

# Environmental Consulting Options Tasmania

## NATURAL VALUES ASSESSMENT OF PROPOSED REZONING AND SUBDIVISION, 27-99 OPOSSUM ROAD (NEGARA STREET), KINGS MEADOWS, TASMANIA

ADDENDUM: SPRING SURVEY 2021



## Environmental Consulting Options Tasmania (ECOtas) for Woolcott Surveys

17 November 2021

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## **AUTHORSHIP**

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Report production: Mark Wapstra

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Base data for mapping: LISTmap, Woolcott Surveys

Digital and aerial photography: Mark Wapstra, LISTmap, GoogleEarth

## **ACKNOWLEDGEMENTS**

Brett Woolcott & James Stewart (Woolcott Surveys) provided background information on the project.

## **COVER ILLUSTRATION**

View north into proposed project area from existing green.

Please note: the blank pages in this document are deliberate to facilitate double-sided printing.

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**CONTENTS**

SUMMARY ..... 1

INTRODUCTION ..... 3

    Purpose ..... 3

    Scope ..... 3

    Limitations ..... 3

    Qualifications ..... 4

    Permit ..... 4

LAND USE PROPOSAL ..... 4

STUDY AREA ..... 4

METHODS ..... 14

    Nomenclature ..... 14

    Preliminary investigation ..... 14

    Field assessment ..... 14

    Botanical survey – vegetation classification ..... 15

    Botanical survey – threatened flora ..... 15

    Zoological survey – general ..... 15

    Declared and environmental weeds ..... 15

    Plant and animal disease ..... 15

FINDINGS ..... 16

    Vegetation types ..... 16

        Comments on TASVEG mapping ..... 16

        Vegetation types recorded as part of the present study ..... 19

        Conservation status of identified vegetation type ..... 21

    Plant species ..... 21

        General information ..... 21

        Threatened flora species recorded from study area ..... 21

        Threatened flora species potentially present (database analysis) ..... 22

    Fauna species ..... 22

        Threatened fauna species known from the study area ..... 22

        Threatened fauna species potentially present (database analysis) ..... 28

    Other ecological values ..... 28

        Weed species ..... 28

        Rootrot pathogen, *Phytophthora cinnamomi* ..... 29

        Myrtle wilt ..... 29

        Myrtle rust ..... 29

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Chytrid fungus and other freshwater pathogens ..... 29

Additional "Matters of National Environmental Significance" ..... 30

DISCUSSION ..... 30

    Summary of key findings..... 30

    Legislative and policy implications ..... 31

REFERENCES..... 37

APPENDIX A. Vegetation community structure and composition ..... 40

APPENDIX B. Vascular plant species recorded from study area ..... 41

APPENDIX C. Analysis of database records of threatened flora ..... 44

APPENDIX D. Analysis of database records of threatened fauna ..... 56

APPENDIX E. DPIPWE's *Natural Values Atlas* report for study area ..... 62

APPENDIX F. Forest Practices Authority's *Biodiversity Values Atlas* report for study area ..... 62

APPENDIX G. CofA's *Protected Matters* report for study area ..... 62

ATTACHMENT ..... 62

APPENDIX H. Threatened flora spring survey 2021 ..... 63

## SUMMARY

### General

Woolcott Surveys engaged Environmental Consulting Options Tasmania (ECOtas) to undertake an assessment of the ecological values associated with a proposed rezoning and subdivision proposal at the end of Negara Street (27-99 Opossum Road), Kings Meadows, primarily to ensure that the requirements of the identified ecological values are appropriately taken into account during further project planning under local, State and Commonwealth government approval protocols.

### Site assessment

The study area was assessed by Mark Wapstra on 14 Jun. 2021. A follow-up timed-targeted survey for spring-flowering flora species was undertaken on 12 Nov. 2021.

### Summary of key findings

#### Threatened flora

- No plant species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) and/or the Tasmanian *Threatened Species Protection Act 1995* (TSPA) were detected, or are known from database information, from the study area.

#### Threatened fauna

- No fauna species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) and/or the Tasmanian *Threatened Species Protection Act 1995* (TSPA) were detected, or are known from database information, from the study area.
- The study area supports potential habitat (to varying degrees of marginality) of several species, as follows:
  - Tasmanian devil (*Sarcophilus harrisii*);
  - spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*);
  - eastern quoll (*Dasyurus viverrinus*);
  - eastern barred bandicoot (*Perameles gunnii* subsp. *gunnii*);
  - grey goshawk (*Accipiter novaehollandiae*);
  - Tasmanian masked owl (*Tyto novaehollandiae* subsp. *castanops*); and
  - wedge-tailed eagle (*Aquila audax* subsp. *fleayi*).

#### Vegetation types

- The study area supports the following TASVEG mapping units:
  - *Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (TASVEG code: DAZ); and
  - extra-urban miscellaneous (FUM).

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- Neither of these mapping units equate to threatened ecological communities listed on schedules of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.
- DAZ is classified as threatened on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*.

### Weeds

- Six species classified as a declared weeds within the meaning of the Tasmanian *Weed Management Act 1999* and several additional "environmental weeds" were detected from the study area.

### Plant disease

- No evidence of plant disease (*Phytophthora cinnamomi*, rootrot fungus) was detected from the study area.

### Animal disease (chytrid)

- The study area does not support habitats conducive to the frog chytrid pathogen.

## INTRODUCTION

### **Purpose**

Woolcott Surveys engaged Environmental Consulting Options Tasmania (ECOtas) to undertake an assessment of the ecological values associated with a proposed rezoning and subdivision proposal at the end of Negara Street (27-99 Opossum Road), Kings Meadows, primarily to ensure that the requirements of the identified ecological values are appropriately taken into account during further project planning under local, State and Commonwealth government approval protocols.

### **Scope**

This report relates to:

- flora and fauna species of conservation significance, including a discussion of listed threatened species (under the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) potentially present, and other species of conservation significance/interest;
- vegetation types (forest and non-forest, native and exotic) present, including a discussion of the distribution, condition, extent, composition and conservation significance of each community;
- plant and animal disease management issues;
- weed management issues; and
- a discussion of some of the policy and legislative implications of the identified ecological values.

This report follows the government-produced *Guidelines for Natural Values Surveys - Terrestrial Development Proposals* (DPIPWE 2015) in anticipation that the report (or extracts of it) may be used as part of various approval processes that will be required for works at the site.

The report format will also be applicable to other assessment protocols as required by the Commonwealth Department of Agriculture, Water and the Environment (for any referral/approval that may be required under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), and under the local planning scheme (at present the *Launceston Interim Planning Scheme 2015*).

### **Limitations**

The main ecological assessment was undertaken on 14 Jun. 2021. Many plant species have ephemeral or seasonal growth or flowering habits, or patchy distributions (at varying scales), and it is possible that some species were not recorded for this reason. However, every effort was made to sample the range of habitats present in the survey area to maximise the opportunity of recording most species present (particularly those of conservation significance). Late spring and into summer is usually regarded as the most suitable period to undertake most botanical assessments. While some species have more restricted flowering periods, a discussion of the potential for the site to support these is presented. Refer to **FINDINGS Plant species** Threatened flora species potentially present (database analysis) for more discussion of this matter. A timed-targeted survey was undertaken on 12 Nov. 2021.

The survey was also limited to vascular species: species of mosses, lichens and liverworts were not recorded. However, a consideration is made of threatened species (vascular and non-vascular) likely to be present (based on habitat information and database records) and reasons presented for their apparent absence.

Surveys for threatened fauna were practically limited to an examination of “potential habitat” (i.e. comparison of on-site habitat features to habitat descriptions for threatened fauna), and detection of tracks, scats and other signs.

### **Qualifications**

Except where otherwise stated, the opinions and interpretations of legislation and policy expressed in this report are made by the author and do not necessarily reflect those of the relevant agency. The client should confirm management prescriptions with the relevant agency before acting on the content of this report.

### **Permit**

Any plant material was collected under DPIPWE permit TFL 20167 (in the name of Mark Wapstra). Relevant data will be entered into DPIPWE’s *Natural Values Atlas* database by the author. Some plant material may be lodged at the Tasmanian Herbarium by the author.

No vertebrate or invertebrate material was collected. A permit is not needed to undertake habitat-level surveys of the type indicated.

### **LAND USE PROPOSAL**

The land use proposal is for a 13 lot residential subdivision and cul-de-sac to be created at the end of Negara Street (Figures 1-4) on land owned by The Launceston Golf Club Limited, currently zoned as Recreation under the Launceston Interim Planning Scheme 2015 i.e. a rezoning to General Residential in line with the adjoining land use is required.

### **STUDY AREA**

For the purpose of the natural values assessment, the study area was deemed to comprise the extent of the proposed subdivision (Figure 4) and its immediate fringes (for context) as well as the proposed future pedestrian access (also shown in Figure 4). For the purposes of reporting, however, all maps include only the proposed subdivision area to provide the appropriate context to the findings.

The current title details of the study area are as follows:

northern title

- PID 6883203; C.T. 4964/16; LPI JFH84 (27-99 Opossum Road, Kings Meadows)

southern title

- PID 6883203; C.T. 198059/1; LPI FZW86 (27-99 Opossum Road, Kings Meadows)

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The study area is currently part of the greater Launceston Golf Course facility.

The study area is private land and is currently zoned as Recreation pursuant to the *Launceston Interim Planning Scheme 2015*. The entire study area is subject to Bushfire Prone Area overlay and the Scenic Management Area overlay pursuant to the *Launceston Interim Planning Scheme 2015*.

The study area is generally flat terrain with essentially no measurable relief at an elevation of ca. 60 m a.s.l. There are no natural drainage features but a trench/drain has been dug along the approximate northern limit of the proposed development area. LISTmap's Fire History layer indicates no recorded fire events and this accords with my field observations.

The study area is bounded to the east by residential dwellings (all fenced and provided with a wide cleared zone between the fences and the remnant native vegetation) and the gated end of Negara Street (Plates 1-4). The northern boundary is formed by a fairway with planted trees and frequently mown grass (Plates 5 & 6). The western and southern boundaries are informally formed by various golf course elements and remnant native vegetation (Plates 7-10).



**Plates 1 & 2.** Gated end of Negara Street – looking into and out of the existing highly disturbed eastern end of the study area



**Plates 3 & 4.** Cleared eastern fringe of the study area – LHS: looking north from gated entrance; RHS: looking south from gated entrance

The proposed residential subdivision site is part of a remnant bit of native forest and woodland nestled between existing residential development (Negara Street and Warragul Street) and the existing Launceston Golf Course. The site includes informal hazard and garden management from adjoining houses, as well as use by the golf club for management of vegetation debris, spoil and landscaping materials. The site includes part of a fairway-green complex, tracks, a major drain and

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an old toilet shed. It is reasonable to characterise the site as highly modified. Available aerial imagery presents a somewhat “rose-coloured” view of the site and immediate surrounds. Most of the vegetation shown between fairways across the golf course are non-native comprising mature planted trees (some native, some mainland species, several non-Australian) with the patches closer to the proposed development site grading into more natural native vegetation, albeit highly modified by long years of use including infestations of woody and herbaceous weeds.



**Plate 5.** (LHS) Looking east along fenceline between fairway (with planted trees) and 6-10 Negara Street

**Plate 6.** (RHS) Looking west along edge of fairway and study area



**Plates 7-10.** Less formally defined western and southern boundaries of study area showing various golf course elements including paths, old toilet building and green

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At a 1:250,000 scale (Figure 5), the study area is mapped as Tertiary (Cainozoic)-age “dominantly non-marine sequences of gravel, sand, silt, clay and regolith” (geocode: Ts). At a 1:25,000 scale, the study area’s geology is marginally more complex (Figure 6), mapped mainly as Cretaceous-Tertiary-age “poorly consolidated clay, silt, and clayey labile sand with rare gravel and lignite; some iron oxide-cemented layers and concretions; some leaf fossils” (geocode: Tsa) i.e. “Cainozoic deposits”. A small polygon of Jurassic-age “dolerite and related rock” (geocode: Jd) is located to the east of the project area, otherwise surrounded by the Tsa mapping. The geology is mentioned because of its potential influence on the classification of vegetation and supporting threatened flora (and to a lesser extent threatened fauna, usually through the geological influence on vegetation structure and composition). In this part of the State, there has long been confusion and informal debate about the classification of *Eucalyptus amygdalina*-dominated forest and woodland, based largely on substrate (as mapped but also as manifested as soil types and reflected in the structure and composition of the vegetation). Some sites close to the study area (e.g. Carr Villa) are notoriously challenging and whether that area is best mapped as *Eucalyptus amygdalina* forest and woodland on dolerite (TASVEG code: DAD) because of sometimes extensive dolerite exposures and obvious localised dolerite influence in the soil or as *Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (TASVEG code: DAZ) remains, in my opinion, open to some interpretation. The present study area is, however, somewhat less challenging because I did not observe any obvious outcropping of dolerite and all exposed soils on tracks and worked areas were typical “Cainozoic deposits” (Plates 11-14).

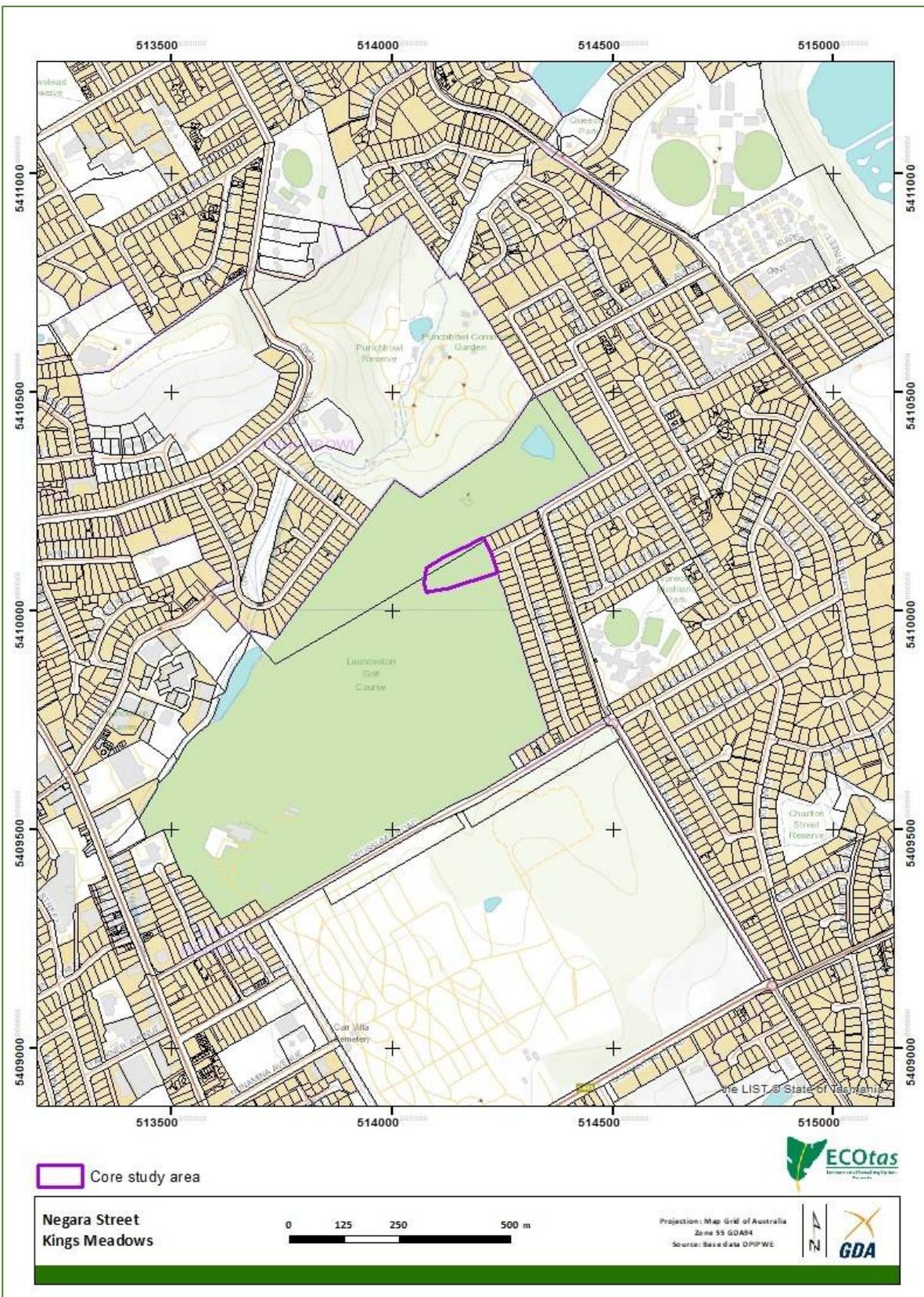


**Plates 11 & 12.** Area of worked over topsoil within the central-eastern part of the study area showing typical clay-sand soils with iron concretions (typical of soils on which the Midlands facies of DAZ occurs)



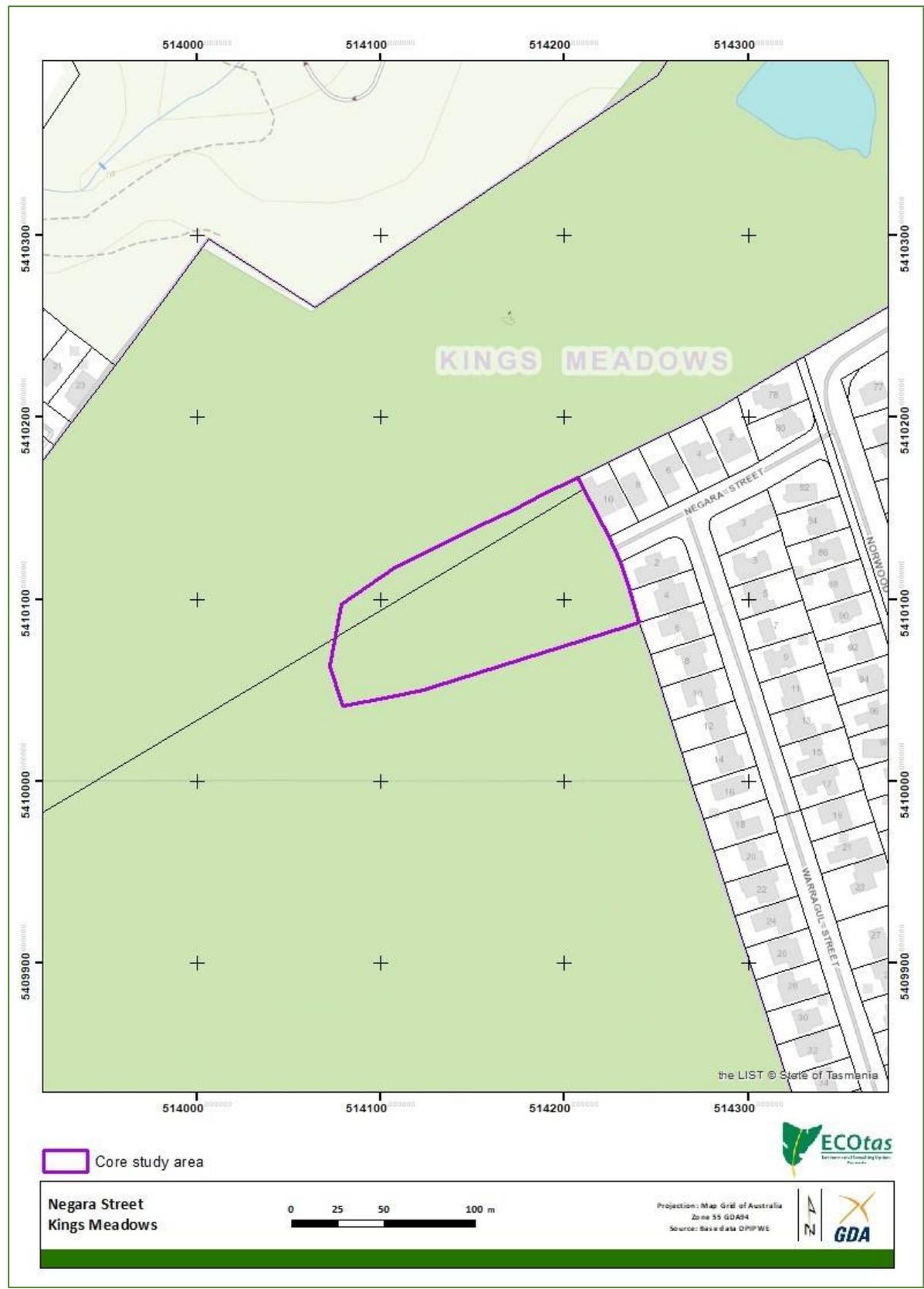
**Plates 13 & 14.** Examples of small rocks in upper soil profile with no affinities to dolerite -closer to basalt, bauxite and fine-grained sediments

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**Figure 1.** General location of the study area – topographic features shown

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**Figure 2.** Detail of the study area – topographic and cadastral features shown

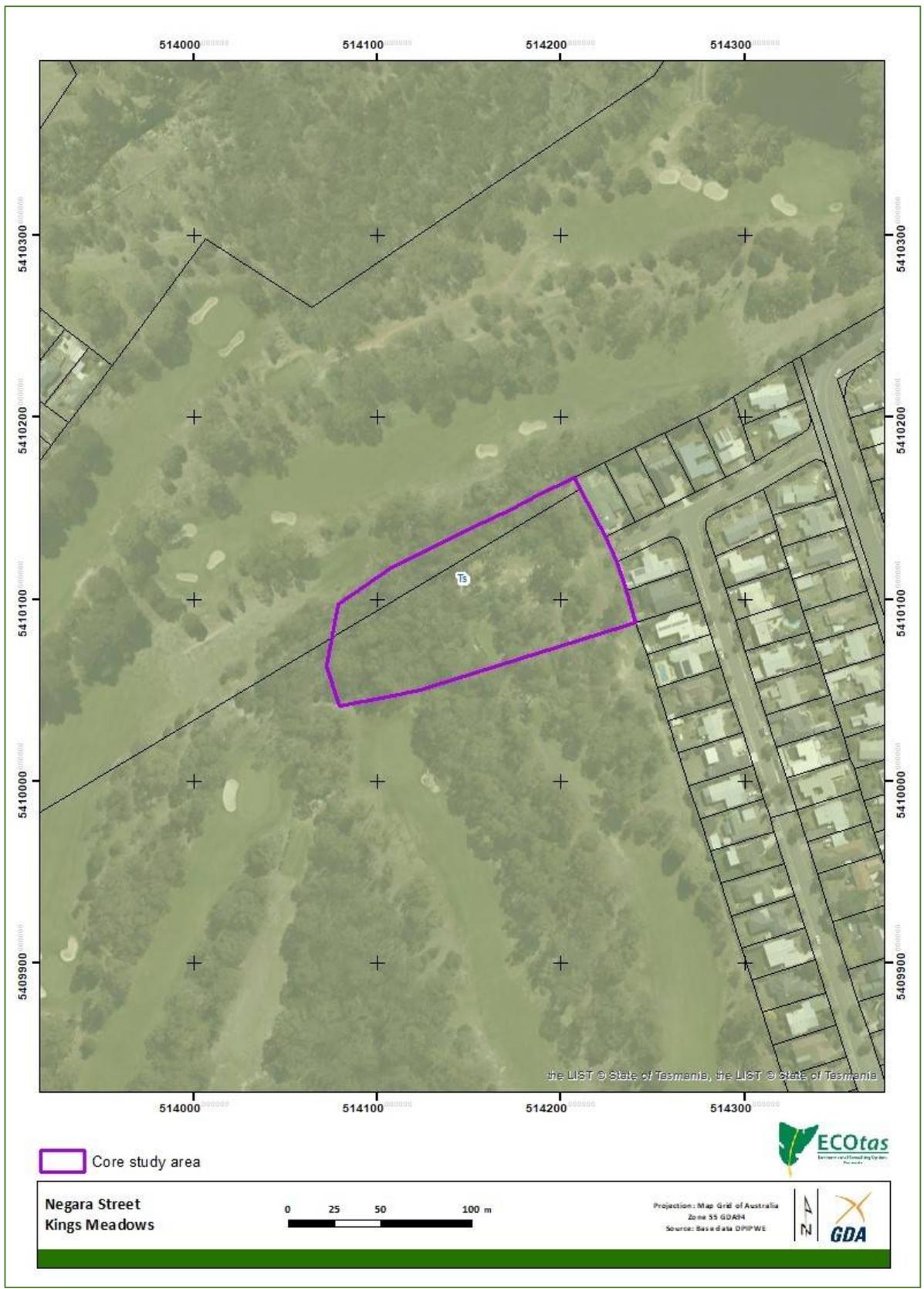
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**Figure 3.** Detail of the study area – aerial imagery shown

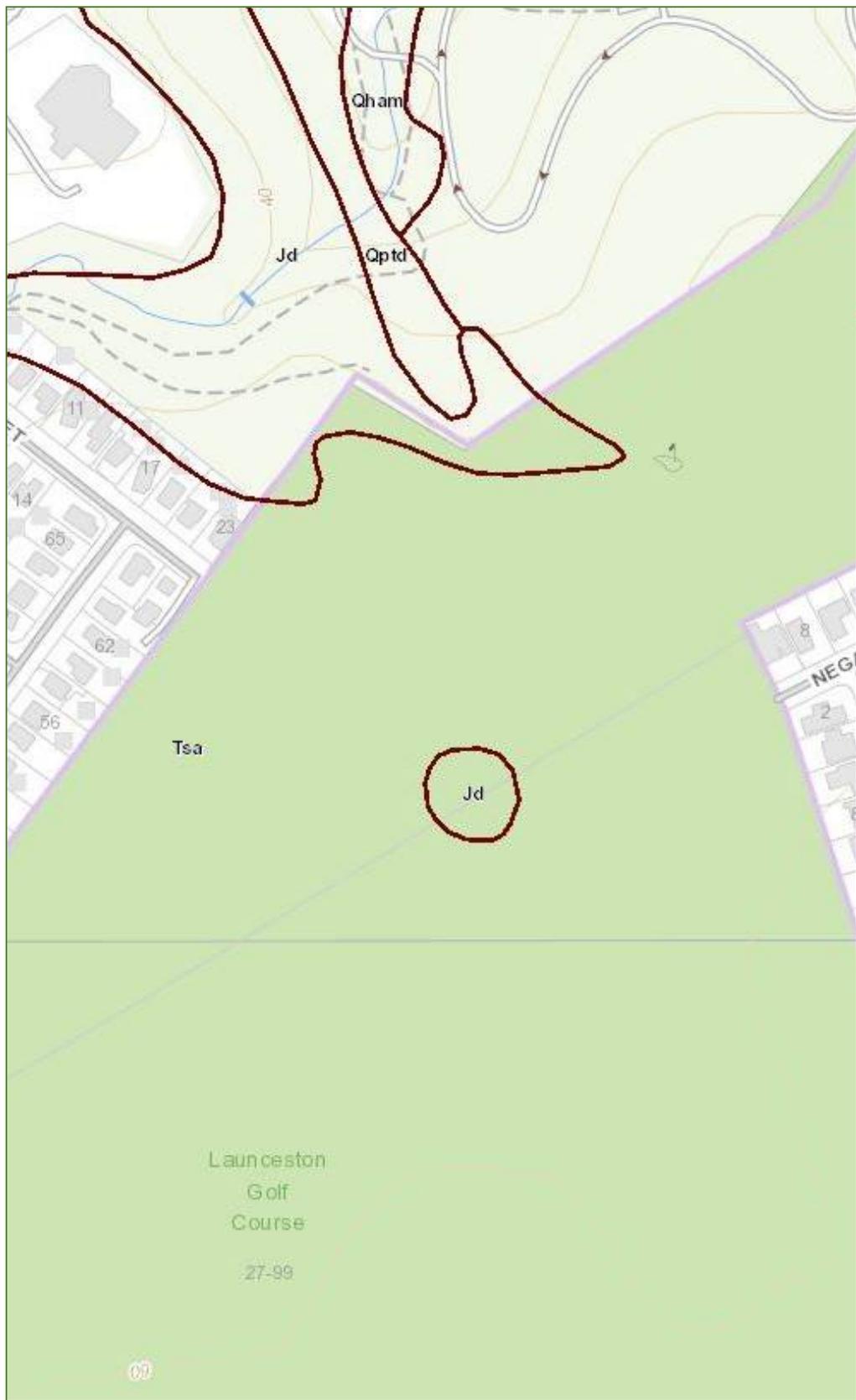


**Figure 4.** Indicative draft subdivision design (included here only for context to findings)



**Figure 5.** Geology of the study area and surrounds: 1:250,000 scale (refer to text for codes)

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**Figure 6.** Geology of the study area and surrounds: 1:25,000 scale (refer to text for codes)

## METHODS

### ***Nomenclature***

All grid references in this report are in GDA94, except where otherwise stated.

Vascular species nomenclature follows de Salas & Baker (2021) for scientific names and Wapstra et al. (2005+) for common names. Fauna species scientific and common names follow the listings in the cited *Natural Values Atlas* reports (DPIPWE 2021).

Vegetation classification follows TASVEG 4.0, as described in *From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation* (Kitchener & Harris 2013+).

### ***Preliminary investigation***

Available sources of threatened flora records, vegetation mapping and other potential environmental values were interrogated. These sources include:

- Tasmanian Department of Primary Industries, Parks, Water & Environment's *Natural Values Atlas* records for threatened flora and fauna (GIS coverage maintained by the author current as at date of report);
- Tasmanian Department of Primary Industries, Parks, Water & Environment's *Natural Values Atlas Report ECOtas\_NegaraStreet* for a point (514170mE 5410100mN) defining the approximate centre of the study area, buffered by 5 km, dated 13 Jun. 2021 (DPIPWE 2021) – Appendix E;
- Forest Practices Authority's *Biodiversity Values Database* report, specifically the species' information for grid reference centroid 514170mE 5410100mN, buffered by 2 km and 5 km for records of threatened flora and fauna, respectively, hyperlinked species' profiles and predicted range boundary maps, dated 13 Jun. 2021 (FPA 2021) – Appendix F;
- Commonwealth Department of Agriculture, Water and the Environment's *Protected Matters Search Tool Report* for a point (-41.46053 147.16972) defining the approximate centre of the study area, buffered by 5 km, dated 13 Jun. 2021 (CofA 2021) – Appendix G;
- the TASVEG 4.0 vegetation coverage (as available through a GIS coverage);
- GoogleEarth and LISTmap aerial orthoimagery; and
- other sources listed in tables and text as indicated.

### ***Field assessment***

A detailed site assessment was undertaken by Mark Wapstra on 14 Jun. 2021. The study area was assessed by slow-walking the whole area and immediate surrounds, criss-crossing through both open areas, on tracks, around buildings and golf elements and more intact native bush (albeit densely infested with shrubby and other weeds). Cadastral/proposal data pre-uploaded to the iGIS application (iPhone) guided in-field assessment.

I am comfortable that I have covered sufficient area to determine and describe the vegetation types, potential occurrence of threatened flora and fauna, at least as far as practical at this time of year (for threatened flora) and without more complex methods (for threatened fauna).

### **Botanical survey – vegetation classification**

Vegetation classification follows TASVEG 4.0, as described in *From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation* (Kitchener & Harris 2013+). Vegetation was classified by waypointing vegetation transitions using hand-held GPS (Garmin Dakota 10) for later comparison to aerial imagery. The structure and composition of the vegetation types was described using nominal 30 m radius plots at a representative site within the vegetation types, and compiling "running" species lists between plots and vegetation types.

### **Botanical survey – threatened flora**

The study area was assessed for the presence of threatened flora by slow-walking the entire area. Further methods are not provided because no such species were detected. This part of the State is recognised as a "hotspot" for threatened flora. For example, Carr Villa supports several species such as *Brunonia australis* (blue pincushion), *Caladenia patersonii* (patersons spider-orchid), *Caesia calliantha* (blue grasslily) and *Senecio squarrosus* (leafy fireweed). While some species are perennial and detectable/identifiable at any time of the year, others require a timed survey to coincide with the peak flowering period. In this case, while initial discussions indicated that this was a likely scenario, upon site assessment this has been reviewed due to the highly modified nature of the understorey (almost wholly dominated by a mat of *Ehrharta erecta*) and lack of detection of certain species such as *Brunonia australis* that can be a reasonable indicator of the likelihood of other species. Even so, a timed-targeted survey was undertaken on 12 Nov. 2021 (refer to Appendix H).

### **Zoological survey – general**

Surveys for threatened fauna were practically limited to an examination of "potential habitat" (i.e. comparison of on-site habitat features to habitat descriptions for threatened fauna), and detection of tracks, scats and other signs.

### **Declared and environmental weeds**

The presence of declared weeds within the meaning of the Tasmanian *Weed Management Act 1999* or "environmental weeds" (authors' opinion and as included in *A Guide to Environmental and Agricultural Weeds of Southern Tasmania*, NRM South 2017) was also assessed. Due to the widespread weeds and their local density, waypoints were not taken.

### **Plant and animal disease**

The potential presence of plant disease, including *Phytophthora cinnamomi* (rootrot, PC), myrtle wilt and myrtle rust, was assessed by reference to field symptoms in susceptible vegetation types and plant species.

The potential presence of animal disease (chytrid) was assessed by reference to the presence of habitats conducive to supporting populations of amphibians such as waterbodies and drainage features.

## FINDINGS

### ***Vegetation types***

#### Comments on TASVEG mapping

This section, which comments on existing TASVEG 4.0 mapping for the study area, is included to highlight the differences between existing mapping and the more recent mapping from the present study to ensure that any parties assessing land use proposals (via this report) do not rely on existing mapping. Note that TASVEG mapping, which was mainly a desktop mapping exercise based on aerial photography, is often substantially different to ground-truthed vegetation mapping, especially at a local scale. An examination of existing vegetation mapping is usually a useful pre-assessment exercise to gain an understanding of the range of habitat types likely to be present and the level of previous botanical surveys.

I usually only refer to the most recent version of TASVEG (i.e. TASVEG 4.0) in this type of review. However, in this case, it is important to review both TASVEG 3.0 and TASVEG 4.0, because the former will inform the incoming Priority Vegetation Overlay (which will affect the Natural Assets overlay in the incoming *Tasmanian Planning Scheme*). In this case, TASVEG 3.0 & 4.0 are similar, with only minor differences within the project area.

TASVEG 3.0 maps the project area as (Figure 7):

- urban areas (TASVEG code: FUR)

FUR is mapped along the back boundaries of the Negara and Warragul street residences, reflecting that aerial imagery shows a wide disturbed strip essentially devoid of a canopy cover.

TASVEG 3.0 maps the golf course as a combination of extra-urban miscellaneous (TASVEG code: FUM), DAZ (see below) and agricultural land (TASVEG code: FAG), the separation of FAG & FUM being a straight east-west line separating AGD66 1:25,000 Tasmapi sheets.

- *Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (TASVEG code: DAZ)

DAZ is mapped across the remainder of the project area, extending beyond its boundaries to the north (on site assessment, this area was very clearly planted trees adjacent to a fairway and not DAZ), southwest (on site assessment, this area was a modified form of DAZ) and south (on site assessment, found to be variably modified DAZ and other modified land).

TASVEG 4.0 maps the project area as (Figure 8):

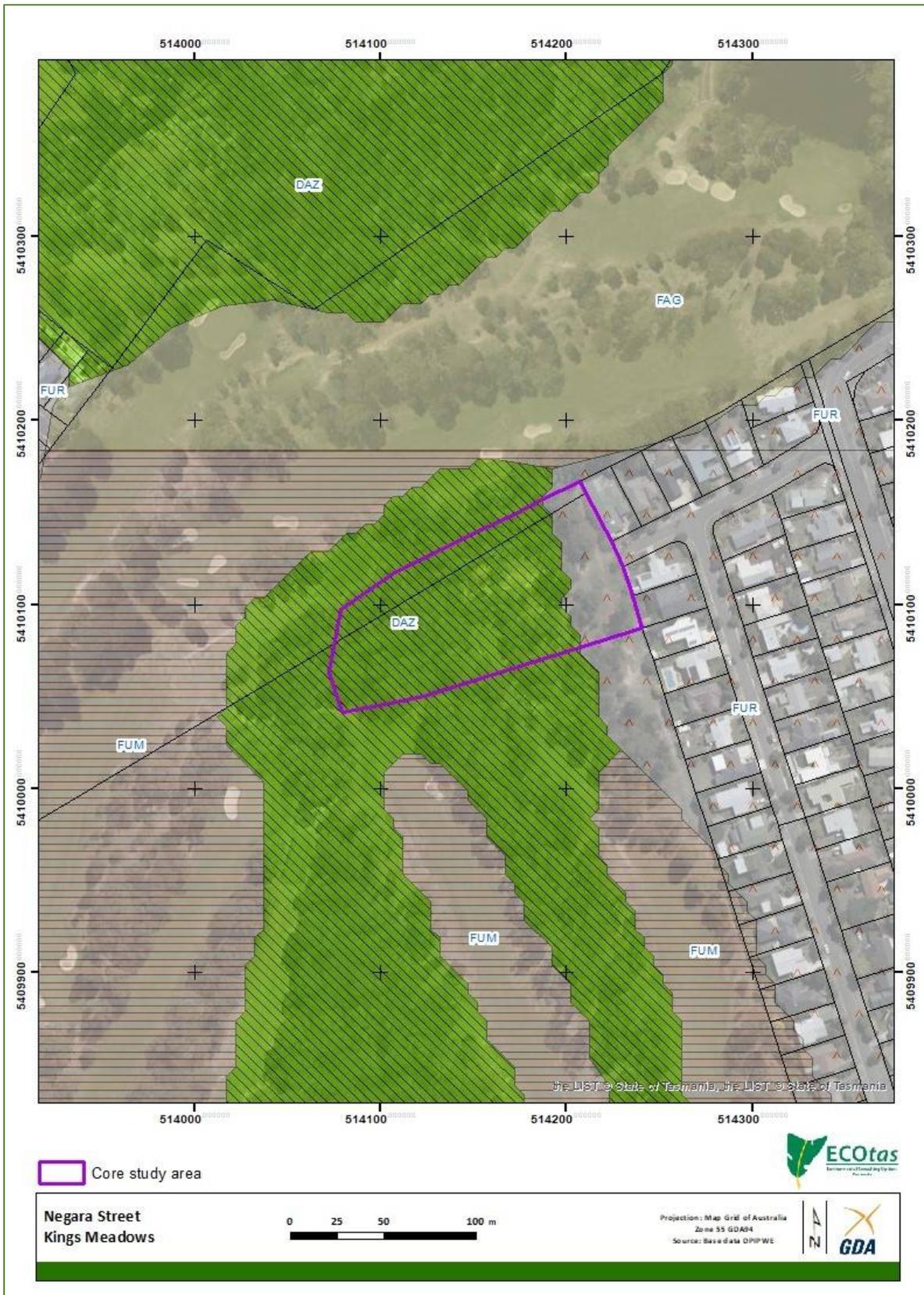
- urban areas (TASVEG code: FUR)

FUR is now mapped for all fairways (under TASVEG 3.0 mapped as a combination of FUM and FAG), with one tiny area extending into the southwest of the project area, but noting the back boundary strip of FUR is re-coded as DAZ (this is an unusual "correction" for TASVEG 4.0, with this version often now recognising modified sites as FUR rather than the original forest).

- *Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (TASVEG code: DAZ)

DAZ is now mapped across essentially the whole of the project area and to the north, southwest and south, but more broadly than TASVEG 3.0 (but also with some minor corrections to reflect more obvious fairways). The most obvious difference is that TASVEG 4.0 extends DAZ to the back boundaries of the residential area, much more appropriately mapped as FUR under TASVEG 3.0

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**Figure 7.** Existing TASVEG 3.0 vegetation mapping for the study area (refer to text for codes)

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**Figure 8.** Existing TASVEG 4.0 vegetation mapping for the study area (refer to text for codes)

Vegetation types recorded as part of the present study

Vegetation types have been classified according to TASVEG 4.0, as described in *From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation* (Kitchener & Harris 2013+). Table 1 provides information on each of the vegetation mapping units identified from the study area (refer also to Appendix A). Figure 9 indicates the revised vegetation mapping of the study area.

**Table 1.** Vegetation mapping units present in the study area

[conservation status: NCA – as per Schedule 3A of the Tasmanian *Nature Conservation Act 2002*, using units described by Kitchener & Harris (2013+), relating to TASVEG mapping units (DPIPWE 2021); EPBCA – as per the listing of ecological communities on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, relating to communities as described under that Act, but with equivalencies to TASVEG units]

| TASVEG mapping unit<br>(Kitchener & Harris 2013+)                                   | Conservation priority<br>NCA<br>EPBCA   | Comments   |
|---|---|--|
| <b>Dry eucalypt forest and woodland</b>   |   |  |
| <i>Eucalyptus amygdalina</i> inland forest and woodland on Cainozoic deposits (DAZ) | not threatened<br><i>not threatened</i> | The study area presents as a highly modified occurrence of DAZ, confirmed by substrate (see Plates 11-14 & Figures 5 & 6) and dominance by <i>Eucalyptus amygdalina</i> and <i>Eucalyptus viminalis</i> over a grassy to shrubby understorey (see Plates 1-10). The site is very weedy, almost to the point of some areas no longer properly classifiable as DAZ but perhaps better allocated to weed infestation (TASVEG code: FWU). DAZ occurs as a mosaic with FUM (see below). |
| <b>Modified land</b>  |   |  |
| extra-urban miscellaneous (FUM)   | not threatened<br><i>not threatened</i> | The most disturbed parts of the study area are allocated to FUM – see notes in main text of report.  |

Site assessment indicated that the project area is complex to classify because of its context and history. At a broad level, ignoring localised disturbance events such as over-the-fence clearing and modification, internal tracks, localised works, etc., I could classify the whole area as *Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (TASVEG code: DAZ) but this would, in my opinion, be disingenuous at a several levels (from both a prospective development potential perspective and consistency of how this level of modified vegetation should be mapped). Consequently, I have elected to map the least disturbed (but still highly modified) parts as DAZ and the balance as extra-urban miscellaneous (TASVEG code: FUM). Areas of the latter include the over-the-fence clearing, tracks, toilet site, fairway/green area and otherwise heavily modified sites lacking a canopy. I have mapped this by reference to a walked GPS route not aerial imagery (which does not properly reflect the extent of canopy and understorey modification at a practical scale). Whether some sites now mapped as FUM are better as FUR is considered moot – both are forms of modified land and the classification is of no practical meaning in terms of management requirements.

The DAZ is highly modified. It includes a sparse taller canopy of mature trees (some hollow-bearing), mainly *Eucalyptus viminalis* but also *Eucalyptus amygdalina*, in turn over a variably dense regrowth layer co-dominated by these two species (the presence of a high proportion of *Eucalyptus viminalis* is entirely consistent with the description of DAZ). The shrub layer is generally dense but dominated by weeds that include *Cotoneaster franchetii*, *Cotoneaster glaucophyllus*, *Coprosma robusta*, *Ulex europaeus*, *Pinus radiata*, *Cytisus scoparius*, *Viburnum tinus* and *Populus alba*. Native

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**Figure 9** Revised vegetation mapping of study area (refer to text for codes)

shrubs and trees include *Acacia dealbata*, *Acacia mearnsii*, *Bursaria spinosa*, *Exocarpos cupressiformis*, *Acacia genistifolia*, *Allocasuarina verticillata*, *Allocasuarina littoralis*, *Hibbertia riparia*, *Styphelia humifusum* and *Banksia marginata* (note that some of these species were recorded very sparsely). The understorey is almost wholly dominated by exotic grasses (mainly *Dactylis glomerata*, *Agrostis capillaris* and *Ehrharta erecta*, the latter often as dense mats to the exclusion of all other ground stratum species) and herbs, with little opportunity for native herbs and grasses (all of which are sparse).

In my opinion, classifying this site as DAZ is "stretching the friendship" but it does not properly meet the intent of the descriptions of any of the modified land mapping units in the TASVEG system of classification (Kitchener & Harris 2013+). The apparent native vegetation north of the core study area is not DAZ but a form of FUM/FUR i.e. a fairway with planted trees. Some form of DAZ, albeit very much in the ilk of that described above, extends to the west and south of the core study area. Most of the between-fairway vegetation across the golf course is very open and modified "native vegetation" (but unmappable as anything other than a form of modified land) or wholly ornamentally planted (so mappable as part of the concept of FUM/FUR). There are some limited areas with more natural DAZ, most notably the larger consolidated patch to the south-southwest of the study area (although this too is tracked and includes maintenance areas) and to the immediate south (the latter modified but associated with a drainage dip in the topography).

### Conservation status of identified vegetation type

DAZ is classified as threatened under Schedule 3A of the Tasmanian *Nature Conservation Act 2002* but does not equate to a threatened ecological community under Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

The administrative control of "clearing" threatened vegetation communities is either through the *Forest Practices Regulations 2017* (as threatened vegetation is classified as "vulnerable land" and any clearance would require a Forest Practices Plan) or the local planning scheme (through a planning application). Refer to **DISCUSSION Legislative and policy implications** for more information.

## **Plant species**

### General information

A total of 100 vascular plant species were recorded from the study area (Appendix B), comprising 68 dicotyledons (including 1 endemic and 45 exotic species), 30 monocotyledons (including 21 exotic species), 1 gymnosperm (exotic) and 1 pteridophyte (native). The very high proportion (66%) of exotic species is noted, with the further observation that several of the native species are represented by one or very few individuals.

### Threatened flora species recorded from study area

No plant species listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are known from database information (Figure 10), or were detected as a consequence of field assessment, from the project area.

There is a database record of *Senecio squarrosus* (leafy fireweed), listed as rare on the TSPA from ca. 60 m west of the western edge of the core study area. The record is attributed to S.G. Hannaford on 1 Nov. 1865, with the site listed as "Launceston, near RC cemetery" with a precision of  $\pm 1,000$  m (supported by a voucher held at the Tasmanian Herbarium, HO14906). The notional site supporting this species is not managed fairway. No evidence of the species was recorded from both the core study area and immediate surrounds.

### Threatened flora species potentially present (database analysis)

Figure 10 indicates threatened flora records within and adjacent to the study area and Table C1 (Appendix C) provides a listing of threatened flora from within 5,000 m of the study area (nominal buffer width usually used to discuss the potential of a particular study area to support various species listed in databases), with comments on whether potential habitat is present for the species, and possible reasons why a species was not recorded.

Note that the field assessment was not restricted to the species listed in Table C1 but considered any threatened flora with the potential to be present. While the database analysis utilises a nominal buffer of 5,000 m, the author's own experience of the vegetation and flora of the general study area combined with database interrogation, meant that the specific potential for numerous other species previously recorded from the wider area were taken into account.

While the survey was conducted in mid-winter, often considered less than ideal for detecting many species of threatened flora, this is a challenging site to recommend further timed-targeted surveys for. While sites such as Carr Villa support a suite of threatened flora species, the opportunity for this site to support such species, based on its condition, especially the understorey dominated by a dense sward of *Ehrharta erecta* and other exotic grasses) is very low. Species such as *Brunonia australis* (blue pincushion) are detectable at any time of the year from the basal rosettes, although in mid-winter, detection is thwarted by the winter diedown and lack of flowering heads. Several modified bushland reserves in Launceston (e.g. Cambridge Street in West Launceston) support important populations of threatened flora (e.g. *Prasophyllum robustum*, *Caesia calliantha*, *Brunonia australis*, *Senecio squarrosus*) and it is (somewhat remotely) possible this site could support such species. In cases such as this, where there is "time up the sleeve", I usually recommend follow-up informal visits during the year, maximising the opportunity to detect any such species. For the record, I will be genuinely surprised if such follow-up assessment results in the detection from the project area (may be possible in fringing, less disturbed, areas to the south). Refer to Appendix H for findings from spring survey (noting no threatened flora from project area).

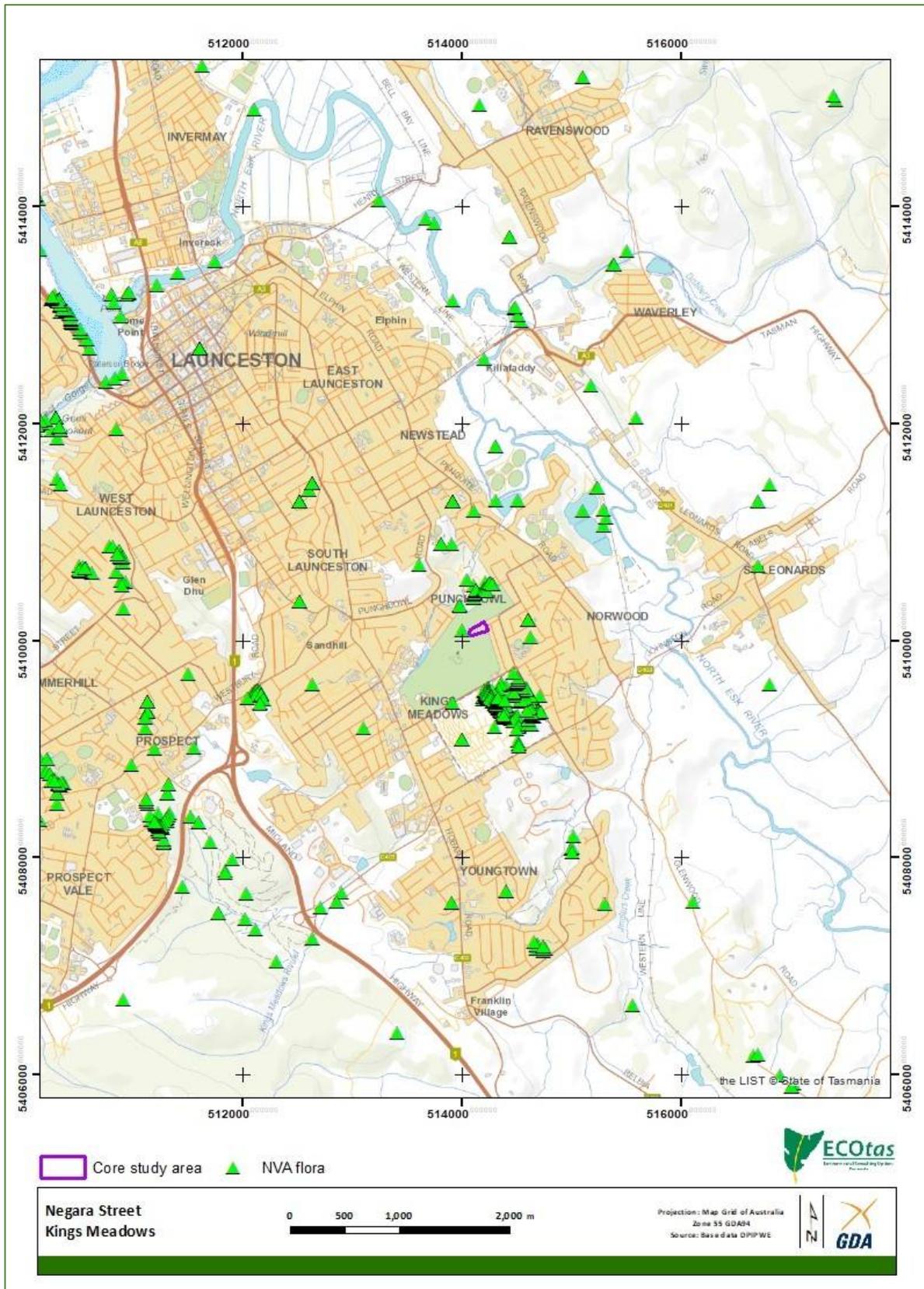
## **Fauna species**

### Threatened fauna species known from the study area

No fauna species listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are known from database information (Figure 11), or were detected as a consequence of field assessment, from the subject title.

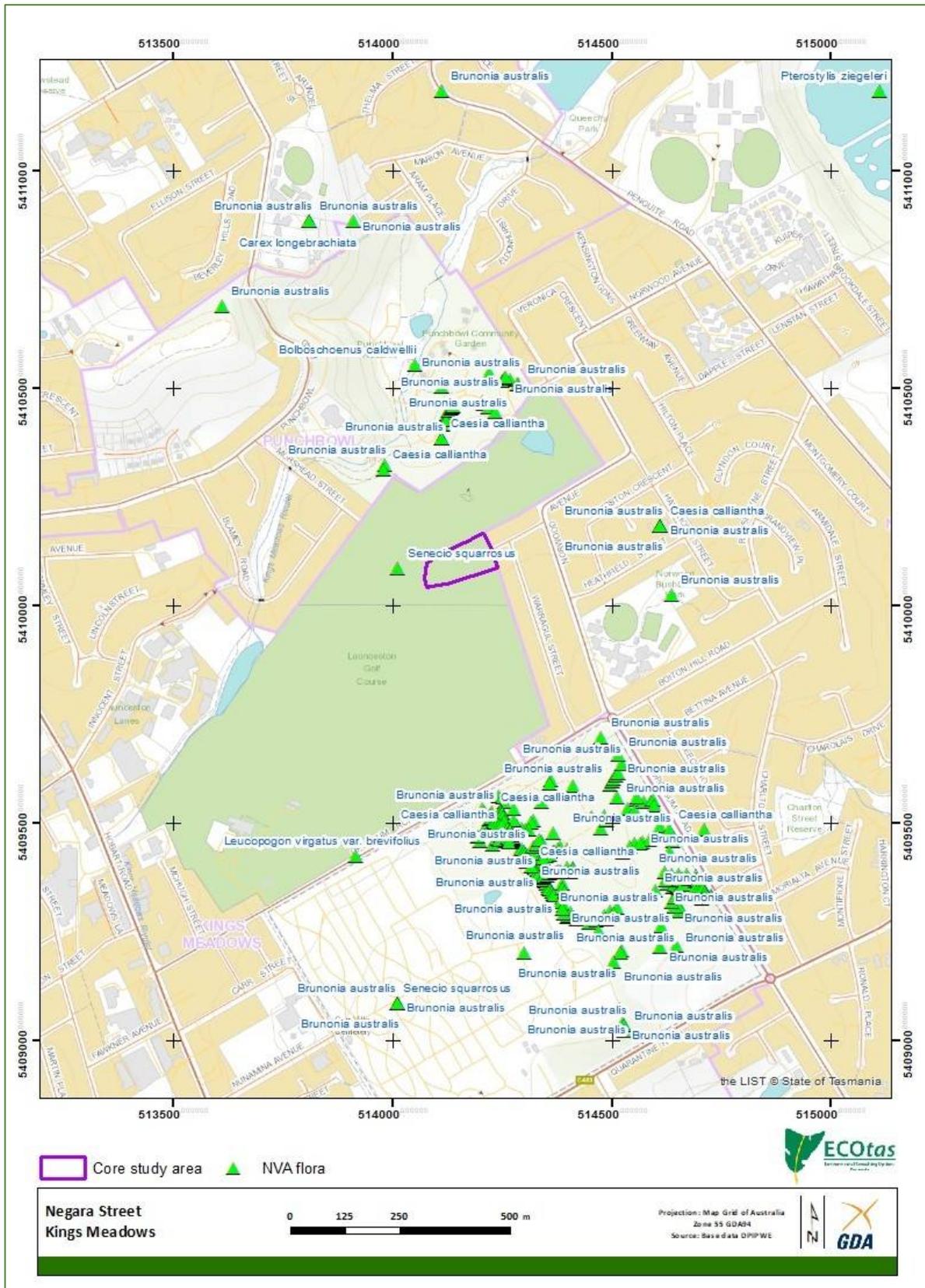
Site assessment indicate the presence of potential habitat of several species. The site provides potential habitat for species such as the Tasmanian devil, spotted-tailed quoll, eastern quoll, eastern barred bandicoot, wedge-tailed eagle and grey goshawk. Development should not require further consideration of these species at any reasonable scale.

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**Figure 10a.** Distribution of threatened flora adjacent to the study area (overview)

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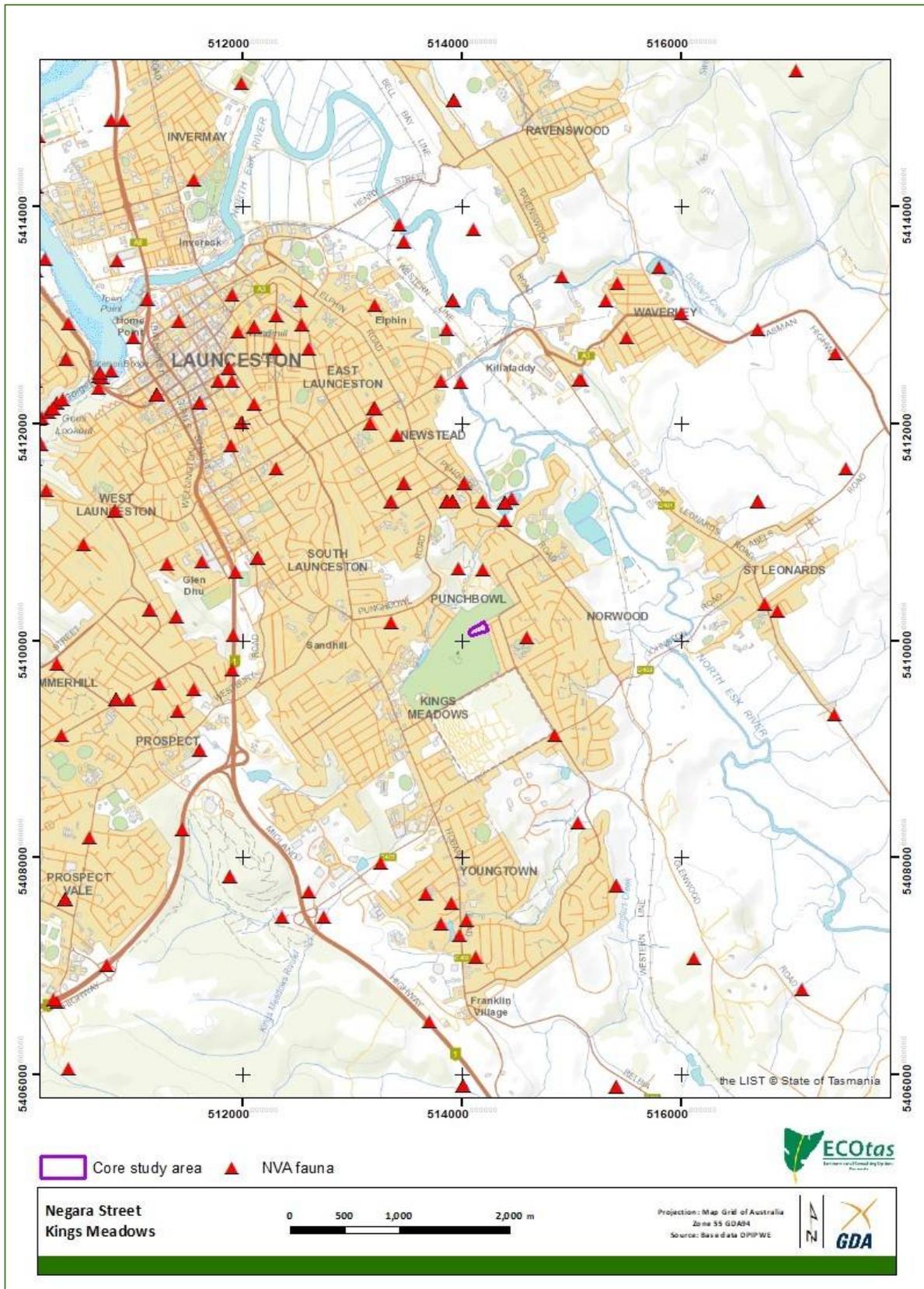


**Figure 10b.** Distribution of threatened flora adjacent to the study area (closer)



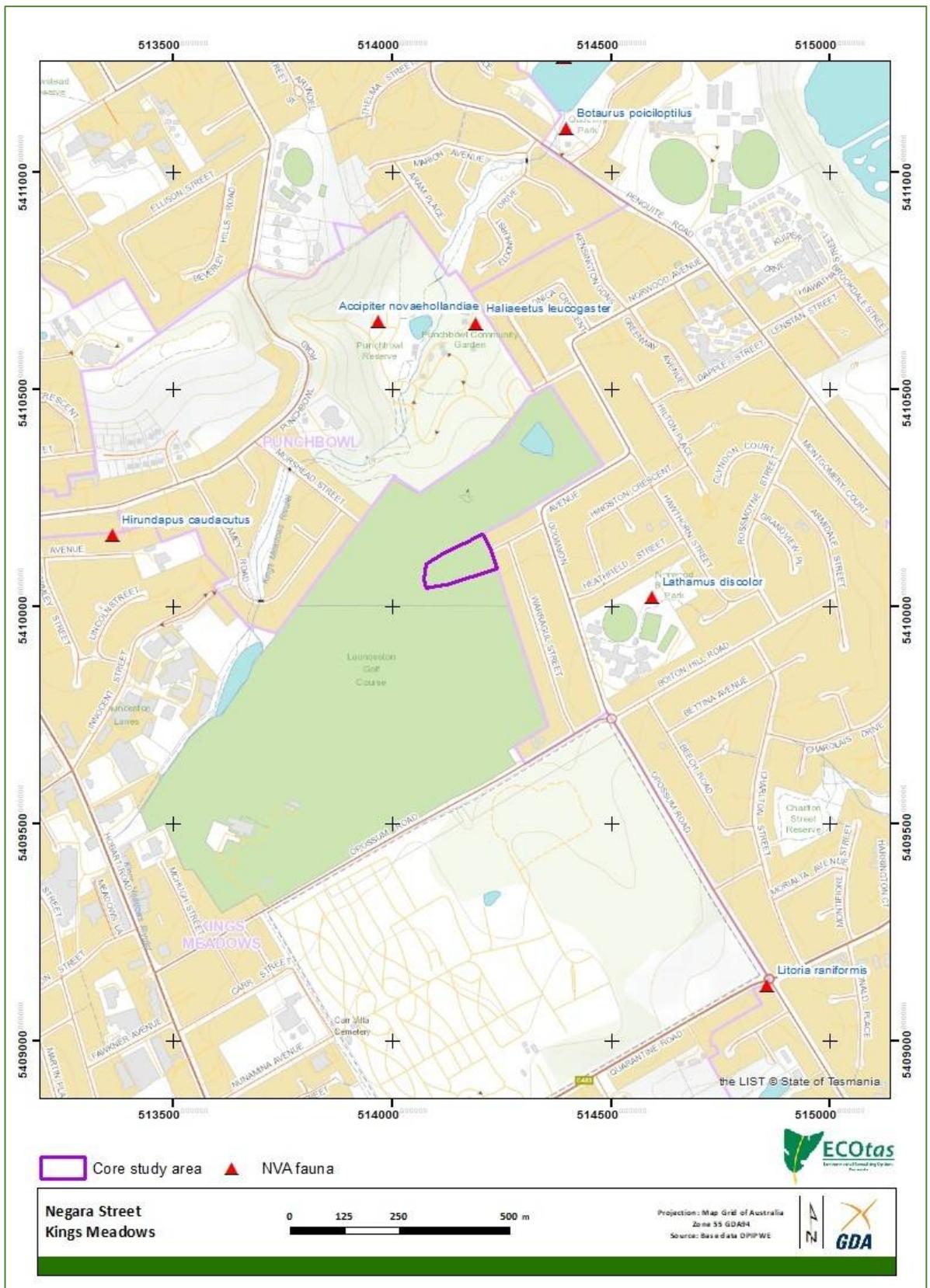
**Figure 10c.** Distribution of threatened flora closest to the study area

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**Figure 11a.** Distribution of threatened fauna adjacent to the study area (overview)

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**Figure 11b.** Distribution of threatened fauna adjacent to the study area (closer)

The occasional larger hollow-bearing tree may need consideration. For other such developments, such trees have been climbed (if safe to do so) and/or staked out at dusk and into the first few hours of dark to determine if being used by a masked owl. If unused, hollows can be covered (basically to prevent use between “now” and “then”). If used, generally the tree is left alone until young fledge. The statistical likelihood of any of the trees in this site being used by masked owls is negligible.

Threatened fauna species potentially present (database analysis)

Figure 7 indicates threatened fauna records within and adjacent to the study area and Table D1 (Appendix D) provides a listing of threatened fauna from within 5,000 m of the study area (nominal buffer width usually used to discuss the potential of a particular study area to support various species listed in databases), with comments on whether potential habitat is present for the species, and possible reasons why a species was not recorded.

**Other ecological values**

Weed species

Six plant species [*Cytisus scoparius* (english broom), *Genista monspessulana* (montpellier broom), *Ulex europaeus* (gorse), *Rubus* sp. (blackberry), *Carduus pycnocephalus* & *C. tenuiflorus* (winged thistles)] classified as declared weeds within the meaning of the Tasmanian *Weed Management Act 1999* were widespread within the study area. Numerous additional species of exotic plant were detected, including several regarded as “environmental weeds”. The study area is highly modified with exotic plants dominating the understorey of most parts of the study area. A weed distribution map has not been provided as “noxious” weeds occur across the entire study area. The recommended management actions below are applicable for all weed species present.

Any management actions should aim to minimise the risk of distributing these invasive weed species to other parts of the municipality, although it is recognised that most of the species already occur widely in the greater area. The key management issue will be centred on treating vegetation debris and topsoil as “contaminated” with weed propagules and managing this product accordingly. This may include on- or off-site disposal and for on-site burial and/or burning. If off-site disposal is undertaken, this will need to be in accordance with municipal regulations and the provisions of the Tasmanian *Weed Management Act 1999* in relation to declared weeds.

Several planning manuals provide guidance on appropriate management actions, which can be referred to develop site-specific prescriptions for any proposed works along the easement. These manuals include:

- Allan, K. & Gartenstein, S. (2010). *Keeping It Clean: A Tasmanian Field Hygiene Manual to Prevent the Spread of Freshwater Pests and Pathogens*. NRM South, Hobart;
- Rudman T. (2005). *Interim Phytophthora cinnamomi Management Guidelines*. Nature Conservation Report 05/7, Biodiversity Conservation Branch, Department of Primary Industries, Water & Environment, Hobart;
- Rudman, T., Tucker, D. & French, D. (2004). *Washdown Procedures for Weed and Disease Control*. Edition 1. Department of Primary Industries, Water & Environment, Hobart; and
- DPIPWE (2015). *Weed and Disease Planning and Hygiene Guidelines - Preventing the Spread of Weeds and Diseases in Tasmania*. Department of Primary Industries, Parks, Water & Environment, Hobart.

### Rootrot pathogen, *Phytophthora cinnamomi*

*Phytophthora cinnamomi* (PC) is widespread in lowland areas of Tasmania, across all land tenures. However, disease will not develop when soils are too cold or too dry. For these reasons, PC is not a threat to susceptible plant species that grow at altitudes higher than about 700 m or where annual rainfall is less than about 600 mm (e.g. Midlands and Derwent Valley). Furthermore, disease is unlikely to develop beneath a dense canopy of vegetation because shading cools the soils to below the optimum temperature for the pathogen. A continuous canopy of vegetation taller than about 2 m is sufficient to suppress disease. Hence PC is not considered a threat to susceptible plant species growing in wet sclerophyll forests, rainforests (except disturbed rainforests on infertile soils) and scrub e.g. teatree scrub (Rudman 2005; FPA 2009).

The native vegetation type identified from the study area and this part of the State are not recognised as being particularly susceptible to PC in most circumstances. No evidence of the pathogen was observed. Special management should not be required if machinery and vehicles have come from a disease-free site and have been cleaned. Note that the publications listed under Weed species provide relevant planning information related to management of *Phytophthora cinnamomi* (PC).

### Myrtle wilt

Myrtle wilt, caused by a wind-borne fungus (*Chalara australis*), occurs naturally in rainforest where myrtle beech (*Nothofagus cunninghamii*) is present. The fungus enters wounds in the tree, usually caused by damage from wood-boring insects, wind damage and forest clearing. The incidence of myrtle wilt often increases forest clearing events such as windthrow and wildfire.

The study area does not support *Nothofagus cunninghamii*. No special management is required.

### Myrtle rust

Myrtle rust is a disease limited to plants in the Myrtaceae family. This plant disease is a member of the guava rust complex caused by *Austropuccinia psidii*, a known significant pathogen of Myrtaceae plants outside Australia. Infestations are currently limited to NSW, Victoria, Queensland and Tasmania (DPIPWE 2015).

No evidence of myrtle rust was noted (possible indicator species present). The longer-term management issue for the site is to ensure that any ornamental plantings source plants from a reputable nursery free from the pathogen (such businesses are already subject to strict biosecurity conditions).

### Chytrid fungus and other freshwater pathogens

Native freshwater species and habitat are under threat from freshwater pests and pathogens including *Batrachochytrium dendrobatidis* (chytrid frog disease), *Mucor amphibiorum* (platypus mucor disease) and the freshwater algal pest *Didymosphenia geminata* (didymo) (Allan & Gartenstein 2010). Freshwater pests and pathogens are spread to new areas when contaminated water, mud, gravel, soil and plant material or infected animals are moved between sites. Contaminated materials and animals are commonly transported on boots, equipment, vehicles tyres and during road construction and maintenance activities. Once a pest pathogen is present in

a water system it is usually impossible to eradicate. The manual *Keeping it Clean - A Tasmanian Field Hygiene Manual to Prevent the Spread of Freshwater Pests and Pathogens* (Allan & Gartenstein 2010) provides information on how to prevent the spread of freshwater pests and pathogens in Tasmanian waterways wetlands, swamps and boggy areas.

The study area does not support any habitats particular strongly associated with amphibian species (on old non-functioning trench/drain is present only). No special management is considered warranted.

### Additional "Matters of National Environmental Significance"

CofA (2021) indicates that the following threatened ecological communities listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) are likely to occur within the area:

- *Eucalyptus ovata* – *Callitris oblonga* Forest [Vulnerable];
- Lowland Native Grasslands of Tasmania [Critically Endangered]; and
- Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*) [Critically Endangered].

Existing vegetation mapping (Figures 7 & 8) and revised vegetation mapping (Figure 10) indicates that these communities are not present within or adjacent to the study area. No further action is required.

## **DISCUSSION**

### ***Summary of key findings***

#### Threatened flora

- No plant species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) and/or the Tasmanian *Threatened Species Protection Act 1995* (TSPA) were detected, or are known from database information, from the study area.

#### Threatened fauna

- No fauna species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) and/or the Tasmanian *Threatened Species Protection Act 1995* (TSPA) were detected, or are known from database information, from the study area.
- The study area supports potential habitat (to varying degrees of marginality) of several species, as follows:
  - Tasmanian devil (*Sarcophilus harrisii*);
  - spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*);
  - eastern quoll (*Dasyurus viverrinus*);
  - eastern barred bandicoot (*Perameles gunnii* subsp. *gunnii*);
  - grey goshawk (*Accipiter novaehollandiae*);

- Tasmanian masked owl (*Tyto novaehollandiae* subsp. *castanops*); and
- wedge-tailed eagle (*Aquila audax* subsp. *fleayi*).

#### Vegetation types

- The study area supports the following TASVEG mapping units:
  - *Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (TASVEG code: DAZ); and
  - extra-urban miscellaneous (FUM).
- Neither of these mapping units equate to threatened ecological communities listed on schedules of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.
- DAZ is classified as threatened on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*.

#### Weeds

- Six species classified as a declared weeds within the meaning of the Tasmanian *Weed Management Act 1999* and several additional “environmental weeds” were detected from the study area.

#### Plant disease

- No evidence of plant disease (*Phytophthora cinnamomi*, rootrot fungus) was detected from the study area.

#### Animal disease (chytrid)

- The study area does not support habitats conducive to the frog chytrid pathogen.

### ***Legislative and policy implications***

Some commentary is provided below with respect to the key threatened species, vegetation management and other relevant legislation. Note that there may be other relevant policy instruments in addition to those discussed. The following information does not constitute legal advice, not represent the views of relevant agencies, and it is recommended that independent advice is sought from the relevant agency/authority.

#### Tasmanian *Threatened Species Protection Act 1995*

Threatened flora and fauna on this Act are managed under Section 51, as follows:

##### 51. Offences relating to listed taxa

- (1) Subject to subsections (2) and (3), a person must not knowingly, without a permit –
  - (a) take, keep, trade in or process any specimen of a listed taxon of flora or fauna; or
  - (b) disturb any specimen of a listed taxon of flora or fauna found on land subject to an interim protection order; or
  - (c) disturb any specimen of a listed taxon of flora or fauna contrary to a land management agreement; or

- (d) disturb any specimen of a listed taxon of flora or fauna that is subject to a conservation covenant entered into under Part 5 of the *Nature Conservation Act 2002*; or
- (e) abandon or release any specimen of a listed taxon of flora or fauna into the wild.
- (2) A person may take, keep or process, without a permit, a specimen of a listed taxon of flora in a domestic garden.
- (3) A person acting in accordance with a certified forest practices plan or a public authority management agreement may take, without a permit, a specimen of a listed taxon of flora or fauna, unless the Secretary, by notice in writing, requires the person to obtain a permit.
- (4) A person undertaking dam works in accordance with a Division 3 permit issued under the *Water Management Act 1999* may take, without a permit, a specimen of a listed taxon of flora or fauna.

The simplest interpretation of this is that any activity that results in a specimen (i.e. individual) of listed flora or fauna being “knowingly taken” would require a permit to be issued through Conservation Assessments, DPIPW, through a formal application process. Note that the Act does not make reference to “potential habitat” such that activities that result in loss of/disturbance to potential habitat (but not known sites) – which mainly refers to threatened fauna – would not require a permit. In this case, a permit will not be required as no listed threatened flora or fauna were found or are known to be present.

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance.

Matters of national environmental significance considered under the EPBCA include:

- listed threatened species and communities
- listed migratory species;
- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- world heritage properties;
- national heritage places;
- the Great Barrier Reef Marine Park;
- nuclear actions; and
- a water resource, in relation to coal seam gas development and large coal mining development.

The Commonwealth Department of Agriculture, Water and the Environment provides a policy statement study titled *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (CoFA 2013, herein the *Guidelines*), which provides overarching guidance on determining whether an action is likely to have a significant impact on a matter protected under the EPBCA.

The *Guidelines* define a **significant impact** as:

*“...an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact*

*depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts”*

and note that:

*“...all of these factors [need to be considered] when determining whether an action is likely to have a significant impact on matters of national environmental significance”.*

The *Guidelines* provide advice on when a significant impact may be likely:

*“To be ‘likely’, it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility.*

*If there is scientific uncertainty about the impacts of your action and potential impacts are serious or irreversible, the precautionary principle is applicable. Accordingly, a lack of scientific certainty about the potential impacts of an action will not itself justify a decision that the action is not likely to have a significant impact on the environment”.*

The *Guidelines* provide a set of Significant Impact Criteria, which are “intended to assist...in determining whether the impacts of [the] proposed action on any matter of national environmental significance are likely to be significant impacts”. It is noted that the criteria are “intended to provide general guidance on the types of actions that will require approval and the types of actions that will not require approval...[and]...not intended to be exhaustive or definitive”.

#### *Listed ecological communities*

The study area does not support any such communities.

#### *Threatened flora*

The study area does not support populations of EPBCA-listed flora, nor significant potential habitat of such species.

#### *Threatened fauna*

The study area may support populations of threatened fauna listed on the Act, most notably the Tasmanian devil, spotted-tailed quoll, eastern quoll, eastern barred bandicoot and masked owl (but no direct evidence of such species). Note that the study area is within the range of several other species listed on the Act but it is unlikely that any proposal will result in a significant impact on these species (this includes wide-ranging species such as the wedge-tailed eagle).

The *Guidelines* consider a “significant impact” to comprise loss that is likely to lead to a long-term decrease in the size of an important population of a species; reduce the area of occupancy of an important population; fragment an existing important population into two or more populations (unlikely); adversely affect habitat critical to the survival of a species; disrupt the breeding cycle of an important population; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; result in invasive species that are harmful to a threatened species becoming established in the threatened species’ habitat; introduce disease that may cause the species to decline; or interfere substantially with the recovery of the species.

With respect to the aforementioned species, it is difficult to anticipate a scenario in which a referral to the Commonwealth Department of Agriculture, Water and the Environment would be become necessary at the scale of the proposal (highly disturbed and modified environment).

Tasmanian Nature Conservation Act 2002

Schedule 3A of the Act lists vegetation types classified as threatened within Tasmania. The subject title supports a highly modified form of *Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (TASVEG code: DAZ), which is so listed. The administrative/regulatory mechanism for managing threatened communities is through either the Tasmanian *Forest Practices Act 1985* (and associated *Forest Practices Regulations 2017*) or the local planning scheme (*Launceston Interim Planning Scheme 2015*), depending on the zone and code provisions.

Tasmanian Land Use Planning and Approvals Act 1993

The current applicable planning scheme for the study area is the *Launceston Interim Planning Scheme 2015*. The study area is currently zoned as Recreation and proposed for General Residential under the *Launceston Interim Planning Scheme 2015*.

It is understood that a detailed planning application will be made and that the present report will inform the relevant responses to various provisions of the *Scheme*. An initial review of the current Scheme provisions related to natural values is provided below.

I can find no clauses in the General Residential zone provisions that relate directly to any of the findings in this report.

The Biodiversity Code may have application, depending on the interpretation of E8.2.1(b) that states:

- E8.2 Application of this Code
  - E8.2.1 Subject to clause E8.2.2, this code applies to use or development of land:
    - (a) shown as priority habitat on the planning scheme overlay maps; or
    - (b) identified in a flora and fauna report prepared by a suitably qualified person, that is lodged with an application for a permit or required in response to a request under section 54 of the Act, which identifies that the removal of native vegetation will have a significant impact on priority vegetation communities.

where clause E8.2.2 states:

- E8.2.2 This Code applies in the following zones:
  - (k) General Residential and Low Density Residential Zones for subdivision, other than a boundary adjustment in accordance with clause 9.3.

That is, the interpretation of the phrase "removal of native vegetation will have a significant impact on priority vegetation communities" is open to interpretation because the *Scheme* does not provide definitions or guidance on terms such as "significant impact" so it falls to professional judgement (i.e. "identified in a flora and fauna report prepared by a suitably qualified person, that is lodged with an application for a permit or required in response to a request under section 54 of the Act") to interpret this in a reasonable manner.

In most proposals that include threatened vegetation types as listed on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*, the starting point is to work towards a solution that allows for the practical retention of such vegetation and its longer-term secure management. In this case, however, the vegetation in question is highly modified to such an extent that its long-term conservation value without active (and significant intervention) is limited. In this scenario, I believe it is reasonable to assess the proportional impact of the removal of this patch of vegetation at different scales, which I usually consider at the Statewide, NRM region, municipality and IBRA region (Table 2). In this case, it is clear that even if all the area conservatively assigned to DAZ (0.6 ha) is totally cleared, this would result in an effectively unmeasurable proportional loss

at any applicable scale. That is, the impact can hardly be regarded as “significant” and hence it is uncertain if the Code can have direct application.

**Table 2.** Spatial extent (and reservation levels) of DAZ at different scales

[source: <http://dpipwe.tas.gov.au/conservation/development-planning-conservation-assessment/planning-tools/tasmanian-reserve-estate-spatial-layer> vers. Jun. 2020]

| scale                       | DAZ                         |                   |
|-----------------------------|-----------------------------|-------------------|
|                             | area (reserved)             | proportional loss |
| Statewide                   | 22,200 ha<br>(33% reserved) | 0.0027%           |
| Northern Midlands bioregion | 18,900 ha<br>(32% reserved) | 0.0032%           |
| NRM North                   | 21,500 ha<br>(32% reserved) | 0.0028%           |
| Launceston                  | 500 ha<br>(22% reserved)    | 0.12%             |

The Development Standards (E8.6) are stated as:

E8.6 Development Standards

E8.6.1 Habitat and vegetation management

Objective: To appropriately protect or manage vegetation identified as priority habitat and priority vegetation communities.

The site does not support “priority habitat” because this is defined in the Code as:

“the areas shown as priority habitat on the planning scheme overlay maps”.

The site does support “priority vegetation communities” because these are defined in the Code as:

“threatened vegetation and important habitat for threatened species that are listed under the *Threatened Species [Protection – sic] Act 1995* or the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)”.

The DAZ area, however modified, qualifies as a “priority vegetation community”. The objective refers to “appropriately protect or manage [such] vegetation”. In this case, in the absence of active (and significant intervention), this patch of DAZ is likely to remain in very poor condition, or more likely, continue to degrade further as weeds become more prevalent and diverse and works continue in the site.

The Acceptable Solution of E8.6.1 is stated as:

Acceptable Solutions

A1

Clearance or disturbance of priority habitat is in accordance with a certified Forest Practices Plan.

This now refers only to “priority habitat”, which is not present (because this relates directly to an overlay, which is absent). It is assumed there will be no certified Forest Practices Plan for any required clearance or disturbance of “native vegetation” (noting no “priority habitat” is present). I am uncertain as to the application of E8.6.1 A1 so will explore E8.6.1 P1.

The Performance Criteria of E8.6.1 is stated as:

Performance Criteria

P1

Clearance or disturbance of native vegetation within priority habitat or areas identified as priority vegetation communities does not compromise the adequacy of representation of species or vegetation communities, having regard to:

This opening statement is addressed initially. Table 2 has clearly indicated that the proportional loss of DAZ (in its highly modified state) will "not compromise the adequacy of representation of species or vegetation communities".

- (a) the quality of the site to provide habitat of significance to the maintenance or protection of biodiversity in the planning scheme area;

The quality of the DAZ at the site has been extensively discussed. It is reiterated that this site is in very poor condition. On this basis, it is difficult to argue that this sub-clause has any direct application.

- (b) the need for the clearance or disturbance of the vegetation;

This is presumably a matter related to the "need" for the subdivision and how its location is necessary relative to other sites. In this case, I acknowledge that the site has a logical existing access off the formed end of Negara Street, backs on to existing residentially-developed titles, and alternative sites within the golf course's title are limited.

- (c) the method of clearance or disturbance of the vegetation;

I am uncertain as to the application of this sub-clause.

- (d) the extent and quality of the vegetation or habitats affected by the proposal;

See response under sub-clause (a) and opening statement of P1.

- (e) the value of the vegetation as a wildlife corridor;

The *Scheme* does not define a "wildlife corridor". Other interim schemes define the concept as "an area or network of areas, not necessarily continuous, which enables migration, colonisation or interbreeding of flora or fauna species between two or more areas of habitat". A term such as "wildlife corridor" is nebulous, and, in my opinion, should be used with caution because it has little practical application at the scale of this type of small-scale development, because unless there is some specific species known in the area that may be affected by the development (no such species identified – see preceding report), the application of the concept to a development proposal is equally nebulous. In this case, in my opinion, the proposed development should not affect the value of the study area or surrounding areas as a "wildlife corridor".

- (f) the value of riparian vegetation to the protection of habitats and wildlife corridors;

Not applicable – no riparian areas.

- (g) any rehabilitation and maintenance measures;

Presumably not applicable because no such works are proposed as part of the development.

- (h) the impacts of development and vegetation clearance, in proximity to the priority habitat or priority vegetation communities;

Uncertain interpretation of the phrase "...in proximity to..", which has little practical application.

- (i) any conservation outcomes achieved and the long term security of any offset for the loss of the vegetation, provided in accordance with the General Offset Principles document published by the Department of Primary Industries, Parks, Water and Environment, available at <http://dpi.pwe.tas.gov.au/Documents/General-Offset-Principles.pdf>;

No formal offsets are proposed for the loss of 0.6 ha of highly modified DAZ in the context described in this report. As such, this sub-clause may have limited or no application.

- (j) any agreement under section 71 of the Act relating to vegetation management;

To my knowledge, this is not applicable.

- (k) any conservation covenant made under the *Nature Conservation Act 2002*, that exists on or adjacent to the site of the proposed development; and

To my knowledge, this is not applicable (but I have not reviewed title documents).

- (l) any recommendations or advice contained in a flora and fauna report.

No specific recommendations have been made herein, such that this sub-clause has limited direct application.

On the basis of the above review of the provisions of the Biodiversity Code, it appears that if the site is re-zoned as General Residential, the Biodiversity Code may have either no, or very little, direct application.

### Tasmanian Wildlife (General) Regulations 2010

While the assessment of the study area indicated the presence of species listed on schedules of the *Regulations* (i.e. "specially protected wildlife", "protected wildlife", "partly protected wildlife"), no individuals, or products (e.g. nests, dens, etc.), of these species, are likely to be directly physically affected by the works.

### Tasmanian Weed Management Act 1999

Six plant species [*Cytisus scoparius* (english broom), *Genista monspessulana* (montpellier broom), *Ulex europaeus* (gorse), *Rubus anglocandicans* (blackberry), *Rubus leucostachys* (blackberry), *Salix x fragilis* nothovar. *fragilis* (crack willow)] classified as declared weeds within the meaning of the *Tasmanian Weed Management Act 1999* were detected from the study area. Under the Statutory Weed Management Plans for these species (see [www.dpipwe.tas.gov.au](http://www.dpipwe.tas.gov.au)), the Launceston municipality is classified as "Zone B" for management purposes. Under the Plans, "containment is the most appropriate management objective for Zone B municipalities which have problematic infestations but no plan and/or resources to undertake control actions at a level required for eradication" and "the management outcome for Zone B municipalities is ongoing prevention of the spread of the species from existing infestations to areas free or in the process of becoming free of the species".

As such, any management actions should aim to minimise the risk of distributing these invasive weed species to other parts of the municipality, although it is recognised that most of the species already occur commonly in the greater area. The key management issue will be centred on treating vegetation debris and topsoil as "contaminated" with weed propagules and managing this product accordingly. This may include on- or off-site disposal and for on-site burial and/or burning. If off-site disposal is undertaken, this will need to be in accordance with municipal regulations and the provisions of the *Tasmanian Weed Management Act 1999* in relation to declared weeds.

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**APPENDIX A. Vegetation community structure and composition**

The table below provides basic information on the structure and composition of the vegetation mapping unit identified from the study area.

***Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (TASVEG code: DAZ)**

The study area presents as a highly modified occurrence of DAZ, confirmed by substrate (see Plates 11-14 & Figures 5 & 6) and dominance by *Eucalyptus amygdalina* and *Eucalyptus viminalis* over a grassy to shrubby understorey (see Plates 1-10). The site is very weedy, almost to the point of some areas no longer properly classifiable as DAZ but perhaps better allocated to weed infestation (TASVEG code: FWU). DAZ occurs as a mosaic with FUM (see below).



Typical weed-infested "DAZ" (see also Plates 1-10)

| Stratum           | Height (m)<br>Cover (%) | Species<br>(underline = dominant, parentheses = sparse; + = present)  |
|-------------------|-------------------------|---|
| Trees             | 30 m<br>5%              | <i>Eucalyptus viminalis</i> , <i>Eucalyptus amygdalina</i><br>[plus <i>Pinus radiata</i> ]  |
| Trees/tall shrubs | 8-15 m<br>variable      | <i>Eucalyptus amygdalina</i> , <i>Eucalyptus viminalis</i><br>[plus <i>Populus alba</i> ]   |
| Tall shrubs       | 4-6 m<br>10-30%         | <i>Exocarpos cupressiformis</i> , <i>Acacia dealbata</i> , ( <i>Acacia mearnsii</i> ),<br><i>Cassinia aculeata</i> , <i>Bursaria spinosa</i> , ( <i>Banksia marginata</i> ),<br><i>Allocasuarina</i> spp.<br>[plus extensive woody weeds locally dominant incl. <i>Cotoneaster</i> spp.,<br><i>Acacia</i> spp.] |
| Shrubs            | <3 m<br>variable        | ( <i>Epacris impressa</i> ), ( <i>Hibbertia riparia</i> ), <i>Acacia genistifolia</i> , <i>Styphelia humifusum</i><br>[plus extensive woody weeds locally dominant incl. <i>Ulex europaeus</i> ,<br><i>Cytisus scoparius</i> , <i>Genista monspessulana</i> ]   |
| Herbs             | variable                | <i>Acaena novae-zelandiae</i>   |
| Grasses           | variable                | <i>Dactylis glomerata</i> , <i>Ehrharta erecta</i> (to 95% cover in places)<br>[natives sparse]   |
| Graminoids        | variable                | <i>Lepidosperma laterale</i>  |
| Climbers          | +                       | <i>Comesperma volubile</i>  |
| Epiphytes         | local                   | <i>Hedera helix</i>   |
| Ground ferns      | variable                | <i>Pteridium esculentum</i>   |

**APPENDIX B. Vascular plant species recorded from study area**

Botanical nomenclature follows *A Census of the Vascular Plants of Tasmania* (de Salas & Baker 2021), with family placement updated to reflect the nomenclatural changes recognised in the *Flora of Tasmania Online* (de Salas 2021+) and APG (2016); common nomenclature follows *The Little Book of Common Names of Tasmanian Plants* (Wapstra et al. 2005+, updated online at www.dpipwe.tas.gov.au).

i = introduced/naturalised; e = endemic to Tasmania

DW = declared weed under the Tasmanian *Weed Management Act 1999*

EW = environmental weed (author opinion)

+ = represented by one or very few individuals

**Table B1.** Summary of vascular species recorded from the study area

| STATUS       | ORDER         |                 |              |              |
|--------------|---------------|-----------------|--------------|--------------|
|              | DICOTYLEDONAE | MONOCOTYLEDONAE | GYMNOSPERMAE | PTERIDOPHYTA |
|              | 20            | 9               | -            | 1            |
| e            | 1             | -               | -            | -            |
| i            | 45            | 21              | 1            | -            |
| <b>Sum</b>   | <b>68</b>     | <b>30</b>       | <b>1</b>     | <b>1</b>     |
| <b>TOTAL</b> | <b>100</b>    |                 |              |              |

**DICOTYLEDONAE**

**ARALIACEAE**

i *Hedera helix* ivy EW

**ASTERACEAE**

i *Arctotheca calendula* capeweed EW

i *Bellis perennis* english daisy

i *Carduus pycnocephalus* slender thistle DW

i *Carduus tenuiflorus* winged thistle DW

*Cassinia aculeata* subsp. *aculeata* common dollybush

i *Cirsium vulgare* spear thistle

i *Conyza bonariensis* flaxleaf fleabane

i *Dittrichia graveolens* stinkweed EW

*Euchiton japonicus* common cottonleaf

i *Gamochaeta calviceps* grey cudweed

i *Hypochaeris radicata* rough catsear

**BRASSICACEAE**

i *Brassica napus* rape

i *Cardamine hirsuta* hairy bittercress

i *Sinapis arvensis* charlock

**CAPRIFOLIACEAE**

i *Viburnum tinus* laurustinus

**CARYOPHYLLACEAE**

i *Cerastium vulgare* common mouse-ear

**CASUARINACEAE**

*Allocasuarina littoralis* black sheoak +

*Allocasuarina verticillata* drooping sheoak +

**DILLENIACEAE**

*Hibbertia riparia* erect guineaflower +

**ERICACEAE**

*Epacris impressa* common heath +

*Styphelia humifusa* native cranberry +

**EUPHORBIACEAE**

i *Euphorbia helioscopia* sun spurge

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|   |  |                            |    |
|---|--|----------------------------|----|
| i | <i>Euphorbia peplus</i>                                | petty spurge               |    |
|   | <b>FABACEAE</b>  |                            |    |
| i | <i>Acacia baileyana</i>                                | cootamundra wattle         | EW |
|   | <i>Acacia dealbata</i> subsp. <i>dealbata</i>          | silver wattle              |    |
|   | <i>Acacia genistifolia</i>                             | spreading wattle           |    |
| i | <i>Acacia longifolia</i> subsp. <i>longifolia</i>      | sydney coast wattle        | EW |
|   | <i>Acacia mearnsii</i>                                 | black wattle               |    |
| i | <i>Acacia pravissima</i>                               | ovens wattle               | EW |
| i | <i>Acacia retinodes</i>                                | hills wirilda              | EW |
| i | <i>Chamaecytisus palmensis</i>                         | tree lucerne               | EW |
| i | <i>Cytisus scoparius</i>                               | english broom              | DW |
| i | <i>Genista monspessulana</i>                           | montpellier broom          | DW |
| i | <i>Ulex europaeus</i>                                  | gorse                      | DW |
| i | <i>Vicia sativa</i> subsp. <i>nigra</i>                | narrowleaf vetch           |    |
| i | <i>Vicia sativa</i> subsp. <i>sativa</i>               | common vetch               |    |
|   | <b>GENTIANACEAE</b>                                    |                            |    |
| i | <i>Centaurium erythraea</i>                            | common centaury            |    |
|   | <b>GERANIACEAE</b>                                     |                            |    |
| i | <i>Geranium dissectum</i>                              | cutleaf cranesbill         |    |
|   | <b>GOODENIACEAE</b>                                    |                            |    |
|   | <i>Goodenia lanata</i>                                 | trailing native-primrose   | +  |
|   | <b>HYPERICACEAE</b>                                    |                            |    |
|   | <i>Hypericum gramineum</i>                             | small st johns-wort        |    |
|   | <b>MYRTACEAE</b>                                       |                            |    |
| e | <i>Eucalyptus amygdalina</i>                           | black peppermint           |    |
|   | <i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>    | white gum                  |    |
|   | <b>OXALIDACEAE</b>                                     |                            |    |
| i | <i>Oxalis corniculata</i> subsp. <i>corniculata</i>    | yellow woodsorrel          |    |
| i | <i>Oxalis incarnata</i>                                | pale woodsorrel            |    |
|   | <b>PAPAVERACEAE</b>                                    |                            |    |
| i | <i>Fumaria muralis</i> subsp. <i>muralis</i>           | wall fumitory              |    |
|   | <b>PITTOSPORACEAE</b>                                  |                            |    |
|   | <i>Bursaria spinosa</i> subsp. <i>spinosa</i>          | prickly box                |    |
|   | <b>PLANTAGINACEAE</b>                                  |                            |    |
| i | <i>Plantago coronopus</i> subsp. <i>coronopus</i>      | slender buckshorn plantain |    |
| i | <i>Plantago lanceolata</i>                             | ribwort plantain           |    |
| i | <i>Plantago major</i>                                  | great plantain             |    |
|   | <b>POLYGALACEAE</b>                                    |                            |    |
|   | <i>Comesperma volubile</i>                             | blue lovecreeper           | +  |
|   | <b>POLYGONACEAE</b>                                    |                            |    |
| i | <i>Acetosella vulgaris</i>                             | sheep sorrel               |    |
| i | <i>Polygonum arenastrum</i>                            | small wireweed             |    |
|   | <b>PRIMULACEAE</b>                                     |                            |    |
| i | <i>Lysimachia arvensis</i>                             | scarlet pimpernel          |    |
|   | <b>PROTEACEAE</b>                                      |                            |    |
|   | <i>Banksia marginata</i>                               | silver banksia             | +  |
|   | <b>RESEDACEAE</b>                                      |                            |    |
| i | <i>Reseda luteola</i>                                  | weld                       | EW |
|   | <b>ROSACEAE</b>  |                            |    |
|   | <i>Acaena novae-zelandiae</i>                          | common buzzy               |    |
| i | <i>Cotoneaster franchetii</i>                          | grey cotoneaster           | EW |
| i | <i>Cotoneaster glaucophyllus</i> var. <i>serotinus</i> | largeleaf cotoneaster      | EW |
| i | <i>Rubus</i> sp.                                       | blackberry                 | DW |
|   | <b>RUBIACEAE</b>                                       |                            |    |
| i | <i>Coprosma repens</i>                                 | mirrorbush                 | EW |
| i | <i>Galium aparine</i>                                  | cleavers                   |    |
|   | <b>SALICACEAE</b>                                      |                            |    |
| i | <i>Populus alba</i>                                    | white poplar               | EW |
|   | <b>SANTALACEAE</b>                                     |                            |    |
|   | <i>Exocarpos cupressiformis</i>                        | common native-cherry       |    |
|   | <b>SCROPHULARIACEAE</b>                                |                            |    |
| i | <i>Digitalis purpurea</i>                              | foxglove                   | EW |
|   | <b>SOLANACEAE</b>                                      |                            |    |
|   | <i>Solanum laciniatum</i>                              | kangaroo apple             | +  |
| i | <i>Solanum nigrum</i>                                  | blackberry nightshade      |    |
|   | <b>THYMELAEACEAE</b>                                   |                            |    |
|   | <i>Pimelea humilis</i>                                 | dwarf riceflower           | +  |

**GYMNOSPERMAE**

**PINACEAE**

i *Pinus radiata* radiata pine EW

**MONOCOTYLEDONAE**

**AMARYLLIDACEAE**

i *Agapanthus praecox* subsp. *orientalis* agapanthus EW

**ASPARAGACEAE**

*Lomandra longifolia* sagg

**CYPERACEAE**

i *Carex breviculmis* shortstem sedge +  
 i *Cyperus eragrostis* drain flatsedge EW  
*Lepidosperma laterale* variable swordsgedge

**IRIDACEAE**

i *Romulea rosea* var. *australis* lilac oniongrass

**JUNCACEAE**

*Juncus pauciflorus* looseflower rush +  
*Juncus procerus* tall rush +

**POACEAE**

i *Agrostis capillaris* browntop bent  
 i *Agrostis stolonifera* creeping bent  
 i *Aira caryophylla* subsp. *caryophylla* silvery hairgrass  
 i *Aira praecox* early hairgrass  
 i *Alopecurus pratensis* subsp. *pratensis* meadow foxtail  
 i *Anthoxanthum odoratum* sweet vernalgrass  
*Austrostipa stiposa* corkscrew speargrass  
 i *Briza maxima* greater quaking-grass  
 i *Briza minor* lesser quaking-grass  
 i *Bromus diandrus* great brome  
 i *Bromus hordeaceus* soft brome  
 i *Cynodon dactylon* var. *dactylon* couchgrass  
 i *Cynosurus echinatus* rough dogstail  
 i *Dactylis glomerata* cocksfoot  
 i *Ehrharta erecta* var. *erecta* panic veldtgrass  
 i *Lolium perenne* perennial ryegrass  
*Microlaena stipoides* var. *stipoides* weeping grass  
 i *Paspalum dilatatum* paspalum  
 i *Poa annua* winter grass  
 i *Poa infirma* early meadowgrass  
*Rytidosperma pilosum* velvet wallabygrass  
*Tetrarrhena distichophylla* hairy ricegrass

**PTERIDOPHYTA**

**DENNSTAEDTIACEAE**

*Pteridium esculentum* subsp. *esculentum* bracken

**APPENDIX C. Analysis of database records of threatened flora**

Table C1 provides a listing of threatened flora from within 5,000 m of the study area (nominal buffer width usually used to discuss the potential of a particular study area to support various species listed in databases), with comments on whether potential habitat is present for the species, and possible reasons why a species was not recorded.

Note that the field assessment was not restricted to the species listed in Table C1 but considered any threatened flora with the potential to be present. While the database analysis utilises a nominal buffer of 5,000 m, the author’s own experience of the vegetation and flora of the greater study area combined with database interrogation, meant that the specific potential for numerous other species previously recorded from the wider area were taken into account.

**Table C1.** Threatened flora records from within 5,000 m of boundary of study area

Species listed below are listed as rare (r), vulnerable (v), endangered (e), or extinct (x) on the Tasmanian *Threatened Species Protection Act 1995* (TSPA); vulnerable (VU), endangered (EN), critically endangered (CR) or extinct (EX) on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA). Information below is sourced from the DPIPWE’s *Natural Values Atlas* (DPIPWE 2021) and other sources where indicated. Habitat descriptions are taken from FPA (2016), FPA (2017) and TSS (2003), except where otherwise indicated. Species marked with # are listed in CofA (2021).

| Scientific name<br>Common name                     | Status<br>TSPA<br>EPBCA | Tasmanian habitat description (and distribution)  | Comments on study area and database records  |
|--|-------------------------|---|--|
| <i>Alternanthera denticulata</i><br>lesser joyweed | e<br>-                  | <i>Alternanthera denticulata</i> displays a preference for rocky (dolerite) river margins, but has also been recorded from disturbed <i>Melaleuca ericifolia</i> swamp forest and damp riparian grasslands.   | Potential habitat absent.  |
| <i>Anogramma leptophylla</i><br>annual fern        | v<br>-                  | <i>Anogramma leptophylla</i> grows in shallow soil layers over rock, on exposed or semi-exposed outcrops in dry or damp sclerophyll forest. Plants are mostly found on rock ledges, often on, or just inside, the drip line of the overhead rock-face. The substrate is variable, including dolerite, basalt and sandstone. | Potential habitat absent.  |
| <i>Aphelia gracilis</i><br>slender fanwort         | r<br>-                  | <i>Aphelia gracilis</i> inhabits damp sandy ground and wet places in the Midlands and northeast of the State. It may readily colonise sites after fire or other disturbance.  | Potential habitat very marginally present.<br>While the survey was conducted outside the peak flowering time of the species, a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence. |
| <i>Aphelia pumilio</i><br>dwarf fanwort            | r<br>-                  | <i>Aphelia pumilio</i> is found growing on damp flats, often with impeded drainage. The main vegetation types are lowland grassland ( <i>Themeda triandra</i> ) and dry sclerophyll forest and woodland dominated by <i>Eucalyptus viminalis</i> , <i>E. amygdalina</i> or <i>E. ovata</i> .                                | As above.  |
| <i>Asperula subsimplex</i><br>water woodruff       | r<br>-                  | <i>Asperula subsimplex</i> occurs in sites with impeded drainage, including damp grasslands, floodplains and sometimes in grassy forest and woodland along drainage depressions (even at the outfall of artificial dams).   | Potential habitat absent.  |

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| Scientific name<br>Common name                    | Status<br>TSPA<br>EPBCA | Tasmanian habitat description (and distribution)  | Comments on study area and database records   |
|---|-------------------------|---|---|
| <i>Barbarea australis</i><br>riverbed wintercress | e<br>EN<br># only       | <i>Barbarea australis</i> is a riparian species found near river margins, creek beds and along flood channels adjacent to the river. It tends to favour the slower reaches, and has not been found on steeper sections of rivers. It predominantly occurs in flood deposits of silt and gravel deposited as point bars and at the margins of base flows, or more occasionally or between large cobbles on sites frequently disturbed by fluvial processes. Some of the sites are a considerable distance from the river, in flood channels scoured by previous flood action, exposing river pebbles. Most populations are in the Central Highlands, but other populations occur in the northeast and upland areas in the central north. | Potential habitat absent.   |
| <i>Blechnum spinulosum</i><br>small raspfern      | r<br>-                  | <i>Blechnum rupestre</i> is associated with major rivers in northern Tasmania. It is strictly riparian, occurring on shaded banks (e.g. Pipers River), amongst the shade of boulders (e.g. First Basin, Cataract Gorge) and on steep soil banks in wet forest above the high flood zone (e.g. River Leven).   | Potential habitat absent.   |
| <i>Bolboschoenus caldwellii</i><br>sea clubssedge | r<br>-                  | <i>Bolboschoenus caldwellii</i> is widespread in shallow, standing, sometimes brackish water, rooted in heavy black mud.  | Potential habitat absent.   |
| <i>Boronia gunnii</i><br>river boronia            | v<br>VU                 | <i>Boronia gunnii</i> is strictly riparian in habitat, occurring in the flood zone of the Apsley, St Pauls, and Dukes rivers (where extant) and the Denison Rivulet and South Esk River (where presumed extinct) in rock crevices or in the shelter of boulders. The base substrate is always dolerite.   | Potential habitat absent.   |
| <i>Brunonia australis</i><br>blue pincushion      | r<br>-                  | <i>Brunonia australis</i> typically occurs in grassy woodlands and dry sclerophyll forests dominated by <i>Eucalyptus amygdalina</i> or less commonly <i>E. viminalis</i> or <i>E. obliqua</i> . Some smaller populations are found in heathy and shrubby dry forests. The species occurs on well-drained flats and gentle slopes between 10-350 m a.s.l. It is most commonly found on sandy and gravelly alluvial soils, with a particular preference for ironstone gravels. Populations found on dolerite are usually small.  | Potential habitat very marginally present.<br>While the survey was conducted outside the peak flowering time of the species, a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence because the survey failed to detect any rosettes either within the core study area or less disturbed nearby patches of DAZ. |
| <i>Caesia calliantha</i><br>blue grasslily        | r<br>-                  | <i>Caesia calliantha</i> is found predominantly in the Midlands in grassland or grassy woodland including wattle and prickly box "scrub" (occasionally extending into forest, then usually dominated by <i>Eucalyptus viminalis</i> or <i>E. amygdalina</i> ). It has also been recorded from grassy roadsides.   | Potential habitat very marginally present.<br>While the survey was conducted outside the peak flowering time of the species, a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence.  |

**ECOtas...providing options in environmental consulting**

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|--|-------------------------|---|---|
| <i>Caladenia caudata</i><br>tailed spider-orchid                 | v<br>VU<br># only       | <i>Caladenia caudata</i> has highly variable habitat, which includes the central north: <i>Eucalyptus obliqua</i> heathy forest on low undulating hills; the northeast: <i>E. globulus</i> grassy/heathy coastal forest, <i>E. amygdalina</i> heathy woodland and forest, <i>Allocasuarina</i> woodland; and the southeast: <i>E. amygdalina</i> forest and woodland on sandstone, coastal <i>E. viminalis</i> forest on deep sands. Substrates vary from dolerite to sandstone to granite, with soils ranging from deep windblown sands, sands derived from sandstone and well-developed clay loams developed from dolerite. A high degree of insolation is typical of many sites. | Potential habitat absent (highly atypical of all known sites due to the very high levels of modification to the understory).<br><br>While the survey was conducted outside the peak flowering time of the species (Wapstra 2018), a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence. |
| <i>Caladenia filamentosa</i><br>daddy longlegs                   | r<br>-                  | <i>Caladenia filamentosa</i> occurs in lowland heathy and sedgy eucalypt forest and woodland on sandy soils.  | As above.   |
| <i>Caladenia patersonii</i><br>patersons spider-orchid           | v<br>-                  | <i>Caladenia patersonii</i> favours coastal and near-coastal areas in northern Tasmania, growing in low shrubby heathland and heathy forest/woodland in moist to well-drained sandy and clay loam.  | As above.   |
| <i>Caladenia tonellii</i><br>robust fingers                      | e<br>CR                 | In Henry Somerset Conservation Area, <i>Caladenia tonellii</i> occurs in <i>Eucalyptus obliqua</i> - <i>E. amygdalina</i> forest with a shrubby understorey, on shallow clay loam and shallow gravelly loam over clay. Topography varies from flats to slopes up to about 80 m a.s.l. Sites near Scottsdale and Sisters Beach require confirmation as the habitat is quite different (e.g. quartzite-based soils on steeper slopes around Sisters Beach).   | As above (except that I do not accept the record of this species from this part of the State).  |
| <i>Callitris oblonga</i> subsp. <i>oblonga</i><br>south esk pine | v<br>EN<br>#            | <i>Callitris oblonga</i> subsp. <i>oblonga</i> occurs predominantly in riparian scrub, woodland and forest (where it can extend away from rivers) in areas with low precipitation and usually sandy soil. It is local on the East Coast, particularly on the margins of the Swan, Apsley, South Esk, Cygnet and St Pauls rivers. A small population is also present in Cataract Gorge.  | Potential habitat absent.   |
| <i>Calocephalus lacteus</i><br>milky beautyheads                 | r<br>-                  | <i>Calocephalus lacteus</i> occurs in open, dry sites in lowland areas of eastern and northern Tasmania and on lower altitudes of the Central Plateau. It requires bare ground for recruitment, and may benefit from disturbance. It is often found on roadsides and beside tracks.   | Potential habitat absent.   |
| <i>Calystegia sepium</i> subsp. <i>sepium</i><br>swamp bindweed  | r<br>-                  | <i>Calystegia sepium</i> has been recorded from riverbanks and the margins of forests in the north of the State around  | Potential habitat absent.   |

**ECotas...providing options in environmental consulting**

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|---|-------------------------|---|--|
|   |                         | the Tamar region, where it mainly occurs in <i>Melaleuca ericifolia</i> swamp forest and amongst <i>Phragmites australis</i> swampland.   |  |
| <i>Carex longebrachiata</i><br>drooping sedge             | r<br>-                  | <i>Carex longebrachiata</i> grows along riverbanks, in rough grassland and pastures, in damp drainage depressions and on moist slopes amongst forest, often dominated by <i>Eucalyptus viminalis</i> , <i>E. ovata</i> or <i>E. rodwayi</i> .   | Potential habitat marginally present. The species was not detected (no seasonal constraint on detection and/or identification).  |
| <i>Centipeda cunninghamii</i><br>erect sneezeweed         | r<br>-                  | <i>Centipeda cunninghamii</i> is found in a wide variety of soil types, usually in areas subject to flooding or where water is stagnant. The seasonally dry margins of wetlands and lagoons also have the potential to support this species. It is currently known from the Sea Elephant River on King Island, the lower reaches of the South Esk River near Launceston, and Panatana Rivulet near Port Sorell. | Potential habitat absent.  |
| <i>Chiloglottis trapeziformis</i><br>broadlip bird-orchid | e<br>-                  | <i>Chiloglottis trapeziformis</i> is known from near Wynyard on sandy soil in damp sclerophyll forest. There is a historical record from dry open forest near Legana. It has also been recorded from <i>Leptospermum</i> (teatree) and <i>Allocasuarina</i> (sheoak) scrub on sandy humus overlying granite on Great Dog Island (Furneaux group).   | Potential habitat absent (highly atypical of all known sites due to the very high levels of modification to the understory).<br>While the survey was conducted outside the peak flowering time of the species (Wapstra 2018), a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence (and the paired leaves of any <i>Chiloglottis</i> species were not detected). |
| <i>Corunastylis nuda</i><br>tiny midge-orchid             | r<br>-                  | <i>Corunastylis nuda</i> occurs in a wide range of habitats from near sea level to 1,000 m a.s.l., on a range of different soil types and geologies. Vegetation types include scrub, subalpine grassland, open rock plates, heathy open forest, shrubby dry sclerophyll forest and wet sclerophyll forest.  | Potential habitat absent.  |
| <i>Cryptandra amara</i><br>pretty pearlflower             | e<br>-                  | <i>Cryptandra amara</i> grows in some of the driest areas of the State and is typically associated with fertile rocky substrates (e.g. basalt). Its habitat ranges from near-riparian rockplates to grasslands or grassy woodlands.   | Potential habitat absent.  |
| <i>Damasonium minus</i><br>starfruit                      | r<br>-                  | <i>Damasonium minus</i> occupies swampy habitat and farm dams and prefers slow-flowing or stationary water.   | Potential habitat absent.  |
| <i>Deyeuxia lawrencei</i><br>lawrences bentgrass          | x<br>-                  | <i>Deyeuxia lawrencei</i> is known only from the type specimen collected around 1831 from an unknown location, possibly from the Launceston area. Habitat is unknown because the precise location of the only collection is not known. <i>Deyeuxia lawrencei</i> is presumed extinct.   | Unknown if site supports potential habitat.<br>The species was not detected (no seasonal constraint on detection and/or identification).   |

**ECotas...providing options in environmental consulting**

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|--|-------------------------|--|---|
| <i>Dianella amoena</i><br>grassland flaxlily                             | r<br>EN<br># only       | <i>Dianella amoena</i> occurs mainly in the northern and southern Midlands, where it grows in native grasslands and grassy woodlands.  | Potential habitat marginally present. The species was not detected (no seasonal constraint on detection and/or identification). |
| <i>Discaria pubescens</i><br>spiky anchorplant                           | e<br>-                  | <i>Discaria pubescens</i> is found sporadically in the Midlands and more abundantly in drier parts of the Central Highlands. It grows on sandy or gravelly soil, in basalt talus slopes and clefts amongst fractured dolerite rocks and flood channels. Many sites are in rough pasture, and it also grows on roadsides. Recent collections indicate the species is occasionally associated with sandstone outcrops. | Potential habitat absent.   |
| <i>Diuris palustris</i><br>swamp doubletail                              | e<br>-                  | <i>Diuris palustris</i> occurs in coastal areas in grassy open eucalypt forest, sedgy grassland and heathland with <i>Leptospermum</i> (teatree) and <i>Melaleuca</i> (paperbark) on poorly- to moderately-drained sandy peat and loams, usually in sites that are wet in winter.  | Potential habitat absent.   |
| <i>Epacris exserta</i><br>south esk heath                                | e<br>EN<br>#            | <i>Epacris exserta</i> occurs along the lower reaches of the South Esk, North Esk and Supply rivers. It is a strictly riparian species that grows in areas subject to periodic inundation, mainly on alluvium amongst dolerite boulders within dense riparian scrub, and occasionally in open rocky sites. It has been recorded from 10-310 m a.s.l.   | Potential habitat absent.   |
| <i>Epilobium pallidiflorum</i><br>showy willowherb                       | r<br>-                  | <i>Epilobium pallidiflorum</i> occurs in wet places (e.g. natural wetlands amongst forest, margins of <i>Melaleuca ericifolia</i> swamp forest, scrubby-sedgy <i>E. ovata</i> woodland on heavy soils, etc.) mostly in the north and northwest of the State.   | Potential habitat absent.   |
| <i>Euphrasia collina</i> subsp. <i>deflexifolia</i><br>eastern eyebright | r<br>-                  | <i>Euphrasia collina</i> subsp. <i>deflexifolia</i> occurs in open woodland or heath (sometimes extending to forest), often associated with road edges, tracks and depressions near the headwaters of creeks. Its habitat is associated with the availability of open patches of ground maintained by fire or other disturbance, the proximity of low vegetation and relatively high soil moisture in spring.        | Potential habitat absent.   |
| <i>Euphrasia scabra</i><br>yellow eyebright                              | e<br>-                  | <i>Euphrasia scabra</i> occurs in moist herb/sedge communities in grassy leads in marshes and in drier open grassy areas at the headwaters of creeks. Its habitat is associated with gaps created by grazing, flooding or other disturbance. It has been recorded from scattered sites throughout lowland areas of Tasmania, including the northwest coast, central north, Midlands, Eastern Tiers and around        | Potential habitat absent.   |

**ECOTas...providing options in environmental consulting**

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|--|-------------------------|--|---|
|  |                         | Hobart. However, it is considered to be extinct from many of these sites, and populations are low and transient in areas (Eastern Tiers and Hobart) with the greatest probability of still supporting the species.   |   |
| <i>Glycine latrobeana</i><br>clover glycine        | v<br>VU<br># only       | <i>Glycine latrobeana</i> occurs in a range of habitats, geologies and vegetation types. Soils are usually fertile but can be sandy when adjacent to or overlaying fertile soils. The species mainly occurs on flats and undulating terrain over a wide geographical range, including near-coastal environments, the Midlands, and the Central Plateau. It mainly occurs in grassy/heathy forests and woodlands and native grasslands. | Potential habitat absent (too highly modified).   |
| <i>Gynatrix pulchella</i><br>fragrant hempbush     | r<br>-                  | <i>Gynatrix pulchella</i> occurs as a riparian shrub, found along rivers and drainage channels, sometimes extending onto adjacent floodplains (including old paddocks), predominantly in the north of the State.   | Potential habitat absent.   |
| <i>Gyrostemon thesioides</i><br>broom wheelfruit   | r<br>-                  | <i>Gyrostemon thesioides</i> occurs predominately on dolerite or granite in <i>Allocasuarina</i> (sheoak) forest in the State's east and northeast, including the Furneaux Group.  | Potential habitat absent.   |
| <i>Haloragis heterophylla</i><br>variable raspwort | r<br>-                  | <i>Haloragis heterophylla</i> occurs in poorly-drained sites (sometimes only marginally so), which are often associated with grasslands and grassy woodlands with a high component of <i>Themeda triandra</i> (kangaroo grass). It also occurs in grassy/sedgy <i>Eucalyptus ovata</i> forest and woodland, shrubby creek lines, and broad sedgy/grassy flats, wet pasture and margins of farm dams.                                   | Potential habitat absent.   |
| <i>Hovea tasmanica</i><br>rockfield purplepea      | r<br>-                  | <i>Hovea tasmanica</i> occurs in central and northeastern regions. It is usually found on dry, rocky ridges or slopes (mostly dolerite) in forest and riverine scrub.  | Potential habitat absent.   |
| <i>Hypolepis muelleri</i><br>harsh groundfern      | r<br>-                  | <i>Hypolepis muelleri</i> occurs along watercourses, swampy areas or deep, rich, alluvial soils below 120 m elevation in northern Tasmania (including King and Flinders islands). It has also been recorded from forest dominated by <i>Acacia melanoxylon</i> (blackwood), <i>Melaleuca</i> (paperbark) or <i>Eucalyptus</i> species.   | Potential habitat absent.   |
| <i>Lepidium hyssopifolium</i><br>soft peppergrass  | e<br>EN<br># only       | The native habitat of <i>Lepidium hyssopifolium</i> is the growth suppression zone beneath large trees in grassy woodlands and grasslands (e.g. over-mature black wattles and isolated eucalypts in rough pasture). <i>Lepidium</i>  | Potential habitat marginally present. The species was not detected (no seasonal constraint on detection and/or identification). |

**ECotas...providing options in environmental consulting**

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|---|-------------------------|---|---|
|   |                         | <i>hyssopifolium</i> is now found primarily under large exotic trees on roadsides and home yards on farms. It occurs in the eastern part of Tasmania between sea-level to 500 m a.s.l. in dry, warm and fertile areas on flat ground on weakly acid to alkaline soils derived from a range of rock types. It can also occur on frequently slashed grassy/weedy roadside verges where shade trees are absent.                          |   |
| <i>Leucopogon virgatus</i><br>var. <i>brevifolius</i><br>shortleaf beardheath | r<br>-                  | <i>Leucopogon virgatus</i> var. <i>brevifolius</i> occurs mainly on low undulating terrain in the drier parts of the State (e.g. Northern Midlands) in heathy forest and woodland extending to open grassland and grassy woodland in disturbed habitats, often associated with rock outcrops (e.g. sandstone patches).  | Potential habitat marginally present. Records from this part of the State require clarification.<br>The species was not detected (no seasonal constraint on detection and/or identification). |
| <i>Lycopus australis</i><br>australian gypsywort                              | e<br>-                  | <i>Lycopus australis</i> occurs in moist shaded places including disturbed areas within <i>Melaleuca ericifolia</i> swamp forest, <i>Phragmites australis</i> reed beds, and rocky (dolerite) riverbeds fringed by riparian scrub.  | Potential habitat absent.   |
| <i>Lythrum salicaria</i><br>purple loosestrife                                | v<br>-                  | <i>Lythrum salicaria</i> inhabits swamps, stream banks and rivers mainly in the north and northeast of the State. It can also occur between gaps in <i>Melaleuca ericifolia</i> forest. This species can act as a weed, proliferating along roadsides and other disturbed areas, and, as horticultural strains are in cultivation and birds can disperse seed, some occurrences may not be native.                                    | Potential habitat absent.   |
| <i>Mentha australis</i><br>river mint   | e<br>-                  | <i>Mentha australis</i> is known from riparian habitats along the lower reaches of the South Esk River, Lake Trevallyn and the Rubicon River, where it occurs along the rocky (dolerite) margins of rivers and lakes.   | Potential habitat absent.   |
| <i>Parietaria debilis</i><br>shade pellitory                                  | r<br>-                  | <i>Parietaria debilis</i> occurs around muttonbird rookeries, on cliffs/rocks in the salt spray zone, in moist shaded areas in dune scrubs, and under rock overhangs in forested gullies.   | Potential habitat absent.   |
| <i>Persicaria decipiens</i><br>slender waterpepper                            | v<br>-                  | <i>Persicaria decipiens</i> occurs on the banks of rivers and streams, mostly in the north of the State, including King Island. The species may colonise farm dams.   | Potential habitat absent.   |
| <i>Persicaria subsessilis</i><br>bristly waterpepper                          | e<br>-                  | <i>Persicaria subsessilis</i> is found in a variety of habitats, including rocky (dolerite) river margins, disturbed <i>Melaleuca ericifolia</i> (coast paperbark) swamp forest and lagoon margins, <i>Cyperus lucidus</i> (leafy flatsedge) sedgeland and within openings in riparian scrub on alluvium. It is known from the Ringarooma River, the South Esk River downstream of Trevallyn Dam, and the West Tamar near Launceston. | Potential habitat absent.   |

**ECOTas...providing options in environmental consulting**

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| <i>Phyllangium divergens</i><br>wiry mitrewort                              | v<br>-                  | <i>Phyllangium divergens</i> occurs in a wide variety of near-coastal habitats on a range of substrates, a common feature usually being bare ground (e.g. tracks) and rock exposures (e.g. outcrops, coastal cliffs, etc.).   | Potential habitat very marginally present.<br>While the survey was conducted outside the peak flowering time of the species, a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence.  |
| <i>Pimelea curviflora</i> var. <i>gracilis</i><br>slender curved riceflower | r<br>-                  | <i>Pimelea curviflora</i> var. <i>gracilis</i> occurs in a range of vegetation types from wet and dry sclerophyll forest to hardwood plantations. Understories vary from open and grassy to densely shrubby. It can densely colonise disturbed sites such as firebreaks, log landings and tracks.   | Potential habitat marginally present.<br>The species was not detected (no seasonal constraint on detection and/or identification).  |
| <i>Pimelea flava</i> subsp. <i>flava</i><br>yellow riceflower               | r<br>-                  | <i>Pimelea flava</i> subsp. <i>flava</i> occurs in wet and dry sclerophyll forest and woodland, and extends into hardwood and softwood plantations. It often occurs abundantly on disturbed sites such as in logged forest, firebreaks, powerline easements and road batters.   | Potential habitat marginally present.<br>The species was not detected (no seasonal constraint on detection and/or identification).  |
| <i>Poa mollis</i><br>soft tussockgrass                                      | r<br>-                  | <i>Poa mollis</i> is relatively widespread in the eastern half of the State, in dry sclerophyll forest and woodland (often dominated by <i>Eucalyptus amygdalina</i> , <i>E. viminalis</i> or <i>Allocasuarina verticillata</i> ). Sites are often steep and rocky (e.g. Cataract Gorge).   | Potential habitat absent.   |
| <i>Prasophyllum robustum</i><br>robust leek-orchid                          | e<br>CR                 | <i>Prasophyllum robustum</i> is now known only from one small site in grassy and shrubby <i>Eucalyptus amygdalina</i> forest on well-drained brown loam derived from basalt. The species has a much wider historical distribution.  | Potential habitat absent (highly atypical of all known sites due to the very high levels of modification to the understory and substrate).<br>While the survey was conducted outside the peak flowering time of the species (Wapstra 2018), a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence. |
| <i>Prostanthera cuneata</i><br>alpine mintbush                              | x<br>-                  | On the mainland <i>Prostanthera cuneata</i> occurs in the alpine and subalpine heaths of Victoria and New South Wales. Apart from planted specimens, this species appears to be extinct in Tasmania, but was collected from a lowland site (but flood debris in the sample suggests it could have been washed down from higher elevations). | Potential habitat absent.   |
| <i>Prostanthera rotundifolia</i><br>roundleaf mintbush                      | v<br>-                  | <i>Prostanthera rotundifolia</i> mainly occurs along flood-prone rocky riverbeds as a component of the dense riparian shrubbery but also extends to adjacent rocky slopes.  | Potential habitat absent.   |
| <i>Pterostylis commutata</i><br>midlands greenhood                          | e<br>CR<br># only       | <i>Pterostylis commutata</i> is restricted to Tasmania's Midlands, where it occurs in native grassland and <i>Eucalyptus pauciflora</i> grassy woodland on well-drained sandy soils and basalt loams.   | Potential habitat absent (too highly modified).   |

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| <i>Pterostylis grandiflora</i><br>superb greenhood                   | r<br>-                  | <i>Pterostylis grandiflora</i> occurs mostly in heathy and shrubby open eucalypt forests and in grassy coastal <i>Allocasuarina</i> (sheoak) woodland on moderately to well-drained sandy and loamy soils. It prefers to grow amongst undergrowth on lightly shaded sites. A recent population has been detected in wet sclerophyll forests.   | Potential habitat absent.   |
| <i>Pterostylis ziegeleri</i><br>grassland greenhood                  | v<br>VU<br>#            | <i>Pterostylis ziegeleri</i> occurs in the State's south, east and north, with an outlying occurrence in the northwest. In coastal areas, the species occurs on the slopes of low stabilised sand dunes and in grassy dune swales, while in the Midlands it grows in native grassland or grassy woodland on well-drained clay loams derived from basalt.   | Potential habitat absent (too highly modified).   |
| <i>Pultenaea prostrata</i><br>silky bushpea                          | v<br>-                  | <i>Pultenaea prostrata</i> occurs in grassy woodlands or grasslands, mostly on Tertiary basalt or Quaternary alluvium.   | Potential habitat marginally present. The species was not detected (no seasonal constraint on detection and/or identification). |
| <i>Ranunculus pumilio</i><br>var. <i>pumilio</i><br>fernny buttercup | r<br>-                  | <i>Ranunculus pumilio</i> var. <i>pumilio</i> occurs mostly in wet places (e.g. broad floodplains of permanent creeks, "wet pastures") from sea level to altitudes of 800-900 m a.s.l.   | Potential habitat absent.   |
| <i>Schenkia australis</i><br>spike centaury                          | r<br>-                  | <i>Schenkia australis</i> has been recorded from rainforest, wet sclerophyll forest, dry sclerophyll forest and heathland in the east and north of the State. It has also been recorded from forest sites which were cleared for pasture. Several recent sites are from windswept coastal heathland/scrub.   | Potential habitat absent (as now understood by the most recent records from coastal sites).                                     |
| <i>Schoenoplectus tabernaemontani</i><br>river clubsedge             | r<br>-                  | <i>Schoenoplectus tabernaemontani</i> inhabits the margins of lagoons on King Island, Flinders Island and on some riverbanks in the Midlands.  | Potential habitat absent.   |
| <i>Scleranthus fasciculatus</i><br>spreading knawel                  | v<br>-                  | <i>Scleranthus fasciculatus</i> is only recorded from a few locations in the Midlands and southeast. The vegetation at most of the sites is <i>Poa</i> grassland/grassy woodland. <i>Scleranthus fasciculatus</i> appears to need gaps between the tussock spaces for its survival and both fire and stock grazing maintain the openness it requires. Often found in areas protected from grazing such as fallen trees and branches. | Potential habitat marginally present. The species was not detected (no seasonal constraint on detection and/or identification). |
| <i>Scutellaria humilis</i><br>dwarf scullcap                         | r<br>-                  | <i>Scutellaria humilis</i> is found in moist, shady places in the northeast and southeast of the State. Recent sites have been associated with rocky slopes and rises.   | Potential habitat absent.   |
| <i>Senecio campylocarpus</i><br>bulging fireweed                     | v<br>-                  | <i>Senecio campylocarpus</i> occurs on grassy margins of permanent rivers in the Midlands and on broad floodplains.  | Potential habitat absent.   |

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|---|-------------------------|---|--|
| <i>Senecio macrocarpus</i><br>largefruit fireweed                           | e<br>VU                 | <i>Senecio macrocarpus</i> is presumed extinct in Tasmania, having been collected from the north of the State including the South Esk River. In Victoria, the species occurs in poorly-drained basalt grasslands and grassy woodlands.  | Potential habitat absent.  |
| <i>Senecio psilocarpus</i><br>swamp fireweed                                | e<br>VU<br># only       | <i>Senecio psilocarpus</i> is known from six widely scattered sites in the northern half of the State, including King and Flinders islands. It occurs in swampy habitats including broad valley floors associated with rivers, edges of farm dams amongst low-lying grazing/cropping ground, herb-rich native grassland in a broad swale between stable sand dunes, adjacent to wetlands in native grassland, herbaceous marshland and low-lying lagoon systems.  | Potential habitat absent.  |
| <i>Senecio squarrosus</i><br>leafy fireweed                                 | r<br>-                  | <i>Senecio squarrosus</i> occurs in a wide variety of habitats. One form occurs predominantly in lowland damp tussock grasslands. The more widespread and common form occurs mainly in dry forests (often grassy) but extends to wet forests and other vegetation types.  | Potential habitat marginally present.<br>The species was not detected (no seasonal constraint on detection and/or identification).   |
| <i>Siloxerus multiflorus</i><br>small wrinklewort                           | r<br>-                  | <i>Siloxerus multiflorus</i> occurs in a range of somewhat exposed lowland habitats, including bare soil and rocks amongst dense windswept coastal shrubbery to rock outcrops and bare ground associated with native grassland, grassy woodland and forest.   | Potential habitat very marginally present.<br>While the survey was conducted outside the peak flowering time of the species, a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence. |
| <i>Spyridium eriocephalum</i> var. <i>eriocephalum</i><br>heath dustymiller | e<br>-                  | <i>Spyridium eriocephalum</i> var. <i>eriocephalum</i> is known to be extant at a single subpopulation within East Risdon State Reserve where it grows on mudstones in open shrublands or low open eucalypt woodlands, the species being closely associated with Aboriginal middens, with abundant crushed and burnt shell. The dominant eucalypt is <i>Eucalyptus amygdalina</i> , with <i>Eucalyptus risdonii</i> occurring at the small inland site. <i>Allocasuarina verticillata</i> (drooping sheoak) is also prominent at one site. The aspect of the East Risdon sites ranges from west to northwest, the slope from 2-25 degrees, elevation a.s.l. from 5-30 m a.s.l., while the majority of plants are within 150 m of the River Derwent. | Potential habitat absent.  |
| <i>Spyridium vexilliferum</i> var. <i>vexilliferum</i><br>helicopter bush   | r<br>-                  | <i>Spyridium vexilliferum</i> occurs in a range of vegetation types, including sandy heaths, rock plates and dry sclerophyll forest and woodland (mainly dominated by <i>Eucalyptus amygdalina</i> ). It is found on a range of substrates (e.g.  | Potential habitat marginally present.<br>The species was not detected (no seasonal constraint on detection and/or identification).   |

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| Scientific name<br>Common name                     | Status<br>TSPA<br>EPBCA | Tasmanian habitat description (and distribution)   | Comments on study area and database records  |
|--|-------------------------|--|--|
|  |                         | mudstone, granite, laterite gravels) from near-coastal areas in the east, north and west of the State, to the Midlands and lower Derwent Valley. It is most abundant in open or disturbed areas, as it can proliferate from soil-stored seed after disturbance.  |  |
| <i>Tetratheca ciliata</i><br>northern pinkbells    | r<br>-                  | <i>Tetratheca ciliata</i> occurs from near-coastal areas in the State's north at elevations below 70 m, ranging from Rocky Cape in the west to Tomahawk/Boobyalla in the east, and an outlying site near Liffey about 60 km inland and 320 m a.s.l. It has been recorded from heathlands and heathy woodlands on sandy well-drained soils, the woodland dominated by <i>Eucalyptus amygdalina</i> .      | Potential habitat absent.  |
| <i>Teucrium corymbosum</i><br>forest germander     | r<br>-                  | <i>Teucrium corymbosum</i> occurs in a wide range of habitats from rocky steep slopes in dry sclerophyll forest and <i>Allocasuarina</i> (sheoak) woodland, riparian flats and forest.   | Potential habitat absent.  |
| <i>Triptilodiscus pygmaeus</i><br>dwarf sunray     | v<br>-                  | <i>Triptilodiscus pygmaeus</i> grows within grasslands, grassy woodlands or rockplates, with the underlying substrate being mostly Tertiary basalt or Jurassic dolerite. The elevation range of recorded sites in Tasmania is 30-470 m a.s.l., with an annual rainfall of about 450-600 mm. The species occurs within native grassland dominated by <i>Themeda triandra</i> (kangaroo grass).            | Potential habitat very marginally present.<br>While the survey was conducted outside the peak flowering time of the species, a follow-up timed-targeted survey is not considered warranted based on the statistically very low likelihood of occurrence. |
| <i>Utricularia australis</i><br>yellow bladderwort | r<br>-                  | <i>Utricularia australis</i> has a widespread distribution, ranging from the Gordon River in the southwest to the northern part of Flinders Island in the far northeast (and also reportedly from the Derwent River in the State's south). It grows in stationary or slow-moving water, including natural lakes, farm dams and reservoirs, where it has been reported as forming 'locally dense swards'. | Potential habitat absent.  |
| <i>Velleia paradoxa</i><br>spur velleia            | v<br>-                  | <i>Velleia paradoxa</i> is known from the Hobart and Launceston areas, the Midlands and the Derwent Valley, where it occurs in grassy woodlands or grasslands on dry sites. It has been recorded up to 550 m a.s.l. at sites with an annual rainfall range of 450-750 mm.  | Potential habitat marginally present.<br>The species was not detected (no seasonal constraint on detection and/or identification).   |
| <i>Veronica plebeia</i><br>trailing speedwell      | r<br>-                  | <i>Veronica plebeia</i> typically occurs in dry to damp sclerophyll forest dominated by <i>Eucalyptus amygdalina</i> on dolerite or Tertiary sediments, but can also occur in <i>Eucalyptus ovata</i> grassy woodland/forest and <i>Melaleuca ericifolia</i> swamp forest.   | Potential habitat marginally present.<br>The species was not detected (no seasonal constraint on detection and/or identification).   |

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| Scientific name<br>Common name                             | Status<br>TSPA<br>EPBCA | Tasmanian habitat description (and distribution)   | Comments on study area and database records   |
|--|-------------------------|--|---|
| <i>Viola caleyana</i><br>swamp violet                      | r<br>-                  | The habitat of <i>Viola caleyana</i> in Tasmania is poorly understood but includes lowland wet grasslands, possibly wet heathlands and a variety of forest types.  | Potential habitat absent.   |
| <i>Vittadinia gracilis</i><br>woolly new-holland-daisy     | r<br>-                  | <i>Vittadinia gracilis</i> occurs in native grassland and grassy woodland.   | Potential habitat marginally present. The species was not detected (no seasonal constraint on detection and/or identification). |
| <i>Vittadinia muelleri</i><br>narrowleaf new-holland-daisy | r<br>-                  | <i>Vittadinia muelleri</i> occurs in native grassland and grassy woodland.   | Potential habitat marginally present. The species was not detected (no seasonal constraint on detection and/or identification). |
| <i>Westringia angustifolia</i><br>narrowleaf westringia    | r<br>-                  | <i>Westringia angustifolia</i> occurs mainly in mid elevations, always on dolerite (but can be close to dolerite-sediment contact zones), in dry to wet sclerophyll forest on broad ridges, slopes and dense riparian shrubberies.   | Potential habitat absent.   |
| <i>Xerochrysum bicolor</i><br>eastcoast everlasting        | r<br>-                  | Species of <i>Xerochrysum</i> are poorly understood in Tasmania, especially the identification of coastal species ( <i>X. bicolor</i> and <i>X. bracteatum</i> ). <i>X. bicolor</i> may be restricted to stabilised dune systems.  | Potential habitat absent.   |
| <i>Xerochrysum palustre</i><br>swamp everlasting           | v<br>VU<br># only       | <i>Xerochrysum palustre</i> has a scattered distribution with populations in the northeast, east coast, Central Highlands and Midlands, all below about 700 m elevation. It occurs in wetlands, grassy to sedgy wet heathlands and extends to associated heathy <i>Eucalyptus ovata</i> woodlands. Sites are usually inundated for part of the year. | Potential habitat absent.   |

**APPENDIX D. Analysis of database records of threatened fauna**

Table D1 provides a listing of threatened fauna from within 5,000 m of the study area (nominal buffer width usually used to discuss the potential of a particular study area to support various species listed in databases), with comments on whether potential habitat is present for the species, and possible reasons why a species was not recorded.

**Table D1.** Threatened fauna records from 5,000 m of boundary of study area

Species listed below are listed as rare (r), vulnerable (v), endangered (e), or extinct (x) on the Tasmanian *Threatened Species Protection Act 1995* (TSPA); vulnerable (VU), endangered (EN), critically endangered (CR) or extinct (EX) on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA). Information below is sourced from the DPIPWE's *Natural Values Atlas* (DPIPWE 2021), Bryant & Jackson (1999) and FPA (2021). Wholly marine and pelagic species are excluded from the list below. Species marked with # are listed in CofA (2021).

| Scientific name<br>Common name  | Status<br>TSPA<br>EPBCA | Tasmanian habitat description<br>(and distribution)   | Comments on study area and<br>database records  |
|---|-------------------------|---|---|
| <i>Accipiter novaehollandiae</i><br>grey goshawk                            | e<br>-                  | Potential habitat is native forest with mature elements below 600 m altitude, particularly along watercourses. Significant habitat may be summarised as areas of wet forest, rainforest and damp forest patches in dry forest, with a relatively closed mature canopy, low stem density, and open understorey in close proximity to foraging habitat and a freshwater body (i.e. stream, river, lake, swamp, etc.).   | Potential habitat absent.<br>The species may very occasionally utilise the greater study area as part of a home range and for foraging but small-scale development should not have a significant impact on this aspect of the life history of the species.  |
| <i>Apus pacificus</i><br>fork-tailed swift                                  | -<br>-<br># only        | Occasional non-breeding migrant to Tasmania only.   | Potential habitat widespread but this is an aerially-foraging bird that rarely lands. Further consideration of this species should not be required.   |
| <i>Aquila audax</i> subsp.<br><i>fleayi</i><br>Tasmanian wedge-tailed eagle | e<br>EN<br>#            | Potential habitat comprises potential nesting habitat and potential foraging habitat. Potential foraging habitat is a wide variety of forest (including areas subject to native forest silviculture) and non-forest habitats.<br>Potential nesting habitat is tall eucalypt trees in large tracts (usually more than 10 ha) of eucalypt or mixed forest. Nest trees are usually amongst the largest in a locality. They are generally in sheltered positions on leeward slopes, between the lower and mid sections of a slope and with the top of the tree usually lower than the ground level of the top of the ridge, although in some parts of the State topographic shelter is not always a significant factor (e.g. parts of the northwest and Central Highlands). Nests are usually not constructed close to sources of disturbance and nests close to disturbance are less productive. More than one nest may occur within a territory but only one is used for breeding in any one year. Breeding failure often promotes a change of nest in the next year. | Potential nesting habitat absent.<br>No known nests within 1 km of study area. No nests were detected as a consequence of site assessment.<br>The species may utilise the greater study area as part of a home range and for foraging but small-scale development should not have a significant impact on this aspect of the life history of the species. |

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| Scientific name<br>Common name  | Status<br>TSPA<br>EPBCA | Tasmanian habitat description<br>(and distribution)   | Comments on study area and<br>database records  |
|---|-------------------------|---|---|
| <i>Beddomeia launcestonensis</i><br>Cataract Gorge freshwater snail         | e<br>-                  | Potential habitat is riverine habitats within the potential range.  | Potential habitat absent.   |
| <i>Botaurus poiciloptilus</i><br>Australasian bittern                       | -<br>EN<br>#            | Potential habitat is comprised of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. <i>Phragmites</i> , <i>Cyperus</i> , <i>Eleocharis</i> , <i>Juncus</i> , <i>Typha</i> , <i>Baumea</i> , <i>Bolboschoenus</i> ) or cutting grass ( <i>Gahnia</i> ) growing over a muddy or peaty substrate (TSSC 2011). | Potential habitat absent.   |
| <i>Catadromus lacordairei</i><br>green-lined ground beetle                  | v<br>-                  | Potential habitat is open, grassy/sedgy, low altitude grasslands and woodlands associated with temporary and permanent wetlands and low-lying plains, flats and ephemeral drainages adjacent to rivers and streams. Key habitat elements that need to be present include sheltering sites such as patches of stones, coarse woody debris and/or cracking soils.   | Potential habitat absent as the key elements are not present.   |
| <i>Ceyx azureus</i> subsp. <i>diemenensis</i><br>Tasmanian azure kingfisher | e<br>EN<br># only       | Potential foraging habitat is primarily freshwater (occasionally estuarine) waterbodies such as large rivers and streams with well-developed overhanging vegetation suitable for perching and water deep enough for dive-feeding. Potential breeding habitat is usually steep banks of large rivers (a breeding site is a hole (burrow) drilled in the bank).   | Potential habitat absent.   |
| <i>Dasyurus maculatus</i> subsp. <i>maculatus</i><br>spotted-tailed quoll   | r<br>VU<br>#            | Potential habitat is coastal scrub, riparian areas, rainforest, wet forest, damp forest, dry forest and blackwood swamp forest (mature and regrowth), particularly where structurally complex and steep rocky areas are present, and includes remnant patches in cleared agricultural land.   | Potential habitat present. No evidence (e.g. scats) of the species was observed.<br>The species may utilise the greater study area as part of a home range and for foraging but development at the scale proposed and within the context of surrounding land uses should not have a significant impact on potential habitat of the species. |
| <i>Dasyurus viverrinus</i><br>eastern quoll                                 | -<br>EN<br>#            | Potential habitat is a variety of habitats including rainforest, heathland, alpine areas and scrub. However, it seems to prefer dry forest and native grassland mosaics which are bounded by agricultural land.   | See under spotted-tailed quoll.   |

**ECOtas...providing options in environmental consulting**

| Scientific name<br>Common name                               | Status<br>TSPA<br>EPBCA | Tasmanian habitat description<br>(and distribution)  | Comments on study area and<br>database records   |
|--|-------------------------|--|--|
| <i>Engaeus orramakunna</i><br>(Mt Arthur burrowing crayfish) | v<br>VU<br># only       | Not relevant.  | Listed in CofA (2021) but both FPA (2021) and DPIPWE (2021) correctly indicate that the species is not known from this part of the State.  |
| <i>Galaxiella fontanus</i><br>swan galaxias                  | e<br>EN                 | Potential habitat is slow to moderately fast flowing streams containing permanent water (even when not flowing), which have good in-stream cover from overhanging banks and/or logs, and shade from overhanging vegetation. A population can only be maintained where barriers have prevented establishment of trout and redfin perch. The nature of these barriers is variable and can include permanent natural structures such as waterfalls and chutes and also low flow-dependent features such as marshes, ephemeral water-losing and remnant channels, and braided channel floodplain features. | Potential habitat absent. The site is also well outside the recognised range of the species (FPA 2021).  |
| <i>Galaxias pusilla</i><br>eastern dwarf galaxias            | v<br>VU<br>#            | Potential habitat is slow to moderately fast-flowing streams containing permanent water (even when not flowing), which have good instream cover from overhanging banks and/or logs, and shade from overhanging vegetation. A population can only be maintained where barriers have prevented establishment of trout and redfin perch. The nature of these barriers is variable and can include permanent natural structures such as waterfalls and chutes and also low flow-dependent features such as marshes, ephemeral water-losing and remnant channels, braided channel floodplain features.      | Potential habitat absent. The site is also well outside the recognised range of the species (FPA 2021).  |
| <i>Haliaeetus leucogaster</i><br>white-bellied sea-eagle     | v<br>-                  | Potential habitat comprises potential nesting habitat and potential foraging habitat. Potential foraging habitat is any large waterbody (including sea coasts, estuaries, wide rivers, lakes, impoundments and even large farm dams) supporting prey items (fish). Potential nesting habitat is tall eucalypt trees in large tracts (usually more than 10 ha) of eucalypt or mixed forest within 5 km of the coast (nearest coast including shores, bays, inlets and peninsulas), large rivers (Class 1), lakes or complexes of large farm dams.   | No known nests within 500 m or 1 km line-of-sight of study area. Additional potential nesting habitat absent from study area. The species may utilise the greater area for foraging. |

**ECOtas...providing options in environmental consulting**

| Scientific name<br>Common name                                 | Status<br>TSPA<br>EPBCA | Tasmanian habitat description<br>(and distribution)   | Comments on study area and<br>database records   |
|--|-------------------------|---|--|
| <i>Hirundapus caudacutus</i><br>(white-throated<br>needletail) | -<br>VU<br>#            | Potential habitat is virtually any aerial habitat as this species generally does not land during the Australian portion of the migration. This species forages aerially, generally following frontal weather systems or other air uplift events such as bushfires to feed on insects etc.   | Potential habitat present. However, as this species does not land, roost or breed on the Australian migration, any proposal will not have an effect on the white-throated needletail.  |
| <i>Lathamus discolor</i><br>swift parrot                       | e<br>CR<br>#            | Potential habitat comprises potential foraging habitat and potential nesting habitat. Potential foraging habitat comprises <i>Eucalyptus globulus</i> (blue gum) or <i>Eucalyptus ovata</i> (black gum) trees that are old enough to flower. For management purposes, potential nesting habitat is considered to comprise eucalypt forests that contain hollow-bearing trees. | <i>Eucalyptus ovata</i> is absent.<br><i>Eucalyptus globulus</i> is absent.<br>Hollow-bearing trees are present but the site is highly atypical of known breeding sites that typically occur in mature hollow-rich forest on ridges and upper slopes.  |
| <i>Limnodynastes peroni</i><br>striped marsh frog              | e<br>-                  | Potential habitat is natural and artificial coastal and near-coastal wetlands, lagoons, marshes, swamps and ponds (including dams), with permanent freshwater and abundant marginal, emergent and submerged aquatic vegetation.   | Potential habitat absent.<br>Site is outside the recognised range of the species (based on database records).  |
| <i>Litoria raniformis</i><br>green and golden frog             | v<br>VU<br>#            | Potential habitat is permanent and temporary waterbodies, usually with vegetation in or around them, including features such as natural lagoons, permanently or seasonally inundated swamps and wetlands, farm dams, irrigation channels, artificial water-holding sites such as old quarries, slow-flowing stretches of streams and rivers and drainage features.            | Potential habitat absent.  |
| <i>Limnodynastes peroni</i><br>striped marsh frog              | e<br>-                  | Potential habitat is natural and artificial coastal and near-coastal wetlands, lagoons, marshes, swamps and ponds (including dams), with permanent freshwater and abundant marginal, emergent and submerged aquatic vegetation.   | Potential habitat absent.  |
| <i>Migas plomleyi</i><br>Cataract Gorge trapdoor<br>spider     | e<br>-                  | Potential habitat is native vegetation (but can be disturbed) with extensive rock exposures that have well-developed moss and/or lichen cover   | Potential habitat absent.  |
| <i>Myiagra cyanoleuca</i><br>satin flycatcher                  | -<br>-<br># only        | Potential habitat is variable but mainly eucalypt-dominated forests, with a stronger association with wetter forest gullies.  | Potential habitat present. This is a spring-summer migrant that may occasionally utilise the greater study area for foraging and possibly nesting. No sightings were made on the single day of assessment in June, which was undertaken outside the species' resident period in Tasmania. It is unlikely that localised land management will significantly deleteriously impact on this species. |

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| Scientific name<br>Common name   | Status<br>TSPA<br>EPBCA | Tasmanian habitat description<br>(and distribution)  | Comments on study area and<br>database records  |
|--|-------------------------|--|---|
|  |                         |  | Further consideration of this species should not be required.   |
| <i>Oxyethira mienica</i><br>caddis fly (Ouse River)                      | r<br>-                  | The potential range is the known location with a buffer of 2 km upstream and downstream of the known site.   | Potential habitat absent.   |
| <i>Pasmaditta jungermanniae</i><br>Cataract Gorge pinhead snail          | v<br>-                  | Potential habitat is intact or disturbed native vegetation with extensive exposed rock faces (usually dolerite), usually greater than 2 m high (e.g. distinct outcrops/cliffs or several large boulders), with well-developed moss and/or lichen cover on rock faces and ledges (such sites often occur in more deeply incised drainage features or steeper slopes). | Potential habitat absent.   |
| <i>Perameles gunnii</i> subsp. <i>gunnii</i><br>eastern barred bandicoot | -<br>VU<br>#            | Potential habitat is open vegetation types including woodlands and open forests with a grassy understorey, native and exotic grasslands, particularly in landscapes with a mosaic of agricultural land and remnant bushland.   | Potential habitat present. No evidence (e.g. scats, diggings) of the species was observed.<br>The species may utilise the greater study area as part of a home range and for foraging but development at the scale proposed and within the context of surrounding land uses should not have a significant impact on potential habitat of the species. |
| <i>Prototroctes maraena</i><br>Australian grayling                       | v<br>VU<br>#            | Potential habitat is all streams and rivers in their lower to middle reaches. Areas above permanent barriers (e.g. Prosser River dam, weirs) that prevent fish migration, are not potential habitat.   | Potential habitat absent.   |
| <i>Pseudemoia pagenstecheri</i><br>tussock skink                         | v<br>-                  | Potential habitat is grassland and grassy woodland (including rough pasture with paddock trees), generally with a greater than 20% cover of native grass species, especially where medium to tall tussocks are present.  | Potential habitat absent.   |
| <i>Pseudemoia rawlinsoni</i><br>glossy grass skink                       | r<br>-                  | Potential habitat is wetlands and swampy sites, including grassy wetlands, teatree swamps and grassy sedgelands, and margins of such habitat.  | Potential habitat absent.   |
| <i>Pteropus poliocephalus</i><br>grey-headed flying-fox                  | -<br>VU                 | Potential habitat is virtually any forest type with eucalypt species flowering including suburban gardens. This species is an infrequent visitor (migrant) to Tasmania.  | Potential habitat marginally present. This species will not be affected by the proposal (vagrant only).   |
| <i>Sarcophilus harrisii</i><br>Tasmanian devil                           | e<br>EN<br>#            | Potential habitat is all terrestrial native habitats, forestry plantations and pasture. Devils require shelter (e.g. dense vegetation, hollow logs, burrows or caves) and hunting habitat (open understorey mixed with patches of dense vegetation) within their home range (427 km <sup>2</sup> ). Significant habitat is   | See under spotted-tailed quoll.   |

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| Scientific name<br>Common name  | Status<br>TSPA<br>EPBCA | Tasmanian habitat description<br>(and distribution)  | Comments on study area and<br>database records  |
|---|-------------------------|--|---|
|   |                         | <p>a patch of potential denning habitat where three or more entrances (large enough for a devil to pass through) may be found within 100 m of one another, and where no other potential denning habitat with three or more entrances may be found within a 1 km radius, being the approximate area of the smallest recorded devil home range. Potential denning habitat is areas of burrowable, well-drained soil, log piles or sheltered overhangs such as cliffs, rocky outcrops, knolls, caves and earth banks, free from risk of inundation and with at least one entrance through which a devil could pass.</p> |   |
| <p><i>Tyto novaehollandiae</i><br/>subsp. <i>castanops</i><br/>Tasmanian masked owl</p> | <p>e<br/>VU<br/>#</p>   | <p>Potential habitat is all areas with trees with large hollows (<math>\geq 15</math> cm entrance diameter). In terms of using mapping layers, potential habitat is considered to be all areas with at least 20% mature eucalypt crown cover (PI type mature density class 'a', 'b', or 'c'). Remnants and paddock trees (in any dry or wet forest type) in agricultural areas may constitute potential habitat. Significant habitat is any areas within the core range of native dry forest with trees over 100 cm dbh with large hollows (<math>\geq 15</math> cm entrance diameter).</p>                          | <p>Potential nesting habitat is marginally present (some more mature trees with hollows, doubtfully large enough to support the species).<br/>The species may utilise the greater title area as part of a home range and for foraging but small-scale development should not have a significant impact on this aspect of the life history of the species.</p> |

**APPENDIX E. DPIPWE's *Natural Values Atlas* report for study area**

Appended as pdf file.

**APPENDIX F. Forest Practices Authority's *Biodiversity Values Atlas* report for study area**

Appended as pdf file.

**APPENDIX G. CofA's *Protected Matters* report for study area**

Appended as pdf file.

**ATTACHMENT**

- .shp file of revised vegetation mapping

## APPENDIX H. Threatened flora spring survey 2021

### Preamble

The original report stated:

The study area was assessed for the presence of threatened flora by slow-walking the entire area. Further methods are not provided because no such species were detected. This part of the State is recognised as a "hotspot" for threatened flora. For example, Carr Villa supports several species such as *Brunonia australis* (blue pincushion), *Caladenia patersonii* (patersons spider-orchid), *Caesia calliantha* (blue grasslily) and *Senecio squarrosus* (leafy fireweed). While some species are perennial and detectable/identifiable at any time of the year, others require a timed survey to coincide with the peak flowering period. In this case, while initial discussions indicated that this was a likely scenario, upon site assessment this has been reviewed due to the highly modified nature of the understorey (almost wholly dominated by a mat of *Ehrharta erecta*) and lack of detection of certain species such as *Brunonia australis* that can be a reasonable indicator of the likelihood of other species.

As part of due diligence for the project, the client engaged ECOtas to undertake timed-targeted surveys of the project area, timed to coincide with the peak flowering period of several possible target species. While the original rationale for such a survey was explained and discussed as of likely limited application (because of the condition of the site), following the discovery of *Chiloglottis trapeziformis* (broadlip bird-orchid), a TSPA-listed (endangered) spring-flowering orchid, from the southern end of Carr Villa in October 2021, the impetus for the survey was somewhat heightened.

### Site assessment

On 12 Nov. 2021, the site was re-assessed, again by slow-walking the entire project area and fringes using a random meandering transect method designed to cover as much ground as practical, targeting likely micro-habitats for threatened species.

### Findings

No species of flora listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* (TSPA) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) were detected. The poor ecological condition of the site is highlighted.

I did detect a small population of *Brunonia australis* (blue pincushion), listed as rare on the TSPA, from the fringes of one of the fairways south of the project area, well outside the limits of any likely works. This site (Figure H1) is typical habitat (Plates H1-4) for the species (Plates H5 & 6) being semi-slashed grassy woodland. While also a managed site, the habitat quality is vastly "superior" to the project area in so far as the understorey is essentially wholly native grass and quite diverse, rather than dominated by weedy and highly competitive grass species.

### Recommendations

No further recommendations are made in relation to natural values for the project area.

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**Plates H1-4.** Habitat of *Brunonia australis* adjacent to the fairway



**Plate H5.** (LHS) Rosette and early flowerhead of *Brunonia australis* from site

**Plate H6.** (RHS) Flowering head of *Brunonia australis* [Powrana Nature Reserve, 10 Dec. 2020]

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**Figure H1.** Distribution of *Brunonia australis* based on 12 Nov. 2021 survey