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BPAD Bushfire Planning & Design

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: Lot 703 Armadale Road

Suburb: Treeby **State:** WA **P/code:** 6164

Local government area: City of Cockburn

Description of the planning proposal: Structure Plan

BMP Plan / Reference Number: 56817 **Version:** R01 Rev 1 **Date of Issue:** 25/11/2019

Client / Business Name: RobertsDay

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 strategic planning proposal (i.e. Structure Plan submission)

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	BPAD 37803	31/08/2020
Company		**Contact No.**	
Strategen-JBS&G		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** 25/11/2019

RobertsDay

Bushfire Management Plan (Structure Plan)

Lot 703 Armadale Road, Treeby

25 November 2019

56817/125147 (Rev 1)

JBS&G Australia Pty Ltd T/A Strategen-JBS&G

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1. Proposal details

1.1 Background

RobertsDay is seeking to lodge a Structure Plan application to guide future subdivision development within Lot 703 Armadale Road, Treeby (the project area), located in the City of Cockburn. The Structure Plan (Figure 1) identifies:

- residential cells including an over 55's site
- local centre for a proposed childcare site
- internal road layout and emergency access
- areas of Public Open Space (POS) comprising unmanaged conservation, managed POS and drainage areas.

1.2 Site description

The project area comprises approximately 19.91 ha and is surrounded by (see Figure 2):

- Bush Forever Area (BF390) to the north
- Armadale Road, remnant vegetation and partially vegetated rural residential lots to the south
- previously sand mined, vacant land with sparse regrowth vegetation to the east (to be developed for future urban use by Perron Group in accordance with MRS amendment)
- Ghostgum Avenue and existing Calleya Residential Estate developed by Stockland to the west.

A portion of the project area is designated as bushfire prone on the *Map of Bush Fire Prone Areas* (DFES 2019; see Plate 1).

1.3 Purpose

This Bushfire Management Plan (BMP) has been prepared to address requirements under *Policy Measure 6.3 of State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2017).

1.4 Other plans/reports

No other relevant bushfire reports are available for the project area. Relevant environmental survey reports prepared by RPS to support the proposed Structure Plan have been referenced as required, particularly with regards to retention and conservation of threatened flora.

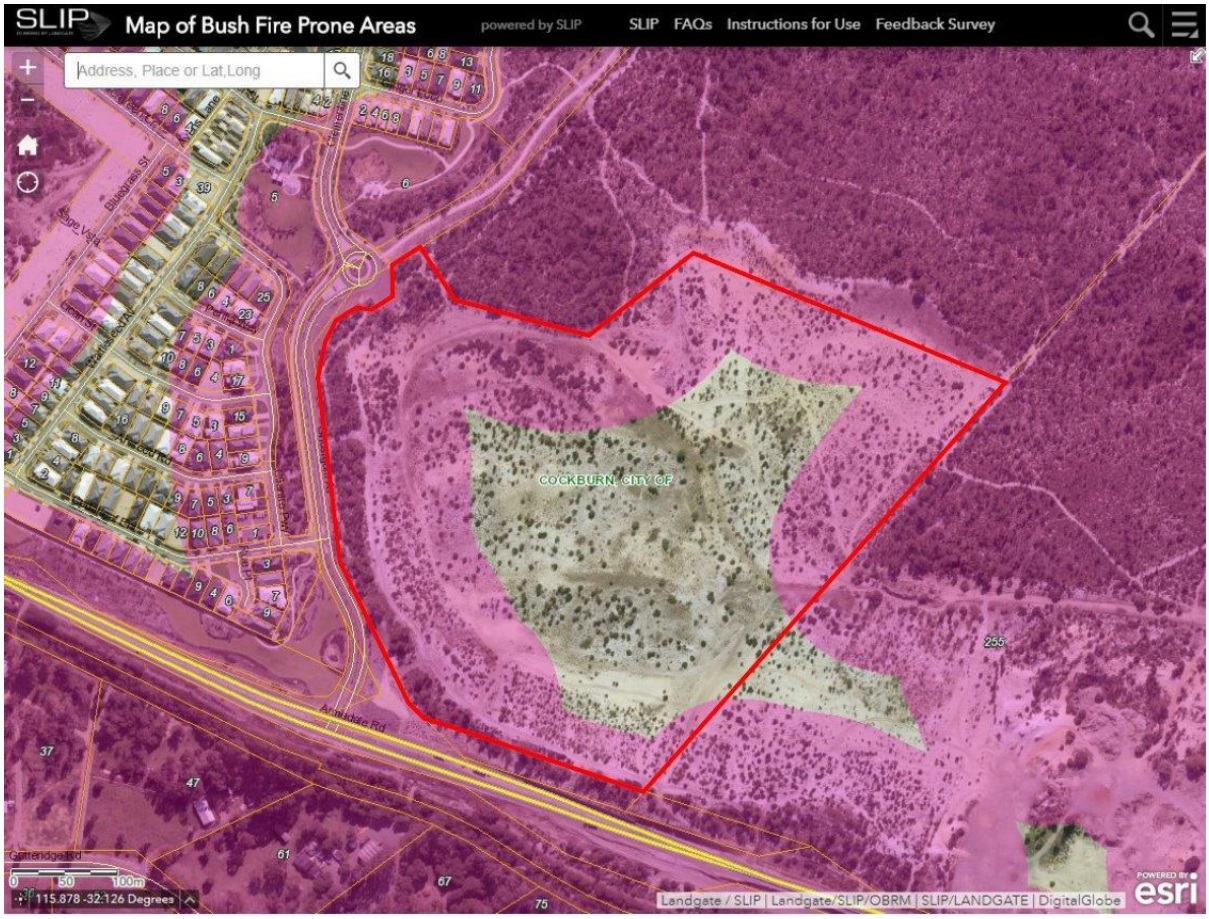


Plate 1: Map of Bush Fire Prone Areas (DFES 2019)



Source: Roberts Day 2019

Figure 1: Treeby Structure Plan



Legend:

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- Bush Forever site (DOP)
- Roads

Scale 1:5,000 at A4 (0 – 100 metres)		**Treeby, WA**
Coord. Sys. GDA 1994 MGA Zone 50		**SITE OVERVIEW**
Job No: 56817		
Client: Roberts Day		**FIGURE 2**
Version: A	Date: 15-Nov-2019	strategen JBS&G
Drawn By: jcrute	Checked By: CT	

File Name: W:\Projects\1)Open\Roberts Day\56817 Strategic fire advice, Treeby\GIS\Maps\R01 Rev A\56817_02_SiteOverview.mxd
Image Reference: www.nearmap.com© - Imagery Date: 18. October 2019.

2. Environmental considerations

2.1 Native vegetation - modification and clearing

The project area will be cleared/earthworked to facilitate future urban use except for a portion of proposed unmanaged conservation POS in the west. Since the project area was subject to previous clearing as part of historical sand mining operations, the proposal is not expected to result in the clearing of any significant native vegetation. Rare orchards (as per RPS 2019 environmental survey) have been identified within the western end of the project area and will be conserved through the allocation of unmanaged conservation POS. A search of publicly available environmental data relating to the project area has been undertaken and is summarised in Table 1.

Table 1: Summary of environmental values

Environmental value	Not mapped as occurring within or adjacent to the project area	Mapped as occurring within or adjacent to the project area		Description
		Within	Adjacent	
Environmentally Sensitive Area		✓	✓	An Environmentally Sensitive Area occurs within and adjacent to the Project Area associated with the broader Jandakot Regional Park.
Swan Bioplan Regionally Significant Natural Area	✓			N/A.
Ecological linkages		✓	✓	A Perth Reginal Ecological linkage occurs within and adjacent to the Project Area.
Wetlands			✓	No Ramsar sites are present. A Resource Enhancement Wetland occurs 100 m to the south of the Project Area.
Waterways	✓			N/A.
Threatened Ecological Communities listed under the EPBC Act		✓	✓	Threatened Ecological Communities are recorded as occurring within and adjacent to the Project Area. Banksia Woodlands are mapped as likely to occur within and adjacent to the Project Area. No Tuart Woodlands are present.
Threatened and priority flora		✓	✓	The buffer zone for three Threatened Flora species occur within and adjacent to the Project Area.
Fauna habitat listed under the EPBC Act		✓	✓	Potential Quenda habitat occurs on the western and southern fringes of the Project Area. Roosting areas for Carnaby's Black Cockatoo are mapped as confirmed to occur within and adjacent to the Project Area. Potential feeding areas also occur on the fringes of the Project Area.
Threatened and priority fauna			✓	Two Priority Fauna species and one Threatened Fauna species occurs between 100 m to 200 m to the south of the Project Area.
Bush Forever Site			✓	Bush Forever Site 390 occurs immediately to the north and east of the Project Area. Bush Forever 263 occurs 100 m to the south.
DBCA managed lands and waters (includes legislated lands and waters and lands of interest)	✓			N/A.
Conservation covenants	✓			N/A.

The majority of environmental values identified above will not be applicable to the proposed built footprint of the project area due to the highly degraded condition of on-site vegetation. Intact vegetation within the project area with the potential to support environmentally significant native vegetation is proposed to be conserved within unmanaged conservation POS.

2.2 Revegetation / Landscape Plans

Landscaping and replanting is likely to occur within proposed drainage areas; however, low threat vegetation is expected to be achieved throughout these areas in accordance with detailed landscape plans (to be prepared at the subdivision stage) given the small size and nature of the drainage proposed (i.e. isolated cells, roadside swales, etc). The Landscape Masterplan (refer to Appendix A) indicates that landscaping within POS will result in the likely exclusions under a combination of Clauses 2.2.3.2 (e) and (f) throughout low threat managed POS components, Clause 2.2.3.2 (c) throughout isolated POS drainage cells and Clause 2.2.3.2 (b) throughout isolated unmanaged conservation areas (refer to Table 2). Post development exclusion of POS is considered further in Section 3.1.

Table 2: Landscaping intent

POS location	Purpose	Vegetation description	Exclusions
Central POS strip	Recreation and community engagement, comprising the following elements: • car park • community building • native garden • community vegetable garden • playground • yoga lawn • tennis courts • fitness equipment area • community event lawn	Vegetation will be limited to managed lawns and gardens	Clauses 2.2.3.2 (e) and (f)
Central drainage basin	Stormwater retention	Mixture of sedges, wetland shrubs and trees	Clause 2.2.3.2 (c)
Unmanaged conservation POS	Conservation of rare orchards	Unmanaged banksia woodland and native shrub vegetation which is located greater than 100 m from other areas of classified vegetation	Clause 2.2.3.2 (b)
Managed entrance/Ghostgum Avenue POS	Entrance statement, passive recreation and conservation POS buffer	Mixture of managed gardens and lawns with sparse trees along the periphery	Clauses 2.2.3.2 (f)
Road reserve drainage swales	Stormwater retention and low fuel zone	Low fuel zone comprising low swale planting and sparse shrubs/trees	Clauses 2.2.3.2 (e) and (f)
Road verges	Beautification	Managed grass, gardens and footpaths beneath sparse street trees	Clauses 2.2.3.2 (e) and (f)

3. Bushfire assessment results

3.1 Assessment inputs

3.1.1 Vegetation classification

Strategen-JBS&G assessed classified vegetation and exclusions within 150 m of the project area through on-ground verification on 19 June 2019 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 B. Vegetation classifications are mapped in Figure 3.

Regional vegetation surveys and mapping of the Swan Coastal Plain indicates the project area and adjacent land is contained within the Bassendean Complex – Central and South. This vegetation complex is described as:

- vegetation ranges from woodland of jarrah (*Eucalyptus marginata) – common sheoak* (*Allocasuarina fraseriana)* – banksia (*Banksia* spp.) to low woodland of paperbark (*Melaleuca* spp.) and sedgelands on the moister sites. This area includes the transition of jarrah (*Eucalyptus marginata*) to coastal blackbutt (*Eucalyptus todtiana)* in the vicinity of Perth.

The Bassendean Complex – Central and South is reflective of the vegetation found adjacent to the project area, with the predominant vegetation type consisting of low to medium height banksia woodland, woolly-bush scrub and wetland paperbark scrub, grading in and out of Class B woodland and Class D scrub classifications. A remnant strip of Class A forest was also identified opposite Armadale Road to the south comprising a predominant eucalyptus overstorey, midstorey scrub and understorey shrubs and grass. As previously mentioned, the project area is to be modified to a low threat state through the various exclusions outlined in Section 2.

3.1.2 Effective slope

Strategen-JBS&G assessed effective slope under classified vegetation through on-ground verification on 19 June 2019 in accordance with AS 3959. Results were cross-referenced with DPIRD 2m contour data and are depicted in Figure 3.

Accurate contour data is not available for the modified topography to the east and abutting Plots 4 and 6 to the north. The latest slope information is reflected in the plot descriptions in Table 3.

3.1.3 Summary of inputs

Figure 3 illustrates the anticipated post-development vegetation classifications and exclusions following completion of subdivision works and implementation of low threat landscaping throughout the project area. The post-development vegetation classifications/exclusions and effective slope are summarised in Table 3.

Table 3: Summary of post-development vegetation classifications/exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Flat/upslope (0°)	Located south of the project area throughout rural residential lots and adjacent tenure. Dominated by eucalypts greater than 20m in height with a shrubby understorey and multi-tiered fuel profile.
2	Class B Woodland	Flat/upslope (0°)	Vegetation with a banksia woodland fuel profile to the north of the project area.
3	Class B Woodland	Downslope >0–5°	Vegetation with a banksia woodland fuel profile to the north and east of the project area.
4	Class D Scrub	Flat/upslope (0°)	Mix of degraded scrub regrowth to the north and east of the project area, intact paperbark scrub to the south of the project area (opposite Armadale Road) and retained scrub along Ghostgum Avenue to the northwest.
5	Class D Scrub	Downslope >0–5°	Intact low banksia/woolly-bush scrub to the east of the project area.
6	Class G Grassland	Flat/upslope (0°)	Low grassy ground covers adjacent to the northern boundary of the project area.
7	Excluded – Clause 2.2.3.2 [b]	N/A	Isolated vegetation less than 1 ha in area and greater than 100 m from other areas of classified vegetation.
8	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing low threat and non-vegetated areas.
9	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Area to be modified to a low threat state throughout the project area.
10	Excluded – Clause 2.2.3.2 [c]	N/A	Small drainage cell proposed within the drainage area, less than 0.25 ha in area and located greater than 20 m from other areas of classified vegetation.



Legend:

- Project area
- 100m assessment area
- 150m assessment area
- Drainage basin
- POS
- Cadastral boundary
- Indicative lot layout
- Topographic contours (mAHD)
- Roads
- Photo point directions

Vegetation classification

- Class A Forest
- Class B Woodland
- Class D Scrub
- Class G Grassland
- Excluded under Clause 2.2.3.2 (b)
- Excluded under Clause 2.2.3.2 (c)
- Excluded under Clauses 2.2.3.2 (e) & (f)
- Area to be modified to a non-vegetated or low threat state

Scale 1:5,500 at A4 (0 – 100 metres)		**Treeby, WA**
Coord. Sys. GDA 1994 MGA Zone 50		**VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE**
Job No: 56817		
Client: LWP Property Group		**FIGURE 3**
Version: A	Date: 15-Nov-2019	strategen JBS&G
Drawn By: jcrute	Checked By: CT	

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Image Reference: www.nearmap.com© - Imagery Date: 18. October 2019.

3.2 Assessment outputs

3.2.1 Bushfire Attack Level (BAL) contour assessment

The Structure Plan indicates a proposed lot layout; therefore, Strategen-JBS&G has undertaken a BAL contour assessment in accordance with Method 1 of AS 3959 for the project area (Figure 4). The Method 1 procedure incorporates the following factors:

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

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

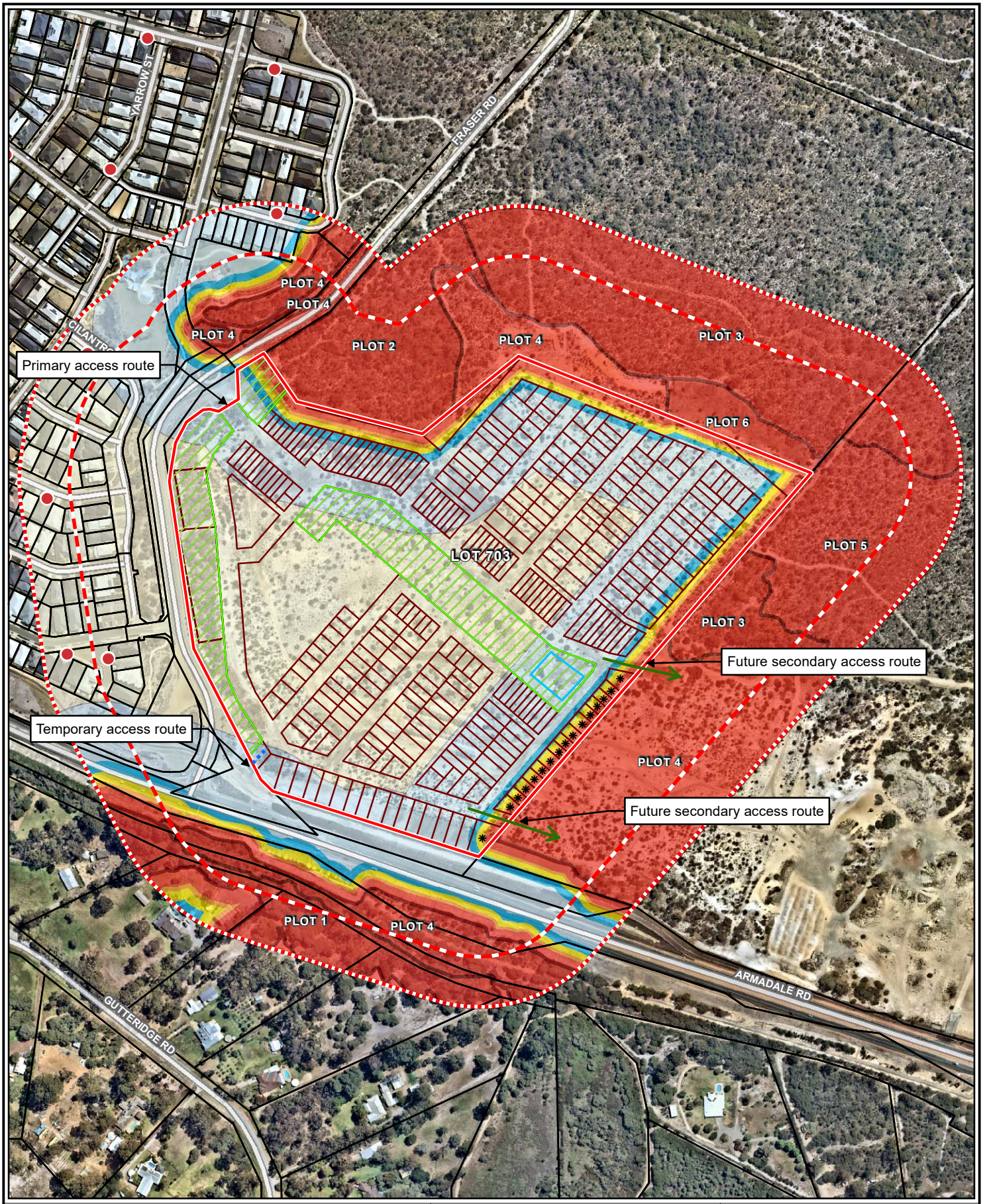
The BAL contours are based on:

- the post-development vegetation classifications and effective slope observed at the time of inspection as well as consideration of the proposed on-site clearing extent, resultant vegetation exclusions and separation distances achieved in line with the Structure Plan concept
- consideration of POS management in accordance with the Landscape Masterplan.

Results of the BAL contour assessment are detailed in Table 4 and illustrated in Figure 4. The highest BAL applicable to the external boundary of proposed lots is BAL–FZ, resulting from a direct interface with the Perron landholding to the east. However, since the affecting interface is proposed for future urban use in line with MRS amendment, this vegetation is temporary and basic staging/quarantining mechanisms will be employed as part of subdivision conditions to stage development appropriately until such time that the hazard is removed and a modified rating of BAL-29 of lower is achieved for all affected lots.

Table 4: BAL contour assessment results

Method 1 BAL determination				
Vegetation plot	**Vegetation classification**	**Effective slope**	**Separation distance**	**Highest BAL**
1	Class A Forest	Flat/upslope (0°)	81 m	BAL–12.5
2	Class B Woodland	Flat/upslope (0°)	20 m	BAL–19
3	Class B Woodland	Downslope >0–5°	20 m	BAL–29
4	Class D Scrub	Flat/upslope (0°)	0 m	BAL–FZ
5	Class D Scrub	Downslope >0–5°	20 m	BAL–29
6	Class G Grassland	Flat/upslope (0°)	20 m	BAL–12.5
7	Excluded – Clause 2.2.3.2 [b]	N/A	N/A	N/A
8	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
9	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
10	Excluded – Clause 2.2.3.2 [c]	N/A	N/A	N/A



Legend:

- Project area
- 100m assessment area
- 150m assessment area
- Drainage basin
- POS
- Cadastral boundary
- Classified vegetation
- Indicative lot layout
- Roads
- Emergency access way (EAW)

BAL contours

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL LOW

- Existing street hydrants
- * Lots to be temporarily quarantined as condition of subdivision

Scale 1:5,000 at A4 (0 – 100 metres)		**Treeby, WA**
Coord. Sys. GDA 1994 MGA Zone 50		**BAL CONTOUR MAP AND PROPOSED MANAGEMENT MEASURES**
Job No: 56817		
Client: LWP Property Group		**FIGURE 4**
Version: A	Date: 15-Nov-2019	strategen JBS&G
Drawn By: jcrute	Checked By: CT	

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Image Reference: www.nearmap.com© - Imagery Date: 18. October 2019.

4. Identification of bushfire hazard issues

4.1 Bushfire context

The project area is bound to the west by existing urban development within Calleya Residential Estate (roads, residential dwellings, commercial precincts and low threat managed landscaping) that does not pose a bushfire threat. However, remnant forest, woodland and scrub vegetation retained to the north, east and south of the project area does have the potential to support a bushfire. The following descriptions outline the possible bushfire scenarios and exposure to risk:

- the potential fire run immediately to the north/northeast of the project area is approximately 1–1.5 km through banksia woodland and scrub vegetation within Bush Forever Site 390. This scenario presents the greatest permanent bushfire threat to development.

  Vegetation beyond the Bush Forever site is highly fragmented due to the mixture of cleared vacant land, rural residential lots and Jandakot Airport. Therefore, landscape scale bushfire impacts are not expected to be received from the north/northeast.

- land to the east of the project area is characterised by highly degraded scrub regrowth vegetation within the Perron landholding, which is earmarked for future urban development. Beyond this, the fire run is highly fragmented via a market garden and residential development within Piara Waters. A bushfire approaching from the east is unlikely to incur significant, unmanageable bushfire behaviour and impact.

- vegetation to the south of the project area is limited due to the expanse of rural residential development and fragmentation via Armadale Road. The narrow strips of forest and scrub vegetation are not expected to pose unmanageable bushfire impacts given the separation afforded by Armadale Road.

The highest risk interface with proposed development at the boundary with Bush Forever Site 390 has been addressed through a strategically placed perimeter road. This deliberate 20 m wide road reserve will reduce the radiant heat impact to a rating of BAL-29 or lower. In addition to proposed reticulated water supply and network of street hydrants, the perimeter road also provides sufficient defendable space for firefighting operations.

4.2 Bushfire hazard issues

Examination of strategic development design in accordance with the Structure Plan concept and post-development BAL contours has identified the following bushfire hazard issues to be considered at future planning stages:

1. A temporary vegetation interface exists between proposed lots along the eastern boundary of the site and temporary Class D Scrub vegetation retained within the adjacent east Perron landholding, resulting in temporary BAL-FZ impact on 16 lots (see Figure 4). This will require that the affected 16 lots be subject to basic staging/quarantining mechanisms employed as part of subdivision conditions to stage development appropriately until such time that the hazard is removed and a modified rating of BAL-29 of lower is achieved for all affected lots.
2. A compliant, 170 m long cul-de-sac with a minimum 17.5 m turnaround head is proposed within the north of the project area. The following justification is provided to justify why the cul-de-sac cannot be avoided:

   - a four-way intersection off the project area entrance road is not possible due to the proximity to the Ghostgum Avenue round-about
   - instead, priority of access for a three-way intersection has been given south from the entrance road to service the childcare and over 55s development sites

- Bush Forever Site 390 to the north of the project area presents a permanent restriction on future development/vehicular access in this direction, which does not enable a through connection to be established to the north
- a Public Access Way (PAW) is proposed linking the cul-de-sac to the primary entrance road, which will permit the movement of people between these areas of the site.

3. The Structure Plan concept makes provisions for two future road connections to the east through the adjacent Perron landholding, which results in single access/egress to and from the project area in the interim. This single access/egress will be resolved through provision of a compliant temporary Emergency Access Way (EAW) in the southwest corner of the project area (less than 100 m in length). This EAW provides a temporary secondary access connection to a different section of Ghostgum Avenue near the Armadale Road intersection and is likely to be required as part of Stage 1 of development, until such time that future permanent connections are provided to the east.
4. POS and landscaping will need to be considered in detail at the subdivision stage. The exclusions identified in Section 2 will need to be incorporated into detailed landscaping plans to ensure a low threat outcome is achieved throughout the project area.
5. The project area will be serviced by a reticulated water supply and network of street hydrants to be established during construction of the internal road network.

Strategen-JBS&G considers that on the basis of the above information, the bushfire risk to the proposed development can be adequately managed via standard application of acceptable solutions under the Guidelines. Bushfire mitigation strategies applicable to the proposed development are addressed further in Section 5.

5. Assessment against the bushfire protection criteria

5.1 Compliance table

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

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

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
Element 1: Location	A1.1 Development location	The BAL contour assessment (see Figure 4 and Table 4) identifies 16 lots being impacted by temporary BAL-FZ. These 16 lots will be quarantined from development until the adjacent land to the east within the adjacent Perron landholding is cleared/managed for future development, at which time the BAL impact will be reduced to a compliant rating of BAL-29 or lower for all affected lots. All other lots have the capacity to achieve a rating of BAL-29 or lower.
Element 2: Siting and design	A2.1 Asset Protection Zone	Separation sufficient to achieve BAL—29 or lower already exists through proposed development design. Aside from the 16 lots with temporary BAL-FZ impact, the remainder of lots are surrounded by permanent low threat and non-vegetated POS and road reserves and do not require additional layers of APZ management.
Element 3: Vehicular access	A3.1 Two access routes	On completion of development, the existing public road network and proposed public internal roads will provide all occupants with the option of travelling to at least two different destinations. Two access points to Ghostgum Avenue will be provided via a primary public access road connection in the northwest and a secondary EAW access connection in the southwest. The EAW connection is temporary and will ultimately be extinguished following construction of future road connections to the east through the adjacent Perron landholding following development of that site. In this regard, the proposed development meets the requirements of Acceptable Solution A3.1. In addition, two access routes will be provided during staging of development, which will likely result in both the primary and secondary connections being required as part of Stage 1 of development.
	A3.2 Public road	All public roads are to be constructed to the relevant technical requirements of the Guidelines (see Appendix C).
	A3.3 Cul-de-sac (including a dead-end-road)	The proposed cul-de-sac cannot be avoided due to the constraints detailed in Section 4.2. The proposed cul-de-sac and any temporary cul-de-sacs required as part of staging will be less than 200 m in length, will include minimum 17.5 m diameter turn-around heads and are to be constructed to the relevant technical requirements of the Guidelines (see Appendix C).
	A3.4 Battle-axe	N/A – no battle-axes are proposed as part of the development and the project area is not serviced by an existing battle-axe.
	A3.5 Private driveway longer than 50 m	N/A – all proposed lots are located within 50 m of a public road.
	A3.6 Emergency access way	The proposed Emergency Access Way (EAW) is to be constructed to the relevant technical requirements of the Guidelines (see Appendix C) and will need to be signposted, with any proposed gates kept unlocked at all times. Following establishment, the City will be responsible for maintaining the EAW. The EAW will be no longer than 600 m. If development and vehicular access construction is to be staged, any proposed temporary EAW is to be constructed to the relevant technical requirements of the Guidelines (see Appendix C).
	A3.7 Fire service access routes (perimeter roads)	N/A – based on the Structure Plan concept, the proposed development would not require fire service access routes (FSARs) to achieve access within and around the perimeter of the project area.
	A3.8 Firebreak width	Each stage of development is required to comply with the requirements of Acceptable Solution A3.8 and the annual City Firebreak Notice (refer to Appendix E).

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
Element 4: Water	A4.1 Reticulated areas	The proposed development will be connected to a reticulated water supply via extension from surrounding development in accordance with Water Corporations Design Standard 63 requirements and technical standards outlined in Appendix D. Figure 4 provides an overview of the existing water hydrants throughout surrounding development.
	A4.2 Non-reticulated areas	N/A – the proposed development is located within an existing reticulated area.
	A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively)	N/A – the proposed development is located within an existing reticulated area.

6. Responsibilities for implementation and management of the bushfire measures

This BMP has been prepared as a strategic guide to demonstrate 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 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 subdivision and development applications are to meet the relevant commitments outlined in this strategic level BMP where required, address the relevant requirements of SPP 3.7 (i.e. Policy Measures 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 lot layout, including any public open space (POS) and drainage areas
- detailed landscaping design/plans in regard to POS and drainage areas, consistent with the provisions of this BMP
- post development classified vegetation extent and effective slope
- BAL contour map demonstrating that proposed development areas will achieve BAL–29 or lower
- width and alignment of compliant APZs/setbacks where required
- confirmation of how bushfire management will be addressed during development staging (i.e. staging buffers, vehicular access, etc)
- proposed approach to fuel management or application of AS 3959 in response to on-site POS if the relevant exclusions cannot be delivered
- vehicular access provisions, including demonstration that a minimum of two access routes will be achieved for each stage of development in accordance with Acceptable Solution A3.1
- water supply provisions with regards to reticulated water
- future requirements for any future vulnerable land uses, such as provision of a Bushfire Emergency Evacuation Plan (likely requirement for proposed childcare site at the DA stage)
- provisions for notification on Title for any future lots with a rating of BAL–12.5 or greater as a condition of subdivision
- quarantining from development via subdivision conditions the 16 lots identified in Figure 4 situated at the direct interface with the adjacent east Perron landholding until the temporary vegetation and subsequent BAL-40/FZ impact is reduced to a compliant rating of BAL-29 or lower
- compliance requirements with the current City's annual firebreak notice
- requirements for BMP/BAL compliance reports as conditions of subdivision
- assessment and compliance with performance principles of the bushfire protection criteria
- proposed implementation and audit program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation

- construction of Class 1, 2, 3 or associated 10a buildings in accordance with AS 3959 to the assessed BAL rating at the building/construction stage.

On the basis of the information contained in this BMP, Strategen-JBS&G considers the bushfire hazards both within and adjacent to the project area and the associated bushfire risks are readily manageable through standard management responses outlined in the Guidelines and AS 3959. Strategen-JBS&G considers that on implementation of the proposed management measures, the project area will be able to be developed with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines and AS 3959.

7. References

Department of Fire and Emergency Services (DFES) 2019, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from: https://maps.slip.wa.gov.au/landgate/bushfireprone/, [15/10/2019].

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

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

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

Western Australian Planning Commission (WAPC) 2017, *Guidelines for Planning in Bushfire Prone Areas*, Version 1.3 August 2017, Western Australian Planning Commission, Perth.

8. Limitations

Scope of services

This report ("the report") has been prepared by Strategen-JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen-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, Strategen-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, Strategen-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. Strategen-JBS&G has also not attempted to determine whether any material matter has been omitted from the data. Strategen-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 Strategen-JBS&G. The making of any assumption does not imply that Strategen-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. Strategen-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.

Strategen-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 Strategen-JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

Appendix A Landscape Plan

TREEBY STRUCTURE PLAN

TREEBY, WESTERN AUSTRALIA



LANDSCAPE STRATEGY

LWP
bringing communities to life

Government of Western Australia
Department of Communities

emerge
ASSOCIATES

Overview

The landscape strategy and design of the Public Open Space for LWP Property and the Department of Communities' joint venture 'Treeby Structure Plan' project at Lot 703 Ghostgum Avenue, Treeby has its landscape design response anchored by a central public open space acting as the heart of the approximate 300 lot development, with supplementary smaller passive open areas and ecologically important Bush Forever and Conservation public open space outcomes supporting the wider green space systems of the Banjup locale.

The centre of the site has very little vegetation or topography of significance due to the site's former land use as quarry site. As a result, public open space location and function has been located, sized and designed to provide the maximum benefit as a communal hub to the development's needs.

Entry POS

Located at the entry into the project off the existing roundabout at Ghostgum Avenue and Clementine Boulevard, two (2) POS areas are proposed to frame the entry boulevard into the development. Taking advantage of the site's topography and one of its highest points, these two POS areas will have commanding views over the development to the east and beyond to the Darling Range.

At approximately 0.55ha and 0.22ha in size, the open spaces provide the opportunity for grand entry statements in the form of signage and / or a landmark sculptural public art elements combined with useable open space that provides a strong greenlink connection to the existing open space network of the adjacent Calleya development. The POS areas will serve primarily as passive open space opportunities coupled with the retention of existing Banksia woodland, forming a backdrop to both the open space and the overall development. All retained bushland will be managed in accordance with the project's bushfire management requirements. The retained bushland will reinforce green linkages to both the Bush Forever site to the north of the project and the Conservation POS running along the project's western boundary interface with Ghostgum Avenue.

These POS areas are not proposed to receive any stormwater drainage given their locations at the highest points of the project site. Where levels permit and in consultation with the Civil Engineer regards the development's engineering and finished levels design, existing trees will be retained to provide these two POS areas with instant shade amenity.

Central POS

Proposed as the key piece of public infrastructure for the development, the creation of a green central public open space corridor with multiple functions that runs almost the length of the development in an east west orientation is to be the development's centrepiece. The Central POS has been designed to include a community focal point or hub, provide public access to a range of recreation opportunities, form a stormwater receival and quality management function, all within a walkable catchment for all residents in the development.
Generally, the theme behind the provision of open space amenity within the Central POS will have a focus on :

- Community gathering – inside/outside around the hub.
- Wellness and mindfulness
- Whole of family fitness
- Intergenerational interaction – mixing young children with retirees

At the western end of the Central POS, located on axial vista views from the development's entry road off Ghostgum Avenue a proposed 'Community Hub' is to act as the development's heart. It's associated outdoor space is to cater for al fresco opportunities and community events. The community hub is to be an architecturally designed building which in close proximity to the Senior's Living site, may include activities such as:

1. Art classes
2. Art displays on walls
3. Sculpture classes,
4. Sculpture displays in park,
5. Food classes tailored over a few weeks to each purchaser profile (new families, retirees, busy dinks)
6. Programmed retiree and toddler interactions
7. Dance classes

East of the Community Hub, amenity that is also proposed to be included in the open space includes:

1. Six Seasons Native Garden and a Community Garden set into an informal parkland setting with associated furniture and picnic facilities.
2. A themed childrens playground, to be located close to the hub to maximise CPTED responses, passive surveillance and comfortable parents supervision.
3. A secluded lawn that provides opportunity for Yoga/Pilates/Tai Chi area associated in close proximity to the Senior Living site. This space is to act as an informal semi hidden quieter space. Noting the older generations preference for quiet contemplative spaces, shade elements and the use low bounding walls to define space.
4. Fitness area which is semi enclosed by shade trees and also considers an innovative design approach to any equipment and room for programmed personal training, targeting both younger and older generations through careful equipment selection.
5. A central open grass area to suit a variety of activities and functions (outdoor cinema etc). The grass area is approximately 60 x 30m in size which acts as a suitable space for informal active kickabout.
6. Community Tennis Courts and associated shelters and facilities, which are lockable for management reasons.
7. The most eastern point of the open space is required to cater for the 1:1 year and 1: 5 year drainage requirements. A 'constructed wetland' response will include an elevated boardwalk over the drainage area providing interpretative opportunity to address flora and fauna.

POS Planting will consist of predominantly native waterwise species, with hydrozoned irrigation design to the City of Cockburn's standards. Select exotic trees will be placed at key locations within POS areas to emphasise focal points and key user spaces.

Biofiltration areas for water quality treatment of the first 15mm of stormwater runoff will be provided within the POS areas relative to each drainage catchment. All other storage and attenuation of stormwater flows will be accommodated in roadside swales on the project's periphery.

Interconnected paths linking POS areas will provide safe and direct access to/from and between POS areas for residents and visitors. Playgrounds and shelter nodes will form key focal points with the POS network, providing opportunity for community gatherings and informal recreation.

The typical suite of parkland furniture will be provided with an acknowledgement to creating a public open space that is future proofed for a smart and sustainable city. The inclusion of designated WIFI areas, smart poles, smart bins and electric vehicle charging stations will be considered as apart of the smart city response. Solar or wind power electrical poles will be preferred for lighting the open space and providing power outlets for community event pop up infrastructure such as food trucks, power for stages and lighting. It is also envisaged that a public art program will be key to the Central POS landscape outcomes.

Conservation POS & Bush Forever

A Conservation POS is proposed along the project's western boundary which interfaces with the existing Ghostgum Avenue. This POS contains rare and endangered Spider Orchids (Caladenia heugelii). The area containing the Spider Orchids has previously been fenced by the Department of Biodiversity, Conservation and Atrractions (DBCA). No further works are proposed to be undertaken within the fenced area.

A pedestrian link through the Conservation POS will be created on an existing cleared track to provide permeability to the urban design by allowing pedestrian access from the development out onto the existing Ghostgum Avenue and Armadale Road footpath network. Level difference of the Conservation POS to the proposed development ranges between heights of less than 1m, up to 3m in height above the development. The proposed interface to the development will require retaining structures, proposed to be either limestone or granite boulder walling no higher 0.9m high which will be softened with pockets of native species low height planting in accordance with bushfire management plan requirements.

No works are proposed within the Bush Forever site located on the projects northern boundary other than possible internal pedestrian paths that utilise existing tracks and clearings to connect to the existing footpaths within the Fraser Road road reserve. Any proposed paths in the Bush Forever will be subject to discussion and agreement with the appropriate management agency and the City of Cockburn. Perimeter fencing will be installed in accordance with the City's standard conservation fencing detail. A widened road reserve exists to the entire interface of the development with the Bush Forever site. This interface will contain stormwater retention basins landscaped to satisfy bushfire management plan requirements.

Street Trees & Streetscapes

Streetscapes throughout the development shall incorporate a variety of treatments in response to the road hierarchy system. In all cases landscape works shall incorporate tree planting in accordance with accepted traffic standards on the standard street tree alignment in relation to the service utility corridor. Treatments may include soft works such as street trees, hedge planting and groundcovers.

Final tree species are yet to be agreed however an indicative street tree plan has been included and consists of a mix of Exotic, Australian native and West Australian native species to define road hierarchy. On verge areas immediately adjacent Bush Forever or Conservation POS areas, only Swan Coastal Plain native trees will be used.

The timing of installation will be to occur at the completion of civil engineering works, prior to the construction of homes. Street trees shall be allocated at one per lot for standard lots and three per lot for corner blocks. Trees will be placed typically centre of lot and in accordance with the corridor provided by utility service providers, being 2.7m from lot boundary.

Due to the site's former land uses resulting in a generally degraded site state, there are no significant trees worthy of retention in road reserves.

Irrigation Strategy

It is proposed that a maximum of two (2) groundwater bores will be required to irrigate all the proposed public open space and streetscape landscaping within the development. Groundwater Licences have been provided by the Department of Waters, Environment and Regulation (DWER) for a groundwater extraction amount of 19,182kL per annum to serve the project's total landscape requirements.

The irrigation system will be designed and constructed in accordance with the City of Cockburn's Irrigation Specifications. Water Quality results will be provided to the City for review and comment following drilling of groundwater bores. Should iron levels within the groundwater drawn from the bore be sufficiently elevated to cause iron staining to landscape infrastructure, discussions will be held with the City regarding the implementation of iron filtration systems.

Maintenance

The industry accepted standard Developer funded and managed landscape and irrigation maintenance period is typically two (2) summers as outlined in standard WAPC subdivision conditions. Following this period, the landscape and irrigation maintenance will be handed over to the City of Cockburn to manage, unless otherwise negotiated.

Typically the first year is an establishment period, followed by a second year of consolidation. Irrigation requirements are to be scheduled to be wound back during this period to a point of almost self sufficiency at the time of handover to the Council.

As part of the ongoing approval process, every public open space landscape and irrigation design will be submitted to and approved by the City of Cockburn prior to construction commencing. The landscape design will incorporate recreation and environmental requirements, whilst focusing on maintenance minimisation principles and techniques. The developer is committed to working with the local authority to deliver outcomes in this process to reflect best practice throughout the development.



TREEBY STRUCTURE PLAN

LANDSCAPE MASTERPLAN

DWG **TRB-01**
REV **C**
DATE **191125**

0 10 20 30 40 50 m

SCALE **1 : 1000 @ A1**

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TREEBY STRUCTURE PLAN

CENTRAL PUBLIC OPEN SPACE CONCEPT PLAN

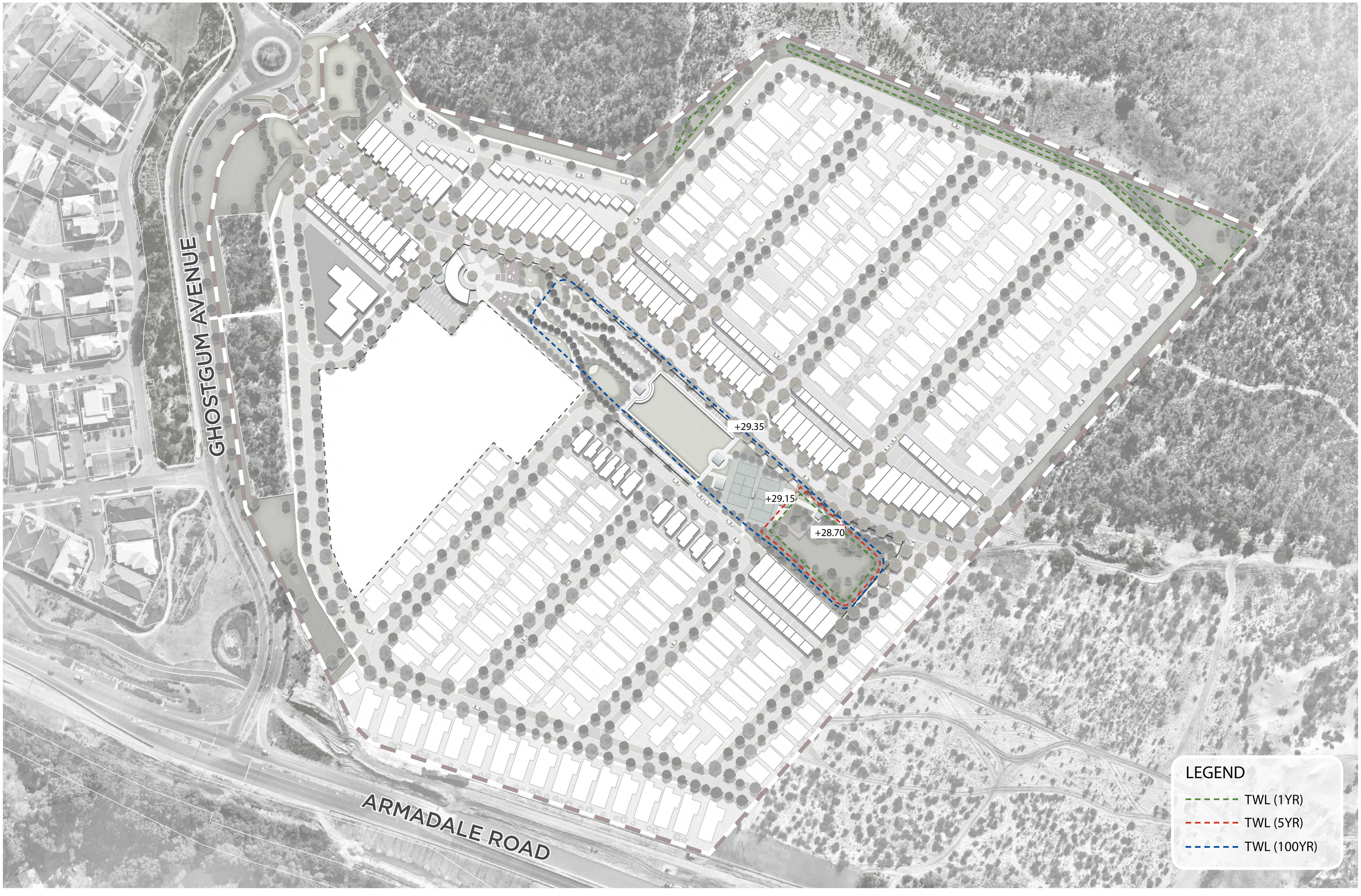
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TREEBY STRUCTURE PLAN

PUBLIC OPEN SPACE DRAINAGE LAYOUT

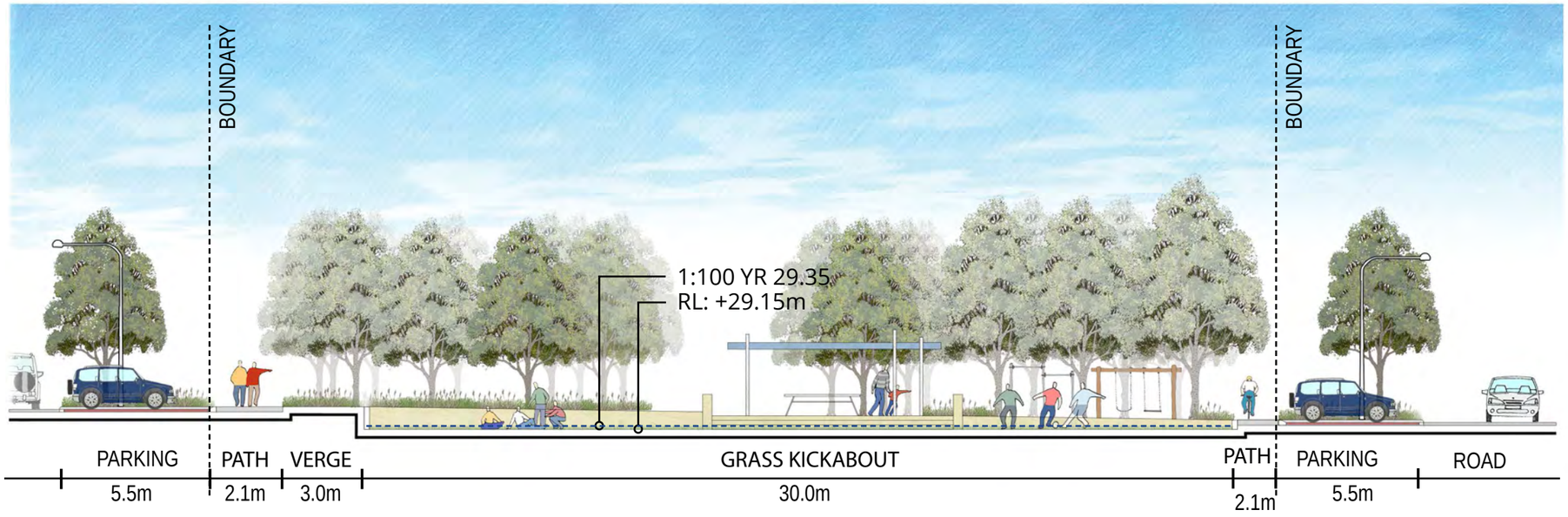
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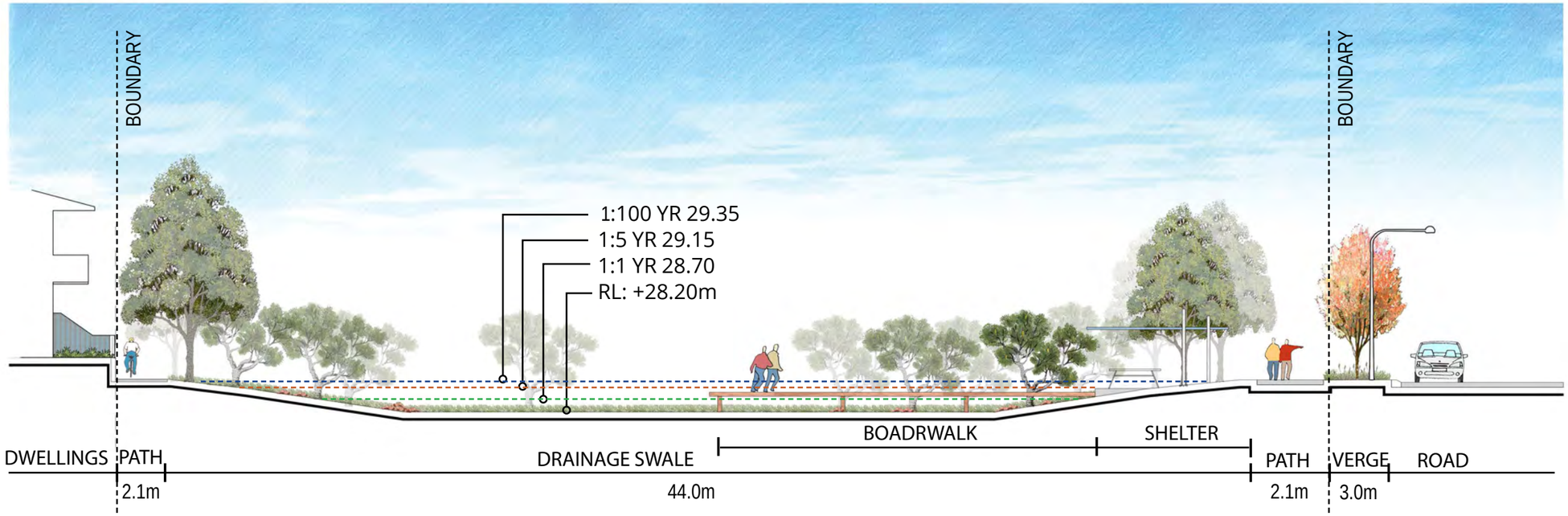
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TREEBY STRUCTURE PLAN

PUBLIC OPEN SPACE DRAINAGE SWALE CROSS SECTIONS

DWG XX-XX-XX
REV 1ST
DATE OCT 2019
SCALE 1 : 200 @ A3
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U:\CURRENT PROJECTS\Treeby LWP\(XXX-01) Photos Drawings & Scans\(XX-01) 02_Concept Plans, Scans & Graphics\02_LIVE Dwgs\01_Overall Project Plans\04 INDD\Typical Street Cross Sections.indd

ENTRY POS 1

- BENCH SEATS
- ENTRY STATEMENT/ LANDMARK/ PUBLIC ART

ENTRY POS 2

- BENCH SEATS
- ENTRY STATEMENT/ LANDMARK/ PUBLIC ART

CENTRAL POS

- OUTDOOR FITNESS
- KICKABOUT COURT
- SWALE PLANTING
- TENNIS COURT
- BBQ
- PICNIC SEATING
- SHELTERS
- FEATURE PLAYGROUND

CONSERVATION POS

- WALKING PATHS
- RETAINED RARE VEGETATION
- INTERPRETIVE SIGNAGE
- BENCH SEATS

GHOSTGUM AVENUE

ARMADALE ROAD

LEGEND

- RETAINED RARE VEGETATION
- INTERPRETIVE SIGNAGE
- WALKING PATHS
- FEATURE PLAYGROUND
- ENTRY STATEMENT
- BBQ
- PICNIC SEATING
- SHELTER
- TENNIS COURT
- KICKABOUT COURT
- OUTDOOR FITNESS EQUIPMENTS
- BASIN PLANTING
- BENCH SEAT

TREEBY STRUCTURE PLAN

PUBLIC OPEN SPACE AMENITY PLAN

DWG **TRB-01**
REV **C**
DATE **191125**

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SCALE **1 : 1000 @ A1**

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POS

POS

BUSH FOREVER

DRAINAGE

DRAINAGE

GHOSTGUM AVENUE

CONSERVATION POS

POS

ARMADALE ROAD

LEGEND



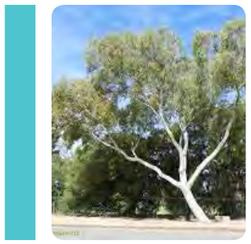
Pyrus calleryana 'Bradford'
BRADFORD PEAR



Corymbia calophylla
MARRI



Corymbia ficifolia 'Summer Red'
RED FLOWERING GUM



Eucalyptus laeliae
DARLING RANGE GHOST GUM



Sapium sebiferum
CHINESE TALLOW TREE

TREEBY STRUCTURE PLAN

STREET TREE MASTERPLAN

DWG XX-XX-XX
REV 2nd
DATE NOV 2019

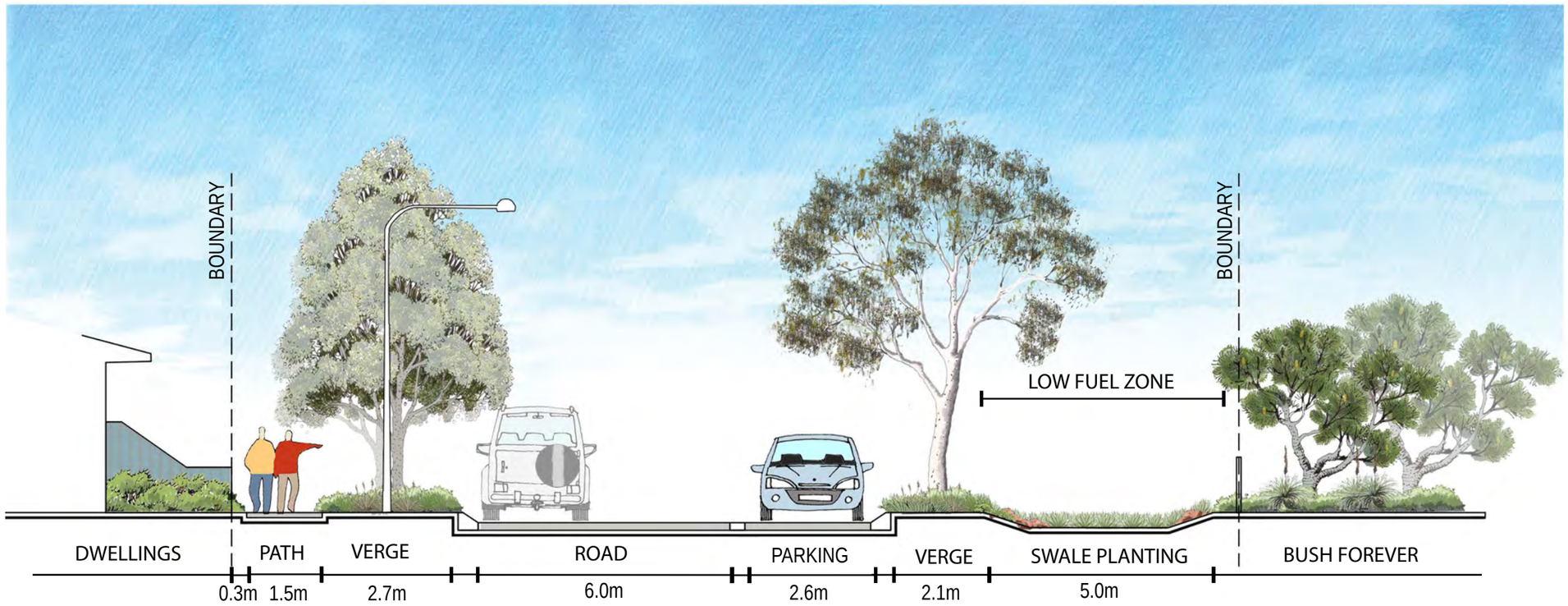
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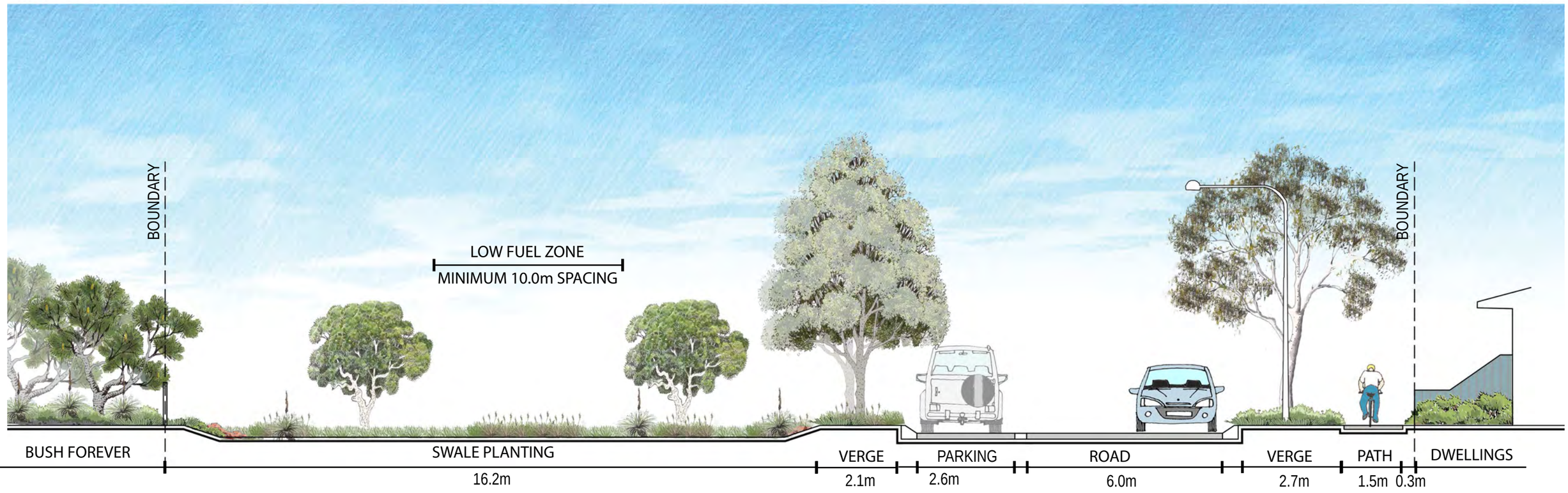
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20M ROAD RESERVE BUSH FOREVER + DRAINAGE INTERFACE



20M ROAD RESERVE BUSH FOREVER + DRAINAGE INTERFACE

TREEBY STRUCTURE PLAN

TYPICAL STREET CROSS SECTIONS

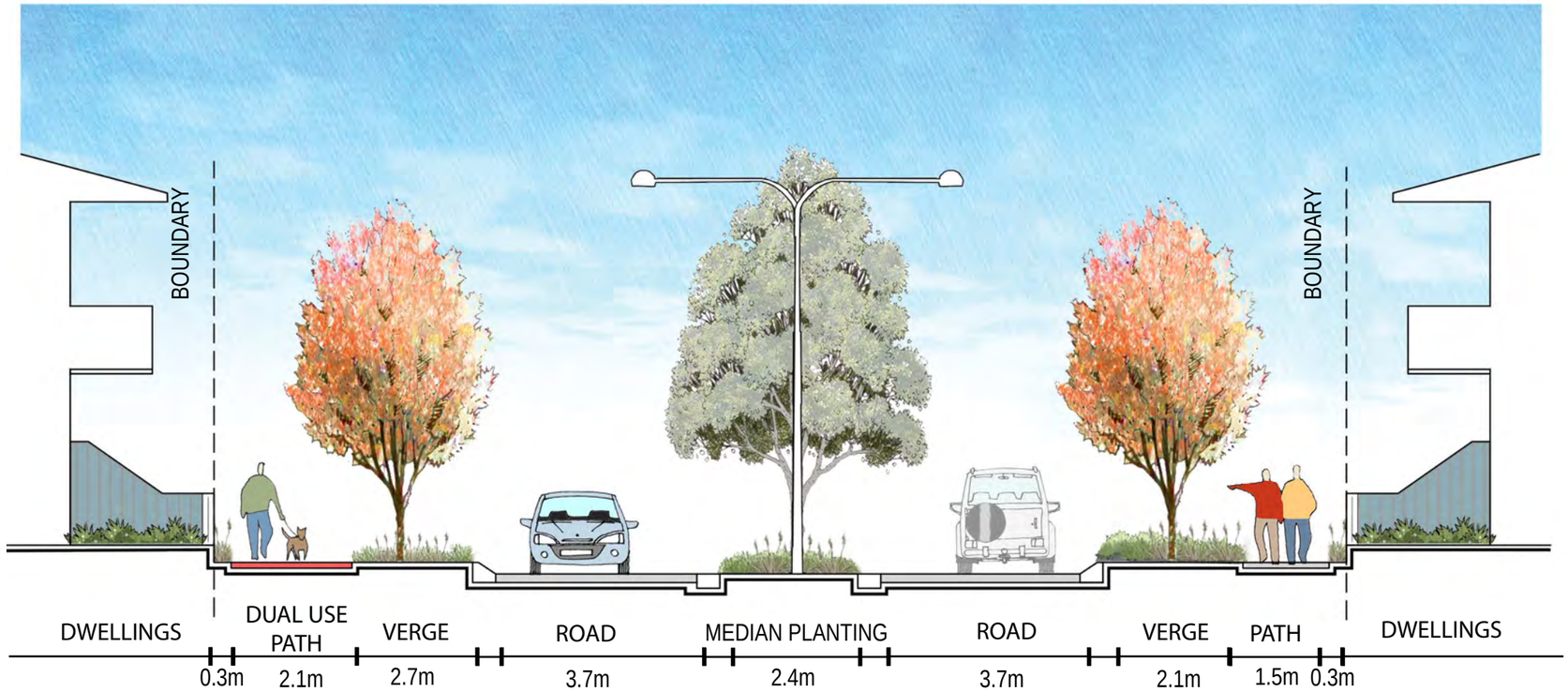
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DATE NOV2019

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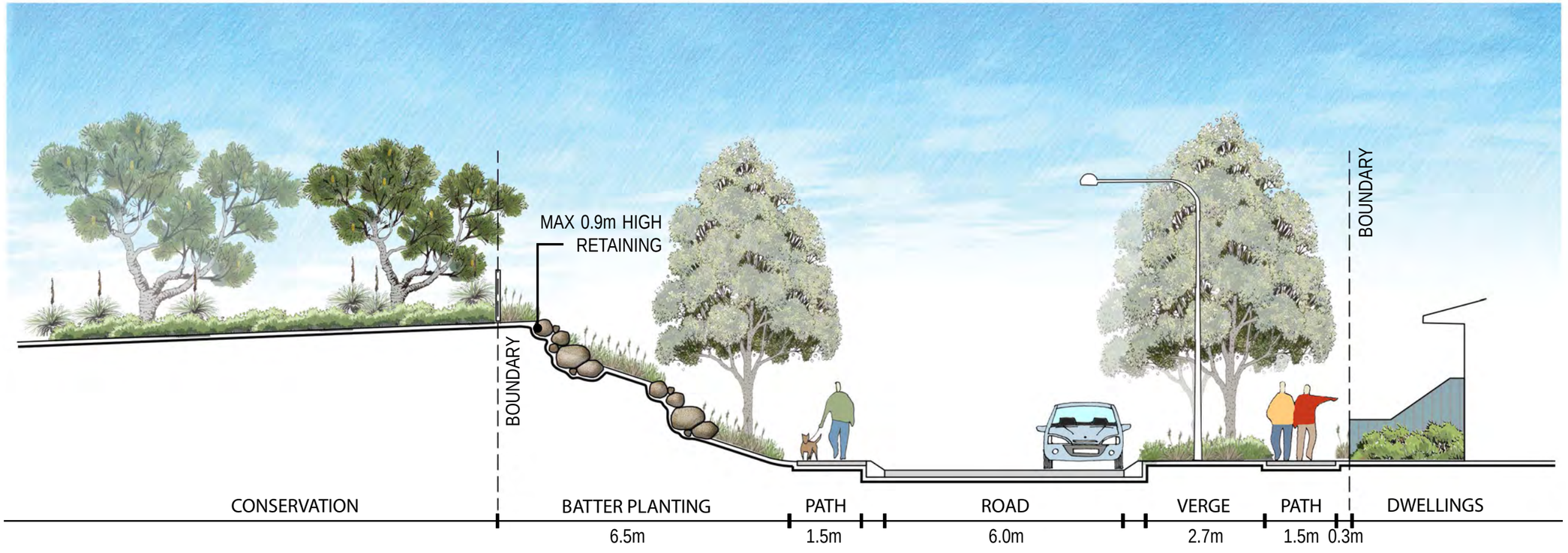
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20M BOULEVARD ENTRY ROAD



20M ROAD RESERVE CONSERVATION INTERFACE

TREEBY STRUCTURE PLAN

TYPICAL STREET CROSS SECTIONS

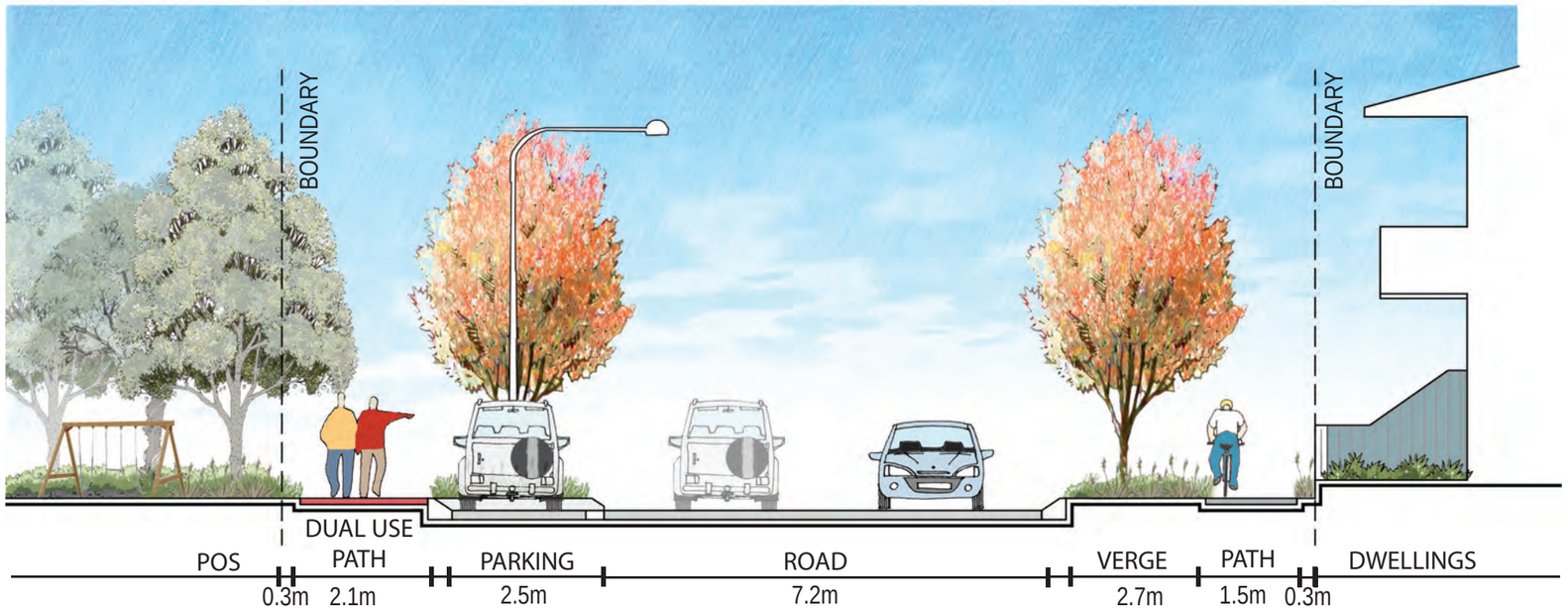
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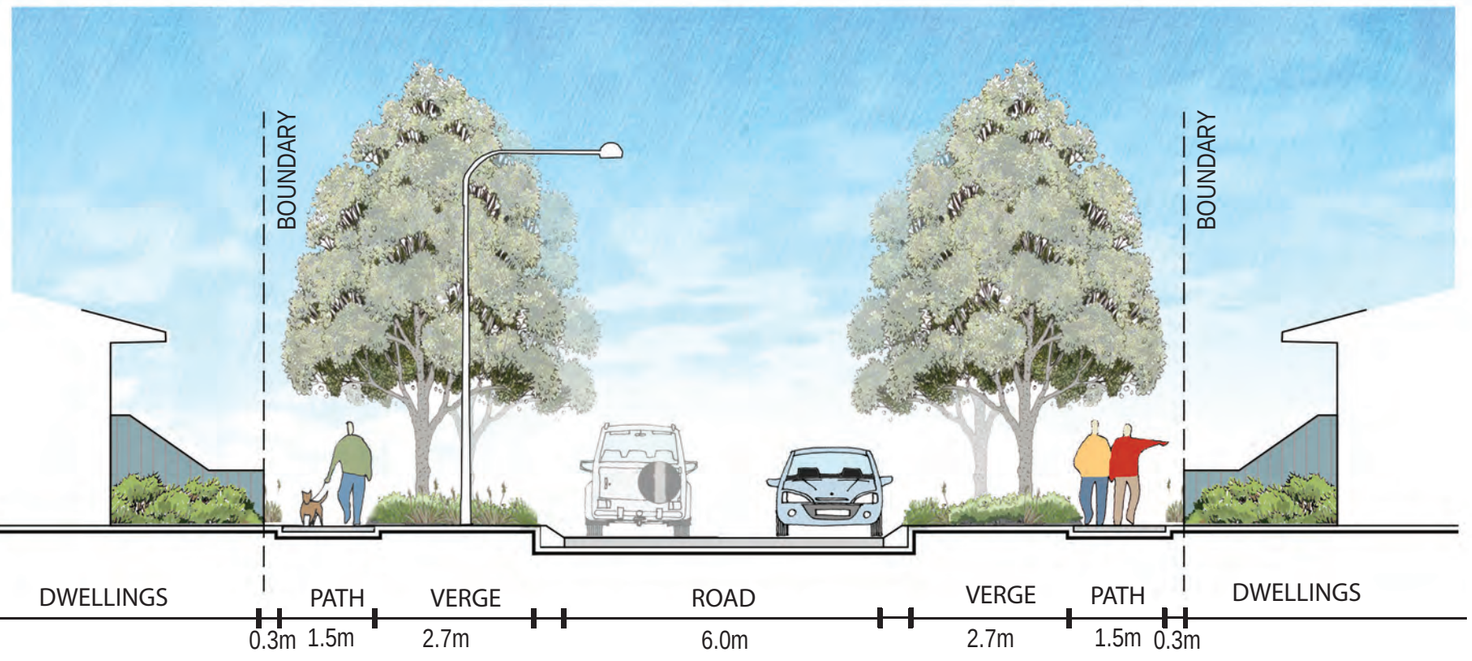
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17M ROAD RESERVE INTERFACE TO PUBLIC OPEN SPACE



15M ROAD RESERVE

TREEBY STRUCTURE PLAN
TYPICAL STREET CROSS SECTIONS

DWG **XX-XX-XX**
REV **2ND**
DATE **NOV2019**
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Appendix B Vegetation plot photos and description



Photo ID: 1

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



Photo ID: 2

Plot number		Plot 2
Vegetation classification	**Pre-development**	Class B Woodland
	Post-development	Class B Woodland
Description / justification		Banksia woodland

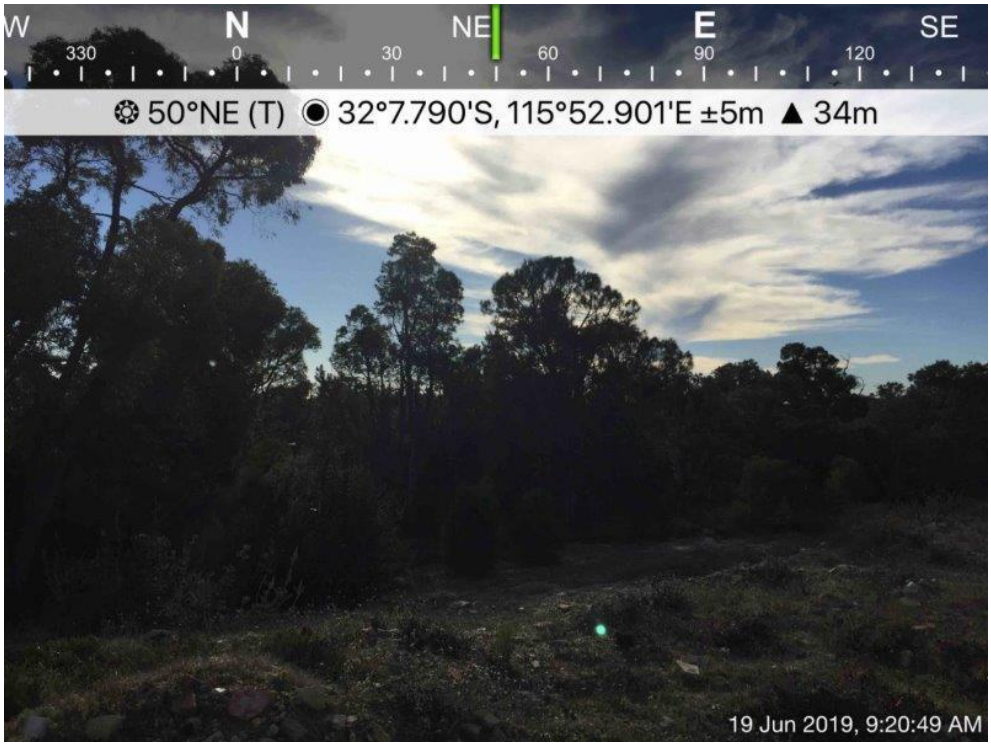


Photo ID: 3a



Photo ID: 3b

Plot number		Plot 3
Vegetation classification	**Pre-development**	Class B Woodland
	Post-development	Class B Woodland
Description / justification		Banksia woodland



Photo ID: 4a



Photo ID: 4b

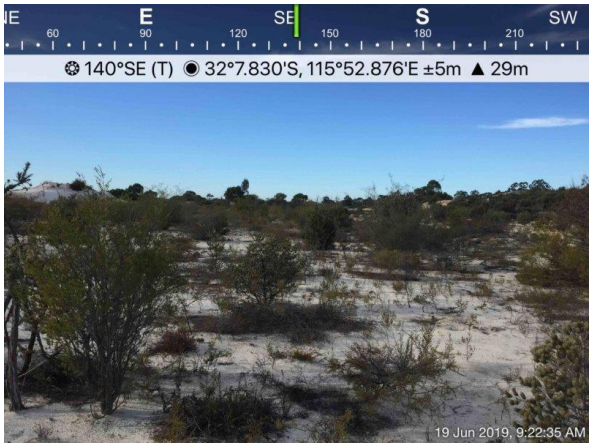


Photo ID: 4c



Photo ID: 4d

Plot number		Plot 4
Vegetation classification	**Pre-development**	Class D Scrub
	Post-development	Class D Scrub
Description / justification		Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity



Photo ID: 5

Plot number		Plot 5
Vegetation classification	**Pre-development**	Class D Scrub
	Post-development	Class D Scrub
Description / justification		Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity

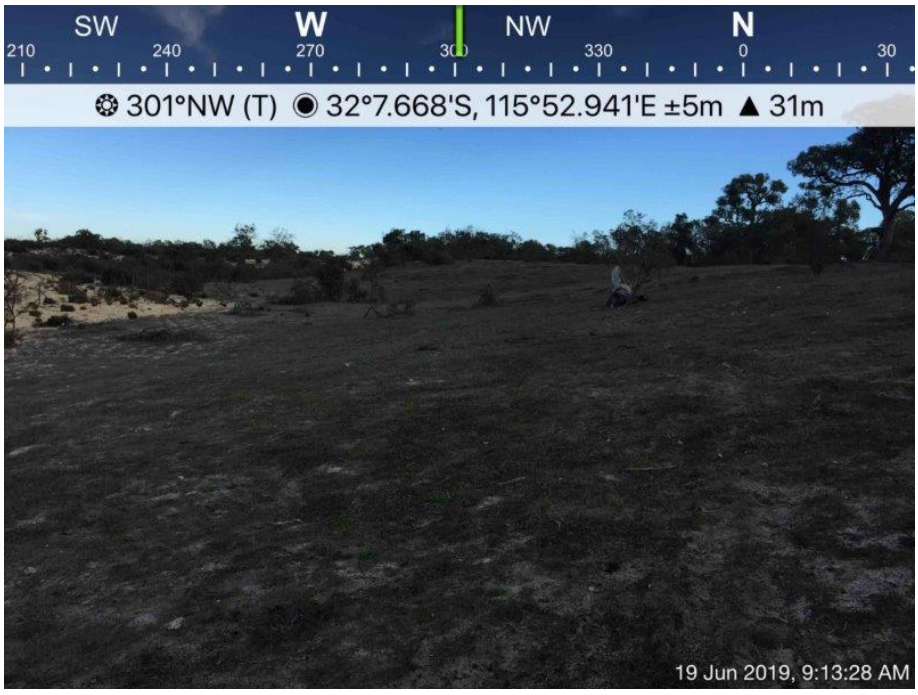


Photo ID: 6

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

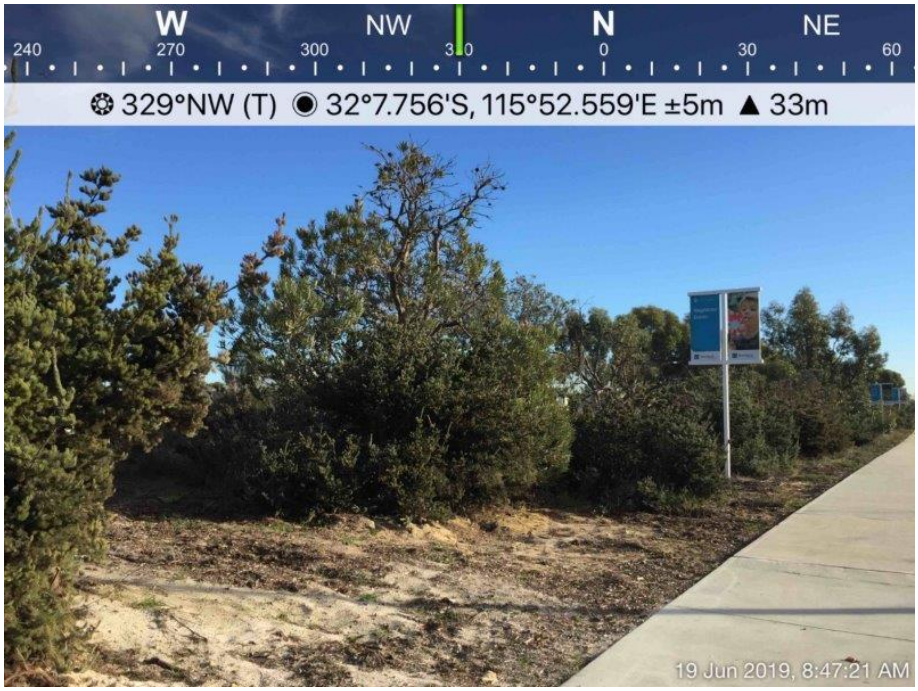


Photo ID: 7

Plot number		Plot 7
Vegetation classification	**Pre-development**	Excluded – Clause 2.2.3.2 [b]
	Post-development	Excluded – Clause 2.2.3.2 [b]
Description / justification		Area of vegetation less than 1 ha in area and greater than 100 m from other areas of classified vegetation.



Photo ID: 8a



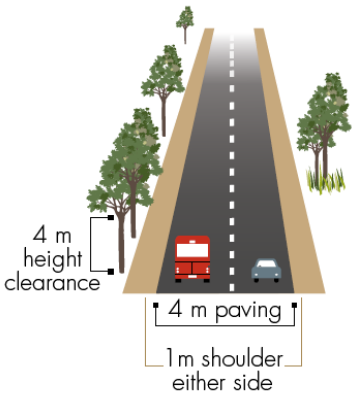
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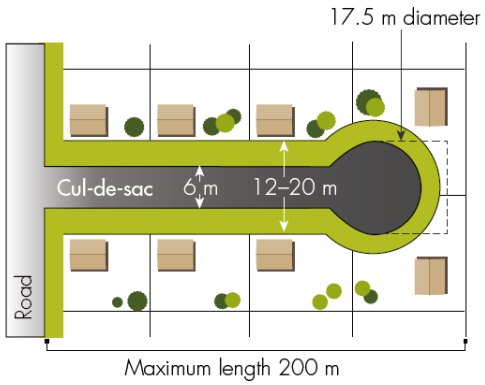


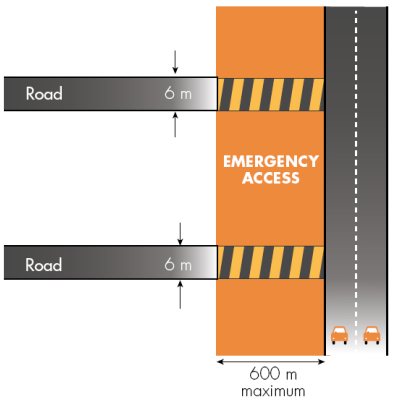
Photo ID: 8c

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

Appendix C Vehicular access technical standards of the Guidelines

Public roads	
Acceptable solution A3.2	A public road is to meet the requirements in Table 1, Column 1.
Explanatory note E3.2	Trafficable surface: Widths quoted for access routes refer to the width of the trafficable surface. A six metre trafficable surface does not necessarily mean paving width. It could, for example, include four metre wide paving one metre wide constructed road shoulders. In special circumstances, where eight lots or less are being serviced, a public road with a minimum trafficable surface of four metres for a maximum distance of 90 metres may be provided subject to the approval of both the local government and Department of Fire and Emergency Services. Public road design: All roads should allow for two-way traffic to allow conventional two-wheel drive vehicles and fire appliances to travel safely on them. 

Cul-de-sac (including a dead-end road)	
Acceptable solution A3.3	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), the following requirements are to be achieved: • Requirements in Table 1, Column 2 • Maximum length: 200 metres (if public emergency access is provided between cul-de-sac heads maximum length can be increased to 600 metres provided no more than eight lots are serviced and the emergency access way is no more than 600 metres) • Turn-around area requirements, including a minimum 17.5 metre diameter head.
Explanatory note E3.3	In bushfire prone areas, a cul-de-sac subdivision layout is not favoured because they do not provide access in different directions for residents. In some instances, it may be possible to provide an emergency access way between cul-de-sac heads to a maximum distance of 600 metres, so as to achieve two-way access. Such links must be provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency. A cul-de-sac in a bushfire prone area is to connect to a public road that allows for travel in two directions in order to address Acceptable Solution A3.1. 

Emergency access way	
Acceptable solution A3.6	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 all of the following requirements: • Requirements in Table 1, Column 4 • No further than 600 metres from a public road • Provided as right of way or public access easement in gross to ensure accessibility to the public and fire services during an emergency • Must be signposted.
Explanatory note E3.6	An emergency access way is not a preferred option however may be used to link up with roads to allow alternative access and egress during emergencies where traffic flow designs do not allow for two-way access. Such access should be provided as a right-of-way or easement in gross to ensure accessibility to the public and fire emergency services during an emergency. The access should comply with minimum standards for a public road and should be signposted. Where gates are used to control traffic flow during non-emergency periods, these must not be locked. Emergency access ways are to be no longer than 600 metres and must be adequately signposted where they adjoin public roads. Where an emergency access way is constructed on private land, a right of way or easement in gross is to be established. 

Technical requirement	1	2	3	4	5
	Public road	Cul-de-sac	Private driveway longer than 50 m	Emergency access way	Fire service access routes
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal distance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	8.5	8.5	8.5	8.5	8.5
* Refer to E3.2 Public roads: Trafficable surface					

Appendix D Water technical standards of the Guidelines

Reticulated areas	
Acceptable solution A4.1	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.
Explanatory note E4.1	Water supply authorities in Western Australia include the Water Corporation, Aqwest and the Busselton Water Board. The Water Corporation's 'No. 63 Water Reticulation Standard' is deemed to be the baseline criterion for developments and should be applied unless local water supply authorities' conditions apply.

Appendix E City of Cockburn Firebreak Notice

City of Cockburn Fire Control Order

Effective from 10 May 2018

First and Final Notice



Pursuant to *Section 33 of the Bush Fires Act 1954* owners or occupiers of land situated within the City of Cockburn are required by law to comply with the prescribed Fire Control Order here within.

Definitions	
Authorised Officer	A person appointed by the City of Cockburn Chief Executive Officer as an authorised person/officer to exercise the powers and duties set out in the Local Government Act 1995, Bush Fires Act 1954 and Local Law(s).
Flammable Material	Any dead or dry grass, vegetation, substance, object, thing or material (except living flora including live and/ or habitat standing trees) that may or is likely to catch fire and burn or any other thing deemed by an Authorised Officer to be capable of combustion.
Maintained Grass	Soil covered land, planted with grasses or other durable plants, maintained green and less than 50mm in height.
Prohibited Burning Time	The time of each year where it is unlawful to set fire to the bush at any time. This time is normally from 1 December of each year until and including 31 March of the following year. This time may be amended, subject to prevailing seasonal conditions.
Restricted Burning Time	The time of each year where it is unlawful to set fire to the bush without a valid Permit to Set Fire To The Bush issued by an Authorised Officer. This period normally is from 1 April until and including 31 May and from 1 October until and including 30 November of any year. This time may be amended, subject to the prevailing seasonal conditions.
Unrestricted Burning Time	The time of each year where it is lawful to set fire to the bush at any time, in areas zoned rural under the Metropolitan Region Scheme. This time normally is from 1 June until and including 30 September. This time may be amended, subject to the prevailing seasonal conditions.
Firebreak Time	The time of each year where fire hazard reduction works must be maintained as specified in this Fire Control Order. This time is 1 November of each year until and including 15 April of the following year.
Structure	A building, as defined in the Building Codes of Australia (BCA) may be made up of a number of classes if it has a mixed use.

1. All property (vacant or developed) – less than 4,047m^2

To reduce the fire hazard on your land and to comply with the requirements of this Fire Control Order you are required to;

1.1 Have all flammable materials such as dry grass and weeds slashed, mown or trimmed down by other means to a maximum height of 50mm across the entire property for the duration of this Firebreak Time; and

1.2 Remove all dead vegetation.

2. All property (vacant or developed) – 4,047m^2 or greater

To reduce the fire hazard on your land and to comply with the requirements of this Fire Control Order you are required to;

2.1 Construct a firebreak (as defined within section 3 of this order) immediately inside all external property boundaries, this includes those adjacent to roads, drains, rail reserves and any public open space reserves; and

2.2 Remove all dead vegetation surrounding and over all habitable structures to a radius of 3 metres except living trees, shrubs, maintained grass and gardens under cultivation.

3. Firebreak Specifications

A firebreak is an area of land cleared of flammable material, installed to minimise the spread or extension of a fire and to provide suitable access for fire fighting vehicles. The standards of a compliant firebreak are as follows;

3.1 A firebreak must be constructed of bare earth, stone, or sealed surfaces and be clear of all flammable materials to create a 3 metre wide trafficable surface;

3.2 Maintained grass may occupy a firebreak;

3.3 Overhanging branches must be pruned to provide a 4 metre vertical clearance above the full width of the 3 metre firebreak surface; and

3.4 A firebreak must be a continuous trafficable surface for a fire fighting vehicle, clear of any obstructions and must not terminate in a cul-de-sac (dead end).

4. Additional Works

Regardless of land size and location, the City of Cockburn or its Authorised Officer(s) may require you to undertake additional work(s) on your property to improve access and/or undertake further works where in the opinion of that Authorised Officer(s), these works would be conducive to preventing the outbreak and/or the spread or extension of a fire.

5. Fire Control Order Variations

A variation will be considered where the owner and/or occupiers believe it is impractical to meet the compliance requirements of this Fire Control Order.

Approved structure's occupying a firebreak will not require a variation approval. However, a firebreak will be required to be installed as close as practical around the approved structure.

If approved, variations will be valid in perpetuity, unless a new variation has been approved or the property changes ownership.

The City of Cockburn reserves the right to review, amend or revoke an existing variation in writing at any time. Should a request to vary the Fire Control Order requirements on your property not be approved in writing, this Fire Control Order must be complied with as applicable in its entirety.

6. Burning

During the declared Prohibited Burning Time owners and/or occupiers must not undertake any bush or garden refuse burning activities.

During the declared Restricted Burning Time only, owners and/or occupiers may:

6.1 Apply for a permit to burn the bush for bush fire risk mitigation purposes, by following the conditions imposed on a permit to burn as issued by an Authorised Officer.

6.2 In areas zoned rural by the Metropolitan Region Scheme you may undertake burning of leaves, tree branches, and other dry vegetation in piles no larger than 1m^3 in size, without a permit to burn, subject to the following conditions:

6.2.1 No flammable material (other than that being burned) is to be within 5m of the fire at any time while the fire is burning;

6.2.2 The fire is lit between 6pm and 11pm and is completely extinguished before midnight on the same day;

6.2.3 At least one person is present at the site of the fire at all times until it is completely extinguished; and

6.2.4 When the fire is no longer required, the person ensures that the fire is completely extinguished by the application of water or earth.

During the Unrestricted Burning Time, owners and/or occupiers in areas zoned rural under the Metropolitan Region Scheme may burn garden refuse and set fire to bush on their land without a permit 'To Set Fire To The Bush'. Burning of the bush must be in accordance with all relevant State legislative requirements.

Burning of garden refuse in areas not zoned rural shall not be undertaken within the City of Cockburn, unless approved by an Authorised Officer.

Burning of household waste is prohibited in all areas of the City of Cockburn.

7. Penalties

Failing to comply with this Fire Control Order will result in a penalty of up to $5,000. A person in default is also liable whether prosecuted or not to pay the costs of performing the work directed by a City's Authorised Officer.

Any owner and/or occupier who engages a contractor to undertake works on their behalf is responsible to ensure that the works completed meet the requirements of this Fire Control Order.

Any Fire Control Order previously published by the City of Cockburn in the Government Gazette or in any Western Australian newsprint is hereby revoked.

By Order of Council

The City of Cockburn Fire Control Order is available in Chinese, Portuguese, Italian and Croatian by contacting the City on 08 9411 3444.

Document Set ID: 7874932
Version: 1, Version Date: 12/10/2018

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Document Status

Report version	Rev No.	Purpose	Author	Reviewed and Approved for Issue	
				Name	Date
Design advice	Rev A	For review by client	Zac Cockerill (BPAD 37803, Level 2)	Zac Cockerill (BPAD 37803, Level 2)	11 July 2019
Final Report	Rev 0	Issued for use: to accompany Structure Plan submission	Brodie Mastrangelo (BPAD 45985, Level 1)	Zac Cockerill (BPAD 37803, Level 2)	18 October 2019
Final Report	**Rev 1**	**Issued for use: updated to address City of Cockburn modifications to Structure Plan design**	**Zac Cockerill (BPAD 37803, Level 2)**	**Zac Cockerill (BPAD 37803, Level 2)**	**25 November 2019**



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