South East Australia Carbon Capture and Storage Project Flora and Fauna Assessment

FINAL REPORT

Prepared for Advisian Pty Ltd

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- Jane Kenny, Samuel Bodycomb, Joshua Orchard, Sam Trollope, Claire Tingate, Zahlia Payne (assistance in the field)
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- Matt Looby (quality assurance)

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SUMMARY

Project background

Biosis Pty Ltd was commissioned by Advisian Service Pty Ltd (Advisian) on behalf of Esso Australia Resources Pty Ltd (in its capacity as operator of the Gippsland Basin Joint Venture the participants in which are Esso Australia Resources Pty Ltd and Woodside Energy (Bass Strait) Pty Ltd) (Esso) to undertake a flora and fauna assessment of the new onshore pipeline component of the South East Australia Carbon Capture and Storage Project (SEA-CCS project). The study area follows an existing easement from the Longford Plant on Garretts Road to the Valve Site 3 (VS3) adjacent to Longford-Loch Sport Road, east of Dutson, Victoria. The pipeline route is approximately 19 kilometres long, within an existing 36 metre wide easement. Once complete, the pipeline will be used to transport carbon dioxide (CO2) from the Longford Gas Conditioning Plant to VS3, where it will connect to the existing Bream pipeline.

Biosis worked with the proponent to produce a disturbance footprint which minimises impacts to biodiversity values. This process included consultation sessions with the Department of Energy, Environment and Climate Action (DEECA) and several iterations of the projects impacts and construction methods. The steps taken to reduce the proposed new pipeline's construction impacts are presented in Figure 1 and discussed further below.

Assessment approach, methods and results

An initial desktop study completed by Biosis in September 2022 focused on a study arear ranging from 70 to 200 meters wide (this area included the existing 36-metre-wide easement). The initial study area was significantly larger than the anticipated disturbance footprint to provide flexibility to avoid and minimise impacts to biodiversity. The aim of the desktop study was to identify key ecological values and constraints within the study area. This desktop study relied on government database searches to identify threatened species records from the local area and used DEECA's Ecological Vegetation Class (EVC) modelling to determine vegetation type, threatened communities and habitat types. Several threatened species and communities were identified as having suitable habitat within the study area. The results of this study were provided to DEECA during consultation prior to undertaking the site assessment to obtain their input on study design and potential environmental issues.

The detailed flora and fauna assessment commenced in October 2022 and included a site assessment of the approximately 70 to 200 metre study area (126 hectare). This investigation included:

- Mapping of Ecological Vegetation Classes (EVCs) within the study area.
- Recording of all native and introduced flora.
- Mapping of all large trees according to EVC benchmarks.
- Characterising and mapping fauna habitat types and quality.
- Identifying the need for targeted surveys for a number of *Environment Protection Biodiversity and Conservation Act* (EPBC Act) and *Flora and Fauna Guarantee Act* (FFG Act) listed flora and fauna species and Threatened Ecological Communities (TECs).
- Documenting land management issues.

- Identifying potential opportunities to avoid and minimise the removal of native vegetation and fauna habitat.

Ecological values identified during the detailed assessment included:

- Six Ecological Vegetation Classes (EVCs) within the Gippsland Plain bioregion:
  - 20.87 hectares of Damp Sands Herb Rich Woodland EVC 3 (Bioregional Conservation Status (BCS): Vulnerable) of low to high quality. An absent canopy layer characterises the low-quality habitat zones, while high quality zones support a diverse native understorey and intact canopy.
  - 8.48 hectares of Sand Heathland EVC 6 (BCS: Rare) of low to moderate quality, supporting a variably diverse native understorey and high cover of weeds at the time of assessment.
  - 3.22 hectares of Lowland Forest EVC 16 (BCS: Vulnerable) of low to moderate quality, supporting a low density of large trees and logs, and high cover of annual weeds at the time of assessment.
  - 11.53 hectares of Heathy Woodland EVC 48 (BCS: Least concern) of low to high quality. High quality habitat zones have a diverse understorey and large trees, while low quality zones lack several habitat components.
  - 8.47 hectares of Swamp Scrub EVC 53 (BCS: Endangered) of moderate to high quality with a low cover of weeds.
  - 2.3 hectares of Creekline Herb-rich Woodland EVC 164 (BCS: Endangered) of moderate to high quality, with little to no weed cover and a diverse understorey.
  - The above EVCs are all present within the existing easement in a derived condition state with the canopy and mid layers removed. Outside of the existing easement these EVCs are intact.
  - 12.56 hectares of modelled wetlands according to DEECA's Current wetlands dataset. These areas were dry at the time of assessment and were predominantly dominated by introduced vegetation, with little evidence of wetland plant species or assemblages present.
- One hundred and sixty-four large trees in patches.
- Nineteen large scattered trees and nine small scattered trees.
- Five flora species listed under the FFG Act were recorded within the study area: Gippsland Lakes Peppermint *Eucalyptus arenicola*, Ribbed Thryptomene *Thryptomene micrantha*, Pink Zieria *Zieria veronicea* subsp. *veronicea*, Pale Swamp Everlasting *Coronidium gunnianum* and Clustered Lily *Thelionema caespitosum.*
- Habitat for eight additional threatened flora species including:
  - One species listed under both the EPBC Act and the FFG Act: Swamp Everlasting *Xerochrysum palustre*.
  - An additional six species listed under the FFG Act: Variable Bossiaea *Bossiaea heterophylla*, Naked Beard-orchid *Calochilus imberbis*, Spurred Helmet-orchid *Corybas aconitiflorus*, Eastern Water-ribbons *Cycnogeton microtuberosum* and Veiled Fringe-sedge *Fimbristylis velata* and Purple Donkey-orchid *Diuris punctata* var. *punctata*, however these species were not recorded within the study area during the field assessment.
- Fifty five species listed as Protected flora under the FFG Act recorded within the study area.
- Four threatened fauna species were recorded within or adjacent to the study area: Southern Brown Bandicoot *Isoodon obesulus obesulus* (presence assumed due to indirect evidence), Green and Golden

Bell Frog *Litoria aurea,* Glossy Grass Skink *Pseudemoia rawlinsoni,* White-bellied Sea-Eagle *Haliaeetus leucogaster*.

- Habitat for an additional 22 threatened fauna species occurs including:
  - Eight species listed under both the EPBC Act and FFG Act: Swift Parrot *Lathamus discolor,* White-throated Needletail *Hirundapus caudacutus*, New Holland Mouse *Pseudomys novaehollandiae*, Grey-headed Flying-fox *Pteropus poliocephalus*, Swamp Skink *Lissolepis coventryi,* Growling Grass Frog *Litoria raniformis,* Dwarf Galaxias *Galaxiella pusilla,* and Hooded Robin *Melanodryas cucullata,* however these species were not recorded within the study area during the field assessment
  - An additional four species listed under the EPBC Act only: Gang-gang Cockatoo *Callocephalon fimbriatum,* Blue-winged Parrot *Neophema chrysostoma,* Pilotbird *Pycnoptilus floccosus* and Brown Treecreeper *Climacteris picumnus victoriae*, however these species were not recorded within the study area during the field assessment
  - An additional ten species listed under the FFG Act only: Eastern Great Egret *Ardea alba modesta*, Little Eagle *Hieraaetus morphnoides*, Powerful Owl *Ninox strenua*, Masked Owl *Tyto novaehollandiae*, Chestnut-rumped Heathwren *Calamanthus pyrrhopygius*, Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*, Lace Monitor *Varanus varius,* Southern Toadlet *Pseudophryne semimarmorata*, Martin's Toadlet *Uperoleia martini* and Flinders Pygmy Perch *Nannoperca sp. 1*., however these species were not recorded within the study area during the field assessment
- Habitat for seven species listed as migratory under the EPBC Act, assessed as likely to inhabit the study area or the airspace above the study area: White-throated Needletail *Hirundapus caudacutus*, Fork-tailed Swift *Apus pacificus*, Black-faced Monarch *Monarcha melanopsis*, Rufous Fantail *Rhipidura rufifrons*, Satin Flycatcher *Myiagra cyanoleuca*, Latham's Snipe *Gallinago hardwickii* and Glossy Ibis *Plegadis falcinellus,* however these species were not recorded within the study area during the field assessment

The detailed assessment identified suitable habitat for 25 threatened flora species and 26 threatened fauna species protected under State or Federal legislation. No TECs were recorded. Targeted survey recommendations were provided to DEECA, who provided comment on the proposed targeted survey schedule and methods.. The flora and fauna targeted surveys that followed were undertaken in accordance with recommendations provided by DEECA.

Targeted surveys for threatened flora were undertaken over two weeks in November and December 2022 and in August and October 2023 for several species that had suitable habitat within the study area. During the targeted surveys five FFG Act listed flora species were recorded;

- Gippsland Lakes Peppermint, listed as endangered
- Ribbed Thryptomene, listed as endangered
- Pink Zieria, listed as endangered
- Pale Swamp Everlasting, listed as critically endangered
- Clustered Lily, listed as vulnerable

No EPBC Act listed flora were recorded during the field assessments.

Potentially suitable habitat was identified for one additional EPBC Act listed species: Swamp Everlasting. Suitable habitat within the study area includes vegetation that could be considered native wetland vegetation

following inundation. Thus, no targeted surveys are planned for this species as inundation of the study area has not occurred.

Targeted surveys for threatened frogs (call playback and active searching) were undertaken over four nights in December 2022, and one night in January 2023. Targeted surveys for threatened reptiles (tile grids and active searching) were undertaken over three weeks in February 2023. Opportunistic searches for Southern Brown Bandicoot (searching for diggings and scats) were undertaken over four days in December 2022, and during other (non-targeted) site investigations. During the site investigation, targeted surveys and opportunistic searches, four threatened fauna species listed under the EPBC Act and/or the FFG Act were recorded:

- Southern Brown Bandicoot listed as endangered under the FFG Act and EPBC Act (presence assumed from indirect evidence of bandicoot activity)
- Green and Golden Bell Frog listed as vulnerable under the EPBC Act
- Glossy Grass Skink listed as endangered under the FFG Act
- White-bellied Sea-eagle listed as endangered under the FFG Act

Impact avoidance and minimisation

The results from the targeted surveys, detailed flora and fauna assessment, constraints assessments and discussions with DEECA provided the data for an ecological constraints map which was utilised by Advisian and Esso during the design phase of the pipeline. The constraints map highlighted areas of known threatened species habitat, potential threatened species habitat, areas of native vegetation, mapped wetlands, and locations of large and scattered trees. Biosis, Advisian and Esso were involved in a workshop in January 2023 and used this map to discuss the approach to the pipeline construction methodology with an aim to avoid and minimise impacts to areas of ecological value.

Several design iterations of the disturbance footprint followed in response to ecological investigations and advice. The resulting disturbance footprint and design now avoids most intact native vegetation by utilising the existing easement, where vegetation is highly modified. Significant areas of threatened species habitat within the easement were avoided by proposing to use trenchless construction methods. No large or scattered trees will be removed or indirectly lost during the pipeline construction following mitigation measures and advice recommended in the arboricultural assessment (Appendix H).

The steps taken to reduce the pipeline's construction impacts are presented in Figure 1.

Residual impacts

In summary the final disturbance footprint will have the following residual impacts:

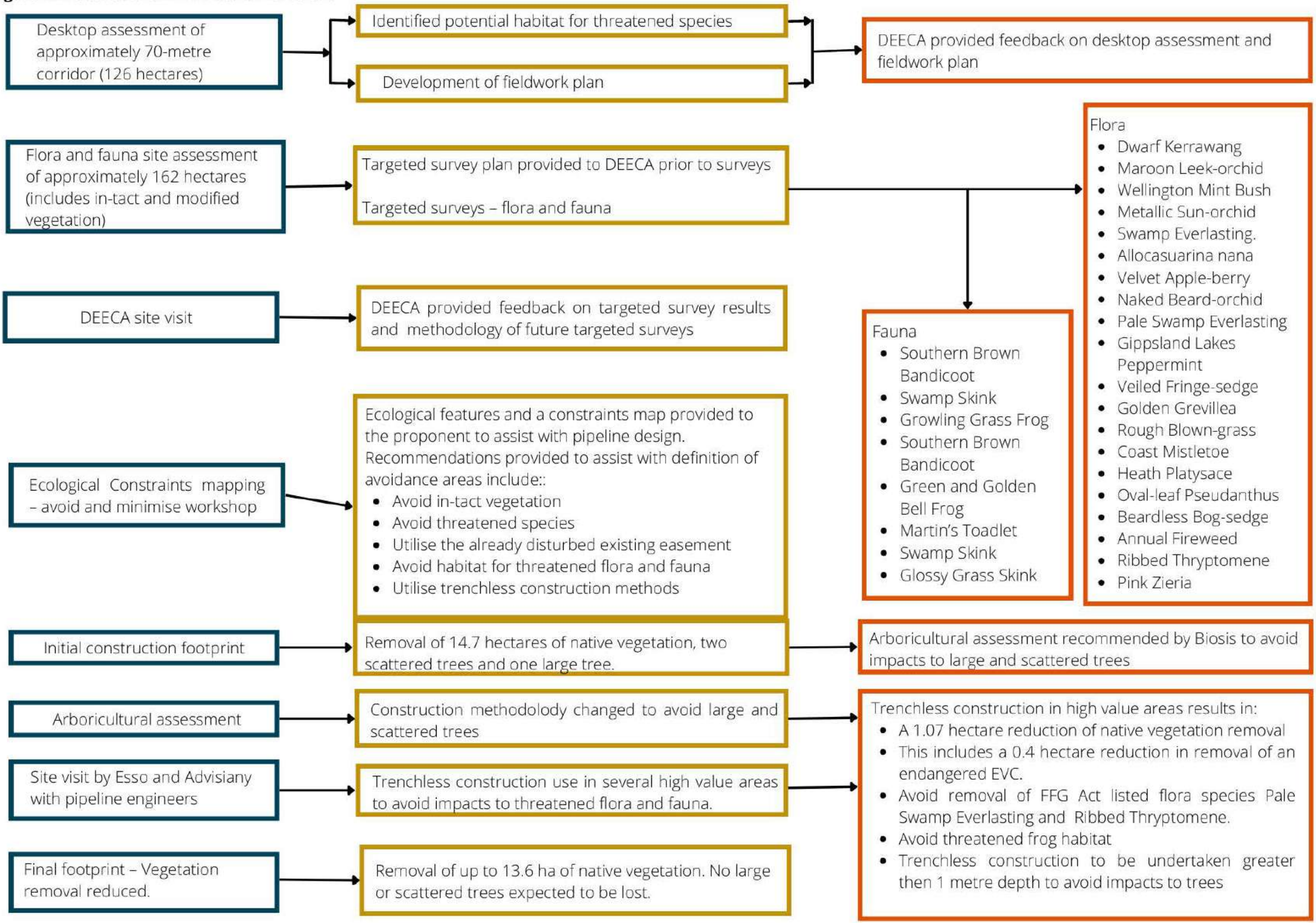
- Removal and temporary disturbance of up to 13.632 hectares of remnant native vegetation representative of five EVCs:
  - Damp Sands Herb-rich Woodland EVC 3
  - Sand Heathland EVC 6
  - Lowland Forest EVC 16
  - Heathy Woodland EVC 48

  - Swamp Scrub EVC 53
  - Deep Freshwater Marsh modelled wetlands from DEECA's Current wetlands dataset.
- Of the 13.632 hectares of native vegetation removal, approximately 12.692 hectares (93%) occurs within the existing easement and is of a highly modified derived state due to decades of easement maintenance (i.e. is a treeless form of the original treed EVCs and supports modified native understorey). The remaining 0.940 hectares (7%) of native vegetation removal occurs within areas of intact native vegetation. These impacts are summarised in the below table.
- Removal and temporary disturbance of up to 5.98 hectares of DEECA modelled Deep Freshwater Marsh, which may provide habitat for EPBC Act and FFG Act listed species Swamp Everlasting *Xerochrysum palustre*, although this species was not recorded within the study area. It should be noted that Winter and Spring of 2022 had above average rainfall in West Gippsland (BOM 2023, Bom 2023a), however modelled wetland areas were dry at the time of assessment, dominated by predominantly introduced vegetation and supporting limited wetland values. As such, indirect impacts to areas of wetland that sit outside the disturbance footprint are considered unlikely.
- Removal of potentially suitable habitat for FFG Act listed flora Naked Beard-orchid *Calochilus imberbis,* Spurred Helmet-orchid *Corybas aconitiflorus* and Veiled Fringe-sedge *Fimbristylis velata*, although these species were not recorded in the study area.
- Impacts to habitat for the FFG Act listed Glossy Grass Skink *Pseudemoia rawlinsoni*.
- Impacts to potential habitat critical to the survival of three EPBC Act listed threatened fauna species; Swamp Skink *Lissolepis coventryi*, Gang-gang Cockatoo *Callocephalon fimbriatum* and Blue-winged Parrot *Neophema chrysostoma*.

Proposed impacts to native vegetation by EVC; intact and modified

EVC	Bioregional Conservation status	Modified vegetation removal (ha)	Intact vegetation removal (ha)	Total vegetation removal (ha)
Damp Sands Herb-rich Woodland EVC 3	Vulnerable	4.662	0.320	4.982
Sand Heathland EVC 6	Rare	0.870	0.470	1.340
Lowland Forest EVC 16	Vulnerable	0.010	0.000	0.010
Heathy Woodland EVC 48	Least Concern	0.480	0.050	0.530
Swamp Scrub EVC 53	Endangered	0.691	0.100	0.791
Deep Freshwater Marsh (modelled wetland)	Vulnerable	5.979	0.000	5.979
Creekline Herb-rich Woodland	Endangered	0.000	0.000	0.000
Total		**12.692**	**0.940**	**13.632**

Figure 1 Avoidance and minimisation flowchart



Legislative and policy considerations

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarised below.

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
EPBC Act	Areas providing potential habitat for one flora species: • Swamp Everlasting Areas providing potential habitat for 14 fauna species and seven listed migratory species. Study area is within 2 km of the Gippsland Lakes Ramsar site.	An EPBC Act referral is recommended as the project has the potential to cause impacts to MNES.	Targeted surveys were undertaken in November 2022 for: • Dwarf Kerrawang • Maroon Leek-orchid • Metallic Sun-orchid • Wellington Mint-bush • Swamp Everlasting A targeted survey was undertaken in August 2023 for: Green-striped Greenhood A targeted survey was undertaken in October 2023 for: • Metallic Sun-orchid • Thick-lip Spider Orchid No EPBC Act listed species were recorded during the November 2022, August 2023 and October 2023 surveys. Swamp Everlasting is a lowland swamp species and would likely only be recorded within the study area following inundation. Assessment against the Significant Impact Criteria (SIC) has been prepared for Swamp Everlasting and a significant impact is considered unlikely (Appendix C). Targeted fauna surveys were undertaken over December 2022 to February 2023 for: • Swamp Skink • Growling Grass Frog. Opportunistic searches for Southern Brown Bandicoot activity in December 2022 and during other fauna surveys.

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
			Assessment against the SIC has been prepared for EPBC Act listed fauna species likely to occur within the study. A significant impact is considered unlikely (Appendix C).
FFG Act	Five FFG Act listed flora species recoded within the study area: • Gippsland Lakes Peppermint • Ribbed Thryptomene • Pink Zieria • Pale Swamp Everlasting • Clustered Lily Areas providing potential habitat for seven FFG Act listed flora species: • Swamp Everlasting • Variable Bossiaea • Naked Beard-orchid • Spurred Helmet-orchid • Eastern Water-ribbons • Veiled Fringe-sedge Areas providing potential habitat for 21 FFG Act listed fauna species. Protected flora species are present.	Protected flora permit required for areas of public land. The study area includes public land. Further consultation with DEECA is required regarding potential impacts to FFG Act listed species on public land.	Targeted surveys undertaken in November 2022, August 2023 and October 2023 for 21 FFG Act listed flora species and October . See Table 2 for full list. Targeted fauna surveys were undertaken over December 2022 to February 2023 for: • Growling Grass Frog • Green and Golden Bell Frog • Martin's Toadlet • Swamp Skink • Glossy Grass Skink Opportunistic searches for Southern Brown Bandicoot activity in December 2022 and during other fauna surveys. DEECA reviewed the targeted survey methodology and provided feedback that it was suitable.
Pipelines Act	Impacts on native vegetation is a relevant consideration.	Licence is required under the Pipelines Act for the construction and operation of the pipeline.	Under the Pipelines Act, license applications are required to meet the no net loss and assessment objectives of the *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines). The Guidelines also provide guidance for avoidance, minimisation and offsetting of impacts to native vegetation.
Planning and Environment Act 1987 (PE Act)	Impacts to native vegetation.	No permit required if a licence is issued under the Pipelines Act	Section 85 of the Pipelines Act provides an exemption from the need to obtain planning

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
			approvals under the PE Act for the use or development of land or the doing or carrying out of any matter or thing for the purpose of the pipeline. Should any aspect of the Project not occur under a pipeline license issued under the Pipelines Act, Esso will obtain any necessary consents in accordance with any local planning requirements.
Catchment and Land Protection Act 1994 (CaLP Act)	Five noxious weeds and four pest animals were recorded within the study area.	N/A	Esso will need to comply with requirements to control/eradicate pest species.
Water Act 1989	Mapped waterways	Referral to West Gippsland Catchment Management Authority (CMA) for a works on waterways permit for any works that occur within waterways.	Esso has consulted with West Gippsland CMA for waterway determination
Fisheries Act	One protected aquatic species may be impacted if in stream or bank works are proposed for any waterway crossings: • Flinders Pygmy Perch *Nannoperca sp. 1*	Provided appropriate mitigation actions are taken, a permit is unlikely to be required.	Waterway crossings have been considered during the detailed site assessment. Impacts to waterways have been minimised through proposed use of trenchless construction under permanent waterways and wetlands. Mitigation actions to be documented in the CMP.
Environment Effects Act 1978	Removal of native vegetation and threatened species population and habitat impacts.	The project is unlikely to meet the biodiversity related referral criteria for individual potential environmental effects under the EE Act, however this will be subject to the outcomes of final orchid surveys.	A referral is required under the individual potential environmental effect when a project removes 10 hectares or more of an endangered EVC. The disturbance footprint associated with the proposed pipeline will only remove up to 0.94 hectares from an endangered EVC

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
			A referral may be required under the combination of two potential environmental effects, however the second effect is unlikely to be related to biodiversity. The disturbance footprint associated with the pipeline will remove over 10 hectares of native vegetation. Removal of 10 hectares or more of native vegetation (regardless of EVC conservation status) meets the biodiversity criteria for a referral if in combination with another potential environmental effect. The decision as to whether an EES is required is ultimately at the discretion of the Minister for Planning.
Environment Protection Act 2017 (EP Act)	Mapped Wetlands and waterways	N/A	Adhere to the mitigation measures outlined in this report to avoid impacts to wetlands and waterways.

Guidelines for the removal, destruction or lopping of native vegetation (the Guidelines)

If a license is issued under the Pipelines Act, the project does not need a local planning permit under the PE Act for the removal, destruction or lopping of native vegetation (and the subsequent application of the Guidelines). However, the Guidelines are still a relevant consideration to guide avoidance, minimisation and offsetting of impacts on native vegetation.

Based on the current design, the proposed development will require the removal of up to 13.632 hectares of native vegetation, from within location category 2, which is the second highest risk category used to indicate the potential risk to biodiversity to remove native vegetation from an area (DELWP 2017a).The strategic biodiversity value score of the native vegetation to be removed is between 0.430 and 0.981 for a range of habitat zones.

Offset requirements for the removal of the native vegetation include 5.909 general habitat units. No large tree offsets are required.

The general offset must be within the West Gippsland Catchment Management Authority (CMA) area or the Wellington Shire municipal district area and must have a minimum strategic biodiversity value score of 0.569.

The applicant may seek to purchase 'third party' general offset credits via an accredited trading scheme. A search using the DEECA native vegetation credit register to purchase general habitat units that satisfy the offset requirements as specified above was undertaken. Eight sites and/or credits are available for purchase as of 20 November 2023 within the West Gippsland CMA. These credit register outputs are available in Appendix G.

Avoid and minimise statement

the following should be considered to avoid and minimise impacts to native vegetation and threatened species habitat:

- Detailed project planning including a desktop constraints assessment and constraints mapping with follow up design meetings to address results.
- Field survey of an expanded study area (70 to 200 metres in width) to provide flexibility during the design phase to avoid and minimise impacts to native vegetation and threatened species habitat.
- Aligning the proposed new pipeline within the existing previously cleared easement, to reduce the extent of removal of native vegetation and threatened species habitat. A total of up to 13.632 hectares of native vegetation is proposed to be removed by the proposed new pipeline works, however 12.7 hectares of that total is native vegetation within the existing easement. The easement lacks all medium and large plant lifeforms due to ongoing maintenance of the existing easement under the Pipelines Act, pipeline licences and AS 2885
- Areas of high ecological value have been avoided entirely using trenchless construction. This is being utilised across habitat zones 30-33 34-45, 54-55, 60, 61 and 79 (Figure 3). The construction right-of-way (ROW) has also been narrowed in several areas to reduce impacts to native vegetation and threatened species habitat. Through these mitigation measures the proponent is avoiding:
  - The removal of FFG Act listed flora species Pale Swamp Everlasting and Ribbed Thryptomene.
  - The removal of 1.07 hectares of native vegetation which includes 0.41 hectares of an endangered EVC; Creekline Herb-rich Woodland EVC 164. There will be no impacts to this endangered EVC from the proposed new pipeline construction.

  - Removal of large and scattered trees (trenchless construction will occur below 1 metre depth to avoid most tree roots and have a negligible impact on tree health.
  - Removal of areas of suitable habitat for FFG Act listed flora Naked Beard-orchid and Variable Bossiaea.
  - Removal or disturbance of potential habitat for EPBC Act and FFG Act listed fauna; Southern Brown Bandicoot, Gang-gang Cockatoo, Blue-winged Parrot, Swift Parrot, Pilotbird, New Holland Mouse, Grey-headed Flying-fox, Swamp Skink, Green and Golden Bell Frog, Growling Grass Frog, Little Eagle, Powerful Owl, Masked Owl, Lace Monitor, Glossy Grass Skink, Southern Toadlet and Martin's Toadlet.
  - Removal or disturbance of all habitat for EPBC Act and FFG Act listed fauna; Dwarf Galaxias and Flinders Pygmy Perch.
- Ensuring construction methods only require the removal of understorey vegetation so the canopy and sub-canopy will remain intact.
- Engaging an arborist at the design stage to review existing conditions for large and scattered trees in the study area to provide sensitive construction techniques that can be applied to ensure encroachment into tree protection zones and structural root zones does not lead to the long-term decline of trees. No large patch or scattered trees will be lost due to the proposed new pipeline construction.

Recommendations

The results of this assessment should be incorporated into the project design, by adding the flora and fauna mapping information into the planning maps and investigating options to retain as much of the mapped vegetation/habitats as possible.

A range of recommendations are provided that underpin avoiding and minimising impacts on biodiversity. Actions to minimise impacts on native vegetation and threatened species habitat need to be considered and evaluated based on technical and stakeholder requirements. Mitigations measures will need to be implemented through a project Construction Environmental Management Plan (CEMP). Recommended mitigation measures are provided in Section 4.

Additional recommendations

Biosis also recommends the following pre-construction and construction measures be implemented:

- The works areas should be clearly delineated and areas outside of the works area marked as 'no-go' zones prior to construction.
- Mitigation measures, and other actions to be included in a detailed Construction Environmental Management Plan (CEMP) that covers:
  - Site environmental inductions that specifically address ecological risks and mitigations for all personnel prior to set out, vegetation clearing or soil disturbance commencing.
  - Erosion, sediment control and water quality.
  - Flooding / high flow events.
  - Management of vegetation outside the immediate works area.

  - Salvage of wildlife during any vegetation clearing i.e. a fauna salvage protocol and an unexpected finds protocol for biota that may be uncovered during the removal of vegetation and disturbed ground.
  - Any fauna uncovered during removal of vegetation should be relocated to adjacent suitable habitat.
  - Pollution control and protection including for dust, noise and emissions
  - Waste minimisation and safe disposal of wastes.
  - Containment and management of spills (oil, fuel, or other products).
  - Procedures against introduction of weeds, pests, livestock and crop diseases, and soil and wildlife pathogens (e.g. Chytrid fungus) to / from site.
  - Identification and management of site hazards.
  - Rehabilitation of temporarily disturbed soil and vegetation and subsidence
  - A process for defining roles and responsibilities in the CEMP and undertaking monitoring, review and adaptive management of CEMP practices.
  - Responsibilities for the provision and maintenance of all environmental protection measures.
- During construction the CEMP requirements outlined above should be implemented and regularly monitored by the contractor and the proponent, with a third-party audit process in place to ensure proper and ongoing compliance throughout the life of the project.
- All access to and from works sites will be via existing tracks or via ground disturbed during construction.

1. Introduction

1.1. Project background

Biosis Pty Ltd was commissioned by Advisian Pty Ltd (Advisian) on behalf of Esso Australia Resources Pty Ltd (in its capacity as operator of the Gippsland Basin Joint Venture the participants in which are Esso Australia Resources Pty Ltd and Woodside Energy (Bass Strait) Pty Ltd) (Esso) to undertake a flora and fauna assessment of the new onshore pipeline component of the South East Australia Carbon Capture and Storage Project (SEA-CC project). The proposed new pipeline runs between the Longford Plant on Garretts Road to the Valve Site 3 (VS3) adjacent to Longford-Loch Sport Road, east of Dutson, Victoria. Once complete, the approximately 19 kilometre pipeline will be used to transport carbon dioxide (CO2) from the Longford Gas Conditioning Plant to VS3 located in Dutson Victoria, where it will connect to the existing Bream pipeline.

Biosis undertook a desktop assessment of the study area in September 2022 to identify key ecological values and constraints likely to occur within the study area. Much of the study area runs through highly modified farmland and small sections traverse Crown Land or land owned by Gippsland Water or Esso. The study area includes an existing 36 metre wide easement where several underground pipelines already exist. The proposed new pipeline construction project will be undertaken in compliance with the *Pipelines Act 2005*.

The detailed flora and fauna assessment commenced in October 2022 and included a site investigation that assessed a study area up to 200 metres wide (approximately 126 hectares) and included the existing easement. This investigation included:

- Mapping of Ecological Vegetation Classes (EVCs) within the study area and Threatened Ecological Communities (TECs).
- Recording of all native and introduced flora within the study area.
- Mapping of all large trees according to EVC benchmarks within the study area.
- Characterising fauna habitat types and quality.
- Providing recommendations for the avoidance and minimisation of native vegetation and fauna habitat.
- Targeted surveys for a number of EPBC Act and FFG Act listed flora species
- Targeted surveys for EPBC Act and FFG Act threatened reptiles, frogs and mammals
- Documenting land management issues and existing threatening processes.

This report presents the results of the detailed ecological assessment, targeted surveys and impact assessments.

1.1 Pipeline construction methods and possible impacts

The new pipeline will be constructed using specialised equipment and crews who work in a production line manner, whereby construction teams move along the pipeline in one direction to complete each stage of construction sequentially. There are a range of possible impacts on native vegetation, threatened species populations and habitat, soils and waterways. The following impacts have been identified for the purpose of this ecological impact assessment:

- Removal of native vegetation in the pipeline disturbance footprint, noting that that vegetation and layers of topsoils are preserved in separate stockpiles to be reinstated following construction. Trenchless construction will be used to avoid several areas of high ecological significance i.e. threatened species habitat and mapped wetlands.
- Removal of threatened fauna habitat, noting that predominantly introduced vegetation can act as suitable fauna habitat.
- Disturbance or removal of rare or threatened plants, noting efforts have been made to realign the design around known populations or potential habitat of threatened species.
- Impacts to Tree Protection Zones (TPZs), noting that no large or scattered trees will be lost for pipeline construction. This includes protection of TPZs.
- Increased risk of weed introduction and spread, noting weed control and revegetation of local native plant species is planned for the rehabilitation phase of construction.
- Increased risk of pathogen spread, noting mitigation strategies recommended here that should be incorporated into a Construction Environmental Management Plan.

1.2. Scope of assessment

The objectives of this investigation are to:

- Undertake a detailed flora and fauna assessment of the study area proposed for the new onshore pipeline component of the SEA-CCS project.
- Assist with options to avoid and/or minimise significant impacts to the environment in the study area.
- Locate, characterise and assess Matters of National Environmental Significance, in particular, terrestrial and aquatic flora, fauna and ecological communities protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within the study area.
- Locate, characterise and assess *Flora and Fauna Guarantee Act 1988* (FFG Act) terrestrial and aquatic flora, fauna and ecological communities within the study area.
- Identify the extent and condition of all Ecological Vegetation Classes (EVCs) within the study area.
- Assess native vegetation within the study area to support the required licensing assessment pathway for native vegetation removal. Information provided must be consistent with DEECA policies and guidelines for native vegetation removal.
- Identify the location of weed and pest species encountered during surveys.
- Undertake Vegetation Quality Assessments.
- Undertake targeted survey and/or assessment of the following:
  - EPBC Act and FFG Act-listed flora species; Dwarf Kerrawang, Maroon Leek-orchid, Wellington Mint Bush and Swamp Everlasting.
  - FFG Act listed flora species; Stunted Sheoak, Velvet Apple-berry, Naked Beard-orchid, Pale Swamp Everlasting, Gippsland Lakes Peppermint, Veiled Fringe-sedge, Golden Grevillea, Rough Blown-grass, Coast Mistletoe, Heath Platysace, Oval-leaf Pseudanthus, Beardless Bog-sedge, Annual Fireweed, Ribbed Thryptomene and Pink Zieria.
  - EPBC Act and FFG Act listed fauna species: Southern Brown Bandicoot (opportunistic survey), Growling Grass Frog and Swamp Skink.

- EPBC Act listed fauna species: Green and Golden Bell Frog.
- FFG Act listed fauna species: Glossy Grass Skink and Martin's Toadlet.

1.3. Location of the study area

The study area runs east from Garretts Road, Dutson to Longford – Loch Sport Road, Dutson Downs, Victoria. It is located 15 to 30 kilometres south-east of Sale (Figure 2). The proposed easement runs through Crown land, private and public land and is currently defined as Industrial Zone near Garretts Road, Farming Zone across the private properties and Public Use Zone – Service and Utility across the remainder of study area. Three Crown land parcels are covered by a Bushfire Management Overlay (BMO) and there are some small areas near VS3and Signboard Lane covered by an Environmental Significance Overlay and a Land Subject to Inundation Overlay in the Wellington Planning Scheme.

The study area is within the:

- Gippsland Plain Bioregion.
- Management area of West Gippsland Catchment Management Authority (CMA).
- Wellington Shire municipality.
- Latrobe River Basin.
- Traditional lands of the Gunaikurnai.

1.2 Project area details and definitions

Table 1 outlines key project terms, abbreviations and their definitions.

Table 1 Definitions of project terms, acronyms and abbreviations

Term, acronym, or abbreviation	Definition
Study area	The area surveyed on ground during the flora and fauna assessment.
Local area	The study area buffered outwards by 10 kilometres. This area is used to conduct the database review and review of biodiversity values.
Disturbance footprint	The 15-75 metre corridor within the study area, where vegetation removal and soil disturbance is likely to occur to construct the pipeline.
BCS	Bioregional Conservation Status
CaLP Act	*Catchment and Land Protection Act 1994*
CEMP	Construction Environmental Management Plan
CMA	Catchment Management Authority
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Federal)
DEECA	Department of Energy, Environment and Climate Action (State)
EE Act	*Environment Effects Act 1978*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
PMST	Protected Matter Search Tool
TEC	Threatened Ecological Community
ROS	Regional Outfall Sewer
MNES	Matters of National Environmental Significance (as defined under the EPBC Act)
SEA-CCS	South East Australia Carbon Capture and Storage Project
SIC	Significant Impact Criteria (as defined under the EPBC Act)

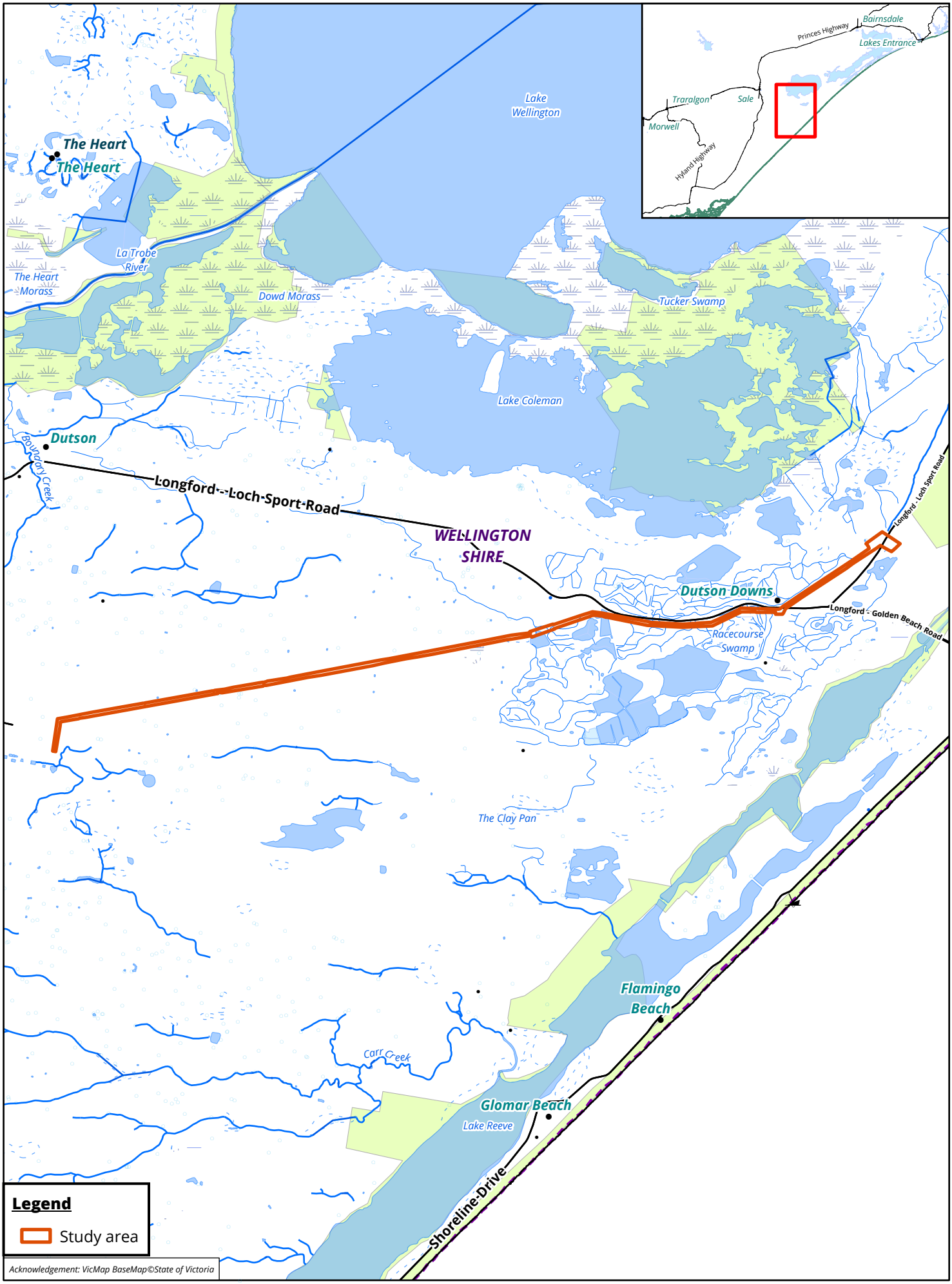


Figure 2. Location of the study area - Dutson Downs, Victoria

Matter: 37664,
Date: 27 October 2022 ,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F1_Locality
Project: P:\37600s\37664\Mapping\37664_ESSO_FFA.aprx

0 1,000 2,000 3,000 4,000
Metres
Scale: 1:100,000 @ A4
Coordinate System GDA 1994 MGA Zone 55

N

00

2. Methods

2.1. Database review

In order to provide a context for the study area, information about flora and fauna from within 10 kilometres of the study area (the 'local area') was obtained from relevant biodiversity databases, many of which are maintained by the Victorian Government Department of Energy, Environment and Climate Action (DEECA) (formerly Department of Environment, Land, Water and Planning (DELWP)) or the Australian Government Department of Climate Change, Energy, Environment and Water (DCCEEW). Records from the following databases were collated and reviewed:

- DEECA's Victorian Biodiversity Atlas (VBA), including the 'VBA_FLORA25, FLORA100 & FLORA Restricted' and 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' datasets.
- DCCEEW's Protected Matters Search Tool for matters protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Australian Platypus Conservancy Database.

Other sources of biodiversity information were examined including:

- DEECA's NatureKit mapping tool.
- DEECA's Habitat Importance maps.
- DEECA's Native Vegetation Information Management (NVIM) system.
- DEECA's Ensym NVR Tool Support team was provided with site-based spatial information in order to generate a Native Vegetation Removal Report for the study area.
- Planning Scheme overlays relevant to biodiversity based on https://www.planning.vic.gov.au/schemes-and-amendments/browse-planning-schemes.

2.2. Definitions of threatened species or communities

Threatened species or communities include those species or communities that are listed under the EPBC Act and/or FFG Act. The conservation status of a species or ecological community is determined by its listing status under Commonwealth or State legislation / policy (Table 2).

Table 2 Conservation status of threatened species and ecological communities

Government level	Conservation status
National	Listed as nationally critically endangered, endangered or vulnerable under the EPBC Act
State	Listed as extinct, extinct in the wild, critically endangered, endangered, vulnerable or conservation dependent in Victoria under the FFG Act

Lists of threatened species generated from the databases are provided in Appendix A (flora) and Appendix B (fauna) and the species have been assessed to determine their likelihood of occurrence based on the process outlined below.

2.3. Determining likelihood of occurrence of threatened species

Likelihood of occurrence indicates the potential for a species or ecological community to occur regularly within the study area. It is based on expert opinion, information in relevant biodiversity databases and reports, and an assessment of the habitats on site. Likelihood of occurrence is ranked as negligible, low, medium, high or recorded. The rationale for the rank assigned is provided for each species in Appendix A (flora) and Appendix B (fauna). Those species for which there is little or no suitable habitat within the study area are assigned a likelihood of low or negligible and are not considered further.

Only those species listed under the EPBC Act or the FFG Act (hereafter referred to as ' threatened species') are assessed to determine their likelihood of occurrence. The habitat value for threatened species is calculated by the Habitat Importance Modelling produced by DEECA (DELWP 2017a). Where threatened species are recorded in the study area this is noted in Appendix A (flora) and Appendix B (fauna).

Threatened species which have at least medium likelihood of occurrence are given further consideration in this report. The need for targeted survey for these species is also considered. Threatened EPBC Act listed species with at least a medium likelihood of occurrence within the disturbance footprint were assessed under their Significant Impact Criteria.

2.4. Site investigations

2.4.1. Flora assessment

The detailed flora assessment was undertaken by a team of ecologists that included Sarah Hilliar, Sam Bodycomb and Jane Kenny of Biosis. The flora assessment took place during the following weeks:

- 10 October to 14 October 2022.
- 17 October to 20 October 2022.

A list of flora species was collected and will be submitted to DEECA for incorporation into the Victorian Biodiversity Atlas (VBA). Planted species have not been recorded unless they are naturalised. A total of approximately 320 hours was spent surveying the study area.

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses' (Clause 73.01).

The Guidelines classify native vegetation into two categories (DELWP 2017a):

- A **patch** of native vegetation (measured in hectares) is either:
  - An area of native vegetation, with or without trees, where at least 25% of the total perennial understorey cover is native plants.
  - An area with three or more native canopy trees where the drip line (i.e. the outermost boundary of a tree canopy) of each tree touches the drip line of at least one other tree, forming a continuous canopy.
  - Any mapped wetland included in the Current wetlands layer , available in DEECA systems and tools.

Patch vegetation is classified into ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments. Definitions of EVCs and benchmarks (condition against which vegetation quality at the site can be compared) are determined by DEECA.

- A **scattered tree** is defined as a native canopy tree that does not form part of a patch of native vegetation.

A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type. Ecological vegetation class descriptions provide a list of the typical canopy species. A scattered tree is defined as either small or large, and is determined using the large tree benchmark for the relevant EVC. The extent of a small scattered tree is the area of a circle with a 10 metre radius (i.e. 0.031 hectares), while the extent of a large scattered tree is a circle with a 15 metre radius (i.e. 0.070 hectares). A condition score is applied to each scattered tree based on information provided by DEECA's NVIM.

A Vegetation Quality Assessment (VQA) was undertaken for all patches of native vegetation identified in the study area. This assessment is consistent with DEECA's habitat hectare method (DSE 2004) and the Guidelines (DELWP 2017a). For the purposes of this assessment the limit of the resolution for identification of a patch of native vegetation was taken to be 0.001 habitat hectares (Hha). That is, if a discrete patch native vegetation was present with sufficient cover but its condition and extent would not have resulted in the identification of at least 0.001 habitat hectares, the vegetation patch of vegetation was not mapped or included in the assessment.

Species nomenclature for flora follows the VBA.

2.4.2. Targeted flora surveys

During the detailed assessment, suitable habitat for 26 threatened flora species listed under the EPBC Act and/or the FFG Act were identified within the study area.

The spring targeted survey was undertaken by a team of botanist that included Sarah Hilliar, Sam Trollope, and Jane Kenny of Biosis. The flora targeted surveys took place during the following weeks:

- 21 November to 25 November 2022.
- 28 November to 2 December 2022.

The targeted survey searched for 20 species with flowering times during November as per the Flora of Victoria website.

Additional targeted surveys were undertaken for Green-striped Greenhood from 7 to 9 August 2023 by Sam Trollope and Jane Kenny and for Metallic Sun-orchid and Thick-lip Spider-orchid from 2 to 3 October 2023 and 9 to 11 October 2023 by Sarah Hilliar and Joshua Orchid.

There are four species listed in Table 3 that have suitable habitat within the study area, however, were not included in the targeted surveys. Species include:

- Pale Swamp Everlasting (FFG Acct listed); Targeted survey timing was outside of the species flowering period, however Pale Swamp Everlasting was recorded during the November 2022 survey.
- Variable Bossiaea (FFG Act listed); This species has a medium likelihood of occurrence within the study area, however a low likelihood of occurrence within the disturbance footprint. This shrub species would have likely been detected within the disturbance footprint if it occurred there.
- Spurred Helmut-orchid (FFG Act listed); All surveys are outside of this species flowering period (May – July). There is one record within 5 kilometres of the study area, however this record is from 28 years old (1995 record). All other records of this species occur more than 20 kilometres from the study area.
- Eastern Water-ribbons (FFG Act listed); This species has a medium likelihood of occurrence following inundation within the study area, however a low likelihood of occurrence within the disturbance footprint. No periods of inundation have occurred within the study area over the span of the assessment.

A list of targeted threatened flora is provided in Table 3.

Table 3 List of threatened flora species, conservation status, potential habitat and targeted surveys

Common name	Scientific name	EPBC Act conservation status	FFG Act conservation status	Extent of potential habitat within the study area	Flowering period	Species included in targeted survey?
Allocasuarina nana	Stunted Sheoak	-	e	Known only from Mt Elizabeth and the upper Genoa River, growing in heath on sandstone in exposed situations.	August-November	Yes
Billardiera scandens s.s.	Velvet Apple-berry	-	e	Common in heathland, woodland and forests from near sea level to the sub-alps.	November-February	Yes
Bossiaea heterophylla	Variable Bossiaea	-	e	Sandy soils in a range of habitats including heathland and open woodland.	April-June	No
Calochilus imberbis	Naked Beard-orchid	-	cr	Mainly found in heath, heathy woodlands and lowland forests.	October-December	Yes
Caladenia tessellata	Thick-lip Spider-orchid	VU	-	Heathlands, heathy woodlands and lowland forest in coastal areas east from Port Phillip Bay.	September-October	Yes
Commersonia prostrata	Dwarf Kerrawang	EN	e	Swampy, sometimes ephemeral, wetlands and lake margins, that are often dominated by *Lepidosperma* spp.	October-November	Yes
Coronidium gunnianum	Pale Swamp Everlasting	-	cr	Widespread and sometimes locally common, particularly in high-rainfall areas of Victoria; often in moist sites in open forests and woodlands.	February-April	No

Common name	Scientific name	EPBC Act conservation status	FFG Act conservation status	Extent of potential habitat within the study area	Flowering period	Species included in targeted survey?
Corybas aconitiflorus	Spurred Helmet-orchid	-	e	Coastal scrubs, heath, heathy woodland and moist foothill forest in damp, shady sites.	May-July	No
Cycnogeton microtuberosum	Eastern Water-ribbons	-	e	Common in fresh, still or slow-flowing water 50-120 cm deep, in small creeks, swamps and farm dams. Can also be found in stagnant water that is often highly eutrophic and humid from farmland run-off.	Fruits various times of year	No
Diuris punctata var. punctata	Purple Donkey Orchid[1]		e	occurring in the open forests, woodlands and grasslands of the fertile lowlands, now much reduced through clearing for agriculture and restricted to relatively few, isolated sites, but sometimes locally abundant.	October-November	Yes
Eucalyptus arenicola	Gippsland Lakes Peppermint	-	e	Sandy soils in both coastal and near coastal environments.		Yes
Fimbristylis velata	Veiled Fringe-sedge	-	e	Drying mud beside lakes and rivers and in seasonally wet depressions.	Spring and Summer	Yes
Grevillea chrysophaea	Golden Grevillea	-	v	Silty sand and sandy loam soils in woodlands and heath.	June-November	Yes
Lachnagrostis rudis subsp. *rudis*	Rough Blown-grass	-	e	Uncommon, occurs in moist, shaded forests and swamp margins near the coast.	Flowering time unknown, however it recently flowered at	Yes

Common name	Scientific name	EPBC Act conservation status	FFG Act conservation status	Extent of potential habitat within the study area	Flowering period	Species included in targeted survey?
					Wilsons Promontory in January	
Muellerina celastroides	Coast Mistletoe	-	cr	Confined to coastal areas mostly on Banksia spp. and *Allocasuarina* spp.	Summer	Yes
Platysace ericoides	Heath Platysace	-	e	Dry forests on coastal plains, foothills and lowland woodlands - typically on shallow, rocky soils.	August-December	Yes
Prasophyllum frenchii	Maroon Leek-orchid	EN	e	Occurs in grassland, heathland and open forest on well-drained or water-retentive sand or clay loams.	Summer	Yes
Prostanthera galbraithiae	Wellington Mint-bush	VU	e	Heathy open forest, heathland and heathy woodland, usually on gravelly sand.	Spring	Yes
Pseudanthus ovalifolius	Oval-leaf Pseudanthus	-	v	Dry sandy or shallow, shale soils.	August-November	Yes
Pterostylis chlorogramma	Green-striped Greenhood	VU	e	Heathy woodland; more specific habitat requirements are poorly known.	July-September	Yes
Schoenus imberbis	Beardless Bog-sedge	-	v	Occasional in near-coastal heathland and woodland eastward from about Sale.		Yes
Senecio glomeratus subsp. *longifructus*	Annual Fireweed	-	v	Areas adjacent to streams, swamps and saline flats.	Spring-Autumn	Yes
Thelionema umbellatum	Clustered Lily[2]	-	v	a few widely separated wet heathland sites in	October-December	No

Common name	Scientific name	EPBC Act conservation status	FFG Act conservation status	Extent of potential habitat within the study area	Flowering period	Species included in targeted survey?
				lowland southern Victoria		
Thelymitra epipactoides	Metallic Sun-orchid	EN	e	Moist or dry sandy loams or loamy sands, primarily in coastal heaths, grasslands and woodlands, but also in similar communities at drier inland sites.	September-November	Yes
Thryptomene micrantha	Ribbed Thryptomene	-	e	Heath or heathy woodland on sandy soils near the Gippsland Lakes, with some populations in low shrubland on exposed rocky slopes.	August-November	Yes
Xerochrysum palustre	Swamp Everlasting	VU	cr	Sedge-swamps and shallow freshwater marshes and swamps in lowlands, on black cracking clay soils.	November-March	Yes
Zieria veronicea subsp. *veronicea*	Pink Zieria	-	e	Sandy mallee and heathy mallee habitats within the Wimmera and southern Mallee.	August-December	Yes

CR, cr – Critically endangered
E, e - endangered
V, v- vulnerable

[1]All records of Purple Donkey Orchid are outside of the 10-kilometre database search area. Thus, this species is not included in the likelihood table in Appendix A.2. This species was included in the targeted survey schedule as requested by DEECA.

[2] Clustered Lily was recorded during the October 2023 targeted surveys. This species is not typically known to occur in the Longford area. The nearest record is over 150 kilometres from the study area; hence this species was not included in the target survey schedule or the likelihood table in Appendix A.2.

The targeted flora survey was undertaken over ten days by two senior botanists. The following methods were used:

- Two botanists systematically surveyed suitable habitat within the study area by walking transects spaced at 5-10 metres apart.
- Suitable habitat generally corresponded with the suitable habitat listed in Table 3 however survey effort increased in areas where habitat was deemed particularly suitable for a given species.

- If populations of targeted threatened flora were encountered, the location was mapped using a GPS-enabled tablet and an estimate of population size was made.
- Many of the target species are cryptic and only readily identifiable when flowering, which occurs at particular times of the year depending on environmental conditions. Surveys were timed to target the peak flowering periods for the majority of species. Where possible, surveys were conducted when a nearby known population of the target species was flowering, to maximise the likelihood of detecting target species.
- During targeted surveys, if plants that were yet to flower were encountered, which have the potential to be the target species, the location of such plants were recorded, so that these locations could be revisited during follow-up survey, with the aim of re-visiting during flowering to allow for positive identification.

Detectability

Surveys to investigate the presence or absence of seasonal flora require careful consideration of the suitable habitat and flowering times for the species. The *Survey Guidelines for Australia's Threatened Orchids* (DoE 2013) outline the best practice by which surveys should be conducted for the target orchid species. These resources indicate that peak detectability for the target species is during flowering (and they include indications of typical flowering times). The methods and advice outlined in these documents were used in order to conduct surveys to achieve the highest probability of detecting the target species.

Reference sites

Where there are known populations of the target species within close proximity to the study area, an accessible reference site was selected and the botanists undertaking surveys checked whether the known population was above ground and flowering or finished flowering at the time the survey was conducted. Table 4 lists reference sites visited during the targeted surveys for threatened flora, including observations made during the visit on whether plants were found and flowering status.

Table 4 Reference sites visited during targeted flora surveys

Flora species	Reference site	Coordinates	Source	Date of visit	Observations
Reference site checks					
Dwarf Kerrawang	Off Signboard Lane, Dutson Downs	-38.221939,147.263880	VBA record	22-Nov-22	No plants were found at the time of survey at the reference site
Maroon Leek Orchid	Next to Gippsland Water monitoring plot	Restricted record	Shannon Dwyer at Gippsland Water	21-Nov-22	One individual found at the end of its flowering period.
Metallic Sun-orchid	Gippsland Water monitoring plot	Restricted record	Shannon Dwyer at Gippsland Water	11 Oct 23	Shannon Dwyer at Gippsland Water confirmed species in flower and provided photos.
Pink Zieria	In study area, along Track One	-38.187108,147.373076	Found during initial FFA assessment	21-Nov-22	Several individuals found. Species was in flower.
Purple Donkey Orchid	Rosedale-Longford Road	-38.171900,147.028300	VBA record	21-Nov-22	Several individuals found. Species was in flower.
Ribbed Thryptomene	On Gippsland Water land, off Longford-Loch Sport Road along	-38.199214,147.344251	Found during initial FFA assessment	21-Nov-22	Several individuals found. All had finished flowering
Wellington Mint-bush	Off Signboard Lane, Dutson Downs	-38.220523,147.272549	Shannon Dwyer at Gippsland Water	22-Nov-22	Several individuals found. Species was in flower.
Green-striped Greenhood	Mullungdung Nature Conservation Reserve	-38.4352000,146.87880	VBA record	7 Aug 23	Multiple individuals along a bike track in the reserve
Naked Beard-orchid	Mullungdung Nature Conservation Reserve	-38.415000,146.918100	VBA record	21-Nov-22	No plants were found at the time of survey at the reference site
Gippsland Lakes Peppermint	Longford-Loch sport Road	-38.197355,147.360138	VBA record	1-Dec-22	Two individuals were found at the reference site
Thick-lip Spider Orchid	Lilly Pilly Track, Wilsons Promontory	-39.0226885,146.3216887	Direct Biosis observation	17 October 203	No plants were found at the time of survey at the reference site

VBA = Victorian Biodiversity Atlas. Locations of some reference sites were taken from the VBA database (i.e. those marked as VBA record in the above table).

2.4.3. Fauna assessment

The study area was investigated on 10 to 13 October 2022 by zoologists Wyn Russell and Claire Tingate to determine its values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s) present.

All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under logs, examination of tracks and scats and identifying calls. Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

The extent and quality of fauna habitat features within the study area were mapped to inform constraints mapping, threatened species likelihood of occurrence assessments, and EPBC Act Significant Impact assessments (SIC). Habitat features included: native and introduced vegetation, logs, rocks and artificial debris for shelter, and permanent and ephemeral wetlands and waterways.

During the initial flora and fauna assessment, suitable habitat for 26 threatened fauna species listed under the EPBC Act and/or the FFG Act were identified within the study area (Table 5).

Table 5 List of threatened fauna species, conservation status, potential habitat and targeted surveys

Common name	Scientific name	EPBC Act	FFG Act	Extent of potential habitat within the study area
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	EN	e	Woodland, heathland and swamp scrub with areas of dense undergrowth, and adjacent cleared pipeline easement. Unlikely to utilise cleared agricultural land. **Opportunistic survey conducted:** Opportunistic search for diggings and scats.
Gang-gang Cockatoo	*Callocephalon fimbriatum*	EN	-	Woodland, heathland and swamp scrub with flowering eucalypts, acacias and Hawthorn for foraging. Unlikely to utilise cleared agricultural land and existing easement.
Blue-winged Parrot	*Neophema chrysostoma*	VU	-	Woodland, heathland and swamp scrub with hollow-bearing trees for nesting. Open wooded areas, grassland and cleared pipeline easement for foraging on grass and herb seeds.
Swift Parrot	*Lathamus discolor*	CR	cr	Woodland, heathland and swamp scrub with flowering trees for foraging. Unlikely to utilise cleared agricultural land and existing easement.
White-throated Needletail	*Hirundapus caudacutus*	VU	V	Airspace above the study area. Unlikely to regularly utilise terrestrial habitat. May occasionally roost in tall trees.
Pilotbird	*Pycnoptilus floccosus*	VU	-	Open woodland, heathland and swamp scrub with understorey vegetation. Unlikely to utilise cleared agricultural land, existing easement, or extremely dense heathland.
Brown Treecreeper (south-eastern subspecies)	*Climacteris picumnus victoriae*	VU	-	Open forest and woodlands, particularly those containing standing dead trees. Unlikely to inhabit the disturbance footprint due to lack of sufficient tree cover.
New Holland Mouse	*Pseudomys*	VU	E	Heathland, heathy woodland and swamp scrub,

Common name	Scientific name	EPBC Act	FFG Act	Extent of potential habitat within the study area
	novaehollandiae			particularly in the eastern extent of the study area. Species may inhabit the cleared easement, as vegetation is slashed to minimum 10cm high to maintain habitat.
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU	V	Woodland, forest and swamp scrub containing flowering trees for foraging. Species may temporarily roost in canopy of mature trees.
Swamp Skink	*Lissolepis coventryi*	EN	E	Vegetation, including Kikuyu *Cenchrus clandestinus* and Australian Salt-grass *Distichlis distichophylla*, adjacent to wetlands and seasonally flooded areas. **Targeted surveys conducted:** Tile grid and active search.
Green and Golden Bell Frog	*Litoria aurea*	VU	-	Wetlands, waterways, seasonally flooded areas and adjacent terrestrial vegetation. No suitable breeding habitat within the study area. **Targeted surveys conducted:** Active listening, call playback and active search.
Growling Grass Frog	*Litoria raniformis*	VU	v	Wetlands, waterways, seasonally flooded areas and adjacent terrestrial vegetation. No suitable breeding habitat within the study area. **Targeted surveys conducted:** Active listening, call playback and active search.
Dwarf Galaxias	*Galaxiella pusilla*	VU	e	Potentially suitable habitat within the Regional Outfall Sewer.
Hooded Robin	*Melanodryas cucullata*	EN	v	Areas of forest and woodland with logs and woody debris.
Eastern Great Egret	*Ardea alba modesta*	-	v	Wetlands, waterways and seasonally flooded areas.
Little Eagle	*Hieraaetus morphnoides*	-	v	Mature trees in forest and woodland for nesting. Cleared land for hunting.
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	-	e	Airspace above the study area. Unlikely to regularly utilise terrestrial habitat due to lack of suitable wetland habitat within or adjacent to the study area.
Powerful Owl	*Ninox strenua*	-	v	Forests and woodlands with mature trees for roosting, nesting and hunting.
Masked Owl	*Tyto novaehollandiae*	-	cr	Forests and woodlands with mature trees for roosting, nesting and hunting.
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	-	v	Woodland and forest with a dense shrubby or heathy understorey.
Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	-	v	Woodland and forest with mature hollow-bearing trees for roosting. Foraging habitat throughout the entire study area.
Lace Monitor	*Varanus varius*	-	e	Woodland and forest, particularly areas with mature hollow-bearing trees for shelter, and termite mounds for

Common name	Scientific name	EPBC Act	FFG Act	Extent of potential habitat within the study area
				nesting. Unlikely to utilise cleared land but may regularly pass through the existing cleared easement between habitat patches.
Glossy Grass Skink	*Pseudemoia rawlinsoni*	-	e	Vegetation, including Kikuyu *Cenchrus clandestinus* and Australian Salt-grass *Distichlis distichophylla*, adjacent to wetlands and seasonally flooded areas. **Targeted surveys conducted:** Tile grid and active search. Recorded within the disturbance footprint in vegetation adjacent to the Regional Outfall Sewer, and seasonally flooded sedgeland.
Southern Toadlet	*Pseudophryne semimarmorata*	-	e	Woodland, swamp scrub and grassland with leaf litter and organic debris, adjacent to wetlands, or in areas that flood seasonally.
Martin's Toadlet	*Uperoleia martini*	-	cr	Woodland, swamp scrub and grassland with leaf litter and organic debris, adjacent to wetlands, or in areas that flood seasonally.
Flinders Pygmy Perch	*Nannoperca sp. 1*	-	v	Potentially suitable habitat within the Regional Outfall Sewer.

CR, cr – Critically endangered
E, e - endangered
V, v- vulnerable

2.4.4. Targeted and opportunistic fauna surveys

Following the initial site investigation, fauna assessment and consultation with DEECA, targeted and opportunistic threatened fauna survey programs were conducted to inform development of constraints mapping and mitigation measures. A summary of the targeted and opportunistic fauna surveys is provided in Table 6 below, and survey sites are mapped in Figure 4.

Table 6 Summary of targeted and opportunistic surveys for threatened fauna

Survey	Target species	Survey methods	Survey dates
Threatened frogs	• Green and Golden Bell Frog *Litoria aurea* • Growling Grass Frog *Litoria raniformis* • Martin's Toadlet *Uperoleia martini*	Call playback, active listening and active searching at suitable wetlands within and adjacent to the study area.	Five nights during summer of 2022/2023: • 5 - 8 December 2022 • 25 January 2023
Threatened bandicoot	• Southern Brown Bandicoot *Isoodon obesulus obesulus*	Opportunistic search for diggings and scats throughout the study area.	Opportunistic searching throughout fieldwork and from 5-8 December 2022.
Threatened reptiles	• Swamp Skink *Lissolepis coventryi* • Glossy Grass Skink *Pseudemoia rawlinsoni*	Artificial shelter surveys (12 grids of 45 terracotta roof tiles) and active searching throughout the study area.	Tile deployment: • 23 - 27 January 2023 Six tile checks and 20-minute active searches at each grid site over following three weeks: • 31 January – 16 February 2023

Targeted Frog survey method

Targeted surveys for Growling Grass Frog, Green and Golden Bell Frog, and Martin's Toadlet were conducted by two experienced zoologists. Surveys were conducted in accordance with the Significant Impact Guidelines for the Vulnerable Growling Grass Frog (DEWHA 2009), and the Survey guidelines for Australia's threatened frogs (DEWHA 2010a).

A combination of active searching, active listening and call playback was conducted using the following methods:

- Surveys were conducted over five nights during peak activity time for the target species, 5 - 8 December 2022 and 25 January 2023.
- Targeted surveys were conducted at permanent and ephemeral wetlands within 200 meters of the study area where potential habitat had been identified during the site investigation (Figure 4).
- Surveys were conducted during suitable weather conditions to record active calling of the targeted species (daytime air temperatures greater than 15°C, night-time air temperatures greater than 12°C, with little or no wind).
- Surveys commenced with active listening for any calling frogs at each survey point. To illicit a response from frogs that may be present but not calling, an advertisement call of each species was played, followed by a further period of listening for any response calls.

- Active searching was carried out by systematically searching through areas of aquatic vegetation using a head-torch and handheld spotlight.
- Relevant weather conditions at the start and end of each survey were recorded using a portable weather meter (Kestral 3000), they included ambient air temperature, relative humidity, wind speed and direction, precipitation and cloud cover.
- Frogs seen or heard during the survey were recorded and their locations mapped.

Opportunistic Bandicoot survey method

Active searching for evidence of Southern Brown Bandicoot foraging diggings and scats was conducted by two experienced zoologists. The following method was used:

- Four days of searching was conducted from 5 – 8 December 2022.
- Opportunistic searching was conducted when undertaking other targeted fauna surveys within the study area.
- During searches, two zoologists systematically surveyed suitable habitat (primarily heathy woodland, forest and swamp scrub, and the adjacent existing cleared pipeline corridor) by walking parallel transects, approximately 5-10 meters apart.
- Searches were conducted within the following habitat zones; 8 – 11, 34 – 36, 38 – 46, 60 – 61, 63 – 64, 67 and adjacent easement, 71 – 76, 79 – 83.
- All Bandicoot diggings and/or scats observed were recorded, and their locations mapped.
- Photographs of Bandicoot diggings were collected to verify against example images, as diggings of Rabbits and Wombats can appear similar.

Active searching for diggings and scats alone is not considered sufficient survey effort to determine absence. Bandicoot presence was considered to be likely following the initial site inspection, due to availability of habitat, and local records. Opportunistic surveys were intended to inform constraints mapping by identifying any areas of high habitat value, and cannot be relied on to prove absence. Potential presence of the non-threatened Long-nosed Bandicoot *Perameles nasuta* also confounds results, as diggings and scats are indistinguishable from Southern Brown Bandicoot. Diggings and scats recorded were all attributed to the threatened Southern Brown bandicoot as a precaution.

Targeted reptile survey method

Targeted surveys for Swamp Skink and Glossy Grass Skink were conducted by two experienced zoologists. Surveys were conducted in accordance with the survey guidelines for Australia's threatened reptiles (DEWHA 2011), and in consultation with DEECA. A combination of active searching and artificial shelter (tile grids) surveys were conducted using the following methods:

- Twelve reptile survey sites were established throughout the study area, encompassing potential habitat within all EVCs and patches of introduced vegetation (Table 7, Figure 4).
- At each survey site, three tile transects were established over 23 - 27 January 2023, each comprised of 15 terracotta roof tiles placed at approximate 5 metre intervals through potential habitat (45 tiles per survey site).
- At each survey site, when possible, one tile transect was placed within the existing cleared pipeline corridor, one in remnant vegetation on the fringe of the existing easement, and one deeper within intact vegetation. This placement was to assess all habitat available at each survey site.

- Following tile grid deployment, six surveys were conducted twice-weekly in suitable weather conditions (daylight hours with air temperature between 14-28°C and without heavy rain or strong wind) over the following three weeks, 31 January – 16 February 2023.
- During each survey all tiles were checked for sheltering or basking reptiles, and 20 minutes of active searching for reptiles was conducted in the habitat surrounding the tile grids. All reptiles observed were recorded and their location mapped.
- Surveys were timed to ensure that each site was surveyed across morning, midday and afternoon periods, to capture variation in reptile activity throughout the day.
- Relevant weather conditions at the start and end of each survey were recorded using a portable weather meter (Kestral 3000), they included ambient air temperature, relative humidity, wind speed and direction, precipitation and cloud cover.
- Temperature of tiles and substrate were recorded to show the range of thermal habitat surveyed, and to indicate the habitat temperature preferences of any threatened reptiles recorded.
  - The temperature of tiles/substrate observed being utilised by any threatened reptiles was measured and recorded.
  - During each survey, the temperature of three tiles within the cleared easement, and three within remnant vegetation were recorded using a handheld infrared thermometer. The temperature of the top of the tiles, and the substrate directly beneath them was measured and recorded.

Table 7 Targeted reptile survey site descriptions

Survey site	Habitat available	Survey site	Habitat available
Site 1	• Dense grassland • Low open shrubs	**Site 7**	• Cleared easement with open grassland • Wetland-adjacent grassland, dominated by Kikuyu • Heathy Woodland with an open canopy and dense Kikuyu groundcover
Site 2	• Cleared easement with low slashed heath and eucalypts • Damp-sands Herb-rich Woodland with a closed canopy and open understorey	**Site 8**	• Cleared easement with grazed grassland • Small freshwater dam in a grazed grassland • Small patch of roadside Damp-sands Herb-rich Woodland with an open canopy, open understorey, and grassy groundcover with logs and patches of Kikuyu
Site 3	• Cleared easement with grazed grassland • Cleared easement with fence line vegetation and seasonally flooding potholes (dry at time of survey) • Damp-sands Herb-rich Woodland with an open canopy and dense understorey	**Site 9**	• Cleared easement with dense heath regrowth • Dense grassland • Seasonally flooding Juncus-dominated sedgeland with patches of Australian Salt Grass (dry at time of survey, small shallow patch of highly turbid water observed during October site investigation) • Heathy Woodland with a dense canopy and dense heathy understorey
Site 4	• Cleared easement with low slashed heath and a seasonal wetland (dry at time of survey) • Lowland forest with an open canopy and heathy understorey	**Site 10**	• Cleared easement with dense Juncus regrowth • Swamp Scrub with a dense low canopy and dense heath understorey • Seasonally flooding Juncus-dominated sedgeland (dry at time of survey, small shallow patch of highly turbid water observed during October site investigation)

Survey site	Habitat available	Survey site	Habitat available
Site 5	• Cleared easement with low slashed heath and eucalypts • Lowland forest with an open canopy and heathy understorey	**Site 11**	• Cleared easement with open grassland, with small patches of Australian Salt Grass • Swamp Scrub and Sand Heathland with no canopy, patches of dense heath understorey, and open grassland containing patches of Australian Salt Grass
Site 6	• Cleared easement with open grassland • Heathy Woodland with an open canopy, open understorey, and grassy groundcover with logs and patches of Kikuyu	**Site 12**	• Cleared easement with low slashed heath • Heathy Woodland with a dense canopy and open understorey • Mapped seasonal wetland with no canopy, scattered shrubs and open groundcover with scatted Lomandra (dry throughout entire field investigation and targeted surveys)

2.4.5. Permits

Biosis undertakes flora and fauna assessments under the following permits and approvals:

- Wildlife Authorisation issued by DEECA under the *Victorian Wildlife Act 1975* (Permit Number 10010193).
- Permit to Take/Keep Protected Flora issued by DEECA under the *Flora and Fauna Guarantee Act 1988* (FFG Act) (Permit Number 10010194).
- Permit to Take Protected Fish issued by DEECA under the *Flora and Fauna Guarantee Act 1988* (FFG Act) (Permit Number 10010195).
- Permit to Conduct Research in areas managed by the Parks Victoria issued by DEECA under the *National Parks Act 1975*, *Crown Land (Reserves) Act 1978* and *Parks Victoria Act 2018* (Permit Number 10010071).
- Permit to catch and release fish issued by the Victorian Fisheries Authority under the *Victorian Fisheries Act 1995* (Permit Number RP 1220, Personal File Number 13041).
- Approvals 18.21 and 20.21 issued by the Wildlife and Small Institutions Animal Ethics Committee of the Victorian Government Department of Economic Development, Jobs, Transport and Resources (DEDJTR).
- Scientific Procedures Fieldwork Licence issued by DEDJTR's Wildlife and Small Institutions Animal Ethics Committee (Licence Number 20020).

2.5. Qualifications

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as low abundance, patchy distribution, species dormancy, seasonal conditions, and migration and breeding behaviours. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The current flora and fauna assessment was conducted during spring and summer, which is an optimal time for survey for most species as many perennial flora species have reproductive material available for identification to the species level.

The flora and fauna assessment was undertaken right after the existing easement underwent maintenance slashing. As a result all medium and large lifeforms were effectively absent.

The survey effort is considered sufficient to assess the general values of the study area and undertake the biodiversity impact assessments that are required. It is also deemed sufficient for the detection of habitat for threatened flora species.

Native Vegetation Removal Reports are prepared through DEECA's NVIM system or requested through DEECA's Ensym NVR Tool Support team. Biosis supplies relevant site-based spatial information as inputs to DEECA and are entirely reliant on DEECA's output reports for all assessment pathway applications. Biosis makes every effort to ensure site and spatial information entered into the NVIM, or supplied to DEECA, is an accurate reflection of proposed native vegetation removal. The Native Vegetation Removal Report can be viewed in Appendix G.

2.6. Legislation and policy

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- Matters listed under the EPBC Act, associated policy statements, significant impacts guidelines, listing advice and key threatening processes.
- Threatened taxa, communities and threatening processes listed under Section 10 of the FFG Act and associated action statements and listing advice.
- Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017a).
- Native Vegetation Management Plans prepared by Catchment Management Authorities.
- Noxious weeds and pest animals listed under the *Catchment and Land Protection Act 1994* (CaLP Act).
- *Environment Effects Act 1978*.
- *Pipelines Act 2005.*
- *Fisheries Act 1995*.
- *Water Act 1989*.
- *Environment Protection Act 1971*: State Environmental Protection Policy (Waters) 2018.

Additional impacts on Crown Land that fall outside of the above legislation are outside scope of assessment.

2.7. Mapping

Advisian supplied aerial photography and site plans.

Mapping was conducted using hand-held GPS-enabled tablets and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the tablets (generally ± 3 to 5 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our flora and fauna spatial data are available to incorporate into design concept plans.

3. Results

The ecological features of the study area are described below and mapped in Figure 3.

Species recorded during the flora and fauna assessment are listed in Appendix A (flora) and Appendix B (fauna). Unless of particular note, these species are not discussed further.

Threatened species recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

3.1. Landscape context

The study area is within the Gippsland Plain bioregion, which is characterised by the flat to gently undulating landscape and generally sandy soils.

Large parts of the study area and its surroundings are highly modified for agricultural use, however there are several large areas of native vegetation and habitat that remain intact. The Gippsland Lakes Ramsar, which surrounds the eastern end of the study area, is the largest estuarine lagoon system in Australia. The site supports a range of ecosystem values including waterbird breeding and fish spawning sites and is an important drought refuge for waterbirds. The Ramsar site is contiguous with the Gippsland Lake Coastal Park, which spans the coastline from Seaspray to Lakes Entrance.

3.2. Vegetation and fauna habitat

The study area is located across private and Crown land and road reserves and supports areas of native and introduced vegetation. The topography of the study area is relatively flat with gentle undulating rises throughout. Past disturbance and current land uses have modified much of the pre-European vegetation throughout the study area. Resulting in the introduction of invasive flora close to roadsides, within farmland and on some areas of the existing easement (particularly the section running north-east adjacent to Longford – Loch Sport Road). The pipeline easement has been previously disturbed during installation of the existing pipelines and through the ongoing maintenance of the easement. The current survey took place after the easement underwent maintenance vegetation slashing.

Disturbance within farmed areas of the easement includes agricultural land uses such as grazing and cropping, and areas of native vegetation differed in quality due to this disturbance and/or land use. Cleared agricultural land offers little habitat value for any threatened fauna species. Some sections of native vegetation within Crown lands are dominated by thickets of Burgan *Kunzea ericoides* and a relatively low diversity understorey, indicating a high level of past disturbance or a varying fire regime. These areas of dense Burgan may still provide suitable habitat for terrestrial fauna, including the threatened Southern Brown Bandicoot and New Holland Mouse.

A range of EVCs occur across the study area. The dominant vegetation communities observed are generally an open woodland with a low canopy height, heathland or scrub. Damp Sands Herb Rich Woodland EVC 3 (DSHRW) is the dominant EVC along the western end of the study area. Canopy species include Coast Manna Gum *Eucalyptus viminalis* subsp. *pryoriana* and Yertchuk *Eucalyptus consideniana*. Derived areas of EVC 3 are dominated by a thicket of Burgan with all trees removed or are within the existing easement and have no medium or large lifeforms present. Heathy Woodland EVC 48 occurs in the middle and eastern end of the study area. Canopy species include Coast Manna Gum, FFG Act listed Gippsland Peppermint *Eucalyptus*

arenicola and Saw Banksia *Banksia serrata*. Several other FFG Act listed species were recorded within areas of Heathy Woodland including Pink Zieria and Ribbed Thryptomene (Figure 3). Derived states of Heathy Woodland lack a canopy and shrub layer, however, a relatively rich species diversity remains.

Sand Heathland EVC 6 and Swamp Scrub EVC 53 are the dominant EVCs along the eastern end of the study area. Sand Heathland EVC 6 is of relatively low quality along most of the study area with large sections dominated by a thick cover of Burgan. Swamp Scrub EVC 53 occurs around wet areas with poor drainage and is dominated by Scented Paperbark *Melaleuca squarrosa* and Burgan.

Other EVCs include Lowland Forest EVC 16, characterised by a tall canopy of Yertchuk and Coast Manna Gum, Creekline Herb-rich Woodland EVC 164 located in a low point in the landscape and has an overstorey of Manna Gum, Swamp Gum and Yertchuk and Deep Freshwater Marsh, which are modelled wetlands from DECCA's Current wetlands dataset layer. Although Winter and Spring of 2022 had above average rainfall in West Gippsland (BOM 2023, Bom 2023a) the modelled wetland areas were dry at the time of assessment, dominated by predominantly introduced vegetation and supporting limited wetland values.

Woodland and forest EVCs with canopy trees provide suitable nesting and foraging habitat for several threatened fauna species, including Grey-headed Flying-fox, Blue-winged Parrot, Powerful Owl and Lace Monitor. Derived woodland and forest EVCs support habitat for terrestrial threatened fauna, including the Southern Brown Bandicoot and New Holland Mouse. Vegetation within the existing cleared easement is likely to provide greater habitat value as it regrows after maintenance slashing.

Wetlands and waterways (particularly the Regional Outfall Sewer (ROS)) provide suitable habitat and may act as a dispersal corridor for several aquatic species, such as the Green and Golden Bell Frog and Dwarf Galaxias. Introduced weeds fringing the ROS and scattered throughout cleared land also provide habitat for threatened fauna species. Kikuyu *Cenchrus clandestinus* grows alongside the ROS and throughout agricultural land within the local area, providing habitat to the Glossy Grass Skink. Scattered Hawthorn *Crataegus monogyna* may provide seasonal foraging habitat for Gang-gang Cockatoos.

Ecological Vegetation Classes that have been assigned to habitat zones often differed from DEECA's modelled EVCs. Ecological Vegetation Classes were selected using data collected during the field assessment including key character species, lifeform and covers and position in the landscape. In instances where an area has been highly modified (i.e. when Bracken is driving the delineation of a patch), the DEECA modelling has been applied. Vegetation has been assigned an EVC by an accredited assessor as per the Guidelines where enough field data exists to make a confident selection. Modelled EVCs (pre-1750 or 2005 extant) have been defaulted to in instances where ground conditions and field data made accurate and confident determination of an EVC difficult.

These features are described further in Table 8 and mapped in Figure 2. Photos are provided in Appendix D.

Table 8 Summary of vegetation and habitat types within the study area

Vegetation or habitat type	Description and quality	Significant flora values	Significant Fauna values
Damp Sands Herb - rich Woodland EVC 3 GipP Bioregional Conservation Status (BCS): Vulnerable	This EVC is characterised by a Coast Manna Gum and Yertchuk canopy to 15 metres tall. The relatively sparse mid-story is comprised of shrub species Burgan and Swamp Paperbark *Melaleuca ericifolia.* The understory is dominated by Saw Sedge *Gahnia sp*. and Austral Bracken *Pteridium esculentum* subsp. *esculentum* with a range of small shrubs and herbs including Small Poranthera *Poranthera microphylla*, Nodding Greenhood *Pterostylis nutans* and Honey Pots *Acrotriche serrulata*. Weed cover is low and includes Perennial Veldt-grass *Ehrharta calycina* and Large Quaking Grass *Briza maxima*. Habitat zones 8 and 12 lack an intact canopy layer and are dominated by a thicket of Burgan. While ground cover is relatively sparse in these areas, there are various orchid species including Greenhoods *Pterostylis* sp. Donkey Orchid *Diuris sp*. and Sun Orchids *Thelymitra* spp. Other understory species include Spiny-headed Mat-rush *Lomandra longifolia* subsp. *longifolia,* Common Flat-pea *Platylobium obtusangulum* and Supple Spear-grass *Austrostipa mollis*. Weed cover is low.	Limited values for threatened flora species following targeted surveys.	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • Gang-gang Cockatoo • Blue-winged Parrot • Swift Parrot • Pilotbird • Brown Treecreeper • New Holland Mouse • Grey-headed Flying-fox • Hooded Robin Suitable habitat for FFG Act listed fauna species: • Little Eagle • Powerful Owl • Masked Owl • Chestnut-rumped Heathwren • Yellow-bellied Sheathtail Bat • Lace Monitor • Southern Toadlet • Martin's Toadlet
Derived Damp Sands Herb- rich Woodland EVC 3	The derived state of this EVC predominantly occurs within the existing easement. An absent tree and medium shrub layer are a result of	FFG Act listed Clustered Lily was recorded within	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot

Vegetation or habitat type	Description and quality	Significant flora values	Significant Fauna values
GipP Bioregional Conservation Status (BCS): Vulnerable	annual slashing. Species diversity within the easement is relatively high and weed cover is low. Sun orchids were recorded throughout. Habitat zones within farmland are driven by Bracken, which makes up >25% perennial vegetation cover. The remaining vegetation is predominantly introduced and is dominated by Yorkshire Fog *Holcus lanatus* and Sweet Vernal *Anthoxanthum odoratum*. These low quality habitat zones do not fit any EVC description and thus the DEECA modelled EVC layer has been applied.	this EVC.	• New Holland Mouse
Heathy Woodland EVC 48 GipP BCS: Least concern	This EVC is characterised by Coast Manna Gum, Gippsland Peppermint *Eucalyptus arenicola* and Saw Banksia *Banksia serrata*. The mid-story shrub layer is comprised of Coast Wattle *Acacia longifolia* subspp. *sophorae*, Spike Wattle *Acacia oxycedrus*, Coast Tea Tree *Leptospermum laevigata* and Black Wattle *Acacia mearnsii*. A diverse ground cover of shrubs, herbs and graminoids includes Pink Zieria *Zieria veronicea* subsp. *veronicea*, Supple Spear-grass *Austrostipa mollis*, Showy Bossiaea *Bossiaea cinerea*, Black Anther-lily *Dianella revoluta* and Pink Fingers *Caladenia carnea*. Weed cover is generally low and includes Sheep Sorrell *Acetosella vulgaris* and Cocksfoot *Dactylis glomeratus.*	Three FFG Act listed flora species were recorded within this EVC: • Gippsland Lakes Peppermint • Ribbed Thryptomene • Pink Zieria Suitable habitat for FFG Act listed flora species: • Naked Beard-orchid • Spurred Helmet-orchid • Clustered Lily	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • Gang-gang Cockatoo • Blue-winged Parrot • Swift Parrot • Pilotbird • Brown Treecreeper • New Holland Mouse • Grey-headed Flying-fox • Hooded Robin Suitable habitat for FFG Act listed fauna species: • Little Eagle • Powerful Owl • Masked Owl • Chestnut-rumped Heathwren • Yellow-bellied Sheathtail Bat

Vegetation or habitat type	Description and quality	Significant flora values	Significant Fauna values
			• Lace Monitor • Southern Toadlet • Martin's Toadlet
Derived Heathy Woodland EVC 48 GipP BCS: Least concern	The derived state of this EVC occurs within the existing easement. An absent tree and medium shrub layer are a result of annual slashing of the easement. Species diversity within the easement remains relatively high, however all large lifeforms are effectively absent. Several threatened species were recorded within the derived version of this EVC including Pink Zieria and Ribbed Thryptomene.	Two FFG Act listed flora species were recorded within this EVC: • Ribbed Thryptomene • Pink Zieria Suitable habitat for FFG Act listed Clustered Lily.	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • Blue-winged Parrot • New Holland Mouse
Swamp Scrub EVC 53 GipP BCS: Endangered	Closed scrub dominated by a thick cover of Scented Paperbark and Burgan. Other shrubs within this EVC include Coast Wattle and Swamp Paperbark. A sparse groundcover of graminoids and herbs includes Thatch Saw-sedge *Gahnia radula*, Swamp Crassula *Crassula helmsii* and Australian Salt-grass *Distichlis distichophylla*. Weed cover is low and includes Perennial Veldt-grass and Bucks Horn Plantain *Plantago coronopus.*	Suitable habitat for FFG Act listed Spurred Helmet-orchid.	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • New Holland Mouse • Grey-headed Flying-fox • Swamp Skink Suitable habitat for FFG Act listed fauna species: • Glossy Grass Skink
Derived Swamp Scrub EVC 53 GipP BCS: Endangered	The derived state of this EVC occurs within the existing easement. Species diversity within the easement is similar to the abutting Swamp Scrub vegetation, however all medium and large lifeforms are absent and weed cover is high. Sun	Suitable habitat for FFG Act listed Spurred Helmet-orchid.	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • Blue-winged Parrot

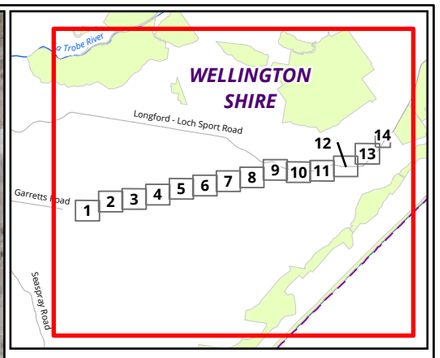
Vegetation or habitat type	Description and quality	Significant flora values	Significant Fauna values
	orchids were recorded throughout the derived Swamp Scrub habitat zones.		• New Holland Mouse • Swamp Skink Suitable habitat for FFG Act listed fauna species: • Glossy Grass Skink • Southern Toadlet • Martin's Toadlet
Sand Heathland EVC 6 GipP BCS: Rare	Treeless heathland characterised by a dense shrub layer including Burgan, Swamp Paperbark and Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana*. Grass Tree *Xanthorrhoea resinosa* are scattered throughout this EVC. Understory species include Tassel Rope-rush *Hypolaena fastigiata*, Common Bog-rush *Schoenus apogon*, Broom Spurge *Amperea xiphoclada* var. *xiphoclada* and Honey Pots *Acrotriche serrulata*. This EVC has a moderate cover of weeds dominated by Sweet Vernal and Yorkshire Fog.	Suitable habitat for FFG Act listed species Spurred Helmet-orchid.	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • New Holland Mouse • Swamp Skink Suitable habitat for FFG Act listed fauna species: • Glossy Grass Skink • Southern Toadlet • Martin's Toadlet
Derived Sand Heathland EVC 6 GipP BCS: Rare	Derived Sand Heathland occurs within the existing easement. These areas have a high cover of weeds (>50% cover) and lack all medium and large lifeforms. Species are similar to the Sand Heathland EVC, however species diversity within is low.	Suitable habitat for FFG Act listed species Spurred Helmet-orchid	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • New Holland Mouse • Swamp Skink • Blue-winged Parrot Suitable habitat for FFG Act listed fauna species: • Glossy Grass Skink

Vegetation or habitat type	Description and quality	Significant flora values	Significant Fauna values
Lowland Forest EVC 16 GipP BCS: Vulnerable	Eucalypt forest to 20 metres tall dominated by Coast Manna Gum and Yertchuck. This EVC appears modified with a thick cover of Burgan in the midstory and scattered Swamp Paperbark and Coast Wattle. The understory is characterised by Spiny-headed Mat-rush, Bracken, Thatch Saw-sedge, and a range of small herbs including Small Poranthera, Tall Bluebell *Wahlenbergia stricta* subsp. *stricta* and Helmet Orchid *Corybas* sp. Weed cover is low and includes Bucks Horn Plantain and Common Centaury *Centaurium erythraea*.	FFG Act listed Pale Swamp Everlasting was recorded in this EVC Suitable habitat for FFG Act listed species Naked Beard-orchid.	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • Gang-gang Cockatoo • Blue-winged Parrot • Swift Parrot • Pilotbird • Brown Treecreeper • New Holland Mouse • Grey-headed Flying-fox • Hooded Robin Suitable habitat for FFG Act listed fauna species: • Little Eagle • Powerful Owl • Masked Owl • Chestnut-rumped Heathwren • Yellow-bellied Sheathtail Bat • Lace Monitor • Glossy Grass Skink • Southern Toadlet • Martin's Toadlet
Derived Lowland Forest EVC 16 GipP BCS: Vulnerable	The derived state of this EVC occurs within the existing easement. An absent tree and medium shrub layer are a result of annual slashing. Species diversity within the easement is relatively high, however all medium and large lifeforms are effectively absent. Weed cover is high within the derived state, likely due to the close proximity to the surrounding farmland.	FFG Act listed Pale Swamp Everlasting was recorded within this EVC. Suitable habitat for FFG Act listed	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • New Holland Mouse • Blue-winged Parrot Suitable habitat for FFG Act listed fauna species:

Vegetation or habitat type	Description and quality	Significant flora values	Significant Fauna values
		species Naked Beard-orchid.	• Southern Toadlet • Martin's Toadlet
Creekline Herb-rich Woodland EVC 164 GipP BCS: Endangered	Woodland to 15 metres tall characterised by Manna Gum, Swamp Gum and Yertchuk. This EVC is located at the bottom of gently undulating hills, forming part of the drainage line. A relatively sparse shrub layer includes Heath Tea-tree *Leptospermum myrsinoides,* Saw Banksia and Burgan. The ground layer is dominated by Spiny-headed Mat-rush and has a range of other small shrubs, graminoids and herbs including Thatch Saw-sedge, Showy Bossiaea *Bossiaea cinerea*, Soft Tussock-grass *Poa morrisii*, Ivy-leaf Violet *Viola hederacea* and Spreading Rope-rush *Empodisma minus*. Weed cover is low, with scattered Cat's-ear *Hypochaeris radicata* recorded.	Suitable habitat for FFG Act listed species Pale Swamp Everlasting	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • Gang-gang Cockatoo • Blue-winged Parrot • Swift Parrot • Pilotbird • Brown Treecreeper • New Holland Mouse • Grey-headed Flying-fox • Hooded Robin Sutable habitat for FFG Act listed fauna species: • Little Eagle • Powerful Owl • Masked Owl • Chestnut-rumped Heathwren • Yellow-bellied Sheathtail Bat • Lace Monitor • Glossy Grass Skink • Southern Toadlet • Martin's Toadlet
Derived Creekline Herb-rich Woodland EVC 164 GipP BCS: Endangered	This EVC occurs within the existing easement and is characterised by the absence of trees and all large lifeforms. Similarity to the abutting	FFG Act listed Pale Swamp Everlasting was	Suitable habitat for EPBC Act listed fauna species: • Southern Brown Bandicoot • Blue-winged Parrot

Vegetation or habitat type	Description and quality	Significant flora values	Significant Fauna values
	Creekline Herb-rich Woodland vegetation, species diversity is high and weed cover is low.	recorded within this EVC.	• New Holland Mouse Suitable habitat for FFG Act listed fauna species: • Southern Toadlet • Martin's Toadlet
Deep Freshwater Marsh – modelled wetlands	Modelled wetlands within the study area mostly occur within farmland. At the time of assessment these areas were dry and dominated by introduced vegetation. Habitat zone 37 is a mapped wetland within the existing easement (Figure 3). This area is characterised by wet depressions that hold small pools of water and several native species were recorded that prefer a moist environment including Sieber Crassula *Crassula sieberiana* and Pale Swamp Everlasting.	Suitable habitat for FFG Act listed flora species: Veiled Fringe-sedge FFG Act listed Pale Swamp Everlasting was recorded within this EVC	Suitable habitat for EPBC Act listed fauna species: • Swamp Skink • Green and Golden Bell Frog • Growling Grass Frog • Dwarf Galaxias Suitable habitat for FFG Act listed fauna species: • Eastern Great Egret • Glossy Grass Skink • Southern Toadlet • Martin's Toadlet • Flinders Pygmy Perch
Predominantly introduced vegetation	Predominantly introduced vegetation occurs in areas that are used for farming and agriculture. Large parts of the study area run through canola crops or areas that have been used to graze cattle, while other parts of the existing easement (predominantly adjacent to the ROS) are dominated by dense patches of Kikuyu grass *Cenchrus clandestinus.*	Limited values for threatened flora species	Suitable habitat for EPBC Act and/or FGG Act listed fauna species: • Swamp Skink and Glossy Grass Skink (areas of Kikuyu adjacent to wetland)
Large hollow-bearing trees	Large hollow bearing trees occur throughout areas of native vegetation within the study area. Tree species include Coast Manna-gum, Yertchuck and Manna Gum.	N/A	Suitable nesting habitat for EPBC Act listed fauna species: • Gang-gang Cockatoo

Vegetation or habitat type	Description and quality	Significant flora values	Significant Fauna values
			• Blue-winged Parrot • Brown Treecreeper Suitable nesting habitat for FFG Act listed fauna species: • Powerful Owl • Masked Owl
Scattered Trees	Small and large scattered trees occur throughout the study area. Tree species include Coast Manna-gum and Manna Gum.	N/A	Marginal foraging and roosting habitat for EPBC Act and/or FFG Act listed fauna species: • Gang-gang Cockatoo • Grey-headed Flying-fox • Swift Parrot • Little Eagle • Powerful Owl • Masked Owl
Non-EVC threatened skink habitat	Low-lying vegetation adjacent to permanent and ephemeral wetlands and waterways, including the ROS. Contains a mixture of Kikuyu, Australian Salt-grass *Distichlis distichophylla* and Sedges.	N/A	Suitable habitat for EPBC Act and/or FGG Act listed fauna species: • Swamp Skink • Glossy Grass Skink



Legend

- Study area
- RAMSAR wetland

Figure 3.Overview Ecological values of the study area

0 500 1,000 1,500 2,000 2,500

Metres

Scale: 1:60,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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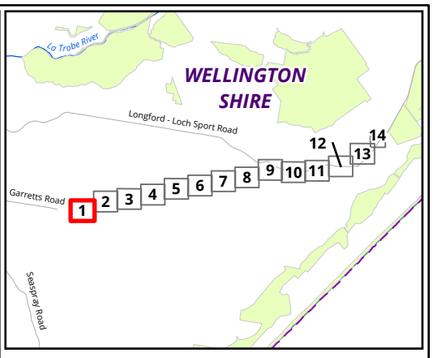

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Large tree in patch
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland
- (GipP0003) Damp Sands Herb-rich Woodland - Derived

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.1 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
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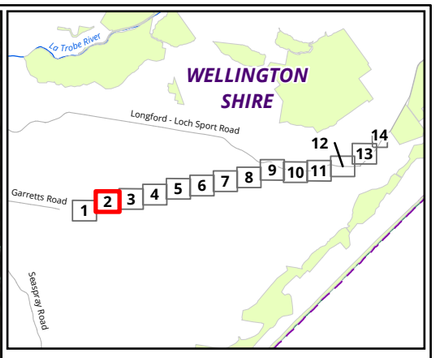

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Large scattered tree
- Large tree in patch
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland
- (GipP0003) Damp Sands Herb-rich Woodland - Derived

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.2 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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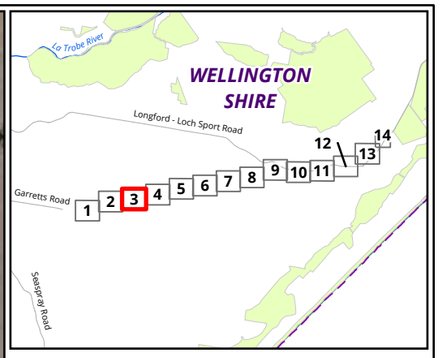

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Small scattered tree
- Large scattered tree
- Large tree in patch
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland
- (GipP0003) Damp Sands Herb-rich Woodland - Derived

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.3 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
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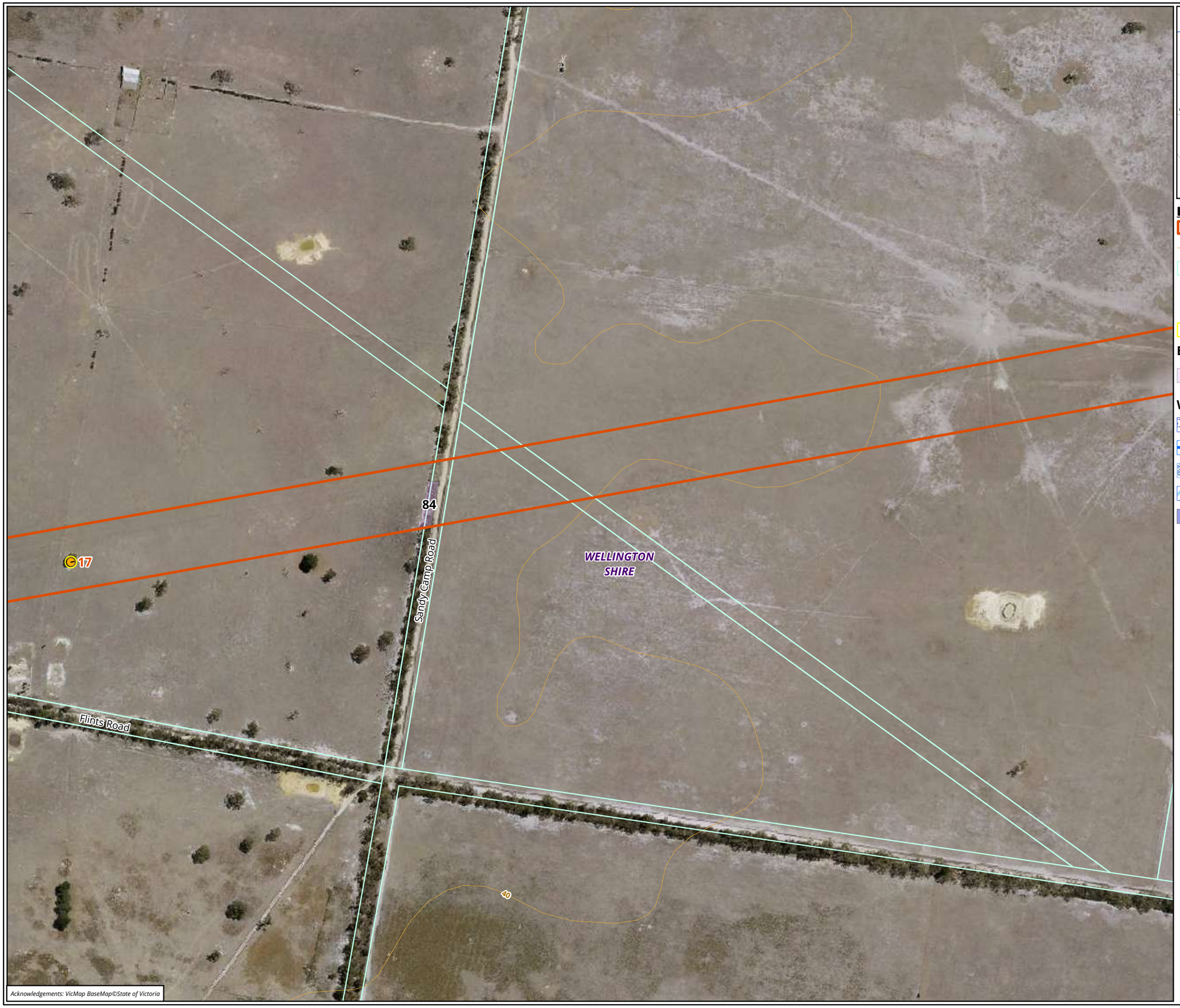

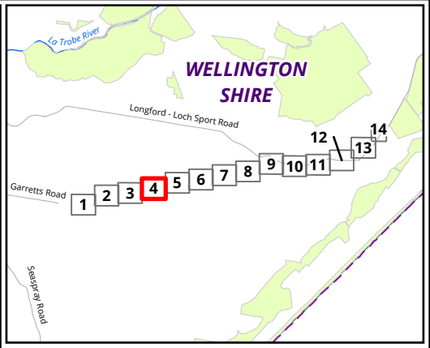

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Small scattered tree
- Large tree in patch
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.4 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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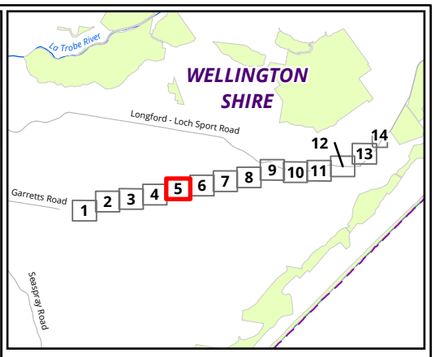

Legend

- Study area
- Current parcel boundary
- Small scattered tree
- Large tree in patch
- Tree protction zone (TPZ)

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.5 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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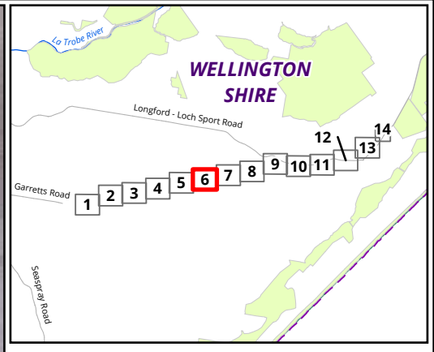

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Large tree in patch
- Tree protction zone (TPZ)

Threatened flora records

- Coronidium gunnianum - Pale Swamp Everlasting

Ecological Vegetation Class (EVC)

- (GipP0016) Lowland Forest
- (GipP0016) Lowland Forest - Derived
- (GipP0048) Heathy Woodland
- (GipP0048) Heathy Woodland - Derived
- (GipP0164) Creekline Herb-rich Woodland
- (GipP0164) Creekline Herb-rich Woodland - Derived

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.6 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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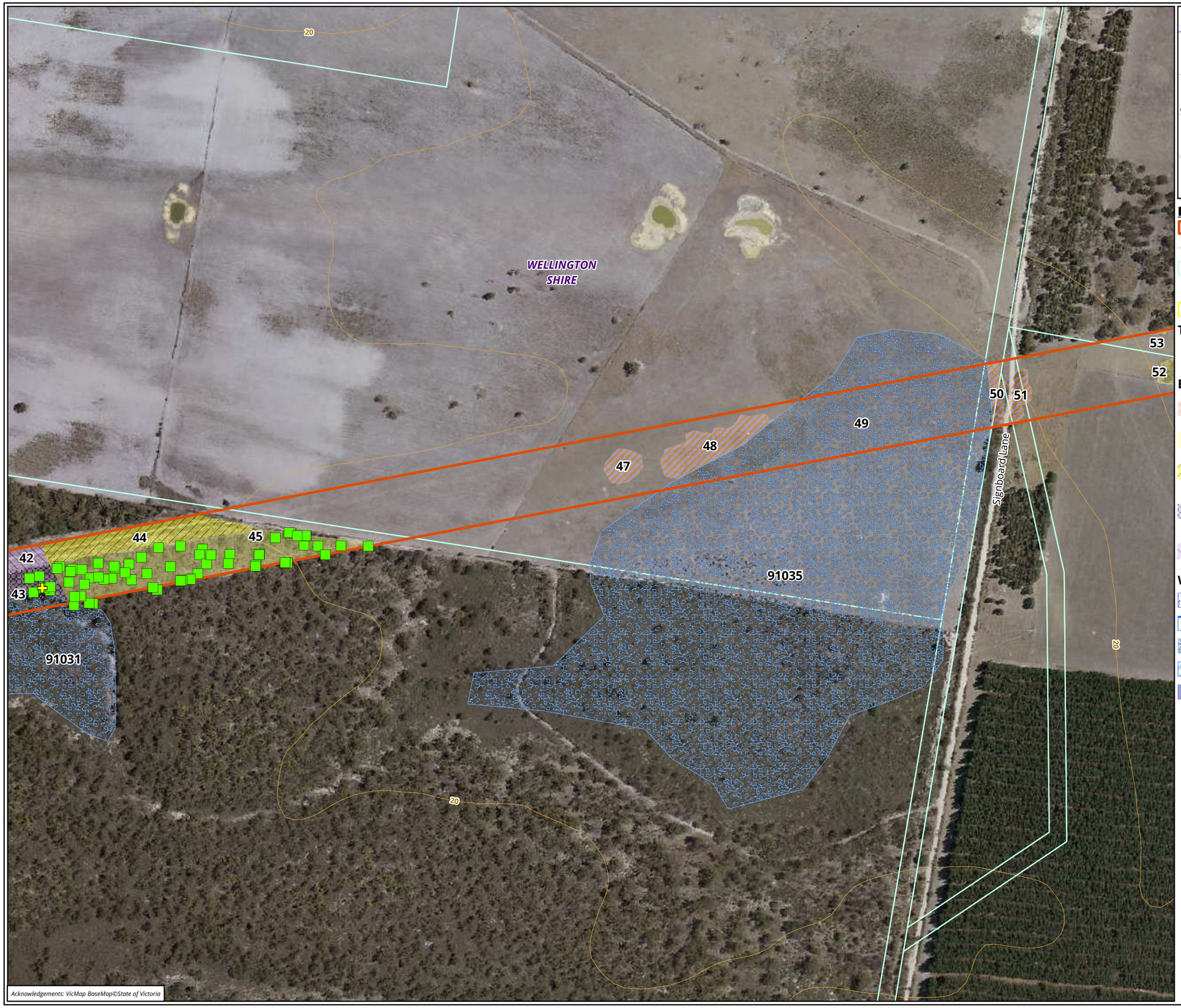

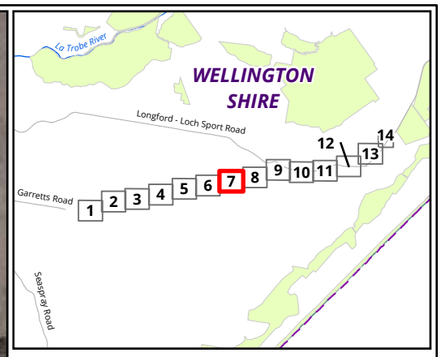

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Large tree in patch
- Tree protction zone (TPZ)

Threatened flora records

- Eucalyptus arenicola - Gippsland Lakes Peppermint

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland - Derived
- (GipP0048) Heathy Woodland
- (GipP0048) Heathy Woodland - Derived
- (GipP0164) Creekline Herb-rich Woodland
- (GipP0164) Creekline Herb-rich Woodland - Derived

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.7 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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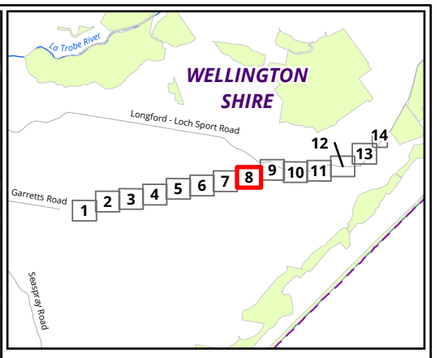

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Small scattered tree
- Large scattered tree
- Large tree in patch
- Tree protction zone (TPZ)
- Skink habitat

Ecological Vegetation Class (EVC)

- (GipP0048) Heathy Woodland

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.8 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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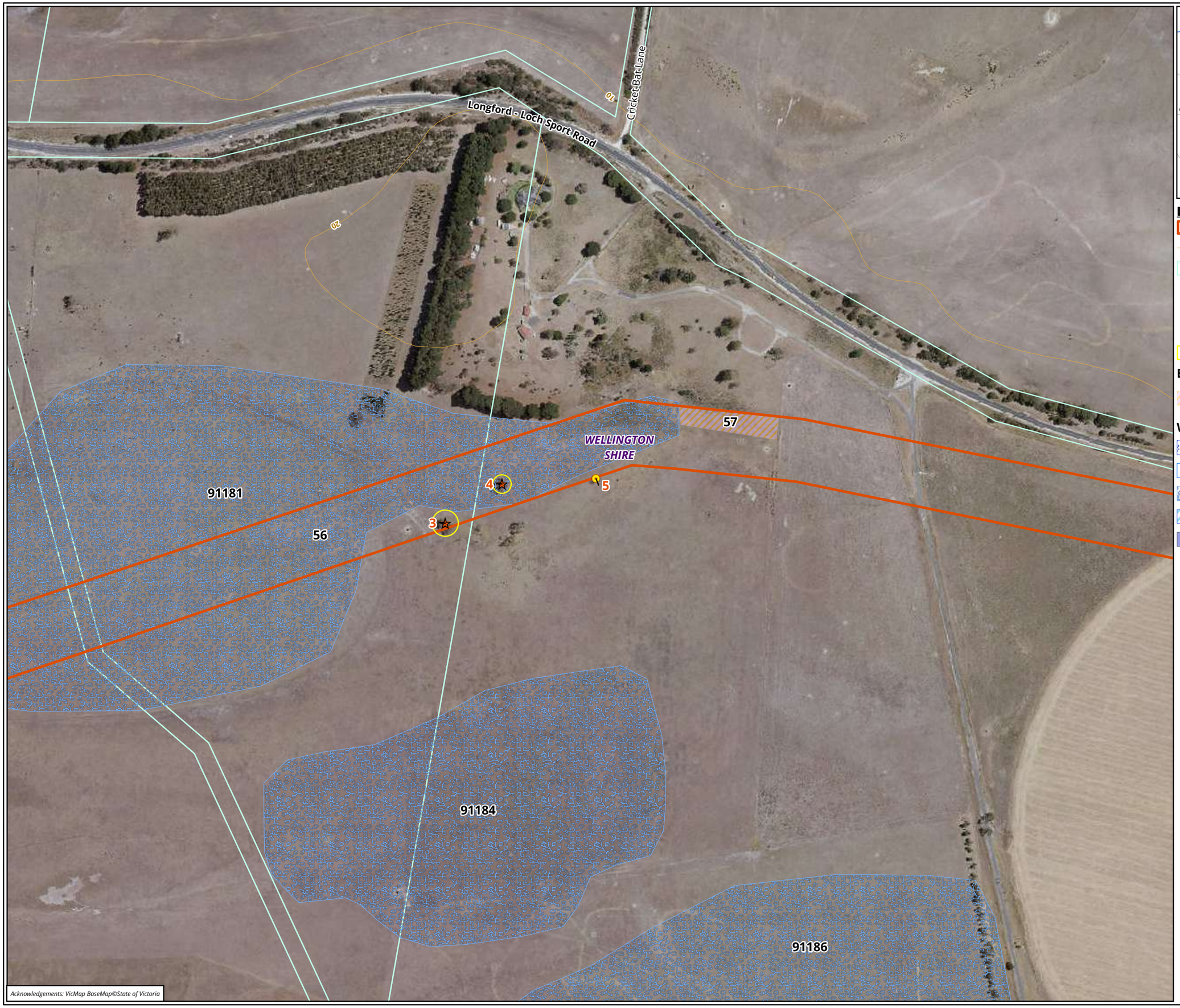

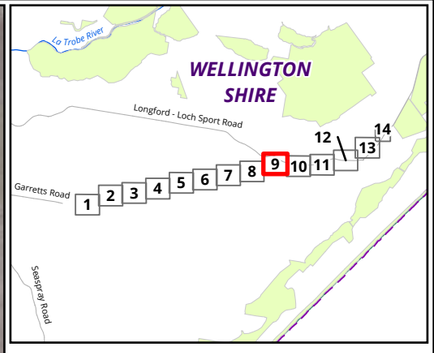

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Small scattered tree
- Large scattered tree
- Large tree in patch
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland - Derived

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.9 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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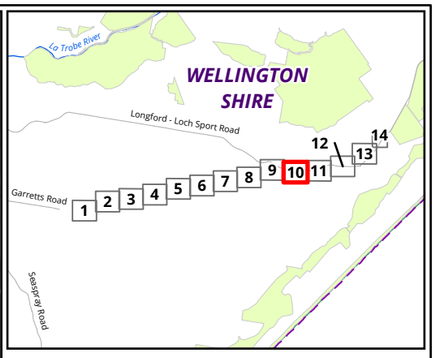

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Large tree in patch
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.10 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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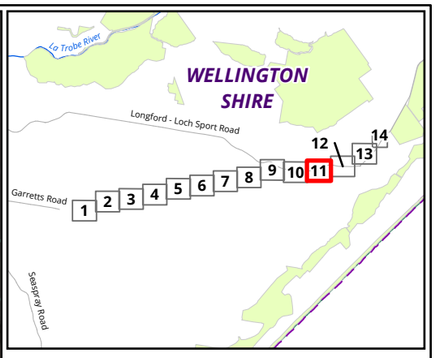

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Small scattered tree
- Large scattered tree
- Large tree in patch
- Tree protction zone (TPZ)

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.11 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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Matter: 37664,
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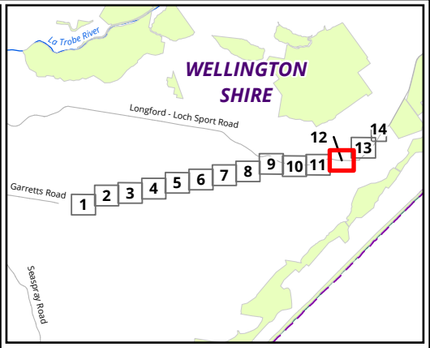

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Large tree in patch
- Tree protction zone (TPZ)
- Skink habitat

Threatened flora records

- Thryptomene micrantha - Ribbed Thryptomene

Ecological Vegetation Class (EVC)

- (GipP0006) Sand Heathland
- (GipP0006) Sand Heathland - Derived
- (GipP0048) Heathy Woodland
- (GipP0048) Heathy Woodland - Derived
- (GipP0053) Swamp Scrub

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.12 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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Matter: 37664,
Date: 23 November 2023,
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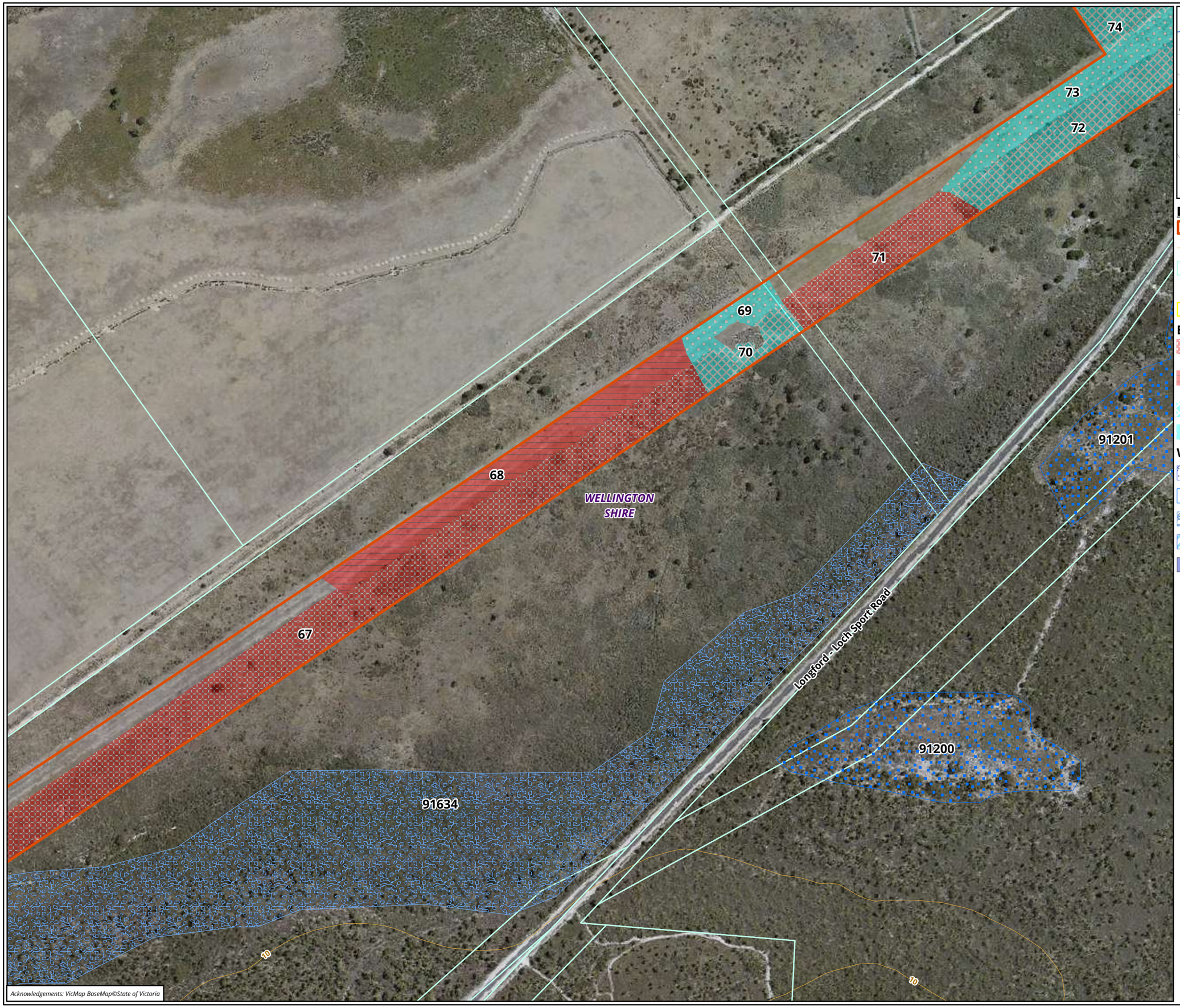

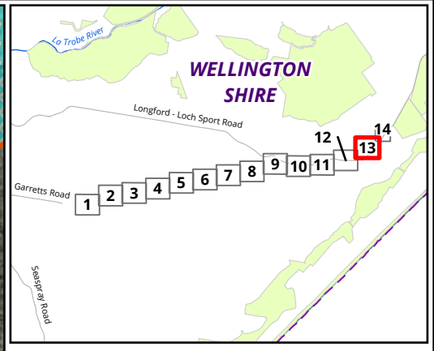

Legend

- Study area
- Contour 10m interval
- Current parcel boundary
- Large tree in patch
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0006) Sand Heathland
- (GipP0006) Sand Heathland - Derived
- (GipP0053) Swamp Scrub
- (GipP0053) Swamp Scrub - Derived

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.13 Ecological values of the study area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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Matter: 37664,
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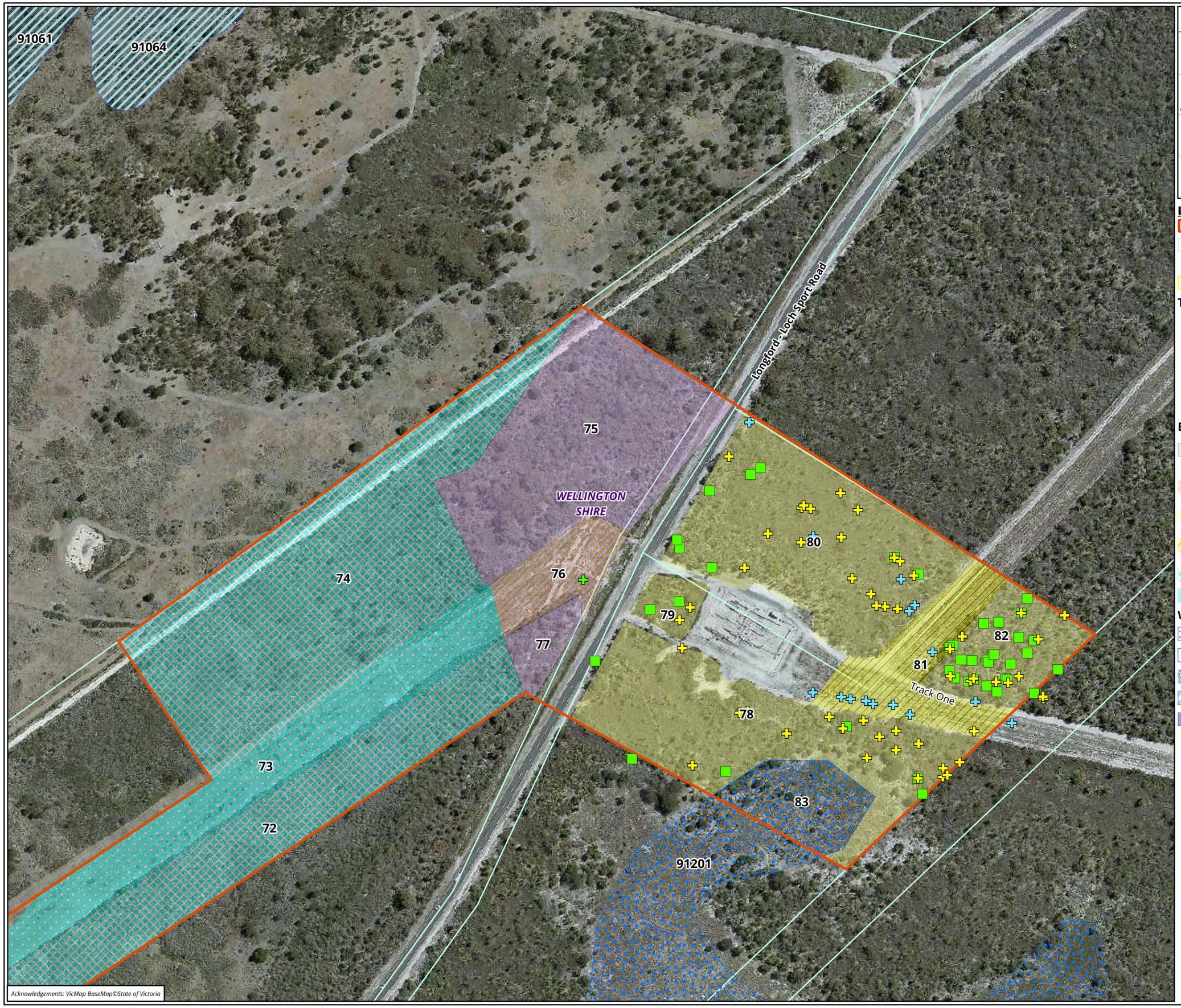

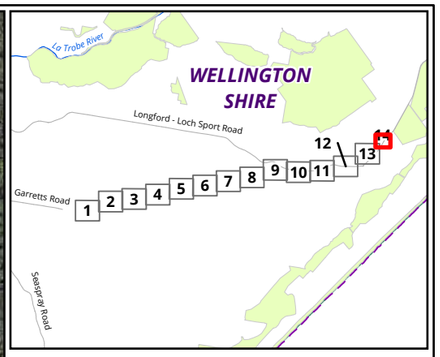

Legend

- Study area
- Current parcel boundary
- Large tree in patch
- Tree protction zone (TPZ)

Threatened flora records

- Zieria veronicea subsp. veronicea - Pink Zieria
- Eucalyptus arenicola - Gippsland Lakes Peppermint
- Thelionema umbellatum - Clustered Lily

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland
- (GipP0003) Damp Sands Herb-rich Woodland - Derived
- (GipP0048) Heathy Woodland
- (GipP0048) Heathy Woodland - Derived
- (GipP0053) Swamp Scrub
- (GipP0053) Swamp Scrub - Derived

Wetlands

- 2 - Freshwater meadow
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 6 - Semi-permanent saline
- 20 - Sewage oxidation basin

Figure 3.14 Ecological values of the study area

0 20 40 60 80 100

Metres

Scale: 1:2,500 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

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Matter: 37664,
Date: 23 November 2023,
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37664_ESSO_FFA.aprx

3.3. Threatened species and ecological communities

Threatened species recorded or predicted to occur within 10 kilometres of the study area or from the relevant catchment (aquatic species) are listed in Appendix A (flora) and Appendix B (fauna). An assessment of the likelihood of these species occurring in the study area and an indication of where within the site (i.e. which habitats or features of relevance to the species) is included. A summary of those species recorded or with a medium or higher likelihood of occurring in the study area is provided in Table 9. Species that have undergone targeted surveys and no longer have a medium to high likelihood of occurrence within the study area have been excluded from Table 9.

Ten flora species, two terrestrial mammals, two fish, two bats, four frogs, three reptiles and ten birds have been identified as having a medium or greater likelihood of occurrence within the disturbance footprint where there is a possibility of an impact/effect. Significant Impact Criteria (SIC) assessments for species listed under the EPBC Act assessed to be likely to inhabit the disturbance footprint have been undertaken in Appendix B.4 to determine if this impact/effect is considered significant. Species descriptions are provided in Sections 0 to 3.3.9 for EPBC Act listed biota. Where practical, species have been grouped together based on their listing status, ecology or life history traits.

Two flora species (Variable Bossiaea and Eastern Water-ribbons) have a medium likelihood of occurrence within the study area, however a low likelihood of occurrence within the disturbance footprint. Variable Bossiaea is a shrub species growing to one metre tall and would have likely been detected within the disturbance footprint if it occurred. There is limited suitable habitat for Eastern Water-ribbons within the disturbance footprint.

Three bird species (Brown Treecreeper, Hooded Robin and Chestnut-rumped Heathwren) were assessed as having a medium-high likelihood of occurrence within the study area, but a low likelihood of occurrence within the disturbance footprint. This reduction in likelihood is due to lack of sufficient contiguous habitat cover due to past clearing within the existing easement. The EPBC Act listed Brown Treecreeper and Hooded Robin were not subject to SIC assessments under the EPBC Act.

Table 9 Summary of EPBC and FFG Act listed species most likely to occur in the study area

Species name	EPBC status	FFG status	Relevance to the study area
Flora			
Swamp Everlasting ***Xerochrysum palustre***	V	cr	Suitable habitat around wetlands, drainage lines and wet depressions. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Naked Beard-orchid ***Calochilus imberbis***	-	cr	Suitable habitat in Heathy Woodland, Damp Sands Herb Rich Woodland, Lowland Forest and Sand heathland EVCs.
Pale Swamp Everlasting ***Coronidium gunnianum***	-	cr	This species was recorded in the study area around wet depressions within the existing easement (Figure 3).
Variable Bossiaea ***Bossiaea heterophylla***	-	e	Suitable habitat in Heathy Woodland, Damp Sands Herb Rich Woodland, Lowland Forest and Sand heathland EVCs.

Species name	EPBC status	FFG status	Relevance to the study area
Spurred Helmet-orchid ***Corybas aconitiflorus***	-	e	Suitable habitat in Swamp Scrub and Sand Heathland EVCs.
Eastern Water-ribbons ***Cycnogeton microtuberosum***	-	e	Suitable habitat in wetlands following inundation.
Gippsland Lakes Peppermint ***Eucalyptus arenicola***	-	e	This species was recorded within the study area in Heathy Woodland, habitat zones 17 to 17.4 (Figure 3).
Veiled Fringe- ***Fimbristylis velata***	-	e	Suitable habitat includes drying mud next to seasonally wet depressions.
Ribbed Thryptomene ***Thryptomene micrantha***	-	e	This species was recorded within the study area in Heathy Woodland in habitat zones 3 and 3.1 (Figure 3).
Pink Zieria ***Zieria veronicea* Subsp. *veronicea***	-	e	This species was recorded within the study area in Heathy Woodland in habitat zones 17 and 17.4 (Figure 3).
Clustered Lily[1] ***Thelionema umbellatum***		v	The species was recorded within the study area in Damp Sands Herb-rich Woodland – Derived, in habitat zone 76 (Figure 3).
Fauna			
Southern Brown Bandicoot ***Isoodon obesulus obesulus***	EN	e	Suitable shelter habitat in contiguous patches of woodland, forest, heathland and swamp scrub. Suitable foraging habitat in cleared easement adjacent to shelter habitat. Bandicoot diggings (potentially including those of Long-nosed Bandicoot *Perameles nasuta, although assumed to be those of Southern Brown Bandicoot as a precaution*) recorded throughout the study area and disturbance footprint. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Gang-gang Cockatoo ***Callocephalon fimbriatum***	EN	-	Suitable foraging habitat in forest, woodland and scattered trees. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Blue-winged Parrot ***Neophema chrysostoma***	VU	-	Suitable nesting habitat in mature heathy woodland and forest. Suitable foraging habitat in open areas, including the existing cleared easement. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Swift Parrot ***Lathamus discolor***	CR	cr	Suitable foraging and roosting habitat in woodland and forest habitat. Species breeds exclusively in Tasmania. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
White-throated Needletail ***Hirundapus caudacutus***	VU	v	Likely to utilise airspace above the study area. Unlikely to regularly utilise terrestrial habitat. May occasionally roost in tall trees. A SIC assessment under the EPBC Act has been undertaken in Appendix C.

Species name	EPBC status	FFG status	Relevance to the study area
Pilotbird ***Pycnoptilus floccosus***	VU	-	May inhabit forest, woodland, heathland and swamp scrub with understorey vegetation. Unlikely to utilise cleared agricultural land, pipeline existing easement, or extremely dense heathland. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Brown Treecreeper ***Climacteris picumnus victoriae***	VU	-	Some potential habitat within contiguous woodland or forest habitat. Unlikely to inhabit the disturbance footprint. disturbance footprint or be impacted by works, and not subject to SIC assessment under EPBC Act.
New Holland Mouse ***Pseudomys novaehollandiae***	VU	e	Suitable habitat in heathland, heathy woodland and swamp scrub, particularly in the eastern extent of the study area. Species may inhabit the cleared easement, as vegetation is slashed to minimum 10cm high which maintains habitat. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Grey-headed Flying-fox ***Pteropus poliocephalus***	VU	v	Suitable habitat in woodland, forest and swamp scrub containing flowering trees for foraging. Species may temporarily roost in canopy of mature trees. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Swamp Skink ***Lissolepis coventryi***	EN	e	Suitable habitat in low vegetation, including Kikuyu and Australian Salt-grass, adjacent to wetlands and seasonally flooded areas. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Green and Golden Bell Frog ***Litoria aurea***	VU	-	Suitable habitat in wetlands, waterways, seasonally flooded areas and adjacent terrestrial vegetation. No suitable breeding habitat within the study area. Species recorded during targeted surveys in wetland adjacent to the study area. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Growling Grass Frog ***Litoria raniformis***	VU	v	Suitable habitat in wetlands, waterways, seasonally flooded areas and adjacent terrestrial vegetation. No suitable breeding habitat within the study area. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Dwarf Galaxias ***Galaxiella pusilla***	VU	e	Potentially suitable habitat within the Regional Outfall Sewer. A SIC assessment under the EPBC Act has been undertaken in Appendix C.
Hooded Robin ***Melanodryas cucullata***	EN	v	Some potential habitat within contiguous woodland or forest habitat with logs and woody debris. Species is not considered likely to inhabit the disturbance footprint or be impacted by works, and not subject to SIC assessment under EPBC Act.
Eastern Great Egret ***Ardea alba modesta***	-	v	Suitable foraging habitat in wetlands, waterways and seasonally flooded areas. No suitable nesting habitat.

Species name	EPBC status	FFG status	Relevance to the study area
Little Eagle ***Hieraaetus morphnoides***	-	v	Suitable nesting habitat in mature trees is forest and woodland. Cleared land for hunting.
White-bellied Sea-Eagle ***Haliaeetus leucogaster***	-	e	Species likely to fly over study area regularly. Unlikely to regularly utilise terrestrial habitat or hunt within the study area due to lack of suitably extensive wetland habitat within or adjacent to the study area.
Powerful Owl ***Ninox strenua***	-	v	Suitable habitat within forests and woodlands with mature trees for roosting, nesting and hunting.
Masked Owl ***Tyto novaehollandiae***	-	cr	Suitable habitat within forests and woodlands with mature trees for roosting, nesting and hunting.
Chestnut-rumped Heathwren ***Calamanthus pyrrhopygius***	-	v	Some potential habitat within contiguous woodland or heathland habitat with a dense understorey. Species is not considered likely to inhabit the disturbance footprint or be impacted by works.
Yellow-bellied Sheathtail ***Saccolaimus flaviventris***	-	v	Suitable habitat in woodland and forest with mature hollow-bearing trees for roosting. Foraging habitat throughout the entire study area.
Lace Monitor ***Varanus varius***	-	e	Woodland and forest, particularly areas with mature hollow-bearing trees for shelter, and termite mounds for nesting. Unlikely to utilise cleared land but may regularly pass through the existing cleared easement between habitat patches.
Glossy Grass Skink ***Pseudemoia rawlinsoni***	-	e	Suitable habitat in vegetation, including Kikuyu and Australian Salt-grass, adjacent to wetlands and seasonally flooded areas. Recorded during targeted surveys within the disturbance footprint. Confirmed habitat within disturbance footprint mapped as 'Skink habitat to be removed' (Figure 5).
Southern Toadlet ***Pseudophryne semimarmorata***	-	e	Suitable habitat in woodland, swamp scrub and grassland with leaf litter and organic debris, adjacent to wetlands, or in areas that flood seasonally. Recent records from within the study area.
Martin's Toadlet ***Uperoleia martini***	-	cr	Suitable habitat in woodland, swamp scrub and grassland with leaf litter and organic debris, adjacent to wetlands, or in areas that flood seasonally. Recent records from woodland extending into the study area.
Flinders Pygmy Perch ***Nannoperca sp. 1***	-	v	Potentially suitable habitat within the Regional Outfall Sewer.

CR, cr – Critically endangered

E, e - endangered

V, v- vulnerable

[1]Clustered Lily was recorded during the October 2023 targeted surveys. This species is not typically known to occur in the Longford area. The nearest record is over 150 kilometres from the study area; hence this species was not included in the target survey schedule or the likelihood table in Appendix A.2.

3.3.1. EPBC Act listed threatened plants

Swamp Everlasting

Swamp Everlasting is listed as vulnerable under the EPBC Act and critically endangered under the FFG Act. This species is a perennial, rhizomatous herb growing to 100 centimetres tall with a large solitary yellow capitula (DAWE 2021). Swamp Everlasting flowers between November and March and its preferred habitat is in lowland swamps, usually on black cracking clay soils (VicFlora 2023). Suitable habitat within the study area includes vegetation that could be considered native wetland vegetation following inundation. This may include areas of modelled wetland Deep Freshwater Marsh. 5.98 hectares of this EVC is being impacted by the proposed new pipeline, however Winter and Spring of 2022 had above average rainfall in West Gippsland (BOM 2023, Bom 2023a) and the modelled wetland areas were dry at the time of assessment, dominated by predominantly introduced vegetation and supporting limited wetland values. This indicates that the modelled wetlands are unlikely to provide suitable habitat for this EPBC Act listed species. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded the proposed works are unlikely to constitute a significant impact to the species.

3.3.2. FFG Act listed threatened plants

Spurred Helmet Orchid is listed as endangered under the FFG Act. Suitable habitat for this species within the study area includes Swamp Scrub and Sand Heathland. The proposed works will result in the removal of suitable habitat.

Six plant species (in addition to those plants listed above), all listed as critically endangered, endangered or vulnerable have been grouped together here based on similar listing status and habitat requirements within the study area. Individual species descriptions have not been provided unless the species are listed under the EPBC Act.

These species are:

- Naked Beard Orchid
- Variable Bossiaea
- Gippsland Lakes Peppermint
- Ribbed Thryptomene
- Pink Zieria
- Clustered Lily

The proposed works will result in the removal of native woodland and heathland vegetation, which provides suitable habitat for these species.

Three plant species (in addition to those listed above) listed as critically endangered or endangered have been grouped together here based on similar listing status and habitat requirements within the study area. These species are:

- Pale Swamp Everlasting
- Eastern Water Ribbons
- Veiled Fringe Sedge.

The proposed works may result in the removal of vegetation that could be considered native wetland vegetation following inundation.

Pale Swamp Everlasting was recorded in habitat zones 34, 37 and 42, however no individuals will be lost from the pipeline construction.

Gippsland Lakes Peppermint, Ribbed Thryptomene and Pink Zieria were recorded in Heathy Woodland in habitat zones 60, 61, 79-82 (Figure 3). The proposed new pipeline construction will remove up to five Gippsland Lakes Peppermint individuals, up to 1440 Pink Zieria individuals and no Ribbed Thryptomene.

Clustered Lily was recorded in Damp Sands Herb-rich Woodland – derived in habitat zone 76. Only one individual was recorded within the impact area.

3.3.3. EPBC Act listed birds

Gang-gang Cockatoo *Callocephalon fimbriatum*

Gang-gang Cockatoo is listed as endangered under the EPBC Act. The Gang-gang Cockatoo is a small cockatoo that inhabits eucalypt forests and woodlands of south-east Australia. During summer months, the species primarily inhabits mature wet eucalypt forests at high altitudes. During winter months the species ranges into lower-lying regions in open eucalypt forest and woodland habitat. The species feeds on flowers, seed pods, fruits and leaf buds of a range of native and introduced trees and shrubs. Foraging habitat includes a range of forests, woodlands and partially cleared agricultural land (particularly areas with dense Hawthorn hedgerows), with highest density of birds supported by eucalypt-dominated assemblages with a dense acacia and banksia understory. Breeding occurs between October and January, with monogamous pairs favouring old-growth forest, where they nest in hollows of large mature trees (Commonwealth of Australia 2022).

Habitat for the species within the study area is predominantly limited to foraging habitat during winter months. Suitable foraging habitat includes flowering eucalypts and banksias in all mapped woodland and forest EVCs, and scattered trees. The proposed works will result in the removal of small patches of woodland and forest habitat. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

Blue-winged Parrot *Neophema chrysostoma*

The Blue-winged Parrot is listed as Vulnerable under the EPBC Act. The Blue-winged Parrot is a small parrot found throughout south-eastern Australia, occupying coastal, subcoastal and semi-arid regions. The species is a partial migrant between the mainland and Tasmania, with most Tasmanian birds migrating to Victoria for the winter. Blue-winged Parrots favour heathy woodland for breeding, nesting in hollows of large trees, preferring vertical hollows of mature eucalypts. Breeding occurs over September-January, with monogamous pairs producing up to two broods per season. The species forages on the ground in grassland, saltmarshes, farmland, and open areas of grassy woodland and heathland, feeding on the seeds of grasses and herbs (Commonwealth of Australia 2023).

Habitat for the species within the study area includes all large hollow-bearing trees in Woodland and Forest EVCs for nesting (particularly in areas with a dense heath understorey, including habitat zones 11, 30, 35, 39, 40, 43, 45 and 60), and foraging habitat throughout agricultural land and the entire existing cleared easement. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

Swift Parrot *Lathamus discolor*

The Swift parrot is listed as Critically Endangered under the EPBC Act and the FFG Act. The Swift Parrot breeds exclusively in Tasmania during the summer, with the entire population migrating to south-eastern mainland Australia for the winter. The species acts as a single nomadic population, following seasonally available food. The species feeds primarily on the nectar of flowering eucalypts and psyllid lerps. Foraging habitat in Victoria predominantly occurs in dry forests and box-ironbark communities inland of the great dividing range, as well as occasional records in Melbourne and Geelong urban areas and the Gippsland region (Commonwealth of Australia 2016).

Habitat for the species within the study area includes all woodland and forest habitat with mature flowering eucalypts for occasional foraging. The study area is outside of the species breeding range. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

White-throated Needletail *Hirundapus caudacutus*

The White-throated Needletail is listed as Vulnerable under the EPBC Act and the FFG Act. The White-throated Needletail is a large swift found throughout eastern and south-eastern Australia. The species migrates to Asia to breed, departing Australia between March and April, and returning from September to October. In Australia, the species is mostly aerial, flying at heights of less than one meter, to over 1000 meters. The species is most often observed flying over wooded areas and is rarely recorded landing. When the species does land, it is usually observed roosting in dense tree canopies or hollows. The species feeds on a range of insects, usually caught on the wing at cloud level (TSSC 2019).

Habitat for the species within the study area is largely restricted to the airspace above the study area, although the species may occasionally roost within the dense canopy or hollows of large mature trees. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

Pilotbird *Pycnoptilus floccosus*

The Pilotbird was recently listed as Vulnerable under the EPBC Act in response to the 2019/2022 Australian Bushfires, which burnt 47% of its distribution, and contributed to an estimated 30-50% decline in the national population (DAWE 2022a).The Pilotbird is a small, plump, bird with a small distribution in coastal and sub-coastal south-eastern Australia. The species is almost entirely terrestrial, with flight largely reserved for use to escape into shrubs when startled. The species in sedentary, foraging for insects, seeds, and fruits in pairs on the forest floor. Habitat includes a range of forests and woodlands with dense undergrowth, leaf litter and organic debris, where they turn litter with their bills and feet. Breeding occurs between August and January, with two eggs laid in a domed nest on or near the ground and incubated by the female for 20-22 days. Young Pilotbirds often forage in family groups with adults (DAWE 2022a).

Habitat for the species within the study area includes woodland and forest with dense undergrowth, leaf litter and debris. The species is unlikely to utilize small fragmented patched of forest or woodland, or cleared areas, including the existing pipeline easement and fringing vegetation. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

3.3.4. EPBC Act listed mammals

Southern Brown Bandicoot *Isoodon obesulus obesulus*

The Southern Brown Bandicoot is listed as Endangered under the EPBC Act and the FFG Act. The Southern Brown Bandicoot is a medium-sized, ground-dwelling marsupial found primarily through coastal areas of south-eastern Australia. The species inhabits areas of dense low vegetation, including wetland fringes, heathlands, and areas infested with introduced weeds such as Blackberry Rubus spp. The species is secretive, rarely venturing far from cover. The species is omnivorous, foraging for food among leaf litter and soil to find fungi, roots, bulbs and invertebrates, leaving distinctive 'digging' marks. It also eats fruit, seeds and other plant matter above ground. The species breeds throughout the year, peaking in spring, with an average of two young produced per litter, and between two and three litters reared per year, depending on resource availability. The species constructs nests on the ground under plants, and occasionally uses the burrows of other species, but does not construct burrows itself. The species is recorded to occur at low densities, with home ranges typically between 0.5 – 5 hectares, and are strongly influenced on availability of resources and seasonal conditions (DoEE 2016).

Opportunistic searches for the species identified Bandicoot activity throughout forested areas of the study area. This Bandicoot activity may include diggings of the non-threatened Long-nosed Bandicoot, however, as a precaution all Bandicoot activity was assumed to be from the threatened Southern Brown Bandicoot, and presence was assumed for the purposes of conducting impact assessments and informing impact mitigation recommendations.

Opportunistic searches for the species indicated that it is likely to inhabit the study area in remnant native vegetation (particularly swamp scrub in the eastern extent of the study area), and forage within the existing cleared easement adjacent to remnant vegetation. Nesting habitat for the species within the study area includes areas of woodland, forest, and swamp scrub EVCs with a dense understorey. Nesting habitat occurs within the disturbance footprint is negligible, with works planned to be largely restricted to the existing cleared pipeline corridor, where vegetation is maintained at a low height unsuitable for nesting. The species may forage within cleared agricultural land, along roadsides, and within the existing cleared easement in areas immediately adjacent to suitably dense understory vegetation for cover. It is estimated that 4.04 ha of potential nesting and foraging habitat will be disturbed by the proposed works, equating to <0.001% of the modelled 2,243,791 ha of habitat within Victoria. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

New Holland Mouse *Pseudomys novaehollandiae*

The New Holland Mouse is listed as Vulnerable under the EPBC Act and Endangered under the FFG Act. The New Holland Mouse is a small, nocturnal, burrowing rodent found in small, fragmented populations in coastal south-eastern Australia. The species is social, living in small communal burrows, with home ranges of 0.44 – 1.4 hectares (DEWHA 2010b). The species inhabits a range of heathlands, open woodlands with a heathy understory, and vegetated sand dunes. The species is largely granivorous, relying on areas with high floristic diversity to provide food year-round. Local abundance peaks in areas of early to mid-stage vegetation, three to five years after fire. Females are known to live up to two years. The species breeds in late winter to early summer. One year old females typically produce one litter per season, with two-year-old females producing three to four. Young are born in nest burrows, with litter sizes of 1-6 young.

A population of New Holland Mouse occur throughout the Gippsland Lakes Coastal Park and Golden Beach region (Burns & Phillips 2020), with recent local records from camera and trapping survey as recent as three years old in suitable woodland and heathland habitat extending into the study area. Habitat for the species within the study area includes areas of woodland, forest, and swamp scrub EVCs with a dense understorey. The species is also likely to inhabit areas of the existing cleared pipeline corridor with a heathy groundcover, particularly once vegetation has regrown after annual slashing. It is estimated that 3.41 ha of potential nesting

and foraging habitat will be disturbed by the proposed works, equating to <0.01% of the modelled 116,376 ha of habitat within Victoria. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works may constitute a short-term impact to the breeding cycle of an important population, but are unlikely to constitute a significant impact to the species.

Grey-headed Flying-fox *Pteropus poliocephalus*

The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act and the FFG Act. The Grey-headed Flying-fox is a large 'fruit bat' that occupies the coastal belt from north-east Queensland, down to Melbourne in Victoria, and on to Adelaide in South Australia. Only a small portion of its range is occupied at any given time, as the species acts as a single highly mobile unit, moving to follow seasonally available food, and with many retreating north of the Hunter Valley in NSW during Winter. The species forms large colonies in densely wooded areas with tall canopies, including Pine plantations, and botanic gardens in population centres. The species is a canopy-feeding frugivore and nectarivore, feeding on nectar of flowering trees in a range of native forests, woodlands, melaleuca swamps and banksia woodlands. The species also feeds on fruit crops and introduced flowering trees species in urban areas. Mating occurs in late autumn, with young born six months after. Young are carried by mothers for up to five weeks, after which they are left at maternal camps and continue to be nursed until they become independent at around 12 weeks (DAWE 2021).

Habitat for the species within the study area is largely limited to seasonal foraging habitat for the permanent colony located nearby at the Sale botanic gardens, approximately 15 kilometres from the study area, and the Woodside camp, approximately 43 kilometres from the study area. Foraging habitat may include mature flowering eucalypts and banksias in mapped forest, woodland and swamp scrub EVCs. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

3.3.5. EPBC Act listed reptiles

Swamp Skink *Lissolepis coventryi*

The Swamp Skink is listed as Endangered under the EPBC Act and the FFG Act. The Swamp Skink is a moderate-sized, robust, long-living skink found throughout coastal areas of south-eastern Australia, with some inland subpopulations inhabiting wetland systems. The species basks and forages in dense low vegetation, fringing freshwater and saltwater wetlands, with little to no overstorey. Areas of habitat may contain rocks, logs, and driftwood, where the skink shelters in burrows or under debris during periods of inactivity. The species is diurnal and heliothermic, although they have been recorded as crepuscular during hot summer months. The species is omnivorous, feeding on a range of plant matter, as well as invertebrates. Breeding occurs in November, with live independent young born in late January to February (DCCEEW 2023c).

Habitat for the species within the study area is minimal, limited to low vegetation fringing permanent or ephemeral wetlands. The majority of DEECA mapped wetlands within and adjacent to the study area were not observed to hold water during the site investigation and targeted surveys (October 2022 – February 2023), despite higher than average rainfall for the period and are unlikely to support suitable habitat vegetation. Potential habitat is likely restricted to low vegetation fringing the ROS (mapped as skink habitat), and areas of Sand Heathland and Swamp Scrub adjacent to mapped wetlands with an open canopy, located in the eastern extent of the study area.

The species was not recorded during targeted surveys within potentially suitable habitat. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

3.3.6. EPBC Act listed frogs

Green and Golden Bell Frog *Litoria aurea*

The Green and Golden Bell Frog is listed as Vulnerable under the EPBC Act. The Green and Golden Bell Frog is a large ground-dwelling frog occurring in coastal lowland areas of eastern NSW and Victoria, with the study area located in the most southern extent of the species. The species inhabits a range of terrestrial habitats near freshwater wetlands. Breeding occurs exclusively in still freshwater wetlands with abundant emergent vegetation, free of predatory fish species. Breeding typically occurs during September-February, peaking during warm weather after heavy rain or storms. Eggs hatch within 2-5 days, with tadpole metamorphosis usually taking six weeks, maturing between 9 to 12 months. The species is highly mobile, capable of dispersing several kilometres across land between breeding sites, or to forage in seasonal wetlands. Individuals are known to bruminate over winter under logs, rocks, dense vegetation, or below ground. The species is carnivorous, feeding on a range of terrestrial and aquatic invertebrates, and is known to prey on other frogs, including cannibalism (DAWE 2014).

Habitat for the species within the study area is minimal, limited to seasonal foraging habitat in ephemeral wetlands and a potential dispersal corridor within the ROS. No suitable breeding habitat was recorded within the study area. The Green and Golden Bell Frog was recorded at a wetland adjacent to the study area during targeted surveys (Figure 4). The species was recorded at a small dam surrounded by heathy vegetation, approximately 60 metres from the study area, and 180 metres from the proposed disturbance footprint. During the constraints mapping project stage, a 200 metre 'High' avoidance buffer was applied to the wetland that the Green and Golden Bell Frog was recorded at, to inform disturbance footprint minimisation. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

Growling Grass Frog *Litoria raniformis*

The Growling Grass Frog is listed as Vulnerable under the EPBC Act and the FFG Act. The Growling Grass Frog shares a similar life history and habitat niche as the Green and Golden Bell Frog. It is a large terrestrial frog found throughout Victoria and into eastern South Australia, and southern NSW. The species inhabits freshwater wetlands with emergent aquatic vegetation, and adjacent low vegetation, and is known to bruminate over winter under logs, rocks, dense vegetation, or below ground. The species relies on still or very slow-moving freshwater wetlands with emergent vegetation, free from predatory fish for breeding. The species generally breeds over November and March, following local flooding. Metamorphosis of tadpoles generally takes 3 months, but can take up to 12 months. The species is highly mobile, capable of moving distances of several kilometres over land. The species is carnivorous, feeding on a range of terrestrial and aquatic invertebrates, and is known to prey on other frogs, including cannibalism (Clemann & Gillespie 2012).

Habitat for the species within the study area is minimal, limited to seasonal foraging habitat in ephemeral wetlands and a potential dispersal corridor within the ROS. No suitable breeding habitat was recorded within the study area. The species was not recorded during targeted surveys. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

3.3.7. EPBC Act listed fish

Dwarf Galaxias *Galaxiella pusilla*

The Dwarf Galaxias is listed as Vulnerable under the EPBC Act and Endangered under the FFG Act. The Dwarf Galaxias is a tiny fish that inhabits still and slow-flowing permanent and temporary freshwater habitat throughout lowland areas of southern Victoria, south-eastern South Australia, and Tasmania. Habitat wetlands generally contain aquatic vegetation, which are required for spawning. The species is short-lived; populations experience annual cycles, with abundance fluctuating annually based of availability of resources. Some populations inhabit ephemeral wetlands that completely dry during summer, relying on seasonal flooding and linkage to permanent waterways for population replenishment. It is not clear if individuals are capable of aestivation over dry periods, or if it relies on small pockets of permanent water, such as freshwater crayfish burrows, to survive until ephemeral habitat refills (Saddlier, Jackson, & Hammer 2010).

Habitat for the species within the study area is largely limited to the ROS, which may support a permanent source population. Individuals may occasionally be washed into ephemeral wetlands during flood events; however, they are unlikely to form permanent populations as all ephemeral wetlands regularly dry over summer. A SIC assessment under the EPBC Act has been undertaken in Appendix C, and concluded that the proposed works are unlikely to constitute a significant impact to the species.

3.3.8. EPBC Act listed migratory species

Seven species listed as migratory under the EPBC Act have been assessed as likely to inhabit the study area. These species are:

- White-throated Needletail *Hirundapus caudacutus*
- Fork-tailed Swift *Apus pacificus*
- Black-faced Monarch *Monarcha melanopsis*
- Rufous Fantail *Rhipidura rufifrons*
- Satin Flycatcher *Myiagra cyanoleuca*
- Latham's Snipe *Gallinago hardwickii*
- Glossy Ibis *Plegadis falcinellus*.

The proposed works will result in clearing of small patches of woodland, forest, swamp scrub and heathland, which may provide habitat for these species. An EPBC Act SIC assessment for these migratory species has been undertaken in Appendix C and concluded that the proposed works are unlikely to constitute a significant impact to migratory species.

3.3.9. FFG Act listed fauna

Twelve (12) animal species (in addition to those listed above) listed under the FFG Act have been assessed as likely to inhabit the study area. Individual species descriptions have not been provided unless the species are listed under the EPBC Act and are considered likely to inhabit the disturbance footprint. These species, their distribution within Victoria, and potential impacts to habitat are outlined in Table 10 below.

Table 10 FFG Act threatened fauna habitat and extent of disturbance

Species	Modelled habitat extent within Victoria*	Habitat extent and disturbance within study area†
Eastern Great Egret	1,598,585 ha	Marginal foraging habitat in seasonally flooded farmland, wetlands, and

Species	Modelled habitat extent within Victoria*	Habitat extent and disturbance within study area†
Ardea alba modesta		the ROS. Habitat extent likely to fluctuate seasonally and may include the 12.56 ha of DEECA mapped wetland within the study area, less than 0.001% of modelled Eastern Great Egret habitat within Victoria. Habitat disturbance is likely to be minimal and short-term.
Little Eagle *Hieraaetus morphnoides*	486,542 ha	Habitat for these species, as outlined in Table 8 includes: • Damp Sands Herb-rich Woodland (4.98 ha proposed for removal) • Heathy Woodland (0.53 ha proposed for removal) • Lowland Forest (0.01 ha proposed for removal) • Large and scattered trees No large or scattered trees are proposed to be removed. Extent of suitable habitat EVCs within the disturbance footprint is 5.52 ha, less than 0.001% of modelled habitat within Victoria for each of these species.
Powerful Owl *Ninox strenua*	3,077,318 ha	
Masked Owl *Tyto novaehollandiae*	903,575 ha	
Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*	7,113,186 ha	
Lace Monitor *Varanus varius*	8,870,907 ha	
Chestnut-rumped Heathwren *Calamanthus pyrrhopygius*	3,313,626 ha	Unlikely to inhabit the disturbance footprint. Upper estimates of terrestrial EVC vegetation to be cleared is 7.65 ha, less than 0.001% of modelled Chestnut-rumped Heathwren habitat within Victoria.
Glossy Grass Skink *Pseudemoia rawlinsoni*	2,530,366 ha	Known habitat in Impacts to known habitat within the disturbance footprint adjacent to the ROS have been avoided through proposed use of trenchless construction. Impacts to up to 0.414 ha of known Glossy Grass Skink habitat (Figure 5) fall below 0.001% of modelled Glossy Grass Skink habitat within Victoria. Impact mitigation measures have been proposed to minimise direct impacts, and to rehabilitate disturbed habitat following construction (Section 4). Upper estimates of terrestrial EVC vegetation and mapped wetlands to be cleared is 13.63 ha, less than 0.001% of modelled Glossy Grass Skink habitat within Victoria.
Southern Toadlet *Pseudophryne semimarmorata*	2,142,250 ha	Recent records from within cleared pipeline in forest and woodland EVCs, encompassing habitat zones 34 – 45. Trenchless construction is proposed under this area to avoid disturbing known habitat of the species. Works planned to be conducted during summer months when ephemeral wetland habitat is likely to be dry. Upper estimates of terrestrial EVC vegetation and mapped wetlands to be cleared is 13.63 ha, less than 0.001% of modelled Southern Toadlet habitat within Victoria.
Martin's Toadlet *Uperoleia martini*	302,284 ha	Potential habitat in forest, woodland, and heathland EVCs, and modelled wetlands, up to 12.84 ha, less than 0.01% of modelled

Species	Modelled habitat extent within Victoria*	Habitat extent and disturbance within study area†
		Martin's Toadlet habitat within Victoria.

** Modelled habitat extent within Victoria sourced from NatureKit SMP Habitat Distribution Models (HDMs) at 225 metre resolution.*

† Habitat extent of mapped EVCs within impact footprint includes both intact and modified vegetation.

The proposed works will result in the temporary disturbance of vegetation within the existing cleared pipeline easement, and clearing of small patches of woodland, forest, swamp scrub and heathland, which provide habitat for these species.

Impacts have been minimised through mitigation measures informed by the targeted survey and constraints mapping processes. Impacts to habitat have been minimised through largely limiting the disturbance footprint to the existing cleared pipeline easement, proposed trenchless construction under areas of high habitat value, and proposed rehabilitation and revegetation of the disturbance footprint. It is unlikely that the proposed works will have a significant long-term impact on any habitat for FFG Act listed species, or direct impact to a significant proportion of individual animals within any potential local populations.

3.4. Targeted survey results

3.4.1. Flora

A summary of the results for the spring 2022 and 2023 surveys for threatened flora is provided in Table 11. Further detail is provided below.

Table 11 Summary of results for targeted surveys of threatened flora

Scientific name	Common name	EPBC Act conservation status	FFG Act conservation status	Recorded (yes/no)
Allocasuarina nana	Stunted Sheoak		e	No
Billardiera scandens	Velvet Apple-berry		e	No
Caladenia tessellata	Thick-lip Spider Orchid	VU		No
Calochilus imberbis	Naked Beard-orchid		cr	No
Commersonia prostrata	Dwarf Kerrawang	EN	e	No
Coronidium gunnianum	Pale Swamp Everlasting		cr	**Yes**
Diuris punctata var *punctata*[1]	Purple Donkey Orchid		e	No
Eucalyptus arenicola	Gippsland Lakes Peppermint		e	**Yes**
Fimbristylis velata	Veiled Fringe-sedge		e	No
Grevillea chrysophaea	Golden Grevillea		v	No
Lachnagrostis rudis subsp. *rudis*	Rough Blown-grass		e	No
Muellerina celastroides	Coast Mistletoe		cr	No
Platysace ericoides	Heath Platysace		e	No
Prasophyllum frenchii	Maroon Leek-orchid	EN	e	No
Prostanthera galbraithiae	Wellington Mint-bush	VU	e	No
Pseudanthus ovalifolius	Oval-leaf Pseudanthus		v	No
Pterostylis chlorogramma	Green-striped Greenhood	VU	en	No
Schoenus imberbis	Beardless Bog-sedge		v	No
Senecio glomeratus subsp. *longifructus*	Annual Fireweed		v	No
Thelionema umbellatum[2]	Clustered Lily		v	**Yes**
Thelymitra epipactoides	Metallic Sun-orchid	EN	e	No
Thryptomene micrantha	Ribbed Thryptomene		e	**Yes**
Xerochrysum palustre	Swamp Everlasting	VU	cr	No
Zieria veronicea subsp. *veronicea*	Pink Zieria		e	**Yes**

Cr – critically endangered

En, e – endangered

VU, v – vulnerable

[1]All records of Purple Donkey Orchid are outside of the 10-kilometre database search area. Thus, this species is not included in the likelihood table in Appendix A.2. This species was included in the targeted survey schedule as requested by DEECA.

[2] Clustered Lily was recorded during the October 2023 targeted surveys. This species is not typically known to occur in the Longford area. The nearest record is over 150 kilometres from the study area; hence this species was not included in the target survey schedule or the likelihood table in Appendix A.2

Pale Swamp Everlasting (FFG critically endangered)

Pale Swamp Everlasting is a perennial herb up to 50 centimetres tall with linear leaves and a solitary yellow capitula. Pale Swamp Everlasting is found at low elevations (under 100 metres) mostly in grasslands and riverine River Red Gum *Eucalyptus camaldulensis* woodland on soils that are prone to inundation (VicFlora 2023b).

Approximately 35 populations of Pale Swamp Everlasting were found along the existing easement is habitat zones 34, 37 and 32 (Figure 3). This species was recorded around wet depressions along the easement. One single individual was found in flower (Photo 1). Population extent is provided in Figure 3.

Photo 1 Pale Swamp Everlasting *Coronidium gunnianum.* Habitat zone 34, 24 November 2022 (Figure 3.

Gippsland Lakes Peppermint (FFG endangered)

Gippsland Lakes Peppermint is a rough fibrous-barked peppermint-scented woodland tree or a multi stemmed mallee endemic to east Gippsland, Victoria. The species has dark green to bluish green foliage, small club-shaped buds and hemispherical fruit (VicFlora 2023c).

A population of approximately 110 individuals was recorded in habitat zones 78, 79, 80 and 82 (Figure 3). This species was recorded during the initial flora and fauna assessment and a sample was taken for positive identification using the VicFlora eucalyptus identification key. During the targeted survey a references site was checked to confirm identification of the Gippsland Lake Peppermint, as many of the trees were in flower at the time of survey (Spring), however VicFlora states that this species flowers in Winter. This may be a data gap or error in the species description on VicFlora as the trees at the reference site were also in flower. Gippsland Lake Peppermint is known to occur in coastal and near coastal areas in the Gippsland Lakes region.

*Gippsland Lakes Peppermint *Eucalyptus arenicola* were formally known as *Eucalyptus willisii.* Plants previously included in this species from the Gippsland Lakes region are now recognised as a distinct species 'Gippsland Lakes Peppermint *Eucalyptus arenicola'.*

An image of Gippsland Lake Peppermint provided below (Photo 2).

Photo 2 Gippsland Lakes Peppermint *Eucalyptus arenicola.* Habitat zone 80, 1 December 2022 (Figure 3).

Ribbed Thryptomene (FFG endangered)

Ribbed Thryptomene is a spreading to erect shrub that grows to 1.5 metres in height and has white, sometimes pinkish flower between August and November. In Victoria, this species is found in heath or heathy woodland environment on sandy soils near the Gippsland Lakes (VicFlora 2023d).

A population of approximately 193 Ribbed Thryptomene were recorded in habitat zones 60 and 61 (Figure 3). The species was recorded during the initial flora and fauna assessment and a sample was taken for positive identification using the VicFlora Thryptomene species key.

Photo 3 Ribbed Thryptomene *Thryptomene micrantha.* Habitat zone 60, 24 November 2022 (Figure 3).

Pink Zieria (FFG endangered)

Pink Zieria is a lemon scented shrub which grows to 60 centimetres tall. The inflorescence is usually pink or white with 1-3 flowers between August and December (VicFlora 2023e). This species is known to occur around the Gippsland Lakes in sandy lowland heaths.

A population of up to 3312 Pink Zieria were recorded in habitat zones 80 and 81. The species was recorded during the initial flora and fauna assessment and a sample was taken for positive identification using the Zieria species key on VicFlora. This species was most abundant within the existing easement in habitat zone 81. During the targeted survey a 20 x 20 metre quadrat was established to quantify species numbers.

Photo 4 Pink Zieria *Zieria veronicea* subsp. *veronicea*, Habitat zone 80, 1 December 2022 (Figure 3).

Clustered Lily (FFG vulnerable)

Clustered Lily is a tufted plant which grows to 40 centimetres tall. The inflorescence is cream to white with 3 – 10 flowers between October and December (VicFlora 2023f). This species is known to occur around some widely distributed wet heathland sites in lowland Victoria. Prior to this finding, the nearest record for Clustered Lily is over 150 kilometres east and west. During the October 2023 targeted survey, one individual was recorded within the impact footprint.

Photo 5 Clustered Lily *Thelionema umbellatum*, Habitat zone 76, 10 October 2023 (Figure 3)

3.4.2. Fauna

Targeted surveys for threatened frogs and reptiles and opportunistic searches for Bandicoot activity were conducted over December 2022 – February 2023. A summary of the results for the survey for threatened fauna is provided in Table 12.

Further details for each survey are provided below.

Table 12 Summary of results for targeted surveys and opportunistic searches of threatened fauna

Scientific name	Common name	EPBC Act	FFG Act	Recorded (yes/no)
Isoodon obesulus obesulus	Southern Brown Bandicoot	EN	e	**Yes***
Litoria aurea	Green and Golden Bell Frog	VU		**Yes**
Litoria raniformis	Growling Grass Frog	VU	v	No
Uperoleia martini	Martin's Toadlet		cr	No
Lissolepis coventryi	Swamp Skink	EN	e	No
Pseudemoia rawlinsoni	Glossy Grass Skink		e	**Yes**

*Bandicoot diggings recorded potentially including those of Long-nosed Bandicoot *Perameles nasuta*, however all are attributed to Southern Brown Bandicoot as a precaution

Opportunistic bandicoot survey results

Bandicoot diggings (potentially including those of Long-nosed Bandicoot *Perameles nasuta,* which are not listed as threatened under the FFG Act or EPBC Act) were found throughout the study area in remnant vegetation, and the existing cleared pipeline corridor (Photo 6). Most diggings were found within Woodland, Forest and Swamp Scrub EVCs, or within the existing cleared easement immediately adjacent to these wooded areas (Figure 4).

Bandicoot diggings were not recorded within any open agricultural land within the study area. No Bandicoot diggings were recorded within the wooded block at the westernmost extent of the study area (parcels containing contiguous Damp Sands Herb-rich Woodland, including habitat zones 8-13), however, a high density of fresh rabbit diggings throughout this wooded area may have obscured any Bandicoot diggings, and the area is considered to support suitable bandicoot habitat.

The results indicate that Bandicoots (Southern Brown Bandicoot and/or Long-nosed Bandicoot) are likely to inhabit contiguous patches of vegetation with patches of dense understorey, and forage in immediately adjacent open areas, including the existing cleared pipeline corridor. As the exact species of Bandicoot cannot be determined from diggings alone, a precautionary approach was taken, assuming that all evidence is of the threatened Southern Brown Bandicoot. A SIC assessment under the EPBC Act has been undertaken for the Southern Brown Bandicoot in Appendix C.

Photo 6 **Bandicoot diggings in Swamp Scrub; 7 December 2022 (Figure 4)**

Targeted frog survey results

Targeted frog surveys were conducted over five nights; four in December 2022, and one additional night in January 2023 to supplement surveys conducted outside of suitable weather conditions for Growling Grass Frog during December.

Surveys were conducted at eight primary survey points at suitable habitat wetlands within 200 meters of the study area (Table 13). Two additional survey points were proposed at mapped wetlands during initial survey planning, however, they were removed from the survey as no water or frog activity was observed during the first survey in December 2022.

A minimum of three surveys were conducted at the eight primary survey points during suitable weather conditions to survey Growling Grass Frog (daytime air temperature >15°C, and night air temperature >12°C, with low wind speeds). Comprehensive survey results, including weather conditions, are presented in Appendix B.4.

Common native frog species were recorded throughout the study area during targeted surveys. They include:

- Common froglet *Crinia signifera*

- Pobblebonk *Limnodynastes dumerilii*
- Southern Brown Tree Frog *Litoria ewingii*
- Spotted Marsh Frog *Limnodynastes tasmaniensis*
- Peron's Tree Frog *Litoria peronii*.

The EPBC Act listed Green and Golden Bell Frog was heard calling during one December survey at a small dam adjacent to the study area (Figure 4). Growling Frass Frogs and Martin's Toadlet were not recorded during the targeted surveys. A summary of the targeted frog survey results, including wetland description, wetland status, and recorded species is found below in (Table 13).

Table 13 Summary of targeted frog survey results

Survey point	Total surveys	Wetland description	December wetland status	January wetland status	Species recorded
Survey point A	4 (3*)	Small deep dam in grazed paddock. Typha sp. and emergent aquatic vegetation around bank.	Full, deep fresh water throughout survey period.		• Common froglet • Pobblebonk • Southern Brown Tree Frog • Spotted Marsh Frog • Peron's Tree Frog
Survey point B	5 (4*)	Two dams in grazed paddock. Western dam shallow and muddy. Eastern dam shallow and clear with extensive emergent vegetation.	Both dams full, western muddy, eastern clear throughout survey period.		• Common froglet • Pobblebonk • Southern Brown Tree Frog • Spotted Marsh Frog • Peron's Tree Frog
Survey point C	5 (4*)	Small dam in grazed paddock with emergent aquatic vegetation. No access to the property, surveys were limited to active listening and call playback from nearby fence line.	Full, deep fresh water throughout survey period.		• Common froglet • Pobblebonk • Southern Brown Tree Frog • Spotted Marsh Frog • Peron's Tree Frog
Survey point D	4 (3*)	Two small seasonal pools in an open clearing within a dense patch of heath. Dense submerged aquatic vegetation.	Both pools contained shallow fresh water with submerged aquatic vegetation.	Both pools mostly dry, damp soil and dying aquatic vegetation, no standing water. One pool contains remains of a dead Deer.	• Spotted Marsh Frog
Survey point E	4 (3*)	Regional Outfall Sewer. Section within and adjacent to the study area is shallow and contains minimal aquatic vegetation.	Shallow, slow flowing, mostly clear water throughout survey period.		• Common froglet • Southern Brown Tree Frog • Spotted Marsh Frog
Survey point F	5 (4*)	Small dam in grazed paddock. Shallow with small patch of fringing	Shallow muddy water throughout survey period.		• Southern Brown Tree Frog

Survey point	Total surveys	Wetland description	December wetland status	January wetland status	Species recorded
		Juncus sp.			
Survey point G	4 (3*)	Seasonal drainage line and shallow pools.	Shallow black opaque water within drainage line and pools.	Dry, no standing water.	• Common froglet (recorded during initial site investigation)
Survey point H	4 (3*)	Seasonal drainage line within and adjacent to study area. Small dam in inaccessible paddock out of sight, outside study area, surveys limited to call playback.	Shallow black opaque water within drainage line throughout survey period. Small dam not visible, but waterbirds heard landing in open water during both survey periods.		• Green and Golden Bell Frog • Pobblebonk
Additional site 1	1 (1*)	Regional Outfall Sewer, contiguous with survey point E and offering same habitat. Site used as alternative to survey point E during first night of December surveys, due to access limitations.	Shallow, slow flowing, mostly clear water throughout survey period.		• Common froglet • Pobblebonk • Peron's Tree Frog
Additional site 2	1 (1*)	Seasonal shallow pools with fringing Juncus sp. Site removed from survey as no suitable habitat was observed during December surveys, and no frogs calling.	Small pool of shallow opaque black stagnant water.	Dry, no standing water.	• No frogs seen or heard calling
Additional site 3	1 (1*)	Seasonally damp open heathland with Lomandra. Site removed from survey as no suitable habitat was observed during December surveys, and no frogs calling.	Dry, no standing water throughout survey period.		• No frogs seen or heard calling

* Surveys conducted during suitable weather conditions suitable for Growling Grass Frog activity, as outlined in the species targeted survey guidelines.

Targeted reptile survey results

Targeted reptile surveys were conducted over four weeks, following survey methodology developed in consultation with DEECA. Tile deployment was conducted in the first week (23 – 27 January 2023), and six checks and active searches were conducted at each site over the following three weeks (31 January – 16 February 2023). Tiles were removed from the site during the final check.

All reptiles observed during surveys were recorded and their location mapped (Table 30, Appendix B.5). Common native reptile species were recorded regularly at survey sites within the existing cleared easement, within remnant native vegetation and patches of introduced weeds. Reptiles were recorded active, basking on tiles, and sheltering under tiles (Table 14)

Table 14 Summary of targeted reptile survey results

Survey site	Species recorded	Survey site	Species recorded
1	• Pale-flecked Garden Sunskink • Bougainville's Skink • Weasel Skink • Tree Dragon	7	• Pale-flecked Garden Sunskink • Weasel Skink • Bougainville's Skink • Eastern three-lined skink • Glossy Grass Skink (FFG Act listed species)
2	• Pale-flecked Garden Sunskink • Weasel Skink • Bougainville's Skink	8	• Red-bellied Black Snake • Skink Sp. (escaped before identification to species level)
3	• Pale-flecked Garden Sunskink • Weasel Skink • Bougainville's Skink • Common Blue-tongued Lizard	9	• Pale-flecked Garden Sunskink • Common Blue-tongued Lizard • Eastern Brown Snake • Bougainville's Skink • Eastern three-lined skink • Glossy Grass Skink (FFG Act listed species)
4	• Pale-flecked Garden Sunskink • White-lipped Snake • Bougainville's Skink • Tree Dragon • Eastern three-lined skink	10	• Pale-flecked Garden Sunskink • White-lipped Snake • Delicate Skink • Eastern three-lined skink
5	• Pale-flecked Garden Sunskink • Bougainville's Skink • Delicate Skink • Tree Dragon	11	• Pale-flecked Garden Sunskink • Bougainville's Skink • Delicate Skink • Eastern three-lined skink
6	• Pale-flecked Garden Sunskink • Weasel Skink • Bougainville's Skink • Common Blue-tongued Lizard • Eastern three-lined skink	12	• Pale-flecked Garden Sunskink • Bougainville's Skink • Tree Dragon • Eastern three-lined skink

The threatened Glossy Grass Skinks was recorded during the second week of surveys on 8 February at two locations:

- Survey site 7, two individuals under tiles placed on deep mat of Kikuyu grass, adjacent to the ROS (Photo 8). Conditions at start of survey, 11:40am:
  - Air Temperature: 19.6°C
  - Relative Humidity: 63.5%
  - Wind Speed: 4.1 km/h
  - Cloud cover: 90%
  - Precipitation: Nil
  - Tile Temperature: 23°C and 24°C

  - Substrate Temperature: 20°C and 20°C.
- Survey site 9, one individual under tile placed on Australian Salt Grass in ephemeral wetland with dense Juncus cover (Photo 10). Conditions at start of survey, 2:25pm:
  - Air Temperature: 23.1°C
  - Relative Humidity: 51.9%
  - Wind Speed: 3.3 km/h
  - Cloud cover: 10%
  - Precipitation: Nil
  - Tile Temperature: 52°C
  - Substrate Temperature: 32°C

Surveys were conducted during suitable weather conditions (air temperature between 14-28°C, without heavy rain or strong wind) by two zoologists. Detailed weather conditions and temperature of tiles and substrate were recorded during each survey (Table 30 and Table 31, Appendix B.5). Mean air temperature and temperature of tiles and substrate are presented in Table 15 below.

Temperatures within the cleared easement were consistently high, with exposed tiles reaching an average of surface temperature of 50.7°C, and some reaching up to 60°C. Substrate temperatures were consistently lower, but still reached an average of 36.3°C. These high temperatures may preclude reptiles with low thermal tolerances from inhabiting areas of the existing cleared easement without dense vegetation cover to provide thermal buffering, such as deep mats of Kikuyu or Australian Salt Grass.

Table 15 Mean air temperature and temperature of reptile survey tiles and substrate during surveys

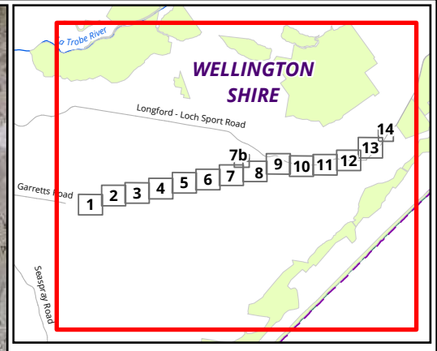
Time of day	Air Temperature	Tiles placed within easement		Tiles placed within vegetation	
		Tile	Substrate	Tile	Substrate
Morning (9am – 11am)	20.6°C	34.3°C	25.5°C	27.2°C	21.9°C
Midday (11am – 2pm)	22.2°C	44.0°C	31.7°C	35.3 °C	26.2°C
Afternoon (2pm – 5pm)	23.6°C	50.7°C	36.3°C	38.7°C	30.3°C

Photo 7 Glossy Grass Skink, reptile survey site 7; 8 February 2023 (Figure 4).

Photo 8 Glossy Grass Skink habitat at reptile survey site 7; looking south, 8 February 2023 (Figure 4)

Photo 9 Glossy Grass Skink, reptile survey site 9; 8 February 2023 (Figure 4)

Photo 10 Glossy Grass Skink habitat at reptile survey site 9; looking east, 8 February 2023 (Figure 4)



Legend

Study area

Figure 4.Overview Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 500 1,000 1,500 2,000 2,500

Metres

Scale: 1:60,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
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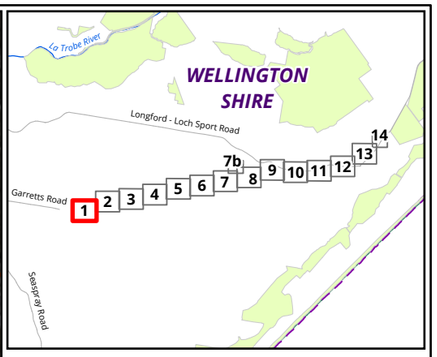

Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Reptile survey
- Reptile survey area

Figure 4.1 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
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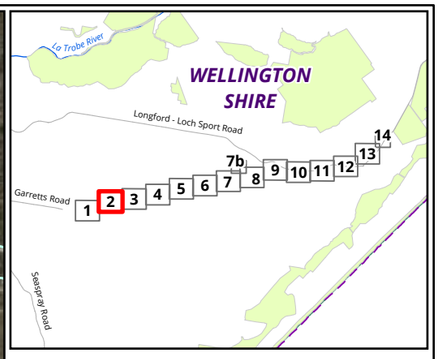

Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Common Froglet
- Pobblebonk Frog
- Southern Brown Tree Frog
- Spotted Marsh Frog
- Reptile survey
- Frog survey area
- Reptile survey area

Figure 4.2 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
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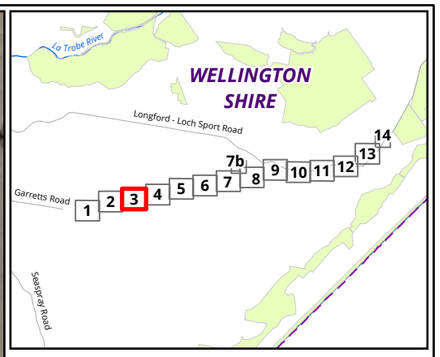


Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Common Froglet
- Peron's Tree Frog
- Pobblebonk Frog
- Southern Brown Tree Frog
- Spotted Marsh Frog
- Reptile survey
- Frog survey area
- Reptile survey area

Figure 4.3 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

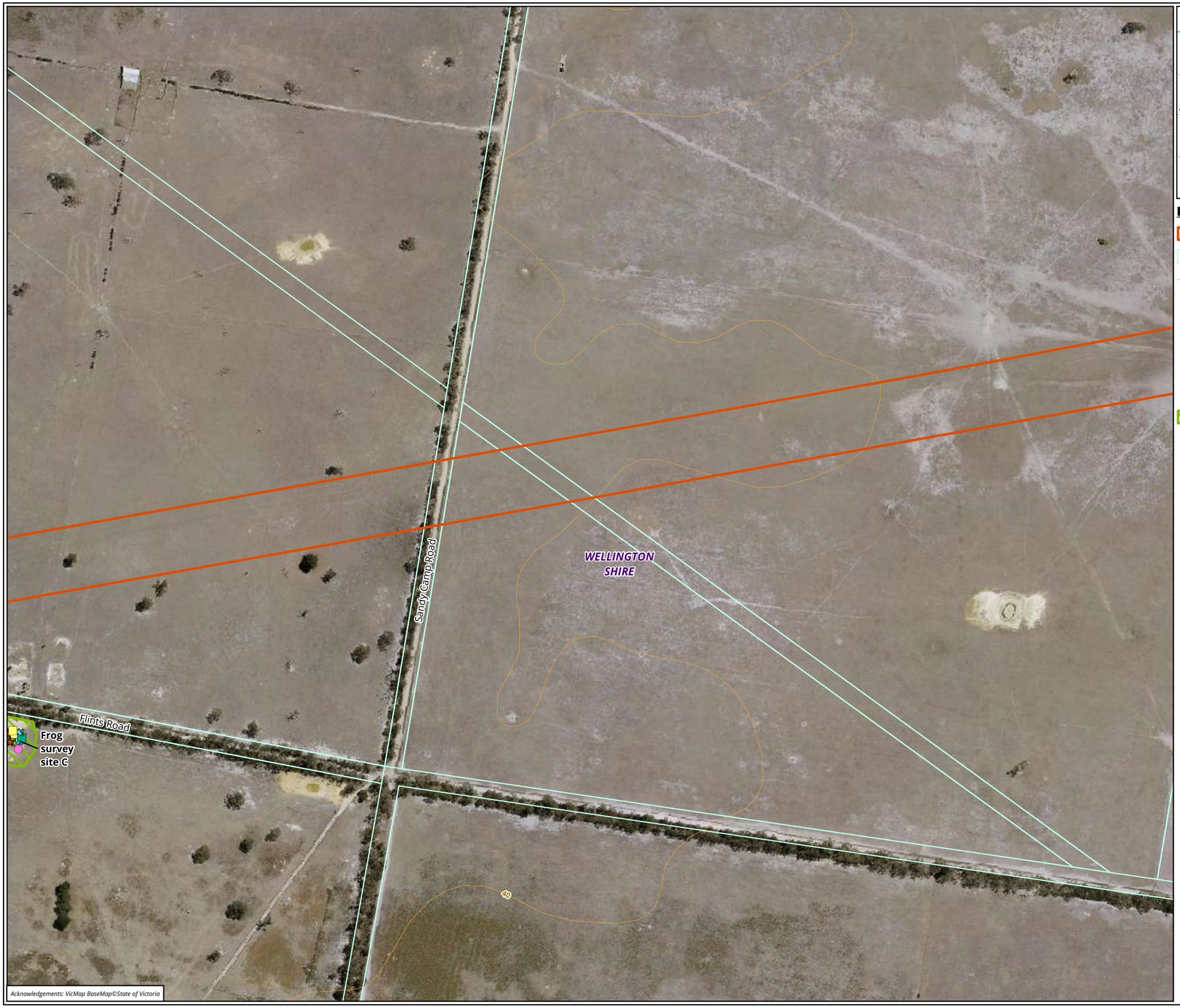
Scale: 1:4,000 @ A3

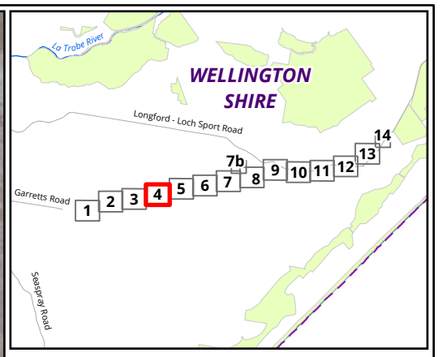
Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx





Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Common Froglet
- Peron's Tree Frog
- Pobblebonk Frog
- Southern Brown Tree Frog
- Spotted Marsh Frog
- Frog survey area

Figure 4.4 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

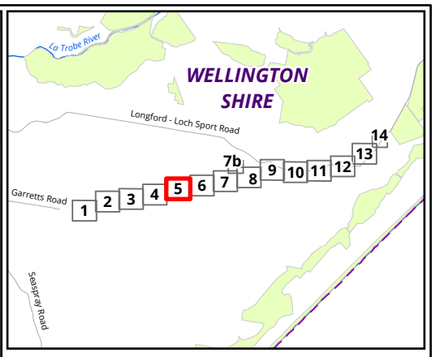
Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\37664_ESSO_FFA.aprx



Legend

- Study area
- Current parcel boundary
- Contour 10m interval

Figure 4.5 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

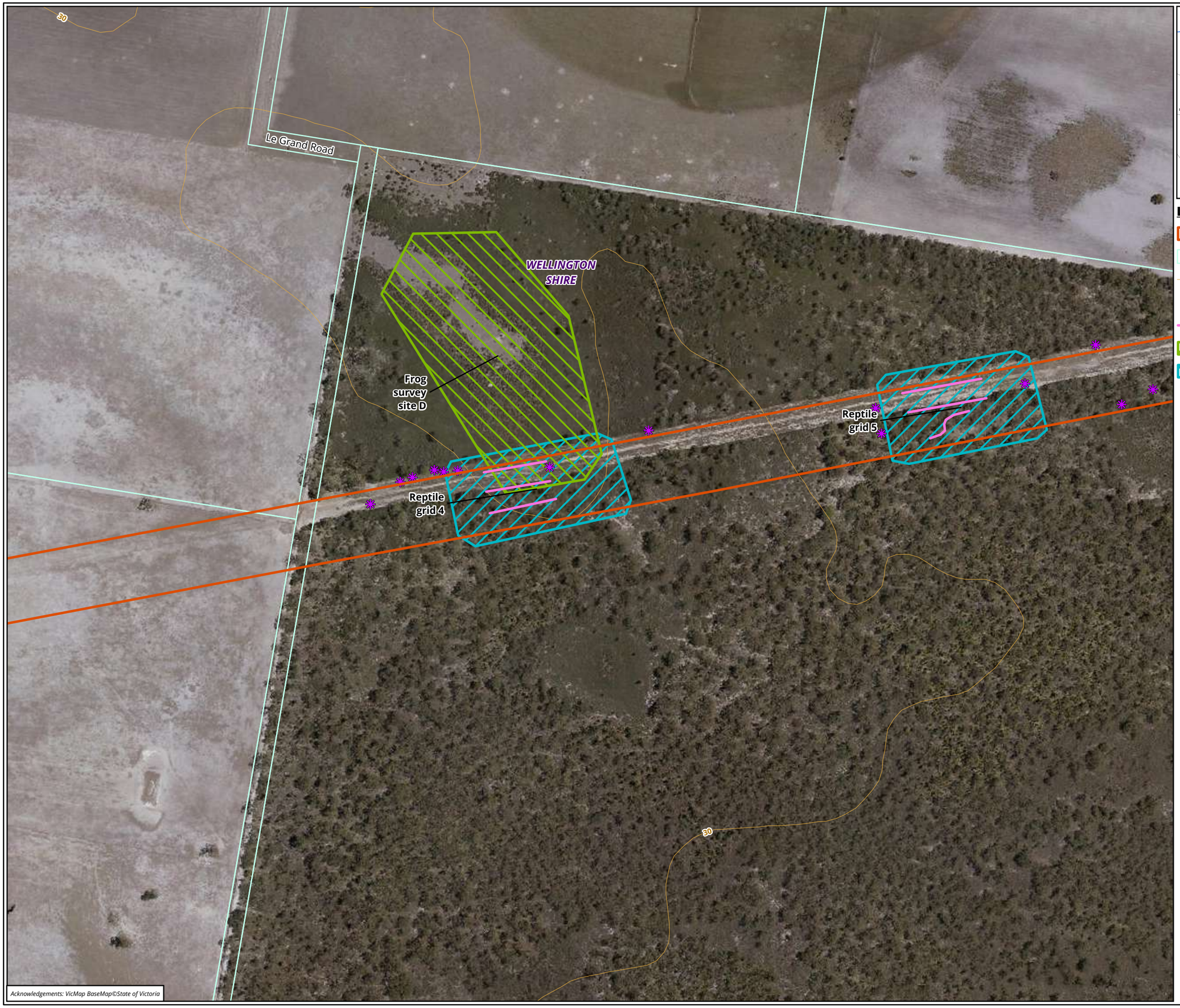
Scale: 1:4,000 @ A3

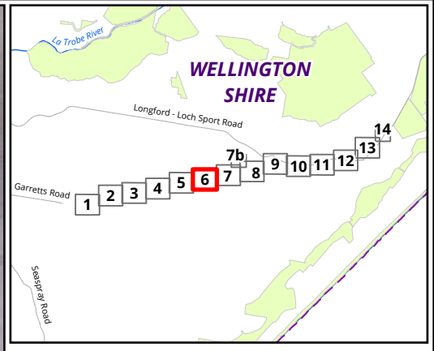
Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx





Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Bandicoot diggings
- Reptile survey
- Frog survey area
- Reptile survey area

Figure 4.6 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

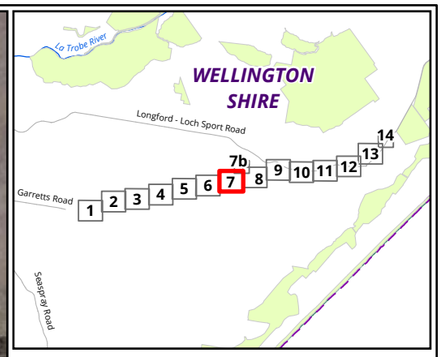
Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\37664_ESSO_FFA.aprx



Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Bandicoot diggings
- Reptile survey area

Figure 4.7 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

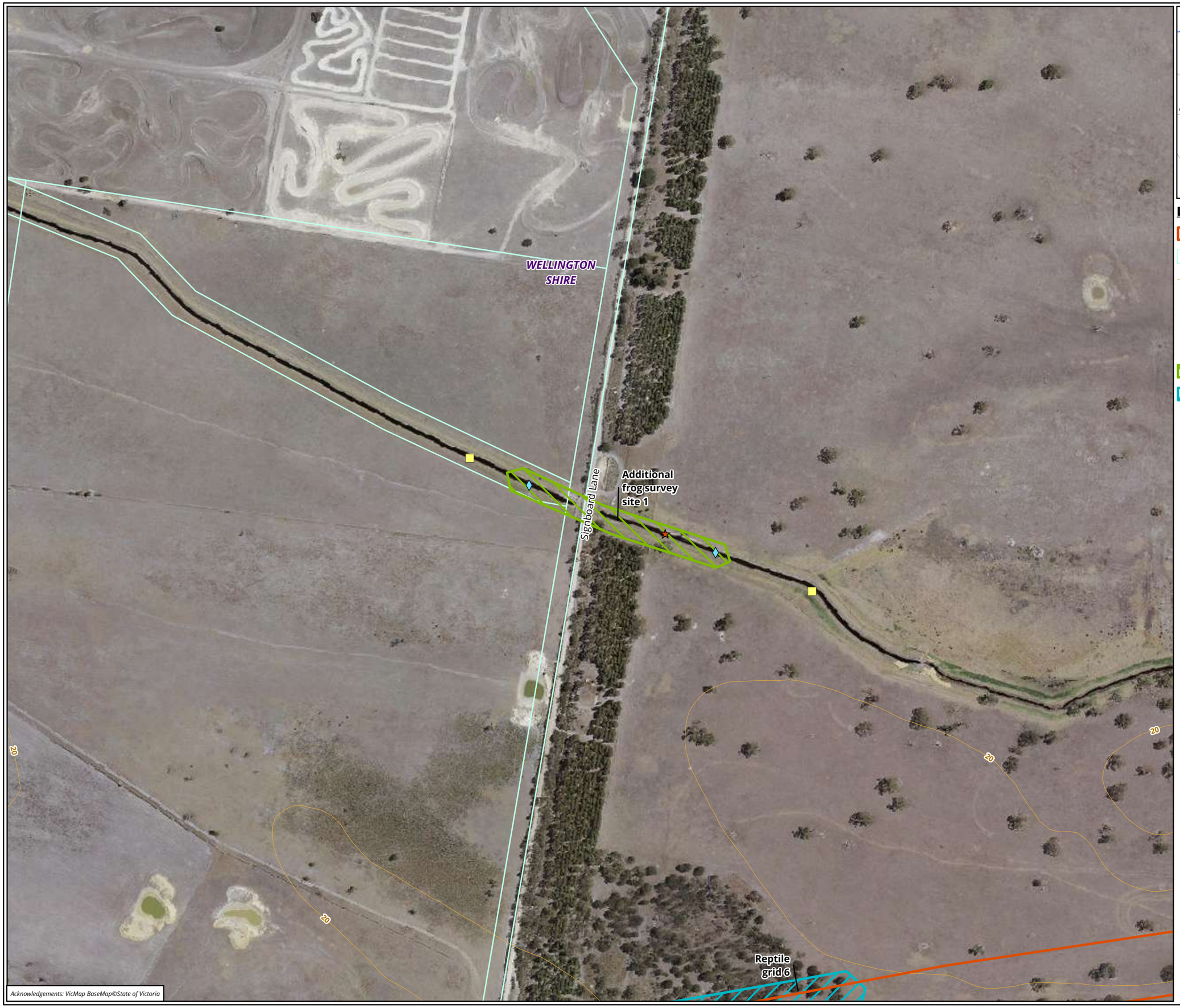
Scale: 1:4,000 @ A3

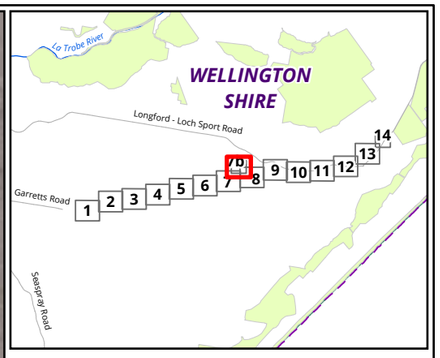
Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx





Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Common Froglet
- Peron's Tree Frog
- Pobblebonk Frog
- Frog survey area
- Reptile survey area

Figure 4.7b Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

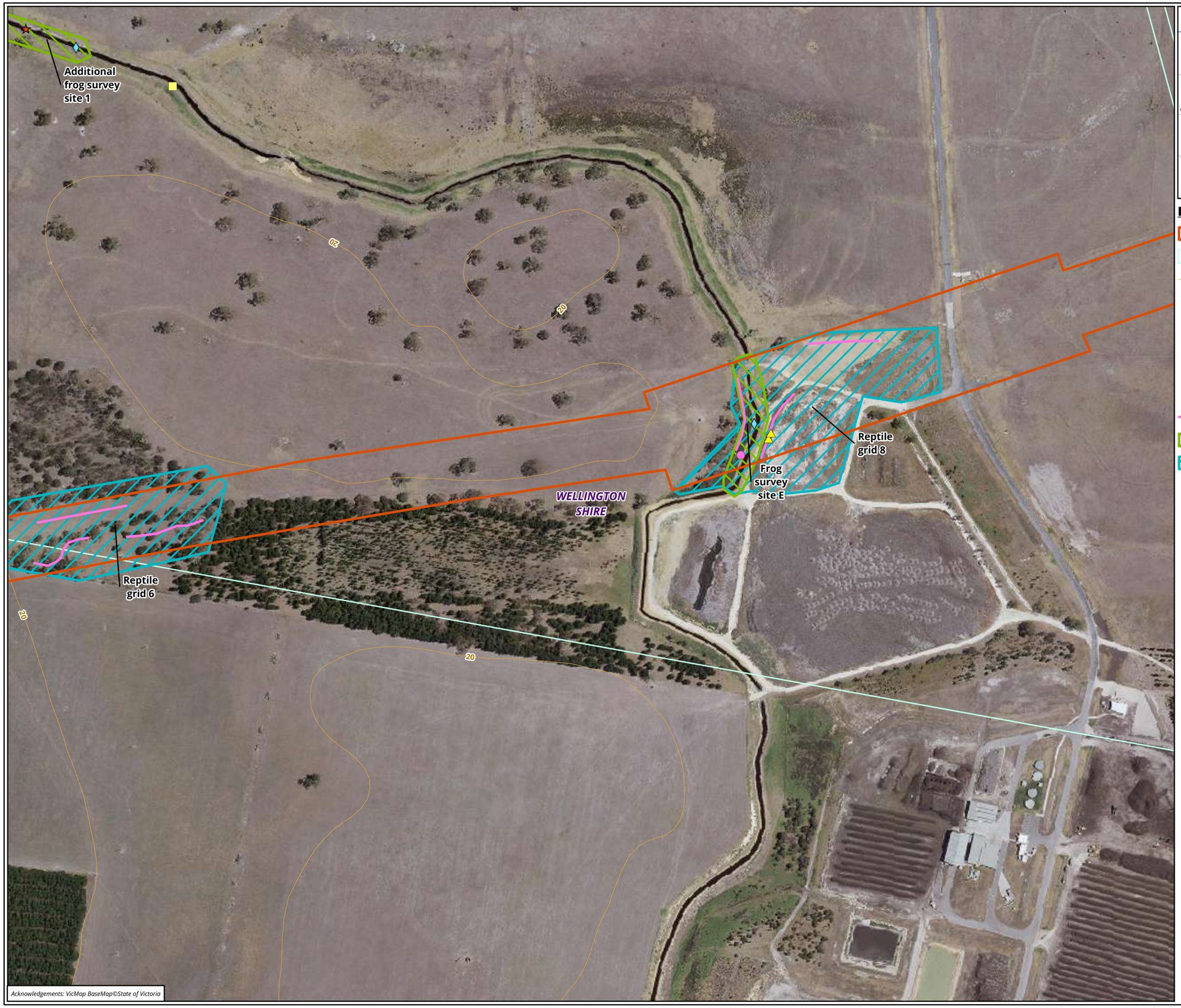
Scale: 1:4,000 @ A3

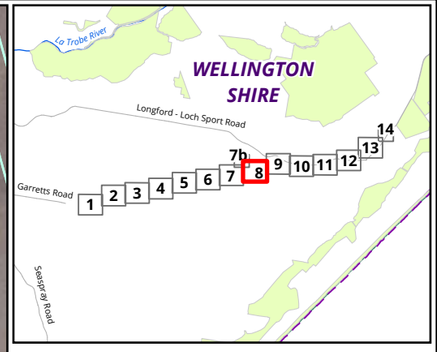
Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx





Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Common Froglet
- Peron's Tree Frog
- Pobblebonk Frog
- Southern Brown Tree Frog
- Glossy Grass Skink
- Reptile survey
- Frog survey area
- Reptile survey area

Figure 4.8 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

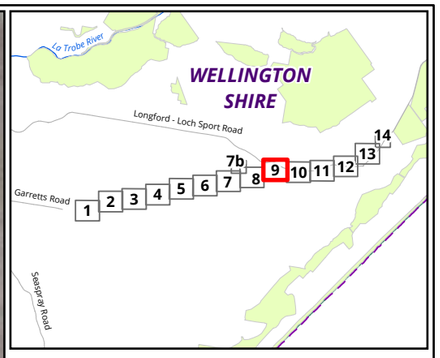
Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx



Legend

- Study area
- Current parcel boundary
- Contour 10m interval

Figure 4.9 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

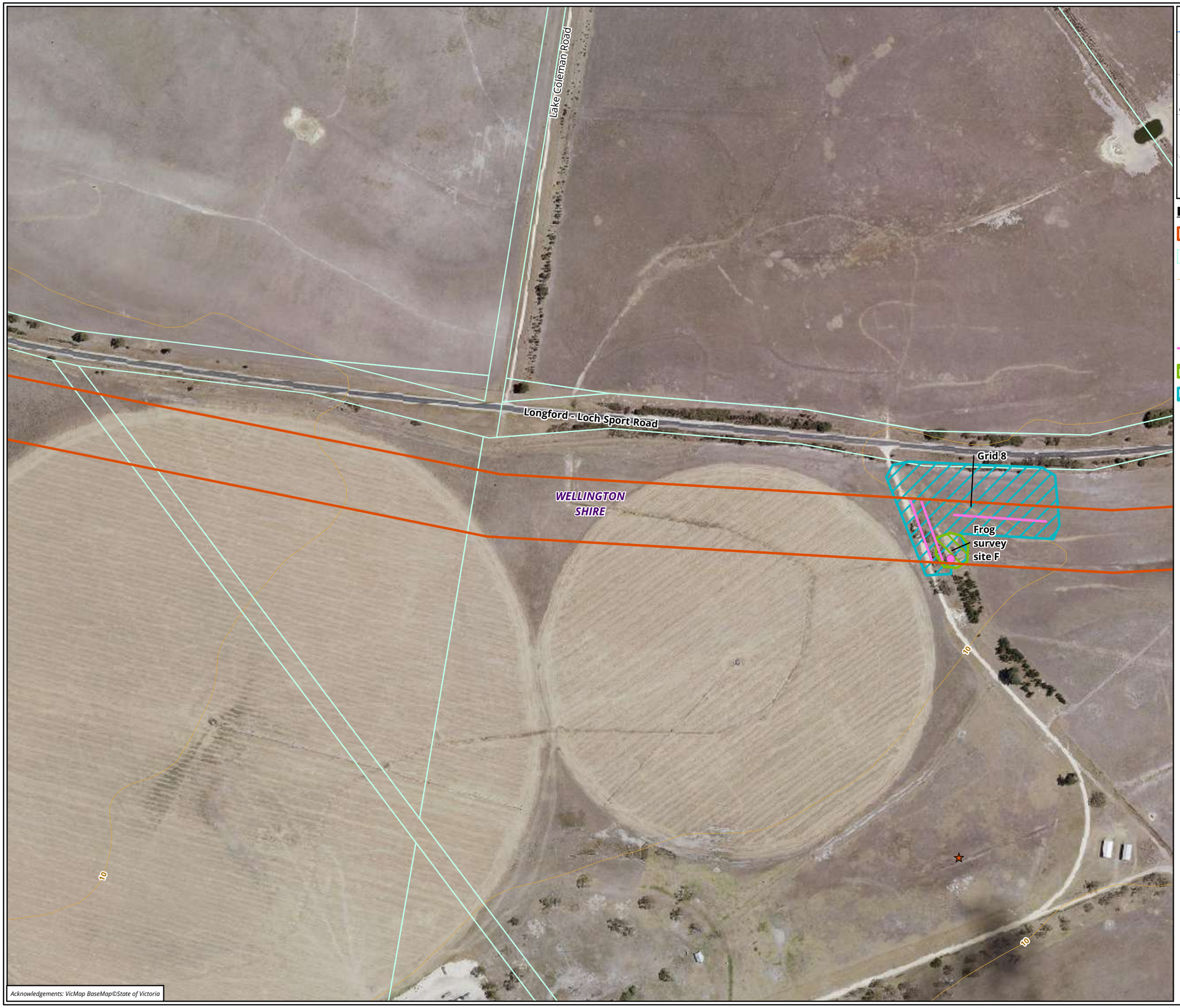
Scale: 1:4,000 @ A3

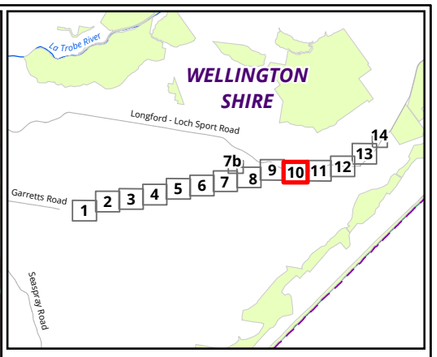
Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx





Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Pobblebonk Frog
- Southern Brown Tree Frog
- Reptile survey
- Frog survey area
- Reptile survey area

Figure 4.10 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

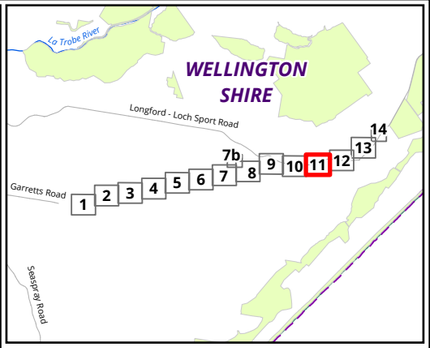
Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx



Legend

- Study area
- Current parcel boundary
- Contour 10m interval

Figure 4.11 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

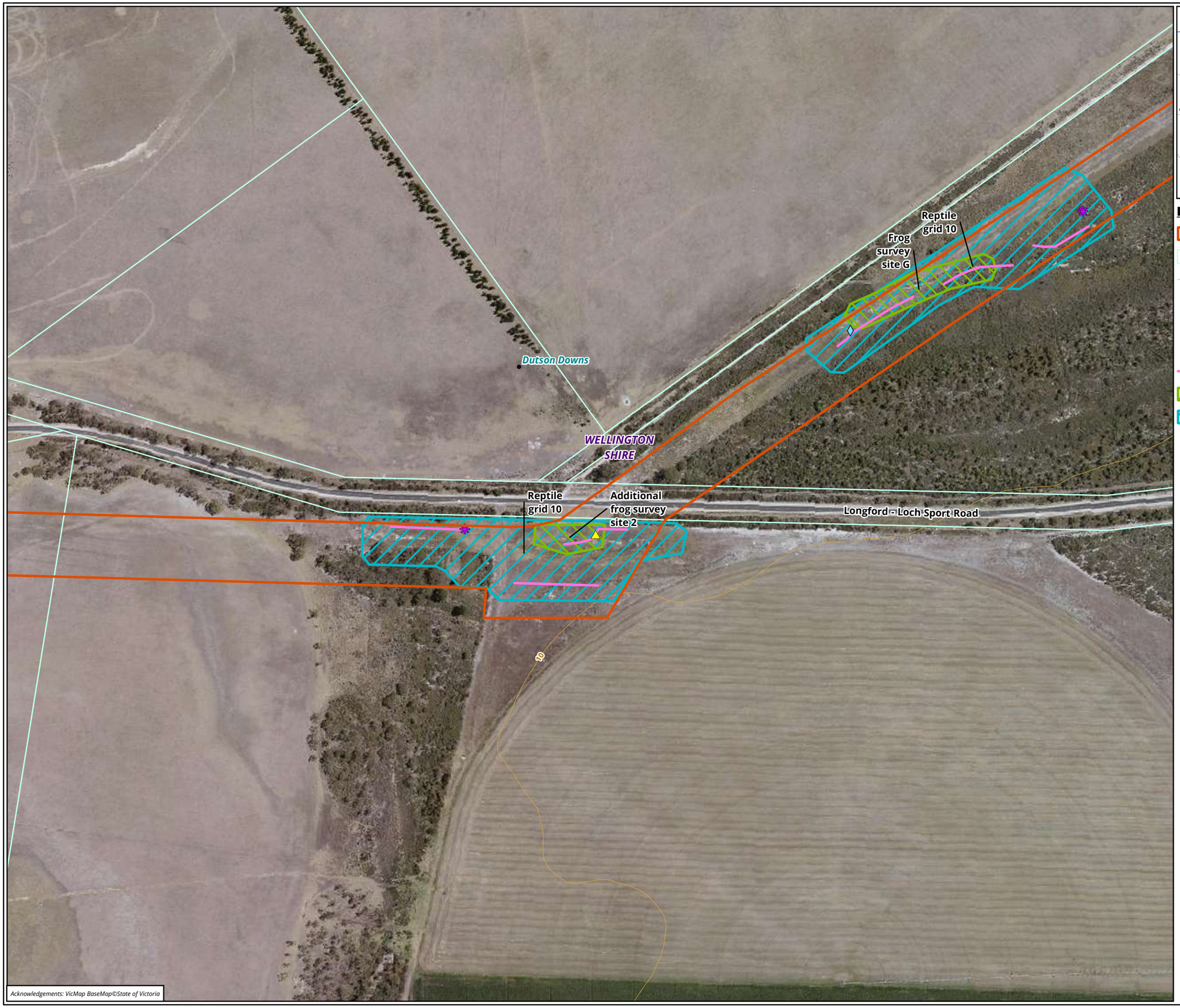
Scale: 1:4,000 @ A3

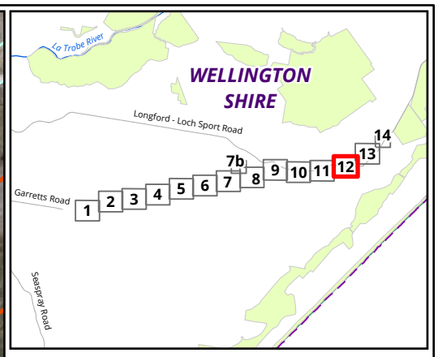
Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx





Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Common Froglet
- Glossy Grass Skink
- Bandicoot diggings
- Reptile survey
- Frog survey area
- Reptile survey area

Figure 4.12 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

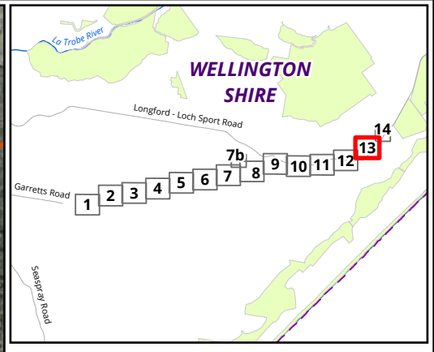
Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx



Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Pobblebonk Frog
- Bandicoot diggings
- Reptile survey
- Frog survey area
- Reptile survey area

Figure 4.13 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 30 60 90 120 150

Metres

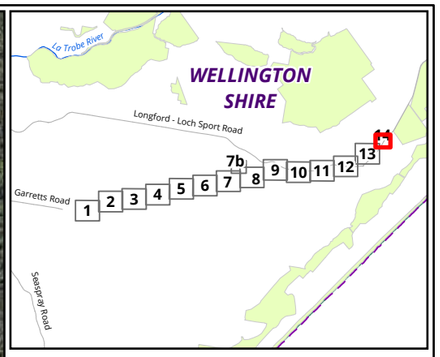
Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx



Legend

- Study area
- Current parcel boundary
- Contour 10m interval
- Green and Golden Bell Frog
- Bandicoot diggings
- Reptile survey
- Frog survey area
- Reptile survey area

Figure 4.14 Targeted and opportunistic fauna survey sites and results (Reptiles, Frogs and Bandicoots)

0 20 40 60 80 100

Metres

Scale: 1:2,500 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 21 July 2023,
Prepared for: SH, Prepared by: MK, Last edited by: gologhlin
Layout: 37664_F4_TargetedFauna
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx

3.5. Threatened ecological communities

Three EPBC Act listed threatened ecological communities were predicted to occur within 10 kilometres of the study area (Appendix A.3), including:

- Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*) Grassy Woodland and Associated Native Grassland.
- Natural Damp Grassland of the Victorian Coastal Plains.
- Subtropical and Temperate Coastal Saltmarsh.

Three FFG-listed ecological communities were predicted to occur within 10 kilometres of the study area, including:

- Central Gippsland Plains Grassland Community.
- Coastal Moonah (*Melaleuca lanceolata* subsp. *lanceolata*) Woodland Community.
- Forest Red Gum Grassy Woodland Community.

The vegetation within the study area does not meet the description of any of the above EPBC or FFG-listed ecological communities.

3.6. Ramsar wetlands

A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention and is considered a Matter of National Environmental Significance (MNES) under the EPBC Act. The study area is approximately 2 kilometres from Gippsland Lakes Ramsar site.

3.7. Weeds, pest animals and pathogens

3.7.1. Noxious weeds

Noxious weeds are introduced plants which are listed under the CaLP Act and classified by region in accordance with the level of action required to control or prevent their spread. There are four categories of noxious weed; state prohibited, regionally prohibited, regionally controlled and restricted. Landowners have legal responsibilities to take action on noxious weeds, depending on their classification in the region. Table 16 presents the noxious weeds recorded in the VBA database within a 10 kilometre buffered search of the existing easement.

Table 16 Noxious weeds recorded within search area

Classification	Species	Legal responsibility (CaLP Act)
State Prohibited	None	Agriculture Victoria is responsible for these species on all land in Victoria.
Regionally Prohibited	None	Landowners, including public authorities responsible for crown land management, must take all reasonable steps to eradicate regionally prohibited weeds on their land.

Classification	Species	Legal responsibility (CaLP Act)
Regionally Controlled	• Winged Slender-thistle *Carduus tenuiflorus* • Boneseed *Chrysanthemoides monilifera* • Spear Thistle *Cirsium vulgare* • Common Bindweed *Convolvulus arvensis* • Hawthorn *Crataegus monogyna* • English Broom *Cytisus scoparius* • Common Thorn-apple *Datura stramonium* • Stinkwort *Dittrichia graveolens* • Paterson's Curse *Echium plantagineum* • African Love-grass *Eragrostis curvula* • Montpellier Broom *Genista monspessulana* • St John's Wort *Hypericum perforatum* subsp. *veronense* • Spiny Rush *Juncus acutus* subsp. *acutus* • African Box-thorn *Lycium ferocissimum* • Sweet Briar *Rosa rubiginosa* • Common Blackberry *Rubus anglocandicans* • Ragwort *Senecio jacobaea* • Gorse *Ulex europaeus* • Bathurst Burr *Xanthium spinosum*	Landowners have a responsibility to take all reasonable steps to prevent the growth and spread of these weeds on their land.
Restricted	Bridal Creeper *Asparagus asparagoides*	Trade in these weeds and their propagules, either as plants, seeds or contaminants in other materials is prohibited.

Of the weeds listed in Table 16, five were recorded in the study area, although additional species may be present but were not recorded due to species dormancy at the time of assessment. The following Regionally Controlled weeds were recorded during assessment:

- Spear Thistle
- Montpellier Broom
- Spiny Rush
- African Box-thorn
- Common Blackberry.

3.7.2. Pest Animals

Four declared pest animals under the CaLP Act were recorded within the study area during the field assessments. These include:

- House Mouse *Mus musculus*
- European Rabbit *Oryctolagus cuniculus*
- Pig (feral) *Sus scrofa*
- Red Fox *Vulpes vulpes*.

3.7.3. Pathogens

Pathogens detrimental to fauna may be introduced to, or spread within the study area, include the amphibian Chytrid Fungus *Batrachochytrium dendrobatids* and Cinnamon fungus *Phytophthora cinnamomi.*

3.8. Further survey recommendations

Threatened flora have a high chance of being directly impacted during pipeline construction due the sedentary nature of flora species. Suitable habitat for 26 flora species listed under the EPBC Act and/or FFG Act was identified within the study area. A targeted survey for 20 species occurred in November 2022 and focused on areas of suitable habitat of each species across the study area. Targeted surveys also occurred in August and October 2023 for three additional species and focused on areas of suitable habitat. The results of this survey are presented in Section 3.4.1.

4. Impacts and mitigation measures

In order to inform project planning and impact assessments, a general discussion of potential residual impacts to biodiversity values that may result from pipeline construction and operational activities is provided in this section.

4.1. Native vegetation and habitat removal

Most works are occurring on the existing easement where native vegetation is highly disturbed. It will be critical to restrict construction activities and vehicles to the existing easement as much as practical.

For EPBC Act listed species, habitat was identified using datasets, surveys and expert knowledge of the area. Habitat suitability considers the vicinity of records within the surrounding landscape as well as the vegetation types present within the study area and their quality. Targeted surveys provide reassurance that construction will not impact on these species although they do not prove absence. The approach for mitigating impacts to threatened species is to avoid areas of suitable habitat as much as possible.

The development of Construction Environmental Management Plan (CEMP) is recommended prior to commencement of construction. All aspects set out below that are of relevance to the construction and immediate post-construction phases should be included in the CEMP.

The development of an Operational Environmental Management Plan (OEMP) is recommended for the project at completion of construction and prior to commissioning. All aspects set out below that are of relevance to the operational phase should be included in the OEMP.

4.2. Native vegetation and threatened flora

The CEMP is to address flora management. It should consider the following aspects that are specific to the protection of listed flora species. Other, more general mitigation and management measures for vegetation are set out in section 4.4 and would add to protective measures for listed flora species.

4.2.1. Pre-construction phase

- Consideration should be given to avoid tree protection zones for all scattered trees and large trees. Avoidance means the exclusion of any construction activity including storage of materials. An assessment of tree impacts by a qualified arborist has been undertaken and there will be no losses to large or scattered trees if recommendations outlined in the arborist report are followed (Appendix H).
- Any EPBC act listed individuals recorded within the disturbance footprint should be flagged on-site prior to construction starting. All plants that are to be retained should be protected within clearly designated and fenced 'no-go' zones on-site. A targeted survey is planned for the next flowering period for the remaining EPBC Act listed species that have a medium to high likelihood of occurrence within the disturbance footprint.
- Following the process outlined above, any necessary removal of native vegetation will be subject to an approved Native Vegetation Offset Strategy, as per the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017). This should be developed prior to any disturbance of native vegetation and when all proposed losses of such vegetation have been quantified.

- If the project entails the potential loss of any threatened flora species that is listed under the EPBC Act, an offset strategy under the EPBC Act may be required to be approved by the Commonwealth and would form part of the CEMP and OEMP.
- All pipeline construction plans and construction drawings should show extents of vegetation clearing and any protected areas clearly on project mapping and mark them in the field.
- Consideration for temporary and permanent access locations & use of existing roads/tracks/areas of disturbance where practicable

4.2.2. Construction phase

- Vegetation to be protected should be clearly identified within fenced and/or signed 'no-go' zones on-site for the duration of construction.
- Trenchless construction methods should be considered in high sensitivity areas to exclude surface disturbance.
- Where threatened species removal is unavoidable, relocation should be investigated and utilised if practicable, achievable and approved by regulatory authorities.
- The removal or disturbance of vegetation outside the access tracks, agreed / approved temporary work areas and pipeline easement should not be permitted unless separate additional regulatory approvals are obtained and widths of access tracks should be minimised.
- Access during and immediately after periods of prolonged or heavy rainfall should be minimised.
- A record should be maintained of all native vegetation cleared for the project (including for subsequent operations and maintenance) as part of the associated offsetting program(s). The record should comprise spatial data showing accurate boundaries of actual clearing at the completion of construction. A final assessment should be done at the end of construction to confirm quantities of each vegetation type removed.
- Development and implementation of a weed management strategy aimed at suppressing and eradicating existing weed populations and preventing establishment of new weeds during construction.
- Development and implementation of protocol for vehicle and machinery hygiene to prevent or pathogen spread during construction.

4.3. Fauna and habitat

The CEMP should address fauna management, including the implementation of pest and disease management within areas of high environmental sensitivity. It should include the following aspects that are specific to the protection of listed fauna species.

4.3.1. Pre-construction phase

- Locations of key habitat for any EPBC Act threatened fauna species outside the disturbance footprint (nests, hollow trees, wetlands etc.) should be flagged on-site prior to construction. All such areas of habitat that are to be retained should be protected within clearly designated 'no-go' zones on-site.

- Impacts on identified areas of habitat for listed threatened riparian and aquatic fauna species (e.g. EPBC Act listed Dwarf Galaxias, Swamp Skink and Growling Grass Frog) to be avoided at key locations by the proposed use of trenchless methods where:
  - 1) the appropriate trenchless method is able to be used with normal engineering constraints, and
  - 2) the activity does not result in impacts that are greater in quantity and extent than would be entailed in open trenching of the area being avoided.
- Consideration for temporary and permanent access locations & use of existing roads/tracks/areas of disturbance where practicable.

4.3.2. Construction

- Construction should be undertaken by trenchless methods to avoid impacts to high quality habitat for threatened species.
- Potential for ground-dwelling fauna, including threatened species (e.g. Southern Brown Bandicoot, New Holland Mouse and Growling Grass Frog) to fall or become trapped in the open trench and open pipe should be minimised by the measures for trench and pipe construction set out below:
  - Minimise the time that trenches are open.
  - Welded pipe sections should have temporary end caps installed when the site is not attended, to prevent ingress of fauna.
  - In areas containing potential shelter habitat for threatened species (particularly Southern Brown Bandicoot), habitat should be walked through by an ecologist or appropriately experienced fauna advisor immediately prior to clearing or construction to 'flush' any animals from the vicinity into nearby habitat outside of the impact area.
  - Branches, ropes, hessian sacks, ramped gangplanks or similar will be used to create 'ladders' to enable fauna to exit the trench. These should be spaced regularly within open trenches.
  - Fauna shelters should be installed overnight within open trench.
  - Open trenches should be checked at the start of each day for any trapped fauna. Any fauna identified within the trench or utilising fauna shelters should be salvaged and relocated to nearby habitat outside of the impact area by an ecologist or an appropriately experienced fauna advisor/
  - Individual pipes and joined pipe sections (pipe strings) should have gaps of no less than 1 metre, to allow movement of ground-dwelling fauna across the pipeline easement.
  - Injured fauna should be taken to a vet or approved wildlife carer for treatment.
  - Records of all fauna interactions should be created, listing the species concerned, the nature of the interaction, the outcome, the GPS coordinates of the interaction and release site (if applicable).
- Ephemeral/seasonal wetlands should be trenched during dry periods, to avoid impacts to aquatic species that may inhabit ephemeral habitat seasonally. The local micro-relief should be reinstated in areas of open trenching through these wetlands to avoid any changes to local hydrology.
- Construction to preference work activities in daylight hours to avoid impacts to nocturnal species breeding and foraging activities. Wherever possible, capacity for fauna movement through habitats should be maintained, including the proposed use of trenchless methods under streams and corridors of adjacent riparian vegetation.

- For waterway sites where trenchless construction is implemented there should be adequate controls to avoid stream bed collapse and incursion of drilling mud into surface waters, and adequate controls to minimise sediment discharge from operations to the watercourse.
- In areas where trees are to be cleared, an ecologist or appropriately experienced fauna advisor should inspect all trees immediately prior to clearing for hollows or nests, and salvage and relocate any fauna recorded in accordance with relevant laws and guidelines.
- In areas of the disturbance footprint containing habitat for threatened skinks (e.g. Kikuyu and Australian Salt-grass mapped as 'Skink habitat to be removed'), staged removal should occur to passively relocate any terrestrial fauna into adjacent habitat outside the disturbance footprint and to prevent recolonisation during construction works. Prior to construction, vegetation should be removed in the following stages:
    1. Slashing vegetation to a height of 30 centimetres.
    2. Slashing vegetation to a height of 10 centimetres (between 2 and 14 days of completion of previous stage).
    3. Slashing vegetation to a high to under 5 centimetres (between 2 and 14 days of completion of previous stage). This stage should be supervised by an ecologist or appropriately experienced fauna advisor, to salvage and relocate any fauna displaced by the habitat removal.
    4. Regular slashing and/or spraying to prevent regrowth during construction works until works within an area are completed and pipeline trench is backfilled.
- Skink habitat identified adjacent to the ROS (dense Kikuyu grass) that will not be impacted by the proposed works should be flagged as a 'no-go' zone, with access through the area limited to existing cleared dirt tracks, which provide no habitat for threatened species.
- Width of access tracks constructed should be minimised to reduce loss of vegetation and fauna habitat.

4.3.3. Post-construction

- Native shrub and graminoid cover should be encouraged to re-established by revegetation of ground flora immediately after construction. Species should include a variety of suitable locally native grasses, herbs, and shrubs to provide foraging and shelter habitat for threatened fauna.

4.4. General vegetation management

4.4.1. Pre-construction phase

- Pre-existing access tracks should be utilised whenever possible and upon completion be reinstated to their pre-construction condition, or as otherwise agreed with the relevant landowner.
- An approved CEMP to be in place prior to any works commencing. The CEMP is to cover, but is not limited to, rehabilitation activities, appropriate application of vegetation regeneration and/or revegetation techniques to optimise potential for regrowth. Flagging/fencing of all 'no-go' zones prior to construction works beginning.

4.4.2. Construction phase

- Where practicable, trenched watercourse crossings should be scheduled during dry or low flow periods. Consideration should be given to potential effects from upstream works on downstream estuarine / tidal waters. The channel bed and banks should be reinstated in areas of open trenching through waterways to avoid any changes to local flow regimes and hydrological connectivity.
  Imported fill will be required to comply with Environmental Protection Regulations, and stockpiles should be managed in accordance with Australian Pipelines and Gas Association Code of Environmental Practice – Onshore Pipelines Tree protection zones (TPZ) should be established and surrounded with a minimum one metre tall, high visibility mesh (or similar) to prevent encroachment into the tree protection zone by machinery. Mitigations as identified in the arborist report (Appendix H) should be implemented including:
  - Trenchless construction below a depth of 1 metre to avoid impacts to tree health.
  - Installing star pickets and flagged bunting at the edge of the easement to prevent machinery access into protected zones
  - Operate machinery on the north side of the trench to minimise encroachment into TPZs
  - Ensure site scraping is not greater than 100 millimetres.
- Removal of trees should l be undertaken in a manner that avoids or minimises damage to adjacent live vegetation (e.g. trees will be felled onto the easement away from standing timber).
- Clearing should aim to retain roots in riparian zones and other sensitive areas where possible, to retain stability. Slashing may be undertaken as a means of vegetation clearing, particularly in sown pastures.
- Pruning or the removal of protected vegetation should only occur in accordance with the requirements of the relevant state legislation.
- Pruning of trees should be undertaken only by suitably trained personnel or an arborist.
- Cleared vegetation should be stockpiled separately from topsoil and subsoil so that the soil can be used for spreading during rehabilitation activities.
- Disturbing roots or compacting soil within tree protection zones should be avoided wherever possible unless deemed entirely necessary for the construction activities.
- A risk-based assessment of the need to clean machinery and equipment of dirt (including possible treatment with PhytoClean or similar products to kill plant pathogens such as Chytrid Fungus and prevent the spread of weeds) should be done. The requirement for treatment is determined by the project environmental manager and communicated to relevant construction personnel. Machinery and equipment should be free of plant and animal pathogens.

4.4.3. Post-construction phase

- Upon completion of pipeline construction, all areas of soil disturbance should be subject to rehabilitation of vegetation to a condition compatible with the surrounding land use, and as pre-agreed with the affected landowner or land manager. This will include temporary access tracks which will then be closed and rehabilitated.
- Where rehabilitation works are at risk of deleterious impacts, such as from livestock or vehicular access, adequate controls should be implemented and maintained. These may include exclusion fencing, signage, etc.

- Where appropriate, rehabilitation of native vegetation patches should use native species that are typical of the surrounding vegetative community and should use stock of local provenance.
- Weed control should l be implemented in all areas of soil disturbance to decrease the risk of weed establishment.
- Relief of soil compaction will be undertaken, as required, by ripping or scarifying soils along the contours. This may be required during and/or after construction.
- Rehabilitation works to be in accordance with CEMP.

5. Biodiversity legislation and government policy

This section provides an assessment of the project in relation to key biodiversity legislation and government policy. This section does not describe the legislation and policy in detail. Where available, links to further information are provided.

5.1. Commonwealth

5.1.1. Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (MNES) protected under the Act.

Further information including a guide to the referral process is available at http://www.environment.gov.au/epbc/index.html

MNES relevant to the project are summarised in Table 17. It includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act. Significant Impact Assessments are provided in Appendix C and summarised in Table 17.

Table 17 Assessment of project in relation to the EPBC Act

MNES	Project specifics	Assessment against significant impact guidelines
EPBC Act listed flora species	Fourteen EPBC Act listed flora species have been recorded or predicted to occur in the study area. The likelihood of these species occurring in the study area is assessed in Appendix A.	Swamp Everlasting is considered to have a medium or higher likelihood of occurrence within the disturbance footprint based on the presence of suitable habitat. A Significant Impact Criteria assessment has been completed for Swamp Everlasting (Appendix C). This assessment concluded that construction is unlikely to have a significant impact on this species. Most of the suitable habitat for Swamp Everlasting is within environments considered Freshwater Marsh, which were all dry during the time of assessment, (even following wetter than usual conditions) and were dominated by introduced vegetation. The remaining threatened flora species predicted to occur within the study area are not likely to occur within the disturbance footprint and the proposed works are unlikely to constitute a significant impact.

MNES	Project specifics	Assessment against significant impact guidelines
EPBC Act listed fauna species	Seventy EPBC Act listed fauna species have been recorded or predicted to occur in the project search area. The likelihood of these species occurring in the study area is assessed in Appendix B. Many species predicted by the PMST to occur within the study area are exclusively marine and were assigned a negligible likelihood of occurrence.	Fourteen (14) EPBC Act listed fauna species are considered to have a medium or higher likelihood of occurrence within the study area due to the habitat present. These species include: • Southern Brown Bandicoot • Gang-gang Cockatoo • Blue-winged Parrot • Swift Parrot • White-throated Needletail • Pilotbird • Brown Treecreeper • New Holland Mouse • Grey-headed Flying-fox • Swamp Skink • Green and Golden Bell Frog • Growling Grass Frog • Dwarf Galaxias • Hooded Robin Following constraints mapping and further definition of the disturbance footprint, Brown Treecreeper and Hooded Robin were assessed as having a low likelihood of occurrence within the disturbance footprint. Therefore, it was assessed that the proposed works were unlikely to impact these species. Significant Impact Criteria assessments have been completed for the 12 species assessed as having a medium or high likelihood of occurrence within the disturbance footprint of the project (Appendix C).
EPBC Act listed ecological communities	Three EPBC Act listed ecological communities have been recorded or predicted to occur in the project search area: • Gippsland Red Gum (*Eucalyptus tereticornis* subsp. *mediana*) Grassy Woodland and Associated Native Grassland • Natural Damp Grassland of the Victorian Coastal Plains • Subtropical and Temperate Coastal Saltmarsh	No EPBC Act listed ecological communities were recorded during the field assessment and as such a significant impact is considered unlikely
Migratory species	Sixty-two migratory fauna species have been recorded or predicted to occur in the project search area (Appendix B.3). Many migratory species predicted by the PMST to occur within the study area are	A significant impact assessment has been completed for seven migratory species that were assessed as likely to visit or inhabit the study area (Appendix C):

MNES	Project specifics	Assessment against significant impact guidelines
	exclusively marine and were assessed as unlikely to inhabit the study area.	• White-throated Needletail • Fork-tailed Swift • Black-faced Monarch • Rufous Fantail • Satin Flycatcher • Latham's Snipe • Glossy Ibis

On the basis of criteria outlined in the relevant Significant Impact Guidelines it is considered unlikely that a significant impact on a Matter of National Environmental Significance would result from the proposed action based on the avoidance works and surveys to date.

State

5.1.2. Flora and Fauna Guarantee Act 1988 (FFG Act)

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a permit is required from DEECA to 'take' protected flora species. Permit exemptions under the FFG Act generally apply to the non-commercial removal of protected flora from private land, unless there is 'critical habitat' that has been declared on the land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish on private or public land.

Link for further information: https://www.environment.vic.gov.au/conserving-threatened-species/victorias-framework-for-conserving-threatened-species

The FFG Act defines public land as Crown land or land owned by, or vested in, a public authority, while private land is defined as any land other than public land. A public authority is defined in the FFG Act as a body established for a public purpose by or under any Act and includes:

- an Administrative Office
- a Government Department
- a municipal council
- a public entity
- a State-owned enterprise.

Parts of the disturbance footprint is on Crown Land or land owned by or vested in a public authority (Gippsland Water) and is therefore public land for the purposes of the FFG Act. Fifty-five protected flora species are present (Appendix A), and a protected flora permit from DEECA would be required if any of these species will be affected by the pipeline construction.

In addition to the requirement for a protected flora permit, it is a requirement of the FFG Act that a public authority, in performing its functions, must consider the objectives of the FFG Act and the impact on biodiversity. Public authorities are also required to consider the Biodiversity 2037 targets (DELWP 2017b), action statements, critical habitat determinations and management plans made under the FFG Act.

FFG Act applicability to the project

Fifty-five protected flora and two threatened fauna species were recorded within the study area. No FFG Act threatened communities were recorded within the study area.

The following FFG Act listed species were recorded within the study area:

- Pale Swamp Everlasting
  - Thirty-five populations were identified within the existing easement across habitat zones 34, 37 and 42 (Figure 3).
  - All impacts to Pale Swamp Everlasting are being avoided through proposed trenchless construction.
- Ribbed Thryptomene
  - One hundred and ninety-three Ribbed Thryptomene individuals were recorded in habitat zones 60 and 61 (Figure 3).
  - All impacts to Ribbed Thryptomene are being avoided through proposed trenchless construction.
- Gippsland Lakes Peppermint
  - Gippsland Lakes Peppermint was recorded in habitat zones 78, 79, 80 and 82. Precise numbers of FFG Act listed Gippsland Lakes Peppermint are difficult to quantify, however approximately 110 individuals were counted.
  - Approximately five individuals are likely to be impacted by the proposed new pipeline construction and will therefor require consideration when applying for a permit
- Pink Zieria
  - Pink Zieria was recorded in habitat zones 80 and 81.
  - A 20-metre x 20-metre quadrat was used to approximate individual numbers of this species within the existing easement where high numbers were evident. 192 individuals were recorded within the quadrat. Based on these results, up to 3312 individuals may occur within the existing easement around valve site 3 (habitat zones 80 and 81) and up to 1440 individuals may occur within the disturbance footprint and will therefor require consideration when applying for a permit
- Clustered Lily
  - One Clustered Lily was recorded in habitat zone 76 during the October 2023 surveys.
  - Approximately one individual is likely to be impacted by the proposed new pipeline construction.
- White-bellied Sea-Eagle
  - One individual observed flying above the study area during the initial site assessment. Impacts to the species are likely to be negligible as the study area offers minimal suitable foraging or nesting wetland habitat, all large trees are to be retained, and impacts are largely restricted to the existing cleared easement.
- Glossy Grass Skink
  - Three individuals recorded in two locations during targeted reptile surveys. Impacts to the species are likely to be minimal with the application of recommended mitigation measures.

Impacts to habitat at the ROS where the species was recorded is to be avoided through use of proposed trenchless construction methods.

5.1.3. Pipelines Act 2005

The *Pipelines Act 2005* (Pipelines Act) has the objective to facilitate the development of pipelines for the benefit of Victoria, and in general to govern process for their construction including environmental considerations. If a licence has been issued under the Pipelines Act for the construction and operation of a pipeline, nothing in a planning scheme under the *Planning and Environment Act 1987* can prevent or require a planning permit for the use or development of the land or the doing, carrying out of any matter or thing for the purpose of the pipeline.

Pipelines Act applicability to the project

Given the Pipeline Act process a planning permit is not required for vegetation removal associated with the proposed new pipeline construction. However, the Pipeline Act still required you to comply with the *Guidelines for the removal, destruction or lopping of native vegetation* to guide avoidance, minimisation and offsetting of impacts on native vegetation and biodiversity values. This report outlines how you comply with the guidelines.

5.1.4. Catchment and Land Protection Act 1994 (CaLP Act)

The CaLP Act identifies and classifies certain species as noxious weeds or pest animals and provides a system of controls on noxious species.

Declared noxious weeds identified in the study area are listed in Appendix A and established pest animals are listed in Appendix B.

CaLP Act applicability to the project

The proponent must take all reasonable steps to prevent the growth and spread of regionally controlled weeds, and prevent the spread of and as far as possible eradicate established pest animals.

Further information is at http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds

5.1.5. Environment Effects Act 1978

The *Environment Effects Act 1978* (EE Act) establishes a process to assess the environmental impacts of a project. If applicable, the Act requires that an Environment Effects Statement (EES) be prepared by the proponent. The EES is submitted to the Minister for Planning and enables them to assess the potential environmental effects of the proposed development.

The general objective of the assessment process is to provide for the transparent, integrated and timely assessment of the environmental effects of projects capable of having a significant effect on the environment (DSE 2005b).

EE Act applicability to the project

The *Ministerial Guidelines for Assessment of Environmental Effects under the Environment Effects Act 1978* (DSE 2005b) provide a range of criteria that can be used to determine whether a project needs to be referred to the Minister. These criteria relate to individual potential environmental effects and a combination of (two or more) potential environmental effects.

An assessment of the project against the individual potential effects criteria is provided in Table 18 and against the combination of potential effects criteria in Table 19.

Table 18 Assessment of project in relation to individual potential effects criteria

Referral criteria	Response	Justification
Potential clearing of 10 ha or more of native vegetation from an area that: • **is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or** • **is, or is likely to be, of very high conservation significance (VHCS) (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and** • **is not authorised under an approved Forest Management Plan or Fire Protection Plan**	Criteria not met.	The pipeline construction proposes to remove up to 0.791ha of Swamp Scrub EVC 53, which has Bioregional Conservation Status of endangered.
Potential long-term loss of a significant proportion (e.g., 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria	Criteria not met.	Suitable habitat is identified for several threatened species, however removal of habitat within the study area is unlikely to lead to a 1 to 5% reduction in known remaining habitat of these species with a medium to high likelihood of occurrence. Thus, this criteria is unlikely to be met by the works associated with the proposed pipeline.
Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'(DIWA)	Criteria not met.	There are no Ramsar wetlands or wetlands listed in the DIWA wetland registry being impacted by the proposed new pipeline construction.
Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term	Criteria not met.	Impacts to surrounding waterways are not expected to occur.
Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences	Not assessed in this report	Beyond scope of Ecology Assessment
Potential greenhouse gas emissions exceeding 200,000 tonnes of carbon dioxide equivalent per annum, directly attributable to the operation of the facility	Not assessed in this report	Beyond scope of Ecology Assessment

Table 19 Assessment of project in relation to a combination of potential environmental effects criteria

Referral criteria	Response	Justification
Potential clearing of 10 ha or more of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan	Criteria met	The proposed new pipeline development will remove up to 13.63 hectares of native vegetation. 12.293 hectares (93%) occurs within the existing easement and is of a highly modified, derived state.
Matters listed under the *Flora and Fauna Guarantee Act 1988*: • **potential loss of a significant area of a listed ecological community; or** • **potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or** • **potential loss of critical habitat; or** • **potential significant effects on habitat values of a wetland supporting migratory bird species**	Criteria not met	Based on the current survey data and disturbance footprint: • No listed ecological communities are being lost as a result of the proposed new pipeline. • No genetically important population of an endangered or threatened species are being lost due to the proposed new pipeline. • No loss of critical habitat will occur. • No potentially significant effects on habitat values of a wetland supporting migratory species will occur.
Potential extensive or major effects on landscape values of regional importance, especially where recognised by a planning scheme overlay or within or adjoining land reserved under the *National Parks Act 1975*	Not assessed in this report	Beyond scope of Ecology Assessment
Potential extensive or major effects on land stability, acid sulphate soils or highly erodible soils over the short or long term	Not assessed in this report	Beyond scope of Ecology Assessment
Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, streamflows or regional groundwater levels	Not assessed in this report	Beyond scope of Ecology Assessment
Potential extensive or major effects on social or economic well-being due to direct or indirect displacement of non-residential land use activities	Not assessed in this report	Beyond scope of Ecology Assessment
Potential for extensive displacement of residences or severance of residential access to community resources due to infrastructure development	Not assessed in this report	Beyond scope of Ecology Assessment
potential significant effects on the amenity of a substantial number of residents, due to extensive or major, long-term changes in visual, noise and traffic conditions	Not assessed in this report	Beyond scope of Ecology Assessment

Referral criteria	Response	Justification
Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport	Not assessed in this report	Beyond scope of Ecology Assessment
Potential extensive or major effects on Aboriginal cultural heritage	Not assessed in this report	Beyond scope of Ecology Assessment
Potential extensive or major effects on cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the Heritage Act 1995.	Not assessed in this report	Beyond scope of Ecology Assessment

Environmental Effects Act implications for the project

No individual potential environmental effects criterion is met based on the current results. One criterion is met under the combined potential environmental effects criteria. An EES is unlikely to be triggered based on biodiversity affects alone.

5.1.6. Fisheries Act 1995

The *Fisheries Act 1995* provides a legislative framework for the regulation, management and conservation of Victorian fisheries including aquatic habitats.

A person must not take, injure, damage, destroy or release any protected aquatic biota. Protected aquatic biota includes all species of the family Syngnathidae (seahorses, sea dragons and pipefish), and any fish or aquatic invertebrate or community that is listed under the FFG Act.

Fisheries Act applicability to the project

Protected aquatic biota that may be impacted upon by the development include:

- Flinders Pygmy Perch *Nannoperca sp. 1*.

Providing mitigation measures outlined in this report are adhered to (primarily trenchless construction under the Regional Outfall Sewer), the potential for protected aquatic biota as listed above, to be injured, damaged or destroyed is considered to be negligible and no permit is likely to be required from DEECA.

5.1.7. Water Act 1989

The primary purpose of the *Water Act 1989* is to provide a framework for the allocation and management of surface water and groundwater throughout Victoria. It provides a principal mechanism for maintenance of ecosystem functions including those of aquatic ecosystems. Under By-Laws created by the relevant Authority under the Act, the authorities regulate the works within and in the vicinity of waterways.

Water Act applicability to the project

The proposed project may involve construction or maintenance activities that affect beds and banks of waterways, riparian vegetation or quality or quantity of water in waterways.

Development within the survey area will require a permit from West Gippsland Catchment Management Authority.

5.1.8. Environment Protection Act 2017: Environmental Reference Standards

The *Environment Protection Act 2017* (EP Act) provides a legal framework for the systematic and strategic management of potential and realised environmental impacts. The *Environment Protection Act 2017*, the Environment Protection Regulations 2021 and Environment Reference Standards (ERS) introduced from 1 July 2021 provide a regulatory framework designed to prevent harm by eliminating or minimising risks of harm to human health and the environment.

Under the regulatory changes, SEPP (Waters) will not continue as a subordinate instrument under the EP Act, and its formal statutory role ended on 1 July 2021. Much of the content of SEPP (Waters) has been saved under the Environment Protection Transitional Regulations 2021 for a period of 2 years after the commencement of the Environment Protection Regulations 2021. As SEPP (Waters) contributes to the state of knowledge and provides guidance on compliance with the General Environmental Duty (GED), the policy remains relevant to the protection and management of Victoria's water environments, including surface waters, estuarine and marine waters and groundwaters.

While not being saved under the Environment Protection Transitional Regulations 2021, the following clauses of SEPP (Waters) applicable to the project remain relevant as they provide guidance for compliance with the GED under the *Environment Protection Act 2017*:

Clause 42 – Construction activities:

- Minimise soil erosion, land disturbance and discharge of sediment and other pollutants to surface waters.
- Where construction activities impinge on surface waters, construction managers need to monitor affected surface waters to assess whether beneficial uses are being protected.

Clause 45 – Native vegetation protection and rehabilitation:

- Minimise the removal of and rehabilitate native vegetation within or adjacent to surface waters.

The ERS requires that aquatic ecosystem values be protected. Environmental quality objectives and indicators are defined to protect beneficial uses (i.e. the uses and values of the water environment) and an attainment program provides guidance on protection of the beneficial uses.

EP Act applicability to the project

To ensure that direct and indirect (e.g. runoff) impacts to surface water quality do not exceed the background levels and/or water quality objectives, it is recommended that the proponent prepare and implement a site-specific Constructional Environmental Management Plan, which includes all EPA approved erosion control measures. These temporary control measures should be inspected during rainfall events to ensure controls are able to prevent/minimise offsite discharges and longer term impacts.

Link to further information: http://www.gazette.vic.gov.au/gazette/Gazettes2021/GG2021S245.pdf

6. Victoria's Guidelines for the removal, destruction or lopping of native vegetation

The Guidelines for the removal, destruction of lopping of native vegetation (the Guidelines) were introduced in December 2017. They set out and describe the application of Victoria's statewide policy in relation to assessing and compensating for the removal of native vegetation in order to achieve the objective of 'no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

If a license is issued under the Pipelines Act, the project does not need a permit under the Clause 52.17 of the local planning scheme for the removal, destruction or lopping of native vegetation (and the subsequent application of the Guidelines). However, the Guidelines are still a relevant consideration to guide avoidance, minimisation and offsetting of impacts on native vegetation.

The key policy mechanism for achieving the no net loss of biodiversity objective in the Guidelines is the three-step approach of avoid, minimise and offset:

- **Avoid** the removal, destruction or lopping of native vegetation to ensure that the important biodiversity values of native vegetation continue to be delivered into the future.
- **Minimise** impacts resulting from the removal of native vegetation that cannot be avoided.
- Provide an **offset** to compensate for the biodiversity impact resulting from the removal of native vegetation.

The strategic and site level steps taken during the design of the development to minimise biodiversity impacts resulting from the removal of native vegetation are outlined below:

- Detailed project planning including a desktop constraints assessment and constraints mapping.
- Field survey of a wide area (70 to 200 metres in width) to provide flexibility during the design phase to avoid and minimise impacts to native vegetation and threatened species habitat.
- Aligning most of the proposed works within the existing easement, to reduce the extent of removal of native vegetation and threatened species habitat. A total of up to 13.63 hectares of native vegetation is proposed to be removed by the proposed new pipeline works, however 12.7 hectares of that total is native vegetation on the existing easement that is highly modified. The easement lacks all medium and large plant lifeforms due to the existing pipelines and maintenance slashing.
- Areas of high ecological value are proposed to be avoided entirely using trenchless construction methods. This is being utilised across habitat zones 30-33 34-45, 54-55, 60,61 and 79 (Figure 3)). Through this the proponent is avoiding following, which would have otherwise been impacted by trenching works:
  - FFG act listed flora species Pale Swamp Everlasting and Ribbed Thryptomene.
  - 1.07 hectares of native vegetation which includes 0.41 hectares of an endangered EVC; Creekline Herb-rich Woodland EVC 164
  - Large and scattered trees (trenchless construction will occur below 1 metre depth to avoid all tree roots.
  - Habitat for FFG Act listed flora: Naked Beard-orchid and Variable Bossiaea.
  - Potential habitat for EPBC Act and FFG Act listed fauna: Southern Brown Bandicoot, Gang-gang Cockatoo, Blue-winged Parrot, Swift Parrot, Pilotbird, New Holland Mouse, Grey-headed Flying-

fox, Swamp Skink, Green and Golden Bell Frog, Growling Grass Frog, Little Eagle, Powerful Owl, Masked Owl, Lace Monitor, Glossy Grass Skink, Southern Toadlet and Martin's Toadlet.

  - All habitat for EPBC Act and FFG Act listed fauna: Dwarf Galaxias and Flinders Pygmy Perch.

- Ensuring construction methods only require the removal of understorey vegetation so the canopy and sub-canopy will remain intact.
- The construction ROW width has been minimised to further avoid impacts to native vegetation and threatened species habitat.
- Engaging a professional arborist at the design stage to review existing conditions for large and scattered trees in the study area to provide sensitive construction techniques that can be applied to ensure any required encroachment into tree protection zones and structural root zones does not lead to the long-term decline of trees. No large or scattered trees will be lost due to the pipeline construction.
- Ensuring that all habitat disturbance is supervised by an appropriately qualified ecologist or appropriately experienced fauna advisor to capture and relocate any fauna disturbed by the works.

The following section summarises the results of the site-based assessment and the outputs generated by the Native Vegetation Removal Report, which identifies the assessment pathway on which the licence application will be assessed. The full Native Vegetation Removal Report can be viewed in Appendix F.

6.1. Proposed removal of native vegetation

The extent of native vegetation patches, the location of large trees within patches and any scattered trees were mapped within the study area (Figure 3) and the condition was assessed in relation to standard methods provided by DSE (2004) and pre-determined EVC benchmarks: https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks. DEECA's Native Vegetation Information Management system was also used to determine vegetation extent and condition.

The project proposes to remove up to 13.632 hectares of native vegetation, comprising entirely of patch vegetation (Figure 5). Spatial data (shapefiles) of proposed vegetation removal were submitted to DEECA's native vegetation support team, who provided a Native Vegetation Removal Report for the project. This is provided in Appendix F and summarised in the following sections.

To note on figure 5.1 the impact area goes beyond the study area. This area is part of Esso's existing gas plant and was therefore not assessed

6.1.1. Vegetation quality assessment

A continuous area of the same EVC is termed a 'habitat zone'. Different habitat zones exists where there are different EVCs present and/or discrete (non-continuous) patches of the same EVC. A separate vegetation quality assessment was conducted for each habitat zone. The vegetation quality assessment score was multiplied by the extent of the habitat zone to give a value in habitat hectares.

Eighty-four habitat zones were identified within the study area. The results of the vegetation quality assessment are provided in Appendix E.

There is a total of 164 large trees within patches of native vegetation within the study area. The locations of large trees within patches are shown in Figure 3 and the circumference of each large tree is provided in Appendix E.1. There are nine scattered small trees and 19 scattered large trees within the study area.

6.2. Determining the assessment pathway

Permit or licence applications to remove native vegetation are categorised into one of three assessment pathways: basic, intermediate or detailed. Two factors are used to determine the assessment pathway for a permit application, the **location** and **extent** of the native vegetation proposed to be removed. Location has been divided into three possible categories by DEECA and has been pre-determined by DEECA for all locations in Victoria. The location of a particular site is determined using the location map available in the Native Vegetation Information Management (NVIM) system (http://nvim.depi.vic.gov.au).

The extent of native vegetation proposed to be removed determines the assessment pathway by considering the following:

- The total area (hectares) of native vegetation (including any patches and scattered trees) proposed to be removed
- Whether any large trees are proposed to be removed, either as scattered trees or occurring in patches.

The project proposed to remove up to 13.632 hectares of native vegetation from within location category 2, therefore the application for removal of this native vegetation must meet the requirements of, and be assessed in, the detailed assessment pathway.

6.3. Offset requirements

In order to ensure a gain to Victoria's biodiversity that is equivalent to the loss resulting from the proposed removal of native vegetation, compensatory offsets are required. Losses and gains are measured in general or species habitat scores or units. The offset must also include at least one large tree for every large tree removed.

For a detailed assessment pathway projects, the species-general offset test will determine if a general offset, species offset or combination of both is required.

The results of the species-general offset test are provided in Appendix G and summarised in Table 20.

Table 20 Summary of DEECA Native Vegetation Removal Report

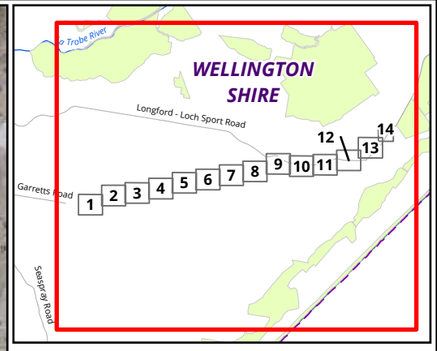
Attribute	Outcome	Notes
Location category	2	Second highest risk category
Native vegetation removal extent	13.632 hectares	All patch vegetation
Assessment pathway	Detailed	Highest level of assessment required.
Strategic Biodiversity Value Score	Between 0.430 and 0.981	Medium to high Strategic Biodiversity Value
Modelled habitat for threatened species	There is mapped habitat for threatened species	The species-general offset test was applied to the proposal. This test determined that the threshold of 0.005 per cent of the mapped habitat value impact for a species was not triggered. Therefore, a species offset is not required.
Offset type	General	General offset units

Attribute	Outcome	Notes
Offset amount: general habitat units	5.909 units	NA
General offset vicinity	West Gippsland CMA or Wellington Shire Council	The offset site must be located within the same Catchment Management Authority boundary or municipal district as the native vegetation to be removed.
General offset minimum Strategic Biodiversity Value Score	0.569	The offset site must have this Strategic Biodiversity Value Score or a higher score
Large tree attributes	0	No large trees are being impacted

6.4. Proposed offset strategy

The proponent intends to purchase the offset credits from the Victorian native vegetation credit register.

The applicant may seek to purchase 'third party' specific offset credits via an accredited trading scheme. A search using the DEECA native vegetation credit register to purchase general habitat units that satisfy the offset requirements as specified above was undertaken. Eight sites and/or credits are available for purchase as of 20 November 2023 within the West Gippsland CMA. These credit register outputs are available in Appendix G.



Legend

- Study area
- New pipeline *

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.Overview Vegetation within the project area

0 500 1,000 1,500 2,000 2,500

Metres

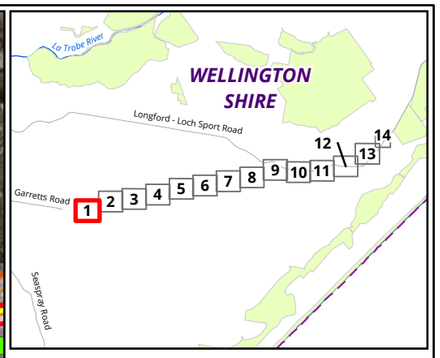
Scale: 1:60,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx



Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Large tree in patch - Retained

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland
- (GipP0003) Damp Sands Herb-rich Woodland - Derived

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.1 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

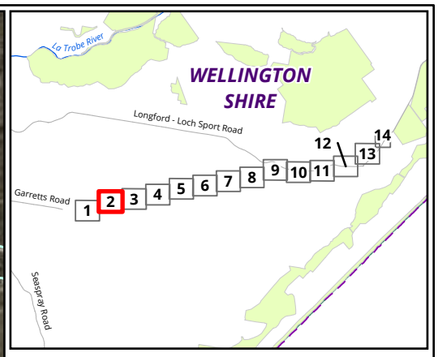
Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
Project: P:\37600s\37664\Mapping\37664_ESSO_FFA.aprx

Acknowledgements: VicMap BaseMap©State of Victoria



Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Large scattered tree - Retained
- Large tree in patch - Retained
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland
- (GipP0003) Damp Sands Herb-rich Woodland - Derived

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.2 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
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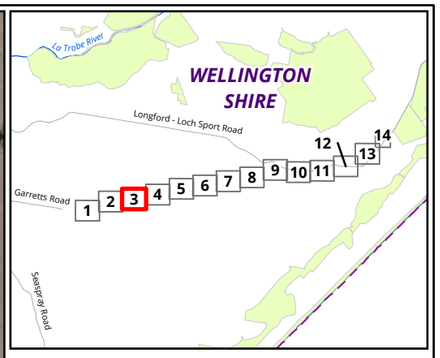

Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Small scattered tree - Retained
- Large scattered tree - Retained
- Large tree in patch - Retained
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland
- (GipP0003) Damp Sands Herb-rich Woodland - Derived

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.3 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
Project: P:\37600s\37664\Mapping\37664_ESSO_FFA.aprx

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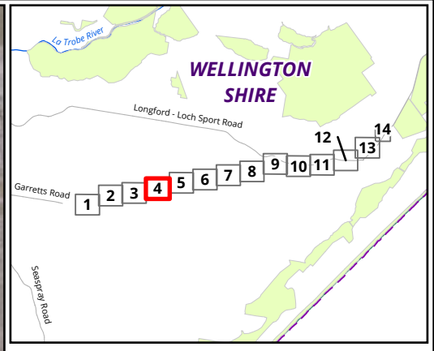


Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Small scattered tree - Retained
- Large tree in patch - Retained
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.4 Vegetation within the project area

0 30 60 90 120 150

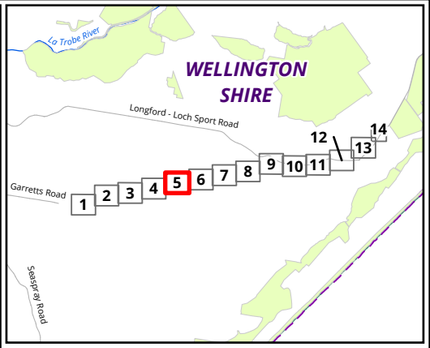
Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx



Legend

- Study area
- New pipeline *
- Disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Small scattered tree - Retained
- Large scattered tree - Retained
- Large tree in patch - Retained
- Tree protction zone (TPZ)

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.5 Vegetation within the project area

0 30 60 90 120 150

Metres

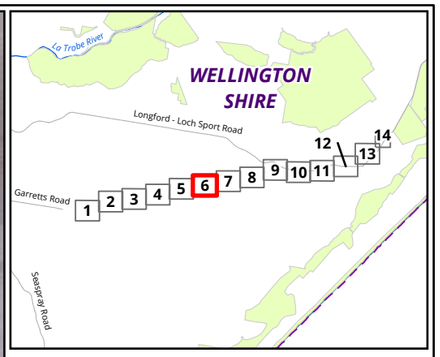
Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
Project: P:\37600s\37664\Mapping\
37664_ESSO_FFA.aprx



Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Large tree in patch - Retained

Threatened flora records

- Coronidium gunnianum - Pale Swamp Everlasting

Ecological Vegetation Class (EVC)

- (GipP0016) Lowland Forest
- (GipP0016) Lowland Forest - Derived
- (GipP0048) Heathy Woodland
- (GipP0048) Heathy Woodland - Derived
- (GipP0164) Creekline Herb-rich Woodland
- (GipP0164) Creekline Herb-rich Woodland - Derived

Wetlands

- 4 - Deep freshwater marsh
- 5 - Permanent open freshwater

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.6 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
Project: P:\37600s\37664\Mapping\37664_ESSO_FFA.aprx

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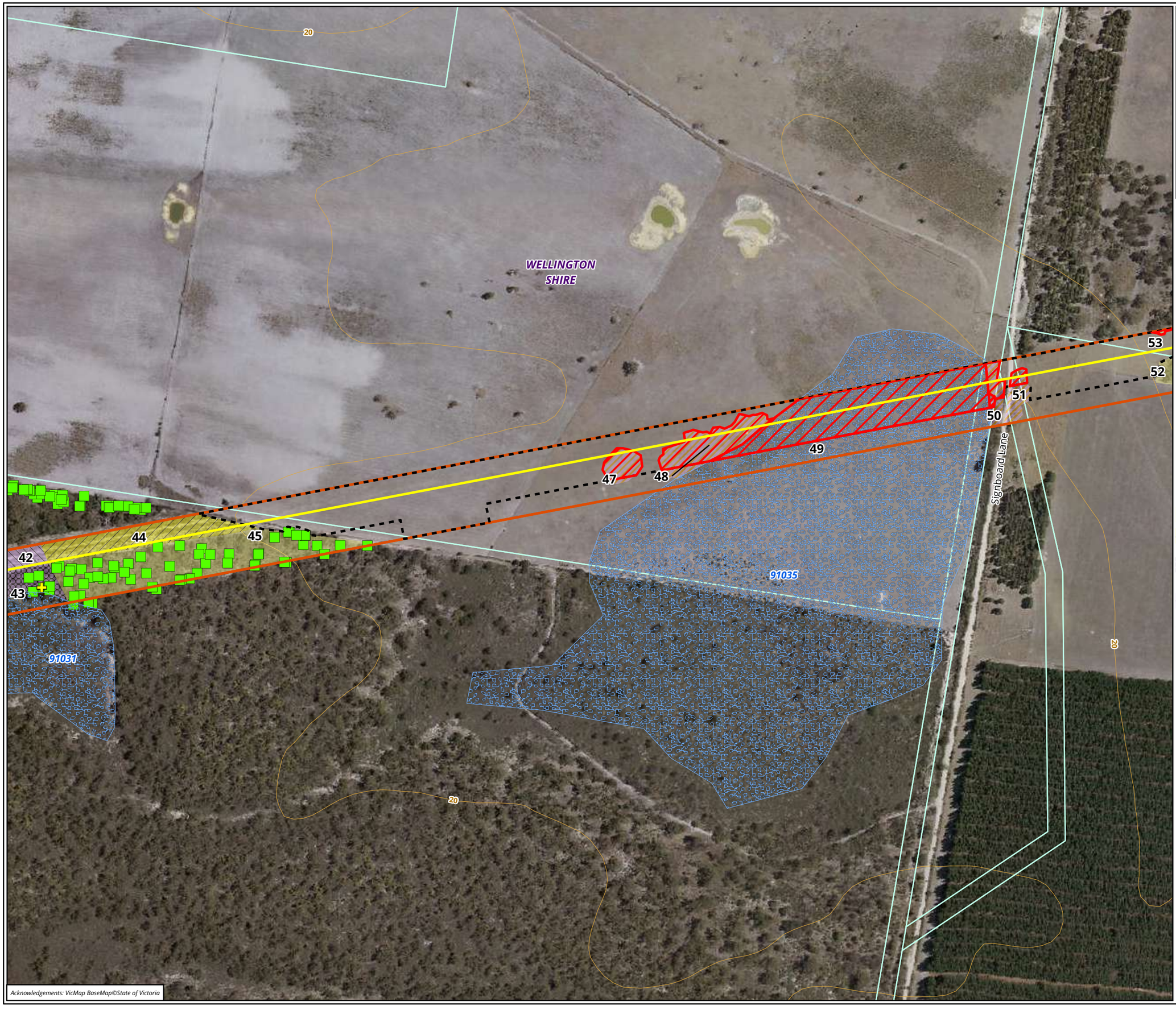
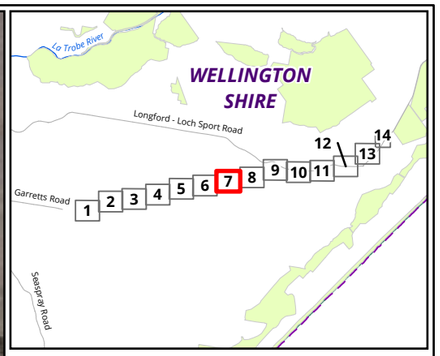




Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Large tree in patch - Retained

Threatened flora records

- Eucalyptus arenicola - Gippsland Lakes Peppermint

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland - Derived
- (GipP0048) Heathy Woodland
- (GipP0048) Heathy Woodland - Derived
- (GipP0164) Creekline Herb-rich Woodland
- (GipP0164) Creekline Herb-rich Woodland - Derived

Wetlands

- 4 - Deep freshwater marsh

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.7 Vegetation within the project area

0 30 60 90 120 150

Metres

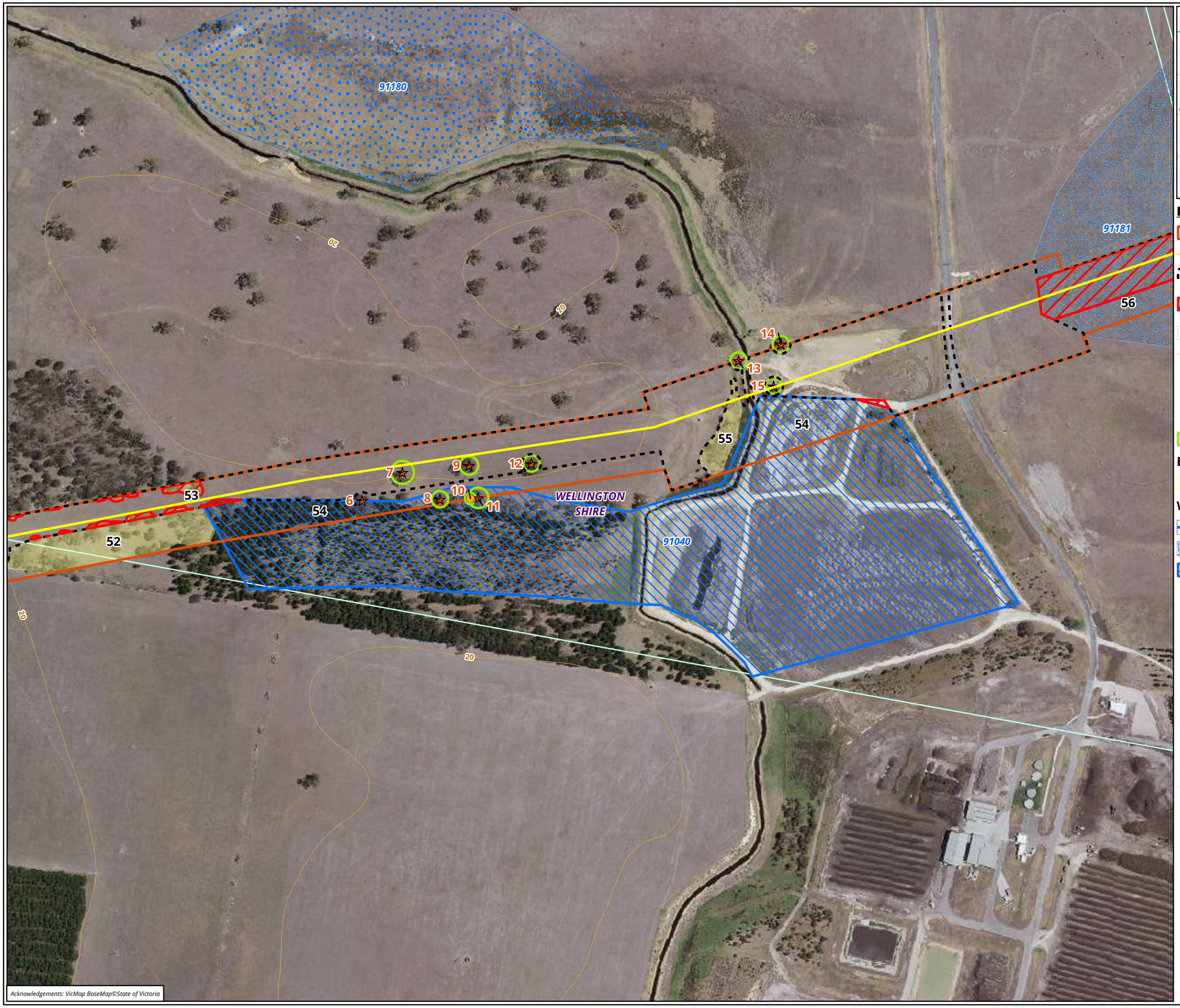
Scale: 1:4,000 @ A3

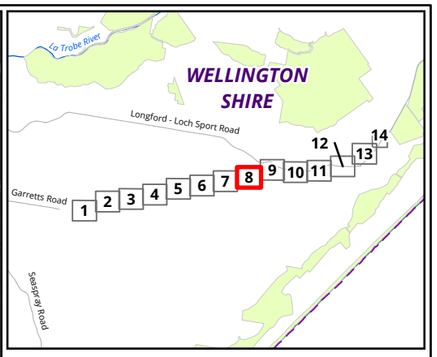
Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
Project: P:\37600s\37664\Mapping\37664_ESSO_FFA.aprx





Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Small scattered tree - Retained
- Large scattered tree - Retained
- Large tree in patch - Retained
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0048) Heathy Woodland

Wetlands

- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- 5 - Permanent open freshwater

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.8 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
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Layout: 37664_F5_VegLoss
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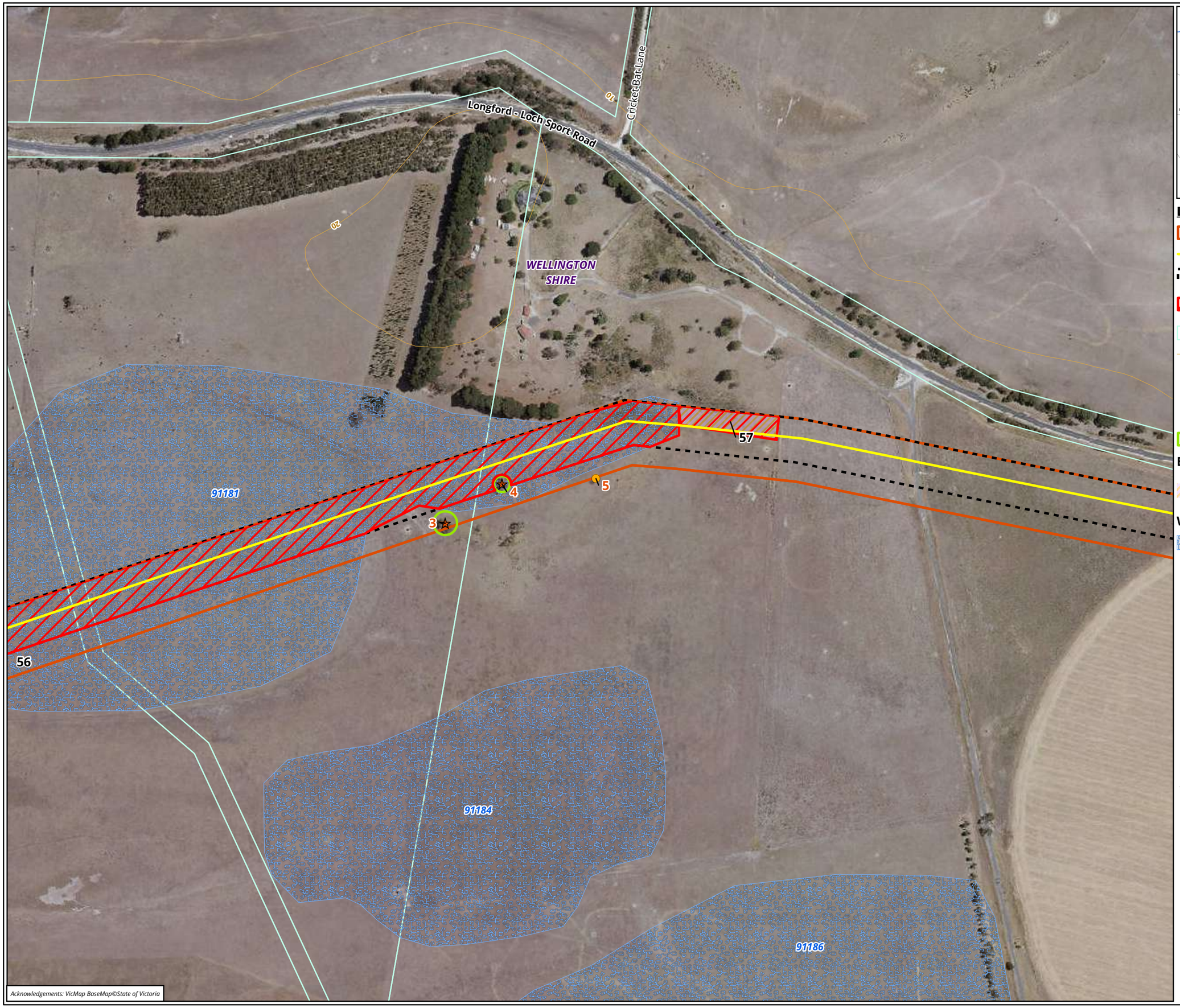

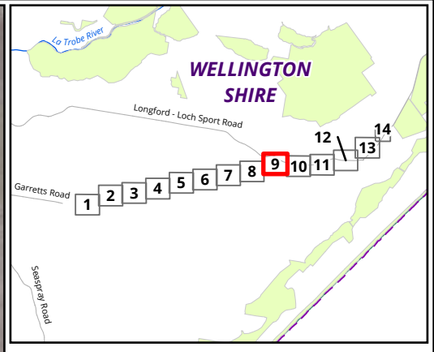

Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Small scattered tree - Retained
- Large scattered tree - Retained
- Large tree in patch - Retained
- Tree protction zone (TPZ)

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland - Derived

Wetlands

- 4 - Deep freshwater marsh

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.9 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
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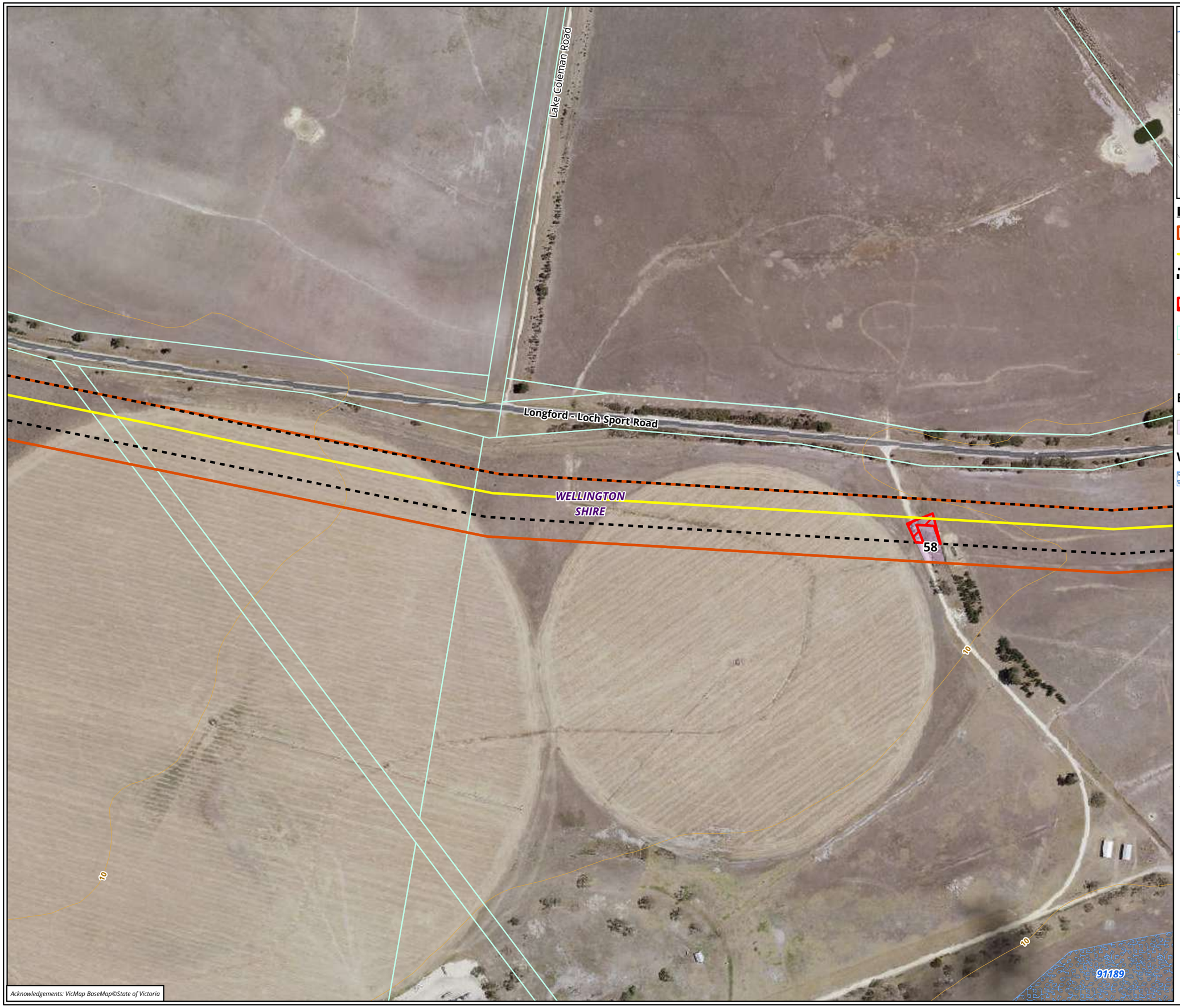

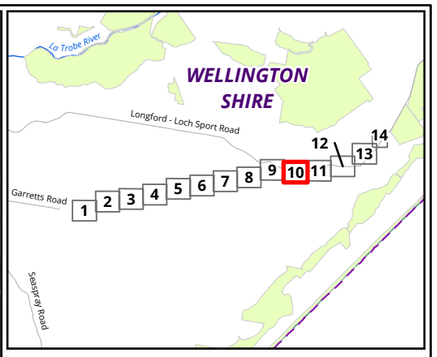

Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Large tree in patch - Retained

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland

Wetlands

- 4 - Deep freshwater marsh

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.10 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
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Layout: 37664_F5_VegLoss
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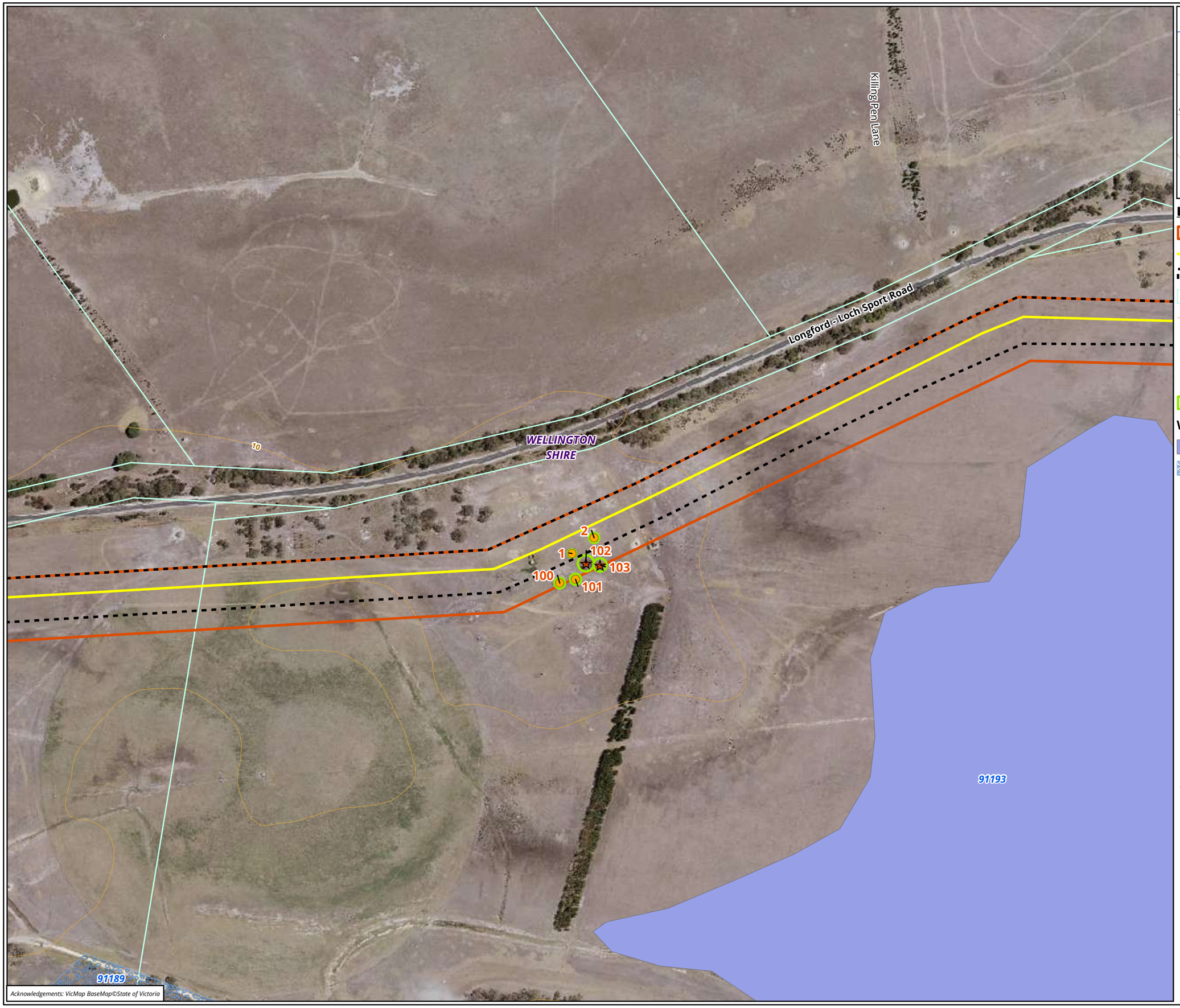
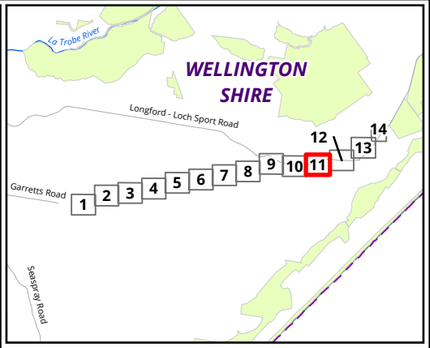
37664_ESSO_FFA.aprx





Legend

- Study area
- New pipeline *
- Disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Small scattered tree - Retained
- Large scattered tree - Retained
- Large tree in patch - Retained
- Tree protction zone (TPZ)

Wetlands

- 20 - Sewage oxidation basin
- 4 - Deep freshwater marsh

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.11 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
Layout: 37664_F5_VegLoss
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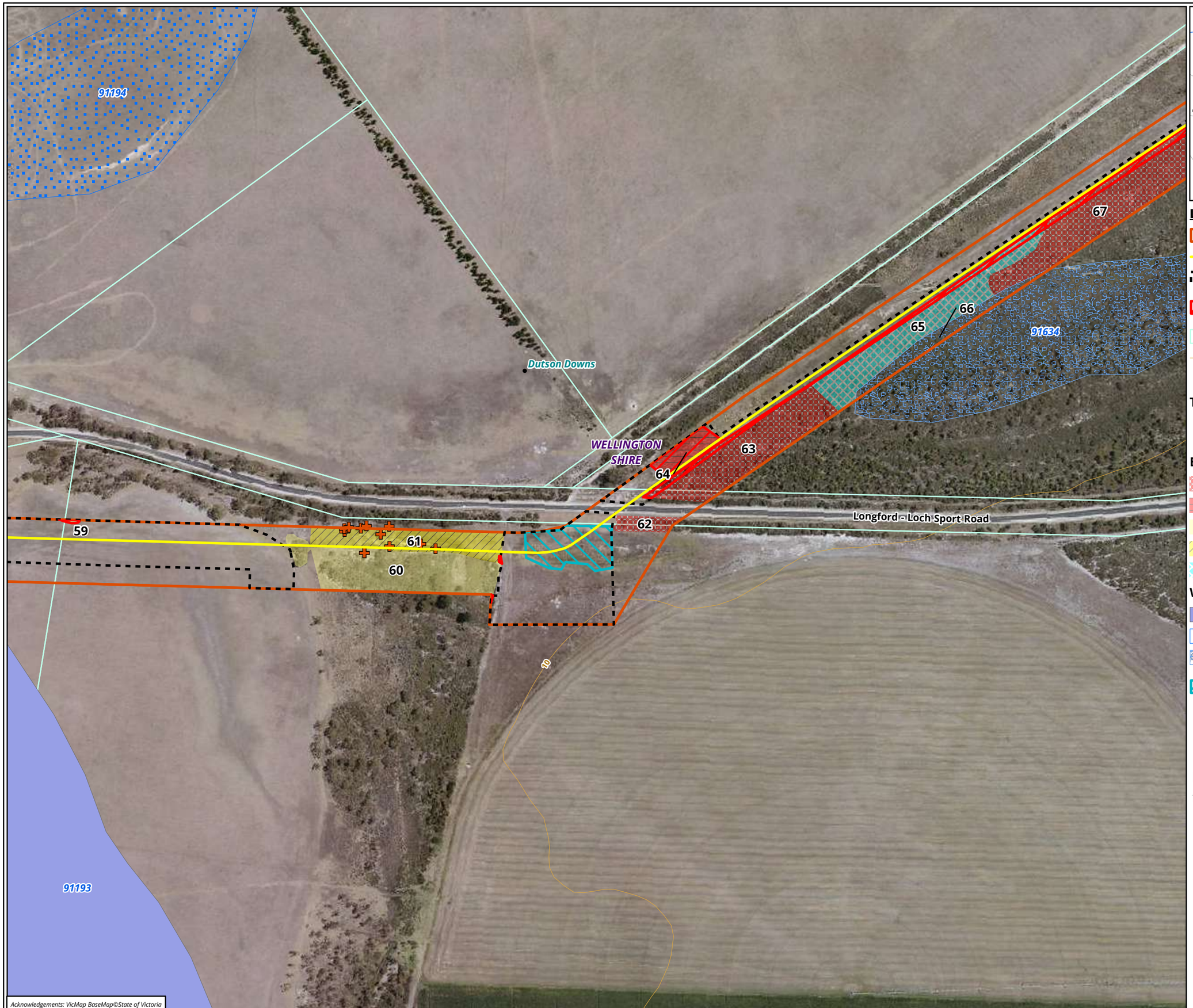

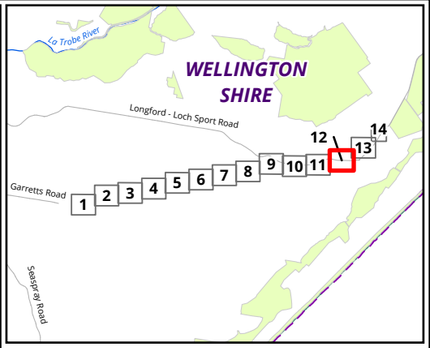

Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Large tree in patch - Retained

Threatened flora records

- Thryptomene micrantha - Ribbed Thryptomene

Ecological Vegetation Class (EVC)

- (GipP0006) Sand Heathland
- (GipP0006) Sand Heathland - Derived
- (GipP0048) Heathy Woodland
- (GipP0048) Heathy Woodland - Derived
- (GipP0053) Swamp Scrub

Wetlands

- 20 - Sewage oxidation basin
- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh
- Skink habitat within the disturbance footprint

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.12 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Matter: 37664,
Date: 23 November 2023,
Prepared for: SH, Prepared by: MK, Last edited by: mknudsen
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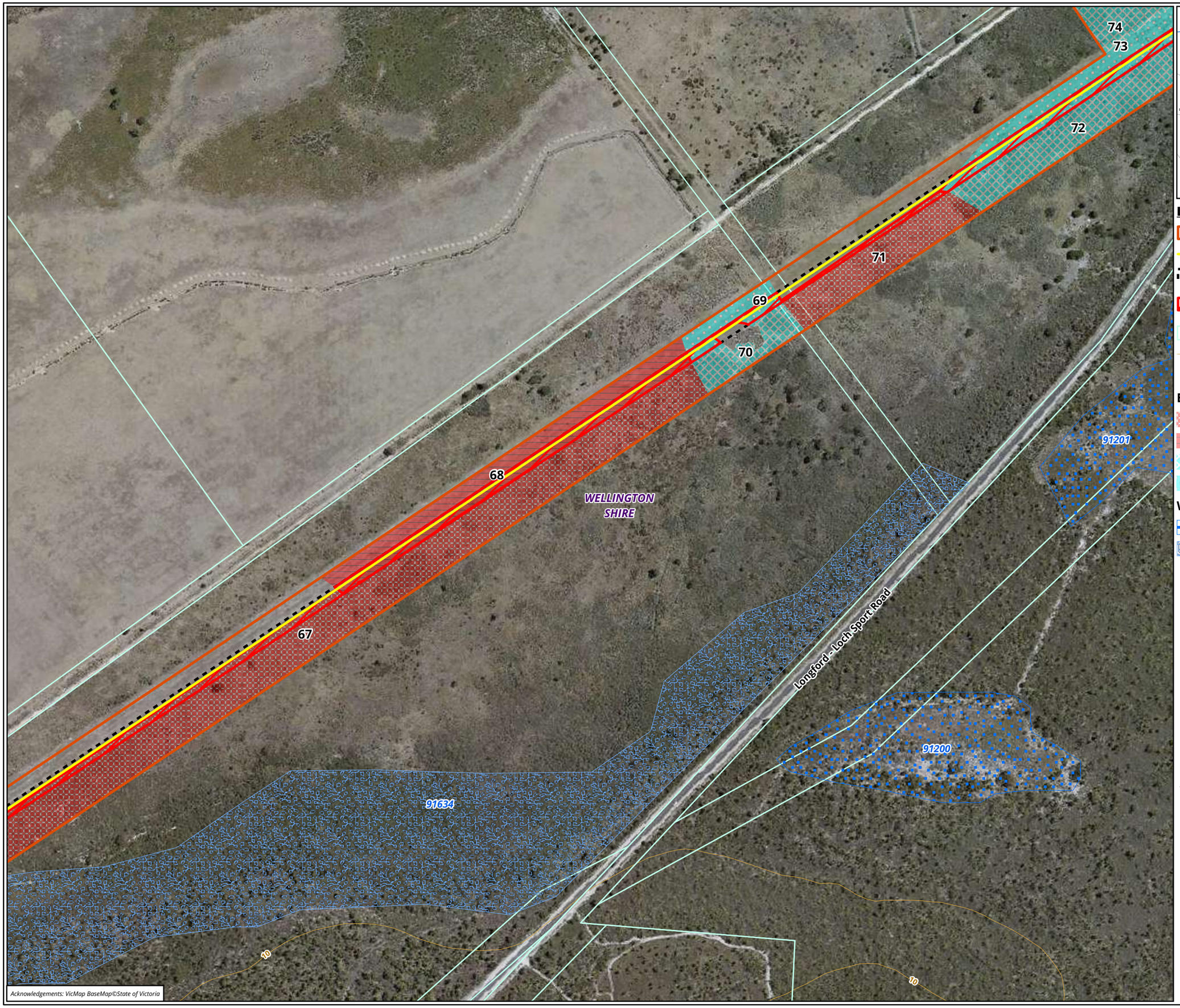

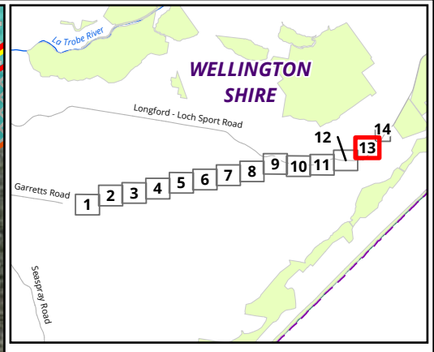

Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Large tree in patch - Retained

Ecological Vegetation Class (EVC)

- (GipP0006) Sand Heathland
- (GipP0006) Sand Heathland - Derived
- (GipP0053) Swamp Scrub
- (GipP0053) Swamp Scrub - Derived

Wetlands

- 3 - Shallow freshwater marsh
- 4 - Deep freshwater marsh

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.13 Vegetation within the project area

0 30 60 90 120 150

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
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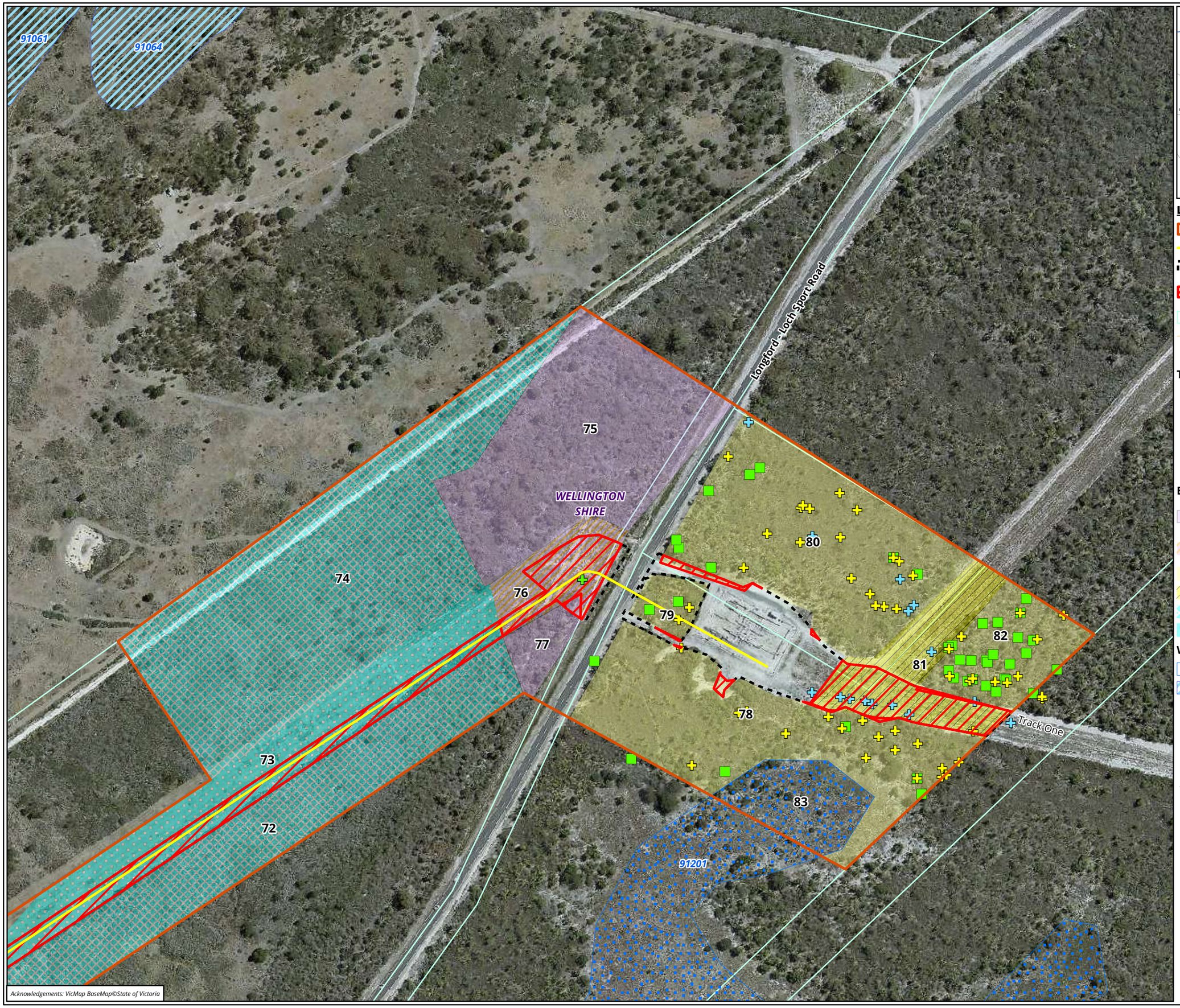

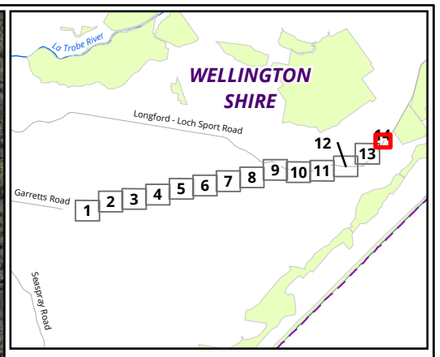

Legend

- Study area
- New pipeline *
- Disturbance footprint
- Vegetation within the disturbance footprint
- Current parcel boundary
- Contour 10m interval
- Large tree in patch - Retained

Threatened flora records

- Zieria veronicea subsp. veronicea - Pink Zieria
- Eucalyptus arenicola - Gippsland Lakes Peppermint
- Thelionema umbellatum - Clustered Lily

Ecological Vegetation Class (EVC)

- (GipP0003) Damp Sands Herb-rich Woodland
- (GipP0003) Damp Sands Herb-rich Woodland - Derived
- (GipP0048) Heathy Woodland
- (GipP0048) Heathy Woodland - Derived
- (GipP0053) Swamp Scrub
- (GipP0053) Swamp Scrub - Derived

Wetlands

- 3 - Shallow freshwater marsh
- 6 - Semi-permanent saline

*Where new pipeline is shown outside of disturbance footprint trenchless construction is proposed

Figure 5.14 Vegetation within the project area

0 20 40 60 80 100

Metres

Scale: 1:2,500 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

biosis

Matter: 37664,
Date: 23 November 2023,
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Project: P:\37600s\37664\Mapping\37664_ESSO_FFA.aprx

7. Conclusion

This report is an assessment of the potential impacts of the pipeline construction on ecological values within the proposed disturbance footprint in accordance with the EPBC Act, FFG Act and other legislation relevant to biodiversity protection.

The final disturbance footprint will have the following residual impacts:

- Removal and temporary disturbance of up to 13.632 hectares of remnant native vegetation representative of five EVCs:
  - Damp Sands Herb-rich Woodland EVC 3
  - Sand Heathland EVC 6
  - Lowland Forest EVC 16
  - Heathy Woodland EVC 48
  - Swamp Scrub EVC 53
  - Deep Freshwater Marsh modelled wetlands from DEECA's Current wetlands dataset.

  Of the 13.632 hectares of native vegetation removal, approximately 12.692 hectares (93%) occurs within the existing easement and is of a highly modified derived state due to decades of easement maintenance (i.e. is a treeless form of the original treed EVCs and supports modified native understorey). The remaining 0.940 hectares (7%) of native vegetation removal occurs within areas of intact native vegetation (Table 21).
- Removal and temporary disturbance of up to 0.414 ha of known habitat for FFG Act listed fauna species Glossy Grass Skink *Pseudemoia rawlinsoni*, less than 0.001% of modelled habitat within Victoria. Upper estimates of EVC and wetland habitat impacts are 13.63 ha, less than 0.001% of modelled habitat.
- Removal and temporary disturbance of up to 4.04 hectares of potential habitat for EPBC Act and FFG Act listed fauna species Southern Brown Bandicoot *Isoodon obesulus obesulus,* <0.001% of modelled habitat within Victoria.
- Removal and temporary disturbance of up to 3.41 hectares of potential habitat for EPBC Act and FFG Act listed fauna species New Holland Mouse *Pseudomys novaehollandiae,* <0.01% of modelled habitat within Victoria.
- Removal and temporary disturbance of up to 5.98 hectares of DEECA modelled Deep Freshwater Marsh, which may provide habitat for EPBC Act and FFG Act listed species Swamp Everlasting, although this species was not recorded within the study area. It should be noted that Winter and Spring of 2022 had above average rainfall in West Gippsland (BOM 2023, Bom 2023a), however modelled wetland areas were dry at the time of assessment, dominated by predominantly introduced vegetation and supporting limited wetland values. As such, indirect impacts to areas of wetland that sit outside the disturbance footprint are considered unlikely.
- Removal of potentially suitable habitat for FFG Act listed flora Naked Beard-orchid *Calochilus imberbis,* Spurred Helmet-orchid *Corybas aconitiflorus* and Veiled Fringe-sedge *Fimbristylis velata*, although these species were not recorded in the study area during site assessments or targeted surveys.

- Impacts to potential habitat critical to the survival of three EPBC Act listed threatened fauna species; Swamp Skink *Lissolepis coventryi*, Gang-gang Cockatoo *Callocephalon fimbriatum* and Blue-winged Parrot *Neophema chrysostoma*, although these species were not recorded in the study area during site assessments or targeted surveys.

Table 21 Potential impacts to native vegetation by EVC; intact and modified, and threatened flora species

EVC	Bioregional Conservation status	Modified vegetation removal (ha)	Intact vegetation removal (ha)	Total vegetation removal (ha)	Swamp Everlasting habitat (EPBC)	Naked Beard-orchid (FFG)	Spurred Helmet-orchid (FFG)	Veiled Fringe-sedge habitat (FFG)
Damp Sands Herb-rich Woodland EVC 3	Vulnerable	4.66	0.32	4.98	0.00	0.00	0.00	0.00
Sand Heathland EVC 6	Rare	0.87	0.47	1.34	0.00	0.00	0.75	0.00
Lowland Forest EVC 16	Vulnerable	0.01	0.00	0.01	0.00	0.01	0.00	0.00
Heathy Woodland EVC 48	Least Concern	0.48	0.05	0.53	0.00	0.52	0.00	0.00
Swamp Scrub EVC 53	Endangered	0.69	0.10	0.79	0.00	0.00	0.79	0.00
Deep Freshwater Marsh (modelled wetland)	Vulnerable	5.98	0.00	5.98	5.98	0.00	0.00	5.98
Creekline Herb-rich Woodland	Endangered	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**12.69**	**0.94**	**13.63**	**5.98**	**0.53**	**1.55**	**5.98**

Through consideration of avoidance and minimisation of native vegetation disturbance at the design and assessment stage of the project, direct impacts on native vegetation and fauna habitat have been minimised. The avoidance and minimisation steps that have been undertaken by the proponent at the design and assessment stage include:

- Detailed project planning including a desktop constraints assessment and constraints mapping with follow up design meetings to address results.

- Field survey of an expanded study area (70 to 200 metres in width) to provide flexibility during the design phase to avoid and minimise impacts to native vegetation and threatened species habitat.
- Aligning most of the proposed works within the existing easement, to reduce the extent of removal of native vegetation and threatened species habitat. A total of up to 13.632 hectares of native vegetation is proposed to be removed by the proposed new pipeline works, however 12.7 (93%) hectares of that total is native vegetation within the existing easement. The easement lacks all medium and large plant lifeforms due to maintenance slashing.
- Areas of high ecological value are proposed to be avoided entirely using trenchless construction. This is being utilised across habitat zones 30-33 34-45, 54-55, 60,61 and 79 (Figure 3). Through this the proponent is avoiding the following, which would have otherwise been impacted by trenching works:
  - FFG Act listed flora species Pale Swamp Everlasting and Ribbed Thryptomene.
  - 1.07 hectares of native vegetation which includes 0.41 hectares of an endangered EVC; Creekline Herb-rich Woodland EVC 164.
  - Large and scattered trees (trenchless construction will occur below 1 metre depth to avoid all tree roots).
  - Suitable habitat for FFG Act listed flora; Naked Beard-orchid and Variable Bossiaea.
  - Potential habitat for EPBC Act and FFG Act listed fauna; Southern Brown Bandicoot, Gang-gang Cockatoo, Blue-winged Parrot, Swift Parrot, Pilotbird, New Holland Mouse, Grey-headed Flying-fox, Swamp Skink, Green and Golden Bell Frog, Growling Grass Frog, Little Eagle, Powerful Owl, Masked Owl, Lace Monitor, Glossy Grass Skink, Southern Toadlet and Martin's Toadlet.
  - All habitat for EPBC Act and FFG Act listed fauna; Dwarf Galaxias and Flinders Pygmy Perch.
- Ensuring construction methods only require the removal of understorey vegetation so the canopy and sub-canopy will remain intact.
- Engaging an arborist at the design stage to review existing conditions for large and scattered trees in the study area to provide sensitive construction techniques that can be applied to ensure any required encroachment into tree protection zones and structural root zones does not lead to the long-term decline of trees. No large or scattered trees will be lost due to the pipeline construction.

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarised in Table 22.

Table 22 Assessment of the project in relation to key biodiversity legislation and policy

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
EPBC Act	Areas providing potential habitat for one flora species: • Swamp Everlasting Areas providing potential habitat for 14 fauna species and seven listed migratory species. Study area is within 2 km of the Gippsland Lakes Ramsar	An EPBC Act referral is recommended as the project has the potential to cause impacts to MNES.	Targeted surveys were undertaken in November 2022 for: • Dwarf Kerrawang • Maroon Leek-orchid • Metallic Sun-orchid • Wellington Mint-bush • Swamp Everlasting

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
	site.		A targeted survey was undertaken in August 2023 for: Green-striped Greenhood A targeted survey was undertaken in October 2023 for: • Metallic Sun-orchid • Thick-lip Spider Orchid No EPBC Act listed species were recorded during the November 2022, August 2023 and October 2023 surveys. Swamp Everlasting is a lowland swamp species and would likely only be recorded within the study area following inundation. Assessment against the Significant Impact Criteria (SIC) has been prepared for Swamp Everlasting and a significant impact is considered unlikely (Appendix C). Targeted fauna surveys were undertaken over December 2022 to February 2023 for: • Swamp Skink • Growling Grass Frog. Opportunistic searches for Southern Brown Bandicoot activity in December 2022 and during other fauna surveys. Assessment against the SIC has been prepared for EPBC Act listed fauna species likely to occur within the study. A significant impact is considered unlikely (Appendix C).
FFG Act	Five FFG Act listed flora species recoded within the study area: • Gippsland Lakes Peppermint • Ribbed Thryptomene	Protected flora permit required for areas of public land. The study area includes public land. Further	Targeted surveys undertaken in November 2022, August 2023 and October 2023 for 21 FFG Act listed flora species and October . See Table 2 for full list.

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
	• Pink Zieria • Pale Swamp Everlasting • Clustered Lily Areas providing potential habitat for seven FFG Act listed flora species: • Swamp Everlasting • Variable Bossiaea • Naked Beard-orchid • Spurred Helmet-orchid • Eastern Water-ribbons • Veiled Fringe-sedge Areas providing potential habitat for 21 FFG Act listed fauna species. Protected flora species are present.	consultation with DEECA is required regarding potential impacts to FFG Act listed species on public land.	Targeted fauna surveys were undertaken over December 2022 to February 2023 for: • Growling Grass Frog • Green and Golden Bell Frog • Martin's Toadlet • Swamp Skink • Glossy Grass Skink Opportunistic searches for Southern Brown Bandicoot activity in December 2022 and during other fauna surveys. DEECA reviewed the targeted survey methodology and provided feedback that it was suitable.
Pipelines Act	Impacts on native vegetation is a relevant consideration.	Licence is required under the Pipelines Act for the construction and operation of the pipeline.	Under the Pipelines Act, license applications are required to meet the no net loss and assessment objectives of the *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines). The Guidelines also provide guidance for avoidance, minimisation and offsetting of impacts to native vegetation.
Planning and Environment Act 1987 (PE Act)	Impacts to native vegetation.	No permit required if a licence is issued under the Pipelines Act	Section 85 of the Pipelines Act provides an exemption from the need to obtain planning approvals under the PE Act for the use or development of land or the doing or carrying out of any matter or thing for the purpose of the pipeline. Should any aspect of the Project not occur under a pipeline license issued under the Pipelines Act, Esso will obtain any necessary consents in accordance with any local planning requirements.

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
Catchment and Land Protection Act 1994 (CaLP Act)	Five noxious weeds and four pest animals were recorded within the study area.	N/A	Esso will need to comply with requirements to control/eradicate pest species.
Water Act 1989	Mapped waterways	Referral to West Gippsland Catchment Management Authority (CMA) for a works on waterways permit for any works that occur within waterways.	Esso has consulted with West Gippsland CMA for waterway determination
Fisheries Act	One protected aquatic species may be impacted if in stream or bank works are proposed for any waterway crossings: • Flinders Pygmy Perch *Nannoperca sp. 1*	Provided appropriate mitigation actions are taken, a permit is unlikely to be required.	Waterway crossings have been considered during the detailed site assessment. Impacts to waterways have been minimised through proposed use of trenchless construction under permanent waterways and wetlands. Mitigation actions to be documented in the CMP.
Environment Effects Act 1978	Removal of native vegetation and threatened species population and habitat impacts.	The project is unlikely to meet the biodiversity related referral criteria for individual potential environmental effects under the EE Act, however this will be subject to the outcomes of final orchid surveys.	A referral is required under the individual potential environmental effect when a project removes 10 hectares or more of an endangered EVC. The disturbance footprint associated with the proposed pipeline will only remove up to 0.94 hectares from an endangered EVC A referral may be required under the combination of two potential environmental effects, however the second effect is unlikely to be related to biodiversity. The disturbance footprint associated with the pipeline will remove over 10 hectares of native vegetation. Removal of 10 hectares or more of native vegetation (regardless of EVC conservation status) meets the biodiversity criteria for a referral if in combination with another

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
			potential environmental effect. The decision as to whether an EES is required is ultimately at the discretion of the Minister for Planning.
Environment Protection Act 2017 (EP Act)	Mapped Wetlands and waterways	N/A	Adhere to the mitigation measures outlined in this report to avoid impacts to wetlands and waterways.

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APPENDICES