Reconnaissance and Targeted Flora and Vegetation Survey

Wonnerup South Road (1.40-8.88 SLK) Upgrade

Prepared for the City of Busselton
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Executive Summary

- A Reconnaissance and Targeted Flora and Vegetation Survey was undertaken of road reserve vegetation along approximately 7.4 km of the Vasse Wonnerup Road (1.40-8.88 SLK) , in the City of Busselton.
- The Survey was conducted on the 3 September 2019.
- The total area surveyed was approximately 16.2 hectares in size and comprised of approximately 1.13 ha of native vegetation.
- Ninety-seven (97) vascular flora taxa were identified within the Survey Area, 39 of these being naturalised non-native or planted species.
- One plant of the Priority 4 listed *Calothamnus quadrifidus* subsp. *teretifolius* was found within the Survey Area.
- Two species of declared pest plants: *Zantedeschia aethiopica (*Arum-lily) and *Asparagus asparagoides* (Bridal creeper) were found in the Survey Area.
- Five vegetation units were identified in the Survey Area.
- Degraded and better condition vegetation in Unit A resembles the State protected "Southern *Corymbia calophylla* woodlands on heavy soils" threatened ecological community (TEC). The total area of this unit is 2.89 ha, 0.05 ha is in Good condition and 0.68 ha is in Degraded condition the remainder is Completely Degraded.
- Degraded and better condition vegetation in Unit C resembles the State protected ""Southern wet shrublands" TEC". The total area of this unit is 0.10 ha, 0.04 ha is in Good condition, the remainder is Completely Degraded.
- Greater than 92% of site is classified as completely degraded, mainly due to historical clearing and impacts such as weed invasion from adjacent farmlands.
- The survey area comprises of one vegetation complex; the Abba Complex which has less than 10% of its Statewide pre-European extent remaining.

A regional ecological axis line occurs to the west of the Survey Area. This axis line is associated with the Sabina River One and is 150 m from the eastern survey boundary at its closet point. Vegetation within Survey Area been assigned proximity value ratings of "1c, 2a, 2b and 3b".

- The boundary of an Environmentally Sensitive Area (ESA) occurs within the southern boundary of the Survey Area.

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Statement of Limitations

Reliance on Data

In the preparation of this report, Ecoedge has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Unless stated otherwise in the report, Ecoedge has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Ecoedge will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to Ecoedge.

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1 Introduction

Ecoedge was engaged by the City of Busselton in April 2019 to undertake a Reconnaissance and Targeted Flora and Vegetation Survey of road reserve vegetation along a 7.4 km section of Wonnerup South Road (SLK 1.40 to 8.88 km) (**Figure 1** and **Figure 2**).

The City of Busselton will be upgrading this section of the road and require the survey to inform the planning for the road works and for any environmental approvals that may be required. The works will involve lifting and widening the road formation and culvert / bridge replacement.

The flora and vegetation survey was undertaken on the 3 September 2019. Its methodology was aligned with State and Commonwealth requirements for the bioregion and species and communities present, and was consistent with State guidelines and Technical Guides (including Environmental Protection Authority (EPA) Technical Guidance (2016)) and Commonwealth survey guidelines for any relevant threatened species.

The total area surveyed was approximately 16.2 hectares in size and comprised of approximately 1.13 hectares (ha) of native vegetation.

This report compiles findings of the survey.

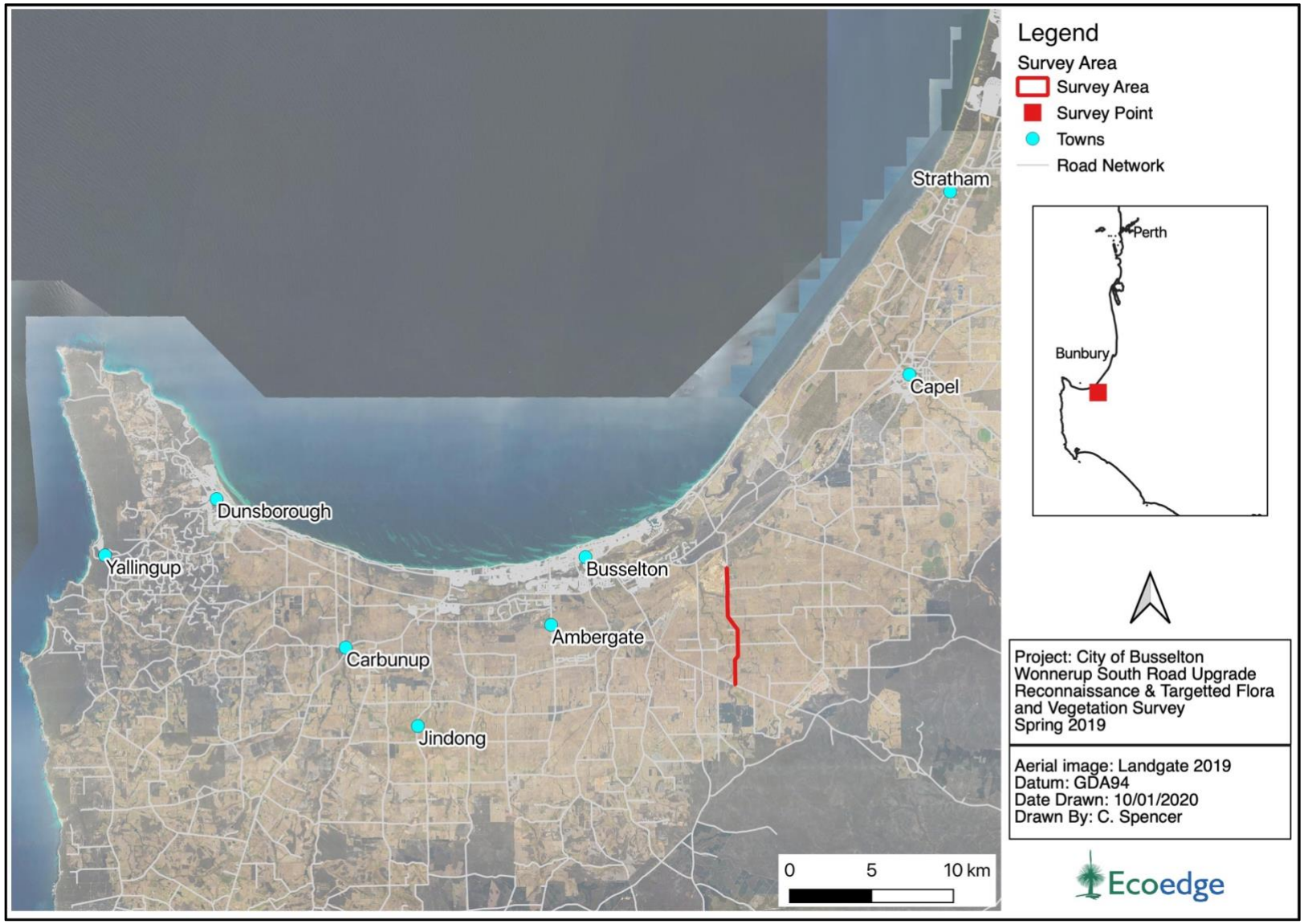

Figure 1. Aerial photograph showing the location of the Survey Area.

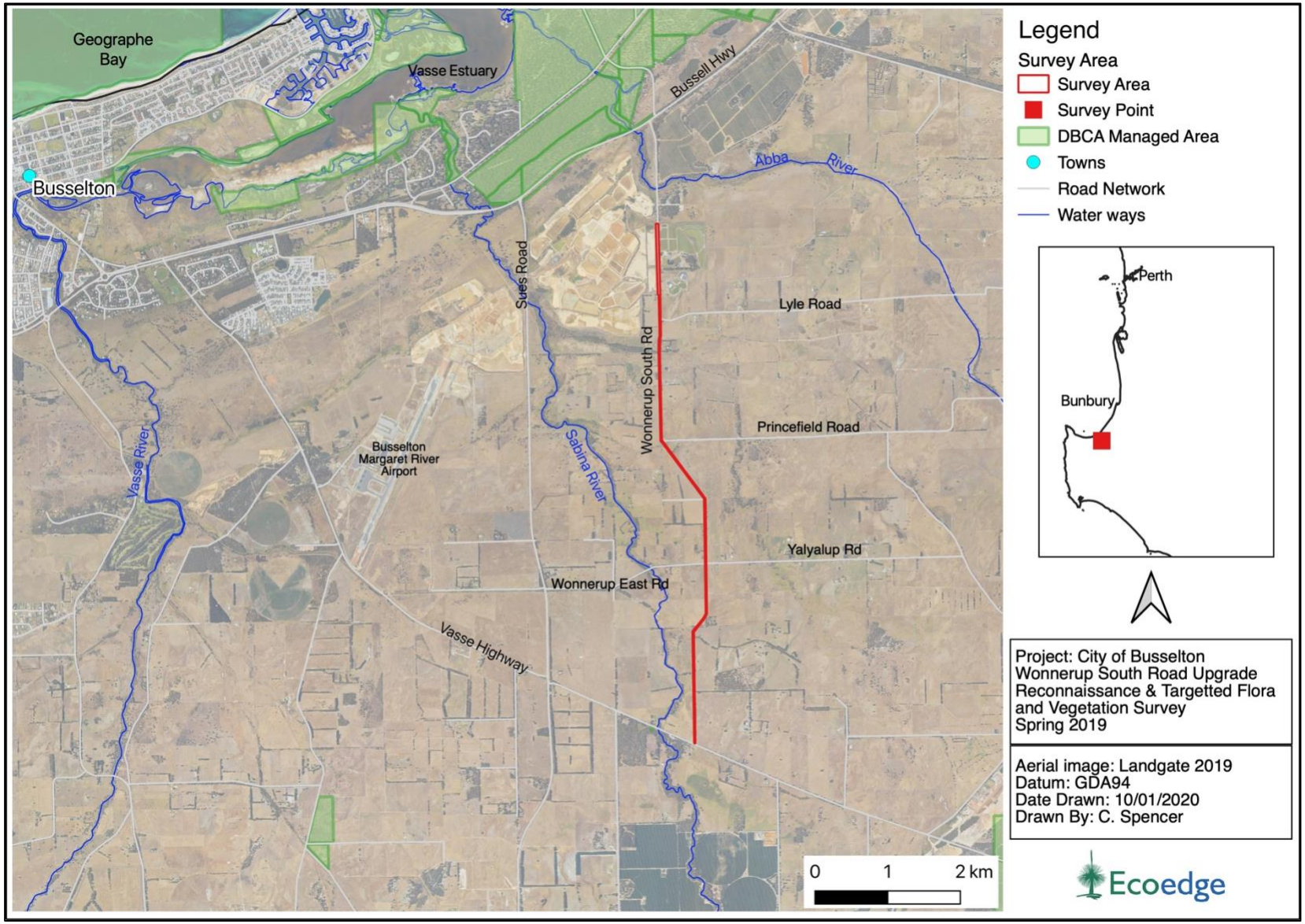

Figure 2. The Survey Area in context of surrounding land uses

1.1 Scope

The scope of the survey was to determine the presence of Threatened and Priority flora and vegetation communities, and determine the conservation value of the native flora and vegetation, specifically:

Desktop Assessment

- Identify flora and vegetation biological features and constraints, which may be in, or nearby the project area, including presentation and review of data from the Department of the Environment and Energy's (DotEE's) Protected Matters Search Tool, the Department of Biodiversity, Conservation and Attractions' (DCBA's) NatureMap and FloraBase, and paid database searches from DBCA's Species & Communities Branch;
- Identify significant flora, vegetation/ecological communities values and potential sensitivity to impact;
- Identify broad pre-European vegetation Webb *et al.* (2016) vegetation complexes for southwest and Swan Coastal Plain areas.

Field Survey

- Conduct a field survey to verify / ground truth the desktop assessment findings through targeted and reconnaissance survey (refer to relevant Environmental Protection Authority (EPA) published flora and fauna Technical Guides & guidance for Matters of National Environmental Significance (MNES) species where available.
- Undertake vegetation community/type mapping to a scale appropriate for the bioregion and described according to the National Vegetation Information System (NVIS) structure and floristics.
- Assess the survey area's plant species diversity, composition, structure and weed cover;
- Undertake vegetation condition mapping using EPA (2016) condition scale;
- Targeted survey for rare and priority flora based on desktop likelihood of occurrence and habitat availability. When populations are identified, survey and map extent of populations to determine number and habitat area for each population. Shapefiles shall be provided with point data indicating the number of plants identified at each point. If more than 100, the edges of the population boundary can be mapped and provided as a shapefile. If the population extends outside the survey area, the survey will map the extent of the population.
- Provide number of individual plants and total number of populations in WA, for any threatened and priority flora, where such data is available. All threatened flora to be mapped with a GPS;

- Identify location of any Weeds of National Significance or Declared Pests

Reporting

- Provide a concise report on the findings of the biological survey.
- Provide environmental constraints mapping using GIS mapping software (e.g. ArcMap) for flora, ecological communities, watercourse, wetlands, ESAs etc.;
- Assess all biological aspects likely to require referral of the project to the EPA and or the Department of Water and Environment Regulation (DWER);
- Assess Matters of National Environmental Significance (MNES) and indicate whether potential impacts on MNES as protected under the EPBC Act are likely to require referral of the project to the Commonwealth DotEE.
- Provide justification of decision as to whether referral to DotEE is likely to be required. Ensure to reference relevant Commonwealth significant impact guidelines;
- Determine the legislative context of environmental aspects required for the assessment;

2 Desktop Assessment

2.1 Location and Biogeographic Region

The Survey Area is situated within the Swan Coastal Plain (SWA02) sub-region of the Swan Coastal Plain biogeographic region, as defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Commonwealth of Australia, 2016). It covers approximately 16.2 ha and is situated approximately 10 kilometres (km) east and south east of the centre of Busselton within the City of Busselton (**Figure 1**).

It comprises of a narrow corridor of mixed of native and introduced vegetation along both sides of the Wonnerup South road. The Survey Area covers approximately 7.4 km of the road with its southern boundary starting at the Vasse Highway intersection. It occurs within a predominantly agricultural context (**Figure 2**).

2.2 Geology

Within the Swan Coastal Plain landform, the Survey Area is situated on the Abba Plains land system (213Ab). The Abba Plain is a level to gently undulating plain formed on alluvium. It is situated on the southern Swan Coastal Plain and extends for about 10 km inland between the Ludlow Plain system to the north and the foot of the Blackwood Plateau system to the south. It lies approximately 10-40 m above sea level and contains extensive areas of poor drainage (Tille and Lantzke, 1990).

Soil-landscape systems have been further divided into subsystems, and within these into soil phases.

Within Abba Plains land system, the Survey Area is situated within the Abba subsystem and comprises of three distinct soil phases which are described in **Table 1** and mapped in **Figure 3**.

Table 1. Soil Mapping Units occurring within the Survey Area (Tille and Lantszke, 1990).

System	Soil Phase	Description
213Ab Abba	213AbABw	Winter wet flats and slight depressions with sandy grey brown duplex (Abba) and gradational (Busselton) soils.
	213AbAB1	Flats and low rises with sandy grey brown duplex (Abba) and gradational (Busselton) soils.
	213AbBvw	Small narrow swampy depressions along drainage lines. Alluvial soils.

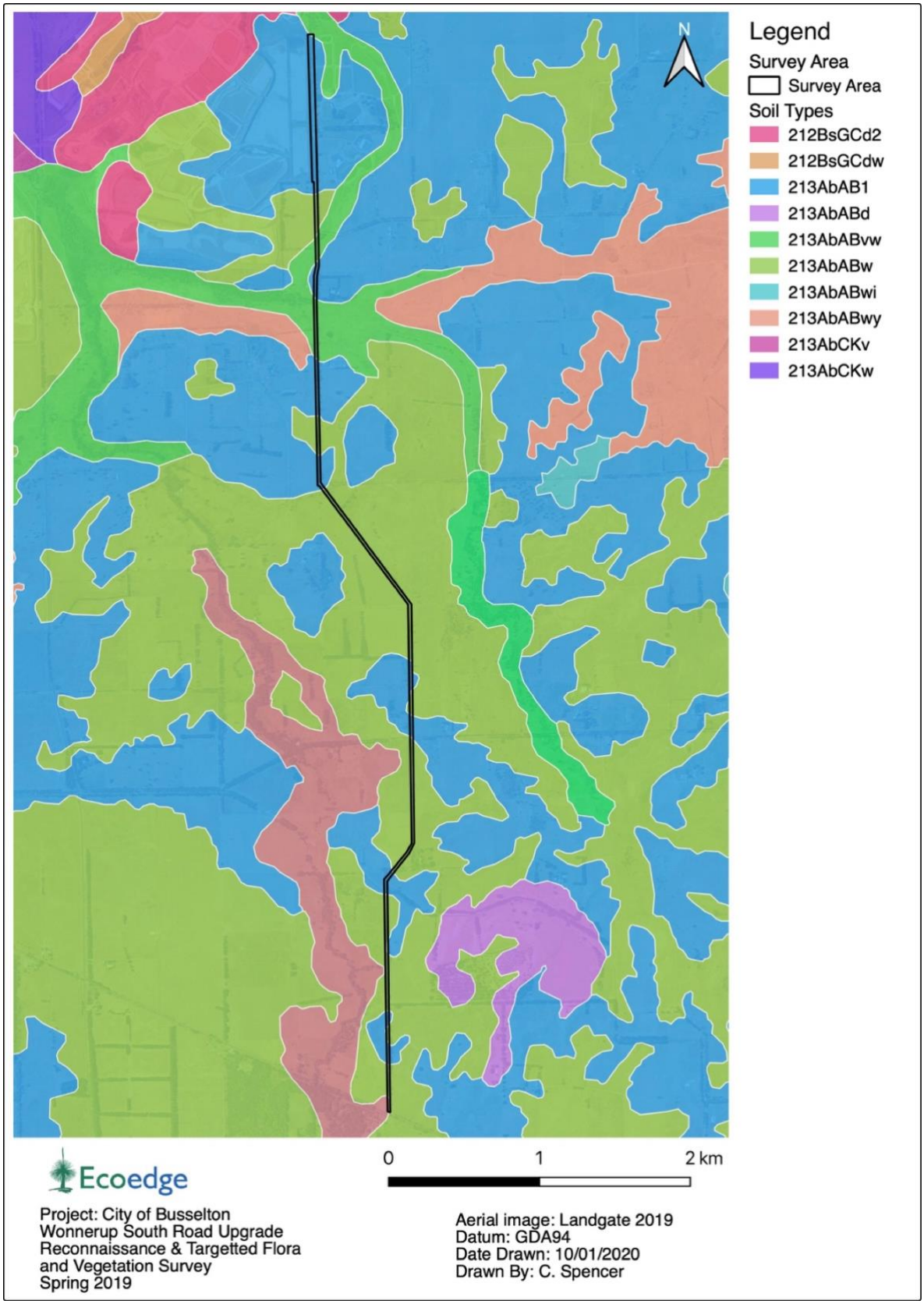

Figure 3. Soil phases mapped within the Survey Area (Tille and Lantszke, 1990).

2.3 Vegetation Description according to pre-European Mapping Datasets

The Survey Area covers approximately 16.2 ha and contains approximately 1.13 ha of remnant native vegetation classed in 'degraded' or better condition.

2.3.1 Vegetation Complexes

In 2016, the Department of Parks and Wildlife (DPaW) revised the vegetation mapping datasets for the Darling Scarp and Plateau Regional Forest Agreement (RFA) mapping of Mattiske and Havel (1998) and the Swan Coastal Plain mapping of Heddle *et al.* (1980). The purpose of the revision was to fill data gaps and improve alignment and correlation between the two datasets (Webb, *et al.* 2016)[1].

One Vegetation Complexes occur within the Survey Area, according to the 1:250,000 mapping of Vegetation Complexes in the Swan Coastal Plain of Western Australia (Heddle *et al.,* 1980) as updated by Webb *et al*. (2016). This is described in **Table 2** and mapped in
.

Table 2. Vegetation complexes mapped for the Survey Area (Webb *et al*., 2016).

Vegetation Complex	Description
Abba Complex (30)	A mixture of open forest of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - Banksia species and woodland of *Corymbia calophylla* (Marri) with minor occurrences of *Corymbia haematoxylon* (Mountain Marri). Woodland of *Eucalyptus rudis* (Flooded Gum) - Melaleuca species along creeks and on flood plains.

[1] At the time of preparation of this report, DBCA was transitioning to the use of a revised mapping dataset for both the Swan Coastal Plain and Southern Jarrah Forest that filled data gaps and addressed differences in the Swan Coastal Plain mapping of Heddle et al. (1980) and the Jarrah Forest mapping of Mattiske and Havel (1988) (Webb, et al. 2016).

2.3.2 Assessment of Remaining Extent against Pre-European Extent

In 2001, the Commonwealth of Australia stated National Targets and Objectives for Biodiversity Conservation, which recognised that the retention of 30%, or more, of the pre-clearing extent of each ecological community was necessary if Australia's biological diversity was to be protected (Environment Australia, 2001).

In its report on the Statewide Vegetation Statistics incorporating the Comprehensive, Adequate and Representative (CAR) Reserve Analysis, the Government of Western Australia provides information on the pre-European and current extent of the ecological communities of Western Australia and reports on the status of the CAR reserve system for WA (Government of Western Australia, 2018). This system is also based on the National retention targets of 30% overall. Only reserves managed by DBCA under the *Conservation and Land Management Act 1984* are considered for inclusion in the "CAR Reserve Analysis".

Table 3 presents the vegetation statistics as they relate to the percentage remaining of the Abba vegetation complex identified within the Survey Area.

The red, orange and yellow shading in the tables indicates the status of the Commonwealth 30% retention target.

Colour indicator	>30%	<30%	<10%

Table 3. Vegetation complexes mapped within the Survey Area with regard to the Commonwealth retention targets (Government of Western Australia, 2018).

Vegetation Complex	Pre-European (ha)	Current Extent (ha)	% Remaining	% remaining in DBCA reserves
Abba Complex (30)				
Swan Coastal Plain	50,892.78	3,326.20	6.54	0.36

2.4 Threatened and Priority Ecological Communities

Ecological communities are defined by Western Australia's DBCA (previously DPaW and the Department of Environment and Conservation (DEC)) as "...naturally occurring biological assemblages that occur in a particular type of habitat. They are the sum of species within an ecosystem and, as a whole, they provide many of the processes which support specific ecosystems and provide ecological services." (DEC, 2013).

Under Section 27 of the *Biodiversity Conservation Act 2016* (BC Act) the Western Australian Minister for Environment may list communities that are considered to be under significant threat as a Threatened ecological communities (TEC). These TECs can be listed under one of three conservation categories; critically endangered (CR), endangered (EN), vulnerable (V). The BC Act also provides for listing communities as collapsed ecological communities.

Possible TECs that do not meet survey criteria are added to the DBCA's Priority ecological community lists under Priorities 1, 2 or 3 (referred to as P1, P2, P3). Ecological communities 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, are placed in Priority 4 (P4). These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in Priority 5 (P5) (DEC, 2013).

The current listing of Threatened and Priority ecological communities is specified in DBCA (2018a, 2019a). The conservation categories for these Threatened and Priority ecological communities are defined in **Appendix 1.**

Threatened ecological communities can also be listed under the Commonwealth *Environment and Biodiversity Conservation Act 1999* (EPBC Act) (Department of the Environment and Energy (DotEE), 2018a; Department of Environment, Water, Heritage and the Arts (DEWHA), 1999). There are three categories of TEC under the EPBC Act: Critically Endangered (CE), Endangered (E) and Vulnerable (V). These are defined in **Appendix 2** (DotEE, 2018b).

Under both the State (BC Act) and Federal Act (EPBC Act) ministerial authorisation is required where significant permanent modification to a TEC will occur.

Noting that if an occurrence of a threatened ecological community is found during a survey conducted under the auspices of the *Environmental Protection Act 1986* (EP Act) it must be mandatorily reported to the Chief Executive Officer of the DBCA under Section 49 of the BC Act.

Potentially occurring Federally listed TECs were identified from the results of a PMST search conducted for a previous survey conducted in close proximity to the current survey area (Ecoedge 2019a). This was checked against a Protected Matters Search Tool report for communities listed under the EPBC Act occurring within a 10 km radius of the Survey Area was undertaken (DotEE, 2020a, **Appendix 3**). The current DPaW and DBCA listings were consulted (DBCA, 2018a; DBCA 2019a) for potentially occurring State listed TEC and PECs. Outcomes of these searches are presented in **Table 4.** .

Table 4. Threatened and Priority ecological communities occurring within 10 km of the Survey Area (DBCA 2018a; DBCA, 2019a; DotEE, 2018a).

Community Name	Community Description	Status (WA)	Status (EPBC Act)
'Claypans of the Swan Coastal Plain' – a federally listed TEC consisting of the following four State-listed communities: 1. SCP07: Herb rich saline shrublands in clay pans (TEC) 2. SCP08: Herb rich shrublands in clay pans (TEC) 3. SCP09: Dense shrublands on clay flats (TEC) 4. SCP10a: Shrublands on dry clay flats (TEC) 5. 5. Clay pans with shrubs over herbs (PEC)		1. VU 2. VU 3. VU 4. EN 5. P1	CR
Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community		PEC (P3)	CR
SWAFCT21b - Southern *Banksia attenuata* woodlands		PEC (P3)	EN
Subtropical and Temperate Coastal Saltmarsh		PEC (P3)	VU
SWAFCT2 – Southern wet shrublands		TEC (EN)	NA
SWAFCT1b – Southern *Corymbia calophylla* woodlands on heavy soils		TEC (VU)	NA
Busselton Yate Community		PEC (P1)	NA
Vasse Blackbutt -*Eucalyptus patens* - Community (near Busselton)		PEC (P1)	NA
Eucalyptus rudis, *Corymbia calophylla* and *Agonis flexuosa* Closed Low Forest		PEC (P1)	NA
Sabina River Jarrah and Marri woodland (Whicher Scarp floristic community F1)		PEC (P1)	NA

Note: This table only includes formally recognised TECs that are known of and mapped by DBCA and are included in their database.

2.5 Threatened and Priority Flora

Species of flora and fauna are defined as having a Threatened or Priority conservation status where their extant populations are restricted geographically and or under threat of possible extinction. The DBCA recognises these threats and consequently applies regulations towards population and species protection.

Threatened extant flora species are listed under Section 19 of the BC Act and are ranked according to their level of threat using IUCN Red List categories and criteria of; critically

endangered (CR), endangered (EN), vulnerable (VU). It is an offence to "take" or damage threatened flora without Ministerial approval. Section 5 of the Act defines "to take" as "… to gather, pluck, cut, pull up, destroy, dig up, remove, harvest or damage flora by any means".

Priority flora are under consideration for future declaration as "Threatened flora", dependent on more information. Species classified as Priority One to Three (referred to as P1, P2 and P3) are in need of further survey to determine their status, while Priority Four (P4) species are adequately known rare or threatened species that require regular monitoring.

Threatened flora lists are formally reviewed on an annual basis, whilst the priority flora list is subject to a less formal ongoing review. The current listing of Threatened and Priority flora is specified in (DBCA, 2018b).

Categories of Threatened and Priority flora as defined by the BC Act are presented in **Appendix 4,** (DBCA, 2019b).

Threatened flora may also be protected under the Commonwealth EPBC Act and be listed in one of six categories; the definitions of these categories are summarised in **Appendix 5** (DotEE, 2018b).

Prior to the field survey a list of Threatened and Priority flora (TPFL) occurring within 10 km of the Survey Area was prepared from Naturemap based reports generated for previous Ecoedge surveys conducted in close proximity to the Survey Area (Ecoedge, 2019a) previous Ecoedge Survey species lists (Ecoedge, 2019a); extracts of two DBCA database searches conducted for two previous surveys conducted in close proximity to the Survey Area (DBCA, 2018c, 2019c) together with a species list prepared for the Busselton ironstone vegetation (and its vicinity) on McGibbon Track by Mr Andrew Webb of the Department of Parks and Wildlife, 2007. The results of these searches are provided in **Appendix 6**. A recent NaureMap search is provided at **Appendix 3, (**DBCA, 2020)

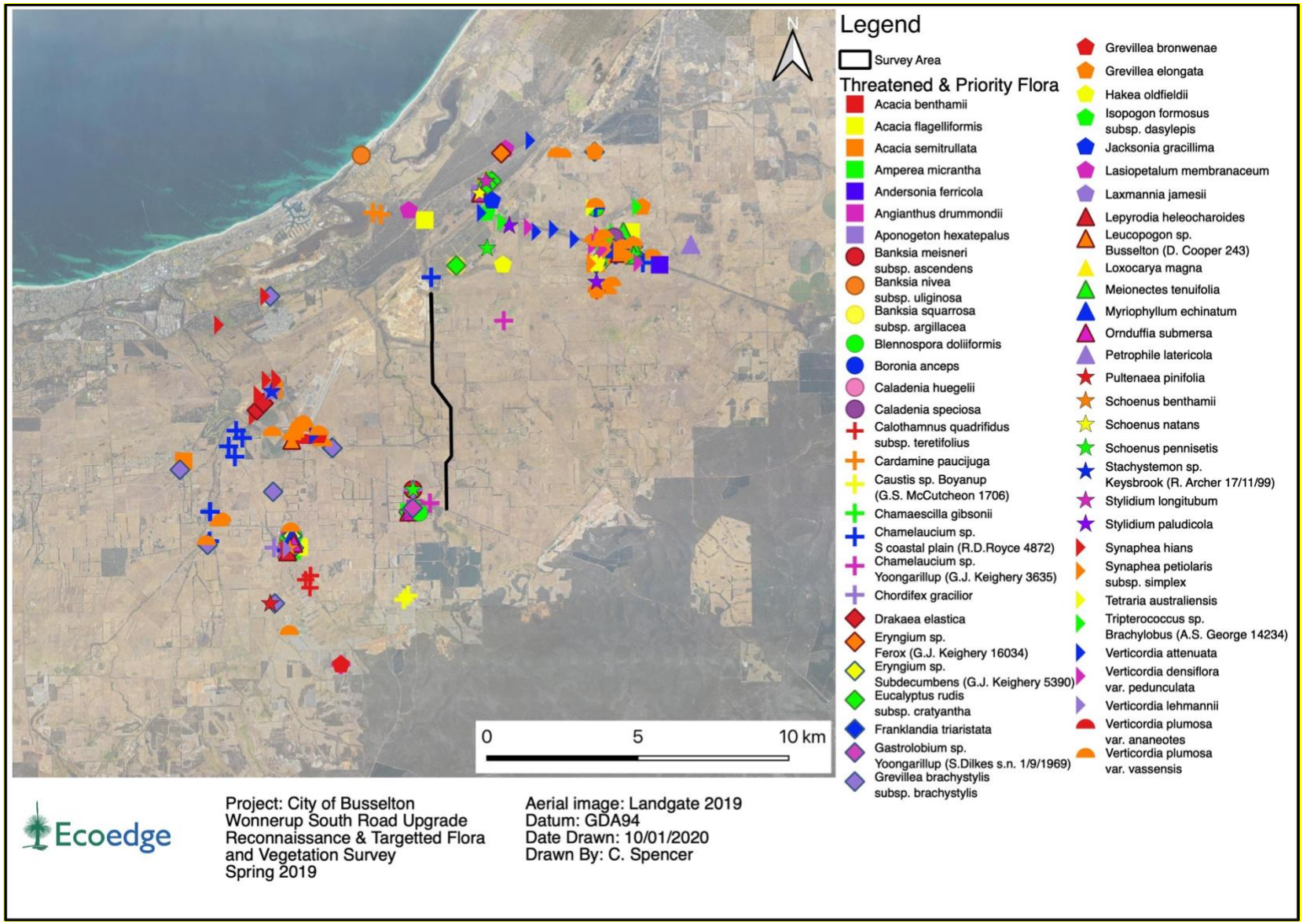

Figure 4 . Threatened and priority flora mapped within 10 km of the Survey Area (DBCA, 2018c & 2019c)

2.6 Geomorphic Wetlands

Wetlands on the Swan Coastal Plain have been classified into types using the geomorphic wetland classification system of Semeniuk & Semeniuk (1995), which is based on the characteristics of landform and water permanence, for example lakes, palusplains and damplands. These are described in **Table 5. .** The Swan Coastal Plain wetlands have also been evaluated and assigned an appropriate management category and corresponding category objective, providing guidance on the nature of the management and protection the wetland should be afforded. These categories are described in **Table 6.**

Table 5. Wetland types (adapted from Semeniuk & Semeniuk, 1995).

Management Category	Basin	Flat	Channel	Slope	Highland
Permanently inundated	Lake		River		
Seasonally inundated	Sumpland	Floodplain	Creek		
Intermittent inundation	Playa	Barlkarra	Wadi		
Seasonally waterlogged	Dampland	Palusplain	Trough	Paluslope	Palusmont

Table 6. Definitions of and objectives for the different wetland management categories (modified from Essential Environmental Services, 2005).

Management Category	Definition	Category Objective
Conservation	Wetlands with high conservation value for both natural or human use	To preserve wetland (natural) attributes and functions
Resource Enhancement	Wetlands with moderate natural and human use attributes that can be restored or enhanced	To restore wetlands through maintenance and enhancement of wetland functions and attributes
Multiple Use	Wetlands that score poorly on both natural and human use attributes	To use, develop and manage wetlands in the context of water, town and environmental planning

The majority of the Survey Area comprises of Multiple Use palusplain wetlands which have been predominantly cleared for agriculture. There are no Conservation category wetlands within the boundary of the Survey Area. The closest CCW wetland is located over 4.1 km ESE of the Survey Area **(Figure 5).**

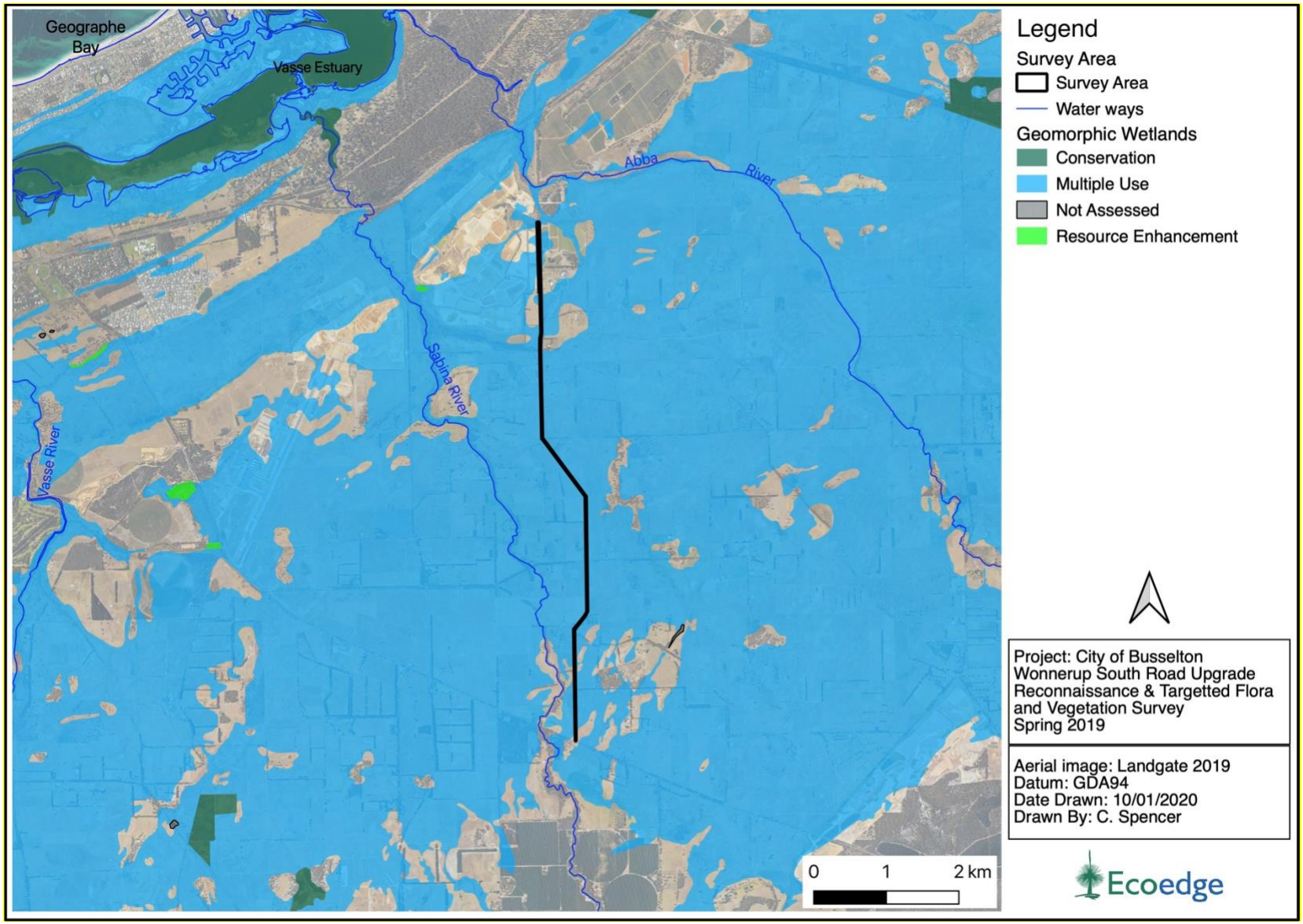

Figure 5. Geomorphic wetlands according to management classifications within and nearby the Survey Area (DWER, 2016).

2.7 Regional Ecological Linkages

Regional ecological linkages "link protected patches of regional significance by retaining the best (condition) patches available as stepping stones for flora and fauna between regionally significant areas" (Molloy *et al.* 2009).

Regional ecological linkages have been mapped by Molloy *et al.* (2009) across the SW of Western Australia in an area spanning between just north of Mandurah to Walpole in the south east. There is no statutory basis for the protection of these regional ecological linkages, however the importance of ecological linkages, in general, has been recognised as an environmental policy consideration in EPA and Planning policy over the last decade (EPA, 2008 and references therein).

Molloy *et al.* (2009) assessed and assigned "proximity value" (pv) ratings to all patches of remnant native vegetation as a way of indicating the value of their connectivity with regional ecological linkages. This was based on their distance from the nearest mapped regional ecological linkage axis line and connected parcels of remnant vegetation (**Table 7.**).

Table 7. Linkage proximity rating values assigned to patches of remnant vegetation within a landscape (from Molloy *et al*., 2009).

1a: with an edge touching or <100m from a linkage
1b: with an edge touching or <100m from a natural area selected in 1a
1c: with an edge touching or <100m from a natural area selected in 1b
2a: with an edge touching or <500m from a linkage
2b: with an edge touching or <500m from a natural area selected in 2a
2c: with an edge touching or <500m from a natural area selected in 2b
3a: with an edge touching or <1000m from a linkage
3b: with an edge touching or <1000m from a natural area selected in 3a
3c: with an edge touching or <1000m from a natural area selected in 3b

An ecological axis line mapped by Molloy *etal*. 2009 occurs to the west of the Survey Area. This axis line is associated with the Sabina River One and is 150 m from the eastern survey boundary at its closet point (**Figure 6**).

Patches of road side vegetation within Survey Area occurring in proximity to this axis line have been assigned pv ratings of "1c, 2a, 2b and 3b" (**Figure 6**).

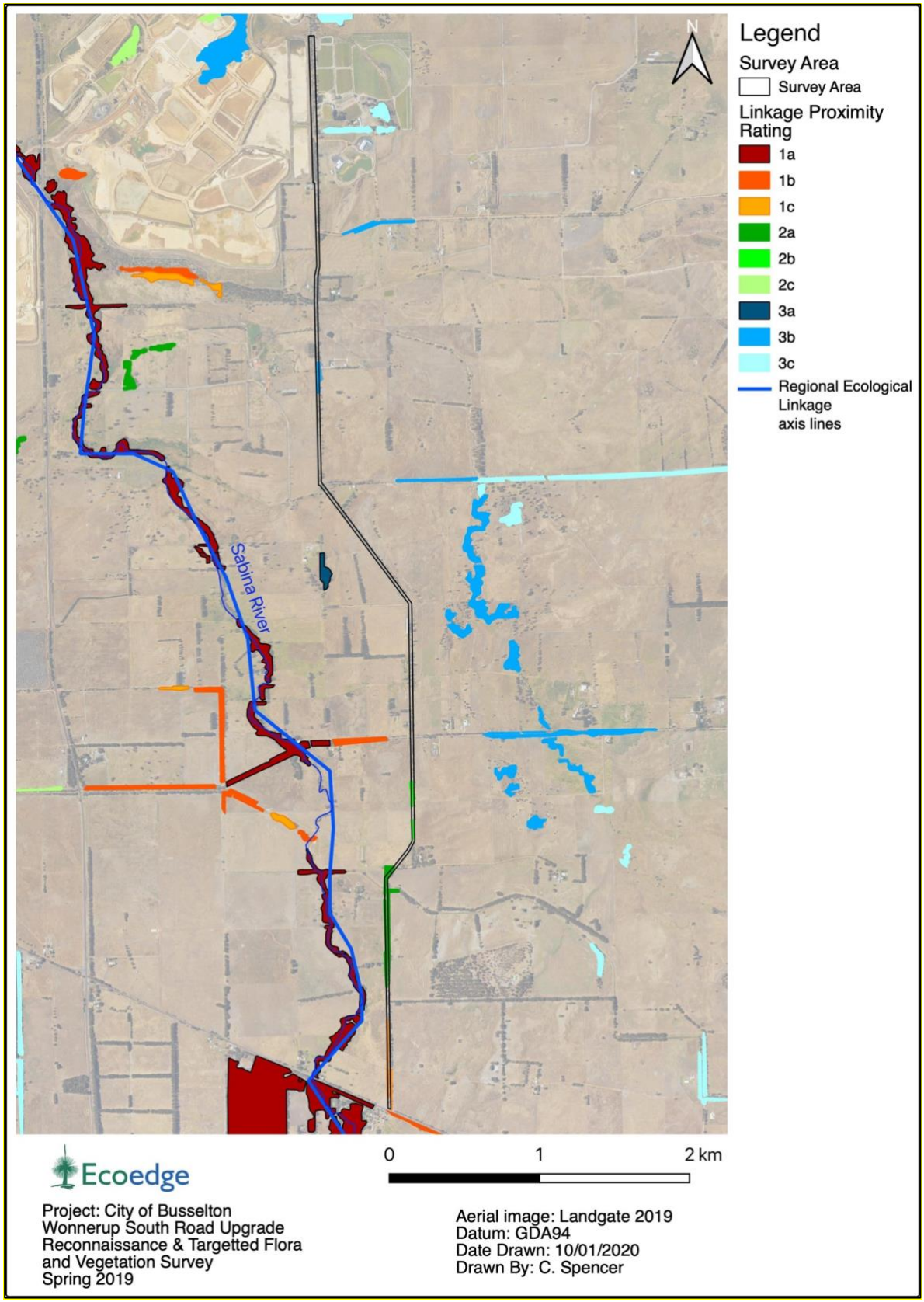

Figure 6. The Survey Area in relation to regional ecological linkages (Molloy *et al*., 2009).

2.8 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are protected under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 and are selected for their environmental values at state or national levels (Government of Western Australia, 2005). They include:

- Defined wetlands and riparian vegetation within 50 m;
- Areas covered by Threatened Ecological Communities;
- Area of vegetation within 50 m of Threatened flora;
- Bush Forever sites; and
- Declared World Heritage property sites.

The most recent Department of Water and Environment Regulation (DWER) mapping dataset (DER, 2016) shows an ESA within the southern boundary of the Survey Area. A portion of this ESA is associated with a DBCA managed nature reserve which is located approximately 0.5 km east of the Survey Area.

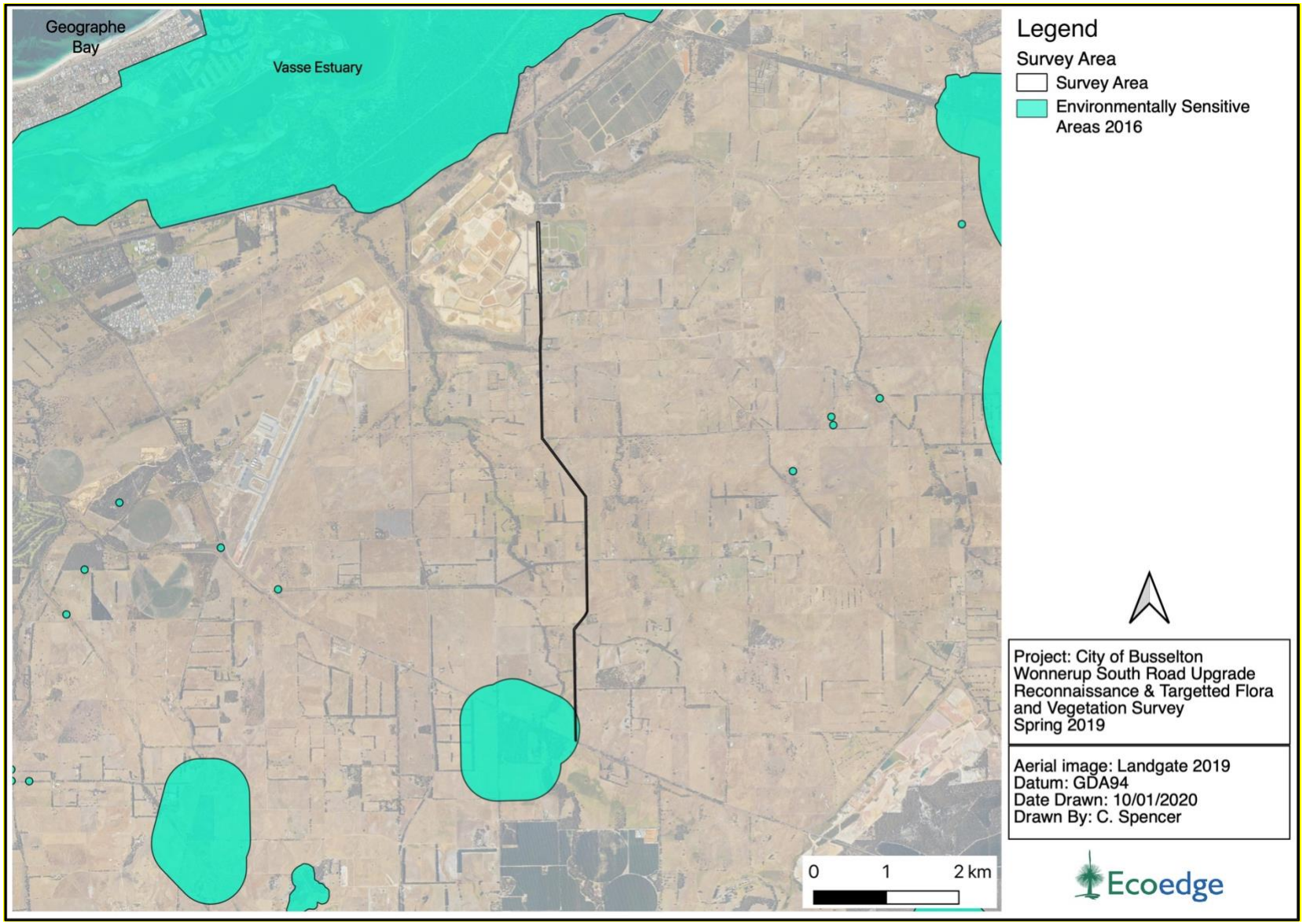

Figure 7. The Survey Area in relation to Environmentally Sensitive Areas (DWER, 2016).

3 Field Survey

3.1 Survey Method

The survey was carried out by Russell Smith (SL flora permit SL012551) and Colin Spencer (SL flora permit FB62000169) according to the requirements of EPA (2016) on 3 September 2019. Flora species that were not identified in the field were collected or photographed for later identification. Taxonomy and conservation status was checked against latest WA Herbarium census download (DBCA, 2019d).

Plant communities were described using data collected at relevés as well as recent aerial photography.

Vegetation condition was also assessed against the method of the EPA (2016) **Appendix 7**.

4 Survey Limitations

Potential limitations with regard to the assessment are addressed in **Table 8.**

Table 8. Limitations of the field survey with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	No	The survey scope was prepared in consultation with the client and was designed to comply with EPA requirements.
Proportion of flora identified	Slight/Moderate	The survey was carried out between early September and early October which is within the prime season for flowering in the south-west of Western Australia. However, the dry winter probably reduced the emergence and growth of herbaceous taxa.
Climatic and seasonal effects	Slight/Moderate	Rainfall for the wet season at Busselton. (1st April – 30th November) was only 58% of average. Germination and growth of herbaceous taxa was probably negatively affected by lack of rainfall.
Availability of contextual information	Negligible	Comprehensive regional surveys of remnant vegetation, as well as more localised surveys, have been carried out on the southern Swan Coastal Plain.
Completeness of the survey	Negligible	The whole search area was covered on foot. Flowering was good.
Skill and knowledge of the botanists	Negligible	The senior field botanist conducting the survey has had extensive experience in botanical surveys in south west Australia over a period of 25 years.

5 Survey Results

5.1 Flora

Ninety-seven species of vascular flora were identified within the Survey Area, of which 39 (ca. 40%) were introduced taxa.

The list of vascular flora recorded during the field survey is included in **Appendix 8**.

5.2 Priority and other Conservation Significant Flora

No Threatened flora and only one plant of a Priority flora species, *Calothamnus quadrifidus* subsp. *teretifolius* was found within the Survey Area (**Figure 8** and **Figure 9**).

A stand of *Eucalyptus patens*, which is an unusual species on the Swan Coastal Plain, was observed Vegetation Unit D in the southern part of the Survey Area.

Copies of the completed Threatened and Priority Flora Report form for *Calothamnus quadrifidus* subsp. *teretifolius* is provided in **Appendix 9.**

Figure 8. *Calothamnus quadrifidus* subsp. *teretifolius* (P4)

5.3 Environmental Weeds and Declared Pest Plants

Of the 39 introduced plant species, two species: *Zantedeschia aethiopica (*Arum-lily) and *Asparagus asparagoides* (Bridal creeper) were identified as Pest Plants under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) (Department of Agriculture and Food, 2019). There are however currently no obligations for management of these species under the Act.

The distribution of both these species within the Survey Area is shown in **Figure 10**.

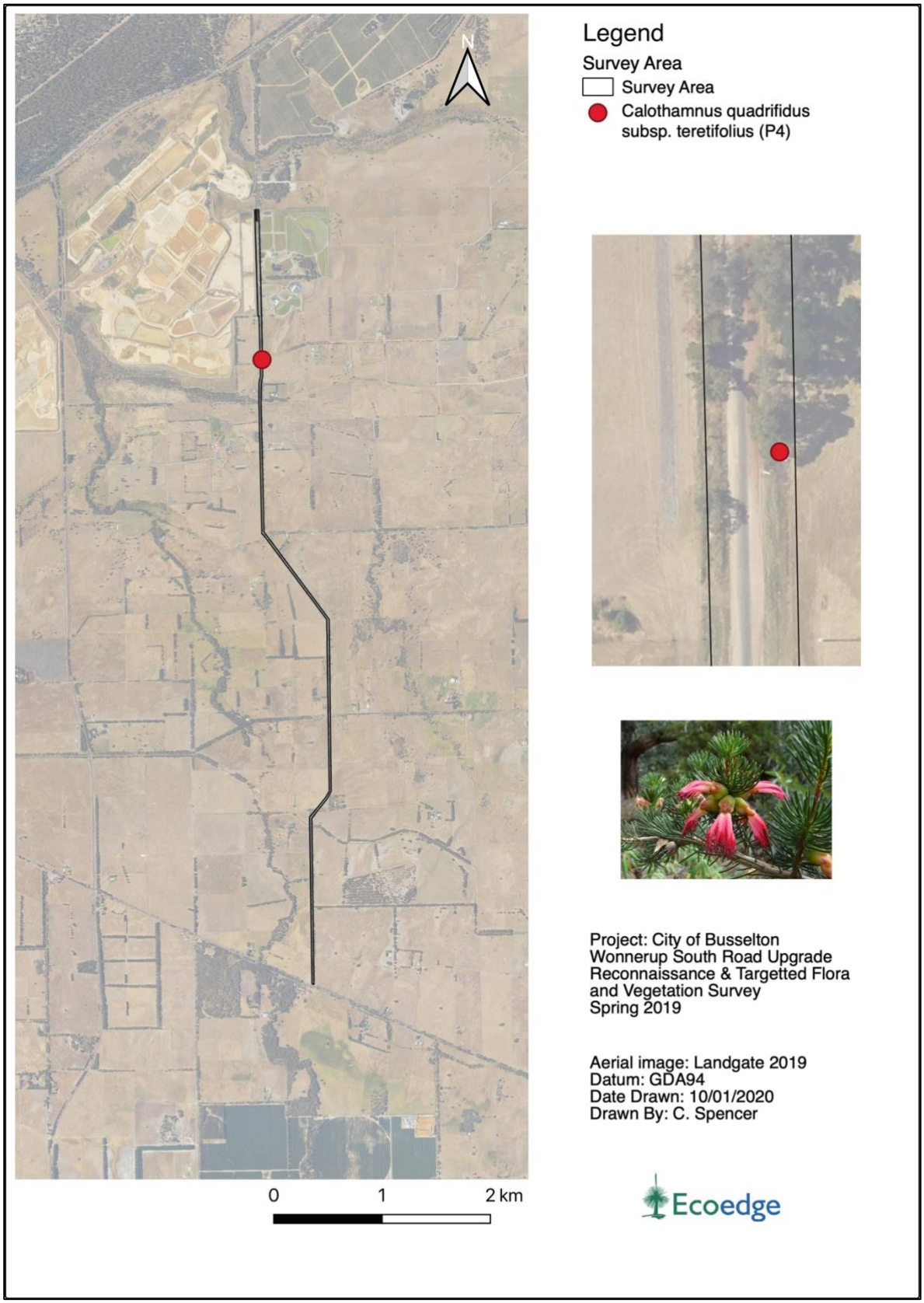

Figure 9. Location of *Calothamnus quadrifidus* subsp. *teretifolius* observed during the field survey

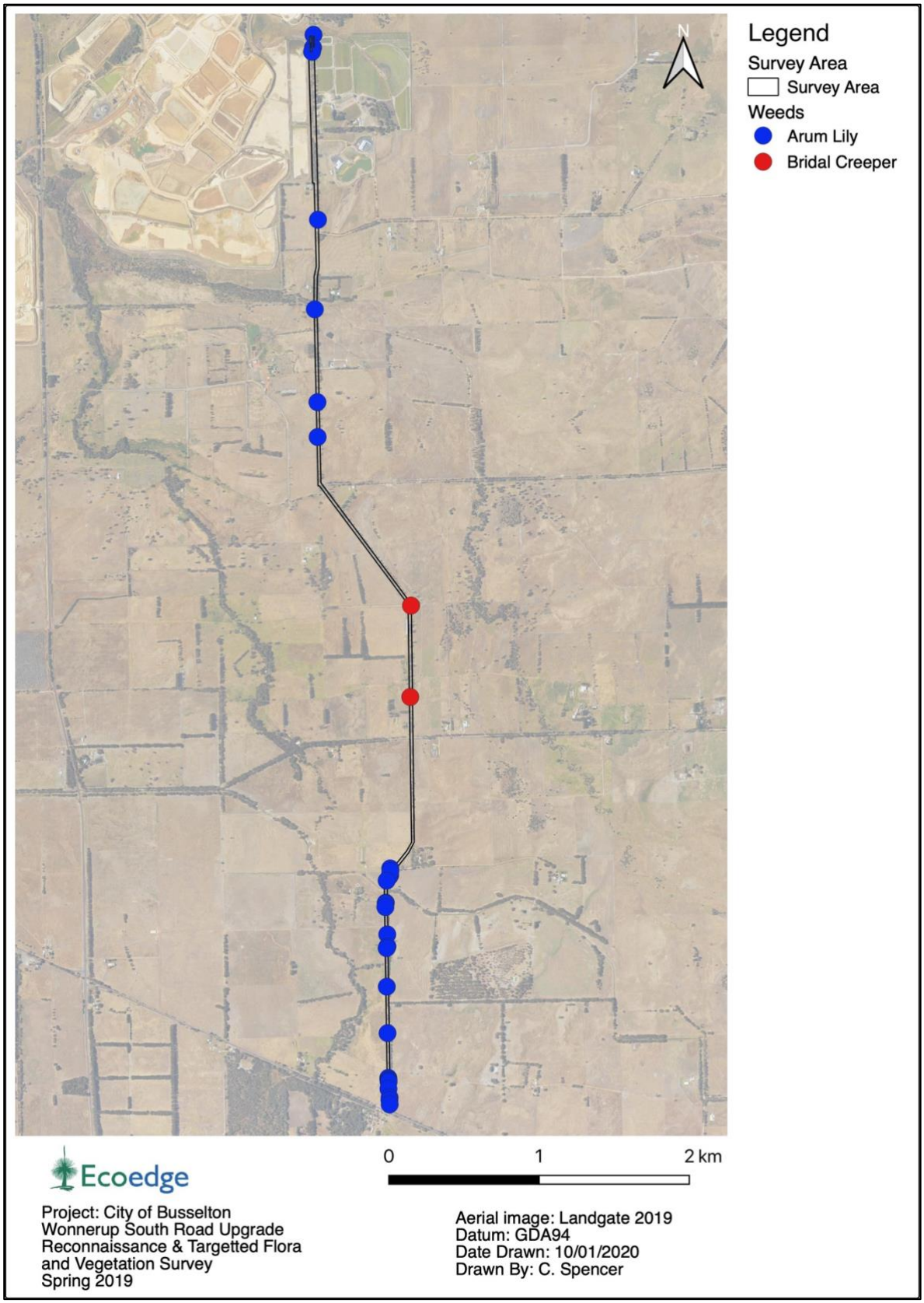

Figure 10. Location of Declared Pest Plants within the Survey Area

5.4 Vegetation Units

Five vegetation units were described for the Survey Area. These are described together with their extent in **Table 9** and mapped in **Figure 11** to **Figure 17**. Photographs with accompanying descriptions are also provided in **Appendix 10**.

Most areas of remnant vegetation were classified as Completely Degraded, however small areas of vegetation units A and C in Good or Degraded condition and have been mapped as occurrences of State listed Threatened Ecological Communities. These are marked in **Figure 11** to **Figure 17**.

Vegetation unit A where it is in Good or Degraded condition resembles the "Southern *Corymbia calophylla* woodlands on heavy soils" TEC (SWAFCT01b) (**Figure 18** and **Figure 19**) and unit C resembles the "Southern wet shrublands" TEC (SWAFCT02) (**Figure 20**). The similarity of the vegetation units to the TECs is based on the location and a comparison of 'typical' and 'other common species' listed by Gibson *etal.* 1994 for these TEC communities.

Copies of completed Threatened Ecological Community Report Forms for both TECs are provided at **Appendix 11**.

Vegetation unit E represents road verge that has been almost completely cleared, or has been largely planted with introduced eucalypts. It also includes the road.

Table 9. Description of vegetation units within the Survey Area.

Unit	Description	Area (ha)
A	Woodland/Open woodland of *Corymbia calophylla* with over occasional *Banksia grandis* over very scattered *Acacia extensa*, *A. saligna*, *Adenanthos meisneri*, *Viminaria juncea*, *Jacksonia furcellata*, *Kingia australis* and *Xanthorrhoea preissii* shrubs over grassland/herbland including **Avena barbata*, **Cenchrus clandestinus*, **Ehrharta calycina*, **Eragrostis curvula*, **Arctotheca calendula*, **Romulea rosea* and **Watsonia meriana* on grey-brown sandy-loam. (*Agonis flexuosa* appears as a mid-storey tree in the southern part of the Survey Area) (TEC: SWAFCT01b)	2.89
B	Woodland of *Eucalyptus rudis*, (*Corymbia calophylla*) over *Melaleuca rhaphiophylla* or *M. preissiana* over shrubland of *Hakea prostrata*, *Kingia australis*, *Melaleuca rhaphiophylla* and *Xanthorrhoea* preissii over *Juncus pallidus* and introduced herbaceous species. (Good to Degraded)	0.61
C	Open forest of *Eucalyptus rudis* or *Corymbia calophylla* over *Melaleuca preissiana* over shrubland of *Astartea scoparia*, *Hakea ceratophylla*, *H. varia*, *Kingia australis*, *Melaleuca viminea*, *M. lateritia* over *Leptocarpus coangustatus* and scattered **Briza maxima* on damp grey-brown clay-loam. (Good-Degraded) (TEC: SWAFCT02)	0.10
D	Open forest of *Corymbia calophylla* (with patches of *Eucalyptus patens*) over *Agonis flexuosa* over scattered *Darwinia citriodora* and *Xanthorrhoea preissii* shrubs over introduced herbaceous taxa including **Avena barbata* and **Eragrostis curvula* on grey-brown sandy loam. (Degraded- Completely Degraded)	0.90
E	Scattered *Corymbia calophylla* and introduced *Eucalyptus* spp. and grassland of Introduced species with isolated native shrubs such as *Xanthorrhoea preissii* on grey-brown loam (includes roadway and gravel shoulders). (Completely Degraded)	11.59
	Area	**16.19**

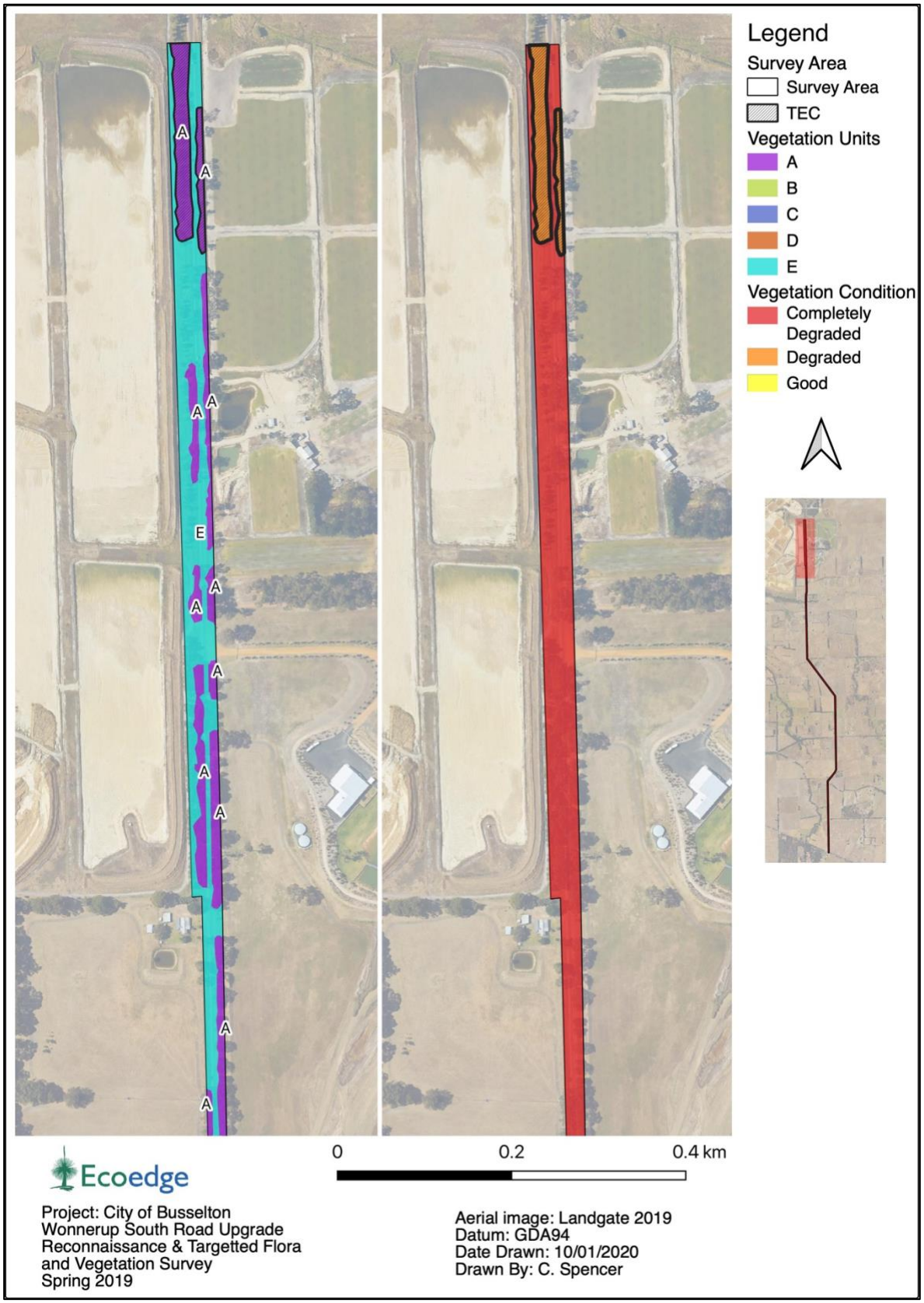

Figure 11. Vegetation units mapped for the Survey Area.

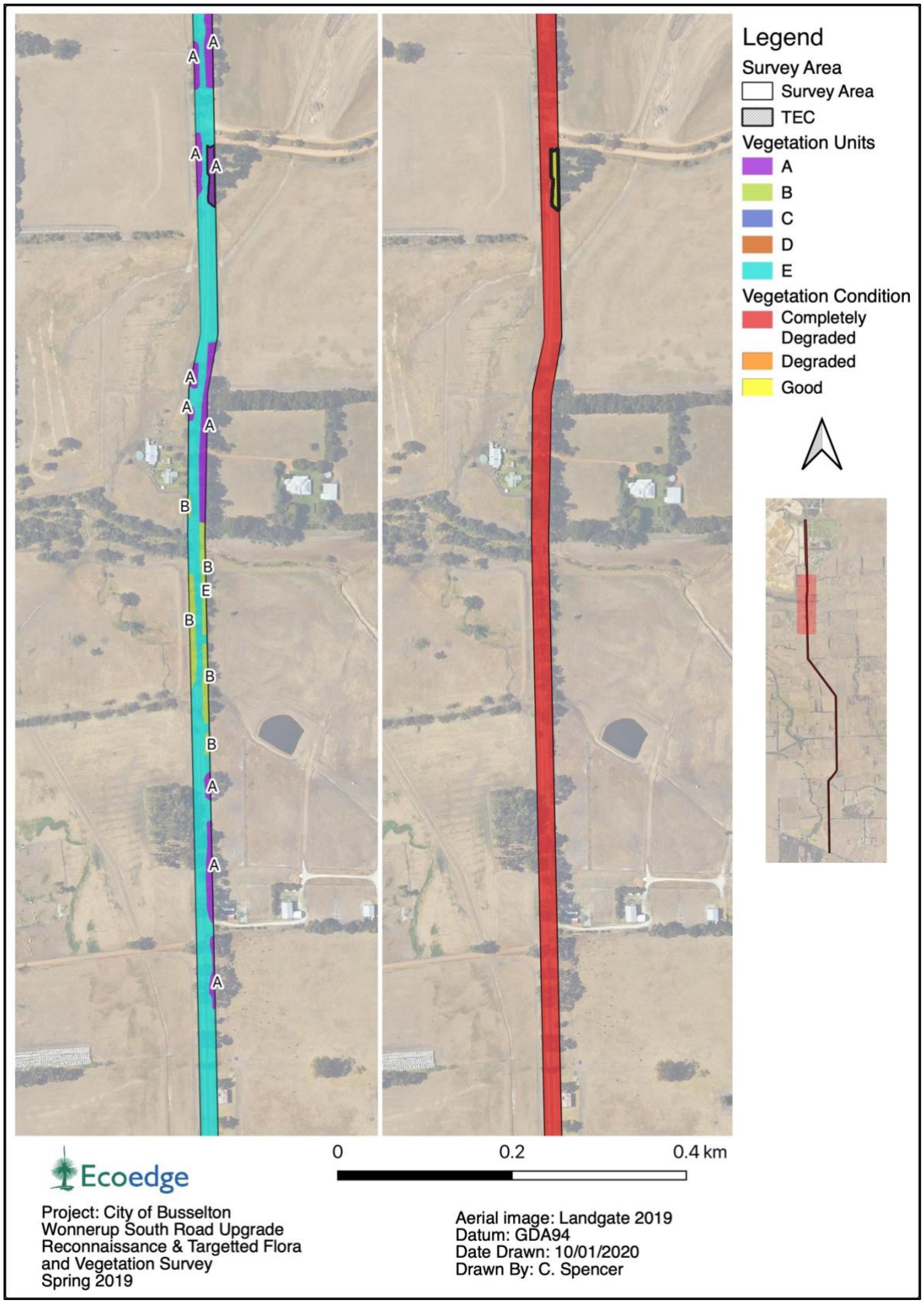

Figure 12. Vegetation units mapped for the Survey Area.

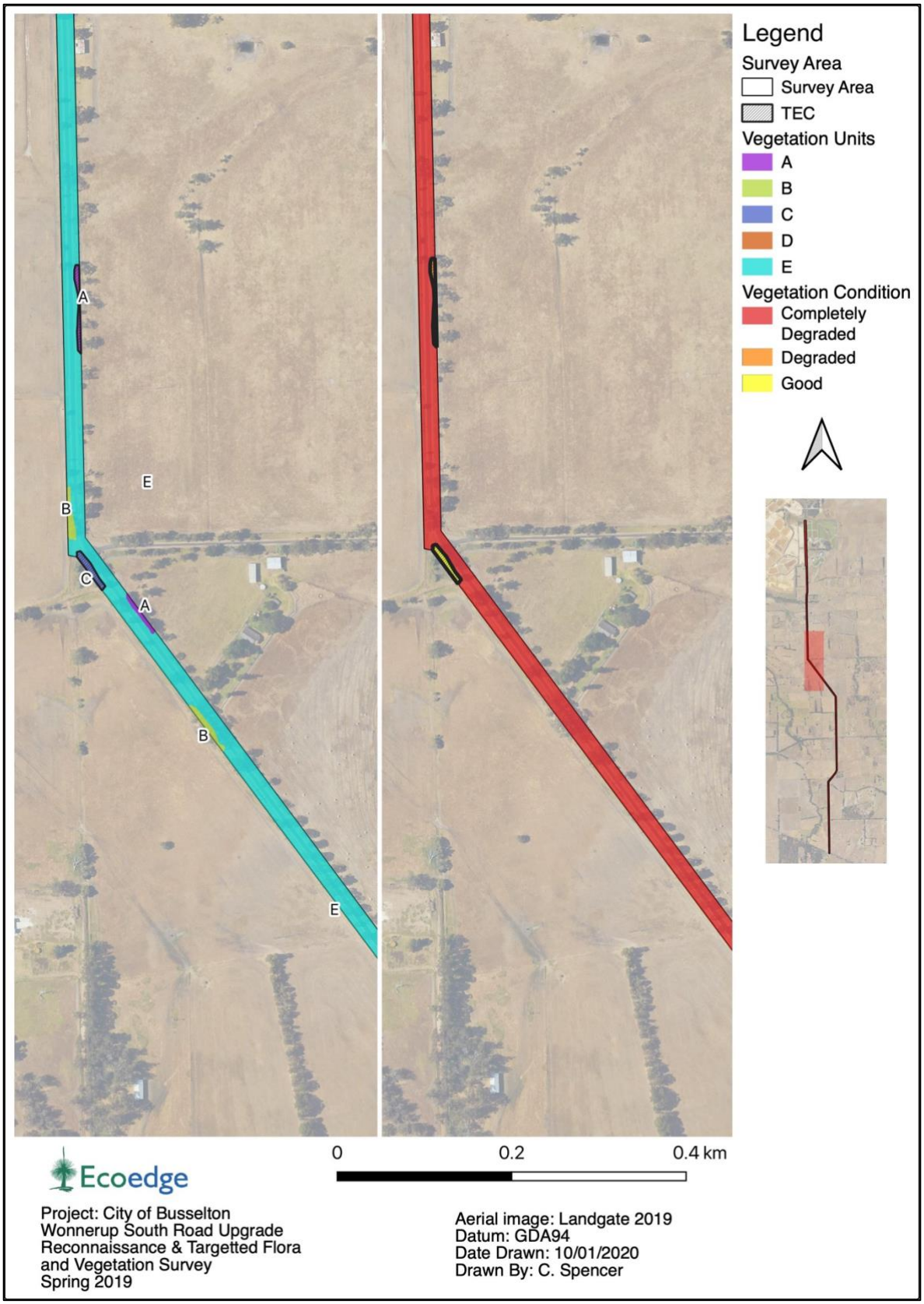

Figure 13. Vegetation units mapped for the Survey Area.

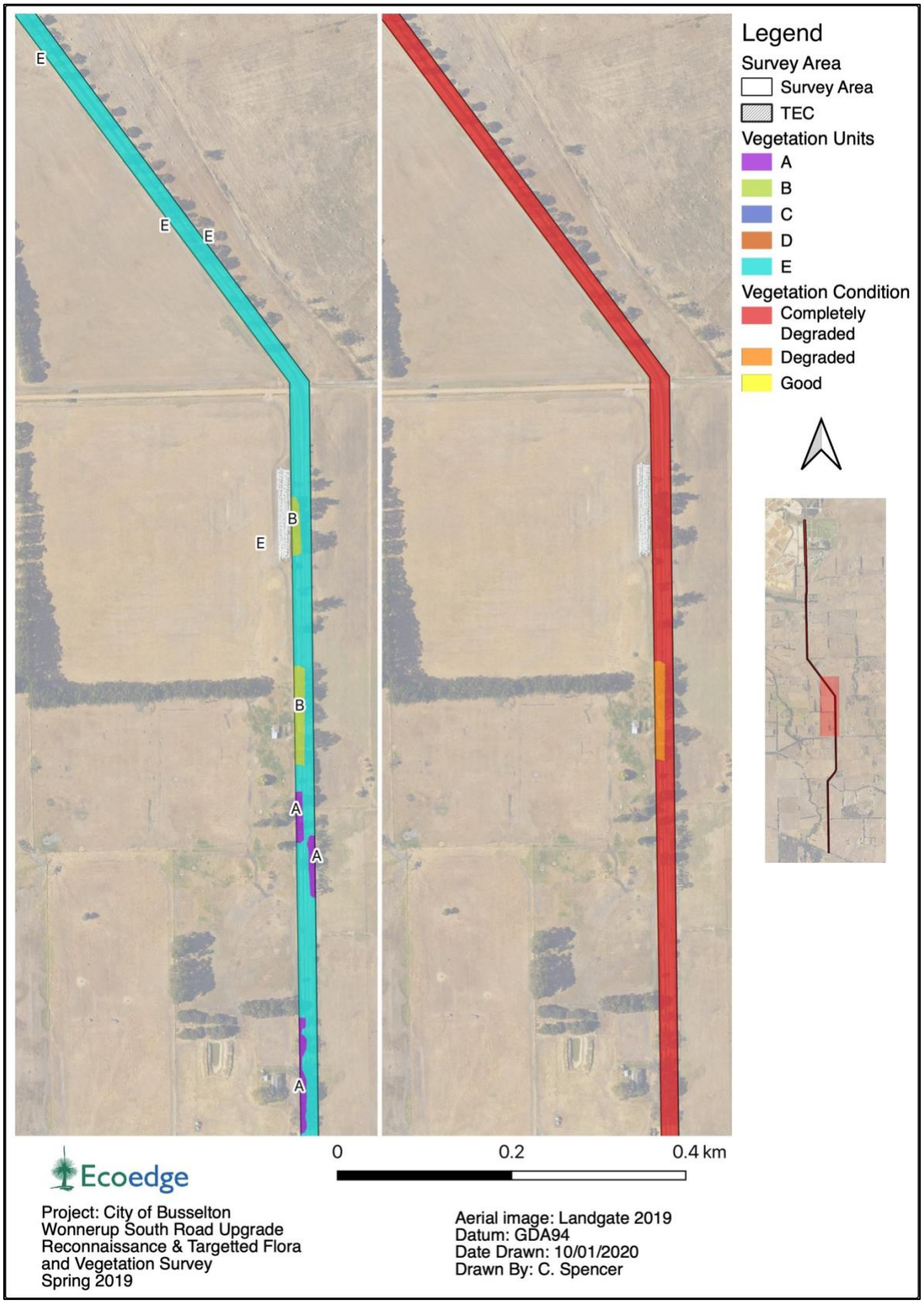

Figure 14. Vegetation units mapped for the Survey Area.

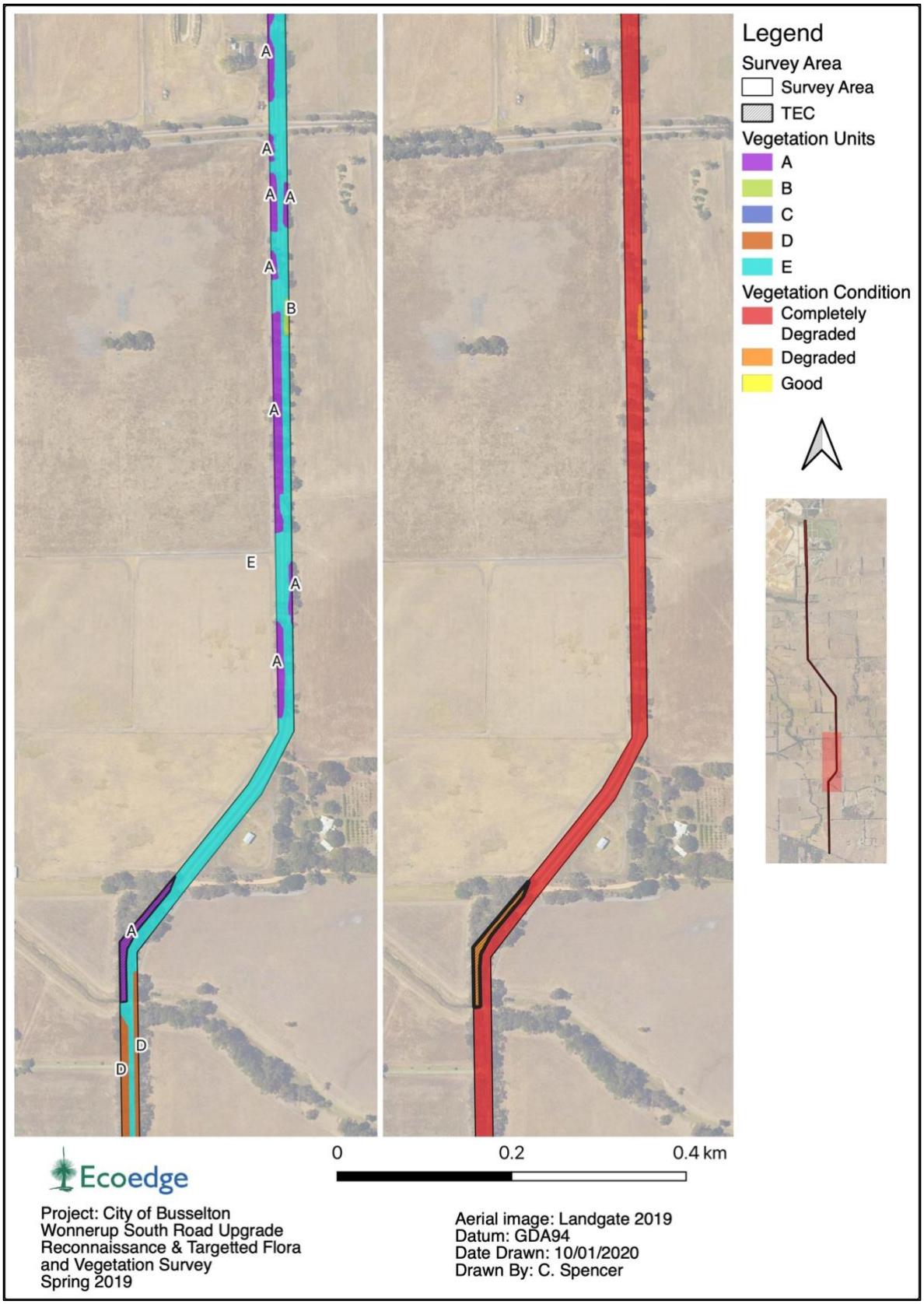

Figure 15. Vegetation condition mapped for the Survey Area.

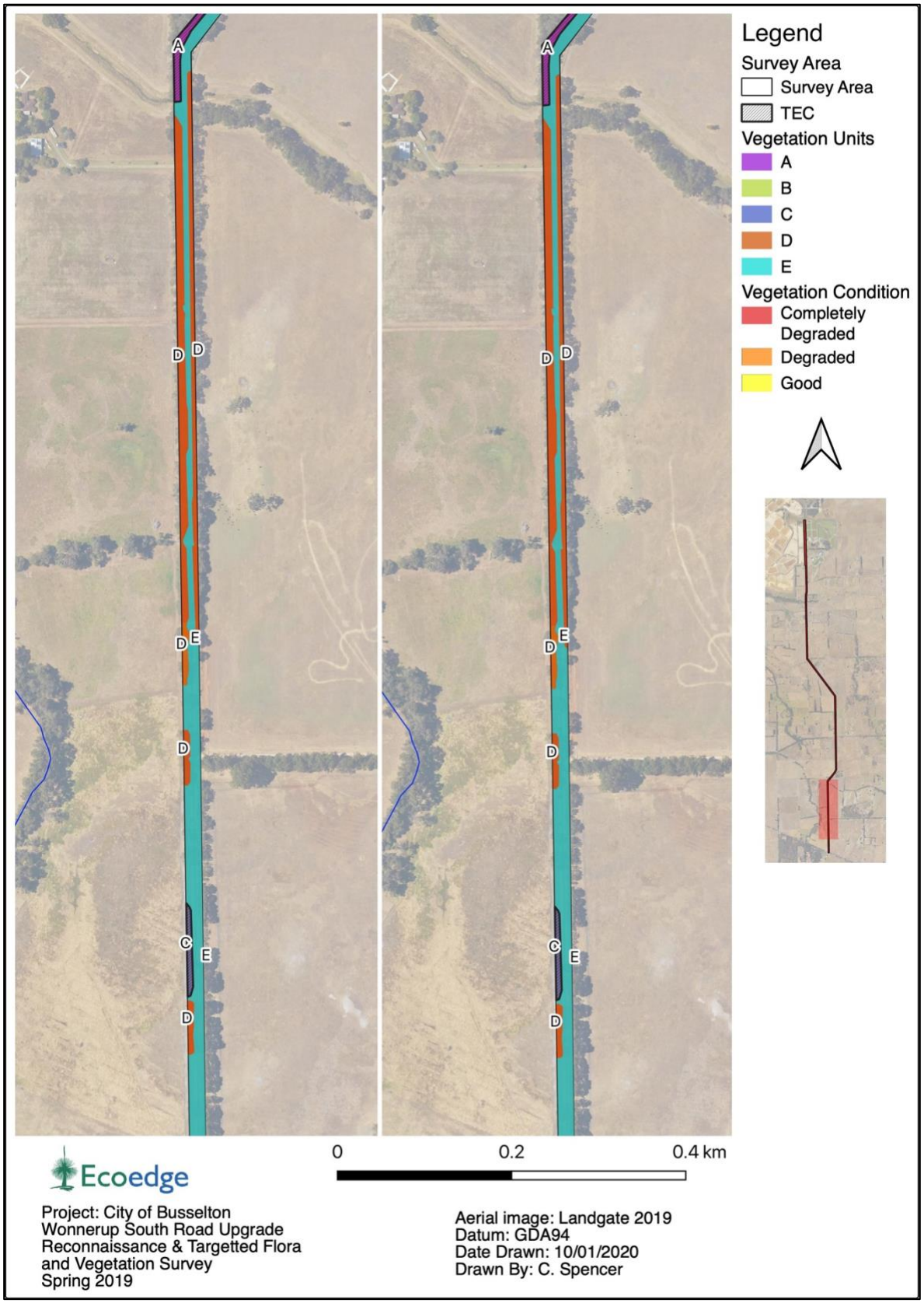

Figure 16. Vegetation condition mapped for the Survey Area.

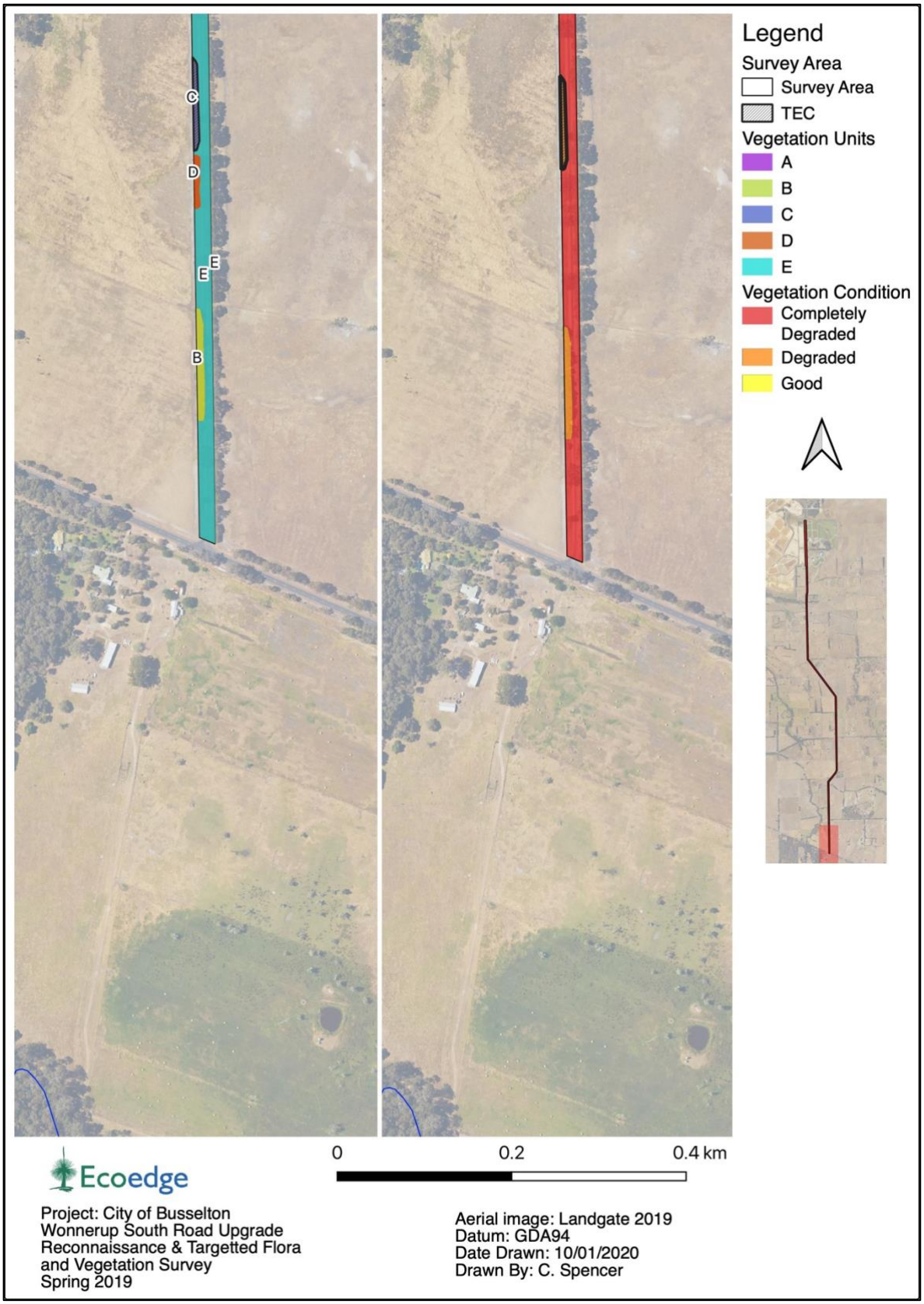

Figure 17. Vegetation condition mapped for the Survey Area.

Figure 18. Vegetation unit A, in Good condition

Figure 19. Vegetation unit A, in Degraded condition

Figure 20. Vegetation unit C (left of photo), in Good condition

5.5 Vegetation Condition

Most of the Survey Area (93%) was categorized as Completely Degraded (Table 10). This is as a result of the generally high degree of disturbance and the fact that the Survey Area sits within an agricultural landscape. This is reflected in the high number of the introduced species present within the Survey Area (40% of taxa).

Only two small areas, totaling 0.57 ha were rated as Very Good. This is undoubtedly because the road verge has been subject to ongoing physical disturbance in many areas, including past clearing, as well as the influx of non-native species from neighboring farmland.

Table 10. Vegetation condition within the Survey Area

Condition	Area (ha)	%
Good	0.09	0.57
Degraded	1.04	6.63
Completely Degraded	14.56	92.80
Total	15.69	100.00

Table 11. Area of each vegetation unit within the Survey Area.

Vegetation Unit	BC Act Cons Status	EPBC Act Cons Status	Condition	Area (ha)	%
A	SWAFCT1b TEC (VU)	NA	Good	0.05	
			Degraded	0.68	
			Completely Degraded	2.16	
			Total	**2.89**	17.85
B			Degraded	0.25	
			Completely Degraded	0.36	
			Total	**0.61**	3.77
C	SWAFCT2 TEC (EN)	NA	Good	0.04	
			Completely Degraded	0.06	
			Total	**0.10**	0.62
D			Degraded	0.05	
			Completely Degraded	0.85	
			Total	**0.90**	5.56
E			Completely Degraded	11.69	72.21
			Grand Total	**16.19**	**100.00**

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6 Discussion and Conclusions

6.1 Significance of the Flora

The conservation significance of priority and other conservation significant flora is discussed below. As stated in section 7.2 above, a single plant of the Priority 4 taxon *Calothamnus quadrifidus* subsp. *teretifolius* was observed about 2 m from the bitumen on the east side of the road. It was situated in a small area of Vegetation unit A in Good condition.

The natural distribution of *Calothamnus quadrifidus* subsp. *teretifolius* (P4) (previously *Calothamnus* sp. Whicher (B.J. Keighery & N. Gibson 230)) is mainly confined to the southern Swan Coastal Plain between the Capel River and Jindong, with a few outlying occurrences on the Blackwood Plateau. The taxon is mainly confined to ironstone soils (shallow soils over massive ironstone) and has been the subject of genetic study (Yates *et al*., 2009). With regard to the value of small populations of this taxon, Yates (*op cit*.) state:

> "Genetic diversity in medium and large populations was higher than in small populations and was highest in the medium and large-sized populations. Genetic distances among populations are very high. A significant outcome of this is that all population fragments of *C*. sp. Whicher contain irreplaceable genetic diversity. Because of the high genetic differentiation between populations the loss of small populations will result in the significant loss of genetic diversity."

Calothamnus quadrifidus subsp. *teretifolius* is represented by 91 records in DBCA databases and occurs in about 30 populations on the Swan Coastal Plain, although many of these are confined to road verges and small reserves.

Although *Eucalyptus patens* (Blackbutt) is a common species in the high rainfall areas of the south-west it is an uncommon species on the Swan Coastal Plain (Webb *et al*., 2009). In the Busselton region it is the dominant species in a number of rare communities with only a few areas of these in better than Degraded condition. The small area of *E. patens* in the Survey Area occurs in vegetation unit D. It is in degraded condition and does not have enough of the original species remaining to ascertain whether it belongs to the Priority 1 ecological community Blackbutt (*Eucalyptus patens*), *Corymbia calophylla* and *Agonis flexuosa* Closed Low Forest as described in Webb *et al* (2009).

6.2 Significance of the Vegetation

6.2.1 Threatened Ecological Communities

As stated above, Vegetation unit A where it is in Good or Degraded condition resembles the threatened ecological community "Southern *Corymbia calophylla* woodlands on heavy soils" TEC (SWAFCT01b). This community is listed as a Vulnerable under the State BC Act, but is not listed as a TEC under the Commonwealth *EPBC Act*.

Vegetation unit C where it is in Good condition resembles the State listed "Southern wet shrublands" (SWAFCT02) TEC. It is listed as Endangered (EN) under the BC Act due to a limited distribution and only a few occurrences, with each being small or isolated and vulnerable to threatening processes. It is not currently listed under the EPBC Act. Examples of this plant community in Excellent condition can be found in Ambergate Reserve and Fish Road Reserve, and also Ruabon-Tutunup and Yoongarillup Bushland areas south of Busselton. The plant community is otherwise very highly cleared and rarely found outside reserves. In consideration of the restricted distribution of this community, the status of allocated threat is in need of review (Webb *et al*. 2009).

It is understood that there is no minimum condition class for a proposed occurrence of a State listed TEC to be considered to belong to the TEC. Consequently, it is advisable to regard all areas of both Vegetation unit A and unit C in Degraded or better condition within the Survey Area as expressions of their respective TEC. This means that there is 0.68 ha of degraded condition and 0.05 ha of good condition "Southern *Corymbia calophylla* woodlands on heavy soils" TEC within the Survey Area and 0.04 ha of good condition ""Southern wet shrublands" TEC within the Survey Area.

The mapping file included with this report has separate fields indicating which areas of the Vegetation units meet the TEC criteria.

6.2.2 Other Vegetation Units

Except for the small area dominated by *E. patens* in Vegetation Unit D, the other vegetation units mapped for the Survey Area do not have any particular conservation significance primarily because they are completely degraded.

6.3 Vegetation complexes

The survey area comprised only of the Abba Vegetation Complexes and it is considered that the surveyed vegetation is a reasonable match for this mapped complex.

The Abba complex (6.54%) has less than 10 % of its Statewide pre-European extent remaining and is also significantly under represented within DBCA landholdings with only 0.36% reserved.

6.4 Geomorphic Wetlands

Most of the Survey Area comprises of Multiple Use palusplain wetlands that have been cleared for agriculture. There are no CCW within or within proximity to the Survey Area that would likely be affected by the proposal.

6.5 Regional Ecological Linkages

Vegetation within the Survey Area is connected to a formally mapped ecological associated with the Sabina River. This linkage is one of the few linkages occurring on the Abba Plains as most the native vegetation has been cleared for agriculture.

Linkage PV ratings of parcels of vegetation within the Survey Area are highest (1c) in the South where vegetation is most closely connected to the Axis line via the Vasse High Highway road reserve vegetation. PV ratings decrease northwards along Wonnerup South Road (2a,2b and 3b) with increasing distance between intact parcels of road reserve vegetation.

Small scale clearing like that expected for the road-upgrade is unlikely to affect the mapped PV ratings within the Survey Area as it is unlikely to result in separating parcels of bushland such that PVR thresholds (i.e. distances between parcels of connected bushland), would be exceeded. Most of the distances between parcels of vegetation occurs well within the PVR threshold limits of 100m (level 1), 500m (level 2) and 1000m (level 3). For example, clearing a 10 m x 2m area of several small trees and shrubs to widen the road or install a new culvert will not increase separation distances between linked of parcels of vegetation such that it would result in a down grade in PV rating.

Small scale clearing impacts are also unlikely to have a significant impact on the overall function of the mapped “Sabina River” regional ecological linkage. However, the clearing may have localised impacts to the ecological function of Survey Area vegetation for example by reducing the width of the corridor, in sections, resulting in higher levels of weed invasion due to increased edge effects.

The scale and significance of impacts to the mapped ecological linkages and road side vegetation corridors is challenging to quantify and is beyond the scope of the report.

6.6 Environmentally Sensitive Areas

An ESA occurs within the southern boundary of the Survey Area. A portion of this ESA boundary is associated with a nature reserve managed by the DBCA.

ESAs are afforded special protection under the EP Act and exemptions to clearing under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 do not apply in these areas.

7 Requirement for Referral

Depending on the scale of the proposed works the presence of both inferred TECs within the proposed road upgrade area may constrain the City's intended works program. Permission is required from the Minister for Environment if an action will, or is likely to, modify an occurrence of a threatened ecological community. 'Modify', in relation to an occurrence of a threatened ecological community under 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.

The scale of impact will determine the level of TEC modification and need or otherwise for authority to modify the TEC. The determination of this impact is beyond the scope of this report. However, it is recommended, in accordance with the DBCA *Guidance note on the modification of an occurrence of a threatened ecological community* (DBCA, 2019) that where there is any uncertainty regarding the potential impact of the proposal that it be referred to the DBCA.

Regardless of conservation significance all native vegetation in Western Australia is protected under the EP Act and permits are required for clearing of this vegetation unless a valid exemption applies. Guidelines to these exemptions under the Act are available on the DWER Website (www.der.wa.gov.au). It is recommended that advice is sought from the DWER where there is any doubt regarding the need or otherwise to obtain a clearing permit.

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Appendix 1. Categories of DBCA Threatened and Priority Ecological Communities (DBCA 2018a, 2019b).

Appendix 2. Categories of Threatened Ecological Communities under the EPBC Act (DotEE, 2018b).

Appendix 3. Protected Matters Search Tool and NatureMap reports

Appendix 4. Categories of Threatened and Priority List flora (DBCA, 2019a).

Appendix 5. Categories of Threatened Species under the EPBC Act (DotEE, 2018c).

Appendix 6. Threatened and Priority Flora within 10 km of the Survey Area (DBCA 2018a, DotEEb)

Appendix 7. Vegetation Condition Scale (EPA, 2016).

Appendix 8. List of Vascular Flora found within the Survey Area.

Appendix 9. Completed Threatened and Priority Flora Report Forms.

Appendix 10. Photographs and descriptions of Vegetation Units mapped within the Survey Area

Appendix 11. Completed Threatened Ecological Community Report Forms.

Appendix 1. Categories of threatened and priority ecological communities under the BC Act (DEC, 2013).

Conservation code	Category
(T) Threatened ecological community pursuant to Sect 27 of the *Biodiversity Conservation Act 2016.*	
T	(T) CR – Critically endangered An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.
	(T) EN - Endangered An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.
	(T) VU - Vulnerable An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.
(P) Priority species – possible threatened communities.	
P1	Poorly known communities Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100ha). 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.

Conservation code	Category
P2	Poorly known communities Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). 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.
P3	Poorly known communities a) 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 or: b) 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), or; c) 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. 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.
P4	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. a) Rare. Species 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 species are usually represented on conservation lands. b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Conservation code	Category
P5	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.

Appendix 2. Categories of Threatened Ecological Communities under the EPBC Act (DotEE, 2018a).

Category	Definition
Critically endangered	If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
Endangered	If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
Vulnerable	If, at that time, an ecological, community is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium–term future (indicative timeframe being the next 50 years).

Australian Government
Department of the Environment and Energy

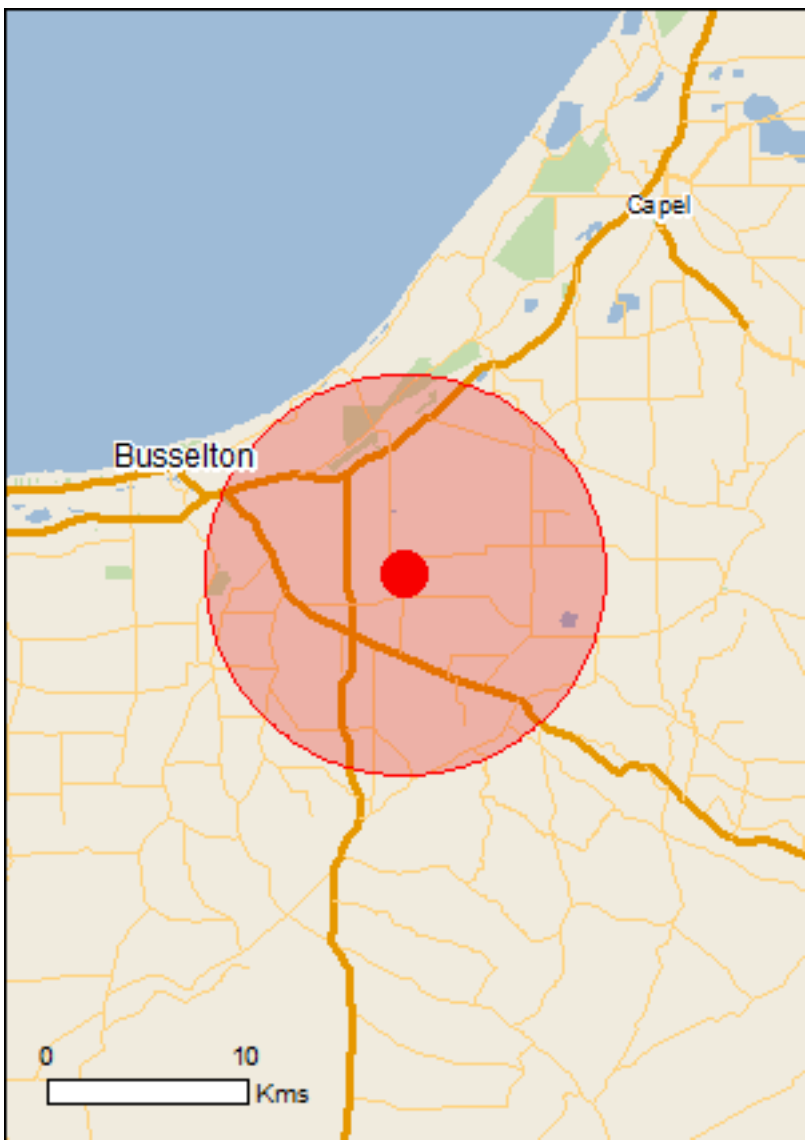
EPBC Act Protected Matters Report

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

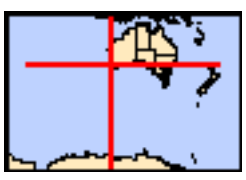
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

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

Report created: 13/01/20 18:47:25



Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	67
Listed Migratory Species:	45

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	70
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	10
Regional Forest Agreements:	1
Invasive Species:	25
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Vasse-wonnerup system	Within Ramsar site

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area
Shrublands on southern Swan Coastal Plain ironstones	Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Extinct within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta cauta Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Fish		
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat known to occur within area
Mammals		

Name	Status	Type of Presence
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Breeding known to occur within area
Other		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat known to occur within area
Banksia nivea subsp. uliginosa Swamp Honeypot [82766]	Endangered	Species or species habitat known to occur within area
Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat known to occur within area
Brachyscias verecundus Ironstone Brachyscias [81321]	Critically Endangered	Species or species habitat likely to occur within area
Caladenia busselliana Bussell's Spider-orchid [24369]	Endangered	Species or species habitat likely to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat likely to occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area
Caladenia procera Carbunup King Spider Orchid [68679]	Critically Endangered	Species or species habitat may occur within area
Chamelaucium sp. S coastal plain (R.D.Royce 4872) Royce's Waxflower [87814]	Vulnerable	Species or species habitat known to occur within area
Darwinia whicherensis Abba Bell [83193]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Daviesia elongata subsp. elongata Long-leaved Daviesia [64883]	Vulnerable	Species or species habitat known to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus x phylacis Meelup Mallee [87817]	Endangered	Species or species habitat may occur within area
Gastrolobium papilio Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat known to occur within area
Grevillea elongata Ironstone Grevillea [64578]	Vulnerable	Species or species habitat likely to occur within area
Grevillea maccutcheonii McCutcheon's Grevillea [64522]	Endangered	Species or species habitat known to occur within area
Lambertia echinata subsp. occidentalis Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat known to occur within area
Petrophile latericola Laterite Petrophile [64532]	Endangered	Species or species habitat known to occur within area
Sphenotoma drummondii Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat may occur within area
Tetraria australiensis Southern Tetraria [10137]	Vulnerable	Species or species habitat known to occur within area
Verticordia densiflora var. pedunculata Long-stalked Featherflower [55689]	Endangered	Species or species habitat known to occur within area
Verticordia plumosa var. ananeotes Tufted Plumed Featherflower [23871]	Endangered	Species or species habitat likely to occur within area
Verticordia plumosa var. vassensis Vasse Featherflower [55804]	Endangered	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Status	Type of Presence
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
[Carcharias taurus (west coast population)](#) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Ardenna carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
[Diomedea amsterdamensis](#) Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
[Diomedea dabbenena](#) Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
[Hydroprogne caspia](#) Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
[Onychoprion anaethetus](#) Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche cauta		
Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis		
Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata		
Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias		
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat may occur within area
Manta alfredi		
Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris		
Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or

Name	Threatened	Type of Presence
		related behaviour known to occur within area
[Thalassarche cauta](#) Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
[Thinornis rubricollis](#) Hooded Plover [59510]		Species or species habitat likely to occur within area
[Tringa glareola](#) Wood Sandpiper [829]		Species or species habitat known to occur within area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Fish		
[Acentronura australe](#) Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
[Campichthys galei](#) Gale's Pipefish [66191]		Species or species habitat may occur within area
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
[Hippocampus angustus](#) Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
[Hippocampus subelongatus](#) West Australian Seahorse [66722]		Species or species habitat may occur within area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
[Lissocampus caudalis](#) Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
[Lissocampus fatiloquus](#) Prophet's Pipefish [66250]		Species or species habitat may occur within area
[Lissocampus runa](#) Javelin Pipefish [66251]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Fish Road	WA
Ruabon Townsite	WA
Sabina	WA
Tuart Forest	WA
Unnamed WA14567	WA
Unnamed WA41568	WA
Unnamed WA44838	WA
Unnamed WA46070	WA
Unnamed WA50270	WA
Whicher	WA

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Vasse-Wonnerup Wetland System	WA

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.6927 115.4477

Acknowledgements

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

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

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

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

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NatureMap
Mapping Western Australia's biodiversity

Wonnerup South Road NatureMap Con_Sig_Flora_ Report_10km

Created By Guest user on 13/01/2020

Kingdom Plantae
Conservation Status Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 26' 52" E,33° 41' 34" S
Buffer 10km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	3237	*Acacia benthamii*		P2	
2.	3339	*Acacia flagelliformis*		P4	
3.	3537	*Acacia semitrullata*		P4	
4.	19258	*Actinotus whicheranus*		P2	
5.	4586	*Amperea micrantha*		P2	
6.	18102	*Andersonia ferricola*		P1	
7.	7829	*Angianthus drummondii*		P3	
8.	141	*Aponogeton hexatepalus (Stalked Water Ribbons)*		P4	
9.	17107	*Banksia meisneri subsp. ascendens (Scott River Banksia)*		P4	
10.	32211	*Banksia mimica (Summer Honeypot)*		T	
11.	32204	*Banksia nivea subsp. uliginosa*		T	
12.	32046	*Banksia squarrosa subsp. argillacea*		T	
13.	20026	*Blennospora doliiformis*		P3	
14.	16313	*Boronia anceps*		P3	
15.	11612	*Boronia capitata subsp. gracilis*		P3	
16.	17804	*Boronia tetragona*		P3	
17.	18492	*Brachyscias verecundus*		T	
18.	1596	*Caladenia huegelii (Grand Spider Orchid)*		T	
19.	13862	*Caladenia speciosa*		P4	
20.	35796	*Calothamnus quadrifidus subsp. teretifolius*		P4	
21.	48449	*Calytrix retrorsifolia*		P2	
22.	3006	*Cardamine paucijuga*		P2	
23.	13766	*Caustis sp. Boyanup (G.S. McCutcheon 1706)*		P3	
24.	19338	*Chamaescilla gibsonii*		P3	
25.	43980	*Chamelaucium sp. S coastal plain (R.D.Royce 4872)*		T	
26.	35657	*Chamelaucium sp. Yoongarillup (G.J. Keighery 3635)*		P4	
27.	17686	*Chordifex gracilior*		P3	
28.	34765	*Darwinia whicherensis*		T	
29.	3808	*Daviesia elongata*		T	
30.	1639	*Drakaea elastica (Glossy-leaved Hammer Orchid)*		T	
31.	41803	*Eryngium sp. Ferox (G.J. Keighery 16034)*		P3	
32.	41810	*Eryngium sp. Subdecumbens (G.J. Keighery 5390)*		P3	
33.	20852	*Eucalyptus relicta*		P2	
34.	13512	*Eucalyptus rudis subsp. cratyantha*		P4	
35.	1945	*Franklandia triaristata (Lanoline Bush)*		P4	
36.	20509	*Gastrolobium papilio*		T	
37.	30453	*Gastrolobium sp. Yoongarillup (S.Dilkes s.n. 1/9/1969)*		P1	
38.	20474	*Gastrolobium whicherense*		P2	
39.	7063	*Gratiola pedunculata (Stalked Brooklime)*		P2	
40.	14011	*Grevillea brachystylis subsp. brachystylis*		P3	
41.	12219	*Grevillea bronwenae*		P3	
42.	14526	*Grevillea elongata*		T	
43.	17112	*Grevillea maccutcheonii*		T	
44.	18436	*Grevillea manglesioides subsp. ferricola*		P3	
45.	2190	*Hakea oldfieldii*		P3	
46.	6867	*Hemigenia ramosissima*		T	
47.	16522	*Isopogon formosus subsp. dasylepis*		P3	
48.	20462	*Jacksonia gracillima*		P3	

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
49.	17734	*Lambertia echinata subsp. occidentalis*		T	
50.	16879	*Lambertia rariflora subsp. rariflora*		P4	
51.	45084	*Lasiopetalum laxiflorum*		P3	
52.	5038	*Lasiopetalum membranaceum*		P3	
53.	1086	*Lepyrodia heleocharoides*		P3	
54.	29492	*Leucopogon sp. Busselton (D. Cooper 243)*		P2	
55.	13779	*Loxocarya magna*		P3	
56.	37320	*Loxocarya striata subsp. implexa*		P1	
57.	33638	*Meionectes tenuifolia*		P3	
58.	6193	*Myriophyllum echinatum*		P3	
59.	36200	*Ornduffia submersa*		P4	
60.	14085	*Petrophile latericola*		T	
61.	8163	*Pithocarpa corymbulosa (Corymbose Pithocarpa)*		P3	
62.	25850	*Platytheca sp. Sabina (G.J. & B.J. Keighery 295)*		P2	
63.	4179	*Pultenaea pinifolia*		P3	
64.	4183	*Pultenaea skinneri (Skinner's Pea)*		P4	
65.	974	*Schoenus benthamii*		P3	
66.	1003	*Schoenus natans (Floating Bog-rush)*		P4	
67.	1008	*Schoenus pennisetis*		P3	
68.	20666	*Stachystemon sp. Keysbrook (R. Archer 17/11/99)*		P1	
69.	31872	*Stylidium ferricola*		P1	
70.	7756	*Stylidium longitubum (Jumping Jacks)*		P4	
71.	25800	*Stylidium paludicola*		P3	
72.	7801	*Stylidium squamellosum (Maize Trigger Plant)*		P2	
73.	7803	*Stylidium striatum (Fan-leaved Triggerplant)*		P4	
74.	16769	*Synaphea hians*		P3	
75.	16862	*Synaphea petiolaris subsp. simplex*		P3	
76.	1033	*Tetraria australiensis*		T	
77.	13783	*Thysanotus sp. Badgingarra (E.A. Griffin 2511)*		P2	
78.	44444	*Tripterococcus sp. Brachylobus (A.S. George 14234)*		P4	
79.	12392	*Verticordia attenuata*		P3	
80.	12412	*Verticordia densiflora var. pedunculata*		T	
81.	6093	*Verticordia lehmannii*		P4	
82.	12448	*Verticordia plumosa var. ananeotes*		T	
83.	12453	*Verticordia plumosa var. vassensis*		T	

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

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

Appendix 4. Definitions of Conservation Codes for Threatened and Priority flora (DBCA, 2019a).

Conservation code	Category
(T) Threatened species pursuant to Sect 19 of the BC Act 2016.	
T	(T) CR – Critcially endangered Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".
	(T) EN - Endangered Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".
	(T) VU - Vulnerable Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".
(P) Priority species – possible Threatened species.	
P1	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Conservation code	Category
P3	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	(a) Rare. Species 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 species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Appendix 5. Categories of Threatened Species under the EPBC Act (DotEE, 2018c).

Category	Definition
Extinct (Ex)	A native species is eligible to be included in the ***extinct*** category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (ExW)	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered 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 (EN)	A native species is eligible to be included in the endangered 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 (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time (a) it is not critically endangered or 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.
Conservation Dependent (CD)	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Appendix 6 Threated and Priority Flora within 10 km of the Survey Area (DBCA, 2018c & 2019c)

Species	Cons Status*	Flowering	Description and Habitat	Likelihood
Brachyscias verecundus	T (CR)	Nov	Annual (or ephemeral), herb, 0.012-0.022 m high, entirely glabrous. Fl. white/cream. In a moss sward. On a granite outcrop.	Low
Caladenia procera	T (CR)	Sep-Oct	Tuberous, perennial, herb, 0.35-0.9 m high. Fl. yellow. Rich clay loam,. Alluvial loamy flats, jarrah/marri/peppermint woodland, dense heath, sedges.	Low
Hemigenia ramosissima	T (CR)	Nov-Dec or Jan	Slender shrub, to 0.5 m high. Fl. blue-purple. Lateritic soils, clay. Granite outcrops.	Low
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T (CR)	Oct	Dense, clumped shrub, to 0.3 m high, to 0.4 m wide. Fl. Yellow. Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.	Low
Andersonia gracilis	T (EN)	Sep-Nov	Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple. White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	Moderate
Banksia nivea subsp. *uliginosa*	T (EN)	July-Sep	Dense, erect, non-lignotuberous shrub, 0.2–1.5 m high. Fl. yellow, brown. Sandy clay, gravel.	Moderate
Caladenia busselliana	T (EN)	Sept-Oct	Tuberous, perennial, herb, 0.2–0.3 m high. Fl. green, yellow, cream. Sandy loam. Winter-wet swamps	Low
Caladenia hoffmanii	T (EN)	Aug-Oct	Tuberous, perennial, herb, 0.13-0.3 m high. Fl. green & yellow & red. Clay, loam, laterite, granite. Rocky outcrops and hillsides, ridges, swamps and gullies.	Low
Caladenia huegelii	T (EN)	Sep-Oct	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green, cream, red. Grey or brown sand, clay loam.	Low
Darwinia whicherensis	T (EN)	Oct-Nov	Erect low shrub to 30 cm, flowers green, outer red. Winter-wet area of shrubland over shallow red clay over ironstone	Moderate
Drakaea elastica	T (EN)	Oct-Nov	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red, green, yellow. White or grey sand. Low-lying situations adjoining winter-wet swamps.	Low

Species	Cons Status*	Flowering	Description and Habitat	Likelihood
Eucalyptus phylacis	T (EN)	May	Mallee or tree, to 5 m high, bark rough & flaky on trunk. Fl. Cream. Laterite, loam over granite. Coastal areas.	Low
Gastrolobium papilio	T (EN)	Oct-Dec	Tangled, clumped shrub, to 1.5 m high. Fl. cream-red. Sandy clay over ironstone and laterite. Flat plains.	Low
Grevillea maccutcheonii	T (EN)	Mar or May or Dec	Densely branched shrub, to 2 m high. Fl. green & red. Shallow soils over laterite, clay. Seasonally inundated sites.	Moderate
Lambertia echinata subsp. *occidentalis*	T (EN)	Feb/May-Jun/Oct	Prickly, much-branched, non-lignotuberous shrub, to 3 m high. Fl. yellow. White sandy soils over laterite, orange/brown-red clay over ironstone.	Low
Petrophile latericola	T (EN)	Nov	Multi-stemmed shrub, 0.4-1.5 m high. Fl. yellow. Red lateritic clay. Winter-wet flats.	Moderate
Sphenotoma drummondii	T (EN)	Sep-Dec	Tufted shrub, 0.15-0.5 m high. Fl. white. Stony or shallow soils over granite or quartzite. Steep rocky slopes, crevices of rocks.	Low
Verticordia densiflora var. *pedunculata*	T (EN)	Dec-Jan	Erect to spreading shrub, 0.3-0.6 m high. Fl. pink/pink-white. Grey/yellow sand, sandy loam. Winter-wet low-lying areas.	
Verticordia plumosa var. *ananeotes*	T (EN)	Nov-Dec	Erect, sparsely branched shrub, 0.3-0.5 m high. Fl. pink-purple/white. Sandy loam. Seasonally inundated plains.	
Verticordia plumosa var. *vassensis*	T (EN)	Sep-Feb	Shrub, 0.3–1 m high. Fl. pink. White/grey sand. Winter-wet flats.	Moderate
Banksia squarrosa subsp. *argillacea*	T (VU)	Jun-Nov	Erect, open, non-lignotuberous shrub, 1.2–4 m high. Fl. yellow, Jun–Nov. White/grey sand, gravelly clay or loam. Winter-wet flats, clay flats.	Low- Moderate
Chamelaucium sp. S Coastal Plain (R.D. Royce 4872)	T (VU)	Oct-Dec	Winter-wet areas, loams and ironstone.	Low - Modarate
Daviesia elongata subsp. *elongata*	T (VU)	Dec-Feb	Spreading shrub, 0.4–1 m high. Fl. yellow, orange, red. Sandy soils.	Low
Diuris micrantha	T (VU)	Sep-Oct	Tuberous, perennial, herb, 0.3–0.6 m high. Fl. yellow, brown. Brown loamy clay. Winter-wet swamps, in shallow water.	Low - Modarate
Drakaea micrantha	T (VU)	Sep-Oct	Tuberous, perennial, herb, 0.15–0.3 m high. Fl. red, yellow. White-grey sand.	Low
Grevillea elongata	T (VU)	Oct	Shrub, 1.5-2 m high. Fl. white-cream. Gravelly clay, sandy clay, sand. Road verges, swamps, creek banks.	Moderate

Species	Cons Status*	Flowering	Description and Habitat	Likelihood
Tetraria australiensis	T (VU)	Nov-Dec	Rhizomatous, tufted perennial, grass-like or herb (sedge), to 1 m high. Fl. brown. Sandy soils associated with heavy soils on the Pinjarra Plain.	Low
Andersonia ferricola	P1	Oct	Shrub, 0.2-0.5 m high. Fl. purple. White sand or red-brown loam over ironstone. Seasonally wet flats.	Low- Moderate
Gastrolobium sp. Yoongarillup (S. Dilkes s.n. 1/9/1969	P1	Aug-Oct	Erect, perennial shrub; 0.5 m high, 1.0 m wide; flowers yellow/orange. Jarrah-Marri forest, white sand, gravel	Low
Loxocarya striata subsp. *implexa*	P1	Jul-Dec	Winter-wet flats.	Moderate
Stachystemon sp. Keysbrook (R. Archer 17/11/99)	P1		Shrub/herb to 0.2 m high.	Low
Stylidium ferricola	P1		Caespitose perennial, herb, 0.09-0.15 m high. Shallow red-brown clay loam over ironstone. Seasonally wet poorly-drained slopes.	Low
Acacia benthamii	P2	Aug-Sep	Shrub, ca 1 m high. Fl. Yellow. Sand. Typically on limestone breakaways.	Low
Actinotus whicheranus	P2	Dec or Jan-Mar	Erect, slender perennial, herb, with flowering branches to 0.4 m high. Fl. white. White sand pockets over laterite.	Low
Amperea micrantha	P2	Oct-Nov	Low, spreading, bushy perennial, herb, 0.1–0.3 m high. Fl. brown. Sandy soils.	Low
Calytrix retrorsifolia	P2	No info avail	Slender, spreading , open shrub, 0.2-2 m high, Fl. 5-merous, white (pale yellow in bud). Shallow red clays and/or yellow sands over massive ironstones.	Low
Cardamine paucijuga	P2	Sep-Oct	Slender erect annual, herb, to 0.4 m high. Fl. white. In moist to dry habitats.	Low
Eucalyptus relicta	P2	Jan-Feb	Mallee or tree, to 7 m high, bark rough all the way to branchlets, thick, grey; leaves lanceolate-falcate, dark olive-gree, glossy above, dull and paler below. Fl. cream. Grey clay-loam. Undulating upper slopes, along creeklines.	Low
Gastrolobium whicherense	P2	Oct	Slender, open shrub, to 1.6 m high. Fl. orange/yellow/red. Red-grey sandy clay over quartzite. Steep westerly slopes.	Low
Gratiola pedunculata	P2	Sep-Nov	Erect to decumbent perennial herb 13–50 cm high. Damp areas.	Low

Species	Cons Status*	Flowering	Description and Habitat	Likelihood
Leucopogon sp. Busselton (D. Cooper 243)	P2	Aug-Sep	Slender, erect shrub to 70 cm; flowers white. Pericalymma ellipticum wet shrubland, Marri-Jarrah woodland.	Low - Moderate
Platytheca sp. Sabina (G.J. & B.J. Keighery 295)	P2	Aug-Nov	Erect open shrub to 70 cm high x 50 cm wide. Petals blue-purple.	Low - Moderate
Stylidium squamellosum	P2	Oct-Nov	Caespitose perennial, herb, 0.12-0.35 m high, leaves tufted, linear to narrowly oblanceolate, 1-5 cm long, 0.8-2.5 mm wide, apex subacute, margin entire, glandular. Scape glandular throughout. Inflorescence racemose. Fl. yellow. Brown to red-brown clay loam. Winter-wet habitats and depressions, open woodland, shrubland.	Low - Moderate
Synaphea petiolaris subsp. *simplex*	P2	Sep-Oct	Tufted shrub, 0.1–0.6 m high. Fl. yellow. Sandy soils. Flats, winter-wet areas.	Low - Moderate
Thysanotus sp. Badgingarra (E.A. Griffin 2511)	P2			
Angianthus drummondii	P3	Oct-Dec	Erect annual, herb, to 0.1 m high. Fl. yellow. Grey or brown clay soils, ironstone. Seasonally wet flats.	Low - Moderate
Banksia mimica	P3	Dec-Feb	Prostrate, lignotuberous shrub, 0.15–0.4 m high. Fl. yellow, brown. White or grey sand over laterite, sandy loam.	Low
Blennospora doliiformis	P3	Oct-Nov	Erect annual, herb, to 0.15 m high. Fl. yellow. Grey or red clay soils over ironstone. Seasonally-wet flats.	Low - Moderate
Boronia anceps	P3	Sep-Dec or Jan	Perennial, herb, 0.3-0.6 m high, lacking lignotuber, stem flattened and ancipitous when young. Fl. pink/pink-purple. White sand, gravelly laterite. Seasonally swampy heaths.	Low
Boronia capitata subsp. *gracilis*	P3	Jun-Nov	Slender shrub, 0.3-0.6(-3) m high, branches pilose. Fl. pink. White/grey or black sand. Winter-wet swamps,	Moderate
Boronia tetragona	P3	Oct-Dec	Perennial, herb, 0.3–0.7 m high, leaves sessile, entire, with papillate margins, branches quadrangular, sepals ciliate. Fl. pink, red. Black/white sand, laterite, brown sandy loam. Winter-wet flats, swamps, open woodland.	Moderate
Caustis sp. Boyanup (G.S. McCutcheon 1706)	P3	Dec-Jan	Rhizomatous, clumped perennial, grass-like or herb (sedge), 0.7–1 m high. White or grey sand.	Low

Species	Cons Status*	Flowering	Description and Habitat	Likelihood
Chamaescilla gibsonii	P3	Sep	Clumped tuberous, herb. Fl. blue. Clay to sandy clay. Winter-wet flats, shallow water-filled claypans.	Moderate
Chordifex gracilior	P3	Sep-Dec	Rhizomatous, erect perennial, herb, 0.3-0.5 m high. Fl. brown. Peaty sand. Swamps.	Low
Eryngium sp. ferox	P3	Oct,Nov		Low - Moderate
Eryngium sp. Subdecumbens (G.J. Keighery 5390)	P3	Nov	Erect, open tuberous, herb, 0.1–0.3 m high. Fl. green. Grey to brown loamy to sandy clay, brown cracking clay. Winter-wet flats, swamps, dried claypans, ridges.	Low - Moderate
Grevillea brachystylis subsp. *brachystylis*	P3	Aug-Nov	Much-branched, prostrate or decumbent, non-lignotuberous shrub, 0.2-0.5 m high, to 3 m wide. Fl. red. Black sand, sandy clay. Swampy situations.	Low- Moderate
Grevillea bronwenae	P3	Jun-Dec	Slender, erect shrub, 0.5–1.6 m high. Fl. red. Grey sand over laterite, lateritic loam. Hillslopes.	Low
Grevillea manglesioides subsp. *ferricola*	P3	Oct	Erect or spreading shrub, 1.5 m high. Fl. red/green/red&green. Red sandy clay over ironstone. Winter wet flats.	Low - Moderate
Hakea oldfieldii	P3	Aug-Oct	Open, straggling shrub, up to 2.5 m high. Fl. white, cream, yellow. Red clay or sand over laterite. Seasonally wet flats.	Moderate
Isopogon formosus subsp. *dasylepis*	P3	Jun-Dec	Low, bushy or slender, upright, non-lignotuberous shrub, 0.2–2 m high. Fl. pink, purple, red. Sand, sandy clay, gravelly sandy soils over laterite. Often swampy areas.	Moderate
Jacksonia gracillima	P3	Oct-Nov	Decumbent shrub - 20 cm high and 50 cm wide. Flowers standard orange-yellow; eye yellow with red halo; wings/keel red. Seasonally damp shrublands and woodlands, on sandy loams or clay loams	Moderate
Lasiopetalum laxiflorum	P3	Sep-Oct	Jarrah forest, lateritic soils. 2-3 ft high. Mauve flowers. Brown on underside of leaf.	Low
Lasiopetalum membranaceum	P3	Sep-Dec	Multi-stemmed shrub, 0.2-1 m high. Fl. pink, blue, purple. Sand over limestone.	Low
Lepyrodia heleocharoides	P3	Dec	Rhizomatous, slender, tufted perennial, herb (sedge-like), 0.15–0.25 m high. Moist peaty sand. Dry or seasonally inundated heath or woodland, swamps.	Low

Species	Cons Status*	Flowering	Description and Habitat	Likelihood
Loxocarya magna	P3	Sep-Nov	Rhizomatous, perennial, herb (sedge-like), 0.5-1.5 m high. Sand, loam, clay, ironstone. Seasonally inundated or damp habitats.	Low - Moderate
Meionectes tenuifolia	P3		Haloragaceae family, broadly distributed across the Swan Coastal Plain, northern and southern Jarrah forests.	Low
Myriophyllum echinatum	P3	Nov	Erect annual, herb, 0.02-0.03 m high. Fl. red. Clay. Winter-wet flats.	Low
Pithocarpa corymbulosa	P3	Jan-Apr	Erect to scrambling perennial, herb, 0.5-1 m high. Fl. white. Gravelly or sandy loam. Amongst granite outcrops.	Low
Pultenaea pinifolia	P3	Oct-Nov	Erect, slender shrub, 1-3 m high. Fl. yellow, orange. Loam or clay. Floodplains, swampy areas.	Low - Moderate
Schoenus benthamii	P3	Oct-Nov	Tufted perennial, grass-like or herb (sedge), 0.15-0.45 m high. Fl. brown. White, grey sand, sandy clay. Winter-wet flats, swamps.	Low
Schoenus pennisetis	P3	Aug-Sep	Tufted annual, grass-like or herb (sedge), 0.05-0.15 m high. Fl. purple-black. Grey or peaty sand, sandy clay. Swamps, winter-wet depressions.	Low
Stylidium paludicola	P3	Oct-Dec	Reed-like perennial, herb, 0.35-1 m high, Leaves tufted, linear or subulate or narrowly oblanceolate, 0.5-4 cm long, 0.5-1.5 mm wide, apex acute, margin entire, glabrous. Scape mostly glabrous, inflorescence axis glandular. Inflorescence racemose. Fl. pink. Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	Low
Synaphea hians	P3	Jul-Nov	Prostrate or decumbent shrub, 0.15-0.6 m high, to 1 m wide. Fl. Yellow. Sandy soils. Rises.	Low
Verticordia attenuata	P3	Dec-May	Shrub, 0.4–1 m high. Fl. pink. White or grey sand. Winter-wet depressions	Moderate
Acacia flagelliformis	P4	May-Sep	Rush-like, erect or sprawling shrub, 0.3-0.75(-1.6) m high. Fl. yellow. Sandy soils. Winter-wet areas.	Moderate
Acacia semitrullata	P4	May-Oct	Slender, erect, pungent shrub, (0.1-)0.2-0.7(-1.5) m high. Fl. cream, white. White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	Low
Aponogeton hexatepalus	P4	Jul-Oct	Rhizomatous or cormous, aquatic perennial, herb, leaves floating. Fl. green, white. Mud. Freshwater: ponds, rivers, claypans.	Low - Moderate

Species	Cons Status*	Flowering	Description and Habitat	Likelihood
Banksia meisneri subsp. *ascendens*	P4	Apr-Sep	Shrub, 0.5-2 m high, leaves ascending, 8-15 mm long. Fl. yellow-orange-brown. White or grey sand. Swampy flats.	Moderate
Caladenia speciosa	P4	Sep-Oct	Tuberous, perennial, herb, 0.35-0.6 m high. Fl. white, pink. White, grey or black sand.	Low
Calothamnus quadrifidus subsp. *teretifolius* A.S.George & N.Gibson ms	P4	Nov-Dec	Erect, compact, perennial shrub 1.7 m high x 1 m wide. Fl. Red. Seeds held. Fruit exposed.	High
Chamelaucium sp. Yoongarillup (G.J. Keighery 3635)	P4	Jul-Oct	Non-lignotuberous shrub, to 2.5 m high. Fl. cream, yellow. Jarrah-marri forest. Loams, sandy clays. Riverbanks, lower slopes, below laterite breakaways.	High
Eucalyptus rudis subsp. *cratyantha*	P4	Jul-Sep	Tree, 5-20 m high, bark rough, box-type. Fl. white. Loam. Flats, hillsides.	High
Franklandia triaristata	P4	Aug-Oct	Erect, lignotuberous shrub, 0.2-1 m high. Fl. white, cream, yellow , brown, purple. White or grey sand.	Low
Lambertia rariflora subsp. *rariflora*	P4	Feb-May	Small tree or shrub, to 7 m high. Fl. green, yellow. Red-brown clay soils, black organic loam, laterite. Near intermittent streams.	Low
Ornduffia submersa	P4	Sep-Oct	Tuberous emergent aquatic perennial dwarf shrub, height to 35 cm; flowers white; leaves floating on surface of water. Clay-based ponds and swamps (semi-aquatic)	Moderate
Pultenaea skinneri	P4	Jul-Sep	Slender shrub, 1-2 m high. Fl. yellow, orange, red. Sandy or clayey soils. Winter-wet depressions.	Low - Moderate
Schoenus natans	P4	Oct	Aquatic annual, grass-like or herb (sedge), 0.3 m high. Fl. brown. Winter-wet depressions.	Low - Moderate
Stylidium longitubum	P4	Oct-Dec	Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. Pink. Sandy clay, clay. Seasonal wetlands.	Low - Moderate
Stylidium striatum	P4	Oct-Nov	Rosetted perennial, herb, 0.15-0.55 m high, Leaves erect, oblanceolate to spathulate, 1.5-4 cm long, 1.5-6 mm wide, apex acute to acuminate, margin entire, glabrous, striate. Scape sparingly glandular on inflorescence axis, glabrous below. Inflorescence racemose. Fl. yellow.	Low

Species	Cons Status*	Flowering	Description and Habitat	Likelihood
			Brown clay loam over laterite. Hillslopes. Jarrah/Marri forest, Wandoo woodland.	
Tripterococcus sp. Brachylobus (A.S. George 14234)	P4	Nov-Dec or Feb	Perennial, herb, to 1 m high. Fl. yellow/yellow-green. Grey sand, red clay, laterite, often moist. Low-lying flats.	Low - Moderate
Verticordia lehmannii	P4	Jan/Apr-Aug/Dec	Slender shrub, 0.2–1 m high. Fl. pink. Sandy clay. Winter-wet flats.	Moderate

Note: The BC Act Conservation Status is shown, EPBC Act status, where relevant, is in brackets.

Appendix 7. Vegetation condition scale (EPA, 2016).

Vegetation Condition	South West and Interzone Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

Appendix 8. List of vascular flora found within the Wonnerup South Road Survey Area

No	FAMILY NAME	SPECIES NAME	NATURALISED	CONSV CODE
1	Alliaceae	*Allium triquetrum*	*	
2	Anarthriaceae	*Lyginia imberbis*		
3	Araceae	*Zantedeschia aethiopica*	*	
4	Asparagaceae	*Asparagus asparagoides*	*	
5	Asparagaceae	*Lomandra micrantha*		
6	Asteraceae	*Arctotheca calendula*	*	
7	Asteraceae	*Cotula turbinata*	*	
8	Asteraceae	*Hypochaeris glabra*	*	
9	Asteraceae	*Sonchus asper*	*	
10	Asteraceae	*Sonchus oleraceus*	*	
11	Asteraceae	*Symphyotrichum squamatum*	*	
12	Brassicaceae	*Heliophila pusilla*	*	
13	Caryophyllaceae	*Stellaria media*	*	
14	Casuarinaceae	*Allocasuarina fraseriana*		
15	Colchicaceae	*Burchardia congesta*		
16	Crassulaceae	*Crassula natans*	*	
17	Cyperaceae	*Bolboschoenus caldwellii*		
18	Cyperaceae	*Cyathochaeta avenacea*		
19	Cyperaceae	*Lepidosperma squamatum*		
20	Cyperaceae	*Lepyrodia muirii*		
21	Dasypogonaceae	*Kingia australis*		
22	Dennstaedtiaceae	*Pteridium esculentum*		
23	Ericaceae	*Leucopogon australis*		
24	Ericaceae	*Leucopogon propinquus*		
25	Fabaceae	*Acacia applanata*		
26	Fabaceae	*Acacia extensa*		
27	Fabaceae	*Acacia incurva*		

No	FAMILY NAME	SPECIES NAME	NATURALISED	CONSV CODE
28	Fabaceae	*Acacia longifolia*	*	
29	Fabaceae	*Acacia pulchella*		
30	Fabaceae	*Acacia saligna*		
31	Fabaceae	*Gastrolobium praemorsum*		
32	Fabaceae	*Jacksonia furcellata*		
33	Fabaceae	*Kennedia coccinea*		
34	Fabaceae	*Kennedia prostrata*		
35	Fabaceae	*Lupinus cosentinii*	*	
36	Fabaceae	*Vicia sativa*	*	
37	Fabaceae	*Viminaria juncea*		
38	Haemodoraceae	*Anigozanthos flavidus*		
39	Haemodoraceae	*Haemodorum laxum*		
40	Haemodoraceae	*Haemodorum spicatum*		
41	Hemerocallidaceae	*Agrostocrinum scabrum*		
42	Hemerocallidaceae	*Caesia micrantha*		
43	Iridaceae	*Gladiolus undulatus*		
44	Iridaceae	*Romulea rosea*	*	
45	Iridaceae	*Sparaxis bulbifera*	*	
46	Iridaceae	*Watsonia meriana*	*	
47	Juncaceae	*Juncus microcephalus*	*	
48	Juncaceae	*Juncus pallidus*		
49	Juncaginaceae	*Cycnogeton lineare*		
50	Loranthaceae	*Nuytsia floribunda*		
51	Myrtaceae	*Agonis flexuosa*		
52	Myrtaceae	*Astartea scoparia*		
53	Myrtaceae	*Calothamnus quadrifidus* subsp. *teretif olius*		P4
54	Myrtaceae	*Corymbia calophylla*		

No	FAMILY NAME	SPECIES NAME	NATURALISED	CONSV CODE
55	Myrtaceae	*Darwinia citriodora*		
56	Myrtaceae	*Eucalyptus citriodora*	*	
57	Myrtaceae	*Eucalyptus globulus*	*	
58	Myrtaceae	*Eucalyptus marginata*		
59	Myrtaceae	*Eucalyptus patens*		
60	Myrtaceae	*Eucalyptus rudis*		
61	Myrtaceae	*Hypocalymma angustifolium*		
62	Myrtaceae	*Leptospermum laevigatum*	*	
63	Myrtaceae	*Melaleuca lateritia*		
64	Myrtaceae	*Melaleuca preissiana*		
65	Myrtaceae	*Melaleuca rhaphiophylla*		
66	Myrtaceae	*Melaleuca viminea*		
67	Oleaceae	*Olea europaea*	*	
68	Oxalidaceae	*Oxalis glabra*	*	
69	Oxalidaceae	*Oxalis pes-caprae*	*	
70	Oxalidaceae	*Oxalis purpurea*	*	
71	Pinaceae	*Pinus pinaster*	*	
72	Poaceae	*Avena fatua*	*	
73	Poaceae	*Cenchrus clandestinus*	*	
74	Poaceae	*Cynodon dactylon*	*	
75	Poaceae	*Ehrharta calycina*	*	
76	Poaceae	*Eragrostis curvula*	*	
77	Poaceae	*Holcus lanatus*	*	
78	Poaceae	*Lolium rigidum*	*	
79	Poaceae	*Poa annua*	*	
80	Polygonaceae	*Rumex acetosella*	*	
81	Polygonaceae	*Rumex crispus*	*	
82	Proteaceae	*Adenanthos meisneri*		

No	FAMILY NAME	SPECIES NAME	NATURALISED	CONSV CODE
83	Proteaceae	*Banksia grandis*		
84	Proteaceae	*Banksia littoralis*		
85	Proteaceae	*Hakea ceratophylla*		
86	Proteaceae	*Hakea prostrata*		
87	Proteaceae	*Hakea ruscifolia*		
88	Proteaceae	*Strangea stenocarpoides*		
89	Proteaceae	*Xylomelum occidentale*		
90	Restionaceae	*Hypolaena exsulca*		
91	Restionaceae	*Hypolaena pubescens*		
92	Restionaceae	*Leptocarpus coangustatus*		
93	Rubiaceae	*Galium murale*	*	
94	Solanaceae	*Solanum nigrum*	*	
95	Typhaceae	*Typha orientalis*		
96	Xanthorrhoeaceae	*Xanthorrhoea preissii*		
97	Zamiaceae	*Macrozamia riedlei*		

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Threatened and Priority Flora Report Form

Version 1.3 August 2017

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at http://dpaw.wa.gov.au/ under *Standard Report Forms*

TAXON: Calothamnus quadrifidus subsp. teretifolius **TPFL Pop. No:**

OBSERVATION DATE: 3/09/2019 **CONSERVATION STATUS:** P4 New population ☐

OBSERVER/S: Russell Smith & Colin Spencer **PHONE :**

ROLE: botanists **ORGANISATION:** Ecoedge

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

Wonnerup South Road, 2826 m southof Bussell Hwy, east side of road

Reserve No:

DBCA DISTRICT: **LGA:** Busselton Land manager present: ☐

DATUM: GDA94 / MGA94 ☒ AGD84 / AMG84 ☐ WGS84 ☐ Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required) DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 6273264.9

Long / Easting: 355481.8

ZONE: 50

METHOD USED: GPS ☐ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☐ Map scale:

LAND TENURE:

Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☒

National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐

Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other:

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☒ Area observed (m²):

EFFORT: Time spent surveying (minutes): No. of minutes spent / 100 m²:

POP'N COUNT ACCURACY: Actual ☐ Extrapolation ☐ Estimate ☐ Count method: (Refer to field manual for list)

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	**Mature:**	**Juveniles:**	**Seedlings:**	**Totals:**
Alive	1			1
Dead				

Area of pop (m²): 2

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. Size Data attached ☐ Total area of quadrats (m²):

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☐ Flower ☐

Immature fruit ☐ Fruit ☒ Dehisced fruit ☐ Percentage in flower: %

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
• Road maintenance/upgrade			
•			
•			

Please return completed form to **Species And Communities Branch** DBCA,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: **Sheet No.:** **Record Entered in Database** ❑

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:
Crest ☐
Hill ☐
Ridge ☐
Outcrop ☐
Slope ☐
Flat ☒
Open depression ☐
Drainage line ☐
Closed depression ☐
Wetland ☐

ROCK TYPE:
Granite ☐
Dolerite ☐
Laterite ☐
Ironstone ☐
Limestone ☐
Quartz ☐
Specify other: _____

LOOSE ROCK:
(on soil surface; eg gravel, quartz fields)
0-10% ☐
10-30% ☐
30-50% ☐
50-100% ☐

SOIL TYPE:
Sand ☐
Sandy loam ☒
Loam ☐
Clay loam ☐
Light clay ☐
Peat ☐
Specify other: _____

SOIL COLOUR:
Red ☐
Brown ☒
Yellow ☐
White ☐
Grey ☒
Black ☐
Specify other: _____

DRAINAGE:
Well drained ☒
Seasonally inundated ☐
Permanently inundated ☐
Tidal ☐

Specific **Landform** Element: _____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:
Eg: **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) ; **3**. Isolated clumps of sedges (Mesomelaena tetragona)

1. Jarrah-marri open forest
2. Nuytsia floribunda, Kingia australis
3.
4.

ASSOCIATED SPECIES:
Other (non-dominant) spp: Adenanthos meisneri, Haemodorum spicatum, Acacia applanata

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

COMMENT: _____

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

DRF PERMIT/ LICENCE No: Note if only observing plants (i.e. no specimens or plant matieral is taken) then no permit/licence is required. For further information on permit and licening requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. ☐ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of Record: Russell Smith Role: botanist Signed: R. Smith Date: 11/01/2020

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Entered in Database** ❑

Appendix 10. Photographs and descriptions of Vegetation Units mapped within the Wonnerup South Road Survey Area

Unit A. Woodland/Open woodland of *Corymbia calophylla* with over occasional *Banksia grandis* over very scattered *Acacia extensa*, *A. saligna*, *Adenanthos meisneri*, *Viminaria juncea*, *Jacksonia furcellata*, *Kingia australis* and *Xanthorrhoea preissii* shrubs over grassland/herbland including **Avena barbata*, **Cenchrus clandestinus*, **Ehrharta calycina*, **Eragrostis curvula*, **Arctotheca calendula*, **Romulea rosea* and **Watsonia meriana* on grey-brown sandy-loam. (*Agonis flexuosa* appears as a mid-storey tree in the southern part of the Survey Area)

Unit B. Woodland of *Eucalyptus rudis*, (*Corymbia calophylla*) over *Melaleuca rhaphiophylla* or *M. preissiana* over shrubland of *Hakea prostrata*, *Kingia australis*, *Melaleuca rhaphiophylla* and *Xanthorrhoea* preissii over *Juncus pallidus* and introduced herbaceous species. (Good to Degraded)

Unit C. Open forest of *Eucalyptus rudis* or *Corymbia calophylla* over *Melaleuca preissiana* over shrubland of *Astartea scoparia*, *Hakea ceratophylla*, *H. varia*, *Kingia australis*, *Melaleuca viminea*, *M. lateritia* over *Leptocarpus coangustatus* and scattered **Briza maxima* on damp grey-brown clay-loam.

Unit D. Open forest of *Corymbia calophylla* (with patches of *Eucalyptus patens*) over *Agonis flexuosa* over scattered *Darwinia citriodora* and *Xanthorrhoea preissii* shrubs over introduced herbaceous taxa including **Avena barbata* and **Eragrostis curvula* on grey-brown sandy loam.

Unit E. Scattered *Corymbia calophylla* and introduced *Eucalyptus* spp. and grassland of Introduced species with isolated native shrubs such as *Xanthorrhoea preissii* on grey-brown loam (includes roadway and gravel shoulders).

Department of Parks and Wildlife

Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

Version 6.0 July 2013

COMMUNITY: Southern wet shrublands" (SWAFCT02) **OBSERVATION DATE:** 3/09/2019

New occurrence ☒ **Site ID:** **CONS STATUS:**

OBSERVER/S: Russell Smith & Colin Spencer **PHONE:** 0447809124

ROLE: botanists **ORGANISATION:** Ecoedge

EMAIL: russell@ecoedge.com.au

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Wonnerup Sth Road, City of Busselton, opposite junction with Princefield Road, and also 520 m north of Vasse Highway

Reserve No:

DISTRICT: **LGA:** Busselton Land manager present: ☐

DATUM:

GDA94 / MGA94 ☒
AGD84 / AMG84 ☐
WGS84 ☐
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)

DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 6271638
Long / Easting: 355507
Zone: 50

METHOD USED:

GPS ☒ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☐ Map used:

LAND TENURE:

Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☒
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole _____ to _____ Specify other: _____

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☒ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m²: _____

THREATS - type, and supporting information: e.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents.	**Cause/Agent:** e.g. weed type, grazing species, recreation type	Area affected	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			
•		%			

*Rate current and potential threat impact: **N=Nil, L=Low, M=Medium, H=High, E=Extreme**

*Estimate time to potential impact: **S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)**

CONDITION OF OCCURRENCE: (Bush Forever Scale) (estimate % of area in each)

Pristine ☐ _____% Very Good ☐ _____% Degraded ☐ _____%

Excellent ☐ _____% Good ☐ _____% Completely Degraded ☐ _____%

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

*Record entered by:*_____ *Date entered:*_____ *Database no:*_____

Department of Parks and Wildlife

Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

Version 6.0 July 2013

RECOMMENDED MANAGEMENT ACTIONS: e.g. roadside markers, weed control, etc.

ACTIONS IMPLEMENTED (include date):

HABITAT INFORMATION: (Check more than one box for combinations or where necessary)

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest ☐	Granite ☐	(on soil surface; e.g. gravel, quartz fields)	Sand ☐	Red ☐	Well drained ☐
Hill ☐	Dolerite ☐		Sandy loam ☐	Brown ☒	Seasonally inundated ☒
Ridge ☐	Laterite ☐	0-10% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	10-30% ☐	Clay loam ☒	White ☐	Tidal ☐
Slope ☐	Limestone ☐	30-50% ☐	Light clay ☐	Grey ☒	
Flat ☐	Quartz ☐	50-100% ☐	Peat ☐	Black ☐	
Open depression ☐					
Drainage line ☐	Specify other:		Specify other:	Specify other:	Specify other:
Closed depression ☐					
Wetland ☐					

Specific Landform Element: (Refer to field manual for additional values)

CONDITION OF SOIL:

Dry ☐ Moist ☐ Waterlogged ☒ Inundated ☐ Cracked ☐ Saline ☐ Other:

VEGETATION CLASSIFICATION:	1. Sbrubland, low woodland
	2.
	3.
	4.

FIRE HISTORY:

Last Fire: Season/Month: Year: **Fire Intensity:** High ☐ Medium ☐ Low ☐ No evidence of fire ☐

Actual Occurrence Landuse:

Please return form to:

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*Record entered by:*_____ *Date entered:*_____ *Database no:*_____

Department of Parks and Wildlife

Threatened and Priority Ecological Community (TEC/PEC) Occurrence Report Form

Version 6.0 July 2013

Adjacent Landuse:	Farming, mining

Associated Flora Species:
Open forest of Eucalyptus rudis or Corymbia calophylla over
Melaleuca preissiana over shrubland of Astartea scoparia, Hakea ceratophylla, H. varia, Kingia australis, Melaleuca viminea, M. lateritia over
Leptocarpus coangustatus and scattered *Briza maxima on damp grey-brown clay-loam.

Associated Fauna Species:

OTHER COMMENTS:

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐

Other:

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of record:	**Russell Smith**	**Role:**	**botanist**
Signature:	**Russell Smith**	**Date submitted:**	

Please return form to:

communities.data@dpaw.wa.gov.au

or Species and Communities Branch, Department of Parks and Wildlife, Locked Bag 104, Bentley Delivery Centre WA 6983

*Record entered by:*_____ *Date entered:*_____ *Database no:*_____