ecology & heritage partners

Final Report

Targeted Significant Flora and Fauna Surveys, Bennett Road Development Plan, Victoria

Prepared for

G2 Urban Planning

November 2021

Ecology and Heritage Partners Pty Ltd

MELBOURNE: 292 Mt Alexander Road, Ascot Vale VIC 3032 **GEELONG:** 230 Latrobe Terrace, Geelong West Vic 3218
BRISBANE: Level 22, 127 Creek Street, Brisbane QLD 4000 **ADELAIDE**: 22 Greenhill Road, Wayville SA 5034
CANBERRA: PO Box 6067, O'Connor ACT 2602 **SYDNEY:** Level 5, 616 Harris Street, Ultimo, NSW, 2007
www.ehpartners.com.au | (03) 9377 0100

DOCUMENT CONTROL

Assessment	Targeted significant flora and fauna surveys
Address	Bennett Road Development Plan, Victoria
Project number	15768
Project manager	Emma Keith (Botanist)
Report reviewer	Aaron Organ (Director / Principal Ecologist)
Other EHP staff	Jared McGuiness (Consultant Botanist), Gemma Tomkins (Botanist), Callum Luke (Consultant Zoologist); Sara Petrovic (Field Ecologist)
Mapping	Dr Monique Elsley (GIS Coordinator)
File name	15768_TargetedSurveys_BennettRoad_Gisborne_Final_05112021
Client	G2 Urban Planning
Bioregion	Victorian Volcanic Plain
CMA	Port Phillip and Westernport
Council	Macedon Ranges Shire Council

Report versions	Comments by	Comments updated by	Date submitted
Draft	-	-	19/01/2021
Final	Damian Loughnan	EK	11/02/2021
Final	-	SP	5/11/2021

Acknowledgements

We thank the following people for their contribution to the project:

- Damian Loughnan, who provided landholder liaison and access to the properties throughout the study area; and,
- The Victorian Department of Environment, Land, Water and Planning for access to ecological databases.

SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was engaged by G2 Urban Planning to undertake targeted surveys for significant flora and fauna species, including Matted Flax-lily, Swamp Everlasting, Swamp Fireweed, Growling Grass Frog and Golden Sun Moth as part of the Bennett Road Development Plan, Victoria. The targeted surveys were required to determine the presence or absence of nationally significant species to inform the preparation of the Bennett Road Development Plan and to outline any implications under Commonwealth and State environmental legislation.

Methods

Flora

Targeted surveys for nationally significant Matted Flax-lily, Swamp Everlasting and Swamp Fireweed were conducted by qualified ecologists across multiple days between 2 November 2020 and 9 December 2020. Targeted surveys focused on suitable habitat identified within the study area during the preliminary flora and fauna assessment.

Terrestrial Fauna

Targeted surveys for nationally significant Growling Grass Frog and Golden Sun Moth were conducted by qualified zoologists in November and December 2020. Surveys were conducted in accordance with approved methods identified within the Biodiversity Precinct Planning Kit, and the Commonwealth's Significant Impact Guidelines for the species, with surveys focusing on potentially suitable habitat identified within the study area during the preliminary flora and fauna assessment.

Results

Flora

Despite targeted surveys undertaken at an appropriate time of year, Matted Flax-lily, Swamp Everlasting and Swamp Fireweed were not identified within the study area. Based on targeted survey results, landscape context and the proximity of previous records, significant flora species are considered unlikely to occur within the study area.

Fauna

Golden Sun Moth

Despite targeted surveys on four separate occasions, Golden Sun Moth was not detected within the study area. The species was detected at several known sites within Greater Melbourne on the same day as the surveys were conducted, providing evidence that conditions were suitable to detect the species within the study area if an extant population was present. Based on the survey results an existing population of Golden Sun Moth is not present within the study area.

Growling Grass Frog

No Growling Grass Frogs were detected during the targeted surveys despite weather conditions being suitable to detect the species if a population was present. Based on targeted survey results, habitat conditions, and

landscape context, there is a low likelihood that the wetlands within the study area currently support a breeding population of Growling Grass Frogs or forms part of a dispersal corridor for the species.

Legislative and Policy Implications

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act - Federal)

Based on the survey results (empirical data) the proposed future development of the area is unlikely to impact any matter of NES, and therefore a referral to the Commonwealth Environment Minister is not required for matters listed under the EPBC Act (e.g. listed species and ecological communities).

Flora and Fauna Guarantee Act 1988 (FFG Act - Victoria)

Based on the results of the targeted surveys and ecological assessment, it is unlikely that the study area supports habitat for any species listed under the FFG Act. The study area is also privately owned, therefore a permit under the FFG Act is not required.

CONTENTS

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by G2 Urban Planning to undertake a Spring flora survey to confirm and map patches of native vegetation within the study area and to undertake targeted significant flora and fauna surveys as part of the proposed Bennett Road Development Plan. A preliminary flora and fauna assessment has been completed within the study area (Ecology and Heritage Partners 2019) and identified suitable habitat for the following nationally significant species:

- Matted Flax Lily *Dianella amoena*
- Swamp Everlasting *Xerochrysum palustre*
- Swamp Fireweed *Senecio psilocarpus*
- Growling Grass Frog *Litoria raniformis*
- Golden Sun Moth *Synemon plana*.

As the field assessments were undertaken during a suboptimal time for flora identification (winter), confirmation of native vegetation patches within the study area was undertaken during an optimal surveying period (spring). Targeted surveys were recommended to determine the presence or absence of these species, and where possible, to ascertain their distribution and abundance within the study area. This additional information addresses Point 4 of the Request for Further Information (RFI) from Melbourne Water, dated 18 November 2019. Point 4 states:

"A Flora and fauna investigation of the waterway corridor and surrounding areas must be undertaken by an appropriated qualified consults on behalf of the proponent and submitted to Melbourne Water for approval".

The following addresses any implications under Commonwealth and State environmental legislation, and provides information on mitigation measures associated with the proposed development.

1.2 Objectives

The objectives of the targeted surveys were to:

- Confirm patches of native vegetation previously recorded by Ecology and Heritage Partners within the study area during an optimal surveying period (spring);
- Determine the presence/absence of Matted Flax Lily, Swamp Everlasting, Swamp Fireweed, Growling Grass Frog and Golden Sun Moth within the study area;
- Provide information in relation to any implications of Commonwealth and State environmental legislation and government policy associated with the proposed development;
- Determine any potential impacts on Matted Flax Lily, Swamp Everlasting, Swamp Fireweed, Growling Grass Frog and/or Golden Sun Moth and their habitats at a National and State level associated with the proposed development; and,

- Provide advice on mitigation measures that may be undertaken to avoid and/or mitigate potential adverse impacts on significant ecological values.

1.3 Study Area

The study area is located at 128-168 Bennett Road, Gisborne, approximately 53 kilometres north-west of Melbourne's CBD (Figure 1). The site covers approximately 130 hectares and is bound by McGregor Road to the north, private property to the south, Coney Court to the east and the Calder Freeway to the west.

The study area consists of six properties and contains areas of undulating topography, mostly cleared for agricultural purposes. Pasture grasses and planted windrows are most common throughout the study area with some small patches of native vegetation present. A creekline traverses the study area from the south to the north-east. The creekline was mostly dry at time of the survey, however, several farm dams are present across the study area, all of which contained water at time of the assessment. The study area has historically been used for agricultural purposes and grazing cattle, sheep and horses. Several dwellings and associated farming infrastructure are present within the properties.

According to the Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management (NVIM) Tool (DELWP 2021a), the study area occurs within the Victorian Volcanic Plain Bioregion. It is located within the jurisdiction of the Port Phillip and Westernport Catchment Management Authority (CMA) and the Macedon Ranges Shire Council municipality.

1.4 Targeted Flora Species

1.4.1 Matted Flax-lily *Dianella amoena*

EPBC Act Conservation Status: Critically Endangered

FFG Act Conservation Status: Threatened

Victorian Advisory List: Endangered

Matted Flax-lily is a perennial, tufted, mat-forming lily which can form patches of up to five metres wide. The plant can grow vegetatively, through sending underground rhizomatous roots, which rise above the ground with a tiller of several leaves, spread over a distance from the parent plant.

Plate 1. Matted Flax-lily *Dianella amoena*. Ecology and Heritage Partners Pty Ltd.

The leaves of the Matted Flax-lily are generally glaucous, blue in colour but may be red at the base and usually but not always having small hooks (teeth) along the margins and midrib. The leaves taper to approximately 45 centimetres long depending on site and climatic conditions and are born on tillers with the leaves arranged alternatively, with several leaves per tiller. Matted Flax-lily generally flowers between November and February but may continue flowering with summer and autumn rains. It has pale blue to violet flowers with bright yellow stamens and berries, which are generally purple in colour. The flowers and berries are born on culms extending to typically 30 cm in height but this may alter depending on location and season (Carter 2010).

Matted Flax-lily generally occurs in grassland and grassy woodland habitats, on well drained to seasonally wet fertile sandy loams to heavy cracking clay soils derived from Silurian or Tertiary sediments, or from volcanic geology (Carter 2010).

1.4.2 Swamp Everlasting *Xerochrysum palustre*

Swamp Ever-lasting is a perennial rhizomatous herb, listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as vulnerable under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) and as vulnerable under the *Advisory List of Rare and Threatened Plants in Victoria* (DEPI 2014). The species is indigenous to New South Wales, Victoria and Tasmania, and is widely distributed across the south eastern corner of Australia. The species typically occurs in wetlands including sedge-swamps and shallow freshwater marshes, as well as marginal wetland habitats such as seasonally wet areas of native grassland and heath communities (Carter and Walsh 2011).

The species grows between 30 and 100cm tall, with narrow leaves and large yellow daisy-like flowers, up to 50mm across. Flowering occurs between November and March.

1.4.3 Swamp Fireweed *Senecio psilocarpus*

Swamp Fireweed is listed as vulnerable under the EPBC act and is considered vulnerable on the DELWP Advisory List (DEPI 2014). The species is indigenous to south-eastern Australia, found within South Australia, Victoria and Tasmania. In Victoria, the species is typically distributed from the South-western corner, along the coast, within the eastern and central areas of the State. The species typically occurs in wetlands, within

the Plains Grassy Wetland Ecological Vegetation Class (EVC 125). The species is a medium-sized herb, growing to approximately 80cm tall, with yellow daisy-like flowers. Flowering occurs between November and March (Walsh and Entwisle 1999).

1.5 Targeted Fauna Species

1.5.1 Growling Grass Frog *Litoria raniformis*

EPBC Act Conservation Status: Vulnerable

FFG Act Conservation Status: Listed

Victorian Advisory List: Endangered

Although formerly widely distributed across southern eastern Australia, including Tasmania (Littlejohn 1963, 1982; Hero et al. 1991), the Growling Grass Frog has declined markedly over the past two decades and in many areas, particularly in south and central Victoria where some populations have experienced local extinction.

Plate 2. Growling Grass Frog *Litoria raniformis.* Ecology and Heritage Partners Pty Ltd.

Growling Grass Frog are largely associated with permanent or semi-permanent still or slow flowing waterbodies (i.e. streams, lagoons, farm dams and old quarry sites) (Hero et al. 1991; Barker et al. 1995; Cogger 1996; Ashworth 1998). The species can also utilise temporarily inundated waterbodies during breeding season, to facilitate reproduction (Organ 2003). The presence of key habitat attributes, primarily an extensive cover of emergent, submerged and floating vegetation (Robertson *et al.* 2002, Organ 2004, 2005), and the spatial orientation of waterbodies (Robertson et al. 2002; Heard et al. 2004; Hamer and Organ 2008) are strong determinants of the species' presence. Terrestrial vegetation (grasses, sedges), rocks and other ground debris around wetland perimeters also provide important foraging, dispersal and over-wintering sites. Dispersal is thought to occur primarily along drainage lines or other low-lying areas between waterbodies, and unhindered movement between and within waterbodies is considered important for population viability.

1.5.2 Golden Sun Moth *Synemon plana*

EPBC Act Conservation Status: Critically Endangered

FFG Act Conservation Status: Listed

Victorian Advisory List: Endangered

Plate 3. Golden Sun Moth *Synemon plana.* Ecology and Heritage Partners Pty Ltd.

Golden Sun Moth typically occur in native grassland, grassy woodland, dominated by greater than 40% cover of wallaby-grass, in particular *Rytidosperma* spp. (DSE 2004), but may also inhabit areas dominated by Kangaroo Grass *Themeda triandra* (Endersby and Koehler 2006) and introduced grassland dominated by Chilean Needle-grass Nassella neesiana and other introduced species (A. Organ pers. obs.). Male flight is typically low, to about a metre above the ground, fast and can be prolonged, but they are generally not recorded flying more than 100 metres from suitable habitat (Clarke and O'Dwyer 1999). The male of this species generally flies between 11am and 3pm on calm, warm (over 20°C), sunny days.

Prior to European settlement, the Golden Sun Moth was widespread and relatively continuous throughout its range, inhabiting grassy open woodlands and grassland, although it now mainly inhabits small isolated sites (DSE 2004a). The species is threatened by habitat loss, disturbance and fragmentation due to agricultural expansion and urbanisation. Many populations are isolated and fragmented, impeding the ability of the relatively immobile females to recolonise areas, thereby reducing the likelihood of genetic exchange (DSE 2004a). Such populations are therefore vulnerable as there is little likelihood of recolonisation in the event of a local extinction.

2 METHODS

2.1 Nomenclature

Common and scientific names of vascular plants follow the Victorian Biodiversity Atlas (VBA) (DELWP 2018) and the Census of Vascular Plants of Victoria (Walsh and Stajsic 2007). Vegetation community names follow DELWP's Ecological Vegetation Classes (EVC) benchmarks (DELWP 20201b). The names of aquatic and terrestrial vertebrate and invertebrate fauna follow the VBA (DELWP 2018).

2.2 Desktop Assessment

Relevant literature, online-resources and numerous databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The VBA (DELWP 2018), Flora Information System (FIS) (Viridans 2013a) and Atlas of Victorian Wildlife (AVW) (Viridans 2013b) for previously documented flora and fauna records within the project locality;
- The Commonwealth Department of Agriculture, Water and Environment (DAWE) (formerly Department of Environment and Energy DoEE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DAWE 2021);
- Relevant environmental legislation and policies pertaining to target species including: EPBC Act Policy Statements; FFG Act Action Statements, National Recovery Plans, Advisory Lists;
- Relevant biological and ecological literature pertaining to the target species.
- Previous ecological assessments within the study area;
- Aerial photography of the study area; and,
- Previous ecological reports, including:
    - Existing Conditions Report: 128-168 Bennett Road, Gisborne (Ecology and Heritage Partners 2019).

2.3 Native Vegetation Assessment

An assessment of the native vegetation recorded during the previous surveys (Ecology and Heritage Partners 2019) was conducted due to the sub-optimal conditions of the first survey (winter) for identifying cryptic flora species. Where native vegetation was identified, a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (Department of Sustainability and Environment (DSE) 2004b).

Four EVCs were recorded during the assessment, in line with the previous assessment. These were Plains Sedgy Wetland (EVC 647), Tall Marsh (EVC 821), Plains Grassland Heavier-soils (EVC 132_61) and Stony Knoll Shrubland (EVC 649). Habitat hectare condition scores are given in Appendix 1.

2.4 Targeted Flora Surveys

Targeted flora surveys for three nationally significant species were undertaken within areas of potential habitat, including along the creekline and around the farm dams. Targeted flora species focussed on Matted Flax-lily, Swamp Fireweed and Swamp Everlasting.

Targeted flora surveys were undertaken on 2 and 5 November 2020 for Matted Flax-lily, Swamp Everlasting and Swamp Fireweed, by qualified botanists, to coincide with the known flowering period of the species (November to February). Areas of potential habitat, including along the creekline and around farm dams, were surveyed for the species using the following standards as outlined in the *Biodiversity Precinct Structure Planning Kit* (DSE 2010):

- Targeted surveys were conducted by people familiar with recognising the species;
- The survey effort was directed to all potential habitat areas (i.e. remnant grassland and the degraded grassy areas surrounding the remnant grassland);
- Transects were walked at five-metre grid intervals through all potential habitat; and
- Where found, locations of Matted Flax-lily were recorded by GPS (accuracy of +/- 3 metres) and the number of plants per land parcel was totalled.

2.5 Targeted Fauna Surveys

Targeted surveys for nationally significant fauna species were undertaken within areas of potential habitat during optimal surveying conditions. Surveys focussed on Growling Grass Frog and Golden Sun Moth.

2.5.1 Growling Grass Frog

Nocturnal Growling Grass Frog surveys were undertaken at eight (8) sites within the study area. Growling Grass Frog Surveys were undertaken in accordance with the methods outlined in the *Significant Impact Guidelines for the Vulnerable Growling Grass Frog* (SEWPaC 2009). The targeted surveys were completed on 18 and 19 November 2020 and were completed as follows:

- Survey sites within 30 meters of the primary water body were chosen based on the presence of supporting suitable habitat for Growling Grass Frog (i.e. moderate to good water quality, moderate to good percentage cover of fringing, emergent and floating vegetation, presence of other refuge).
- Each survey site was visited on two occasions during weather conditions considered suitable for Growling Grass Frog activity (warm, over 20 degrees, relatively still and clear).
- Two qualified zoologists, experienced in Growling Grass Frog detection, systematically walked along (or around) each watercourse (or waterbody).
- Zoologists searched fringing, emergent and floating vegetation within and adjacent to the watercourse/waterbody with 50W 12V hand-held spotlights and used call-playback to initiate a response from any males that may have been present.
- All frog species heard or seen were recorded and several site-specific habitat variables were documented including a visual assessment of water quality, flow and depth, and records of fringing, emergent, floating and submerged vegetation cover.

2.5.2 Golden Sun Moth

Targeted surveys for Golden Sun Moth were undertaken at the study area on four separate occasions on 10 and 25 November, and 4 and 10 December 2020. Areas of suitable habitat were traversed by qualified zoologists during the known flight season (i.e. November to early January). Surveys concentrated in areas identified as supporting indigenous grassland, particularly those supporting wallaby-grass *Rytidosperma* spp. and Chilean Needle-grass *Nassella Neesiana*, which are known food sources for Golden Sun Moth. Surveys were undertaken at a time which is considered suitable for detecting the Golden Sun Moth (i.e. when adult males are flying), and when the species was observed flying at nearby locations.

Survey procedures were in accordance with the *Significant Impact Guidelines for the Critically Endangered Golden Sun Moth* (DEWHA 2009), with the following tasks undertaken:

- A habitat assessment was completed detailing information on habitat quality, presence of weeds and floristic diversity;
- Surveys were conducted by ecologists experienced in the detection and identification of Golden Sun Moth;
- The study area was surveyed on four separate occasions, with at least one week between surveys where possible;
- Surveys took place during the species' flight season (generally described as late October to early January). Moths were confirmed flying at known, nearby reference sites (Broadmeadows) prior to undertaking each survey;
- Surveys were undertaken during weather conditions suitable for detecting the species (i.e. between 10am and 3pm on warm (over 20˚C by 10am) days with minimal cloud cover and still conditions); and
- Surveys were conducted by qualified zoologists walking or driving (where access was permitted) 10 to 50-metre-wide parallel transects across all areas of suitable habitat.

2.6 Assessment Qualifications and Limitations

Flora and fauna data collected during the field assessment, and information obtained from relevant sources (e.g. biological databases and relevant literature) are considered adequate to provide an accurate assessment of the ecological values within the study area. Fauna surveys were conducted under the Ecology and Heritage Partners Pty Ltd research permit (#10005952) issued by DELWP under the *Wildlife Act 1975*.

3 RESULTS

3.1 Flora

3.1.1 Native Vegetation

The majority of the study area comprised introduced and planted vegetation in the form of crops, pasture, windrows and ornamental plantings. The small patches of native vegetation within the study area identified during the previous assessment are still present.

Plains Sedgy Wetland

The creek that runs through the southern and eastern extent of the study area contains native vegetation with the highest diversity and condition. Patches of Plains Sedgy Wetland are present along the creek alignment and ranges from moderate to low condition (Plate 4). Species such as Common Tussock-grass *Poa labillardierei*, Tall Rush *Juncus procerus,* Tall Sedge *Carex appressa* and Common Spike-sedge *Eleocharis acuta* were common throughout the patches of Plains Sedgy Wetland. The patches of Plains Sedgy Wetland along the creekline have reduced slightly in area since the previous assessment due to encroachment of weedy species. A small patch of Plains Sedgy Wetland was also present around the edge of a farm dam in the centre of the study area (Figure 2). This patch was not present during the previous survey.

Grassy, herbaceous and woody weeds species were common throughout the creekline and within the patches of Plains Sedgy Wetland (Plate 5). Species such as Spiny Rush *Juncus acutus,* Toowoomba Canary-grass *Phalaris aquatica,* Cape Weed *Arctotheca calendula,* Ribwort *Plantago lanceolata,* Blackberry *Rubus fruticosus* spp. agg. and Gorse *Ulex europaeus* were common throughout the creekline (Plate 5).

Plate 4. Small patch of poor-quality Plains Sedgy Wetland along the creekline (Ecology and Heritage Partners Pty Ltd 02/11/2020).

Plate 5. Woody weeds, including Blackberry, are common along the creekline (Ecology and Heritage Partners Pty Ltd 02/11/2020).

Tall Marsh

One patch of Tall Marsh was present along the edges of a dam within the southern extent of the study area. Sedges densely populated the inflow drain to the dam, and emergent vegetation was present in the centre

and around the edges (Plate 6, Plate 7). Species present included Common Reed *Phragmites Australia,* Common Spike-sedge and Narrow-leaf Cumbungi *Typha domingensis.*

Plate 6. Patch of Tall Marsh around the dam in the southern extent of the study area (Ecology and Heritage Partners Pty Ltd 05/11/2020).

Plate 7. Patch of Tall Marsh around the dam in the southern extent of the study area (Ecology and Heritage Partners Pty Ltd 05/11/2020).

Plains Grassland

One continuous long patch of *Heavier-soils* Plains Grassland was present beneath the row of planted windrows and ornamental plantings in the north of the study area (Figure 2). This EVC has a bioregional conservation status of Endangered and consists of native grasses such as Spear Grass *Austrostipa* spp. and Common Wallaby-grass *Rytidosperma caespitosum* (Plate 8 and 9). Common weeds within this patch included listed noxious weed and Weed of National Significance (WoNS) Chilean Needle Grass *Nassella neesiana*, as well as other common exotic grasses such as Perennial Rye-grass *Lolium perenne* and Yorkshire Fog *Holcus lanatus*.

Plate 8. Plains Grassland within the study area (Ecology and Heritage Partners Pty Ltd 25/11/2020).

Plate 9. Chilean Needle Grass was present within and around the patch of Plains Grassland (Ecology and Heritage Partners Pty Ltd 25/11/2020).

Stony Knoll Shrubland

Two small patches of Stony Knoll Shrubland were present within the north eastern extent of the study area. These patches were still in a poor condition, with a low diversity of herb species, likely caused by continuous grazing by cattle. However, the bryophyte and lichen life form component cover was high.

Plate 10. Stony Knoll Shrubland within the study area (Ecology and Heritage Partners Pty Ltd 25/05/2018).

Plate 11. Stony Knoll Shrubland within the study area (Ecology and Heritage Partners Pty Ltd 25/05/2018).

Introduced and Planted Vegetation

Areas not supporting native vegetation had a high coverage (>95%) of exotic species, the majority being pasture grasses such as Perennial Rye-grass and Oat *Avena* spp (Plate 12). Areas of non-native vegetation within the creekline had a high coverage (>90%) of exotic and invasive species, including 12 species listed as noxious under the *Catchment and Land Protection Act 1994* (CaLP Act), four of which are also listed as Weeds of National Significance (WoNS); Blackberry *Rubus fruticosus* spp. agg., Gorse *Ulex europaeus,* Serrated Tussock *Nassella trichotoma* and Broom *Genista* spp (Plate 13). Many exotic grass species present have been direct-seeded for use as pasture. Disturbed areas along the creekline also had a high coverage of

environmental weeds such as Toowoomba Canary-grass, Perennial Rye-grass *Lolium perenne* and Yorkshire Fog *Holcus lanatus*.

Plate 12. The majority of the study area contains pasture grasses (Ecology and Heritage Partners Pty Ltd 25/11/2020).

Plate 13. Weeds such as Blackberry were common along the creekline (Ecology and Heritage Partners Pty Ltd 02/11/2020).

3.1.2 Targeted Flora Surveys

Targeted surveys for significant flora species were undertaken by two qualified Botanists, experienced in searching for the target species. Surveys were undertaken across two days, 2 and 5 November 2020, during an optimal period for identification. Surveys focussed on areas of potential habitat, including the creekline and around farm dams (Figure 4).

Potential habitat for the EPBC Act-listed Matted Flax-lily, Swamp Everlasting and Swamp Fireweed was identified during previous ecological assessments (Ecology and Heritage Partners 2019). Despite the availability of potential habitat (albeit highly modified) no specimens of any of these species were detected within the study area.

3.2 Fauna

Targeted surveys for significant fauna species were undertaken by two qualified ecologists experienced in searching for the target species. Surveys were undertaken during a period optimal for identification of the species and in line with the survey guidelines. Survey effort is outlined below (Table 1 and 2).

Although the weather conditions during the site surveys were conducive for frogs to be active, no Growling Grass Frogs were detected during the targeted surveys (Table 1). During the surveys, three other species (Whistling Tree Frog *Litora verreauxii verreauxii*, Eastern Common Froglet *Crinia signifera* and Spotted Marsh Frog *Limnodynastes tasmaniensis*) were recorded throughout the study area. Based on targeted survey results and landscape context there is a low likelihood that the wetlands within the study area currently support a breeding population of Growling Grass Frogs or forms part of a dispersal corridor for the species.

Despite targeted surveys on four separate occasions, Golden Sun Moth was not detected within the study area (Table 2). The species was detected at several known sites within Greater Melbourne on the same day as the surveys were conducted, indicating that conditions were suitable for surveying and identifying the species. As such, a Golden Sun Moth population does not occur within the study area.

Table 1. Summary of Growling Grass Frog survey results

Date	Time	Survey Number	Temperature (°C)	Rain (mm)	Wind (Km/h)	Relative humidity (%)	Cloud Cover (%)	GGF Observed	Juveniles Observed	Tadpoles Observed
18/11/2020	22:00	1	23.0	0.0	20.4	25	50	0	0	0
19/11/2020	21:45	2	25.9	0.0	24.1	21	30	0	0	0

Table 2. Summary of Golden Sun Moth survey results

Date	Survey times	Reference Site	Temperature (°C)	Wind (km/hr)	Cloud cover (%)	No. of days since rain	No. GSM
10/11/2020	13:00-14:00	Confirmed flying at Broadmeadows	26.2	20.1	5	>2	0
25/11/2020	12:00-13:00	Confirmed flying at Broadmeadows	24.8	18.5	0	>2	0
04/12/2020	12:30-13:30	Confirmed flying at Broadmeadows	20.1	20.4	0	2	0
09/11/2020	12:00-13:00	Confirmed flying at Broadmeadows	20.7	5.5	10	>2	0

3.3 Habitat Assessment

The majority of the study area is highly modified as a result of current land use, being dominated by exotic grassland and cultivated land (i.e. crop) and stock. The areas of exotic grassland comprised improved pasture species, predominantly Perennial Ryegrass *Lolium perenne* and Toowoomba Canary-grass *Phalaris aquatica*. The surrounding area is also highly fragmented and predominantly consists of introduced vegetation, which lacks suitable habitat for Growling Grass Frog and Golden Sun Moth.

The linear strip of Plains Grassland was the primary focus of the targeted surveys for Golden Sun Moth as this presented the highest likelihood of supporting the species. The creekline and surrounds of farm dams were the focus areas for Growling Grass Frog and the significant flora species, as these present the highest likelihood of supporting these species. The remainder of the study area comprised introduced exotic grasses used for pasture and grazing stock, and planted windrows an ornamental species, all of which do not provide suitable habitat for significant species.

4 IMPACTS AND MITIGATION MEASURES

4.1 Known Impacts

Based on the results of the targeted surveys, the development is highly unlikely to impact on any matters of NES, including Matted Flax-lily, Swamp Everlasting, Swamp Fireweed, Growling Grass Frog and Golden Sun Moth.

It is highly unlikely that any other matters of NES [including Natural Temperate Grassland of the Victorian Volcanic Plains (NTGVVP) and Striped Legless Lizard] are present within the study area based on the current conditions and therefore will not be impacted by the proposed development.

4.2 Potential Impacts

A final Development Plan across the study area has not yet been prepared, and therefore potential impacts on native vegetation within the study area are currently unknown. However, impacts may include:

- Potential for further habitat fragmentation in a fragmented landscape and the associated creation of barriers to the movement and migration of indigenous species;
- Potential disturbance associated with increased human activity and noise during construction.
- Potential indirect impacts on adjacent areas outside of the limit of construction if activities and drainage are not appropriately managed;
- The potential for injury and/or mortality from construction activities;
- Potential for the spread of weeds and soil pathogens due to on-site activities;
- Decreased habitat quality downstream of the study area due to improper sedimentation controls and subsequent deterioration of water quality; and,
- Permanent alteration of environmental flows to aquatic habitat.

4.3 Mitigation Measures

General recommended measures to minimise impacts to ecological values present within the study area were identified and are outlined in the Existing Conditions report (Ecology and Heritage Partners 2019). A 30-metre buffer along the creekline will be implemented, with all native vegetation inside the buffer protected, and noxious weed species controlled in accordance with the Native Vegetation Management Plan which has been prepared (Ecology and Heritage Partners in 2021). Additional measures recommended to minimise potential impacts may include:

- Removal of any habitat trees or shrubs (particularly hollow-bearing trees) should be undertaken between February and September to avoid the breeding season for the majority of fauna species. If any habitat trees or shrubs are proposed to be removed, this should be undertaken under the

supervision of an appropriately qualified zoologist to salvage and translocate any displaced fauna. A Fauna Management Plan may be required to guide the salvage and relocation process;

- Infrastructure removed in accordance with agreed end land use in consultation with relevant stakeholders;
- Contaminated waste dumps remediated or removed; no contaminated seepage discharges to the surrounding environment;
- A Construction Environmental Management Plan to be prepared prior to the commencement of any construction to ensure there are no adverse impacts on ecological values within the study area, particularly the creekline;
- Vegetation in rehabilitated areas demonstrate values that trend towards relevant target ecosystem sites;
- Ecosystem function in rehabilitated areas demonstrate values that trend towards relevant target ecosystem sites; and,
- Adherence to the recommendations within the Native Vegetation Management Plan (Ecology and Heritage Partners 2021) for the creekline.

Given that subdivision plans are yet to be prepared, there is potential for the native vegetation recorded within the study area, outside of the creekline buffer to be protected, thereby ensuring that proposed vegetation removal is kept to a minimum. Any impacts to native vegetation that cannot be avoided or minimised by the development must be offset accordingly prior to its removal.

5 LEGISLATIVE AND POLICY IMPLICATIONS

This section identifies biodiversity policy and legislation relevant to the proposed development.

5.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of national environmental significance (NES), or on Commonwealth land.

For species listed under the EPBC Act, a 'significant impact' is defined as an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE 2013). Whether an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment, which is affected, and upon the intensity, duration, magnitude and geographic extent of the impacts. Importantly, for a 'significant impact' to be 'likely', it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility (DoE 2013).

Given that no significant flora and fauna species were detected during the targeted surveys and no other matters of NES (e.g. NTGVVP) occur within the study area, an EPBC Act referral is not required.

5.2 Flora and Fauna Guarantee Act 1988 (Victoria)

The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected[1] flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

Based on the results of the targeted surveys and ecological assessment, it is unlikely that the study area supports habitat for any species listed under the FFG Act. The study area is also privately owned, therefore a permit under the FFG Act is not required

5.3 Wildlife Act 1975 and Wildlife Regulations 2002 (Victoria)

The *Wildlife Act 1975* (and associated Wildlife Regulations 2002) is the primary legislation in Victoria providing for protection and management of wildlife. Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the

[1] In addition to 'listed' flora species, the FFG Act identifies 'protected' flora species. This includes any of the Asteraceae (Daisies), all orchids, ferns (excluding Pteridium esculentum) and Acacia species (excluding Acacia dealbata, Acacia decurrens, Acacia implexa, Acacia melanoxylon and Acacia paradoxa), as well as any taxa that may be a component of a listed ecological community. A species may be both listed and protected.

Planning and Environment Act 1987. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*.

6 FURTHER REQUIREMENTS

Further requirements associated with development of the study area, including relevant legislation and policy identified within the preliminary assessment report (Ecology and Heritage Partners 2019), are provided below (Table 3).

Table 3. Further requirements associated with development of the study area

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	Given that no significant flora and fauna species were detected during the targeted surveys, and no other matters of NES (e.g. NTGVVP) occur within the study area and would be impacted by the future development, an EPBC Act referral is not required	No further action required.
Flora and Fauna Guarantee Act 1988	Based on the results of the targeted surveys and ecological assessment, it is unlikely that the study area supports habitat for any species listed under the FFG Act. The study area is also privately owned, therefore a permit under the FFG Act is not required.	No further action required.
Wildlife Act 1975	Any persons engaged to conduct salvage and relocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.
Planning and Environment Act 1987	A Planning Permit from Macedon Ranges Shire Council is required to remove, destroy or lop any native vegetation.	Prepare and submit a Planning Permit Application once impact is known.
Catchment and Land Protection Act 1994	Several weed species listed under the CaLP Act were recorded within the study area. To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	Planning Permit conditions may include a requirement for a weed management to be incorporated into a CEMP

7 CONCLUSION

Targeted surveys of the study area were recommended based on the results of the Existing Conditions assessment of the study area (Ecology and Heritage Partners 2019). Given the presence of potentially suitable habitat identified within the study area during the previous assessment conducted by Ecology and Heritage Partners in 2018, targeted surveys were completed for Matted Flax-lily, Swamp Everlasting, Swamp Fireweed, Golden Sun Moth and Growling Grass Frog. Despite surveys following the recommended guidelines, no individuals of any of these species were recorded within the study area. Based on the survey results, the study area is highly unlikely to support populations of any of the target species.

The VBA contains records of Matted Flax-lily, Swamp Everlasting and Swamp Fireweed within five kilometres of the study area (Figure 5). However, despite several previous records within the local area, based on the results of the targeted surveys, it is unlikely that these nationally significant flora species occur within the study area.

The proposed subdivision and future development may result in the removal of remaining areas of vegetation which do not support any of the target species, therefore based on available information there are no implications under the EPBC Act or under State legislation or policy pertaining to the proposed development in terms of impacts to significant species.

REFERENCES

Carter, O. & Walsh, N. 2011. National Recovery Plan for the Swamp Everlasting *Xerochrysum palustre*, Department of Sustainability and Environment, East Melbourne, Victoria.

Clarke, G.M. & C. O'Dwyer 1999. Further survey in southeastern New South Wales for the endangered golden sun moth, Synemon plana. Pg 77. CSIRO Entomology, Canberra.

Cogger, H. G (Ed). 1996. Reptiles and Amphibians of Australia. 5th Edition. Reed Books Australia, Victoria.

Cogger, H.G., Cameron, E.E., Sadlier, R.A. and Eggler P., 1993. The Action Plan for Australian Reptiles. Australian Nature conservation Agency, Canberra, ACT.

Coulson, G. 1990. Conservation Biology of the Striped Legless Lizard (*Delma impar*): an initial investigation. Arthur Rylah Institute for Environmental Research Technical Report Series No. 106, Department of Conservation and Environment, Melbourne.

Coulson, G. 1995. Management directions for the Striped Legless Lizard (Delma impar) in the Australian Capital Territory. Technical Report 12. Wildlife Research Unit, ACT Parks & Conservation Service.

DAWE 2021. Protected Matters Search Tool: Interactive Map [WWW Document]. URL http://www.environment.gov.au/epbc/pmst/ Federal Department of Agriculture, Water and Environment, Canberra.

Dear, C. 1996. Distribution of Synemon plana: a new encounter. Victorian Entomologist 26: 26-28.

DELWP 2018d. Victorian Biodiversity Atlas. Sourced from: "VBA_FLORA25", "VBA_FLORA100", "VBA_FAUNA25", "VBA_FAUNA100", December 2017. Victorian Department of Environment, Land, Water and Planning.

DELWP 2021a. Native Vegetation Information Management Tool [www Document]. URL: <https://nvim.delwp.vic.gov.au/>. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DELWP 2021b. Victorian Biodiversity Atlas. Sourced from GIS layers: "VBA_FLORA25", "VBA_FLORA100", "VBA_FAUNA25", "VBA_FAUNA100", July 2017. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DELWP 2021c. Ecological Vegetation Class (EVC) Benchmarks for each Bioregion [www Document]. URL: <http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/evc-benchmarks#bioregionname>. Victorian Department of Environment, Land, Water and Planning, Melbourne, Victoria.

DEWHA 2009a. EPBC Act Policy Statement 3.14: Significant Impact Guidelines for the vulnerable Growling Grass Frog *Litoria raniformis*. The Department of the Environment, Water, Heritage and the Arts, Canberra, ACT. www.environment.gov.au/epbc.

DEWHA 2009b. Significant impact guidelines for the critically endangered Golden Sun Moth (*Synemon plana*). Nationally threatened species and ecological communities EPBC Act policy statement 3.12. Department of Environment, Water, Heritage and the Arts. Commonwealth of Australia, Canberra

DSE 2004a. Flora and Fauna Guarantee Act Action Statement: Five threatened Victoria Sun Moths. Department of Sustainability and Environment, East Melbourne, Victoria.

DSE 2004b. Vegetation quality assessment manual: Guidelines for applying the habitat hectares scoring method. Version 1.3. Victorian Department of Sustainability and Environment.

DSE 2005. Advisory List of Rare or Threatened Plants in Victoria. Victorian Department of Sustainability and Environment.

Ecology and Heritage Partners Pty Ltd 2019. Existing Conditions Report 128-168 Bennett Road, Gisborne. Prepared for G2 Urban Planning.

Endersby, I & Koehler, S. 2006. Golden Sun Moth Synemon plana: discovery of new populations around Melbourne. The Victorian Naturalist 123, 362-365.

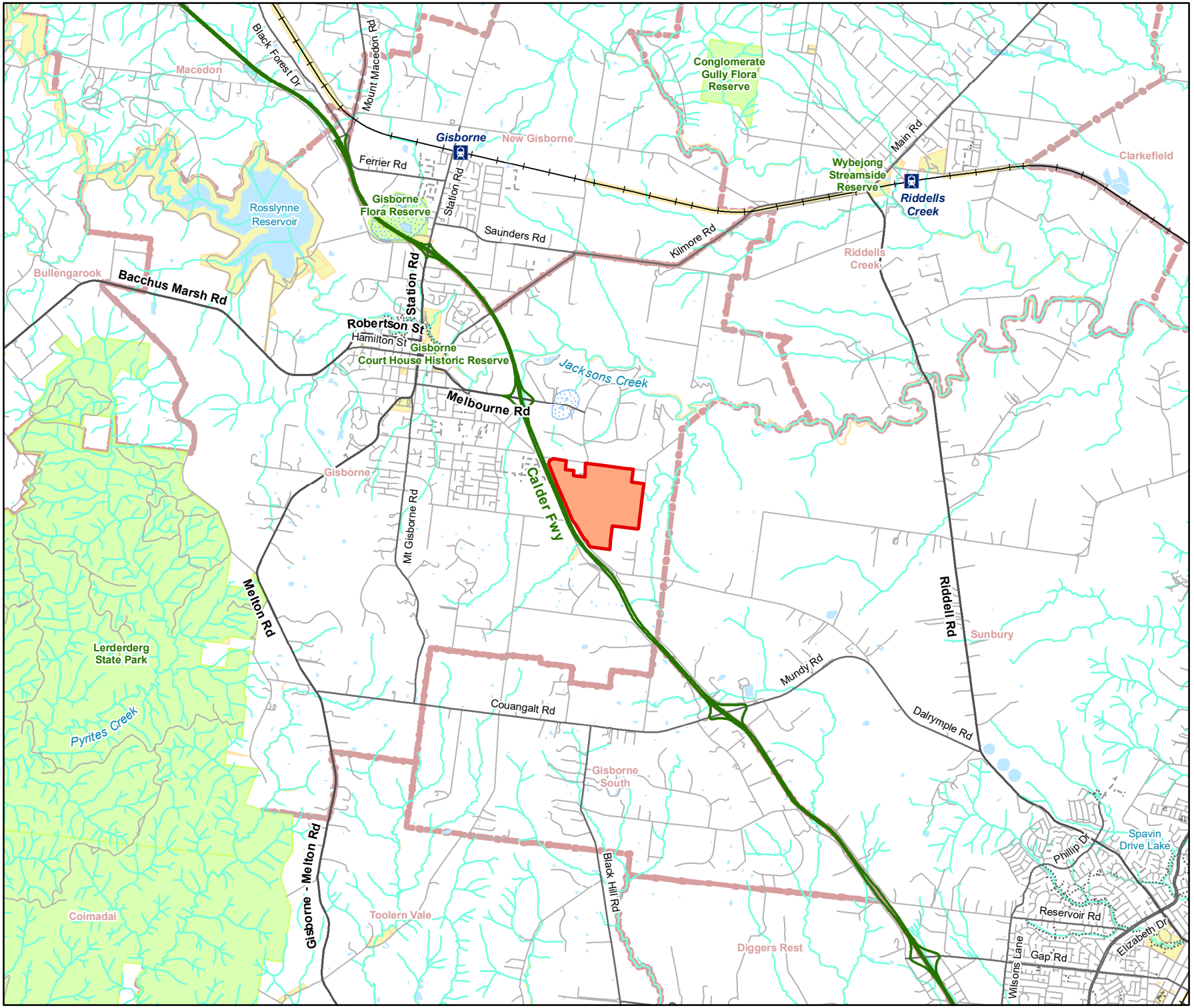
Gilmore, D., Koehler, S. O'Dwyer, C. & Moore, W. 2008. Golden Sun Moth Synemon plana (Lepidoptera: Castniidae): results of a broad survey of populations around Melbourne. Victorian Naturalist Vol. 125 (2).

Gullan, P. 2017. Illustrated Flora Information System of Victoria (IFLISV). Viridans Pty Ltd, Victoria.

SEWPaC 2009. Environment Protection and Biodiversity Conservation Act 1999 Referral Guidelines for the vulnerable Growling Grass Frog, *Litoria raniformis*. Department of the Environment, Water, Heritage and the Arts. Canberra, ACT.

Walsh, N.G., Entwisle T.J., 1999. Flora of Victoria Vol. 4, *Cornaceae to Asteraceae.* Inkata Press, Melbourne

FIGURES



Legend

- Study Area
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Walking Track
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Parks and Reserves
- Crown Land
- Localities

Figure 1

Location of the study area

Bennett Road Development Plan, Gisborne

N

0 950 1,900

Metres

ecology & heritage partners

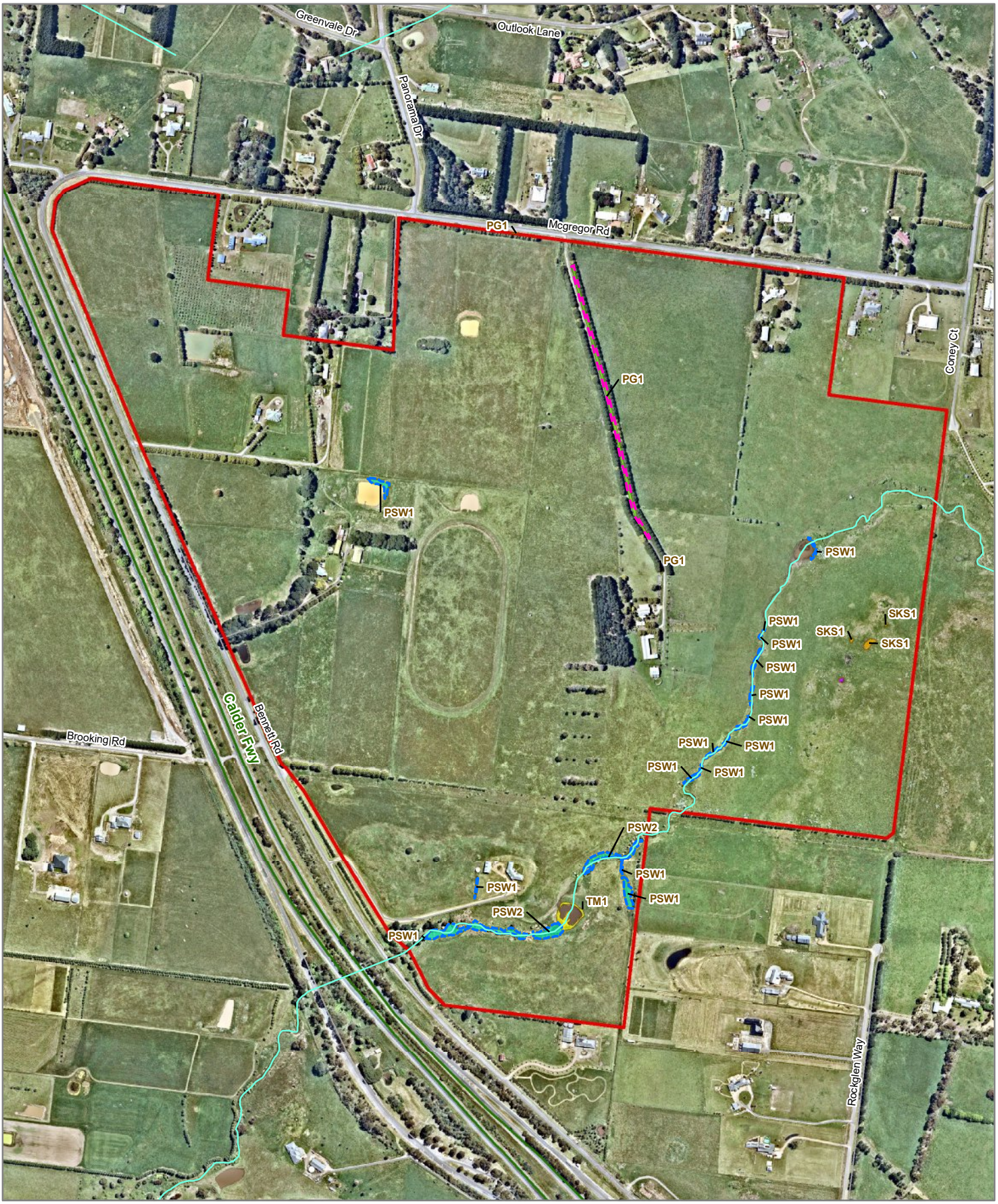


Figure 2 Overview

Ecological features

Bennett Road Development Plan, Gisborne

Legend

- Study Area
- Areas of potential Growling Grass Frog habitat
- Potential Golden Sun Moth habitat
- Acacia

Ecological Vegetation Classes

- Plains Grassland (EVC 132)
- Plains Sedgy Wetland (EVC 647)
- Stony Knoll Shrubland (EVC 649)
- Tall Marsh (EVC 821)

N

0 100 200

Metres

14226_Fig02_EcolFeat_PMB 22/12/2020 melsley

ecology & heritage partners

Aerial source: Nearmap 2020

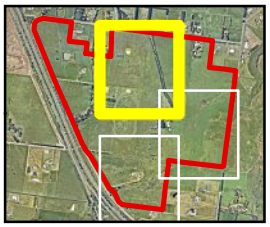
Figure 2a
Ecological features
Bennett Road Development Plan, Gisborne

Legend

- Study Area
- Areas of potential Growling Grass Frog habitat
- Potential Golden Sun Moth habitat

Ecological Vegetation Classes

- Plains Grassland (EVC 132)
- Plains Sedgy Wetland (EVC 647)



N

0 35 70
Metres

ecology & heritage partners

14226_Fig02_EcolFeat_PMB 22/12/2020 melsley

Aerial source: Nearmap 2020

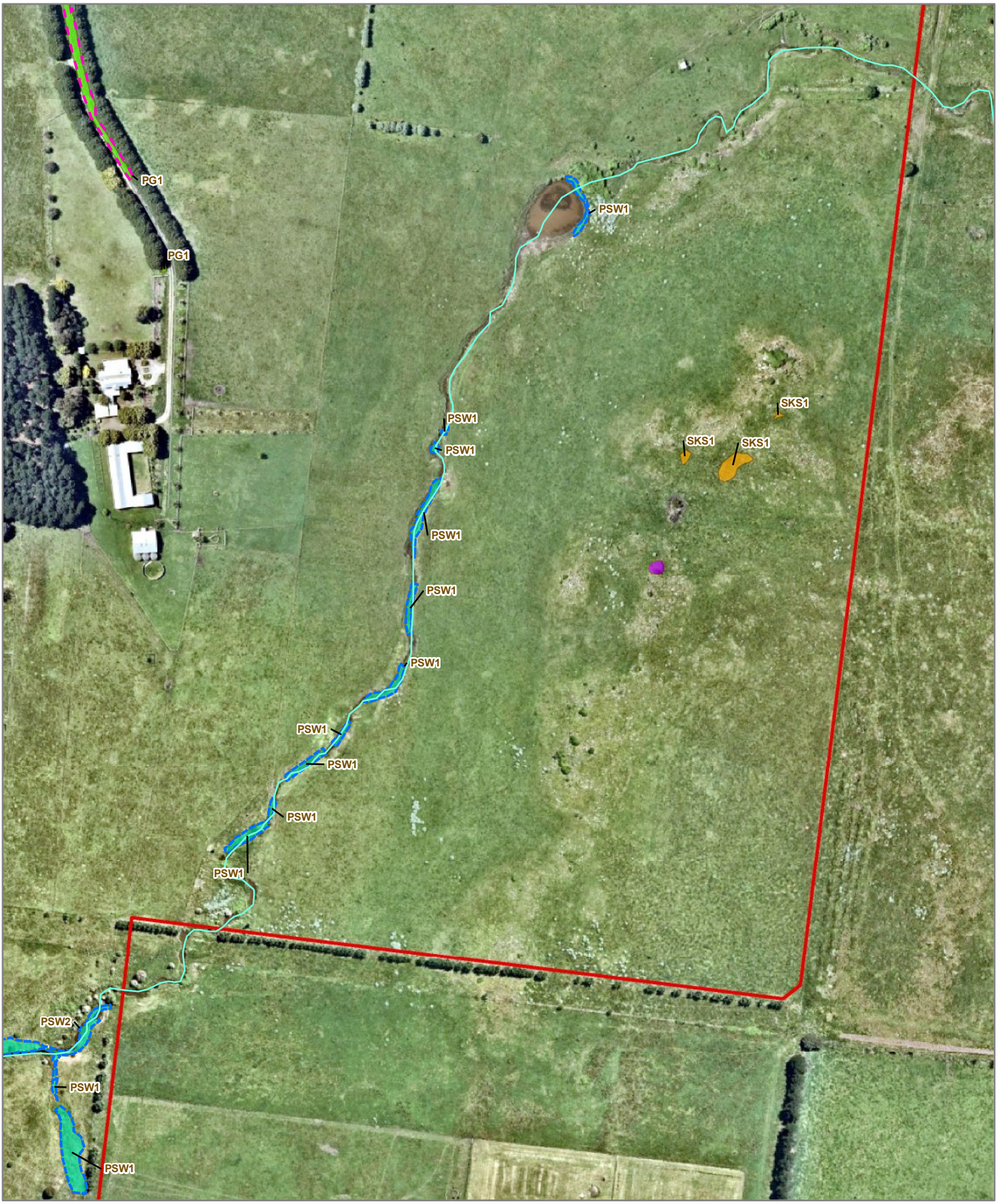


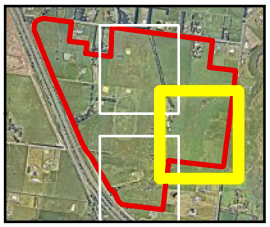
Figure 2b
Ecological features
Bennett Road Development Plan, Gisborne

Legend

- Study Area
- Areas of potential Growling Grass Frog habitat
- Potential Golden Sun Moth habitat
- Acacia

Ecological Vegetation Classes

- Plains Grassland (EVC 132)
- Plains Sedgy Wetland (EVC 647)
- Stony Knoll Shrubland (EVC 649)



N

0 35 70
Metres

14226_Fig02_EcolFeat_PMB 22/12/2020 melsley

ecology & heritage partners

Aerial source: Nearmap 2020

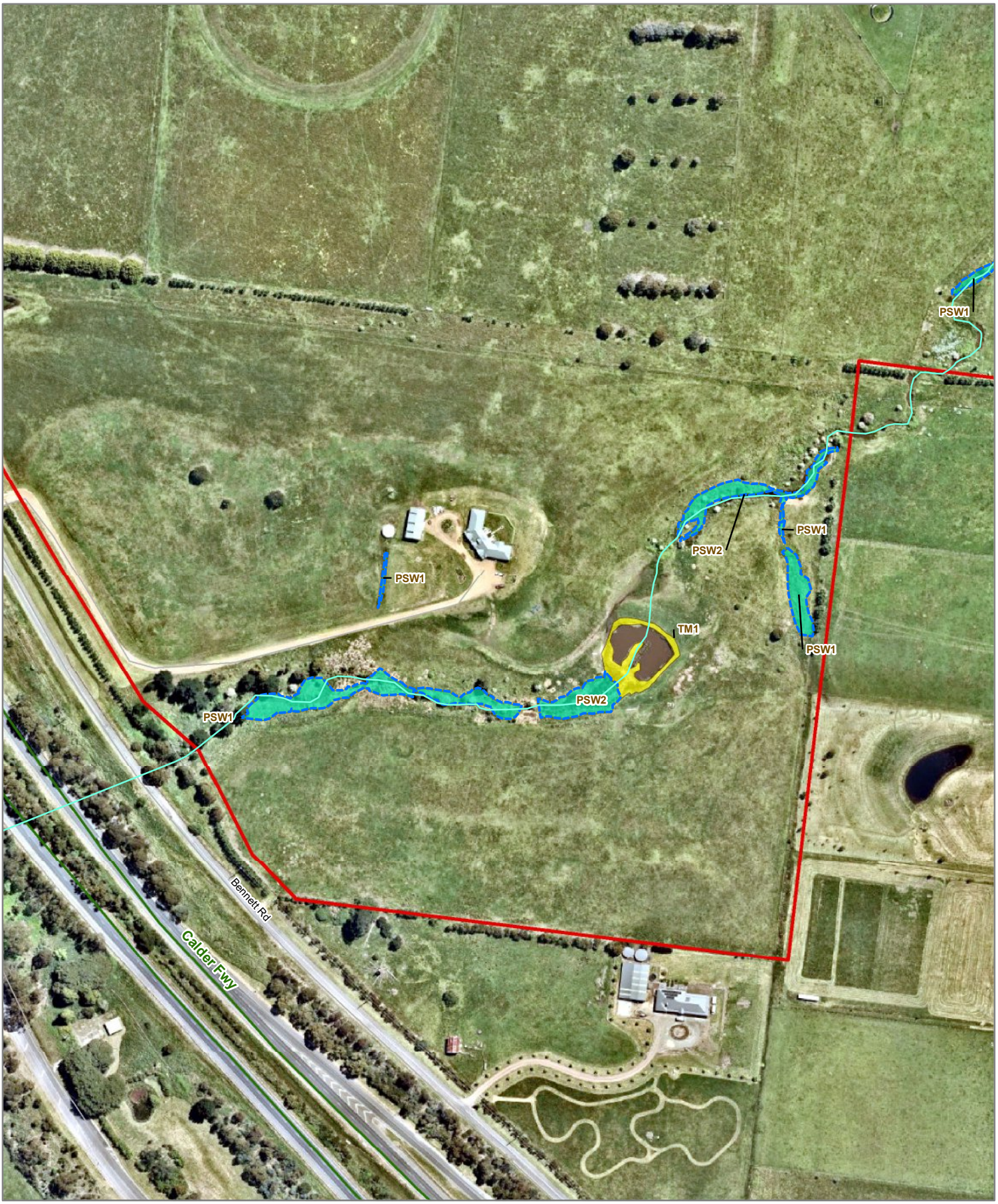


Figure 2c
Ecological features
Bennett Road Development Plan, Gisborne

Legend

- Study Area
- Areas of potential Growling Grass Frog habitat

Ecological Vegetation Classes

- Plains Sedgy Wetland (EVC 647)
- Tall Marsh (EVC 821)

N

0 35 70
Metres

ecology & heritage partners

14226_Fig02_EcolFeat_PMB 22/12/2020 melsley

Aerial source: Nearmap 2020

Figure 3
Targeted Golden Sun Moth surveys
Bennett Road Development Plan, Gisborne

Legend

Study Area

Survey tracks*

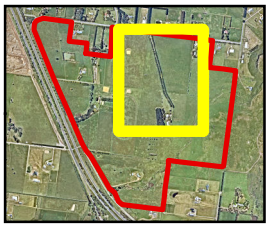
Date: 10/11/2020

Date: 25/11/2020

Date: 04/12/2020

Date: 09/12/2020

*No Golden Sun Moth were recorded during the surveys



N

0 30 60
Metres

14226_Fig03_TargGSM_P 16/12/2020 melsley

ecology & heritage partners

Aerial source: Nearmap 2020

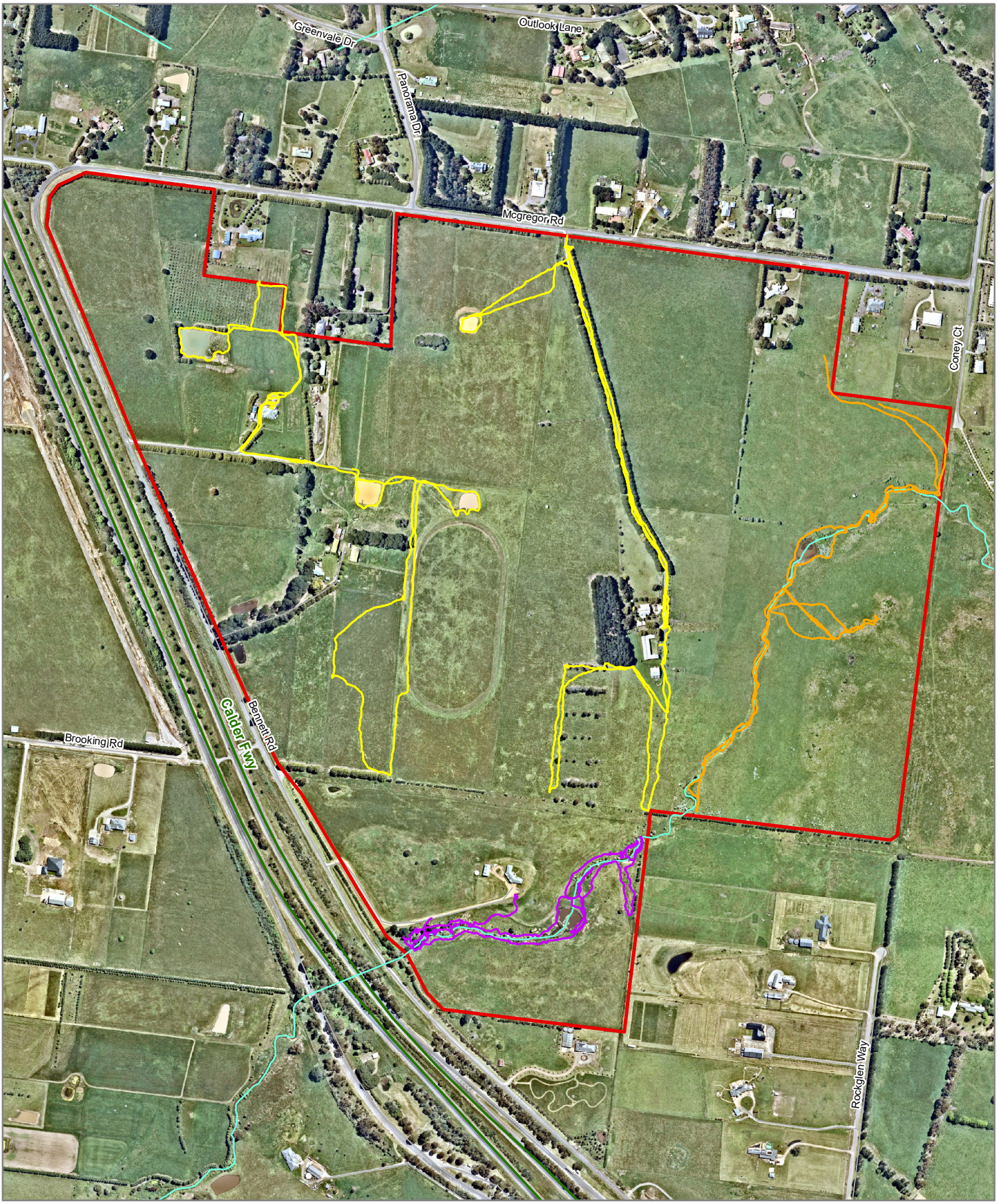


Figure 4
Targeted significant flora species surveys
Bennett Road Development Plan, Gisborne

Legend

- Study Area

Survey tracks*

- Track 1
- Track 2
- Track 3

N

0 75 150
Metres

ecology & heritage partners

*No significant flora species were recorded during the surveys

14226_Fig04_TargSigFlora_P 16/12/2020 melsley

Aerial source: Nearmap 2020

APPENDICES

Appendix 1.1 - Habitat Hectare Assessment

Table A1.2. Habitat Hectare Assessment Table.

Vegetation Zone		PSW1	PSW2	SKS1	TM1	PG1
Bioregion		VVP	VVP	VVP	VVP	VVP
EVC / Tree		PSWe	PSWe	SKS	TM	PG
EVC Number		647	647	649	821	132_62
EVC Conservation Status		Endangered	Endangered	Endangered	Least Concern	Endangered
Patch Condition	Large Old Trees /10	0	0	0	0	0
	Canopy Cover /5	0	0	0	0	0
	Under storey /25	5	15	5	5	5
	Lack of Weeds /15	0	9	0	9	4
	Recruitment /10	0	6	0	3	0
	Organic Matter /5	4	2	4	2	3
	Logs /5	0	0	0	0	0
	Treeless EVC Multiplier	1.36	1.36	1.36	1.36	1.36
	Subtotal =	12.24	43.52	12.24	25.84	16.32
Landscape Value /25		2	2	2	2	2
Habitat Points /100		14	46	14	28	18
Habitat Score		0.14	0.46	0.14	0.28	0.18

Note: VVP = Victorian Volcanic Plain, PSWe = Plains Sedgy Wetland, SKS – Stony Knoll Shrubland, TM = Tall Marsh, PG = Plains Grassland