



Development Services Attachments Wednesday, 18 November 2015

REPORT NUMBER	REPORT TITLE AND ATTACHMENT DESCRIPTION	PAGE NUMBER(S)
9.1.6	Proposed Scheme Amendment No. 56 - Rezone from 'Agricultural Resource' to 'Rural Smallholdings' – Lots 1 & 2 Tea Tree Road, Bindoon 1. Scheme Amendment document includes, but not limited to: <ul style="list-style-type: none">• Locality Plan• draft Structure Plan• Flora and Fauna Survey• Bushfire Management Plan	1

LOTS 1 & 2 TEA TREE ROAD, BINDOON

**SHIRE OF CHITTERING
LOCAL SCHEME AMENDMENT NO. 56**



**SHIRE OF CHITTERING
TOWN PLANNING SCHEME NO. 6
AMENDMENT NO. 56**

LOTS 1 & 2 TEA TREE ROAD, BINDOON
SHIRE OF CHITTERING

PREPARED FOR
MAROU PROPERTY DEVELOPMENTS PTY LTD

BY
WHELANS TOWN PLANNING

OCTOBER 2015

SHIRE OF CHITTERING
TOWN PLANNING SCHEME NO. 6

AMENDMENT NO. 56

LOTS 1 & 2 TEA TREE ROAD, BINDOON

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PLANNING AND DEVELOPMENT ACT 2005
RESOLUTION DECIDING TO AMEND A LOCAL PLANNING SCHEME

SHIRE OF CHITTERING
TOWN PLANNING SCHEME NO. 6

AMENDMENT NO. 56

RESOLVED that the Council, in pursuance of Section 75 of the Planning & Development Act 2005, amend the above local planning scheme by:

1. Rezoning Lots 1 & 2 Tea Tree Road, Bindoon from 'Agricultural Resource' to 'Rural Smallholdings' and amending the Scheme Map accordingly.

Dated this _____ day of _____ 2015

CHIEF EXECUTIVE OFFICER

**MINISTER FOR PLANNING
PROPOSAL TO AMEND A TOWN PLANNING SCHEME**

LOCAL AUTHORITY	Shire of Chittering
DESCRIPTION OF TOWN PLANNING SCHEME	Town Planning Scheme No. 6
TYPE OF SCHEME	District Scheme
SERIAL NUMBER OF AMENDMENT	Amendment No. 56
PROPOSAL	To rezone Lots 1 & 2 Tea Tree Road, Bindoon from 'Agricultural Resource' to 'Rural Smallholdings', to facilitate development of the land in accordance with the 'Rural Smallholdings' zone.

SCHEME AMENDMENT REPORT

LOTS 1 & 2 TEA TREE ROAD BINDOON



Original timber posts set out on Lot 1 for vineyard (2012)

1.0 INTRODUCTION

This report presents a proposal to initiate a Town Planning Scheme Amendment to the Shire of Chittering Town Planning Scheme No. 6 (TPS 6). The proposal seeks to rezone Lots 1 & 2 Tea Tree Road, Bindoon ("the subject site") from "Agricultural Resource" to "Rural Smallholdings".

The report provides a description of the subject site, details of the proposal and town planning justification. A draft Structure Plan (Appendix 4) has been prepared as supporting information to this proposed Local Scheme Amendment. However formal Structure Plan approval is not being sought as part of this application to rezone the subject site.

1.1 Location

Lots 1 & 2 (formerly Lot 102) Tea Tree Road, Bindoon is situated within the Shire of Chittering approximately 7 kilometres south-west of the Bindoon townsite and approximately 85 kilometres north-east of Perth. **Figure 1** is a location plan of the subject site. The combined area of Lots 1 & 2 is approximately 483.9 hectares and the property has frontage to Tea Tree Road along the northern boundary of approximately 2,661 metres.

Tea Tree Road is presently a gravel road serving the large rural properties west of Bindoon. Brennan Road runs along the property's western boundary, however, the road is not formally constructed and is also a gravel road. **Figure 2** shows the cadastral boundaries and aerial view of the subject site.

1.2 Landownership

The (2) land parcels forming the subject site are in ownership of M & I Marouchtchak. The legal description and area of each land parcel is set out in Table 1 below.

Table 1. Land description and area of lots comprising subject site

Lot	Plan	Volume	Folio	Area (ha)
1	41201	2618	80	433.81
2	41201	2618	81	50.09
TOTAL				483.90

2.0 SITE CONTEXT AND DESCRIPTION

2.1 Existing Land Use

The subject site has an area of 483.9 hectares and in the past it has been used for grazing with occasional cereal and lupin crops. Most of the land has been cleared for agricultural pursuits but there are some stands of remnant vegetation left on the property. The property is currently being used for grazing. Rows of *Tagasaste* have been planted in the past in the central area of the subject site by the landowner as supplementary stock feed.

2.2 Surrounding Context

The predominant surrounding land use is rural based, comprising of agricultural activities and rural residential living (refer to **Figure 3**). To the east of the subject land (excluding neighbouring Lot 4) many of the original rural properties in the area have been subdivided into predominantly 2.0 – 2.5 hectare lots supporting rural-residential living, with some larger 3 - 4 hectare lots within those developments. The neighbouring land uses to the south, north, east and west are predominantly large agricultural lots or undeveloped land containing remnant vegetation.

Lot 101 to the west has been recently rezoned to 'Rural Conservation' with approval for cluster rural residential development. On the opposite side of Tea Tree Road to the north is the new Parkwood Springs Estate which has been approved and subdivided into 4 hectare rural residential lots.

The subject site is strategically located to provide a transitional land use between 'Rural Conservation' and 'Agricultural Resource' land and the rural-residential living precincts to the east. This will be further discussed in the report as town planning rationale for the proposed rezoning to 'Rural Smallholdings'.

2.3 Opportunities and Constraints

A Land Capability Assessment (**Appendix 1**) , was undertaken by Landform Research in May 2000. The assessment was based on field analysis on 3 May 2000, 48 soil auger holes, geological and hydrological mapping, knowledge of the area, aerial photography interpretation and published information.

Opportunities and constraints have been identified from the Land Capability Assessment. Opportunity exists to create a unique rural smallholdings development which is site specific and relevant to its local context. The following are some of the opportunities identified for the subject land:

Opportunities

- Proximity to Bindoon Townsite - The subject land is only 7 kilometres south-west of Bindoon townsite and all its services and amenities.
- Availability of Groundwater - The white sand filled valleys contain abundant accessible groundwater of high quality with the greatest volumes of groundwater being in the central east valley. The landowner currently has a licensed bore approved by Department of Water.
- Vineyard - Soils have potential for cottage and perennial horticulture, particularly on the eastern side where there is good sources of groundwater. The landowner has obtained a licence from Department of Water to extract groundwater for the proposed vineyard in the north-east of the property.
- Soils high in phosphorous retention - The presence of yellow sand with good phosphorous retention over most of the site is suitable for on-site wastewater treatment.
- Ridges Views - The form of ridges provide visual screening as well as aesthetical values such as views and cooling breezes in summer.

Constraints

- There are limited land and environmental constraints for the site which would preclude development of the site for rural smallholding land use.
- Soak/Dam - There is a small soak/dam near the eastern boundary which will limit development and setback of residences from the wetland area, for instance, nominal Department of Environment and Conservation 100m buffer for effluent disposal from soak/dam wetland.

The main opportunities and constraints for the site are shown in **Appendix 2** Opportunities and Constraints plan.

2.4 Topography

The land varies from two main ridges at just over 210m AHD in the south east corner and 205m AHD in the central west dropping to 175m in a gentle valley in the south western corner and 163m on the central eastern boundary.

2.5 Geology and Soils

Quartz sands cover the majority of the property with leaching of sand to white sand occurring in the valleys. The main soil types found on the subject land are Leached Sand over Gravel, Leached White Sand, Yellow Sand and Ferricrete and Gravel, which are typical for its position in the landscape. These sands are described as free draining calcareous sand of high permeability.



(Above) Typical view of white sands found on the property

2.6 Hydrology

Groundwater

Groundwater drains from each catchment, which is defined by the ridges found on the subject land, with the greatest volume of groundwater in the central east valley. The landowner has stated that the groundwater bore on the property is at a depth of around 30 metres.

Surface Water

Surface drainage is minimal due to the permeability of the soil. The only natural expression of surface water within the development site is a small flow emanating from the soak/dam in the central east. The direction of flow is east and surface drainage ultimately enters into Lake Chittering about 3 kilometres to the east of the subject land. There is no evidence of surface salinity and the Land Capability Assessment concluded that it is unlikely that salinity will be an issue in the future even though the land has been excessively cleared.

Wetlands

There are no natural wetlands or sumplands within the subject site. As mentioned above, there is a soak or dam in the eastern portion of the development site which feeds into a series of soaks and a dampland on the neighbouring eastern property. For the subject land, infiltration at source is the dominant hydrological characteristic in the pre-development catchment.

2.7 Vegetation & Flora

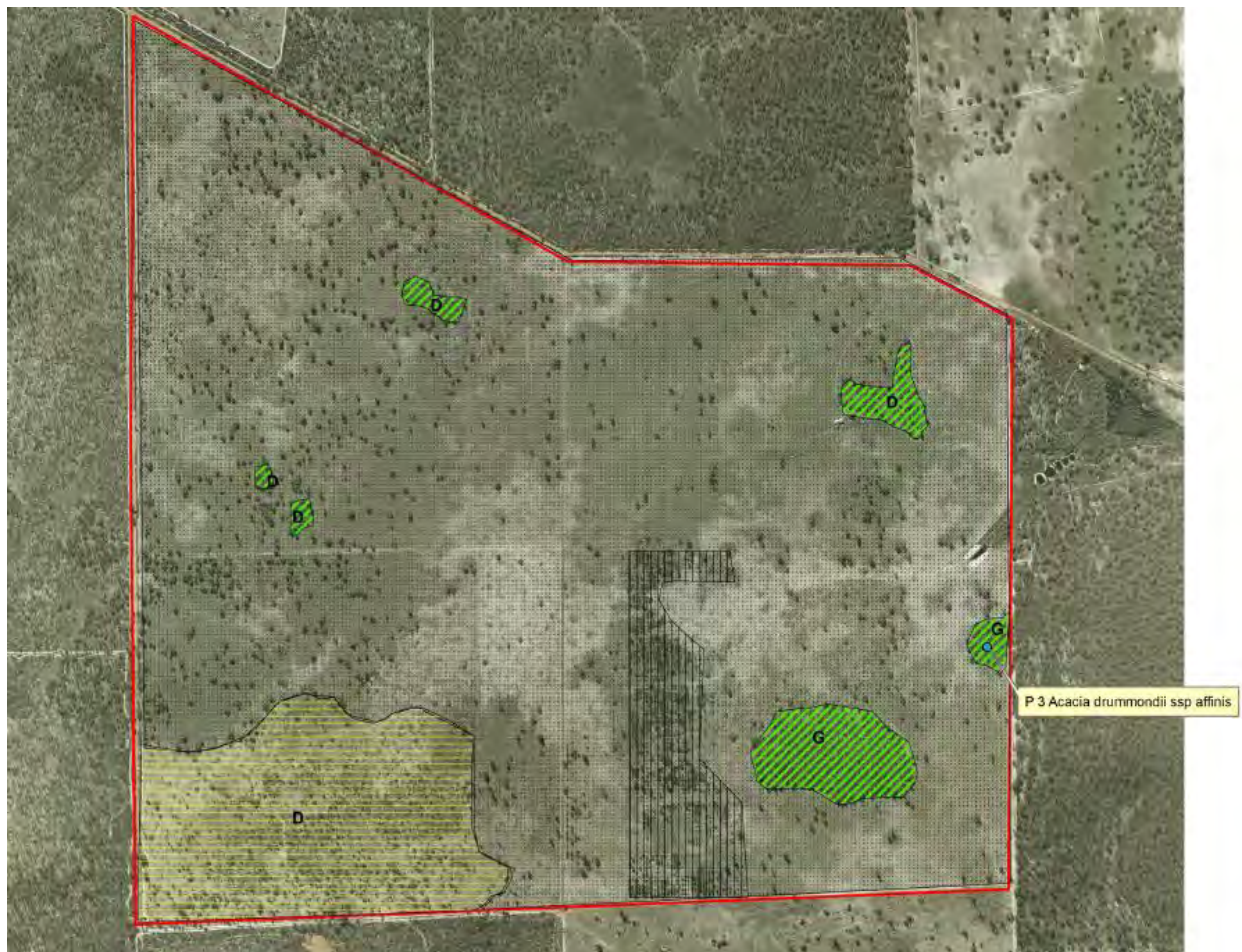
The subject land has been predominantly cleared apart from scattered remnant stands of trees. The main vegetation on the site can be described as tree remnants of Eucalyptus woodlands. Some of the gravel ridges have largely been left as remnant vegetation, but have been subjected to grazing to the extent that the vegetation diversity of species is limited both in numbers and density in most areas. The leached white sands in the west and south have been allowed to regenerate with there being evidence of some native species repopulating some areas of the property.

Landform Research in its Land Capability Assessment report made these comments on flora and vegetation on the property

"...Tagasaste has been planted in the central south on leached and yellow sands. The main vegetation on the site are tree remnants of Eucalypt woodlands. The following partial community types are represented by scattered Eucalypts and taller shrubs: Jarrah – Marri (Eucalyptus marginata, E. calophylla) Woodland occurs on the ferricrete/gravel and duricrust, grading into Jarrah Woodland where duricrust becomes significant and the soil more shallower. Marri Woodland was the dominant original vegetation on the yellow sand but changes to Pricklebark (E. tottiana) Woodland and remnant Banksia Woodland as the sand becomes more leached to the south west. Juncas pallidus occurs on wet pasture areas with the introduced Isolepis prolifera associated with the wet area around the soak in the central east. No evidence of dieback disease was noted." [page 4].

The 2011 Spring Flora and Vegetation Survey (Bio Diverse Solutions, 2012) (**Appendix 3**) identified the presence of Priority 3 species (*Acacia drummondii ssp affinis*) in the eastern portion of the development site.

The Survey recommends that development is restricted in this area and the remnant vegetation area containing Priority 3 species *Acacia drummondii ssp affinis* is fenced to exclude stock in order to maintain habitat for the flora species. It should be noted that the draft Structure Plan (**Appendix 4**) prepared does not propose any development in the eastern portion of the development site and therefore the P3 flora species in this area should be retained within a large lifestyle lot.



Location of Priority 3 Flora *Acacia drummondii ssp affinis* in the eastern portion of the subject site



(Above) View of artificial re-growth *Tagasaste* rows near the central part of the site used to supplement livestock feed

(Below) Typical parkland cleared areas of the subject site with remnant eucalyptus trees



2.8 Fauna

The only remnant vegetation on the development site is the scattered trees and native vegetation pockets on the ridges. Due to the clearing of the land there is limited natural habitat for fauna. The trees on the development site potentially provide habitat for birds, however, no Carnaby Black Cockatoos were observed during site inspections.

Wherever possible, significant healthy trees will be preserved as part of development of the site. Kangaroos are frequent and reptiles are likely to be found on the site, including skinks, goannas, snakes etc that are local to the area. Feral animals such as rabbits and foxes are also likely to be found on the development site.

Plantings and revegetation can form linkages between remnant pockets of vegetation and to the more substantially remnant vegetation on surrounding neighbouring properties. It is likely that the development site attracts fauna that migrates between the surrounding remnant vegetated areas that have been assessed as important biodiversity areas under the Shire's Biodiversity Strategy.

2.9 Indigenous & European Heritage

Indigenous Heritage

A search of the Department of Indigenous Affairs (DIA) Aboriginal Heritage Inquiry System indicates there are no registered Aboriginal Heritage sites within the development site.

It is important to note that the database of heritage sites held by the DIA is not comprehensive and there exists the potential for unknown sites of Indigenous heritage significance to be located inside or within close proximity to the subject land.

Archaeological monitoring is recommended for any eventual excavation works as part of subdivision and development. The process for protecting Indigenous heritage sites and considering proposals that may impact a known site is set out under the *Aboriginal Heritage Act 1972*. The Act protects all Aboriginal sites in WA whether they are known to the DIA or not.

European Heritage

There are no places or sites of cultural significance within the subject site area under the Shire of Chittering Municipal Heritage Inventory and State Heritage Register.

3.0 KEY PLANNING FRAMEWORK

3.1 SPP 2.5 'Agricultural and Rural Land Use Planning'

For lot sizes in Rural Smallholdings, SPP 2.5 sets out a range of 4ha – 40ha in size. The Policy recommends that a Rural Smallholding zone focus on providing rural living and rural lifestyle land use. SPP 2.5 generally requires proposals for Rural Smallholdings to be consistent with Local Planning Strategies and located in areas where bushfire risk is not extreme and there are no significant topography, environment, or servicing constraints. The subject site is well suited for Rural Smallholdings zone and this will be further discussed in the report.

3.2 Shire of Chittering Local Planning Strategy 2004

The Shire of Chittering Local Planning Strategy 2004 (LPS) was endorsed by the Shire of Chittering and Western Australian Planning Commission as a planning instrument to guide land uses and subsequent development within the Shire for the period 2001 – 2015.

The LPS identifies the subject site as suitable for 'Rural Retreat – Priority Development Area' development (with minimum lot size of 10 hectares). However, as will be discussed under heading 4.1 of this report, the subject site is considered better suited for 'Rural Smallholdings'.

3.3 Shire of Chittering Draft Local Planning Strategy Update 2010

The Shire of Chittering Draft Local Planning Strategy Update 2010 proposes modifications to the LSP 2004. It is noted that Lots 1 & 2 Tea Tree Road are retained under the draft Local Planning Strategy Update 2010 as 'Rural Retreat'. Should this proposed local scheme amendment be supported, the draft LSP will require updating to reflect proposed 'Rural Smallholdings'.

3.4 Shire of Chittering Town Planning Scheme No. 6

The subject land is currently zoned 'Agricultural Resource' under the Shire of Chittering Town Planning Scheme No. 6. The proposal is to rezone the subject land from 'Agricultural Resource' to 'Rural Smallholdings'. A Structure Plan is required as a prerequisite to subdivision and/or development in order to provide an appropriate planning framework to guide decision making regarding subdivision and/or development approval.

3.5 Local Planning Policy No. 21 – Fire Management

This policy applies to all land zoned Rural Residential, Rural Retreat and Rural Smallholdings under TPS 6. A Bushfire Management Plan is to be prepared in accordance with the Policy for the proposed ODP. A Bushfire Hazard Assessment is required for the proposed Local Scheme Amendment and this is provided for in **Appendix 5**.

3.6 Local Planning Policy No. 32 – Development Plans

For the rezoning and development of the subject site, the policy requires preparation of an Outline Development Plan (or Structure Plan) which considers the proposed subdivision of land and assembly of elements including road layout, configuration of proposed lots, provision of infrastructure, public open space and fire risk assessment/management.

Under the policy, a minimum lot size of 5 hectares is applied to Rural Smallholdings zone. A draft Structure Plan (or Outline Development Plan) is provided with this scheme amendment has supporting information to demonstrate how the subject site could be subdivided/developed under a 'Rural Smallholdings' zone.

4.0 PLANNING RATIONALE

4.1 Local Planning Strategy 2004 (LPS)

The Shire of Chittering LPS identifies the subject site as future 'Rural Retreat', however, the subject site falls outside designated Rural Retreat Precincts as per [Figure 8 in the LPS] (as shown in **Figure 4**).

The LPS identifies Small Ruralholding Precincts to be located further away from Bindoon townsite as per [Figure 7 in the LPS] (as shown in **Figure 5**). It is considered that the subject site has merit for rezoning to 'Rural Smallholdings', being in relative proximity to Bindoon townsite.

The Shire's LPS identifies Rural Residential Precincts as per [Figure 6 in the LPS] (refer to **Figure 6**). The subject site falls within a portion of the Chittering Heights Estate/Odelon Estate Precinct with the balance of the subject site abutting this Precinct and the Country Club Estate Precinct to the north-east.

The proposed Scheme Amendment for the subject site provides for a suitable transition of rural residential to the east and larger agricultural lots to the west (including the western neighbouring 'Rural Conservation' lot).

4.2 Suitability of Subject Site for Rural Smallholdings

Vegetation Clearing

The subject site has historically been cleared for grazing and does not form part of environmentally sensitive areas as identified in the Shire of Chittering Local Biodiversity Strategy.

Site Accessibility & upgrading of Tea Tree Road

The subject site is accessible via Tea Tree Road, which has been sealed up to Parkwood Springs Estate providing bitumen access to that development. Further west of Parkwood Springs Estate Tea Tree road is traffiable but constructed gravel. Brennan Road along the western boundary of the subject site is also trafficable gravel road.

The proposed 'Rural Smallholdings' zone will provide opportunity to create a rural smallholding subdivision over the subject site, which will in turn require the upgrading (to bitumen standard) of Tea Tree Road along the frontage of the subject site. Brennan Road potentially can remain as a gravel trafficable road providing a secondary access point to the subject site. The primary access to the subject site would be Tea Tree Road.

Part of the upgrading of Tea Tree Road will require extension of the bitumen seal from Parkwood Springs Estate to the north-east corner of the subject site. Of particular significance will be the need to upgrade the drainage crossing of the natural surface drainage line on the northern side of Tea Tree Road to the southern wetland area in neighbouring Lot 4 to the east. At present the water flow across Tea Tree Road is uncontrolled and creates a water hazard and erosion issue.



Natural surface water drainage across Tea Tree Road opposite wetland area in Lot 4 – image taken in summer

Upgrading of the road by the developer would necessitate installation of a suitable culvert to allow the natural surface drainage to pass under Tea Tree Road to the wetland within Lot 4.



Upgrade to Tea Tree Road as part of Parkwood Springs Estate development

Suitability of Small Ruralholding Lot Size

The subject site is generally within a transitional area between rural residential development to the east and agricultural lots to the west. The proposed 'Rural Smallholdings' zone would provide opportunity for minimum lot size of 5 hectares, which would not be out of keeping with the character of the area. To the east of the development site there are existing and planned rural residential developments.

Parkwood Springs Estate to the north is zoned 'Rural Residential' with lot sizes of 4 hectares. The neighbouring land to the west (Lot 101 Tea Tree Road) is zoned 'Rural Conservation' with a WAPC conditional approval for (cluster subdivision, providing for lot sizes of 5000m²).

Market sounding indicates that the community prefers lot sizes in this locality to be generally around 1 – 5 hectares. For the majority, larger lot sizes above 5 hectares are not preferable, due to issues of land maintenance.

Further, lot sizes around 4 – 5 hectares are sufficient to provide a rural lifestyle and amenity. From a perspective of landowner maintenance (i.e. sustainable land management practice), a 4 - 5 hectare lot size (i.e. generally the size of a primary school site) is reasonably manageable, for inexperienced prospective landowners seeking a *tree change*, or those wishing to downsize.

Generally speaking larger lot sizes (i.e. 10 hectares or greater) attracts less market and community demand. Accordingly, the Proponent requests the 'Small Ruralholdings' zone in lieu of a 'Rural Retreat' zone, to create opportunity to provide a more appropriate lot product to meet community demand and expectations.

4.3 Opportunities for Ecological Linkages

The subject site is in a unique location between pockets of environmentally sensitive areas as identified in the Shire of Chittering Local Biodiversity Strategy. In particular, the subject site is between Indicative High Conservation Value Areas (IHCVA) to the north, east, south and west as shown in **Figure 7** in proximity to subject site.

As part of structure planning, there is opportunity to investigate local ecological links or biodiversity corridors to join these IHCVAs for the benefit of fauna as encouraged in the Shire of Chittering Local Biodiversity Strategy. The Proponent's preference is for the ecological links to be provided for within proposed public open space (POS) with management order to the Shire of Chittering. However, this would be subject to further consideration.

4.4 Other Considerations

If the subject site were subdivided/developed as 'Rural Retreat' only, the maximum lot yield that could be achieved would be (44) rural retreat lots as shown in **Figure 8**. Notwithstanding issues of commercial viability (i.e. 10 hectare lots require substantially greater servicing and road infrastructure requirements), subdivision/development at 10 hectares on a broad scale is an inefficient use of land and resources.

Although commercial viability is generally not a town planning consideration, the viability of a proposal should be fundamentally important in any town planning decision making.

The objectives of the 'Rural Smallholdings' zone are set out in Clause 4.2.4 under the Shire of Chittering TPS 6, which states:

"To preserve productive land suitable for intensive horticulture and other compatible productive rural uses in a sustainable manner.

To protect the landform and landscape values of the district against despoliation and land degradation.

To provide lots with a minimum size of 5ha."

The draft Structure Plan demonstrates the suitability of the subject site to meet the objectives of the 'Rural Smallholdings' zone, in that:

- (i) The proposed lifestyle lot (in the draft structure plan) is site responsive and takes advantage of the good agricultural soils and groundwater supply on the eastern side of the property, for proposed horticultural use (i.e. vineyard with potential tourist use).
- (ii) 'Rural Smallholding' lifestyle lots (i.e. 5 hectares in size) respond to community demand and expectations. The lots provide opportunity for prospective landowners to plant trees and vegetation (or manage re-growth of areas within the lot), as an overall lot size of 5 hectares is not considered too large an area for inexperienced landowners to manage.
- (iii) Providing an attractive and interesting rural development for people to live in, particularly with the development of the vineyard on the larger eastern lot (to be retained by the landowner) with future tourist accommodation and function/reception overlooking an artificial lake (re-contouring of the existing soak/dam) to create a sense of community and identity.
- (iv) Potentially delivery of an attractive proposed Public Open Space (POS) network in the structure plan could incorporate public amenities such as walking and bridal trails, not just for the exclusive use of immediate residents in the structure plan.

- (v) The proposed 'Rural Smallholdings' is considered appropriate given that the majority of the subject land has already been historically cleared for grazing and there are no significant biodiversity areas within the subject site. Neither would the proposal require extensive and significant clearing of existing vegetation for building envelopes as the site has already been cleared and 5 hectare lot sizes allow areas outside of the nominated building envelope (i.e. 3,000m²) to potentially re-grow, subject to bushfire management.
- (vi) Smaller rural lot sizes work better on cleared land creating opportunities for rehabilitation and reduced risks associated with bush fires, compared with smaller lots in more densely vegetated areas.

Extinguishment of use for Extractive Industry - Sand

In circa early 2010 the Department of Mines & Petroleum (DMP) sought permission from the landowner to carry out geological tests within the subject site to investigate the extent and quality of sand deposits found within the subject site. DMP confirmed the success of the geological testing and Main Roads WA (MRWA) entered into agreement with the landowner to extract sand from the subject site under the *Public Works Act 1902*. Around late 2010, MRWA extracted approximately 70,000 – 80,000 cubic metres of sand from the south-east portion of the subject site for its road upgrade works in the Bindoon and Chittering area. The MRWA south-east extraction area and access tracks are clearly visible in Figure 2.

In May 2012 the landowner sought development approval to carry out Extractive Industry – Sand over a portion of the subject site. At its Meeting held 15 August 2012 the Shire of Chittering refused the development application on the grounds of strong community objections relating to traffic, noise, dust, proximity to conservation category wetland [within neighbouring Lot 4] and that the subject site is within a *"....predominantly rural lifestyle area the subject site is identified as high priority development area for the purpose of rural retreat...."*.

In September 2012 the landowner lodged an application for review by State Administrative Tribunal (SAT) against the Shire's refusal decision. Following SAT mediation, the Shire of Chittering reconsidered its decision and at its Meeting held 20 March 2013, Council resolved to grant planning approval subject to conditions. The Extractive Industry – Sand development approval for the subject site is valid until 30 June 2022, after which time a renewal of the use would be required.

Subsequently under the current 'Agricultural Resource' zone, the subject site can be utilised for Extractive Industry – Sand. However, rezoning the subject site to 'Rural Smallholdings' would mean that Extractive Industry use is a prohibited ("X") use, under the Shire of Chittering Town Planning Scheme No. 6. The local community has expressed previous strong concern in relation to use of the subject site for Extractive Industry, with [rural residential type] land use being the preferred use of the subject site, if given an option between the two land use categories. The current proposal to rezone the subject site to 'Rural Smallholdings' effectively would extinguish the ability of the subject site to be used for Extractive Industry in future. Notwithstanding, the landowner is aware that the 'Rural Smallholdings' rezoning will essentially close-the-door on any ability to undertake Extractive Industry land use on the subject site. In terms of sourcing basic raw materials, there are potentially other locations within the Shire of Chittering for extractive industry (sand) in less sensitive areas.

5.0 BUSHFIRE MANAGEMENT PLAN

A Bushfire Hazard Assessment (BHA) has been undertaken to inform the proposed Local Scheme Amendment and draft Structure Plan design and recommends appropriate bushfire management response and measures.

Overall, the Bushfire Management Plan (Appendix 5) including BHA categorises the subject site as having a 'Moderate' Bushfire Hazard level. The Bushfire Management Plan recommends a number of fire management measures be undertaken to address the risk of bushfire to property and persons within and adjacent to the ODP area. The risk of bushfire is to be generally managed in terms of implementation of the following:

- A detailed Bushfire Management Plan (BMP) being prepared and endorsed at the subdivision stage;
- Dwelling/building construction standard (AS 3959-2009) i.e. BAL 12.5 for any future housing within 100m of extreme fire hazard areas (esp. neighbouring properties);
- Section 70A notifications on title advising prospective residents in areas which are affected by the Bushfire Management Plan;
- Identification of building protection zones (i.e. low fuel loading) of 20 metres from any external housing walls in areas adjacent to or within proximity to 'extreme - high fire risk areas' as identified in the Fire Management Plan;
- Construction of road system which provides for two access points in case of an emergency. This includes an Emergency and Fire Service Access trafficable access link between the internal subdivision road and Brennan Road within proposed public open space;

The Bush Fire hazard assessment suggests a Bushfire Attack Level of BAL 12.5 be applied to any building located within 100m of an extreme fire hazard >0.25 ha. Under the WAPC *Planning for Bush Fire Protection Guidelines*, this would require buildings to be constructed in accordance with AS 3959-2009 for a BAL 12.5 rating.

A more detailed Bushfire Management Plan would be prepared as a condition of subdivision approval and the BAL 12.5 requirement for construction to AS 3959-2009 standards for buildings within 100m can be further considered.

6.0 INFRASTRUCTURE & SERVICING

In 2009 SMEC Urban civil engineering consultants reviewed the subject site for potential to accommodate proposed rural smallholdings development of the property and concluded that there are no significant constraints that would preclude development of the subject land in terms of servicing for a rural smallholdings development. With the current subdivision and development occurring at Parkwood Springs Estate, services have been extended and are now closer to the subject site than beforehand.

6.1 Earthworks

The subject land has no severely sloping areas which would present any significant engineering constraints for road construction. The proposed road levels will be designed to match (where practical) the existing ground levels to minimise earthworks. No earthworks are proposed to be undertaken to the proposed lots.

Some earthworks will be required for the new subdivision roads and strategic firebreak access routes within the subject site to accommodate subdivision. Aside from road works, consideration may be given to improving the storage capacity of the existing soak on the property for water supply (e.g. vineyard) and aesthetic purposes. This would require separate development approval from the Shire depending on the nature of the works.

There may also be a requirement for excavation within the building envelope areas for the construction of dwellings and on-site effluent disposal, depending upon ease of excavation. This would be subject to individual geotechnical investigations and assessment for development areas.

6.2 Roads

Tea Tree Road is a single carriageway road providing existing access to the subject site. Tea Tree Road is currently a constructed bitumen road up to the Parkwood Estate (Lot 9502) and west onwards the road is a trafficable gravel road. As part of subdivision and development of the subject site, the section of Tea Tree Road along the frontage of the subject site would need to be constructed to a standard to the Shire's satisfaction.

Brennan Road abutting the western boundary of the subject site is a single carriageway trafficable gravel road, which extends from Tea Tree Road and terminates at the south-west boundary of Lot 2. This road would not be required to be constructed to bitumen standard, however, as outlined in the Bushfire Management Plan, Brennan Road provides an alternative access route.

6.3 On Site Effluent Disposal – Nutrient Management

There is no reticulated sewerage in this area and it is proposed that wastewater management be accommodated by on-site effluent disposal units. Across the development site, the yellow sands and ferricrete soils that are found have high phosphate absorbing qualities. This is based on the level of sesquioxides and clay at depth and the depth to water tables. The leached white sands on the western ridges frequently overlies yellow sand, gravel and ferricrete at depths of approximately one metre.

All yellow sand, loam, gravel and duricrust soils on the subject site are capable of supporting conventional effluent disposal systems, with the exception of the leached white sands in lower lying areas mainly found in the eastern part of the development site, particularly around the soak. These are contained within the proposed larger eastern lot in the draft Structure Plan.

The Land Capability Assessment report recommends a 100m setback for on-site effluent disposal systems from the existing soak, however under the draft development plan no lots are proposed within the eastern half of the subject site.

Late winter groundwater monitoring and laboratory soil testing confirms the site's suitability to support on-site effluent disposal. For more details on geotechnical and nutrient management (effluent disposal), refer to the Land Capability Assessment report (Appendix 1) and Land Capability for On-Site Effluent Disposal (Appendix 6).

6.4 Water Supply

There is no reticulated water supply in the nearby area and there are no plans to provide reticulated water to this area. It is proposed that development on each proposed lot incorporate provision of a 120,000 litre rainwater tank, including storage capacity for fire fighting. Rainwater harvesting shall be in accordance with the Shire of Chittering Town Planning Scheme Clause 5.8.5 "Non-Potable Water Supply", whereby rainfall harvesting using rain surface runoff collection area shall be as follows:

"Where rainfall is to be used as the predominate source for a water storage tank, the minimum collection area, in terms of rain surface runoff, to service the tank, is to be provided. The collection area will normally comprise of the roof area of structures on the lot and may include the dwelling, outbuildings and any other structure capable of collecting and directing water into the tank.

The size of the collection area is to be based on the following calculation:

$\text{Collection area (m}^2\text{)} = 120,000 \text{ divided by } (0.85 \times (\text{local rainfall} - 24\text{mm}))$

Where:

- *Collection area (m²) is the minimum area for rain surface runoff that is required to service the water tank.*
- *120,000 is the minimum size of the water tank in litres (unless Council has determined an alternative size in accordance with the Scheme).*
- *0.85 is the efficiency of the collection (a minimum of 85% of the water will be collected).*
- *Local rainfall is the average annual mean rainfall measured in millimeters (mm) guided by the nearest collection point provided by the Bureau of Meteorology.*
- *24mm is the anticipated loss through absorption and wetting of materials based on 2mm a month."*

6.5 Power

There is existing power supply infrastructure in the vicinity of the proposed development and the subdivision would be supplied with underground high and low voltage power, including provision of transformers and switchgear around the development site. The required extensions and upgrades necessary to facilitate 'Rural Smallholdings' subdivision and development would be subject to consultations with the relevant servicing authorities at the time of subdivision.

6.6 Telecommunications

There is existing telecommunication infrastructure available along Tee Tree Road and preliminary consultation with Telstra by SMEC Urban indicates that it is possible to connect to this service. Additional cabling will need to be provided to service the subdivision.

6.7 Gas

Reticulated gas is not an available service within the area.

7.0 CONCLUSION

The proposed 'Rural Smallholdings' zone for the subject site is considered to be a better town planning outcome, compared with rezoning to 'Rural Retreat', which requires a minimum 10 hectare lot size. Although the subject site is identified under the current Shire Local Planning Strategy for 'Rural Retreat', it is considered a 'Rural Smallholdings' zone is more site specific and more responsive to its local context.

Rezoning the subject site to 'Rural Smallholdings' will provide the opportunity to create a commercially viable subdivision with minimum lot size of 5 hectares, as demonstrated in the draft Structure Plan accompanying this scheme amendment proposal as supporting information only.

The benefits for the community of rezoning (and subsequent thereafter development) the subject site to 'Rural Smallholdings' include, but not limited to:

- Creation of 5 – 6 hectare lots which offer a different market product to Parkwood Springs Estate and compliment the nearby rural residential land uses to the east (with possible public open space ecological linkages);
- Generally provide a transitional land use between 'Agricultural Resource' lots to the south and west and rural residential land use to the north and east;
- Provide for proper and orderly settlement expansion in Bindoon to accommodate for population growth on land which has been predominantly cleared in the past for grazing, thereby having limited impact on biodiversity values to the local environment;
- Subdivision for settlement, of the [already cleared] subject site, would reduce pressure to set aside other lands for settlement expansion (to accommodate population growth), of which other lands may have more significant environmental values to overcome;
- Upgrading of Tea Tree Road to bitumen seal abutting the subject site, including bitumen road extension from Parkwood Springs Estate and the delivery of an appropriate culvert treatment for the wetland crossing in front of eastern neighbouring Lot 4, which would provide for a more controlled natural surface drainage crossing; and
- Currently under 'Agricultural Resource' zone, the subject site could be utilised for Extractive Industry – Sand. Rezoning of the subject site to 'Rural Smallholdings' means that Extractive Industry uses are a prohibited ("X") use under the Shire of Chittering Town Planning Scheme No. 6. The community has expressed previous concern in relation to use of the subject site for Extractive Industry, with [rural residential type] land use being the preferred use of the subject site, if given an option between the two land use categories.

Upon adoption of the 'Rural Smallholdings' zone, an application for Structure Plan would be required for approval as a prerequisite to subdivision and/or development of the subject site in accordance with the Shire of Chittering Town Planning Scheme No. 6.

PLANNING & DEVELOPMENT ACT 2005

SHIRE OF CHITTERING

TOWN LOCAL PLANNING SCHEME NO. 6

AMENDMENT NO. 56

The Shire of Chittering under and by virtue of the powers conferred upon it in that behalf by the Planning and Development Act 2005 hereby amends the above local planning scheme by:

1. Rezoning Lots 1 & 2 Tea Tree Road, Bindoon from 'Agricultural Resource' to 'Rural Smallholdings' and amending the Scheme Map accordingly.

ADOPTION

ADOPTED by resolution of the Council of the Shire of Chittering at the Council Meeting held on the _____

day of _____ 2015

Chief Executive Officer

Date:



FINAL APPROVAL

ADOPTED for final approval by resolution of the Shire of Chittering at the Council Meeting held on _____

day of _____ 2016. THE COMMON SEAL of the Shire of Chittering was hereunto affixed by authority

of a resolution of the Council in the presence of:

Shire President

Chief Executive Officer

Recommended/Submitted for Final Approval

Delegated under S.16
of the PD Act 2005

Date

Final Approval Granted

Minister for Planning

Date

FIGURES

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Land Capability Assessment (May, 2000)

APPENDIX 2

Opportunities & Constraints Plan

APPENDIX 3

SPRING FLORA & VEGETATION SURVEY

APPENDIX 4

DRAFT STRUCTURE PLAN

APPENDIX 5

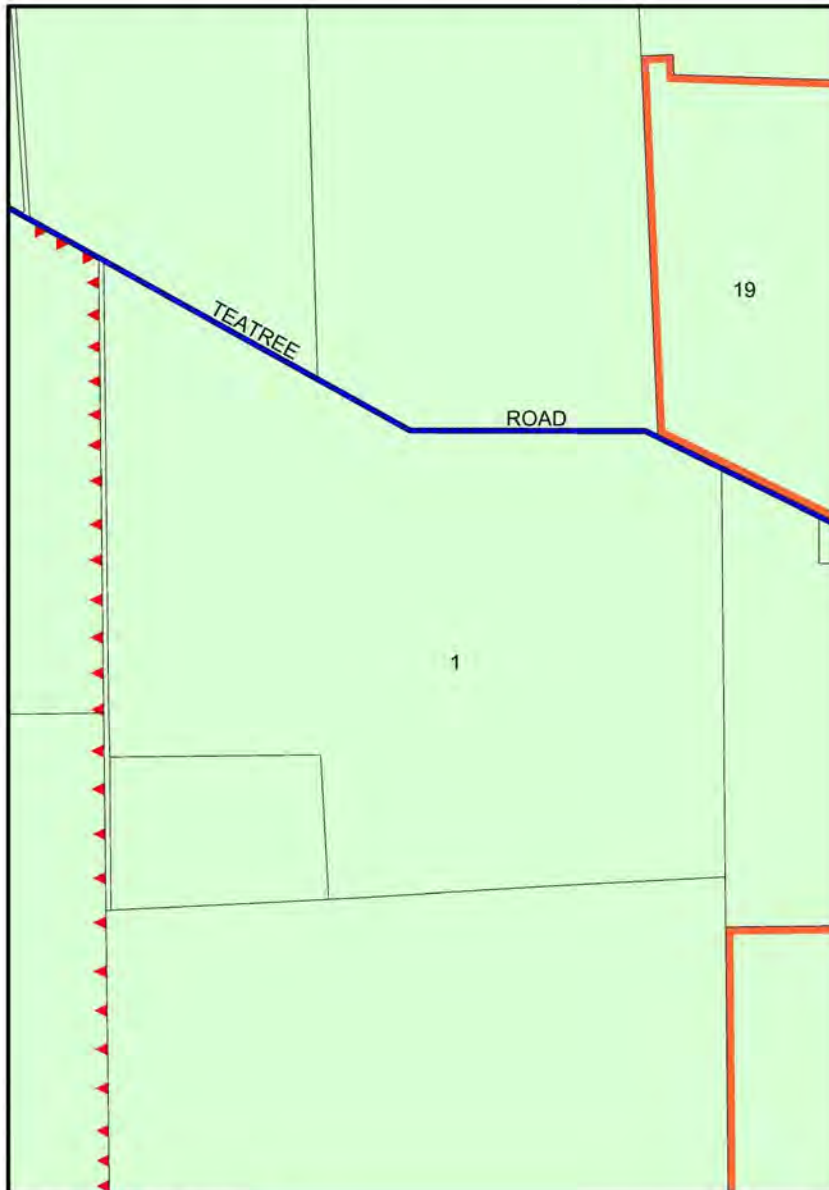
Bushfire Management Plan

APPENDIX 6

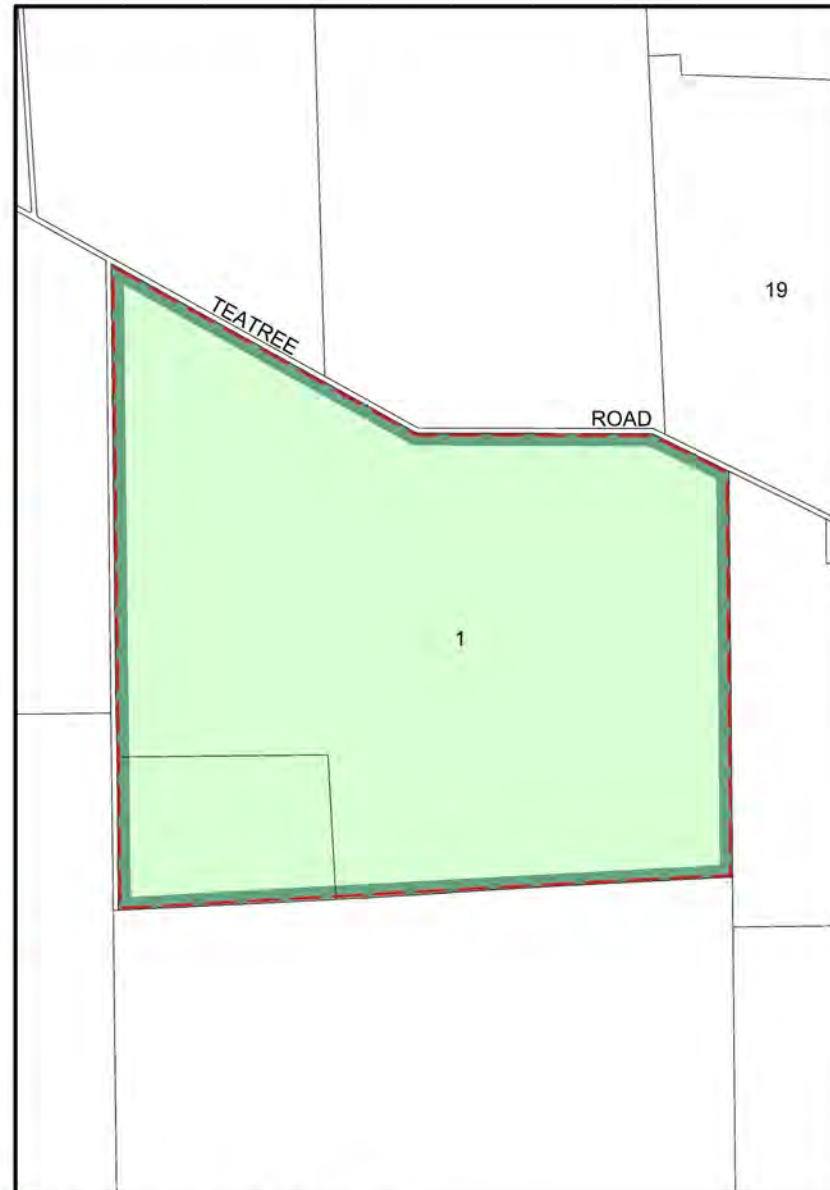
Land Capability for On-site Effluent Disposal (October, 2015)

SHIRE OF CHITTERING
TOWN PLANNING SCHEME No. 6

Amendment No. 56



EXISTING ZONING




SCHEME (AMENDMENT) MAP

LEGEND

LOCAL SCHEME RESERVES

 Major Road

ZONES

 Agricultural Resource

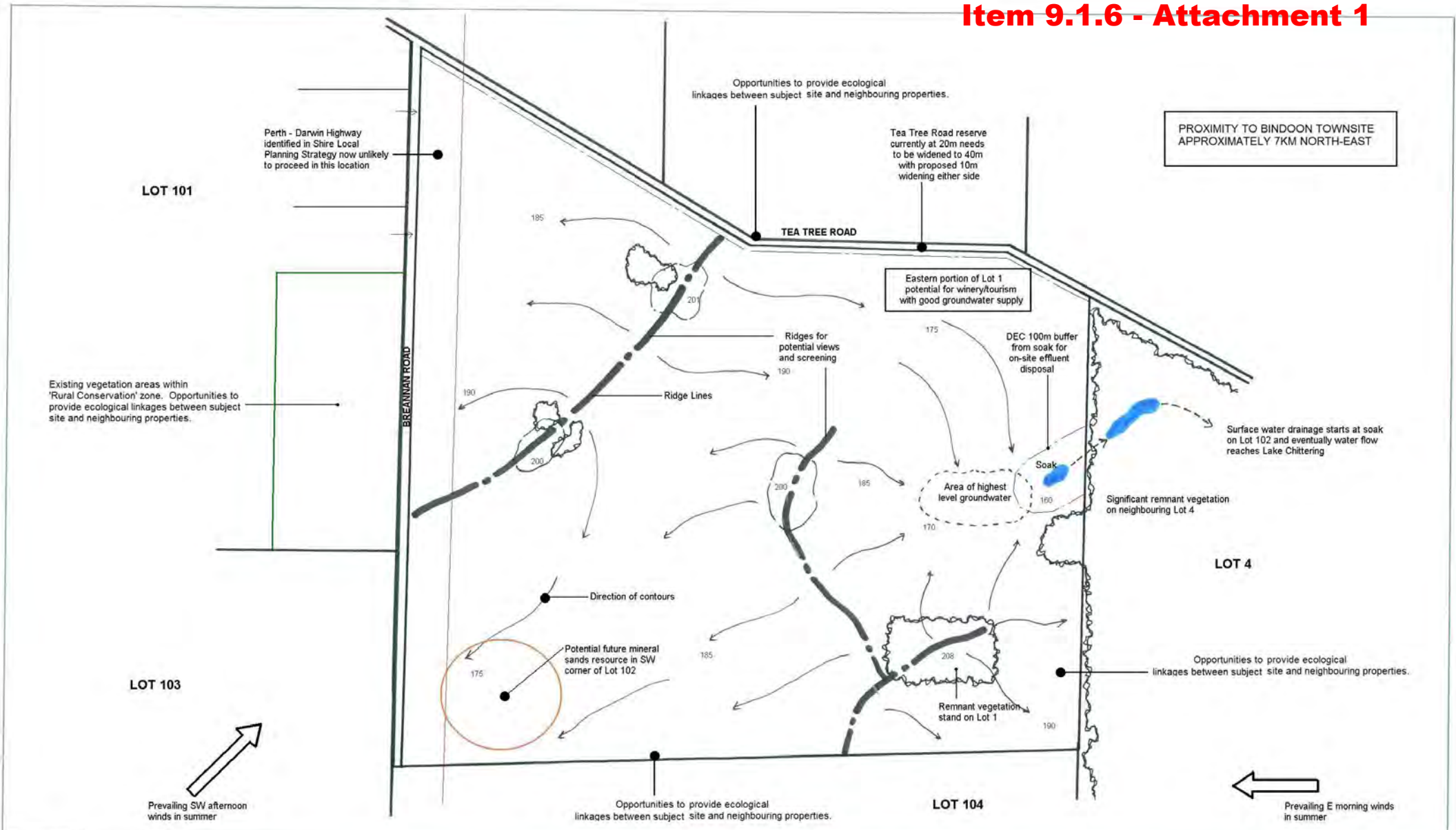
 Rural Residential

 Small Rural Holdings

OTHER

 Military Considerations

SCALE 1:30000



Job Number: 11763
 Sheet Name:
 Scale: 1:1000
 Date: 18 March 2015
 Drawn By: JP

The Client hereby warrants that the information provided to the Designer is true and correct and that the Designer is not responsible for any errors or omissions in the information provided to the Designer.

The Designer warrants that the design is based on the information provided to the Designer and that the Designer is not responsible for any errors or omissions in the information provided to the Designer.

This statement must accompany this plan and digital data at all times.



OPPORTUNITIES & CONSTRAINTS
 LOTS 1 & 2 TEA TREE ROAD
 BINDOON



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**Lot 1 and 2 Tea
Tree Road,
Bindoon WA**

Spring Flora and Vegetation Survey



Kathryn Kinnear

Bio Diverse Solutions

15/3/2012



**BIO
DIVERSE
SOLUTIONS**

DOCUMENT CONTROL

TITLE

Lot 1 and 2 Tee Tree Road Bindoon Spring Flora and Vegetation Syrvey

Author (s) : Kathryn Kinnear

Reviewer (s) :

Job No. : WHEL014

Client : Marou Property Development Pty Ltd

REVISION RECORD

REVISION	SUMMARY	REVISED BY	DATE
DRAFT	CLIENT REVIEW	WHELANS	14/2/2012
FINAL	CLIENT		15/3/2012



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APPENDIX A – LOCATION MAPPING

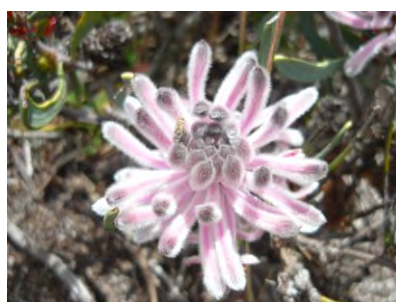
APPENDIX B – OUTLINE DEVELOPMENT PLAN

APPENDIX C – DEC THREATENED FLORA SEARCH REPORT

APPENDIX D – VEGETATION MAPPING

APPENDIX E – FLORA SPECIES LIST

APPENDIX F – RECOMMENDATIONS MAPPING



1. Introduction

Bio Diverse Solutions was commissioned to undertake a Spring Flora and Vegetation Survey of Lot 1 and 2 Tee Tree Road Bindoon as part of investigations requested from Whelans in support of a proposal to rezone a portion of the land for Rural Residential purposes. The Spring Flora and Vegetation Survey is required by the Western Australian Planning Commission (WAPC) to assist with the rezoning process. The survey is aligned to Environmental Protection Authority (EPA) *Guidance Statement number 51: Terrestrial Flora and Vegetation Surveys*.

This report details the vegetation types on site, provides a flora inventory for the site, an assessment of Threatened Flora, and recommendations for management of the proposed land use.

1.1. Alignment to Legislation, Policy and Guidelines

In assessing the property, Bio Diverse Solutions has prepared this report aligned to the following legislation, please refer to Table 1 below.

Table 1–Government Legislation Applicable to the Proposal

Legislation	Responsible Government Agency	Aspect
<i>Agricultural and Related Resources Protection Act 1976</i>	Department of Agriculture, Western Australia	Weeds and feral pest animals
<i>Conservation and Land Management Act 1984</i>	Department of Environment and Conservation	Wetlands/Flora and fauna / habitat /weeds / pests / diseases
<i>Environmental Protection Act 1986 (Part IV)</i>	Office of the Environmental Protection Authority	Assessment and Management Environmental Impact
<i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i>	Department of Environment and Conservation	Clearing of native vegetation
<i>Local Government Act 1995</i>	Shire of Chittering	Development approvals, Building approvals
<i>Soil and Land Conservation Act 1945</i>	Department of Agriculture and Food	Protection of soil resources
<i>Wildlife Conservation Act 1950</i>	Department of Environment and Conservation	Protection of indigenous wildlife
<i>The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).</i>	The Commonwealth Department of Sustainability, Environment, Water, Population and Communities	Protection of Vulnerable and Threatened species of national significance
<i>Country Areas Water Supply Act 1947 (WA) (CAWS Act).</i>	Department of Water, Water Corporation WA	Protection of water source areas and drinking water catchments.

1.2. Spring Flora and Vegetation Survey Method

This study was undertaken in October 2011 in spring conditions and has included desktop analysis and site survey of the site vegetation.

Desktop analysis included a number of resources reviewed, including:

- Database searches of the DEC Threatened Flora Database and review of Threatened Flora plant species for location, habitat and growth form;
- General texts including Native Vegetation WA (Shepherd *et al* 2002), A Biodiversity Audit of WA (Hearn *et al.*, 2002), and Local Biodiversity Strategy Shire of Chittering (SoC, 2010);
- Public available databases (Florabase, SLIP, WALIS, ASRIS etc);
- Review of species form, growth and habitat at the DEC State herbarium; and
- Overlay of GIS datasets (DEC Pre-European Vegetation extent and Department of Water (DoW) 250K Hydrogeology).

Site Survey included:

- The survey area was approximately 484 ha, with the majority of the site cleared. Remnant vegetation patches were traversed on foot and intensively sampled, a list of dominant flora species present (native and exotic) was compiled as seen; samples or photographs were collected for unfamiliar species;
- Threatened Flora searches as listed by DEC was undertaken in known locations and probable habitat types;
- Specimens collected were pressed, dried and identified;
- Specialist texts were used to identify specimens (Wheeler *et al*, 2002) with some checked against examples in the reference herbarium. The authority for taxonomic names was DEC's Florabase website as of November 2011;
- Assessment of vegetation types present and vegetation condition; and
- Herbarium verification for Threatened Species as required.

Vegetation condition was assessed to the following criteria:

- Pristine: Pristine or nearly so, no obvious signs of disturbance;
- Excellent: Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species;
- Very good: Vegetation structure altered, obvious signs of disturbance;
- Good: Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate to it;
- Degraded: Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management; and
- Completely Degraded: The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.

(Keighery, 1994)

1.3. Other documents relating to this plan

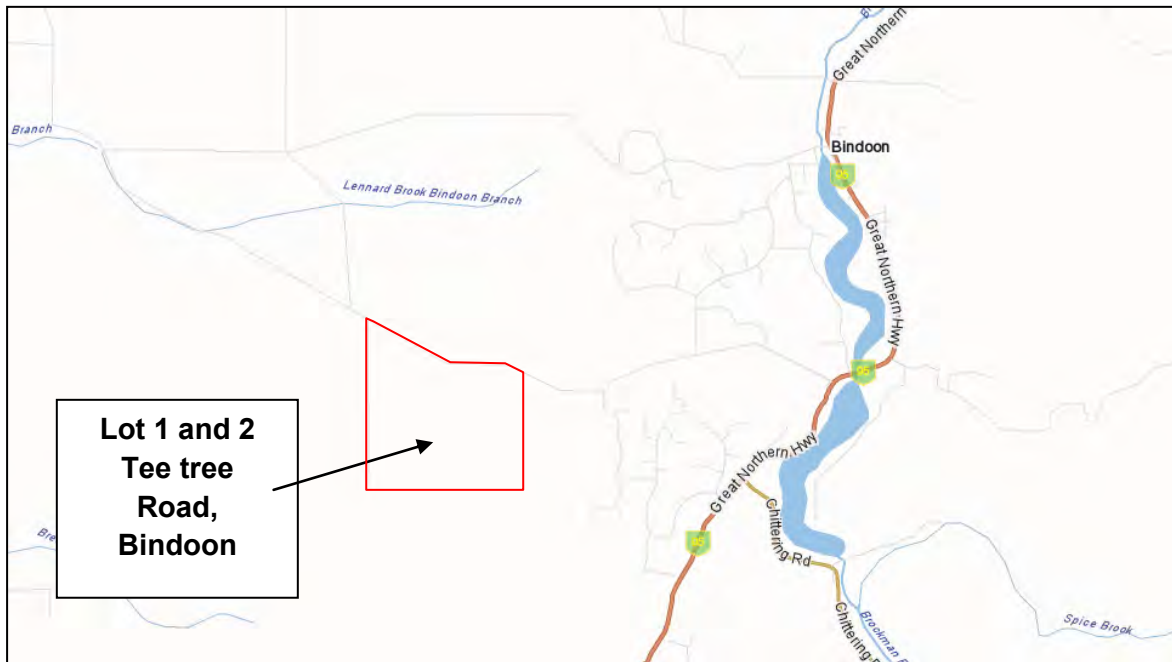
Other unpublished documents that have been prepared for this development proposal which should be consulted when reading this plan include:

- Outline Development Plan -Whelans (2012) ?
- Land Capability Report – Landform Research (2000)
- Fire Management Plan – Bio Diverse Solutions (2012)
- Stormwater Management Plan – Whelans/SMEC (2012)

2. Site details

The subject site is located south of Tee Tree Road and east of Brennan Road, approximately 10 km's south of Bindoon town site in the municipality of the Shire of Chittering. The subject site is a 48ha rural lot which has been used for grazing of stock. Please refer to Figure 1 below - Locality Map, and Site Location Mapping Appendix A.

Figure 1 – Subject site locality



2.1. Development proposal

The applicant is seeking to rezone the subject area for 'Rural Retreat'. The "Spring Flora and Vegetation Survey" has been undertaken prior the WAPC assessment for rezoning, to verify the floristic conditions on site and gives recommendations for any proposed development.

The development proposal includes the creation of 44 Rural Retreat Lots. In creating the subdivision the developer proposes to implement "Vegetative Corridors" to increase linkages to remnant vegetation from the north-south and east-west.

Please refer to the Outline Development Guide Plan as provided by Whelans, Appendix B.

3. Desktop Assessment – Regional Setting

3.1. Current site land use

The site is currently 2 rural lots of predominantly cleared paddocks with grasslands and small isolated patches of remnant vegetation, newly installed vineyards and tagasaste plantation. Historically the subject area has been used for sheep and cattle grazing. An abandoned shack exists in 1 (south west corner) and some shed buildings are located in Lot 2 associated with the rural activities. Please refer to Photograph 1 and 2 below.



Photograph 1 – View of abandoned shack in Lot 1 (south west of subject area)



Photograph 2 – View of shed infrastructure in Lot 2, associated with rural activities.

3.2. Climate

Bindoon has similar climate to Perth (75 Km away) and thus has been described as per Bureau of Meteorology descriptions of Perth. Perth experiences a Mediterranean climate, characterised by hot, dry summers and mild, wet winters. These seasons extend into the autumn and spring months, which are transitional periods between the main seasons.

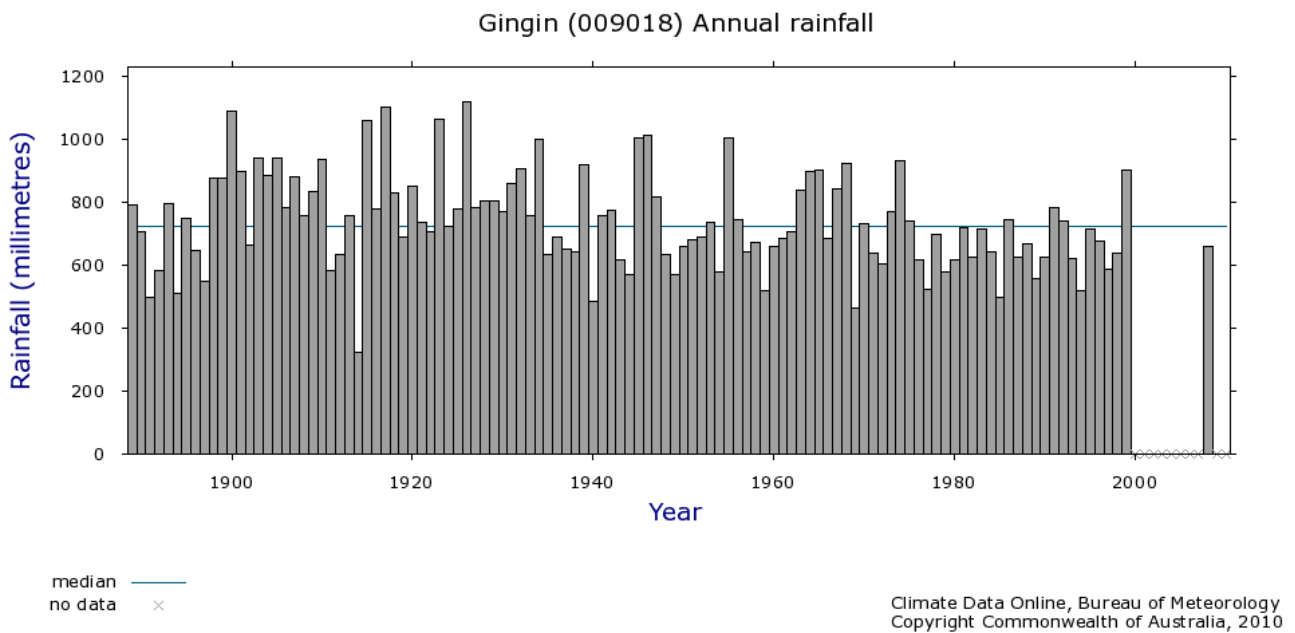
The climate of the region is strongly influenced by the position of the axis of the band of high pressure known as the sub-tropical ridge, and in the warmer months by the development in the easterlies to the north of the ridge of a trough of low pressure near the West Coast. For much of the year the ridge is located to the south allowing the east or southeasterly winds to prevail. During the cooler months the ridge periodically moves to the north allowing cold fronts to pass over the west coast and deliver much of the annual rainfall. Sometimes these fronts interact with tropical cloud bands from the northwest and this can enhance the amount of rainfall produced.

3.2.1. Rainfall

Of the annual mean rainfall of 869 mm, which occurs on 119 rain days, about 80% usually falls between May and September. Rain occurs on four days out of every seven on average during winter. Flooding is rare in Perth, however heavy rain may be produced by strong winter cold fronts or, less frequently, by summer storms or, more rarely, by decaying tropical cyclones. The highest daily rainfall is 120.6 mm recorded on 9 February 1992.

In contrast to winter rainfall, the mean summer rainfall is just 36 mm on an average of 10 rain days. It is not unusual for there to be extended dry periods during the warmer months. Please refer to Gingin Annual Rainfall graph over the page (Figure 2).

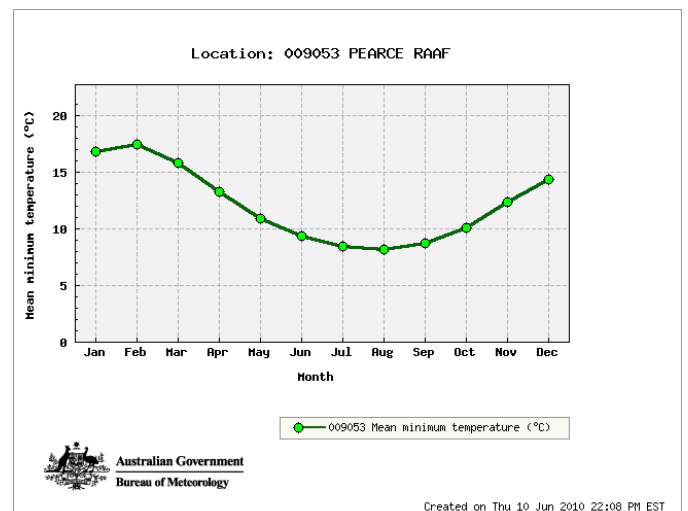
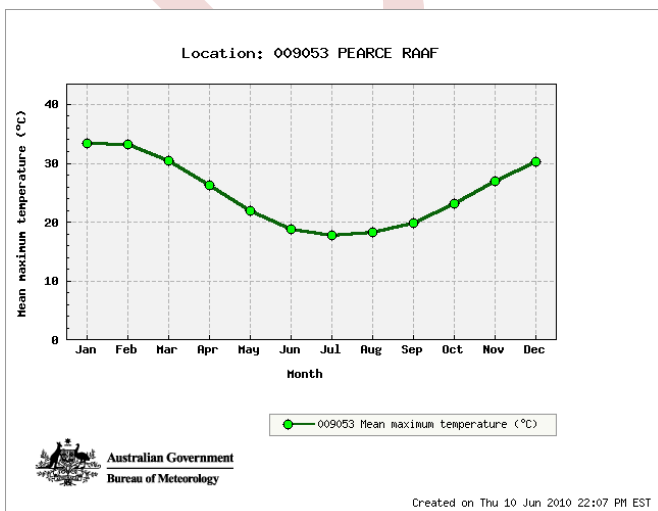
Figure 2 – BoM Rainfall for Gingin Station



3.2.2. Temperature

Mean monthly air temperature range from 31°C in February to 18°C in July and August. Summer maximum temperatures are strongly dependent upon the arrival time of the reliable sea breezes. On some days the difference between the maximum temperatures on the coast and the eastern suburbs may exceed 10°C. Heatwaves are associated with strong easterly winds and the late arrival or absence of the sea breeze. The highest temperature ever recorded is 46.2°C, however, the temperature exceeds 40°C on only three days per year on average. The average minimum temperature ranges from just 8°C in July and August to 17°C in January and February. Temperatures below 5°C are not uncommon during any of the winter months. The lowest temperature ever recorded at Perth Airport is -1.1. Please refer to average temperatures below for Gingin (40km away), Figure 3.

Figure 3 – Average Temperatures BoM



3.2.3. Wind

Winds are mainly easterly but varied in the warmer months by reliable afternoon sea breezes from the south west and in the cooler months by the westerlies that are associated with the bulk of the annual rainfall. Despite the occurrence of strong winds or gales, average wind speeds in winter are considerably lighter than in summer.

3.2.4. Climate Change

Climate change is expected to impact on the future rainfall pattern of the area. It is recognised that the average rainfall has already declined by 20%-30% over the past few decades and that the long term impact of climate change may lead to a shift in rainfall, as well as dryer climatic conditions for the region. The long term changes are predicted to impact on the flora, fauna and water availability for the region. (Climate Commission 2010)

The Climate Commission (Climate Commission 2010) estimates that
“...Rainfall patterns in Western Australia have changed over the last 40 years. There is significant evidence that climate change has contributed to the marked drying trend in the southwest of the state.”

The construction of the proposed development is not predicted to be affected by sea-level rise, however could be affected from increased intensity rainfall events or extended drying periods. The findings from the Land Capability Report (Landform Research 2000) recommends 100m setback from the soak in the central east area. This will ensure that any flooding or high rainfall periods do not affect infrastructure and that any watershed from the development from increased intensity rainfall events does not affect the Chittering River catchment area.

3.3. Topography and Slope

The subject site is located in an undulating landscape on the Dandaragan Plateau with the average slope for the site (assessed as an average over 4 slopes 100m in distance) calculated to be less than 5° and range between 1° and 3°. One metre contours indicate there are 2 hills in the western portion up to 201m AHD and one dominant ridge in the south east of the subject site up to 208m AHD. The lowest elevation of the site is in the east along the formation of a creek upper catchment at 168m AHD.

3.4. Geology and Site Soils

Australian Geoscience Mapping indicates the site is from the Pleistocene (Recent) Period (**Qpo**): **colluviums, soil and undifferentiated sand cover over laterite of Coastal plain, includes minor alleviated areas** (AGM, 1984). The subject site lies west of the Darling Scarp, within the Dandaragan trough of the Perth basin landform system.

3.5. Vegetation Types

The subject lies within the Swan IBRA bioregion. This bioregion is comprised of *“low lying coastal plain, mainly covered with woodlands. It is dominated by Banksia or Tuart on sandy soils.”* The area is located within the SWA1- Dandaragan Plateau *The plateau is bordered by Derby and Dandaragan Faults. Cretaceous marine sediments are mantled by sands and laterites. Characterised by Banksia low woodland, Jarrah - Marri woodland, Marri woodland, and by scrub-heaths on laterite pavement and on gravelly sandplains.* (Hearn et al., 2002).

The vegetation has been mapped on a broad scale by Beard (Shepherd et al 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett 2010).

A GIS search of Beards vegetation classification for general area places the site within 2 broad Vegetation Associations for the site:

System Association: Gingin 1027

- Vegetation Association Number: 1027
- Vegetation Description: *Mosaic: Medium open woodland; jarrah & marri, with low woodland; banksia/Medium sparse woodland; jarrah & marri.*

(Source DEC Pre-European Vegetation GIS dataset)

3.6. Threatened Flora Search

A search of the DEC Threatened Flora Database within 5km of the subject area was undertaken a summary shown in Table 2 below and as provided by DEC in Appendix C.

Table 2 – Threatened Flora Database Search Summary

SPECIES	CONSERVATION CODE
<i>Acacia drummondii</i> subsp. <i>affinis</i>	3
<i>Acacia pulchella</i> var. <i>reflexa</i> <i>acuminate bracteole variant</i> (R.J. Cumming 882)	3
<i>Adenanthos cygnorum</i> subsp. <i>chamaephyton</i>	3
<i>Astroloma</i> sp. <i>Cataby</i> (E.A. Griffin 1022)	4
<i>Chamelaucium</i> sp. <i>Gingin</i> (N.G. Marchant 6)	T
<i>Cyanicula ixioides</i> subsp. <i>candida</i>	2
<i>Gastrolobium nudum</i>	2
<i>Grevillea corrugata</i>	T
<i>Hypocalymma</i> sp. <i>Tea Tree Road</i> (O. Davies OD 171)	1
<i>Oxymyrrhine coronata</i>	4
<i>Ptychosema pusillum</i>	T
<i>Tetratheca pilifera</i>	3
<i>Verticordia rutilastra</i>	3

Under the *Wildlife Conservation Act 1950*, the Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection. Schedules 1 and 2 deal with those that are threatened and that are presumed extinct, respectively.

Definitions of Threatened Flora under the *Wildlife Conservation Act 1950* are as follows:

- **T: Threatened Flora (Declared Rare Flora — Extant)**
Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedule 1 under the *Wildlife Conservation Act 1950*).
Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List criteria:
CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild
EN: Endangered – considered to be facing a very high risk of extinction in the wild
VU: Vulnerable – considered to be facing a high risk of extinction in the wild.
- **X: Presumed Extinct Flora (Declared Rare Flora — Extinct)**
Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 under the *Wildlife Conservation Act 1950*).

Taxa that have not yet been adequately surveyed to be listed under Schedule 1 or 2 are added to the Priority Flora List 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 or fauna.

Taxa that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation Dependent species are placed in Priority 5.

- **Priority 1** - Poorly known Taxa. Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. Priority 1 taxa may include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey;
- **Priority 2** - Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey;
- **Priority 3** - Poorly Known Taxa. Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey;
- **Priority 4** - Rare Taxa. Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years; and
- **Priority 5** - Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxon becoming threatened within five years.

Based on the desktop assessment that has been conducted above, several Priority and Threatened Species could be present within the vicinity of Lot 1 and 2 Tee Tree Road Bindoon. A detailed site search was undertaken to assess the site for the above listed flora species (Table 2, Page 10).

4. Site Assessment

Site flora survey and intensive Threatened Flora survey was undertaken at the proposed development areas and remnant vegetation areas, this was undertaken on the 13th October 2011. This is the spring flowering period, and considered the appropriate time of year to capture most flowering species for positive identification.

4.1. Methodology

The survey area is defined as Lot 1 and 2 Tee Tree Road Bindoon, with the whole property mapped for vegetation types and intensive flora sampling for Threatened Flora in possible habitat types and remnant vegetation areas.

The remnant vegetation areas were traversed on foot and a list of dominant flora species present (native and exotic) was compiled as seen; samples or photographs were collected for unfamiliar species. Specimens collected were pressed, dried and identified. Specialist texts were used to identify specimens (Wheeler *et al*, 2002) with some checked against examples in the reference herbarium at the DEC Albany Regional Herbarium for confirmation. The authority for taxonomic names was DEC's Florabase website as of November 2011.

Intensive survey was undertaken for Threatened Flora species, with follow up identification at the DEC State Herbarium. Areas were searched for Threatened Flora adjacent to known populations and likely habitat for specific species. Vegetation condition was assessed during the field survey. Vegetation condition was assessed using the vegetation condition scale as per Keighery (1994).

4.2. Vegetation

Detailed vegetation inventory was undertaken in the vegetation types identified on site. A total of 149 species was identified within 3 vegetation types. The vegetation types are shown below in Table 3.

Table 3 – Vegetation Types Identified on site




Vegetation Unit	Beards Vegetation Association	Site Unit Description	Photograph
Medium woodland; jarrah-marri (EmCc)	965	Medium woodland of <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i>	

Table 3 cont.

Vegetation Unit	Beards Vegetation Association	Site Unit Description	Photograph
Mosaic Medium open woodland: jarrah, marri & banksias (EmCcBa),	1027	Medium open woodland: Jarrah & Marri, with low woodland Banksia/sparse woodland jarrah/marri	
Cleared paddock areas	N/A	Open paddocks, cleared of native vegetation, occasional paddock trees Jarrah & Marri,	

A map of the vegetation types identified on site is shown in Appendix D. Descriptions and Photographs of each vegetation type are given in the following sections.

4.3. Marri Jarrah (EmCc)

Shepard *et al.* (2002) estimate the pre-European extent of 965: Medium woodland; Jarrah – Marri was 114,948ha, with a current area of 5,415ha. It is estimated that 36% of this vegetation type is represented in national parks, nature reserves and state forest and 10.2% is represented in other reserves. The subject site comprised of approximately 20% of this vegetation type which was identified as small isolated remnant areas which had not been previously cleared in the eastern side of the subject area. Please refer to Appendix D– Vegetation Mapping.

The dominant overstorey species in this vegetation type are: *Eucalyptus marginata*, jarrah; and *Corymbia calophylla*, marri. These species form a mosaic of Medium to Low Open Forest with tree height between 15 to 30m. Jarrah comprises between 30-70% of the canopy cover and marri comprise 2-10% canopy cover. Banksia grandis, *Allocasuarina humilis*, occasional *Eucalyptus tottiana* (Coastal Blackbutt), *Banksia sessilis* var. *Sessilis*, *Xanthorrhoea preissii* and *Hakea lissocarpa* were the dominant second storey species within this vegetation complex, and represent 10-30% vegetation cover. These species were shrubs 1- 2m. The midstorey species were generally less dominant due to the vegetation being grazed. Please refer to Photographs 5 and 6.



Photograph 5 – View along eastern boundary of subject site in Jarrah/Marri vegetation type, Good Condition.



Photograph 6 – View of Jarrah/Marri in south east of subject site, the largest remnant patch, Good condition.

Other species identified within this cover class (1m to greater than 2m in height) include: *Anigozanthos humilis*; *Austrodanthonia occidentalis*, *Baeckea grandiflora*; *Caladenia flava* *Drosera erythrorhiza*; *Elythranthera brunonis*, *Haemodorum venosum*; *Kennedia prostrata*, *Lomandra caespitosa*, *Neurachne alopecuroidea*, *Petrophile striata*; *Stylidium hispidum*; *Stylidium calcaratum*; *Trachymene pilosa*, and *Tricoryne elatior*. The sedge and herb storey in this vegetation complex has 10-30% cover depending on the amount of grazing the vegetation has sustained. The majority of species were less than 1m in height. Please refer to Appendix D – Flora Species List.

The Medium Woodland vegetation type is generally considered to be in “Disturbed” condition: “Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate to it;” (Keighery, 1994). Some areas of “Good Condition”: *Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate to it;* (Keighery, 1994), occurs in the eastern extent of the remnant vegetation areas. Refer to Mapping Appendix D.

4.4. Mosaic: open woodland: Jarrah & Marri, with low woodland *Banksia*/sparse woodland jarrah/marri (EmCcBa)

Shepard *et al.* (2002) estimate the pre-European extent of Vegetation Type 1027 open woodland: Jarrah & Marri, with low woodland *Banksia*/sparse woodland jarrah/marri was 46,748ha, with a current area of 16,423ha. It is estimated that 30.1% of this vegetation type is represented in national parks, nature reserves and state forest, and 0% is represented in other reserves. Lot 1 (south west of subject area) is comprised of approximately 90% of this vegetation type, although is in a much degraded form due to clearing and grazing of stock. Please refer to Appendix D – Vegetation Mapping.

The overstorey in this vegetation type is dominated by a mosaic of *Eucalyptus marginata*, jarrah; *Corymbia calophylla*, marri, and *Banksia attenuata*; Slender *Banksia* and occasional *Eucalyptus tottiana*, Coastal Blackbutt and *Nuytsia floribunda*; Australian Christmas Tree, comprising to 10-60% cover depending on disturbance. The dominant shrubland species in this vegetation type are: *Pteridium esculatum*, bracken, *Adenanthos cygnorum*, *Astroloma xerophyllum*, *Bossiaea eriocarpa*, *Centrolepis drummondiana*, *Daviesia nudiflora*, *Hakea ruscifolia*, *Hibbertia hypericoides*,

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Lechenaultia floribunda *Jacksonia floribunda*, *Patersonia occidentalis*, and *Synaphea spinulosa* which comprise 0-30% cover depending on disturbance. Please refer to Photograph 7 below.



Photograph 7 – View of Mosaic: jarrah, marri, banksias woodland in sandy soils in south west of subject area.

This vegetation type which has been disturbed is generally considered to be in “Degraded” condition: *“Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management”*. (Keighery, 1994).

4.5. Paddock Grasslands (G)

The cleared areas form approximately 70% of the property. This vegetation type is considered to be in a “Completely Degraded” condition: *“The structure of the vegetation is no longer intact and the area is completely or almost completely without native species”* (Keighery, 1994). This area can be described as Parkland Cleared, and may have been cleared in the past for the purposes of farming and agricultural use. Vegetation is primarily composed of environmental (non aggressive) weed species with isolated trees of *E.marginata* and *C.calophylla* and some areas of tagsaste plantations.

Please refer to Photograph 8 and 9 below, and Vegetation Mapping Appendix D.



Photograph 8 – View to the west from eastern paddocks



Photograph 6 – View of isolated Jarrah/Marri trees in cleared paddock areas.

4.6. Recommendations

Based on the site survey, it is therefore recommended:

- The development is restricted to areas previously disturbed.
- Intact native vegetation in “Good” Condition should be retained to preserve biodiversity and habitat;
- Clearing of any native vegetation should be restricted to existing cleared areas and should not extend into current remnant vegetation patches; and
- Vegetation should be fenced from stock.

4.7. Threatened Flora

A search of the DEC Threatened (Declared Rare) Flora and WA Herbarium Databases was undertaken with the Species and Communities Branch of DEC. Please refer to Report in Appendix C. The database search revealed a possible 13 species could be located within 5km of the subject area.

The subject site was intensively searched in remnant vegetation areas for Threatened Flora species, as listed in Table 2 and Appendix C. Searches were undertaken in walked, sweeping transects searching all of the remnant vegetation areas for a minimum of 100m outside of vegetation areas.

Site searches revealed the presence of Priority Flora species (*Acacia drummondii ssp affinis*), Priority 3 pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act 1950*. Please refer to Vegetation Mapping Appendix D.

No species of Declared Rare Flora (DRF) was located on site.

It is therefore recommended:

- The development is restricted to areas previously cleared, and the remnant vegetation area containing the Priority 3 species *Acacia drummondii ssp affinis* is fenced to exclude stock to maintain habitat for the species.

4.8. Environmentally Sensitive Areas and Threatened Ecological Communities

There are no Environmentally Sensitive Areas on the subject site or adjacent to Lot 1 and 2 Tee Tree Road, Bindoon.

A search for Threatened Ecological Communities (TECs) within the Swan (SWA2) IBRA bioregion on the SLIP portal database found that there are no TECs present on the subject site.

4.9. Weeds

In 1976 the Agriculture Protection Board introduced legislation to control weeds – the *Agriculture and Related Resources Protection Act 1976*. This legislation sets out “declared” plants and legal obligations to landowners in regards to these species. If a plant is declared then landowners are obliged to control that plant on their properties.

Environmental Weeds are defined by the “Environmental Weeds Strategy for Western Australia” (1999) as “plants that establish themselves in natural ecosystems and proceed to modify natural processes, usually adversely, resulting in the decline of the communities they invade”. At present there is no legislation governing management of Environmental Weeds, landowners are encouraged to control movement and restrict further spread of these species.

Any plant other than a declared plant can be prescribed as a “Pest Plant”, under Section 109 of the *Agriculture and Related Resources Protection Act 1976*. Typically these are prescribed whereby the occurrence of these may adversely affect property values, comfort or convenience of the inhabitants of a particular district.

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The Act states (6) (1) “The council may serve on the owner or occupier of private land...a duly completed notice...requiring him/her to destroy eradicate, or otherwise control any pest plant on that land”(Agriculture and Related Resources Protection Act 1976).

Thirty eight weed species in total were recorded, excepting the Pink Gladiolus (*Gladiolus caryophyllaceus*), the majority of these weeds are non aggressive in nature, refer to Table 3.

Table 3 – Weed species present on site

Family	Species	Common Name
POACEAE	<i>Avena sp.</i>	Wild oats
BRASSICACEAE	<i>Brassica tournefortii</i>	
POACEAE	<i>Bromus diandrus</i>	
MYRTACEAE	<i>Callistemon x citrinus</i>	
FABACEAE	<i>Chamaecytisus palmensis</i>	Tagasaste
ASTERACEAE	<i>Cotula coronopifolia</i>	Waterbuttons
CYPERACEAE	<i>Cyperus brevifolius</i>	
CYPERACEAE	<i>Cyperus tenuiflorus</i>	
ORCHIDACEAE	<i>Disa bracteata</i>	
SCROPHULARIACEAE	<i>Dischisma arenarium</i>	
POACEAE	<i>Ehrharta longiflora</i>	Annual Veldt Grass
GERANIACEAE	<i>Erodium botrys</i>	
IRIDACEAE	<i>Gladiolus caryophyllaceus</i>	Pink gladiolus
ASTERACEAE	<i>Helichrysum luteoalbum</i>	
ASTERACEAE	<i>Hypochaeris glabra</i>	
CYPERACEAE	<i>Isolepis marginata</i>	
CYPERACEAE	<i>Isolepis prolifera</i>	
FABACEAE	<i>Lotus subbiflorus</i>	
FABACEAE	<i>Ornithopus compressus</i>	
FABACEAE	<i>Ornithopus sativus</i>	
OROBANCHACEAE	<i>Orobanche minor</i>	
SCROPHULARIACEAE	<i>Parentucellia viscosa</i>	
POACEAE	<i>Pentascistis airoides</i>	
POLYGONACEAE	<i>Persicaria decipiens</i>	
CARYOPHYLLACEAE	<i>Petrorhagia dubius</i>	
POACEAE	<i>Polypogon monspeliensis</i>	Annual beardgrass
IRIDACEAE	<i>Romulea rosea</i>	Guildford grass
ASTERACEAE	<i>Sonchus asper</i>	
ASTERACEAE	<i>Sonchus oleraceus</i>	Sowthistle
FABACEAE	<i>Trifolium arvense</i>	Hare's foot clover
FABACEAE	<i>Trifolium dubium</i>	
FABACEAE	<i>Trifolium hirtum</i>	Rose clover
FABACEAE	<i>Trifolium subterraneum</i>	Subclover
ASTERACEAE	<i>Ursinia anthemoides</i>	
ASTERACEAE	<i>Vellereophyton dealbatum</i>	
POACEAE	<i>Vulpia myuros</i>	
CAMPANULACEAE	<i>Wahlenbergia capensis</i>	

The weed species identified are not “Declared” weeds under the *Agricultural and Related Resources Protection Act 1976*, and are environmental weeds which should be restricted from movement off-site and further into any adjacent vegetation. The Pink Gladiolus (*Gladiolus*

caryophyllaceus) is aggressive and is present within the remnant native vegetation on the eastern boundary of the subject site. It is recommended this species is targeted for control and eradication from the area to allow native species to establish.

Skeleton Weed (*Chondrilla juncea*) has been recorded on site, however no species were located during vegetation survey. Skeleton Weed is a Declared plant. Management strategies for this species include:

- P1 – Plants which cannot be introduced or spread; and
- P4 – Containment, plants should be prevented from further spread.

Skeleton Weed Control Method - Report any plants to the Department of Agriculture and Food (DAFWA)

All plants found must be reported immediately to Agriculture Western Australia or District Agriculture Protection officers to be dealt with under the Skeleton Weed Eradication Project.

It is therefore recommended:

- Weeds should be controlled on-site and restricted from movement offsite, this can be undertaken by ensuring machines are clean on entry and exit when disturbing any soils or vegetative matter;
- The Pink Gladiolus (*Gladiolus caryophyllaceus*) is targeted for eradication in the eastern remnant vegetation area; and
- Continue monitoring the subject area for occurrences of the Declared plant Skeleton Weed (*Chondrilla juncea*) and if located report to DAFWA.

5. Discussion

The Shire of Chittering have a Local Biodiversity Strategy which aims to conserve existing native vegetation and extend linkages to further protect vegetation complexes and values. The subject site is not located in a Priority area or contains a Priority Vegetation Complex.

The Priority areas of native vegetation (SOC, 2010) include:

- Natural areas with vegetation complexes under represented regionally and locally, within and outside the IHCVAs;
- Adequate buffers to significant flora, fauna and ecological communities;
- Adequate buffers to creeklines and other wetlands;
- Vegetation that provides habitat to Carnaby's black cockatoos;
- Patches of native vegetation that form a regional or local ecological linkage;
- Buffers to formal conservation reserves as well as private properties with voluntary management agreements through Land for Wildlife and conservation reserves or similar; and
- High conservation value roadside remnant vegetation.

The vegetation on site supports possible habitat and feed trees for the Carnaby's Black Cockatoo and Baudin's Cockatoo these species are presently protected Federally and under State legislation.

Status:

Carnaby's Black Cockatoo: Wildlife Conservation (Specially Protected Fauna) Notice 2010 - Schedule 1 Endangered: EPBC Act Endangered; Forest Red-Tailed Black Cockatoo: Wildlife Conservation (Specially Protected Fauna) Notice 2010 Schedule 1 - Vulnerable: EPBC Act Vulnerable;.

A survey of possible habitat trees and feed trees was not undertaken within the scope of these works. It is possible that isolated trees in paddock areas could be frequented by these species. A survey of trees which are going to be removed in the paddock areas (i.e for road or fencing infrastructure) should be undertaken and referral to the Federal Department of Sustainability, Environment, Water, Population and Communities may be required depending on the outcome.

The subject site supports remnant native vegetation patches in the east of the site which is in "Good" Condition which, if fenced from stock, would recover to "Excellent Condition without any further revegetation. The protection of these areas would provide an increase in the biodiversity values of the local area, meeting one of the aims of the Shire of Chittering Biodiversity Strategy.

It is recommended to the client that the following is implemented at Subdivision to ensure the existing Biodiversity values are achieved and future values for the area are achieved:

1. Protect the Priority 3 species *Acacia drummondii ssp affinis*, and provide further suitable habitat for the species in the future by fencing the area from stock;
2. Increase the local Biodiversity by creating north-south and east-west micro corridors.
3. The remnant vegetation areas in the east should be fenced to exclude stock in an effort to increase the biodiversity within these areas and encourage regeneration.
4. A survey of current habitat and feed trees of the Carnaby's and Red tailed black cockatoo occur of any trees >500mm diameter.
5. Applying Development Exclusion Zones over remnant vegetation areas in 'Good Condition' to ensure the long term protection of these areas. A notification on title should be applied to ensure if the land is sold this is known to prospective buyers.

These recommendations have been mapped across the site and is shown in Appendix F – Recommendations Mapping.

6. Conclusion

Bio Diverse Solutions was commissioned to undertake a Spring Flora and Vegetation Survey of Lot 1 and 2 Tee Tree Road Bindoon as part of investigations requested from Whelans in support of a proposal to rezone land for Rural Residential purposes. The Spring Flora and Vegetation Survey is required by the Western Australian Planning Commission (WAPC) to assist with the rezoning process. The survey is aligned to Environmental Protection Authority (EPA) *Guidance Statement number 51: Terrestrial Flora and Vegetation Surveys*.

This report details the vegetation types on site, gives a flora inventory, an assessment of Threatened Flora and recommendations for future management of the proposed Rural Residential Development land use. The assessment of the site involved desktop assessment by review of the GIS datasets mapping (DoW, DEC), review of DEC Threatened Flora Database, review of literature sources, searches of Florabase and associated reference texts.

The survey area was approximately 484 ha, with the majority of the site cleared for agricultural use, intensive survey was undertaken in remnant vegetation patches via traversing on foot. Physical survey was undertaken in the spring flowering period on the 13th October 2011, which is considered the appropriate time of year for positively identifying plant species. Site survey included sweeping transects across the whole site, remnant vegetation areas, and further intensive searches for Threatened Flora at probable habitat types.

A total of three Vegetation types were identified on site, being:

- Medium woodland; jarrah-marri (EmCc);
- Mosaic: Medium open woodland: Jarrah & Marri, with low woodland Banksia/sparse woodland jarrah/marri; and
- Grassland areas: bare paddock areas.

One Priority species as listed by the Wildlife Conservation Act 1950 was located within a remnant vegetation area in the east. This area is not proposed to be disturbed as part of the subdivision development.

The proposed development is utilising already cleared/disturbed areas for infrastructure requirements, with some removal of isolated paddock trees for road/infrastructure requirements. The vegetation in these areas was considered to be in Completely Degraded Condition. It is not anticipated that this development will impact the remnant vegetation areas which are in Good Condition.

The findings in this report are based on the implementation of the following recommendations:

1. Protect the Priority 3 species *Acacia drummondii ssp affinis*, and provide further suitable habitat for the species in the future by fencing the area from stock;
2. Increase the local biodiversity by creating north-south and east-west micro corridors, by linking to the remnant vegetation patches in the east of the subject site and through the north of existing Lot 1;
3. The remnant vegetation areas in the east should be fenced to exclude stock in an effort to increase the biodiversity within these areas and encourage regeneration;
4. A survey of current habitat and feed trees of the Carnaby's and Red tailed black Cockatoo occur of any trees >500mm diameter, depending on the outcome of the survey, possible referral may be required to the Federal Department of Sustainability, Environment, Water, Population and Communities;
5. Applying Development Exclusion Zones over remnant vegetation areas in 'Good Condition' to ensure the long term protection of these areas. A notification on title should be applied to ensure if the land is sold this is known to prospective buyers.

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6. Weeds should be controlled on-site and restricted from movement offsite, this can be undertaken by ensuring machines are clean on entry and exit when disturbing any soils or vegetative matter;
7. The Pink Gladiolus (*Gladiolus caryophyllaceus*) is targeted for eradication in the eastern remnant vegetation area; and
8. Continue monitoring the subject area for occurrences of the Declared plant Skeleton Weed (*Chondrilla juncea*) and if located report to DAFWA.

If the above recommendations are implemented the property would assist in achieving the following goals from the Shire of Chittering's local Biodiversity Strategy:

1. **Goal 1 – Retention of natural areas:** through the fencing of all the “Good Condition” vegetation areas and providing linkages to adjacent remnant vegetation.
2. **Goal 2 – Protection of natural areas:** in remnant vegetation areas place “Development Exclusion” and notification on title top prospective buyers.

Bio Diverse Solutions conclude that if the listed recommendations are implemented by the client, the development of rural residential on Lot 1 and 2 Tee Tree Road Bindoon can be implemented sustainably and in an environmentally sound manner.

It is further recommended that if the construction of this development is not undertaken within 5 years of this survey, after that time the Spring Survey should be re-conducted to verify/confirm absence/presence of Threatened Flora species adjacent to proposed disturbance areas.

7. References

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Appendices

Appendix A – Location Mapping

Appendix B – Outline Development Plan

Appendix C – DEC Threatened Flora Report

Appendix D – Vegetation Mapping

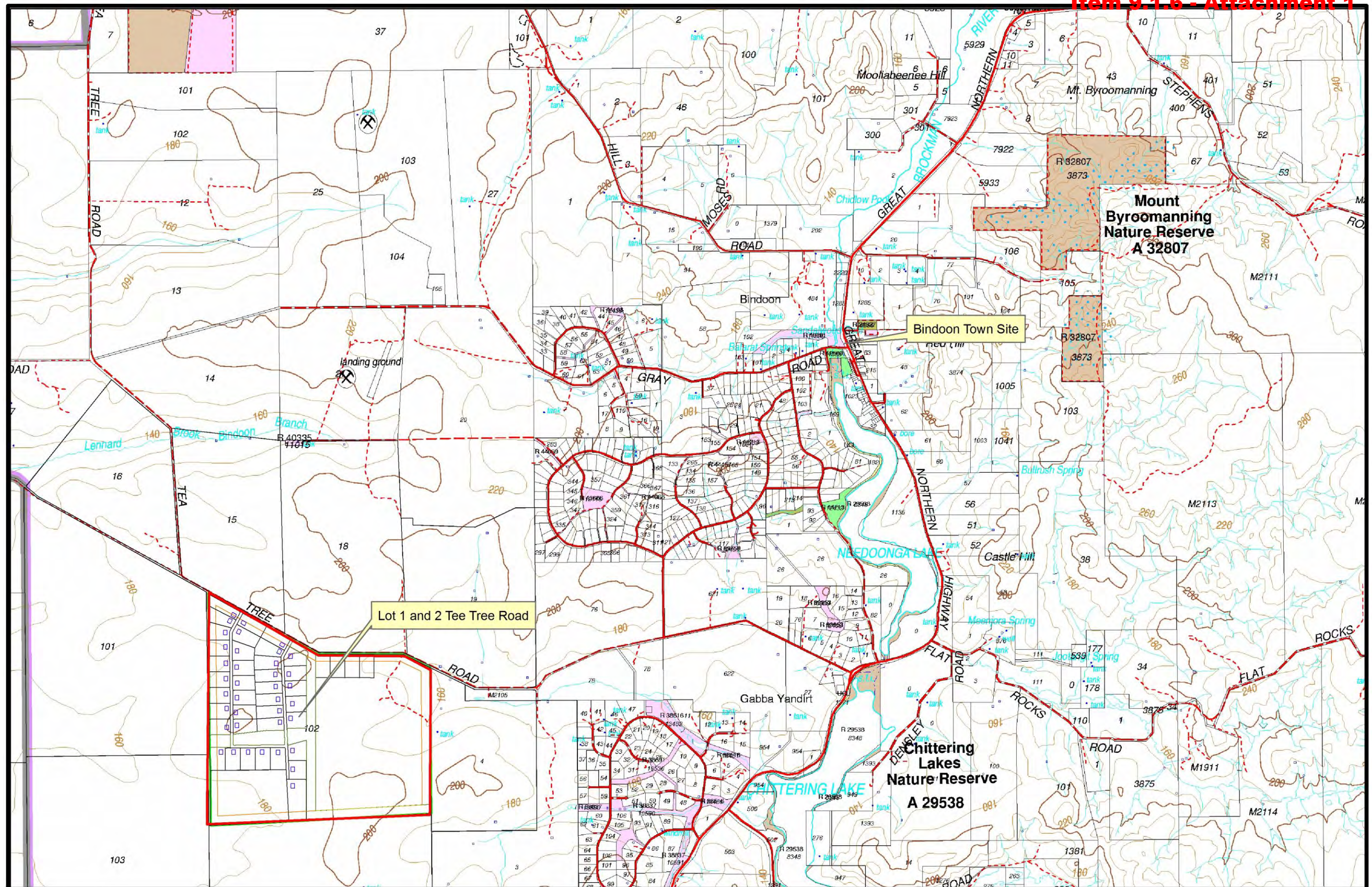
Appendix E – Flora Species List

Appendix F – Recommendations Mapping

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Appendix A

Location Mapping



Legend

Subject area

Scale
1:40000 @ A3

0 390 780 1,560 2,340 3,120 Meters



**BIO
DIVERSE
SOLUTIONS**

55 Peppermint Drive
Albany, WA 6330
Australia
Tel: 08 9841 3936
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Mob: 0447 555 516

CLIENT Lot 1 and 2 Tee Tree Road
Bindoon WA

Location Mapping

STATUS	FILE	DATE
FINAL	WHEL014	20/01/2012

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Appendix B

Outline Development Guide Plan

Whelans

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10m road widening of Tea Tree Road

Dwelling construction within 100m FHS to be BAL 12.5

Brennan Road as Strategic Fire Break

Proposed subdivision roads 30m wide

Public open space corridors to link areas of high biodiversity

Retention of windmill on Lot 31

Landowner to retain balance lot for winery and possible incidental tourism uses

Emergency and Fire Service access within POS

Future site for Ukrainian Youth Camp

ADOPTION

Adopted by resolution of the Council of the Shire of Chittering and the Ordinary meeting of Council held on the day of 2012 and the seal of the municipality was pursuant to the resolution hereto affixed in the presence of:

President

Chief Executive Officer

Date

Job Number: 11783
 Sheet Name: 11783-6
 Scale: 1:1500 @ A3
 Date: 15/02/2012
 Drawn By: SJF
 Checked by: JEP
 File: s:\p\11783\11783\planning\drafting & design\11783 outline development plan.dgn
 All dimensions and notes are subject to survey. This plan is subject to copyright and should not be reproduced without the permission of WHELAN.
 The Council has adopted this plan and the Shire of Chittering has approved this plan. The Shire of Chittering is not responsible for any errors or omissions in this plan. The Shire of Chittering is not responsible for any errors or omissions in this plan. The Shire of Chittering is not responsible for any errors or omissions in this plan.



LEGEND

- 100m Fire Hazard Separation
- Public Open Space
- Strategic Fire Breaks (indicative only)
- Building Envelopes
- Strategic Fire Service Access

PUBLIC OPEN SPACE
 Total Site Area of Lots 1 & 2 = 483 hectares
 Public Open Space provided = 48 hectares (10%)

DEVELOPMENT PLAN LOT YIELD
 Total No. lots proposed = 44
 (including indicative lots on Tea Tree Rd)



- DEVELOPMENT PROVISIONS RELATING TO THE ESTATE**
- The Development Plan has been approved by the Council and the Western Australian Planning Commission. Subdivision and development should generally be in accordance with the Plan.
- (i) Development Requirements and Lot Size
 In considering development and subdivision of the land, the requirements of the Shire of Chittering Town Planning Scheme No. 6 for the Rural Retreat zone apply.
- (ii) Vegetation Preservation
 No clearing is permitted without Planning Consent, within areas of Vegetation Protection and the vegetation as depicted on the Development Plan - unless those trees are dead, diseased or present danger to property.
- (iii) Building Envelopes
 Buildings, water tanks and waste disposal are to be contained within an area not to exceed a maximum of 2,000 sqm without the prior approval of Council. Building envelopes are to be setback from cadastral boundaries as follows:
- | | |
|----------|------------|
| Highways | 100 metres |
| Road | 20 metres |
| Lease | 20 metres |
| Side | 15 metres |
- If the site is to have a land put for the proposed dwelling greater than 0.5 metres above natural ground level, then for every 0.5 metres or height above natural ground level setback distances are to be increased by 2 metres.
- (iv) Fencing
 In accordance with Local Planning Policy No. 22 "Fences", within a lot the construction of a fence around the building envelope, any previously cleared area and adjoining an authorised firebreak, is permitted. Elsewhere, no boundary fences are permitted in vegetation protection areas identified on the Development Plan, without planning consent of the Council.
- (v) Crossovers
 The construction of a crossover to each lot is to be in accordance with Council specifications.
- (vi) Potable Water
 Each dwelling is to have a water supply from roof catchment of a minimum of 120,000 litres, of which 10,000 litres is to be kept in reserve for the lighting purposes and fixed with a standard 50mm male Camlock valve.
- (vii) Land Management
 The maintenance of any drainage routes, easements, fire breaks and vegetation protection and re-vegetation areas is the responsibility of the landowner.
- (viii) Storm, Storm and Water Courses
 The siting of houses, construction of dams and extraction of surface water is not permitted without the approval of the Council and relevant State Government department.
- (ix) Fire Control
 Strategic Fire Breaks as shown on the Development Plan will be constructed by the Developer and are to be maintained by the owner/occupier to the satisfaction of the Chief Executive Officer and the Fire and Emergency Services Authority, in accordance with Local Planning Policy No. 21 "Fire Management Plans".
- (x) Permitted Uses
 In considering development and subdivision of the land, the requirements of the Shire of Chittering Town Planning Scheme No. 6 for the Rural Retreat zone apply. For any use that may result in degradation of land or water resources or nuisance to neighbours, a management plan may be required as a condition of development approval.
- (xi) Stocking Restrictions
 Grazing animals are to be restricted to avoid overgrazing in accordance with Local Planning Policy No. 24 "Stocking Rates and Keeping of Animals".
- (xii) Domestic Pests
 The keeping of domestic cats shall be prohibited.
- (xiii) Roofing Materials
 All buildings shall be constructed with roofs of non-reflective materials.
- (xiv) Waste Disposal
 Where indicated on the Development Plan, alternative treatment units are required for effluent disposal.
- (xv) Drainage
 Landowners shall maintain natural drainage lines to ensure erosion and soil erosion to adjoining lots. There shall be no alteration to natural drainage lines.
- (xvi) Vendor Responsibility
 The developer/vendor shall inform prospective purchasers of the lots, in writing, of the provisions of the Council's Town Planning Scheme relating to the management of the land, as specified in the Development Plan and Fire Management Plan.

OUTLINE DEVELOPMENT PLAN LOTS 1 & 2 TEA TREE ROAD BINDOON



0 100 200 300 400 500 600 700

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Appendix C

DEC Threatened Flora

Database Search



Department of
Environment and Conservation

Our environment, our future



Your Ref:

Our Ref: **23-1011FL**

Enquiries: Jessica Donaldson

Phone: (08) 9334 0123

Fax: (08) 9334 0278

Email: [REDACTED]

Bio Diverse Solutions

55 Peppermint Drive
Albany WA 6330

Attention: Kathryn Kinnear

Dear Kathryn Kinnear,

REQUEST FOR RARE FLORA INFORMATION

I refer to your request of 03 October 2011 for Threatened Flora information in the Bindoon area. The search was conducted within a 5km radial area from the central coordinates you submitted.

A search was undertaken for this area of **(1)** the Department's *Threatened (Declared Rare) Flora* database (for results, *if any*, see "DEFL" – coordinates are GDA94), **(2)** the *Western Australian Herbarium Specimen* database for priority species opportunistically collected in the area of interest (for results, *if any*, see "WAHERB" – coordinates are GDA94 – see condition number 9 in the attached 'Conditions in Respect of Supply' and **(3)**, the Department's *Declared Rare and Priority Flora List* [this list is searched using 'place names'. This list, which may also be used as a species target list, contains species that are declared rare (Conservation Code R or X for those presumed to be extinct), poorly known (Conservation Codes 1, 2 or 3), or require monitoring (Conservation Code 4) – for results, *if any*, see "DP List"]. The results are attached electronically to this email.

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the seventh point, which refers to the requirement to undertake field investigations for the accurate determination of rare flora occurrence at a site. *The information supplied should be regarded as an indication only of the rare flora that may be present and may be used as a target list in any surveys undertaken.*

The information provided does not preclude you from obtaining and complying with, where necessary, land clearing approvals from other agencies.

An invoice for \$300 (plus GST) to supply this information will be forwarded.

It would be appreciated if any populations of rare flora you encounter in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss rare flora management, please contact Dr Ken Atkins, Manager, Species and Communities Branch, on (08) 9334 0455.

Yours faithfully

Jessica Donaldson

.....
for Keiran McNamara
DIRECTOR GENERAL

7 October 2011

Species and Communities Branch

17 Dick Perry Ave, Technology Park, Kensington

Phone: (08) 9334 0455 Fax: (08) 9334 0278

Locked Bag 104, Bentley Delivery Centre, Bentley, Western Australia 6983

www.dec.wa.gov.au

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

RARE FLORA INFORMATION

CONDITIONS IN RESPECT OF SUPPLY OF INFORMATION

1. All requests for data to be made in writing to the Director General, Department of Environment and Conservation, Attention: Threatened Flora Database Officer, Species and Communities Branch.
2. The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided, without the prior written consent of the Director General, Department of Environment and Conservation.
3. Specific locality information for Declared Rare Flora is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for DRF may not be used in public reports without the written permission of the Director General, Department of Environment and Conservation. Publicly available reports may only show generalised locations or, where necessary, show specific locations without identifying species. The Department is to be contacted for guidance on the presentation of rare flora information.
4. Note that the Department of Environment and Conservation respects the privacy of private landowners who may have rare flora on their property. Rare flora locations identified in the data as being on private property should be treated in confidence, and contact with property owners made through the Department of Environment and Conservation.
5. Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data provided, they may be present. The Department of Environment and Conservation accepts no responsibility for this.
6. Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.
7. **It should be noted that the supplied data do not necessarily represent a comprehensive listing of the rare flora of the area in question. Its comprehensiveness is dependant on the amount of survey carried out within the specified area. The receiving organisation should employ a botanist, if required, to undertake a survey of the area under consideration.**
8. Acknowledgment of the Department of Environment and Conservation as source of the data is to be made in any published material. The unique reference number that is given upon the request for information should be quoted. Copies of all such publications are to be forwarded to the Department of Environment and Conservation, Attention: The Manager, Species and Communities Branch.
9. The development of the PERTH Herbarium database was not originally intended for electronic mapping (eg. GIS ArcView). The latitude and longitude coordinates for each entry are not verified prior to being databased. It is only in recent times that collections have been submitted to PERTH with GPS recorded in latitude and longitude coordinates. Therefore, be aware when using this data in ArcView that some records may not plot to the locality description given with each collection.

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THE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DECLARED RARE AND PRIORITY FLORA LIST

for Western Australia

CONSERVATION CODES

R: Declared Rare Flora - Extant Taxa

Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

X: Declared Rare Flora - Presumed Extinct Taxa

Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.

1: Priority One - Poorly known Taxa

Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: Priority Two - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

4: Priority Four - Rare Taxa

Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

Note, the need for further survey of poorly known taxa is prioritised into the three categories depending on the perceived urgency for determining the conservation status of those taxa, as indicated by the apparent degree of threat to the taxa based on the current information.

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Item 9.1.6 - Attachment 1

ABBREVIATIONS USED IN THREATENED FLORA DATABASE PRINTOUTS

VESTING

AAP	Aboriginal Planning Authority
AGR	Chief Executive, Dep. of Agriculture
ALT	Aboriginal Land Trust
APB	Agricultural Protection Board of WA
BGP	Botanical Gardens & Parks Authority
BSA	Boy Scouts Association
CC	Conservation Commission – NPNCA - LFC
CGT	Crown Grant in Trust
COM	Commonwealth of Australia
CRO	Crown Freehold-Govt Ownership
CRW	Crown
DAG	Dep. of Agriculture
DOW	Dep. of Water
DPI	Dep. of Planning & Infrastructure
EXD	Exec Direc CALM
FES	Fire and Emergency Services Aust.
HOW	Dep. of Housing/State Housing Commission
ILD	Industrial Lands Develop. Auth
LAC	LandCorp
MAG	Minister for Agriculture
MBC	Metropolitan Cemeteries Board
MED	Ministry of Education
MHE	Minister for Health
MIN	Minister for Mines
MPL	Ministry for Planning
MPR	Minister for Prisons
MRD	Main Roads WA
MTR	Minister for Transport
MWA	Minister for Water Resources
MWO	Minister for Works
NAT	Natural Trust of Australia WA
NON	Not Vested
PLB	Pastoral Lands Board
PRI	Private/Freehold
RAI	Public Transport Authority
REL	Religious Organisation
SEC	Synergy (ex Western Power)
SHI	Shire
SPC	State Planning Commission
SWA	State of Western Australia
TEL	Telstra
UNK	Unknown
WAT	Water Corporation
WEL	Minister Community Welfare
WRC	Water & Rivers Commission
XPL	Ex-Pastoral Lease

PURPOSES

ABR	Aboriginal Reserve
ACC	Access Track
AER	Aerodrome
AIR	Airport
ARS	Agricultural Research Station
BAP	Baptist Union of WA
CAM	Camping
CAR	Caravan park
CEM	Cemetery
CFA	Conservation of Fauna
CFF	Conservation Of Flora & Fauna
CFL	Conservation of Flora
CHU	Church
CPK	Car Park
CMN	Communications
COM	Common

CON	Conservation Park
DEF	Defence
DRA	Drain
EDE	Educational Endowment
EDU	Educational purposes UWA
ENE	Enjoyment of Natural Environ.
EXC	Excepted from sale
EXL	Exploration Lease
EXP	Experimental Farm
FIR	Firing Range
FOR	State Forest
GE	General Lease
GHA	Grain Handling
GOL	Golf
GRA	Gravel Pit
GVT	Government Requirements
HAR	Harbour Purposes
HEP	Heritage Purposes
HER	Heritage trail
HOS	Hospital
KEN	Kennels
LPR	Landscape Protection
MIN	Mining lease
MUN	Municipal Purposes
NPK	National Park
NRE	Nature Reserve
OTH	Other
PAR	Parkland (& Recreation)
PAS	Pastoral lease
PFF	Protection of Flora & Fauna
PFL	Protection of Flora
PIC	Picnic ground
PLA	Plantation
POS	Public Open Space
PRS	Prison site
PUR	Purchase Lease
PUT	Public Utility
QUA	Quarry
RAD	Radio Station
RAC	Racecourse
REC	Recreation
REH	Rehabilitation/Re-establish Native Plants
RRE	Railway Reserve
RUB	Rubbish
SAN	Sand
SCH	School-site
SET	Settlers requirements
SHI	Shire Requirements
SHO	Showgrounds
SNN	Sanitary
SOI	Soil Conservation
STO	Stopping place
TIM	Timber
TOU	Tourism
TOW	Town-site
TRA	Training Ground
TRI	Trig station
UCL	Unallocated Crown Land
UNK	Unknown
VER	Road Verge
VPF	Vermin Proof Fence
WAT	Water
WLS	Wildlife Sanctuary
WOO	Firewood

Item 9.1.6 - Attachment 1
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DECLARED RARE AND PRIORITY FLORA LIST
16 September 2010

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
<i>Acacia browniana</i> var. <i>glaucescens</i>	2	MW,SW	Bindoon, Julimar, Mogumber	
<i>Acacia drummondii</i> subsp. <i>affinis</i>	3	MW,SW	Bindoon, Muchea, Julimar, Wannamal, Mullewa, New Norcia, Drummond NR	
<i>Acacia pulchella</i> var. <i>reflexa</i> acuminate bracteole variant (RJ Cumming 882)	3	SW	Wannamal, Bindoon, York, Boonanarring	
<i>Adenanthos cygnorum</i> subsp. <i>chamaephyton</i>	3	SW,SR	Chidlow, Mundaring, Collie, Bindoon, Muchea, Sawyers Valley	
<i>Asteridea gracilis</i>	3	SW,SC	Gosnells, Mt Saddleback, South Stirling, Gordon Inlet, Bindoon, Helena Valley	Sep-Oct
<i>Asterolasia nivea</i>	T	SW	Bindoon	Aug-Oct
<i>Astroloma</i> sp. <i>Cataby</i> (EA Griffin 1022)	4	MW,SW	Eneabba, Gairdner Range, Cataby, Calingiri, Bindoon, New Norcia	Feb-Jul
<i>Astroloma</i> sp. <i>Nannup</i> (RD Royce 3978)	4	SR,SW,WA	Bindoon, Forest Grove, Nannup, Scott River, Careys Flat, Manjimup (Barlee Brook), Witchcliffe, Abba River, Margaret River	Apr-Jun
<i>Calothamnus pachystachyus</i>	4	MW,SW	Bindoon, Mogumber, New Norcia	Aug-Oct
<i>Commersonia</i> sp. <i>Bindoon</i> (CF Wilkins & F & J Hort CW 2155)	1	SW	Bindoon	
<i>Conostylis caricina</i> subsp. <i>elachys</i>	1	WB,SW	Gunyidi, Goomalling, Dowerin, Bindoon	Aug,Sep
<i>Cyanicula ixioides</i> subsp. <i>candida</i>	2	SW	Bindoon, Smiths Mill, York, Wooroloo	Sep-Oct
<i>Drosera sewelliae</i>	1	SW	Lower Chittering, Julimar	Oct
<i>Eucalyptus exilis</i>	4	MW,WB,SW	Mt Lesueur, Coorow, Boyagin Rock, Wandering, Bindoon, Gunapin, Coomallo NR, Beverley	Dec-Apr
<i>Gastrolobium crispatum</i>	1	SW	Bindoon, Julimar, Gidgegannup, Mt Byroomanning	Oct
<i>Goodenia arthrotricha</i>	T	SW,MW	Wannamal, Moora, Ellis Brook, Bindoon	Nov,Dec
<i>Grevillea corrugata</i>	T	SW	Bindoon	Aug-Sep
<i>Grevillea drummondii</i>	4	MW,SW	Bindoon, Hay Flat, New Norcia, Yandan Hill	Jun-Oct
<i>Grevillea florida</i>	3	MW,SW	Bindoon, New Norcia, Cataby	Jul-Sep
<i>Hibbertia glomerata</i> subsp. <i>ginginensis</i>	1	SW	Gingin, Bindoon	Jul-Sep
<i>Hibbertia miniata</i>	4	SW	Hay Flat, Bindoon Hill, Julimar, Wannamal	Jul-Oct
<i>Hypocalymma</i> sp. <i>Tea Tree Road</i> (O. Davies OD 171)	1	SW	Bindoon	
<i>Hypocalymma sylvestre</i>	1	SW	Chittering	Aug-Oct
<i>Johnsonia inconspicua</i>	3	SR,SW	South of Carbunup, Yelverton, Bindoon, Julimar, Quindalup	Nov
<i>Lasiopetalum</i> sp. <i>Toodyay</i> (F. Hort 2689)	1	SW	Wannamal, Bindoon Training Area	Sep
<i>Lechenaultia magnifica</i>	1	SW,WB	Bindoon, Julimar SF, Calingiri, Gingin	Nov
<i>Oxymyrrhine coronata</i>	4	SW	Chittering, Bullsbrook, Avon Valley	Dec,Jan
<i>Persoonia sulcata</i>	4	SW,WB,MW	John Forrest N.P., Wongamine N.R., Bindoon, Dardadine, Calingiri	Sep-Nov
<i>Petrophile plumosa</i>	3	MW,SW	Bindoon, Mogumber, New Norcia	Jul-Nov
<i>Schoenus griffinianus</i>	3	MW,WB,SW	Eneabba, Wongan Hills, Greenough, Chittering, Hazelmere, Wanneroo	Oct-Nov

Item 9.1.6 - Attachment 1
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DECLARED RARE AND PRIORITY FLORA LIST
16 September 2010

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
<i>Senecio gilbertii</i>	1	SW,SR	Bindoon, York, Wooroloo, Wilga, Gooseberry Hill	Sep-Nov
<i>Spirogardnera rubescens</i>	T	MW,SW	Bindoon-Eneabba, Alexander Morrison NP	Aug-Nov
<i>Stylidium cymiferum</i>	3	MW,SW	Calingiri, Bindoon, Chittering, Toodyay	Oct
<i>Stylidium glabrifolium</i>	2	SW	Bindoon	Oct
<i>Synaphea grandis</i>	4	MW,SW	Wannamal, New Norcia, Julimar, Muclea, Bindoon, Gingin	Oct-Nov
<i>Synaphea panhesya</i>	1	SW	Bindoon, Mogumber	Aug-Sep
<i>Tetratheca similis</i>	3	SW	Bindoon, Mt Dale area, Wandoo CP	Aug-Sep
<i>Verticordia serrata</i> var. <i>Udumung</i> (D Hunter & B Yarran 941006)	2	SW	Bindoon	Oct

Item 9.1.6 - Attachment 1

OID SHEET_NO	SPECIES	20_1011_WAHERB		VEGETATION	LOCALITY	LAT	LONG_	DATE_
		CONSCODE	SITE					
PERTH 00319244	Acacia drummondii subsp. affinis	3	On hillside in latetitic gravel.		22.5 km from Bullsbrook East towards Chittering	-31.4642	116.025	02 08 1973
PERTH 07215134	Acacia drummondii subsp. affinis	3	On high ground between the highway and lake.	Remnant woodland. Contiguous with fringing vegetation on la	Site 7, Great Northern Highway, S of Bindoon	-31.4167	116.0833	09 2005
PERTH 00342750	Acacia pulchella var. reflexa acuminate bracteole varian	3	Road verge.	Eucalyptus calophylla-wandoo woodland.	8 km (5 miles) from Bindoon towards Toodyay	-31.4519	116.09	05 09 1981
PERTH 1616188	Adenanthos cygnorum subsp. chamaephyton	3	Low upland, well drained; shallow grey sand over laterite,	Low Heath C over Low Heath D (Scheme of Muir 1977); Alloca	Private Property, 6.4 km at 250degrees from Bindoon	-31.409	116.0348	24 11 1990
PERTH 07215126	Adenanthos cygnorum subsp. chamaephyton	3	On slope above the highway, adjacent to totally cleared pa	Isolated remnant woodland. Good understorey diversity rema	Site 10, Great Northern Highway, S of Bindoon	-31.4167	116.0833	09 2005
PERTH 01297473	Astroloma sp. Cataby (E.A. Griffin 1022)	4	Yellow gravel soil.	Forest.	7 miles from Bindoon, 50 miles NE of Perth	-31.3833	116.0833	27 04 1957
PERTH 07782160	Chamelaucium sp. Gingin (N.G. Marchant 6)	T	Slope, dry red-brown gravel.	No associated species.	Lot 439 Breera Road, Gingin, lot number on front entry gate shown as 4!	-31.4401	115.9693	03 09 2007
PERTH 847917	Cyanicula ixioiodes subsp. candida	2		Eucalyptus wandoo and E. calophylla woodland over formerly	9 km NNE of Bindoon, access off Stevenson Road	-31.3833	116.0833	21 09 1986
PERTH 01052683	Gastrolobium nudum	2			Chittering	-31.4414	116.0964	25 09 1956
PERTH 04360745	Grevillea corrugata	T	In gravelly loam.	Beside road in eucalypt forest. Disturbed verge.	Julimar road, 1.3 km from Chittering road, c. 10 km S of Bindoon	-31.4333	116.0667	04 10 1992
PERTH 04360753	Grevillea corrugata	T	In gravelly loam.	Beside road in eucalypt forest. Disturbed verge.	Julimar road, 1.3 km from Chittering road, c. 10 km S of Bindoon	-31.4333	116.0667	04 10 1992
PERTH 04360761	Grevillea corrugata	T	In gravelly loam.	Beside road in eucalypt forest. Disturbed verge.	Julimar road, 1.3 km from Chittering road, c. 10 km S of Bindoon	-31.4333	116.0667	04 10 1992
PERTH 07739028	Hypocalymma sp. Tea Tree Road (O. Davies OD 171)	1	Gentle slope. Damp, brown sand-loam-gravel over laterite.	Low Heath D. Hibbertia hypericoides var. hypericoides, Pentas	In property of Tea Tree Road, Bindoon	-31.4417	116.0547	22 11 2007
PERTH 03259951	Oxymyrrhine coronata	4	Lateritic gravel.	Marginal Jarrah/Wandoo forest.	3.5 km SE of Keating road, Chittering	-31.4414	116.0964	10 12 1981
PERTH 07782152	Ptychosema pusillum	T	Slope, dry white sand.	Low Woodland B over Low Heath Cover Herbs. Banksia menze	Lot 439 Breera Road, Gingin, Plants at NE corner of property on fire brea	-31.4383	115.9716	18 09 2007
PERTH 08202931	Tetratheca pilifera	3	Slope, breakaway. Gully, drainage line. Dry - moist brown li	Eucalyptus wandoo fringing shrubland. Associated species: Tr	350 Bindoon Spring Road, ca 750 m E of the farmhouse, Toodyay Wes	-31.4137	116.0723	08 10 2009
PERTH 07835302	Verticordia rutilastra	3	Sand, flat, private property.	Low Open Woodland of Eucalyptus todiana and Banksia attar	Lot 26 Ioppolo Road, Dandragan Plateau	-31.4548	115.9904	12 10 2008

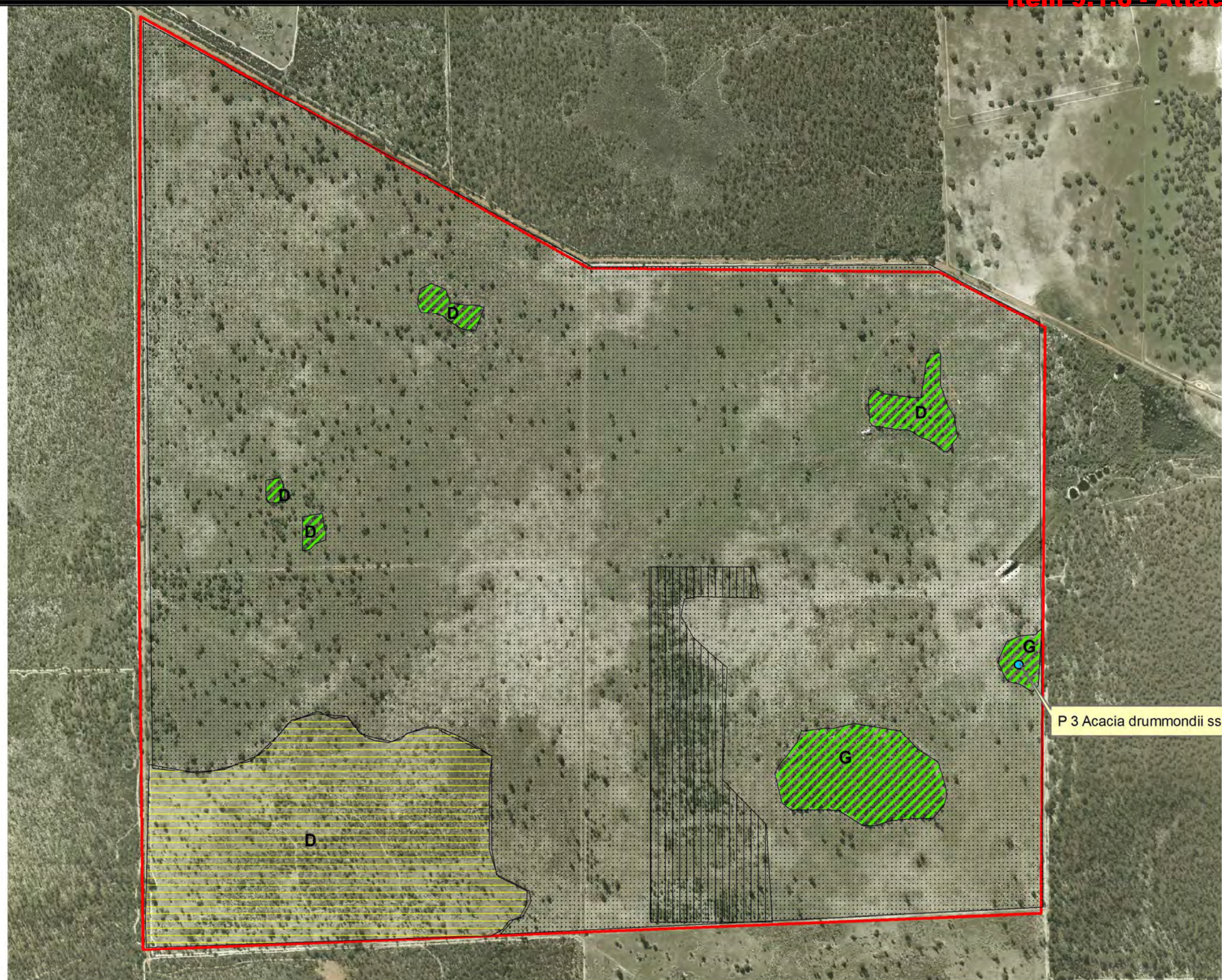
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23_1011 DEFL												
OID_	SHEET	SPNAME	CONSVCOE	POPID1	POPID2	GDA94LAT	GDA94LONG	VESTING	PURPOSE1	PURPOSE2	STATUS	OWNERDATE
	25616	Acacia drummondii subsp. affinis		3	16	-31.41667	116.08333	UNK	UNK			1/09/2005 0:00
	9630	Adenanthos cygnorum subsp. chamaephyton		3	3 A	-31.40322	116.08842	MRD	GRA			26/10/1996 0:00
	9631	Adenanthos cygnorum subsp. chamaephyton		3	3 B	-31.40322	116.08897	SHI	OTH			26/10/1996 0:00
	9632	Adenanthos cygnorum subsp. chamaephyton		3	3 C	-31.40349	116.08869	SHI	VER			26/10/1996 0:00
	9636	Adenanthos cygnorum subsp. chamaephyton		3	3 D	-31.41294	116.09147	SHI	VER			26/10/1996 0:00
	9639	Adenanthos cygnorum subsp. chamaephyton		3	4	-31.43016	116.07814	MRD	VER			26/10/1996 0:00
	9655	Adenanthos cygnorum subsp. chamaephyton		3	11	-31.40905	116.03481	PRI				24/11/1990 0:00
	25678	Adenanthos cygnorum subsp. chamaephyton		3	20	-31.40906	116.03481	PRI				24/11/1990 0:00
	27496	Chamelaucium sp. Gingin (N.G. Marchant 6)	T		7	-31.44006	115.96925	PRI				3/09/2007 0:00
	27494	Ptychosema pusillum	T		3	-31.43828	115.97161	PRI				3/09/2007 0:00

Item 9.1.6 - Attachment 1

Appendix D

Vegetation Mapping



Legend

- P 3 Acacia drummondii ssp affinis
- Jarrah - Marri JmCc
- Mosaic Jarrah - Marri - Banksia JmCcBa
- Tagasaste plantation
- Cleared Paddock Areas
- Subject area
- G - Good Condition
- D - Degraded Condition

Scale
1:11000 @ A3



0 90 180 360 540 720 Meters



**BIO
DIVERSE
SOLUTIONS**

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CLIENT Lot 1 and 2 Tee Tree Road
Bindoon WA

Vegetation Mapping

STATUS	FILE	DATE
FINAL	WHEL014	20/01/2012

Item 9.1.6 - Attachment 1

Appendix E

Flora Species List

Flora species list

Family	Species	Common Name	Weed
FABACEAE	<i>Acacia barbinervis ssp barbinervis</i>		
FABACEAE	<i>Acacia drummondii ssp affinis</i>	P3 #319	
FABACEAE	<i>Acacia pulchella</i>		
FABACEAE	<i>Acacia pulchella var. pulchella</i>		
PROTEACEAE	<i>Adenanthos cygnorum</i>		
ASTERACEAE	<i>Angianthus tomentosus</i>		
HAEMODORACEAE	<i>Anigozanthos humilis</i>	Cats paw	
CASUARINACEAE	<i>Allocasuarina humilis</i>		
ERICACEAE	<i>Astroloma pallidum</i>		
ERICACEAE	<i>Astroloma xerophyllum</i>		
POACEAE	<i>Austrostipa compressa</i>		
POACEAE	<i>Austrodanthonia occidentalis</i>		
POACEAE	<i>Avena sp.</i>	Wild oats	Y
MYRTACEAE	<i>Babingtonia camphorosmae</i>		
MYRTACEAE	<i>Baeckea crispiflora var. tenuior</i>		
MYRTACEAE	<i>Baeckea grandiflora</i>		
PROTEACEAE	<i>Banksia attenuata</i>		
PROTEACEAE	<i>Banksia dallanneyi var. dallanneyi</i>		
PROTEACEAE	<i>Banksia grandis</i>		
PROTEACEAE	<i>Banksia sessilis var. sessilis</i>		
CYPERACEAE	<i>Baumea rubiginosa</i>		
RUTACEAE	<i>Boronia ramosa ssp anethifolia</i>		
FABACEAE	<i>Bossiaea eriocarpa</i>		
BRASSICACEAE	<i>Brassica tournefortii</i>		Y
POACEAE	<i>Bromus diandrus</i>		Y
COLCHICEAE	<i>Burchardia congesta</i>		
HEMEROCALLIDACEAE	<i>Caesia micrantha</i>		
ORCHIDACEAE	<i>Caladenia flava</i>		
PORTULACEAE	<i>Calandrinia corrigioloides</i>		
MYRTACEAE	<i>Callistemon x citrinus</i>		Y
LAURACEAE	<i>Cassytha flava</i>		
CENTROLEPIDACEAE	<i>Centrolepis drummondiana</i>		
FABACEAE	<i>Chamaecytisus palmensis</i>	Tagasaste	Y
ASPARAGACEAE	<i>Chamaescilla corymbosa</i>	Blue squills	
PROTEACEAE	<i>Conospermum stoechadis</i>		
HAEMODORACEAE	<i>Conostylis setosa</i>		
MYRTACEAE	<i>Corymbia calophylla</i>	Marri	
ASTERACEAE	<i>Cotula coronopifolia</i>	Waterbuttons	Y
CRASSULACEAE	<i>Crassula exserta</i>		
CYPERACEAE	<i>Cyperus brevifolius</i>		Y
CYPERACEAE	<i>Cyperus tenuiflorus</i>		Y
FABACEAE	<i>Daviesia decurrens</i>		

Item 9.1.6 - Attachment 1

Family	Species	Common Name	Weed
FABACEAE	<i>Daviesia nudiflora</i>		
FABACEAE	<i>Daviesia preissii</i>		
FABACEAE	<i>Daviesia triflora</i>		
RESTIONACEAE	<i>Desmocladius fascicularis</i>		
ASPARAGACEAE	<i>Dichopogon capillipes</i>		
ORCHIDACEAE	<i>Disa bracteata</i>		Y
SCROPHULARIACEAE	<i>Dischisma arenarium</i>		Y
DROSERACEAE	<i>Drosera erythrorhiza</i>		
DROSERACEAE	<i>Drosera glanduligera</i>		
DROSERACEAE	<i>Drosera macrantha</i>		
DROSERACEAE	<i>Drosera pallida</i>		
POACEAE	<i>Ehrharta longiflora</i>	Annual Veldt Grass	Y
ORCHIDACEAE	<i>Elythranthera brunonis</i>	Enamel Orchid	
MYRTACEAE	<i>Eremaea pauciflora</i>		
GERANIACEAE	<i>Erodium botrys</i>		Y
MYRTACEAE	<i>Eucalyptus marginata</i>	Jarrah	
MYRTACEAE	<i>Eucalyptus todtiana</i>		
PROTEACEAE	<i>Grevillea synapheae</i>		
IRIDACEAE	<i>Gladiolus caryophyllaceus</i>	Pink gladiolus	Y
FABACEAE	<i>Gompholobium knightianum</i>		
FABACEAE	<i>Gompholobium tomentosum</i>		
HAEMODORACEAE	<i>Haemodorum venosum</i>		
PROTEACEAE	<i>Hakea lissocarpha</i>		
PROTEACEAE	<i>Hakea ruscifolia</i>		
ASTERACEAE	<i>Helichrysum luteoalbum</i>		Y
DILLENIACEAE	<i>Hibbertia huegelii</i>		
DILLENIACEAE	<i>Hibbertia hypericoides</i>		
DILLENIACEAE	<i>Hibbertia lasiopus</i>		
DILLENIACEAE	<i>Hibbertia racemosa</i>		
DILLENIACEAE	<i>Hibbertia subvaginata</i>		
ASTERACEAE	<i>Hyalospermum cotula</i>		
ASTERACEAE	<i>Hypochaeris glabra</i>		Y
CYPERACEAE	<i>Isolepis marginata</i>		Y
CYPERACEAE	<i>Isolepis prolifera</i>		Y
FABACEAE	<i>Isotropis cuneiformis</i>		
FABACEAE	<i>Jacksonia floribunda</i>		
FABACEAE	<i>Jacksonia sternbergiana</i>		
JUNCACEAE	<i>Juncus pallidus</i>		
JUNCACEAE	<i>Juncus planifolius</i>		
FABACEAE	<i>Kennedia prostrata</i>		
MYRTACEAE	<i>Kunzea glabrescens</i>		
ASTERACEAE	<i>Lagenophora huegelii</i>		
GOODENIACEAE	<i>Lechenaultia biloba</i>		
GOODENIACEAE	<i>Lechenaultia floribunda</i>		

Item 9.1.6 - Attachment 1

Family	Species	Common Name	Weed
ORCHIDACEAE	<i>Leporella fimbriata</i>	Hare orchid	
MYRTACEAE	<i>Leptospermum erubescens</i>		
MYRTACEAE	<i>Leptospermum spinescens</i>		
ERICACEAE	<i>Leucopogon nutans</i>		
ERICACEAE	<i>Leucopogon propinquus</i>		
CAMPANULACEAE	<i>Lobelia rhombifolia</i>		
ASPARAGACEAE	<i>Lomandra caespitosa</i>		
ASPARAGACEAE	<i>Lomandra hermaphrodita</i>		
ASPARAGACEAE	<i>Lomandra preissii</i>		
ASPARAGACEAE	<i>Lomandra sericea</i>		
FABACEAE	<i>Lotus subbiflorus</i>		Y
ZAMIACEAE	<i>Macrozamia reidlei</i>		
MYRTACEAE	<i>Melaleuca preissiana</i>		
MYRTACEAE	<i>Melaleuca trichophylla</i>		
RESTIONACEAE	<i>Mesomelaena pseudostygia</i>		
POACEAE	<i>Neurachne alopecuroides</i>		
LORANTHACEAE	<i>Nuytsia floribunda</i>		
FABACEAE	<i>Ornithopus compressus</i>		Y
FABACEAE	<i>Ornithopus sativus</i>		Y
OROBANCHACEAE	<i>Orobanche minor</i>		Y
SCROPHULARIACEAE	<i>Parentucellia viscosa</i>		Y
IRIDACEAE	<i>Patersonia occidentalis</i>		
GERANIACEAE	<i>Pelargonium capitatum</i>		
POACEAE	<i>Pentaschistis airoides</i>		Y
POLYGONACEAE	<i>Persicaria decipiens</i>		Y
PROTEACEAE	<i>Petrophile linearis</i>		
PROTEACEAE	<i>Petrophile macrostachya</i>		
PROTEACEAE	<i>Petrophile striata</i>		
CARYOPHYLLACEAE	<i>Petrorhagia dubius</i>		Y
RUTACEAE	<i>Philothea spicata</i>		
LOGANIACEAE	<i>Phyllanthus paradoxum</i>		
EUPHORBIACEAE	<i>Phyllanthus calycinus</i>		
ASTERACEAE	<i>Podothea gnaphalioides</i>		
POACEAE	<i>Polypogon monspeliensis</i>	Annual beardgrass	Y
ORCHIDACEAE	<i>Pterostylis nana</i>		
ORCHIDACEAE	<i>Pterostylis vittata</i>		
ORCHIDACEAE	<i>Pyrorchis nigricans</i>		
ASTERACEAE	<i>Rhodanthe citrina</i>		
IRIDACEAE	<i>Romulea rosea</i>	Guildford grass	Y
MYRTACEAE	<i>Scholtzia involucreata</i>		
ASTERACEAE	<i>Sonchus asper</i>		Y
ASTERACEAE	<i>Sonchus oleraceus</i>	Sowthistle	Y
STYLIDACEAE	<i>Stylidium hispidum</i>		
STYLIDACEAE	<i>Stylidium calcaratum</i>		

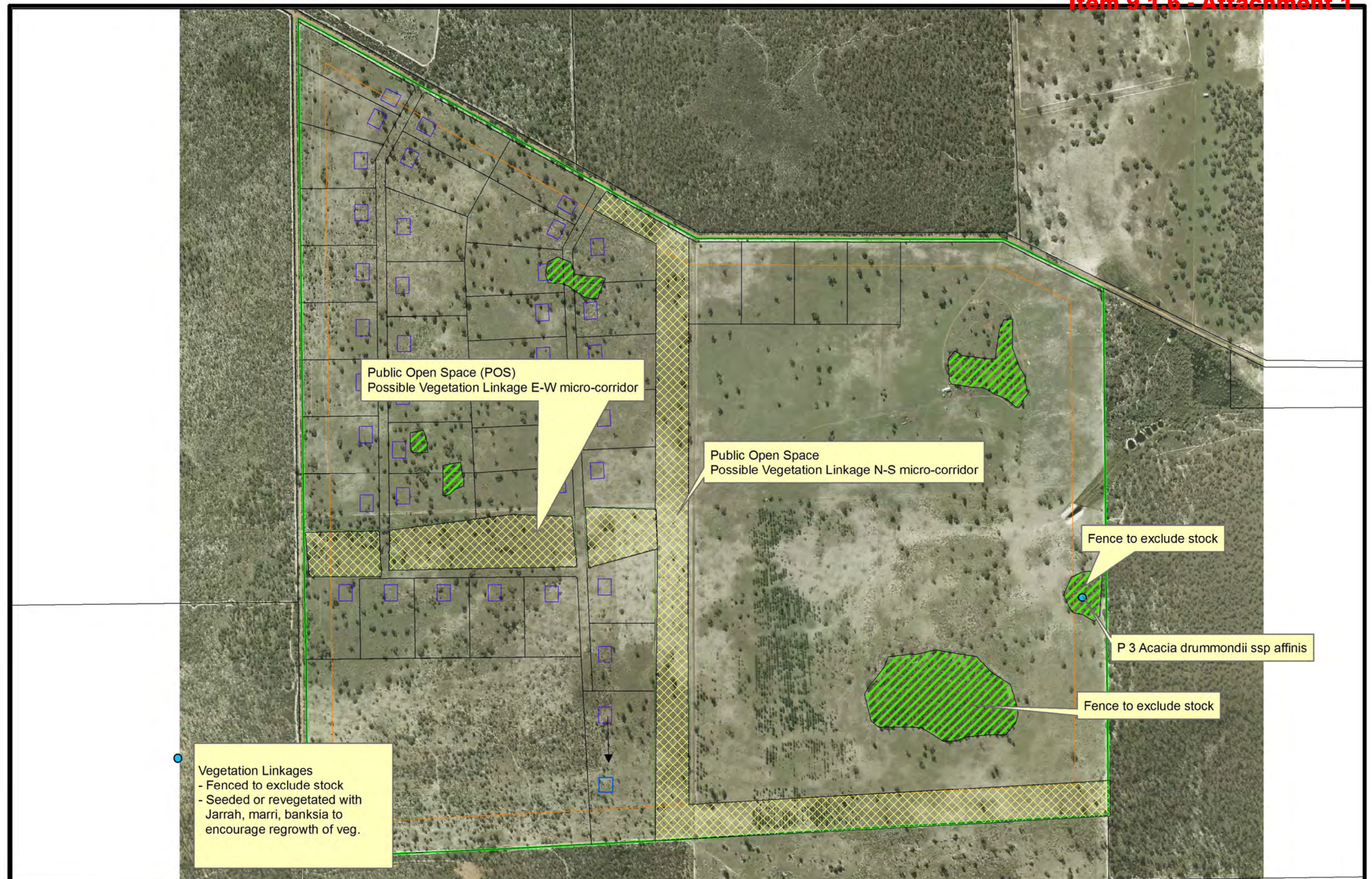
Item 9.1.6 - Attachment 1

Family	Species	Common Name	Weed
PROTEACEAE	<i>Synaphea spinulosa</i>		
CYPERACEAE	<i>Tetraria octandra</i>		
TREMANDRACEAE	<i>Tetradlea hirsuta</i>		
FABACEAE	<i>Trifolium arvense</i>	Hare's foot clover	Y
FABACEAE	<i>Trifolium dubium</i>		Y
FABACEAE	<i>Trifolium hirtum</i>	Rose clover	Y
FABACEAE	<i>Trifolium subterraneum</i>	Subclover	Y
CELASTRACEAE	<i>Tripterococcus brunonis</i>		
ORCHIDACEAE	<i>Thelymitra sp</i>		
TYPHACEAE	<i>Typha domingensis</i>		
ASPARAGACEAE	<i>Thysanotus patersonii</i>		
ASPARAGACEAE	<i>Thysanotus tenellus</i>		
APIACEAE	<i>Trachymene pilosa</i>		
HEMEROCALLIDACEAE	<i>Tricoryne elatior</i>		
ASTERACEAE	<i>Ursinia anthemoides</i>		Y
ASTERACEAE	<i>Vellereophyton dealbatum</i>		Y
POACEAE	<i>Vulpia myuros</i>		Y
CAMPANULACEAE	<i>Wahlenbergia capensis</i>		Y
XANTHORRHOEACEAE	<i>Xanthorrhoea preissii</i>		
Count	149		37

Item 9.1.6 - Attachment 1

Appendix F

Recommendations Mapping



Legend

- P 3 Acacia drummondii ssp affinis
- Vegetative Linkages
- Jarrah - Marri JmCc

Scale
1:11000 @ A3



0 90 180 360 540 720 Meters



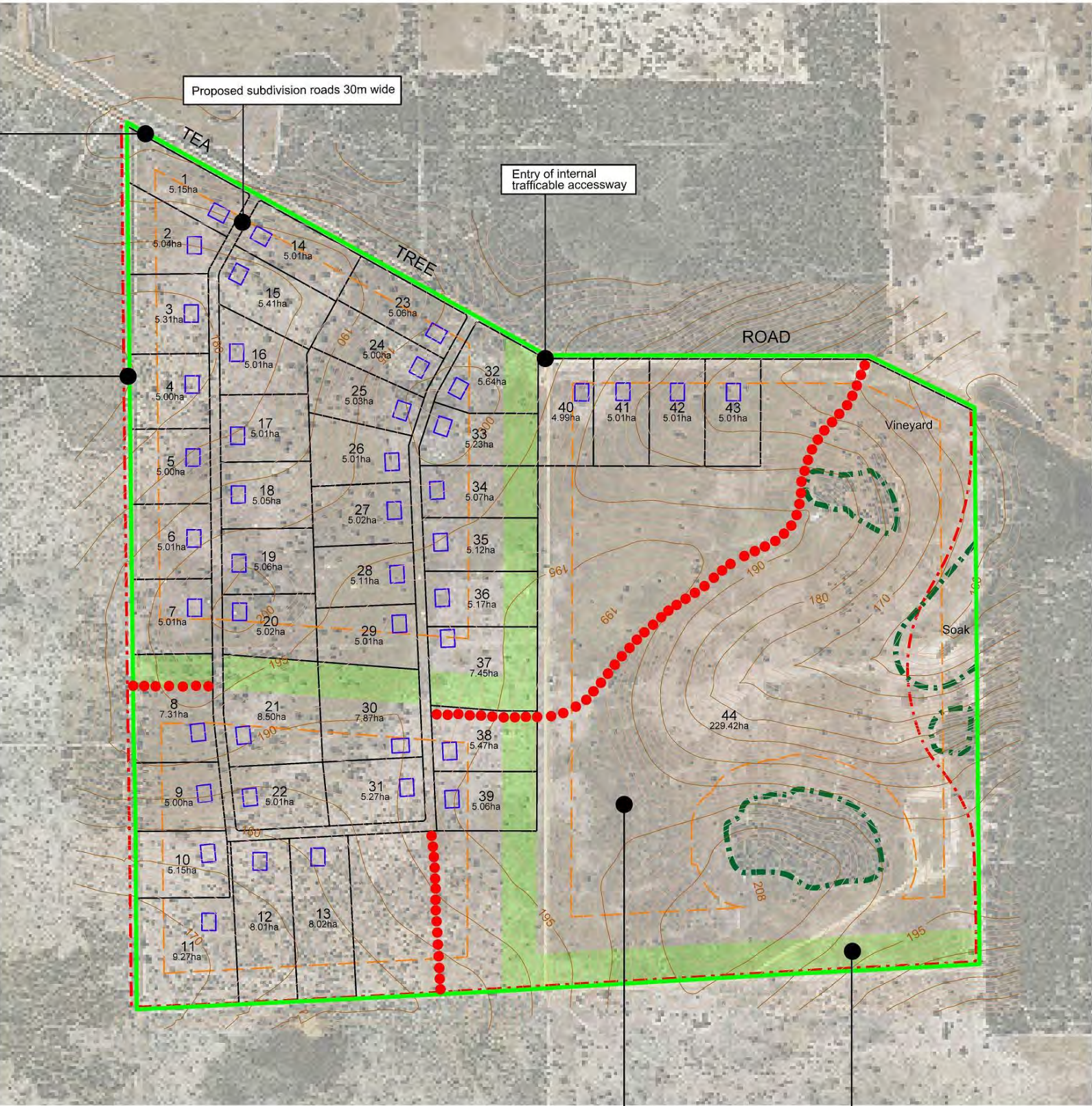
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CLIENT Lot 1 and 2 Tee Tree Road
Bindoon WA

Recommendations Mapping

STATUS	FILE	DATE
FINAL	WHEL014	20/01/2012



DEVELOPMENT PROVISIONS RELATING TO THE ESTATE

(a) Development Plan
This Development Plan has been approved by the Council and the Western Australian Planning Commission. Subdivision and development should generally be in accordance with the Plan.

(b) Development Requirements and Lot Sizes
In considering development and subdivision of the land, the requirements of the Shire of Chittering Town Planning Scheme No. 6 for the Rural Smallholdings zone apply, along with the Rural Smallholdings zone.

(c) Vegetation Preservation
No clearing is permitted, without Planning Consent, within areas of Vegetation Protection and Re-vegetation as depicted on the Development Plan - unless those trees are dead, diseased or present danger to property.

(d) Building Envelopes
Buildings, water tanks and waste disposal are to be contained within an area not to exceed a maximum of 2,000 sqm without the prior approval of Council; building envelopes are to be setback from cadastral boundaries as follows:

Highways	100 metres
Road	20 metres
Rear	20 metres
Side	15 metres

If the site is to have a sand pad for the proposed dwelling greater than 0.5 metres above natural ground level, then for every 0.5 metres or height above natural ground level, setback distances are to be increased by 2 metres.

(e) Fencing
In accordance with Local Planning Policy No. 22 "Fences", within a lot the construction of a fence around the building envelope, any previously cleared area and adjoining an authorised firebreak, is permitted. Elsewhere, no boundary fences are permitted in vegetation protection areas identified on the Development Plan, without planning consent of the Council.

(f) Crossovers
The construction of a crossover to each lot is to be in accordance with Council's specifications.

(g) Potable Water
Each dwellings is to have a water supply from roof catchment of a minimum of 120,000 litres, of which 10,000 litres is to be kept in reserve for fire fighting purposes and fitted with a standard 50mm male Camlock valve.

(h) Land Management
The maintenance of any drainage swales, easements, fire breaks and vegetation protection and re-vegetation areas is the responsibility of the owner/occupier.

(i) Bores, Dams and Water Courses
The sinking of bores, construction of dams and extraction of surface water is not permitted without the approval of the Council and relevant State Government department.

(j) Fire Control
Strategic Fire Breaks as shown on the Development Plan will be constructed by the Developer and are to be maintained by the owner/occupier to the satisfaction of the Chief Executive Officer and the Fire and Emergency Services Authority, in accordance with Local Planning Policy No. 21 "Fire Management Plans".

(k) Permitted Uses
In considering development and subdivision of the land, the requirements of the Shire of Chittering Town Planning Scheme No. 6 for the Rural Smallholdings zone apply. For any use that may result in degradation of land or water resources or nuisance to neighbours, a management plan may be required as a condition of development approval.

(l) Stocking Restrictions
Grazing animals are to be restricted to avoid overgrazing in accordance with Local Planning Policy No. 24 "Stocking Rates and Keeping of Animals".

(m) Domestic Pets
The keeping of domestic cats shall be prohibited.

(n) Roofing Materials
All buildings shall be constructed with roofs of non-reflective materials.

(o) Waste Disposal
Where indicated on the Development Plan, alternative treatment units are required for effluent disposal.

(p) Drainage
Landowners shall maintain natural drainage lines to prevent erosion and soil export to adjoining lots. There shall be no alteration to natural drainage lines.

(q) Vendor Responsibility
The developer/vendor shall inform prospective purchasers of the lots, in writing, of the provisions of the Council's Town Planning Scheme relating to the management of the land, as specified in the Development Plan and Fire Management Plan.

ADOPTION

Adopted by resolution of the Council of the Shire of Chittering and the Ordinary meeting of Council held on the day of 2015 and the seal of the municipality was pursuant to the resolution hereto affixed in the presence of:

President

Chief Executive Officer

Date

LEGEND

100m Fire Hazard Separation

Re-vegetation areas for ecological corridors within lots to link areas of high biodiversity

Strategic Fire Breaks (indicative only)

Indicative Building Envelopes (2000m²)

Strategic Fire Service Access

Vegetation Protection & Development Exclusion Areas

DEVELOPMENT PLAN
LOTS 1 & 2 TEA TREE ROAD
BINDOON

DATE DRAWN: 17/06/2015	FILE: 150303 outline develop plan.dgn
DRAWN BY: CdeL	V DATUM: AHD
CHECKED BY: JP	H DATUM: MGA94 (50)

**Lot 1 and 2 Tee
Tree Road,
Bindoon WA**

Bushfire Management Plan



17/04/2015

Kathryn Kinnear

Bio Diverse Solutions **Page 85**

DOCUMENT CONTROL

TITLE

Lot 1 and 2 Tee Tree Road Bindoon Bushfire Management Plan

Author (s) : Kathryn Kinnear

Reviewer (s) :

Job No. : WHEL014

Client : Marou Property Development Pty Ltd

REVISION RECORD

Revision	Summary	Revised By	Date
Draft	Client review	Whelans	14/2/12
Final	Client		15/3/12
Final	Issued to client with ODP changes & review of legislation/guidelines	Kathryn Kinnear	17/04/2015

DISCLAIMER

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959 – Building in Bushfire prone Areas, DFES's planning for Bushfire Protection and CSIRO's research into Bushfire behaviour. These are considered the minimum standards required to balance the protection of the proposed dwelling and occupants with the aesthetic and environmental conditions required by local, state and federal government authorities. They DO NOT guarantee that a building will not be destroyed or damaged by a bushfire. All surveys and forecasts, projections and recommendations made in this assessment report and associated with this proposed dwelling are made in good faith on the basis of the information available to the fire protection consultant at the time of assessment. The achievement of the level of implementation of fire precautions will depend amongst other things on actions of the landowner or occupiers of the land, over which the fire protection consultant has no control. Notwithstanding anything contained within, the fire consultant/s or local government authority will not, except as the law may require, be liable for any loss or other consequences (whether or not due to negligence of the fire consultant/s and the local government authority, their servants or agents) arising out of the services rendered by the fire consultant/s or local government authority.



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- APPENDIX E – DFES INFORMATION FOR THE HOMEOWNER
- APPENDIX F – BUSHFIRE MANAGEMENT PLAN
- APPENDIX G - DFES CHECKLIST



1. Introduction

Marou Property Development Pty Ltd commissioned Bio Diverse Solutions (Bushfire Consultants) to undertake a fire hazard assessment and prepare a Bushfire Management Plan to guide all future fire management for the proposed subdivision development of Lots 1 and 2 Tee Tree Road, Bindoon.

The basic requirements of any Bushfire Management Plan (BMP) is to identify potential issues or problems relating to environmental fire threats and recommend specific actions by certain persons, agencies, authorities and developers to ensure, as much as practical, that the lives and assets of the location are not put at undue threat from any unplanned fire event. A BMP takes into account various physical attributes of the land, including topographical and vegetation properties, local climatic impacts, past and current land use, past fire history and management practices, local authority fire management obligations, road access, water supplies, adjacent property and tenure, and future obligations by various parties should the subdivision application be successful.

Such planning takes into consideration standards and requirements specified in various documents such as Australian Standard (AS) 3959-2009 and WA Planning for Bushfire Protection Edition 2 (2010) which have been developed to ensure uniformity with interpretation of onsite vegetation types, site design, and building standards.

1.1. Statutory Conditions

This Bushfire Management Plan (BMP) has been prepared for Lot 1 and 2 Tee Tree Road Bindoon (refer to Appendix A for location of subject site) to address fire management issues associated with the proposed Outline Development Plan (ODP). The BMP is consistent with State and Local Government planning instruments in particular guidance notes/information from Department of Fire and Emergency Services (DFES), Western Australia Planning Commission (WAPC) Planning for Bushfire Protection Ed. 2 (2010) and Draft "Planning for Bushfire Risk Management Guidelines (WAPC, 2014). The BMP aims to resolve any conflicts and provide planning information and guidance for the Shire of Chittering, DFES, developers, present and future owners.

As of the 15th May 2015 it is proposed that the *Planning and Development (Bushfire Risk Management) Regulations 2014* and Western Australian State Bushfire Prone Mapping will be gazetted.

This means that:

- Any building licence application for residential buildings and outbuildings i.e. Class 1, 2 or 3 buildings or associated Class 10a buildings or decks associated with Class 1, 2 or 3 buildings in designated bushfire prone areas will be required to be constructed in accordance with AS3959 Construction of Buildings in Bushfire Prone Areas;
- A Bushfire Attack Level (BAL) assessment must be undertaken on the site; and
- Development on sites with a BAL-40 or BAL-FZ rating will require a planning application under the *Planning and Development (Bushfire Risk Management) Regulations 2014*.

(DoP, 2015)

The *Planning and Development (Bushfire Risk Management) Regulations 2014* define Bushfire Prone Vegetation as:

"...means contiguous vegetation including grasses and shrubs but not including maintained lawns, parks and gardens, nature strips, plant nurseries, golf courses, vineyards, orchards or vegetation on land that is used for horticultural purpose."

(DoP, 2015)

The *Planning and Development (Bushfire Risk Management) Regulations 2014* outline "Bushfire Prone Areas" as:

"(a) where the development site is on land covered by a Bushfire Prone Area Map endorsed by the FES Commissioner – if any part of the development of the site is designated on that map as being bushfire prone; or

(b) where the development is not on land covered by a Bushfire Prone Area Map endorsed by the FES Commissioner – if any part of the development is within 100m of an area of bushfire prone vegetation equal or greater than one hectare.”
(DoP, 2015)

The site has been deemed to be Bushfire Prone as per the above draft regulations as is situated within 100m of >1 ha of bushfire prone vegetation.

This document and the recommendations contained are aligned to the following policy and guidelines:

- AS 3959-2009 “Construction of Buildings in Bushfire Prone Areas”;
- “Planning for Bushfire Protection Edition 2” WAPC (2010);
- Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014);
- *Bushfires Act 1954*;
- Shire of Chittering Local Planning Policy 21 – Fire Management Plans;
- Shire of Chittering Annual Fire Break Notice; and
- Proposed *Planning and Development (Bushfire Risk Management) Regulations 2014*.

1.2. Suitably Qualified Bushfire Consultant

This BMP has been prepared by Kathryn Kinnear (nee White), who has 10 years operational fire experience with the DEC (1995-2005) and has the following accreditation in Fire Management:

- Incident Control Systems;
- Operations Officer;
- Prescribed Burning Operations;
- Fire and Incident Operations;
- Wildfire Suppression 1, 2 & 3;
- Structural Modules – Hydrants and hoses, Introduction to Structural Fires, and Fire extinguishers; and
- Ground Controller.

Kathryn Kinnear currently has the following Tertiary Qualifications:

- BAS Technology Studies & Environmental Management;
- Diploma Business Studies; and
- Progression towards Masters of Environmental Management (current).

1.3. Other documents relating to this plan

Other documents that have been prepared for this subdivision proposal which should be consulted when reading this plan include:

- Lot 1 and 2 tee Tree Road Planning Report – Whelans (2015);
- Vegetation Assessment – Bio Diverse Solutions (2012); and
- Land Capability Report – Landform Research (2000).

2. Aims of this Plan

The aim of this Plan is to reduce the occurrence of, and minimise the impact of bushfires, thereby reducing the threat to life, property and the environment. This BMP has been prepared by Bio Diverse Solutions (Bushfire Consultants) with the “subject site” being Lots 1 and 2 Tee Tree Road, Bindoon see Appendix A.

2.1. Planning Context

The BMP has been prepared to support an Outline Development Plan (ODP) at Lots 1 and 2 Tee Tree Road, Bindoon, refer to Appendix B.

2.2. Site inspection

To ensure that every aspect of the proposed subdivision meets the planning requirements as set in Planning for Bushfire Protection Ed. 2 (2010), a site inspection was undertaken on the 13th October 2011 by Kathryn Kinnear (Bio Diverse Solutions) to assess the vegetation and the site conditions.

The site was assessed as having a “**Moderate**” bush fire hazard rating due to the presence of internal and external Woodland vegetation. “Elements” which are to be met either through the objectives of the “Performance Principle” or “Acceptable Solutions” (WAPC, 2014) for the subject site include:

- Element 1 - Location;
- Element 2 - Siting and design of development.
- Element 3 - Vehicular access; and
- Element 4 – Water.

2.3. Objectives

The objectives of this BMP are:

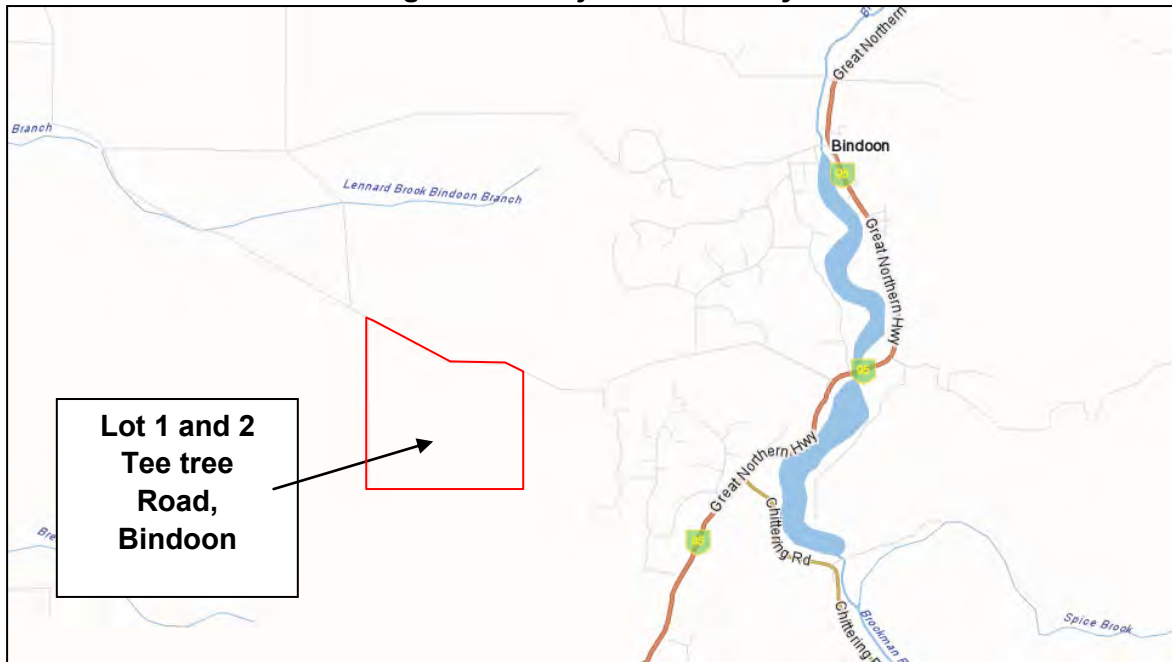
- Achieve consistency with objectives and policy measures of SPP 3.7, AS3959-2009 (current and endorsed standards), the Planning for Bushfire Protection Guidelines (WAPC 2010, current and endorsed guidelines) and due regard to the Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014);
- Understand and document the extent of the bushfire risk to the subject site
- Prepare bushfire risk management measures for bushfire management of all land within the subject area with due regard to people, property, infrastructure and the environment;
- Nominate individuals and organisations responsible for fire management and associated works within the subject area; and
- Aligned to the recommended assessment procedure which evaluates the effectiveness and impact of proposed, as well as existing, bushfire risk management measures and strategies.

3. Description of the area

3.1. Location

The subject site is located south of Tee Tree Road and east of Brennan Road, approximately 10 km's south of Bindoon town site in the municipality of the Shire of Chittering (SoC). The subject site is a 484ha rural lot which has been used for primarily for the grazing of stock. Please refer to Figure 1 below - Locality Map, and Site Location Mapping Appendix A.

Figure 1 – Subject site locality



3.2. Development proposal

The development proposal includes the creation of 48 lots (47 Small Rural Holding zoning and 1 Rural zoning lot). The Small Rural Holding lots are ranging in size from 5.01ha to 5.44ha. In creating the subdivision the developer proposes to implement “Vegetative Corridors” to increase linkages to remnant vegetation from the north-south and east-west.

Please refer to the Outline Development Plan as provided by Whelans, Appendix B.

4. Desktop Assessment – Regional Setting

4.1. Current site land use

The site is currently 2 rural lots of predominantly cleared paddocks with grasslands and small isolated patches of remnant vegetation, newly installed vineyards and tagasaste plantation. Historically the subject area has been used for sheep and cattle grazing. An abandoned shack exists in Lot 1 (south west corner) and some shed buildings are located in Lot 2 associated with the rural activities. Please refer to Photograph 1 to 3 below.



Photograph 1 – View of abandoned shack in Lot 1 (south west of subject area).



Photograph 2 – View of shed infrastructure in Lot 2, associated with rural activities.



Photograph 3 – View of stock on site.

4.2. Climate

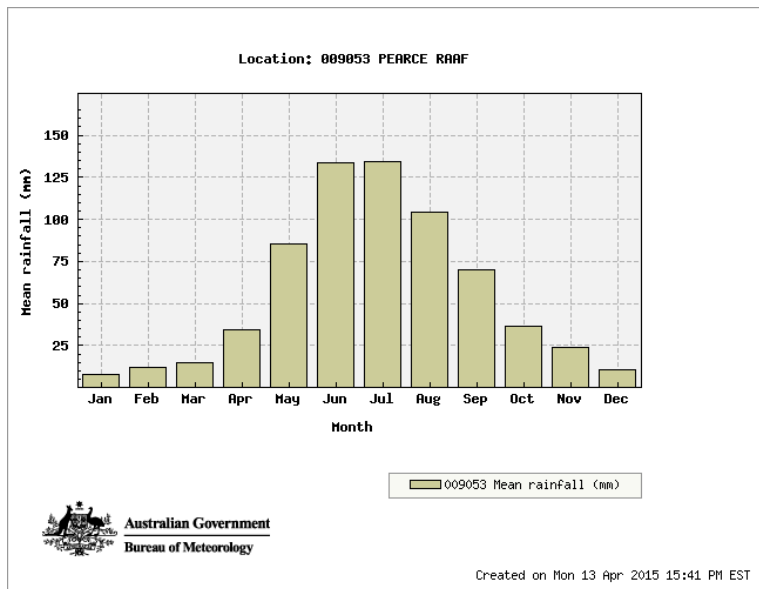
Bindoon has similar climate to Perth (75 Km away) and thus has been described as per Bureau of Meteorology (BoM) descriptions of Perth. Perth experiences a Mediterranean climate, characterised by hot, dry summers and mild, wet winters. These seasons extend into the autumn and spring months, which are transitional periods between the main seasons.

The climate of the region is strongly influenced by the position of the axis of the band of high pressure known as the sub-tropical ridge, and in the warmer months by the development in the easterlies to the north of the ridge of a trough of low pressure near the West Coast. For much of the year the ridge is located to the south allowing the east or south easterly winds to prevail. During the cooler months the ridge periodically moves to the north allowing cold fronts to pass over the west coast and deliver much of the annual rainfall. Sometimes these fronts interact with tropical cloud bands from the northwest and this can enhance the amount of rainfall produced.

4.2.1. Rainfall

The annual mean rainfall of 678.3 mm (BoM, 2015) occurs on 119 rain days, of which 80% usually falls between May and September. Rain occurs on four days out of every seven on average during winter. Flooding is rare in Perth, however heavy rain may be produced by strong winter cold fronts or, less frequently, by summer storms or, more rarely, by decaying tropical cyclones. The highest daily rainfall is 120.6 mm recorded on 9 February 1992. In contrast to winter rainfall, the mean summer rainfall is just 36 mm on an average of 10 rain days. It is not unusual for there to be extended dry periods during the warmer months. Please refer to Pearce RAAF BoM rainfall records (closest climate statistics), Annual Rainfall graph below (Figure 2).

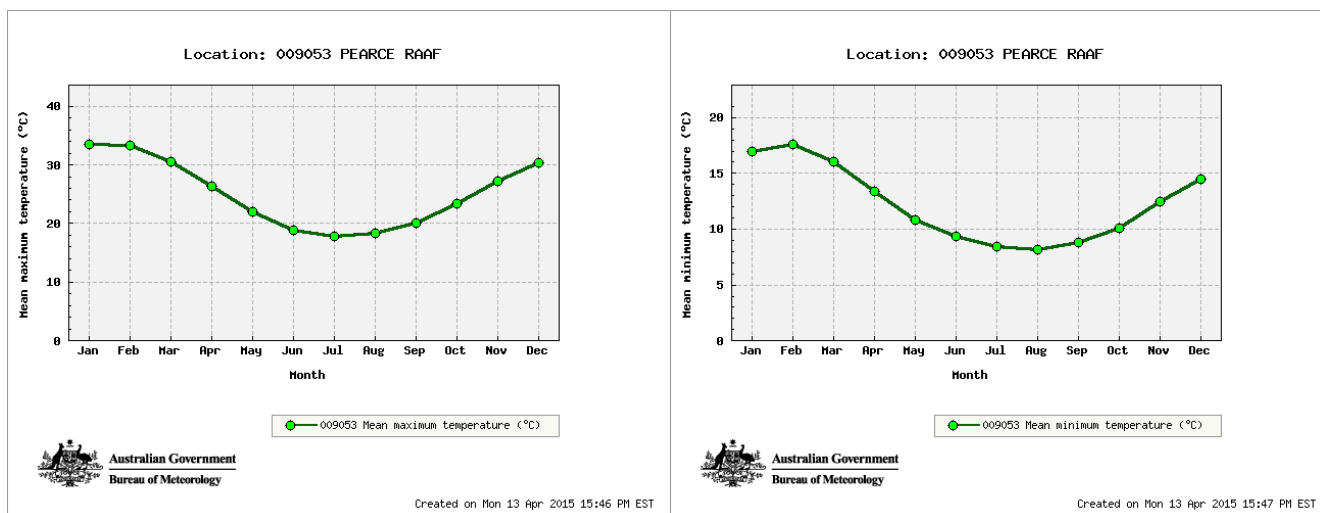
Figure 2 – BoM Rainfall for Pearce (BoM) Station 9053



4.2.2. Temperature

Mean monthly air temperature range from 33.5°C in January to 17.8°C in July (BoM, 2015). Summer maximum temperatures are strongly dependent upon the arrival time of the reliable sea breezes. On some days the difference between the maximum temperatures on the coast and the eastern suburbs may exceed 10°C. Heatwaves are associated with strong easterly winds and the late arrival or absence of the sea breeze. The highest temperature ever recorded is 46.2°C, however, the temperature exceeds 40°C on only three days per year on average. The average minimum temperature ranges from just 8.2°C in August to 17.6°C in February (BoM, 2015). Temperatures below 5°C are not uncommon during any of the winter months. Please refer to average temperatures below for Gingin (40km away), Figure 3.

Figure 3 – Average Temperatures BoM Pearce RAAF (BoM 9053)



4.2.3. Wind

Winds are mainly easterly but varied in the warmer months by reliable afternoon sea breezes from the south west and in the cooler months by the westerlies that are associated with the bulk of the annual rainfall. Despite the occurrence of strong winds or gales, average wind speeds in winter are considerably lighter than in summer. Please refer to Figure 4 and 5 below.

Figure 4 – Summer (Jan) wind rose 9am & 3pm BoM Pearce RAAF Stn

Rose of Wind direction versus Wind speed in km/h (02 Nov 1940 to 31 Oct 2011)

Custom time series table, refer to attached note for details

PEARCE RAAF

Site No: 000053 • Opened Jan 1937 • SMI Open • Latitude: -31.6669° • Longitude: 116.0189° • Elevation: 40m

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

Rose of Wind direction versus Wind speed in km/h (02 Nov 1940 to 31 Oct 2011)

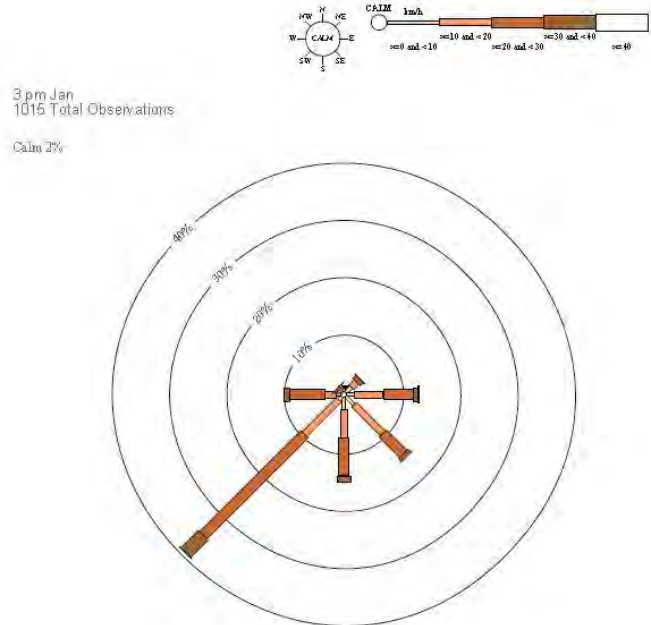
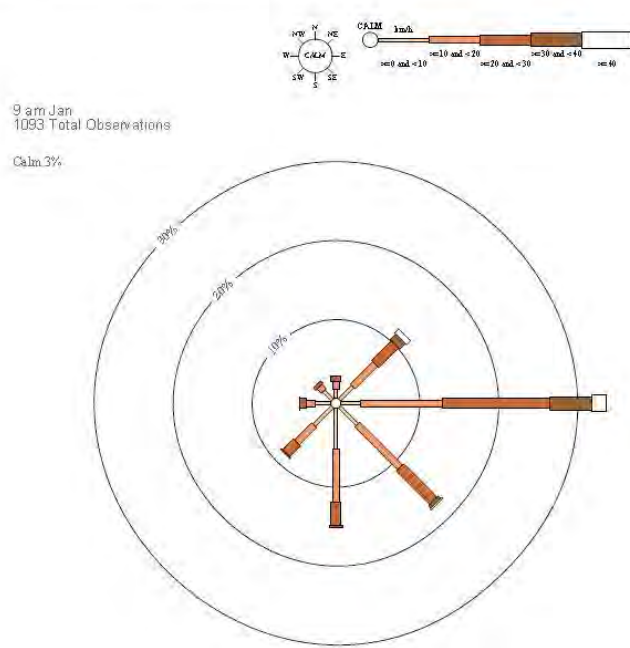
Custom time series table, refer to attached note for details

PEARCE RAAF

Site No: 000053 • Opened Jan 1937 • SMI Open • Latitude: -31.6669° • Longitude: 116.0189° • Elevation: 40m

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



(BoM, 2015)

Figure 5– Winter (July) wind rose 9am & 3pm BoM Pearce RAAF Stn

Rose of Wind direction versus Wind speed in km/h (02 Nov 1940 to 31 Oct 2011)

Custom time series table, refer to attached note for details

PEARCE RAAF

Site No: 000053 • Opened Jan 1937 • SMI Open • Latitude: -31.6669° • Longitude: 116.0189° • Elevation: 40m

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

Rose of Wind direction versus Wind speed in km/h (02 Nov 1940 to 31 Oct 2011)

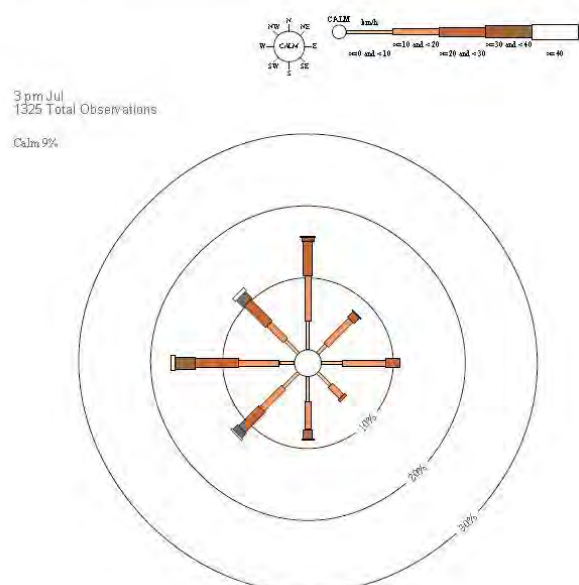
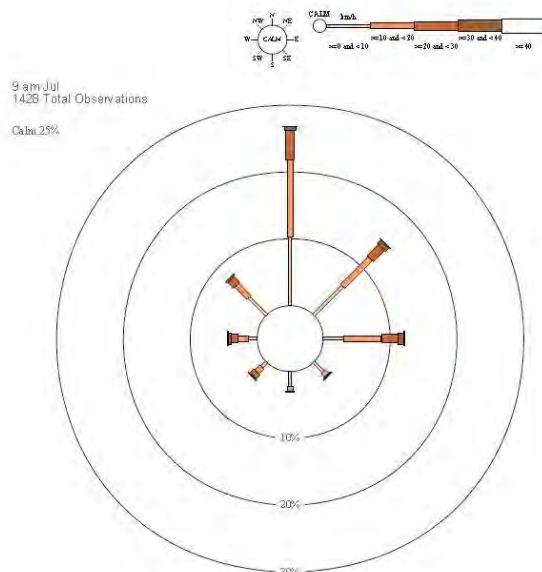
Custom time series table, refer to attached note for details

PEARCE RAAF

Site No: 000053 • Opened Jan 1937 • SMI Open • Latitude: -31.6669° • Longitude: 116.0189° • Elevation: 40m

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



(BoM, 2015)

4.3. Prevalent Fire Weather

Fire weather is characterised by mid-level disturbances across the south west of Western Australia, bringing unstable atmospheric conditions (thunder and lightning) from the north or north-west wind directions. This is characteristic of “Extreme” Fire Weather conditions to the area with hot dry conditions prior to storm events. Risk of lightning strikes, spark ignition, arson and other causes of fire give rise to wild fires under these conditions.

Prevalent winds which most wildfire events occur in the region are from the north-west, east and north-east direction. Conditions tend to be dry with low relative humidity. High winds and excess fuels can lead to hazardous conditions for residents. Strong easterly and south westerly winds exist at the subject site during dry summer periods (Figure 4). These circumstances place residential housing under the most risk from bushfire events.

4.3.1. Climate Change

Climate change is expected to impact on the future rainfall pattern of the area. It is recognised that the average rainfall has already declined by 20%-30% over the past few decades and that the long term impact of climate change may lead to a shift in rainfall, as well as dryer climatic conditions for the region. The long term changes are predicted to impact on the flora, fauna and water availability for the region. (Climate Commission 2010)

The Climate Commission (Climate Commission 2010) estimates that

“...Rainfall patterns in Western Australia have changed over the last 40 years. There is significant evidence that climate change has contributed to the marked drying trend in the southwest of the state.”

The construction of the proposed development is not predicted to be affected by sea-level rise, however could be affected from increased intensity rainfall events or extended drying periods. Increased extreme weather from climate change could affect fire frequency and behaviour in Western Australia (DEC, 2012), this BMP has been prepared to reduce the risk of bushfire on the proposed residential dwelling of the property.

4.4. Topography




The subject site is located in an undulating landscape on the Dandaragan Plateau with the average “Effective Slope” (as per AS3959-2009) slope for the site as 1.7 ° (assessed as an average over 5 slopes/100m) calculated to be < 5° and ranges between 1° and 3°. One metre contours indicate there are 2 hills in the western portion up to 201m AHD and one dominant ridge in the south east of the subject site upto 208m AHD. The lowest elevation of the site is in the east along the formation of a creek (upper catchment) at 168m AHD.

4.5. Bushfire fuels – Vegetation

The subject lies within the Swan IBRA bioregion. This bioregion is comprised of “*low lying coastal plain, mainly covered with woodlands. It is dominated by Banksia or Tuart on sandy soils.*” The area is located within the SWA1- Dandaragan Plateau. *The plateau is bordered by Derby and Dandaragan Faults. Cretaceous marine sediments are mantled by sands and laterites. Characterised by Banksia low woodland, Jarrah - Marri woodland, Marri woodland, and by scrub-heaths on laterite pavement and on gravelly sandplains.* (Hearn et al., 2002).

Detailed vegetation inventory was undertaken in the vegetation types identified on site (Bio Diverse Solutions, 2012). A total of 149 species was identified within 3 vegetation types. The vegetation types are shown over the page in Table 3 and mapped in Appendix C.

Table 3 – Vegetation Types Identified on site

Vegetation Unit	Planning Bushfire Protection (2010) Vegetation Type	Site Description	Unit	Photograph
Medium woodland; jarrah-marri (EmCc)	Type B - Woodland	Medium woodland of <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i>		
Mosaic Medium open woodland: jarrah, marri & banksias (EmCcBa),	Type B - Woodland	Medium open woodland: Jarrah & Marri, with low woodland Banksia/sparse woodland jarrah/marri		
Cleared paddock areas	Type G - Grassland	Open paddocks, cleared of native vegetation, occasional paddock trees Jarrah & Marri,		

A map of the vegetation types identified on site is shown in Appendix C.

The majority of the vegetation across the subject site is in 'Degraded' vegetation condition with isolated patches of remnant vegetation in "Good Condition" in the east of the subject area. The western portion of the subject area is predominantly pasture with paddock trees and grasstrees interspersing the area. Please refer to Photographs 4 and 5 over the page.

Site searches (Bio Diverse Solutions 2012) revealed the presence of Priority Flora species (*Acacia drummondii* spp *affinis*), Priority 3 pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act 1950*. Please refer to Vegetation Mapping Appendix C.

There are no known Threatened Ecological Communities (TEC) or Priority Ecological Community (PEC) within, or adjacent to the subject site.

Item 9.1.6 - Attachment 1



Photograph 4 – View of eastern side of lot 1 where large Marri and Jarrah trees and grass trees are scattered throughout.



Photograph 5 – View of remnant patch of Jarrah/Marri Woodland in eastern side of lot 1.

Internal to the site remnant patches of Jarrah/Marri Woodland occurs, which is generally lacking in midstorey and understorey species due to grazing of stock. These areas are in a “Degraded Condition”, however can still pose as a fire risk to adjacent property. Refer to Photograph 5.

Adjacent to the site in the north, west and east of the subject area are extensive remnant vegetation areas, these are classified as Woodland areas, which dominant species differing depending on soil types. To the south the property borders rural cleared land. Please refer to Photographs 6 to 9 showing classifications of dominant tree/vegetation heights and vegetation structure according to Table 2.3 AS3959-2009.



Photograph 6 –Vegetation to the east. Woodland Type B.



Photograph 7 – Paddock areas to the south. Vegetation Type G.



Photograph 8 –Vegetation to the west. Woodland Type B.



Photograph 9 –Vegetation to the north. Woodland Type B.

The Vegetation type for the subject site (internal) has been classified as per AS3959-2009 criteria as:

- **Grassland (Type G)** – *Open paddock areas, overstorey foliage <10%. (WAPC 2010), open paddock areas located internal and adjacent to the Subject Site.*
- **Woodland (Type B)** – *Trees 10 -30 m in high; 10-30% foliage cover dominated by Eucalypts; understorey low trees to tall shrubs dominated by Acacia, Callitris or Casuarinas (WAPC 2010); Jarrah/marri woodland and Mosaic Jarrah & Marri, with low woodland Banksia/sparse woodland Jarrah/Marri. adjacent and internal to the Subject Site.*

4.6. Assets

The subject site is predominantly cleared of remnant vegetation, with some isolated remnant vegetation patches which have been grazed. The site is valued for its proximity to the Bindoon townsite and Perth city, remnant vegetation and sandy soils (where perennial horticulture i.e. vineyards are being established).

The site has some isolated vegetative areas vegetation deemed important as a refuge for flora and fauna species, a micro corridor links proposed (defined by Whelans in 2012) to establish linkages to the north/south and west/east remnant vegetation areas. Please refer to the Vegetation Survey document (Bio Diverse Solutions 2012) and Whelans Planning Report (2015) for more information. Vegetative Corridors are proposed through the estate to maintain ecological function and provide corridors for movement to link neighbouring areas of high biodiversity value and habitat for fauna species.

Once developed, the values which will be potentially affected by fire include:

- **Human lives:** It is likely that more than 110 people could be resident at the newly created subdivision;
- **Assets:** The development will contain dwellings and valuable infrastructure; and
- **Environmental Conservation Values:** the site has vegetation corridors proposed and remnant vegetation conservation values.

4.7. Access

Vehicle access to the subject site is from Tree Road and Brennan Road in the west. An internal informal 4 x 4 track services paddocks and water supplies for grazing stock. Please refer to Photograph 10 and 11 below



Photograph 10 – View of Tee Tree Road to the north of the subject site



Photograph 11 – View of Brennan Road to the west of the subject site

4.8. Water Supply

There is presently no developed land within the subject site. Water is presently gained from a dam in the east and pumped via windmill across the property. Please refer to Photograph 12.



Photograph 12 – View of dam in Lot 1 Tee Tree Road.

4.9. Firebreaks

There are existing firebreaks to SoC required standards around the property, refer to Photograph 13.



Photograph 13 – View of existing firebreaks along perimeter of property.

5. Potential Fire Issues and Fire Risk

The bushfire hazard assessment provides a measure of the fire intensity and likelihood of bushfire attack measures on a dwelling, subdivision or residential area (Planning for Bushfire Protection, Edition 2 2010). This measure can provide an assessment of the land for suitability for residential construction and takes into account:

1. Vegetation Assessment – type and class in each direction;
2. Distance - between the predominant vegetation class and proposed building;
3. Topography and slope – with reference to accessibility; and
4. Land use – surrounding and internal to the proposal.

(Refer to Planning for Bushfire Protection, Edition 2, 2010)

The Vegetation type adjacent to the subject site has been classified as per AS3959-2009 as Woodland (Type B) and Grassland (Type G) (as per vegetation classifications outlined in AS3959-2009). The bushfire hazard (risk) ratings have been assessed as per the methodology as outlined in the Draft Planning for Bushfire Risk Management Guidelines (May, 2014). Please refer to Table 1 below.

Table 1 – Bushfire Hazard Level Categories

CATEGORY	CHARACTERISTICS
Low	<ul style="list-style-type: none"> • Areas devoid of standing native vegetation (less than 0.25ha cumulative area) • Areas which, due to climatic or vegetation (eg. rainforest) conditions, do not experience bushfires • Inner urban or suburban areas with maintained gardens and very limited native standing vegetation (less than 0.25 ha cumulative area) • Pasture or cropping areas with very limited native standing vegetation that is a shrubland, woodland or forest • Generally areas with slopes of less than 10 degrees
Moderate	<ul style="list-style-type: none"> • Areas containing pasture or cropping areas with slopes in excess of 10 degrees • Open woodlands • Open shrublands • Low shrubs with slopes of less than 10 degrees or flat land • Suburban areas with some native tree cover
Extreme	<ul style="list-style-type: none"> • Forests • Woodlands • Tall shrubs • Any area not otherwise categorised as low or moderate

(WAPC, 2014)

Internal Fire Risks

The subject site has sustained vegetation clearing and is predominantly a cleared landscape representing a **“Low”** bushfire hazard as defined by Table 1 (WAPC, 2014). There are proposed “Vegetation Corridors” which may have the capacity in the future to become fire risks. These are recognised as a fire risk however is not presently “rated” as per Table 1 (as mostly cleared paddock areas at the time of writing report). A 100m setback will be required from these areas refer to Section 6.2.3 for more detail.

The remnant vegetation internal to the site in the north west of the subject site is not over 100m continuous vegetation, and does not exceed >1ha and therefore is not classified as “Bushfire Prone Vegetation” or classifiable vegetation to AS3959-2009.

The Woodlands in the south west of the property are sparsely vegetated and degraded however are classified as a “Moderate” bushfire hazard as defined by Table 1 (WAPC, 2014).

There are low effective slopes for the site, with all slopes $<5^{\circ}$. Refer to Bushfire Hazard (and BAL) Mapping, Appendix D.

External Fire Risks

Surrounding the subject site to the west, north and east west there is remnant bushland with cleared paddocks to the south. The predominant fire risk associated with the site is the adjacent Woodlands to the west, south and north which are a “**Moderate**” bushfire hazard as defined by Table 1 (WAPC, 2014). Bushfire risk increases with slope, which with hot conditions can give rise to hot and intense fires in north (Summer mid-level disturbances) and easterly (prevailing summer) wind conditions. Slopes are generally low being $<5^{\circ}$ within 100m of the subject site.

The predominant extreme fire weather in summer conditions can give rise to flame and ember attack from north and north west wind directions (mid level disturbances) and from the east and south west (summer prevailing winds, see Figure 4).

Refer to Bushfire Hazard (and BAL) Mapping, Appendix D.

Proposed Subdivision Fire Risk Rating

The fire risk for this subdivision has been rated at **Moderate risk** bushfire hazard as defined by Table 1 (WAPC, 2014) due to the site being predominantly a cleared landscape with the presence of internal patches of Woodland areas and adjacent to remnant Woodlands (north, south and west). The overall slope for the residential areas are low and setback distances of over 100m can be achieved in most instances. Where 100m cannot be achieved, building to AS3959-2009 will apply.

The proposal will be required to meet the minimum “Performance Principle” and “Acceptable Solutions” as per Planning for Bushfire Protection Edition 2, 2010 and Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014). These are outlined in **Section 6 – Bushfire Management/Mitigation Plan**.

6. Bushfire Management/Mitigation Plan

The management issues (Elements) which relate to this proposal include:

- Location
- Siting and Design of Development
- Vehicle Access; and
- Water

(WAPC, 2014)

The Development is required to meet the “Performance Principles” and “Acceptable Solutions” of each “Element”. The site has been classified as a Moderate Bushfire Risk (adjacent woodland vegetation). The design allows for an appropriate level of bushfire risk with mitigation measures applied to the level of risk. These include:

- Meeting “Performance Principles” for location (Element);
- Meeting Acceptable Solutions for Siting of the development (Element);
- Meeting Performance Principles for Vehicles (Element); and
- Meeting Performance Principles for Water (Element).

The following sections outline the bushfire mitigation procedures and how the design meets either a Performance Principle or Acceptable Solution as per the sections of the Planning for Bushfire Protection Edition 2, 2010 and Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014).

(Note the following sections are aligned to the Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014) as per recent Department of Planning advice.

6.1. Element 1: Location-

Intent: To ensure that the subdivision, development or land use is located in areas with the least possible risk of bushfire, to help minimise risk to people, property and infrastructure.

Performance Principle: The subdivision, development or land use is located in an area where the bushfire hazard assessment classification is or will be moderate or low, and the risk can be managed.

The subdivision is located on land that will not require construction standards to greater than BAL 12.5. The subdivision has a **Moderate** rating due to the presence of remnant woodland areas (north, south and west) and proposed Vegetative Corridors internal to the site. The bushfire hazard level is manageable and adequate setbacks can be achieved (most instances >100m).

The large size lots (Rural Small Holding zoning) ranging from 5.01ha to 5.44ha allow for setbacks to bushfire hazards, therefore reducing the risk of bushfire to people, property and infrastructure.

6.2. Element 2: Siting and design of development

Intent: To ensure that the siting of development minimises the level of bushfire impact.

Performance criteria - The siting and design of the subdivision, development or land use (including paths and landscaping) is appropriate to the level of bushfire risk that applies to the site and minimises the bushfire risk to people, property and infrastructure.

The site has been classified as a Moderate Bushfire Risk. The design and size of the lots allow for an appropriate level of bushfire risk with mitigation measures applied to the level of risk. As the subject site has minimal (future) internal hazards with adjacent bushfire hazards to the south, west and north of the subject site, the site has been classified as having BAL (Bushfire Attack Level) applied to at the interface of the adjacent remnant vegetation. It is recommended that some dwellings are built to BAL and AS3959-2009 construction standards as it applies to the property.

The final detailed assessment for BAL allocations will be the responsibility of the developer and undertaken at subdivision condition stages. Detailed assessment (or re-assessment) for BAL Construction as described in this document can be undertaken by individual owners through the engagement of an accredited Bushfire Consultant with building approval from the Shire of Chittering.

The Subject site has a Moderate Bushfire risk rating, the Acceptable Solutions which will apply to this development include:

- Building Protection Zones;
- Hazard Separation Zones; and
- Building to BAL and AS3959-2009.

The subdivision is able to meet the Acceptable Solutions as outlined in the proceeding sections.

6.2.1. Dwelling construction (A2.1)

Bushfire Attack Level (BAL) is the determination of the construction requirements for a building site, with the threat or risk of bushfire attack assessed by a qualified Fire Consultant. BAL rating determinations are of 6 levels BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40, BAL FZ. Building is generally not recommended in BAL-40 or BAL-FZ areas. The BAL rating is determined by the distance of the building to vegetation, slope and vegetation type adjacent to the dwelling.

Minimum setbacks (inclusive of BPZ) will be required from bushfire prone vegetation. The standards outlined in AS 3959-2009 provide reference to specific items of building and it is recommended that individual prospective home owners discuss these in detail with their builder.

Table 2 outlines some of the construction consideration to AS3959-2009 when building in bushfire prone areas. Construction standards are to be approved by the CoC prior to construction. Building to AS3959-2009 as outlined in the Australian Building Code (ABC) (Section 3.7.4) only applies to Class 1 (residential) or 10a buildings or a deck associated with Class 1 buildings within 6m of the Class1 structure.

Table 2 – AS3959-2009 Construction Requirement (Example)

Construction requirement AS3959-2009
Flooring systems
Supporting posts, columns, stumps, piers and poles
External Walls
Windows
External Doors
Vents and weep holes
Roof
Eaves
Fascia's
Gutters and downpipes
Veranda and decks
Service Pipes (water and gas)

The construction standard that shall apply to the dwellings adjacent to the remnant vegetation is shown over the page in Table 3 – Minimum Setback Distances and Construction Standards. The final detailed assessment for BAL allocations will be the responsibility of the developer and undertaken at subdivision condition stages.

A minimum of 20m BPZ must apply to all dwellings, an additional HSZ is required and dictates the BAL construction standard depending on the distance as shown in Table 3.

Table 3 – Minimum Setback Distances and Construction Standards

BAL Rating	Vegetation Type	Distance to Vegetation	Construction
BAL 29	Woodland Type B	17-<25m	AS3959-2009 to apply
BAL 19	Woodland Type B	25-<35m	AS3959-2009 to apply
BAL 12.5	Woodland Type B	35-<100m	AS3959-2009 to apply
No BAL Rating Required	All Vegetation	>100 metres	No construction standards required

Vegetation is downslope and >0 to 5 Degrees (as per AS3959-2009).

Notes on BAL Assessment:

- **Sites affected by BAL will be subject to detailed feature survey and the mapping depicted in the BAL Mapping Appendix D is a guide, with accuracy to within 5m.**
- **If dwellings cannot achieve >100m from the adjacent vegetation then BAL Construction will apply as outlined in Table 3.**
- **BAL setback distances are measured from the edge of existing vegetation at time of feature survey and building construction approvals stages.**
- **Detailed assessment for BAL Construction as described in this document can be undertaken at construction stage by an accredited Bushfire Consultant with approval from the Shire of Chittering.**

Revegetation strategies in vegetation corridors (POS) are not defined at time of writing this BMP, therefore the level of bushfire risk in the future is not known. It is likely (if no further clearing occurs and there is some revegetation of tree species) the vegetation could become a sparse "Woodland" type vegetation structure and therefore setbacks should apply to dwellings. A 100m HSZ from these areas can be achieved as shown on the ODP Appendix B and the BAL Mapping Appendix C. The buildings in the south west are subject to vegetation clearing and thus may require to be built to BAL and AS3959-2009 as per Table 3. This is indicated in the BAL Mapping Appendix D.

The developer will be responsible for the implementation of a notification on title pursuant to 70A of the *Transfer of Land Act 1893* with regard to the notification on title on lots alerting the future owners of the endorsed Bushfire Management Plan

6.2.2. Building Protection Zones (A2.2)

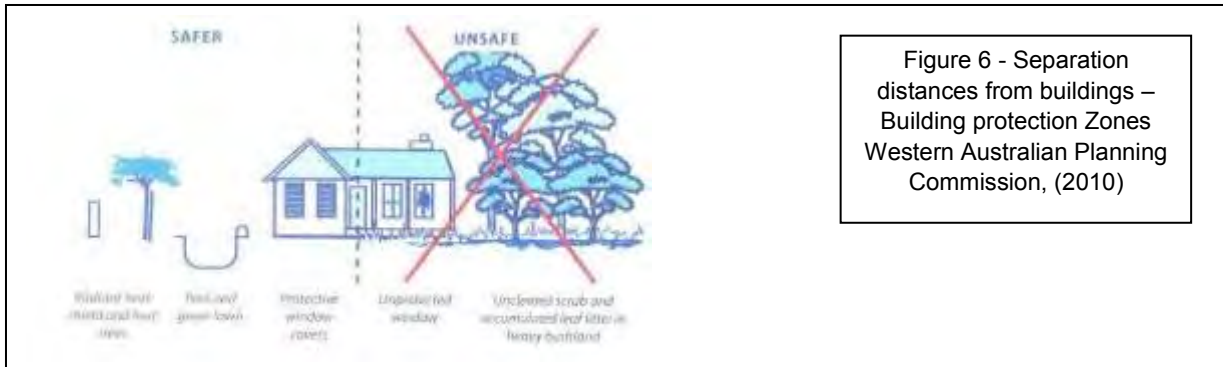
The aim of the Building Protection Zone (BPZ) is to reduce bush fire intensity close to dwellings and to minimise the likelihood of flame contact with buildings (Planning for Bushfire Protection Edition 2, 2010). BPZ will minimise the risk of the building igniting, (thus protecting the occupants), and with the reduced fuel quantities, allow safer and more effective conditions for fire-fighters to contain wildfires. Roads, pathways, lawns, and other low hazard items should be placed within this zone to improve the effectiveness of the zone.

It is recommended that a 20 metre wide BPZ as the minimum width to be constructed around all buildings. Activity within the BPZ must include:

- Width: 20 metres measured from any external wall of the building;
- Location: within the boundaries of the lot on which the building is situated;
- Fuel load: reduced to and maintained at 2 tonnes per hectare;
- Trees (crowns) are a minimum of 5 metres apart;
- Trees are low pruned at least to a height of 2 metres;
- No tall shrub or tree is located within 2 metres of a building (including windows);
- There are no tree crowns overhanging the building;
- Fences and sheds within the BPZ are constructed using non-combustible materials (e.g. colour bond iron, brick, limestone);

- Shrubs in the BPZ have no dead material within the plant;
- Tall shrubs in the BPZ are not planted in clumps close to the building i.e. within 3 metres; and
- Trees in the building protection zone have no dead material within the plant's crown or on the bole.

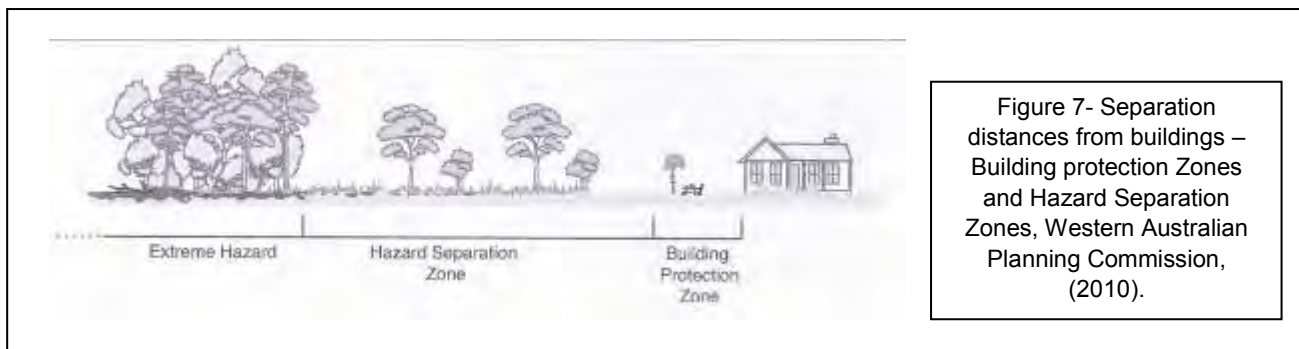
An example of BPZ from the “Planning for Bushfire Protection Edition 2” is shown in Figure 6.



All residences within the proposed subdivision can achieve the required 20m BPZ within their respective boundaries. Information on long term maintenance of BPZ for the homeowner, as recommended by DFES is provided in Appendix E.

6.2.3. Hazard Separation Zones (A2.3)

Hazard Separation Zones (HSZ) are defined (as per Planning for Bushfire Protection Edition 2, 2010) as the area surrounding a building which is maintained in a fuel reduced state. This can be achieved at subdivision stage during the construction of roads by clearing for formation of roads, grazing of stock and slashing of understorey species. The internal road network can assist housing to achieve HSZ. An example of achieving 100m HSZ is shown below in Figure 7.



All lots developed for residential use at the interface of the remnant vegetation will be required to meet Hazard Separation Zones (HSZ) as per the Planning for Bushfire Protection Edition 2 (2010) and Bushfire Attack Levels (BAL).

A Hazard Separation Zone of 80 metres (100m combined with BPZ) is recommended in all areas where housing is sited adjacent to woodland areas and vegetation corridors, measured from the outer edge of the BPZ. Where hazard separation cannot be achieved to 80m (100m combined with BPZ) adjacent to woodland and/or vegetation corridor areas, the site will require building requirements of BAL with AS3959-2009 to be implemented by the owners of the property and approved by the Shire of Chittering. Please refer to more detail in Table 3. Information on long term maintenance of HSZ for the homeowner, as recommended by DFES is provided in Appendix E.

It is recommended that hazard reduction burning may be required in the future (depending on success of any revegetation efforts) in the Vegetative Corridors to maintain a maximum of 8T/ha ground fuels on any internal remnant vegetation (see Section 6.5.2). Prescribed burning should be carried out in consultation with the DEC (Flora and Fauna), DFES and the Shire of Chittering in accordance with the Bushfires Act 1954. This will be the responsibility of Shire of Chittering in public areas.

6.3. Element 3: Vehicle Access - Performance Criteria

Intent: To ensure that the vehicular access serving a subdivision/development is available during a bushfire event.

Performance Principle: The internal layout, design and construction of public and private vehicular access in the subdivision allows emergency and other vehicles to move through it easily and safely at all times.

The internal layout of roads and fire access allows emergency vehicles and other vehicles to move through the subdivision. Vehicle access standards as outlined in Table 4 (below) shall apply to this development; these standards are the minimum requirements from Planning for Bushfire Protection Edition 2 (2010) and acceptable from DFES for implementation. These standards shall be included in the engineering design of the subdivision. These standards meet the Performance Principles.

Table 4 – Vehicular Access Standards

Standard	Public Roads	Fire Service Access Ways	Emergency Access Ways
Minimum trafficable	6 metres	4 metres	6 metres
Horizontal clearance	6 metres	6 metres	6 metres
Vertical clearance	4 metres	4 metres	4 metres
Maximum grades	1 in 8	1 in 8	1 in 8
Maximum grade over <50	1 in 5	1 in 4	1 in 5
Maximum average grade	1 in 7	1 in 7	1 in 7
Minimum weight capacity	15 tonnes	15 tonnes	15 tonnes
Maximum crossfall	1 in 33	1 in 33	1 in 33
Curves minimum inner	12 metres	12 metres	12 metres
Cul de sacs	N/A	N/A	N/A
Battle Axes	Not more than 600m	N/A	N/A
Private Driveways	Standard as roads if house >50m from road, passing bays every 200m for 20m.	N/A	N/A
Signage	Not required	Required	Must be signposted
Gates	Not required	Min width 3.6	Min width 3.6
Design and construction	Approved by relevant local government	Approved by relevant local government	Approved by relevant local government
Turn around areas	Every 500 metres, within 50 metres of the house and at water tanks	Every 500 metres, within 50 metres of the house.	Not required

From Planning for Bushfire Protection Edition 2, 2010.

6.3.1. Two Access Ways (A3.1)

The ODP design allows for two access points onto Tee Tree Road and an Emergency Access Way and Fire Service Access onto Brennan Road in the West and to southern firebreaks (in adjacent properties) to the south. Please refer to Bushfire Management Plan Appendix F.

6.3.2. Public roads(A3.2)

All internal public roads shall be constructed to acceptable standards (Refer to Table 4 – Vehicle Access Standards) and shall be detailed in Civil Engineering Designs. The Subdivision design allows for two way traffic and safe egress from the subdivision via a road network with 30m internal road reserves. Please refer to Bushfire Management Plan Appendix F.

6.3.3. Cul de Sacs (A3.3)

Cul-de-sacs will not exceed 200m in length.

6.3.4. Battle Axes (A3.4)

Battle Axes shall not exceed 600m, standards for road/street construction are as per Table 4 – Vehicle Access Standards. All Battle Axes proposed meet this requirement.

6.3.5. Private Driveways (A3.5)

Constructed driveways are to meet the requirements of Table 4. All driveways will be <50m from road to dwelling and will not require turnaround areas or passing pays, therefore meeting the Performance Principle.

6.3.6. Emergency Access Ways (A3.6)

Emergency Access Ways (“Fire Access”) will be from the northern side of the subdivision to Tee Tree Road, from Brennan Road to the west and to southern firebreaks (in adjacent properties) to the south. If the subdivision is staged, the Emergency Access Ways will be required to link through to Brennan Road and to Tee Tree Road, this will need to be via a hardened surface as per Table 4 - Vehicular Access Standards. The linking Emergency Access Way to Brennan Road will provide a trafficable surface for emergency access through the POS corridor (Shire land) linking Brennan Road and the subdivision internal roads. Please refer to the Please refer to Bushfire Management Plan Appendix F.

6.3.7. Fire Service Access (A3.7)

Fire Service Access (FSA) is proposed from the northern side of the subdivision to Tee Tree Road, from Brennan Road to the west and to southern firebreaks (in adjacent properties) to the south. These FSA's to enable fire appliance ease of access through the subdivision for fire fighting operations, please refer to the Bushfire Management Plan- Appendix F. The road reserve through the subdivision enables light unit fire appliance and heavy unit (truck appliances) access in an emergency.

The linking Fire Service Access to Brennan Road will provide a trafficable surface for fire appliance access through the POS corridor (Shire land) linking Brennan Road and the subdivision internal roads. Please refer to the Please refer to Bushfire Management Plan Appendix F.

The minimum running surface and standards of construction roads is as per Planning for Bushfire Protection Edition 2 (2010), please refer to Table 4. Fire Service Access routes for this subdivision will:

- Link the road network;
- Be adequately signposted (see following section);
- Allow for two-way traffic (as per Table 4);
- Have a hardened surface (as per Table 4 standards); and
- Have erosion control measures in place such as culverts, stormwater contours/diversions, and native vegetation remediation/stabilisation at gully crossings.

If the subdivision is staged, the Fire Service Access Ways will be required to link through to Brennan Road, this must be via a hardened surface as per Table 4 - Vehicular Access Standards.

6.3.8. Signage

“Fire Service Access Ways” are to be sign posted where they adjoin public roads. DFES recommend the following wording for signage as appropriate:

- “Fire Service Access – No Public Access”; and
- “Emergency Access Only”.

An example of clear street signage is shown below in Photograph 14.



Photograph 14 – Example of street/road signage clearly indicating emergency access/egress within the subdivision.

6.3.9. Gates

The use of gates to restrict public traffic on “Emergency Access Ways” is acceptable provided it is wide enough to accommodate 3.4 Heavy Duty Fire Appliances. Gate standards are to be as follows:

- Minimum width 3.6 metres;
- Approved by the Shire of Chittering;
- Emergency Access must not be locked; and
- Bollards should be installed to restrict vehicle movement around the gates where appropriate.

6.3.10. Individual Fire breaks

Internal fire breaks are required by the Shire of Chittering, refer to the current Fire Break order from the Shire website:

<http://www.chittering.wa.gov.au/chittering-fire-services/fire-breaks-and-important-dates-to-remember.aspx>

As at 2014/15 Shire of Chittering Firebreak the following firebreaks would apply to this subdivision:

- **All properties, including Rural Residential with land greater than equal or greater than 2 ha:** Must clear a fire break of all flammable materials three metres (3) metres wide, with a four (4) metre vertical clearance along the inside of the boundary to the property.
- **Land Greater than 120 ha:** Must have a firebreak in such a position which divides the land into areas not exceeding 120 ha. An indication of how this can be achieved on the Rural Lot is shown in the BMP Appendix F.

Individual fire breaks will apply to lots 1-47 (Small Rural Holdings 5.01 to 5.44ha), with firebreaks for the larger Rural Lot (proposed lot 48) along existing fire breaks as shown in the BMP Appendix F.

The fire breaks are to be maintained to the standard of the Shire of Chittering's Town Planning Scheme No 6, Local Planning Policy No 21. This policy requires all firebreaks to be as stated above (3m wide with a 4m vertical clearance) for 4 wheel drive access. Where a Fire Access (Emergency Access Way) or road adjoins a property, an individual fire break is not required

Internal lot firebreaks should be designed to minimise soil erosion. For instance, firebreaks will generally avoid areas undergoing environmental remediation (Remnant Vegetation areas or Vegetative Corridors) and be installed around these areas. In areas of steep terrain, firebreaks can be created by spraying with chemicals, the path of a firebreak can be meandered to follow contours to reduce the risk of soil erosion from storm water.

6.4. Element 4 Water – Performance Criteria

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: The development is provided with a permanent and secure water supply that is sufficient for fire fighting purposes.

Scheme water will not be provided to the subdivision. Planning for Bushfire Protection (WAPC 2010) recommends rural residential land use to have the provision of a 50, 000L water tank (to a standard approved by the Shire of Chittering) every 25 residences and a hydrant installed. It is therefore required that a 100,000 L capacity should be applied at this subdivision at a central location. These structures will be located on public land and vested with the Shire of Chittering as subdivision clearance occurs.

The hydrant/water tank construction must meet the following standard specifications and have:

- Hardstand and turnaround area suitable for 3.4 Heavy Duty fire appliance;
- Fire water tanks to have level indicators installed;
- Valves and manifolds must be locked by the developer with a Shire Standard lock;
- AS approved fire hydrants;
- Must be capable of delivering 600 litres per minute via Engineers certification;
- Procedures to be put in place by the developer to ensure the tank is maintained at full capacity at all times;
- Be easily accessible with standard fire services hydrant and key; and
- Be identified by standard road and pole markings.

A recommended location for the tank and hardstand area is shown in the Bushfire Management Plan Appendix F. After the developer has completed all maintenance periods, it shall be the responsibility of the Shire of Chittering to maintain this facility.

As scheme water is not to be provided to individual houses, all buildings intended for residential use must include provision for the storage of water in tanks not less than 120,000 litres capacity, of which 10,000L is to be held in reserve for fire fighting purposes. All water tanks intended to reserve 10,000L for fire fighting purposes are required to install a 50mm male camlock fitting to the floor of the tank and the draw point for the residential purposes is to be 10,000L above the floor of the tank.

6.5. Other Bushfire Mitigation Procedures

6.5.1. Landscaping/Streetscaping Areas

Landscaping and Streetscaping areas subject to similar standards that apply to the HSZ and the following minimum standards shall apply:

- Trees (crowns) a minimum of 10m apart (no continuous crowns);
- Trees should have no dead material within the plant's crown or on the bole;
- Fuel reduced to <8t/ha; and
- Shrubs should be no higher than 0.5 m.

6.5.2. Bushland Vegetation Corridors

Bushland Corridors (See ODP Appendix B and BMP Appendix F) are proposed through the subdivision to maintain ecological function and provide linking micro-corridors to remnant vegetation areas. These areas are >0.25ha and in the future (depending on success of

revegetation efforts) could be classified under Planning for Bushfire Protection as a fire risk. It is recommended that detailed surveys are undertaken of these areas at subdivision stages to ensure that these areas do not increase the fire risk to the subdivision. The Vegetation types on site are such that most areas exist as low fuel areas (previously disturbed i.e. from historical activity, cleared and grazed) or are in a regenerating phase.

Revegetation strategies in vegetation corridors are not defined at time of writing this BMP, therefore the level of bushfire risk in the future is not known. Given the sandy soils it is likely the vegetation could become a sparse "Woodland" type vegetation structure and therefore setback should apply to dwellings. Where 100m HSZ cannot be achieved buildings should be built to BAL and AS3959-2009 as per Table 3. See Section 6.2.1 for more detail.

6.5.3. Staged Development

If the development is staged it should incorporate the following:

- Reduction of bushfire fuels in HSZ and BPZ for each stage of construction of the subdivision and during maintenance periods;
- Construction of 2-way Emergency Access Way from Tee Tree Road to Brennan Road;
- Installation of Water Tank on public land (minimum of 50,000L/25 residences); and
- Maintenance of fire protection measures in public areas (gates, access, landscaped areas etc) until the developer has relinquished construction/maintenance responsibility of public use areas to the Shire of Chittering.

6.5.4. Evaporative Air Conditioners

Evaporative air conditioning units can catch fire as a result of embers from bushfire getting into the unit. These embers can then spread quickly through the home causing destruction. It can be difficult for fire-fighters to put out a fire in the roof spaces of homes. Information on Evaporative air conditioners is supplied in Appendix E of this document.

It is also recommended that home owners:

- Ensure that suitable external ember screens are placed on roof top mounted evaporative air conditioners compliant with AS3959-2009 (current and endorsed standards) and that the screens are checked annually.

7. Shire of Chittering Fire Protection Plan

The Shire of Chittering has the assistance of the Chittering Fire Services which is made up of six Volunteer Bush Fire Brigades. It has a Chief Bush Fire Control Officer and two Deputies. Five Brigades are fire fighting units and one is an incident support Brigade. Each fire fighting unit has three appliances suited to its area. The Incident Support Brigade supports the Incident Management Team at all fires when required.

Training and induction courses are held regularly and land owners are encouraged to attend these. For more information refer to their website:

<http://www.chitteringfireservices.org.au/>

Local Bush Fire Control Officers are allocated throughout the Shire depending on region, the latest Fire Break Order should be consulted from the Shire's website for contact details:

www.chittering.wa.gov.au

7.1. Fire Fighting Facilities

The subject area is in the Upper Chittering Bushfire Brigade District. Response times can vary depending on commitments of volunteers, fire events current at time and priority of the fire services in the south west of Western Australia during summer periods. DFES recommend that homeowners take care to prepare their individual dwellings for fire season and take precautions against fire as per the **"Bushfire Preparedness – Prepare. Act. Survive."**

It is generally acknowledged that during large wildfire events, local resources may not be able to respond to every dwelling due to strategic deployments of services, priorities within the area or state and/or present commitments of volunteers and resources.

The Chittering Fire Services has 3.4 and 2.4 heavy duty tankers (3000L and 2000L) and light tankers (fast attack 400L capacity). These are typical of Brigade units for fire fighting services within Western Australia.

The Chittering Fire Services' six bush fire brigades provide local fire services and have:

- 4 fire stations;
- Volunteer members;
- A communications and call out system;
- Protective clothing issue to volunteers; and
- DFES approved fire appliances.

7.2. Homeowner Protection

It is the responsibility of homeowners to protect their property from fire. DFES have readily available information online which can assist homeowners in their preparedness during fire season (October to May). The DFES website **"Bushfire Preparedness – Prepare. Act. Survive."** should be accessed by all owners in bushfire prone areas. A hard copy of the A4 book "Prepare. Act. Survive" can be found at local Shire of Chittering Offices or DFES offices, or downloaded off the above web address:

<http://www.dfes.wa.gov.au>

7.3. Bushfire Plan

Residents should prepare their own individual fire plans, as they need to make a commitment to develop a bushfire survival plan detailing preparations and actions to take if a bushfire threatens. When developing a bushfire survival plan, the following should be considered:

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- If you plan to leave for a safer place - where will you go and how will you get there? Your safer place could be with friends and family, and may not be far away. Know where you will go and never 'wait and see'. Relocating at the last minute can be deadly
- Does your household include elderly relatives, young children, people with disabilities or illness? When, where and how will they be relocated? Who will care for them?
- What will you do with your pets and livestock?
- Can your home be defended? Is it in a location that makes it difficult or dangerous to actively defend? (refer to DFES's Homeowners Bushfire Survival Manual - PDF)
- Will your home provide shelter if you have to or decide to stay?
- Are you capable of defending your home without the support of fire fighters?
- Do you have the skills, knowledge and capacity to check for and put out spot fires for up to ten hours after the fire front has passed?
- Do you have the right equipment and resources to actively defend? (e.g. sufficient independent water supply of at least 20,000 litres and a petrol, diesel or generator powered pump capable of pumping 400 litres per minute)
- Will you cope with the noise and stress of a bushfire if you decide to actively defend? Being in a bushfire may be the most traumatic experience of your life.

(from DFES website, 2013)

By compiling information as outlined above, the individual lot owner can be prepared for their response in a bushfire emergency. Home owners should not rely on emergency personnel to attend their home and thus it is stressed to prepare an individual bushfire emergency plan regarding their intentions and property. This Bushfire Management Plan is not an individual bushfire emergency plan.

Information is also available on the ABC Radio website to guide homeowners in the event of a fire emergency, such information includes:

Planning for an Emergency Bushfire:

- Survival Kit
- Fire Emergency Services
- Before a Bushfire
- During a Bushfire
- After a Bushfire

Refer to the following link for more information on how to prepare a bushfire plan:

<http://www.abc.net.au/news/emergency/?ref=front-page-slider-v2--emergencies>

*"Before summer starts you need to decide what you will do if a bushfire threatens. If you live or work in a bushland area you need to **prepare** your home, family or business and have a plan so you can **act** to make sure you **survive**."* (DFES 2010)

8. Summary

8.1. Overall Fire Threat

Marou Property Development Pty Ltd commissioned Bio Diverse Solutions (Bushfire Consultants) to undertake a fire hazard assessment and prepare a Bushfire Management Plan to guide all future fire management for the proposed subdivision development of Lots 1 and 2 Tee Tree Road, Bindoon. The subdivision proposal is for approximately 47 lots to be created as Small Rural Holdings zoning (5.01ha to 5.44ha) and large 1 Rural Lot.

The subject site is predominantly cleared paddock areas with some internal remnant vegetation patches with woodland vegetation. The majority of the site has have been disturbed from previous land activities (clearing, grazing, agricultural pursuits). Adjacent to the subject site to the south, north and west are remnant Woodland Type B (AS3959-2009) vegetated areas which are >1ha and would be classified as “Bushfire Prone Vegetation” (DOP, 2014). The subdivision has been rated as having a **Moderate** Bushfire Hazard as defined by Planning for Bushfire Protection Edition 2, 2010. . This requires “Performance Principles” and “Acceptable Solutions” (as set out in the Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014) to be met.

The Elements which are met either through the objectives of the “Performance Principle” or “Acceptable Solutions” for the Subject site include:

- Element 1 - Location;
- Element 2 - Siting and design of development.
- Element 3 - Vehicular access; and
- Element 4 – Water.

This Plan has identified a number of ways fire risk can be mitigated and managed across the lots to ensure there is protection to life and property and biodiversity assets. To mitigate fire risks and meet the Performance Principles this report outlines:

- **Element 1 – Location:** The subdivision are located in an appropriate landscape, the bushfire risk rating is Moderate and does not require building greater than BAL 12.5, meeting Acceptable Solutions;
- **Element 2 - Siting and design of development:** The design of the subdivision design allows for bushfire hazard mitigation measures to be incorporated to reduce threat to people, property and infrastructure meeting Acceptable Solutions;
- **Element 3 - Vehicular access:** All roads and access can meet technical standards as outlined in Table 4, meeting Performance Principles; and
- **Element 4 – Water:** On-site water capture to meet Acceptable Solutions.

This BMP report provides details of the fire management strategies proposed to be implemented across the site as it is subdivided and developed to ensure adequate protection of life, property and biodiversity assets. This BMP has identified a number of ways fire risk can be mitigated and managed across the lots to ensure there is protection to life and property and biodiversity assets. To mitigate fire risks this report outlines the implementation of linking road network, community water facilities, location of building envelopes and some Building Construction to AS3959-2009 BAL where 100m HSZ cannot be achieved from moderate bushfire risks.

This report provides details of the fire management strategies proposed to be implemented across the site as it is subdivided and developed to ensure adequate protection of life, property and biodiversity assets.

8.2. Future Lot Owners Responsibility

It is recommended the Future Property Owners shall be responsible for the following:

- To take measures to protect their own assets on their property, home owners should not rely on emergency personnel to attend their home and thus it is stressed to **prepare an individual bushfire emergency plan** regarding their intentions and

property. This Bushfire Management Plan is **not** an individual bushfire emergency plan;

- Implement this document, Bushfire Management Plan of 1 and 2 Tee Tree Road Bindoon as it applies to their individual property;
- Ensure that BPZ's are maintained to a minimum of 20 metres around all buildings (see Appendix E);
- Ensure that HSZ's are maintained from the vegetation (fire) risks (see Appendix E);
- Ensure that their property is built to BAL AS3959-2009 Building Standards (if it applies to their property);
- Provision for the storage of water in tanks not less than 120,000 litres capacity, of which 10,000L is to be held in reserve for fire fighting purposes;
- Ensuring that suitable external ember screens are placed on roof top mounted evaporative air conditioners compliant with AS3959-2009 (current and endorsed standards) and that the screens are checked annually; and
- Each property owner is to be made aware of:
 - Fire Management Plan,
 - A hard copy of the A4 book "Prepare. Act. Survive",
 - Fire Control Information supplied by the Shire of Chittering; and
- It is the responsibility of the individual property owner to maintain in good order and condition BPZ, HSZ and driveway standards. Future modifications other than requirements as set out in this Bushfire Management Plan can only be done with written agreement from the Shire of Chittering.

8.3. Developers Responsibility

Prior to development being given final approval by the Shire of Chittering, the Developer shall be required to carry out works that include the following but in respect to individual stages of development. Subsequent to the issue of final approval, the Developer shall have no further responsibilities to the provision of fire fighting facilities and bushfire management on individual lots that pass from their ownership.

It is recommended that the Property Developer shall be responsible for the following:

- Implement this document, Bushfire Management Plan of Lots 1 and 2 Tee Tree Road Bindoon as it applies to their development;
- Comply with standards as outlined by the Shire of Chittering and WAPC conditions of subdivision;
- Ensure that potential property owners are aware of this Bushfire Management Plan;
- Comply with minimum subdivision construction standards as outlined by this Bushfire Management Plan;
- Ensure areas adjacent to new dwellings in public Vegetation Corridor areas are fuel reduced at clearance of title stages, as per **Section 6.5.2** of this document;
- Maintain fire protection measures in public areas (gates, access, landscaped areas etc) until the Developer has relinquished construction/maintenance responsibility of public use areas to the Shire of Chittering;
- Install a 100,000 L capacity water tank for fire fighting purposes located at a central location of the subdivision;
- Construct Access to the following standards as outlined in Table (4).

Table 4 – Vehicular Access Standards

Standard	Public Roads	Fire Service Access Ways	Emergency Access Ways
Minimum trafficable surface	6 metres	4 metres	6 metres
Horizontal clearance	6 metres	6 metres	6 metres
Vertical clearance	4 metres	4 metres	4 metres
Maximum grades	1 in 8	1 in 8	1 in 8
Maximum grade over <50	1 in 5	1 in 4	1 in 5
Maximum average grade	1 in 7	1 in 7	1 in 7
Minimum weight capacity	15 tonnes	15 tonnes	15 tonnes
Maximum crossfall	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	12 metres	12 metres	12 metres
Cul de sacs	N/A	N/A	N/A
Battle Axes	Not more than 600m	N/A	N/A
Private Driveways	Standard as roads if house >50m from road, passing bays every 200m for 20m.	N/A	N/A
Signage	Not required	Required	Must be signposted
Gates	Not required	Min width 3.6	Min width 3.6
Design and construction	Approved by relevant local government	Approved by relevant local government	Approved by relevant local government
Turn around areas	Every 500 metres, within 50 metres of the house and at	Every 500 metres, within 50 metres of the house.	Not required

(As per "Planning for Bushfire Protection" Edition 2, WAPC 2010)

- Install Signage and Gates of Fire Service Access (if required);
- Install signage for Emergency Access Ways (if required);
- Implement a notification on title under Section 70A of the *Transfer of Land Act 1983* notifying future lot owners about the BMP;
- Provide each prospective owner with:
 - Fire Management Plan,
 - A hard copy of the A4 book "*Prepare. Act. Survive*"; and
 - Fire Control Information supplied by the Shire of Chittering (Yearly advice Brochure updated annually).

8.4. Shire of Chittering Responsibility

At approval and endorsement of this Bushfire Management Plan, the Shire of Chittering has statutory control and responsibility to ensure that aspects of the Plan and community fire safety are maintained.

It is recommended the Shire of Chittering be responsible for the following:

- Provide advice on standards and methods to achieve community fire protection to owners/occupiers of land.
- Ensure individual Property Owners maintain in good order and condition Emergency Access/Fire Access Ways building protection zones, hazard reduction zone and driveway standards.
- Maintain district Fire Fighting Facilities.

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- Undertake Prescribed Burning (if required) and fuel reduction strategies to ensure a maximum of 8T/ha ground fuels on any internal public remnant vegetation (i.e. Vegetative corridor areas) in accordance with the *Bushfire Act 1954*.
- Ongoing management of any public areas will be the responsibility of the Shire of Chittering after the Developer has relinquished construction/maintenance responsibility.
- Maintain condition and working order of district water supplies and equipment for fire fighting purposes.

9. Conclusions

This Bushfire Management Plan has been developed to meet “Performance Principles” and the “Acceptable Solutions” as outlined in Planning for Bushfire (2010) Edition 2 and Draft Planning for Bushfire Risk Management Guidelines, (WAPC, 2014) with specific recommendations for:

- The layout of the subdivision and the facilities proposed have been designed to reduce the fire threat to persons and property within the development (i.e. Internal road design, setbacks and building envelopes);
- Accessible “Fire Service Access” and “Emergency Access Ways” in opposing directions through the subdivision for access and egress in fire events;
- Meeting firebreak requirements as per Shire of Chittering Firebreak notice; and
- Building to BAL AS3959-2009 where setbacks of 100m from woodland bushfire risks.

A copy of DFES’s Compliance Checklist for “Performance Criteria” and “Acceptable Solutions” is provided in Appendix G.

In summary it is recommended to the Developers that in building the proposed subdivision at Lots 1 and 2 Tee Tree Road Bindoon, the Developer:

- Implements the bushfire protection standards as outlined in this document and by Department of Planning Bushfire guidelines;
- Adheres to subdivision conditions;
- If any changes to detailed designs occur, that this Bushfire Management Plan is updated to reflect these changes, with approval from the Shire of Chittering and DFES; and
- Implement this document, Bushfire Management Plan of 1 and 2 Tee Tree Road Bindoon standards of construction and recommendations.

10. References

AS 3959-2009 Australian Standard, *Construction of buildings in bushfire-prone areas*, Building Code of Australia, Primary Referenced Standard, Australian Building Codes Board and Standards Australia.

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<http://www.bom.gov.au/climate/data/index.shtml>

Keighrey, B. (1994) *Bushland Plant Survey, A Guide to Community Survey for the Community*, Wildflower Society of WA.

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Department of Planning Western Australia *Planning and Development (Bushfire Risk Management) Regulations 2014 and Development (Bushfire Risk Management) Regulations 2014* accessed from website February 2015 from:

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Environmental Weeds Strategy for Western Australia (1999) Department of Environment and Conservation, Western Australia.

Hearn, H., Williams, K., Comer, S. and Beecham, B. (2002) SWAN 1 (SWA1 – Swan 1 subregion). Department Conservation and Land Management. Government of Western Australia.

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Item 9.1.6 - Attachment 1

Appendices

Appendix A – Location

Appendix B – Outline Development Plan

Appendix C - Vegetation Mapping

Appendix D – BAL and Bushfire Hazard Mapping

Appendix E – DFES Information for the homeowner

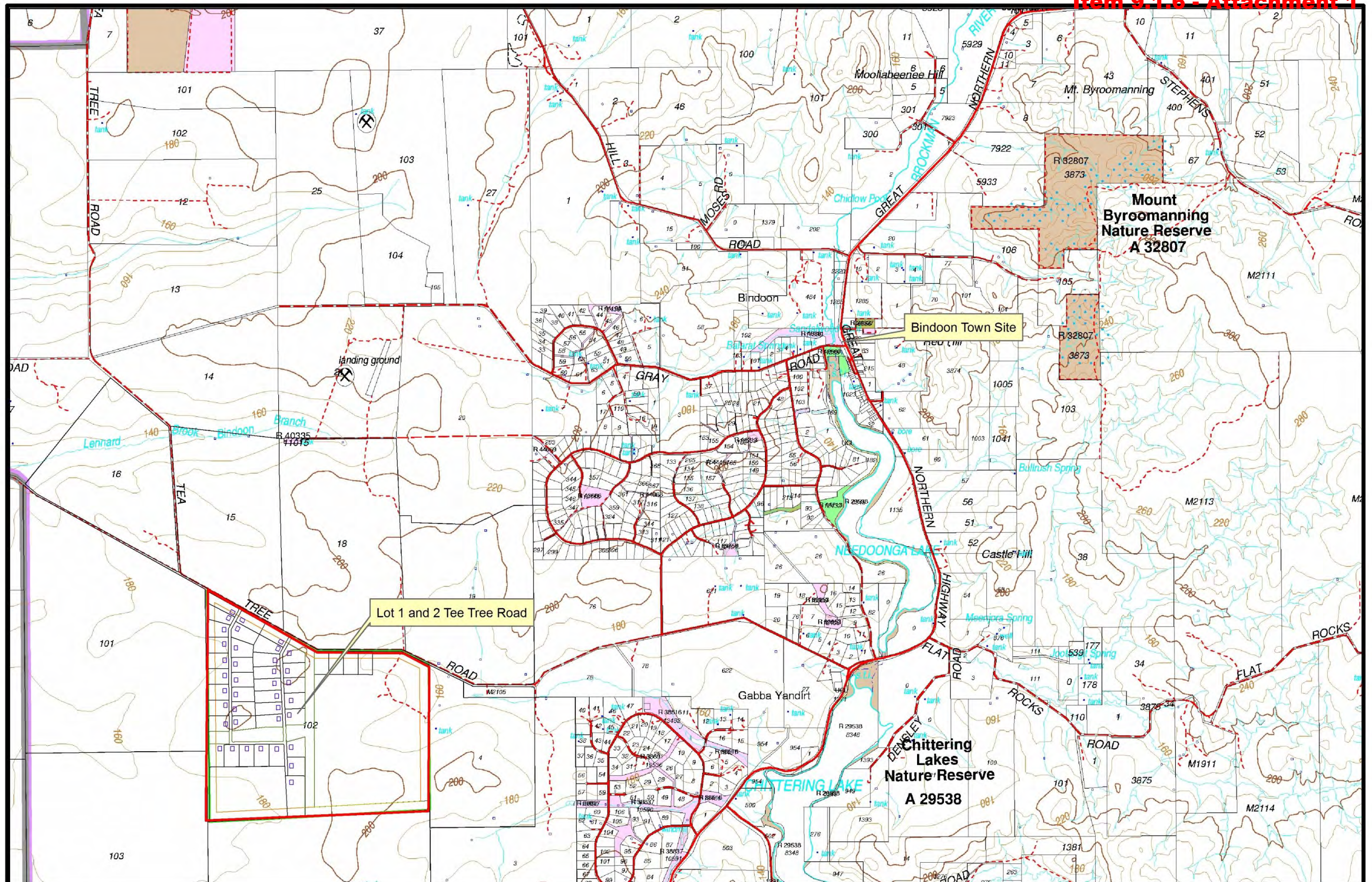
Appendix F – Fire Management Plan

Appendix G - DFES Checklist

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Appendix A

Location Mapping



Legend

Subject area

Scale
1:40000 @ A3



0 390 780 1,560 2,340 3,120 Meters



**BIO
DIVERSE
SOLUTIONS**

55 Peppermint Drive
Albany, WA 6330
Australia
Tel: 08 9841 3936
Fax: 08 9841 3936
Mob: 0447 555 516

CLIENT Lot 1 and 2 Tee Tree Road
Bindoon WA

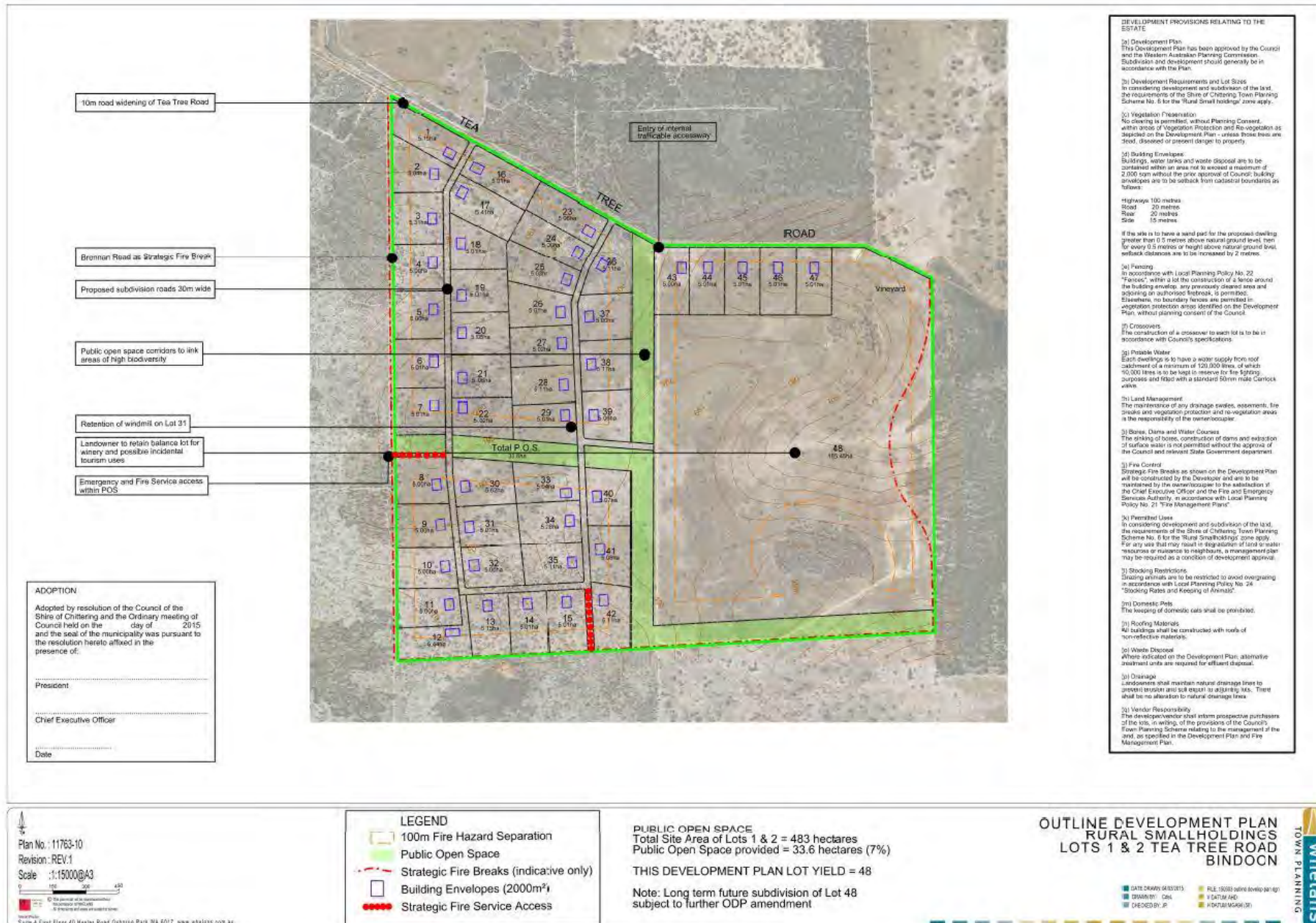
Location Mapping

STATUS	FILE	DATE
FINAL	WHEL014	20/01/2012

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Appendix B

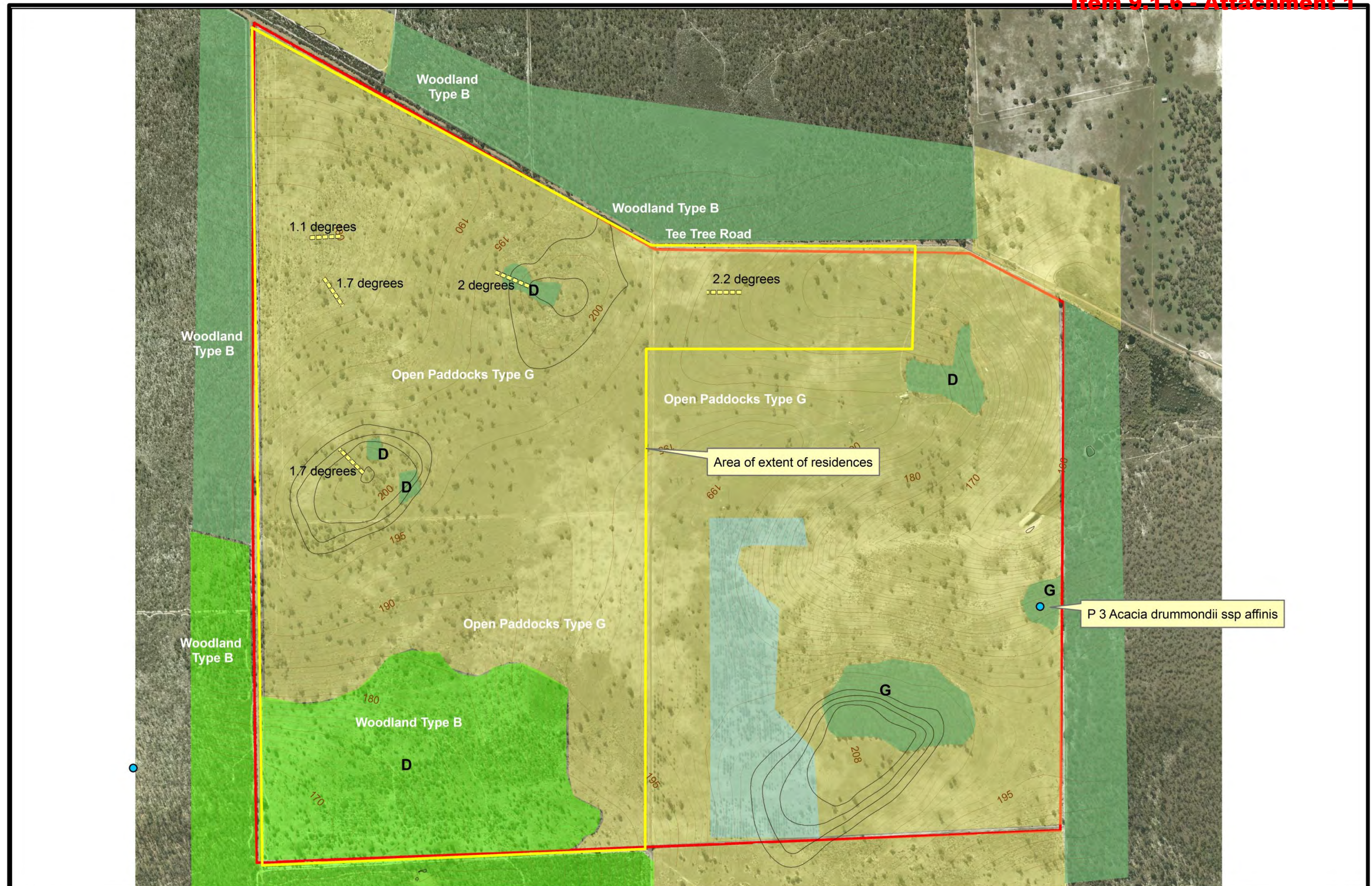
Outline Development Plan



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Appendix C

Vegetation Mapping



Legend

- P 3 Acacia drummondii ssp affinis
- Slope degrees
- Woodland Type B - Jarrah - Marri JmCc
- Woodland Type B - Mosaic Jarrah - Marri - Banksia JmCcBa
- Type G - Cleared Paddock Areas
- Tagasaste plantation
- G - Good Condition D - Degraded Condition
- Residential areas
- Subject area

Scale 1:11000 @ A3
0 90 180 360 540 720 900 Meters



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CLIENT Lot 1 and 2 Tee Tree Road
Bindoon WA

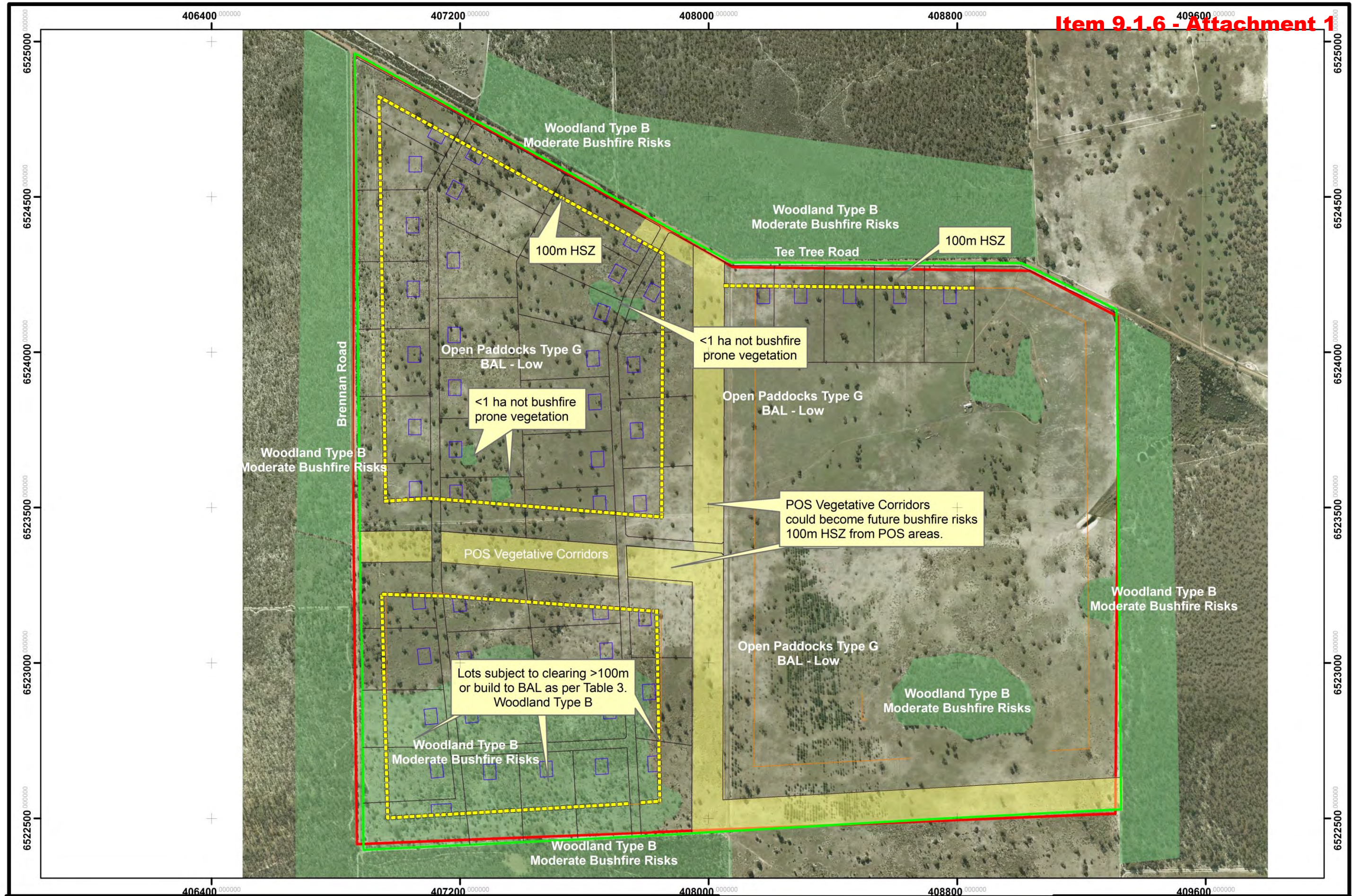
Vegetation Mapping

STATUS FINAL	FILE WHEL014	DATE 13/04/2015
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Appendix D

BAL and Bushfire Hazard Mapping



Legend <div style="display: flex; justify-content: space-between;"> <div> <p> 100 HSZ</p> <p> Vegetative Linkages</p> <p> Outline Development Plan</p> </div> <div> <p> Woodland Type B - Moderate Risks</p> <p> Subject area</p> </div> </div>		 Scale 1:11500 @ A3 <div style="display: flex; align-items: center;"> <div style="width: 100px; border-bottom: 1px solid black; position: relative;"> 0 800 </div> <div style="margin-left: 5px;"> 100 200 400 600 Meters </div> </div>	 BIO DIVERSE SOLUTIONS <small>55 Peppermint Drive Albany, WA 6330 Australia Tel: 08 9841 3936 Fax: 08 9841 3936 Mob: 0447 555 516</small>	CLIENT Marou Property Group Pty Ltd Lot 1 and 2 Tee Tree Road Bindoon WA <hr/> BAL & Fire Hazard Mapping <table style="width: 100%; font-size: small;"> <tr> <td style="width: 33%;">STATUS</td> <td style="width: 33%;">FILE</td> <td style="width: 33%;">DATE</td> </tr> <tr> <td>FINAL</td> <td>WHEL014</td> <td>17/04/2015</td> </tr> </table>	STATUS	FILE	DATE	FINAL	WHEL014	17/04/2015
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FINAL	WHEL014	17/04/2015								

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Appendix E

DFES information for the homeowner

BUSHFIRE

Building Protection Zones

FACTSHEET

02

ARE YOU
BUSHFIRE
READY?

areyouready.wa.gov.au

PREPARING YOUR HOME AND
PROPERTY FOR A BUSHFIRE

You should prepare your home to survive the passage of a bushfire, even if your plan is to leave. A well prepared and constructed house is more likely to survive a bushfire than an unprepared one. Firefighters cannot defend every property and are unlikely to defend a poorly prepared property; remember their lives are at risk too.



DID YOU KNOW?

Firebreaks have a number of purposes.

They are used to stop the spread of a bushfire and are also used by firefighters to gain access around all areas of your property and as a place from which to fight a fire.

Remember that firebreaks must be wide enough and have enough vertical clearance to let a firefighting truck pass.

Maintain your firebreaks to ensure your property can be defended during a fire.

- ☐ **Create a minimum 20 metre building protection zone** around your home and other buildings. This area needs to be cleared of all rubbish, long dry grass, bark and material that may catch fire.
- ☐ **Prune lower branches** (up to two metres off the ground) to stop a ground fire spreading into the canopy of the trees.
- ☐ **Clear vegetation** around your property to create a fire break, particularly the overhanging branches. Make sure you meet your local government's firebreak requirements.
- ☐ **Cut grass** to less than 10 centimetres high and prune shrubs to remove dead material.

For more information visit www.dfes.wa.gov.au or contact DFES Community Engagement 9395 9816



Government of Western Australia
Department of Fire & Emergency Services



PREPARE ACT SURVIVE



Information Note

September 2014

What is a Building Protection Zone?

Key Points

- Fuel loads influence bushfire intensity.
- The lower the fire's intensity the less impact on the building.
- Creating a minimum 20 metre reduced fuel load area (building protection zone) will increase the protection of the building.
- Ember protection is important to protect the building.
- Constructing or retrofitting your home to meet the Australian Standard 3959 — *Construction of buildings in bushfire-prone areas*; and addressing bushfire risks in accordance with the *Planning for Bushfire Risk Management Guidelines* will ensure your house has the best bushfire protection.

Definitions

- Scrub crown** is the green, leaf material on the scrub plants.
- Surface fire** is the fire burning the leaves and scrub on the top of the ground.
- Mineral earth firebreak** is a firebreak without vegetation.
- Ember attack** is where the bark and fine vegetation material is set alight, becomes airborne and is carried forward of the fire.

Managing and reducing fuel loads

Managing and reducing fuel loads for a minimum of 20 metres around a building will increase its likely survival from a bushfire.

Known as the Building Protection Zone (BPZ), the aim of this area is to ensure that there will be no direct flame contact on the building from a bushfire. By utilising fuel management options it will also be possible to reduce the potential radiant heat impact on the building.



Above: Well prepared Building Protection Zone with reduced fuel.

If there is little or nothing to burn then the fire's impact will be reduced. This can be achieved by:

- Maintaining a minimum 2 metre gap between trees and the building. Make sure that no trees overhang the house.
- Ensuring tree crowns are a minimum of 10 metres apart.
- Ensuring there is a gap between shrubs and buildings of three times their mature height.
- Ensuring shrubs aren't planted in clumps.
- Keeping the grass short and prune the scrub so that it is not dense, nor does it have fine, dead aerated material in the crown of the scrub.
- Raking up leaf litter and twigs under trees and remove trailing bark.
- Pruning lower branches (up to 2 metres off the ground) to stop a surface fire spreading to the canopy of the trees.
- Creating a mineral earth firebreak.
- Having your paths adjacent to the building and have your driveway placed so that it maximises the protection to the house.

Version 6, September 2014

For more information contact the Environmental Protection Branch on 9395 9300 • email: environment@dfes.wa.gov.au or visit www.dfes.wa.gov.au

- Storing firewood away from the building.
- Ensuring fences and sheds are constructed using non-combustible materials, but preferably not located in the BPZ.
- Keeping your gutters free of leaves and other combustible material.
- Ensuring gas bottles are secured and positioned so that they will vent away from the building, if subject to flame contact or radiant heat.

Ember attack

In a bushfire, most homes that are damaged or destroyed are from ember attack. These burning embers get into gaps within the building, such as into the roof cavity, and ignite the material within the cavity. It can take a number of hours before the burning becomes apparent and by that time the building may not be able to be saved.






Above: Reduced fuel in the Building Protection Zone contributed to the survival of this home in a bushfire.

Right: Home destroyed by bushfire, note the tree branches overhanging the house.

It is recommended that all homes that may be affected by embers be made ember proof. If a bushfire occurs in the general area, then the roof cavity and other crevices should be inspected to ensure that no embers have caused a fire. Be aware that there are electricity cables in the roof area and the introduction of water will be a safety issue.



 For more information contact the Environmental Protection Branch on 9395 9300, email: environment@dfes.wa.gov.au or visit www.dfes.wa.gov.au

Information Note

19/5/08 – Version Control I

Why do we need to manage fuel loads in the urban/forest interface zone?

<p>Key Points</p> <ul style="list-style-type: none"> ⇒ Fuel loads influence bush fire intensity. ⇒ The lower the intensity the more options are available to firefighters to suppress a fire. ⇒ Managing the fuel load will assist firefighters to suppress bush fires that may threaten homes. ⇒ A destructive fire does not need extreme weather conditions. <p>Definitions</p> <ul style="list-style-type: none"> ⇒ Bush fire intensity is determined by the rate of spread of the fire, the fuel consumed and the heat yield of the burning vegetation. ⇒ Fire intensity is calculated by <p style="margin-left: 20px;"><i>Rate of spread x fuel burnt / 2</i></p>	<p>By managing and reducing fuel loads fire-fighters are able to put bush fires out more quickly. This also reduces the impact a fire has on property and lives of the owners and surrounding neighbours.</p> <p>With the correct weather conditions and planning, property owners can undertake their own prescribed burning during winter months to reduce the risk of bush fires.</p> <p>This will reduce the impact a bush fire may have on the owner's property and assist fire fighters in suppressing a fire.</p> <p>High fuel loads in a bush fire which will burn quicker and hotter and destroy more bush.</p> <p>As the intensity of the fire increases, it is harder for fire-fighters to put the fire out as their options become increasingly diminished. This can be seen from the head fire behaviour classes table over the page.</p> <p>For example a fire which starts in the Perth hills which has 20 tonne per hectare of fuel and travels at 200 metres per hour will have a fire intensity of approximately 2,000 kilowatts per metre. The table over the page shows fire-fighters can put the fire out using fire appliances and machinery to cut fire breaks.</p> <p>A destructive fire doesn't need extreme weather conditions.</p> <p>A fire of 2,000 kilowatts per metre in the Perth hills which has 20 tonnes per hectare of fuel only needs a temperature of 30 degrees, relative humidity of 55 percent and a wind speed of 16 kilometres per hour before it directly exceeds the capability of fire-fighters to directly attack the bush fire.</p> <p>The only way to stop this from occurring and to decrease fire intensity is by reducing and managing the amount of fuel available.</p> <p>People undertake prescribed burning because it is the least intrusive option compared with slashing or using herbicides.</p>
--	--

For more information contact the Bush Fire and Environmental Protection Branch on 9323 9300 or visit www.fesa.wa.gov.au

Why do we need to manage fuel loads in the urban/forest interface zone?

The table below shows the options available to firefighters when suppressing a fire at different levels of intensity and rate of spread (ROS).

HEADFIRE BEHAVIOUR CLASSES
1 Readily suppressed. Intensity < 800 kW/m and/or ROS < 60 m/hr in all fuels
2 Hand tool attack possible Intensity < 800 kW/m and/or ROS < 140 m/hr in forest/woodland and shrubland Intensity < 800 kW/m and/or ROS < 300 m/hr in grassland
3 Direct machine and tanker attack possible Intensity < 2000 kW/m and/or ROS < 400 m/hr in forest/woodland Intensity < 2000* kW/m and/or ROS < 1000 m/hr in shrubland Intensity < 5000 kW/m and/or ROS < 6500 m/hr in grassland
4 Direct attack not possible/unlikely to succeed. Intensity > 2000 kW/m and/or ROS > 400 m/hr in forest/woodland Intensity > 2000* kW/m and/or ROS > 1000 m/hr in shrubland Intensity > 5000 kW/m and/or ROS > 6500 m/hr in grassland
5 Indirect attack likely to fail Intensity > 4000 kW/m and/or ROS > 800 m/hr in forest/woodland Intensity > 8000 kW/m and/or ROS 2000 m/hr in shrubland ROS > 10000 m/hr in grassland

Table from C Muller, 2008, "Bush Fire Threat Analysis" Chris Muller

Key
kW/m Kilowatts per metre
m/h Metres per hour
ROS Rate of spread

Description of fuels

Forest occurs where the tall trees and dense canopies grow in the higher rainfall areas such as the jarrah forest between Mundaring and the karri forest near Walpole.

Woodland is an area covered in trees ranging between the higher rainfall areas to the arid interior of the State or on the Swan Coastal Plain. As the trees are spaced further apart than in a forest there is little leaf litter. These areas can also be very floristically diverse.

Shrubland is dominated by small woody shrubs such as in mallee and mulga areas and are primarily in the low rainfall interior. These areas can also be very floristically diverse.

Grassland is an area dominated by grasses, with varying levels of over storey.

For more information contact the Bush Fire and Environmental Protection Branch on 9323 9300 or visit www.fesa.wa.gov.au

BUSHFIRE

Evaporative Air Conditioners

FACTSHEET

08

ARE YOU
BUSHFIRE
READY?

areyouready.wa.gov.au

DID YOU KNOW?

Your evaporative air conditioning unit can catch fire as a result of embers from bushfires, or even small back yard fires, getting into your unit. If a fire starts in your air conditioner, it can spread quickly throughout your home.

If there is smoke nearby
you should:

- ☐ Run the air conditioner to wet the filter pads
- ☐ When smoke is over your home or ash starts to drop around your house, switch the air conditioner off
- ☐ If possible, continue to run water over the filter with the fan turned off
- ☐ If the water can't be run on its own, or if there is a power failure at the time, wet the air conditioner filter pads using a garden hose
- ☐ Keep checking your air conditioner and the area around your home for spot fires from embers until the danger has passed

It can be difficult for firefighters to put out a fire caused by embers getting into the roof space of your home. Knowing what to do to keep your evaporative air conditioner safe from fire can help save your property.

For more information on evaporative air conditioners see DFES Information Note on Ember Protection Screens.

DID YOU KNOW?

If you live within 500 metres of bushland and have a roof mounted evaporative air conditioning unit, your home may be at increased risk of ember attack.



If your home does
catch fire, leave your
home and call 000
immediately

WHAT IS EMBER ATTACK?

Embers are pieces of burning bark, leaves or twigs that are carried by the wind around the main fire creating spot fires.

For more information visit www.dfes.wa.gov.au or contact DFES Community Engagement 9395 9816



Government of Western Australia
Department of Fire & Emergency Services

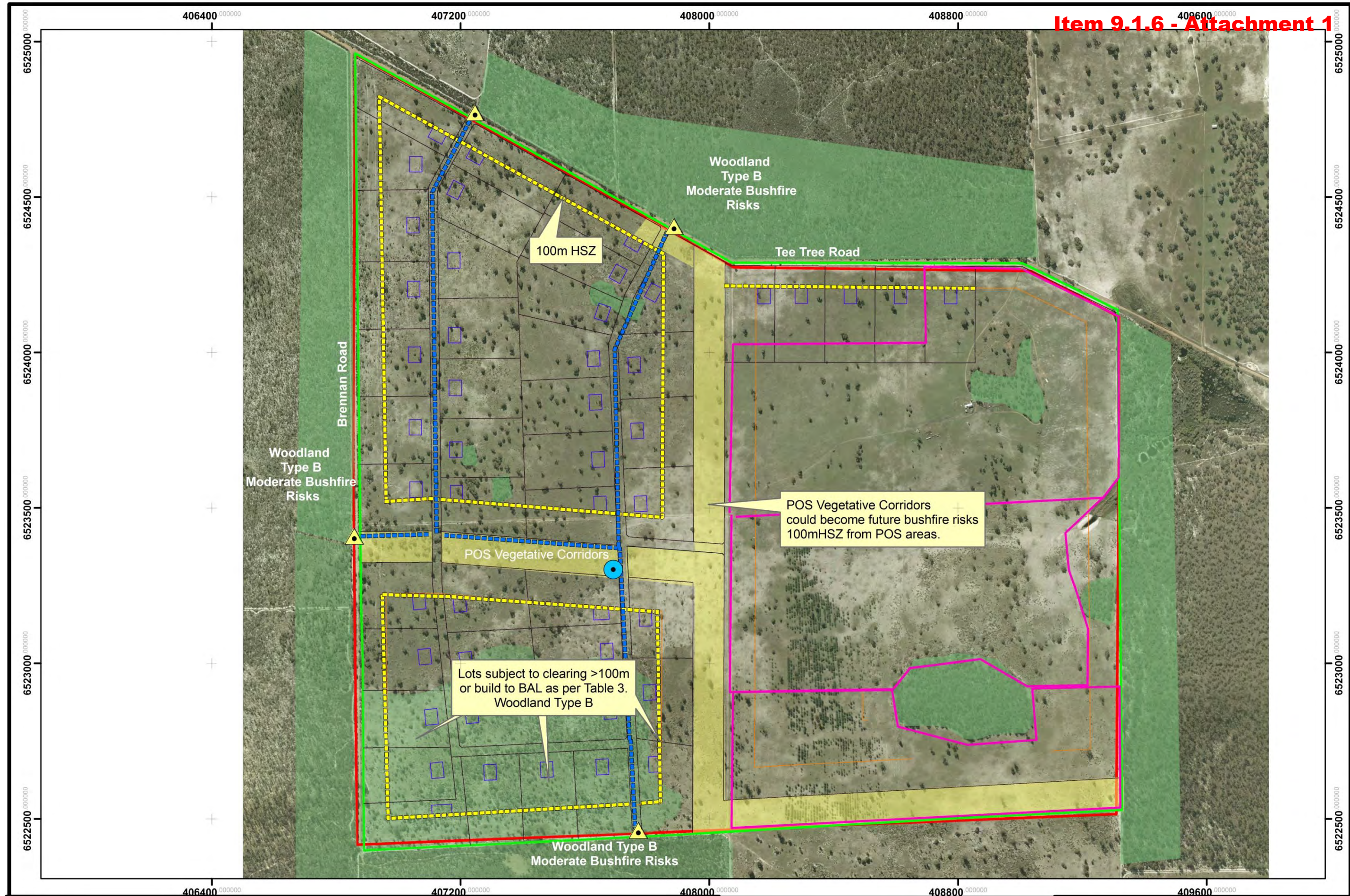


PREPARE ACT SURVIVE

Item 9.1.6 - Attachment 1

Appendix F

Bushfire Management Plan



Legend Access points Water tank Emergency & Fire Service Access Outline Development Plan		Rural Firebreaks 100 HSZ Vegetative Linkages		Woodland Type B - Moderate Risks Subject area		 Scale 1:11500 @ A3 0 105 210 420 630 840 Meters		 BIO DIVERSE SOLUTIONS 55 Peppermint Drive Albany, WA 6330 Australia Tel: 08 9841 3936 Fax: 08 9841 3936 Mob: 0447 555 516		CLIENT Marou Property Group Pty Ltd Lot 1 and 2 Tee Tree Road Bindoon WA Bushfire Management Plan <table border="1"> <tr> <td>STATUS</td> <td>FILE</td> <td>DATE</td> </tr> <tr> <td>FINAL</td> <td>WHEL014</td> <td>17/04/2015</td> </tr> </table>		STATUS	FILE	DATE	FINAL	WHEL014	17/04/2015
STATUS	FILE	DATE															
FINAL	WHEL014	17/04/2015															

Item 9.1.6 - Attachment 1

Appendix G

DFES Checklist

Appendix G Bushfire Management Plan– Compliance Checklist

Element 1: Location

Does the proposal comply with the performance criteria by applying acceptable solution **A1.1?**

Yes ☒ No ☐

Not in an area where the bushfire hazard does not present an unreasonable level of risk to life and property. Requires some construction standards to BAL Construction and AS3959-2009 where 100m HSZ cannot be achieved. No building to higher than BAL 12.5.

Element 2: Siting and Design of Development

Does the proposal comply with the performance criteria by applying acceptable solution **A2.1?**

Yes ☒ No ☐

HSZ achieved, where 100m cannot be achieved to be built to BAL 12.5 and AS3959-2009.

Does the proposal comply with the performance criteria by applying acceptable solution **A2.2?**

Yes ☒ No ☐

Every building sited >20m from vegetation, meeting 20m BPZ requirement.

Does the proposal comply with the performance criteria by applying acceptable solution **A2.3?**

Yes ☒ No ☐

HSZ to DFES and SoC standards, HSZ achieved, where 100m cannot be achieved to be built to BAL construction.

Element 3: Vehicular access

Does the proposal comply with the performance criteria by applying acceptable solution **A3.1?**

Yes ☒ No ☐

Vehicle access along internal road network access in tow opposing directions to Brennan Road and Tee Tree Road.

Does the proposal comply with the performance criteria by applying acceptable solution **A3.2?**

Yes ☒ No ☐

Public roads to DFES Standards.

Does the proposal comply with the performance criteria by applying acceptable solution **A3.3?**

Yes ☒ No ☐

Cul de sacs not proposed.

Does the proposal comply with the performance criteria by applying acceptable solution **A3.4?**

Yes ☒ No ☐

Battle axes to Acceptable Standards.

Does the proposal comply with the performance criteria by applying acceptable solution **A3.5?**

Yes ☒ No ☐

Private driveways will be constructed to DFES standards.

Does the proposal comply with the performance criteria by applying acceptable solution **A3.6?**

Yes ☒ No ☐

Emergency Access Ways along internal road network and POS areas

Does the proposal comply with the performance criteria by applying acceptable solution **A3.7?**

Yes ☒ No ☐

Fire Service Access along internal road network and POS areas

Does the proposal comply with the performance criteria by applying acceptable solution **A3.8?**

Yes ☒ No ☐

If required will be to SoC and DFES standards.

Does the proposal comply with the performance criteria by applying acceptable solution **A2.9?**

Yes ☒ No ☐

If required in POS areas will be to SoC and DFES standards.

Element 4: Water

Does the proposal comply with the performance criteria by applying acceptable solution **A4.1?**

Yes ☒ No ☐

Meets Acceptable Solutions.

Application Declaration

I declare that the information provided is true and correct to the best of my knowledge.

Full name:

Agency/Corporation:

Applicant signature:

Date:

LOTS 1 AND 2 TEA TREE ROAD, BINDOON

**LAND CAPABILITY FOR
ON-SITE EFFLUENT DISPOSAL**

Prepared for

Marou Property Developments Pty Ltd

c/- Whelans

PO Box 99

MT HAWTHORN WA 6915

Draft Report No. J15017

14 October 2015

BAYLEY ENVIRONMENTAL SERVICES

30 Thomas Street

SOUTH FREMANTLE WA 6162

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1.0 INTRODUCTION

Marou Property Developments Pty Ltd plans to subdivide Lots 1 and 2 Tea Tree Rd, Bindoon (the subject land) into 47 five hectare rural smallholding lots and one balance lot of about 186ha. All lots will employ on-site effluent disposal.

Bayley Environmental Services was commissioned in August 2015 to investigate and report on the capability of the subject land to accommodate on-site effluent disposal. The investigations took place in September-October 2015 and included:

- drilling of nine boreholes across the site, focussing on areas of likely groundwater accumulation and/or drainage;
- installation of bores in three boreholes where groundwater was encountered;
- collection of soil samples from the boreholes and analysis for phosphorus retention index (PRI);
- measurement of depth to groundwater in the bores;
- collection and analysis of water samples from the bores;
- review of environmental information including aerial photography, topography, geology, soils, groundwater and previous reporting on the site by Landform Research (2000).

The conclusion from these investigations is that the subject land has a very high capability for on-site effluent disposal by conventional or alternative systems. Specifically:

- The site has low slopes (less than 10%; mostly less than 5%).
- The soils are deep, sandy and permeable with no confining layers such as clay or rock in the shallow profile.
- The water table is more than 6m deep over all but the eastern extremity of the site.
- All proposed lots have a large separation (>500m) to surface water bodies.

Details of the investigations and findings are presented below.

2.0 ENVIRONMENTAL CHARACTERISTICS

2.1 Topography and Landforms

The subject land is located on an elevated, undulating plateau at elevations for 160m AHD to 208m AHD. From high ground in the centre, west and south-east, the land falls away in broad valleys to the north-west, south-west, north-east and east. Figure 1 shows topographic contours of the site. Figure 2 shows an oblique aerial view.

The slope varies from about 10% in the steepest eastern valley to less than 1% in the centre of the site, with the slope averaging about 4% over the site.

2.2 Geology and Soils

2.2.1 Overview

The subject land is located on the Dandaragan Plateau just west of the Darling Fault. The soils are predominantly sandy, with deep yellow and yellow-brown sands, earthy sands and gravelly sands on the slopes and leached grey sands in the valleys. Ferricrete cemented sandstone rock occurs on a few ridge tops.

Landform Research Pty Ltd (2000) described and mapped the soils in detail based on 47 shallow test pits across the subject site. Figure 1 shows the Landform Research soil mapping.

Drilling of nine boreholes across the site by Bayley Environmental Services in 2015 (Figure 1) found generally sandy soils with grey and grey-brown sands to about 1m over yellow and yellow-brown sands and earthy and clayey sands. Appendix A presents the soil logs from the drilling.

2.2.2 Soil Permeability

The sandy soils have a high permeability, with no evidence of clay being found in the boreholes at less than 3m deep.

Landorm Research (2000) mapped ferricrete on some ridge tops and beneath the sandy soils of the valley slopes, but drilling in these areas in 2015 found no evidence of this beyond minor gravel to at least 6m depth.

2.2.3 Phosphorus Retention Index

Soil samples from 1m depth in the boreholes were analysed for phosphorus retention index (PRI). This depth was generally at about the interface between the grey and grey-

brown surface soils and the yellow earthy subsoils, so the results would underestimate the PRI of the subsoils.

The analysis found low PRI across the site. Table 2.1 summarises the PRI results.

Table 2.1 Phosphorus Retention Index

Site Figure 1)	BB1	BB2	BB3	BB4	BB5	BB6	BB7	BB8	BB9
PRI @ 1m	0.5	0.6	0.9	0.3	0.3	0.4	0.5	1.4	0.9

2.3 Hydrology

2.3.1 Surface Drainage

The subject land lies across a drainage divide between Chandala Brook to the west and the Brockman River to the east, both tributaries of the Swan-Avon system.

Given the deep sandy soils and low slopes of the subject land, there is no defined surface drainage. Surface runoff would be limited to short-lived overland flow during and immediately after extreme rainfall.

Surface flow begins at the eastern boundary of the site, where a small drainage line rises and flows into the Brockman River via Lake Chittering. A soak dam has been constructed just inside the eastern boundary at the beginning of this drainage line.

2.3.2 Groundwater

Groundwater is present beneath the site and is expected to flow east and west from the central high ground in line with the prevailing topography. The groundwater intersects the ground surface in the soak at the eastern boundary and in another soak just outside the boundary at the north-east corner.

Over most of the site, the groundwater is at least 6m below the surface. The depth to groundwater is likely to exceed 30m in the higher parts of the site. Table 2.2 shows the depths to groundwater found by drilling and bore measurements in September 2015.

Table 2.2 Depth to Groundwater

Site Figure 1)	BB1	BB2	BB3	BB4	BB5	BB6	BB7	BB8	BB9
Depth to Water (mbgl)	>9	>6	>9	>6	1.16	4.10	>6	>6	1.09

2.3.3 Water Quality

Analysis of samples collected from the bores and the soak dam in September 2015 shows that the groundwater quality is high, with low salinity, near-neutral pH and low nutrient levels. Appendix B presents the full results of the water analysis.

3.0 LAND CAPABILITY ASSESSMENT

Land capability for on-site effluent disposal depends on a number of factors, some of which are mandated by the Health Department's *Country Sewerage Policy* (2002):

- slope (maximum 20%);
- depth to groundwater (minimum 0.5m);
- soil profile (minimum 1.2m of free-draining soil free of rocks, clay and other confining layers);
- soil permeability (sufficient to permit infiltration but not so great as to permit unrestricted flow);
- soil purification ability (able to effectively remove bacteria, nutrients etc. from effluent by soil filtration);
- separation from surface water bodies (30-100m, depending on soil and system type);
- flooding risk (not susceptible to inundation more than once every ten years); and
- development density (maximum 10 lots equivalent per hectare in unsewered towns).

The subject land meets all of these criteria, as detailed below.

Slope

The slope of the subject land is all less than 10% and mostly less than 5%.

Groundwater Depth

The shallowest groundwater was measured at 1.09m near the eastern boundary. Over most of the site the depth to groundwater is greater than 6m.

Soil Profile

The site has deep sandy soils with no significant confining layers. Although Landform Research (2000) found ferricrete gravel and rock on ridge tops, there are no building envelopes proposed in these areas and in any case the ferricrete (cemented sandstone) would likely be permeable and/or readily excavated.

Soil Permeability

The sandy soils would be readily permeable but not excessively so.

Soil Purification Ability

The deep earthy sand subsoils would ensure very effective removal of contaminants before the effluent reaches the water table. Although the PRI at 1m depth is low, the change in soil colour at most sites below this depth indicates that the subsoil PRI would be higher. Added to this, the large depth to groundwater will ensure effective uptake of phosphorus from effluent.

The exception to this is the eastern side of the subject land, where leached white sands and shallower groundwater (less than 2m) would require alternative treatment systems. However, the development plan shows no building envelopes within this zone.

Separation from Water Bodies

The nearest surface water bodies are the soak dam near the eastern boundary and the wetland just outside the north-eastern corner of the site. The nearest building envelopes are more than 500m from these water bodies.

Flooding/Inundation Risk

There is no risk of inundation anywhere on the subject land.

Development Density

The Country Sewerage Policy limits unsewered development in Bindoon to ten residences (or equivalent) per hectare. The total of 48 lots proposed on the subject land is equivalent to less than one residence per hectare.

4.0 CONCLUSION

This investigation has concluded that the subject land has very high capability to support on-site effluent disposal using conventional or alternative treatment systems for the development as proposed.

-

Figures

Item 9.1.6 - Attachment 1

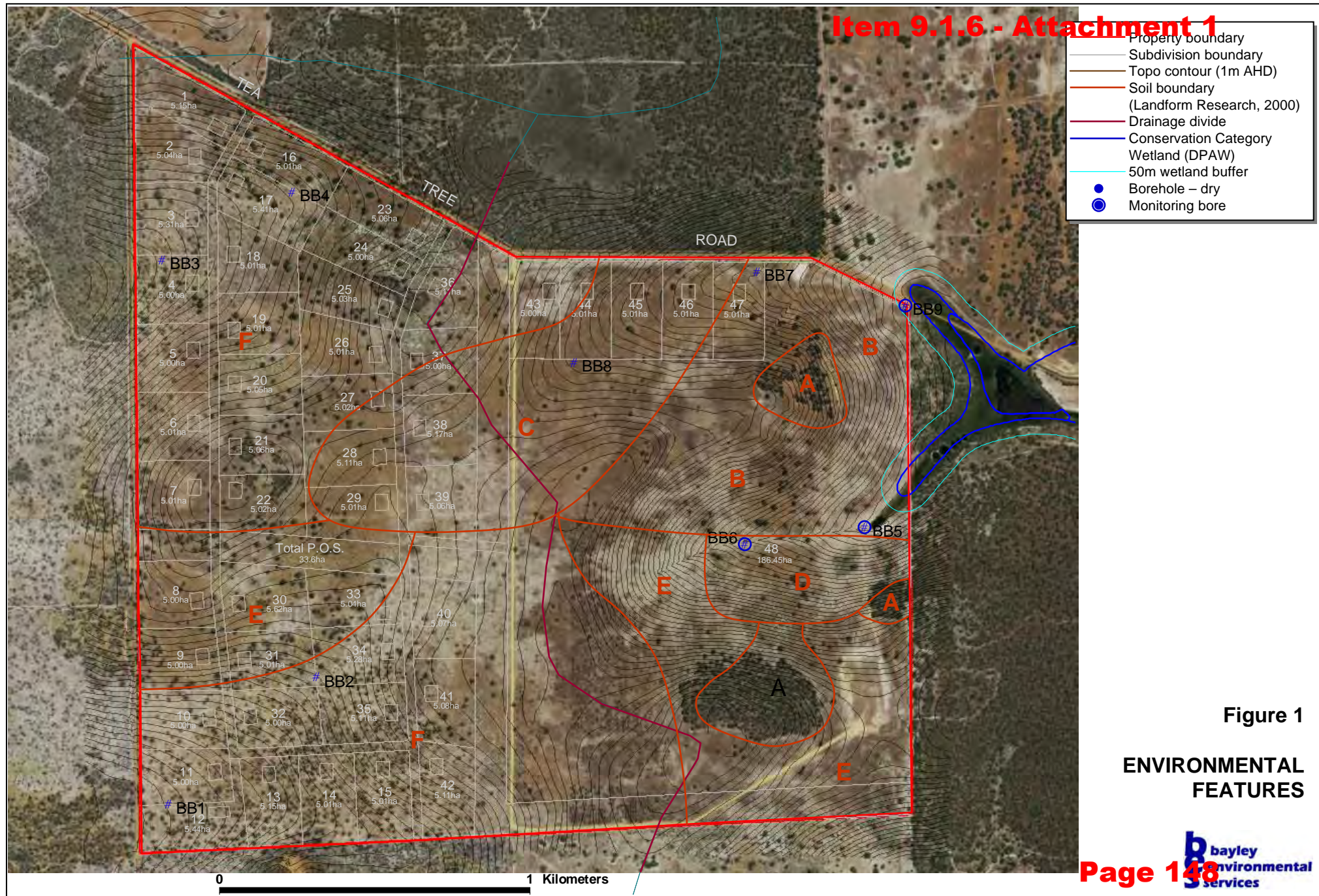
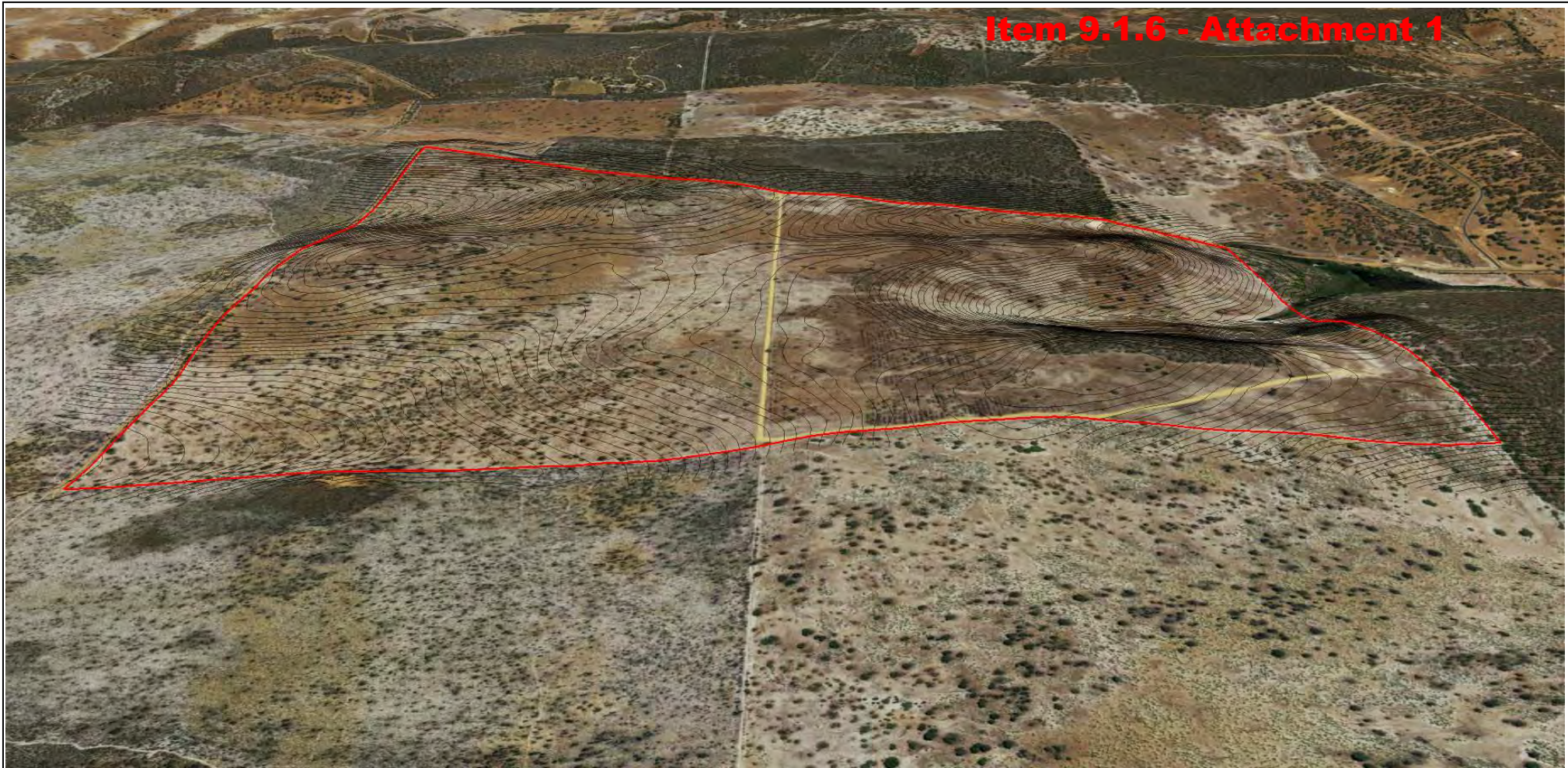


Figure 1

ENVIRONMENTAL
FEATURES



0 200 metres
Vertical exaggeration: 3x

Figure 2

OBLIQUE AERIAL VIEW

Appendix A

Soil Logs

SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB1
EASTING:	406974
NORTHING:	6522556
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	9m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	>9m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 0.5	Dark grey sand		
1 - 3.5	Pale brown-grey sand, paler and finer with depth		
4 - 4.5	Grey-brown sand with occasional gravel to 10mm		
5	Yellow-brown sand with occasional gravel to 10mm		
5.5	Brown-yellow sand with occasional gravel to 10mm		
6 - 7	Brown-yellow earthy sand with occasional gravel to 15mm		
7.5 - 9	Brown-yellow coarse sandy clay with occasional white clay lumps		



SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB2
EASTING:	407441
NORTHING:	6522958
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	6m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	>6m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 0.5	Grey sand		
1	Pale grey sand		
1.5	Very pale grey sand		
2 - 2.5	Cream sand		
3 - 3.5	Pale yellow-brown sand with occasional gravel to 15mm		
4	Yellow-brown sand with occasional gravel to 15mm		
4.5	Coarse yellow earthy sand with common gravel to 15mm		
5 - 6	Orange coarse clayey gritty sand		



SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB3
EASTING:	406954
NORTHING:	6524278
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	9m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	>9m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 0.5	Brown-grey sand		
1	Yellow-brown sand		
1.5 - 2	Yellow sand		
2.5 - 3	Yellow sand with occasional gravel to 10mm		
3.5	Yellow sand with occasional gravel to 20mm		
4	Brown-yellow coarse sand with gravel to 25mm		
4.5 - 6	Orange-brown-yellow earthy sand with gravel to 25mm		
6.5 - 7	Red gritty clayey sand		
7.5 - 9	Red gritty clayey sand, more clay		



SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB4
EASTING:	407365
NORTHING:	6524494
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	6m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	>6m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 0.5	Grey sand		
1	Very pale brown-grey sand, coarse		
1.5 - 2	Very pale grey sand, finer		
2.5 - 3	Pale yellow-brown sand with occasional gravel to 15mm		
3.5 - 5.5	Yellow-brown gravelly sand wo 20mm		
6	Red-brown earthy sand with gravel to 20mm		



SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB5
EASTING:	409178
NORTHING:	6523433
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	4.5m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	~1.25m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 2	Brown-grey sand, medium coarse, wet from ~1.25m		
2.5 - 3	Grey-brown sand, medium coarse		
3.5 - 4.5	Pale grey sand, medium coarse	Cased to 4.5m	



SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB6
EASTING:	408798
NORTHING:	6523380
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	6m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	4.5m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 0.5	Grey sand		
1 - 1.5	Pale brown-grey sand		
2	Yellow sand with occasional gravel to 10mm		
2.5	Brown sand with gravel to 10mm		
3 - 5	Yellow earthy sand, wet from ~4.5m		
5.5	Pale yellow earthy sand		
6	Grey sandy clay	Cased to 6m	



SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB7
EASTING:	408836
NORTHING:	6524241
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	6m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	>6m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 0.5	Grey sand		
1 - 1.5	Yellow-brown sand		
2 - 6	Orange earthy sand, moist		



SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB8
EASTING:	408258
NORTHING:	6523954
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	6m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	>6m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 0.5	Yellow-brown sand		
1 - 1.5	Yellow sand		
2 - 6	Orange earthy sand, moist		



SOIL PROFILE LOG

PROJECT NUMBER:	J15017
SITE ID:	BB9
EASTING:	409306
NORTHING:	6524134
METHOD:	Auger rig
TOTAL DEPTH (mbgl):	4.5m
REFUSAL (Y/N):	N
DATE:	7/09/2015
DEPTH TO WATER (mbgl)	~1.5m

SOIL PROFILE		SAMPLE DATA	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE ID	INTERVAL (m)
0 - 0.5	Grey sand		
1 - 2	Pale grey sand, medium coarse, wet from ~1.5m		
2.5	Brown sand		
3 - 4	Grey-brown sand		
4.5	Dark brown earthy sand	Cased to 4.5m	



Appendix B

Water Analysis Results

LABORATORY REPORT

Bayley Environmental Services

ARL Job No: 15-7050

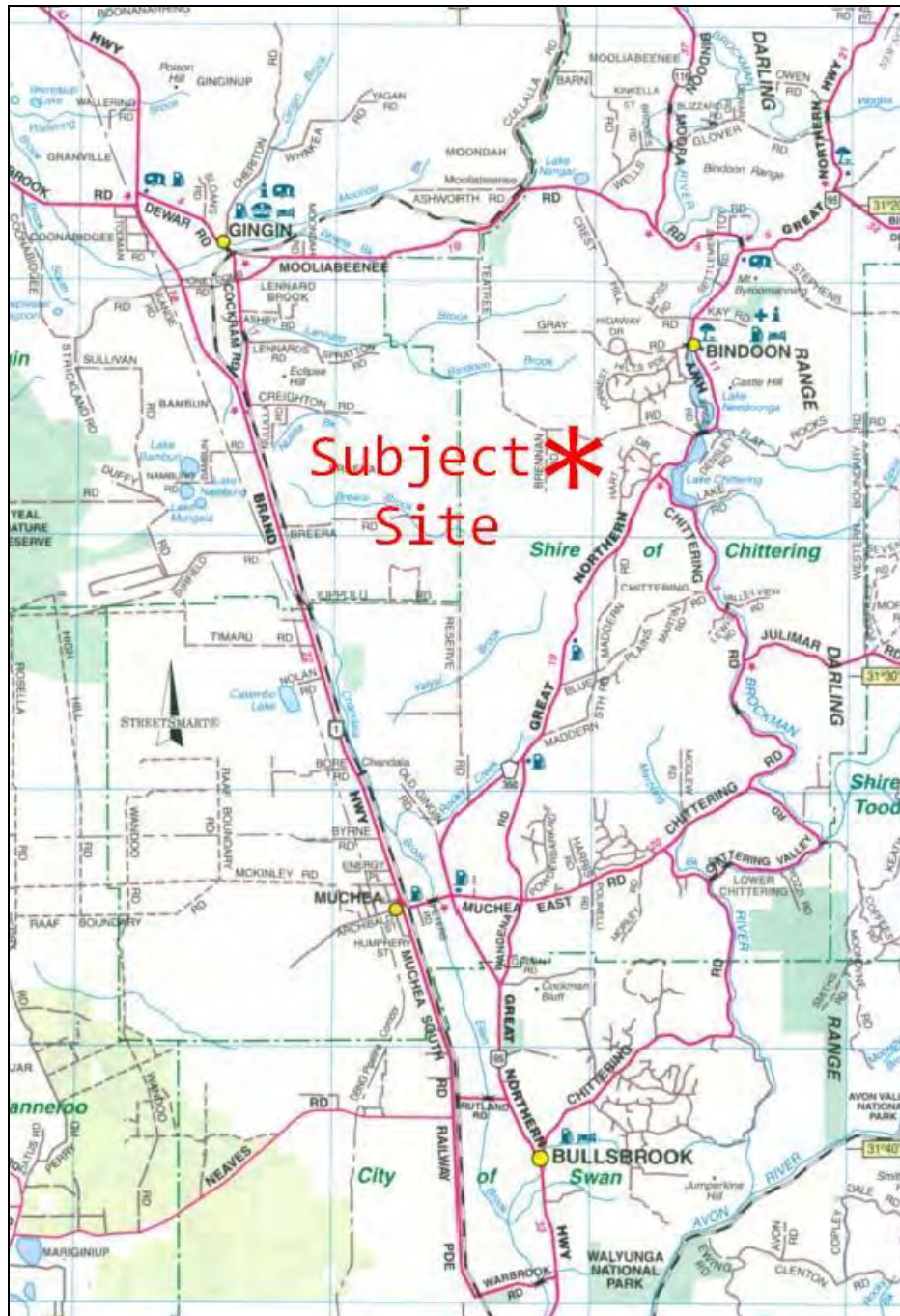
Revision: 00

Date: 9 October 2015

Metals in Water Sample No: Sample Description:	LOR	UNITS	15-7050-1 BB5	15-7050-2 BB6	15-7050-3 BB9	15-7050-4 Dam
Aluminium - Dissolved	0.1	mg/L	<0.1	<0.1	<0.1	<0.1
Arsenic III	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Arsenic V	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	1.3	1.1	1.7	1.4
Cadmium - Dissolved	0.002	mg/L	<0.002	<0.002	<0.002	<0.002
Chromium III	0.01	mg/L	<0.01	<0.01	<0.01	<0.01
Copper - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0002	mg/L	<0.0002	<0.0002	<0.0002	<0.0002
Potassium - Dissolved	0.1	mg/L	1.2	0.8	1.2	2.6
Magnesium - Dissolved	0.1	mg/L	2.6	3.1	6.5	6.4
Sodium - Dissolved	0.1	mg/L	35	31	89	78
Nickel - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01
Lead - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01
Total Nitrogen in Water Sample No: Sample Description:	LOR	UNITS	15-7050-1 BB5	15-7050-2 BB6	15-7050-3 BB9	15-7050-4 Dam
Total Nitrogen	0.2	mg/L	5.9	3.6	4.1	4.2
TKN	0.2	mg/L	<0.2	<0.2	<0.2	<0.2
Total Phosphorus in Water Sample No: Sample Description:	LOR	UNITS	15-7050-1 BB5	15-7050-2 BB6	15-7050-3 BB9	15-7050-4 Dam
Total Phosphorus	0.01	mg/L	0.05	0.02	0.09	0.03
Ions by Discrete Analyser Sample No: Sample Description:	LOR	UNITS	15-7050-1 BB5	15-7050-2 BB6	15-7050-3 BB9	15-7050-4 Dam
Chloride	5	mg/L	55	21	120	100
Sulphate	1	mg/L	11	8	4	15
Filterable Reactive Phosphorus	0.01	mg/L	0.01	<0.01	0.01	<0.01
NOx-N	0.01	mg/L	5.9	3.6	4.1	4.2
Physical Parameters Sample No: Sample Description:	LOR	UNITS	15-7050-1 BB5	15-7050-2 BB6	15-7050-3 BB9	15-7050-4 Dam
Acidity	5	mgCaCO ₃ /L	32	88	32	20
Alkalinity	5	mgCaCO ₃ /L	<5	<5	<5	8
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002
Conductivity	0.01	mS/cm	0.15	0.12	0.43	0.37
Total Suspended Solids	5	mg/L	51	8	250	<5
pH	0.1	pH units	6.4	6.2	5.2	5.6
Misc. Inorganics in Water Sample No: Sample Description:	LOR	UNITS	15-7050-1 BB5	15-7050-2 BB6	15-7050-3 BB9	15-7050-4 Dam
Hardness	5	mgCaCO ₃ /L	14	16	31	30

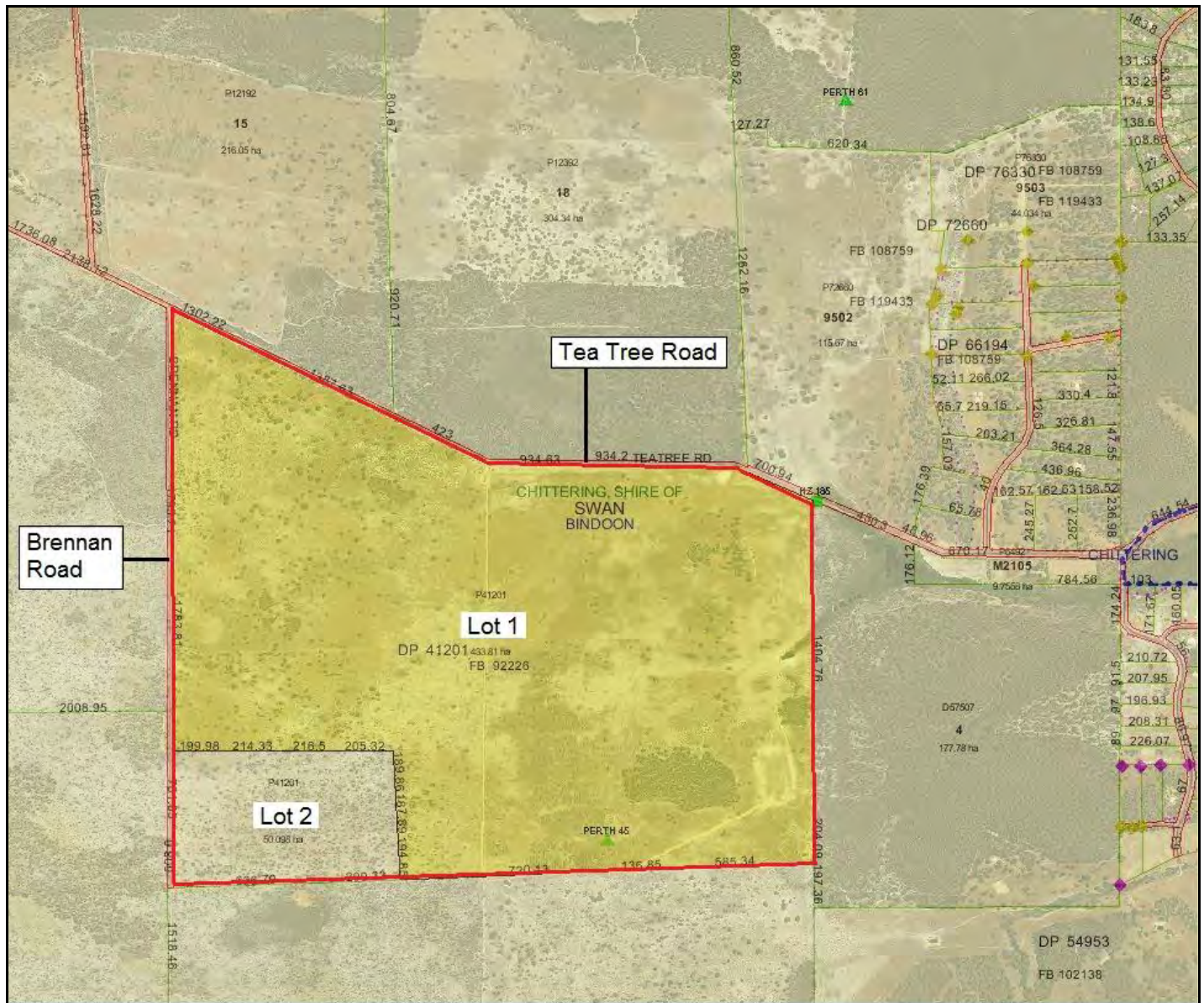
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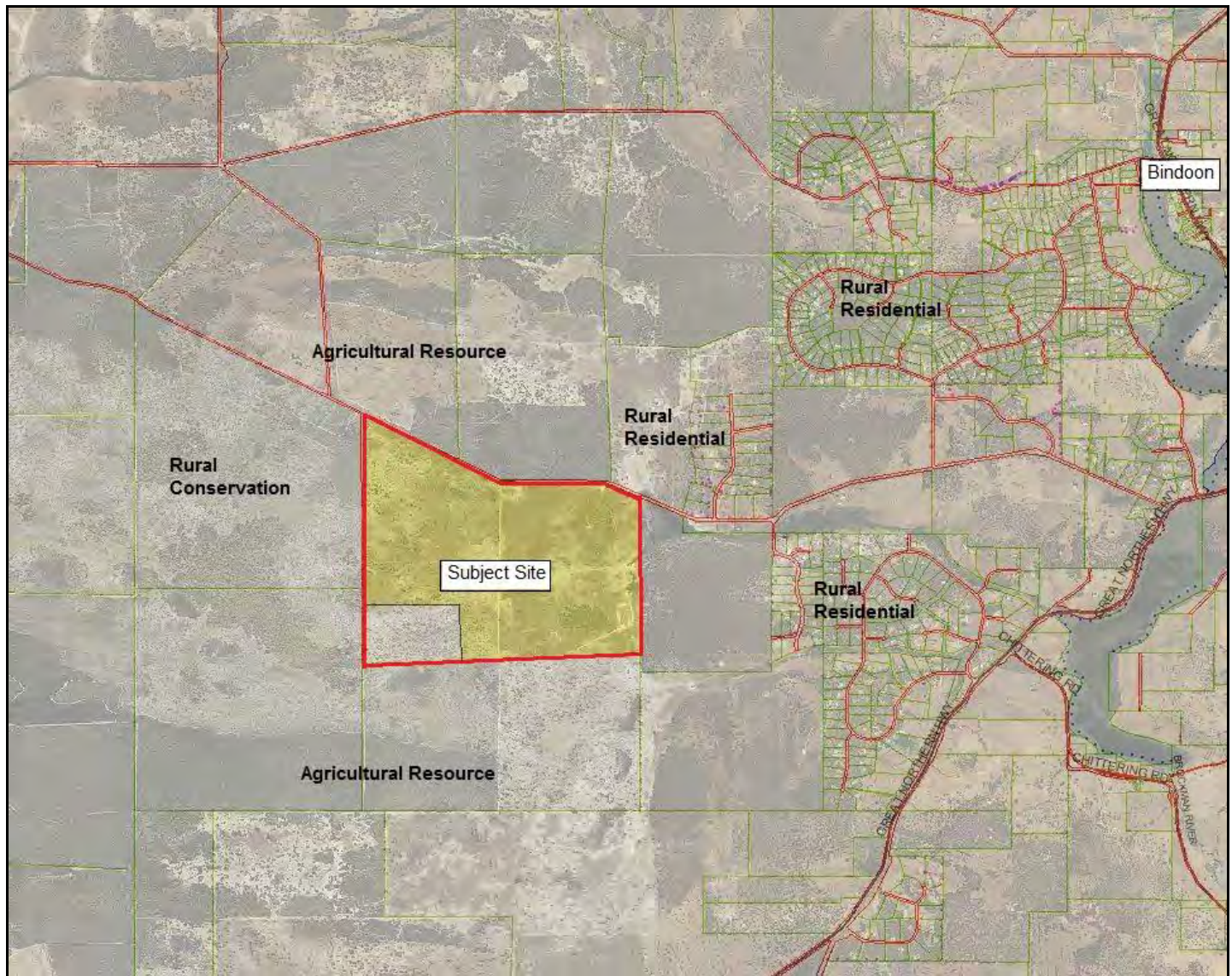
(Source: Streetsmart, 2013 - modified)

FIGURE 1
LOCATION PLAN



(Source: Landgate 2015 - modified)

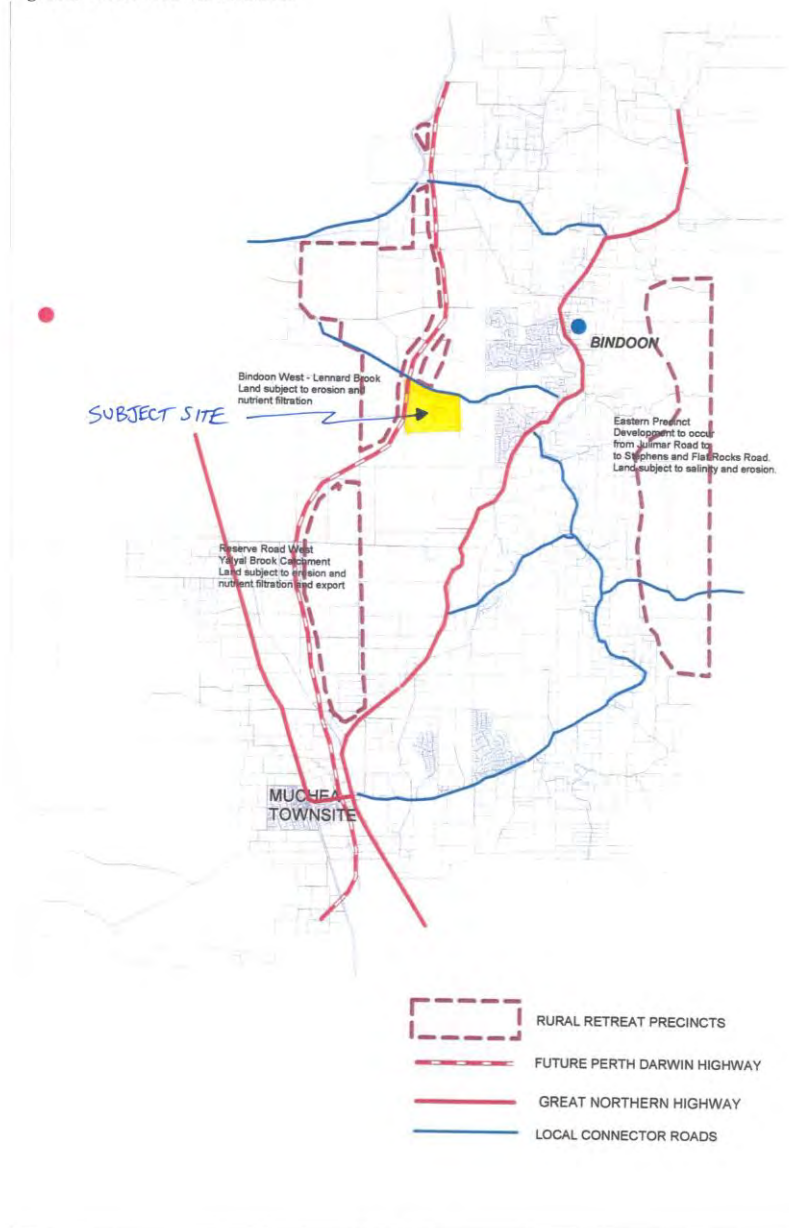
FIGURE 2
CADASTRAL & AERIAL VIEW



(Source: Landgate 2015 - modified)

FIGURE 3
SURROUNDING CONTEXT

Figure 8 – Rural Retreat Precincts

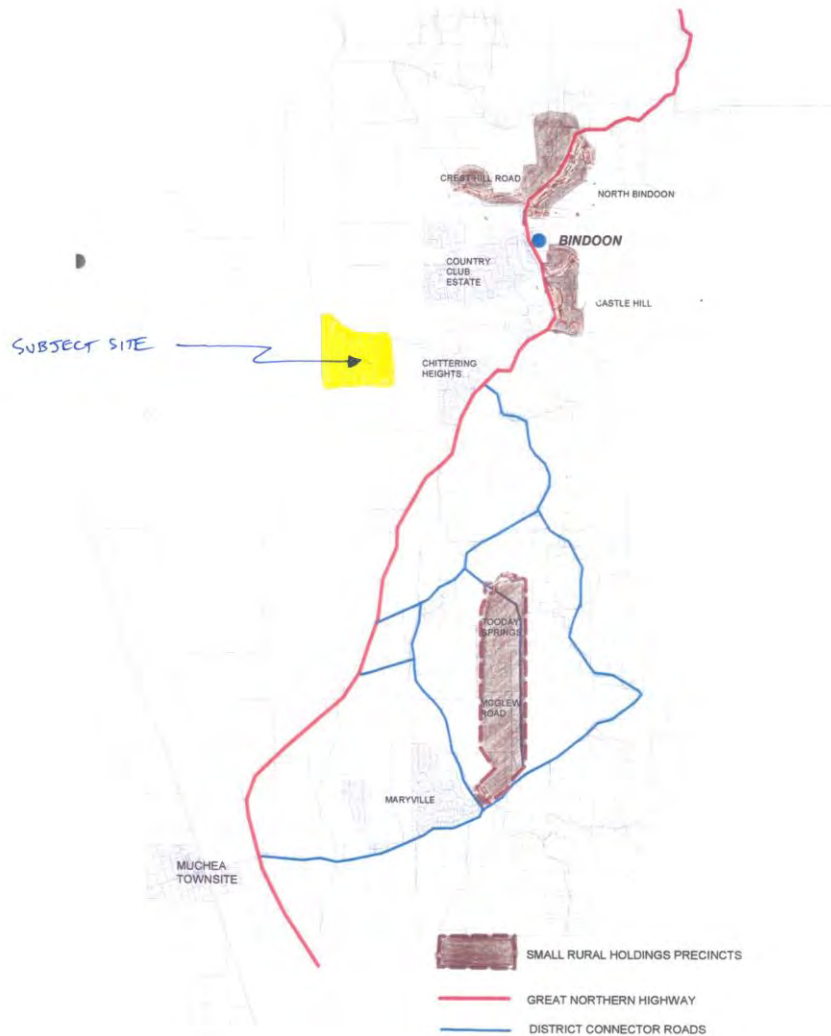


(Source: Shire of Chittering Local Planning Strategy, 2004 - modified)

FIGURE 4
LPS RURAL RETREAT PRECINCTS

Shire of Chittering – Local Planning Strategy, 2001 - 2015

Figure 7 – Small Rural Holdings Precincts



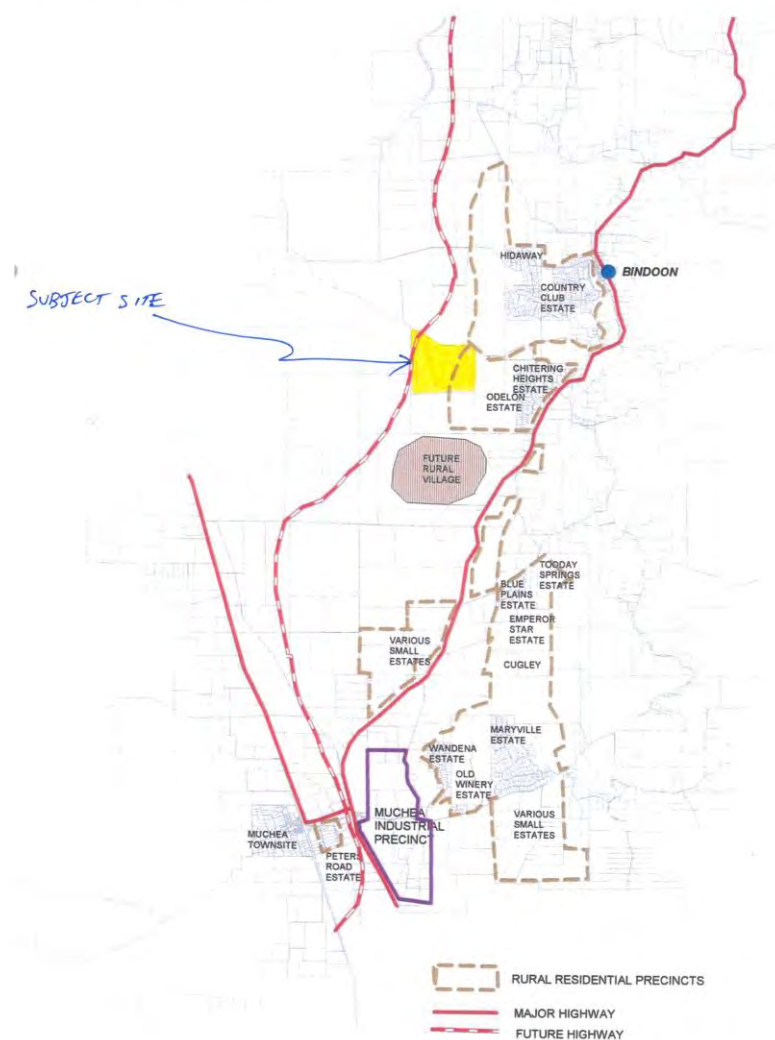
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(Source: Shire of Chittering Local Planning Strategy, 2004 - modified)

FIGURE 5
LPS RURAL SMALLHOLDINGS PRECINCTS

Shire of Chittering – Local Planning Strategy, 2001 - 2015

Figure 6 – Rural Residential Precincts



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(Source: Shire of Chittering Local Planning Strategy, 2004 - modified)

FIGURE 6
LPS RURAL RESIDENTIAL PRECINCTS

(Source: Landgate - *modified*)

FIGURE 7

ECOLOGICAL LINKAGES



FIGURE 8
RURAL RETREAT SUBDIVISION CONCEPT PLAN