

1 December 2025

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Dear Kirsten,

Plantecology Consulting was commissioned by Accendo Australia to undertake an assessment for the presence of the nationally significant ecological community 'Tuart Woodlands and Forests of the Swan Coastal Plain' (Tuart Woodlands) at 365 Mallokup Rd, Stirling Estate in the Shire of Capel (Figure 1). This report presents the results of that survey.

1 Introduction

1.1 Tuart Woodlands

Eucalyptus gomphocephala (Tuart) woodlands are mainly confined to the Quindalup and Spearwood Dune Systems of the Swan Coastal Plain, extending in a near continuous belt from north of Yanchep to the Sabina River in the Geographe region (Keighery et al. 2002). Being situated on the Swan Coastal Plain (SCP), the Tuart woodlands have been impacted by clearing and grazing (Keighery et al. 2002). Over 80% of the estimated original extent of the Tuart woodlands has been cleared (DEE 2019) and few remnants of the community are considered to be intact (Keighery et al. 2002).

1.2 Conservation

Tuart occurs in a number of Floristic Community Types (FCTs) on the SCP and is dominant in two (Gibson et al. 1994). FCT 25 'Southern *Eucalyptus gomphocephala* – *Agonis flexuosa* woodlands' occurs from north of Mandurah to the Capel area, mainly on the Spearwood Dune System. FCT 30b 'Quindalup *Eucalyptus gomphocephala* and/or *Agonis flexuosa* woodlands' is found on the Quindalup Dune System from north of Bunbury to the Geographe Bay area. Both FCT 25 and FCT 30b are listed as Priority Ecological Communities (PECs) under Western Australian state policy in the Priority 3 category (see Appendix A for category definitions).

In 2019, the Tuart woodlands were listed as a Critically Endangered Ecological Community under the Commonwealth Environment Protection and Biodiversity Conservation 1999 (EPBC Act). This includes all occurrences of Tuart that meet key diagnostic criteria (DCCEEW 2019):

- The primary defining feature is the presence of at least two living established *Eucalyptus gomphocephala* (Tuart) trees in the uppermost canopy layer, although they may co-occur with trees of other species;
- The edge of a patch is measured as being 30m from the outer edge of the canopy. Trees are considered to be part of the same patch if there is a gap of no more than 60 m between the outer edges of the canopies of adjacent Tuart trees;

- Other tree species may be present in the canopy or sub-canopy;
- An understorey of native plants is typically present, which may include grasses, herbs and shrubs, although this is often modified by disturbance;
- Patches of Tuart woodlands and forests may contain areas that vary in structural or biological complexity;
- A patch may include small areas without understorey vegetation, such as bare ground, as well as waterbodies or hardscape (e.g. roads, paths, car parks, or buildings) that do not significantly alter the overall function of the ecological community;
- If the patch is smaller than 0.5 ha, it is not part of the nationally protected ecological community;
- If the patch is at least 0.5 ha and up to 5 ha in size are presumed to be part of the nationally protected ecological community unless surveys indicate they do not meet the minimum condition required for national protection; and
- All patches of 5 ha or greater that meet the key diagnostic characteristics are part of the nationally protected ecological community.

Occurrences of Tuart woodlands that are not part of FCT 25 or FCT 30b are categorised as Priority 3 under state policy.

1.3 Buffers

A buffer zone is often applied to conservation areas to protect the integrity and ecological functioning of a patch from impacts such as damage to tree root zones, chemical spray drift, weed invasion, water extraction and runoff (DEE 2019). For the Tuart woodlands, the recommended buffer is 30m from the edge of a patch. Therefore, the Tuart woodlands ecological community and its associated buffer zone extends 60m from the outer edge of the tree canopy.

1.4 Impact Assessment

Indicators to be used when assessing the impacts of proposed actions on the Tuart woodlands include (DCCEEW 2019):

- Large size or large area to boundary ratio;
- Recruitment of key native species or the presence of a range of age cohorts;
- Quality as faunal habitat;
- The presence of important species or unique combinations of species;
- High native species richness;
- Presence of conservation-listed species;
- Presence of cryptogams, soil crust, leaf litter or proteaceous root mats that indicate low disturbance.

1.5 Existing Environment

The property at 365 Mallokup Rd, Stirling Estate is bordered by other agricultural properties on the northern side and by the Tuart Forest National Park on the southern side (Figure 1). The property is currently used for agricultural grazing and, as such, the pastured areas have been

‘parkland cleared’. Apart from paddock trees of mainly Tuart and Peppermint (*Agonis flexuosa*), the original native flora has been entirely replaced by pasture grasses and other exotics (Plates 1-5).

Current mapping for the Tuart woodlands extends from the adjacent Tuart Forest National Park and across the southern portion of the property (Figure 2). The condition rating for this patch of the Tuart woodlands is ‘high disturbance’, which is consistent with the current agricultural land use.

2 Methods

The field survey was conducted by a botanist from Plantecology Consulting on the 9th December 2022. The site was traversed on foot and the location of each individual *Eucalyptus gomphocephala* over 15cm Diameter at Breast Height (DBH) was recorded. Trees of other species were also recorded to distinguish the boundary of the Tuart woodlands on the prepared maps. An assessment of the vegetation condition throughout the site was also made.

3 Results

70 individual *Eucalyptus gomphocephala* trees were recorded within the property (Figure 3). These were scattered throughout the paddock areas and extended the presence of the Tuart woodlands from the adjacent Tuart Forest National Park. *Agonis flexuosa* was also scattered throughout the property, with other trees present including *Melaleuca raphiophylla*, planted exotic eucalypts and *Pinus pinaster*. One isolated dead stag of *Eucalyptus gomphocephala* is situated in the centre of the property and is over 60m from any other *Eucalyptus gomphocephala* individual. This tree does not form part of the Tuart woodlands ecological community.

The total area of the Tuart woodland within the property is 14.95 ha, and all stands are in a ‘Poor’ condition with no native understorey (Plates 1:5). The largest stand is 10.96 ha and would therefore meet the criteria for inclusion in the Tuart woodlands regardless of condition. However, all occurrences of the Tuart woodlands within the property are extensions of the patch within the Tuart Forest National Park, and therefore are part of the same community.

Adjusting the mapping for the extent of the Tuart woodlands within the property to include the results of this survey increases the mapped area in the north of the property and decreases it in the southern section (Figure 4). However, much of the area removed from the existing mapped extent would still be included in the buffer zone for the Tuart woodlands.

4 Discussion

The patches of Tuart woodland within the property are contiguous with the patch mapped within the adjacent Tuart Forest National Park and therefore meet the criteria for inclusion in the Tuart Woodlands and Forests of the Swan Coastal Plain ecological community. Although these patches are in 'Poor' condition themselves, this does not exclude them from inclusion within the tuart woodlands, as a single patch may have a range of conditions and native species richness (DCCEEW 2019).

When assessing potential impacts of any proposed development within the property, the main factors would be as potential fauna habitat and any change in the area to boundary ratio. The tuart woodlands within the property:

- present little prospect for the recruitment of native plant species;
- the trees are all mature and do not represent a range of ages;
- do not contain any rare or important species or groups of species;
- have no native species richness;
- no threatened species are present; and
- no cryptogams, soil crust and leaf litter habitats or intact proteaceous root mats are present.

The mature trees within the property may present faunal habitat but an assessment of those values are outside the scope of this survey. Any proposed impacts on the Tuart woodlands within the property will need to consider alterations to the area to boundary ratio of the total patch.

5 Conclusion

In summary, the Tuart woodlands within the property form part of a patch of the Tuart Woodlands and Forests of the Swan Coastal Plain ecological community along with that of the adjacent Tuart Forest National Park.

Should you require any further information or have any other queries, please feel free to contact me.

Sincerely yours,



Dr. Shane Chalwell

Plantecology Consulting

6 References

- DCCEEW (2019) Approved Conservation Advice (incorporating listing advice) for the Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community, Department of Climate Change, Energy, the Environment and Water, Canberra.
- DEE (2019) Tuart Woodlands and Forests of the Swan Coastal Plain: A Nationally Significant Ecological Community, Department of Environment and Energy, Commonwealth of Australia, Canberra.
- Keighery, B.J., Keighery, G.J. and Shepherd, D. (2002) The Distribution and Conservation of Tuart and the Community with which it lives, in Keighery BJ and Longman VM (Eds) *Tuart (Eucalyptus gomphocephala) and Tuart Communities*. Perth Branch Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.



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Plates



Plate 1: View of understorey at MP01. Condition is rated as 'Poor' with no native species present.



Plate 2: View of understorey at MP02. Condition is rated as 'Poor' with no native species present.



Plate 3: View of understorey at MP03. Condition is rated as 'Poor' with no native species present.



Plate 4: View of understorey at MP04. Condition is rated as 'Poor' with no native species present.

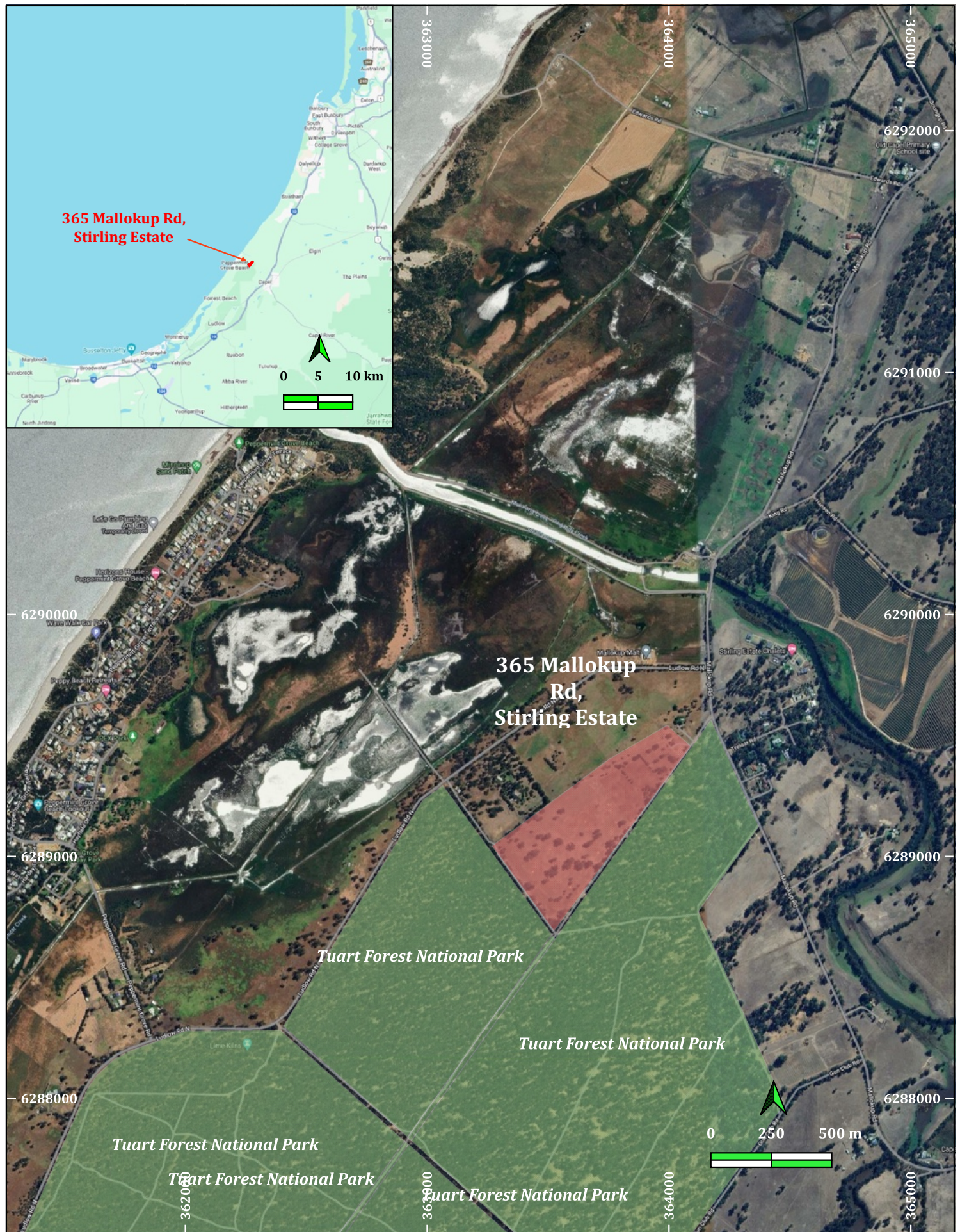


Plate 5: View of understorey at MP05. Condition is rated as 'Poor' with no native species present.



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Figures

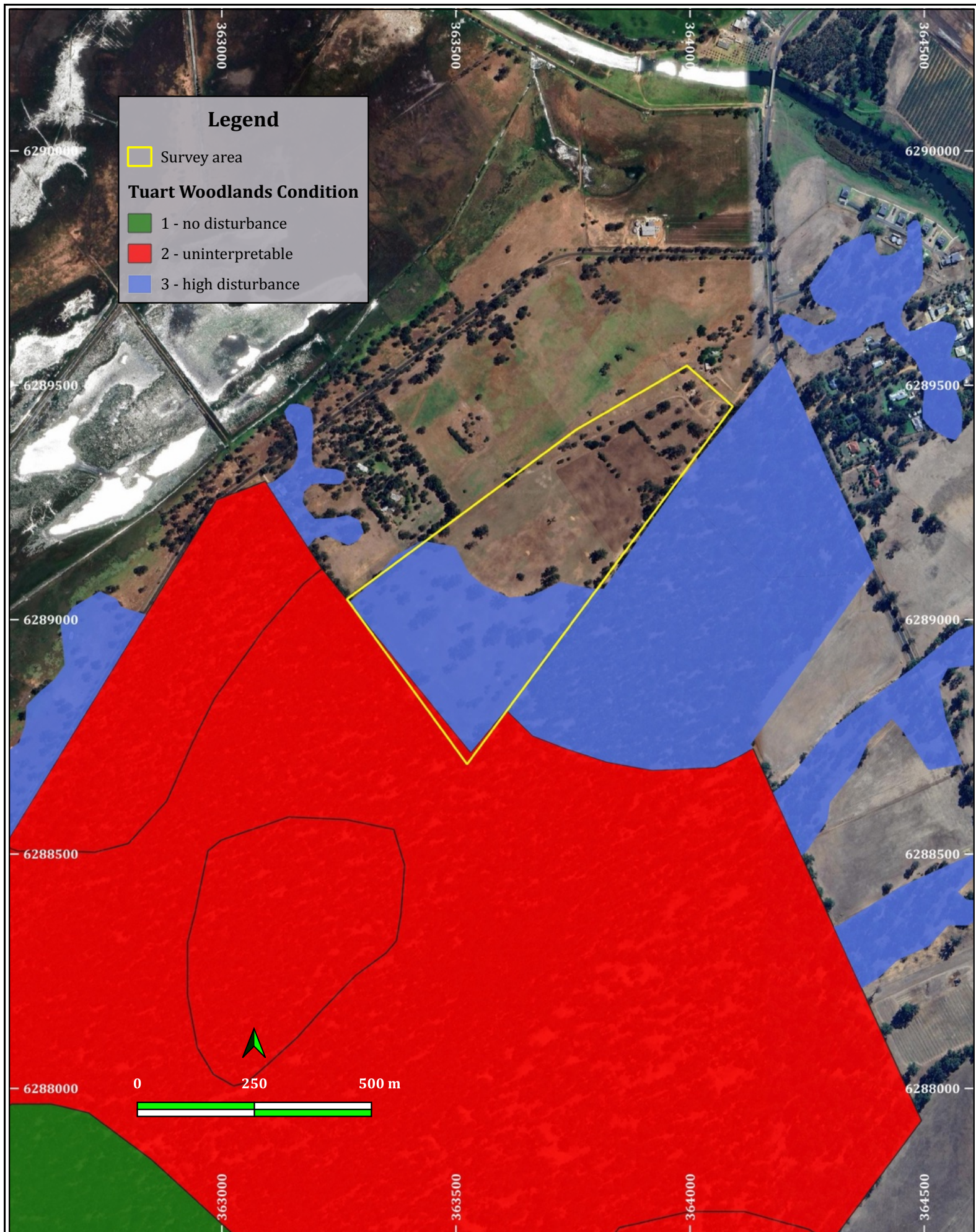


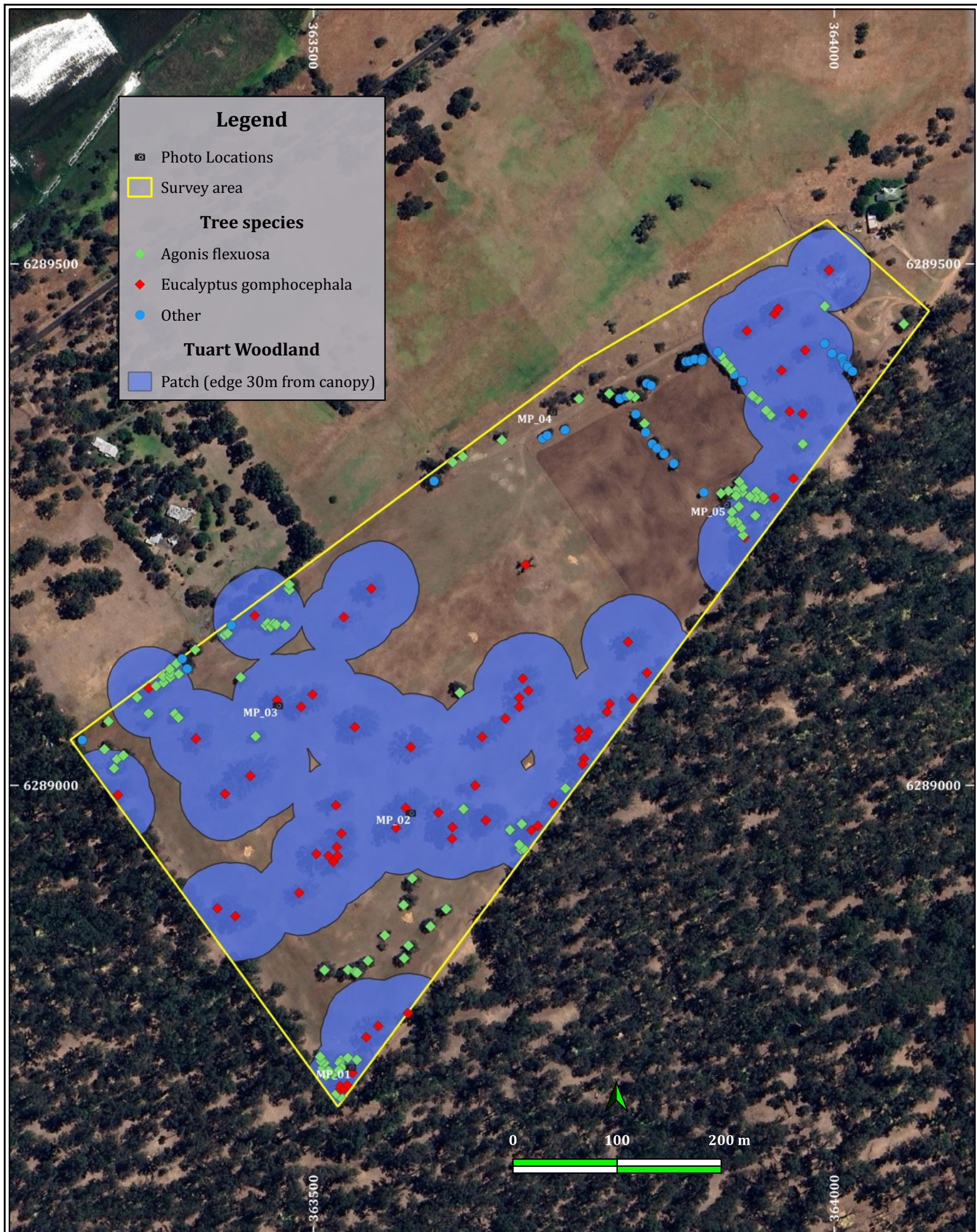
50 New Cross Rd Kingsley WA 6026

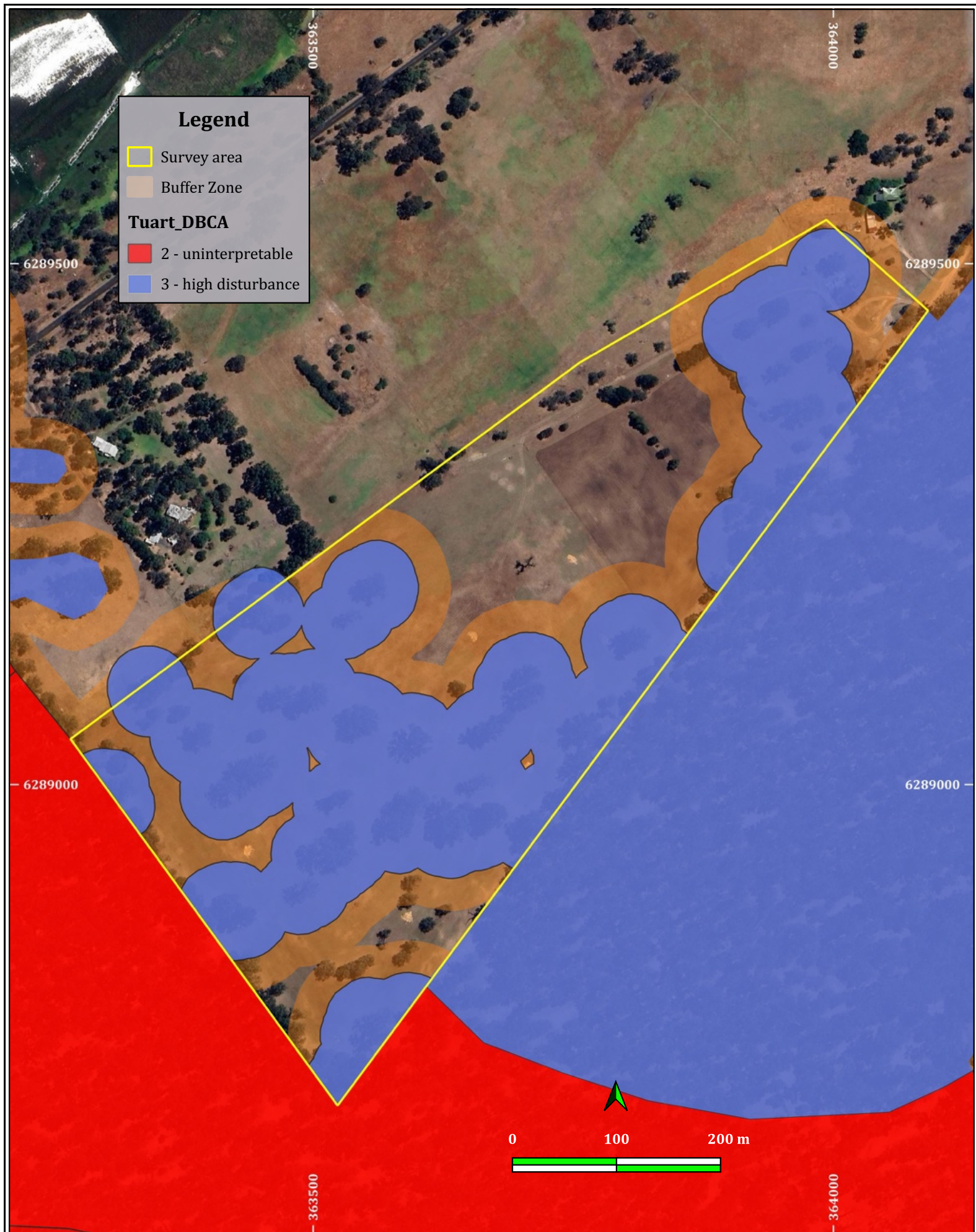
Scale: 1:20 000
 Basemap Source: Google Hybrid
 Datum: GDA 2020
 Projection: EPSG 7850

Client: Accendo Australia
 Project: Stirling Estate Tuart Survey
 Location: 365 Mallokup Rd, Stirling Estate
 Author: S.T.S. Chalwell
 Drawn: S.T.S. Chalwell

**Figure 1:
 Locality Plan**









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Appendix A

Conservation codes for Threatened and Priority Communities and their definitions for flora within Western Australia.

CONSERVATION CATEGORY DEFINITIONS

for Western Australian Ecological Communities

GENERAL DEFINITIONS

An **ecological community** is a naturally occurring assemblage of organisms that occurs in a particular habitat, as defined in the *Biodiversity Conservation Act 2016* (BC Act). Ecological communities may comprise various life forms including plants, animals and microorganisms.

Note: The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community** (TEC) means an ecological community that is listed under section 27(1) of the BC Act as a critically endangered, endangered or vulnerable ecological community, or is a rediscovered ecological community to be regarded as a threatened ecological community under section 33 of the BC Act.

An **assemblage** is a defined group of biological entities.

Habitat, as defined in the BC Act, means the biophysical medium or media —

- a) occupied (continuously, periodically or occasionally) by an organism or group of organisms, or
- b) once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced.

An **occurrence** is a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres with, for example: a different ecological community, a sealed road, a building, a water body (for terrestrial communities), or a terrestrial body (for aquatic communities). There is no minimum size of an occurrence of a threatened or priority ecological community. By ensuring that every discrete occurrence is recognised and recorded, future changes in status can be readily monitored.

Adequately surveyed is defined as an ecological community that has been searched for thoroughly in most likely habitats, by relevant experts.

Community structure is defined as the spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage. For example, the vegetation structure (e.g., *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs) or the trophic structure in a faunal assemblage (e.g., dominance by feeders on detritus as distinct from feeders on live plants).

To **modify** an occurrence of an ecological community, as defined in section 44 of the BC Act, means to take action that results in —

- (a) the modification of the occurrence of the threatened ecological community to such an extent that the occurrence is unlikely to recover —
 - (i) its species composition or structure; or
 - (ii) its species composition and structure; or
- (b) the destruction of the occurrence of the threatened ecological community.

Destruction of an occurrence of an ecological community means modification such that reestablishment of ecological processes, species composition or community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention.

Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Refer to the document [Guidance note – Modification of an occurrence of a threatened ecological community](#) for more information on what constitutes modification and how to determine whether an action is likely to modify an occurrence of a threatened ecological community.

Threatening process means a process that threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community, as defined under the BC Act. Examples of some of the continuing threatening processes in Western Australia include: vegetation clearance; competition and land degradation by introduced fauna; dieback caused by the root-rot fungus (*Phytophthora cinnamomi*); competition and displacement of native plants by introduced flora; hydrological changes (declining groundwater levels); drying climate, fire regimes that cause declines in biodiversity; direct human exploitation and disturbance of ecological communities.

Restoration is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

Rehabilitation is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

LISTED ECOLOGICAL COMMUNITIES

Assessment of the conservation status of ecological communities is carried out in accordance with the BC Act listing criteria and the requirements of [Ministerial Guideline Number 1](#) and [Ministerial Guideline Number 4](#) that adopt the use of the International Union for Conservation of Nature (IUCN) [Red List of Ecosystems Categories and Criteria](#).

CO Collapsed ecological communities

An ecological community listed by order of the Minister as collapsed under section 31(1) of the BC Act. As determined by criteria set out in section 32 of the BC Act, an ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time —

- (a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or
- (b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover —
 - (i) its species composition or structure; or
 - (ii) its species composition and structure.

CR Critically endangered ecological communities

A threatened ecological community listed in the category of critically endangered under section 27(1)(a) of the BC Act, as determined by criteria set out in section 28 of the BC Act and the ministerial guidelines. A critically endangered ecological community faces an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- 'Assemblages of the organic springs and mound springs of the Mandora Marsh area' is listed as a critically endangered threatened ecological community under the *Biodiversity Conservation Act 2016*.
- 'Assemblages of the organic springs and mound springs of the Mandora Marsh area' is listed as critically endangered under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table – column heading: BC Act; row text: CR.

EN Endangered ecological communities

A threatened ecological community listed in the category of endangered ecological community under section 27(1)(b) of the BC Act, as determined by criteria set out in section 29 of the BC Act and the ministerial guidelines. A threatened ecological community faces a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- 'Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson *et al.* (1994))' is listed as an endangered threatened ecological community under the *Biodiversity Conservation Act 2016*.
- 'Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson *et al.* (1994))' is listed as endangered under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table – column heading: BC Act; row text: EN.

VU Vulnerable ecological communities

A threatened ecological community listed in the category of vulnerable ecological community under section 27(1)(c) of the BC Act, as determined by criteria set out in section 30 of the BC Act and the ministerial guidelines. A vulnerable ecological community faces a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- 'Calothamnus graniticus subsp. graniticus heaths on south west coastal granites' is listed as a vulnerable threatened ecological community under the *Biodiversity Conservation Act 2016*.
- 'Calothamnus graniticus subsp. graniticus heaths on south west coastal granites' is listed as vulnerable under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table – column heading: BC Act; row text: VU.

PRIORITY ECOLOGICAL COMMUNITIES

Priority is not a listing category under the BC Act. The Priority Ecological Communities list is maintained by the department and is published on the department's website.

All fauna and flora that may be present in an ecological community are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when these species occur in an ecological community that is not listed as threatened, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Possible threatened ecological communities that do not meet survey criteria or are not adequately defined to enable listing are added to the department's [Priority Ecological Communities for Western Australia list](#) under priority 1, 2 or 3. Ecological communities that are adequately known and not threatened but rare, near threatened, or have recently been removed from the threatened list are placed in priority 4. Conservation dependent ecological communities are placed in priority 5.

P1 Priority 1: Poorly known ecological communities – very few occurrences, very restricted distribution

Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g., within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Examples of use:

- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as a Priority 1 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as Priority 1 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P1.

P2 Priority 2: Poorly known ecological communities – few occurrences, restricted distribution

Communities that are known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Examples of use:

- 'Aquatic invertebrate communities of peat swamps' is listed as a Priority 2 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Aquatic invertebrate communities of peat swamps' is listed as Priority 2 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P2.

P3 Priority 3: Poorly known ecological communities – inadequately surveyed or not well defined

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them. This category includes three sub-categories:

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation.
- (ii) Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years).
- (iii) Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change, etc.

Examples of use:

- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as a Priority 3(iii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as Priority 3(iii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P3(iii).

P4 Priority 4: Adequately known ecological communities – rare, near threatened, or recently removed from the threatened list

Ecological communities that are adequately known and either rare but not threatened, near threatened, or have recently been removed from the threatened list. These communities require regular monitoring.

- (i) Rare: ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
- (ii) Near threatened: ecological communities that are considered to have been adequately surveyed and that do not qualify as conservation dependent, but that are close to qualifying for a higher threat category.
- (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Examples of use:

- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as a Priority 4(ii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as Priority 4(ii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table: column heading: DBCA, row text: P4(ii).

P5 Priority 5: Conservation dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Categories of Threatened Communities pursuant to the Environment Protection and Biodiversity Conservation Act 1999

Category	Definition
Critically Endangered	(1) An ecological community is eligible to be included in the <i>critically endangered</i> category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	(2) An ecological community is eligible to be included in the <i>endangered</i> category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	(3) An ecological community is eligible to be included in the <i>vulnerable</i> category at a particular time if, at that time: (a) it is not critically endangered nor endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.