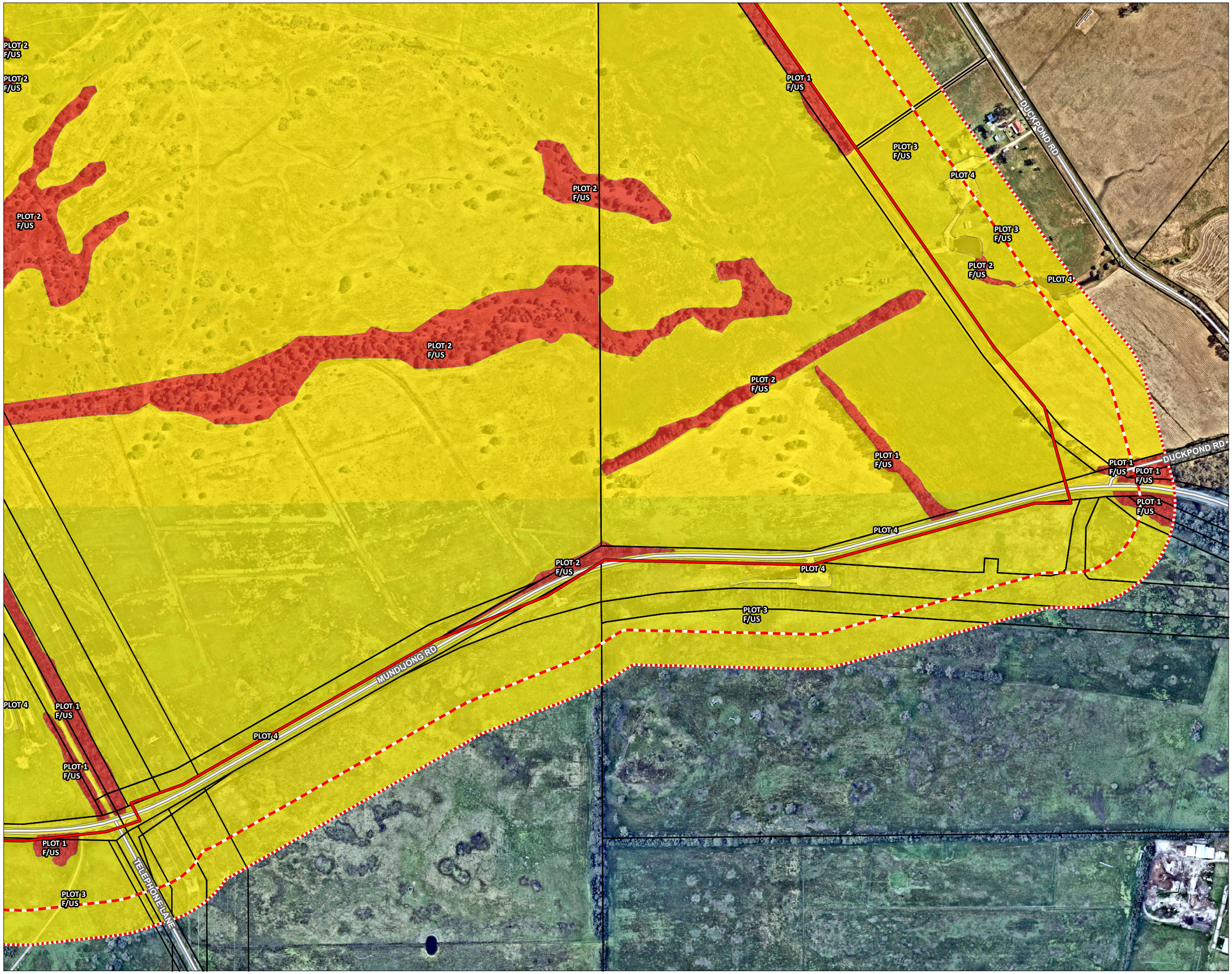
Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT BUSHFIRE HAZARD LEVELS

FIGURE: 4 - Page 6 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_04_A3_MB_PreDevBHLs.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

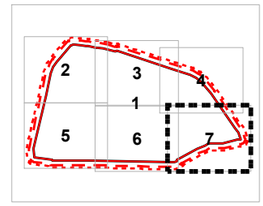


Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary

Hazard level

- Extreme
- Moderate
- Roads



stategen JBS&G

Job No: 64079	
Client: Stockland	
Version: A	Date: 08-Dec-2022
Drawn By: jcrute	Checked By: CT

Scale 1:5,000 at A3

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

Wellard Farms, Baldivis, WA

PRE-DEVELOPMENT BUSHFIRE HAZARD LEVELS

FIGURE: 4 - Page 7 of 7

File Name: W:\Projects\1)Open\Stockland\Bushfire\64079 Wellard DSP BMP\GIS\Maps\R01_Rev_A\64079_04_A3_MB_PreDevBHLs.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30. September 2022.

4. Identification of bushfire hazard issues

4.1 Bushfire context

The project area is situated in an evolving landscape of urban development at the rural-urban interface and, whilst the on-site and adjacent vegetation extent has the potential to carry bushfire, the majority extent of grassland and flat terrain throughout the landscape indicates that bushfire behaviour will be moderated and manageable in the context of present day urban development requirements including design compliance with Guideline acceptable solutions.

The project area is bound by multiple infrastructure corridors in all directions (i.e. Kwinana Freeway to the west, Telephone Lane/heavy freight rail line/Millars Road to the north, Duckpond Road to the east and Mundijong Road to the south). This provides significant fragmentation of vegetation and bushfire hazards, particularly intact forest and scrub fuels to the north, northeast and northwest where the bulk of the bushfire risk to the site originates from. In addition, these infrastructure corridors also provide perimeter access opportunities for the project area to ensure there is sufficient public and emergency vehicular access. This, in the context of the predominant grassland coverage within the project area and surrounding landscape, provides a highly manageable bushfire environment for proposed urban development. Interface treatments with adjacent areas of classified vegetation will be one of the key management requirements going forward, particularly where the adjacent vegetation extent comprises a forest or scrub classification.

Whilst there are significant grassland fire runs from the south and east, JBS&G considers the highest risk bushfire scenarios for proposed urban development are from the northern quadrant in response to the predominant forest and scrub fuels opposite Millar Road. Bushfire spread from the north throughout these fuels has the potential to result in elevated bushfire behaviour, particularly under worst case fire weather conditions and prevailing winds from the north. The potential impacts on proposed development are expected to be elevated levels of radiant head and ember attack. These impacts would be mitigated by the existing separation and perimeter access provided by Millars Road, Telephone Lane and the heavy freight rail line, plus any residual mitigation provided internally for the project area through a design response. On this basis, the potential bushfire impacts from the northern (worst case) bushfire scenario can be adequately mitigated within the framework of SPP3.7 and Guideline compliance.

Bushfire scenarios from the west, south and east will be predominantly grassland driven, with possible brief bursts of elevated fire behaviour throughout small pockets of short fire run forest and scrub vegetation. Whilst these scenarios still pose a bushfire risk to the site, the existing separation and perimeter access provided by Kwinana Freeway to the west, Mundijong Road to the south and Duckpond Road to the east, plus any residual mitigation provided internally for the project area through a design response, will be sufficient to manage the bushfire risk in accordance with SPP3.7 and Guideline requirements.

Bush Fire Brigades stationed at Mandogalup (Mandogalup Volunteer Bush Fire Brigade), Oakford (Oakford Volunteer Bushfire Brigade) and Wellard (Kwinana South Volunteer Bush Fire Brigade) are expected to provide a best-case emergency suppression response time of 10-20 minutes should a bushfire threaten development within the project area.

4.2 Bushfire hazard issues

Examination of strategic development design in accordance with the DSP and pre-development BHLs has identified the following bushfire hazard issues to be considered at future planning stages:

1. The project area currently contains on-site areas of Extreme BHL (approximately 10.3% of the project area). However, it is recognised that a large proportion of the site will be modified to a low threat state following proposed urban development. While development design at this strategic DSP stage does not contain sufficient detail to inform future design and compliance, future assessments will be undertaken when the details are available to ensure that all proposed habitable development will be located on land with a Low or Moderate BHL that can sufficiently deliver BAL-29 or lower. Confirming the extent of proposed urban development versus vegetation retention/revegetation areas will be crucial in delivering compliant bushfire design as planning stages progress. A detailed BAL contour assessment will be undertaken at future planning stages (i.e. subdivision) to provide accuracy around lot design and demonstrate in detail that all proposed habitable development will be located within areas of BAL-29 or below.
2. Based on the current assessment, the following minimum separation distances will need to be applied between areas of proposed habitable development and post-development classified vegetation to achieve BAL-29:
    a. Class A forest: 21 m
    b. Class D scrub: 13 m
    c. Class G grassland: 8 m.
3. Given a large proportion of the site is expected to occupy a combination of DOS, POS, flood storage and conservation wetland retention, confirmation of low threat landscape treatments versus non-low threat landscape treatments, as well as potential revegetation throughout these open space areas will be crucial in informing compliant bushfire design as planning stages progress, particularly where these areas interface with proposed urban/habitable development. Landscape concepts/plans will need to be prepared to support future planning stages (i.e. Structure Plan and subdivision) to confirm vegetation classifications/exclusions throughout open space areas and inform development design responses where required.
4. As the project area contains bushfire prone vegetation in a pre-development state, staged construction at the subdivision stage of planning is to consider the BAL impacts from adjacent future stages that have not yet been developed. Low threat staging buffers up to 100 m in width may need to be implemented around active stages of development to ensure there is no residual impact from any temporary vegetation that has not yet been cleared or landscaped to achieve a low threat state.
5. The surrounding public road network, as depicted in the current DSP design in Figure 1, offers multiple vehicular access opportunities to suitable destinations in accordance with acceptable solution A3.2a of the Guidelines, including:
    a. Telephone Lane to the north/northwest, which provides access west towards Baldivis Road and Wellard Road
    b. Mundijong Road to the south, which provides access west towards Kwinana Freeway/Kulija Road or east towards Mundijong
    c. Kwinana Freeway to the west (as accessed from Mundijong Road), which provides access north or south throughout the broader Perth Metropolitan Area.

Further to the above, since proposed development will occur in stages, staging of development is to ensure that at least two vehicular access routes are always provided in accordance with acceptable solution A3.2a of the Guidelines. This may require provision of temporary staging measures such as temporary compliant no-through roads and/or Emergency Access Ways (EAWs) to deliver compliant access outcomes for individual stages.

6. The abovementioned vehicular access provisions (i.e. Telephone Lane, Mundijong Road and Kwinana Freeway) also provide perimeter access for the project area in accordance with acceptable solution A3.4a of the Guidelines.

   Extension of Duckpond Road west through to Telephone Lane along the northern perimeter of the project area should be considered to resolve the legacy non-compliant no-through road to provide additional perimeter access for the project area, as well as community benefit for the existing residents along Duckpond Road via secondary access west to Telephone Lane.

   Perimeter access will also need to be considered at the interface between proposed habitable development and any internal vegetation hazards that are retained or introduced through revegetation, such as flood storage and conservation wetland retention areas.

7. A reticulated water supply and network of street hydrants is expected to be readily achievable for the project area via extension of services from adjacent urban development areas. This is to be confirmed as part of future planning stages.

Based on the above, JBS&G considers the bushfire hazards within and adjacent to project area and the associated bushfire risks are readily manageable through standard acceptable solution 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. Assessment against the bushfire protection criteria

5.1.1 Compliance with Elements 1–4

Demonstration that the proposed development can comply with relevant acceptable solutions of Elements 1–4 of the bushfire protection criteria of the Guidelines (Version 1.4) is outlined in Table 4.

Table 4: Compliance with the bushfire protection criteria of the Guidelines

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Proposed bushfire management strategies	Compliance achievable at future planning stages
Element 1: Location	**P1** – 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. 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.	**A1.1 Development location** 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.	The pre-development BHL assessment (Figure 4) identifies that the project area currently contains land with Low (1.4%), Moderate (88.3%) and Extreme (10.3%) bushfire hazard levels. The majority extent of Moderate BHL over the project area is indicative of the predominant grassland hazards, which are readily manageable from a bushfire risk and development compliance perspective. Given the size of the site and significant coverage of land with a Low–Moderate BHL within the project area, there is considered to be sufficient space to locate all proposed habitable development within areas of Low–Moderate BHL. Consideration will need to be given to any on-site and external classified vegetation and the appropriate separation distances necessary for habitable development to achieve BAL—29 or lower. As mentioned above, the project area is considered of sufficient size such that any interface with post-development classified vegetation could be readily accommodated via compliant subdivision design to ensure all future habitable development can achieve BAL-29 or lower (refer to minimum BAL-29 separation distances under Item 2 of Section 4.2). This will be demonstrated through preparation of a subdivision stage BMP and accompanying BAL contour map.	✓
Element 2: Siting and design	**P2** – 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 defendable 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.	**A2.1 Asset Protection Zone** Every habitable building is surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the requirements set out in Schedule 1.	Any APZs required for future habitable development to achieve BAL—29 are to be implemented for all relevant lots where required. Should they be required, APZs will be identified at future planning stages based on future subdivision/development design and following a BAL contour assessment. As mentioned previously, refer to the minimum BAL-29 separation distances under Item 2 of Section 4.2. Any APZs are to be implemented and maintained in accordance with Schedule 1 of the Guidelines (Appendix C).	✓
Element 3: Vehicular access	**P3i** – The design and capacity of vehicular access and egress is to provide for the community to evacuate to a suitable destination before a bushfire arrives at the site, allowing emergency services personnel to attend the site and/or hazard vegetation.	**A3.1 Public roads** *The minimum requirements under this acceptable solution are applicable to all proposed and existing public roads.* Public roads are to meet the minimum technical requirements in 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.	All proposed public roads established as part of the DSP will be required to meet the technical requirements of the Guidelines (Appendix B). This will be confirmed at the subdivision stage of planning.	✓

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Proposed bushfire management strategies	Compliance achievable at future planning stages
		A3.2a Multiple access routes 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: • 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.	The project area is surrounded by existing public roads that provide multiple access routes to suitable destinations, including Kwinana Freeway to the west, Mundijong Road to the south and Telephone Lane to the north. Determination of internal road alignments and through access within the project area will be required to ensure that the existing and future road network will provide all occupants with the option of travelling to multiple suitable destinations, including during staging of development.	✓
		A3.2b Emergency access way *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.* An emergency access way is to meet all the following requirements: • 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.	Based on the DSP, the proposed development would not require any permanent emergency access ways (EAWs) to provide through access to a public road if it can be demonstrated that all internal public roads will ultimately have public road connections to the surrounding public road network. The internal road network will be determined at future planning stages to ensure that this requirement is achieved. Any temporary EAWs required to address staged development are to be constructed to the relevant technical requirements of the Guidelines (see Appendix B).	✓
		A3.3 Through-roads All public roads should be through-roads. No-through roads should be avoided and should only be considered as an acceptable solution where: • 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. A no-through road is to meet all the following requirements: • requirements of a public road (Table 6, Column 1); and • turn-around area as shown in Figure 24.	The DSP aims to deliver through roads for all proposed public roads. Any no-through roads that are unavoidable due to site constraints, or required to address staged development, must be designed and constructed in compliance with relevant technical requirements of the Guidelines (refer to Appendix B).	✓
	P3ii – The design of vehicular access and egress provides: • access and egress for emergency service vehicles while allowing the community to evacuate; • a defendable space for emergency services personnel on the interface • between classified vegetation and development site; and	**A3.4a Perimeter roads** 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: • 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. A perimeter road is to meet the requirements contained in Table 6, Column 1.	The project area is currently surrounded by perimeter roads in Kwinana Freeway to the west, Mundijong Road to the south, Telephone Lane to the north and Duckpond Road to the east (noting this road is slightly offset from the project area boundary). These perimeter roads will provide separation between proposed habitable development and external areas of classified vegetation, as well as public and emergency access at the external development interface. Provision of the proposed internal lot and road layout at the subdivision stage will determine whether additional perimeter roads are required internally within the project area to provide adequate separation between areas of internal classified vegetation and proposed habitable development.	✓

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Proposed bushfire management strategies	Compliance achievable at future planning stages
	• hazard separation between classified vegetation and the subject site to reduce the potential radiant heat that may impact a lot(s).	A perimeter road may not be required where: • 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.		
	P3iii – Vehicular access is provided which allows: • access and egress for emergency service vehicles; • defendable 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).	**A3.4b Fire service access route** *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.* A fire service access route is to meet all the following requirements: • 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.	No permanent fire service access routes (FSARs) are expected to be required; however, if development and construction of vehicular access is to be staged, any proposed temporary FSARs are to be constructed to the relevant technical requirements of the Guidelines (see A3.4b and Appendix B).	✓
	P3iv – Vehicular access is provided which allows emergency service vehicles to directly access all habitable buildings and water supplies and exit the lot without entrapment.	**A3.5 Battle-axe access legs** *Where it is demonstrated that a battle-axe cannot be avoided due to site constraints, it can be considered as an acceptable solution.* There are no battle-axe technical requirements where the point the battle-axe access leg joins the effective area of the lot, is less than 50 metres from a public road in a reticulated area. 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: • 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).	Not applicable at this stage. Battle-axe provisions are considered at the subdivision planning stage. However, no battle-axes are expected to be proposed as part of future subdivision design and the project area is not serviced by an existing battle-axe.	N/A
		A3.6 Private driveways There are no private driveway technical requirements where the private driveway is: • 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.	Not applicable at this stage. Private driveways are considered at the Development Application planning stage. However, there are not anticipated to be any private driveway technical requirements applicable to the proposed development, as all future habitable buildings are expected to be located no more than 70 m from a public road with a speed limit below 70 km/hr given the residential nature of the proposed development. In addition, the lots will be serviced by a reticulated water supply. In this regard, private driveway technical provisions are not anticipated to apply at future development stages.	N/A

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Proposed bushfire management strategies	Compliance achievable at future planning stages
		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: • 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.		
Element 4: Water	No performance principle applies	**A4.1 Identification of future water supply** Evidence that a reticulated or sufficient non-reticulated water supply for bushfire fighting can be provided at the subdivision and/or development application stage, in accordance with the specifications of the relevant water supply authority or the requirements of Schedule 2. Where the provision of a strategic water tank(s) is required a suitable area within a road reserve or a dedicated lot the location should be identified, should be identified on the structure plan, to the satisfaction of the local government.	It is anticipated that proposed urban development throughout the site will be connected to a reticulated water supply and street hydrants network via extension of services from surrounding urban development areas that will meet the specifications of Water Corporation (Design Standard DS 63).	✓
	P4 – Provide a permanent water supply that is: • sufficient and available for firefighting purposes; • constructed from non-combustible materials (e.g. steel), or able to maintain its integrity throughout a bushfire; and • accessible, with legal access for maintenance and re-filling by tankers and emergency service vehicles.	**A4.2 Provision of water for firefighting purposes** 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: • 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, then the following requirements apply: – 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). 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.	Not applicable at this stage. The provision of water for firefighting purposes is considered at the subdivision and/ or Development Application planning stages. However, the proposed development will be connected to reticulated water supply.	N/A

6. Responsibilities for implementation and management of the bushfire measures

This BMP has been prepared as a strategic guide to support the DSP And MRS amendment stages in demonstrating how development compliance will be delivered at future planning stages in accordance with the Guidelines. Aside from the preparation of future BMPs to accompany future Structure Plan, subdivision and Development Applications where appropriate, there are no further items to implement, enforce or review at this strategic stage of the planning process.

Future BMPs prepared for subsequent Structure Plans, subdivisions and Development Applications are to meet the relevant commitments outlined in this strategic level BMP, address the relevant requirements of SPP 3.7 (i.e. Policy Measures 6.3, 6.4 and 6.5 respectively) and demonstrate in detail how the proposed development will incorporate the relevant acceptable solutions or meet the performance requirements of the Guidelines. Future BMPs are to include the following detailed information:

- proposed development cell layout for Structure Plans, lot layout for subdivisions or development layout for Development Applications
- landscaping details confirming any low threat or classifiable vegetation throughout DOS, POS, multiple use (flood storage) and conservation wetland retention areas
- confirmation of the post-development classified vegetation extent, effective slope, exclusions and separation distances
- post development BHL assessment and/or BAL contour mapping for Structure Plans and detailed BAL contour mapping for subdivisions and DAs demonstrating that proposed habitable development areas will achieve a Low–Moderate BHL and/or rating of BAL–29 or lower
- width and alignment of compliant APZs (if applicable), including any APZ setback requirements for individual lots
- confirmation of how bushfire management will be addressed regarding temporary vegetation/bushfire hazards on adjacent future development stages, including low threat staging buffers or temporary quarantining of lots where required
- vehicular access provisions, including demonstration that a minimum of two access routes will be achieved for each stage of development, including consideration of any temporary compliant access provisions such as no-through roads and EAWs
- provision of perimeter public roads or temporary compliant FSARs around the perimeter of vegetation hazards where required
- reticulated water supply provisions
- future requirements for any identified vulnerable land uses, such as provision of a Bushfire Emergency Evacuation Plan at the DA stage for the proposed primary school sites
- provisions for notification on Title for any future lots with a rating of BAL-12.5 or greater as a condition of subdivision
- compliance requirements with the annual City of Rockingham Fire Control Notice
- assessment against the bushfire protection criteria of the Guidelines demonstrating future compliance is achievable for Structure Plans, or demonstrating compliance has been achieved for subdivisions/development applications

- proposed audit and compliance program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation.

Based on the information contained in this BMP, JBS&G considers the bushfire hazards within and adjacent to the project area and the associated bushfire risks are readily manageable through standard acceptable solution responses outlined in the Guidelines. JBS&G considers that on implementation of the proposed management measures, to be confirmed as part of future BMPs prepared to accompany future, more detailed planning application stages, the project area will be able to be developed with a manageable level of bushfire risk whilst maintaining full compliance with SPP3.7, the Guidelines and AS 3959.

7. References

Department of Fire and Emergency Services (DFES) 2021, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from: https://maps.slip.wa.gov.au/landgate/bushfireprone/, [4/11/2022].

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

JBS&G 2023, *Environmental Assessment Report*, JBS&G Australia Pty Ltd, Perth WA.

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

Strategen 2018a, *Due diligence Baldivis, Mundijong Road Baldivis*, Strategen Environmental, Perth WA.

Strategen 2018b, *Desktop study – odour and dust impacts Wellard Farms*, Baldivis, Strategen Environmental, Perth WA.

Strategen-JBS&G 2020a, *Environmental Assessment Report*, JBS&G Australia Pty Ltd, Perth WA.

Strategen-JBS&G 2020b, *Level 1 Fauna Survey and Black Cockatoo Habitat Assessment*, JBS&G Australia Pty Ltd, Perth WA.

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.

8. Limitations

Scope of services

This report ("the report") has been prepared by JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. JBS&G has also not attempted to determine whether any material matter has been omitted from the data. JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to JBS&G. The making of any assumption does not imply that JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

Appendix A Vegetation plots – photographs and descriptions

Plot 1	
Vegetation classification	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: 1a

Photo ID: 1b

Photo ID: 1c

Photo ID: 1d

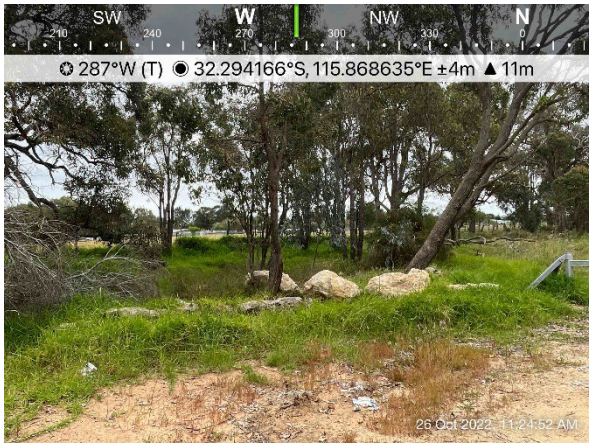


Photo ID: 1e

Photo ID: 1f

Plot 1	
 **Photo ID:** 1g	 **Photo ID:** 1h
 **Photo ID:** 1i	 **Photo ID:** 1j
 **Photo ID:** 1k	 **Photo ID:** 1l

Plot 1	
 **Photo ID:** 1m	 **Photo ID:** 1n
 **Photo ID:** 1o	 **Photo ID:** 1p

Plot 2	
Vegetation classification	Class D Scrub
Description / justification	Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity

Photo ID: 2a

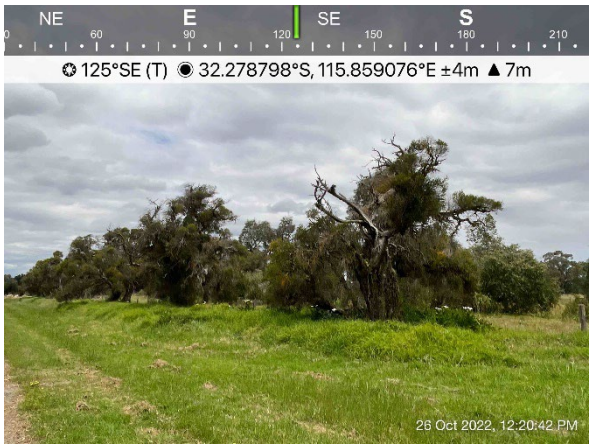


Photo ID: 2b

Photo ID: 2c

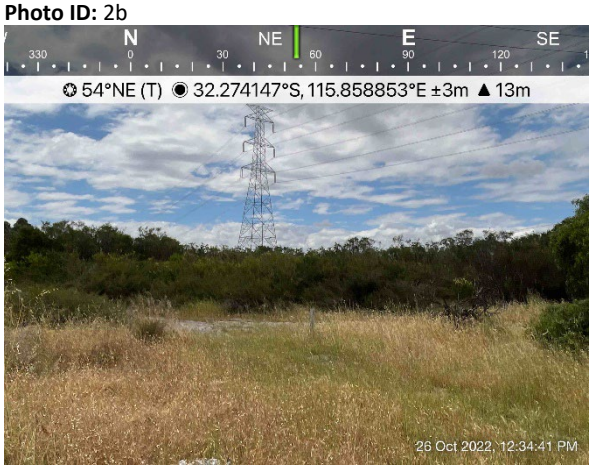
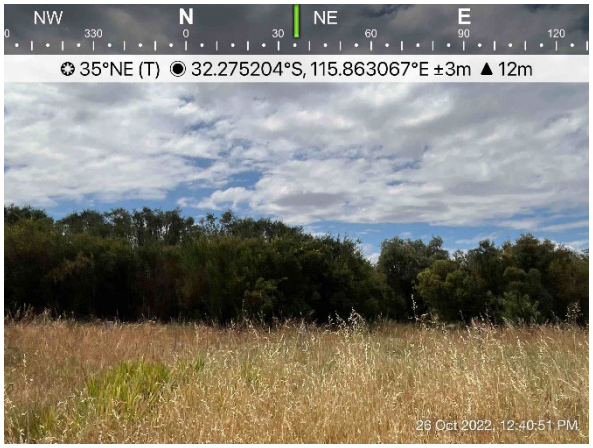


Photo ID: 2d

Photo ID: 2e

Photo ID: 2f

Plot 2	
 **Photo ID:** 2g	 **Photo ID:** 2h
 **Photo ID:** 2i	 **Photo ID:** 2j
 **Photo ID:** 2k	 **Photo ID:** 2l

Plot 2	
	
Photo ID: 2m	**Photo ID:** 2n
	
Photo ID: 2o	**Photo ID:** 2p
	
Photo ID: 2q	**Photo ID:** 2r

Plot 2	
 **Photo ID:** 2s	 **Photo ID:** 2t
 **Photo ID:** 2u	 **Photo ID:** 2v
 **Photo ID:** 2w	 **Photo ID:** 2x

Plot 2	
	
Photo ID: 2y	**Photo ID:** 2z

Plot 3	
Vegetation classification	Class G Grassland
Description / justification	Grassland at maturity, greater than 100 mm in height

Photo ID: 3a

Photo ID: 3b

Photo ID: 3c

Photo ID: 3d

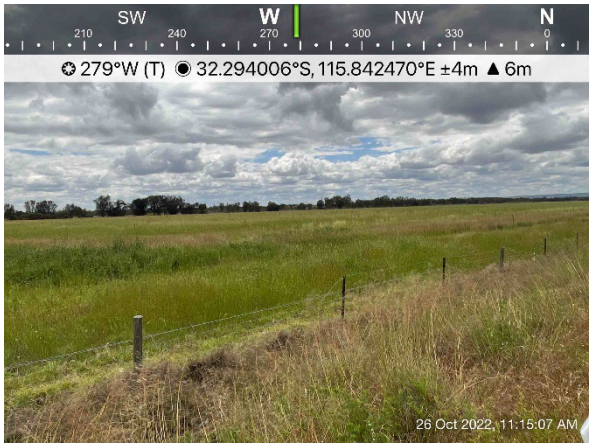


Photo ID: 3e

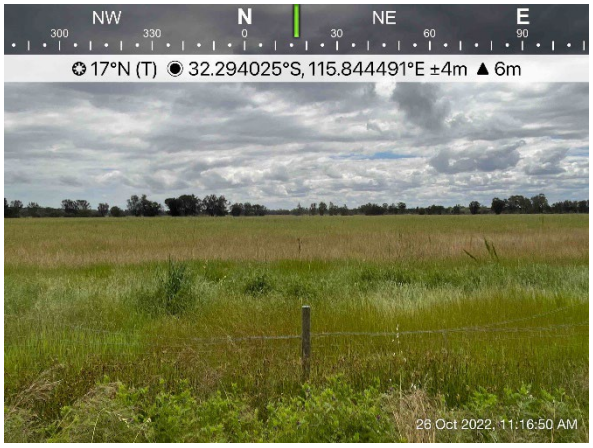


Photo ID: 3f

Plot 3

Photo ID: 3g

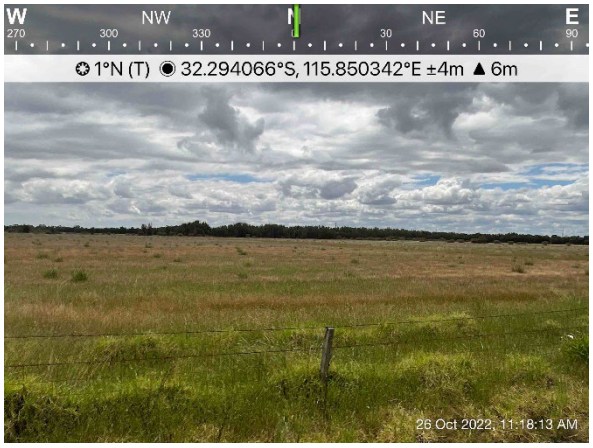


Photo ID: 3h

Photo ID: 3i

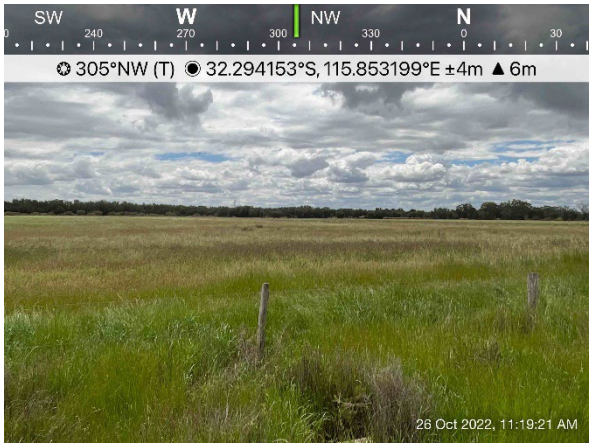


Photo ID: 3j

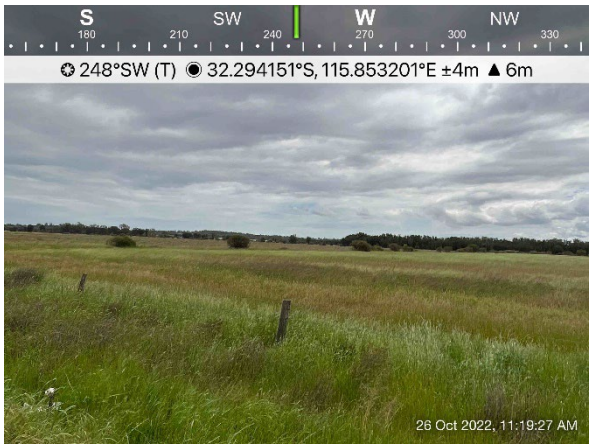
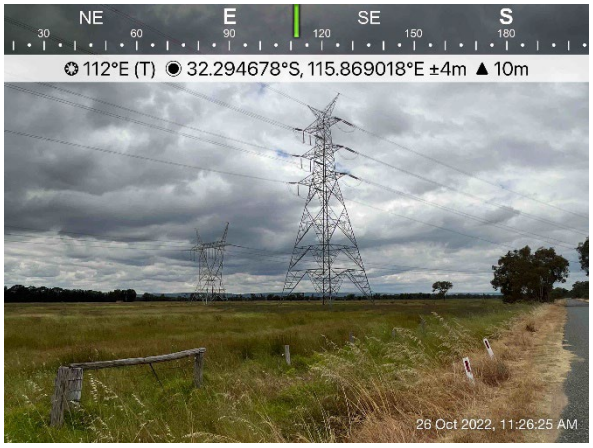
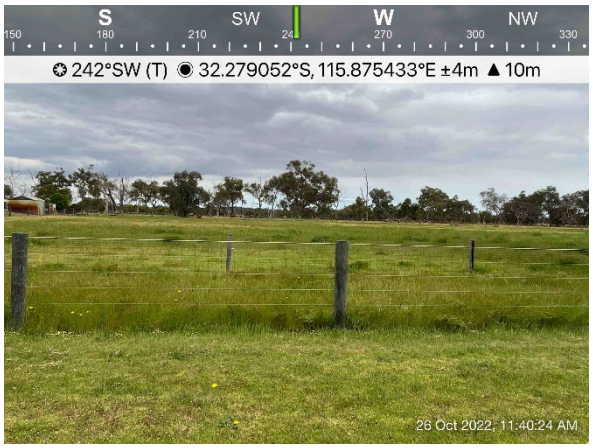


Photo ID: 3k

Photo ID: 3l

Plot 3	
 **Photo ID:** 3m	 **Photo ID:** 3n
 **Photo ID:** 3o	 **Photo ID:** 3p
 **Photo ID:** 3q	 **Photo ID:** 3r

Plot 3	
 **Photo ID:** 3s	 **Photo ID:** 3t
 **Photo ID:** 3u	 **Photo ID:** 3v
 **Photo ID:** 3w	 **Photo ID:** 3x

Plot 3

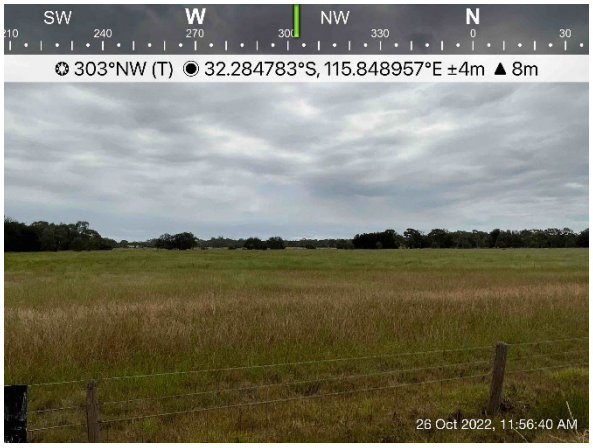


Photo ID: 3y

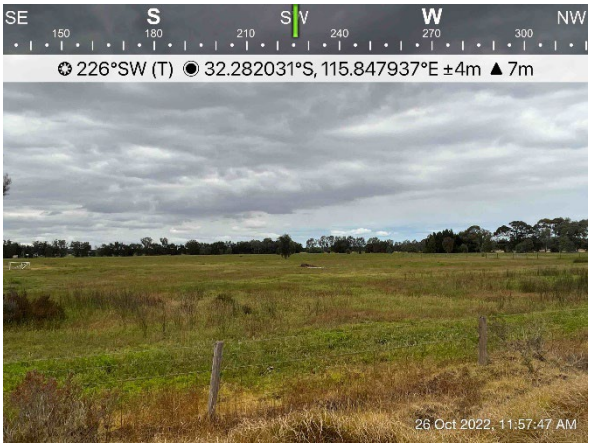


Photo ID: 3z

Photo ID: 3aa

Photo ID: 3ab

Photo ID: 3ac

Photo ID: 3ad

Plot 3	
	
Photo ID: 3ae	**Photo ID:** 3af

Plot 4	
Vegetation classification	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: 4a

Photo ID: 4b

Photo ID: 4c

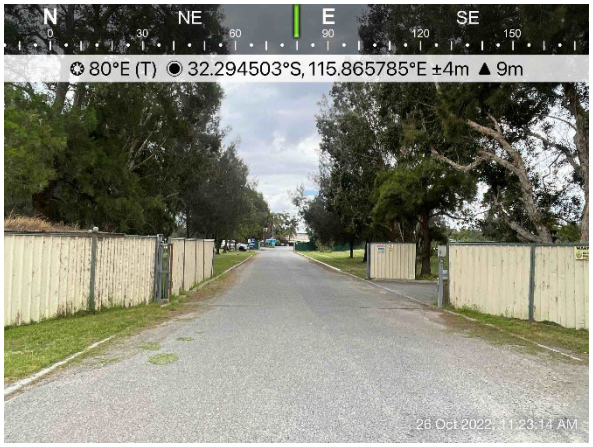
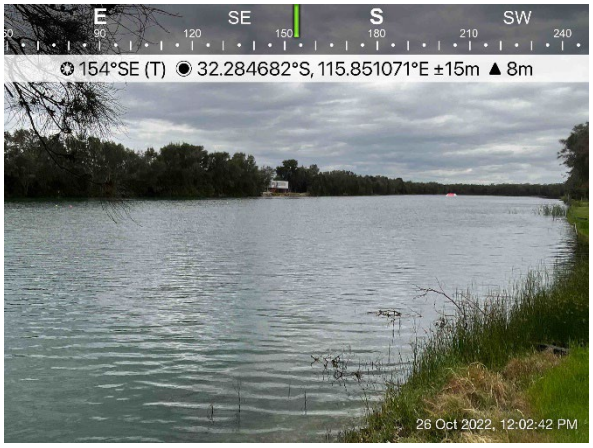
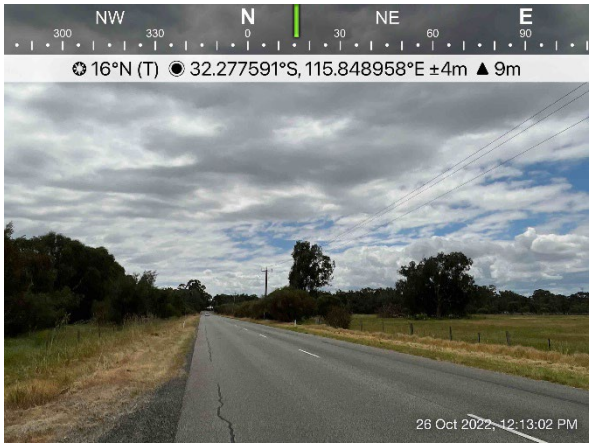
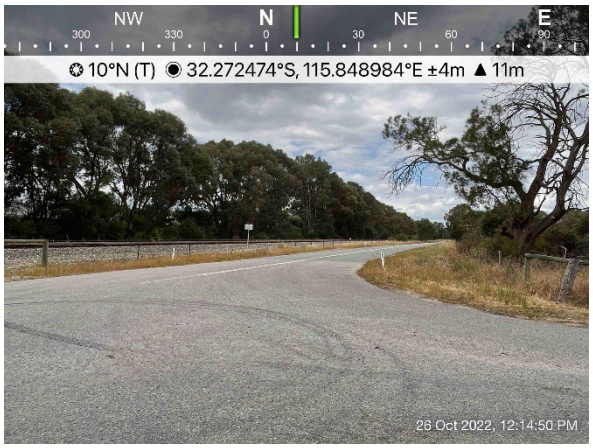
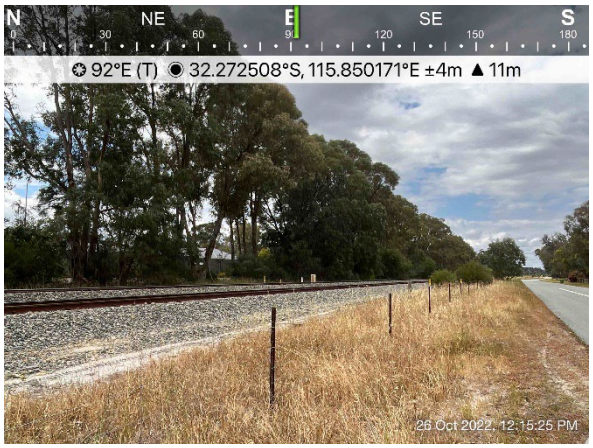
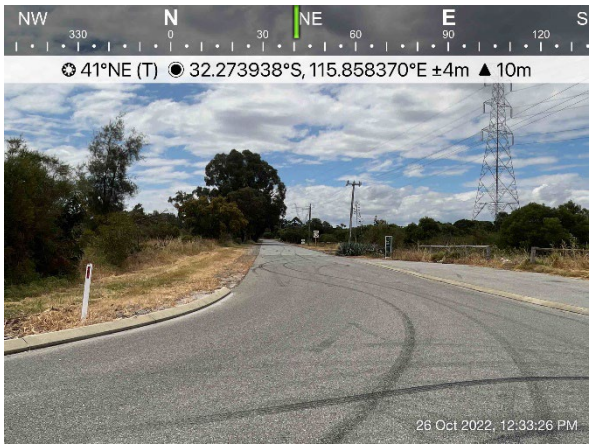


Photo ID: 4d

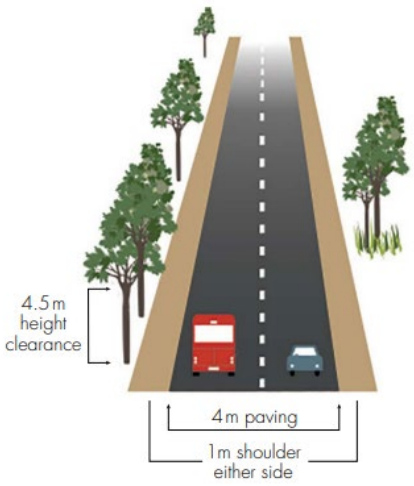
Photo ID: 4e

Photo ID: 4f

Plot 4	
 **Photo ID:** 4g	 **Photo ID:** 4h
 **Photo ID:** 4i	 **Photo ID:** 4j
 **Photo ID:** 4k	 **Photo ID:** 4l

Plot 4	
 **Photo ID:** 4m	 **Photo ID:** 4n
 **Photo ID:** 4o	 **Photo ID:** 4p
 **Photo ID:** 4q	

Appendix B Vehicular access – explanatory notes from the Guidelines

Acceptable Solution A3.1 – Public Roads
Explanatory Note E3.1
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. 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. Where local government roads are proposed to be widened by the proponent, they must obtain approval from the local government.    Figure 20: Example of a public road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.2a – Multiple access routes
Explanatory Note E3.2a

Two-way public road access is public road access from a lot in at least two different directions to two suitable destinations, and provides residents and the community, as well as emergency services, with access and egress from both the subdivision and individual habitable buildings/development in the event of a bushfire emergency. A single road provides no alternative route if the access becomes congested or is unable to be traversed due to smoke and/or fallen trees during a bushfire.

Two-way public road access applies to access/egress routes leading into a subdivision, as well as those within a subdivision. A road that loops back onto itself does not constitute the option of two different directions.

Two-way public road access should always be the first option. Where the site is not able to achieve two-way access within 200 metres of the lot boundary, due to demonstrated site or environmental constraints, the proponent should identify options for an emergency access way from the subject site to a suitable destination. Where an emergency access way cannot be provided, the proponent should demonstrate compliance with the performance principle.

Subject sites or proposed lots greater than 200 metres from an intersection, which provides two-way access, do not satisfy the requirement for two-way access unless they meet the provisions which allow for no-through roads greater than 200 metres in A3.2a.

To demonstrate compliance with the performance principle for two-way access, the bushfire planning practitioner may have regard to:

a. the extent of the bushfire hazard, location and vegetation classification, the likelihood, potential severity and impact of bushfire to the subject site and the road network;
b. time between fire detection and the onset of conditions in comparison to travel time for the community to evacuate to a suitable destination;
c. available access route(s) travelling towards a suitable destination; and
d. turn-around area for a fire appliance for no-through roads.

Figure 21: Example of compliant and non-compliant two-way

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.2b – Emergency access way
Explanatory Note E3.2b

An emergency access way is not a preferred alternative to through public road access and should only be considered acceptable where it has been demonstrated that it will provide the safety and performance needs of emergency services and the community, including consideration for future needs, and that public road access to satisfy A3.2a cannot be achieved due to site constraints, such as an established road network with no opportunity to provide a public road for secondary access. Acceptance of an emergency access way should also consider the ability to accommodate reasonable worst-case vehicle volumes.

The principle function of the emergency access way is to provide a contingency (second) community evacuation route and simultaneously provide access for emergency services, in the event of a bushfire emergency. Where an emergency access way traverses classified vegetation, which has the potential to create a bushfire hazard, an emergency access way performs the secondary function of providing access by emergency services to this vegetation.

Emergency access ways should connect to a public road to allow alternative two-way through access. An emergency access way should not exceed 500 metres in length as they may not be as safe for road-use due to not being designed or constructed to the full requirements of a public road and may present uncertainties to emergency service personnel and the public as they are not part of the daily road network and not identified on Maps.

Permanent public emergency access way

An emergency access way can be provided as either a public easement in gross or a right-of-way. In both approaches, the management of the emergency access way is by the local government as the grantee of the easement or management body of the right-of-way. The proponent must obtain written consent from the local government that the local government will accept care, control and management of the easement or right-of-way; this must be provided to the decision-maker prior to granting planning approval. The approach taken is at the discretion of the decision-maker and/ or the local government and is also dependent on whether the land is to remain in private ownership or be ceded to the Crown. Consultation with Land Use Management at the Department of Planning, Lands and Heritage should also be considered if the land is to be ceded to the Crown or if the local government is uncertain of which approach to take.

If the emergency access way is provided as an easement, it should be provided as a public easement in gross under sections 195 and 196 of the Land Administration Act 1997 in favour of the local government and/or public authority, to ensure accessibility for emergency services and the public at all times. To be provided as a right-of-way the emergency access way should be vested in the Crown under section 152 of the Planning and Development Act 2005 as a right-of-way and such land to be ceded free of cost and without any payment or compensation by the Crown. If gates are used to control traffic flow during non-emergency periods, these will be managed by the local government and must not be locked. Gates should be double gates wide enough to access the full pavement width and accommodate Type 3.4 fire appliances with the design and construction to be approved by the relevant local government.

Temporary public emergency access way

A temporary emergency access way may be proposed to facilitate the staging arrangements of a subdivision. The provision of two public roads may not be possible in the first stage of the subdivision and an emergency access way can be provided as an interim access route until the second public road is developed and gazetted in a subsequent stage of the subdivision (see figure 22). The emergency access way should be provided in the same manner as a permanent emergency access way, but it should be removed from the certificate of title once the public road is developed and gazetted. Where an emergency access way is proposed as an alternative to a public road, the Bushfire Management Plan should provide thorough justification for its use.

Restricted public emergency access way

There may be some instances where a restricted emergency access way is proposed as a performance principle based solution where access is only available to the public in the event of a bushfire emergency. This option can only be considered where the local government or Main Roads WA have advised that vehicular access on the emergency access way is not allowed during non-emergency periods, as it provides an additional thoroughfare and entry point on a local or State road. In this scenario, the emergency access way can be provided as an easement under section 195 of the Land Administration Act 1997, as public access in the event of a bushfire emergency or vested in the Crown as a reserve under section 152 of the Planning and Development Act 2005. Such land is to be ceded free of cost without any payment or compensation by the Crown. The proponent must obtain written consent from the local government that the local government will accept care, control and management of the proposed reserve and agree to the terms of the Management Order Conditions (if applicable); this must be provided to the decision-maker prior to granting planning approval.

The purpose of the reserve should be for a public purpose specified in the condition related to the subdivision, for example for emergency access only, or for emergency access and recreation. A reserve for emergency access and

Acceptable Solution A3.2b – Emergency access way
Explanatory Note E3.2b

recreation can optimise the land-use as a dual purpose where it provides vehicular access in the event of a bushfire emergency, but can be accessed by the public (on foot) on a day-to-day basis as a recreation link. Appropriate signage can ensure the general public is aware of the purpose of the reserve. The approach taken is at the discretion of the decision-maker and/or local government.

Right-of-carriageway emergency access way

There may be some instances where a right-of-carriageway easement is proposed as a performance principle-based solution. This may be where particular landowner(s) and emergency services, but not the public, require access over a neighbouring lot(s). A right-of-carriageway easement should be provided under section 195 of the Land Administration Act 1997. The easement is to provide alternative access for the particular landowner(s) in the event of a bushfire emergency and not for use by the public. In this scenario, support will be necessary from the adjoining lot owner(s). The easement is to be granted to the local government and it is to agree with the landowner on the arrangements of the management of the easement area by deed. These management arrangements will be at the discretion of the local government. If gated, the easement area can be locked to restrict day-to-day vehicular access.

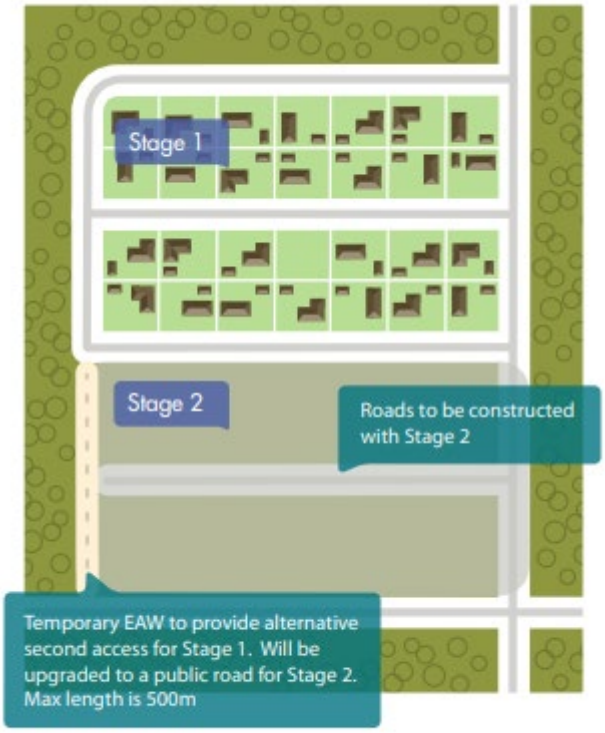


Figure 22: Example of an emergency access way

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.3 – Through roads

Explanatory Note E3.3

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.

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.

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.

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.

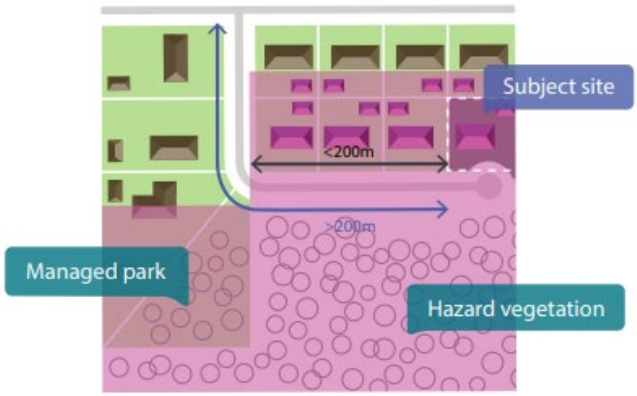


Figure 23: Example of a site on a no-through road greater than 200 metres from the intersection, but within 200 metres of BAL-LOW

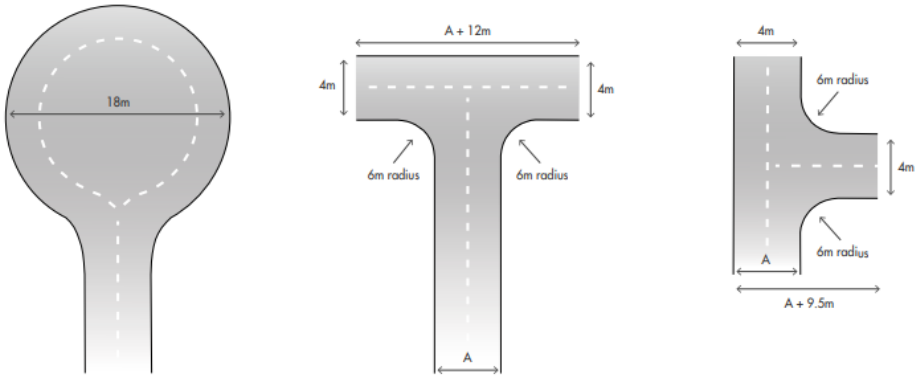


Figure 24: Turn-around area dimensions for a no-through road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.4a – Perimeter roads

Explanatory Note E3.4a

Where a planning proposal includes the creation of 10 or more lots adjacent to each other, which adjoin classified vegetation under AS 3959 with the exception of Class G Grassland, as part of a greenfield development or large urban infill site, hazard separation and defendable space should be provided in the form of a perimeter road. Greenfield is 'undeveloped or minimally developed areas that have been identified for urban development'; and urban infill is 'the redevelopment of existing urban areas at a higher density than currently exists'. The creation of 10 or more lots includes cumulative subdivision applications where the subdivision application may be part of a staged subdivision.

A perimeter road 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 as per the requirements of a public road in Table 6, Column 1.

As the road is likely to function as a key neighbourhood distributor, or similar, consideration should be given to the provision of additional width to allow for emergency services vehicles to stop and operate on the side of the perimeter road, whilst simultaneously proving for the evacuation of the community (Figure 20).

When designing a strategic planning proposal and/or subdivision, creating a large setback between classified vegetation and proposed lots with a perimeter road, and orientating habitable buildings to front onto (rather than back onto) areas of vegetation has many benefits, including:

- passive surveillance;
- defendable space for firefighting and emergency management purposes;
- reducing the potential radiant heat that may impact a habitable building in a bushfire event;
- reducing the need for battle-axe lots; and
- unconstrained public access/egress for the community in the event of a bushfire.

In developments where no perimeter road exists, property defence in a bushfire event is difficult and can be impossible. Where proposed lots have frontage to an existing public road and abut the hazard at the rear or side, it may be an undesirable planning outcome to create lots which front the existing public road and back onto a perimeter road. In this instance, consideration should be given to a fire service access route. Refer to E3.4b below.

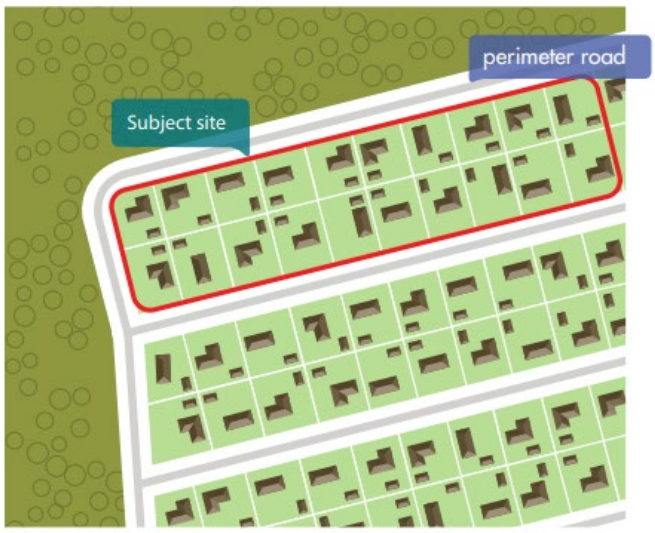


Figure 25: Example of a perimeter road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.4b – Fire service access route
Explanatory Note E3.4b

Where a subdivision adjoins classified vegetation and where A3.2a has been satisfied, hazard separation and defendable space across multiple lots may be required in the form of a fire service access route.

A fire service access route is not intended to provide residents and the general public with emergency egress and therefore is not a suitable second access or substitute for a public road. A fire service access route is to provide access for emergency services to classified vegetation for firefighting and fire management purposes.

A fire service access route can be provided as either an easement in gross over private or Crown land, or ceded to the Crown as a reserve. In both approaches, the management of the fire service access route is by the local government as the grantee of the easement or management body of the reserve. Determining which approach to take is dependent on what the intended tenure of the fire service access route is, which is explained further below. The proponent must obtain written consent from the local government that the local government will accept care, control and management of the easement or reserve and agree to the terms of the Management Order Conditions (if applicable); this must be provided to the decision-maker prior to granting planning approval. The approach taken is at the discretion of the decision-maker and/or the local government. Consultation with Land Use Management at the Department of Planning, Lands and Heritage should also be considered if the land is to be ceded to the Crown or if the local government is uncertain of which approach to take.

Figure 26: Example of a fire service access route

Where gates are used, these should be double gates wide enough to access the full required horizontal clearance and accommodate type 3.4 fire appliances with the design and construction to be approved by the relevant local government. Gates on fire service access routes may be locked to restrict access, provided a common key system is used, and such keys are made available for emergency services and designated fire officers within the local government area and/or surrounding district. Gates should be installed where fences cross fire service access routes. If an easement in gross is proposed, such arrangements for gates should be included in the deed of easement and be agreed to by the local government.

Fire service access route to remain in private ownership of multiple landowners

Where a fire service access route is proposed to traverse multiple private lots and they are intended to remain in the private ownership of the multiple landowners, it should be provided as an easement in gross under section 196 of the Land Administration Act 1997, to ensure accessibility for fire emergency services and not for use by the public. The easement is to be granted to the local government and/or public authority for firefighting and emergency management purposes.

Fire service access route to be created under State ownership

Where a fire service access route is proposed to traverse multiple private lots, but the decision-maker and/or local government prefer for the fire service access route to remain in one ownership under the State for management purposes, the fire service access route can be vested in the Crown under section 152 of the Planning and Development Act 2005 as a reserve, such land to be ceded free of cost without any payment or compensation by the Crown. The purpose of the reserve should be for a public purpose specified in the condition related to the subdivision, for example for vehicular access for emergency services and the local government only, or for vehicular access for emergency services and the local government and recreation. A reserve for emergency services access and recreation can optimise the land-use as a dual purpose, where it provides vehicular access for emergency services, but can be accessed by the public (on foot) on a day-to-day basis as a recreation link. Appropriate signage will ensure the general public is aware of the purpose of the reserve. The approach taken is at the discretion of the decision-maker and/or local government.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

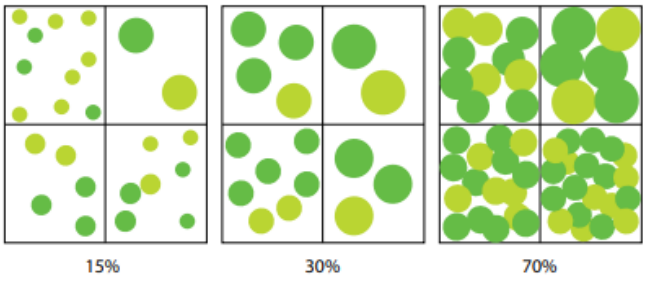
Technical requirement	1	2	3	4
	Public road	Emergency access way[1]	Fire service access route[1]	Battle-axe and private driveways[2]
Minimum trafficable surface (m)	In accordance with A3.1	6	6	4
Minimum horizontal clearance (m)	N/A	6	6	6
Minimum vertical clearance (m)	4.5	4.5	4.5	4.5
Minimum weight capacity (t)	15	15	15	15
Maximum grade unsealed road[3]	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%, 6°)	1:10 (10%, 6°)	1:10 (10%, 6°)
Maximum grade sealed road[3]		1:7 (14.3%, 8°)	1:7 (14.3%, 8°)	1:7 (14.3%, 8°)
Maximum average grade sealed road		1:10 (10%, 6°)	1:10 (10%, 6°)	1:10 (10%, 6°)
Minimum inner radius of road curves (m)		8.5	8.5	8.5

[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 C Asset Protection Zones – standards (Schedule 1) and explanatory notes from the Guidelines

Schedule 1: Standards for Asset Protection Zones	
Object	**Requirement**
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).
Fine fuel load (Combustible, dead vegetation matter <6 millimetres 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 >6 millimetres in thickness.
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. **Figure 19:** Tree canopy cover – ranging from 15 to 70 per cent at maturity 
Shrub* and scrub* (0.5 metres to six metres in height). Shrub and scrub >6 metres in height are to be treated as trees.	• 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.
Ground covers* (<0.5 metres in height. Ground covers >0.5 metres in height are to be treated as shrubs)	• 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.
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.

Schedule 1: Standards for Asset Protection Zones	
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.
LP Gas 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.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Element 2 Explanatory Notes
E2 Landscaping and design of an Asset Protection Zone

Landscaping, design, and maintenance of an APZ in a bushfire prone area can significantly improve the bushfire resilience of a building. An APZ should not be seen as an area entirely cleared of vegetation, but as a strategically designed space that gives holistic consideration to how existing or proposed vegetation or non-combustible features interact with, or affect the building's bushfire resilience.

A well designed APZ provides a greater level of vegetation management within the first few metres of a building with, for example, less vegetation or inclusion of non-combustible materials. The vegetation within the remainder of an APZ can increase further away from the building with carefully considered plant selection and landscaping techniques.

Strategic landscaping measures can be applied, such as replacing weeds with low flammability vegetation (refer to E2 Plant Flammability) to create horizontal and vertical separations between the retained vegetation. The accumulation of fine fuel load from different plants is an important consideration for ongoing maintenance in accordance with Schedule 1. For example, when planting ground covers under deciduous trees within an APZ, the total fine fuel load prescribed in Schedule 1 will include any dead plant material from ground covers and leaf litter from the trees.

Plant density and final structure and form of mature vegetation should be considered in the initial landscaping stages. For example, clumps of sapling shrubs planted at a density without consideration of future growth, may increase the bushfire risk as a clump will quickly grow to exceed 5m2. It should be noted that in some cases, a single shrub in a mature state may be so dense as to fill a 5m2 clump alone.

The location of plants within an APZ is a key design technique. Separation of garden beds with areas of low fuel or non-combustible material, will break up fuel continuity and reduce the likelihood of a bushfire running through an APZ and subjecting a dwelling to radiant heat or direct flame contact. It is important to note, where mature trees are separated from a building by six metres, but the canopy has grown to extend or overhang a building, maintenance and pruning to remove the overhanging branches should be undertaken without the entirety of the tree being removed.

Mulches used within the APZ should be non-combustible. The use of stone, gravel, rock and crushed mineral earth is encouraged. Wood mulch >6mm in thickness may be used, however it is recommended that it is used in garden beds or areas where the moisture level is higher by regular irrigation. These materials could be sourced from non-toxic construction and demolition waste giving the added benefit of reducing the environmental impact of any 'hard landscaping' actions.

Combustible objects, plants, garden supplies such as mulches, fences made from combustible material, should be avoided within 10 metres of a building. Vines or climbing plants on pergolas, posts or beams, should be located away from vulnerable parts of the building, such as windows and doors. Non-flammable features can be used to provide hazard separation from classified vegetation, such as tennis courts, pools, lawns and driveways or paths that use inorganic mulches (gravel or crushed rock). Consider locating firewood stacks away from trees and habitable buildings.

Incorporation of landscaping features, such as masonry feature walls can provide habitable buildings with barriers to wind, radiant heat and embers. These features can include noise walls or wind breaks. Use of Appendix F of AS 3959 for bushfire resistant timber selection within areas of 29kW/m² (BAL-29) or below, or the use of non-combustible fencing materials such as iron, brick, limestone, metal post and wire is encouraged.

Element 2 Explanatory Notes

In addition to regular maintenance of an APZ, further bushfire protection can be provided at any time by:

- ensuring gutters are free from vegetation;
- installing gutter guards or plugs;
- regular cleaning of underfloor spaces, or enclosing them to prevent gaps;
- trimming and removing dead plants or leaf litter;
- pruning climbing vegetation (such as vines) on a trellis, to ensure it does not connect to a building, particularly near windows and doors;
- removing vegetation in close proximity to a water tank to ensure it is not touching the sides of a tank; and/or
- following the requirements of the relevant local government section 33 fire break notice, which may include additional provisions such as locating wood piles more than 10 metres from a building.

Preparation of a property prior to the bushfire season and/or in anticipation of a bushfire is beneficial even if your plan is to evacuate. As embers can travel up to several kilometres from a bushfire and fall into small spaces and crevices or land against the external walls of a building, best practice recommends that objects within the APZ are moved away from the building prior to any bushfire event. Objects may include, but are not limited to:

- door mats;
- outdoor furniture;
- potted plants;
- shade sails or umbrellas;
- plastic garbage bins;
- firewood stacks;
- flammable sculptures; and/or
- playground equipment and children's toys.

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.

Element 2 Explanatory Notes
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.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Document Status

Report version	Rev No.	Purpose	Author	Reviewed and Approved for Issue	
				Name	Date
Draft Report	Rev A	For review by Client	Olivia Johnston	Zac Cockerill (BPAD 37803, Level 2)	9/12/2022
Final Report	**Rev 0**	**Issued for use: to accompany DSP submission**	**Zac Cockerill (BPAD 37803, Level 2)**	**Zac Cockerill (BPAD 37803, Level 2)**	**18/04/2023**

www.jbsg.com.au