LOT 36 KEVILL ROAD, MARGARET RIVER - STRUCTURE PLAN

Prepared by

AHOLA PLANNING
TOWN PLANNING | DESIGN

PO Box 1713
MARGARET RIVER, WA 6285
E: glenn@aholaplanning.com.au
T: 08 9757 1330
M: 0413 611 725
W: www.aholaplanning.com.au

Project Contact: Glenn Ahola
Project Job Code: 00064
Identification No: AUGU/2020/2268 - 1
Date: 20 August 2020

Prepared for

KEVILLSUPER PTY LTD

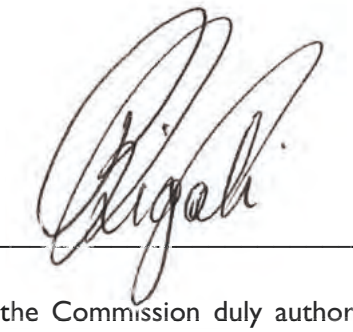
ENDORSEMENT PAGE

This Structure Plan is prepared under the provisions of the Shire of Augusta-Margaret River Local Planning Scheme No.1

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

_____27 August 2020_____

Signed for and on behalf of the Western Australian Planning Commission:



an officer of the Commission duly authorised by the Commission pursuant to section 16 of the *Planning and Development Act 2005* for that purpose, in the presence of:

_____ Witness

_____27 August 2020_____ Date

_____27 August 2030_____ Date of Expiry

TABLE OF AMENDMENTS

Amendment No.	Summary of Amendment	Amendment Type	Date Approved by WAPC

Executive Summary

This Structure Plan relates to Lot 36 Kevill Road, Margaret River ('the land') which comprises 3 hectares and is situated 2.7 kilometres west of the Margaret River town centre.

AholaPlanning has been commissioned by the landowner of Lot 36 Kevill Road, Margaret River to prepare a Structure Plan that provides the detailed planning framework to guide future subdivision and development of the land to accommodate one additional lot.

The land is Zoned 'Rural Residential' in the Shire of Augusta-Margaret River Local Planning Scheme No. 1 ('the Scheme'). The general provisions for the 'Rural Residential' Zone state that, unless otherwise specified at Schedule 7, the minimum lot size for the land within the zone is three (3) hectares. Schedule 7 of the Scheme includes the land as 'R-R17' and provides specific provisions that permit smaller lot sizes and require preparation and endorsement of a Structure Plan to support the re-subdivision of the land. The specific scheme provisions provide guidelines for the subdivision and development to a minimum of not less than 1 hectare in a manner that is consistent with other proposals that have been approved (and developed) west of Margaret River.

The Structure Plan is provided under 'Part 1 – Implementation' of this report. It is considered that the Structure Plan is consistent with current state and local policy framework. The summary table below provides for specific information regarding the Structure Plan area.

Structure Plan Summary Table

Item	Data	Structure Plan Ref (Section No.)
Total area covered by the structure plan	3 hectares	1.2.2
Area of each land use: • Rural Residential	Hectares/m^2 Lot Yield 3.00 2 Provides for one additional lot	3.1
Total estimated lot yield	2	3.1
Estimated number of dwellings	2	
Estimated residential site density	1 Dwelling per 1.5 Hectares	
Estimated population	5	
Estimated percentage of natural area (existing trees to be retained within lots)	2.225 Hectares 74.15 %	2.1

Table of Contents

Figures

Tables

Appendices

PART ONE – IMPLEMENTATION

1.0 Structure Plan Area

The Structure Plan is applicable to Lot 36 Kevill Road, Margaret River. The Structure Plan area comprises an individual lot as set out in Table 1below:

Table 1 – Land Details

Lot Number	Plan Number	Street Address	Area
36	68099	72 Kevill Road, Margaret River	3 hectares

The Structure Plan area is bounded by Kevill Road to the west, 'Rural Residential' zoned Lot 392 Devon Drive to the east, Lot 55 (being a 6m wide emergency access way (EAW) linking Kevill Road to Devon Drive) with 1ha 'Rural Residential' zoned Lots 351, 352 and 353 Kevill Road to the north, 'Rural Residential' zoned Lot 42 Devon Drive and Reserve 12646 to the south.

The land is approximately 2.7 kilometres to the west of the Margaret River town site. It is located amongst similarly zoned properties that have predominantly been identified for subdivision to a minimum lot area of 1 hectare as per Schedule 7 – 'RR-17' of the Scheme where an endorsed Structure Plan (or equivalent) has been previously prepared and endorsed by the Western Australian Planning Commission (WAPC) or Council to guide subdivision. The majority of surrounding 'Rural Residential' zoned land has seen lots created to a minimum lot area of 1 hectare which is now characteristic of the locality fronting Kevill Road.

The lot fronts Kevill Road which is constructed to a sealed bitumen standard. Kevill Road provides primary and secondary access to the property – noting it continues both north and south of the land which connect to the broader road network.

The land contains and existing dwelling that is serviced with power and telecommunications and associated outbuildings/water tanks. Wastewater is treated onsite by way of septic tanks and leach drains and watertanks provide a potable water supply.

2.0 Operation

The date the Structure Plan comes into effect is the date the Structure Plan is approved by the Western Australian Planning Commission.

3.0 Staging

There is no staging applicable to the Structure Plan.

4.0 Subdivision and Development Requirements

The Structure Plan outlines land use and zoning applicable within the Structure Plan area. The zone designated under this Structure Plan is consistent with the zone identified for the land as set out in the Scheme.

4.1 Subdivision

1. The following matters will be addressed via recommended conditions of subdivision -

   a) Subdivision shall be generally in accordance with this endorsed Structure Plan.

   b) The subdivider implementing the requirements of an approved Bushfire Management Plan applicable to the Structure Plan area.

   b) A Section 70A Notification being placed on the Certificates of Title informing prospective landowners of the existence of an approved Bushfire Management Plan and their responsibilities to comply with the plan.

   c) A Section 70A Notification being placed on the Certificates of Title informing prospective landowners that a mains water supply is not available to the lot/s and a reticulated sewerage service is not available to the lot/s.

   d) A Section 70A Notification being placed on the Certificates of Title informing landowners of the existence of Significant Trees with Potential Hollows for Black Cockatoos, as identified on the endorsed Structure Plan, and that those trees may not be removed or damaged.

   e) The subdivider preparing and implementing a Wildlife Impact Mitigation Plan to detail the methods for any vegetation removal from the site to ensure the protection of Western Ringtail Possums, black cockatoos or other fauna and their habitat that may be present. The plan is to be provided to future owners of Lot 361.

   f) The subdivider preparing and implementing a Revegetation Plan showing areas to be rehabilitated between the Asset Protection Zone of the existing Dwelling on proposed Lot 362 and the rear boundary, and for the area of land in the south-west corner of Proposed Lot 361 located outside the 21m Asset Protection Zone from the proposed Building Envelope.

4.2 Development

1. Use and development will be assessed in accordance with the provisions applicable to the 'Rural Residential' zone as set out in the Scheme.

2. Development shall comply with the approved Bushfire Management Plan for the Structure Plan – which includes all dwellings to comply with AS 3959-1999 – Construction of Houses within Bushfire Prone Areas and other 'owner/occupier' responsibilities as prescribed.

4. Dwellings are to make provision for the catchment of potable water in accordance with Clause 5.22 of the Scheme.

5. Dwellings and associated facilities are to be connected to an on-site wastewater effluent disposal system to provide for the treatment and disposal of effluent waste to the satisfaction of the Local Government and the Department of Health.

6. Boundary fencing is to be open style (e.g post and wire) standard to the satisfaction of the Local Government and is to accord with specific provisions set out in Schedule 7 – 'RR-17' of the Scheme relating to the land.

7. All built structures and effluent disposal systems on the relevant lot shall be contained within the designated building envelope.

8. A fauna spotter should be used to monitor any tree removal to ensure no animals are present at the time of any clearing for development.

9. Significant trees with observed or potential hollows as identified on the Structure Plan are to be retained wherever possible/practicable outside of the building envelopes and that trees requiring removal within an Asset Protection Zone will be selected to maintain those with observed or potential hollows.

5.0 Other Requirements

1. The subdivider is to make financial contributions to the Local Government towards the costs of providing community/or common infrastructure in accordance the Shire of Augusta-Margaret River Local Planning Scheme No.1.

6.0 Structure Plan (Map)

The Structure Plan Map is provided on the next page.

0 7.5 15 22.5 30m

NOTE: Base Data supplied by Survey South.
Projection MGA 50
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
C	10/08/20	Revise Building Envelopes
B	17/02/20	Revise Building Envelopes
A	10/06/19	Initial Issue

LEGEND

- APPLICATION BOUNDARY
- PROPOSED BOUNDARY
- PROPOSED BUIDLING ENVELOPE
- EXISTING GRAVEL DRIVEWAY
- EXISTING FIREBREAK
- EXISTING BUILDING TO BE RETAINED
- UNDERGROUND POWER ALIGNMENT
- 90 EXISTING CONTOURS

- SIGNIFICANT TREES (DIAMETER AT BREAST HEIGHT > 500MM - HOLLOW IDENTIFIED OR POSSIBLE HOLLOW
- SIGNIFICANT TREES (DIAMETER AT BREAST HEIGHT > 500MM - NO HOLLOWS OBSERVED

ZONES

- RURAL RESIDENTIAL

STRUCTURE PLAN

Lot 36 Kevill Road East, MARGARET RIVER

R. Hooper	:	CLIENT
A3@1:750	:	SCALE
11 August 2020	:	DATE
00064-2-001	:	PLAN No
C	:	REVISION
G.A	:	PLANNER
B.L	:	DRAWN

AHOLAPLANNING
TOWN PLANNING | DESIGN

ABN: 315 363 00411 I A: PO Box 1713, Margaret River, WA 6285 I W: aholaplanning.com.au
T: (08) 9757 1330 I M: 0413 611 725 I E: glenn@aholaplanning.com.au

PART 2 – EXPLANATORY REPORT

1.0 Planning Background

1.1 Introduction and Purpose

AholaPlanning has been commissioned by the landowner of Lot 36 Kevill Road, Margaret River to prepare a Structure Plan that provides the detailed planning framework to guide future subdivision and development of the land to accommodate an additional lot.

This Structure Plan has been prepared in accordance with the Department of Planning Structure Plan Framework (August 2015). The Structure Plan has considered and incorporated regional strategies, relevant state planning policies, Shire local planning controls and the outcomes of technical and environmental assessments of the land to inform the Structure Plan.

In 1998 the Western Australian Planning Commission (WAPC) adopted the Leeuwin Naturaliste Ridge Statement of Planning Policy 6.1 (LNRSPP) which includes policies that identify the land within a broad area already committed for Rural Residential development.

The land is zoned 'Rural Residential' in the Shire of Augusta-Margaret River Local Planning Scheme No.1 and also falls within an existing Rural Residential area in the Shire of Augusta-Margaret River Local Planning Strategy (2017).

The WAPC's recently adopted (May 2019) Leeuwin-Naturaliste Sub-regional Strategy confirms the land to be developed for Rural Living purposes as denoted on its Strategy Plan.

This Structure Plan will facilitate rural residential development that further consolidates rural living land use and development consistent with the surrounding locality. Use of existing driveway access points onto Kevill Road, a lower density of development to surrounding areas already re-subdivided and suitable location of building envelopes will ensure that development is setback from roads and minimizes the impact on remnant vegetation.

The Structure Plan integrates with and complements the existing rural living lifestyle land use enjoyed in the locality and is generally consistent with key strategic and statutory policies relating to the land and surrounding area.

1.2 Land Description

1.2.1 Location

The land is situated approximately 2.7 kilometres west of the existing Margaret River townsite (refer **Figure 1**). The Structure Plan area is bounded by Kevill Road to the west, 'Rural Residential' zoned Lot 392 Devon Drive to the east, Lot 55 (being a 6m wide emergency access way (EAW) linking Kevill Road to Devon Drive) with 1ha 'Rural Residential' zoned Lots 351, 352 and 353 Kevill Road to the north, 'Rural Residential' zoned Lot 42 Devon Drive and Reserve 12646 to the south.

1.2.2 Area and Land Use

The land comprises 3.00 hectares and contains an existing Dwelling and associated structures toward the eastern portion of the property. The land contains two existing gravel driveway entries accessing on to Kevill Road. There are also firebreaks located toward the peripheral boundaries of

the land. Remnant vegetation (comprising established Marri and Jarrah vegetation) is located on the balance portion of the land.

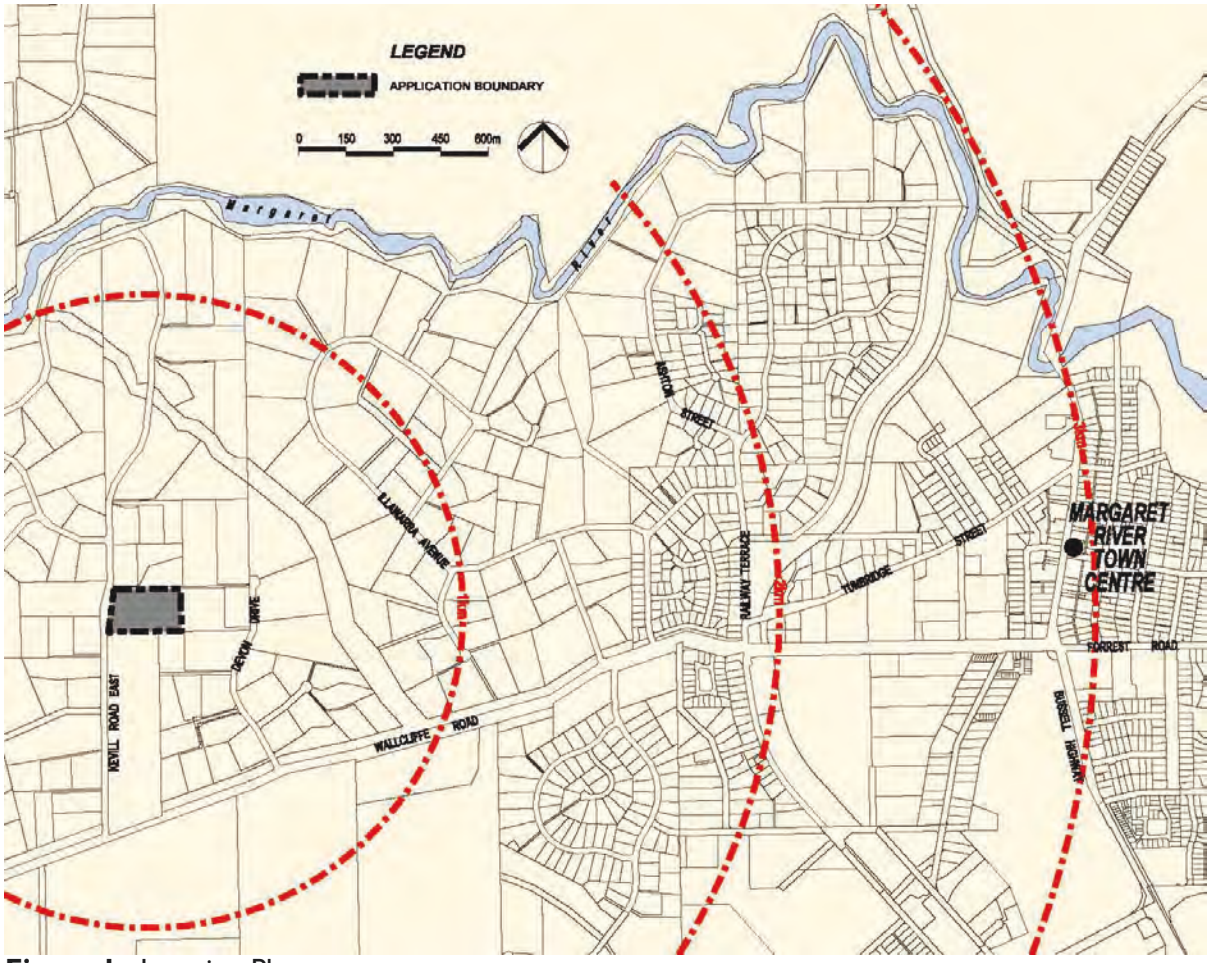


Figure 1 –Location Plan

The dwelling is serviced with power and telecommunications connected to an overhead supply located to the north-west corner of the property abutting Kevill Road. An existing constructed gravel driveway forms part of a 6m wide pedestrian access way (referred to as Lot 55) immediately north of this overhead power supply and runs between Kevill Road and Devon Drive to the east.

1.2.3 Legal Description and Ownership

The land is legally described as Lot 36 Kevill Road, Margaret River. **Table 1** below outlines the relevant ownership information associated with the land. The Certificate of Title is contained at **Appendix 1**.

Landowner	Lot No.	Plan/Diagram No.	Certificate of Title	Street Address	Easements/ Encumbrances
Kevillsuper Pty Ltd	36	68099	Volume 1700 Folio 123	72 Kevill Road, Margaret River	None

Table 1 - Ownership Details

1.3 Planning Framework

1.3.1 Zoning

1.3.1.1 Shire of Augusta-Margaret River Local Planning Scheme No.1

The land is zoned 'Rural Residential' under the Shire of Augusta-Margaret River Local Planning Scheme No.1 ('the Scheme') and is subject to standard development provisions that relate to this zone. The provisions set out in Schedule 7 – Special Provisions 'RR17' specifically relating to the land and are provided in the table below:

Scheme Map Ref No.	***Site Description***	***Specific Conditions and Requirements***
R-R17	*Lots 9, 10, 37, 1238, 391 AND 392 Devon Drive and 36 Kevill Road, Margaret River.* *Lot 36 Kevill Road East* *AMD 29 GG 24/3/16* *AMD 54 GG 10/8/18* *AMD 51 GG 26/04/19*	*1. The local government will not support any proposal to re-subdivide the land until such time a Structure Plan has been approved by Western Australian Planning Commission in accordance with Part 4 of the Deemed Provisions. All subdivision and development is to be in accordance with an approved Structure Plan.* *2. All vegetation on the land shall be preserved unless dead or dangerous or required to be removed to give effect to an approved subdivision or development.* *3. Notwithstanding the provisions of Clause 4.21 of the Scheme, the average lot size for re-subdivision of the land shall be 1 hectare.* *4. Fencing is restricted to the building envelope areas only.*

The Structure Plan has been prepared in accordance with the requirement set out in Schedule 7 – Special Provisions 'RR17' specifically relating to the land. It demonstrates the suitability of Lot 36 for subdivision into two (2) lots of 1.5 hectares as is able to be considered in accordance with the provisions of Shire of Augusta-Margaret River Local Planning Strategy (LPS) and Scheme.

The requirements set out under Part 1 of the Structure Plan will further guide the subdivision and subsequent development of the land.

The Scheme includes the following purpose and objectives relating to the 'Rural Residential' zone:

'*Purpose of the Rural-Residential Zone:*

To provide and recognise established rural-residential lifestyle development opportunities in strategic rural locations but to confine any further such development to land where such activities are consistent both with the provisions of the LNRSPP, the conservation of the significant landscape values and environmental attributes of the land and with appropriate fire management.

Objectives of the Rural-Residential Zone:

a) *To limit the extent of land set aside for rural-residential use to that consistent with the objectives and policies of the LNRSPP;*
b) *To recognise that the conservation of the physical, environmental and landscape characteristics of the land is paramount;*
c) *To provide opportunities for a range of limited rural and related ancillary pursuits on rural-residential lots where those activities will be consistent with the amenity of the locality and the conservation and landscape attributes of the land;*
d) *To facilitate the conservation of native vegetation and to promote revegetation with suitable indigenous species consistent with sound bushfire management practices; and*
e) *To require adequate bushfire management consistent with the objective of preserving environmental and landscape values.'*

The Structure Plan demonstrates that the purpose and objectives of the Scheme can be satisfied at the subdivision and development stage. This will require due regard to the general provisions for development in the 'Rural Residential' zone provided under Clause 4.22 of the Scheme. This Clause states the following:

'Land uses and development within this zone shall comply with the following general provisions and where appropriate with the site specific conditions relevant to particular land areas nominated in Schedule 7. In the event of any conflict between the provisions of clause 4.22 and the site-specific provisions of Schedule 7, the provisions of Schedule 7 shall prevail.'

Clause 4.22.1 of the Scheme makes provision for subdivision in the 'Rural Residential' zone as follows:

'*a)* *The minimum lot size is 3 hectares unless otherwise specified at Schedule 7 and shown on an applicable Structure Plan.*

b) *Subdivision is to be preceded by the preparation of a Structure Plan. Subdivision, which is inconsistent with an endorsed Structure Plan, will not be supported. All subdivision is to be consistent with the objectives and policies applicable to the Rural Residential Zone.'*

Additional provisions of the Scheme that follow include the application of building envelopes which are shown on the Structure Plan. The Scheme provisions confine development to occur within the limits of the building envelope, unless otherwise approved by the local government. It also places a prohibition on clearing of any land outside the building envelope except where it is necessary to:

'(i) *gain vehicular access to the lots, which access points and crossovers may be nominated by the local government;*
(ii) *comply with the provisions of the Bush Fires Act 1954;*
(iii) *construct dwellings and outbuildings within the building envelope and to provide sufficient protection for those buildings at risk from bushfire; or*

(iv) conduct a rural pursuit where it can be demonstrated that such an activity is consistent with both the objective of the subdivision from which the lot was created and the visual amenity and landscape values of the area.'

The Structure Plan has been designed to include building envelopes that capture existing development and utilise existing crossovers and vehicular access driveways to each proposed lot. Clearing of remnant vegetation will be limited to that required to facilitate development and associated infrastructure in accordance with the above Scheme provisions.

The existing firebreaks located around the perimeter of the land will continue to be maintained upon subdivision taking place in accordance with the Structure Plan. It is not proposed to have any fencing or additional firebreak along the newly created lot boundary. This will retain remnant vegetation and maintain the current natural landscape value of the land.

The Bushfire Management Plan provided at **Appendix 4** is to be implemented at the subdivision stage. The environmental assessment for the land identifies there to be no major implications for protected fauna or habitat from implementing the Bushfire Management Plan. Details relating to the environmental assessment and Bushfire Planning are discussed further under Section 2 of this report.

The landscape character has been considered, with the Structure Plan identifying the closest building envelope to Kevill Road to be setback 30 metres. This setback is in accordance with the general development standards set out in Schedule 9 of the Scheme and will maintain the native vegetation character of the land as viewed from Kevill Road.

The Structure Plan has duly considered the general development provisions and the site specific provisions detailed for the land under Schedule 7 of the Scheme as referenced above. The Structure Plan has been prepared so that there is no conflict between it and the provisions of the Scheme.

1.3.2 Planning Strategies

1.3.2.1 Leeuwin-Naturaliste Sub-regional Strategy (WAPC: May 2019)

The Leeuwin-Naturaliste Sub-regional Strategy (LNSS) is an overarching strategic land use planning document outlining the WAPC's approach and guidance to implement State strategic priorities and inform local planning strategies and scheme. Its purpose is to manage and plan for growth within the sub-region and to inform a review of Statement of Planning Policy 6.1- Leeuwin Naturalist Ridge.

A key strategic direction of the LNSS relevant to this Structure Plan is to adopt a presumption against the creation of new urban and rural living areas beyond those identified in existing local planning strategies or local planning schemes. The LNSS includes a Strategy Plan that identifies the land as zoned 'Rural Living'. The Structure Plan is consistent with the land use allocation identified in the LNSS.

1.3.2.2 South West Regional Planning and Infrastructure Framework (WAPC: December 2009)

The WAPC's south West Regional Planning and Infrastructure Framework (SWRPIF) updates the South-West Framework (2009) and identifies infrastructure and planning priorities for the region to achieve sustainable growth. The framework provides direction for local governments in the preparation of more detailed local planning strategies and local planning schemes.

Section 6.2 (Building Sustainable Communities) references relevant reasons that support consolidating density of existing 'Rural Residential' zoned land as follows:

"Constraining low-density urban sprawl through:

- *preventing the creation of new rural residential lots beyond those identified in existing local planning strategies or local town planning schemes, while making provisions for the creation of conservation lots or other forms of lots that provide a mechanism for the protection of existing native vegetation or opportunities for revegetation of previously cleared land with endemic species; and*

- *support increasing the density of existing rural residential areas where this is seen as beneficial to the community as a whole and does not adversely impact on the landscape and environmental values of the locality;*

The Structure Plan has been designed to provide smaller lots and building envelopes that have been cleared as a result of existing development, where the proposed lots can utilize existing access driveways and ensure natural landscape values are maintained when viewed from Kevill Road and surrounding properties.

The Structure Plan further aims to not impact on the environmental and landscape values of the locality through:

- applying a lower density of development that aims to minimise clearing requirements of remnant vegetation on the land,

- using the existing crossover access points and driveways to provide access to the existing dwelling on Proposed Lot 362 and proposed building envelope on Proposed Lot 361, and

- achieving a 30m building setback to Kevill Road whereby existing vegetation will be retained within the setback and also within the widened Kevill Road reserve that will maintain the natural landscape values of the locality.

1.3.2.3 Shire of Augusta-Margaret River Local Planning Strategy (2017)

The Shire of Augusta-Margaret River Local Planning Strategy (LPS) details the strategies for development within the Shire over the medium to longer term.

The LPS outlines that re-subdivision of 'Rural Residential' allocated lots to create smaller lots can be considered so as to make more efficient use of committed land. The LPS included rural residential policies to identify existing 'Rural Residential' lots that may be considered suitable for re-subdivision. These are provided as follows:

Rural Residential Policies

'*3.3.1 Rural residential proposals will only be supported in areas designated as 'Rural Residential' in the LNRSPP and the LPS maps.*

3.3.2 Clustered rural residential will be favoured where a significant portion of land can be permanently held for landscape protection, creek rehabilitation, recreation and/or biodiversity values. The 'non-developed' land can be held in common, Shire or private ownership and must have a notification on title stating that no further subdivision will be considered. Density shall be generally 1 lot per hectare.

3.3.3 Rural residential subdivision and development shall be designed and implemented to protect the environmental and landscape values of the subject land and its locality.

3.3.4 Uses permitted and development control standards are as prescribed in Local Planning Scheme No. 1.

3.3.5 The re-subdivision of areas which display any of the following attributes are unlikely to be supported:

a) Significantly vegetated – subdivision of densely vegetated land would result in an undesirable environmental outcome, would likely put future residents at higher risk of bushfire, and have greater potential to be inconsistent with the environment and landscape provisions of the LNRSPP.

b) Located in areas which have an extreme fire risk and/or have poor fire management characteristics.

c) Located along Caves Road – Caves Road is identified as a travel route corridor by the LNRSPP wherein development should be sited so as to be inevident from the road. Subdivision would result in additional development and thus a greater potential for adverse visual impact.

d) Located in an identified Environmental Corridor (LPS) or National Park Influence Area.

e) Located in areas which have been developed around the maximisation of views, where additional development would impact upon such views and landscape character

f) Isolated from all other lots having potential for subdivision (i.e. – would commence rather than complete a pattern of subdivision inconsistent with the character of the locality).

g) Not easily accessible, for example – no direct road frontage, located at end of long cul de sac, etc.

3.3.6 Once an area has been determined to be suitable for re-subdivision (refer to locational criteria at 3.3.5) proposals are required to meet the following criteria:

a) Subdivision at a ratio of less than 1ha (average) will not be supported.

b) Lots of not less than 4000m2 may be considered where a clustered subdivision approach is appropriate notwithstanding that the 1ha average lot size will still need to be met.

c) Rezoning and structure planning necessary to support subdivision should be undertaken on a precinct (rather than lot by lot) basis unless completing a pattern of subdivision.

d) Subdividers will be required to contribute to the proportional upgrade of infrastructure necessary to adequately service the intended additional population.

e) Opportunities for re-subdivision should seek to provide enhanced environmental outcomes.

f) A bushfire hazard assessment and Bushfire Management Plan is to be prepared and implemented at the time of subdivision.'

The Structure Plan will locate building envelopes that will include existing cleared vegetation and structures on the property. It is also designed to utilise existing driveways and access crossovers from Kevill Road to each respective building envelope. Limited clearing will be required on proposed Lot 361 at the time of development so as to comply with Bushfire Management Plan Bushfire Attack Level (BAL) requirements. The building envelope for proposed Lot 361has been located to exclude significant trees with hollows identified/or possible hollows. Furthermore a significant majority of significant trees with no hollows observed will be located outside the building envelopes identified on the Structure Plan.

It should be noted that clearing surrounding development (single dwelling) does not require removal of all vegetation to satisfy Bushfire Management Plan requirements. The siting of proposed development within the building envelopes can be undertaken so as to comply with suitable fire management characteristics discussed in the Bushfire Management Plan discussed further under Section 2 of this report and included at **Appendix 4**.

The land has already been identified within Council's Scheme to be the subject of Structure Planning to be considered for re-subdivision to a 1 hectare minimum average. The land forms part of a broader number of lots that have already received structure plan approval and subsequent subdivision. Moreover, the Structure Plan completes a pattern of subdivision that has been supported/developed in the locality. The Structure Plan provides for limited additional development that is consistent with, and will retain the landscape character of the locality.

The land fronts Kevill Road that is constructed to a sealed bitumen standard. Kevill Road provides two direction access north and south of the property, which connects on to the broader road network in the locality.

It should be noted that recent rural residential subdivision occurring within the area is down to a 1 hectare minimum lot size. The Structure Plan proposes re-subdivision to achieve one additional lot with the aim to limit additional development so as to maintain the remnant vegetation on the property. The Structure Plan therefore achieves a 1.5 hectare minimum average, which is consistent with previous approvals made in the immediate locality.

The LPS identifies the land to fall within Visual Management Area 'B' and outlines the following with regards to Development:

'Developments or changes of use may be visually apparent but should nevertheless be subordinate to established landscape patterns. Introduced visual elements may be apparent in the landscape but should not be visually dominant.'

The siting of the proposed building envelope for proposed Lot 361 has been setback 30m from the front lot boundary which is consistent with Scheme requirements. The retention of vegetation within this setback, coupled with retention of existing vegetation within the widened Kevill Road reserve, will offer filtered views to future development within the building envelope. Development will therefore not be visually dominant on the land in context with its locality. The siting of the building envelopes is therefore consistent with the natural and landscape characteristics and density development within the surrounding 'Rural Residential' area.

1.3.3 Planning Policies

1.3.3.1 Statement of Planning Policy 6.1 – Leeuwin-Naturaliste Ridge (WAPC)

In 1998 the WAPC adopted Statement of Planning Policy 6.1 – Leeuwin-Naturaliste Ridge (SPP 6.1) to provide the strategic framework for the Policy Area for the next 30 years through greater vision, guidance and certainty of land use. It promotes sustainable development, conservation and land and resource management that will, amongst other things, provide direction to those managing land use change and give clear regional-level advice to proponents on subdivision and development.

SPP 6.1 identifies the land as 'Rural Residential' on its Land Use Strategy Plan. LUS 1.26 of SPP 6.1 states '*consolidation and diversification of existing Rural Residential land to the west of Margaret River will be compatible with regional environmental functions and landscape values*'. Development within allocated building envelopes will ensure that the natural landscape values of the land are maintained and that the development is suitably screened from Kevill Road and the surrounding locality.

The land falls within a locality that has been subject to re-subdivision down to 1 hectare west of Margaret River. Preparation of a Structure Plan is consistent with previous scheme amendments (as referenced in the table under 1.3.1.1 of this report) applicable to the land. The surrounding locality has also been the subject of similar amendments to the Local Planning Scheme together with approval of related Structure Plans.

SPP 6.1 outlines that '*Where possible, infill development within the areas designated Rural Residential should adopt cluster principles that are more responsive to retaining landscape values and allowing some agricultural pursuits*'. It goes on further to state that '*closer settlement will not be supported in productive and potentially productive agricultural areas, conservation areas, around wetlands, in important landscapes, and in locations near designated settlements which would conflict with future urban development*'

Cluster principles have been applied by way of allocating building envelopes to contain existing and future development. Coupled with limiting re-subdivision to one additional lot, the Structure Plan aims to limit the impact of development on existing vegetation located on the land. It should be noted that re-subdivision in the surrounding locality has typically seen the creation of lots to 1 hectare and slightly less in some instances. The Structure Plan proposes 1 additional rural residential lot to achieve a minimum average of 1.5hectares. This aims to restrict development and retain the majority of existing vegetation so as to maintain the lands natural landscape values. The proposal is therefore generally consistent with previous decisions made in the immediate locality as per the Policies set out under SPP 6.1.

1.3.3.2 State Planning Policy 3.7 – Planning in Bushfire Prone Areas

Statement of Planning Policy No 3.7 Planning in Bushfire Prone Areas ('SPP 3.7') and the associated Guidelines for Planning in Bushfire Prone Areas (the 'Bushfire Guidelines') are relevant for the Structure Plan area. A Bushfire Management Plan ('BMP') has been prepared in accordance with SPP 3.7 and the Bushfire Guidelines and can be viewed at **Appendix 4** of this report.

The BMP includes a Bushfire Attack Level (BAL) assessment, identifies bushfire hazard issues and demonstrates that the bushfire protection criteria set out in the Bushfire Guidelines can be achieved as part of the subdivision process under this Structure Plan.

1.3.4 Other Approvals and Decisions

The land forms part of a group of nearby landholdings that, through previous gazetted Scheme Amendments, form part of the same set of provisions in Schedule 7 – Special Provisions 'RR17'. Nearby landholdings received WAPC subdivision approval, with subsequent development occurring in accordance with approved Detailed Area Plans and Structure Plans. The Structure Plan has been submitted in isolation to the remaining landholdings referenced in Schedule 7 – Special Provisions 'RR17' on the basis that the land contains characteristics whereby the planning controls can be implemented independently noting:

- it is the only landholding that gains frontage to and access from Kevill Road (in context with other referenced lots 9, 10, 37, 1238, 391 and 392 that gain access from Devon Drive),

- Structure Planning and future development is not reliant on any coordinated planning controls to be implemented that effect these surrounding landholdings;

- All Bushfire Management requirements can be implemented independently to the property, which comply with State Planning Policy 3.7 – Planning for Bushfire Prone Areas and set out in the Bushfire Management Plan provided at **Appendix 4**; and

- Creation and implementation of the Emergency Access Way (Lot 55) that runs along the northern boundary of the Structure Plan area was installed in accordance with separate historical subdivision of the locality.

1.3.5 Pre-lodgement Consultation

August 2016 – Shire of Augusta-Margaret River

Discussions with and a meeting was held with Shire of Augusta-Margaret River senior planning staff to consider matters needing to be addressed in support of preparing a Structure Plan and included:

- the requirement to prepare a Structure Plan pursuant to Clause 4.22.1 and Schedule 7 – Special Provisions 'RR17' of the Scheme,

- providing supporting assessments to consider environmental, bushfire management and land capability for onsite effluent disposal (soils assessment), and

- considering the location of the proposed building envelope so as to minimise the impact on vegetation through satisfying Asset Protection Zone requirements surrounding the proposed dwelling.

September 2016 – Department of Planning

Discussions and email correspondence with Department of Planning; Lands; Heritage senior planning staff to consider the conceptual subdivision design tabled with Council included feedback being received that included:

- confirming the need to prepare a Structure Plan in accordance with Clause 4.22.1 of the Scheme, and

- preparation of a Structure Plan for the land is the most suitable planning document to influence/guide subdivision of the land.

The Structure Plan has been prepared in accordance with the Deemed Provisions in order to provide an orderly approach to future subdivision of the land.

2.0 Site Conditions and Constraints

2.1 Biodiversity and Natural Area Assets

A Flora and Fauna Significance Assessment was undertaken by Ecosystem Solutions during September - November 2018 with the report being provided at **Appendix 2**.

2.1.1 Flora and Vegetation

A Reconnaissance Flora and Vegetation Survey (including a spring flora survey) was undertaken by Ecosystem Solutions. The study area was inspected for flora species of significance and Threatened Ecological Communities, based on Department of Biodiversity, Conservation and Attractions (DBCA) database records. The flora survey concluded that there were no Declared Rare Flora or Priority Species observed on site. The field surveys did not appear to have the characteristics of any listed Threatened Ecological Communities.

Field surveys identified the site to contain Jarrah-marri Forest which reflects the Cowaramup Uplands (C1) and Wilyabrup Valleys (W1) complex, however there were no *Banksia grandis* or *Allocasuarina decussate* observed on the property.

When utilizing the scale of condition developed by Keighery (1994), the report concluded that approximately 2.5ha of the Jarrah Marri Forest is classified as Excellent with the area surrounding the existing house, firebreaks and driveways classed as Degraded to Completely Degraded.

The assessment does recommend that trees with a Diameter at Breast Height greater than 500mm with identified potential hollows should not be impacted and where they fall within the Asset Protection Zone, neighbouring trees should be removed instead to meet the *Guidelines in Planning for Bushfire Prone Areas*.

The clustering of development within building envelopes aims to contain existing and future development and minimise removal of existing vegetation. The building envelope for proposed Lot 361 has been sited so that all significant trees with a Diameter at Breast Height greater than 500mm with identified potential hollows will not be impacted or removed as a result of development.

2.1.2 Fauna

A desktop study undertaken by Ecosystem Solutions and a corresponding field study was undertaken to determine the presence and relative abundance and distribution a fauna and faunal assemblages on the land. This assessment primarily targeted terrestrial threatened vertebrate species listed under the Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth), (EPBC Act) and the Biodiversity Conservation Act 2016 (WA).

The study identified a species list of native fauna expected to occur within a 5 kilometre radius of the land. The fauna species specifically targeted as part of the site survey included the Western Ringtail Possum (*Pseudocheirus occidentale*) and signs or suitable habitat for Black Cockatoo Species (*Calyptorhynchus baudinii*, C. *latirostris and C. banksii subsp. naso*) as well as any other significant fauna within identified lots.

The assessment concluded that there were no signs of Black Cockatoo Species or Western Ringtail Possums or any other fauna of significance observed during any of the surveys on the land.

The field survey did observe Black Cockatoos flying overhead. It has been noted that Black Cockatoo species can forage over extensive areas and given there are large areas of preferred habitat within their range from nesting sites (15-20kilometres), it could be assumed that Black Cockatoo species are not relying on the land for habitat or food source.

The study identified 127 trees with a diameter in excess of 500mm at Breast Height were observed within the property, with 24 trees observed with hollows or with potential hollows that meet the criteria for nesting of Black Cockatoo species. However no signs of nesting, roosting or socializing were found during the survey. It should also be noted that the listing of potential nesting hollows is likely to be an over-estimation of those actually suitable for this purpose.

The assessment recommends that trees with a diameter at breast height greater than 500 mm and with identified or potential hollows will be selected to stay and will not be impacted as they can be accommodated within the Asset Protection Zone surrounding the building envelope. These trees have been accommodated on the Structure Plan and it is noted that the location of the proposed building envelope aims to ensure these trees are retained within the Asset Protection Zone.

It is recommended a condition be placed on the subdivision approval whereby a Section 70A Notification will be required on Certificates of Title informing landowners of the existence of Significant trees with potential hollows for Black Cockatoos, as identified on the endorsed Structure Plan, and that those trees may not be removed or damaged.

2.2 Landforms and Soils

2.2.1 Topography

The land is flat to gently undulating with a high point of approximately 93 metres AHD located on the south west corner of the property and descends eastwards to a broad level of 82 metres AHD to the north-east.

2.2.2 Soils and Land Capability

The Busselton-Margaret River-Augusta Land Capability Study (Prepared by Tille and Lantzke at the Department of Agriculture – 1990) identifies the eastern portion of the land to fall within the Wilyabrup Valleys Land System and the western portion to fall within the Cowaramup Uplands Land System (Refer to **Figure 2** – Land Capability).

The eastern portion of the land more specifically falls within the Wilyabrup Slopes (W) sub system – referred to as slopes with gradients generally 5-15% and gravelly soils (ie Forest Grove and Keenan Soils). This sub-system is identified to have moderate limitations for soil absorption and ease of excavation and minor limitations for water erosion, slope and trafficability with regard to housing development.

The western portion of the land falls within the Cowaramup Flats (C1) sub-system which is referred to as flats (0-2% gradient) with gravelly duplex (Forest Grove) and pale mottled (Mungite) soils. This

sub-system is identified to have moderate limitations for soil absorption and minor limitations for with regard to housing development.

Trafficability is not considered to be an issue, noting that existing driveways to both building envelopes provide suitable constructed access. We further note that similar soil unit classifications surrounding the land have also accommodated the creation of smaller lots down to 1 hectare (or similar) in accordance with approved Structure Plans.

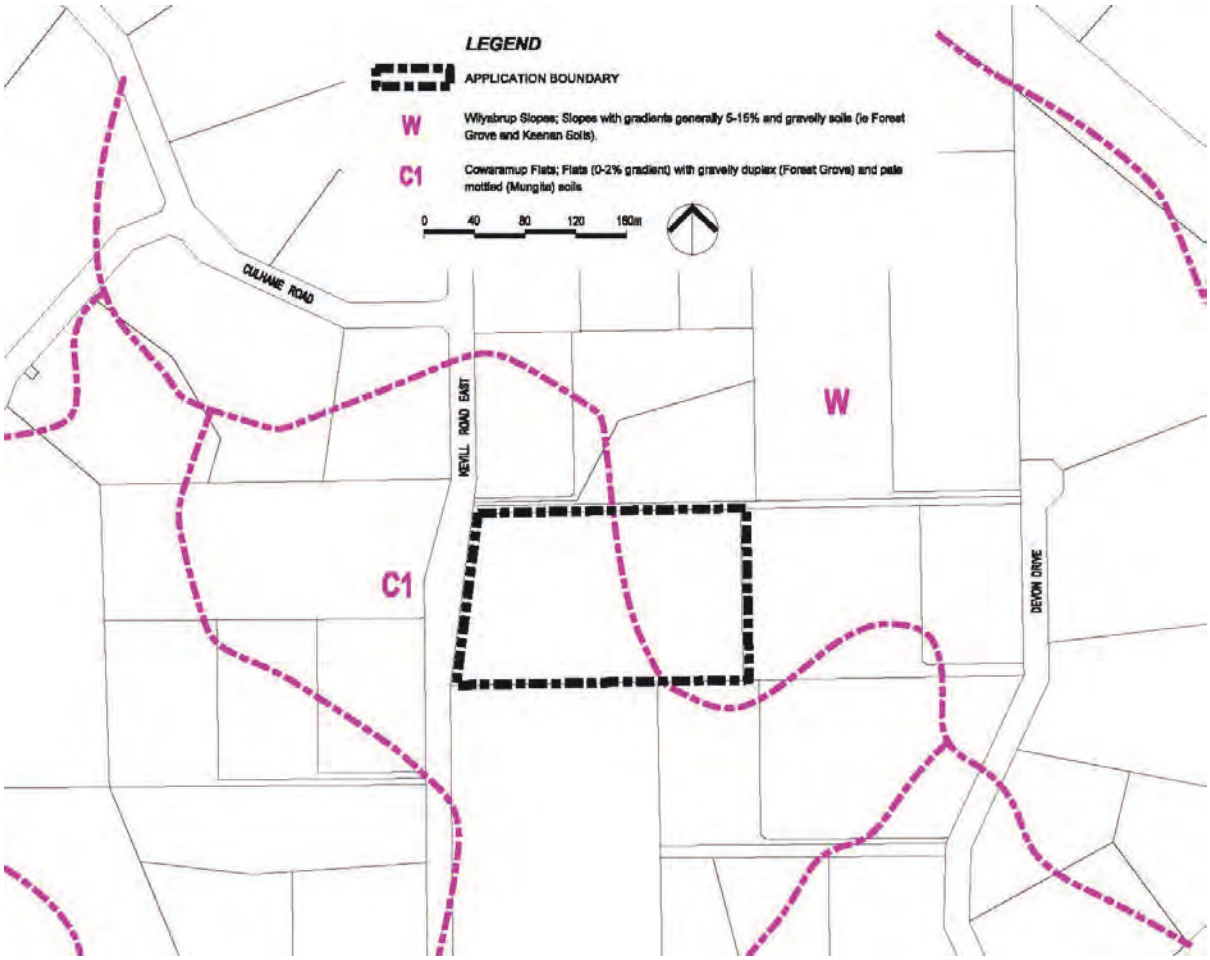


Figure 2 – Land Capability (Tille and Lantzke - Department of Agriculture – 1990)

A Soil Wastewater Assessment (that includes a Land Capability Assessment) has been undertaken by Environmental and Landscape Management in August 2019 and is provided at **Appendix 3**. This report demonstrates a high capability for on-site effluent disposal for the test pit area – which is located within the building envelope on Proposed Lot 361 on the Structure Plan. The assessment also confirmed:

- a very high capacity of the soil to bind phosphorous from effluent and will prevent nutrient flow into groundwater or surface waters;
- the site has a high infiltration capacity with a fall rate less than 5 minutes; and
- The assessment demonstrates that the new lot has soils capable of receiving wastewater and is suitable for stand-alone on-site effluent disposal systems and a subdivision approval can be granted on this basis.

We note that the existing development within proposed Lot 362 is serviced by an approved onsite effluent disposal system that demonstrates soil absorption capabilities in that locality.

2.2.3 Acid Sulfate Soils

A review of the Acid Sulfate Soils risk map for the lower south west (DWER -052) confirms there is no risk of Potential Acid Sulfate Soils being disturbed by land development activities on the land.

The nature of the development involves negligible excavation. In addition the large lot sizes are sufficient for development that is highly unlikely to require excavation deeper than 2.0m. As a result it is unlikely that a more detailed Acid Sulfate Soils Assessment will be required.

2.3 Groundwater and Surface Water

2.3.1 Groundwater

One groundwater monitoring well was located on the land within the building envelope for proposed Lot 361 on the Structure Plan- as part of the assessment undertaken by Environmental and Landscape Management in September 2019.

The groundwater monitoring results concluded that the depth to groundwater was identified to be greater than two metres.

The location of future development within the building envelope on the Structure Plan can therefore accommodate water supply and wastewater management in accordance with Council and Department of Health policies and delegated powers of approval, and stormwater through assessment of building drawings at the development stage.

2.3.2 Surface Water and Waterways

The land is located within the Blackwood Groundwater Area and Cape to Cape South Surface Water Area – as proclaimed under the Right in Water and Irrigation Act 1914. The land does not contain any surface water areas or waterways.

2.4 Bushfire Hazard

The land is located within a bushfire prone area, as declared by State Planning Policy 3.7: Planning in Bushfire Prone areas. A Bushfire Management Plan (BMP) was prepared by Ecosystem Solutions to reflect the final land uses, and is attached at **Appendix 4.**

The BMP includes a number of actions (responsibilities) to be undertaken by the developer (at the subdivision stage), the landowner (at the development stage) and by Council. Compliance with these actions/requirements will see the fire risk being appropriately managed. The recommendations of the BMP have been duly considered with the creation of lots identified on the Structure Plan. These include:

- Any additions or alterations to the existing dwelling within proposed Lot 362 will be subject to BAL 29,

- Asset Protection Zones for BAL 29 will be achieved with the provision of a low fuel zone established and maintained around the habitable dwelling within the site, 27 metres to any Class A Forest Downslope >0 to 5 degrees and 21 metres to any Class A Forest upslope/flat

- Any class 1,2, 3 or associated 10a structure that is to be constructed, or additions planned to existing dwellings shall be designed and built to conform with Australian Standards AS3959-2009,

- A Section 70A notifications being placed on each Certificate of Title alerting prospective purchasers/landowners of the responsibilities set out in the approved Bushfire Management Plan, and

- Ensuring that all dwellings are to be constructed in full compliance with Australian Standards AS3959-2009 as applicable to the property.

2.5 Heritage

2.5.1 Indigenous Heritage

A review of the Department of Indigenous Affairs Heritage Inquiry System has outlined that there are no registered aboriginal heritage sites or other heritage places recorded within the land. The Findings of the Heritage Enquiry are attached at **Appendix 5**.

2.5.2 Non-Indigenous Heritage

A search of the Heritage Council of WA State Heritage Register did not show any sites located on the subject land. The Shire of Augusta-Margaret River Heritage Inventory does not identify any sites located on the land.

3.0 Land Use and Subdivision Requirements

3.1 Land Use

The Structure Plan area proposes two (2) 'Rural – Residential' lots, both being 1.5 hectares in area. The proposed lot sizes are consistent with surrounding similar zoned landholdings that have been rationalised (consolidated) down to a minimum average of 1 hectare.

This Structure Plan report and accompanying documentation provides information and justification regarding the suitability of the land for subdivision and development, including the landform characteristics, demonstrated low risk of detrimental environmental impact and appropriately managing fire risk.

The Structure Plan Map and related subdivision and development requirements set out in Part 1of this document formalise the land use and conditions to be satisfied. Should there be an inconsistency between the Structure Plan map and any other map contained in the Structure Plan documentation (which may occur due to the ongoing process undertaken to complete the proposal), then the Structure Plan Map prevails to the extent of that inconsistency.

3.2 Water Management

Rainwater will be collected from roof catchment/watertanks and provide the principal water supply for each dwelling.

3.3 Infrastructure Coordination, Servicing and Staging

Future development is to be serviced on-site (with regards to potable water supply and effluent disposal). Reticulated power and communications will be provided from the network within the locality.

3.3.1 Power and Telecommunications

Power will be supplied from the existing power main that runs along Kevill Road and in front of the land.

3.3.2 Effluent Disposal

Based on the soil categories, permeability, slopes, low level of development and phosphorous retention index characteristics of the land as detailed in the Soil Wastewater Assessment (refer **Appendix 3**), the land has been assessed to be suitable for on-site effluent disposal. Moreover, the majority of the land is suitable for conventional on-site effluent disposal,

3.3.3 Water Supply

Due to the absence of reticulated water and sewer servicing within reasonable proximity to the Structure Plan area, and considering the information provided in Section 3.3.2 above (relating to on-site effluent disposal), lots created in accordance with the Structure Plan ensures there will be sufficient potable water supply for each household and for fire-fighting purposes. These requirements can be implemented at the development approvals stage in accordance with relevant government policy requirements.

Clause 5.22 of the Scheme outlines that dwellings without reticulated mains water supply are required to provide a rainwater tank with a minimum capacity of 120,000 litres prior to occupation, with an additional 10,000 litres for fire-fighting purposes.

3.6.4 Gas

There is no mains gas supply servicing the Kevill Road 'Rural Residential' locality.

3.4 Developer Contribution Arrangements

The Council's Scheme includes Shire wide contributions attending to community infrastructure that is available for use by all people in the Shire – referred to as a district catchment level.

The subdivider is to contribute proportionately for shire wide community facilities for each additional lot created. Such a requirement will be imposed as a condition of subdivision.

4.0 Conclusion

This report seeks endorsement of the Structure Plan for Lot 36 Kevill Road Margaret River that provides the planning framework and sets out the relevant requirements to facilitate the future subdivision and development of the land. The land has been identified for development in various WAPC and Council adopted documents, most particularly Statement of Planning Policy 6.1 – Leeuwin-Naturaliste Ridge (SPP 6.1) (1998), the Shire of August-Margaret River Local Planning Strategy and Local Planning Scheme No.1.

This report demonstrates that proposed 'Rural Residential' development of the land can be undertaken for the following reasons:

- All environmental, geotechnical and servicing assessments confirm the site is capable and suitable for development;
- Aims to minimise impact on existing vegetation by limiting subdivision/development to one additional lot;
- Creates two lots that is typically of a size that is consistent with, and greater than the 1 hectare minimum average approved for landholdings in the locality and identified for the land in Schedule 7 – Special Provisions 'RR17' in Council's Local Planning Scheme No.1;
- Utilises existing driveways and crossovers to access each proposed lot;
- The Structure Plan is reflective of ongoing decisions in local planning to make better use of rural residential land taking into account the objectives of the LNRSPP and Council's LPS and is a rounding off of the opportunity in the Kevill Road East locality; and
- Compliance with the actions/requirements set out in the Bushfire Management Plan will see the fire risk being appropriately managed, while also aiming to retain significant trees identified in the Flora and Fauna Significance Report;

5.0 Technical Appendices

A range of technical assessments have been undertaken to consider the site opportunities and constraints and thereafter inform the preparation of the Structure Plan. The technical appendices have assisted in identifying the actions and recommendations to inform and link the implementation provisions of the Structure Plan and provide further basis for the assessment of subsequent planning applications within the Structure Plan area.

The supporting Technical Documents are listed in the Table of Contents of this report and appended accordingly.

APPENDIX I

Certificate of Title

FIRST SCHEDULE (continued)

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT
ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	REGISTERED
Brendan James MacDowell, Solicitor and Janice Vivienne Losewitz, Clinical Psychologist and Rodney Stuart Hooper, Solicitor, all of 74 Simper Street, Wembley, as joint tenants.	Transfer	D126715	11.10.85
Rodney Stuart Hooper and Kaylene Lorraine Hooper both of 74 Simper Street, Wembley, Brendan James MacDowell of 8 The Boulevarde, Mt Hawthorn and Michael Gordon Linsley of 196 Abbett Street, Scarborough, as joint tenants.	Transfer	E183358	1.9.89
Rodney Stuart Hooper Kaylene Lorraine Hooper and Michael Gordon Linsley all of 74 Simper Street Wembley	Transfer	E450546	20.9.90
Rodney Stuart Hooper and Kaylene Lorraine Hooper both of 74 Simper Street Wembley as joint tenants	Transfer	E450547	20.9.90
Kevill Super Pty Ltd of care of Athans & Taylor. 63 North Lake Road, Myaree.	Transfer	H593085	8.11.00

SECOND SCHEDULE (continued)

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT
ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

INSTRUMENT NATURE	INSTRUMENT NUMBER	PARTICULARS	REGISTERED	TIME	SEAL	INITIALS	CANCELLATION	NUMBER	RE O
Mortgage	D126716	to Town & Country W.A. Building Society.	11.10.85	3.01			Discharged	E183357	
Mortgage	E183359	to Commonwealth Savings Bank of Australia.	1.9.89	14.38			Discharged	E450545	2
Mortgage	E450548	to Commonwealth Savings Bank of Australia	20.9.90	10.11			Discharged	F754881	

H593085

VOL. 1700 FOL. 173

I certify that the person described in the First Schedule hereto is the registered proprietor of the undermentioned es
the undermentioned land subject to the easements and encumbrances shown in the Second Schedule hereto.

Dated 12th July, 1985

N. J. Smyth
REGISTRAR OF TITLES

ESTATE AND LAND REFERRED TO

Estate in fee simple in portion of Sussex Location 1238 and being Lot 36 on Diagram 68099, delineated and coloured green on the map in the Third Schedule hereto, limited however to the natural surface and therefrom to a depth of 60.96 metres.

FIRST SCHEDULE (continued overleaf)

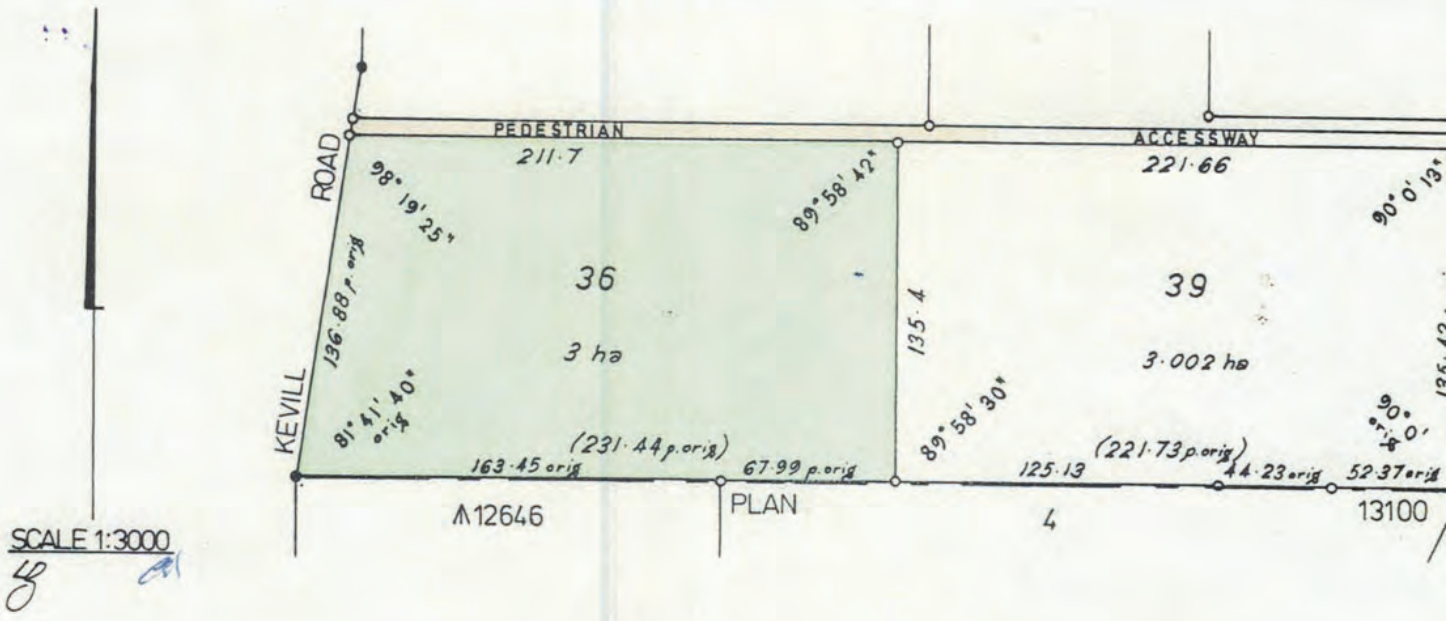
George Henry Kevill and Raymond Ira Kevill both of Margaret River, Farmers, as tenants in common in equal shares.

SECOND SCHEDULE (continued overleaf)

NIL

N. J. Smyth
REGISTRAR OF TITLES

THIRD SCHEDULE



NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFF
ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

APPENDIX 2

Flora and Fauna Significance Assessment
9 October 2019
Prepared by: Ecosystem Solutions

ecosystem solutions
PO Box 685
DUNSBOROUGH WA 6281
Ph: +61 8 9759 1960
Fax: +61 8 9759 1920
Mobile: 0427 591 960
info@ecosystemsolutions.com.au
www.ecosystemsolutions.com.au

Flora and Fauna Significance Assessment

72 Kevill Road, Margaret River

9 October 2019

Prepared for:
Rod Hooper

Limitations Statement

This report has been prepared for Rod Hooper and remains the property of Ecosystem Solutions Pty Ltd. No express or implied warranties are made by Ecosystem Solutions Pty Ltd regarding the findings and data contained in this report. No new research or field studies were conducted other than those specifically outlined in this report. All the information details included in this report are based upon the research provided and obtained at the time Ecosystem Solutions Pty Ltd conducted its analysis.

In undertaking this work the authors have made every effort to ensure the accuracy of the information used. Any conclusions drawn, or recommendations made in the report are done in good faith and the consultants take no responsibility for how this information and the report are used subsequently by others.

Please note that the contents in this report may not be directly applicable towards another organisation's needs. Ecosystem Solutions Pty Ltd accepts no liability whatsoever for a third party's use of, or reliance upon, this specific report.

Document Control

Rod Hooper

72 Kevill Road, Margaret River

Version	Revision	Purpose	Author	Reviewer	Submitted	
					Form	Date
Report	Rev A	Initial Report	DP	KP/GM	Electronic (email)	29/11/2018
Report	Rev B	Comments from client	KP	GM	Electronic (email)	26/09/2019
Report	Rev C	Correct mapping	DC	KP	Electronic (email)	27/09/2019
Report	Rev D	Correct Dates	DC	KP	Electronic (email)	09/10/2019

Filename: z:\projects\18593 lot 36 (72) kevill road, margaret river flora fauna\reports\72 kevill road, margaret river flora fauna rev c.docx

Contents

List of Figures

List of Tables

Appendices

1 Introduction

Ecosystem Solutions were contracted by Rod Hooper to survey and document the presence and distribution of significant flora and fauna within 72 Kevill Road, Margaret River, within the Shire of Augusta-Margaret River (hereafter called the "Site"). The owners are assessing the suitability of the Site to subdivide the existing Lot into two, Lots 361 and Lot 362, each 1.5 ha with details provided in Figure 1.

The purpose of this report is to identify any significant flora and fauna, to support the proposed subdivision.

The fauna species specifically targeted are the Western Ringtail Possum (*Pseudocheirus occidentale*) and signs or suitable habitat for Black Cockatoo Species (*Calyptorhynchus baudinii*, C. *latirostris and C. banksii subsp. naso*) as well as any other significant fauna within identified lots.

The flora elements specifically targeted includes Declared Rare Flora and Threatened Ecological Communities.

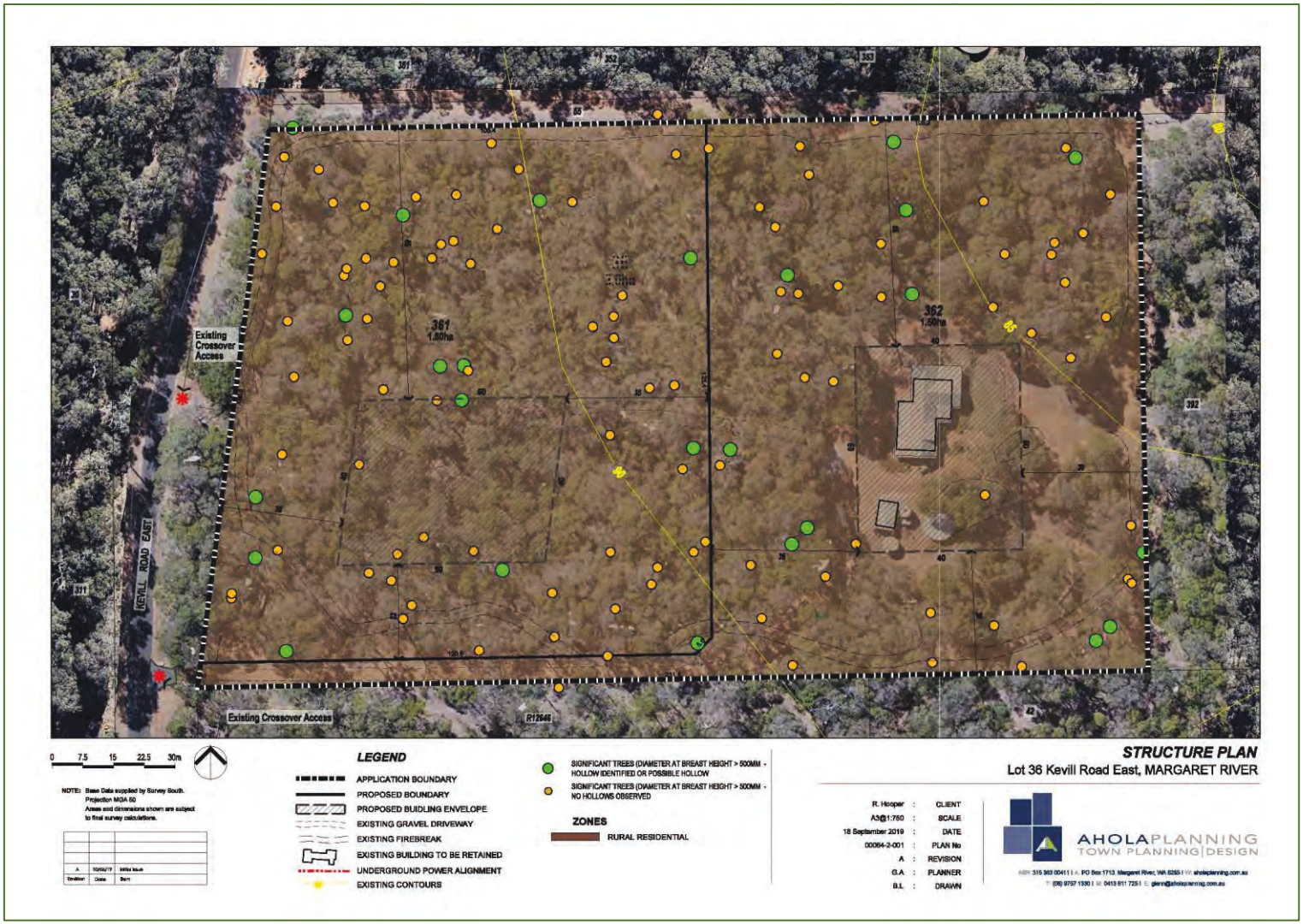


Figure 1 Proposed Site Layout

2 Site Details

The Site is 3.0 Ha in area consisting a residential house within the eastern portion of the Lot, Kevill Road to the West and an Emergency Access Way running along the north of the lots out to Devon Drive (Map 1).

Remnant vegetation, comprising of *Eucalyptus marginata* subsp. *marginata* (Jarrah), *Corymbia calophylla* (Marri) over a well developed understorey including *Acacia pulchella*, *Acacia myrtifolia*, *Patersonia occidentalis*, *Macrozamia riedlei*, *Persoonia longifolia* and various other native shrubs.

The Site sits approximately 92 m Australian Height Datum (AHD) to the west and slopes down to the east to approximately 85 m AHD.

The surrounding area consists of rural residential Lots with areas of remnant vegetation and cleared paddocks. The Margaret River runs westerly, approximately 1 km north of the Site.

3 Flora and Vegetation

3.1 Landscape, Soils and Vegetation

Soil-Landscape systems are areas with recurring patterns of landforms, soils and vegetation and are used by the Department of Agriculture to maintain a consistent approach to land resource surveys (Map 2).

The Site is within the Leeuwin Soil-Landscape Zone (Map 2) which is underlain by the Leeuwin Complex of granites and gneiss. Over this has formed the lateritic plateau of the Cowaramup Uplands system which has been dissected by a number or relatively shallow, undulating valleys collectively known as the Wilyabrup Valleys (Tille and Lantzke, 1990):

- Cowaramup Uplands System (216Co) - Lateritic plateau in the Leeuwin Zone with sandy gravel, loamy gravel and grey sandy duplex soils. Principle vegetation is Jarrah-Marri forest.
- Wilyabrup Valleys System (216Wv) – Granitic valleys, in the Leeuwin Zone with loamy gravel, sandy gravel and loamy earth. Principle vegetation is Jarrah-Marri forest.

The vegetation mapping of Havel and Matiske (2000) identifies the same boundary as the soil landscape (Map 2):

- Cowaramup Uplands (C1) - Open to tall open forest of *Eucalyptus marginata subsp. marginata-Corymbia calophylla-Banksia grandis* on lateritic uplands in the hyperhumid zone.
- Wilyabrup Valleys (W1) - Tall open forest of *Eucalyptus diversicolor-Corymbia calophylla-Allocasuarina decussata-Agonis flexuosa* on deeply incised valleys in the hyperhumid zone.

3.2 Methods

Extracts from the Department of Biodiversity, Conservation and Attractions (DBCA) Nature Base Database (Appendix A) and the Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Protected Matters Search Tool (Appendix B) were obtained to determine if records of any rare or threatened flora are known within the boundary or vicinity of the Site. A preliminary reconnaissance survey of the results of the desktop study was conducted, consistent with a Reconnaissance Survey Flora and Vegetation Survey (EPA, 2016).

The Site was surveyed on 18 September and 19 September 2018 by Kelly Paterson (B.Sc Hons. Nat Rs Mgmt., SL012472) and Dani Cuthbert (Dip Bus & Dip TM). A follow up site inspection was conducted 19 September 2019 Kelly Paterson and Dani Cuthbert. The Site was walked in a systematic manner to cover the entire Lot. Zones with consistent vegetation structure and composition were noted and the main species in each of the strata were identified and recorded. The vegetation condition of the vegetation based on Keighery (1994) was also recorded using Global Positioning System (GPS). Vegetation communities and condition was noted.

The Site was also inspected for flora species of significance and Threatened Ecological Communities, based on the DBCA database records.

3.3 Conservation Significant Flora

Species of flora and fauna are protected as defined in Table 1, have been determined that their populations are restricted geographically or threatened by local processes. DBCA recognizes these threats of extinction and consequently applies regulations towards population and species protection. Protected species are gazetted under the *Biodiversity Conservation Act (2016)* and therefore it is an offence to “take” or damage rare flora without Ministerial approval. The act defines “to take” as “… to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means” (Government of Western Australia, 2010).

Table 1 presents the definitions for conservation codes under the *Biodiversity Conservation Act (2016)* which was previously the *Wildlife Conservation Act 1950*.

Table 1 Western Australian Flora Conservation Codes (DPAW 2017)

CONSERVATION CODE	CATEGORY
Threatened species (T) or Declared Rare Flora (DRF)	Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 4, Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora) Threatened flora is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the Wildlife Conservation Act.
Critically endangered species (CR)	Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 1 of the Wildlife Conservation (Rare Flora) Notice.
Endangered species (EN)	Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 2 of the Wildlife Conservation (Rare Flora) Notice.
Vulnerable species (VU)	Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 3 of the Wildlife Conservation (Rare Flora) Notice.
Priority species (P)	Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

3.4 Threatened and Priority Ecological Communities

An ecological community is a naturally occurring biological assemblage that occurs in a particular type of habitat. A Threatened Ecological Community (TEC) is one which is found to fit into one of the following categories: Presumed Totally Destroyed; Critically Endangered; Endangered, or Vulnerable.

Possible TECs that do not meet survey criteria are added to the Department of Biodiversity, Conservation and Attraction's Priority Ecological Community Lists, under Priority 1, 2 and 3. These are ranked in order of priority for survey and/or the definition of the community and evaluation of its conservation status.

3.5 Results and Discussion

3.5.1 Flora Results

The Protected Matters Search Tool and NatureMap identified four Declared Rare Flora (DRF) species and six Priority species which are likely to occur within the area or the species habitat is likely to occur within the area (Table 2).

Table 2 Protected Flora Likely to Occur Within 5 km of the Site (Protected Matters Search Tool & NatureMap)

SPECIES	STATUS	LIFE FORM	HABITAT
Caladenia excelsa Giant Spider-orchid	DRF	Herb	White, grey or brown sand, sandy loam
Caladenia lodgeana Lodge's Spider-orchid	DRF	Herb	Black loam
Drakaea micrantha *Dwarf Hammer-orchid*	DRF	Herb	White-grey sand
Gastrolobium papilio Butterfly-leaved Gastrolobium	DRF	Shrub	Sandy clay over ironstone and laterite on flat plains.
Acacia inops	P3	Shrub	Black peaty sand, clay, swamps, creeks
Amperea micrantha	P2	Herb	Black peaty sand, clay, swamps, creeks
Franklandia triaristata Lanoline Bush	P4	Shrub	White or grey sand

SPECIES	STATUS	LIFE FORM	HABITAT
Gahnia sclerioides	P4	Sedge	Sandy soils, creeklines and winter wet areas
Pultenaea pinifolia	P3	Shrub	Loams or clay, floodplains, swampy areas
Stylidium lowrieanum Lowrie's Triggerplan	P3	Herb	Sand or sandy loam over limestone

There were no Declared Rare Flora or Priority species observed on Site.

A spring flora survey was conducted on the Site. While no flora species of significance were observed, this should not be taken as a guarantee that those species are absent from the Site.

3.5.2 Vegetation Communities

There were no TECs identified within the NatureMap database or Protected Matters Search Tool. During the field surveys, the area did not appear to have the characteristics of any listed TEC.

The vegetation on the Site is predominantly Jarrah-Marri Forest which reflects the Cowaramup Uplands (C1) and Wilabrup Valleys (W1) complex, however there were no *Banksia grandis* or *Allocasuarina decussata* observed within the Site. The relevé locations are depicted in Figure 2 to Figure 4 and Map 4. Appendix C contains the data collected for each relevé site.

Figure 2 Relevé Location 001

Figure 3 Relevé Location 002

Figure 4 Relevé Location 003

The area of the Jarrah-Marri Forest within the Site is approximately 2.5 ha and is grouped into one broader vegetation community (described according to Keighery, 1994, adapted Muir (1977) and Aplin (1979), Table 3 below) as *Corymbia calophylla* and *Eucalyptus marginata* subsp. *marginata* open forest over *Hovea elliptica, Bossiaea linophylla* and *Persoonia longifolia* tall open shrubland over *Hovea elliptica, Bossiaea linophylla, Hakea lissocarpha, Acacia myrtifolia, Acacia pulchella* var. *pulchella* and *Xanthorrhoea preissii* open shrubland over *Hibbertia hypericoides, Tremandra stelligera, Leucopogon capitellatus* and *Acacia pulchella* var. *pulchella* low open heath over *Patersonia umbrosa* var. *xanthina, Lomandra integra* and *Burchardia congesta* very open sedgeland.

Table 3 Structural Classification (from Keighery 1994, adapted from Muir 1977 and Aplin 1979).

Stratum	Canopy Cover				
	70%-100%	30%-70%	10%-30%	2%-10%	<2%
Trees > 30m	Tall Closed Forest	Tall Open Forest	Tall Woodland	Tall Open Woodland	Scattered Tall Trees
Trees 10-30m	Closed Forest	Open Forest	Woodland	Open Woodland	Scattered Trees
Trees < 10m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland	Scattered Low Trees
Shrubs >2m	Tall Closed Scrub	Tall Open Scrub	Tall Shrubland	Tall Open Shrubland	Scattered Tall Shrubs
Shrubs 1-2m	Closed Heath	Open Heath	Shrubland	Open Shrubland	Scattered Shrubs
Shrubs <1m	Low Closed Heath	Low Open Heath	Low Shrubland	Low Open Shrubland	Scattered Low Shrubs
Hummock Grasses	Closed Hummock Grassland	Mid-Dense Hummock Grasslands	Hummock Grassland	Open Hummock Grassland	Scattered Hummock Grassland
Grasses, Sedges & Herbs	Closed Tussock Grassland/ Sedgeland/ Herbland	Tussock Grassland/ Sedgeland/ Herbland	Open Tussock Grassland/ Sedgeland/ Herbland	Very Open Tussock Grassland/ Sedgeland/ Herbland	Scattered Tussock Grassland/ Sedgeland/ Herbland

Utilising the scale of condition developed by Keighery (1994), this area is classed as Excellent with the area surrounding the existing house, firebreaks and driveways classed as Degraded to Completely Degraded (Table 4 & Map 5). Figure 5 and Figure 6 depict the existing house and driveway respectively.

Figure 5 Existing house and surrounds

Figure 6 Existing driveway

Table 4 Keighery Condition Scale (Keighery 1994)

Category	Description
Pristine	Pristine or nearly so, no obvious signs of destruction.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. For example, damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle track.
Very Good	Vegetation structure altered, No obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate to it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration, but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation in no longer intact and the area is completely or almost completely without native species. These areas are often described as “parkland cleared” with the flora composing weed or crop species with isolated native trees or shrubs.

4 Fauna

4.1 Methods

A desktop study and analysis of the records of NatureMap and the Protected Matters Search Tool (Appendix A & B) were made to determine the presence or likely presence of fauna or faunal assemblages within the Site. The analysis primarily targeted terrestrial threatened vertebrate species listed under the *Biodiversity Conservation Act 2016* (WA) and *Environmental Protection Biodiversity Conservation Act 1999* (Commonwealth).

With these species in mind, a field study of the site was conducted. The approach adopted for this survey was:

- A Satellite Image of the Site was acquired.
- A day time visual inspection of the property and adjoining vegetation for any signs of fauna (e.g. scats, diggings, dreys, nests, burrows, feeding signs) was conducted.
- Hollow bearing trees or trees suitable for Black Cockatoos were recorded.
- Direct observations of fauna and signs of fauna were recorded using a Trimble Global Positioning System (GPS) and ArcPad© (Version 8- ESRI).
- Two, non-consecutive, night time spotlight surveys were conducted to determine fauna activity. A 40 w LightForce hand-held spotlight was used with white light. Observations were recorded using GPS and ArcPad©.
- Two pre-dawn and two dusk surveys were conducted to determine Black Cockatoo activity. A spotting scope was used in these surveys to identify any other birds within the site.
- Field observations were analysed and mapped with ArcGis (ArcMap V10.3©).

The Site was inspected via a walked transect and the trees were inspected via a physical inspection for hollows or signs of fauna usage.

All trees with large hollows were inspected for any signs of use by cockatoos. These include wear around the hollow, chewing, scarring and scratch marks on the trunks or branches. Old or recent evidence of cockatoo's feeding or roosting sites (feathers, droppings etc.) were also searched for.

This type of survey has minimal impact on the fauna within the property and provides sufficient data on the presence and relative abundance and distribution of taxa. During the field surveys, the habitat at the site was assessed to determine its potential suitability to host any of the anticipated threatened or rare species. This approach is consistent with a Level 1 survey under the EPA's Technical Guide: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (2010)

which specifies a minimum requirement of a background research or desktop study to gather information on the subject site and a reconnaissance survey to verify the accuracy of the background study and delineate fauna and faunal assemblages.

The survey's protocol is also consistent with the requirements outlined in the Development Planning Guidelines for Western Ringtail Possums (CALM 2003, now DBCA).

Guidelines for the three Black Cockatoo species (Department of Sustainability, Environment, Water, Populations and Communities, 2011) outline requirements for appropriate level of surveys for these species. This survey's intensity and design comply with these guidelines.

4.2 Conservation Significant Fauna

The conservation status of fauna within Western Australia is determined by criteria outlined within two acts of legislation: Commonwealth EPBC Act 1999 and the State-based Western Australian *Biodiversity Conservation Act 2016* (WA).

Table 5 presents the definitions for fauna under the *Biodiversity Conservation Act (2016)* which was previously the *Wildlife Conservation Act 1950*.

These categories are consistent with the International Union for Conservation of Nature (IUCN) classifications and therefore link into a global ranking system for taxa at risk of extinction.

Table 5 Western Australian Fauna Conservation Codes (DPAW 2017)

CONSERVATION CODE	CATEGORY
Threatened species (T)	Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna Threatened fauna is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the Wildlife Conservation Act.
Critically endangered species (CR)	Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice.
Endangered species (EN)	Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice.

CONSERVATION CODE	CATEGORY
Vulnerable species (VU)	Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice.
Migratory birds protected under an International Agreement (IA)	Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.
Conservation dependent fauna (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.
Other specially protected fauna (OS / S)	Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.
Priority species (P)	Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

4.3 Expected Fauna

A list of fauna expected to occur within a 5 kilometre radius of the study site was compiled from searches conducted on the DBCA database (NatureMap) and the Commonwealth EPBC Protected Matters Search Tool (Table 6).

The results of the native fauna database search for species likely to be within or utilise the Site are listed below. Note marine species are excluded due to the location of the Site. The following species are listed as likely to be found within 5 km of the Site.

Table 6 Protected Fauna Likely to Occur Within 5 km of the Site (Protected Matters Search Tool & NatureMap)

SPECIES	STATUS	CATEGORY	HABITAT
Botaurus poiciloptilus Australasian Bittern	EN	Bird	Specialise in living in dense beds of reeds and rushes in wetlands.
Calidris canutus Red Knot, Knot	EN	Bird	Migrating bird which travel in vast flocks. Foraging in sandy estuaries with tidal mudflats.
Calidris ferruginea Curlew Sandpiper	CR	Bird	Migrating bird which travel in vast flocks. Foraging in sandy estuaries with tidal mudflats.
Calyptorhynchus banksii subsp. naso Forest Red-tailed Black-Cockatoo	VU	Bird	Mostly in Eucalyptus forests or woodlands and often in adjacent areas of woodlands or shrublands, especially if they have experienced fire recently. Can also be found in grasslands and farmlands.
Calyptorhynchus baudinii Baudin's Cockatoo (Long-Billed Black-Cockatoo)	EN	Bird	Prefer the dense Jarrah, Marri and Karri forests of the south-west.
Calyptorhynchus latirostris Carnaby's Cockatoo (Short-Billed Black-Cockatoo)	EN	Bird	Woodlands and scrubs of semiarid interior of Western Australia, in non-breeding season wandering in flocks to coastal areas, especially pine plantations and Banksia woodlands.
Numenius madagascariensis Eastern Curlew (Far Eastern Curlew)	CR	Bird	Migrating bird found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons.

SPECIES	STATUS	CATEGORY	HABITAT
Cherax tenuimanus Hairy Marron (Margaret River Hairy Marron)	CR	Crustacean	The majority of the species' population is restricted to pools along Margaret River, located in the forests of the upper reaches.
Bettongia penicillata ogilbyi Woylie	CR	Mammal	Woodlands and adjacent heaths with a dense understory of shrubs, particularly *Gastrolobium spp*.
Dasyurus geoffroii Chuditch, Western Quoll	VU	Mammal	Most abundant in areas of continuous Jarrah forest with a home range of 15 km^2 for males and 3-4 km^2 for females. Live in dens which can be hollow logs, tree limbs, rocky outcrops and burrows.
Falco peregrinus subsp. Macropus Australian Peregrine Falcon	S	Bird	Wide variety
Hydromys chrysogaster Water-rat, *Rakali*	P4	Mammal	Permanent fresh or brackish water.
Isoodon fusciventer Quenda, southwestern brown bandicoot	P4	Mammal	Forest, woodland, shrub and heath, usually in sandy soils with dense healthy vegetation in lower stratum.
Leipoa ocellata Malleefowl	T	Bird	Semi-arid to arid shrublands and low woodlands dominated by mallee and/or acacia
Myrmecobius fasciatus Numbat, *Walpurti*	T	Mammal	Eucalyptus forest
Notamacropus Irma Western Brush Wallaby	P4	Mammal	Some areas of mallee and heathland and are uncommon in wet sclerophyll forests.
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir	CR	Mammal	Peppermint and Eucalypts in the south-west of Western Australia, found in tree hollows and dreys.

SPECIES	STATUS	CATEGORY	HABITAT
Phascogale tapoatafa subsp. Wambenger South-western Brush-Tailed Phascogale	OS	Mammal	Shelter during the day in hollows in mature and dead Jarrah *Eucalyptus marginata* and Marri *Corymbia calophylla*. Home range is 20-70 ha, with more than 20 nest sites used per year. Nest sites include hollow tree limbs, rotten stumps, and bird nests.
Psophodes nigrogularis subsp. Nigrogularis Western Wipbird	T	Bird	Mallee and heath vegetation
Setonix brachyurus Quokka	T	Mammal	Mainly dense riparian vegetation, other areas with dense vegetated understory with close proximity to freshwater
Tyto novae-hollandiae subsp. Novae-hollandiae Masked Owl	P3	Bird	Tall open eucalypt forest and woodlands. Preferred roosts large hollows in standing trees
Westralunio carteri Carter's Freshwater Mussel	T	Crustacean	Permanent fresh or brackish water.

4.4 Results and Discussion

4.4.1 Fauna Results

The Site was surveyed on 20 September, 22 October, 26 October and 27 October 2018 by Gary McMahon (B.Sc. M. Env Mgmt). The site was walked in a systematic manner to cover all the area.

There are trees on the site, and possibly in the adjoining areas, that had a diameter at breast height (DBH) over 500 mm and can support nesting of any Black Cockatoo species. Black Cockatoo species were flying overhead from west to east during the flora survey on 18 September, with calls heard at 12:07 pm and 1:50 pm.

The canopy of the vegetation within the Site was thoroughly inspected and there were no dreys observed.

There were signs of rabbits however none were observed during the survey. A number of common native fauna species were observed including the Western Grey Kangaroos and Pink and Grey Galah.

The first nocturnal survey was conducted on 22 October 2018 from 5:30 pm to 9:00 pm. The site was traversed by foot in a systematic plan to cover the area thoroughly. This included a pre dusk survey of Black Cockatoos. Official sunset time was 6:37 pm with dusk (last light) at 7:03 pm. No fauna species were observed.

A pre-dawn and dawn survey for any sign of Black Cockatoos was conducted on 20 September 2018 from 5:00 am to 7:00 am. Official sunrise time was 6:11 am with first light at 5:46 am. No Black Cockatoo or Western Ringtail Possum species were seen or heard during these surveys.

The second nocturnal survey was conducted on 27 October 2018 from 5:30 pm to 8:00 pm. This included the second dusk survey for black cockatoo species. The official sunset time was 6:43 pm with dusk at 7:09 pm.

The second pre-dawn survey took place on 26 October 2018, between 4:00 am and 7:30 am. Dawn was at 5:00 am and first light was at 5:25 am. No Black Cockatoos were seen or heard during this survey.

The Site was traversed in a systematic fashion to ensure all habitat areas were inspected during these surveys. No fauna species were observed, and no Black Cockatoo species were observed or heard during this survey.

4.4.2 Discussion

A total of 127 Trees with a DBH over 500 mm were observed within the Site with 24 trees observed with hollows or with the potential for hollows suitable for nesting of Black Cockatoo species (Tree details in Section 9 & Map 3). Black Cockatoos were seen flying overhead, however there were no signs of Black Cockatoos within the Site. There were no signs of feeding or feathers within the Site.

All local species of Black cockatoos can forage over extensive areas (up to 15-20 kms from their nesting sites (Saunders, 1980)) and given that there are larger areas of preferred habitat within their range, it could be assumed that Black Cockatoo species are not relying on the Site for habitat or food source.

The nocturnal survey did not identify a population of WRP or any other fauna of significance within the Site.

While no other animals of significance were observed, either directly or through signs, the lack of this data should not be taken directly as an indication that those species are absent from the Site. No trapping or seasonal sampling was conducted.

Table 7 summarises the likely presence of the species based on habitat availability for mammals. Table 8 and Table 9 discussed the likely presence and impact on Black Cockatoos.

The bird species protected under international agreements were not seen during the surveys.
The Hairy Marron and Carter's Freshwater Mussel were not identified nor was the species habitat.

The Site has good drainage with no wetlands or permanent water body within the Site. It is unlikely these species are within the Site.

Table 7 Significant Mammals Likelihood and Impact

Species	Potential impact in the Site
Chuditch	This specie is listed as being found within 5 km of the Site, however these are historical records and/or the habitat within the Site is not considered suitable. It is listed here for completeness and were not found within the Site.
Quenda	Quenda will thrive in more open habitat subject to introduced predator control. The vegetation within the Site contained an open understory with limited protection from predators. Quenda's may be located within the Site however none were identified during the survey.
Numbat	This specie is listed as being found within 5 km of the Site, however these are historical records and/or the habitat within the Site is not considered suitable. It is listed here for completeness and were not found within the Site.
Woylie	Given their large home range required (15-141 ha) for this species, it is unlikely that the species is found within the site and there were no indications that the specie was likely to utilise the site.
Western Brush Wallaby	This specie is listed as being found within 5 km of the Site, however these are historical records and/or the habitat within the Site is not considered suitable. It is listed here for completeness and were not found within the Site.
Western Quoll	Given their large home range required (3-15 km^2), minimal vegetation to be cleared on Site with no evidence of the species found, there is no impact anticipated.
Phascogale	Given their large home range required (20-70 ha) and minimal vegetation to be cleared on Site with no evidence of the species found, there is no impact anticipated. A fauna spotter should be used to monitor any tree removal to ensure no animals are present at the time of any clearing.
Western Ringtail Possum	No dreys or animals were observed during the surveys. The area to be cleared is less than 1 ha. No impact is anticipated, however a fauna spotter should be used to monitor any tree removal to ensure no animals are present at the time of any clearing.

Species	Potential impact in the Site
Quokka	This specie is listed as being found within 5 km of the Site, however these are historical records and/or the habitat within the Site is not considered suitable. It is listed here for completeness and were not found within the Site.

5 Survey Constraints

Field surveys were confined to two day surveys and two nocturnal spotlight surveys conducted over non-consecutive night. Two pre-dawn and two pre-dusk surveys for Black Cockatoo activity were also conducted. The night surveys were conducted using and experienced ecologist utilising a head torch and a single hand-held spotlight.

The site was traversed by foot in a systematic way.

All large trees of suitable size were examined from the ground for the presence of hollows. Guidelines for the survey techniques for Black Cockatoo species (Dept. of Sustainability, Environment, Water Populations and Communities, 2011) state that all trees with a DBH of over 500 m should be inspected. It should be noted however, that all of the prerequisites that determine the suitability of a hollow for use by cockatoos is difficult to assess. In addition to entrance size, the depth, floor and orientation of the hollow are important factors. The presence of suitable hollows, even in breeding areas, does not make them available for breeding as hollows must be spatially, structurally and temporally correct (Johnstone and Johnston, 2004). The listing of potential nesting hollows is therefore likely to be an over estimation of those actually suitable.

Western Ringtail Possums are arboreal nocturnal species (Dept of BCA, 2017). They use up to 2-7 rest sites and up to 20 throughout the year. Rest sites can be within a tree hollow or drey, built in various tree canopies. In suburban areas, they may also rest in roof spaces and other dark cavities. Their home range is less than 5 ha. There are constraints in surveying Western Ringtail Possums due to the time they may arise from their rest site or their home range may overlap the survey area, with a rest site being used outside the Site during the survey times.

There are constraints in monitoring flora which include some annual species do not appear every season and the survey is limited to identifying only those that appear during the survey times.

6 Significance

Under the EPBC Act, an action that has, will have, or is likely to have, a significant impact on a

matter of national environmental significance, requires approval from the Minister. A significant impact is defined as an impact which is important or of consequence, having regard for its context or intensity (Commonwealth of Australia, 2009).

Matters of environmental significance are:

- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Ramsar wetlands of international importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Great Barrier Reef Marine Park, and
- Nuclear actions.

For this development, there is a limited potential for impact on threatened species. Significant Impact Guidelines 1.1 (Commonwealth of Australia, 2009) lists significant impact criteria for the assessment for activities which may impact on threatened species. Table 7 above describes these criteria as it relates to the Site and the vulnerable species that may potentially be impacted in the subject site.

Table 8 Significant Impact Criteria for Key Protected Species

Significant Impact Criterion	Discussion		Meets Criterion
	Black Cockatoo Species	**Western Ringtail Possum**	
Lead to a long term decrease in the size of an important population[1] of a species	There is a potential Black Cockatoos are utilising the trees due to the amount of trees identified with hollows above 500 mm DBH. There were no observed Black Cockatoo species within the trees.	No signs of the species are present in the Site.	No
Reduce the area of occupancy of an important population	While no population was observed there will be a reduction in area will occur with the construction of the dwelling and Asset Protection Zone. The area with the Asset Protection Zone requires the removal of leaf litter and dead vegetation with a separation between trees. The trees removed can be selected to maintain those with observed or potential hollows.	NO population was observed within the site. A slight reduction in area will occur, however trees with observed or potential hollows will be retained wherever possible within the Asset Protection Zone.	No
Fragment an existing important population into two or more populations	Will not fragment current population. The clearing of vegetation required for the dwelling is less than 1 ha and the Asset Protection Zone can select to maintain those with observed or potential hollows. Canopy connection will be maintained around the Asset Protection Zone.	Will not fragment populations as canopy connection will be retained.	No

[1] *An 'important population' is a population that is necessary for a species' long-term survival and recovery.*

Adversely affect habitat critical to the survival of a species	None of the trees were observed being utilised by Black Cockatoos. Will not affect critical habitat as trees with observed or potential hollows will not be impacted, as they can be selected to be maintained within the Asset Protection Zone.	Will not affect critical habitat.	No
Disrupt the breeding cycle of an important population	Will not affect critical habitat as trees with observed or potential hollows will not be impacted.	No signs of the species are present in the Site.	No
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	A slight decrease in trees above 500 mm DBH will occur however trees with observed or potential hollows will not be impacted as those can be selected to stay within the Asset Protection Zone.	It is unlikely that the species is present on the Site. No impact is anticipated.	No
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Introductions are unlikely to occur. Any introductions highly unlikely to have any impact on species.	Introductions are unlikely to occur. Any introductions highly unlikely to have any impact on species.	No
Introduce disease that may cause the species to decline	Highly unlikely to occur.	Highly unlikely to occur.	No
Interfere substantially with the recovery of the species.	Development will not impact on the recovery of the species.	Development will not impact on the recovery of the species.	No

Using these criteria, the proposed development will not significantly impact on any significant species to a point where a referral is required under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Referral guidelines for three threatened Black Cockatoo species (Commonwealth of Australia. 2011) uses a decision tree and a set of criteria to determine whether actions significantly impact on Black Cockatoos. These are set out in Table 9, based on the details of the development and the data obtained from the surveys. Notes on the flow chart follow.

Table 9 Assessment of Significant Impact to Black Cockatoo

Question	Answer	High Risk of Significance - Referral Recommended
1. Could the impacts of your action occur within the modelled distribution of the Black Cockatoos?	Yes – Action occurs within the distribution area of all three species. The clearing of vegetation required for the dwelling is less than 1 ha and the Asset Protection Zone can select to maintain those trees with observed or potential hollows.	Clearing of any known nesting tree Clearing of any part or degradation of breeding habitat Clearing more than 1 ha of quality foraging habitat Creating a gap of greater than 4 km between patches of habitat Clearing or degradation of known roosting site.
2. Could the impacts of your action affect any Black Cockatoo habitat or individuals?	No signs of animal utilisation of the Site. Trees with a DBH greater than 500 mm with identified or potential hollows will not be impacted, as those within the Asset Protection Zone will be selected to stay.	Uncertainty – Referral Recommended or contact Department

Question	Answer	High Risk of Significance - Referral Recommended
3. Have you surveyed for Black Cockatoos using the recommended methods?	Yes	Degradation of more than 1 ha of foraging habitat. Clearing or disturbance in areas surrounding habitat that has the potential to degrade through introduction of threats. Actions that do not directly affect species but have potential to introduce indirect impacts. Actions with potential to introduce known plant diseases.
4. Could your actions have an impact on Black Cockatoos or their habitats?	Unlikely impact. No signs of animal activity was found within the Site.	Low risk of significant impacts – referral may not be required.
5. Is your impact mitigation best practice so that it may reduce the significance of your impacts on Black Cockatoos?	Yes, there is no significant impact anticipated due to lack of evidence of activity on Site and trees with a DBH greater than 500 mm with identified or potential hollows will not be impacted as they will be selected to stay within the Asset Protection Zone.	Actions that do not affect Black Cockatoo habitat or individuals Actions whose impact occurs outside modelled distribution.
6. Could your action require a referral to the federal environmental Minister for significant impact on Black Cockatoos?	No, as there are no direct signs of any of the three species present within or adjoining the Site. It is unlikely that the species is dependent on the Site.	

The summary of these responses are:

- The development is within the area of modelled distribution of Black Cockatoo species.
- The Site has been surveyed using the recommended methods from the guideline.
- There was no evidence of use or visitation by the species within the Site. Black Cockatoos were seen flying overhead of the Site.
- The proposed dwelling area is 0.02 ha and is unlikely to significantly impact Black Cockatoo individuals or habitat.
- The surrounding Asset Protection Zone can maintain trees, however a separation of the tree canopy should be 5 m. The trees with a DBH greater than 500 mm and with identified or potential hollows will be selected to stay and will not be impacted. No mitigation measures are therefore required.
- Using the flow chart and criteria it is determined that there is a low risk of actions resulting in an impact upon Black Cockatoos within the Site.

It is recommended that a referral pursuant to the EPBC Act is not required for the components of the development within the Site, as actions involved do not constitute a significant impact on any of the threatened species present.

7 Summary and Recommendations

Based on the results of the analysis of Site, the following conclusions and recommendations are made.

- There were no Declared Rare Flora or Priority flora observed in the site.
- The Site contains predominately Jarrah-Marri woodland in excellent condition.
- There were no signs of the Western Ringtail Possum within the Site or any other listed fauna (Table 7).
- There were no signs of feeding, nesting or roosting by Black Cockatoos species within the Site. Black Cockatoos were seen flying overhead of the Site.
- Trees with a DBH greater than 500 mm with identified or potential hollows should not be impacted (Map 3 & Appendix D) and where they fall within the Asset Protection Zone, neighbouring trees should be removed instead to meet the *Guidelines in Planning for Bushfire Prone Areas*.
- Black cockatoo species are highly mobile and it is highly unlikely they would be impacted by the comparatively small area to be cleared.
- A fauna spotter should be used to monitor any tree removal to ensure no animals are present at the time of any clearing.

Given there were no signs of rare or endangered flora or any signs of utilisation of any significant fauna, a referral under the EPBC Act is not considered as required as any proposed actions are unlikely to significantly impact on the species or the local populations.

8 Maps

Map 1 Site

Location details: 72 Kevill Road Margaret River
Project: 18593
Assessment date: 17 Sept 2018 / 19 Sept 2019
Prepared by: D.Plowman
Date aerial photo: Aug 2019
Datum & Projection: GDA94 MGA50
The details on this map have not been surveyed.
This map is for planning/discussion purposes only.

Meters
0 5 10 20 30 40

N

Lot Boundary
Proposed Lots
Building Envelope
Height m (AHD)

ecosystem solutions
www.ecosystemsolutions.com.au
(08) 9759 1960


319000
319100
319200
6241400
6241400
319000
319100
319200
Map 2 Soil Landscape & Vegetation Complex
Location details: 72 Kevill Road Margaret River
Project: 18593
Assessment date: 17 Sept 2018 / 19 Sept 2019
Prepared by: D Plowman
Date aerial photo: Aug 2019
Datum & Projection: GDA94 MGA50
The details on this map have not been surveys.
This map is for planning/discussion purposes only.
Meters
0 5 10 20 30 40
N
Lot Boundary
Proposed Lots
Building Envelopes
Height m (AHD)
Soil Landscape System
Cowarumup Uplands System (216Co)
Wilyabrup Valleys System (216Wy)
Vegetation Complex
Cowaramup Uplands (C1)
Wilyabrup Valleys (W1)
ecosystem solutions
www.ecosystemsolutions.com.au
(08) 9759 1960

Map 3 Significant Trees

Location details: 72 Kevill Road Margaret River
Project: 18593
Assessment date: 18 / 19 Sept 2018 & 19 Sept 2019
Prepared by: D Plowman
Date aerial photo: Aug 2019
Datum & Projection: GDA94 MGA50
This map is for planning/discussion purposes only.

Meters
0 5 10 20 30 40

N

Lot Boundary
Proposed Lots
Building Envelopes
Height m (AHD)

DBH > 500 mm
Hollow identified or possible hollow
No Hollows Observed

ecosystem solutions
www.ecosystemsolutions.com.au
(08) 9759 1960

Map 4 Relevé Locations

Location details: 72 Kevill Road Margaret River
Project: 18593
Assessment date: 18 / 19 Sept 2018 & 19 Sept 2019
Prepared by: D Plowman
Date aerial photo: Aug 2019
Datum & Projection: GDA94 MGA50
This map is for planning/discussion purposes only.

Meters
0 5 10 20 30 40

N

Lot Boundary
Relevé
Proposed Lots
Building Envelopes
Height m (AHD)

ecosystem solutions
www.ecosystemsolutions.com.au
(08) 9759 1960

Map 5 Vegetation Condition

Location details: 72 Kevill Road Margaret River
Project: 18593
Assessment date: 18 / 19 Sept 2018 & 19 Sept 2019
Prepared by: D Plowman
Date aerial photo: Aug 2019
Datum & Projection: GDA94 MGA50
This map is for planning/discussion purposes only.

Meters
0 5 10 20 30 40

N

Lot Boundary
Proposed Lots
Building Envelopes
Height m (AHD)

Condition
Degraded / Completely Degraded
Excellent

ecosystem solutions
www.ecosystemsolutions.com.au
(08) 9759 1960

9 References (not all cited)

Aplin, T.E.H. 1977 The Flora. *Environment and Science*. (Ed. B.J. O'Brien) (University of Western Australia Press, Perth).

Barrett, G., A. Silcocks, S. Barry, R. Cunningham & R. Poulter (2003). *The New Atlas of Australian Birds*. Melbourne, Victoria: Birds Australia.

Cale, B. (2003). Carnaby's Black-Cockatoo (Calyptorhynchus latirostris) Recovery Plan 2002-2012. [Online]. Department of Conservation and Land Management, Perth. Available from: http://www.dec.wa.gov.au/pdf/plants_animals/threatened_species/frps/Carnaby_WA_Rec_Plan_2003.pdf.

Cooper, C. (2000). Food manipulation by southwest Australian cockatoos. *Eclectus*. 8:3-9.

Department of Biodiversity, Conservation and Attractions (2017). *Fauna Profile Western Ringtail Possum Pseudocheirus occidentalis*.

Department of Sustainability, Environment, Water, Populations and Communities (2012). *Guidelines for three black cockatoo species*.

Environmental Protection Authority (2016). Technical Guidance: Flora and Vegetation Surveys *for Environmental Impact Assessment in Western Australia*. EPA December 2016.

Environmental Protection Authority (2004). *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia*. Guidance Statement No. 56. 2004.

Garnett, S.T. & G.M. Crowley (2000). The Action Plan for Australian Birds 2000. [Online]. Canberra, ACT: Environment Australia and Birds Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/action/birds2000/index.html

Havel, J.J. and Mattiske, E.M . (2000). Vegetation mapping of south west forest region of Western Australia. Part 6, maps (MAP). Department of Conservation and Land Management, 7 maps.

Heddle, EM, Loneragan, OW. & Havel JJ (1980) Vegetation Complexes of the Darling System Western Australia in Atlas *of Natural Resources Darling System Western Australia*. Department of Conservation and Land Management. WA.

Johnstone, R.E., C. Johnstone, T. Kirkby & G. Humphreys (2006). Perth-Bunbury Highway (Kwinana Freeway Extension and Peel Deviation): Targeted Threatened Fauna Survey. Unpublished Report to Main Roads Western Australia.

Keighery, B. J. (1994). *Bushland Plant Survey: A guide to plant community survey for the community*. Wildflower Society of Western Australia (Inc.), Nedlands.

Mawson, P. (1997). A captive breeding program for Carnaby's Cockatoo Calyptorhynchus latirostris. *Eclectus*. 3:21—23.

Mawson, P. & R. Johnstone (1997). Conservation status of parrots and cockatoos in Western Australia. *Eclectus*. 2:4-9.

Muir, B.G. (1977) Biological survey of the Western Australia wheatbelt, Part II. Records of the Western Australian Museum, Supplement No. 3.

Saunders, D.A. (1974c). The function of displays in the breeding of the White-tailed Black Cockatoo. Emu. 74:43-46.

Saunders, D.A. (1977). The effect of agricultural clearing on the breeding success of the White-tailed Black Cockatoo. *Emu*. 77:180--184.

Saunders, D.A. (1979). Distribution and Taxonomy of the White-tailed and Yellow-tailed Black-Cockatoos Calyptorhynchus spp. *Emu*. 79:215--227.

Saunders, D.A. (1979b). The availability of the hollows for use as nest sites by White-tailed Black Cockatoo. *Australian Wildlife Research*. 6:205-216.

Saunders, D.A. (1980). Food and movements of the short-billed form of the White-tailed Black Cockatoo. *Australian Wildlife Research*. 7:257--269.

Saunders, D.A. (1982). The breeding behaviour of the short-billed form of the White-tailed Black Cockatoo Calyptorhynchus funereus. *Ibis*. 124:422--455.

Saunders, D.A. (1986). Breeding season, nesting success and nestling growth in Carnaby's Cockatoo, Calyptorhynchus funereus latirostris, over 16 years at Coomallo Creek, and a methods for assessing the viability of populations in other areas. *Australian Wildlife Research*. 13:261--273.

Saunders, D.A. (1988). Patagial tags: do benefits outweigh risks to the animal?. *Australian Wildlife Research*. 15:565-569.

Saunders, D.A. (1990). Problems of survival in an extensively cultivated landscape: the case of Carnaby's Cockatoo Calyptorhynchus funereus latirostris. *Biological Conservation*. 54:277-290.

Saunders, D.A. & J.A. Ingram (1987). Factors affecting survival of breeding populations of Carnaby's cockatoo Calyptorhynchus funereus latirostris in remnants of native vegetation. In: Saunders, D.A., G.W. Arnold, A.A. Burbidge & A.J.M. Hopkins, eds. *Nature Conservation: The Role of Remnants of Native Vegetation*. Page(s) 249--258. Surrey Beatty, Sydney.

Saunders, D.A. & J.A. Ingram (1995). Birds of Southwestern Australia: An Atlas of Changes in the Distribution and Abundance of the Wheatbelt Avifauna. Surrey Beatty and Sons, Chipping Norton, NSW.

Saunders, D.A. & J.A. Ingram (1998). Twenty-eight years of monitoring a breeding population of Carnaby's Cockatoo. Pacific Conservation Biology. 4:261-70.

Triggs, B. (2004). *Tracks, Scats and Other Traces: A Field Guide to Australian Mammals*. Revised Edition. Oxford University Press.

Wayne, A. (2005). *The ecology of the koomal (Trichosurus vulpecula hypoleucus) and ngwayir (Pseudocheirus occidentalis) in the jarrah forests of south-western Australia*. PhD thesis, ANU, Canberra.

Wayne, A.F., Cowling, A., Ward, C.G., Rooney, J.F., Vellios, C.V., Lindenmayer, D.B., & Donnely, C.F. (2005a). A comparison of survey methods for arborial possums in Jarrah forest, Western Australia. *Wildlife Research*. **32**: 701-714.

Wayne, A.F., Cowling, A., Rooney, J.F., Ward, C.G., Wheeler, I.B., Lindenmayer, D.B., & Donnely, C.F. (2005b). Factors affecting the detection of possums by spotlighting in Western Australia. *Wildlife Research*. **32**: 689-700.

Wayne, A.F., Cowling, A., Lindenmayer, D.B., Ward, C.G., Vellios, C. V., Donnely, C.F. and Calver, M.C. 2006. The abundance of a threatened arboreal marsupial in relation to anthropogenic disturbances at local and landscape scales in Mediterranean-type forests in south-western Australia. *Biological Conservation*. **127**: 463-476.

Webb, A, Keighery, B.J., Keighery, G.J., Longman, V. (2009). The flora and vegetation of the Busselton Plain (Swan Coastal Plain): a report for the Department of Environment and Conservation as part of the Swan Bioplan Project. Dept. of Environment and Conservation, Perth, Western Australia.

Whitford, K.R. (2002). Hollows in jarrah (Eucalyptus marginata) and marri (Corymbia calophylla) trees I. Hollow sizes, tree attributes and ages. *Forest Ecology and Management*. 160:201-214.

Appendix A NatureMap Extract

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 06/11/2018

Kingdom	Animalia
Conservation Status	Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	115° 02' 32" E,33° 57' 07" S
Buffer	5km

	Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area[1]
1.	24049	*Balaenoptera musculus subsp. intermedia (Antarctic Blue Whale)*		T	
2.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
3.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
4.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)*		T	
5.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
6.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
7.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
8.	33940	*Cherax tenuimanus (Margaret River hairy marron, Margaret River Marron)*		T	
9.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
10.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
11.	24475	*Falco peregrinus subsp. macropus (Australian Peregrine Falcon)*		S	
12.	34030	*Geotria australis (Pouched Lamprey)*		P1	
13.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
14.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
15.	24557	*Leipoa ocellata (Malleefowl)*		T	
16.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
17.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
18.	48070	*Phascogale tapoatafa subsp. wambenger (South-western Brush-tailed Phascogale, Wambenger)*		S	
19.	24164	*Potorous platyops (Broad-faced Potoroo)*		X	
20.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
21.	24388	*Psophodes nigrogularis subsp. nigrogularis (Western Whipbird (western heath))*		T	
22.	24145	*Setonix brachyurus (Quokka)*		T	
23.	48135	*Thinornis rubricollis (Hooded Plover, Hooded Dotterel)*		P4	
24.	24855	*Tyto novaehollandiae subsp. novaehollandiae (Masked Owl (southwest))*		P3	
25.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 06/11/2018

Kingdom	Plantae
Conservation Status	Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	115° 02' 32" E,33° 57' 07" S
Buffer	5km

	Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area[1]
1	3386	*Acacia inops*		P3	
2	4586	*Amperea micranthia*		P2	
3	13619	*Caladenia excelsa*		T	
4	18037	*Caladenia lodgeana*		T	
5	1945	*Franklandia triaristata (Lanoline Bush)*		P4	
6	17744	*Gahnia sclerioides*		P4	
7	20504	*Gastrolobium formosum*		P3	
8	4179	*Pultenaea pinifolia*		P3	
9	12590	*Stylidium lowrieanum (Lowrie's Triggerplant)*		P3	

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix B EPBC Act Protected Matters Report

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

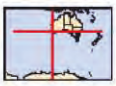
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 06/11/18 13:19:42

This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	31
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	1
Invasive Species:	23
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area

Name	Status	Type of Presence
Thalassarche cauta cauta		
Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi		
White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Crustaceans		
Cherax tenuimanus		
Hairy Marron, Margaret River Hairy Marron, Margaret River Marron [78931]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Bettongia penicillata ogilbyi		
Woylie [66844]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Pseudocheirus occidentalis		
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Setonix brachyurus		
Quokka [229]	Vulnerable	Species or species habitat likely to occur within area
Other		
Westralunio carteri		
Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
Banksia nivea subsp. uliginosa		
Swamp Honeypot [82766]	Endangered	Species or species habitat may occur within area
Banksia squarrosa subsp. argillacea		
Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat may occur within area
Caladenia excelsa		
Giant Spider-orchid [56717]	Endangered	Species or species habitat likely to occur within area
Caladenia hoffmanii		
Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area
Caladenia huegelii		
King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area
Caladenia lodgeana		
Lodge's Spider-orchid [68664]	Critically Endangered	Species or species habitat known to occur within area
Drakaea micrantha		
Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Gastrolobium papilio		
Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat may occur within area
Lambertia echinata subsp. occidentalis		
Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Sphenotoma drummondii Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Bramley	WA
Leeuwin-Naturaliste	WA

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database.

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.95194 115.04222

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Appendix C Relevé Fieldsheets

STRUCTURAL VEGETATION, FLORA – Relevé											**SITE_ID: 001**
Date: 18/09/18	**GPS:**									**E**	**Structural comm. type**
										N	
Recorder: KP	**Photo no. + direction:**										
Location: Kevill Road, Margaret River, north of site											

Condition: Pristine **Excellent** Very Good Good Degraded	
Aspect: N NE **E** SE S SW W NW	**Slope:** Flat **Gentle** Mod Steep
Geology: Gran **Lat** Lime Other	**Rock:** 0 **<2** 2-10 10-20 20-50 >50
Soil Colour: Grey **Dark Brown** Light Brown Orange/Brown Red/Brown White Yellow	**Soil Type:** C CL CLS CS L LS **S gravel** SCL SL SP ZCL ZL ZS
Litter (% cover & depth): 90% 4cm	**Bare Ground (% cover): 0%**
Hydrology: Good drain Poor drain Wet all year Seas wet winter/spring	**Topographic position:** Upland Wetland Rock Outcrop Drainage Depression Creekline Riparian Bank Gully Plain Slope Lower **Slope Middle** Slope Upper Valley Flat

Layer	**Height (m)**	**Cover**	**Plant Species (Dominant 3 first)**
Tree (T2)	10-30	10-30%	*Corymbia calophylla, Eucalyptus marginata* subsp. *marginata*
Tree (T3)	< 10	10-30%	*Corymbia calophylla, Eucalyptus marginata* subsp. *marginata*
Shrub (S1)	> 2	<2%	*Persoonia longifolia*
Shrub (S2)	1-2	2-10%	*Acacia myrtifolia, Hovea elliptica*
Shrub (S3)	0-1	30-70%	*Hibbertia hypericoides* subsp. *hypericoides, Macrozamia riedlei, Tremandra stelligera, Leucopogon capitellatus, Hakea lissocarpha, Hibbertia amplexicaulis*
Sedge/Rush (VR)		2-10%	*Patersonia umbrosa* var. *xanthina*
Herb (H)		30-70%	*Opercularia hispidula, Scaevola calliptera, Caladenia* sp. (no flowers), *Craspedia variabilis, Pterostylis barbata*
Grass (G)		-	
Other (climbers) (C)		-	

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% VV <2% E <5% Emergent * = Introduced

Surrounding plants: **Acacia longifolia* and **Pittosporum undulatum* observed to the east of this site

STRUCTURAL VEGETATION, FLORA – Relevé											SITE_ID: 002
Date: 18/09/19	GPS:									E	Structural comm. type
										N	
Recorder: KP	Photo no. + direction:										
Location: Kevill Road, Margaret River, east of site											

Condition: Pristine **Excellent** Very Good Good Degraded	
Aspect: N NE **E** SE S SW W NW	**Slope:** Flat **Gentle** Mod Steep
Geology: Gran **Lat** Lime Other	**Rock: 0** <2 2-10 10-20 20-50 >50
Soil Colour: Grey **Dark Brown** Light Brown Orange/Brown Red/Brown White Yellow	**Soil Type:** C CL CLS CS L LS **S gravel** SCL SL SP ZCL ZL ZS
Litter (% cover & depth): 90% 5cm	**Bare Ground (% cover): 0%**
Hydrology: **Good drain** Poor drain Wet all year Seas wet winter/spring	**Topographic position:** Upland Wetland Rock Outcrop Drainage Depression Creekline Riparian Bank Gully Plain Slope Lower **Slope Middle** Slope Upper Valley Flat

Layer	Height (m)	Cover	Plant Species (Dominant 3 first)
Tree (T2)	10-30	30-70%	*Corymbia calophylla, Eucalyptus marginata* subsp. *marginata*
Tree (T3)	< 10	2-10%	*Corymbia calophylla, Eucalyptus marginata* subsp. *marginata, Agonis flexuosa*
Shrub (S1)	> 2	<2%	*Bossiaea linophylla*
Shrub (S2)	1-2	2-10%	*Hakea lissocarpha, Bossiaea linophylla, Hovea elliptica, Agonis flexuosa, Xanthorrhoea preissii, Acacia myrtifolia, Acacia pulchella* var. *pulchella*
Shrub (S3)	0-1	>70%	*Hibbertia hypericoides, Leucopogon capitellatus, Acacia pulchella* var. *pulchella, Lagenophora huegelii, Hovea chorizemifolia, Hibbertia amplexicaulis, Phyllanthus calycinus, Tremandra stelligera, Hakea amplexicaulis, Philotheca spicata*
Sedge/Rush (VR)		10-30%	*Patersonia umbrosa* var. *xanthina, Lomandra integra*
Herb (H)		<2%	**Zantedeschia aethiopica, Craspedia variabilis*
Grass (G)		-	
Other (climbers) (C)		<2	*Clematis pubescens, Cassytha racemosa*

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% VV <2% E <5% Emergent * = Introduced

Surrounding plants:

STRUCTURAL VEGETATION, FLORA – Relevé											SITE_ID: 003
Date: 19/09/18	GPS:									E	Structural comm. type
										N	
Recorder: DC	Photo no. + direction:										
Location: Within proposed building envelope											

Condition: Pristine **Excellent** Very Good Good Degraded **Tracks nearby, occasional weeds**	
Aspect: N NE **E** SE S SW W NW	**Slope:** Flat **Gentle** Mod Steep
Geology: Gran **Lat** Lime Other	**Rock:** 0 **<2** 2-10 10-20 20-50 >50
Soil Colour: Grey **Dark Brown** Light Brown Orange/Brown Red/Brown White Yellow	**Soil Type:** C CL CLS CS L LS **S gravel** SCL SL SP ZCL ZL ZS
Litter (% cover & depth): 90%, 4 cm	**Bare Ground (% cover): 0%**
Hydrology: Good drain Poor drain Wet all year Seas wet winter/spring	**Topographic position:** Upland Wetland Rock Outcrop Drainage Depression Creekline Riparian Bank Gully Plain Slope Lower **Slope Middle** Slope Upper Valley Flat

Layer	Height (m)	Cover	Plant Species (Dominant 3 first)
Tree (T2)	10-30	30–70	*Corymbia calophylla, Eucalyptus marginata* subsp. *marginata*
Tree (T3)	< 10	2–10%	*Corymbia calophylla, Eucalyptus marginata* subsp. *marginata, Agonis flexuosa*
Shrub (S1)	> 2	2–10%	*Hovea elliptica, Bossiaea linophylla*
Shrub (S2)	1-2	10–30%	*Hovea elliptica, Acacia myrtifolia, Hakea amplexicaulis, Hakea lissocarpha, Hibbertia cuneiformis*
Shrub (S3)	0-1	30–70%	*Hibbertia cuneiformis, Tremandra stelligera, Opercularia hispidula, Hovea trisperma, Leucopogon capitellatus, Macrozamia riedlei*
Sedge/Rush (VR)		2-10%	*Lomandra sericea, Patersonia umbrosa* var. *xanthina, Burchardia congesta*
Herb (H)		<2%	*Caladenia sp.* (no flowers), *Eriochilus sp., *Hypochaeris radicata, Scaevola calliptera*
Grass (G)		-	
Other (climbers) (C)		<2%	*Hardenbergia comptoniana, Billardiera variifolia*

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% VV <2% E <5% Emergent * = Introduced

Surrounding plants:

Appendix D Significant Trees

DBH (cm)	Species	Height (m)	Elevation (m AHD)	Easting	Northing	Notes
61	Marri	15	93	319204	6241470	No Hollows Observed
82	Marri	15	84.82	319195	6241480	Small Hollows
66	Marri	15	80.75	319193	6241490	No Hollows Observed
61	Unknown	12	78.09	319197	6241460	Dead, No Hollows Observed
63	Marri	15	78.33	319190	6241460	No Hollows Observed
72	Marri	15	79.05	319189	6241460	No Hollows Observed
77	Marri	15	82.63	319193	6241450	No Hollows Observed
52	Karri	10	81.51	319203	6241440	No Hollows Observed
67	Marri	10	86.07	319194	6241430	No Hollows Observed
87	Marri	15	84.58	319184	6241440	No Hollows Observed
60	Jarrah	4	80.76	319175	6241450	No Hollows Observed
55	Marri	15	81.54	319178	6241460	No Hollows Observed
53	Marri	15	85.41	319173	6241470	No Hollows Observed
87	Marri	15	84.7	319151	6241490	Possible Hollow Forming at 7m
54	Jarrah	10	83.96	319154	6241470	Small Hollow at 9m
67	Unknown	6	86.74	319155	6241450	Dead, Possible Hollow
76	Marri	20	88.77	319148	6241450	No Hollows Observed
67	Marri	15	88.62	319148	6241460	No Hollows Observed
87	Marri	15	84.76	319128	6241490	No Hollows Observed
76	Jarrah	15	89.02	319130	6241480	No Hollows Observed
52	Jarrah	15	69.59	319002	6241410	No Hollows Observed
100	Jarrah	10	87.34	318995	6241400	Hollow at 8m
111	Marri	15	90.56	318996	6241390	Hollow at 20 m
87	Jarrah	15	94.19	319001	6241390	No Hollows Observed

DBH (cm)	Species	Height (m)	Elevation (m AHD)	Easting	Northing	Notes
56	Jarrah	2	97.55	318990	6241380	No Hollows Observed
75	Marri	15	98.43	318990	6241380	No Hollows Observed
87	Marri	15	97.48	319003	6241360	Possible Hollow
58	Jarrah	10	92.63	319001	6241370	Possible Hollow
59	Jarrah	15	91.18	319023	6241380	No Hollows Observed
78	Marri	15	92.34	319030	6241390	No Hollows Observed
56	Jarrah	15	96.26	319021	6241410	No Hollows Observed
134	Marri	15	96.05	319036	6241390	No Hollows Observed
51	Marri	15	92.67	319029	6241380	No Hollows Observed
62	Marri	10	92.85	319034	6241370	No Hollows Observed
53	Marri	15	97.64	319031	6241370	No Hollows Observed
88	Marri	10	94.8	319051	6241360	No Hollows Observed
56	Unknown	12	95.51	319049	6241390	Dead, no hollows observed
128	Marri	15	101	319056	6241380	Possible Hollows, some limb senescing
79	Marri	15	103.11	319068	6241380	No Hollows Observed
52	Marri	15	97.66	319065	6241370	No Hollows Observed
56	Marri	15	100.44	319069	6241350	No Hollows Observed
69	Marri	15	99.68	319082	6241360	No Hollows Observed
67	Marri	15	95.6	319083	6241370	No Hollows Observed
55	Marri	20	95.51	319092	6241380	No Hollows Observed
52	Marri	15	89.31	319082	6241390	No Hollows Observed
105	Marri	15	90.77	319082	6241420	No Hollows Observed
84	Marri	15	97.77	319102	6241410	Hollows

DBH (cm)	Species	Height (m)	Elevation (m AHD)	Easting	Northing	Notes
56	Jarrah	10	101.38	319108	6241410	Senescing, No Hollows Observed
136	Marri	20	102.33	319111	6241410	Possible Hollows
63	Unknown	10	103.78	319100	6241410	Dead, No Hollows Observed
78	Jarrah	15	103.55	319105	6241390	No Hollows Observed
130	Marri	20	92.73	319106	6241370	Possible Hollows
79	Jarrah	15	88.7	319102	6241390	No Hollows Observed
55	Marri	15	88.43	319116	6241380	No Hollows Observed
52	Marri	15	87.97	319118	6241370	No Hollows Observed
79	Marri	15	89.6	319126	6241360	No Hollows Observed
95	Jarrah	20	92.11	319134	6241380	No Hollows Observed
84	Unknown	15	90.99	319126	6241390	Dead, Possible Hollow
110	Marri	15	88.69	319130	6241390	Possible Hollows
58	Marri	15	85.23	319142	6241390	No Hollows Observed
60	Marri	15	84.66	319160	6241370	No Hollows Observed
52	Marri	20	85.31	319160	6241360	No Hollows Observed
60	Jarrah	15	88.11	319175	6241370	No Hollows Observed
57	Marri	15	87.46	319182	6241360	No Hollows Observed
86	Jarrah	13	85.78	319200	6241370	Possible Chimney Hollow
90	Marri	13	87	319203	6241370	Possible Chimney Hollow
74	Marri	15	86.49	319209	6241380	No Hollows Observed
72	Jarrah	15	83.62	319212	6241390	Possible Hollow
57	Marri	15	83.15	319209	6241390	No Hollows Observed
59	Jarrah	10	78.3	319173	6241400	No Hollows Observed
95	Marri	15	72.85	319129	6241430	No Hollows Observed

DBH (cm)	Species	Height (m)	Elevation (m AHD)	Easting	Northing	Notes
65	Marri	15	74.22	319136	6241430	No Hollows Observed
51	Marri	15	71.7	319137	6241450	No Hollows Observed
64	Marri	15	66.74	319147	6241490	No Hollows Observed
63	Jarrah	15	83.7	319118	6241470	No Hollows Observed
79	Marri	15	84.76	319122	6241470	No Hollows Observed
74	Jarrah	10	82.51	319125	6241450	Senescing, Possible Hollow at 8 m
71	Marri	15	81.1	319123	6241450	No Hollows Observed
85	Marri	15	83.24	319128	6241450	No Hollows Observed
96	Jarrah	10	82.45	319122	6241440	No Hollows Observed
90	Marri	13	85.47	319097	6241430	No Hollows Observed
81	Jarrah	13	87.78	319102	6241460	Senescing, Possible Hollows
96	Jarrah	15	86.92	319106	6241490	No Hollows Observed
71	Jarrah	13	87.73	319098	6241480	Senescing, No Hollows Observed
60	Marri	15	88.48	319094	6241490	No Hollows Observed
57	Marri	8	85.21	319085	6241450	No Hollows Observed
83	Marri	15	87.57	319083	6241440	No Hollows Observed
76	Marri	13	88.15	319083	6241440	No Hollows Observed
73	Marri	15	84.84	319091	6241430	No Hollows Observed
52	Jarrah	10	85.3	319081	6241430	No Hollows Observed
65	Jarrah	17	85.85	319078	6241440	No Hollows Observed
52	Jarrah	10	89.99	319073	6241470	No Hollows Observed
84	Unknown	15	88.12	319065	6241470	Dead, Possible Hollow
89	Jarrah	10	85.96	319060	6241480	No Hollows Observed
58	Jarrah	15	86.088	319053	6241490	No Hollows Observed

DBH (cm)	Species	Height (m)	Elevation (m AHD)	Easting	Northing	Notes
81	Marri	13	85.15	319045	6241470	No Hollows Observed
59	Jarrah	15	82.86	319055	6241470	No Hollows Observed
54	Jarrah	10	87.57	319041	6241460	No Hollows Observed
93	Marri	13	88.91	319044	6241460	No Hollows Observed
79	Marri	15	92.64	319048	6241460	No Hollows Observed
87	Jarrah	15	89.37	319047	6241430	No Hollows Observed
56	Jarrah	5	89.25	319046	6241420	Possible Hollow, Senescing
61	Jarrah	20	90.6	319040	6241420	No Hollows Observed
56	Unknown	7	92.1	319046	6241430	Dead, Possible Hollow
87	Marri	15	94.04	319041	6241430	Possible Hollow
60	Jarrah	13	94.99	319038	6241460	No Hollows Observed
73	Marri	15	94.74	319029	6241460	No Hollows Observed
88	Jarrah	3	95.16	319032	6241470	Fallen, Possible Hollow
66	Marri	13	94.85	319035	6241470	No Hollows Observed
62	Jarrah	13	90.86	319022	6241470	No Hollows Observed
54	Jarrah	15	91.5	319023	6241460	No Hollows Observed
56	Marri	10	91.91	319026	6241450	No Hollows Observed
74	Jarrah	10	94.23	319017	6241450	Senescing, No Hollows Observed
70	Marri	15	94.08	319023	6241440	No Hollows Observed
90	Marri	15	93.91	319027	6241430	No Hollows Observed
62	Marri	13	95.91	319018	6241440	No Hollows Observed
65	Jarrah	8	95.99	319018	6241440	Dead, Possible Hollow
75	Marri	15	96.56	319018	6241440	No Hollows Observed
75	Jarrah	10	91.8	319018	6241460	Senescing, No Hollows Observed

DBH (cm)	Species	Height (m)	Elevation (m AHD)	Easting	Northing	Notes
57	Jarrah	13	90.22	319015	6241470	No Hollows Observed
65	Marri	15	89.87	319011	6241480	No Hollows Observed
116	Marri	20	90.7	319005	6241490	Possible Hollows
79	Jarrah	15	90.32	319003	6241480	No Hollows Observed
93	Marri	15	90.73	319001	6241470	No Hollows Observed
110	Jarrah	15	85.6	318997	6241460	No Hollows Observed
87	Marri	15	90.49	319004	6241440	No Hollows Observed
68	Marri	20	84.84	319005	6241430	No Hollows Observed

APPENDIX 3

Soil Wastewater Assessment
24 September 2019
Prepared by: Environmental & Landscape Management

2019

Soil Wastewater Assessment Lot 36 Kevill Road, Margaret River

Environmental

& Landscape

Management

Prepared by: Sean Smith

Email: seanic@iinet.net.au

Mob. 0437 806 119

TABLE OF CONTENTS

Disclaimer: All attempts have been made to ensure the accuracy of the material presented in this report. However, some information may be inaccurate due to changes to database information or government policy or legislation. Seasonal variation and the ephemeral nature of native vegetation also present limitations on the overall accuracy of the information in this report.

DOCUMENT STATUS

STATUS	DATE	ISSUED
Original	24 September 2019	SJS

INTRODUCTION

Lots 36 Kevill Road is being considered for subdivision and as part of the investigations a soil wastewater assessment has been undertaken. The site is located approximately 3 kilometres west of the Margaret River town centre. The site location and context is shown in Figure 1 below.

Figure 1: Site context (image courtesy of the Shire of Augusta Margaret River Intramaps).

SCOPE OF REPORT

The consultant was asked to provide an assessment of the soils to determine the suitability of the site for disposal of wastewater using either a conventional septic tank system or Alternative/Aerobic

Treatment Unit. The assessment has been carried out in accordance with the requirements of AS1547:2012 On-site domestic wastewater management.

BACKGROUND

WASTEWATER DISPOSAL

A number of options are available for wastewater disposal depending on the suitability of the site. The easiest and cheapest option to install consists of a septic tank with leach drains. Another option includes the use of an Aerobic/Alternative Treatment Unit (ATU). Both of these options are controlled under Regulations or a Code of Practice overseen by the Health Department of WA.

The local government generally requires that a number of issues are addressed in such assessments to determine if the development proposal sites are suitable for septic tank disposal of wastewater. These issues include:

1. Depth to highest ground water from ground level;
2. Depth to bedrock or impervious clay;
3. Depth of free draining soil;
4. Set back from water bodies;
5. Soil structure and profile to a depth of 2 metres;
6. Phosphate Retention Index to 1 metre;
7. Infiltration rate of the soil ($L/m^2/day$).

The State Government has produced a 'Draft for Consultation' Government Sewerage Policy (November 2016). The policy outlines the state government's position on the provision of reticulated sewerage for the rezoning, structure planning, subdivision and development of land. The policy seeks to promote reticulated sewerage over other forms of on-site treatment. The policy adopts a risk management approach to sewage management that is consistent with Australian/New Zealand Standard 1547 On-site domestic wastewater management. This risk management approach is to be used for guidance when assessing planning proposals where on-site sewage disposal is proposed.

The policy sets out to require that reticulated sewerage is provided for all new subdivisions in WA unless specific exemptions apply. In such cases a best practice approach in accordance with the Australian Standard is recommended. Exemptions include:

- Residential subdivisions for lots greater than –
    - 2 hectares in Priority 2 public drinking water source areas
    - One hectare in Priority 3 drinking water source areas
    - One hectare in sewage sensitive areas
    - 2000m^2 for lots not in public drinking water source areas or sewage sensitive areas, with lots classed as having 'heavy soils' requiring secondary treatment systems.
- Incremental residential subdivision in urban areas that are already developed, providing the lots are not in public drinking water source areas or sewage sensitive areas and the average lot size is 1000m^2 (min. 950m^2). Secondary treatment will be required for lots with 'heavy soils'.
- Residential subdivision in towns outside of the Perth Metropolitan and Peel regions without an established sewerage scheme with similar requirements as for incremental subdivision above. Smaller lot sizes may be considered on a case by case basis provided an independent assessment has been carried out in accordance with AS1547.
- Residential subdivision in towns outside of the Perth Metropolitan and Peel regions with an established sewerage scheme with similar requirements as for incremental subdivision above and where on-site sewage disposal is determined the best option in the local planning scheme or a Structure Plan endorsed by the WAPC.
- Development applications and non-residential subdivision that;
    - Are remote from existing or proposed sewerage schemes and cannot be connected to existing schemes (with technical advice from provider)
    - Utilise secondary treatment with nutrient removal in sewage sensitive areas or public drinking water source areas
    - Where the proponent has demonstrated that there is sufficient capacity to treat and dispose of sewage within relevant buffers based on the maximum hydraulic load and impacts on waterways and wetlands.
- Land in sewage sensitive areas zoned urban at R5 or R10 density coding.

The policy further sets out minimum requirements for on-site sewage disposal with regard to separation to groundwater, groundwater source areas, private bores, waterways, significant wetlands, surface drains and areas subject to flooding. Schedules attached to the policy outline the supporting information that is required where on-site sewage disposal is proposed.

The Australian Standard (AS1547:2012) On-site domestic wastewater management outlines a risk management process and details the various roles that are required to carry out assessments at a range of scales from planning stage to implementation. The process for site and soil evaluation is set out within the standard with performance requirements, a general methodology and soil categorisation with further details outlined in a number of appendices attached to the standard.

The Department of Agriculture has published a Technical Report that sets out five land capability classes for on-site septic tank effluent disposal (Wells, 2001). The five classes vary from non to very slight limitation to severe limitation. The parameters that determine the land capability classes are

similar to those stipulated by the local government. These parameters will be discussed in relation to the overall suitability of the site for on-site septic tank effluent disposal.

THE STUDY AREA

TENURE AND VESTING

The lot is zoned Rural Residential under the Shire of Augusta Margaret River Town Planning Scheme and is owned freehold.

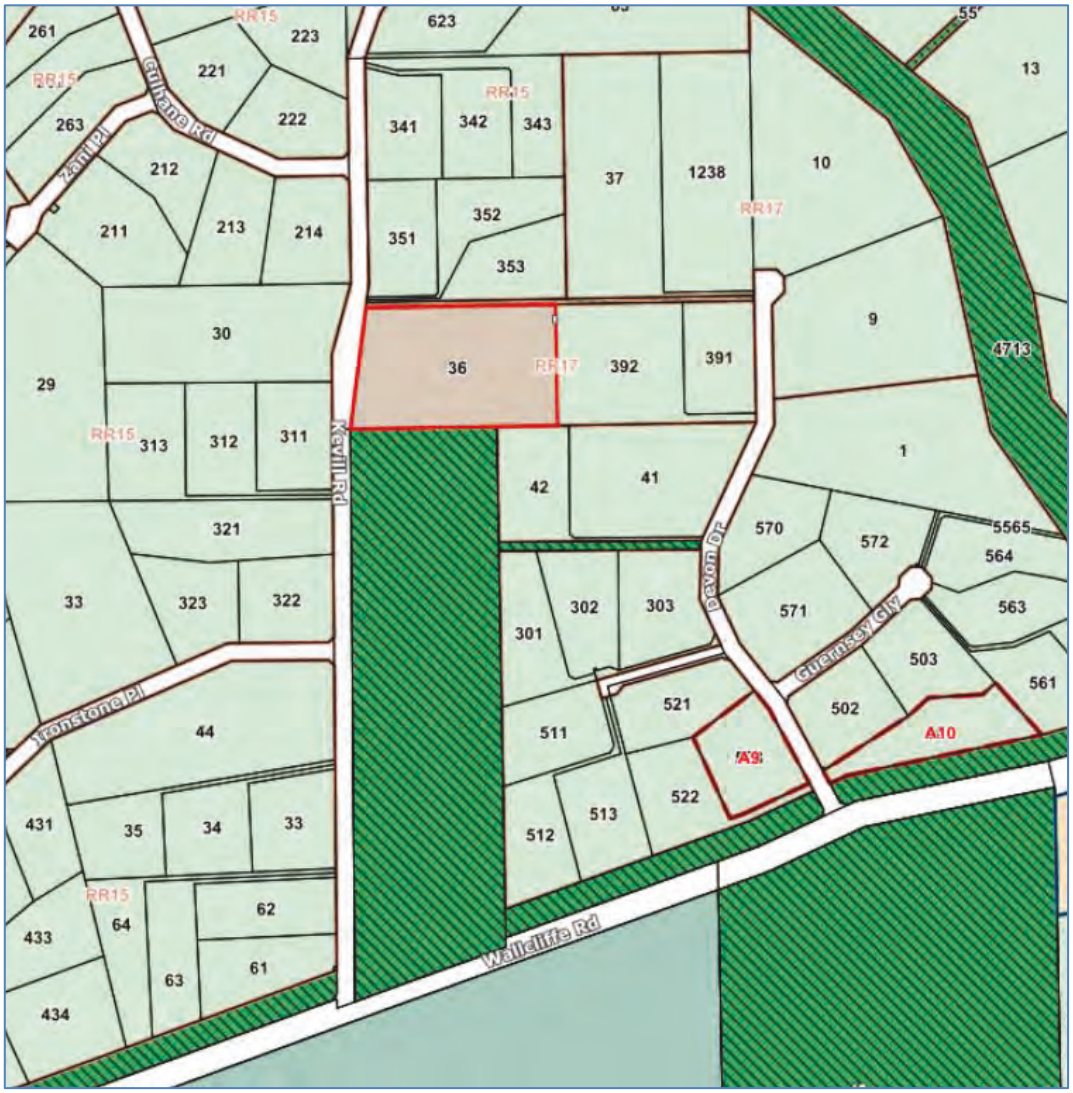


Figure 2: Town Planning Scheme zoning for the lot under consideration (source: Shire of Augusta-Margaret River intramaps)

The site is just over 3 hectares in size and is covered under special provisions RR17 within Schedule 7 of the Town Planning Scheme. The Town Planning Scheme stipulates that development within the zone shall be sited and clad in materials to minimise adverse impacts on the landscape, values and physical features of each lot within the locality.

Within the Rural Residential zoning there is a requirement for any on-site effluent disposal facilities to be constructed within the building envelope and shall be more than 100 metres from the high water mark of any watercourse or soak and must have a 2 metre vertical separation from the highest known water table or bedrock or lesser distances as approved by the local government of Health Department of WA.

HISTORICAL LAND USE

The site is mostly covered with remnant native mixed eucalypt forest. It is likely to have been part of larger grazing properties prior to the subdivision to the current lifestyle lots.

ADJACENT LAND USE

The site is located on the western side of the Margaret River township and is surrounded by other rural residential lots, a replanted local government gravel pit reserve, creekline reserves and vineyards.

THE NATURAL ENVIRONMENT

THE PHYSICAL ENVIRONMENT

LANDFORM

The site is located on the edge of the Leeuwin Block, a narrow area along the coast between Cape Naturaliste and Cape Leeuwin, which is dominated by a gently undulating lateritic plateau (Department of Agriculture, 2003). The plateau is dissected by a series of valley systems and has formed on lateritized granitic and gneissic basement rock (Tille and Lantzke, 1990).

LOCAL SOILS/GEOLOGY

The soils that correspond with the western portion of the site are the Cowaramup Ironstone Rises Phase (COi) (Department of Agriculture, 2019). These soils occur on lateritic rises and knolls on weathered mantle over granite in the Margaret River district between Eagle Bay and Augusta. Soils include shallow gravels with some loamy gravel, duplex sandy gravels, gravelly pale deep sands and shallow pale sands. Typical vegetation includes jarrah-marri-banksia woodland. Less than three per cent of the soils in this classification have a very high risk of water erosion. Three to ten per cent of the soils within this classification have a very high risk of phosphorous loss.

Figure 3: Delineation of soil classifications across the overall site (Department of Agriculture, 2019).

The soils on the eastern end of the site are classified as the Wilyabrup undifferentiated hillslopes phase (WLh) (Department of Agriculture, 2019). These soils occur on gentle to moderate valley slopes on colluvium and weathered mantle over granite. Soils consist of loamy gravels, duplex sandy gravels, brown deep loamy duplexes and friable red/brown and brown loamy earths. Typical

vegetation includes marri-jarrah forest and woodland. Around 5 per cent of the soils in this classification have a very high risk of water erosion. Five per cent of the soils within this classification have a very high risk of phosphorous loss.

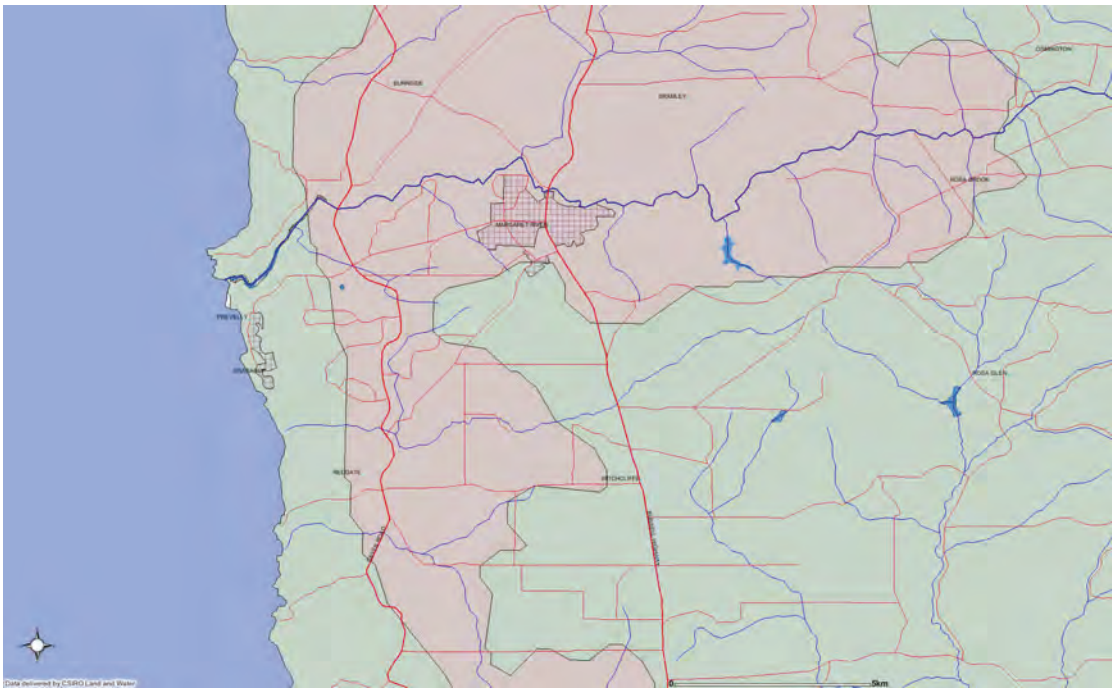


Figure 4: Acid sulphate soils risk in the local area (image courtesy of ASRIS, 2019).

There is a low probability with low confidence of acid sulphate soils (see Figure 4) occurring across the site (ASRIS, 2019). No testing for the presence of Acid Sulphate Soils was undertaken for the site.

HYDROLOGY

The overall area of the lot has a moderate slope and is approximately 81 to 90 metres above sea level. This equates to a slope of slightly less than 3.5% across the entire block.

There are no open streamlines crossing the lot with the closest stream a small tributary of the Yalgardup Brook around 350 metres away. The Yalgardup Brook itself is around 600 metres from the test site and the Margaret River is around 1 kilometre away. This means the site is not within a sewage sensitive area as per the draft state government Sewerage Policy. Any areas within two kilometres of the estuarine areas of the Margaret River are considered to be sewage sensitive areas under the state government's Draft Sewerage Policy.

The flood risk for the location of the test pits (see Figure 6) is considered minimal (Department of Agriculture, 2019).

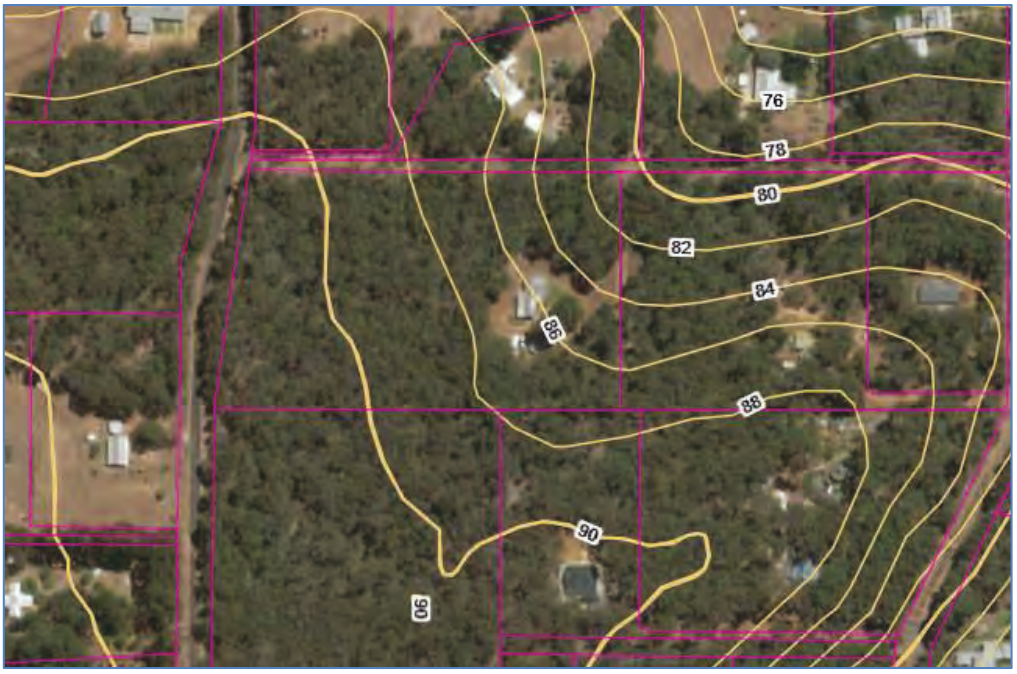


Figure 5: Contours across the site (source: Department of Agriculture)

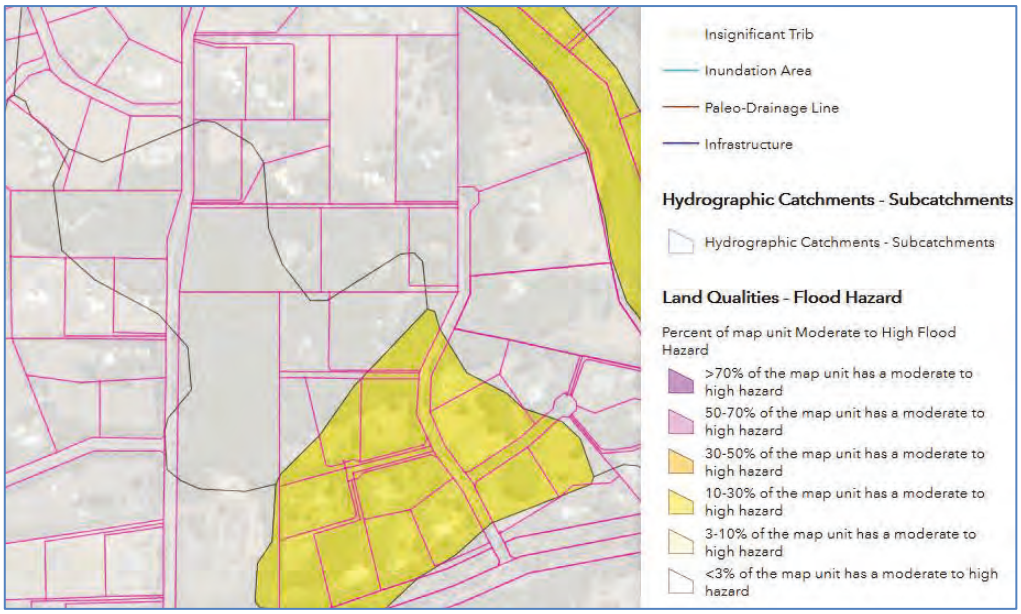


Figure 6: Nearby areas with increased flood hazard (source: Department of Agriculture, 2019).

There are no Environmentally Sensitive Areas near the site (see Figure 7).

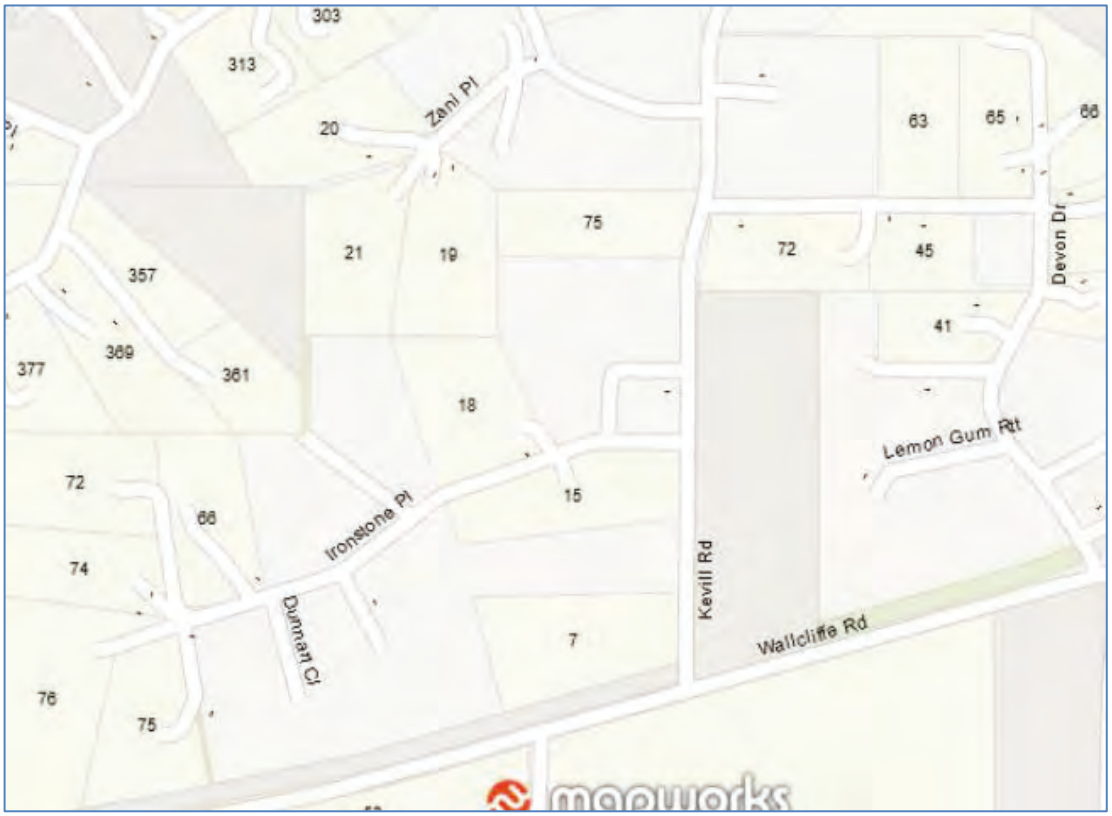


Figure 7: Environmentally Sensitive Area near the site (image courtesy of Department of Water).

CLIMATE

The southwest region of Western Australia experiences a Mediterranean climate with warm dry summers and cool wet winters. The closest weather monitoring station is based at Witchcliffe. The average annual rainfall recorded at the station is 947.4mm, with most of the rain falling between April and October (Bureau of Meteorology, 2019). The average daily temperature is between 10.7 and 21.4 degrees.

LOCAL INFRASTRUCTURE

Reticulated sewerage is not available in the local area, as per the Dial Before You Dig information provided by the utilities.

SITE ASSESSMENT

METHODOLOGY

The site evaluation was undertaken on 4 September 2019. The test pit for the soil assessment was excavated within proximity to the proposed new dwelling to a depth of 2 metres and a composite sample was taken from the sample pit to determine the Phosphate Retention Index (PRI). The sample was analysed by Vintessential Laboratories in Dunsborough. The soil horizons and groundwater depth were examined for the test pit. Samples were taken for determining soil texture. An infiltration test was carried out in accordance with the method in Schedule 8 of the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974.

The soil testing results will be used to derive a land capability class for the proposed wastewater disposal location. These results will be used to make recommendations for wastewater disposal following the methodology of AS 1547, the draft sewerage policy and the requirements within the Town Planning Scheme.

RESULTS

SOIL PROFILES

The soil test pit was excavated within proximity of the likely location of the proposed new dwelling. A full description of the soil test pit can be found in Appendix 1. The approximate location of the test pit can be found in Appendix 2. Photographs of the pit are shown in Appendix 4.

TEST PIT 1

The soil consists of dark sand with organic matter from the soil surface to a depth of around 20cm. From 20cm to around 40cm the soil consists of brown sandy gravel. From 40cm to 60cm the soil is a ferricrete layer consisting of large laterite rocks. From 60cm to a depth of 2 metres the soil consists of brown and yellow lateritic gravel with clay. No groundwater was present. There were large lateritic rocks through the soil profile.

SOIL INFILTRATION

The Infiltration rate was determined by the method outlined in Schedule 8 of the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974. The following infiltration times were observed.

Table 1: Infiltration times

Test pit location	Infiltration time (minutes:seconds)
Pit 1	4:18

DEPTH TO GROUNDWATER

The depth to groundwater was greater than two metres during the initial assessment. The assessment was carried out during the wettest time of the year following sustained high rainfall.

Table 2: Groundwater depths

Test pit location	Groundwater depth (m from surface) 4/9/19	Groundwater depth (m from surface) XX/9/19
Pit 1	>2m	XX

PHOSPHATE RETENTION INDEX

The Phosphate Retention Index for the test pits was determined by Vintessential Laboratories in Dunsborough. The laboratory results are attached as Appendix 3.

Table 3: Phosphate Retention Index

Test pit location	PRI
Test pit 1	58

The results shown in Table 3 demonstrate a very high capacity of the soil to bind phosphorous for the test pit.

DISCUSSION

SOIL AND SITE FACTORS

DEPTH TO WATER TABLE

According to Wells (2001) the test pit is likely to present a high level of purification ability, over the depth of the test pit for the soil type.

PHOSPHATE RETENTION INDEX

The Phosphate Retention Index indicates the ability of a soil to bind phosphorous from effluent and prevent nutrient flow into groundwater or surface waters. The State Government has allocated four risk categories based on soil type, PRI and nutrient loadings (DEP, 2002). Clay/loam soils with a PRI greater than 10 have the highest capacity for nutrient loads, with the risk of eutrophication of receiving waters the main factor for determining maximum loads and risk category. The Yalgardup Brook is rated as a Landscape or Multi-Use creekline and the Margaret River downstream of the site is rated as either Habitat Reach or Multi-use by Pen (1997). This combined with the high PRI levels for the soils means that the site would fit into the highest load category (Category D).

PROXIMITY TO STREAMS/WATERBODIES

The *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974* requires that leach drains are to be constructed so that effluent or liquid wastes will not be discharged into the ground at a distance less than 30 m from any well stream or underground source of water intended for consumption by humans and not be constructed within 6 m of any subsoil drainage system or open drainage channel. The Department of Water (2010) recommends a buffer distance of 100 metres from sensitive water resources for conventional wastewater systems for soils with a PRI up to 5. A distance of only 30 metres from waterways is recommended for soils with a PRI greater than 5.

POSITION RELATIVE TO FLOOD HAZARD AREA

The Department of Agriculture (2018) mapping indicates a low to no percentage risk of flooding for the wastewater disposal field areas on the lot.

PERMEABILITY

Infiltration testing was carried out in accordance with Schedule 8 of the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974. The test pit had a high infiltration capacity with a fall rate less than 5 minutes.

Table 4: Extract from Schedule 8 of the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974

Time for water to fall 25 m (minutes)	Soil type	Loading infiltration rate litres per m^2 per day	
		Alternating system	Non-alternating system
1 to 5	Sand	30	15
more than 5 to 60	Loams or gravels	20	10
more than 60	Impervious clays, etc	As approved by the Executive Director, Public Health (see clause 5)	

The Health Department regulations classify infiltration rate by the time it takes for water levels to fall 25mm. Using the times shown in Table 1, the test results equate to a fall time of 1 to 5 minutes for Pit 1. Based on this, the soils are suitable for a Loading Infiltration Rate (LIR) of 30 litres per m^2 for alternating systems and 15 litres per m^2 for non-alternating systems.

SLOPE

Across the overall site the slope is around 3.5%. The slope is much less than the 10% maximum suggested by Wells (2001) for the overall lot. AS1547 recommends slopes between 10 and 15%.

STONE CONTENT

The test pit had a moderate amount of rock material through the profile. A suitably sized excavator would easily deal with the amount of rock material encountered during the testing. There are not likely to be any significant problems with excavation or insurmountable effects on the performance of a septic system due to the stone content of the soils. Amended soils may need to be added to the leach fields to increase the size of the absorptive area.

DISPERSIBLE CLAYS

There is no evidence of salinity affecting the properties and creating conditions for dispersible clays.

DEPTH TO ROCK

Bedrock was not encountered in the full depth of the test pit. Wells (2001) recommends a depth of greater than 1 metre above bedrock to ensure an adequate soil capacity for effluent purification.

LAND CAPABILITY ASSESSMENT

An overall assessment may be made based on all of the factors that have been considered. Wells (2001) provides a framework for deriving a land capability class to assist in deciding if a site is suitable for on-site septic tank effluent disposal. Table 5 below sets out the parameters discussed above and provides a rating scale.

Table 5: Land qualities and subsequent capability classes for on-site effluent disposal taken from Wells (2001)

Land qualities[2]		Capability class				
		I	II	III	IV	V
		(Nil ……..Degree of limitation ……..Severe)				
Soil purification ability	p	High	Moderate	Low	Very Low	-
Water pollution risk[3]						
- by overland flow	o	Very low	Low	Moderate	High	Very high
- by subsurface leaching	s	-	-	Low	High	Very high
Ease of excavation	x	High	Moderate	Low	Very Low	-
Soil absorption ability	a	High	Moderate	Low	Very Low	-
Flood hazard	f	-	-	Low	Moderate	High

For the test pits, an assessment has been made of all of the land qualities in Table 6.

Table 6: Assessment of land capability for test pits using the criteria established by Wells (2001)

Land qualities	Soil purification (p)	Water pollution risk	- By overland flow (o)	- By sub-surface leaching (s)	Ease of excavation (x)	Soil absorption ability (a)	Flood hazard (f)	Overall
Test Pit 1	High		Very Low	Low	Mod	High	Low	II

Based on the above assessment, the overall site has a high capability with only slight limitation for on-site effluent disposal for the test pit. Wells (2001) suggests different levels of response to the degree of limitation. Class II sites have a high capability and limitations can be overcome with careful planning.

PLANNING REQUIREMENTS AND RECOMMENDATIONS

The Australian Standard requires a risk management approach to wastewater management. The risk management framework includes:

a) Performance objectives to ensure protection of public health and the environment
b) Commitment to responsible on-site wastewater management
c) Analysis and management of the on-site systems
d) Review, covering the long term evaluation and auditing as a basis for continuous improvement.

Site evaluators are expected to have suitable training, be familiar with the regulatory requirements, be responsible for work to evaluate the capacity of the site, certify that the process has been undertaken in accordance with the Standard and identify any cultural concerns or constraints. Property owners are expected to inform themselves about the operation of the on-site wastewater management system and ensure all maintenance is carried out as required.

Performance requirements for site evaluations include being able to provide sufficient information to decide if a site is suitable, identifying characteristics of the soil, evaluate risks of contamination of groundwater or surface water and measures to reduce and monitor risks.

The steps in the soil evaluation include:

a) A desktop study
b) Comprehensive site and soil check
c) Detailed site and soil assessment
d) Evaluation of results and preparation of report.

The intensity of the evaluation is expected to be matched to the volume of wastewater, lot sizes, cumulative risks to public health, previous land uses, previous assessments and performance record of local on-site systems. Timing should take into account seasonal factors and the timing of site works.

The result of the site investigation should be to derive a soil category as per Table 5.1 in the Australian Standard (see below).

TABLE 5.1
DETERMINATION OF SOIL CATEGORY

Soil category (see Notes 1 and 2)	Soil texture	Structure	Indicative permeability (K_{sat}) (m/d) (see Note 2)
1	Gravels and sands	Structureless (Massive)	> 3.0
2	Sandy loams	Weakly structured	> 3.0
		Massive	1.4 – 3.0
3	Loams	High/moderate structured	1.5 – 3.0
		Weakly structured or massive	0.5 – 1.5
4	Clay loams	High/moderate structured	0.5 – 1.5
		Weakly structured	0.12 – 0.5
		Massive	0.06 – 0.12
5 (Note 3)	Light clays	Strongly structured	0.12 – 0.5
		Moderately structured	0.06 – 0.12
		Weakly structured or massive	< 0.06
6 (Note 3)	Medium to heavy clays	Strongly structured	0.06 – 0.5
		Moderately structured	< 0.06
		Weakly structured or massive	< 0.06

NOTES:

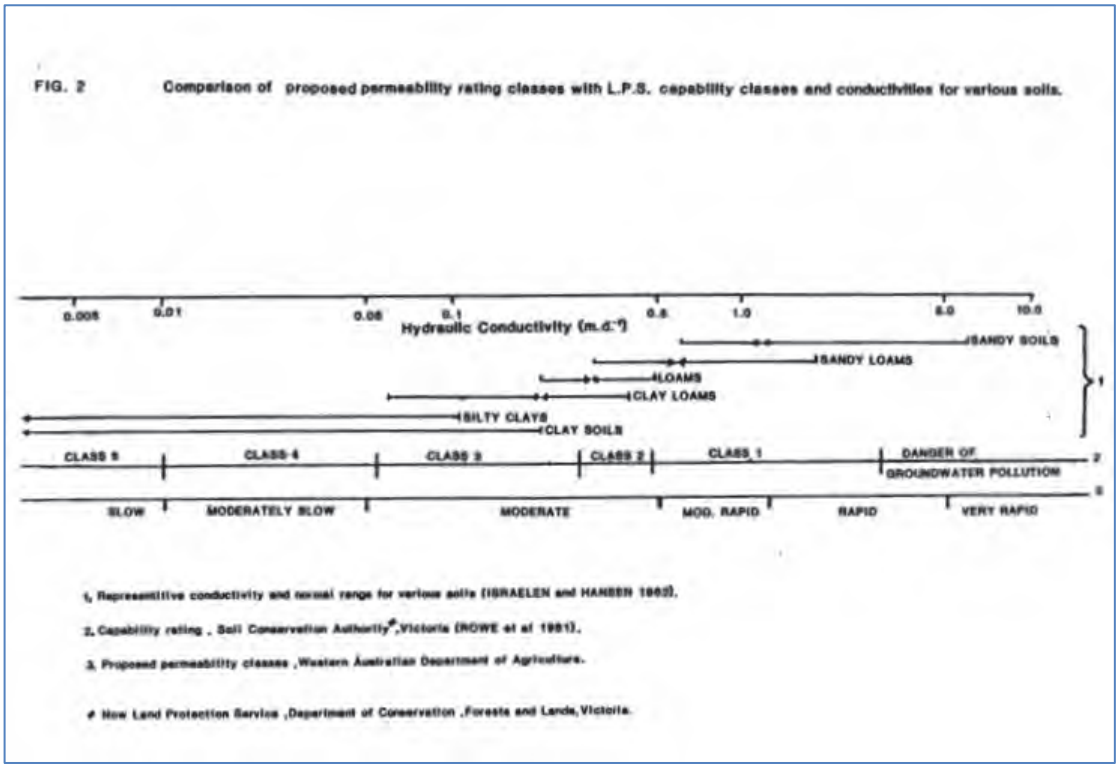
1 Soil category determination shall take into account the soil horizons within the depth range into which effluent is absorbed (see 5.2.3). Figure B1 may be used to report on the overall soil category determined from the inspection of the individual soil layers. Table E1 should be used to assist in determining soil category from soil texture assessment.

2 The values of indicative permeability K_{sat} are based on the movement of water, not effluent, through the soil. They are estimates only and shall be used with caution in assisting the determination of the soil category. In the field, soil permeability is strongly influenced by the presence of biological channels such as old root holes, termite, ant and worm passages, as well as shrinkage cracks, and not merely by soil texture. A virgin clay-based soil under native bush could easily be ten times as permeable as the same soil under frequent cultivation or compacted by heavy traffic. More accurate estimates for effluent K_{sat} values may be obtained by modifying the characteristics of the test water to better match that of effluent, particularly the salt composition. See Appendices F and G.

3 For clay-dominated soils having dispersive (sodic) or shrink/swell behaviour, specialist soil advice and special design techniques will be required to enable their use for land application systems. Generally these soils will have very poor soil drainage.

The soil categories within the Standard map directly to those derived in the assessment methodology of Wells (2001), as seen in Figure 2 below (taken from Wells, 2001). Based on the table and figure, Class II sites correspond with Soil Categories 3 and 4 (not including Massive soils in soil category 4).

As per the standard, design flows are to be based on the number of bedrooms, average and peak occupancy, wastewater volumes and other factors that determine overall water use and wastewater volumes. This information will need to be assessed by the system designer as it has not been ascertained in this early part of the development process.



The soil classes can be utilised to derive specific design measures for the variety of disposal systems that may be designed for the site, as per Table 5.2 from the Standard below.

TABLE 5.2
SOIL CATEGORIES AND RECOMMENDED DESIGN IRRIGATION/LOADING RATES (DIR/DLR) FOR LAND-APPLICATION SYSTEMS

Soil Category	Soil texture	Structure	Indicative permeability (K_{sat}) (m/d)	Design irrigation/loading rate (DIR/DLR) (mm/day)						
				Trenches and beds (see Table L1)			ETA/ETS beds and trenches (Table L1)	Drip and spray irrigation (Table M1)	LPED irrigation (Table M1)	Mounds (basal area) (Table N1)
				Primary treated effluent		Secondary treated effluent				
				Conservative rate	Maximum rate					
1	Gravels and sands	Structureless (massive)	> 3.0	(see Note 1 of Table L1 for DLR values)			(see Note 4 of Table L1)	5 (see Note 2 of Table M1)	(see Note 3 of Table M1)	32
2	Sandy loams	Weakly structured massive	> 3.0						4	24
			1.4 – 3.0	15	25	50				
3	Loams	High/ moderate structured	1.5 – 3.0	15	25	50		4 (see Note 1 of Table M1)	3.5	24
		Weakly structured or massive	0.5 – 1.5	10	15	30				16
4	Clay loams	High/ moderate structured	0.5 – 1.5	10	15	30	12	3.5 (see Note 1 of Table M1)	3	16
		Weakly structured	0.12 – 0.5	8	10	20	8			8
		Massive	0.06 – 0.12	4	5	10	5			(see Note to Table N1)
5	Light clays	Strongly structured	0.12 – 0.5	5	8	12	8	3 (see Note 1 of Table M1)	2.5 (see Note 4 of Table M1)	8
		Moderately structured	0.06 – 0.12	(see Notes 2 and 3 of Table L1)	5	10	5 (see Notes 2, 3, and 5 of Table L1)			(see Note to Table N1)
		Weakly structured or massive	< 0.06			8				
6	Medium to heavy clays	Strongly structured	0.06 – 0.5					2 (see Note 2 of Table M1)	(see Note 3 of Table M1)	
		Moderately structured	< 0.06							
		Weakly structured or massive	< 0.06							

In addition to the Land Capability Class derived from Wells (2001) and the Soil Category derived from AS1547, a number of other design requirements are outlined in the Health Act Regulations, the Town Planning Scheme and the state governments Draft Sewerage Policy, as shown in the table below.

Site Factor requirements	**Health Act Regulations**	**AS1547**	**Draft Sewerage Policy**	**DoW Wastewater Treament Water Quality Protection Note**
Location			Not in Priority Drinking Water Catchment of Sewage Sensitive area (with exceptions) Not in wellhead protection zone or on Crown land within a reservoir protection zone	
Watercourses or soaks	30m from any well, stream or underground source or 6m from any subsoil drainage system or open drainage channel		100m from bores used for public drinking water supply or high water mark of a reservoir or waterway. 30m from any private bore used for drinking water. 100m of any waterway or significant wetland or any surface or sub-surface drainage system	100m from sensitive water resources with PRI up to 5 and 30m for PRI greater than 5
Vertical separation		1.2m	Distance from discharge point: 2m in Public Drinking Water Source Areas 1.2 to 1.5 metres in sewage sensitive areas 0.6 to 1.5m in all other areas	
Slope		Not more than 10-15%		
Disposal field		Larger for		

		heavier soils		
Secondary treatment			Nutrient removal required for all public drinking water source areas and sewage sensitive areas, areas below required buffer distances, heavy soils, lots less than 2000m^2, trade waste	
Notice on title			To ensure unencumbered area for disposal wherever secondary treatment systems are required	

Further details of the size of secondary treatment systems and application area calculations for soil types from the Draft Sewerage Policy is shown in Appendix 5.

The overall site factors can be summarized as:

- The site is not within a Sewage Sensitive Area
- The new lot will be approximately 15 000m^2 in size;
- The site assessment confirms the land is not classed as having heavy soils;
- Reticulated sewerage is available in parts of Margaret River but is likely to be more than 2000m from the existing lot. This means that it is not economically practical to extend the sewer to the land. This also means that the proposed subdivision application more reasonably falls under section 6.2 (5) of the exemptions within the Draft Sewerage Policy. The hydraulic loading will be dependent on the occupancy and will need to be determined by the system designer;
- The lot size is greater than the 2000m^2 specified in Table 1 of Schedule 3 of the draft policy for conventional systems;
- According to Table 2 of Schedule 3, a land application area of between 429 and 620 m2 is required for primary treatment systems for the soil type on the lot. The requirement for a secondary treatment system can be determined by the system designer at the development stage;
- According to Table 3 of Schedule 3, secondary treatment systems outside of sewage sensitive areas should have a vertical separation of 0.6m above the highest post-development seasonal water table. The separation distance to groundwater is significantly greater than this for the lot and can be increased during site works for newly constructed dwelling;

- The land application area above does not include the area required for the apparatus and must not include any temporary or permanent structures, not be paved or trafficked by vehicles or subject to regular foot traffic;
- Slopes greater than 1:5 (20% slope) should be engineered to prevent run-off. Some form of retaining and the use of inverted leach drains/disposal fields is recommended;
- Hydraulic loading should be calculated by the system designer according to Table 4 of Schedule 3.

WASTEWATER RECOMMENDATIONS

Recommendation 1:

The assessment demonstrates that the new lot has soils capable of receiving wastewater and is suitable for stand-alone on-site effluent disposal systems and a subdivision approval can be granted on this basis.

REFERENCES

ASRIS (2019), Australian Soil Resource Information System, http://www.asris.csiro.au/index_ie.html.

Australian/New Zealand Standard AS1547:2012, On-site domestic wastewater management.

Bureau of Meteorology (2019), Climate Averages for specific sites. Publicly available data prepared by the Bureau of Meteorology, Commonwealth of Australia. http://www.bom.gov.au/climate/averages/tables/ca_wa_names.shtml

Department of Agriculture (2003), Land Profiler, Shires of Capel, Busselton and Augusta-Margaret River, Perth, Western Australia.

Department of Agriculture and Food (2018), Natural Resources, http://www.agric.wa.gov.au/

Department of Environmental Protection (DEP) (2002), West Australian Guidelines for the Direct Land Application of Biosolids and Biosolids Products. Perth, Western Australia.

Department of Health (2001), Code of Practice for the Design, Manufacture, Installation and Operation of Aerobic Treatment Units (ATU's). November 2001. Department of Health, Perth.

Department of Health (2002), Movement of Nutrients from Onsite Wastewater Systems in Soils. Department of Health, Perth, Western Australia.

Department of Health (2003), Draft Country Sewerage Policy. Department of Health, Perth, September 2003.

Departments of Health, Planning and Water (2016), Draft for Consultation – Government Sewerage Policy (November 2016)

Department of Water (2005), Margaret River Catchment Area (Including Ten Mile Brook Catchment) Drinking Water Source Protection Plan.

Department of Water (2006b), WQPN 22, Water Quality Protection Note: Irrigation with Nutrient Rich Wastewater (July 2006). Department of Water, Perth, Western Australia.

Department of Water (2006c), WQPN 28, Water Quality Protection Note: Mechanical Servicing and Workshops (September 2006). Department of Water, Perth, Western Australia.

Department of Water (2006d), WQPN 79, Water Quality Protection Note: Rural restaurants, cafes and taverns near sensitive water resources (May 2006). Department of Water, Perth, Western Australia.

Department of Water (2006e), WQPN 6, Water Quality Protection Note: Vegetation buffers to sensitive water resources (February 2006). Department of Water, Perth, Western Australia.

Department of Water (2009), WQPN 93, Water Quality Protection Note: Light industry near sensitive waters (September 2009). Department of Water, Perth, Western Australia.

Department of Water (2010), WQPN 70, Water Quality Protection Note: Wastewater Treatment and Disposal – domestic systems (June 2010). Department of Water, Perth, Western Australia.

Department of Water (2016), WQPN 25 Land use compatibility tables for public drinking water source areas.

Government of Western Australia (2005), Health (Treatment of Sewerage and Disposal of Effluent and Liquid Waste) Regulations 1974. October 2005.

Mattiske, EM and Havel, JJ (2002), Review of management options for poorly represented vegetation complexes, Mattiske Consulting.

Pen, L.J. (1997), A Systematic Overview of Environmental Values on the Wetlands, Rivers and Estuaries of the Busselton-Walpole Region, Water and Rivers Commission Report WRAP 7.

Penn, L.J. (1999), Managing Our Rivers: A guide to the nature and management of streams of south-west Western Australia. Water and Rivers Commission, Perth, Western Australia.

Tille, P. J. and Lantzke, N. C. (1990) Busselton – Margaret River – Augusta: Land Capability Study. Land Resources Series No. 5. Western Australian Department of Agriculture.

Wells, M. (2001), Assessment of Land Capability for On-Site Septic Tank Effluent Disposal. Agriculture WA, Perth, Western Australia.

APPENDIX 1: SOIL TEST PIT DESCRIPTION

Test pit soil horizon descriptions

PIT	LOCATION	DEPTH (cm)	DESCRIPTION	TEXTURE
1	WP871	0-20	Dark sandy organic layer with leaf litter	10% black organic matter, 10% black sand, 10% silt/clay
		20-40	Brown sandy gravel	70% brown sand, 20% brown silt, 10% brown clay
		40-60	Ferricrete layer	Lateritic duricrust
		60-200	Brown and yellow lateritic gravel with clay	70% brown/white grit, 20% light brown silt and 10% light brown clay

APPENDIX 2: PIT LOCATIONS

APPENDIX 3: LABORATORY RESULTS

VINTESSENTIAL LABORATORIES

www.vintessential.com.au
ABN: 60 068 057 045

VIC (Site A - Base site)
32 Brasser Ave
Dromana VIC, 3936
T: 03 5987 2242
E: lab-vic@vintessential.com.au

WA (Site B)
15a Wrigglesworth Drive
Cowaramup WA, 6284
T: 08 9755 9620
E: lab-wa@vintessential.com.au

NSW (Site D)
Leeds Parade (CSU)
Orange NSW, 2800
T: 02 6361 3141
E: lab-nsw@vintessential.com.au

TAS (Site E)
4 Warwick Street
Hobart TAS, 7002
T: 03 6234 7581
E: lab-tas@vintessential.com.au

LABORATORY REPORT | **NUMBER: B1909014**

Environmental & Landscape Management
27 Charles Hine Avenue
Margaret River WA 6285
Phone 08 9758 7926

Purchase Order
Sample(s) Received 04/09/2019
Report Type Final
Issue Preferences seanic@inet.net.au

Sample Number	Sample Details
B1909014/01	Lot 36 Kevill Pit 1

Test	Result	Unit	Test Site
Phosphorous Retention Index (VLSM06#)	58		B

Carly Gamble
Approved Signatory
Vintessential Laboratories

Date Report Issued
06/09/2019

The above results refer to the sample analysed as received.
* Indicates determination by NATA accredited method.
# NATA accreditation does not cover the performance of this method
Method Uncertainty (MU) data for accredited method results are available at www.vintessential.com.au/resources

APPENDIX 4: PIT PHOTOGRAPHS

Pit 1

SCHEDULE 3:
SITE REQUIREMENTS FOR ON-SITE SEWAGE DISPOSAL SYSTEMS

MINIMUM LOT SIZES FOR RESIDENTIAL DEVELOPMENT IN HEAVY SOILS.

Table 1: Minimum lot sizes for residential development serviced by on-site sewage disposal in heavy soils located outside public drinking water source areas and sewage sensitive areas.

Soil category[5]	Soil texture	Minimum lot sizes m2 (R-code)[6]	
		Primary treatment	Secondary treatment
4	Clay loams	2,000 (R5)	1,000 (R10)
5	Light clays	4,000 (R2.5)	1,000 (R10)
6	Medium to heavy clay	Special design requirements and distribution techniques or soil modification procedures will be necessary. Refer to Table L1 of AZ/NZS 1547 for more details.	2,000 (R5)
-	Rock	Special design requirements and distribution techniques or soil modification procedures will be necessary.	

LAND APPLICATION AREAS FOR SINGLE HOUSES

Table 2: Land application areas for single houses

Soil category	Soil texture	Land application area (m²)[7]	
		Primary treatment	Secondary treatment
1	Gravels and sands	339	180
2	Sandy loams	339	180
3	Loams	429	225
4	Clay loams	620	257
5	Light clays	1,156	300
6	Medium to heavy clays	Special design	450

A sample calculation for determining the land application area for a primary treatment system in Soil Categories 1 and 2 is provided in the Explanatory Notes.

5 Soil categories, extrapolated from Table 5.1 AS/NZS 1547, are to be determined by undertaking a site and soil evaluation (SSE) as per AS/NZS 1547 On-site domestic wastewater management.

6 Minimum lot sizes are based upon area required to accommodate dwelling, primary sewage treatment apparatus, land application areas and associated setback distances.

7 The land application area has been determined using design loading rates for trenches and beds, extrapolated from Table L1 AZ/NZS 1547 On-site domestic wastewater management. Calculations used a hydraulic loading of 900litres/day, which is based on the occupancy of 6 persons in a 3 bedroom house and a sewage design flow of 150L/person/day. Values for primary treatment include setback distances. Note that values for secondary treatment exclude setback distances, which will vary depending on the system used.

GENERAL SITE FEATURES FOR ON-SITE SEWAGE DISPOSAL

Table 3: General site features for on-site sewage disposal

Site feature	Minimum requirement
Separation from groundwater – outside public drinking water source areas and sewage sensitive areas **(The minimum requirements for public drinking water source areas and sewage sensitive areas are found at Section 6.4 of this policy)**	Where land is not within a Public Drinking Water Source Area or a sewage sensitive area[8], the discharge point of the on-site sewage disposal system should be located the following distances above the highest known groundwater level: • For loams and heavy soils, the base of the proposed land application system should have a depth of at least 0.6 metres above the highest seasonal post development water table. • For gravels, the base of the proposed land application system should have a depth of at least one metre above the highest seasonal post development water table. • For sands the base of the proposed land application system should have a depth of at least 1.5 metres above the highest seasonal post development water table. • Where a nutrient retentive secondary treatment system will be used, the proposed land application system should have a depth of at least 0.6 metre above the highest seasonal post development water table.
Land application area	Depending on the soil type, a land application area should be provided for all development in accordance with tables 2 and 4 of this schedule for the disposal of sewage.
	The land application area excludes the area required for the apparatus. It should be kept free of any temporary or permanent structures.
	Activities within the land application area shall not interfere with the function of the current and future land application system and people should avoid potential contact with effluent residues. Unless allowed for in the design, the land application area (which does not include the apparatus) should: • not be built on or paved in a manner which precludes reasonable access; • not be subject to vehicular traffic (other than a pedestrian-controlled lawnmower); • not be subject to regular foot traffic such as pathways and clothes line areas; and • should be kept in a manner which enables servicing and maintenance of the disposal system.
Gradient of the land application area	Where slope exceeds one in five (1:5), the land application area should be engineered to prevent run-off from the land application area. Surface contours should be provided on the site plan.

8 The minimum separation distances for sewage sensitive areas and public drinking water source areas are provided in Section 6.4 of this policy.

DETERMINATION OF LAND APPLICATION AREA (M2) FOR DEVELOPMENT/SUBDIVISION

The size of the land application area should be determined in accordance with the conversion factors prescribed in Table 4 and AS/NZS 1547 On-site domestic wastewater management as follows:

1. Estimate hydraulic load (L/day):
   - occupancy rate (persons) x design loading rate (L/person/day)
2. Calculate land application area (m^2):
   - hydraulic load (L/day) x conversion factor from Table 4

Table 4: Conversion factors to calculate the minimum required land application area for subdivision/ development (conversion factors are determined using a hydraulic load of 1 L/day.

Soil category	Soil texture	Conversion factors	
		Primary treatment	Secondary treatment
1	Gravels and sands	0.377	0.2
2	Sandy loams	0.377	0.2
3	Loams	0.477	0.25
4	Clay loams	0.689	0.286
5	Light clays	1.284	0.333
6	Medium to heavy clays	Special design requirements and distribution techniques or soil modification procedures will be necessary	0.5

APPENDIX 4

Bushfire Management Plan
20 August 2020
Prepared by: Ecosystem Solutions

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: 72 (Lot 36) Kevill Road		
Suburb: Margaret River	**State:** WA	**P/code:** 6285
Local government area: Shire of Augusta-Margaret River		
Description of the planning proposal: Subdivision of one lot into two		
BMP Plan / Reference Number: 18528	**Version:** Rev F	**Date of Issue:** 20/08/2020
Client / Business Name: Rod Hooper		

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.)?

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
Kelly Lamp	Level 2	38253	02/2021
Company Ecosystem Solutions		**Contact No.** (08) 9759 1960	

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** 20/08/2020

ecosystem solutions
PO Box 685
DUNSBOROUGH WA 6281
Ph: +61 8 9759 1960
Fax: +61 8 9759 1920
Mobile: 0427 591 960
info@ecosystemsolutions.com.au
www.ecosystemsolutions.com.au

Bushfire Management Plan

72 Kevill Road, Margaret River

20 August 2020

Prepared for:
Rod Hooper
C/- Ahola Planning Pty Ltd
Att: Glenn Ahola

Limitations Statement

This report has been prepared for Rod Hooper C/- Ahola Planning Att: Glenn Ahola and remains the property of Ecosystem Solutions Pty Ltd. No express or implied warranties are made by Ecosystem Solutions Pty Ltd regarding the findings and data contained in this report. No new research or field studies were conducted other than those specifically outlined in this report. All of the information details included in this report are based upon the research provided and obtained at the time Ecosystem Solutions Pty Ltd conducted its analysis.

In undertaking this work the authors have made every effort to ensure the accuracy of the information used. Any conclusions drawn or recommendations made in the report are done in good faith and the consultants take no responsibility for how this information and the report are used subsequently by others.

Please note that the contents in this report may not be directly applicable towards another organisation's needs. Ecosystem Solutions Pty Ltd accepts no liability whatsoever for a third party's use of, or reliance upon, this specific report.

STATEMENT OF CONFORMITY – *PLANNING AND DEVELOPMENT ACT 2005*

Kelly Lamp
B.Sc Hons, Nat Rs Mgmt. BPAD Level 2 (38253)

The signatory declares that this Bushfire Management Plan meets the requirements of State Planning Policy 3.7.

Document Control

Client - Rod Hooper

C/- Ahola Planning Pty Ltd

Att: Glenn Ahola

Site – 72 Kevill Road, Margaret River

Version	Revision	Purpose	Author	Reviewer	Submitted	
					Form	Date
Report	Rev A	Initial Report	KP	DP	Electronic (email)	18/05/2018
Report	Rev B	Update proposed house footprint	KP	DP	Electronic (email)	29/06/2018
Report	Rev C	Comments from GA	KP	DP	Electronic (email)	26/09/2019
Report	Rev D	Comments from GA	DC	GM	Electronic (email)	27/09/2019
Report	Rev E	Comments from DFES and Shire of Augusta - Margaret River	KP	DC	Electronic (email)	09/03/2020
Report	Rev E	Update building envelope	KP	DC	Electronic (email)	20/08/2020

Filename: Z:\PROJECTS\18528 72 Kevill Road, Margaret River BMP\Reports\72 Kevill Road, Margaret River BMP Rev F.docx

Contents

Appendices

List of Figures

List of Tables

1 Proposal

This Bushfire Management Plan (BMP) has been prepared for 72 Kevill Road, Margaret River (hereafter referred to as the 'Site') by Danae Plowman (B.Sc. Env Sc. PG Dip Erg & Env.) and Kelly Lamp (B.Sc Hons. Nat Rs Mgmt.) from Ecosystem Solutions.

The proposal is to subdivide the existing Lot into two, Lot 361 and Lot 362, each 1.5 ha with details provided in Figure 1.

The Site is located within a bushfire prone area, as declared by State Planning Policy 3.7: Planning in Bushfire Prone Areas (Figure 2).

The purpose of this BMP is to detail the fire management methods and requirements that will be implemented within and around the Site to reduce the threat to residents and fire fighters in the event of a fire.

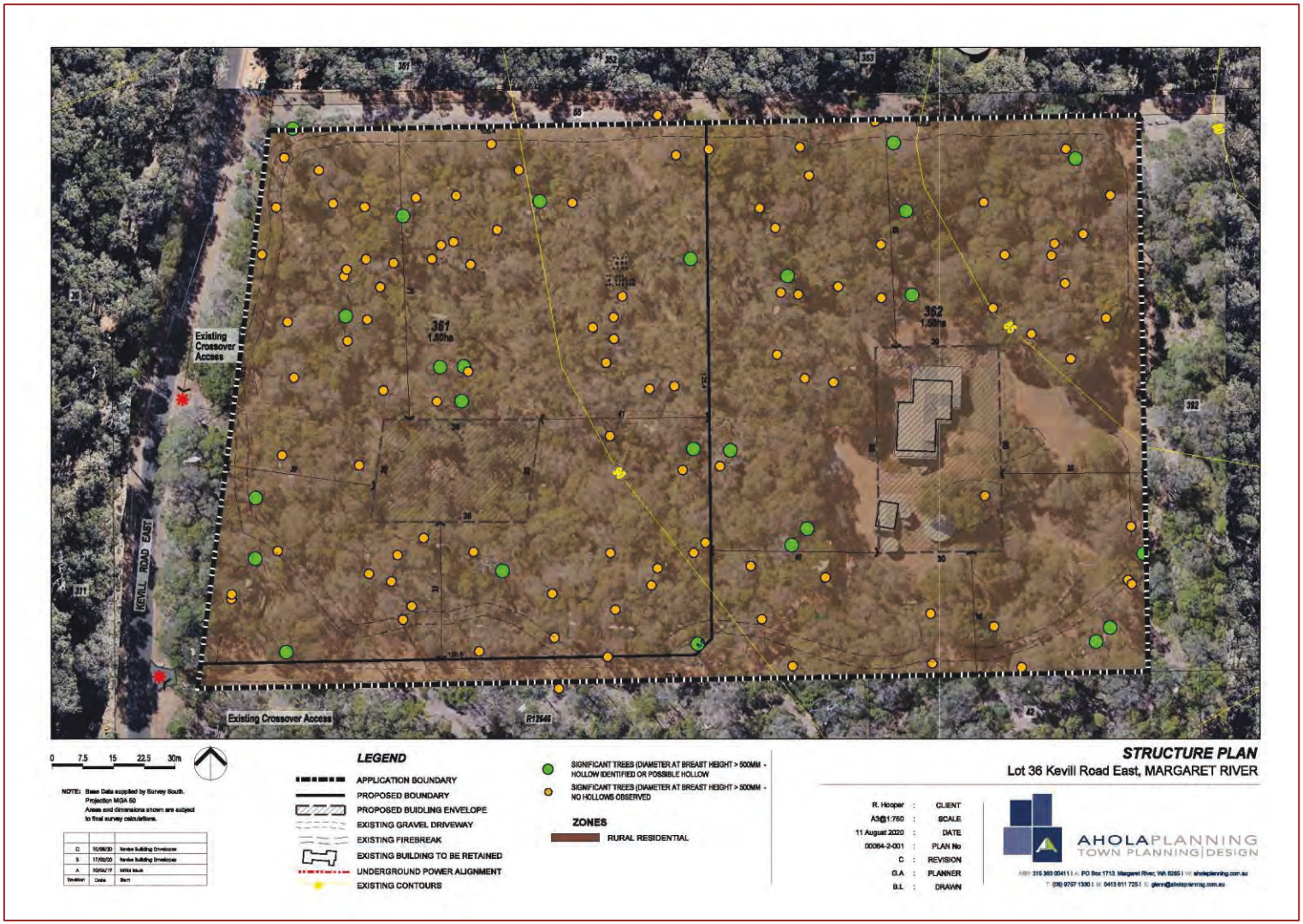


Figure 1 Proposed Structure Plan for 72 Kevill Road

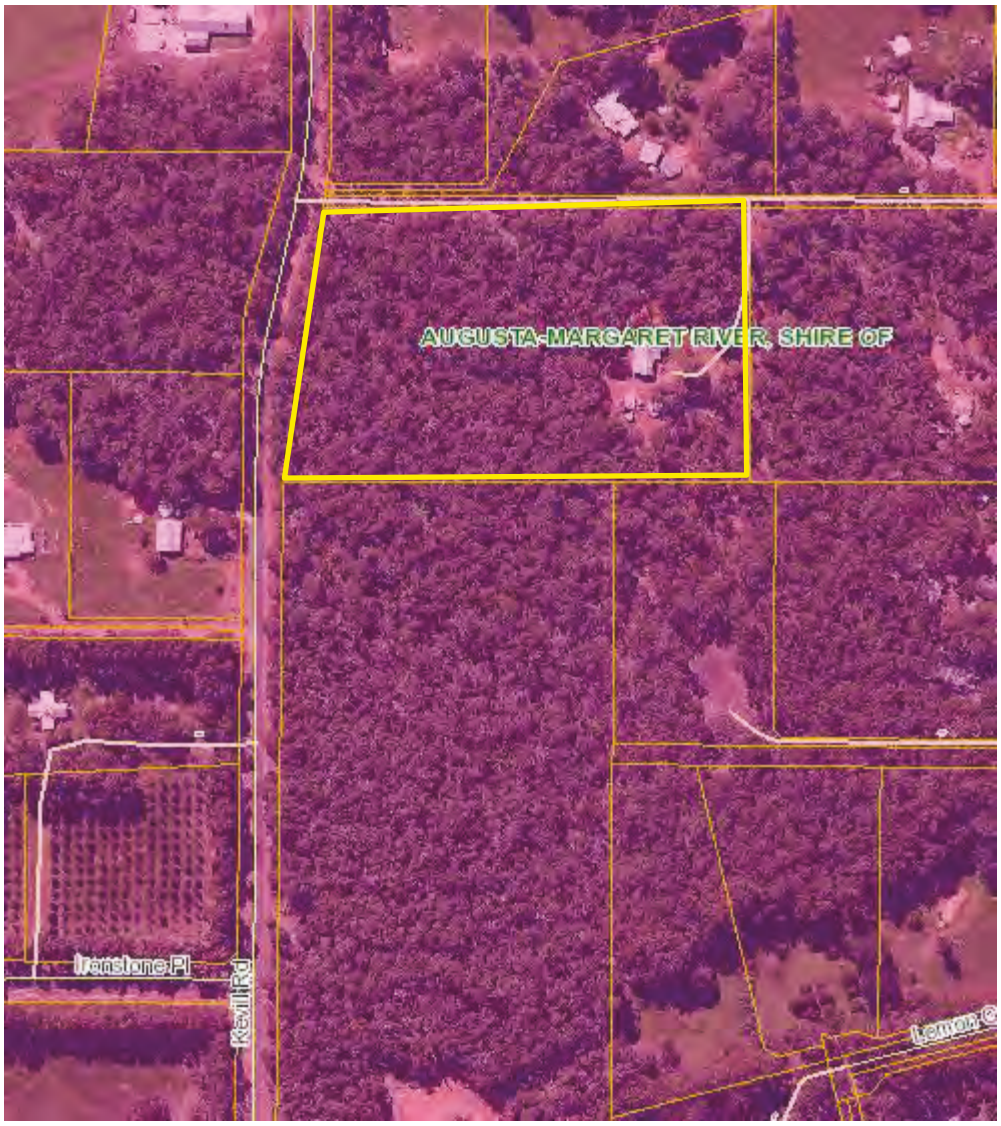


Figure 2 Map of Bushfire Prone Areas for the Subject Site (within yellow square)

2 Bushfire Assessment Results

2.1 Assessment Inputs

The assessments of the Site were undertaken on 11 May 2018 and 19 September 2019 by a BPAD Accredited Practitioner for the purpose of determining the Bushfire Attack Level in accordance with AS 3959 - 2018 Simplified Procedure (Method 1).

All vegetation within 150m of the Site was classified in accordance with Clause 2.2.3 of AS 3959-2018, shown in the photos below with maps provided in Figure 3 and 4.

Plot	1	**Vegetation Classification or Exclusion Clause**	Class A Forest Downslope >0 to 5 degrees

Photo ID: 1

Photo ID: 2

Description / Justification for Classification	Canopy of *Eucalyptus marginata* and *Corymbia calophylla* with a well developed understorey including *Acacia pulchella, Acacia myrtifolia, Patersonia occidentalis, Macrozamia riedlei, Persoonia longifolia.*

Plot	2	Vegetation Classification or Exclusion Clause	Class A Forest Flat/Upslope

Photo ID: 3

Photo ID: 4

Description / Justification for Classification	Canopy including *Eucalyptus marginata* and *Corymbia calophylla* with a well developed understorey including *Acacia pulchella, Acacia myrtifolia, Patersonia occidentalis, Macrozamia riedlei, Persoonia longifolia*. Photo 6 includes areas that will be established as part of the Asset Protection Zone for the dwelling within Proposed Lot 361.

Plot	3	Vegetation Classification or Exclusion Clause	Excluded Clause 2.2.3.2 (a), (e) & (f)

Photo ID: 5

Photo ID: 6

Photo ID: 7

Photo ID: 8

Description / Justification for Classification	Areas greater than 100m from the Site are excluded under S 2.2.3.2 (a). Non vegetated areas including roads and buildings excluded under S 2.2.3.2 (e). Low threat vegetation including managed gardens and lawns excluded under S 2.2.3.2 (f). The building envelopes and maximum Asset Protection Zones surrounding them have been excluded under S 2.2.3.2 (f) in Figure 4 - Vegetation Classification Post Development.

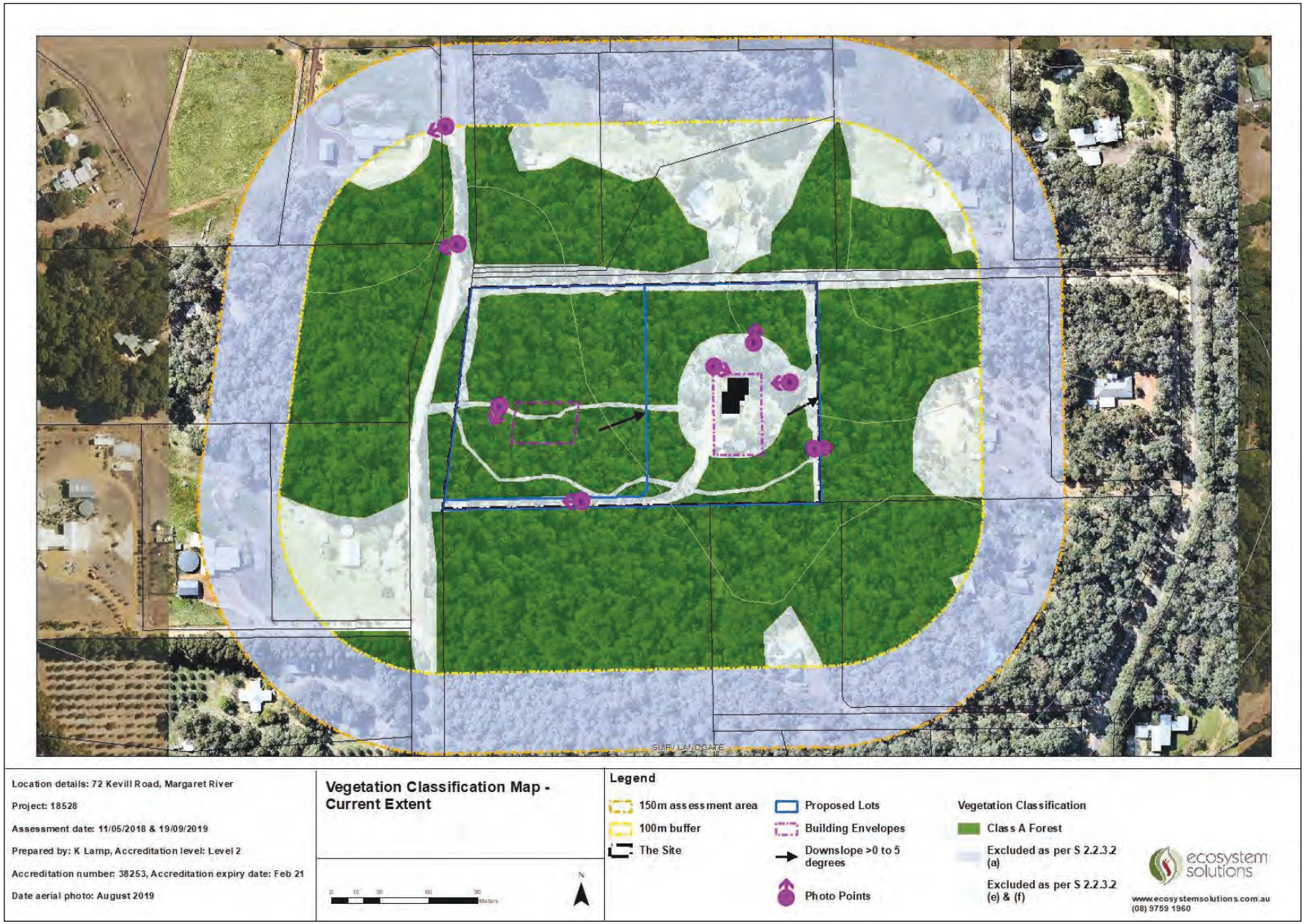


Figure 3 Map of Vegetation Class – Current Extent

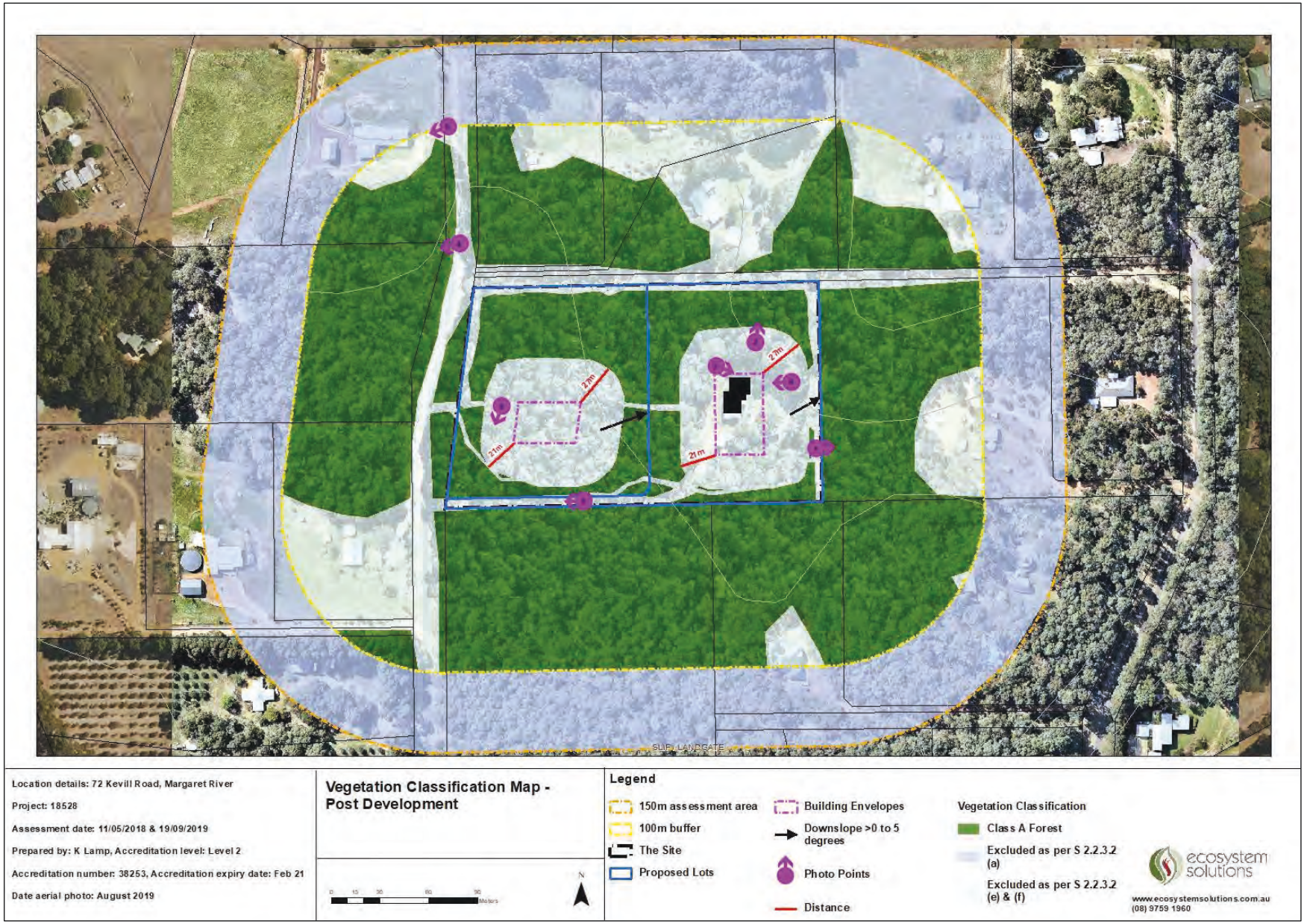


Figure 4 Map of Vegetation Class - Post Development

2.2 Assessment Outputs

The results from the Site assessment are provided in Table 1. The Determined Bushfire Attack Level (highest BAL) for the Site has been determined in accordance with clause 2.2.6 of AS 3959-2018 with map provided in Figure 5.

Table 1 Site Assessment Results

Method 1 BAL Determination				
Fire Danger Index - 80 (AS3959-2018 Table 2.1)				
Plot	**Vegetation Classification**	**Effective Slope Under the Classified Vegetation (degrees)**	**Separation Distance to the Classification Vegetation (metres)**	**Bushfire Attack Level**
1	Class A Forest	Downslope >0-5°	Min 27 m	BAL-29
2	Class A Forest	Flat / Upslope	Min 21 m	BAL-29
3	Excluded Clause 2.2.3.2 (e) & (f)	NA	NA	BAL-LOW
Determined Bushfire Attack Level				**BAL-29**

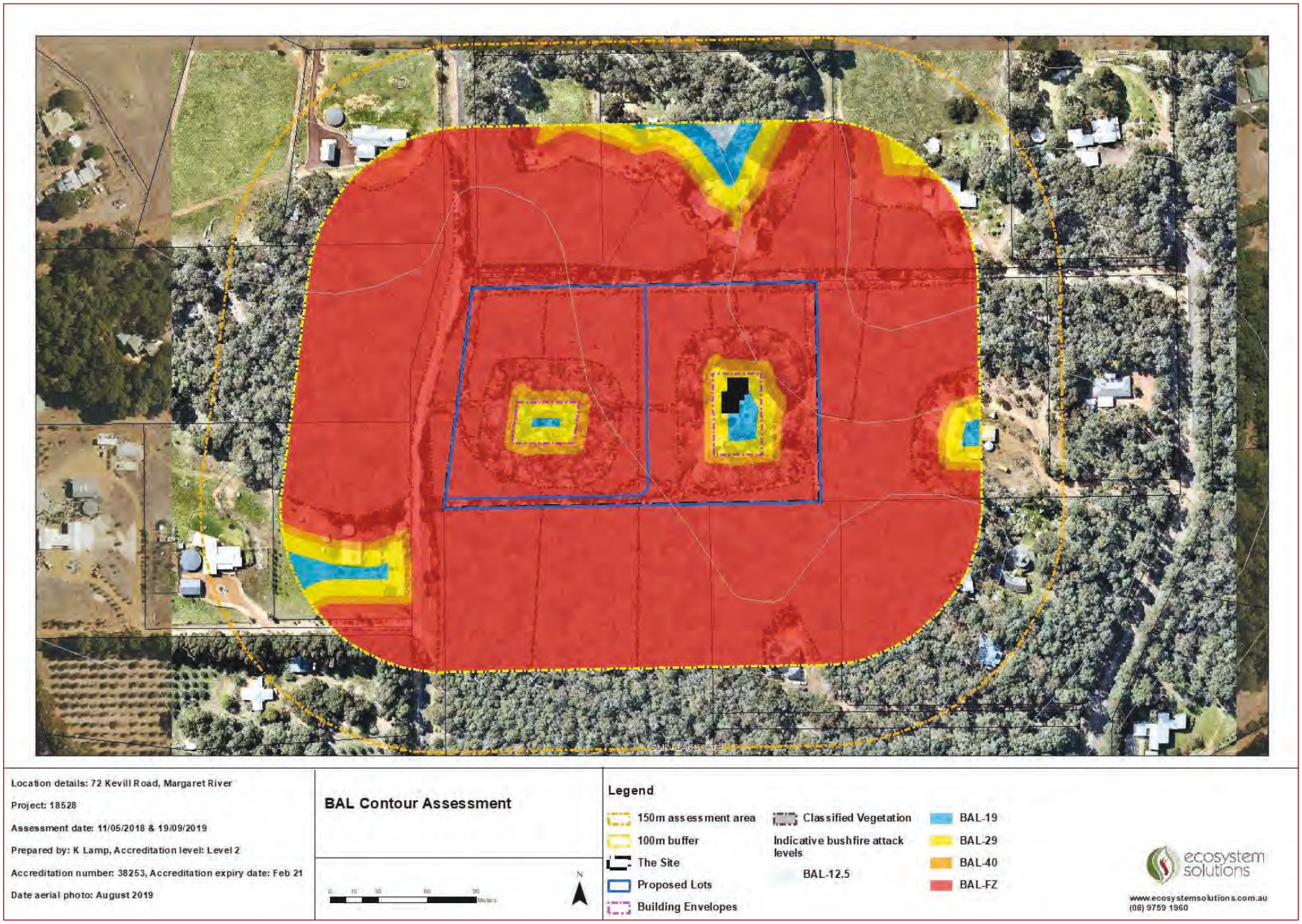


Figure 5 Map of Bushfire Attack Level Assessment

3 Environmental Considerations

3.1 Native Vegetation – modification and clearing

72 Kevill Road, Margaret River contains areas of remnant native vegetation. Modification of this vegetation will be required within Proposed Lot 361 to achieve the setbacks required for a BAL-29 rating. An indicative APZ for Proposed Lot 361 is based on the edge of the building envelope. Before the construction of a dwelling within Proposed Lot 361, an Asset Protection Zone to achieve a BAL-29 rating based on the exact footprint of the proposed dwelling must be established. This is likely to be much smaller than the APZ illustrated in Figure 9.

The building envelope within Proposed Lot 361 has been carefully selected to ensure minimal vegetation modification is required. Establishment of the Asset Protection Zone does not mean the removal of all vegetation within the area, trees can be retained if the trunks at maturity are 6 metres from all elevations of the building, branches at maturity do not touch or overhang the building, lower branches are removed to a height of 2 metres above the ground or surface vegetation and canopy cover is less than 15 %, with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy. Shrubs and ground covers can also be retained if they are managed to the APZ Requirements. There are a number of significant trees with a Diameter at Breast Height of >500mm within the Site, these should be retained within any APZ. These trees are described and illustrated spatially within the Flora and Fauna Significance Assessment (Ecosystem Solutions, September 2019), and have also been referenced on the Structure Plan Map (Figure 1).

This bushfire assessment assumes that relevant government approvals for any vegetation modification will be achieved prior to the commencement of any clearing.

The area has been assessed for environmental values using a simple desktop review. Protected Matters Search Tool (accessed 6 November 2018) has identified with a number of threated flora species or species habitat likely to occur within the area (Table 2). The Flora and Fauna Significance Assessment did not find any threated flora within the Site.

Table 2 Summary of Environmental Values

Environmental Value	Yes or No	If Yes - describe
Conservation Covenants	No	Not applicable
Bushfire Forever Sites	No	Not applicable
Conservation Category Wetlands and Buffer	No	Not applicable
Threatened Ecological Communities (TECs)	No	Not applicable
Declared Rare Flora (DRF)	Yes	A number of DRF species of species habitat may occur within the area (PMST report, 6/11/18).
Significant through Local Planning or Biodiversity Strategy	No	Not applicable

3.2 Re-vegetation / Landscape Plans

No active revegetation is required. Any future planting of vegetation, or a failure to maintain Asset Protection Zones as detailed in this BMP can change the BAL ratings significantly

4 Assessment Against the Bushfire Protection Criteria

4.1 Compliance with the Acceptable Solutions for each Element

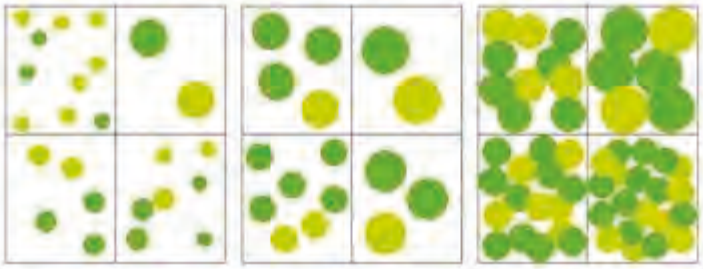
Bushfire Protection Criteria - Element 1 - Location		
Intent: To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.		
Performance Principle P1: The intent may be achieved where the strategic planning proposal, subdivision or development application is located in an area where the bushfire hazard assessment is or will, on completion, be moderate or low OR a BAL-29 or below applies AND the risk can be managed. For unavoidable development in areas where BAL-40 or BAL-FZ applies, demonstrating that the risk can be managed to the satisfaction of DFES and the decision-maker.		
Acceptable Solution	**Compliance**	**Assessment Statements**
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.	Compliance with this element is achieved.	Lot 362 includes an existing dwelling which does not require a BAL assessment. If additions or alterations are planned, a setback of 27 metres from any Class A – Forest vegetation downslope at >0 to 5 degrees and 21 metres from any Class A Forest upslope / flat will be required to achieve a BAL-29 rating. An indicative maximum APZ has been mapped around the building envelope, to illustrate that the entire building envelope can achieve a BAL-29 rating subject to vegetation modification within the lot. Any dwelling eventuating within Lot 361 will require an APZ of 27 metres to Class A Forest Downslope >0 to 5 degrees and 21 metres to Class A Forest upslope / flat meeting the requirements of the Guidelines to be established and maintained to achieve the setbacks required for BAL-29. For the purposes of this report, an indicative APZ based on the edge of the building envelope has been used. Any actual APZ eventuating within the Site will be significantly

Bushfire Protection Criteria – Element 1 - Location	
	smaller, based on the edge of a proposed dwelling to achieve a BAL-29 rating. Due to the environmental values of this Site, additional clearing of vegetation to achieve a lower BAL rating will not be supported.

Bushfire Protection Criteria – Element 2 – Siting and Design		
Intent: To ensure that the siting and design of development minimises the level of bushfire impact.		
Performance Principle P2: The siting and design of the strategic planning proposal, subdivision or development application, including roads, paths and landscaping, is appropriate to the level of bushfire threat that applies to the site. That it incorporates a defendable space and significantly reduces the heat intensities at the building surface thereby minimising the bushfire risk to people, property and infrastructure, including compliance with AS 3959 if appropriate.		
Acceptable Solution	**Compliance**	**Assessment Statements**
A2.1 Asset Protection Zone (APZ) Every habitable building is surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements: • Width: Measured from any external wall or supporting post or column of the proposed building, and of sufficient size to ensure the potential radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29) in all circumstances. • Location: the APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity. • Management: the APZ is managed in accordance with the requirements of 'Standards for Asset Protection Zones' (Figure 6).	Compliance with this element is achieved.	Asset Protection Zones for BAL-29 will be achieved with the provision of a low-fuel zone established and maintained to the standards of the Guidelines (Figure 6), around any habitable dwelling within the Site, 27 metres to any Class A Forest Downslope >0 to 5 degrees and 21 metres to any Class A Forest upslope / flat. Asset Protection Zones are illustrated spatially in Figure 9, with the APZs being based off the edge of the building envelopes. The actual APZ eventuating within the Site will be based off the footprint of any dwelling to achieve a BAL-29 rating.

- **Fences:** within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.
- **Objects:** within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.
- **Fine Fuel load:** combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare.
- **Trees (> 5 metres in height):** trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy.

Figure 18: Tree canopy cover – ranging from 15 to 70 per cent at maturity



- **Shrubs (0.5 metres to 5 metres in height):** should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m² in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height):** can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.
- **Grass:** should be managed to maintain a height of 100 millimetres or less.

Figure 6 Requirements for Asset Protection Zones (WAPC, Dec 2017)

Bushfire Protection Criteria – Element 3 – Vehicular Access		
Intent: To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event.		
Performance Principle P3: The internal layout, design and construction of public and private vehicular access and egress in the subdivision/ development allow emergency and other vehicles to move through it easily and safely at all times.		
Acceptable Solution	**Compliance**	**Assessment Statements**
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.	Compliance with this element is achieved.	Both lots are accessed from Kevill Road via existing gravel driveways. Kevill Road is a loop road, which can be taken to the south or to the north and then west to access Wallcliffe Road. Wallcliffe Road can then be taken west to Caves Road or east to Bussell Highway.
A3.2 Public Road A public road is to meet the requirements in Table 6, Column 1.	Compliance with this element is achieved.	No new roads are proposed as part of this development. All roads listed above are well built public roads.
A3.3 Cul-de-sac (including a dead-end road) Where no alternative exists (i.e. the lot layout already exists, demonstration required): • Requirements in Table 6, Column 2; • Maximum length: 200 m (if public emergency access is provided between cul-de-sac heads maximum length can be increased to 600 m provided no more than eight lots are serviced and the emergency access way is no more than 600 m); and • Turn-around area requirements, including a minimum 17.5 metre diameter head.	Not applicable to this Site.	

Bushfire Protection Criteria – Element 3 – Vehicular Access		
A3.4 Battle-axe Where no alternative exists, (demonstration required): • Requirements in Table 6, Column 3; • Maximum length: 600 m; and • Minimum width: 6 m.	Compliance with this element is achieved.	Lot 362 includes a battle-axe, 6 metres in width, meeting the requirements outlined in the Guidelines. This battle-axe includes the existing driveway which is currently used to access the existing house (Figure 7). The location of this existing dwelling and the shape of the Site makes a battle-axe driveway unavoidable.
A3.5 Private driveway >50m • Requirements in Table 6, Column 3; • Required where a house site is more than 50 m from a public road; • Passing bays: every 200 m with a minimum length of 20 m and a minimum width of 2 m; • Turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 m (i.e. kerb to kerb 17.5 m) and within 50 m of a house; • Any bridges or culverts are able to support a minimum weight capacity of 15 t; and • All-weather surface (i.e. compacted gravel, limestone or sealed).	Compliance with this element is achieved.	The private driveway to access Proposed Lot 361 is less than 50 metres. The private driveway to access Proposed Lot 362 is approximately 180 metres in length and meets the requirements of the Guidelines (Figure 7), including a 4 metre wide constructed gravel driveway and 6 metre wide horizontal clearance.

Bushfire Protection Criteria – Element 3 – Vehicular Access	
A3.6 Emergency Access Way Where no alternative exists (demonstration required), an emergency access way is to be provided as an alternative link to a public road during emergencies: • Requirements in Table 6, Column 4; • No further than 600 m 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; and • Must be signposted	Not applicable to this Site.

Bushfire Protection Criteria – Element 3 – Vehicular Access		
A3.7 Fire Service Access Routes (perimeter roads) 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 firefighting purposes: • Requirements Table 6, Column 5; • Provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency; • Surface: all-weather (i.e. compacted gravel, limestone or sealed); • Dead end roads are not permitted; • Turn-around areas designed to accommodate type 3.4 appliances and to enable them to turn around safely every 500 m (i.e. kerb to kerb 17.5 m); • No further than 600 m from a public road; • Allow for two-way traffic; and • Must be signposted.	Not applicable to this Site.	
A3.8 Firebreak Width Lots greater than 0.5 ha must have an internal perimeter firebreak of a minimum width of 3 m or to the level as prescribed in the local firebreak notice issued by the local government.	Compliance with this element is achieved.	The lots are classified as 'All lots 4001 m^2 and Over' on the Shire of Augusta Margaret River's Firebreak Notice (Appendix A). This requires minimum 2m wide internal firebreaks immediately inside all boundaries of the lot (Refer to Figure 8). It is proposed that the existing firebreaks around the lot will be sufficient, to avoid the unnecessary clearing of native vegetation between the two lots to create an additional firebreak.

Bushfire Protection Criteria - Element 4 - Water		
Intent: To ensure that water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.		
Performance Principle P4: The subdivision, development or land use is provided with a permanent and secure water supply that is sufficient for fire fighting purposes.		
Acceptable Solution	**Compliance**	**Assessment Statements**
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.	Not applicable to this Site.	
A4.2 Non-reticulated Areas Water tanks for fire fighting purposes with a hydrant or standpipe are provided: • Volume: minimum 50,000 L per tank; • Ratio of tanks to lots: minimum one tank per 25 lots (or part thereof); • Tank location: no more than 2 km to the further most house site within the residential development to allow a 2.4 fire appliance to achieve a 20 minute turnaround time at legal road speeds; • Hardstand and turn-around areas suitable for a type 3.4 fire appliance (i.e. kerb to kerb 17.5 m) are provided within 3 m of each water tank; and • Water tanks and associated facilities are vested in the relevant local government.	Not applicable to this Site.	

Bushfire Protection Criteria - Element 4 - Water		
A4.3 Individual lots within non-reticulated areas (only for 1 additional lot) Single lots above 500 m^2 need a dedicated static water supply on the lot that has the effective capacity of 10,000 L.	Compliance with this element is achieved.	A dedicated 10,000L water tank with access for fire fighting purposes shall be installed within Lot 361. Lot 362 has an existing water tank for fire fighting purposes (Figure 9). A fire hydrant is located on Kevill Road, south of the Site (Figure 8).

Figure 7 Private driveway to access Proposed Lot 362

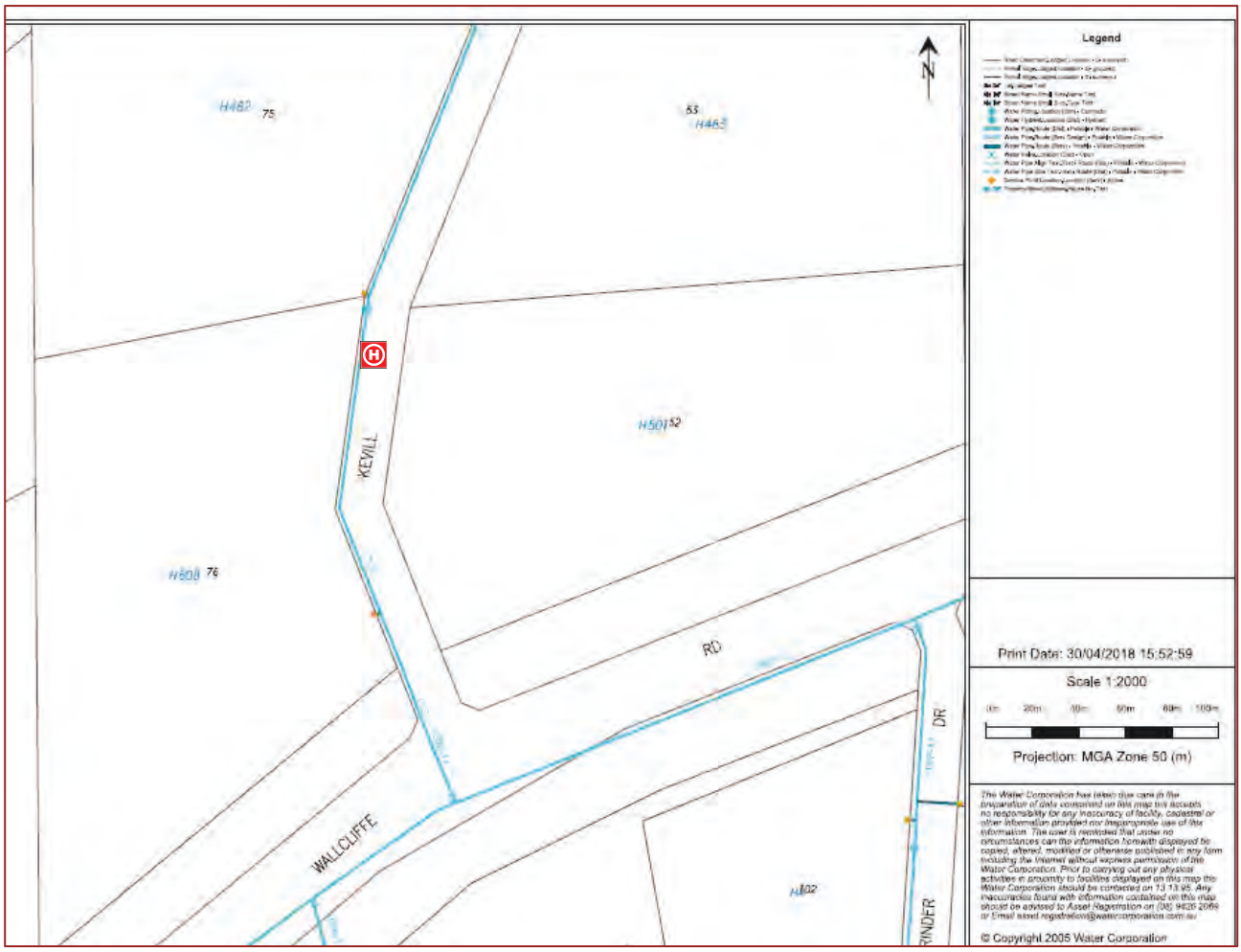


Figure 8 Fire hydrant located on Kevill Road, depicted by a H

4.2 Performance Based Solutions

The Site assessment was conducted in accordance with AS 3959-2018 Simplified Procedure (Method 1). The Proposal meets all the compliance requirements for the four Bushfire Protection Criteria Elements. There are no performance-based solutions proposed.

4.3 Summary of the Assessment Outcomes

This plan provides acceptable solutions and responses to the performance criteria outlined in the Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017).

The layout and design of the development is such that no structure will be required to be exposed to a radiant heat flux in excess of 29kW/m^2 (BAL-29) provided the management as outlined in the plan is adopted.

Any class 1,2, 3 or associated 10a structure that is to be constructed, or additions planned to existing dwellings shall be designed and built to conform with Australian Standards AS3959-2018:

- BAL-29: sections 3 & 7;
- BAL-19 sections 3 & 6; and
- BAL 12.5 sections 3 & 5.

A summary of the Bushfire Management Strategies to be implemented is provided in Figure 9.

Spatial representation of the proposed risk management measures

NOTES

Asset Protection Zone (APZ)

The minimum width for the APZ is the distance required to meet the BAL-29 setback, for this Site being 27 m to the Class A Forest-Downslope >0 to 5 degrees and 21 m for the Class A Forest-Upslope / Flat. The area between any dwelling and the classified vegetation is to be maintained as an APZ. The APZs are based off the edge of the building envelope for the purposes of this BMP, any APZ eventuating within the Site will be based on the exact footprint of an existing or proposed dwelling to achieve a BAL-29 rating.

Vegetation within the APZ is to comply with Schedule 1 Element 2 of the Guidelines noting that:

- Trees >5m in height are to be setback a minimum distance of 6m from the building with no branches overhanging the roof.
- Shrubs <5m in height are to be setback a minimum distance of 3m from the building, and not planted in clumps greater than 5 sqm
- Grass is to be maintained at less than 100mm in height.

In addition to the APZ, compliance with the Shire of Augusta-Margaret River's Bushfire Management Information Booklet is required.

The driveway access into Proposed Lot 362 is suitable for a fire truck with a minimum 4m trafficable surface. There is a turning tee provided near the existing dwelling. Compliance with the Guidelines (A3.5) will be maintained.

Any gates along the driveway will have a minimum width of 3.6m.

Interal firebreaks 3 m in width are required around the perimeter of the Site, to the standard in the Shire of Augusta-Margaret River's Bushfire Management Information Booklet.

A dedicated tank for firefighting purposes will be provided within each lot, with minimum 10,000L capacity and an 80mm female camlock coupling as preferred by the Shire of Augusta-Margaret River.

Installation and upkeep of the APZs, driveway, firebreaks and water tanks are the responsibility of the landowner. The measures listed above shall continue to be maintained in perpetuity.

LEGEND

- The Site
- Elevation (m) AHD
- Proposed Lots
- Existing Dwelling
- Building Envelopes
- Maximum Asset Protection Zone
- Distance
- Private Driveway
- Two metre wide internal firebreaks
- Water Tank

PROPERTY / ASSESSMENT DETAILS

Client: R Hooper
Property Address: 72 Kevill Road, Margaret River
Project No: 18528
Prepared by: K Lamp
Accreditation Level: Level 2
Accreditation Number: 38253
Accreditation Expiry Date: 02/21

N

0 25 50
Meters

ecosystem solutions
www.ecosystemsolutions.com.au
(08) 9759 1960

Figure 9 Map of Bushfire Management Strategies

5 Responsibilities for Implementation and Management of the Required Bushfire Measures

The responsibilities for the Developer, Builder, Landowner/Occupier and Local Government are outlined in Table 3, Table 4, Table 5 and Table 6 respectively.

Table 3 Developer Responsibilities

Number	Action	Due	Completed
1	Establish the Building Envelope within Lot 361 to the dimensions and standard stated in the Bushfire Management Plan.	Post planning approval and prior to lot sale	☐
2	Maintain the battle-axe driveway and private driveway as detailed in the Bushfire Management Plan until individual lots are sold.	Post planning approval and prior to lot sale	☐
3	Place a Section 70A notification on each Certificate of Title alerting prospective purchasers/landowners of the responsibilities set out in the approved Bushfire Management Plan.	Creation of titles and deposited plan	☐
4	Provide a copy and obtain endorsement of this Bushfire Management Plan by those with responsibility under this plan including Builders, Landowners/Occupiers and Shire of Augusta-Margaret River.	Post planning approval and prior to lot sale	☐

Table 4 Builder Responsibilities

Action	Action	Due	Completed
1	Be aware of the existence of any BMP that refers to the Site	Prior to any building work.	☐
2	Ensure the building or incidental structure to which a building permit applies is compliant on completion with the bushfire provisions of the Building Code of Australia (BCA) as it applies in WA.	Prior to any building work.	☐

Table 5 Landowner / Occupier Responsibilities

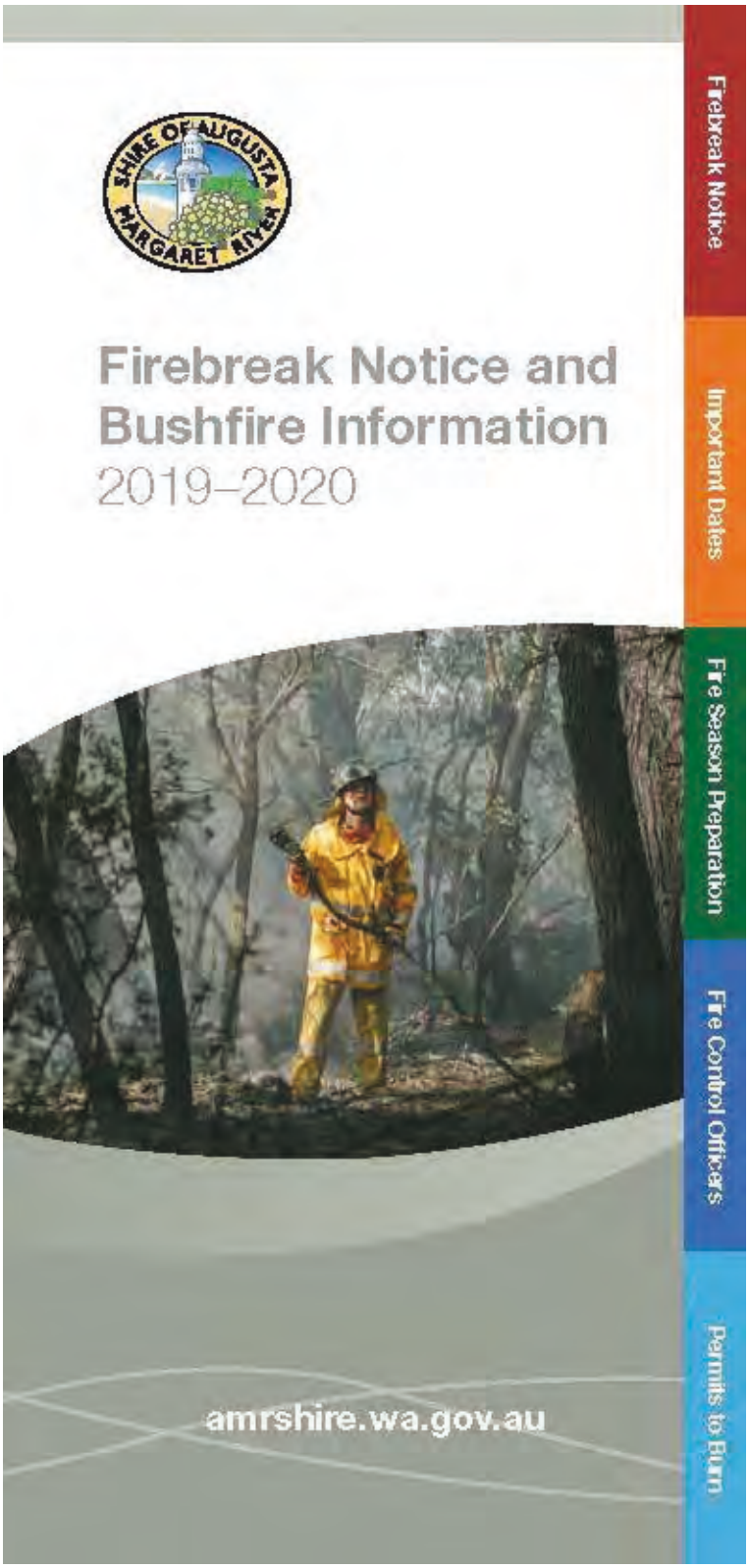
Number	Action	Due
1	Install a dedicated 10,000L water tank with access for firefighting purposes within Lot 361.	Prior to occupancy
2	Establish and maintain the Asset Protection Zone (APZ) to the dimensions and standard stated in the Bushfire Management Plan.	Ongoing

Number	Action	Due
3	Maintain existing Firebreaks within each Lot to comply with this Bushfire Management Plan and the Shire of Augusta-Margaret River's Bushfire Management Information Booklet.	Ongoing
4	Comply with the relevant local government annual firebreak notice issued under s33 of the *Bush Fires Act 1954*.	Ongoing
5	Maintain vehicular access routes within the lot to the required surface condition and clearances.	Ongoing
6	Maintain the water tanks and associated fittings and vehicular access in good working condition.	Ongoing
7	Ensure that any builders (of future structures on the Lot) are aware of the existence of this Bushfire Management Plan and the responsibilities it contains regarding the application of construction standards corresponding to the determined BAL rating.	Ongoing
8	Ensure all future buildings the landowner has responsibility for, are designed and constructed in full compliance with: (a) the requirements of the WA Building Act 2011 and the bushfire provisions of the Building Code of Australia (BCA) as applicable to WA; and (b) with any identified additional requirements established by this BMP or the relevant local government.	Ongoing
9	Updating the Bushfire Management Plan may be required to ensure that the bushfire risk management measures remain effective. Bushfire plans do not expire and are a 'living document'. Updating is required in certain circumstances, including (but not limited to) if site conditions change, if further details are required at subsequent development stages or to reflect new technologies or methodologies in best practice bushfire risk management ('Guidelines' s4.6.4).	Ongoing

Table 6 Shire of Augusta-Margaret River Responsibilities

Number	Action	Due
1	Monitor landowner compliance with the annual firebreak notice.	Ongoing
2	Develop and maintain district bushfire fighting services and facilities.	Ongoing
3	Promote education and awareness of bushfire prevention and preparation measures though the community.	Ongoing
4	Administer the requirements of the *Bush Fires Act 1954*, *Planning and Development Act 2005* and the *Building Act 2011*.	Ongoing

Appendix A Shire of Augusta-Margaret River Firebreak Notice and Bushfire Information


Firebreak Notice
Important Dates
Fire Season Preparation
Fire Control Officers
Permits to Burn
SHIRE OF AUGUSTA MARGARET RIVER
Firebreak Notice and Bushfire Information
2019–2020
amrshire.wa.gov.au

Definitions

For the purpose of this notice the following definitions apply:

Asset Protection Zone (APZ) means the area of land within twenty (20) metres from the external walls of any habitable building (or a distance as otherwise stated in your BAL assessment if your property boundary is less than 20 metres from the external walls of a building). The fuel loading (flammable material) in the APZ is to be reduced and maintained to less than two (2) tonnes per hectare, trees must not be closer than two (2) metres to a building (evidently reticulated and maintained, zero fuel garden beds may be acceptable), and trees must not overhang a building within four (4) metres of the external roof.

Bushfire Management Plan means a plan that has been developed and approved by the Shire to reduce and mitigate fire hazards within a subdivision, lot or other area of land within the district.

Driveway / Access Way means the access route from the road to your main dwelling. This should be minimum four (4) metres wide with a minimum four (4) metre vertical clearance to allow a fire appliance to access your property.

Firebreak means an area of land that has been cleared of all trees, bushes, grasses and any other object or thing which may be flammable, leaving a surface of bare mineral earth a minimum of two (2) metres wide, with a four (4) metre high vertical clearance. Firebreaks will not stop fires from spreading, but they may prevent small fires from escaping your property and landscape fires from entering. More importantly, firebreaks provide safer access for yourself and firefighters to conduct fire suppression activities on your land.

Flammable Material means any plant, tree, grass, vegetable, substance, object, thing or material that may or is likely to catch fire and burn.

Plantation means any area of planted pines, eucalypt, hardwood or softwood trees exceeding three (3) hectares in area.

Trafficable means a firm stable surface, unhindered and without obstruction that a 4WD fire appliance is able to travel along from one point to another. A firebreak must not terminate without provision to egress to a safe place or a cleared turn around area of not less than a nineteen (19) metre radius.

Firebreak Notice

Bush Fires Act 1954

The following Notice is hereby given to all owners and/or occupiers of land within the Shire of Augusta Margaret River:

Pursuant to the powers contained in section 33 of the *Bush Fires Act 1954*, you are hereby required and therefore ordered by the local government to carry out fire prevention work in accordance with the requirements of this Notice, on or before 30 November 2019.

All land is to be maintained up to and including 12 May 2020 as specified in this Notice. All previous versions of this document are hereby cancelled. Properties subject to an approved Bushfire Management Plan must comply with the requirements of their Plan.

Rangers will be inspecting properties for compliance from 1 December 2019. Persons who fail to comply with the requirements of this Notice may be issued with an infringement notice ($250) or prosecuted with a modified penalty (up to $5,000). The Shire of Augusta Margaret River may carry out the required work on the land at cost to the owner/occupier.

Can We Access Your Property?

DID YOU KNOW?

In order for fire appliances to access your property safely, firebreaks should be three (3) metres wide and have at least four (4) metres vertical clearance. Fire appliances must be able to fit through gates on your property. The average fire appliance is nine (9) metres in length.

DON'T FUEL FIRES

- x Don't have thick vegetation near your home.
- ✓Clear all flammable material from around all structures.
- ✓Store firewood, timber, petrol and kerosene well away from the house.
- ✓Clear all dead leaves out of gutters regularly.
- ✓Remove dead trees and branches which, when burning, could drop on your roof.
- ✓Rake up leaves, twigs and dead material regularly.
- ✓Burn off dry grass and vegetation at the approved times and in the approved manner or consider using alternative methods to burning.

Up to 1 cubic metre (a 6x4 trailer load) of uncontaminated green waste can be disposed of at the Davis Road Waste Management Facility and up to 2 cubic metres at the Cowaramup and Kudardup Transfer Stations, at no cost to Shire residents. The new FOGO bin is emptied weekly and is a great way to dispose of garden waste

Important Dates

Restricted Burning Period 1 (spring/summer)

Permits Required
9 November to 22 December

Deadline for Prevention Works

Installed on or before 30 November
Maintained up to and including 12 May

Prohibited Burning Period

Burning Prohibited
23 December to 14 March

Restricted Burning Period 2 (autumn)

Permits Required
15 March to 12 May

PLEASE NOTE

- These dates can change at short notice due to variable weather conditions so you should always call your area FCO or the Shire Rangers to check prior to lighting up.
- Burning is prohibited on days where the Fire Danger Rating is Very High or above.
- **A TOTAL FIRE BAN** may be declared by the DFES Commissioner at any time. If, declared a person must not light any fire or undertake any activity that may cause a fire.
- Fire danger ratings change daily. To check the fire danger rating go to www.emergency.wa.gov.au or contact Shire Rangers on 9780 5695.

Fire Season Preparation

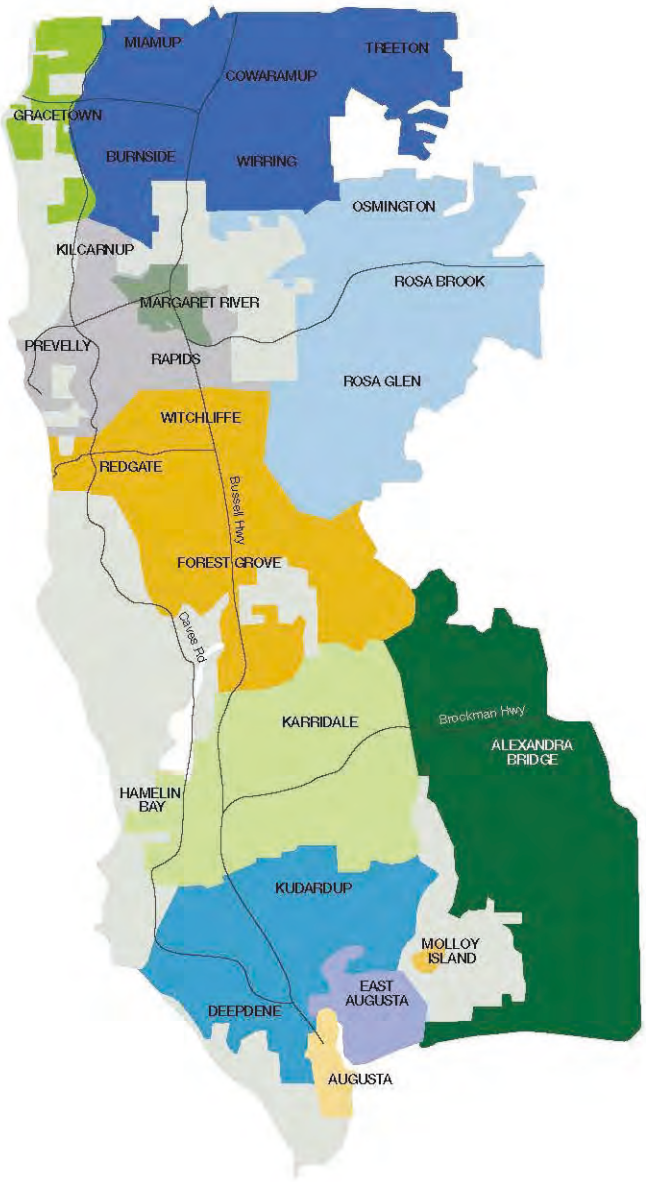
All land owners/occupiers must carry out fire prevention work in accordance with the requirements of this Notice on or before 30 November 2019. All land is to be maintained up to and including 12 May 2020.

	Firebreaks
All Lots 4000m² and under	• 2m wide firebreaks required around all piles of garden refuse and/or wood stacks
Residential/ Rural Residential Lots 4001m² and over	• Minimum 2m wide trafficable firebreaks required inside all boundaries • 2m wide firebreaks around all piles of garden refuse/wood stacks, fuel and fodder
Rural Lots (excluding plantations, vineyards, orchards and olive groves)	• Minimum 2m wide trafficable firebreaks required within 100 metres of a boundary that abuts a road reserve • 2m firebreaks around all piles of garden refuse/wood stacks, fuel and fodder
Plantations	• 10m wide mineral earth firebreak required around each cell or block. Minimum 3m must be trafficable • 2m firebreaks around all piles of garden refuse/wood stacks, fuel and fodder
Vineyards, Orchards and Olive Groves	• 5m wide mineral earth firebreak around each cell or block. At least 3 metres must be trafficable • 2m wide firebreaks around all piles of garden refuse/wood stacks, fuel and fodder

If it is considered impractical to clear firebreaks or to carry out any other works as required by this Notice, you may apply to the Shire of Augusta Margaret River for a VARIATION to the Firebreak Notice. Applications must be completed on the approved form, which is available upon request from the Shire or can be downloaded via the Shire's website at amrshire.wa.gov.au. Applications must be submitted to the Shire of Augusta Margaret River no later than 22 November.

Asset Protection Zone (APZ)	Grass slashed/ mowed to less than 10cm	Driveway/ Access way	Gutters and rooftops free of debris
✓	✓	✓	✓
✓	Vacant land/cleared blocks only	✓	✓
✓	Vacant land/cleared blocks only	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

Fire Control Officer Area Map



Fire Control Officer Contact Details

Brigade	Fire Control Officer(s)
Alexandra Bridge	**Alexandra Bridge** Tony Mostert: 0428 461 388
Augusta	**Augusta** Brendan Jordan: 0477 970 415
Cowaramup	**Burnside** Tim Garstone: 0428 555 292 **Cowaramup** Ian Earl: 0418 932 847 **Miamup** Billy Pascoe: 0405 965 447 **Treeton** Geoff Jenkins: 0407 776 920 **Wirring** Greg Tennant: 0487 677 062
East Augusta	**East Augusta** Peter Brindley: 0439 869 680
Gracetown	**Gracetown** Peter Delfs: 0427 555 491
Karridale	**Hamelin Bay** Simon Hanson: 0428 147 001 **Karridale** Paul Vanzetti: 0447 929 057
Kudardup	**Deepdene** Scott Hamilton: 0427 778 840 **Kudardup** Matthew Nield: 0427 772 719
Margaret River	**Margaret River** Leith Jones: 0417 960 514
Molloy Island	**Molloy Island** John Matten: 0427 440 620
Rosa Brook	**Osmington** Keith Scott: 0407 880 877 **Rosa Brook** Mark Ridge: 0408 945 684 **Rosa Glen** Andrew Newnham: 0491 313 968
Wallcliffe	**Kilcarnup** Ian Dowling: 0419 969 642 **Prevelly** Bob Baker: 0438 669 701 **Rapids** David Kelly: 0428 387 286
Witchcliffe	**Forest Grove** Larry Brennan: 0419 938 923 **Redgate** Richard Nash: 0419 951 511 **Witchcliffe** Diane Holland: 0427 930 735

General Information

BURNING OF GARDEN REFUSE

You may burn one small heap of up to one (1) cubic metre during the spring/summer Restricted Burning Period (up until commencement of the Prohibited Burning Period at midnight on 21 December 2019) without a Permit. It cannot be lit before 6pm and must be fully extinguished by 11pm. A courtesy call to your area FCO is recommended.

A PERMIT IS REQUIRED to burn garden refuse during the autumn Restricted Burning Period from 15 March to 12 May.

WOOD/SOLID FUEL BBQS AND PIZZA OVENS

Use of wood/solid fuel bbqs are prohibited on days where the fire danger rating is VERY HIGH or above. Use of wood/solid fuel pizza ovens are prohibited on days where the fire danger rating is EXTREME or above. Use of all wood/solid fuel bbqs and pizza ovens are prohibited during a TOTAL FIRE BAN.

CAMPFIRES

Campfires are NOT permitted;

- on days where the fire danger rating is VERY HIGH or above
- at any time during the PROHIBITED Burning Period
- in a designated campground where the camp ground has prohibited the lighting of fires at any time
- on public land, unless purpose built campfire pits have been provided by the owner of the land and permission to use them has been given.

Campfires are permitted on private property in the RESTRICTED Burning Periods, but cannot be lit before 6pm and must be fully extinguished by 11pm. Consent from the land owner must be given (and proof of consent available if requested by an Authorised Person).

Permits to Burn

A permit to burn is required during the RESTRICTED Burning Periods.
To obtain a Permit, contact your area Fire Control Officer (FCO) by referring to the FCO map in this notice. Where the FCO is unavailable the Chief Bush Fire Control Officer or the Shire Rangers can also issue Permits. Please allow up to 72 hours for your Permit to be issued.

Plan your burn in advance
When contacting the FCO to request a Permit, have the following information ready to provide;

- the size of your burn
- what you are burning
- the address of the burn
- the name and contact number of the Permit holder (Note: the Permit holder must be the land owner)

You must notify your adjoining land owners 24 hours in advance of your intention to burn.

Prior to burning, you must register your Permit with the Shire, DBCA and DFES. To do this call the numbers on the Permit and have your Permit handy as the operator will need the Permit details.

Failure to: obtain a Permit, comply with all Permit conditions, burn without a Permit, or burn in contravention to any information provided in this Notice, may result in a modified penalty of $250 and up to $5,000 should the matter go before the courts.

PLEASE NOTE
A PERMIT TO BURN IS NOW REQUIRED between 15 March – 12 May to burn garden refuse (one small heap up to one (1) cubic metre)

Permits to Burn

Key Contacts

Chief Bush Fire Control Officer
0419 525 843

Deputy Chief Bush Fire Control Officer
0419 628 465

Shire Rangers
9780 5695

DFES Emergency Info Line
13 DFES (133 337)
Follow DFES on Twitter and Facebook
or listen to ABC Radio South West WA

DIAL 000

TO REPORT ALL FIRES OR LIFE THREATENING EMERGENCIES

PO Box 61, Margaret River, Western Australia 6285
T (08) 9780 5255 | F (08) 9757 2512
amrshire@amrshire.wa.gov.au | amrshire.wa.gov.au

APPENDIX 5

Aboriginal Heritage Inquiry
16 August 2019
Prepared by: Department of Planning, Lands and Heritage

Aboriginal Heritage Inquiry System

Map of Registered Aboriginal Sites

Search Criteria

No Registered Aboriginal Sites in Certificate of Title - 1700/123

Disclaimer

The *Aboriginal Heritage Act 1972* preserves all Aboriginal sites in Western Australia whether or not they are registered. Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at heritageenquiries@dplh.wa.gov.au and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land within or adjacent to the following Indigenous Land Use Agreement(s): South West Boojarah #2 People ILUA.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Mines, Industry Regulation and Safety (DMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at https://www.dpc.wa.gov.au/swnts/South-West-Native-Title-Settlement/Pages/default.aspx.

Further advice can also be sought from the Department of Planning, Lands and Heritage at heritageenquiries@dplh.wa.gov.au.

Copyright

Coordinates

Map coordinates (MGA Zone 50 Easting/Northing metres) are based on the GDA 94 Datum.

Aboriginal Heritage Inquiry System

Map of Registered Aboriginal Sites

Legend

- Registered Aboriginal Site
- Search Area
- Town
- Road
- River
- Local Government Authority

0.09 kilometres

Map Scale 1 : 2,700

MGA Zone 50 (GDA94)

Aboriginal Heritage Inquiry System

List of Other Heritage Places

Search Criteria

No Other Heritage Places in Certificate of Title - 1700/123

Disclaimer

The Aboriginal Heritage Act 1972 preserves all Aboriginal sites in Western Australia whether or not they are registered. Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at heritageenquiries@dplh.wa.gov.au and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land within or adjacent to the following Indigenous Land Use Agreement(s): South West Boojarah #2 People ILUA.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Mines, Industry Regulation and Safety (DMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at https://www.dpc.wa.gov.au/swnts/South-West-Native-Title-Settlement/Pages/default.aspx.

Further advice can also be sought from the Department of Planning, Lands and Heritage at heritageenquiries@dplh.wa.gov.au.

Copyright

Coordinate Accuracy

Coordinates (Easting/Northing metres) are based on the GDA 94 Datum. Accuracy is shown as a code in brackets following the coordinates.

Department of Planning, Lands and Heritage

Aboriginal Heritage Inquiry System

Map of Other Heritage Places

For further important information on using this information please see the Department of Planning, Lands and Heritage's Disclaimer statement at https://www.dplh.wa.gov.au/about-this-website

Legend

- Other Heritage Place
- Search Area
- Town
- Road
- River
- Local Government Authority

0.09 kilometres

Map Scale 1 : 2,700

MGA Zone 50 (GDA94)