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Bushfire Management Plan

Neerabup Industrial Area

Prepared for
LandCorp
by Strategen

June 2017

Bushfire Management Plan

Neerabup Industrial Area

Strategen is a trading name of
Strategen Environmental Consultants Pty Ltd
Level 1, 50 Subiaco Square Road Subiaco WA 6008
ACN: 056 190 419

June 2017

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Client: LandCorp

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1. Introduction

1.1 Background

LandCorp is progressing development approvals within the Neerabup Industrial Area (hereon referred to as the project area). The Neerabup Industrial Area Agreed Structure Plan No. 17 (ASP 17, first adopted in January 2005) provides the overarching planning framework that guides development over the industrial estate (Figure 1a). TPG, on behalf of LandCorp, has recently lodged an amendment to ASP 17 (Amendment No. 4) that proposes modifications to the Final Surface Contour Plan to reflect the revised earthwork design levels across the site (Figure 1b). The proposed Structure Plan Amendment does not propose any land use modifications outside of those approved under ASP 17.

A large proportion of the project area and adjacent land is designated as bushfire prone on the WA *Map of Bush Fire Prone Areas* (DFES 2016) due to the extent of on-site and adjacent vegetation. As a result, Strategen has prepared this Bushfire Management Plan (BMP) to fulfil the following key objectives:

1. Accompany submission of the proposed Structure Plan Amendment to City of Wanneroo (the City) and Department of Planning (DoP) to meet requirements triggered under *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015a).
2. Accompany Subdivision/Development Application to the City and DoP for Stages 1–5 to meet planning requirements triggered under SPP 3.7.

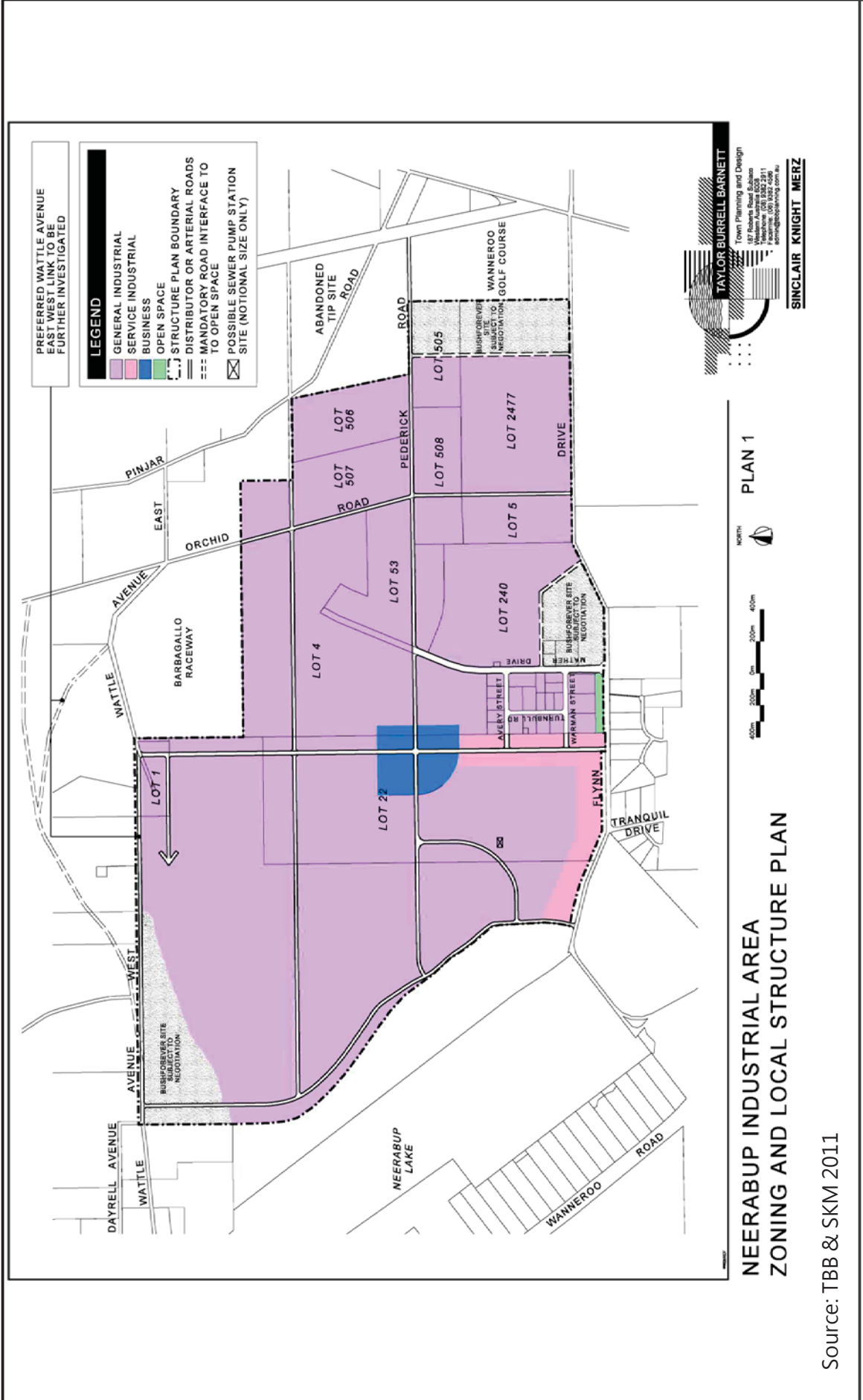
The following information is required in the form of a BMP to accompany the Structure Plan Amendment and relevant Subdivision/Development Applications under SPP 3.7 Policy Measures 6.3 and 6.4/6.5 respectively:

- results of a Bushfire Hazard Level (BHL) assessment determining the applicable hazard level(s) across the subject land in accordance with methodology set out in *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2015b) – refer to Section 2.3 and Figure 5
- where the lot layout of the proposal is known (i.e. Stages 1–5), a Bushfire Attack Level (BAL) contour map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines – refer to Section 2.5 and Figure 6
- identification of any bushfire hazard issues arising from the relevant assessments – refer to Section 2.4
- assessment against the bushfire protection criteria contained in the Guidelines demonstrating compliance within the boundary of the development site – refer to Section 4 and Table 3.

This BMP has been prepared in accordance with the Guidelines and addresses all of the above information requirements to satisfy SPP 3.7.

1.2 Purpose and application of the plan

The purpose of this BMP is to provide guidance on how to plan for and manage the bushfire risk to future assets of the project area through implementation of a range of bushfire management measures. The BMP outlines how future on-site assets can be protected during the summer months when the threat from bushfire is at its peak. This is particularly relevant when existing fire appliances in the area may be unable to offer an immediate emergency suppression response; therefore, development planning and design should aim to provide mitigation strategies that protect future life and property from bushfire as a priority.



Source: TBB & SKM 2011

Figure 1a: Neerabup Industrial Area Zoning and Local Structure Plan

2. Spatial consideration of bushfire threat

2.1 Existing site characteristics

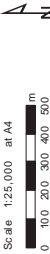
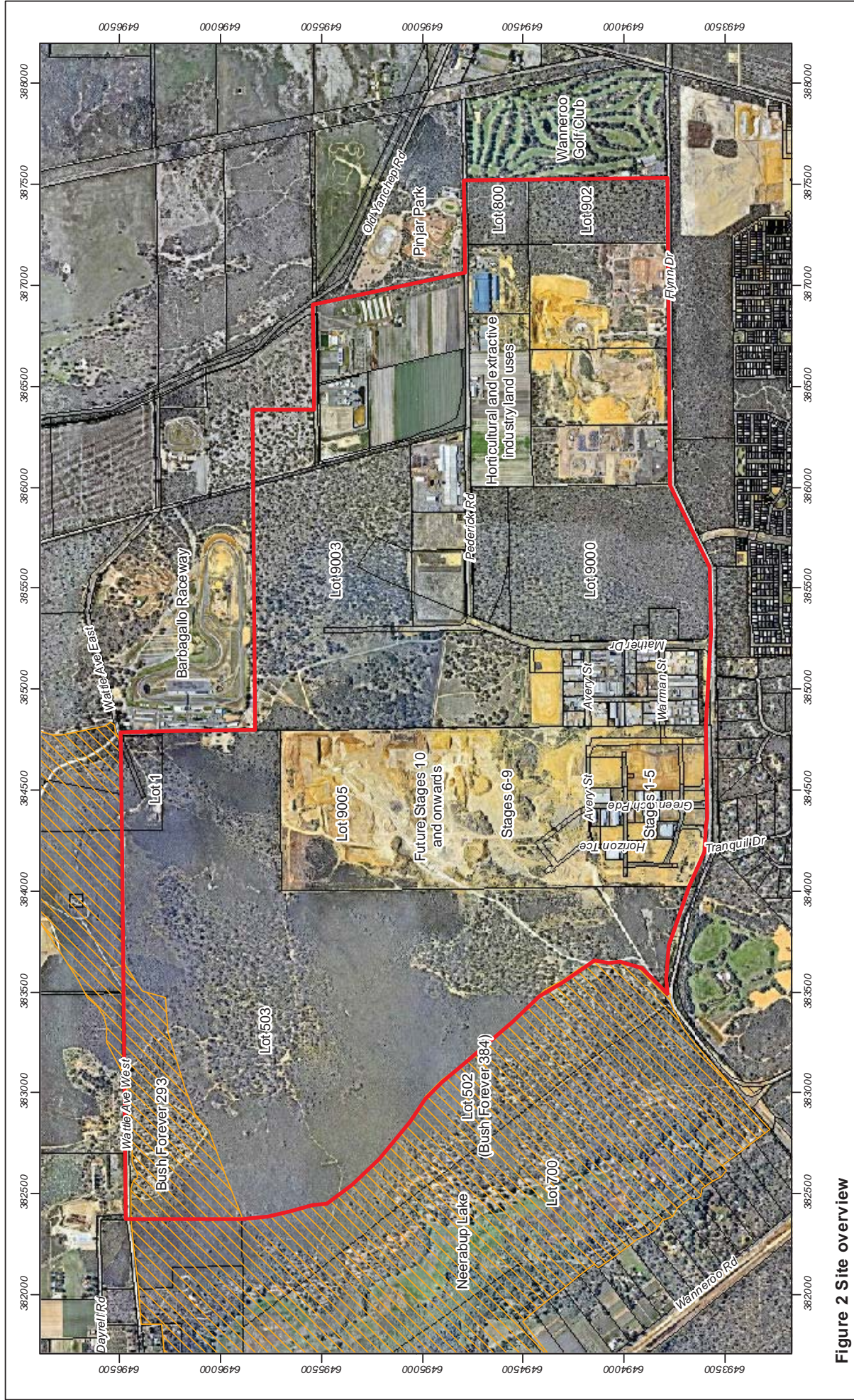
2.1.1 Location

The project area encompasses around 1000 ha of land located in Neerabup, City of Wanneroo and is situated approximately 32 km north of the Perth CBD and 6 km northeast of Joondalup. The project area is bound by the following, as depicted in Figure 2:

- Flynn Drive to the south
- Lot 700 (including Neerabup Lake) and Lot 502 (Bush Forever Site 384) to the west
- Wattle Avenue West/East and Barbagallo Raceway to the north
- Old Yanchep Road, Pinjar Park and Wanneroo Golf Club to the east.

The project area comprises the following, which are also depicted in Figure 2:

- Lot 503 Flynn Drive in the west (in accordance with DP 409677), which at this stage is the subject of precinct planning only pending detailed design (environmental approval for the initial 90 ha development area is in its final stages)
- 98 ha proposed conservation area within the northwest of Lot 503 (Bush Forever Site 293)
- Lot 1 Wattle Avenue East in the north adjacent to Barbagallo Raceway
- Lot 9005 Flynn Drive situated central to the site (in accordance with DP 409191), which comprises the following:
 - * Stages 1–5 of Meridian Park Industrial Estate in the south, which are a mix of completed and constructed stages (i.e. Stages 1, 2A, 3A, 3B and 3C) and future undeveloped stages (i.e. Stages 2B, 4 and 5)
 - * Stages 6–9 of Meridian Park Industrial Estate throughout central areas (currently extractive industry quarry)
 - * future Stages 10 and onwards of Meridian Park Industrial Estate in the north (currently extractive industry quarry)
- approved industrial subdivision situated central south within the site
- Lot 9003 Mather Drive in the northeast
- Lot 9000 Flynn Drive situated central south
- existing extractive industry and horticultural land uses in the eastern portion of the project area along Pederick Road, Trandos Road and the eastern extent of Flynn Drive
- Lot 800 Pederick Road and Lot 902 Flynn Drive in the southeast adjacent to Wanneroo Golf Club.



- Legend**
- Project area
 - Existing cadastre
 - Bush Forever sites

Scale: 1:25,000 at A4
 Coordinate System: GDA 1984 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 2/08/2016
 Author: A/Crute
 Source: Aerial image and plan: Client 07/2016, Existing cadastre: SLIP Landgate 2016, Bush Forever: DPL 2014.
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Figure 2 Site overview

2.1.2 Zoning and land use

The project area is currently zoned 'Industrial' and 'Industrial Development' under the City of Wanneroo District Planning Scheme No. 2, with small pockets of local and regional 'Parks and Recreation' reserve. A large proportion of the site is currently undeveloped and vegetated, particularly in the west and northwest, whilst central and eastern portions of the site are subject to a combination of extractive industry, industrial and horticultural land uses, as well as undeveloped vegetated lots. Extractive industry is part of the sequential land development process, required due to 'Priority Resource' classification of a portion of land contained within the structure plan area.

Aside from Barbagallo Raceway, adjacent land to the north largely comprises undeveloped vegetated land. This is also the case to the west with regards to Lot 700 (including Neerabup Lake wetland vegetation) and Lot 502 (Bush Forever Site 384). Land to the south opposite Flynn Drive is a combination of larger rural residential lots and undeveloped vegetated land. Land to the east comprises a range of land uses including Wanneroo Golf Club, Pinjar Park (retained native vegetation), various motor-cross and go-kart tracks and undeveloped rural land, most of which comprises native vegetation.

2.1.3 Assets

The project area currently contains a range of assets, including life and property in the form of developed industrial, extractive industry and horticultural land uses. There is a distinct lack of high density overnight resident and visitor occupancy throughout the project area by virtue of the industrial zoning of the land.

The project area and adjacent land contains environmental assets in the form of large areas of intact native vegetation, particularly to the west and northwest in association with Neerabup Lake and Bush Forever Site 384. Lot 9000 and 902 Flynn Drive and Lot 800 Pederick Road in the south-eastern portion of the site are the other key properties that contain on-site native vegetation that are being considered for retention. Pinjar Park located east of the project area also contains retained native vegetation.

2.1.4 Access

The majority of industrial and extractive industry land uses that currently operate within the project area are accessed from the south via Flynn Drive and Mather Drive. Flynn Drive is a major connector between Wanneroo Road in the west and Old Yanchep Road in the east. Horticultural and industrial land uses located in the eastern portion of the site are accessed via Pederick Road and Trandos Road, which navigate west from Old Yanchep Road.

Connection to the west from realigned Flynn Drive and Neerabup Road to Mitchell Freeway Extension (Burns Beach Road to Hester Avenue) is currently under construction. Connection to the east from Flynn Drive to future realigned Neaves Road to Perth Darwin Highway is also currently under construction.

Access throughout western vegetated portions of the site is currently limited to firebreak access and informal tracks. This is also the case throughout the north and north-western portion of the site. Wattle Avenue West currently provides restricted access along the northern boundary of the site in the form of a limestone base track, which links to existing tracks servicing extractive industry uses and a Department of Parks and Wildlife (DPAW) monitoring station to the north. These tracks eventually link with Wattle Avenue East, which is a sealed road servicing Barbagallo Raceway to the north of the site, which in turn links with Old Yanchep Road to the northeast.

2.1.5 Servicing

The project area is connected to reticulated water and underground power supplies and these services will be expanded as staging progresses (Taylor Burrell Barnett & SKM 2011). This is also the case with sewer and gas services (sewer will be serviced by tankering prior to construction of the proposed wastewater pump station and pressure main).

2.2 Existing fire environment

2.2.1 Vegetation class

Vegetation class has been assessed for this site in accordance with methodology contained within *AS 3959–2009 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2009). Strategen assessed vegetation class within the project area and adjacent 100 m through on-ground site investigation on 30 June 2016. Results of this assessment are depicted in Figure 3, which identifies the spatial extent of classified vegetation and the location/direction of site photographs depicting the relevant vegetation classes. A detailed summary of site photographs is contained in Appendix 1.

In general, the project area and surrounding land grades from Class B banksia woodland on white, sandy soils in the east; to a mix of Class A Jarrah-Marri forest and Class B banksia woodland at high points throughout central and northern areas; to Class A Tuart forest and Class D acacia scrub at low points, around wetlands and on limestone outcrops in the west. There are also areas of Class G grassland where native vegetation has been cleared and the understorey grasses and weeds remain unmanaged.

Further to the above, a large proportion of the project area and adjacent land is currently cleared, developed or subject to ongoing management. This includes remnant regrowth currently scattered throughout the Lot 9005 quarry site consisting of small regrowth saplings, scrub and shrubs, which have been cleared and re-cleared on multiple occasions and will be cleared again as quarry activities progress. These areas have been excluded from vegetation classification under the following clauses of AS 3959:

- Clause 2.2.3.2 (e): Non-vegetated areas including waterways, roads, footpaths, buildings and rocky outcrops
- Clause 2.2.3.2 (f): Low threat vegetation including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks (note minimal fuel condition means there is insufficient fuel available to significantly increase the severity of bushfire attack, recognizable as short-cropped grass for example, to a nominal height of 100 mm).

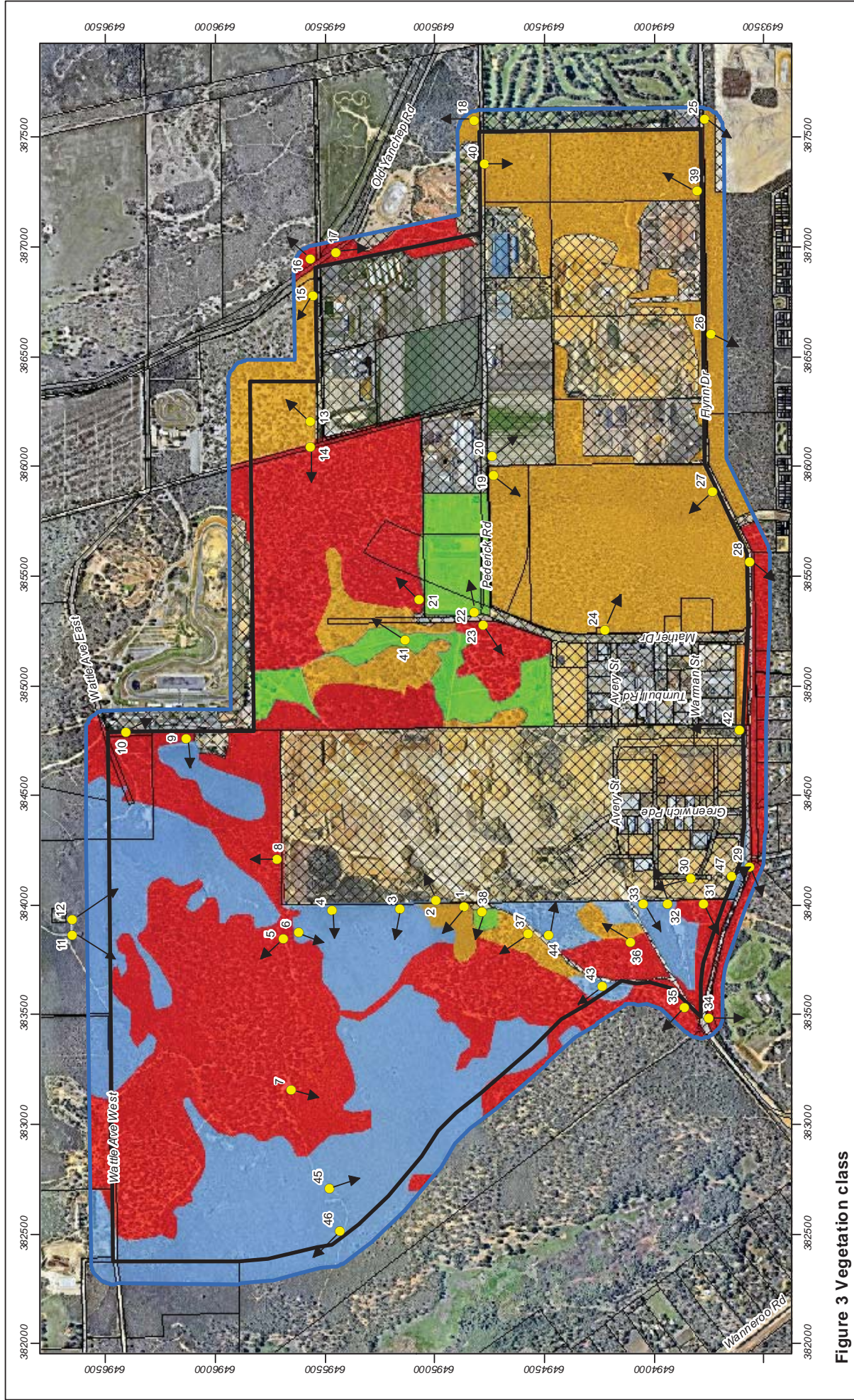
Aside from recurring clearing being undertaken within the Lot 9005 quarry site, the vegetation extent discussed above and mapped in Figure 3 demonstrates current site conditions and does not take into account vegetation clearance proposed as part of the development. Therefore, the mapped extent of Clause 2.2.3.2 exclusions within the project area will increase as industrial development is approved and constructed progressively throughout the site.

2.2.2 Effective slope

Effective slope has been assessed for this site in accordance with methodology contained within AS 3959. Strategen assessed effective slope within the project area and adjacent 100 m through on-ground site investigation on 30 June 2016. On-ground observations and measurements of effective slope have been validated through topographic mapping, as displayed in Figure 4, which identifies the feature survey topographic contours and surface elevation across the assessed vegetation classes.

Generally, the project area and adjacent land contains undulating topography. Effective slope varies from flat land (0 degrees) throughout low lying areas to the west and developed areas central to the site; to 0–5 degrees throughout gently undulating topography in the northwest, central south and east; to 5–10 degrees throughout steeper areas to the north.

The effective slope discussed above and mapped in Figure 4 demonstrates current site conditions and does not take into account post development site levels. Strategen emphasises that on completion of the development, the bulk of the project area will be built out subject to the amended contour plan outlined in Figure 1b and effective slope for the purposes of BAL assessment will only be relevant throughout areas of retained vegetation. The designed land gradient throughout the site will not exceed 2% post bulk earthworks and will result in the majority of proposed development being situated below (i.e. not up-slope of) retained vegetated areas.



Scale 1:23,000 at A4

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Coordinate System: GDA 1984 MGA Zone 50
 Note that positional errors may occur in some areas
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 Author: JClube
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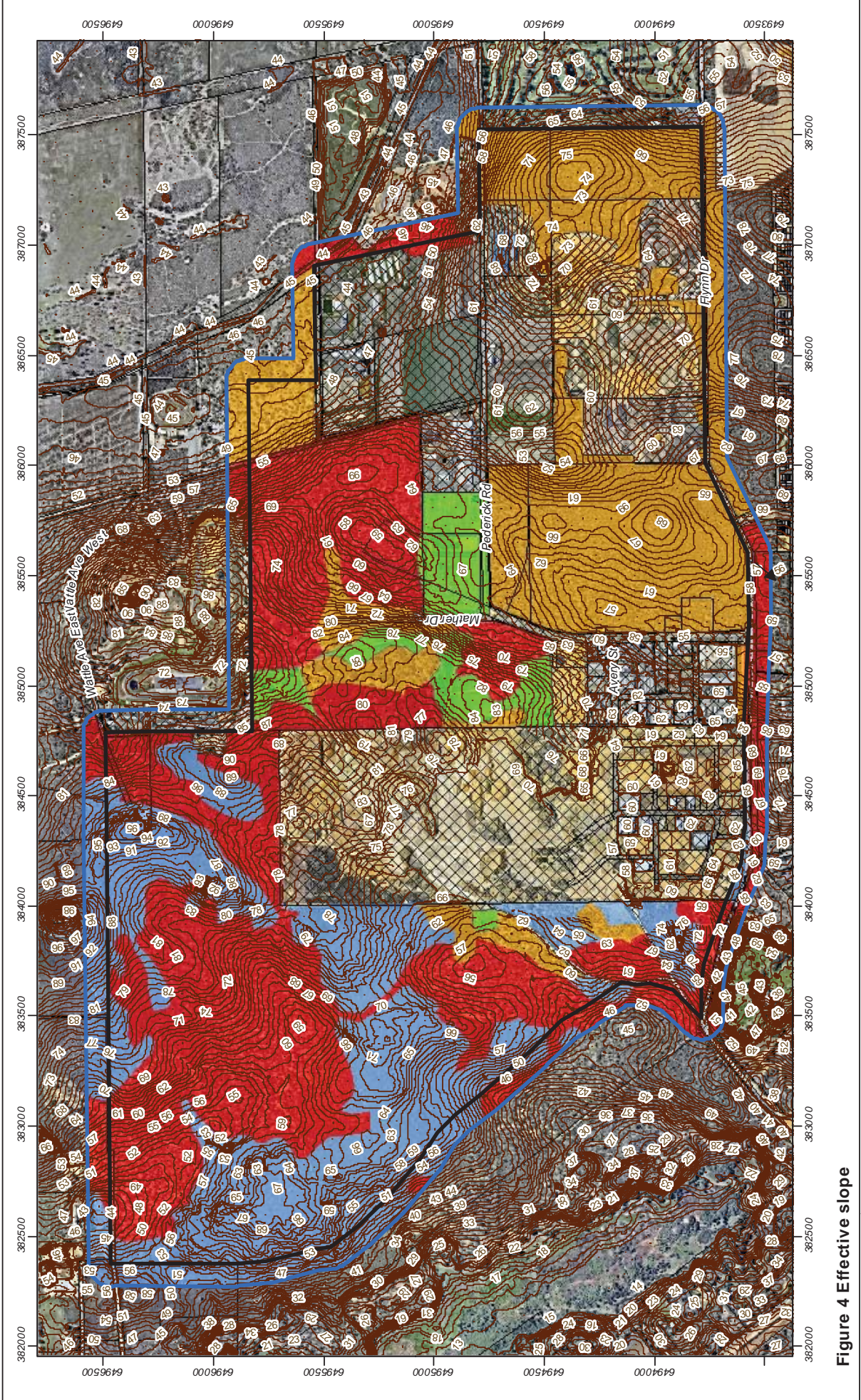
Legend


- Photo point and direction
- Existing cadastre
- Project area
- Class D Scrub
- Class A Forest
- Class B Woodland
- Class G Grassland
- ▨ Low threat exclusion under Clause 2.2.3.2
- 100m wide assessment area

Vegetation class

Figure 3 Vegetation class

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Legend

<ul style="list-style-type: none"> Project area Existing cadastre 	<ul style="list-style-type: none"> Class D Scrub Class G Grassland Class A Forest Class B Woodland 	<ul style="list-style-type: none"> 100m wide assessment area Surface elevation (mAHD) Low threat exclusion under Clause 2.2.3.2
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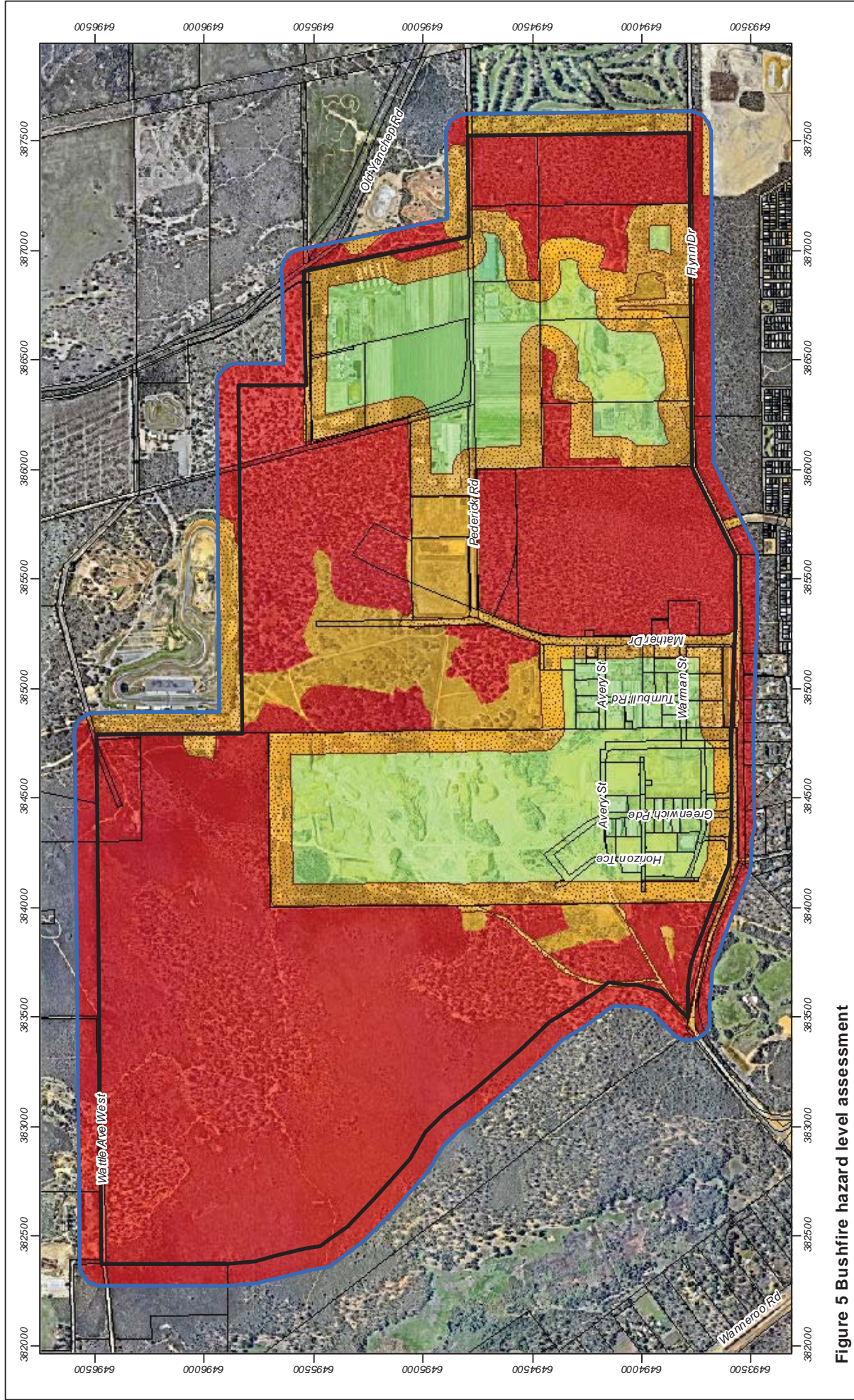
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Figure 4 Effective slope

2.3 Bushfire hazard level assessment

Bushfire hazard levels have been assessed for this site in accordance with methodology contained within the Guidelines. Strategen has mapped the bushfire hazard levels within the project area and adjacent 100 m as per the conditions outlined in Figure 3 and Figure 4. A summary of results is provided below and depicted in Figure 5:

- all areas of Class A forest represent an extreme bushfire hazard level
- all areas of Class B woodland represent an extreme bushfire hazard level, except degraded areas of woodland, which represent a moderate bushfire hazard level where the fuel profile is less dense and the potential fire behaviour will be reduced
- all areas of Class D scrub represent an extreme bushfire hazard level, except degraded areas of scrub, which represent a moderate bushfire hazard level where the fuel profile is less dense and the potential fire behaviour will be reduced
- all areas of Class G grassland represent a moderate bushfire hazard level
- all non-vegetated areas and areas currently managed as low threat vegetation, which are both excluded from classification under Clause 2.2.3.2 (e) and (f) of AS 3959, represent a low bushfire hazard level (including areas of recurring clearing throughout the Lot 9005 quarry site)
- all areas located within 100 m of Class A forest, Class B woodland, Class D scrub or Class G grassland have been assigned a moderate bushfire hazard level by default to reflect the increased level of risk and 100 m wide Hazard Separation Zone (HSZ) requirements (WAPC 2015b).



Scale: 1:23,033 at A4

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Coordinate System: GDA 1984 MGA Zone 50
 Note that positional errors may occur in some areas
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 Author: JCrute
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Figure 5 Bushfire hazard level assessment

Legend

- Project area
- Existing cadastre
- 100m wide assessment area
- 100m wide HSZ

Bushfire hazard level

- Extreme
- Moderate
- Low

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2.4 Identification of bushfire hazard issues

The project area in its pre-development state is subject to significant landscape scale bushfire risk as a result of the vast areas of vegetation within and adjacent to the site. This is particularly relevant to the north where a very long fire run exists through dense native vegetation including forest, woodland and scrub. A bushfire approaching the site from the northern quadrant under adverse fire weather conditions in summer (i.e. days of extreme or catastrophic fire danger) is expected to result in significantly elevated levels of radiant heat and ember attack if full fire escalation is achieved. Standard fire suppression under these conditions is not likely to be achievable, as experienced in January 2015.

The project area is also subject to significant landscape scale bushfire risk to the west in association with Lot 700 (including Neerabup Lake wetland vegetation) and Lot 502 (Bush Forever Site 384). This area contains dense forest, woodland and scrub vegetation, as well as vast areas of peat material, which can exacerbate fire behaviour and prolong bushfire impacts. A bushfire approaching the site from the western quadrant, particularly under predominant afternoon fire weather conditions in summer (i.e. in association with a prevailing south-westerly sea breeze) is expected to result in elevated levels of radiant heat and ember attack if full fire escalation is achieved.

In response to the abovementioned bushfire scenarios and landscape scale risk, LandCorp is actively working with the City and Department of Fire and Emergency Services (DFES) to undertake ongoing fuel hazard reduction works in the form of mosaic cell burning and the upgrade and maintenance of emergency access. The City and DFES have prepared a working Fire Management Plan document that outlines a proposed burn plan over the site to create low fuel areas at strategic interfaces and provide an increased level of bushfire risk mitigation to current and future life, property and environmental assets. The indicative cell burn plan is provided in Plate 1. Strategen emphasises that although low intensity prescribed fire reduces fuel loads and potential fire behaviour, it does not alter vegetation class.

On completion of the development, there will be a significantly reduced bushfire risk to future assets of the site as a result of the scale of vegetation clearing that will be undertaken to facilitate industrial development. Vegetation clearing throughout project staging will play an important role in managing the bushfire risk posed by on-site temporary vegetation during roll out of individual development stages. This is discussed as a key management measure in Section 3.1.

On this basis, Strategen considers the bushfire hazards within and adjacent to the project area and the associated bushfire risk to be readily manageable through standard management responses outlined in the Guidelines and AS 3959. These responses will be factored in to proposed industrial development early in the planning process to ensure a suitable, compliant and effective bushfire management outcome is achieved for protection of future life, property and environmental assets.



Plate 1: Indicative cell burn plan for LandCorp-owned land at Neerabup (Source: City of Wanneroo 2015)

2.5 BAL assessment

Stratagen has undertaken a Method 1 BAL assessment in accordance with AS 3959 for existing and proposed subdivision areas of Stages 1–5 Meridian Park Industrial Estate. The BAL assessment is based on post-development conditions in line with the existing and proposed subdivision lot layout for Stages 1–5. BAL assessment will need to be undertaken at the relevant subdivision stage for areas of the site where subdivision lot layout is yet to be confirmed.

The Method 1 procedure for calculating the BAL (as outlined in AS 3959) incorporates the following factors:

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

Based on the specified BAL, building construction/separation requirements for proposed buildings can then be assigned. A Method 1 BAL calculation for proposed development within Stages 1–5 is outlined in the following subsections.

2.5.1 Fire Danger Index

A blanket rating of FDI 80 is adopted for Western Australian environments, as outlined in AS 3959 and endorsed by Australasian Fire and Emergency Service Authorities Council.

2.5.2 Vegetation class as per AS 3959

Vegetation class is described in Section 2.2.1 (Figure 3). In consideration of the proposed clearing extent required to facilitate development in accordance with the existing/proposed subdivision lot layout for Stages 1–5, the post-development vegetation extent will consist of:

- Class D scrub located adjacent south of the site within the northern Flynn Drive road verge
- Class A forest located adjacent southwest and south of the site within the northern and southern Flynn Drive road verges
- Class A forest located adjacent south of the site opposite Flynn Drive within private lots
- low threat vegetation excluded from classification under Clause 2.2.3.2 (e) located adjacent west and east of the site following creation of a 100 m wide low threat buffer throughout on-site temporary vegetation.

2.5.3 Effective slope

Effective slope is described in Section 2.2.2 (Figure 4). For the classified vegetation affecting proposed development within Stages 1–5, Class D scrub and Class A forest areas are located on flat land (0 degrees) or up-slope except for the far eastern portion of Class A forest, which has an effective slope of 0–5 degrees and is down-slope.

2.5.4 Distance between proposed development areas and the classified vegetation

Minimum separation distances for a BAL–29 rating or lower can be achieved for all proposed development within Stages 1–5. This equates to a minimum separation distance of 21 m adjacent to Class A forest and 13 m adjacent to Class D scrub. The required separation distances will be achieved in the form of minimum 20 m wide Asset Protection Zones (APZs) comprising road reserves at the vegetation interface and building setbacks where required.

2.5.5 Method 1 BAL calculation

A Method 1 BAL calculation has been completed for existing/proposed development within Stages 1–5 that are located within the 100 m wide HSZ in accordance with AS 3959 methodology (Table 1). The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed buildings and subsequently informs the standard of building construction required to increase building tolerance to potentially withstand such impacts in line with the assessed BAL.

The assessed BAL ratings are depicted as BAL contours in Figure 6. A detailed depiction of the BAL contours is provided in Appendix 2. All proposed lots situated outside of the 100 m wide HSZ are BAL–Low, where there is insufficient risk to warrant specific building construction requirements. However, the extent of BAL–Low application relies on successful implementation of the management measures documented in this BMP.

Table 1: Method 1 BAL calculation

Classified vegetation	Effective slope	Hazard separation distance	BAL rating	Comment
Class A forest	All up-slopes and flat land (0 degrees)	<16 m	BAL–FZ	No development is proposed in this area
		16–<21	BAL–40	No development is proposed in this area
		21–<31	BAL–29	Development may occur in this area
		31–<42	BAL–19	Development may occur in this area
		42–<100	BAL–12.5	Development is likely to occur in this area
Class A forest	Down-slope >0–5 degrees	<20 m	BAL–FZ	No development is proposed in this area
		20–<27	BAL–40	No development is proposed in this area
		27–<37	BAL–29	Development may occur in this area
		37–<50	BAL–19	Development may occur in this area
		50–<100	BAL–12.5	Development is likely to occur in this area
Class D scrub	All up-slopes and flat land (0 degrees)	<10 m	BAL–FZ	No development is proposed in this area
		10–<13	BAL–40	No development is proposed in this area
		13–<19	BAL–29	No development is proposed in this area
		19–<27	BAL–19	Development may occur in this area
		27–<100	BAL–12.5	Development is likely to occur in this area

The above BAL contours are based on the vegetation class and effective slope assessed at the time of inspection and take into consideration the proposed clearing extent and separation distances achieved in line with proposed subdivision and development. Should there be any changes in development/subdivision design or vegetation/hazard extent that requires a modified bushfire management response, then the above BAL contours will need to be reassessed for the affected areas and documented in a brief addendum to this BMP prepared to accompany a future planning/building application.

3. Bushfire management measures

Strategen has identified a range of bushfire management measures that on implementation will enable proposed development to be implemented with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines and AS 3959. The bushfire management measures are discussed in the following subsections and depicted in Figure 6 where applicable.

3.1 Separation distances and fuel management

3.1.1 APZs

APZs will be implemented at the interface between all proposed development areas and the classified vegetation extent. The width of the APZs will be a minimum of 20 m and can be accommodated within existing/proposed road reserves and building setbacks where required.

APZs are required to be maintained on a regular and ongoing basis at a fuel load less than 2 t/ha to achieve a low threat minimal fuel condition all year round. This may include regular slashing of road verges and grassland fuels where applicable. Individual trees can be retained within the APZ provided the understorey is managed through regular slashing to achieve a low threat vegetation minimal fuel condition. No buildings are permitted in the APZ.

Alignment and width of the APZs may be reassessed through a BMP addendum in response to any modifications to lot layout, changes to the vegetation extent currently affecting the site or as an accompaniment to subdivision applications for new development stages.

3.1.2 HSZs

Formal HSZs in accordance with Acceptable Solution A 2.2 of the Guidelines are not required around the proposed APZs in this instance since building construction within each proposed lot will meet the standard appropriate to the BAL for that location (WAPC 2015b).

3.1.3 On-site staging buffers

Clearing will occur throughout the project area on a staged basis and in advance where necessary to ensure building construction is not inhibited by a temporary vegetation extent located on an adjacent development stage that is yet to be cleared. This can be achieved by ensuring each approved stage subject to construction is surrounded by a 100 m wide, on-site cleared or low threat vegetation buffer prior to development (not including vegetation proposed to be retained).

A proportion of the required 100 m wide staging buffers will be achieved through battering, whereby, due to differences between proposed development levels and the natural surface levels of retained Bush Forever and conservation sites, the resultant cut batters will be cleared of vegetation.

Once the buffers are created, they will need to be maintained on a regular and ongoing basis at a fuel load less than 2 t/ha to achieve a low threat minimal fuel condition all year round until such time that the buffer area is developed as part of the next development stage. This will manage the bushfire risk from on-site temporary vegetation during development staging.

3.1.4 POS management

Development within 100 m of on-site vegetation retained within POS, proposed conservation areas or Bush Forever sites will require BAL contour assessment in accordance with AS 3959. Results will need to be provided in the form of a brief BMP addendum to accompany the relevant subdivision application.

The location and size of Drainage POS (if required) is yet to be confirmed. Some planting may occur throughout Drainage POS; however, LandCorp has confirmed that these areas will be subject to an ongoing management commitment by the responsible authority. The required works will include slashing of understorey grasses and weeds on a regular and ongoing basis to maintain fuel loads at less than 2 t/ha and achieve a low threat minimal fuel condition all year round.

Should the final Drainage POS concept result in introduction of vegetation that triggers application of AS 3959, then BAL assessment will be required to determine the necessary separation requirements and building construction standards for affected development areas.

3.2 Increased building construction standards

Strategen acknowledges that the bushfire construction provisions under AS 3959 and the National Construction Code do not apply to Class 4–9 buildings, which are likely to be the dominant types of buildings constructed throughout the proposed industrial development. Therefore, the applicant has the discretion to utilise any or all of the elements of AS 3959 in the construction of the building that they deem appropriate if the building is a Class 4–9 building (WAPC 2015b).

Whilst acknowledging the above, Strategen considers however that to achieve a best practice outcome for protection of future life and property assets from potential bushfire, building design measures be applied for all proposed buildings situated within the 100 m wide HSZ to ensure the building construction standard aligns with the assessed BAL under AS 3959 as far as reasonably practicable, regardless of building class. This measure intends to address the deemed provisions relating construction of habitable buildings¹ in bushfire prone areas as outlined in Section 78B of the *Planning and Development (Local Planning Schemes) Amendment Regulations 2015*.

Strategen has assigned BAL contours throughout the 100 m wide HSZ for Stages 1–5 only, as depicted in Figure 6 and Appendix 2, as these are the only stages where subdivision lot layout is known. BAL contours have been assigned in accordance with AS 3959 on the basis of the existing/proposed subdivision layout and parameters assessed at time of inspection (refer to the Method 1 BAL calculation outlined in Section 2.5). The BAL contour assessment indicates that all proposed development within these stages can achieve a BAL–29 rating or lower and no development is proposed within BAL–FZ or BAL–40 areas. If a lot is affected by more than one BAL, then the worst case BAL shall apply unless it can be demonstrated that the worst case BAL can be avoided through strategic building location at the building permit stage.

All proposed lots within these stages that are situated outside of the 100 m wide HSZ are BAL–Low, where there is insufficient risk to warrant specific building construction requirements. The extent of BAL–Low throughout these stages relies on the separation distances and fuel management measures being implemented as per Section 3.1. BALs may be reassessed through a BMP addendum or individual lot BAL assessment in response to any modifications to lot layout or changes to the vegetation extent currently affecting the site.

Strategen reiterates that BAL assessment will need to be undertaken at the relevant subdivision stage for areas of the site where subdivision lot layout is yet to be confirmed.

¹ 'Habitable building' is defined as any permanent or temporary structure that is fully or partially enclosed and has at least one wall and a roof of solid material and is used for a purpose that involves the use of the interior of the structure by people for living, working, studying or being entertained.

3.3 Vehicular access

3.3.1 Public roads

The proposed road network will provide at least two different points of vehicular access for all development stages at all times. This will be achieved initially through multiple connections with Flynn Drive to the south and links with the existing road network to the east, such as Warman Street. All public roads constructed as part of the development will comply with technical requirements of the Guidelines, as outlined in Table 2.

Where applicable, each stage of subdivision will include a requirement for provision of fire service access routes in accordance with acceptable solution A3.7, or an appropriate performance-based solution in accordance with P3 of the bushfire protection criteria set out in the Guidelines. Any proposed fire service access routes will be required to meet the technical requirements of the Guidelines, as outlined in Table 2.

Table 2: Vehicular access technical requirements

Technical requirement	Public road	Fire service access route
Minimum trafficable surface (m)	6*	6*
Horizontal distance (m)	6	6
Vertical clearance (m)	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10
Minimum weight capacity (t)	15	15
Maximum crossfall	1 in 33	1 in 33
Curves minimum inner radius	8.5	8.5

* Refer to E3.2 Public roads: Trafficable surface

Source: WAPC 2015b

3.3.2 Individual lot firebreaks

Following creation of lots, internal lot boundary firebreaks will need to be created and maintained to meet compliance with the current City of Wanneroo annual firebreak notice (refer to Appendix 3). The relevant firebreak provisions currently state that:

- for any lot greater than 2000 m², a minimum 3 m wide firebreak with 3 m high vertical clearance is required immediately inside and around all external boundaries of the lot
- for any lot less than 2000 m², a minimum 2 m wide firebreak with 2 m high vertical clearance is required immediately inside and around all external boundaries of the lot.

These provisions are required unless a firebreak variation stating otherwise is approved by the City.

3.4 Reticulated water supply

All proposed development areas will be provided a reticulated water supply. The reticulated system will ensure an all year round supply of water is provided for each lot to meet minimum industrial and emergency water supply requirements.

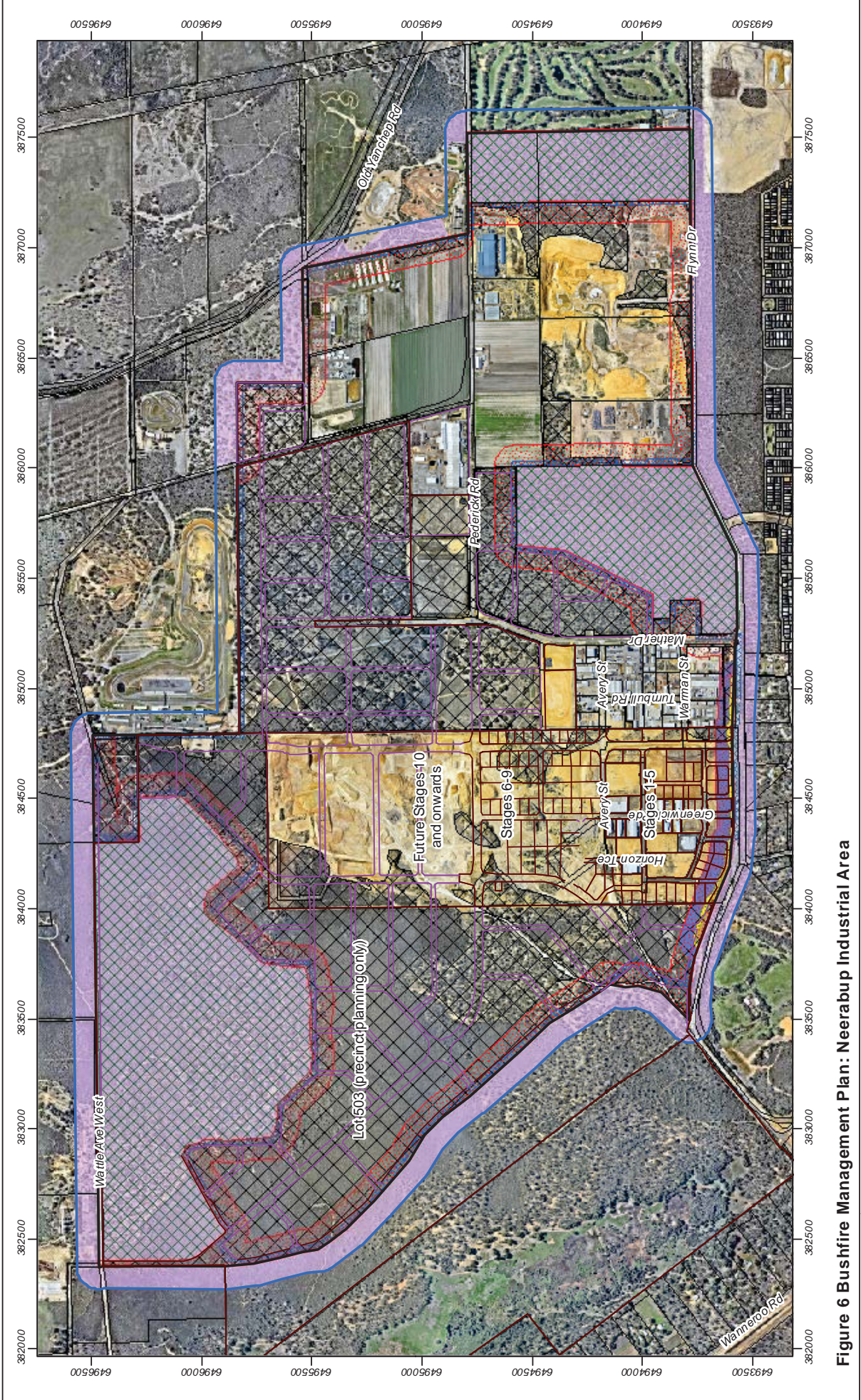
A network of hydrants will also be provided along the internal road network at locations which meet relevant water supply authority and DFES requirements, in particular the Water Corporation Design Standard DS 63 'Water Reticulation Standard Design and Construction Requirements for Water Reticulation Systems up to DN250'. This standard will guide construction of the internal reticulated water supply system and fire hydrant network, including spacing and positioning of fire hydrants so that the maximum distance between a hydrant and the rear of a building envelope (or in the absence of a building envelope, the rear of the lot) shall be 120 m and the hydrants shall be no more than 200 m apart.

3.5 Additional measures

Strategen makes the following additional recommendations to inform ongoing stages of development:

1. High risk land uses²: proposed industrial development has the potential to establish high risk land uses² throughout the project area. Where possible, high risk land uses should be avoided throughout the 100 m wide HSZ. Where they can't be avoided, high risk land uses located in areas of BAL–12.5 to BAL–29 will require the following documentation in addition to this BMP to accompany submission of the Development Application (DA) or building permit application (whichever is deemed more appropriate) in order to address Policy Measure 6.6.1 of SPP 3.7:
 - (a) Emergency Evacuation Plan
 - (b) Risk Management Plan that addresses bushfire risk management measures for any flammable on-site hazards.
2. Notification on Title: notification is to be placed on the Title of all proposed lots with a designated BAL rating (either through condition of subdivision or other head of power) to ensure all landowners/proponents and prospective purchasers are aware that their lot is currently in a designated bushfire prone area and that increased building construction standards may apply to future buildings as determined by this BMP. The notification on title is also to include that the site is subject to a Bushfire Management Plan.
3. Updated BMP or individual lot BAL assessment: the BAL assessment contained within this BMP is considered sufficient to inform future development and building construction within Stages 1–5. However, an updated BMP will be required to accompany each future subdivision application within the project area. Further BMP addendums or individual lot BAL assessment may be prepared at a later date to demonstrate reassessment of the management measures documented in this BMP (such as the APZ and/or BALs) in response to any modifications to development design or changes to the vegetation extent currently affecting the site.
4. Compliance with current City of Wanneroo annual firebreak notice: the developer/land manager and prospective land purchasers are to comply with the current City of Wanneroo annual firebreak notice, as documented in Appendix 3.

² High risk land uses may include, but are not limited to: service stations, landfill sites, bulk storage of hazardous materials, fuel depots and certain heavy industries as well as military bases, power generating land uses, saw-mills, highways and railways, among other uses meeting the definition.



Scale 1:23,000 at A4

0 100 200 300 400 500 m

Coordinate System: GDA 1984 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 3/08/2016
 Author: JCrute
 Source: Aerial image and plan; Client: 07/2016; Existing cadastre: SLIP; Landdate: 2016.
 Path: Q:\Consult\62016\LAN\LAN16242\rd\Map_documents\R0911Rev0\LAN16242_01_R001_Rev0_F006.mxd

Legend

- Cell structure plan layout
- Subdivision plan layout
- Project area
- Existing cadastre
- 100m wide assessment area
- 100m wide HSZ
- PO.S. proposed conservation/ Bush Forever sites
- Indicative 20m wide APZ
- Classified vegetation (permanent vegetation extent)
- On-site temporary vegetation to be managed via staging works
- BAL 29
- BAL 19
- BAL 40
- BAL 40 FZ
- BAL 12.5

Figure 6 Bushfire Management Plan: Neerabup Industrial Area

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4. Proposal compliance and justification

Proposed development within the project area is required to comply with SPP 3.7 under the following policy measures:

6.2 Strategic planning proposals, subdivision and development applications

a) Strategic planning proposals, subdivision and development applications within designated bushfire prone areas relating to land that has or will have a Bushfire Hazard Level (BHL) above low and/or where a Bushfire Attack Level (BAL) rating above BAL-LOW apply, are to comply with these policy measures.

b) Any strategic planning proposal, subdivision or development application in an area to which policy measure 6.2 a) applies, that has or will, on completion, have a moderate BHL and/or where BAL-12.5 to BAL-29 applies, may be considered for approval where it can be undertaken in accordance with policy measures 6.3, 6.4 or 6.5.

c) This policy also applies where an area is not yet designated as a bushfire prone area but is proposed to be developed in a way that introduces a bushfire hazard, as outlined in the Guidelines.

6.3 Information to accompany strategic planning proposals

Any strategic planning proposal to which policy measure 6.2 applies is to be accompanied by the following information prepared in accordance with the Guidelines:

a) (i) the results of a BHL assessment determining the applicable hazard level(s) across the subject land, in accordance with the methodology set out in the Guidelines. BHL assessments should be prepared by an accredited Bushfire Planning Practitioner; or

a) (ii) where the lot layout of the proposal is known, a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. The BAL Contour Map should be prepared by an accredited Bushfire Planning Practitioner; and

b) the identification of any bushfire hazard issues arising from the relevant assessment; and

c) clear demonstration that compliance with the bushfire protection criteria in the Guidelines can be achieved in subsequent planning stages.

This information can be provided in the form of a Bushfire Management Plan or an amended Bushfire Management Plan where one has been previously endorsed.

6.4/6.5 Information to accompany subdivision applications/development applications

Any subdivision application/development application to which policy measure 6.2 applies is to be accompanied by the following information in accordance with the Guidelines:

a) a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. BAL Contour Maps should be prepared by an accredited Bushfire Planning Practitioner

b) the identification of any bushfire hazard issues arising from the BAL Contour Map

c) an assessment against the bushfire protection criteria requirements contained within the Guidelines demonstrating compliance within the boundary of the subdivision/development site.

Implementation of this BMP is expected to meet the following objectives of SPP 3.7:

5.1 Avoid any increase in the threat of bushfire to people, property and infrastructure. The preservation of life and the management of bushfire impact are paramount.

5.2 Reduce vulnerability to bushfire through the identification and consideration of bushfire risks in decision-making at all stages of the planning and development process.

5.3 Ensure that higher order strategic planning documents, strategic planning proposals, subdivision and development applications take into account bushfire protection requirements and include specified bushfire protection measures.

5.4 Achieve an appropriate balance between bushfire risk management measures and, biodiversity conservation values, environmental protection and biodiversity management and landscape amenity, with consideration of the potential impacts of climate change.

In response to the above requirements of SPP 3.7, the bushfire management measures, as outlined in Section 3, have been devised for the proposed development in accordance with acceptable solutions of the Guidelines to meet compliance with bushfire protection criteria. An 'acceptable solutions' assessment is provided in Table 3 to assess the proposed bushfire management measures against each bushfire protection criteria in accordance with the Guidelines and demonstrate that the measures proposed meet the intent of each element of the bushfire protection criteria.

Table 3: Acceptable solutions assessment against bushfire protection criteria

Bushfire protection criteria	Intent	Acceptable solutions	Proposed bushfire management measures	Compliance statement
Element 1: Location	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure	<p>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.</p> <p>A2.1 Asset Protection Zone Every building is surrounded by an APZ, depicted on submitted plans, which meets detailed requirements (refer to the Guidelines for detailed APZ requirements).</p> <p>A2.2 Hazard Separation Zone Every building and its contiguous APZ is surrounded by an HSZ, depicted on submitted plans, that meets detailed requirements (refer to the Guidelines for detailed HSZ requirements). An HSZ may not be required if the proposed construction meets the standard appropriate to the BAL for that location, and does not exceed BAL-29.</p>	<p>Refer to Section 3.2, which demonstrates that development will only occur in areas of BAL-29 or lower. No development will occur in BAL-FZ or BAL-40 areas.</p> <p>Refer to Section 3.1, which demonstrates that a minimum 20 m wide APZ will be provided at all development-vegetation interfaces.</p> <p>HSZs are not proposed since individual building construction meets the standard appropriate to the BAL for that location.</p>	The measures proposed are considered to comply and meet the intent of Element 1 Location.
Element 2: Siting and design of development	To ensure that the siting and design of development minimises the level of bushfire impact	<p>A3.1 Two access routes Two different vehicular access routes are provided, both of which connect to the public road network, provide safe access and egress to two different destinations and are available to all residents/the public at all times and under all weather conditions.</p> <p>A3.2 Public road A public road is to meet the requirements in Table 4 Column 1 of the Guidelines.</p> <p>A3.3 Cul-de-sac (including a dead-end-road) A cul-de-sac and/or a dead end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/or will need to be demonstrated by the proponent), detailed requirements will need to be achieved as per Table 4 Column 2 of the Guidelines.</p> <p>A3.4 Battle-axe Battle-axe access legs should be avoided in bushfire prone areas. Where no alternative exists, (this will need to be demonstrated by the proponent) detailed requirements will need to be achieved as per Table 4 Column 3 of the Guidelines.</p>	<p>Refer to Section 3.3, which demonstrates that a minimum of two different vehicular access routes will be provided for the proposed development at all times via the existing/proposed road network.</p> <p>Refer to Section 3.3, which demonstrates that all proposed public roads will meet requirements of the Guidelines (refer to Table 2).</p> <p>N/A No cul-de-sacs are proposed as part of the development.</p> <p>N/A No battle-axe lots are proposed as part of the development.</p>	The measures proposed are considered to comply and meet the intent of Element 2 Siting and design of development
Element 3: Vehicular access	To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event	<p>A3.1 Two access routes Two different vehicular access routes are provided, both of which connect to the public road network, provide safe access and egress to two different destinations and are available to all residents/the public at all times and under all weather conditions.</p> <p>A3.2 Public road A public road is to meet the requirements in Table 4 Column 1 of the Guidelines.</p> <p>A3.3 Cul-de-sac (including a dead-end-road) A cul-de-sac and/or a dead end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/or will need to be demonstrated by the proponent), detailed requirements will need to be achieved as per Table 4 Column 2 of the Guidelines.</p> <p>A3.4 Battle-axe Battle-axe access legs should be avoided in bushfire prone areas. Where no alternative exists, (this will need to be demonstrated by the proponent) detailed requirements will need to be achieved as per Table 4 Column 3 of the Guidelines.</p>	<p>Refer to Section 3.3, which demonstrates that a minimum of two different vehicular access routes will be provided for the proposed development at all times via the existing/proposed road network.</p> <p>Refer to Section 3.3, which demonstrates that all proposed public roads will meet requirements of the Guidelines (refer to Table 2).</p> <p>N/A No cul-de-sacs are proposed as part of the development.</p> <p>N/A No battle-axe lots are proposed as part of the development.</p>	The measures proposed are considered to comply and meet the intent of Element 3 Vehicular access

		<p>A3.5 Private driveway longer than 50 m A private driveway is to meet detailed requirements as per Table 4 Column 3 of the Guidelines.</p> <p>A3.6 Emergency access way An access way that does not provide through access to a public road is to be avoided in bushfire prone areas. Where no alternative exists (this will need to be demonstrated by the proponent), an emergency access way is to be provided as an alternative link to a public road during emergencies. An emergency access way is to meet detailed requirements as per Table 4 Column 4 of the Guidelines.</p> <p>A3.7 Fire service access routes (perimeter roads) Fire service access routes are to be established to provide access within and around the edge of the subdivision and related development to provide direct access to bushfire prone areas for fire fighters and link between public road networks for fire fighting purposes. Fire service access routes are to meet detailed requirements as per Table 4 Column 5 of the Guidelines.</p> <p>A3.8 Firebreak width Lots greater than 0.5 hectares must have an internal perimeter firebreak of a minimum width of three metres or to the level as prescribed in the local firebreak notice issued by the local government</p> <p>A4.1 Reticulated areas The subdivision, development or land use is provided with a reticulated water supply in accordance with the specifications of the relevant water supply authority and Department of Fire and Emergency Services.</p> <p>A4.2 Non-reticulated areas Water tanks for fire fighting purposes with a hydrant or standpipe are provided and meet detailed requirements (refer to the Guidelines for detailed requirements for non-reticulated areas)</p> <p>A4.3 Individual lots within non-reticulated areas (only for use if creating 1 additional lot and cannot be applied cumulatively) Single lots above 500 square metres need a dedicated static water supply on the lot that has the effective capacity of 10 000 litres.</p>	<p>N/A No private driveways longer than 50 m are proposed as part of the development.</p> <p>N/A No emergency access ways are required as part of the development.</p> <p>Where applicable, fire service access routes will be required at the subdivision stage in accordance with A3.7 or an appropriate performance based solution in accordance with P3 of the Guidelines.</p> <p>Refer to Section 3.3, which demonstrates that all proposed lots will be required to comply with the firebreak requirements prescribed in the annual firebreak notice issued by the local government.</p> <p>Refer to Section 3.4, which demonstrates that all proposed lots will be provided a reticulated water supply and network of hydrants in accordance with local water authority, City and DFES requirements.</p> <p>N/A The proposed development will not occur within a non-reticulated area.</p> <p>N/A The proposed development will not occur within a non-reticulated area.</p>	<p>The measures proposed are considered to comply and meet the intent of Element 4 Water</p>
<p>Element 4: Water</p>	<p>To ensure that water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.</p>			

5. Implementation and enforcement

Implementation of the BMP applies to LandCorp, prospective landowners and the relevant land authority/manager (such as the City or future land purchasers) to ensure bushfire management measures are adopted and implemented on an ongoing basis. A summary of the bushfire management measures described in Section 3, as well as a works program, is provided in Table 4. These measures will be implemented to ensure the ongoing protection of proposed life and property assets is achieved. Timing and responsibilities are also defined to assist with implementation of each measure.

Table 4: Proposed works program

Bushfire management measure	Timing for application	Responsibility
Creation and ongoing maintenance of APZs as per Section 3.1.1	APZs are to be created for each development stage where required, prior to development within that stage, and maintained as required to ensure they are kept in a low threat minimal fuel condition on a regular and ongoing basis	LandCorp during development of each relevant stage, relevant land authority/manager where required following completion of each relevant stage
Creation and maintenance of on-site staging buffers as per Section 3.1.3	Staging buffers are to be created in advance around each development stage where required, prior to development within that stage, and maintained as required to ensure they are kept in a low threat minimal fuel condition on a regular and ongoing basis until developed	LandCorp
Ongoing maintenance of Drainage POS as per Section 3.1.4	If created, Drainage POS is to be maintained, in advance where required, prior to development within that stage to ensure the POS is kept in a low threat minimal fuel condition on a regular and ongoing basis	LandCorp during development of each relevant stage, relevant land authority/manager where required following completion of each relevant stage
Building construction to the recommended BAL ratings as far as reasonably practicable as per Section 3.2	At the building construction stage	Prospective landowner, builder
Construction of public roads and fire service access routes (if required) as per Section 3.3.1	Prior to building construction for each relevant stage	LandCorp
Creation and ongoing maintenance of firebreaks as per Section 3.3.2	Firebreaks are to be created for each relevant lot following creation of lots and maintained as required in accordance with the current City of Wanneroo annual firebreak notice	LandCorp prior to lot sale, prospective landowner following lot sale
Provision of reticulated water supply and network of hydrants as per Section 3.4	Prior to building construction for each relevant stage	LandCorp
Preparation of Emergency Evacuation Plan and Risk Management Plan as per Section 3.5	At the Development Application stage or building permit application stage (whichever is deemed more appropriate) for any high risk land uses proposed in areas of BAL-12.5 to BAL-29	Prospective landowner
Notification on Title as per Section 3.5	Following subdivision approval	LandCorp
Updated BMP or individual lot BAL assessment as per Section 3.5	An updated BMP is required to support each future subdivision application within the project area. Further BMP addendums and/or individual lot BAL assessments may be required at future planning/building stages to demonstrate reassessment of the management measures documented in this BMP (such as the APZ and/or BALs) in response to any modifications to development design or changes to the vegetation extent currently affecting the site.	LandCorp or prospective landowner depending on the applicant

Bushfire management measure	Timing for application	Responsibility
Compliance with current City of Wanneroo annual firebreak notice as per Section 3.5	All year round as specified in the current firebreak notice	LandCorp, prospective landowner, relevant land authority/manager

5.1 Document review

This BMP will be updated as necessary following the date of approval to ensure:

1. Implementation is assessed and corrective actions are applied in cases of non-compliance.
2. The effectiveness and impact of fire prevention work is evaluated and any significant changes in development design or the surrounding environment are reassessed in a BMP addendum.

LandCorp will be responsible for updating and revising the BMP as required until such time that the development is complete, after which time the City will be the authority responsible for updating and revising the BMP as required.

5.2 Stakeholder consultation

Strategen has undertaken consultation with LandCorp, the City and DFES to ensure aims and objectives of the BMP are in accordance with stakeholder expectations and the BMP maintains compliance with the Guidelines.

6. References

City of Wanneroo 2016, *Fire Management Plan: LandCorp Land at Neerabup*, plan prepared for the City and DFES, February 2015.

Department of Fire and Emergency Services (DFES) 2016, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from:
<http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx>, [11/07/2016].

Standards Australia (SA) 2009, *Australian Standard AS 3959–2009 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.

Taylor Burrell Barnett and Sinclair Knight Merz (SKM) 2011, *Neerabup Industrial Area Agreed Structure Plan (As Amended)*, report prepared for LandCorp, November 2011.

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

Western Australian Planning Commission (WAPC) 2015b, *Guidelines for Planning in Bushfire-Prone Areas*, Western Australian Planning Commission, Perth.

Appendix 1

Photo points (refer to Figure 3 for spatial location of photo points)




Photo No.	Vegetation class	Comment	Photo
1	Class B woodland	Banksia overstorey, scrub understorey, adjacent west of Lot 9005	
2	Class D scrub	Temporary vegetation within Lot 9005	
3	Class D scrub	Adjacent west of Lot 9005, eucalyptus overstorey in background signifies narrow band of Class A forest	




Photo No.	Vegetation class	Comment	Photo
4	Class D scrub	Adjacent west of Lot 9005	
5	Class A forest	Adjacent northwest of Lot 9005, subject to recent prescribed burn by DFES/City of Wanneroo brigades (Cell 2)	
6	Class D scrub	Adjacent west of Lot 9005, south of prescribed burn (Cell 2) boundary	




Photo No.	Vegetation class	Comment	Photo
7	Class A forest	Central north within Lot 503, south of prescribed burn (Cell 2) boundary	
8	Class A forest	Adjacent north of Lot 9005, subject to recent prescribed burn by DFES/City of Wanneroo brigades (Cell 2)	
9	Class D scrub	Adjacent west of Barbagallo Raceway	




Photo No.	Vegetation class	Comment	Photo
10	Low threat vegetation Clause 2.2.3.2 (e) and (f)	Within western boundary of Barbagallo Raceway	
11	Class D scrub	View to southwest from DPaW station, north of site	
12	Class D scrub	View to southeast from DPaW station, north of site	




Photo No.	Vegetation class	Comment	Photo
13	Class B woodland	Sparse banksia and casuarina canopy over grassland, within northeast portion of site	
14	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, within northeast portion of site	
15	Class B woodland	Sparse melaleuca canopy over grassland, within northeast portion of site	




Photo No.	Vegetation class	Comment	Photo
16	Class A forest	Eucalyptus regrowth, will become forest in mature state, northeast of site	
17	Class A forest	Roadside vegetation east of site, eucalyptus overstorey	
18	Class B woodland	Predominant banksia woodland within Pinjar Park, east of site	




Photo No.	Vegetation class	Comment	Photo
19	Class B woodland	Predominant banksia and casuarina woodland, proposed for on-site retention within central southern portion of site	
20	Low threat vegetation Clause 2.2.3.2 (f)	Managed horticulture within central eastern portion of site	
21	Class A forest	Very recently burnt, eucalyptus overstorey with regeneration of understorey within northeast portion of site	




Photo No.	Vegetation class	Comment	Photo
22	Class G grassland	Unmanaged grassland plot, central to site	
23	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understory, central to site	
24	Class B woodland	Predominant banksia and casuarina woodland, proposed for on-site retention within central southern portion of site	




Photo No.	Vegetation class	Comment	Photo
25	Class B woodland	Roadside vegetation, southeast of site	
26	Class B woodland	Roadside vegetation, southeast of site	
27	Class B woodland	Predominant banksia and casuarina woodland, proposed for on-site retention within central southern portion of site	




Photo No.	Vegetation class	Comment	Photo
28	Class A forest	Greater proportion of eucalyptus overstorey over banksia and casuarina midstorey over shrubs/scrub, south of site opposite Flynn Drive	
29	Class A forest	South of site within adjacent larger rural residential lots	
30	Low threat vegetation Clause 2.2.3.2 (e)	Within Stages 1–5 subdivision area	




Photo No.	Vegetation class	Comment	Photo
31	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, southwest of Stages 1–5 subdivision area	
32	Low threat vegetation Clause 2.2.3.2 (e)	Within Stages 1–5 subdivision area	
33	Class D scrub	West of Stages 1–5 subdivision area	




Photo No.	Vegetation class	Comment	Photo
34	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, southwest of site opposite Flynn Drive	
35	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, west of site opposite quarry access road	
36	Class B woodland	Predominant banksia overstorey with scrub understorey, west of Stages 1-5 subdivision area	




Photo No.	Vegetation class	Comment	Photo
37	Class B woodland	Sparse banksia/eucalyptus overstorey over grassland, west of quarry access road	
38	Class G grassland	Unmanaged grassland plot west of quarry access road	
39	Class B woodland	Banksia and casuarina woodland proposed for on-site retention within eastern portion of site	




Photo No.	Vegetation class	Comment	Photo
40	Class B woodland	Banksia and casuarina woodland proposed for on-site retention within eastern portion of site	
41	Class B woodland	Banksia woodland in background beyond predominant grassland plot within central northern portion of site	
42	Class B woodland	Predominant banksia and casuarina woodland with some minor eucalyptus incursion within southern portion of site	






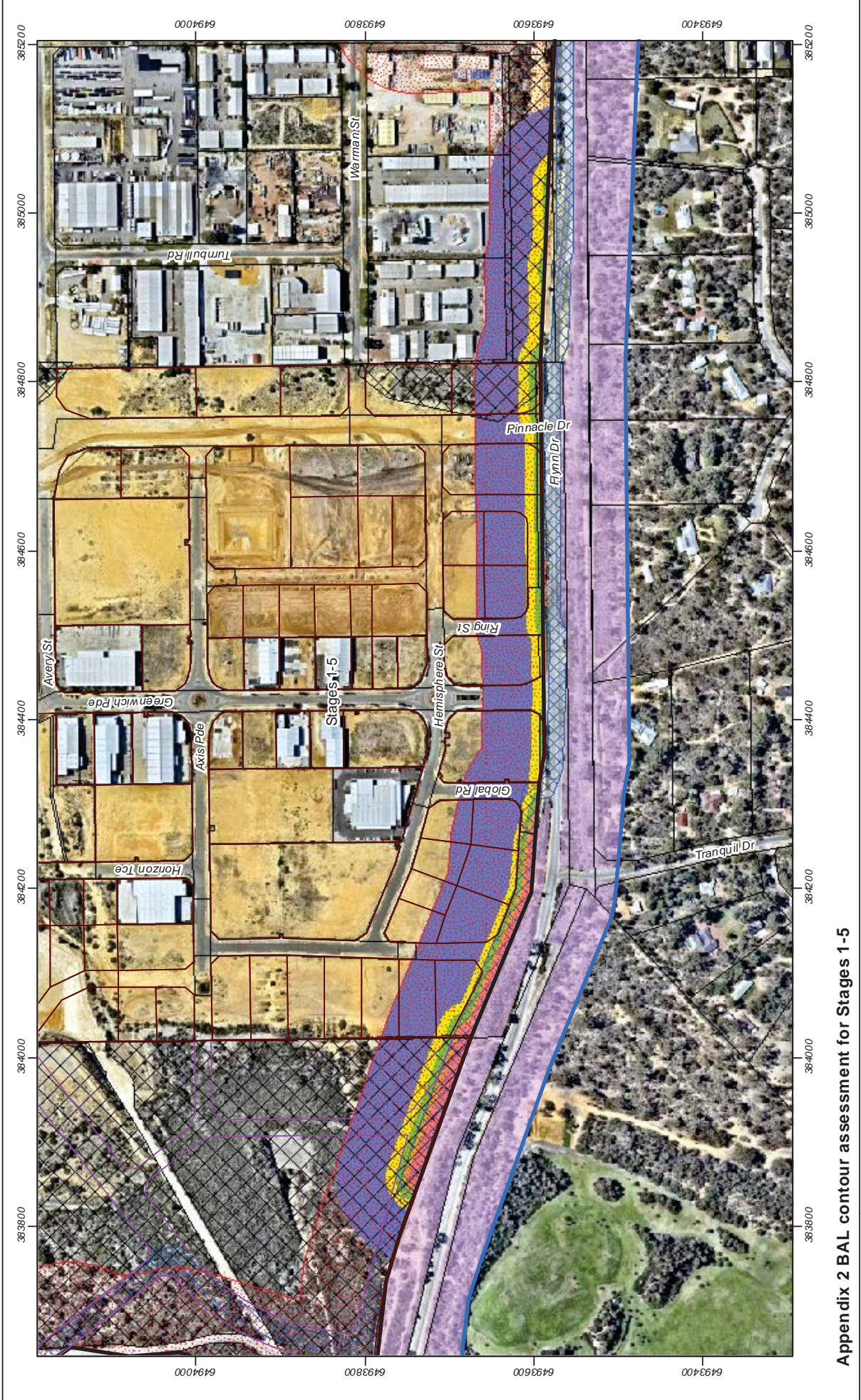
Photo No.	Vegetation class	Comment	Photo
43	Class D scrub	West of quarry access road	
44	Class D scrub	East of quarry access road	
45	Class D scrub	Low lying contiguous scrub within Lot 503	

Photo No.	Vegetation class	Comment	Photo
46	Class D scrub	Low lying contiguous scrub within Lot 502	
47	Class D scrub	Adjacent south of Stages 1-5 subdivision area, north of Flynn Drive	

Appendix 2
BAL contour assessment for Stages 1–5



Scale: 1:6,000 at A4

Legend

- Cell structure plan layout
- Subdivision plan layout
- Project area
- Existing cadastral
- 100m wide assessment area
- 100m wide HSZ
- PO S, proposed conservation/ Bush Forever sites
- Classified vegetation (permanent vegetation extent)
- On-site temporary vegetation to be managed via staging works
- Indicative 20m wide APZ
- BAL contours:
 - BAL 29
 - BAL 19
 - BAL 12.5
 - BAL FZ
 - BAL 40

Coordinate System: GDA 1984 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 3/08/2016
 Author: JClubb
 Source: Aerial image and plan: Client 07/2016, Existing cadastral: SLIP Landdate 2016.
 Path: Q:\Consult\62016\L\LAN\LAN16242\Map_documents\R001Rev0\LAN16242_01_R001_Rev0_Appendix2.mxd

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Appendix 2 BAL contour assessment for Stages 1-5

Appendix 3
City of Wanneroo annual firebreak
notice

Protect your home and property from bushfires

NOTICE TO ALL OWNERS OR OCCUPIERS OF LAND IN THE DISTRICT OF THE CITY OF WANNEROO REGARDING FIREBREAKS.

The City of Wanneroo hereby gives notice pursuant to Section 33 of the **Bush Fires Act 1954** to all owners or occupiers of land in its district that they are required on or before 15 November, or within 14 days of becoming the owner or occupier of the land if that occurs after the 15 November, to annually plough, cultivate, scarify, or otherwise clear firebreaks as specified in this Notice and thereafter up to, and including the 30 April, annually, to maintain the firebreaks clear of flammable matter.

1. Land having an area of 2000m² or more

A firebreak not less than 3 metres wide and 3 metres high immediately inside and around all external boundaries of the land must be cleared.

2. Land having an area of less than 2000m²

A firebreak not less than 2 metres wide and 2 metres high immediately inside and around all external boundaries of the land must be cleared.

3. Buildings

A firebreak not less than 3 metres wide immediately around all external walls of every building must be cleared. Whenever a firebreak is cleared by burning the provisions of the Act and Regulations made thereunder must be observed. If pursuant to Item (2) of this Notice, mowing or slashing is carried out the height of vegetation thereafter must not exceed, as far as is reasonably practicable, 20mm over the entire area of the firebreak. The use of chemicals is subject to all restrictions imposed by the Department of Agriculture. Attention is drawn to the Flammable Liquids Regulations made under the Explosives and Dangerous Goods Act 1961, which requires a site on which flammable liquid is stored to be totally cleared of all flammable material for a minimum distance of 5 metres surrounding the site.

If it is considered to be impracticable for any reason to comply with the provisions of this Notice, application may be made not later than the 1st day of November annually to the Council or its authorised officer for permission to provide alternative fire protection measures. If permission is not granted the requirements of this Notice must be complied with.

Penalty

An owner or occupier of land who fails or neglects in any respect to comply with the requirements of this Notice is liable to a maximum fine of \$5,000.

DATES TO REMEMBER

- Firebreaks must be cleared by **15 November (AND KEPT CLEAR UNTIL APRIL 30)**
- Burning permits required all year round
- Burning prohibited between **1 December to 31 March**

When and how to obtain a fire permit

Permits are available from the City of Wanneroo at the following locations:

WANNEROO ANIMAL CARE CENTRE

Located at the rear of the Ashby Operations Centre,
1204 Wanneroo Road, Ashby
The City's Rangers / Fire Control Officers are available to issue permits 7 days a week* from 4pm - 6pm
*Except Good Friday

CITY OF WANNEROO CIVIC CENTRE

23 Dundeebar Road, Wanneroo
The City's Fire Control Officers / Permit Issuing Officers are available to issue permits Monday to Friday 9am - 4pm

NEED ADVICE?

Further advice about how to protect your home, constructing firebreaks, and when and how to burn off, is available from the City of Wanneroo during office hours on 9405 5000.



23 Dundeebar Road, Wanneroo, WA 6065

Locked Bag 1, Wanneroo, WA 6946

T : (08) 9405 5000 F : (08) 9405 5499

After Hours : 1300 13 83 93

E : enquiries@wanneroo.wa.gov.au

wanneroo.wa.gov.au  

PROTECT YOUR HOME
AND PROPERTY FROM
BUSHFIRES



Keeping your home safe from fire

There are a number of ways you can help keep your home safe from fire:

- Install smoke detectors in your home
- Clear vegetation away from the walls of your home
- Clear all rubbish and flammable material from around your home to create a 20 metre circle of safety
- Store firewood, timber, petrol, and kerosene well away from your home
- Prior to summer, clean all leaves and debris from your gutters
- Don't have flammable trees such as conifers near buildings
- Have branches trimmed that overhang the house or powerlines
- Fit wire insect screens or shutters to windows and glass doors

If a firebreak is impractical along your boundary for environmental or other reasons notify the City of Wanneroo by 1 October to obtain permission to install firebreaks in alternative positions, or of a different nature.

ALTERNATIVE METHODS OF REDUCING FIRE HAZARDS ON VACANT LAND

- For urban land less than 2000m², if mowing or slashing is carried out, the height of the vegetation must not exceed, as far as is reasonably practical, 20mm over the entire area of the firebreak
- The use of chemicals is subject to all restrictions imposed by the Department of Agriculture
- Mulching • Disposal at an authorised rubbish tip site

When and how to burn

NO BURNING FROM 1 DECEMBER - 31 MARCH

Burning off - that is, bush/running fire including grass, on any land is totally prohibited between 1 December and 31 March. Fire permits for burning material other than garden rubbish are required all year round.

A person in control of the fire must stay with the fire until it is completely extinguished.

GARDEN RUBBISH AND REFUSE

The burning of garden refuse is permitted between the hours of 6pm and 11pm, provided the fire danger rating is not VERY HIGH, SEVERE, EXTREME or CATASTROPHIC or a TOTAL FIRE BAN has been declared.

Fire danger rating signs are located at the following locations:

- Corner of Joondalup Drive and Wanneroo Road
- Wanneroo Road, south of the Yanchepp Beach Road turn off
- Wanneroo Road, Carabooda • Marmion Avenue, Jindalee
- Neaves Road, Mariginiup • Old Yanchepp Road, Pinjar
- Gngangara Road, Landsdale • Country Side Drive, Two Rocks

Other points to remember when burning garden refuse and rubbish are:

- All bush and flammable material must be thoroughly cleared within two metres of all points of the site of the fire
- The material must be on the ground, and be no more than one metre wide and one metre high

Only one heap may be burnt at any one time

Incinerators may be used providing:

- The incinerator is properly constructed and designed to prevent the escape of sparks of burning material
- The incinerator is situated not less than two metres away from a building or fence
- An area of two metres surrounding the incinerator is clear of all flammable material

BARBECUES

Only gas or electric barbecues may be lit during VERY HIGH, SEVERE, EXTREME or CATASTROPHIC fire danger rating or declared TOTAL FIRE BAN. The lighting of solid fuel barbecues is not permitted on these days.

SMOKE NUISANCES

City of Wanneroo residents are advised to be mindful of smoke issues associated with any burning that they conduct. Steps should be taken to avoid undue smoke impact to neighbours and adjacent roads. Smoke across roadways can severely impact motorists' visibility and therefore road safety. Issues of smoke nuisance are regulated by the Waste Avoidance and Resource Recovery Act 2007.

CAMPFIRES

Campfires must not be lit on VERY HIGH, SEVERE, EXTREME or CATASTROPHIC fire danger days or declared TOTAL FIRE BAN. A person must remain in attendance at the site during the whole time the fire is burning. The user must extinguish the fire using water or earth before leaving the area.

Hints for safer burning

- Don't light a fire on a hot or windy day
- Don't burn more than you can control
- Let your neighbours know you'll be burning material
- Make sure smoke and sparks will not affect your neighbour's washing or enter open windows
- Cut or rake long grass around trees, building and fences before burning
- Burn against the wind
- On a sloping block, burn from the top down
- Keep a hose or spray pack at hand to dampen down fierce fires
- If in doubt, don't burn material yourself - call the Volunteer Fire Brigade
- Stay with the fire until it is completely extinguished
- Where possible, don't burn any closer than 20 metres from your home or other buildings

Penalties

Under the Bush Fires Act 1954, failing to comply with regulations can result in a fine ranging from \$250 to \$250,000 or imprisonment.

Failure to maintain 2/3 metre firebreak as per firebreak order \$250

Offence relating to lighting fire in the open air \$250

Setting fire to bush during prohibited burning times \$250

Failure of occupier to extinguish bush fire \$250

Major offences result in Court action with fines ranging from \$250 to \$250,000 or imprisonment for 14 years.

THE BIGGEST PENALTY OF ALL

The biggest penalty of all would be losing your loved ones or home to fire. Please ensure you, your family and your home are kept safe by taking the necessary precautions.

Special rural and residential land

Owners and occupiers of special rural and special residential land should be aware of their responsibilities to take bush fire prevention measures, while ensuring they do not contravene Town Planning Scheme provisions which control the removal of vegetation in Special Residential and Special Rural Zones.

These special rural zones were created in areas of natural flora, and the Scheme recognises the importance of preserving the natural environment in these areas. Anyone found cutting down, lopping or damaging trees in these areas without City approval may be guilty of an offence.

However, bush fire prevention, including the installation of firebreaks, is essential regardless of the zoning of the land.

Below are some guidelines for installing firebreaks in special rural zones to prevent bush fires, while minimising damage to the natural environment.

- A 3 metre wide and 3 metre high firebreak should be cleared around the perimeter of special rural or special residential lots
- These firebreaks need not be strictly around the perimeter, but may deviate according to the flora
- The firebreak does not have to be ploughed but can instead be created by clearing and removing all flammable material
- Care should be taken to avoid damaging or removing significant trees and shrubs
- Avoid the build up of undergrowth and leaf litter