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To: Barry Williams; brian@ecotas.com.au
Cc: "[Chris Davey](#)"; "[Luke Donohue](#)"; "[Mark Wapstra](#)"
Subject: RE: HBMI site - strategic ecological survey and report
Date: 26 September 2022 10:23:41 AM
Attachments: [ECOtas HBMI LeslieVale GISData.zip](#)

Hi Barry,

You have our permission to use the ECOtas Strategic Survey Report for the HBMI Quarry at Leslie Vale EPBCA referral.

Attached is the GIS data that accompanies the report.

Please let us know if you require any further information or data?

Regards

Brian

Brian French
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-----Original Message-----

From: Barry Williams <barry.williams@ilmp.com.au>
Sent: Monday, 26 September 2022 8:46 AM
To: Mark Wapstra (mark@ecotas.com.au) <mark@ecotas.com.au>; 'brian@ecotas.com.au' <brian@ecotas.com.au>
Cc: Chris Davey <Chris.Davey@hazellbros.com.au>; Luke Donohue <Luke.Donohue@hazellbros.com.au>
Subject: HBMI site - strategic ecological survey and report

Hi Mark,

We wish to use your ecological strategic survey report prepared for HBMI Quarry at Leslie Vale in our EPBCA referral.

Please reply to this email as confirmation you give your permission.

We would also like to receive the spatial data you picked up doing the ground work to accompany the referral.

Please call me if you have any questions.

Regards,

Barry Williams

[cid:image001.jpg@01D8D184.59EAFBD0]

Email: barry.williams@ilmp.com.au <<mailto:barry.williams@ilmp.com.au>>

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**STRATEGIC NATURAL VALUES ASSESSMENT OF THE HBMI
LESLIE VALE QUARRY FACILITY, LESLIE VALE, TASMANIA**



**Environmental Consulting Options Tasmania (ECOtas) for
Hazell Bros**

16 January 2022

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CITATION

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AUTHORSHIP

Field assessment: Brian French, Kerri Spicer & Mark Wapstra

Report production: Brian French, Mark Wapstra & Kerri Spicer

Habitat and vegetation mapping: Brian French, Kerri Spicer & Mark Wapstra

Base data for mapping: LISTmap

Digital and aerial photography: Mark Wapstra, Brian French, Mark Wapstra, Kerri Spicer, GoogleEarth, LISTmap

ACKNOWLEDGEMENTS

Chris Davey (Manager Health & Environment, Hazell Bros) provided information on the project scope.

DISCLAIMER

Except where otherwise stated, the opinions and interpretations of legislation and policy expressed in this report are made by the author(s) 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. This report and associated documents do not constitute legal advice.

Note that any reference to the Department of Primary Industries, Parks, Water & Environment (DPIPWE) now refers to the Department of Natural Resources and Environment Tasmania.

COVER ILLUSTRATIONS

Main image: *Eucalyptus pulchella* forest and woodland in the south of the study area. Insets *Epacris virgata* 'Kettering' (pretty heath), a "threatened" plant species that occurs at a number of locations within the study area.

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

CONTENTS

SUMMARY 1

PURPOSE, SCOPE, LIMITATIONS AND QUALIFICATIONS OF THE SURVEY 7

 Purpose 7

 Scope 7

 Limitations 7

 Permit 8

STUDY AREA 8

METHODS 9

 Nomenclature 9

 Preliminary investigation 17

 Field assessment 17

 Vegetation classification 18

 Threatened flora 18

 Threatened fauna 18

 Weed and hygiene issues 18

FINDINGS 19

 Vegetation types 19

 Comments on TASVEG mapping 19

 Vegetation types recorded as part of the present study 20

 Conservation status of recorded vegetation communities 22

 Plant species 33

 General information 33

 Threatened flora species recorded from the study area 33

 Threatened flora species potentially present (database analysis) 41

 Fauna species 41

 Threatened fauna species recorded from the study area 41

 Threatened fauna species potentially present (database analysis) 46

 Other ecological values 52

 Weed species 52

 Rootrot pathogen, *Phytophthora cinnamomi* 52

 Myrtle wilt 54

 Myrtle rust 54

Chytrid fungus and other freshwater pathogens	54
Additional “Matters of National Environmental Significance” – Threatened Ecological Communities	55
DISCUSSION.....	55
Summary of key findings.....	55
Recommendations.....	57
REFERENCES.....	59
APPENDIX A. Vegetation community structure and composition	62
APPENDIX B. Vascular plant species recorded from study area.	68
APPENDIX C. Analysis of database records of threatened flora	73
APPENDIX D. Analysis of database records of threatened fauna	78
APPENDIX E. DNRET’s <i>Natural Values Atlas</i> report for the study area	82
APPENDIX F. Forest Practices Authority’s <i>Biodiversity Values Atlas</i> report for the study area	82
APPENDIX G. CofA’s <i>Protected Matters</i> report for the study area.....	82
ATTACHMENTS	82

SUMMARY

General

Hazell Bros engaged Environmental Consulting Options Tasmania (ECOtas) to undertake a strategic natural values assessment of the Leslie Vale HBMI facility, Tasmania, primarily to consider to ensure that the identified natural values can be appropriately considered during any future project planning under local, State and Commonwealth government approval protocols.

Natural values assessment

Natural values assessments of the study area were undertaken on 28 & 29 May 2019 (Brian French, ECOtas), 1 Oct. 2021 (Mark Wapstra, ECOtas) and 24 & 26 Nov. 2021 (Kerri Spicer).

Summary of key findings

Threatened flora

- No plant species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) were detected, or are known from database information, from the study area. Potential habitat for such species is limited.
- One plant species listed on the Tasmanian *Threatened Species Protection Act 1995* was detected as a consequence of the field survey, as follows:
 - *Epacris virgata* Kettering (pretty heath): listed vulnerable (Schedule 4), previously known from property and now known from several additional patches.

Threatened fauna

- Evidence of three threatened fauna species listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was detected as a consequence of the field survey from within the study area, as follows:
 - *Sarcophilus harrisii* (Tasmanian devil): numerous scats on various internal tracks;
 - *Aquila audax* subsp. *fleayi* (Tasmanian wedge-tailed eagle): one known nest south of the property and two novel nests on the slopes above Mafeking Creek; and
 - *Accipiter novaehollandiae* (grey goshawk): novel nest on slopes above Mafeking Creek.
- Potential habitat is present for the above species and additional species, as follows:
 - *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll): potential habitat widespread;
 - *Dasyurus viverrinus* (eastern quoll): potential habitat widespread;
 - *Perameles gunnii* (eastern barred bandicoot): potential habitat widespread;
 - *Haliaeetus leucogaster* (white-bellied sea-eagle): widespread foraging habitat (albeit opportunistic) but limited potential nesting habitat;

- *Tyto novaehollandiae* subsp. *castanops* (Tasmanian masked owl): potential foraging/range habitat widespread but potential nesting habitat limited to scattered mature trees with large hollows;
- *Lathamus discolor* (swift parrot): potential foraging habitat present as scattered *Eucalyptus globulus* (blue gum) and patches of forest dominated by *Eucalyptus ovata* (black gum), the latter mapped as DOV, and limited potential nesting habitat in the form of scattered mature trees with hollows;
- *Lissotes menalcas* (Mt Mangana stag beetle): potential habitat limited to the wet sclerophyll forests along Mafeking Creek; and
- *Litoria raniformis* (green and golden frog): potential habitat in farm dams.

Vegetation types

- The study area supports the following TASVEG mapping units:
 - improved pasture with a native tree canopy (TASVEG code: FAC);
 - agricultural land (TASVEG code: FAG);
 - regenerating cleared land (TASVEG code: FRG);
 - extra-urban miscellaneous (TASVEG code: FUM);
 - weed infestation (TASVEG code: FWU);
 - urban areas (TASVEG code: FUR);
 - *Eucalyptus obliqua* dry forest (TASVEG code: DOB);
 - *Eucalyptus ovata* forest and woodland (TASVEG code: DOV);
 - *Eucalyptus pulchella* forest and woodland (TASVEG code: DPU);
 - *Eucalyptus obliqua* forest with broad-leaf shrubs (TASVEG code: WOB); and
 - water, sea (TASVEG code: OAQ).
- *Eucalyptus ovata* forest and woodland (TASVEG code: DOV) is identified as a threatened vegetation type on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*.
- Two of the eleven patches of DOV equate to Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*), a threatened ecological community listed as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Weeds

- Numerous plant species classified as declared weeds within the meaning of the Tasmanian *Weed Management Act 1999* were detected or are known from the study area.
- Non-declared but potentially invasive species are common in the area.
- Weed and disease management is not discussed further as recommended management actions for these and other weed species are discussed extensively in H.B.M.I. (2012).
- GIS data is provided with this report of the new locations of invasive and potentially invasive weed species within the study area.

Plant disease

- No evidence of *Phytophthora cinnamomi* (PC, rootrot) was recorded from within the study area.
- No evidence of myrtle wilt was recorded from within the study area.
- No evidence of myrtle rust was recorded from within the study area.

Animal disease (chytrid)

- The study area is not known to support frog chytrid disease but there is potential habitat for amphibian species.
- Chytrid is known from approximately 1.5 km to the north of the study area.
- It is recommended to assume that the disease is currently absent and to manage the area to minimise the risk of introducing the pathogen – see also in H.B.M.I. (2012).

Recommendations

The recommendations provided below are a summary of those provided in relation to each of the ecological features described in the main report. The main text of the report provides the relevant context for the recommendations. It is recommended that this report be used to inform more detailed planning and targeted detailed surveys for any disturbance within native vegetation communities within the study area.

Vegetation types

In a general sense, it is recommended that the clearance and conversion and further disturbance of native vegetation should, where practical, be minimised as far within the study area.

Specifically, areas mapped as *Eucalyptus ovata* forest and woodland (TASVEG code: DOV), listed as threatened under Schedule 3A of the Tasmanian *Nature Conservation Act 2002*, and with some patches equating to Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata*/*E. brookeriana*), a threatened ecological community listed as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, should be excluded from any development, where practical, recognising the existing configuration of land uses has created a patchwork of different vegetation types not necessarily conducive to excluding all native vegetation (threatened or otherwise).

Where development includes a proposal to remove DOV (excluding those recognised at the EPBCA level), it is suggested that this be accompanied by an offset proposal that aims to achieve a net gain for DOV with a minimum offset ratio of 5:1.

Threatened flora

Epacris virgata Kettering (pretty heath) has been recorded from within the study the area in the past and a number of new sites were located during the current survey. Any works that result in it being “knowingly taken” will require a permit under Section 51 of the Tasmanian *Threatened Species Protection Act 1995*. In the first instance it is recommended to seek a solution that avoids direct impact on the species. However, where this cannot be accommodated, it should be acknowledged that minor loss of the species would not represent a significant impact at any reasonable scale, given the widely accepted conservation status of the species. It is recommended that the status of the species be confirmed prior to any works.

Threatened fauna

Evidence of three threatened fauna species, namely *Sarcophilus harrisii* (Tasmanian devil), *Aquila audax* subsp. *fleayi* (Tasmanian wedge-tailed eagle) and *Accipiter novaehollandiae* (grey goshawk), were detected as a consequence of the field survey from within the study area.

With specific relation to the swift parrot, it is recommended that:

- any areas mapped as DOV be excluded from development;
- wherever practical, individuals of *Eucalyptus globulus* (blue gum) and *Eucalyptus ovata* (black gum) are retained – this includes consideration of fence-line trees, paddock trees and copses;
- wherever practical, individuals of hollow-bearing trees are retained – this is also relevant to the masked owl; and
- where the above cannot be accommodated, further consideration of the implications under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* will be required on a case-by-case basis (recognising that the company has capacity for relevant and appropriate offsets at different scales).

With specific relation to the grey goshawk, it is recommended that:

- a ca. 100 m buffer be established around the nest site but that with such a buffer, no breeding season restrictions should need to be applied.

With specific relation to the Mt Mangana stag beetle, it is recommended that:

- potential habitat (WOB) be excluded from future clearance and conversion (but recognising that the habitat potentiality is highly variable and this can be clarified with more targeted surveys, if required).

With specific relation to the green and golden frog, it is recommended that:

- potential habitat (small farm dams) be excluded from development.

With specific relation to marsupial carnivores, it is recommended that:

- consider a dawn to dusk 40 km/h speed limit between the Huon Highway and the weighbridge, with dawn to dusk defined as one hour before and after, respectively, of sunrise/sunset times published by an official agency such as the Bureau of Meteorology (appropriate signage will be needed);
- consider erecting ca. 50-100 m sections of wallaby-proof fence on the verge of the access road adjacent to the two dams, with the objective of minimising direct road access by wildlife using the water sources;
- consider upgrading/maintaining the table drains on either side of the access road with the objective of keeping these flowing (i.e. not holding water, which is attractive to wildlife) and free of vegetation (i.e. "green pick", also attractive to wildlife) for ca. 3 m each side of the edge of the drain, the overall objective of minimising roadkill and attracting marsupial carnivores;
- consider use of pale road surfaces for any road upgrades (less attractive to wildlife); and
- where there will be clearance and conversion of native vegetation, a pre-clearance survey for dens is undertaken as close to the clearance date as practical and appropriate management established for any suspected/confirmed den sites.

With specific relation to the wedge-tailed eagle, it is recommended that:

- the site provides an opportunity to study the impacts of different types/intensities of activity on the breeding behaviour of the species and if the opportunity arises, collaboration with relevant researchers/specialists may be possible; and
- minimise the risk of inadvertent disturbance to nest trees on the slopes above Mafeking Creek by appropriate overburden/vegetation management on the upper slope.

Weed and disease management

It is recommended that specific weed management actions be incorporated into any operations plans due to the abundance of declared and environmental species across the study area.

Weed and disease management is not discussed further as recommended management actions for these and other weed species are discussed extensively in H.B.M.I. (2012).

Legislative and policy implications

It is unlikely that future proposals will require formal referral under the Commonwealth Department of Agriculture, Water and the Environment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* provided that future development avoids known fauna sites such as wedge-tailed eagle nests, potential habitat of the swift parrot and patches of *Eucalyptus ovata* forest and woodland (TASVEG code: DOV) that qualify as Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*), listed as Critically Endangered under the Act.

Any action that includes “knowingly taking specimens of threatened flora” namely *Epacris virgata* Kettering (pretty heath) will require a formal permit application to the Conservation Assessments Section (CAS, DRNET) under Section 51 of the Tasmanian *Threatened Species Protection Act 1995* (TSPA).

PURPOSE, SCOPE, LIMITATIONS AND QUALIFICATIONS OF THE SURVEY

Purpose

Hazell Bros engaged Environmental Consulting Options Tasmania (ECOtas) to undertake a strategic natural values assessment of the Leslie Vale HBMI facility, Tasmania, primarily to consider to ensure that the identified natural values can be appropriately considered during any future 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 could be required.

The report format should 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 other local and state planning requirements if required.

Limitations

The natural values assessments have been conducted over several periods: 28 & 29 May 2019, 1 Oct. 2021 and 24 & 26 Nov. 2021 (Kerri Spicer). 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 are 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. That said, this particular site presents limited seasonal restrictions on surveys for threatened flora and the last set of surveys were undertaken during spring and the peak flowering period of most possible target species.

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 largely 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.

The survey was not limited by access due to road and vehicle track access to all areas, and mainly relatively open native vegetation.

Permit

Any plant material was collected under DPIPWE permit TFL 18174 & TFL 21138 (in the names of Mark Wapstra, Brian French & Kerri Spicer). Relevant data will be entered into DPIPWE's *Natural Values Atlas* database by the authors. Some plant material may be lodged at the Tasmanian Herbarium by the authors.

No vertebrate or invertebrate material was collected.

STUDY AREA

The study area (Figures 1-3) is comprised of private land situated at:

- 715 Huon Highway (PID 2074556; C.T. 101664/7; LPI GMH56);
- 715 Huon Highway (PID 2074556; C.T. 199923/1; LPI GSF83);
- 441 Leslie Road (PID 2074548; C.T. 198868/1; LPI FSV35); and
- 441 Leslie Road (PID 2074548; C.T. 126817/1; LPI GMT93).

The study area was defined by GIS files supplied by the client and then micro-adjusted in ArcGIS to match LISTmap's cadastral features for Kingborough municipality and watercourse features for Mafeking Creek.

The study area comprises a mosaic of native forest, pasture, the commercial HBMI facilities, leased commercial landscape supply business, a leased residential dwelling, a telecommunications tower and various roads, tracks, dams, storage areas, etc.

The study area is comprised of gentle to steep undulating terrain with elevation varying from ca. 90 m (in the south) to ca. 300 m a.s.l. in the northeastern corner.

The study area is dissected by several ephemeral drainage features with no permanent creeks or waterbodies occurring in the area (except Mafeking Creek that forms the boundary on one side).

Geology of the study area is mapped at a 1:250,000 scale as (Figure 4):

- Jurassic-age "dolerite (tholeiitic) with locally developed granophyre" (geocode: Jd)
Dominates most of the study area.
- Permian-age "upper glaciomarine sequences of pebbly mudstone, pebbly sandstone and limestone." (geocode: Pu)
Mapped in the east, northwest and southwest of the study area, occurring mainly in the relatively flat areas used as pasture.

- Permo-Carboniferous age “lower glaciomarine sequences of mudstone, pebbly mudstone, pebbly sandstone, minor limestone and Tasmanite oil shale” (geocode: PI)
Mapped as a small slither in the southeastern corner of the study area.
- Permian-age “freshwater and paralic sandstone and mudstone with some coal measures” (geocode: Pf)
Mapped as a small slither in the southeastern corner of the study area.

The geology is mentioned as it influences vegetation classification and characterisations and the potential for threatened species (especially threatened flora, and to a lesser extent, threatened fauna). Finer-scaled geology mapping is available but this is not considered of great relevance to the present natural values assessment.

LISTmap’s Fire History layer indicates that the whole study area was affected by the 1967 bushfire event (Figure 5), which is observed in the generally even-aged mature regrowth canopy in eucalypt forest with some larger trees with large basal fire scars.

Land tenure and other categorisations of the study area are as follows:

- Kingborough municipality, zoned as a Rural Resource (Figure 6) with the entire study area subject to the Biodiversity Protection Area overlay and partly subject to the Waterway and Coastal Protection Area overlay (Figure 7), the latter associated with mapped tributaries of Mafeking Creek, pursuant to the *Kingborough Interim Planning Scheme 2015*;
- South East Bioregion, according to the IBRA 7 bioregions used by most government agencies); and
- NRM South Natural Resource Management (NRM) region.

LAND USE PROPOSAL

The current strategic survey will be used to assist with planning associated with any future operational expansion of the existing quarry and processing areas. It has not been prepared in response to any particular proposal.

The findings of this assessment will need to be reviewed in the context of any such proposal, with particular regard to ensuring legislative and policy implications are checked.

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* report (DPIPWE 2019).

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

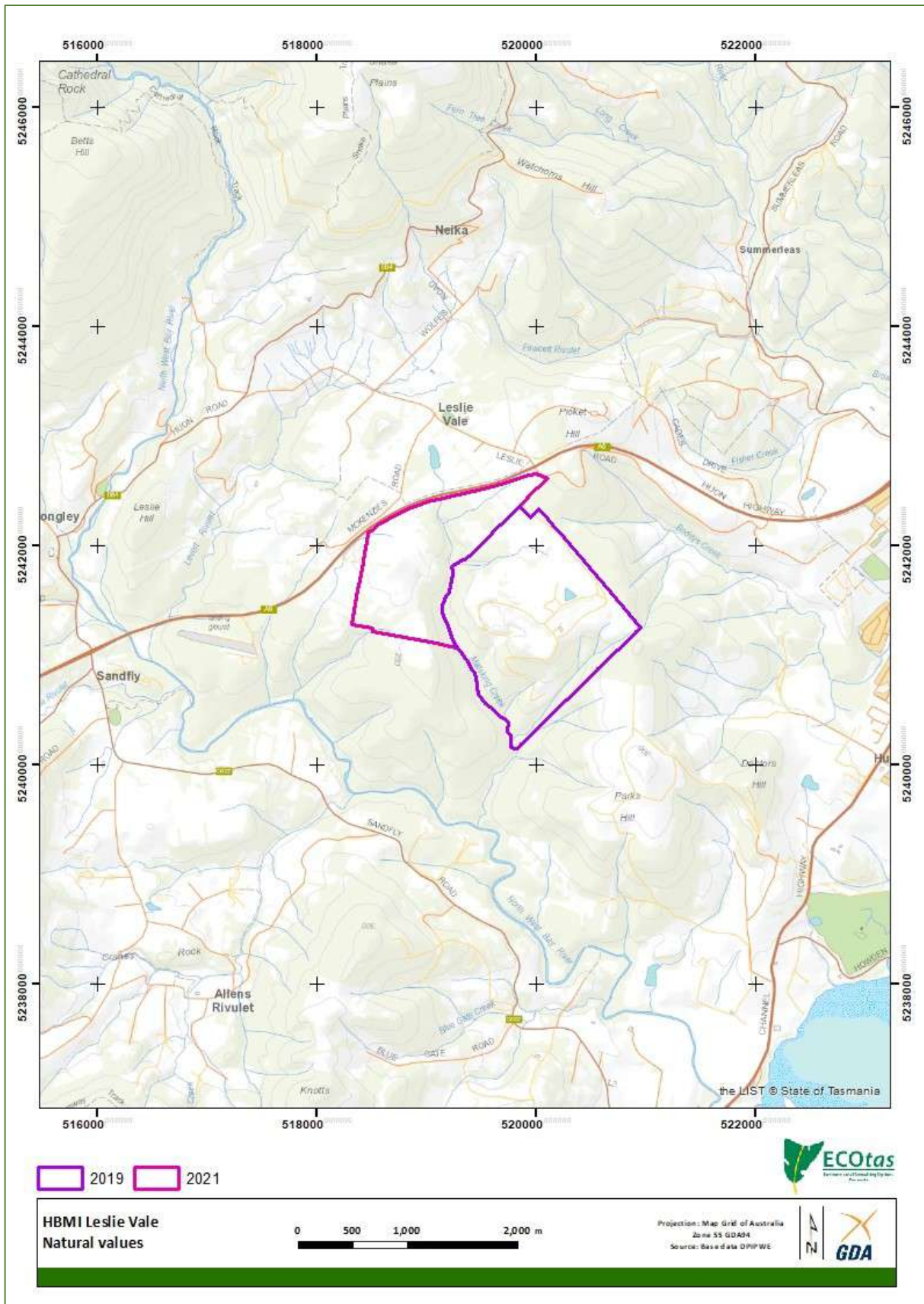


Figure 1. General location of the study area

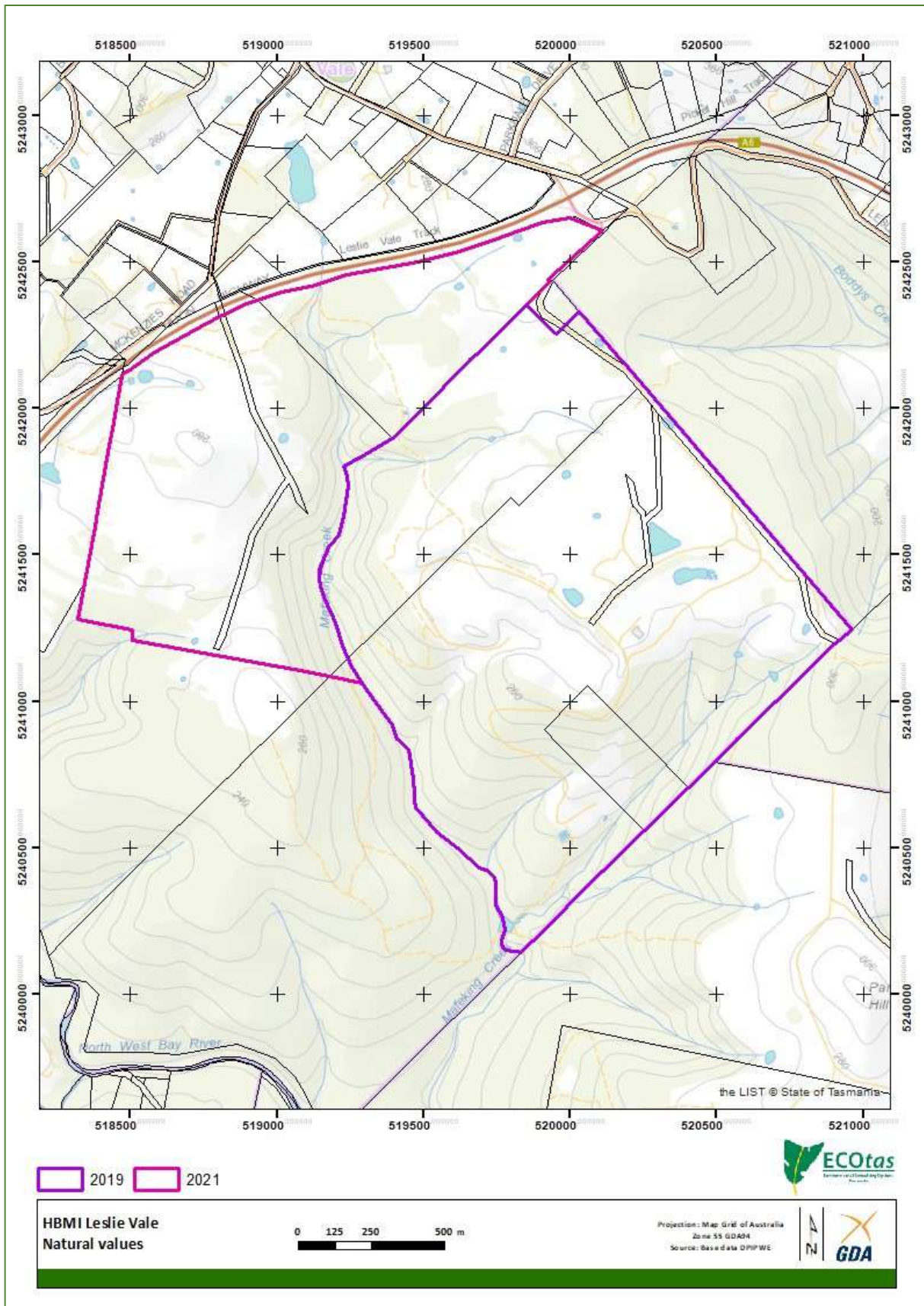


Figure 2. Detail of the study area showing cadastral boundaries

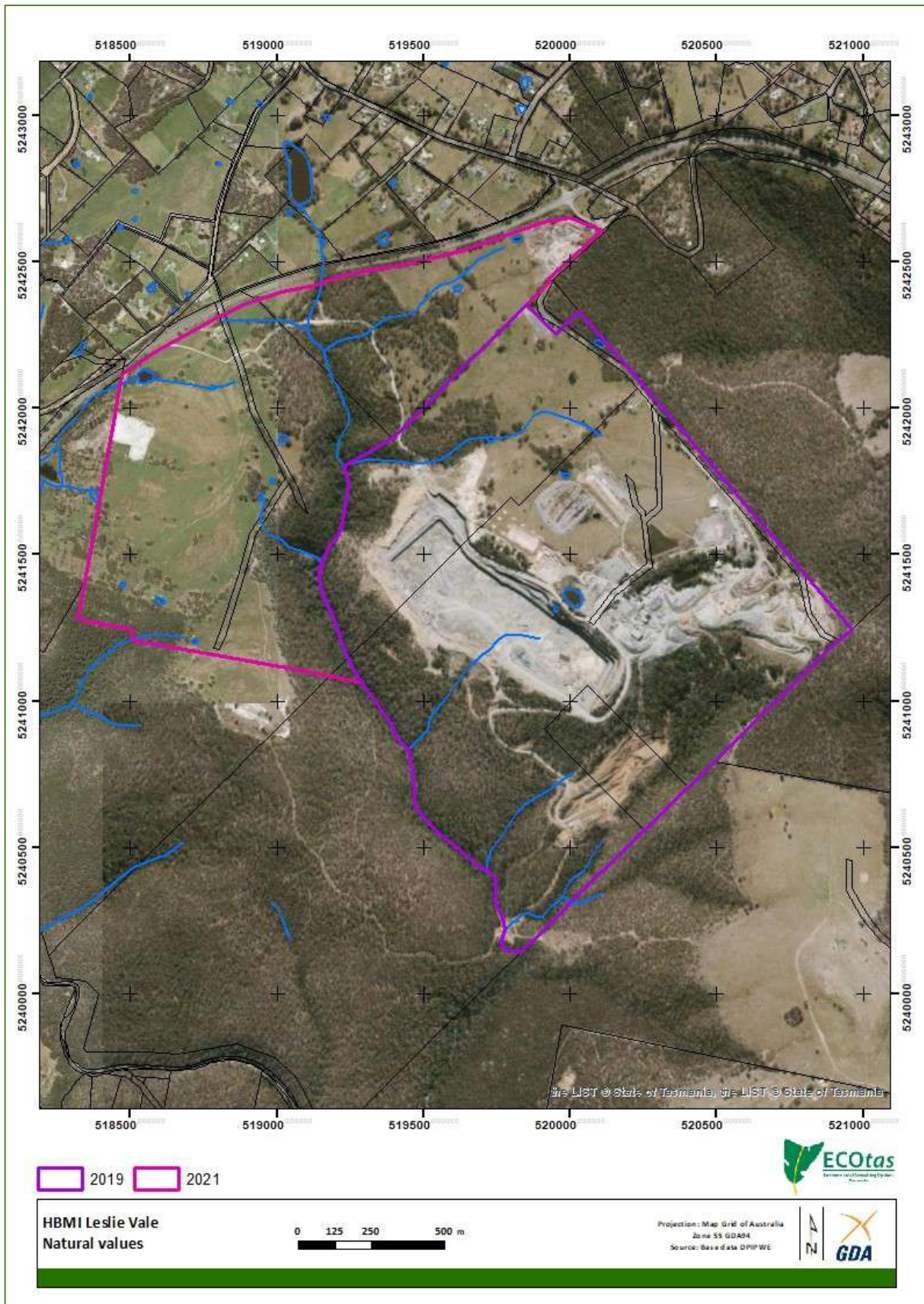


Figure 3. Detail of the study area showing cadastral boundaries and recent aerial imagery

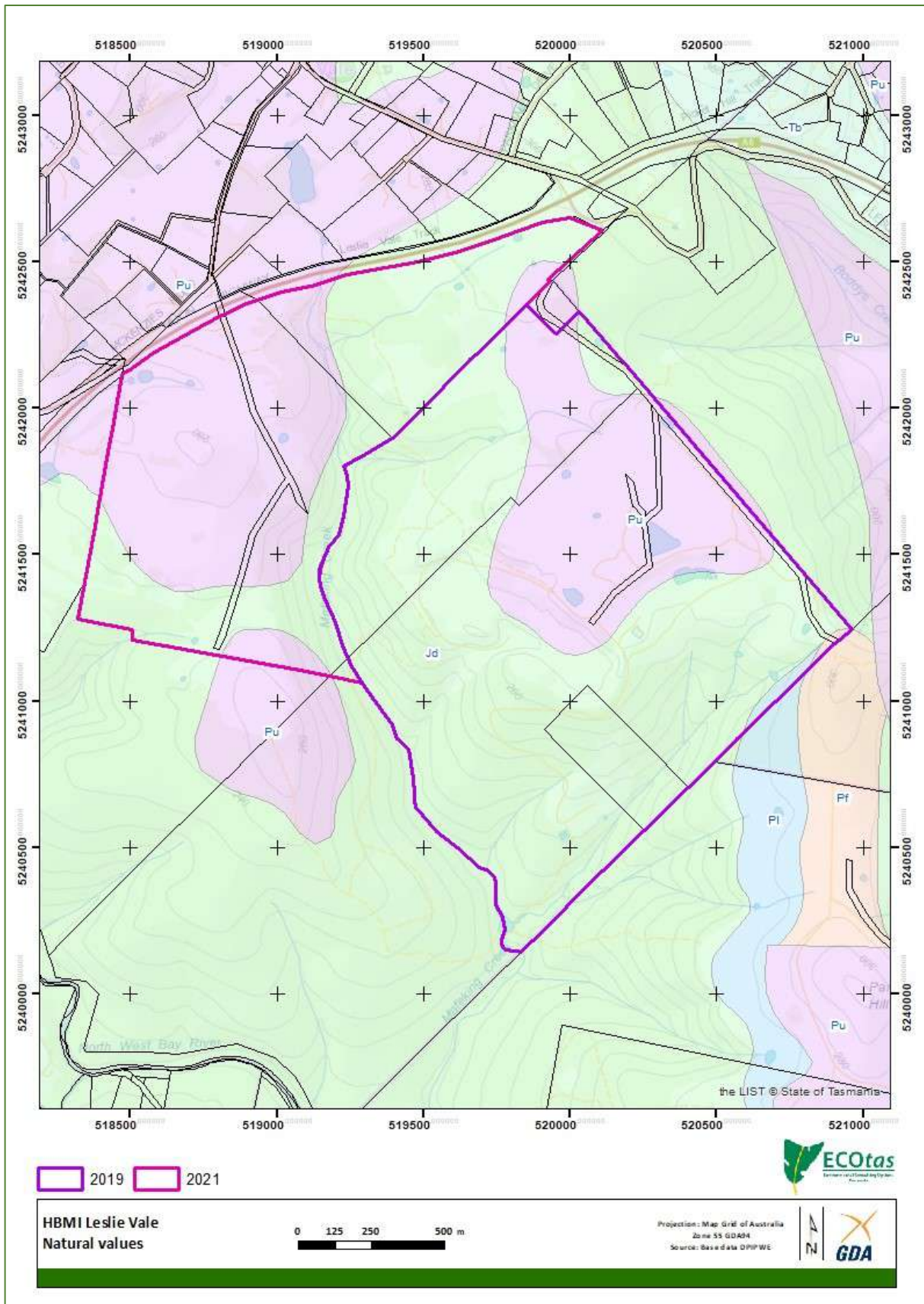


Figure 4. Geology (1:250,000 scale) of study area and surrounds (refer to text for codes)

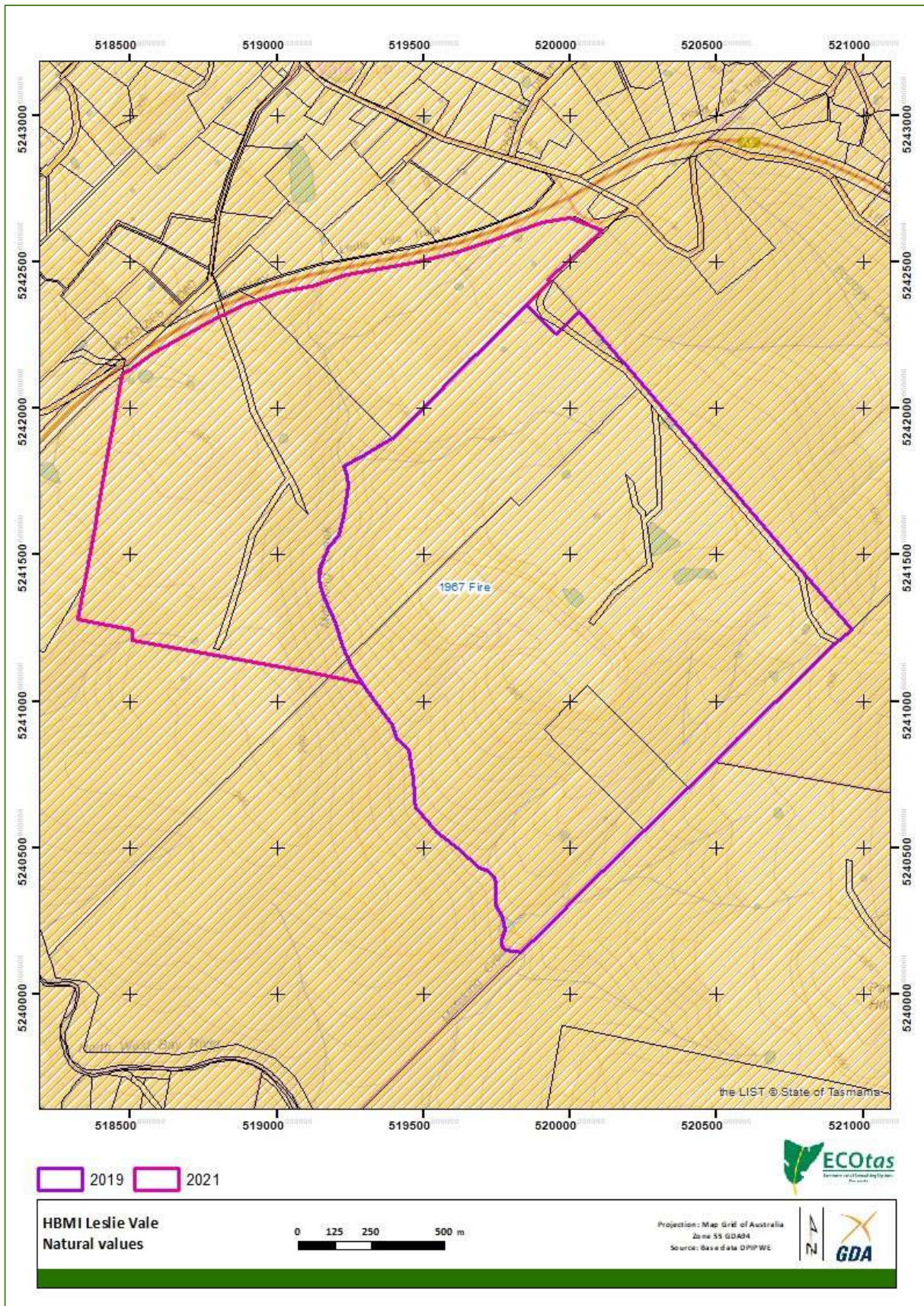


Figure 5. Fire history (LISTmap) of study area and surrounds

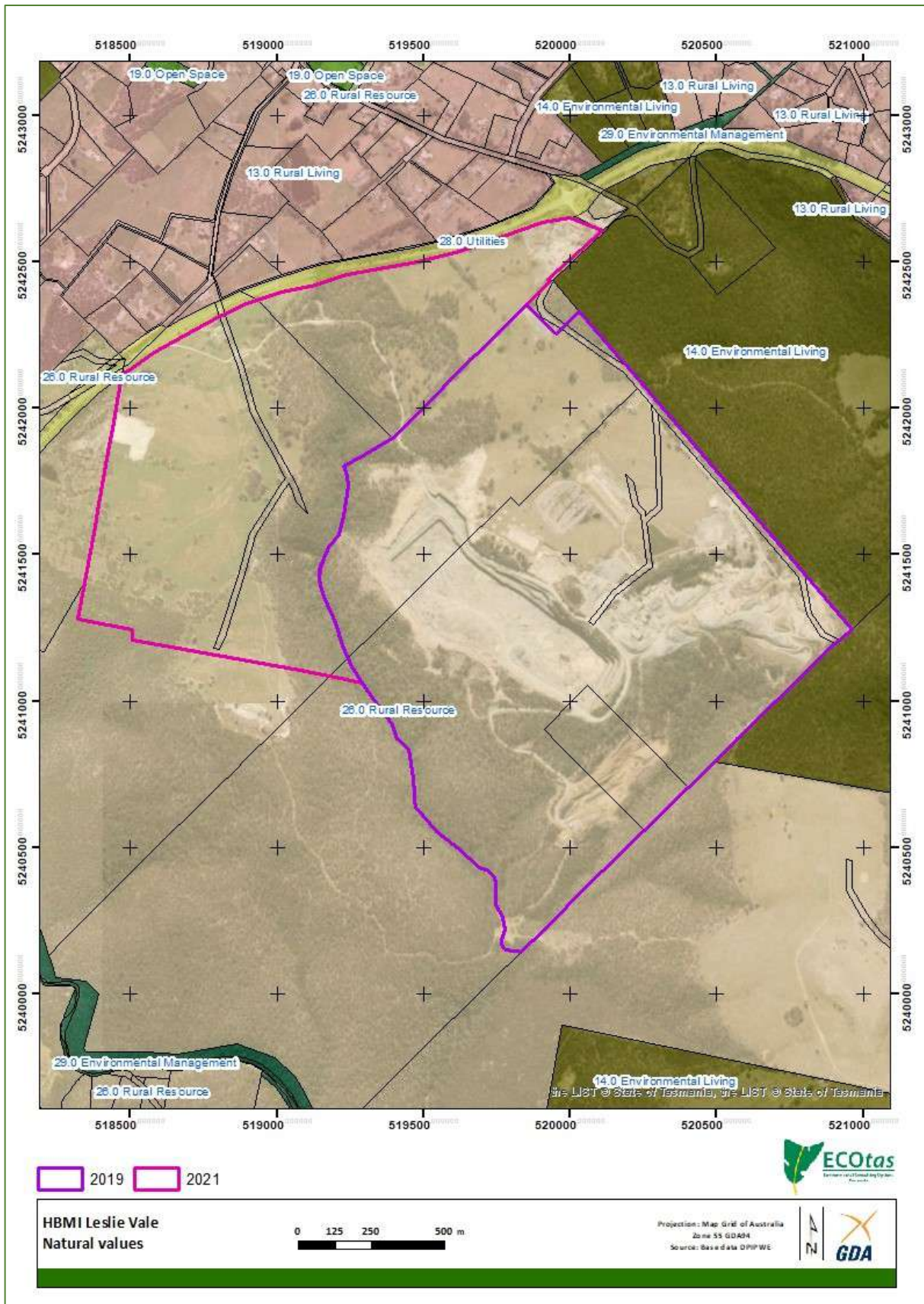


Figure 6. Zoning of study area and surrounds pursuant to Kingborough Interim Planning Scheme 2015

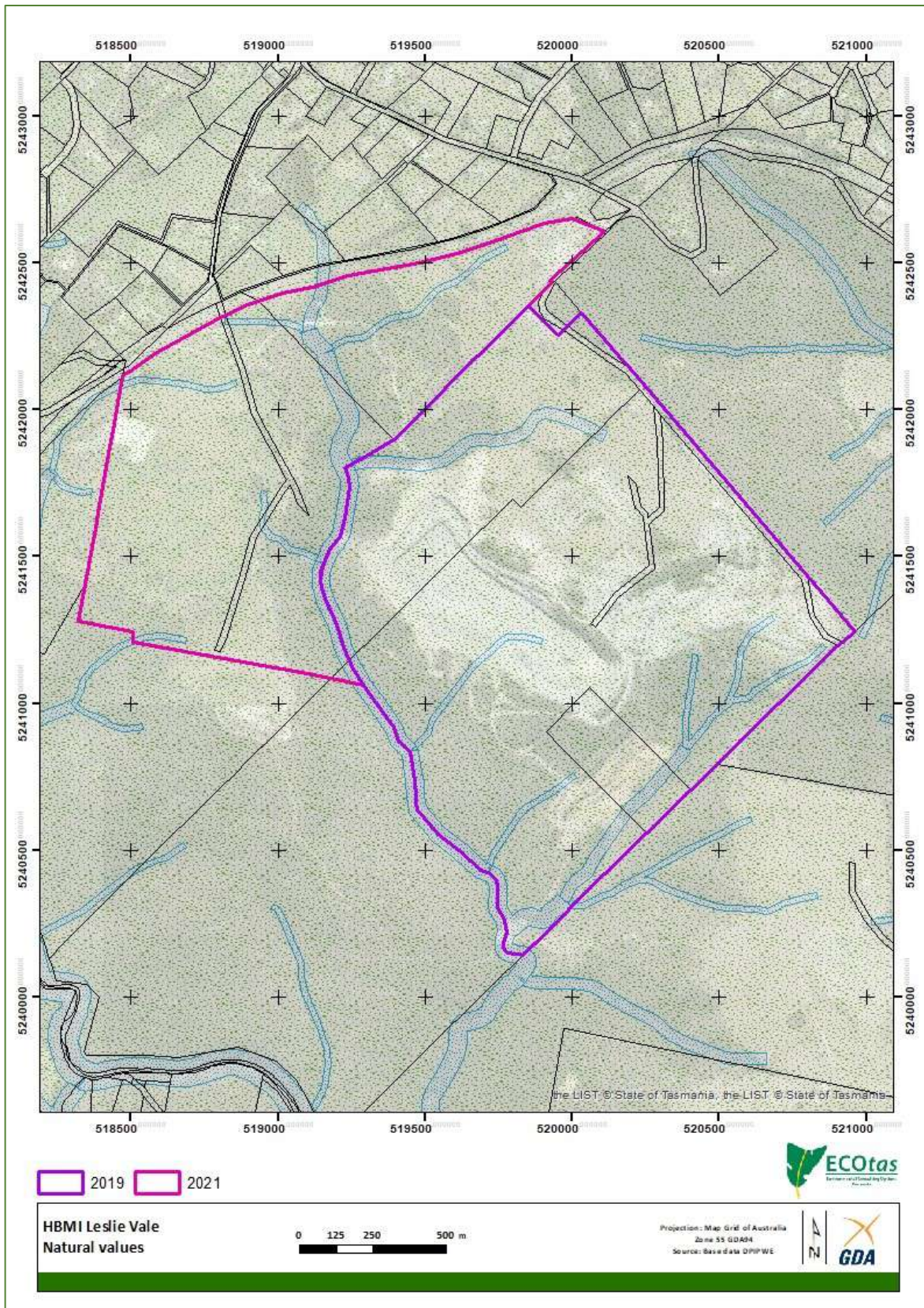


Figure 7. Extent of Biodiversity Protection Area overlay (green stippling) and Waterway and Coastal Protection Area overlay (blue stippling) within study area and surrounds pursuant to *Kingborough Interim Planning Scheme 2015*

Preliminary investigation

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

- Tasmanian Department of Natural Resources and Environment Tasmania's *Natural Values Atlas* records for threatened flora and fauna (GIS coverage maintained by the authors current as at date of report);
- Tasmanian Department of Natural Resources and Environment Tasmania's *Natural Values Atlas* report ECOtas_HBMI_2021 for a polygon defining the study area centred on 519622mE 5241513mN, buffered by 5 km, dated 16 Jan. 2022 (DNRET 2022) – Appendix E;
- Forest Practices Authority's *Biodiversity Values Database* report, specifically the species' information for grid reference centroid 519622mE 5241513mN (i.e. the centroid of the study area), buffered by 2 km & 5 km for records of threatened flora and fauna, respectively, hyperlinked species' profiles and predicted range boundary maps, dated 16 Jan. 2022 (FPA 2022) – Appendix F;
- Commonwealth Department of Agriculture, Water and the Environment's *Protected Matters Report* for a polygon defining the study area, buffered by 5 km, dated 16 Jan. 2022 (CofA 2022) – Appendix G;
- the TASVEG vegetation coverage (as available through GIS coverage and via LISTmap);
- GoogleEarth and LISTmap aerial orthoimagery; and
- other sources listed in tables and text as indicated.

Note that much of the southeastern survey area has been previously assessed by ECOtas for weed management and other specific projects, as follows:

- H.B.M.I. Pty Ltd (2012). *Weed and Disease Management Plan: H.B.M.I. Leslie Vale Facility*. Plan prepared by Environmental Consulting Options Tasmania in consultation with Integrated Land Management & Planning for H.B.M.I. Pty Ltd, February 2012.

This includes field assessments by Mark Wapstra & Brian French in Dec. 2011, mainly focussed on mapping of declared and environmental weeds, but also included some mapping of threatened flora locations.

- ECOtas (2014). *Threatened Flora Assessment and Management Recommendations: H.B.M.I. Red Gravel Quarry Sediment Control Upgrade*. Report by Environmental Consulting Options Tasmania (ECOtas) for H.B.M.I., 16 April 2014.

This assessment and report covered a small area only. Field work was undertaken on 14 Jul. 2014 by Mark Wapstra.

Field assessment

The southeastern study area was assessed by Brian French (ECOtas) on 28 & 29 May 2019. Note also additional surveys of this area undertaken in 2011 (H.B.M.I. 2012) and 2014 (ECOtas (2014)). The northwestern study area was assessed by Mark Wapstra (ECOtas) on 1 Oct. 2021 and Kerri Spicer on 24 & 26 Nov. 2021.

The areas were assessed by meandering transects through the study areas to map vegetation transitions, populations of threatened flora, potential habitat of threatened fauna and other management issues such as declared weed species.

Vegetation classification

Vegetation was classified by waypointing vegetation transitions 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.

Threatened flora

With reference to the threatened flora, the survey included consideration of the most likely habitats for such species, and if detected, their location was be marked using hand-held GPS. The waypoint function was used to geolocate individuals of threatened flora, or where more extensive and/or densely clumped, to define the boundary of patches (and then approximate estimates made of abundance).

The study area supports database records of threatened flora. These sites were targeted to confirm the presence of the reported species (refer to **FINDINGS Plant species Threatened flora known from the study area** for more details as well as **APPENDIX B**, both of which discuss the veracity of these records).

Threatened fauna

Surveys for threatened fauna were largely 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.

With reference to the wedge-tailed eagle, the survey targeted the known nest to the south of the study area (to confirm its location) and other suitable habitat along Mafeking Creek with the intention to mark their location, if detected, using hand-held GPS. New nest locations were marked using hand-held GPS. A fixed-wing aerial survey was undertaken by Nick Mooney (contracted direct by Hazell Bros) on 16 Dec. 2019 to confirm the activity status of the wedge-tailed eagle nests along Mafeking Creek. This resulted in the additional detection of a grey goshawk nest on the slopes above Mafeking Creek.

With reference to the species such as the Tasmanian devil, spotted-tailed quoll and eastern quoll, the survey included consideration of potential den/lay-up sites (recognising that these can be cryptic) and scats, with the intention to mark their location, if detected, using hand-held GPS.

Weed and hygiene issues

The study area was also assessed with respect to plant species classified as declared weeds under the *Tasmanian Weed Management Act 1999 (Biosecurity Act 2019)*, Weeds of National Significance (WoNS) or “environmental weeds” (author opinion and as included in *A Guide to Environmental and Agricultural Weeds of Southern Tasmania*, NRM South 2017). Where such species were detected, hand-held GPS was used to waypoint individuals/patches, with notes made on supporting habitat and population structure (abundance/extent).

The site was also assessed with respect to potential impacts of plant and animal pathogens, by reference to habitat types and field symptoms.

FINDINGS

Vegetation types

Comments on TASVEG mapping

This section, which comments on the existing TASVEG 4.0/TASVEG Live 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.

TASVEG maps the study area as (Figure 8 = TASVEG 4.0; Figure 9b & 9c = TASVEG Live):

- *Eucalyptus pulchella* forest and woodland (TASVEG code: DPU)
Mapped across most of the forested areas within the study area and extensively in surrounding areas, notably including forest associated with watercourses and adjacent sheltered slopes. TASVEG Live makes minor corrections to the extent of DPU but the most significant change between TASVEG 4.0 and Live is the re-coding of some areas of DPU to DOV.
- *Eucalyptus ovata* forest and woodland (TASVEG code: DOV)
No DOV is mapped within the study area under TASVEG 4.0 but TASVEG Live includes several polygons, as follows: ellipse northeast of access road northwest of small dam; bulging ellipse northeast and southwest of access road (DOV straddles road and includes the road itself) northwest of the other small dam; relatively large polygon extending from northern side of Huon Highway, across the highway itself and southwest into the study area east of the leased residential property; and a "tongue" extending in from west adjacent to the Huon Highway west and southwest of the small dam near the "white quarry". These polygons are attributed to the BLACK_BROOKERS_GUM_REVIEW-NRMS-2021 project code with the Field Check date indicated as 17 Mar. 2021 but the Source Type as orthoimagery (23 Dec. 2015, 11 Mar. 2020). That is, this mapping post-dates the original 2019 vegetation mapping undertaken by ECOTas, which was never provided to DPIPW. Interestingly, that survey did map a small area of DOV near the access road (northern dam) but a considerably smaller area than indicated on TASVEG Live.
- *Eucalyptus obliqua* dry forest (TASVEG code: DOB)
DOB is mapped near Leslie Road and just extends into the study area along the access road.
- *Acacia dealbata* forest (TASVEG code: NAD)
Mapped as a band along Mafeking Creek, with some association with the aerial photography "signature" of a canopy locally dominated by silver wattle. Mapped the same on TASVEG 4.0 and Live.
- agricultural land (TASVEG code: FAG)
Mapped across most of the paddock areas including several areas of obvious forest, woodland or scrub canopy including both scattered paddock trees, larger copses and fenceline remnants. TASVEG Live makes minor alterations to the extent of FAG only.

- regenerating cleared land (TASVEG code: FRG)
A small area of disturbed vegetation north of the dolerite put is mapped as FRG. TASVEG Live makes minor alterations to the extent of FUM only.
- extra-urban miscellaneous (TASVEG code: FUM)
Mapped across all active and obvious quarry facilities but not specifically roads and tracks, dams and the like. TASVEG Live makes minor alterations to the extent of FUM only.
- water, sea (TASVEG code: OAQ)
A small farm dam near the Huon Highway is mapped as OAQ. TASVEG Live corrects this to add in the larger dam to the east.

Vegetation types recorded as part of the present study

Vegetation types have been classified according to TASVEG 3.0, as described in *From Forest to Fjaeldmark: Descriptions of Tasmania's Vegetation* (Kitchener & Harris 2013+). Table 1 provides information on the vegetation types identified with notes on extent, structure, composition and condition. Appendix A provides annotated images describing the native vegetation mapping units identified from the study area. Figure 10 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 (DNRET 2022); table headings are as per modules in Kitchener & Harris (2013+); 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 (Kitchener & Harris 2013+)	Conservation priority NCA EPBCA	Comments
Modified land		
improved pasture with native tree canopy (FAC)	not threatened <i>not threatened</i>	FAC describes the areas of pasture in the north of the property with native tree species persisting over agricultural land (pasture). In this regard, scattered patches of <i>Eucalyptus pulchella</i> , <i>E. obliqua</i> and <i>E. ovata</i> are the dominant remnant tree species. Weed species such as <i>Rubus</i> spp. (blackberry) and <i>Genista monspessulana</i> (broom) are common invaders of these remnant forest patches.
agricultural land (FAG)	not threatened <i>not threatened</i>	FAG occurs in the north of the study area. This mapping unit is characterised by improved pasture for grazing, which is dominated by introduced grass and herb species.
regenerating cleared land (FRG)	not threatened <i>not threatened</i>	FRG describes the previously cleared areas across the study area that are regenerating to native vegetation. FRG is associated with disturbed areas that have been either rehabilitated or are being invaded by native plant species from surrounding native forest. These areas are generally dominated by a broad mix of introduced grass and herb species and the presence of native shrub species. The areas mapped as FRG under TASVEG were found to be largely weed infestation (FWU), which is discussed below. It should be noted that numerous invasive weeds species are common in the areas mapped as FRG. The relationship between FRG and FAG is one of geographic and temporal transience, depending on grazing regime.

TASVEG mapping unit (Kitchener & Harris 2013+)	Conservation priority NCA EPBCA	Comments
extra-urban miscellaneous (FUM)	not threatened <i>not threatened</i>	FUM is the mapping unit used to describe the areas associated with the existing industrial developments including quarries, buildings, roads and material stockpiles. There are very few plant species present in these areas and if present, are introduced weedy species.
weed infestations (FWU)	not threatened <i>not threatened</i>	FWU describes areas that have been invaded by weed species. There are numerous areas associated with quarry activities that have been highly disturbed where these species dominate. These invasive species and areas are discussed further under FINDINGS Other ecological Values <u>Weed species</u> .
urban areas (FUR)	not threatened <i>not threatened</i>	The existing residential dwelling and associated yards are mapped as FUR.
Dry eucalypt forest and woodland		
<i>Eucalyptus obliqua</i> dry forest (DOB)	not threatened <i>not threatened</i>	<p>DOB occurs on generally fertile and well-drained sites across the study area either occurring as a remnant community in the disturbed area in the vicinity of the processing plant or a gradational community between WOB and DPU as sites become more insolated and less fertile. DOB is characterised by a sedgy understorey with scattered shrubs and a multi-age tree canopy.</p> <p>DOB is also found in riparian areas where conditions are not moist enough for WOB (e.g. upper reaches of creek systems). DOB in the central northern survey area has been partially cleared in the past with scattered larger eucalypts (20 m tall, 5% cover) and a younger cohort of eucalypt regeneration.</p> <p>DOB is generally in good condition with few weed species noted due to the relative isolation of the areas such as above Mafeking Creek. However, the areas of DOB in the vicinity of the processing facility and in the paddock areas are in very poor condition with invasive weed species such as <i>Genista monspessulana</i> (canary broom) being common. No symptoms of <i>Phytophthora cinnamomi</i> (PC) were observed.</p>
<i>Eucalyptus pulchella</i> forest and woodland (DPU)	not threatened <i>not threatened</i>	<p>DPU dominates the forested areas across both study areas. DPU is characterised by a tree layer dominated <i>E. pulchella</i> with scattered <i>E. viminalis</i> present. The understorey is variable with a diverse grassy understorey dominating, with sedges and shrubs dominating at sites where moisture and fertility increases. DPU is gradational with DOB as fertility and moisture availability increases. In areas where the community has been previously cleared or heavily disturbed adjacent to roads and the quarry sites, introduced grasses, herbs and shrubs are common.</p> <p>DPU is variable in age structure: to the west of Mafeking Creek, it consists of younger regrowth forest and to the east of more multi-aged forest.</p> <p>DPU ranges from very good condition with no weeds recorded in the undisturbed areas such as on the slopes above Mafeking Creek to very poor condition in highly disturbed areas with highly invasive weed species being present. No symptoms of <i>Phytophthora cinnamomi</i> (PC) were observed.</p>
<i>Eucalyptus ovata</i> forest and woodland (DOV)	threatened <i>threatened</i>	<p>DOV occurs as small remnants within the agricultural land that are highly disturbed with an understorey dominated by exotic grasses with some native graminoids. DOV is also found within the broader forest areas where drainage is impeded as small patches with two slightly larger areas found on the broad flat at the top of the slopes west of Mafeking Creek. Poorer drainage dictates the location of this community and it grades into DPU where drainage improves.</p> <p>DOV is characterised, for the most part, by younger regrowth trees that are relatively even-aged (the exception is the central north remnant (Patch A) that has larger more mature trees) over a grassy/sedgy understorey. A large proportion of the areas have been impacted by grazing with altered shrub layers and exotic grasses present.</p>

TASVEG mapping unit (Kitchener & Harris 2013+)	Conservation priority NCA EPBCA	Comments
		The condition of the DOV ranges from poor for the remnants (dominated by exotic grasses with weed covers typically >50%, limited to no native shrubs, saggs & sedges the main native element) with better condition DOV examples associated with the forest areas (native grass species present, a native shrub layer present that is still slightly modified, lower weed covers (<50%) with scattered weeds still present). No symptoms of <i>Phytophthora cinnamomi</i> (PC) were observed. Only two of the DOV areas meet the criteria for the EPBCA listed Black Gum – Brookers Gum Forest/Woodland ecological community (Table 2 of main text).
Wet eucalypt forest and woodland		
<i>Eucalyptus obliqua</i> forest with broad-leaf shrubs (WOB)	not threatened <i>not threatened</i>	WOB occurs as a narrow-band in the moist and fertile east and south-facing gullies associated with Mafeking Creek and associated unnamed streams and drainage lines. WOB is characterised by tall trees (c. 30-35 m) tall <i>Eucalyptus obliqua</i> (stringybark) with scattered <i>E. globulus</i> (blue gum) over a tall shrub layer generally dominated by <i>Pomaderris apetala</i> (dogwood) or on the slightly drier upper slopes by <i>Bedfordia salicaria</i> (blanketleaf). The understorey is dominated by fern species. WOB is gradational with DOB (see above) as moisture availability decreases and insolation increases. WOB is very good condition with only a few opportunistic weed species noted.
Other natural environments		
water, sea (OAQ)	not threatened <i>not threatened</i>	OAQ is the mapping unit used to describe waterbodies that do not have plant species present. OAQ is used to map the dam areas across the study area.

Conservation status of recorded vegetation communities

Of the vegetation communities recorded, only *Eucalyptus ovata* forest and woodland (TASVEG code: DOV) is identified as having higher conservation value under legislation and policy. DOV is classified as a threatened vegetation type on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*. It can also equate to a threatened ecological community listed on the schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA), viz. Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*), listed as Critically Endangered.

Eleven discrete patches of DOV have been mapped across the study area (Figure 11). There are a set of criteria issued to work out if a patch of DOV equates to the EPBCA-listed entity (CofA 2019), based on extent, structure, composition and contiguity. Only two of the DOV areas identified from the study area meet the criteria for the EPBCA-listed entity (Table 2).

In summary, at present the property supports ca. 3.7 ha of DOV that currently matches the intent of the EPBCA-listed threatened ecological community.

The combination of the State and Commonwealth threatened status of the DOV on the property, as well as its recognised strong association with potential foraging habitat of the swift parrot (*Lathamus discolor*), will constrain any proposal to substantially alter the structure and/or composition of these patches of DOV without seeking specific relevant approvals. The context of the patches of DOV are, however, such that active ongoing management should not be required to maintain their current extent and condition.

Table 2. DOV patch descriptions relative to EPBCA criteria for Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*) [patch label corresponds to Figure 10]

patch	area (ha)	comments	EPBCA quality category	reason for not meeting EPBCA Criteria
A	0.7	80% weed cover, dominated by exotic grasses with some native saggs/sedges (15-20% cover), nice large trees (some with good hollows)	n/a	too weedy
B	0.1	narrow, small area that links to DOV in road reserve but still <0.5 ha total area, 20% weed cover	n/a	too small
C	0.1	small locally dominant area at top of a drainage depression, could be incorporated into DOB but has been mapped out separately	n/a	too small
D	0.2	small area, native understorey	n/a	too small an area
E	0.1	small sliver in survey area but links to adjoining DOV to west, 80% weed cover	n/a	too small; adjoining DOV not EPBCA due to weediness
F	0.3	small remnant dominated by exotic grasses (70% weed cover) with some native saggs/sedges	n/a	too small
G	0.6	links to DOV woodland on western side of fence (extent not mapped), low native diversity from grazing impacts, 30% weed cover, native grasses/graminoids 50%	n/a	low native diversity
H	2.1	west of Mafeking Creek (north), broad flat at top of slopes, largest DOV area, component of exotic grasses in the understorey and scattered <i>Genista monspessulana</i> (weed cover 20-50%) but understorey predominantly native and has some native shrub cover (5-10%)	B2	n/a
I	0.6	woodland fringe dominated by exotic grasses (weed cover 80%)	n/a	too weedy
J	1.6	west of Mafeking Creek (south), scattered <i>Genista monspessulana</i> but weed cover only 5-10%, the best condition DOV area, native shrub cover 30%	A2	n/a
K	0.1	"circle" of modified vegetation surrounding a small dam northeast of the main access road, embedded in non-DOV vegetation (i.e. it is not contiguous with a larger patch of DOV, rather with surrounding DPU	n/a	too small

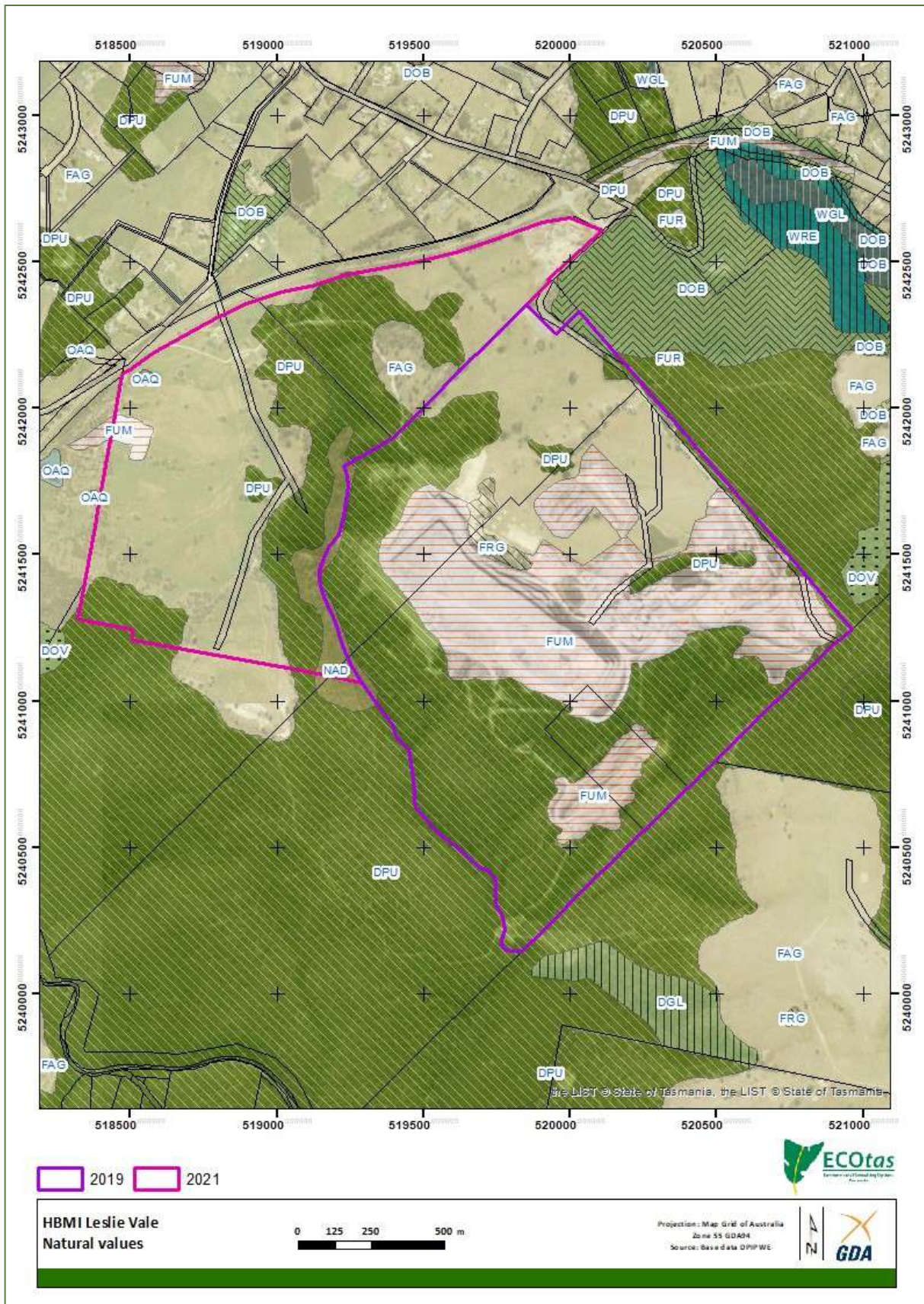


Figure 8. Existing TASVEG 4.0 vegetation mapping for study area and surrounds (see text for codes)

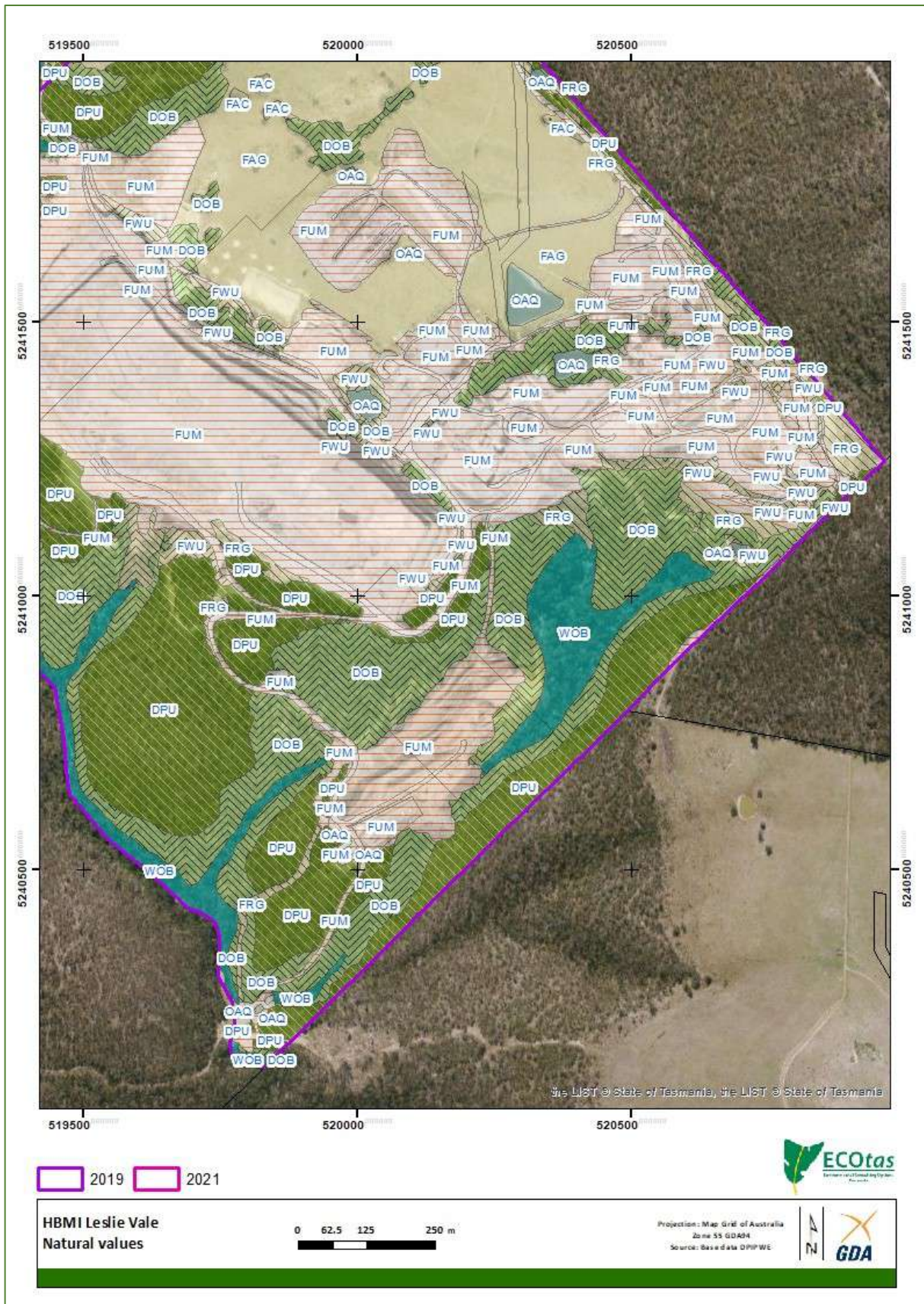


Figure 10b. Revised vegetation mapping for study area: southeast section (see text for codes)

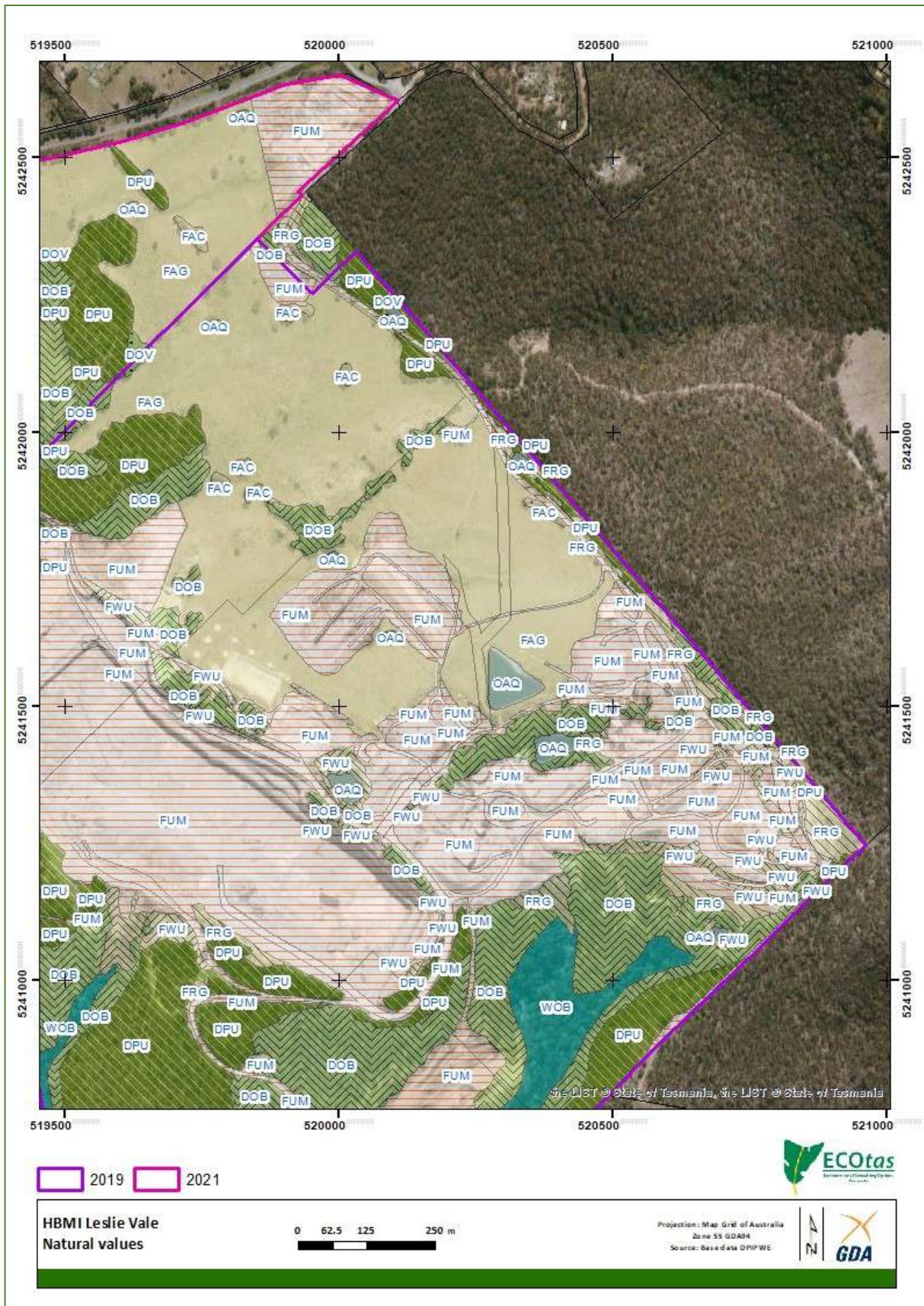


Figure 10c. Revised vegetation mapping for study area: northeast section (see text for codes)

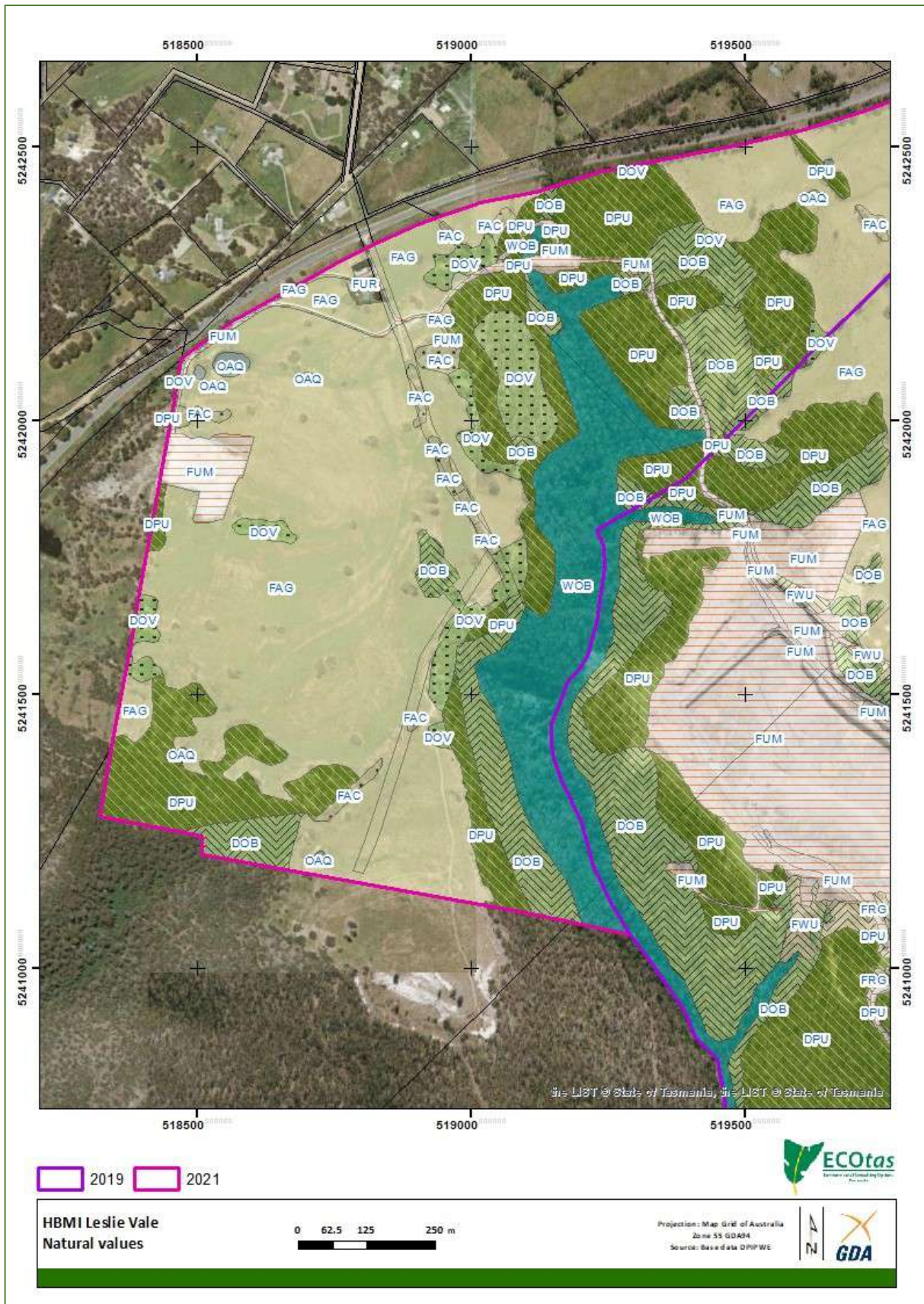


Figure 10d. Revised vegetation mapping for study area: western section (see text for codes)

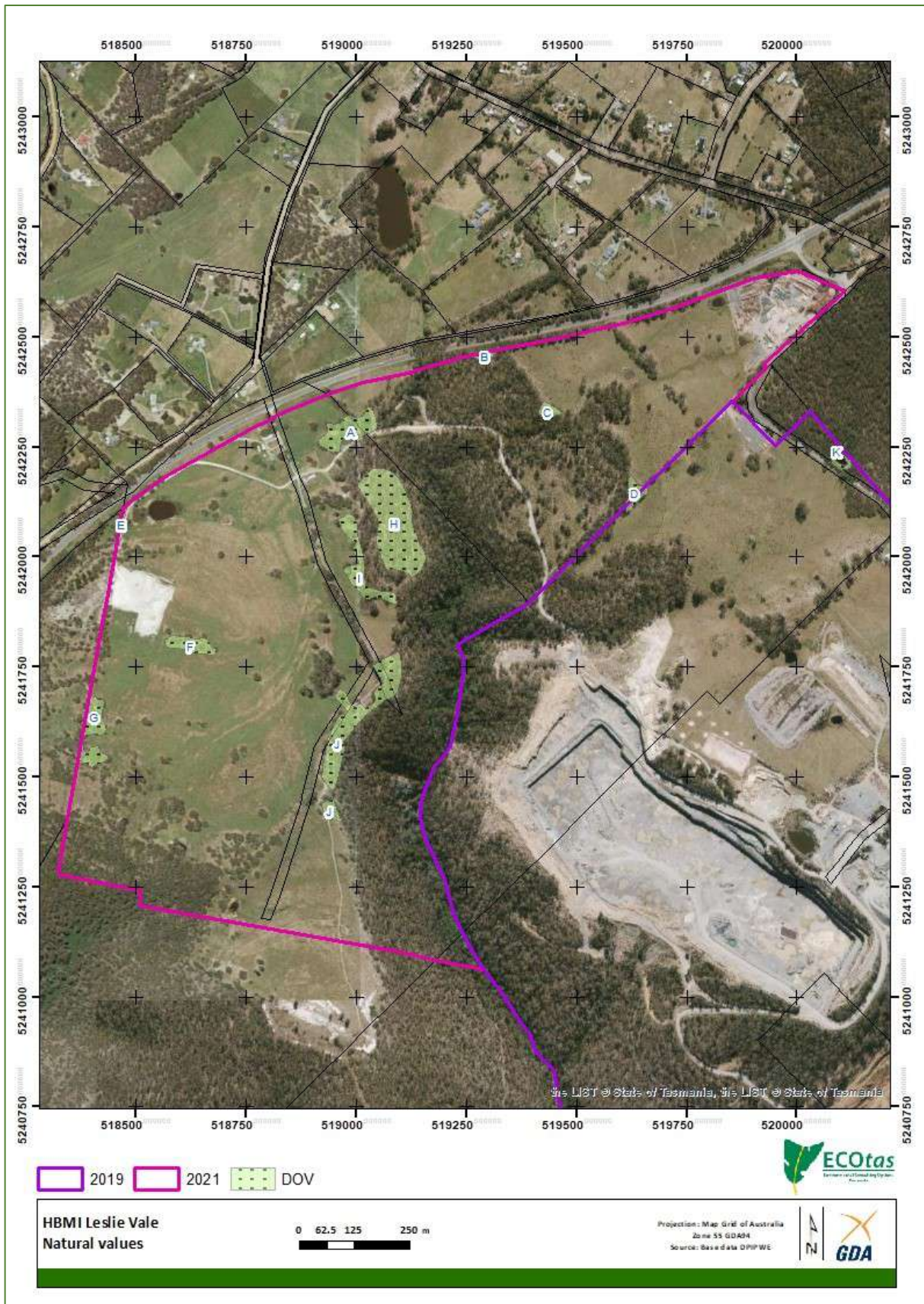


Figure 11a. Distribution of patches of DOV (patch labels correspond to Table 2, see also Appendix A)

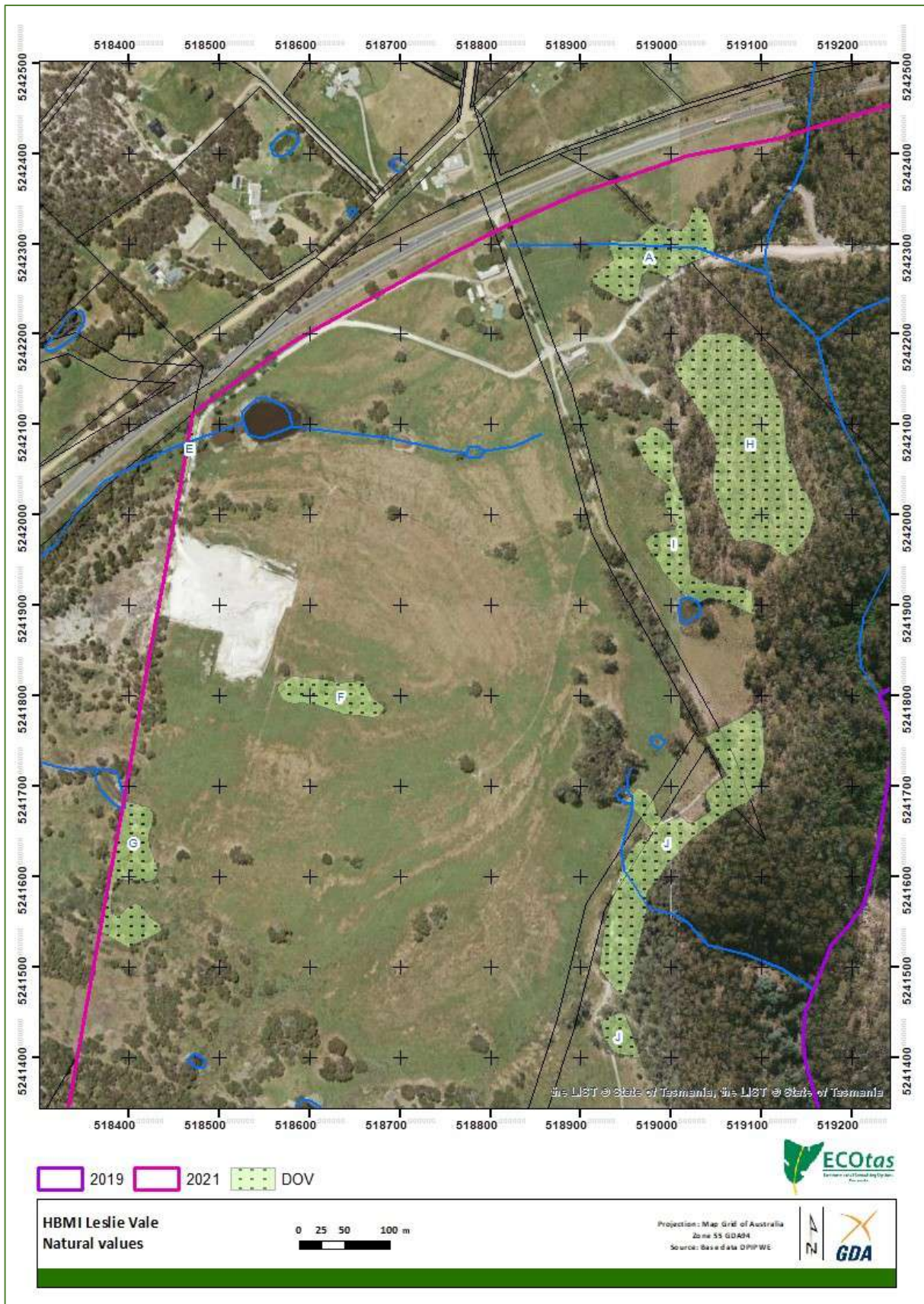


Figure 11b. Distribution of patches of DOV: west (patch labels correspond to Table 2, see also Appendix A)

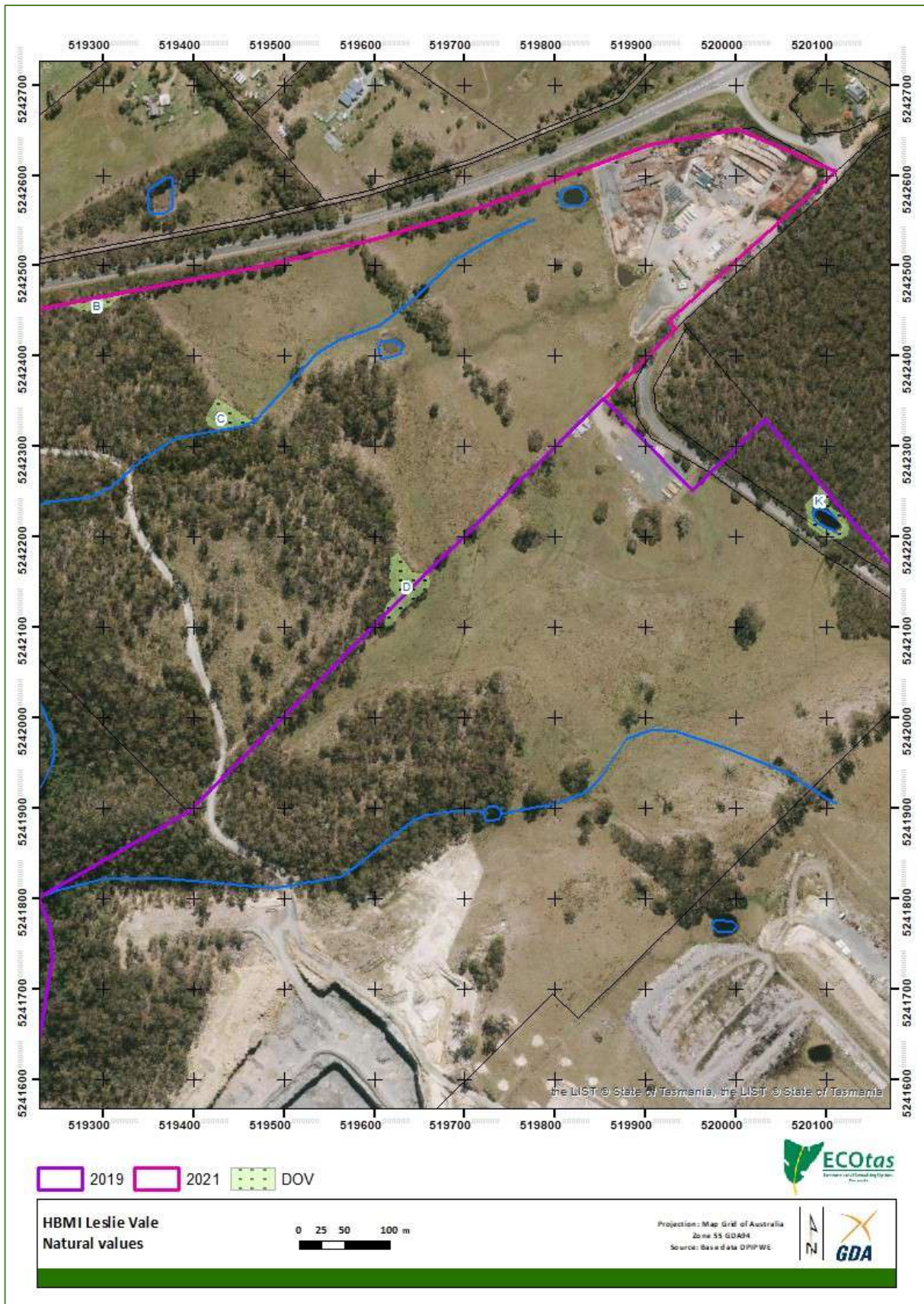


Figure 11c. Distribution of patches of DOV: east (patch labels correspond to Table 2, see also Appendix A)

Plant species

General information

A total of 175 vascular plant species were recorded from the area (Appendix B), comprising 124 dicotyledons (including 10 endemic and 48 introduced), 40 monocotyledons (including 14 introduced species), 1 gymnosperm (naturalised) and 10 pteridophytes (all native).

Additional surveys at different times of the year may detect additional short-lived herbs and grasses. Timed-targeted follow-up surveys for species with a higher priority for conservation management (e.g. threatened species) are not considered warranted due to the lack of suitable habitat (see also discussion under **FINDINGS Plant species** Threatened flora species potentially present (database information) and Appendix C).

Threatened flora species recorded from the study area

One plant species, namely *Epacris virgata* Kettering (pretty heath), listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* was detected as a consequence of the field survey.

No plant species listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* were detected from the study area. Note that State authorities have confirmed that *Epacris virgata* Kettering is not considered as the listed entity on the EPBCA.

- *Epacris virgata* Kettering (pretty heath) [EPBCA: not listed; TSPA: vulnerable]

Epacris virgata Kettering (pretty heath) has been recorded from within the study the area in the past (e.g. H.B.M.I. 2012; ECOTas 2014; Figure 12) and a number of new sites were located during the current survey (Figure 13). *Epacris virgata* is found mainly in *Eucalyptus pulchella* forest and woodland (TASVEG code: DPU) but extends into *Eucalyptus obliqua* dry forest (TASVEG code: DOB) and *Eucalyptus ovata* forest and woodland (TASVEG code: DOV), always associated with Jurassic dolerite and usually in the sedgy facies of a vegetation community.

The surveys to date have probably detected most of the patches of the species within the study area, although its finer-scale distribution is likely to be somewhat different to shown as it is impractical to record all individuals in any particular survey. It is possible there are additional localised patches within the study area.

Future works will need to be cognisant of the locations of *Epacris virgata* Kettering. The population northeast of the main dolerite pit has been marginally encroached on (unknowingly because it was only the present survey that revealed the presence of the additional patches within the property). Any activities that will result in individuals of the species being “knowingly taken” would require a permit under Section 51 of the Tasmanian *Threatened Species Protection Act 1995*, through a formal permit application to Conservation Assessments Section (CAS, DNRET).

It is highly unlikely that that the species would qualify as a “critical constraint” in terms of project planning. The simplest administrative route is to avoid known sites such that a permit application is obviated. However, the formal status of the species should be checked prior to any permit application because it is widely accepted that its status warrants review, pending some taxonomic resolution. There has been much discussion that the species warranted removal from the TSPA.



Plate 1. *Epacris virgata* Kettering (pretty heath) within the study area (inset: flowers)



Plate 2. Woodland habitat of *Epacris virgata* Kettering (pretty heath) above Mafeking Creek in the south of the study area

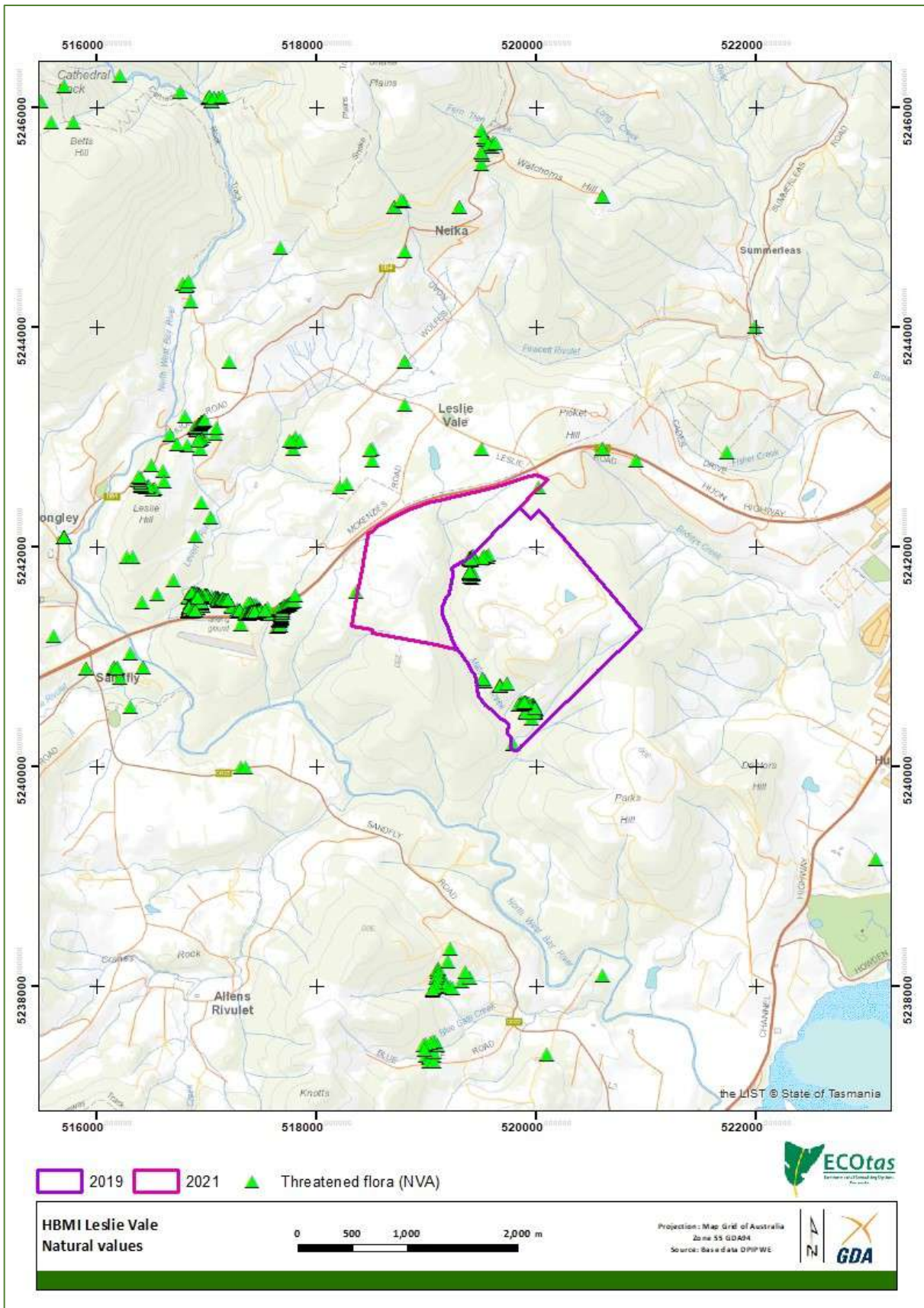


Figure 12a. Natural Values Atlas records of threatened flora from the wider area (overview)

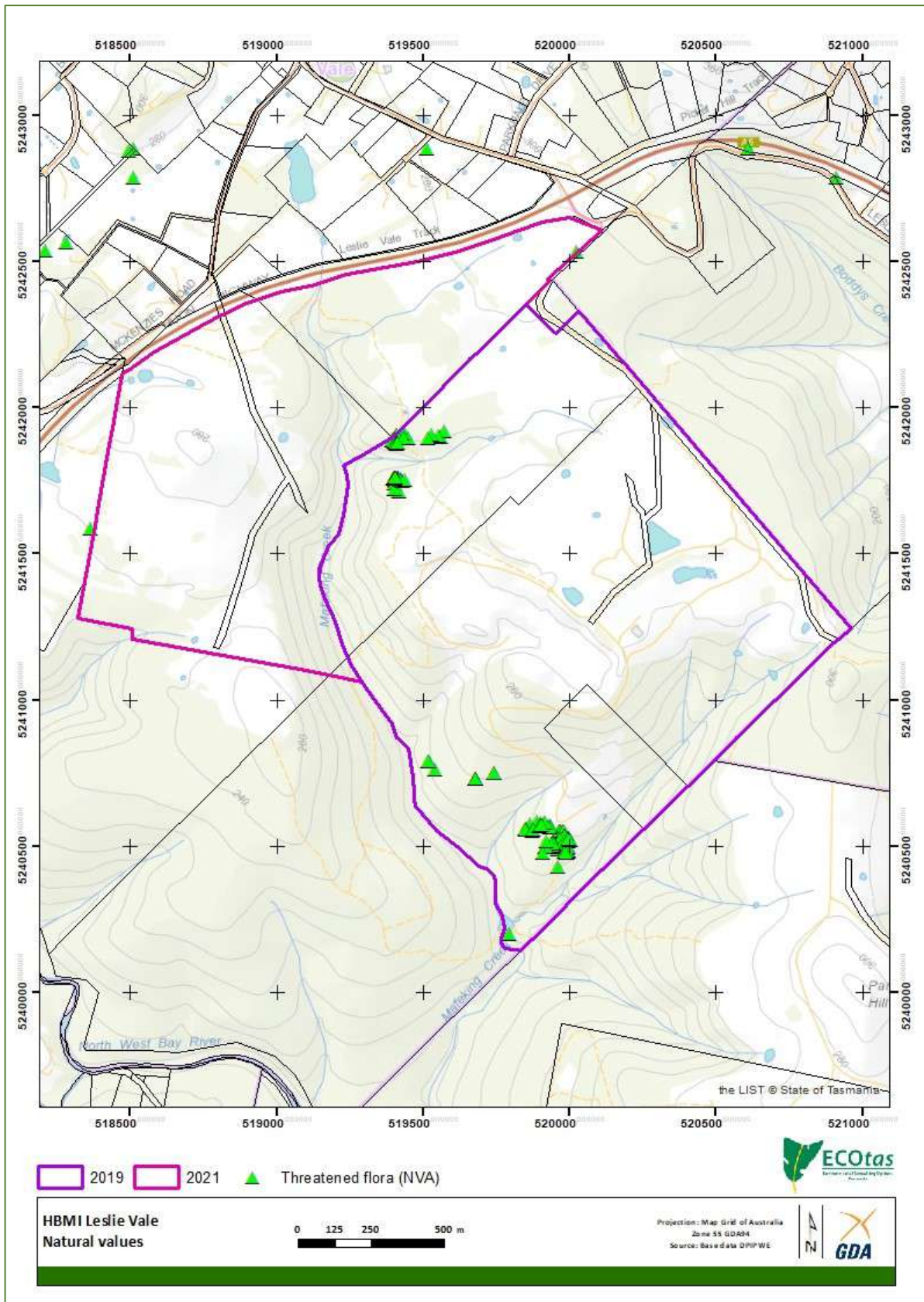


Figure 12b. Natural Values Atlas records of threatened flora from the wider area (detail) – all records within study area are *Epacris virgata* Kettering

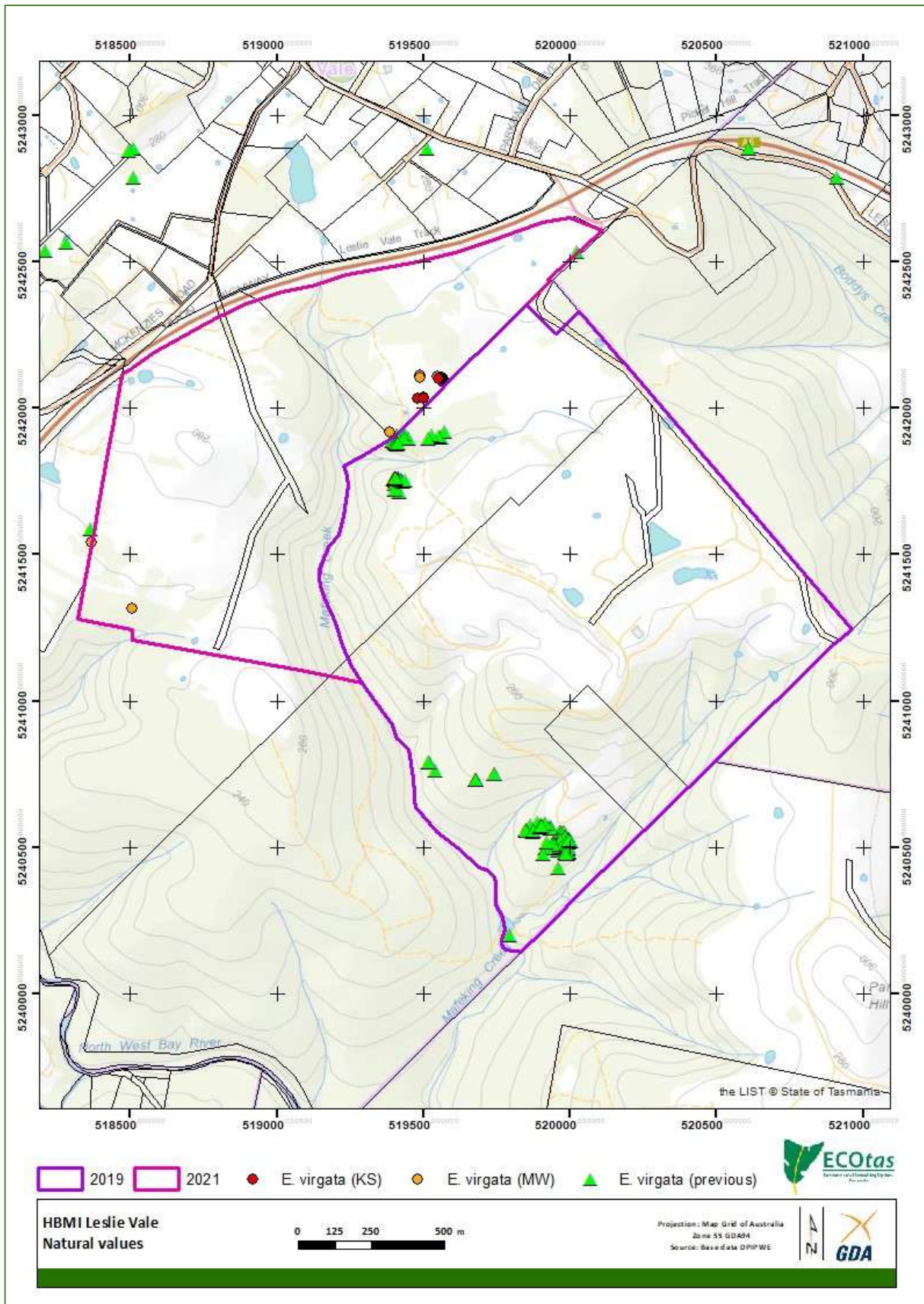


Figure 13a. Distribution of threatened flora within and adjacent to the study area (overview)

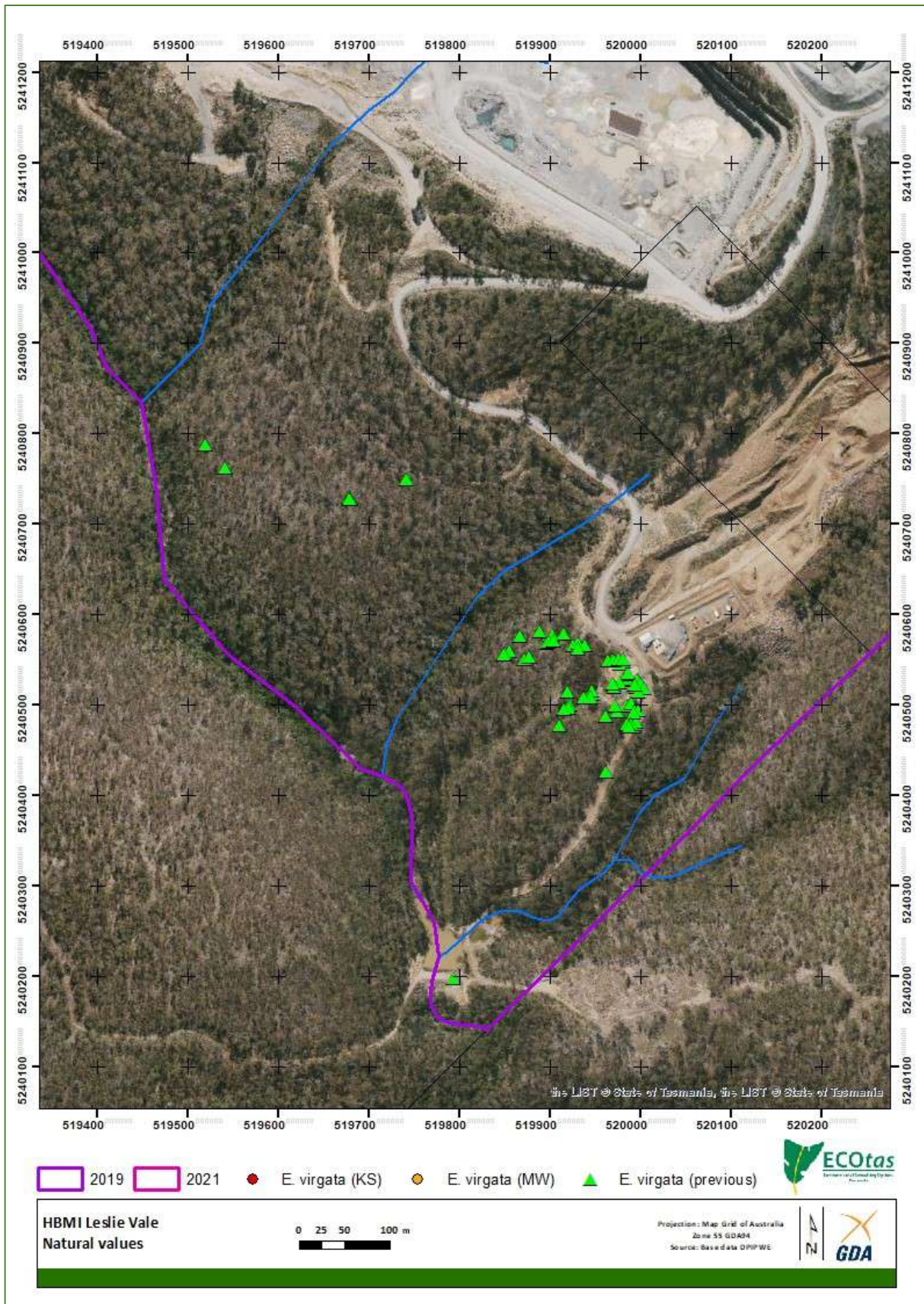


Figure 13b. Distribution of threatened flora within and adjacent to the study area (southern section)

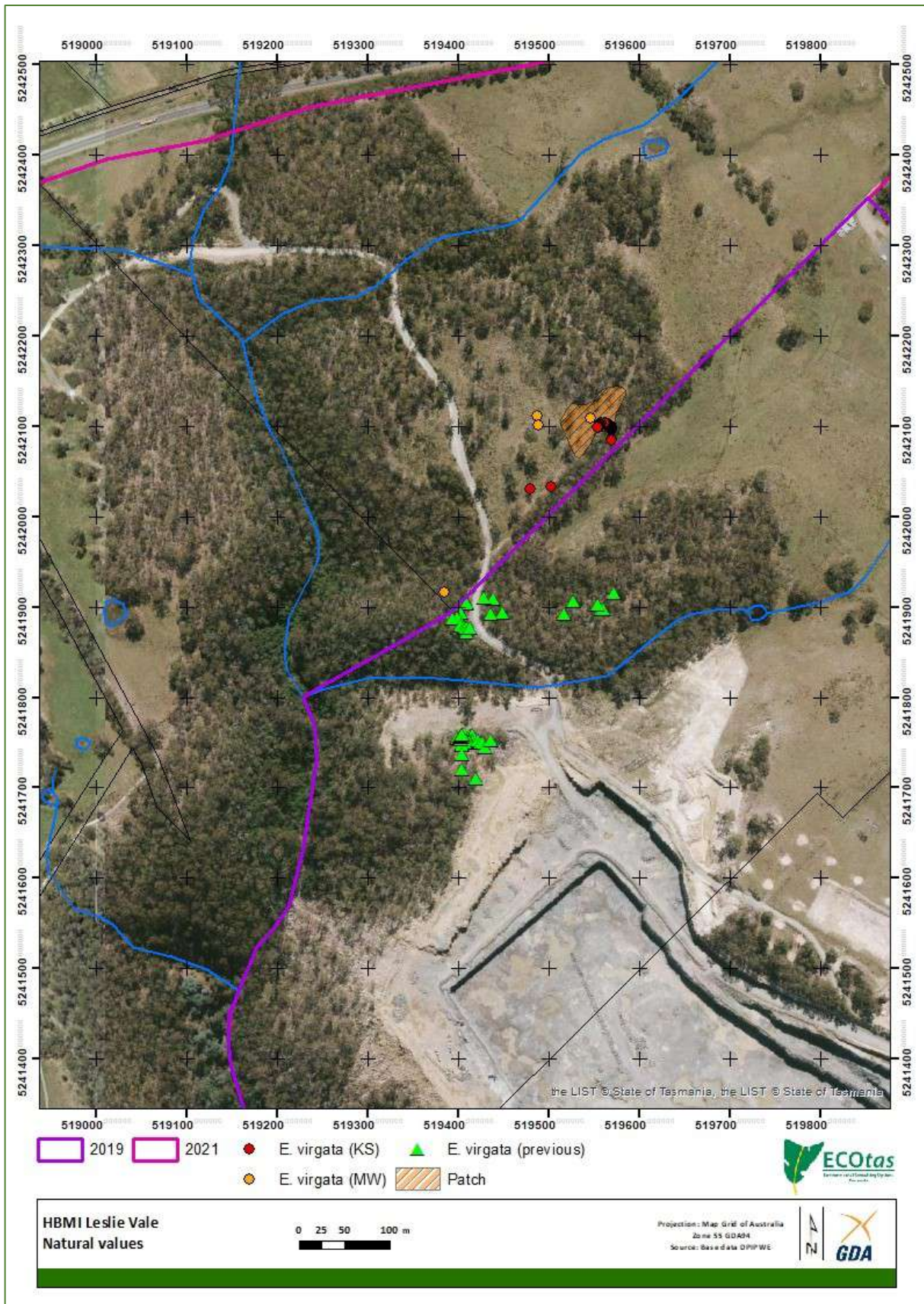


Figure 13c. Distribution of threatened flora within and adjacent to the study area (northern section)

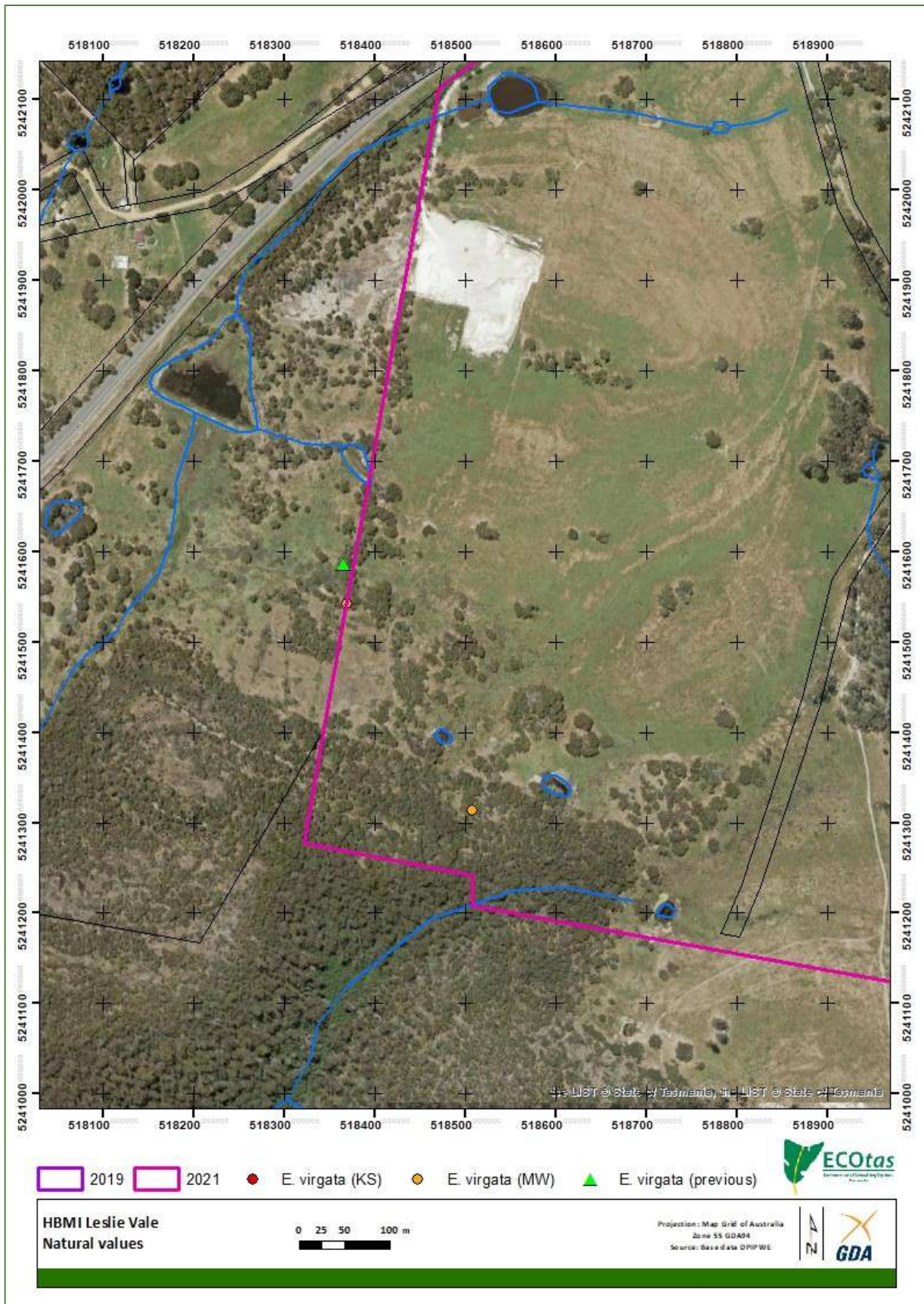


Figure 13d. Distribution of threatened flora within and adjacent to the study area (western section)

Threatened flora species potentially present (database analysis)

Figure 12 indicates threatened flora species near to the greater 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.

Fauna species

Threatened fauna species recorded from the study area

Evidence of three threatened fauna species, listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, namely *Sarcophilus harrisii* (Tasmanian devil), *Aquila audax* subsp. *fleayi* (Tasmanian wedge-tailed eagle) and *Accipiter novaehollandiae* (grey goshawk) was detected as a consequence of the field survey (or from associated data sources) from within the study area (Figure 14). Further information on these species is provided below.

- marsupial carnivores

Three species (*Sarcophilus harrisii*, Tasmanian devil; *Dasyurus maculatus* subsp. *maculatus*, spotted-tailed quoll; *Dasyurus viverrinus*, eastern quoll) are considered collectively because they have broadly similar habitat and management requirements.

Scats of the Tasmanian devil were located at a number of sites across the study area including numerous recent scats, indicating that this species utilises the area frequently (Figure 14). All scats were found on old vehicle tracks, which the species is actively using for access to foraging sites.

There are database records adjacent to the study area for the Tasmanian devil, spotted-tailed quoll and eastern quoll representing roadkill records, mainly associated with the Huon Highway. These species have broad ranges and can occupy a wide variety of habitats. Within (and close to) the study area, it is highly likely that these species use the greater area for opportunistic foraging. The assessment did not locate any potential den sites such as suitable hollow logs, cliffs with small caves or wombat burrows, although these can be cryptic and require more intensive surveys.

It is unlikely that continuing operation of the existing elements of the facility will have a significant impact on these species. Any expansion of operations that results in the clearance of native vegetation that may support den sites should be subject to pre-clearance surveys. If active dens are located, further advice will need to be sought from Conservation Assessments Section (CAS, DNRET).

It is possible that any increase in activity at the facility could facilitate an increase in roadkill incidence on the access road between the Huon Highway and the facility. This risk is considered low, however, because the access road already has three significant bends/curves that automatically reduce vehicle speeds.

Under the *Survey Guidelines and Management Advice for Development Proposals that may Impact on the Tasmanian Devil (Sarcophilus harrisii): A Supplement to the Guidelines for Natural Values Surveys - Terrestrial Development Proposals* (DPIPWE 2015), the following is recommended in relation to assessing the potential risk of roadkill from a project:

3.7 Roadkill assessment

To be conducted where desktop assessment of the local devil population and the projected roadkill risk indicate potential for a substantial impact on the local population (i.e. predicted >10 % increase in deaths). Ideally, the survey should be conducted regularly over a long period of time, preferably covering all seasons (noting that January to April is when peak roadkill of weaned devils may occur). Notwithstanding the previous point, at a minimum, survey of road-killed devils should cover one of the following set periods of time - either 3 months for weaned devils between January and April or 6 months over the remainder of the year.

Additional notes:

- If assessing the impact of traffic associated with a proposed development on the devil, it is necessary to understand the current roadkill rate, potential construction phase roadkill rate, and potential post-development roadkill rate.
- It can be difficult to attribute the relative contribution of an individual proposed development to roadkill rates on public roads. Where this is an issue, it should be resolved by extending the impact assessment area to the point on a road at which it no longer represents a potential increase in the risk of roadkill of greater than 10 % using a parameter relevant to the proposed development or activity (e.g. to a point where the proposed land use activity is no longer responsible for a greater than 10 % increase in the volume or speed of night time traffic).

In this case, a formal roadkill survey is not considered warranted, given that the facility and road is long-established. However, the following is suggested for the access road:

- consider a dawn to dusk 40 km/h speed limit between the Huon Highway and the weighbridge, with dawn to dusk defined as one hour before and after, respectively, of sunrise/sunset times published by an official agency such as the Bureau of Meteorology (appropriate signage will be needed);
 - consider erecting ca. 50-100 m sections of wallaby-proof fence on the verge of the access road adjacent to the two dams, with the objective of minimising direct road access by wildlife using the water sources;
 - consider upgrading/maintaining the table drains on either side of the access road with the objective of keeping these flowing (i.e. not holding water, which is attractive to wildlife) and free of vegetation (i.e. "green pick", also attractive to wildlife) for ca. 3 m each side of the edge of the drain, the overall objective of minimising roadkill and attracting marsupial carnivores; and
 - consider use of pale road surfaces for any road upgrades (less attractive to wildlife).
-
- *Aquila audax* (wedge-tailed eagle)

Potential habitat for the wedge-tailed eagle 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. 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 (FPA 2022).

A known nest (#807) is located approximately 250 m to the south of the study area adjacent to Mafeking Creek: the precise location of this nest was confirmed during the current survey (Figure 14 & 15c, Plate 3). A further two previously unreported nests were located further to the northwest along Mafeking Creek in large *Eucalyptus globulus* (blue gum) trees (Plates 4 & 5). Note that all relevant data was supplied to DPIPW's *Natural Values Atlas* database for allocation of nest names and numbers in the Raptor Nest Database (RND): these are now allocated as #2665 (southern nest) and #2666 (northern nest), both called "Mafeking Creek, near Leslie Vale".

Both of the newly located nests were considered to be in good condition (at least from the ground), however, no evidence of recent use was noted such as whitewash, bones or other debris under the nests. A serendipitous fixed-wing aerial check of several nests by Nick Mooney was undertaken on 18 Dec. 2019, which took a route over the two novel nests. Both were deemed inactive in the 2019 breeding season, with the southern nest ranked as "viable" and the northern as "derelict" (Nick Mooney's self-explanatory terminology of prime, viable, derelict or remnant). An observation that was made was that there were a few big boulders in the creek bed where the nests are that have rolled down from works above (they stand out as pale brown with damage trails). Avoiding this occurring (at least in the more critical earlier phases of the breeding season) is suggested (N. Mooney pers. comm.).



Plate 3. Known wedge-tailed eagle nest (#807) along Mafeking Creek (southernmost nest in Figure 14 & 15c)

The context of the nests is interesting because they are within relatively close proximity to an active and intensively managed quarry facility. Ascertaining the history of use of the nests would be academically interesting, particularly if this information can add to the knowledge of how the species responds to different forms of quarrying works such as blasting, carting and general use. For example, some data is available from the Long Hill facility, also managed by Hazell Bros (Nick Mooney pers. comm.).

From a legislative perspective, a permit under Section 51 of the Tasmanian *Threatened Species Protection Act 1995* can only be issued if an individual will be "knowingly taken", which would not occur at this site. Taking of products of protected wildlife (which includes nests of the wedge-tailed eagle) would require a permit under the Tasmanian *Wildlife (General) Regulations 2010*, again a scenario that would not occur at this site. While the species is listed under the Commonwealth

Environment Protection and Biodiversity Conservation Act 1999, putative disturbance to nest sites, especially associated with an existing use (which would most likely be reasonably referred to as “continuing use” under the Act) would not warrant a referral to the Commonwealth Department of Agriculture, Water and the Environment. The “rules” sometimes applied to the management of wedge-tailed eagle nests (e.g. minimum 10 ha reserve, 500 m and 1,000 m line-of-sight breeding season restrictions, etc.) were developed for, and should only strictly apply to, commercial wood production activities. Application of these “rules” to other land uses, especially continuing use such as at this site, should be under careful consideration, ideally in consultation with a specialist.

If there is an extension to the hours of operation, this could be perceived as an additional threat to the breeding activity of this pair of birds. However, this pair is clearly habituated to high levels of activity, having constructed new nests closer to the facility well after operations commenced. An extension of operations would be incidental activity not directed disturbance and as such, of very low additional risk to breeding activity (N. Mooney pers. comm.).



Plate 4. New wedge-tailed eagle nest (#2665) along Mafeking Creek (central nest in Figure 14 & 15c)

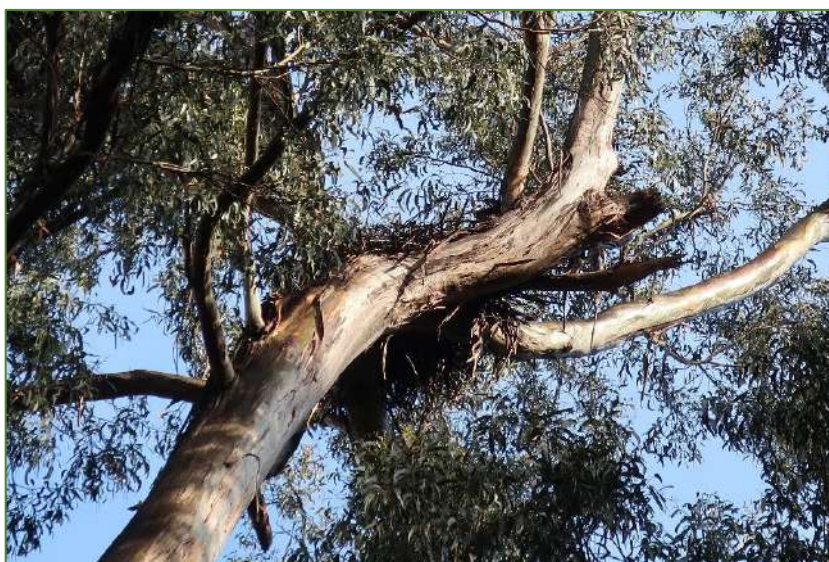


Plate 5. New wedge-tailed eagle nest (#2666) along Mafeking Creek (northern nest in Figure 14 & 15c)

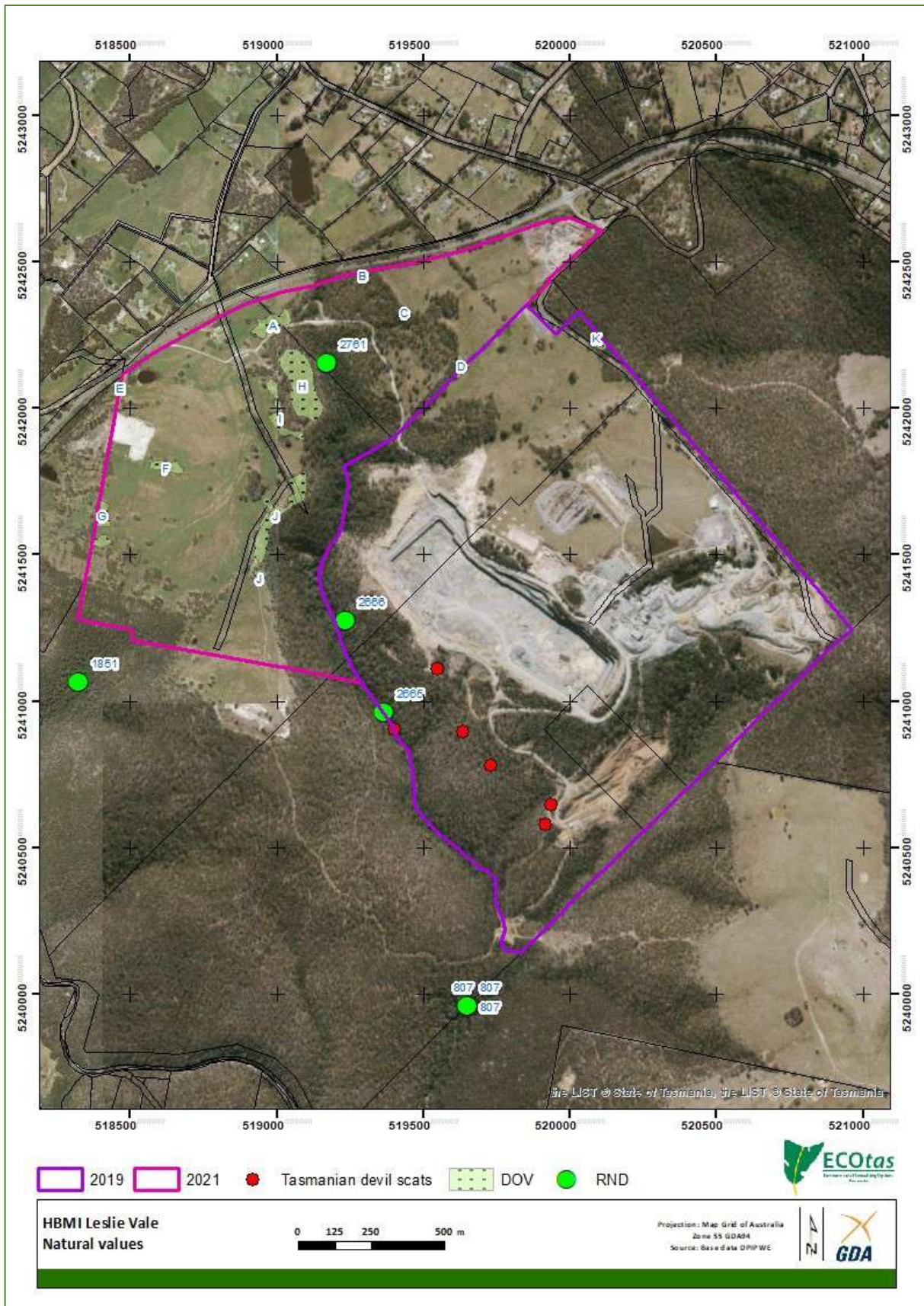


Figure 14. Distribution of threatened fauna (incl. habitat) within study area (this study)

As mentioned, this site presents an ideal opportunity to contribute to the knowledge of how the species responds to disturbance but day-to-day special management should not be required. However, visits to the nests should be avoided, as far as practical: such assessments are probably best undertaken by a specialist as part of a longer term monitoring program that takes account of ideal vantage points selected outside the breeding season and/or as part of a broader aerial survey of breeding activity.

- *Accipiter novaehollandiae* (grey goshawk)

As a consequence of the serendipitous fixed-wing aerial check of several nests by Nick Mooney undertaken on 18 Dec. 2019, a novel grey goshawk nest was discovered in *Eucalyptus obliqua* wet sclerophyll forest on the slopes above Mafeking Creek (Figure 14 & 15c). The nest was described as active. More detailed surveys may be warranted if future expansion includes clearing of wet sclerophyll forest on the slopes of Mafeking Creek. There are no “rules” for activities near an active grey goshawk nest but a general guideline is a buffer of ca. 100 m (but this can be designed in consultation with a specialist).

Threatened fauna species potentially present (database analysis)

Figure 15 indicates threatened fauna species close to the study area and Figure 8 indicates threatened fauna records from the greater area. 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.

In addition to the marsupial carnivores and wedge-tailed eagle discussed in the preceding section, potential habitat (to some degree) is present for several species, as follows:

- *Tyto novaehollandiae* (masked owl);
- *Haliaeetus leucogaster* (white-bellied sea-eagle);
- *Accipiter novaehollandiae* (grey goshawk);
- *Lissotes menalcas* (mount mangana stag beetle);
- *Lathamus discolor* (swift parrot);
- *Litoria raniformis* (green and golden frog); and
- *Perameles gunnii* (eastern barred bandicoot).

Further information on these species is provided below. Refer to Appendix D for further discussion of additional species.

- *Tyto novaehollandiae* (masked owl)

Potential habitat of *Tyto novaehollandiae* is all areas with trees with large hollows (≥ 15 cm entrance diameter). Significant habitat for the masked owl is any area of native dry forest, within the core range, with trees with large hollows (≥ 15 cm entrance diameter) (FPA 2019).

It is likely that the species uses the greater area for foraging and roosting with extensive potential habitat occurring in the greater area. Within the study area, potential nesting habitat is present with large well-formed hollows noted across the study area (Plate 6). More detailed surveys may be warranted if future expansion is anticipated to result in the loss of such trees.



Plate 6. (LHS) Example of a well-formed nesting hollow within the study area

Plates 7. (RHS) Example of farm dam with emergent vegetation potentially suitable for the green and golden frog

- *Haliaeetus leucogaster* (white-bellied sea-eagle)

Potential habitat for the white-bellied sea-eagle species 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. Scattered trees along river banks or pasture land may also be used. Significant habitat is all native forest and native non-forest vegetation within 500 m or 1 km line-of-sight of known nest sites (where nest tree still present) (FPA 2019).

The study area contains good potential nesting habitat for this species, however, no nests of this species were located or are known within 5,000 m of the study area. The species may use the greater area for opportunistic foraging.

- *Lathamus discolor* (swift parrot)

Potential habitat comprises potential foraging habitat and potential nesting habitat. Potential foraging habitat comprises *Eucalyptus globulus* (blue 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 (FPA 2019).

There are numerous records for the swift parrot within 5,000 m of the study area, which represent opportunistic sightings and/or nest locations (Figure 15). No sightings or nests have been recorded within the study area.

Potential foraging habitat is associated with DOV forest and scattered *E. ovata* trees found through agricultural land. Additionally, *Eucalyptus globulus* is found as a subdominant in the WOB associated with Mafeking Creek (section with 20-50% *E. globulus*).

Potential nesting habitat is in the more mature forests associated with WOB in Mafeking Creek (ca. 9 mature trees/ha). The central northern patch of DPU (between the access road and Huon Highway) had scattered mature trees (ca. 2-5 mature trees/ha), some with good large hollows. The central north DOV patch also has some nice scattered mature trees, some with good hollows. Refer to Figure 14 for map of DOV (potential foraging habitat) but note that there are also individuals of both *Eucalyptus ovata* and *Eucalyptus globulus* within the study area that will comprise potential foraging habitat.

More detailed surveys may be warranted if future expansion includes clearing of DOV (highly unlikely) or loss of significant individuals of *Eucalyptus ovata* and/or *Eucalyptus globulus* and/or hollow-bearing trees.

- *Perameles gunnii* (eastern barred bandicoot)

Potential habitat for the eastern barred bandicoot 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. Significant habitat is dense tussock grass-sedge swards, piles of coarse woody debris and denser patches of low shrubs (especially those that are densely branched close to the ground providing shelter) within the core range of the species (FPA 2019).

Virtually all of the potential and significant habitat elements are present over the entire study area.

There are numerous records for this species immediately adjacent to the study area representing sightings and roadkill records along the Huon Highway (Figure 15). No evidence of this species was noted (such as distinctive diggings), however, it is likely that the species utilises the greater area.

Lissotes menalcas (mount mangana stag beetle)

Potential habitat for the Mt Mangana stag beetle is any eucalypt forest that contains rotting logs (often numerous, and usually greater than about 40 cm diameter at mid-log length) below about 650 m a.s.l. (generally moist habitats that have not been subject to high intensity or frequent fires in about the last 20 years). The species has a patchy distribution within areas of potential habitat. Some rainforest will support the species, although in low densities as the species has an apparent preference for eucalypt logs (FPA 2019).

There are no records within 5,000 m of the study area, however, the species has been recorded in wet forest in the Fern Tree and Snug Falls areas either side of the property. Potential habitat is present within the wet forests associated with Mafeking Creek and associated tributaries. If any of the wet forests on the property are to be extensively disturbed, a targeted survey may be required to determine the potential presence of this species.

Litoria raniformis (green and golden frog)

Potential habitat is present in the farms dams (Plate 7), although it is noted (a) the species was not heard or observed during survey work; and (b) the species is not represented by recent records from southern Tasmania, except from the Richmond area.

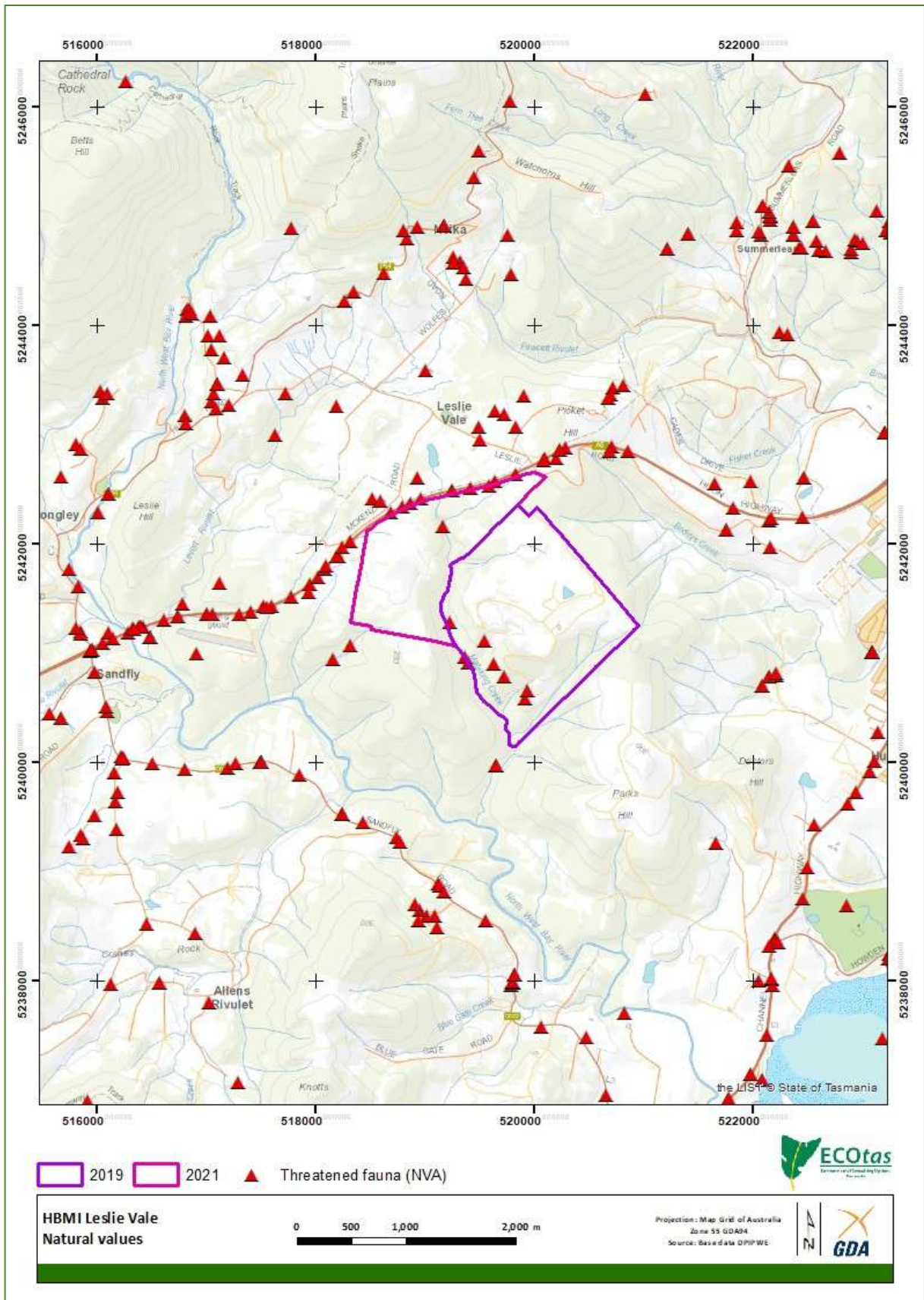


Figure 15a. Natural Values Atlas records of threatened fauna from the wider area (overview)

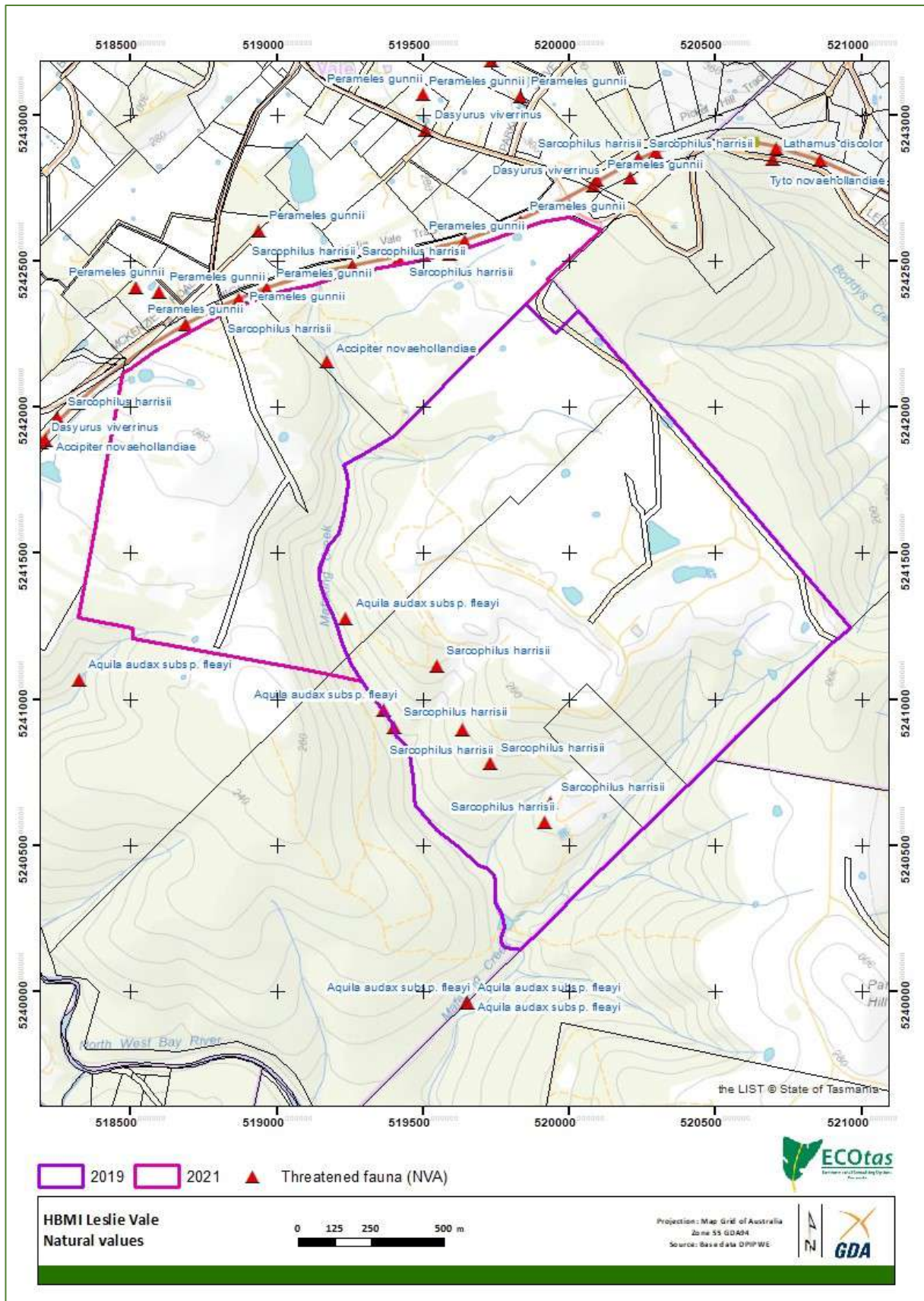


Figure 15b. Natural Values Atlas records of threatened fauna from the wider area (detail)

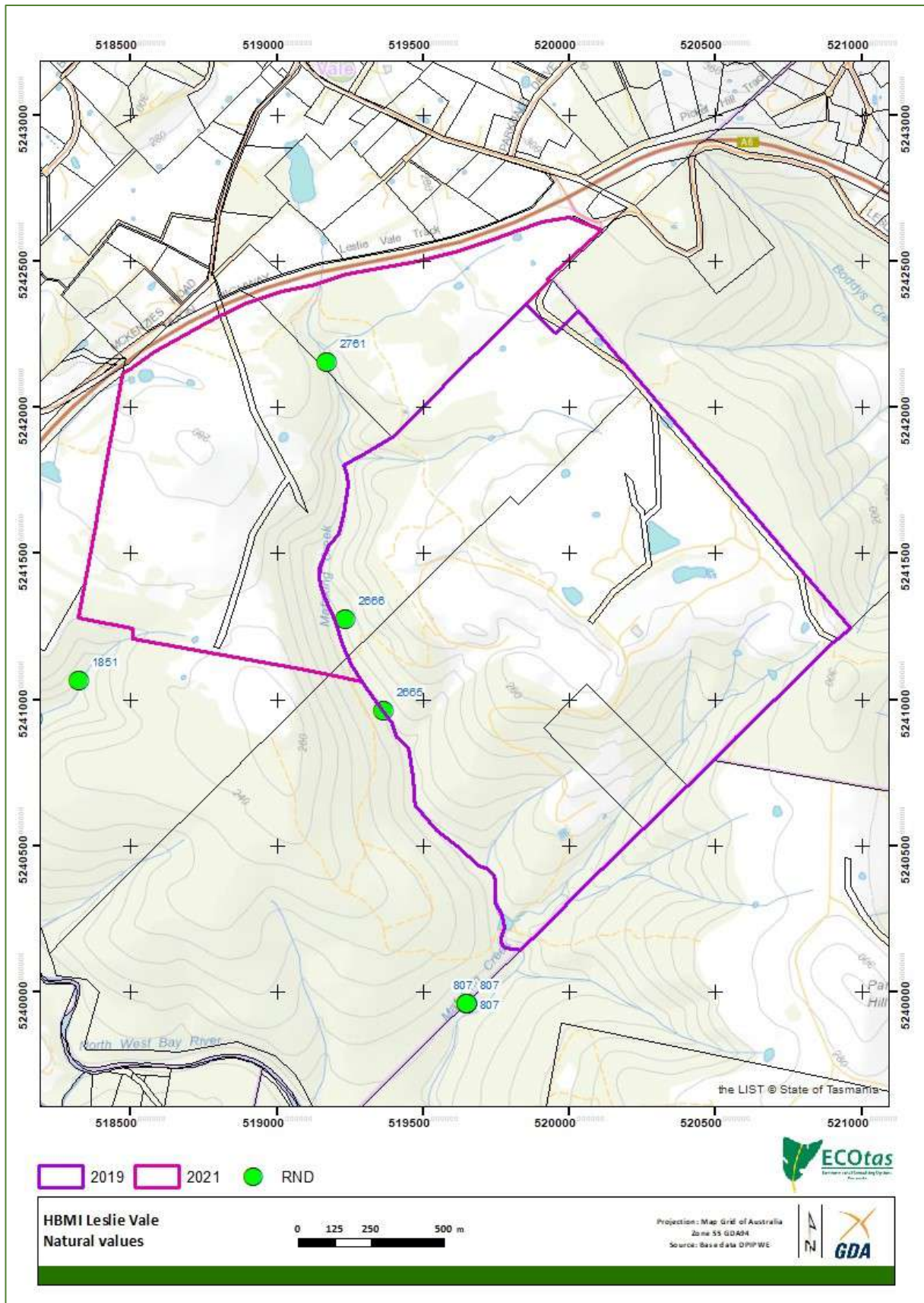


Figure 15c. Natural Values Atlas records of records of raptor nests

Other ecological values

Weed species

The study area supports several weed species classified as declared within the meaning of the Tasmanian *Weed Management Act 1999 (Biosecurity Act 2019)*, and additional species considered as “environmental weeds” (author opinion and as included in *A Guide to Environmental and Agricultural Weeds of Southern Tasmania*, NRM South 2017). The study area has been surveyed and reported on including weed management recommendations in H.B.M.I. (2012). GIS data of the new populations of weed species are included with this report (see Figure 16 for an indicative map).

Any further management actions should aim to minimise the risk of introducing weeds and distributing weeds to other areas due to the abundance of invasive species within the study area. The key to this will be hygiene protocols for machinery, vehicles and personnel entering the area during works, particularly if they have come from a potentially weed-affected site or are leaving the site with contaminated soil present.

Several planning manuals provide guidance on appropriate management actions, which can be referred to develop site-specific prescriptions for any proposed works in the study area. 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.

Weed and disease management is not discussed further as recommended management actions for weed species are discussed extensively in H.B.M.I. (2012).

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 metres 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 metres 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).

Some vegetation types identified from the study area, namely DPU, DOV and DOB, are recognised as potentially moderately susceptible to PC, and the pathogen is known to occur in this part of the State. No convincing evidence of the pathogen was observed.

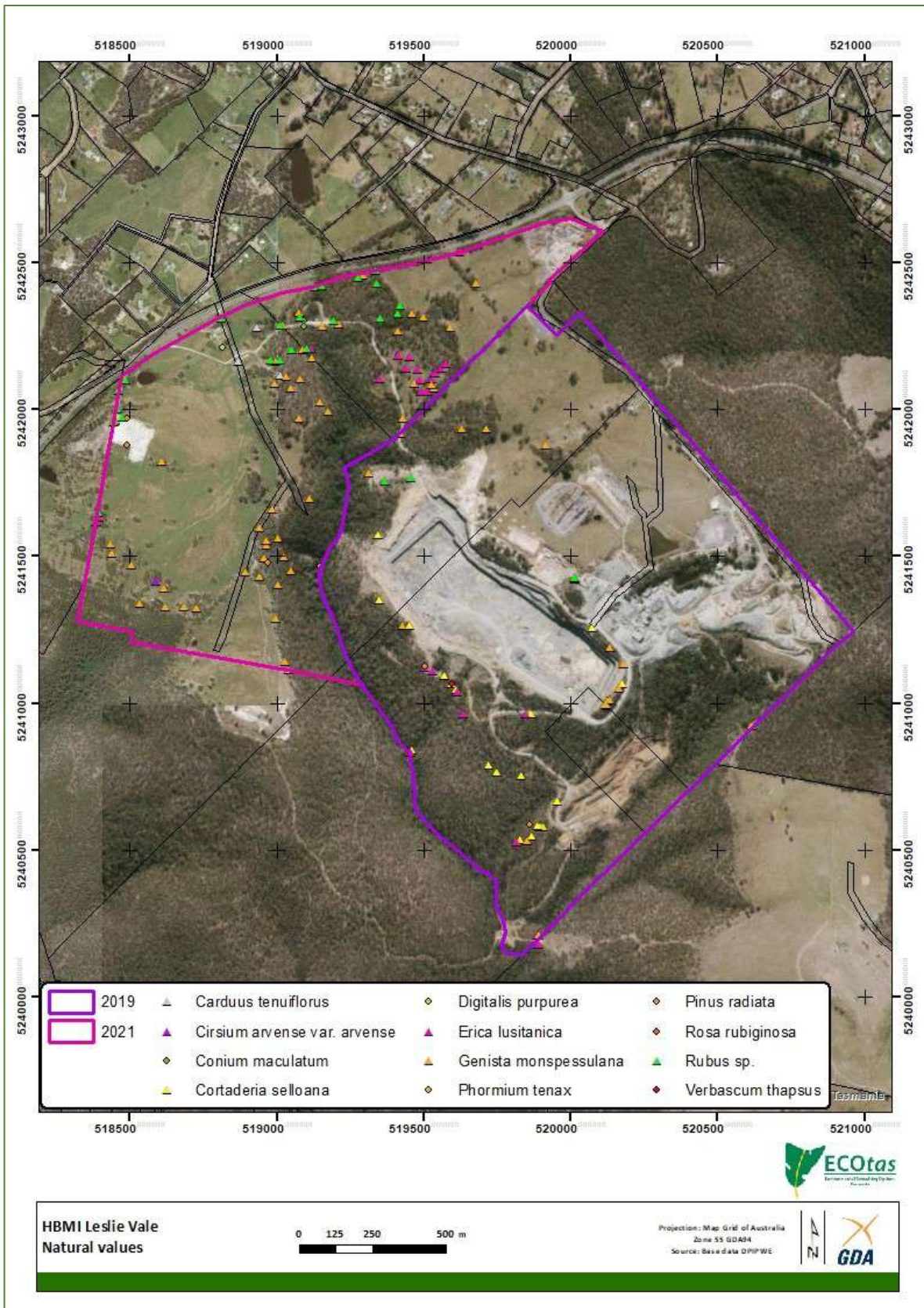


Figure 16. Indicative distribution of declared and environmental weeds (refer to GIS data for details)
 [triangle symbols – declared species]

Given the apparent pathogen-free status of the vegetation within the study area and the well-formed access roads and internal roads, special management within the study area should not be required if machinery and vehicles have come from a disease-free site.

Note that the publications listed under Weed species provide relevant planning information related to management of *Phytophthora cinnamomi* (PC). Note also that hygiene management is discussed extensively in H.B.M.I. (2012).

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. The longer-term management issue for the site is to ensure that any ornamental and/or rehabilitation plantings undertaken source plants from a reputable nursery free from the pathogen (such facilities are already subject to strict biosecurity legislation, policies and protocols).

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.

Chytrid has been recorded approximately 1.5 km to the northwest of the study area in the vicinity of Leslie Vale. The project area supports numerous defined drainage features that include the dams on the property that are ideal habitat for several frog species. It is recommended to assume that the disease is currently absent and to manage the area to minimise the risk of introducing the pathogen. At this site, the following specific actions are recommended:

- ensure that vehicles, machinery, equipment, materials and personnel adhere to the general hygiene protocols provided in *Keeping it Clean - A Tasmanian Field Hygiene Manual to Prevent the Spread of Freshwater Pests and Pathogens* (Allan & Gartenstein 2010);
- ensure that tracks are well-drained such that water does not pool for long periods, minimising the opportunity for the disease to establish and persist, and ensuring that frog species are restricted to non-anthropogenic habitats in the adjacent forest/natural streams; and
- ensure that the surface of any infrastructure sites is similarly appropriately drained to ensure no long-term pooling of water.

Hygiene management is discussed further in H.B.M.I. (2012).

Additional "Matters of National Environmental Significance" – Threatened Ecological Communities

CofA (2022) indicates that the following threatened ecological communities listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) are likely to, or may, occur within the area:

- Alpine Sphagnum Bogs and Associated Fens [Endangered]
- Giant Kelp Marine Forests of South East Australia [Endangered];
- Subtropical and Temperate Coastal Saltmarsh [Vulnerable];
- Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*) [Critically Endangered]; and
- Tasmanian White Gum (*Eucalyptus viminalis*) Wet Forest [Critically Endangered].

Existing vegetation mapping (Figure 8) indicates that there may be small areas of *Eucalyptus ovata* forest and woodland (TASVEG code: DOV) present, which can equate to *Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum* (*Eucalyptus ovata* / *E. brookeriana*) in certain circumstances. Site assessment confirmed eleven discrete patches of DOV, two of which are considered to equate to the EPBCA-listed entity.

DISCUSSION

Summary of key findings

Threatened flora

- No plant species listed as threatened on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA) were detected, or are known from database information, from the study area. Potential habitat for such species is limited.
- One plant species listed on the Tasmanian *Threatened Species Protection Act 1995* was detected as a consequence of the field survey, as follows:
 - *Epacris virgata* Kettering (pretty heath): listed vulnerable (Schedule 4), previously known from property and now known from several additional patches.

Threatened fauna

- Evidence of three threatened fauna species listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* was detected as a consequence of the field survey from within the study area, as follows:
 - *Sarcophilus harrisii* (Tasmanian devil): numerous scats on various internal tracks;
 - *Aquila audax* subsp. *fleayi* (Tasmanian wedge-tailed eagle): one known nest south of the property and two novel nests on the slopes above Mafeking Creek; and
 - *Accipiter novaehollandiae* (grey goshawk): novel nest on slopes above Mafeking Creek.
- Potential habitat is present for the above species and additional species, as follows:
 - *Dasyurus maculatus* subsp. *maculatus* (spotted-tailed quoll): potential habitat widespread;
 - *Dasyurus viverrinus* (eastern quoll): potential habitat widespread;
 - *Perameles gunnii* (eastern barred bandicoot): potential habitat widespread;
 - *Haliaeetus leucogaster* (white-bellied sea-eagle): widespread foraging habitat (albeit opportunistic) but limited potential nesting habitat;
 - *Tyto novaehollandiae* subsp. *castanops* (Tasmanian masked owl): potential foraging/range habitat widespread but potential nesting habitat limited to scattered mature trees with large hollows;
 - *Lathamus discolor* (swift parrot): potential foraging habitat present as scattered *Eucalyptus globulus* (blue gum) and patches of forest dominated by *Eucalyptus ovata* (black gum), the latter mapped as DOV, and limited potential nesting habitat in the form of scattered mature trees with hollows;
 - *Lissotes menalcas* (Mt Mangana stag beetle): potential habitat limited to the wet sclerophyll forests along Mafeking Creek; and
 - *Litoria raniformis* (green and golden frog): potential habitat in farm dams.

Vegetation types

- The study area supports the following TASVEG mapping units:
 - improved pasture with a native tree canopy (TASVEG code: FAC);
 - agricultural land (TASVEG code: FAG);
 - regenerating cleared land (TASVEG code: FRG);
 - extra-urban miscellaneous (TASVEG code: FUM);
 - weed infestation (TASVEG code: FWU);
 - urban areas (TASVEG code: FUR);
 - *Eucalyptus obliqua* dry forest (TASVEG code: DOB);
 - *Eucalyptus ovata* forest and woodland (TASVEG code: DOV);
 - *Eucalyptus pulchella* forest and woodland (TASVEG code: DPU);
 - *Eucalyptus obliqua* forest with broad-leaf shrubs (TASVEG code: WOB); and
 - water, sea (TASVEG code: OAQ).
- *Eucalyptus ovata* forest and woodland (TASVEG code: DOV) is identified as a threatened vegetation type on Schedule 3A of the Tasmanian *Nature Conservation Act 2002*.

- Two of the eleven patches of DOV equate to Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*), a threatened ecological community listed as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Weeds

- Numerous plant species classified as declared weeds within the meaning of the Tasmanian *Weed Management Act 1999* were detected or are known from the study area.
- Non-declared but potentially invasive species are common in the area.
- Weed and disease management is not discussed further as recommended management actions for these and other weed species are discussed extensively in H.B.M.I. (2012).
- GIS data is provided with this report of the new locations of invasive and potentially invasive weed species within the study area.

Plant disease

- No evidence of *Phytophthora cinnamomi* (PC, rootrot) was recorded from within the study area.
- No evidence of myrtle wilt was recorded from within the study area.
- No evidence of myrtle rust was recorded from within the study area.

Animal disease (chytrid)

- The study area is not known to support frog chytrid disease but there is potential habitat for amphibian species.
- Chytrid is known from approximately 1.5 km to the north of the study area.
- It is recommended to assume that the disease is currently absent and to manage the area to minimise the risk of introducing the pathogen – see also in H.B.M.I. (2012).

Recommendations

The recommendations provided below are a summary of those provided in relation to each of the ecological features described in the main report. The main text of the report provides the relevant context for the recommendations. It is recommended that this report be used to inform more detailed planning and targeted detailed surveys for any disturbance within native vegetation communities within the study area.

Vegetation types

In a general sense, it is recommended that the clearance and conversion and further disturbance of native vegetation should, where practical, be minimised as far within the study area.

Specifically, areas mapped as *Eucalyptus ovata* forest and woodland (TASVEG code: DOV), listed as threatened under Schedule 3A of the Tasmanian *Nature Conservation Act 2002*, and with some patches equating to Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata*/*E. brookeriana*), a threatened ecological community listed as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, should be excluded from any development, where practical, recognising the existing configuration of land uses has created a patchwork of different vegetation types not necessarily conducive to excluding all native vegetation (threatened or otherwise).

Where development includes a proposal to remove DOV (excluding those recognised at the EPBCA level), it is suggested that this be accompanied by an offset proposal that aims to achieve a net gain for DOV with a minimum offset ratio of 5:1.

Threatened flora

Epacris virgata Kettering (pretty heath) has been recorded from within the study the area in the past and a number of new sites were located during the current survey. Any works that result in it being "knowingly taken" will require a permit under Section 51 of the Tasmanian *Threatened Species Protection Act 1995*. In the first instance it is recommended to seek a solution that avoids direct impact on the species. However, where this cannot be accommodated, it should be acknowledged that minor loss of the species would not represent a significant impact at any reasonable scale, given the widely accepted conservation status of the species. It is recommended that the status of the species be confirmed prior to any works.

Threatened fauna

Evidence of three threatened fauna species, namely *Sarcophilus harrisi* (Tasmanian devil), *Aquila audax* subsp. *fleayi* (Tasmanian wedge-tailed eagle) and *Accipiter novaehollandiae* (grey goshawk), were detected as a consequence of the field survey from within the study area.

With specific relation to the swift parrot, it is recommended that:

- any areas mapped as DOV be excluded from development;
- wherever practical, individuals of *Eucalyptus globulus* (blue gum) and *Eucalyptus ovata* (black gum) are retained – this includes consideration of fenceline trees, paddock trees and copses;
- wherever practical, individuals of hollow-bearing trees are retained – this is also relevant to the masked owl; and
- where the above cannot be accommodated, further consideration of the implications under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* will be required on a case-by-case basis (recognising that the company has capacity for relevant and appropriate offsets at different scales).

With specific relation to the grey goshawk, it is recommended that:

- a ca. 100 m buffer be established around the nest site but that with such a buffer, no breeding season restrictions should need to be applied.

With specific relation to the Mt Mangana stag beetle, it is recommended that:

- potential habitat (WOB) be excluded from future clearance and conversion (but recognising that the habitat potentiality is highly variable and this can be clarified with more targeted surveys, if required).

With specific relation to the green and golden frog, it is recommended that:

- potential habitat (small farm dams) be excluded from development.

With specific relation to marsupial carnivores, it is recommended that:

- consider a dawn to dusk 40 km/h speed limit between the Huon Highway and the weighbridge, with dawn to dusk defined as one hour before and after, respectively, of sunrise/sunset times published by an official agency such as the Bureau of Meteorology (appropriate signage will be needed);

- consider erecting ca. 50-100 m sections of wallaby-proof fence on the verge of the access road adjacent to the two dams, with the objective of minimising direct road access by wildlife using the water sources;
- consider upgrading/maintaining the table drains on either side of the access road with the objective of keeping these flowing (i.e. not holding water, which is attractive to wildlife) and free of vegetation (i.e. "green pick", also attractive to wildlife) for ca. 3 m each side of the edge of the drain, the overall objective of minimising roadkill and attracting marsupial carnivores;
- consider use of pale road surfaces for any road upgrades (less attractive to wildlife); and
- where there will be clearance and conversion of native vegetation, a pre-clearance survey for dens is undertaken as close to the clearance date as practical and appropriate management established for any suspected/confirmed den sites.

With specific relation to the wedge-tailed eagle, it is recommended that:

- the site provides an opportunity to study the impacts of different types/intensities of activity on the breeding behaviour of the species and if the opportunity arises, collaboration with relevant researchers/specialists may be possible; and
- minimise the risk of inadvertent disturbance to nest trees on the slopes above Mafeking Creek by appropriate overburden/vegetation management on the upper slope.

Weed and disease management

It is recommended that specific weed management actions be incorporated into any operations plans due to the abundance of declared and environmental species across the study area.

Weed and disease management is not discussed further as recommended management actions for these and other weed species are discussed extensively in H.B.M.I. (2012).

Legislative and policy implications

It is unlikely that future proposals will require formal referral under the Commonwealth Department of Agriculture, Water and the Environment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* provided that future development avoids known fauna sites such as wedge-tailed eagle nests, potential habitat of the swift parrot and patches of *Eucalyptus ovata* forest and woodland (TASVEG code: DOV) that qualify as Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum (*Eucalyptus ovata* / *E. brookeriana*), listed as Critically Endangered under the Act.

Any action that includes "knowingly taking specimens of threatened flora" namely *Epacris virgata* Kettering (pretty heath) will require a formal permit application to the Conservation Assessments Section (CAS, DRNET) under Section 51 of the Tasmanian *Threatened Species Protection Act 1995* (TSPA).

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APPENDIX A. Vegetation community structure and composition

The tables below provide basic information on the structure and composition of the native vegetation mapping units identified from the study area.

<i>Eucalyptus obliqua</i> dry forest (TASVEG code: DOB)		
<p>DOB occurs on generally fertile and well-drained sites across the study area either occurring as a remnant community in the disturbed area in the vicinity of the processing plant or a gradational community between WOB and DPU as sites become more insolated and less fertile. DOB is characterised by a sedgy understorey with scattered shrubs and a multi-age tree canopy.</p> <p>DOB is also found in riparian areas where conditions are not moist enough for WOB (e.g. upper reaches of creek systems). DOB in the central northern survey area has been partially cleared in the past with scattered larger eucalypts (20 m tall, 5% cover) and a younger cohort of eucalypt regeneration.</p> <p>DOB is generally in good condition with few weed species noted due to the relative isolation of the areas such as above Mafeking Creek. However, the areas of DOB in the vicinity of the processing facility and in the paddock areas are in very poor condition with invasive weed species such as <i>Genista monspessulana</i> (canary broom) being common. No symptoms of <i>Phytophthora cinnamomi</i> (PC) were observed.</p>		
		
DOB in the centre of the study area		
Stratum	Height (m) Cover (%)	Species (underline = dominant, parentheses = sparse or occasional)
Trees	10-18 m 20%	<u><i>Eucalyptus obliqua</i></u> , (<i>Eucalyptus viminalis</i>), (<i>Eucalyptus pulchella</i>)
Trees/tall shrubs	4-8 m 10%	<u><i>Eucalyptus obliqua</i></u> , <i>Eucalyptus viminalis</i> , <i>Exocarpos cupressiformis</i> , <i>Banksia marginata</i> , <i>Leptospermum lanigerum</i> , <i>L. scoparium</i>
Shrubs	<3 m variable	<i>Epacris impressa</i> , <i>Pultenaea juniperina</i> , <i>Lomatia tinctoria</i> , <i>Pimelea nivea</i> , <i>Cassinia aculeata</i>
Grasses/Graminoids	<1.5 m 15-30%	<u><i>Lomandra longifolia</i></u> , <i>Rytidosperma</i> spp., <i>Poa</i> spp., <i>Gahnia grandis</i>
Herbs	5-10%	<i>Oxalis perennans</i> , <i>Viola hederacea</i>

***Eucalyptus ovata* forest and woodland (TASVEG code: DOV)**

DOV occurs as small remnants within the agricultural land that are highly disturbed with an understorey dominated by exotic grasses with some native graminoids. DOV is also found within the broader forest areas where drainage is impeded as small patches with two slightly larger areas found on the broad flat at the top of the slopes west of Mafeking Creek. Poorer drainage dictates the location of this community and it grades into DPU where drainage improves.

DOV is characterised, for the most part, by younger regrowth trees that are relatively even-aged (the exception is the central north remnant (Patch A) that has larger more mature trees) over a grassy/sedgy understorey. A large proportion of the areas have been impacted by grazing with altered shrub layers and exotic grasses present.

The condition of the DOV ranges from poor for the remnants (dominated by exotic grasses with weed covers typically >50%, limited to no native shrubs, saggs & sedges the main native element) with better condition DOV examples associated with the forest areas (native grass species present, a native shrub layer present that is still slightly modified, lower weed covers (<50%) with scattered weeds still present). No symptoms of *Phytophthora cinnamomi* (PC) were observed.

Only two of the DOV areas meet the criteria for the EPBCA listed Black Gum – Brookers Gum Forest/Woodland ecological community (Table 2 of main text).

Stratum	Height (m) Cover (%)	Species (<u>underline</u> = dominant, parentheses = sparse or occasional)
Trees	13-20 m 20-25%	<u><i>Eucalyptus ovata</i></u> , <i>Eucalyptus pulchella</i> , (<i>Eucalyptus viminalis</i>), (<i>Eucalyptus obliqua</i>)
Low shrubs	<1 m 0-10%	<u><i>Pultenaea juniperina</i></u> , <i>Acacia verticillata</i>
Tall shrubs	4-8 m 30%	<i>Banksia marginata</i> , <i>Exocarpos cupressiformis</i> , <i>Leptospermum lanigerum</i>
Grasses/Graminoids	20-70%	<i>Lomandra longifolia</i> , <i>Lepidosperma laterale</i> , <i>Lepidosperma elatius</i> , <i>Diplarrena moraea</i> , <i>Rytidosperma</i> spp., <i>Microlaena stipoides</i> , <i>Poa rodwayi</i>
Herbs	sparse	<i>Gonocarpus tetragynus</i> , <i>Viola hederacea</i>

Images below relate to Table 2 in main text.



DOV Patch A



DOV Patch B



DOV Patch C



DOV Patch H



DOV Patch I (fringing DOV woodland)



DOV northern section Patch J (note the dumping of scallop shells occurring)



DOV southern section Patch J

***Eucalyptus pulchella* forest and woodland (TASVEG code: DPU)**

DPU dominates the forested areas across both study areas. DPU is characterised by a tree layer dominated *E. pulchella* with scattered *E. viminalis* present. The understorey is variable with a diverse grassy understorey dominating, with sedges and shrubs dominating at sites where moisture and fertility increases. DPU is gradational with DOB as fertility and moisture availability increases. In areas where the community has been previously cleared or heavily disturbed adjacent to roads and the quarry sites, introduced grasses, herbs and shrubs are common.

DPU is variable in age structure: to the west of Mafeking Creek, it consists of younger regrowth forest and to the east of more multi-aged forest.

DPU ranges from very good condition with no weeds recorded in the undisturbed areas such as on the slopes above Mafeking Creek to very poor condition in highly disturbed areas with highly invasive weed species being present. No symptoms of *Phytophthora cinnamomi* (PC) were observed.



DPU in the south of the study area

Stratum	Height (m) Cover (%)	Species (<u>underline</u> = dominant, parentheses = sparse or occasional)
Trees	12-16 m 15%	<u><i>Eucalyptus pulchella</i></u> , (<i>Eucalyptus viminalis</i>), (<i>Eucalyptus obliqua</i>)
Tall shrubs	4-8 m 10%	<u><i>Eucalyptus pulchella</i></u> , <i>Exocarpos cupressiformis</i> , <i>Allocasuarina littoralis</i>
Shrubs	<2 m <10%	<i>Acacia genistifolia</i> , <i>Bursaria spinosa</i> , <i>Bedfordia salicina</i> , <i>Pultenaea juniperina</i> , <i>Epacris impressa</i> , <i>Leptospermum scoparium</i> , <i>Acacia melanoxylon</i> , <i>Hibbertia riparia</i>
Low shrubs	<0.5 m <10%	<i>Pimelea humilis</i> , <i>Styphelia humifusa</i> , <i>Acrotriche serrulata</i> , <i>Bossiaea prostrata</i>
Grasses/Graminoids	50%	<i>Austrostipa</i> spp., <i>Rytidosperma</i> spp., <i>Lepidosperma laterale</i> , <i>Lomandra longifolia</i> , <i>Diplarrena moraea</i> , <i>Tetrarrhena distichophylla</i>

***Eucalyptus obliqua* forest with broad-leaf shrubs (TASVEG code: WOB)**

WOB occurs as a narrow-band in the moist and fertile east and south-facing gullies associated with Mafeking Creek and associated unnamed streams and drainage lines. WOB is characterised by tall trees (c. 30-35 m) tall *Eucalyptus obliqua* (stringybark) with scattered *E. globulus* (blue gum) over a tall shrub layer generally dominated by *Pomaderris apetala* (dogwood) or on the slightly drier upper slopes by *Bedfordia salicaria* (blanketleaf). The understorey is dominated by fern species. WOB is gradational with DOB (see above) as moisture availability decreases and insolation increases.

WOB is very good condition with only a few opportunistic weed species noted.



WOB to the east of the red gravel pit in the east of the study area

Stratum	Height (m) Cover (%)	Species (<u>underline</u> = dominant, parentheses = sparse or occasional)
Trees	20-30 m 25%	<u><i>Eucalyptus obliqua</i></u> , <i>Eucalyptus globulus</i> , (<i>Eucalyptus viminalis</i>) [on western slopes, there is an average 20% <i>E. globulus</i> with some patches where locally dominant but not large enough area to map out as WGL]
Trees	16 m 10%	<u><i>Eucalyptus obliqua</i></u> , (<i>Eucalyptus globulus</i>), <i>Acacia dealbata</i>
Tall shrubs	5-10 m 35%	<u><i>Pomaderris apetala</i></u> , <i>Bedfordia salicina</i> , <u><i>Beyeria viscosa</i></u> , <i>Olearia argophylla</i> , (<i>Leptospermum lanigerum</i>)
Shrubs	<4 m <30%	<i>Bedfordia salicina</i> , <i>Coprosma quadrifida</i>
Grasses/Graminoids	<3 m 30%	<i>Lepidosperma elatius</i> , <i>Lomandra longifolia</i>
Ferns	<3 m 20%	<i>Dicksonia antarctica</i> , <u><i>Polystichum proliferum</i></u> , (<i>Pteridium esculentum</i>), <i>Histiopteris incisa</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 2022+) 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 within meaning of *Tasmanian Weed Management Act 1999* (*Tasmanian Biosecurity Act 2019*);

TSPA = *Tasmanian Threatened Species Protection Act 1995* (status shown)

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

STATUS	ORDER			
	DICOTYLEDONAE	MONOCOTYLEDONAE	GYMNOSPERMAE	PTERIDOPHYTA
	66	22	-	10
e	10	-	-	-
i	48	18	1	-
Sum	124	40	1	10
TOTAL	175			

DICOTYLEDONAE

ACANTHACEAE

i *Acanthus mollis* bears breeches

APIACEAE

i *Conium maculatum* hemlock

i *Foeniculum vulgare* fennel DW

APOCYNACEAE

i *Vinca major* blue periwinkle

ARALIACEAE

Hydrocotyle hirta hairy pennywort

ASTERACEAE

e *Bedfordia salicina* tasmanian blanketleaf

i *Carduus tenuiflorus* winged thistle DW

Cassinia aculeata subsp. *aculeata* common dollybush

i *Cirsium vulgare* spear thistle

Coronidium scorpioides curling everlasting

i *Dimorphotheca fruticosa* trailing daisy

i *Hypochaeris glabra* smooth catsear

i *Hypochaeris radicata* rough catsear

i *Leontodon saxatilis* hairy hawkbit

Leptorhynchus squamatus subsp. *squamatus* scaly buttons

Olearia argophylla musk daisybush

e *Olearia ericoides* heathy daisybush

Olearia floribunda flowery daisybush

Olearia ramulosa twiggy daisybush

Olearia viscosa viscid daisybush

Ozothamnus ferrugineus tree everlastingbush

Senecio biserratus jagged fireweed

Senecio linearifolius var. *linearifolius* common fireweed groundsel

i *Silybum marianum* variegated thistle

i *Sonchus asper* prickly sowthistle

i *Sonchus oleraceus* common sowthistle

i *Taraxacum officinale* common dandelion

BORAGINACEAE

i *Echium plantagineum* patersons curse DW

BRASSICACEAE		
i	<i>Raphanus raphanistrum</i>	wild radish
CAMPANULACEAE		
	<i>Wahlenbergia gracilis</i>	sprawling bluebell
CARYOPHYLLACEAE		
i	<i>Cerastium glomeratum</i>	sticky mouse-ear
i	<i>Stellaria media</i>	garden chickweed
CASUARINACEAE		
	<i>Allocasuarina littoralis</i>	black sheoak
CONVOLVULACEAE		
	<i>Dichondra repens</i>	kidneyweed
DILLENIACEAE		
	<i>Hibbertia appressa</i>	southern guineaflower
	<i>Hibbertia riparia</i>	erect guineaflower
ERICACEAE		
	<i>Acrotriche serrulata</i>	ants delight
	<i>Epacris impressa</i>	common heath
e	<i>Epacris virgata</i> Kettering	pretty heath
i	<i>Erica lusitanica</i>	spanish heath
	<i>Leucopogon collinus</i>	white beardheath
	<i>Lissanthe strigosa</i> subsp. <i>subulata</i>	peachberry heath
	<i>Styphelia humifusa</i>	native cranberry
EUPHORBIACEAE		
	<i>Beyeria viscosa</i>	pinkwood
i	<i>Euphorbia helioscopia</i>	sun spurge
FABACEAE		
	<i>Acacia dealbata</i> subsp. <i>dealbata</i>	silver wattle
	<i>Acacia genistifolia</i>	spreading wattle
	<i>Acacia melanoxylon</i>	blackwood
e	<i>Acacia mucronata</i> subsp. <i>mucronata</i>	erect caterpillar wattle
	<i>Acacia myrtifolia</i>	redstem wattle
	<i>Acacia verticillata</i> subsp. <i>verticillata</i>	prickly moses
	<i>Bossiaea prostrata</i>	creeping bossia
	<i>Daviesia sejugata</i>	leafy spiky bitterpea
i	<i>Genista monspessulana</i>	montpellier broom
i	<i>Lupinus arboreus</i>	tree lupin
i	<i>Medicago polymorpha</i>	burr medick
	<i>Pultenaea daphnoides</i>	heartleaf bushpea
	<i>Pultenaea gunnii</i> subsp. <i>gunnii</i>	golden bushpea
	<i>Pultenaea juniperina</i>	prickly beauty
	<i>Sphaerolobium minus</i>	eastern globepea
i	<i>Trifolium repens</i>	white clover
i	<i>Trifolium subterraneum</i>	subterranean clover
i	<i>Ulex europaeus</i>	gorse
i	<i>Vicia sativa</i> subsp. <i>sativa</i>	common vetch
GENTIANACEAE		
i	<i>Centaurium erythraea</i>	common centaury
GERANIACEAE		
i	<i>Erodium cicutarium</i>	common heronsbill
GOODENIACEAE		
	<i>Goodenia lanata</i>	trailing native-primrose
	<i>Goodenia ovata</i>	hop native-primrose
HALORAGACEAE		
	<i>Gonocarpus tetragynus</i>	common raspwort
	<i>Gonocarpus teucrioides</i>	forest raspwort
HYPERICACEAE		
	<i>Hypericum japonicum</i>	matted st johns-wort
LAMIACEAE		
i	<i>Marrubium vulgare</i>	white horehound
	<i>Prostanthera lasianthos</i> var. <i>lasianthos</i>	christmas mintbush
LAURACEAE		
	<i>Cassytha pubescens</i>	downy dodderlaurel
LINACEAE		
it	<i>Linum catharticum</i>	purging flax
MALVACEAE		
i	<i>Malva sylvestris</i>	tall mallow

MYRSINACEAE

i *Lysimachia arvensis* scarlet pimpernel

MYRTACEAE

Eucalyptus globulus subsp. *globulus* tasmanian blue gum
Eucalyptus obliqua stringybark
Eucalyptus ovata var. *ovata* black gum
e *Eucalyptus pulchella* white peppermint
Eucalyptus viminalis subsp. *viminalis* white gum
Leptospermum lanigerum woolly teatree
Leptospermum scoparium common teatree

OLEACEAE

Notelaea ligustrina native olive

PAPAVERACEAE

i *Fumaria muralis* subsp. *muralis* wall fumitory

PITTOSPORACEAE

e *Billardiera longiflora* purple appleberry
Bursaria spinosa subsp. *spinosa* prickly box
Pittosporum bicolor cheesewood

PLANTAGINACEAE

i *Digitalis purpurea* foxglove
i *Plantago coronopus* subsp. *coronopus* slender buckshorn plantain
i *Plantago lanceolata* ribwort plantain
i *Plantago major* great plantain
Plantago varia variable plantain
e *Veronica formosa* common speedwell bush

POLYGALACEAE

Comesperma volubile blue lovecreeper

POLYGONACEAE

i *Acetosella vulgaris* sheep sorrel
i *Polygonum aviculare* creeping wireweed
i *Rumex crispus* curled dock

PROTEACEAE

Banksia marginata silver banksia
e *Hakea epiglottis* subsp. *epiglottis* beaked needlebush
e *Lomatia tinctoria* guitarplant

RANUNCULACEAE

Clematis aristata mountain clematis
i *Ranunculus repens* creeping buttercup

RESEDACEAE

i *Reseda luteola* weld

RHAMNACEAE

Pomaderris apetala subsp. *apetala* common dogwood
Pomaderris elliptica var. *elliptica* yellow dogwood

ROSACEAE

Acaena novae-zelandiae common buzzy
i *Cotoneaster glaucophyllus* var. *serotinus* largeleaf cotoneaster
i *Potentilla recta* upright cinquefoil
i *Rosa rubiginosa* sweet briar
i *Rubus anglocandicans* blackberry DW

RUBIACEAE

Coprosma hirtella coffeeberry
Coprosma quadrifida native currant

RUTACEAE

Correa reflexa var. *reflexa* common correa

SANTALACEAE

Exocarpos cupressiformis common native-cherry
Leptomeria drupacea erect currantbush

SCROPHULARIACEAE

i *Verbascum thapsus* great mullein

SOLANACEAE

Solanum laciniatum kangaroo apple

STYLIDIACEAE

Stylidium graminifolium narrowleaf triggerplant

THYMELAEACEAE

Pimelea drupacea cherry riceflower
Pimelea humilis dwarf riceflower

e	<i>Pimelea nivea</i>	bushmans bootlace	
	VIOLACEAE		
	<i>Viola hederacea</i> subsp. <i>hederacea</i>	ivy leaf violet	
	GYMNOSPERMAE		
	PINACEAE		
i	<i>Pinus radiata</i>	radiata pine	
	MONOCOTYLEDONAE		
	AMARYLLIDACEAE		
	<i>Dianella revoluta</i> var. <i>revoluta</i>	spreading flaxlily	
	<i>Dianella tasmanica</i>	forest flaxlily	
	ASPARAGACEAE		
	<i>Arthropodium milleflorum</i>	pale vanilla-lily	
	<i>Lomandra longifolia</i>	sagg	
	ASPHODELACEAE		
	<i>Bulbine glauca</i>	bluish bulbine-lily	
i	<i>Phormium tenax</i>	new zealand flax	
	CYPERACEAE		
i	<i>Carex flacca</i>	blue sedge	
	<i>Eleocharis acuta</i>	common spikesedge	
	<i>Gahnia grandis</i>	cutting grass	
	<i>Lepidosperma elatius</i>	tall sword sedge	
	<i>Lepidosperma laterale</i>	variable sword sedge	
	<i>Schoenus apogon</i>	common bog sedge	
	HYPOXIDACEAE		
	<i>Hypoxis hygrometrica</i> var. <i>hygrometrica</i>	golden weatherglass	
	IRIDACEAE		
	<i>Diplarrena moraea</i>	white flag-iris	
	JUNCACEAE		
	<i>Juncus bufonius</i>	toad rush	
	<i>Juncus pallidus</i>	pale rush	
	<i>Juncus procerus</i>	tall rush	
	ORCHIDACEAE		
e	<i>Chiloglottis triceratops</i>	threehorned bird-orchid	
	<i>Thelymitra arenaria</i>	forest sun-orchid	
	<i>Thelymitra ixioides</i>	spotted sun-orchid	
	<i>Thelymitra peniculata</i>	trim sun-orchid	
	POACEAE		
i	<i>Agrostis capillaris</i>	browntop bent	
i	<i>Aira caryophyllea</i> subsp. <i>caryophyllea</i>	silvery hairgrass	
i	<i>Anthoxanthum odoratum</i>	sweet vernalgrass	
	<i>Austrostipa mollis</i>	soft speargrass	
i	<i>Avena sativa</i>	cereal oat	
i	<i>Bromus catharticus</i>	prairie grass	
i	<i>Bromus hordeaceus</i>	soft brome	
i	<i>Cortaderia selloana</i>	silver pampasgrass	DW
i	<i>Dactylis glomerata</i>	cocksfoot	
i	<i>Holcus lanatus</i>	yorkshire fog	
i	<i>Lolium perenne</i>	perennial ryegrass	
i	<i>Phalaris aquatica</i>	toowoomba canarygrass	
i	<i>Poa annua</i>	winter grass	
	<i>Poa labillardierei</i> var. <i>labillardierei</i>	silver tussockgrass	
	<i>Poa sieberiana</i> var. <i>sieberiana</i>	grey tussockgrass	
	<i>Poa tenera</i>	scrambling tussockgrass	
	<i>Tetrarrhena distichophylla</i>	hairy ricegrass	
	<i>Themeda triandra</i>	kangaroo grass	
i	<i>Vulpia bromoides</i>	squirreltail fescue	
	PTERIDOPHYTA		
	ASPLENIACEAE		
	<i>Asplenium flabellifolium</i>	necklace fern	
	BLECHNACEAE		
	<i>Blechnum nudum</i>	fishbone waterfern	
	DENNSTAEDTIACEAE		
	<i>Histiopteris incisa</i>	batswing fern	

<i>Pteridium esculentum</i> subsp. <i>esculentum</i>	bracken
DICKSONIACEAE	
<i>Dicksonia antarctica</i>	soft treefern
DRYOPTERIDACEAE	
<i>Polystichum proliferum</i>	mother shieldfern
<i>Rumohra adiantiformis</i>	leathery shieldfern
HYMENOPHYLLACEAE	
<i>Hymenophyllum cupressiforme</i>	common filmyfern
<i>Hymenophyllum flabellatum</i>	shiny filmyfern
POLYPODIACEAE	
<i>Microsorium pustulatum</i> subsp. <i>pustulatum</i>	kangaroo fern

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.

Table C1. Threatened flora records from within 5,000 m of boundary of the 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 DNRET's *Natural Values Atlas* (DNRET 2022) 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 (2022).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
<i>Allocasuarina duncanii</i> conical sheoak	r -	<i>Allocasuarina duncanii</i> is strongly associated with dolerite rock plates or shallow soils over dolerite, where it occurs in monotypic stands or in association with <i>Eucalyptus delegatensis</i> or <i>E. coccifera</i> . Two small sites are on quartzitic sandstone. The species is found from 230-1,000 m a.s.l. with most sites above 500 m.	Potential habitat marginally present. This species was not located (no seasonal constraint on detection or identification).
<i>Amphibromus neesii</i> southern swampgrass	r -	<i>Amphibromus neesii</i> is found in damp ground around marshes, lagoons, river flats, pools and streams.	Potential habitat marginally present around the dams in the study area. This species was not located (no seasonal constraint on detection or identification).
<i>Australina pusilla</i> subsp. <i>muelleri</i> large shade nettle	r -	<i>Australina pusilla</i> subsp. <i>muelleri</i> is known from the southern flanks of Mount Wellington in deeply-shaded gullies within wet eucalypt forest, and from King Island where it grows in association with <i>Australina pusilla</i> subsp. <i>pusilla</i> along stream flats in blackwood swamp forest.	Potential habitat is present in wet forest along Mafeking Creek (albeit atypical of known sites in Tasmania). This species was not detected (no seasonal constraint on detection or identification).
<i>Caladenia caudata</i> tailed spider-orchid	v VU #	<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 (atypical of known sites).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
<i>Caladenia filamentosa</i> daddy longlegs	r -	<i>Caladenia filamentosa</i> occurs in lowland heathy and sedgy eucalypt forest and woodland on sandy soils.	Potential habitat absent (atypical of known sites).
<i>Caladenia sylvicola</i> forest fingers	e CR #	<i>Caladenia sylvicola</i> has only been found in dry forest adjacent to Huon Road, near Hobart. One site is on a highly insolated hillside on well-drained gravelly loam overlying mudstone in heathy/shrubby <i>Eucalyptus tenuiramis</i> forest at about 240 m a.s.l. A second site is at slightly lower elevation (160 m a.s.l.) on a moist, sheltered slope (on a similar substrate), growing among leaf litter and dense shrubs in <i>E. obliqua</i> dry sclerophyll forest.	Potential habitat absent.
<i>Centropappus brunonis</i> (syn. <i>Brachyglottis brunonis</i>) tasmanian daisytree	r -	<i>Brachyglottis brunonis</i> is known from scattered colonies on the Wellington Range and Mt Dromedary. It grows in shrubby woodland/forest dominated by <i>Eucalyptus delegatensis</i> (at mid altitudes) and by <i>E. coccifera</i> and <i>E. urnigera</i> (at higher altitudes). It typically occurs on dolerite talus but also occurs on poorly-drained sandstone shelves.	Potential habitat absent.
<i>Colobanthus curtisiae</i> grassland cupflower	r VU # only	<i>Colobanthus curtisiae</i> occurs in lowland grasslands and grassy woodlands but is also prevalent on rocky outcrops and margins of forest on dolerite on the Central Highlands (including disturbed sites such as log landings and snig tracks).	Potential habitat absent.
<i>Comesperma defoliatum</i> leafless milkwort	r -	<i>Comesperma defoliatum</i> occurs in wet heathland/sedgeland, buttongrass moorland, coastal low scrub and on the crests of dunes. It has also been recorded from flat alkaline pans. The predominant substrates include peat, quartzite and sand.	Potential habitat absent.
<i>Discaria pubescens</i> spiky anchorplant	e -	<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 marginally present (albeit atypical of known sites in Tasmania). This species was not detected (no seasonal constraint on detection or identification).
<i>Dianella amoena</i> grassland flaxlily	r EN # only	<i>Dianella amoena</i> occurs mainly in the northern and southern Midlands, where it grows in native grasslands and grassy woodlands.	Potential habitat absent (atypical of known sites). This species was not detected (no seasonal constraint on detection or identification).
<i>Diuris palustris</i> swamp doubletail	e -	<i>Diuris palustris</i> occurs in coastal areas in grassy open eucalypt forest, sedgy grassland and heathland with	Potential habitat absent.

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
		<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.	
<i>Dryopoa dives</i> tasmanian giant mountaingrass	r -	<i>Dryopoa dives</i> occurs on Snug Plains in wet or damp sclerophyll forest, teatree scrub and sedgeland, often on the edge of animal or vehicular tracks. Typically, it occurs within clumps of <i>Gahnia grandis</i> (cutting grass) in the ecotone between heathy moorlands and damp sclerophyll forest. Some occurrences are associated with old sawmill sites.	Potential habitat absent.
<i>Epacris virgata</i> Kettering pretty heath	v EN #	<i>Epacris virgata</i> (Kettering) occurs among foothills in southeastern Tasmania in dry sclerophyll forest on hilly terrain at elevations of 10-300 m a.s.l., mainly on dolerite, though sometimes close to the geological boundary of dolerite and Permian mudstone. It is generally associated with grassy/heathy <i>Eucalyptus ovata</i> woodland/forest, but is also occasionally found in grassy/heathy <i>E. pulchella</i> woodland/forest.	Refer to FINDINGS Plant species Threatened flora known from the study area for more details.
<i>Lachnagrostis robusta</i> tall blowgrass	r -	<i>Lachnagrostis robusta</i> occurs in saline situations such as the margins of coastal and inland saline lagoons	Potential habitat absent.
<i>Lepidium hyssopifolium</i> soft peppercress	e EN # 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 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 metres 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.	Potential habitat marginally present but localised and atypical of most known sites. This species not detected (no seasonal constraint on detection or identification).
<i>Lepidosperma tortuosum</i> twisting rapiersedge	r -	<i>Lepidosperma tortuosum</i> occurs in heathland and heathy woodland, in lowland sites, mainly in eastern parts of the State. It often occurs in the sedgier (peatier) parts of dry heathland. It can occur on a range of substrates.	Potential habitat marginally present (albeit atypical of most known sites). This species not detected (no seasonal constraint on detection or identification).
<i>Poa mollis</i> soft tussockgrass	r -	<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 marginally present (albeit atypical of known sites in Tasmania). This species was not detected (no seasonal constraint on detection or identification).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
<i>Pomaderris elachophylla</i> small-leaf dogwood	v -	<i>Pomaderris elachophylla</i> occurs in a range of forested habitats from shrubby riparian forests along major rivers (e.g. Derwent River) and heathy/shrubby forests in the northeast on granitic soils. It can proliferate on disturbed sites such as firebreaks, tracks and powerline easements.	Potential habitat present in limited parts of the study area. This species was not detected (no seasonal constraint on detection or identification).
<i>Prasophyllum amoenum</i> dainty leek-orchid	v EN # only	<i>Prasophyllum amoenum</i> has been recorded from Snug Tiers and Mt Wellington. At Snug Tiers the species occurs in sedgy buttongrass moorland and heath, and also in openings in eucalypt woodland and scrub on damp stony loam. On Mt Wellington the species is found in and near cushion plants in alpine moorland.	Potential habitat absent.
<i>Prasophyllum apoxychilum</i> tapered leek-orchid	v EN # only	<i>Prasophyllum apoxychilum</i> is restricted to eastern and northeastern Tasmania where it occurs in coastal heathland or grassy and scrubby open eucalypt forest on sandy and clay loams, often among rocks. It occurs at a range of elevations and seems to be strongly associated with dolerite in the east and southeast of its range.	Potential habitat marginally present, albeit atypical of known sites in southeastern Tasmania. Several of the surveys were within the peak flowering period of spring-summer (Wapstra 2018) but further targeted-timed surveys are not considered warranted because of the statistically very low likelihood of the species being present.
<i>Prostanthera rotundifolia</i> roundleaf mintbush	v -	<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.	Only listed in databases because of ornamental and/or escaped plants. Southern Tasmanian is well outside the natural range. This species not detected (no seasonal constraint on detection or identification).
<i>Pterostylis squamata</i> ruddy greenhood	v -	<i>Pterostylis squamata</i> occurs in heathy and grassy open eucalypt forest, woodland and heathland on well-drained sandy and clay loams.	Potential habitat marginally present, albeit atypical of known sites in southeastern Tasmania. Surveys were outside the peak flowering period of spring-summer (Wapstra 2018) but further targeted-timed surveys are not considered warranted because of the statistically very low likelihood of the species being present.
<i>Senecio longipilus</i> longhair fireweed	v -	In Tasmania, the two presumed extinct sites are in lowland locations and the St Patricks Plains site occurs in herb-rich <i>Poa</i> -dominated native grassland on basalt at an elevation of 870 m.	Potential habitat absent.
<i>Senecio squarrosus</i> leafy fireweed	r -	<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 present. This species was not detected (no seasonal constraint on detection or identification).
<i>Thelymitra atronitida</i> blackhood sun-orchid	e -	<i>Thelymitra atronitida</i> has been recorded from near-coastal heathland, sedgeland and open heathy/sedgy eucalypt woodland on relatively poorly-drained	Potential habitat absent.

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
		sandy loams. The altitude range of known sites is 10-120 m a.s.l.	
<i>Thelymitra inflata</i> Inflated sun-orchid	e -	Jeanes (2004) described the habitat of <i>Thelymitra inflata</i> as "...usually...dry to moist woodlands and open forests, often in disturbed, winter-wet sites on clay loam soils" and the elevation range as "10-350 m". On that basis, potential habitat in Tasmania is widespread. However, despite the distinctiveness of the species, it has been recorded only twice (16 Dec. 1992, Ridgeway Park, near Mount Wellington, M. Wapstra & 20 Nov. 1991, Leslie Hill, near Longley, A. Moscal). The habitat of the Ridgeway site is sedgy-heathy <i>Eucalyptus pulchella</i> forest and woodland on clay loam soils derived from Jurassic dolerite, with the species present in the areas of slightly impeded drainage on a saddle of a long insolated ridge at about 330-350 m a.s.l., with infrequent fires resulting in the saddle vegetation becoming quite dense since the time of discovery (recently burnt at that time).	Potential habitat possibly present. Some surveys have been within the peak flowering period of November to December (Wapstra 2018) but further targeted-timed surveys are not considered warranted because of the statistically very low likelihood of the species being present.
<i>Thelymitra malvina</i> mauветuft sun-orchid	e -	<i>Thelymitra malvina</i> has been recorded from coastal heath and sedgeland on sandy loams or clay loams at low elevations.	Potential habitat absent.
<i>Westringia angustifolia</i> narrowleaf westringia	r -	<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 present within forest areas across the study area on dolerite. This species was not detected (no seasonal constraint on detection or identification).
<i>Xerochrysum palustre</i> swamp everlasting	v VU # 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 (except perhaps associated with existing small farm dams). This species was not detected (no seasonal constraint on detection or identification).

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 the 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 DNRET's *Natural Values Atlas* (DNRET 2022), Bryant & Jackson (1999) and FPA (2022); marine, wholly pelagic and littoral species such as marine mammals, fish and offshore seabirds are excluded. Species marked with # are listed in CofA (2022).

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
<i>Accipiter novaehollandiae</i> grey goshawk	e -	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.).	Refer to FINDINGS Fauna species for more detail.
<i>Ammoniropa vigens</i> ammonite pinwheel snail	e CR	Potential habitat is dry and wet eucalypt forests on dolerite in the Hobart lowlands (all below 400 m a.s.l.).	Potential habitat very marginally present, however, there are no records within 5 km of the study area. This species is not considered further. Listed in DNRET (2022) as <i>Discocharopa vigens</i> .
<i>Antipodia chaostola</i> tax. <i>leucophaea</i> chaostola skipper	e EN #	Potential habitat is dry forest and woodland supporting <i>Gahnia radula</i> (usually on sandstone and other sedimentary rock types) or <i>Gahnia microstachya</i> (usually on granite-based substrates).	Potential habitat absent. <i>Gahnia radula</i> is absent.
<i>Aquila audax</i> subsp. <i>fleayi</i> Tasmanian wedge-tailed eagle	e EN #	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. 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	Refer to FINDINGS Fauna species for more detail.

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
		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.	
<i>Botaurus poiciloptilus</i> Australasian bittern	- EN # only	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. Small farms dams do not provide suitable habitat.
<i>Ceyx azureus</i> subsp. <i>diemenensis</i> Tasmanian azure kingfisher	e EN #	Potential habitat comprises potential foraging habitat and potential breeding habitat. 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 (Mafeking Creek is too heavily forested). Listed in DNRET (2022) as <i>Alcedo azurea</i> subsp. <i>diemenensi</i> .
<i>Dasyurus maculatus</i> subsp. <i>maculatus</i> spotted-tailed quoll	r VU #	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.	Refer to FINDINGS Fauna species for more detail.
<i>Dasyurus viverrinus</i> eastern quoll	- EN #	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.	Refer to FINDINGS Fauna species for more detail.
<i>Exquisitiropa agnewi</i> silky pinwheel snail	r -	Potential habitat is between 600 and 1000 m a.s.l. on the eastern slopes of Mount Wellington generally in subalpine vegetation and boulderfields.	Potential habitat absent. Listed in DNRET (2022) as <i>Roblinella agnewi</i> .

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
<i>Haliaeetus leucogaster</i> white-bellied sea-eagle	v -	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.	Refer to FINDINGS Fauna species for more detail.
<i>Hirundapus caudacutus</i> white-throated needletail	- VU #	Occasional non-breeding migrant to Tasmania only.	Potential habitat widespread but this is an aerially-foraging bird that rarely lands. No significant impact on this aspect of the species' life history is anticipated.
<i>Lathamus discolor</i> swift parrot	e CR #	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.	Refer to FINDINGS Fauna species for more detail.
<i>Lissotes menalcas</i> mount mangana stag beetle	v -	Potential habitat ranges from patches of wet forest within dry eucalypt forest (especially drainage lines and wet gullies) to wet eucalypt forest and rainforest, noting that areas where logs occupy more than 10% of the forest floor are preferred.	Refer to FINDINGS Fauna species for more detail.
<i>Litoria raniformis</i> green and golden frog	v VU #	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.	Refer to FINDINGS Fauna species for more detail.
<i>Pardalotus quadragintus</i> forty-spotted pardalote	e EN #	Potential habitat is any forest and woodland supporting <i>Eucalyptus viminalis</i> (white gum) where the canopy cover of <i>E. viminalis</i> is greater than or equal to 10% or where <i>E. viminalis</i> occurs as a localised canopy dominant or co-dominant in patches exceeding 0.25 ha.	Potential habitat absent. <i>Eucalyptus viminalis</i> is a minor canopy species but nowhere dominant.

Scientific name Common name	Status TSPA EPBCA	Tasmanian habitat description (and distribution)	Comments on project area and database records
<i>Perameles gunnii</i> subsp. <i>gunnii</i> eastern barred bandicoot	- VU #	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.	Refer to FINDINGS Fauna species for more detail.
<i>Prototroctes maraena</i> Australian grayling	v VU #	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 very marginally present within Mafeking Creek, however, this tributary forms the boundary of the study area and disturbance in the future is unlikely.
<i>Pseudemoia pagenstecheri</i> tussock skink	v -	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. Native grasslands are not present.
<i>Sarcophilus harrisi</i> Tasmanian devil	e EN #	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 ²). Significant habitat is 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.	Refer to FINDINGS Fauna species for more detail.
<i>Tyto novaehollandiae</i> subsp. <i>castanops</i> Tasmanian masked owl	e VU #	Potential habitat of is all areas with trees with large hollows (≥15 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 for the masked owl is any areas within the core range of native dry forest with trees over 100 cm dbh with large hollows (≥15 cm entrance diameter).	Refer to FINDINGS Fauna species for more detail.

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

Appended as pdf file.

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

Appended as pdf file.

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

Appended as pdf file.

ATTACHMENTS

- .shp file of revised vegetation mapping
- .shp file of locations of *Epacris virgata* Kettering
- .shp file of locations of weeds