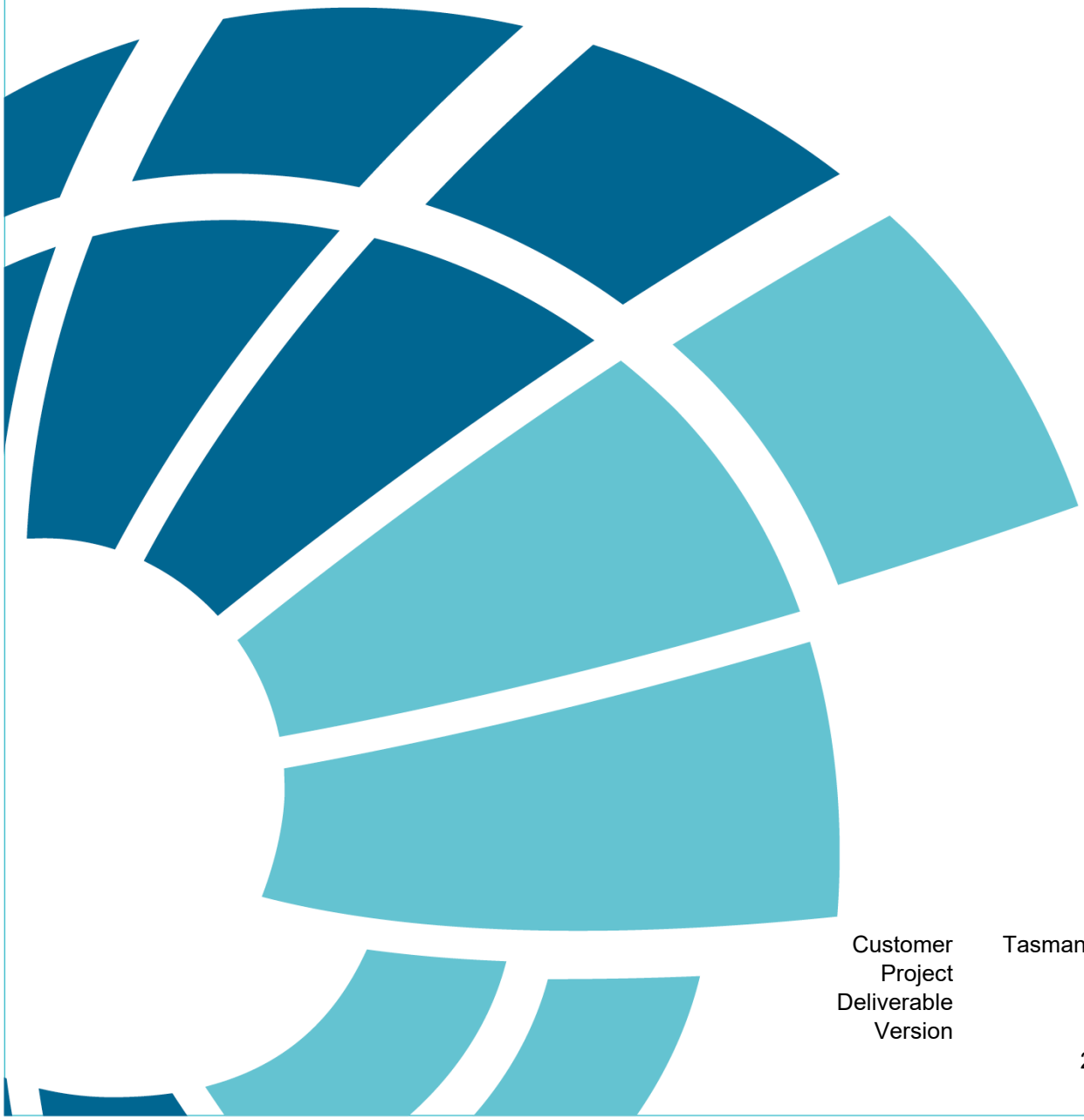
EPBC 2023/09666 Sassafras-Wesley Vale Irrigation Scheme Augmentation

EPBC Preliminary Documentation Report



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Author	Jeremy Visser, Jessica Kasearu, Mackenzie Stacey
Checked By	Darren Richardson, Suanne Richards
Project Manager	Jeremy Visser

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The Amendment Record below records the history and issue status of this document.

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01	13 December 2024	Tasmanian Irrigation	DCCEEW submission
02	28 March 2025	Tasmanian Irrigation	DCCEEW submission
03	21 May 2025	Tasmanian Irrigation	DCCEEW submission

Contents

Glossary and definitions

Abbreviation	Definition
ABS	Australian Bureau of Statistics
Acoustic specialist	Means a person who has relevant professional qualifications and at least three years of work experience designing and implementing noise management strategies and can give an authoritative assessment and advice using relevant protocols, standards, methods and/or literature.
Active eagle nest	Any Tasmanian Wedge-tailed Eagle nest, unless the nest site has had an activity check conducted by either the Forest Practices Authority or a suitably qualified eagle specialist and determined to be inactive.
Aerial nest search	An aerial search conducted using helicopters to identify and record the location of Tasmanian Wedge-tailed Eagle nests. All aerial nest searches must be undertaken between 1 March and 30 June of any given year, and in accordance with the document Fauna Technical Note 1: Eagle Nest Searching, Activity checking and Nest Management (FPA, 2024).
AHT	Aboriginal Heritage Tasmania
ASL	Above Sea Level
ASS	Acid sulphate soils
Avoidance Area	The Avoidance Area is the areas of verified natural values that will not be impacted by the Construction of the SWISA.
BCR	Benefit Cost Ratio
BPS	Booster Pump Station
CEMP	Construction Environmental Management Plan
CEP	Construction Environmental Plan
CET	Construction Environmental Table
CNBC	Central north burrowing crayfish
Construction Corridor	The Construction Corridor represents the impact area of construction activities including both permanent impact areas (e.g. buildings, access roads, and other minor infrastructure such as scour valves and property outlets) and temporary impacts to land that will be reinstated post construction (such as the pipeline alignment and temporary laydown areas). The Construction Corridor is nominally a 30m corridor around the pipeline alignment plus any permanent infrastructure and temporary construction impact areas. The Construction Corridor represents the maximum extent of the construction impact area and has been minimised in areas containing natural values to reduce impact. Assessment of direct impacts to natural values due to construction are based on the Construction Corridor.
Construction Project Area (Survey Area)	The Construction Project Area represents the limits of the area in which construction can be moved outside the approved Construction Corridor due to unforeseen circumstances. This area is equivalent to the Survey Area and any deviation from the approved Construction Corridor impact area within the Construction Project Area will not require additional survey. However, any change will require assessment of potential impact on MNES and can only proceed if there is no change or a reduction in the quantum of impact to MNES and the time of survey does not exceed 2 years. If there is potential to increase the net impact on an MNES, approval from DCCEEW will be sought. The Construction Project Area represents the boundary for the application of the Construction Environmental Management Plan (CEMP). The Construction Project Area encompasses an area of 1,664.64ha.
Daylight hours	The period between one hour after dawn and one hour before dusk.
DBH	Diameter at Breast Height
DCCEEW	Department of Climate Change, Energy, the Environment and Water

Abbreviation	Definition
Devil management constraint period	Devil management constraint period. The breeding season of devils in proximity to GBPS and Devil Road which is likely to fall between 1 February and 31 August. However, requires confirmation in writing by a suitably qualified ecologist supported by monitoring evidence that the breeding season has commenced and has been completed as Devil Facial Tumour Disease may cause breeding seasons to fluctuate.
DFTD	Devil Facial Tumour Disease
DGV	Default guideline values
DICL	Ductile Iron Cement Lined
DOB	*Eucalyptus obliqua* dry forest
DOL	Direct on-line
DOV	*Eucalyptus ovata* forest and woodland
DOW	*Eucalyptus ovata* heathy woodland
DSC	*Eucalyptus amygdalina - Eucalyptus obliqua* damp sclerophyll forest
Eagle management constraint period	The period commencing on 1 July and ending on 31 January in the same financial year, unless a shortened or lengthened period is determined (identified annually in November) and publicly advised by the Forest Practices Authority in writing.
e-flow	Environmental flow
EOI	Expression of Interest
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
EPR	Environment Protection Requirement
ESCP	Erosion and Sediment Control Plan
Exclusion Zones	Areas containing identified values and required buffer within which no works are permitted. Exclusion Zones will not be impacted by construction or maintenance activities. These must be appropriately field delineated and flagged. Exclusion zones are intended to prevent human incursion into areas of value, not to prevent animals from entering the construction corridor.
Farm Water Access Plan	Farm Water Access Plans (Farm WAPs) are included in by-laws made by TI under section 46 of *Irrigation Clauses Act 1973.* In preparing a Farm Water Access Plan a person must have regard to safeguard and mitigation measures to protect and avoid significant impact on Matters of National Environmental Significance in relation to the taking and use of the water on the land in the Irrigation District. Requirements of the Operational Environmental Management Plan must be implemented through the Farm Water Access Plans.
Farm WAP	Farm Water Access Plan
FTE	Full Time Equivalent
GA	General Availability
GBPS	Great Bend Pump Station
GGF	Green and gold frog
ha	Hectare
HDD	Horizontal directional drilling
HDPE	High-density polyethylene
HV	High Voltage
HVAC	Heating, ventilation, and air-conditioning
Irrigation District	The Sassafras Wesley Vale Irrigation District under s176 of the *Water Management Act 1999* (Tas), covering an area of 18,000ha.
IFT	Issue for Tender

Abbreviation	Definition
IRR	Internal Rate of Return
km	Kilometre
L/s	Liters per second
LGA	Local Government Area
LV	Low Voltage
m	Meter
Maintenance	Refers to the systematic and routine activities carried out to ensure the optimal performance, reliability, and longevity of irrigation infrastructure. This includes regular inspections, cleaning, repairs, and replacements of components such as pumps, pipes, valves, and control systems. Its purpose is to prevent breakdowns, minimize downtime, and ensure efficient water delivery.
ML	Megalitre (one million litres)
MNES	Matters of National Environmental Significance
MVA	Mega-volt amperes
NAD	*Acacia dealbata* forest
NAF	*Acacia melanoxylon* swamp forest
NBES	North Barker Ecosystem Services
NC Act	*Nature Conservation Act 2002* (Tas)
Nest activity assessment	Refers to a check of known eagle nests by a suitably qualified eagle specialist during the eagle management constraint period to determine the activity status of the nest. Eagle nest surveys must be undertaken in the breeding season, with timeframes informed by either the FPA or a suitably qualified eagle specialist (optimal timeframes for assessment are typically around October/November).
Night-time hours	The period between one hour before dusk and one hour after dawn.
NME	*Melaleuca ericifolia* swamp forest
Noise sensitive premises	Means residences and residential zones (whether occupied or not), schools, hospitals, caravan parks and similar land uses involving the presence of individual people for extended periods, except in the course of their employment or for recreation.
NPV	Net Present Value
NRE Tas	Department of Natural Resources and Environment Tasmania
NWGA	National Water Grid Authority
Operational Area	The Operational Area includes all land within properties that may purchase SWISA water within the Irrigation District. It also represents the boundaries for the application of the OEMP.
OEMP	Operational Environmental Management Plan
P50	A preliminary estimate that has a 50% likelihood of being exceeded in a final estimate
P90	A preliminary estimate that has a 90% likelihood of being exceeded in a final estimate
PAM	Passive acoustic monitoring
PASS	Potential acid sulphate soils
PO	Property Outlet
Project Area	The Project Area is for the purposes of the Natural Values Assessment. The Natural Values Assessment Project Area is also used to determine the level of risk to MNES associated with the operation of the scheme. The Project Area consists of an area buffer 5km either side of the Construction Corridor excluding entirely aquatic areas (i.e. Bass Strait) but including estuarine areas such as Port Sorrell. Note this Project Area represents the area in which assessments have been undertaken but does not directly correlate to the overall area of the SWISA project itself.

Abbreviation	Definition
Relocation management area	An area of known potential habitat that cannot be avoided by construction activities and is subject to salvage and relocation requirements.
SAV	Surge Anticipation Valve
SBPS	Sassafras Booster Pump Station
SCADA	Supervisory Control and Data Acquisition
SEIFA	Socio-Economic Index for Areas
SHBT	Saggers Hill Balance Tank
S.M.A.R.T principles	Specific Measurable Achievable Relevant Time-bound management actions
SPIBA	Swift parrot important breeding area
SPRAT	Species Profile and Threat
Suitably qualified ecologist	A person with relevant professional qualifications and: • at least three years of experience writing, implementing and reporting on management plans for the habitat of protected matters, • has implemented and reported on management plans for the habitat of protected matters and can demonstrate the implementation of those plans achieved the desired habitat quality for habitat of protected matters.
Suitably qualified eagle specialist	A person who has attended and passed an eagle management course organised or approved by the Forest Practices Authority with at least five years' experience in eagle nest management.
Suitably qualified wildlife carer	A person who has attended wildlife rescue training through a certified training agent (e.g. WIRES or Bonorong Wildlife Sanctuary).
Survey Area	The Survey Area is the combined extent of all ground vegetation, flora, fauna, and fauna habitat surveys for all alignment options considered during the design process. Typically, the Survey Area is a 50m buffer (100m corridor width) of pipeline alignment(s) and 100m buffer around the pump stations and a balance tank site. Additional surveys to determine presence of fauna species (including green and gold frog and dasyurid species) and eagle nests within the Operational Area were undertaken beyond the Survey Area. The Survey Area encompasses an area of 1,664.64ha.
SWIS	Sassafras Wesley Vale Irrigation Scheme (EPBC 2010/5327).
SWISA	Sassafras Wesley Vale Irrigation Scheme Augmentation
TEC	Threatened ecological community
TI	Tasmanian Irrigation Pty Ltd
TPZ	Tree Protection Zone
TSP Act	*Threatened Species Protection Act 1995*
TWL	Top of water level
VSD	Variable Speed Drive
WBR	*Eucalyptus brookeriana* wet forest
WIRES	Wildlife Information, Rescue and Education Service
WVI	*Eucalyptus viminalis* wet forest
WVPM	Wesley Vale Paper Mill

1 Introduction

1.1 Overview and Aims

The Sassafras-Wesley Vale Irrigation Scheme Augmentation (SWISA) (EPBC 2023/09666) is a proposed redevelopment of the Sassafras-Wesley Vale Irrigation Scheme (SWIS) (EPBC 2010/5327)

SWIS was developed by Tasmanian Irrigation (TI) and commenced operations in the 2012-13 irrigation season. Water is sourced from the Great Bend Pump station (GBPS) and services the Sassafras Wesley Vale Irrigation District (16,381 hectares (ha)) located between the city of Devonport, town of Port Sorell, and locality of Sassafras in northern Tasmania.

Tasmanian Irrigation proposes several upgrades to the SWIS infrastructure and a new trunkline to service new customers. The Sassafras Wesley Vale **Irrigation District** was amended under s176 of the *Water Management Act 1999* (Tas), including two additional satellite areas, delineated as 'Mole Creek Area' and Weegena Area'. The inclusion of the satellite areas expands the Irrigation District to 18,000ha. Figure 1.2 illustrates the location and extent of the existing SWIS Irrigation District and the amended SWISA Irrigation District.

The following terminology will be used throughout this assessment:

- **Survey Area** (Figure 1.2) – The Survey Area is the combined extent of all ground vegetation, flora, fauna, and fauna habitat surveys for all alignment options considered during the design process. Typically, the Survey Area is a 50m buffer (100m corridor width) of pipeline alignment(s) and 100m buffer around the pump stations and a balance tank site. Additional surveys to determine presence of fauna species (including green and gold frog and dasyurid species) and eagle nests within the Operational Area were undertaken beyond the Survey Area. The Survey Area encompasses an area of 1,664.64ha.
- **Construction Project Area** (Figure 1.2) –The Construction Project Area represents the limits of the area in which construction can be moved outside the approved Construction Corridor due to unforeseen circumstances. This area is equivalent to the Survey Area and any deviation from the approved Construction Corridor impact area within the Construction Project Area will not require additional survey. However, any change will require assessment of potential impact on Matters of National Environmental Significance (MNES) and can only proceed if there is no change or a reduction in the quantum of impact to MNES and the time of survey does not exceed 2 years. If there is potential to increase the net impact on an MNES, approval from DCCEEW will be sought. The Construction Project Area represents the boundary for the application of the Construction Environmental Management Plan (CEMP). The Construction Project Area encompasses an area of 1,664.64ha.
- **Construction Corridor** (Figure 1.2) –The Construction Corridor represents the impact area of construction activities including both permanent impact areas (e.g. buildings, access roads, and other minor infrastructure such as scour valves and property outlets) and temporary impacts to land that will be reinstated post construction (such as the pipeline alignment and temporary laydown areas). The Construction Corridor is nominally a 30m corridor around the pipeline alignment plus any permanent infrastructure and temporary construction impact areas. The Construction Corridor represents the maximum extent of the construction impact area and has been minimised in areas containing natural values to reduce impact. Assessment of direct impacts to natural values due to construction are based on the Construction Corridor. The Construction Corridor encompasses an area of 320.85ha. A breakdown of the elements making up the Construction Corridor is provided in Section 2.3.

- **Avoidance Area** – Areas with confirmed natural values that will not be impacted from SWISA construction activities.
- **Exclusion Zones**—Areas containing identified values and required buffer within which no works are permitted. Exclusion zones will not be impacted by construction or maintenance activities. These must be appropriately field delineated and flagged.
- **Operational Area** – The Operational Area includes all land within properties that may purchase SWISA water within the Irrigation District, including the two satellite areas. It also represents the boundaries for the application of the Operational Environmental Management Plan (OEMP). The Operational Area is equivalent to the Irrigation District and encompasses an area of 18,000ha.

Note the two satellite areas in the Irrigation District/Operational Area will involve direct take of water by customers from the river using their own on-farm infrastructure and therefore require no new TI infrastructure or construction activities. All water take in these areas will be subject to a Farm Water Access Plan (Farm WAP) process, as detailed in Section 2. These areas are included in the scope of SWISA but have not been subject to values surveys due to the lack of construction impacts and the ability for the Farm WAP process to integrate matter-specific assessment, avoidance, and mitigation measures into water take.

For a closer resolution of all areas associated with the SWISA and the Construction Corridor see Annex A.

This report has been supported by a Natural Values Assessment (NBES 2025) that has been undertaken across a nominal '**Project Area'**. For the purposes of the Natural Values Assessment, this Project Area consists of an area buffered 5km either side of the Construction Corridor, excluding entirely aquatic areas (i.e. Bass Strait) but including estuarine areas such as Port Sorrell. Note this Project Area represents the area in which assessments have been undertaken but does not directly correlate to the overall area of the SWISA project itself.

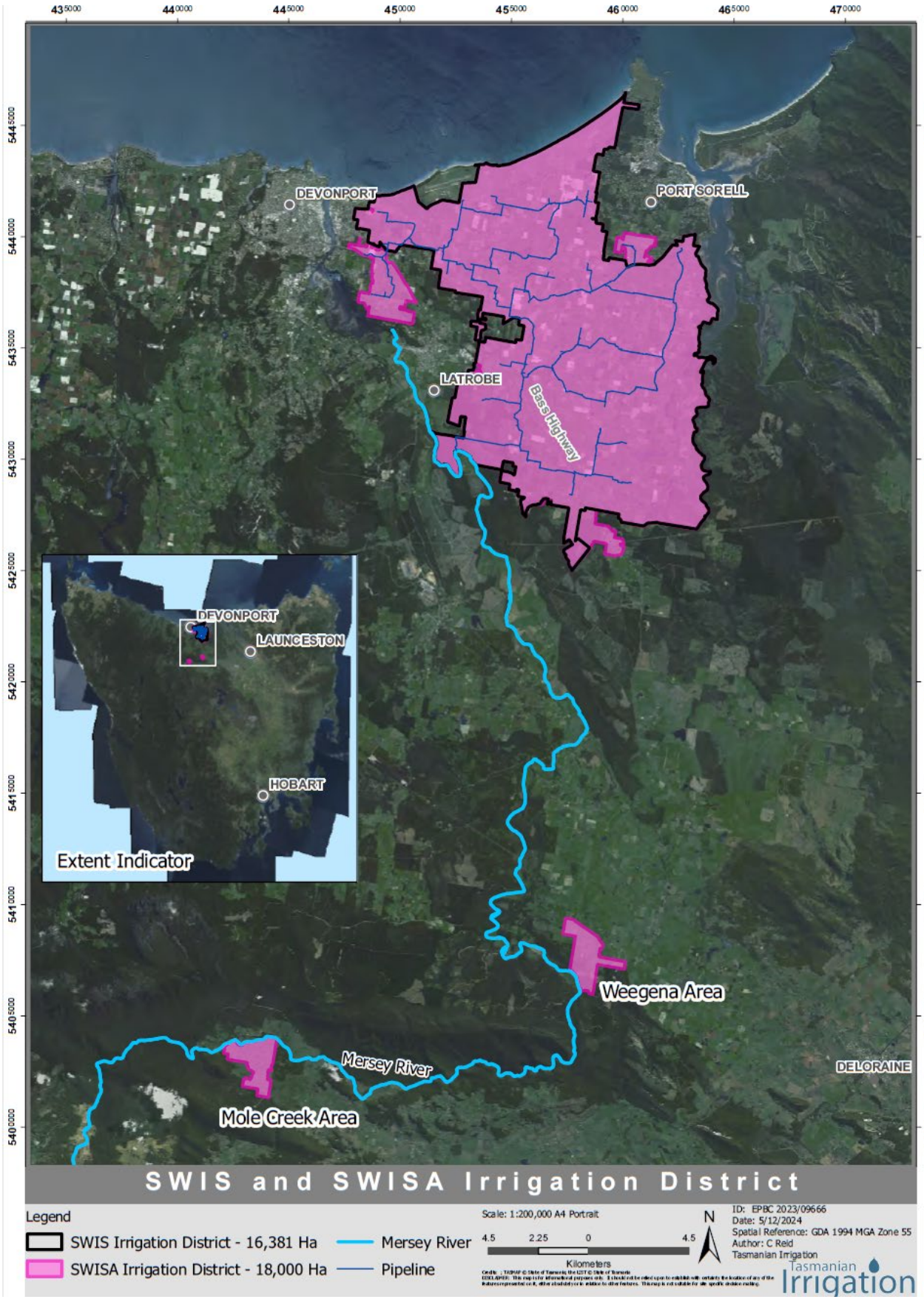

Figure 1.1 Existing SWIS Irrigation District and new SWISA Irrigation District

Figure 1.2 SWISA Project Footprint

1.2 Report Structure

This report has been structured in accordance with the Request for Additional Information Assessment by Preliminary Documentation issued for EPBC 2023/09666 by the Department of Climate Change, Energy, the Environment and Water (DCCEEW). Specifically, this requests the following report elements:

- Description of the action (**Section 2**)
- Description of the environment (**Section 3**)
- MNES (**Section 4**), with a focus on:
  - Tasmanian Forests and Woodlands dominated by Black gum or Brookers gum (*Eucalyptus ovata*/*E. brookeriana*) – Critically Endangered
  - Tasmanian white gum (*Eucalyptus viminalis*) wet forest – Critically Endangered
  - Swift parrot (*Lathamus discolor*) – Critically Endangered
  - Tasmanian wedge-tailed eagle (*Aquila audax fleayi*) – Endangered
  - Tasmanian masked owl (*Tyto novaehollandiae* subsp. *castanops*) – Vulnerable
  - Spotted-tail quoll (Tasmanian population) *Dasyurus maculatus maculatus*) – Vulnerable
  - Eastern quoll (*Dasyurus viverrinus*) – Endangered
  - Tasmanian devil (*Sarcophilus harrisii*) – Endangered
  - Growling grass frog (*Litoria raniformis*) – Vulnerable
  - Central north burrowing crayfish (*Engaeus granulatus*) – Endangered
  - Australia grayling (*Prototroctes maraena*) – Vulnerable
  - Robust fingers (*Caladenia tonellii*) – Endangered
  - Tailed spider-orchid (*Caladenia caudata*) – Vulnerable
  - Wrinkled dollybush (*Cassinia rugata*) – Vulnerable
- Relevant impacts on MNES (**Section 5**)
- Proposed avoidance and mitigation measures (**Section 6**)
- Residual impacts/proposed offsets (**Section 7**)
- Social and economic (**Section 8**)
- Other approvals and conditions (**Section 9**)
- Environmental record of person proposing to take the action (**Section 10**)
- Ecologically sustainable development (**Section 11**)
- Conclusion (**Section 12**).

This report is supported by a series of technical documents which are attached as annexes. These are:

- Technical ecological reports presenting the survey and baseline information and technical impact assessment for specific MNES. These are:
  - Natural Values Assessment (NBES, 2025) – **Annex B**. This presents an assessment for all listed MNES except the Australian grayling, including details of survey activities and findings, species habitat requirements, significant impact assessment and mitigation measures. This report has also been prepared to support state-level assessments and therefore includes details for ecological communities and species protected at a state-level.
  - Australian Grayling Species Impact Assessment (Elgin, 2025) – **Annex C**. This presents an assessment specific to the Australian grayling, including details of survey activities and findings, species habitat requirements, significant impact assessment and mitigation measures.
  - Tasmanian Devil Impact Assessment (Enviro-dynamics, 2024) – **Annex D**. This presents an assessment of impacts on Tasmanian devil from the proposed [redacted] including details of survey activities and findings, species habitat requirements, significant impact assessment and mitigation measures.
- Environmental management plans:
  - Construction Environmental Protection Requirements (EPRs) – **Annex E**. These are safeguard and mitigation measures to protect MNES during construction and maintenance phases.
  - Construction Environmental Management Plan (CEMP) – **Annex F**. This sets out management measures to be applied for construction and infrastructure maintenance activities, including Construction Environmental Tables (CETS) and Construction Environmental Plans (CEPS). The CEMP provides a mechanism for implementation of the EPRs.
  - Operational Environmental Management Plan (OEMP) – **Annex G**. This sets out management measures to be applied on an ongoing basis for operational activities, including protocols associated with the future access of property holders to water for irrigation purposes.

These documents form part of the overall Preliminary Documentation.

2 Description of the Action

2.1 Project Background

In 2011 and 2012, TI commissioned the SWIS by repurposing infrastructure from the former Wesley Vale Paper Mill (WVPM). That scheme currently delivers up to 5,660 megalitres (ML) over a 150-day summer period (season) of high-surety irrigation water to 99 irrigators across several regions of northwestern Tasmania. Water is primarily sourced from the Mersey River, with extra released from Lake Parangana used during low flow periods.

Following the success of the SWIS, TI initiated the Preferred Option Design Plan for the SWISA to address increased demand for water access and inefficiencies associated with existing infrastructure that was reaching end-of-life. This plan involves:

- Retrofitting the GBPS, including replacement of all equipment, additional pumps, and structural modifications to improve safety
- Construction of new infrastructure including:
  - Saggers Hill Balance Tank (SHBT) and associated access road
  - Sassafras Booster Pump Station (SBPS)
  - Installation of approximately 100 km pipeline network
- Decommissioning existing end-of-life WVPM assets.
- Commissioning of SWISA, including the transition of all SWIS customers to the SWISA.

SWISA will increase capacity to 14,860ML/season with a design peak flow, serving 132 irrigators.

Decommissioning of existing end-of life assets will be assessed under EPBC 2010/5327 and therefore will not be discussed in this report.

2.2 Preconstruction

2.2.1 Preferred Option Design and Business Case

TI developed an initial Preferred Option Design focusing on upgrades to increase water delivery by 1,300 ML and improver tradability. Expression of Interest (EOI) surveys revealed interest in an additional 5,745ML of water from 28 existing and 33 new irrigators, and future growth expectations led the Irrigator Representative Committee to recommend a 20% reserve capacity. This was the basis of the Preferred Option Design.

Several initial investigations were explored at the Preferred Option Design stage focusing on additional water sources including:

1. New Storage Dam—The construction of a storage dam filled from the existing water license and additional winter water to be released during summer months.
2. Parangana Dam Upgrades—Upgrades to the Parangana Dam outlet and negotiate additional water acquisition with Hydro Tasmania.

The cost-benefit analysis of the initial investigations favoured Parangana Dam Upgrades due to its lower costs and minimal social and environmental impacts. Early designs also looked at repairing and upgrading the existing SWIS, but these were eliminated due to the condition of the existing assets, landowner opposition, suburban encouragement, hydrologic inefficiencies, and funding ineligibility.

The final design, referred to the Saggers Hill Loop Option was developed in early 2022, consisting of the construction of a new rising main, balance tank, and trunk main alignment. The advantages of the Saggers Hill Loop included the higher elevation at Saggers Hill allowing for gravity-fed distribution, requiring only one BPS and improvements to tradability within the loops.

After stakeholder consultation, Saggers Hill Loop Option was chosen as the Preferred Option Design, progressing to the Business Case stage. The Business Case was approved on 1 May 2023, allowing TI to proceed to detailed design and construction readiness, pending full funding, which was secured in May 2023.

2.2.2 Detailed Design, Permits and Approvals

Following the approval of the Business Case and budget in mid-2023, TI worked closely with the design partners (GHD and Pinion Advisory) to refine the preferred option for the issue for tender (IFT). In parallel, environmental and heritage assessments were initiated to support the application process for required governmental/regulatory permits and approvals. The detailed design progressed through several iterations to confirm suitability of the detailed design for IFT. Key changes included modifications to pipeline alignments to reduce environmental and heritage impacts to the greatest extent practicable without compromising scheme operation.

In addition to the EPBC referral, this project requires approvals from the Tasmanian State Government and Latrobe and Devonport local councils. Applications for these approvals commenced during the detailed design phase and are anticipated to be finalised after the determination of this EPBC approval. To support the development of the detailed design and approval applications, comprehensive desktop and field analyses were implemented by TI and subconsultants (Table 2.1).

Table 2.1 Supporting evidence for detailed design, permits and approvals

Category	Assessments completed
Ecology and Biodiversity Assessments	• Natural values desktop assessment • Seasonal alignment field walks • Species-specific surveys—eagle nests, green and gold frogs, central north burrowing crayfish, Australian grayling, giant freshwater crayfish • Camera trapping—monitoring devil and quoll activity around potential dens • Habitat tree surveys— identification of significant trees for parrots and masked owls
Environmental Management and Compliance	• Asbestos survey and management plan • Soil and water management plan • Forest practices plan
Technical Assessments and Planning	• Flood risk assessment • Geotechnical investigations • Structural assessments • Asset location • Coatings assessments (GBPS) • Noise monitoring
Heritage and Community Engagement	• Heritage surveys— Aboriginal and European heritage site identification and preservation measures • Landowner access agreements—Negotiation and documentation of access terms with landowners

2.3 Construction

The construction phase of the works includes retrofitting GBPS and development of the SHBT, SBPS and new pipeline network.

2.3.1 Great Bend Pump Station

GBPS is a brownfield site from the late 1960s, built for the WVPM. While the building is structurally sound and can be serviceable for another century, modifications are required for SWISA.

Pumps
Two existing pumps will be replaced with four new pumps with capacity to meet SWISA's increased flow and head requirements. GBPS was designed with four pump spaces therefore minimal adjustments are needed. A new inlet manifold, scour valve, and surge anticipation valve (SAV) are also required. The pumps will be integrated into TI's Supervisory Control and Data Acquisition (SCADA) system for remote operation and alarm monitoring.

Electrical
The new pumps and VSDs will require an increase in power. Therefore, upgrades to the high- and low-voltage (HV/LV) electrical switching gear, including replacing the three existing transformers with a single 3 MVA transformer kiosk, new HV reclosers, and metering will occur. Tas Networks will replace the existing wooden HV pole with a new super pole. A fibre optic cable will be installed to allow the interconnectivity between GBPS, SHBT and BPS.

The new VSDs and pumps will generate additional heat, thus a heating, ventilation, and air conditioning (HVAC) system will be installed to cool the pump and switch rooms. Cool air will be ducted from two external HVAC units through internal ducts.

Structural
Several structural modifications will be required to improve accessibility, safety, and longevity. Structural upgrades will include:

- Installation of new access and emergency exit doors.
- Replacement of the existing ship-style staircase with a contemporary staircase and landing.
- Cracks and recoating applied to concrete.
- Replacement of two screen wells and installation of new penstocks on the inlet and outlet on each screen well. The hydraulic system associated with the screen wells will be replaced with electric winch systems.
- Rock wall stability upgrades to the northern retaining wall adjacent to the river's edge. Upgrades will consist of a batter and bench approach.

2.3.2 Saggers Hills Balance Tank

The SHBT will be constructed on the greenfield site, Saggers Hill, approximately 2km east of the existing GBPS. The design to operate includes:

- A usable volume of 2.1ML that will be able to supply the scheme at full flow for 30 minutes.
- Minimum base level of 170m Australian Height Datum (AHD) with top of water level (TWL) at 175m AHD.
- Diameter of 24.0m, height of 6.0m constructed from steel panels.

- A 3.0 x 3.0 x 2.4m electrical and control service concrete shed. The shed will have a lockable caged ladder for roof maintenance access.
- A 5.0m wide compacted gravel hardstand will be constructed around the circumference of the tank, surrounded by a 2.1m high security fence and 2.0m wide access gate.
- A 4.0m wide access road will be construction via Native Plains Road, via a new 4.0m. Farm gates will be installed to control access and allow for landowner movement around the property.

2.3.3 Sassafras Booster Pump Station

The SBPS is located at the base of the Sassafras line on Native Plains Road, downstream of SHBT. The design to operate include:

- A 9.0 x 8.5m Colourbond clad steel frame shed on a concrete slab with a Colourbond roller door, pedestrian access door, surrounded by a 2.1m security fence. The station will house a total of five pumps (four main pumps, one smaller pump for low flow conditions) with a total flow rate of 137L/s and 41m of additional pump head.
- A compacted gravel hardstand will be constructed around the permitter of SBPS (4m wide on the east and 1.5m wide on the west) to allow for vehicular and pedestrian access.
- Installation of a HVAC system.

2.3.4 Pipeline Network

The pipeline network will become established across approximately 100km. The pipeline network will originate from the GBPS and a enter ductile iron concrete lined (DICL) rising main before extending to the Devil Road in the Warrawee Conservation Area. Once the pipeline has transversed to the northern edge of the conservation area it bends eastwards through Forico plantation forestry.

The DICL pipe transitions to a 1,000mm high-density polyethylene (HDPE) pipe, before it reaches the SHBT. A flow meter will be installed at the SHBT before and after the branching of the pipeline. The network forks east continuing the 450mm Sassafras line while the 1,000mm trunk main continues north with branches, loops, and spurs as needed.

Secondary networks from the trunk main of the gravity network are Moriarty loop, Wesley Vale loop, Northdown line, and Latrobe line, all of which have flow meters and isolation valves. The values allow for minimal disruption during maintenance as sections of the pipeline can be drained without shutting down the entire network. While air values are placed periodically along the pipeline to prevent air entrainment and inefficient flow.

Irrigator water will be supplied by 179 network connected property outlets. Each outlet is fitted with a riser from the distribution line, filters, a meter for billing, electrical equipment, and various valves for operation and maintenance. The size of the outlets varies based on the water volume purchased by the irrigator, affecting the flow rate. Outlets are housed in enclosures to prevent condensation and frost accumulation.

The pipeline as a result crosses 73 watercourses including irrigation ditches and drains, but no major watercourses. Where threatened species are present, and it is practicable, Horizontal Directional Drilling (HDD) will be used to avoid disturbing the watercourse. HDD is proposed to occur across 12 watercourses while the remaining 61 will be crossed by trenching.

2.3.5 Parangana Outlet

The additional water required for the augmented scheme will be supplemented by Hydro Tasmania and released from the Parangana Dam (~1.5 days of flow above Great Bend) during low flow or cease to take conditions. Parangana dams the River Mersey, with most of water stored in Lake Parangana diverted west through pipelines to the Lemonthyme Power Station, and then into Lake Cethana and the River Forth. To ensure environmental flows (e-flows) in the River Mersey, Hydro Tasmania is required by the Tasmanian Department of Natural Resources and Environment (NRE Tas) to release water through an outlet valve, typically routed through a mini-hydro scheme. The water supplied to the existing SWIS under the Deed of Agreement also flows through this e-flow valve.

Since the infrastructure at Parangana Dam is outdated, including the existing e-flow valve TI is in negotiations to share the costs of redeveloping the dam outlet to supply appropriate flow rates for the full SWISA. The design is still in progress; however, the goal is for TI to have its own outlet pipe, managed by SCADA. This will enable the scheme operator to control the release of the required water volume at the appropriate times to ensure sufficient flow past GBPS when needed. The outlet will be subject to overrides from Hydro Tasmania for safety and maintenance purposes.

2.3.6 Disturbance Areas

Construction works will have both permanent and temporary impacts in the Construction Corridor associated with the loss of habitat. Table 2.2 provides a summary of the disturbance area per infrastructure element, including both permanent and temporary impacts. Table 2.3 provides this breakdown based on vegetation community (see further Section 3.4).

Table 2.2 SWISA construction and commissioning timeline

Construction Corridor element	Impact area (ha)		
	Permanent	Temporary	Total
GBPS	0.35	0.23	0.58
SHBT	0.4545456	0.8888889	1.3333335
SBPS	0.12	0.45	0.5757576
Pipeline	0.10	318.27	318.37
Total	1.0202023	319.8383834	320.85

Table 2.3 Construction impacts based on vegetation types

Vegetation community	Extent in Survey Area (ha)	Extent in Construction Corridor (ha)	Temporary impact (ha)	Permanent impact (ha)
Freshwater aquatic sedgeland and rushland	6.41	0.00	0.00	0.00
Eucalyptus amygdalina coastal forest and woodland	2.52	0.39	0.39	0.00
Eucalyptus amygdalina forest on mudstone	3.73	0.18	0.18	0.00
Eucalyptus obliqua dry forest	23.69	1.31	1.31	0.00
Eucalyptus ovata forest and woodland	4.41	0.03	0.03	0.00
Eucalyptus amygdalina – Eucalyptus obliqua damp sclerophyll forest	22.64	1.11	1.11	0.00
Acacia dealbata forest	1.91	0.23	0.23	0.00
Acacia melanoxylon swamp forest	1.04	0.00	0.00	0.00
Melaleuca ericifolia swamp forest	3.07	0.13	0.13	0.00
Eucalyptus obliqua forest with broad-leaf shrubs	5.10	0.25	0.17	0.06

Vegetation community	Extent in Survey Area (ha)	Extent in Construction Corridor (ha)	Temporary impact (ha)	Permanent impact (ha)
Eucalyptus obliqua forest over *Leptospermum*	0.92	0.11	0.11	0.00
Improved pasture with native tree canopy	22.77	1.55	1.52	0.03
Agricultural land	1,382.93	295.40	294.77	0.64
Permanent easements	0.46	0.41	0.41	0.00
Plantations for silviculture - hardwood	12.68	4.11	4.11	0.00
Plantations for silviculture – softwood	9.12	0.62	0.62	0.00
Regenerating cleared land	1.16	0.06	0.06	0.00
Extra urban miscellaneous	108.83	14.41	14.12	0.29
Urban areas	22.66	0.43	0.43	0.00
Water, sea	28.08	0.12	0.12	0.00
Total	1,664.64	320.85	319.83	1.02

*Yellow cells indicate areas of existing modified land

2.4 Commissioning

The existing SWIS must continue to operate throughout the construction of SWISA. To achieve this, TI intends to install two of the new pumps and VSDs shortly after the end of the 2024/25 irrigation season on to a temporary manifold that will tie-in to the existing scheme. Following the completion of all SWISA pipeline works, the final two pumps and VSDs can be installed, along with the permanent manifold, and cut over to SWISA can commence. Simultaneously, all existing SWIS property outlets will be cut over to SWISA.

Commissioning of SWISA then will occur in several stages. Firstly, the pipeline will be gradually filled to test the integrity of the entire scheme, especially pipe welds, and other joints. If the entire network holds water satisfactorily, then commissioning will progress to flushing, where water is discharged through the scour valves to remove any floc or other solids present in the pipeline which may damage outlets or valves. The pump stations are then tested through their full range of operation (including critical safety functions), and the balance tank is filled and drained under different conditions to test its integrity and function. Following testing of the system at large, each individual property outlet must then be tested and commissioned. The scheme will then be ready to commence delivering water in the subsequent irrigation season.

2.5 Construction and Commissioning Timeframe

The commencement and duration of the construction and commissioning phase is summarized in Table 2.4.

Table 2.4 SWISA construction and commissioning timeline

Construction activity	Planned commencement	Planned completion
GBPS refurbishment	May 2025	August 2027
Construct SBPS	October 2025	August 2027
Construct SHBT	October 2025	August 2027
Install pipework	May 2025	May 2027
Install outlets	October 2025	June 2027
SWIS cutovers	June 2027	October 2027

Construction activity	Planned commencement	Planned completion
Commissioning – pipeline	May 2027	October 2027
Commissioning – GBPS	September 2027	October 2027
Commissioning – SHBT & SBPS	September 2027	October 2027
Commissioning - outlets	October 2027	November 2027

2.6 Operations

After the commissioning of the scheme, control will be transferred to the TI Operations team. Designed to operate for the next century, the scheme will have a 150-day summer water season, running from November to March over approximately 18,000ha. However, replacing General Availability (GA) under SWIS, a winter season is planned to be implemented for SWISA. As a result, many parts of the scheme will function year-round, with a reduced-capacity 215-day winter water season of 7,800ML from April to October pending licence approval.

2.6.1 Parangana Outlet

TI proposes to have day-to-day operational control of the Parangana outlet for water release while all routine and emergency maintenance is proposed to be carried out by Hydro Tasmania due to the outlet's integration with other Hydro Tasmania infrastructure.

2.6.2 Irrigation

Irrigation water will be used by irrigators for various purposes, primarily for filling dams or directly irrigating crops. To manage how and where TI water is utilised, and to monitor its environmental impact, each irrigator must have an approved Farm WAP. Farm WAPs guide the sustainable application of water to ensure the long-term viability of land for agricultural production. Farm WAPs are a condition of Federal and State Government approval for all TI built schemes. The SWISA includes the requirement to have a Farm WAP covering all land and dams that TI water is applied to. The provision of water by TI is contingent upon compliance with the Farm WAP, which is regularly audited by TI Environmental Compliance Officers. Failure to adhere to the terms of the Farm WAP may result in the suspension or revocation of the irrigator’s water entitlement.

The commencement of the first full irrigation season is anticipated to be scheduled between October 2026 and March 2027.

2.6.3 Maintenance

Routine and emergency maintenance will be required periodically to ensure the reliability of the scheme. Emergency maintenance is inherently difficult to predict, however, TI’s experience operating SWIS, and its other schemes around Tasmania, allows a high degree of certainty around the frequency requirements for routine maintenance. The required routine maintenance tasks and their frequencies for each scheme component are detailed in Table 2.5.

Table 2.5 Routine maintenance schedule

Asset	Item	Task	Frequency
Great Bend pump station	Pumps	Lubrication	3 months
	Inlet screen	Inspect and clean	4 months
	Switchboard	Replace filters	6 months
	Pump station	Weed/Vegetation management	6 months
	HVAC	Filter clean	6 months
	SAV	Inspect and test	yearly
	Transformer	Service and oil check	yearly
	Instruments	Inspect, clean, calibrate	yearly
	Pumps	Thrust bearing change	2 years
	HVAC	Service	3 years
	Wet well	Cleanout	8 years
Saggers Hill balance tank	Balance tank	Weed/vegetation management	6 years
	Isolation valves	Function test	yearly
	Instruments	Inspect, clean, calibrate	yearly
	Balance tank	Internal inspection	3 years
	Balance tank	Integrity assessment	10 years
	Balance tank	Internal clean	10 years
Sassafras booster pump station	Pumps	Lubrication	3 years
	Switchboard	Replace filters	6 years
	HVAC	Filter clean	6 years
	Pump station	Weed/vegetation management	6 years
	Isolation valves	Function test	yearly
	Instruments	Inspect, clean, calibrate	yearly
	HVAC	Service	3 years
Distribution network and property outlets	Air valves	Inspect and clean	yearly
	Isolation valves	Function test	yearly
	Flow meter	Inspect and calibrate	yearly
	PO	Inspect and maintain	yearly
	PO	Meter verification	yearly
	Pipeline	Scour line for snails	3 years

3 Description of the Environment

This section describes the existing environment for the Project Area and underpins the specific information assessments relevant to the occurrence and status of MNES.

3.1 Land Tenure and Use

The majority of the Irrigation District is private freehold consisting of grazing (irrigated) modified pastures and/or irrigated cropping lands. This land is used for agricultural activities including meat production, vegetation and cereal cropping, stone fruits, and fodder, as well as dryland grazing. The Irrigation District also encompasses the Warrawee Conservation Area (0.58% of the Irrigation District), Narawntapu National Park (0.77% of the Irrigation District), six smaller reserves and conservation areas (0.87% of the Irrigation District) and areas of private timber plantation. Outside the Irrigation District, land use is predominantly non-forest agricultural land with small patches of remnant native vegetation.

The Warrawee Conservation Area is reserved land under the *National Parks and Reserve Management Act 2002* (Tas), managed by the Tasmanian Parks and Wildlife Service. Project infrastructure within this area includes the GBPS and 850m of proposed pipeline infrastructure and will therefore require approval under the Act.

Within the Irrigation District, there are several townships and localities, including Wesley Vale, Sassafras, Harford, Northdown, Thirlstane, and Pardoe. The Irrigation District is one of the most diverse irrigation areas in the State with high value land and proximity to transportation links. The district is located adjacent to the Port of Devonport and near key air and road freight hubs at Bellfield and East Devonport. Additionally, the Bass Highway, a major transport route, runs through the irrigation district.

The central north region is a popular tourist destination, known for its local produce, historic towns, beaches, coastlines, and limestone caves. Activities for tourists in the area include mountain biking, horse riding, hiking, water sports, and fishing.

3.2 Climate, Topography and Geology

The climate of the SWISA region is characterised by mild summers with a mean maximum summer temperature of 21°C and cool winters with mean minimum winter temperatures of 5°C. The average rainfall in the SWISA region is 905mm per year with highest levels of precipitation occurring between July and August.

The elevation along the pipeline route ranges from 10m to 170m Above Sea Level (ASL), with Saggers Hill and the Sassafras township being the highest points of the proposed alignment.

Mineral Resources Tasmania Geological Polygons 250K data (available from LISTmap[1]) indicates that the geology of the Project Area consists primarily of quaternary gravels and tertiary basalt with a mixture of mudstone, sandstone, and limestone (Table 3.1). Soils in the Project Area are derived from these base materials.

[1] https://www.thelist.tas.gov.au/app/content/home

Table 3.1 Geology (1:250,000 scale) within Project Area

Symbol (Code)*	Description	Extent in Construction Corridor (ha)	Extent in Project Area (ha)
Lt (1496)	Undifferentiated pelitic rocks and quartzite sequences, with greenschist facies metamorphism.	2.52	1,151.58
Ldp (1500)	Strongly faulted sequence of pyritic, carbonaceous and cherty siltstone, chert, greywacke, laminated siltstone, dolomite and basalt (Port Sorell Formation, possible correlate of Success Creek Group).	-	561.17
CO (2996)	Undifferentiated or poorly constrained conglomerate-sandstone sequences of Late Cambrian to Ordovician age.	-	114.29
Os (2999)	Shallow marine sandstone- mudstone +/- conglomerate +/- limestone sequences, typically grey, trace fossils and tubicular burrows in places. Ordovician fossils in places. Includes Moina Sandstone, Pioneer beds, Butler Island Formation.	-	238.42
Ol (3496)	Shallow marine limestone sequence with minor siltstone and sandstone (Gordon Group).	-	20.36
Pl (5988)	Lower glaciomarine sequences of mudstone, pebbly mudstone, pebbly sandstone, minor limestone and tasmanite oil shale.	11.02	4,670.50
Pf (5989)	Freshwater and paralic sandstone and mudstone with some coal measures.	4.45	1,662.27
Pu (5991)	Upper glaciomarine sequences of pebbly mudstone, pebbly sandstone and limestone.	0.87	2,141.51
P (5993)	Undifferentiated Upper Carboniferous-Permian glacial, glaciomarine and non-marine sedimentary rocks.	-	161.84
Jd (6499)	Dolerite (tholeiitic) with locally developed granophyre.	15.93	5,220.24
Tc (7495)	Conglomerate, gravel and grit.	-	403.13
Ts (7497)	Dominantly non-marine sequences of gravel, sand, silt, clay and regolith.	133.34	8,183.50
Tb (7499)	Basalt (tholeiitic to alkalic) and related pyroclastic rocks.	135.55	6,679.09
TQ (8494)	Undifferentiated Cenozoic sediments.	-	940.88
Qps (8496)	Coastal sand and gravel.	0.13	706.98
Qpt (8497)	Talus, vegetated and active.	-	419.13
Qp (8498)	Glacial, periglacial and fluvioglacial sediments including till and interglacial deposits.	-	468.82
Qh (8499)	Sand gravel and mud of alluvial, lacustrine and littoral origin.	19.69	5,278.90

*Codes as per LISTmap

3.3 Hydrology and Aquatic Values

The Project Area occurs within the Mersey and Rubicon river catchments. Water extraction is proposed from the Mersey River only, while the Irrigation District covers both catchments. The Rubicon River drains to the Port Sorell estuary while the Mersey River drains directly to Bass Strait.

The Mersey River drains a significant area of northern central Tasmania, including two large hydro-electric impoundments: Lake Rowallan and Lake Parangana, The Mersey River within the Project Area and downstream is generally free from in-stream structures, with the closest significant structure being the Parangana Dam, located ~85km upstream of the GBPS site. The dam represents an impassable barrier for fish species and therefore represents the upstream limit of movement by aquatic fauna within the river. Downstream of the dam, other major tributaries consist of Lobster Rivulet, Dasher River, and Coilers Creek.

The Rubicon River flows from Red Hills, west of Deloraine and flows to Port Sorell. No water extraction is proposed from the Rubicon, and all smaller waterways in this catchment drain directly to the Port Sorell estuary.

Both river catchments support significant agricultural activities, including grazing, piggeries, dairying, and commercial cropping. Currently, there are 386 water licenses allocated for irrigation or commercial water extraction across both catchments. The SWIS sources water from the Mersey River for provision to the existing SWIS irrigation area.

In the preparation of the design of the SWISA, a review has been undertaken of the aquatic environment associated with SWIS activities. This has included a review of water quality and flow monitoring undertaken (Pinion Advisory, 2023). This review found that existing water quality monitoring has not shown any significant impact from the operation of the SWIS. Additionally, it quantified the utilisation of water associated with existing agricultural activities and related runoff. This indicates that 90% of water is either utilised or evaporated, with the remaining discharging to the environment through runoff. Collectively this represents a 2% increase in uncontrolled water release which is within the natural interannual variability for the area.

General condition of waterways within the Project Area are considered poor, with many smaller streams highly modified in agricultural land, and weed species present in place of native riparian vegetation in others. Additionally, there are no Ramsar wetlands present within the Project Area.

3.4 Broader Terrestrial Vegetation

Terrestrial vegetation across the Project Area has predominantly been cleared to provide for modified pasture, cropping land and forestry activities. Remnants of native forest are present across the Project Area with intermixed introduced species.

A total of 75.44ha of native vegetation is present within the 1,664.64ha Survey Area (i.e. the area surveyed in connection with proposed construction and clearing activities), as well as 1,589.20ha on non-native, modified land, and water. Field studies across the Survey Area (NBES, 2025) reported a total of 172 flora species, including 46 introduced species (seven species declared under the Tasmanian *Biosecurity Act 2019*). Threatened flora species identified are described in Section 4.2.1.

Native vegetation communities observed in the Survey Area are summarised in Table 3.2.

Table 3.2 Summary of observed native community types.

Community type	Description	Extent	
		Survey Area (ha)	Construction Corridor (ha)
Freshwater aquatic sedgeland and rushland	Established in isolated patches within large waterbodies. *Eleocharis sphacelata* is typically the dominant species, forming dense mats that cover nearly 100% of the vegetated area in wetland zones. The community composition includes a mix of native and non-native species.	6.41	0.00
Eucalyptus amygdalina coastal forest and woodland	Established in remnant patches adjacent to Woodbury Lane and Frankford Roads. The recorded patches are atypical of *Eucalyptus amygdalina* coastal forest and woodland, with low diversity among legume, heath, and shrub families observed.	2.52	0.39
Eucalyptus amygdalina forest on mudstone	Established perpendicular to Abey's Road on dry slopes. *Eucalyptus amygdalina* dominants the community with a poor present of other species recorded.	3.73	0.18
Eucalyptus obliqua dry forest	Established on land between GBPS and the proposed Saggers Hill balance tank site. Smaller patches occur along the Creeley's Road extension. This is the most extensive native forest community observed.	23.69	1.31
Eucalyptus ovata forest and woodland	Established across eight remnant patches associated with modified vegetation, either cleared land for paddock/crops or paddock trees over pasture grasses. Farm paddocks with associated patches subjected to grazing pressure have a modified understory structure and reduced diversity of characteristic species. These areas are dominated by a higher proportion of pasture grass ground cover and show increased weed presence.	4.41	0.03
Eucalyptus amygdalina - Eucalyptus obliqua damp *sclerophyll* forest	Established communities were observed in five separate locations and three remnant communities in the western extent of Project Area. This forest type is a feature of the central north, particularly in the Frankford region.	22.64	1.11
Acacia dealbata forest (NAD)	Established across three separate vegetation communities on the margins of larger forest patches. The canopy is dominated by NAD while the understorey typically represents adjacent forest communities.	1.91	0.23
Acacia melanoxylon swamp forest (NAF)	Established in three highly localised and isolated patches on the headwaters of minor waterways. The community was dominated by a canopy of NAF, with *Melaleuca squarrosa* forming the tallest understorey tree	1.04	0.00
Melaleuca ericifolia swamp forest (NME)	Established only in small remnants and regrowth patches, typically found along drainage ditches and poorly drained areas. Historically, NME were more extensive in the broader region historically, particularly in the northern parts of the Project Area, where land has since been altered for agricultural use.	3.07	0.13
Eucalyptus obliqua forest with broad-leaf shrubs	Established from the GBPS to the proposed Saggers Hill balance tank site mong on damp gullies and lower slopes. In gullies where the canopy and tall shrub layer is dense, the ground layer is a sparse layer while, on the lower slopes within the Warrawee Conservation Area the ground layer is denser.	5.10	0.25
Eucalyptus obliqua forest over Leptospermum	Established from the Great Bend and the proposed Saggers Hill balance tank site. This is an area of regrowth where previously there was a land use history of forest production. Regrowth is predominantly a sparse mixed *Eucalyptus obliqua* and *Melaleuca squarrosa* canopy with a denser *Gahnia grandis* and *Gleichenia microphylla* undergrowth.	0.92	0.11

4 Matters of National Environmental Significance

4.1 Overview and Survey Effort

This section provides an overview of the relevant MNES across the Project Area. These are based on species and community-specific assessments and targeted surveys to characterise the potential presence, status, and extent of relevant listed threatened species within the Project Area. Three sets of surveys were undertaken:

- Surveys within the Survey Area by North Barker Ecosystem Services (NBES, 2025) targeting terrestrial flora and fauna and burrowing crayfish.
- Surveys of priority waterways in the Survey Area for Australian grayling, undertaken by Elgin (2025). This focused on operational impacts and waterways in the Construction Corridor which are likely to experience trenching for pipeline construction and supported relevant habitat features for the grayling.
- Surveys of denning habitats [redacted] by Enviro-Dynamics (2024), including acoustic monitoring undertaken by Tarkarri Engineering.

Table 4.1 provides the surveys undertaken per MNES feature and how these were undertaken to meet the relevant State and Commonwealth survey guidelines.

These assessments also built on the relevant profiles for matters published on the Species Profile and Threats Database (SPRAT), as cited in the technical reports, together with relevant listing advice for the matters. Reference to relevant threat abatement plans and recovery plans for each is made, as relevant, in Sections 5.3 and 7 regarding the impact assessment.

Further details for each of these matters are provided in Sections 4.2 and 4.3.

Table 4.1 MNES survey compliance against relevant guideline requirements

MNES	Survey coverage	Guideline	Compliance with guideline
Tailed spider orchid	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify threatened flora 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify threatened flora 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify threatened flora 28/8/24 – general walkthrough of (realigned) Survey Area to identify threatened flora	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species included collection of location, number and condition of individuals/potential habitat and spatial context. If threatened flora were observed during field surveys, the location, population size, age structure (including evidence of recruitment), condition (including potential threats) and distinguishing features of the species (i.e. evidence of hybridisation) were recorded.
	1/11/22 – targeted survey in vicinity of Devil Road 16/11/22 – targeted survey in vicinity of Devil Road 6/11/23 to 8/11/23 – targeted survey in vicinity of Devil Road	Commonwealth Government (2013). Survey guideline for Australia's threatened orchids: guidelines for detecting orchids listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth Government, Canberra	Yes—This is consistent with the guidelines that recommend: • appropriate qualifications and field experience with threatened orchid species • desktop assessment to identify species that are likely to or may occur in the study area • identify and complete survey during optimal flowering period • identify and complete survey at optimal locations where the threatened orchid species is known to, or may support orchid population, orchid microhabitats and within potential orchid habitats • complete appropriate survey design (replicating sampling, search efforts within the habitat and if time permissible potential unsuitable habitat)
Robust fingers	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify threatened flora 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify threatened flora 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify threatened flora 28/8/24 – general walkthrough of (realigned) Survey Area to identify threatened flora	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species included collection of location, number and condition of individuals/potential habitat and spatial context. If threatened flora were

MNES	Survey coverage	Guideline	Compliance with guideline
			observed during field surveys, the location, population size, age structure (including evidence of recruitment), condition (including potential threats) and distinguishing features of the species (i.e. evidence of hybridisation) were recorded.
	1/11/22 – targeted survey in vicinity of Devil Road 16/11/22 – targeted survey in vicinity of Devil Road 6/11/23 to 8/11/23 – targeted survey in vicinity of Devil Road	Commonwealth Government (2013). Survey guideline for Australia's threatened orchids: guidelines for detecting orchids listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999, Commonwealth Government, Canberra	Yes—This is consistent with the guidelines that recommend: • appropriate qualifications and field experience with threatened orchid species • desktop assessment to identify species that are likely to or may occur in the study area • identify and complete survey during optimal flowering period • identify and complete survey at optimal locations where the threatened orchid species is known to, or may support orchid population, orchid microhabitats and within potential orchid habitats • complete appropriate survey design (replicating sampling, search efforts within the habitat and if time permissible potential unsuitable habitat)
Wrinkled cassinia/wrinkled dollybush	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify threatened flora 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify threatened flora 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify threatened flora 28/8/24 – general walkthrough of (realigned) Survey Area to identify threatened flora	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species included collection of location, number and condition of individuals/potential habitat and spatial context. If threatened flora were observed during field surveys, the location, population size, age structure (including evidence of recruitment), condition (including potential threats) and distinguishing features of the species (i.e. evidence of hybridisation) were recorded.
		Department of Primary Industries, Parks, Water & Environment, *Cassinia rugata wrinkled dollybush: Tasmanian Threatened Species Listing Statement*, State of Tasmania, Hobart, citing Carter, O. & Walsh, N. (2006). National Recovery Plan for the Wrinkled Cassinia *Cassinia rugata*.	Yes—This is consistent with the listing advice and the National Recovery Plan for Wrinkled dollybush as detailed desktop and field surveys were completed including the identification of the area and extent of populations, estimates of the number size and structure of the population and estimation of population chance. Field surveys were completed during optimal flowering period of

MNES	Survey coverage	Guideline	Compliance with guideline
		Department of Sustainability and Environment, Melbourne.	February to April in known or potential habitat using ecological and bioclimatic habitat preferences.
Eastern quoll	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use (i.e. tracks or scat) and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
	4/12/23 to 5/3/24 camera trapping survey across Survey Area	Department of Sustainability, Environment, Water, Population & Communities (2011), *Survey guidelines for Australia's threatened mammals - Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia, Canberra. Environment Strategic Business Unit (2023), *Survey Guidelines and Management Advice for Development Proposals that may impact the Tasmanian Devil (Sarcophilus harrisii)*, State of Tasmania, Hobart.	Yes—This is consistent with *Table 6: Large sized ground dwelling mammals listed on the EPBC Act* (DCCEEW, 2011) that recommend a desktop assessment with appropriate diurnal surveys for habitat resources and signs of mammal activity. Recommendations of a minimum of day-time search effort of two hours for every 1ha survey site of a stratified sampling program was exceeded. Preliminary remote camera surveys were conducted in areas of high habitat suitability in alignment with recommended survey methods. A secondary remote camera survey was implemented throughout the project region targeting both areas within the Survey Area and suitable habitat within the greater region. Cameras were deployed for a minimum of 14 nights (10 camera per hectare), consistent with appropriate guidelines.
Spotted-tail quoll	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number

MNES	Survey coverage	Guideline	Compliance with guideline
	28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat		and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use (i.e. tracks or scat) and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
Tasmanian devil	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use (i.e. tracks or scat) and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
	23/9/24 to 1/10/24 – targeted devil camera trapping survey [redacted] 11/10/24 to 4/11/24 – targeted devil camera trapping survey [redacted] 1/10/24 to 7/10/24 – targeted devil camera trapping survey [redacted]	Department of Sustainability, Environment, Water, Population & Communities (2011), *Survey guidelines for Australia's threatened mammals - Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia, Canberra. Environment Strategic Business Unit (2023), *Survey Guidelines and Management Advice for Development Proposals that may impact the Tasmanian Devil (Sarcophilus harrisii)*, State of Tasmania, Hobart. Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with appropriate guidelines (*Table 6: Large sized ground dwelling mammals listed on the EPBC Act* (DCCEEW, 2011) and Environment Strategic Business Case Unit (2023)) that recommend a desktop assessment, ground truthing surveys (diurnal surveys) for habitat resources (i.e. dens) and signs of mammal activity. Recommendations of a minimum of day-time search effort of two hours for every 1ha survey site of a stratified sampling program was exceeded. Preliminary remote camera surveys were conducted in areas of high habitat suitability in alignment with recommended survey methods. A secondary remote camera survey was implemented throughout the project region targeting both areas within the Survey Area and suitable habitat within the greater region. Cameras were

MNES	Survey coverage	Guideline	Compliance with guideline
			deployed for a minimum of 14 nights (10 camera per hectare), consistent with appropriate guidelines. In accordance with the Tasmanian devil survey guidelines, (Environment Strategic Business Case Unit (2023) a traffic impact assessment, roadkill assessment and roadkill mitigation plan was completed.
Eastern barred bandicoot	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use (i.e. tracks or scat) and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
Swift parrot	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use (i.e. tracks or scat) and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.

MNES	Survey coverage	Guideline	Compliance with guideline
	4/12/23 to 8/12/23 – targeted habitat tree assessment across Survey Area	Forest Practices Authority (2014c). *Identifying swift parrot breeding habitat*, Fauna Technical Note No. 3, Forest Practices Authority, Hobart, Tasmania. Department of the Environment, Water, Heritage & the Arts (2010). *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population & Communities, Canberra, Australian Capital Territory.	Yes—This is consistent with the guidelines that recommend a desktop assessment including mapping information on foraging and mature habitat availability (Forest Practices Authority, 2014c) and baseline field survey that records potential habitat (i.e., potential hollow bearing trees in native forest vegetation and native paddock trees) and potential foraging habitat. Surveys specifically targeting habitat use (i.e. potential nesting and breeding habitat) were not conducted as these have been prioritized for avoidance and mitigation. Thus, survey methodologies for detection including sighting or calls (DEWHA, 2010) were not implemented. Field surveys were conducted within the recommended survey season from August to February (DEWHA, 2010).
Tasmanian masked owl	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use (i.e. tracks or scat) and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
	4/12/23 to 8/12/23 – targeted habitat tree assessment across Survey Area	Forest Practices Authority (2014), *Identifying masked owl habitat*, Fauna Technical Note No. 17, State of Tasmania, Hobart. Department of the Environment, Water, Heritage & the Arts (2010). *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population & Communities, Canberra, Australian Capital Territory.	Yes—This is consistent with the guidelines that recommend a desktop assessment including mapping information on foraging and mature habitat availability (Forest Practices Authority, 2014c) and baseline field survey that records potential habitat (i.e. recording and examining potential hollow bearing trees in native forest vegetation and native paddock trees) and potential foraging habitat. Surveys specifically targeting habitat use (i.e. potential nesting and breeding habitat) was conducted in

MNES	Survey coverage	Guideline	Compliance with guideline
			conjunction with habitat suitability modelling to determine estimation of mature habitat availability.
	17/12/23 to 19/12/23 – call back surveys across Survey Area	Department of Environment, Water, Heritage & the Arts (2010), *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia, Canberra.	Yes—This is consistent with the guidelines recommended. While the Tasmanian masked owl is not included in DEWHA, 2010, it is recommended on Species Profile and Threats Database that survey methodologies for the northern Australian subspecies (*T. n. kimberli*) may be relevant. Thus, call-back surveys were completed across an entire year, consistent with the limited effect of season on owl calling/responses.
Tasmanian wedge-tailed eagle	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
	9/2/23 to 10/2/23 – aerial eagle nest search of Survey Area and 1.5km adjoining buffer area	Forest Practices Authority (2014). *Wedge-tailed eagle nesting habitat model*, Fauna Technical Note No. 6, Forest Practices Authority, State of Tasmania, Hobart. Forest Practices Authority (2023), *Eagle nest searching, activity checking and nest management,* Fauna Technical Note No. 1, Forest Practices Authority, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend an initial desktop assessment against the Forest Practice Authority (2014) eagle habitat model and nest surveys (aerial searches) transecting the whole area (Survey Area and buffer) capturing more areas than what the eagle habitat model established. If a nest was located, minimal hovering near the canopy was conducted with photographs and GPS location recorded.
Blue-winged parrot	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-

MNES	Survey coverage	Guideline	Compliance with guideline
	15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat		truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
	4/12/23 to 8/12/23 – targeted habitat tree assessment across Survey Area	Department of the Environment, Water, Heritage & the Arts (2010). *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population & Communities, Canberra, Australian Capital Territory.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence and baseline field survey that records potential habitat (i.e. recording and examining potential hollow bearing trees in native forest vegetation and native paddock trees) and potential foraging habitat. Surveys specifically targeting habitat use (i.e. potential nesting and breeding habitat) were not conducted as these have been prioritized for avoidance and mitigation. Thus, survey methodologies for detection including sighting or calls (DEWHA, 2010) were not implemented.
Australian grayling	23/10/24 to 21/11/24 – electrofishing of priority waterway sites in Survey Area	Department of Sustainability, Environment, Water, Population and Communities (2011), *Survey guidelines for Australia's threatened fish: Guidelines for detecting fish listed as threatened under the EPBC Act*, Commonwealth of Australia, Canberra.	Yes – This is consistent with the general guideline steps of identifying optimal survey locations (through prioritisation of likely habitat areas), and with specific guidance for Group 3: Small south-eastern Australian freshwater fishes, including survey by backpack electrofishing.
Central north burrowing crayfish	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance

MNES	Survey coverage	Guideline	Compliance with guideline
			and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
	20/5/24 to 24/5/24 – targeted survey across Survey Area	Department of State Growth (2014), *A guide to managing threatened burrowing crayfish in the Department of State Growth road reserves*, State of Tasmania, Hobart. Department of Sustainability, Environment, Water, Population & Communities (2011), *Draft referral guidelines for four Tasmanian burrowing crayfish*, Commonwealth of Australia, Canberra.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence and potential habitat. Opportunistic observations of potential habitat were recorded during all field surveys. Targeted field surveys guidelines to determine presence include searching potential habitat (i.e. chimneys, pellets, or burrow entrances) during the autumn season exceeded the recommended search effort (60 minutes/10,000m^2). Description of key factors for potential habitat including proximity to and presence of surface water source, vegetation level and type of disturbance were recorded.
Green and gold frog	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify habitat 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify habitat 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify habitat 28/8/24 – general walkthrough of (realigned) Survey Area to identify habitat	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. For threatened fauna observations, the location (with GPS coordinates), extent and condition of known/potential habitat, sightings of habitat use and photos to depict spatial context were recorded. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted versus retained.
	4/12/23 to 8/12/23 – targeted survey across Survey Area 17/12/23 to 21/123 – targeted survey across Survey Area 8/1/24 to 12/1/24 – targeted survey across Survey Area 4/12/23 to 18/1/24 – targeted frog survey-song meter audio survey across Survey Area	Department of the Environment, Water, Heritage & the Arts (2010), *Survey guidelines for Australia's threatened frogs: Guidelines for detecting frogs listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth of Australia, Canberra. Department of State Growth (2015), *Green and Golden Frog (Litoria raniformis) Management Guidelines*, report prepared by GHD, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment to determine habitat distribution and suitability. Preliminary field surveys included identifying potential habitats. Targeted field surveys were conducted in alignment with appropriate guidelines including ground and audio surveys. Ground surveys (up to six times visit at each site) were conducted during breeding season (summer), day (three times visited) and night (three times visited) time under warm and windless conditions. Audio surveys (passive acoustic

MNES	Survey coverage	Guideline	Compliance with guideline
			monitoring) were conducted concurrently, within close proximity to suitable habitats.
Tasmanian forests and woodlands dominated by black gum or Brookers gum	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify vegetation communities 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify vegetation communities 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify vegetation communities 28/8/24 – general walkthrough of (realigned) Survey Area to identify vegetation communities	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted vs retained.
	17/5/23 to 19/5/23 – assess patch quality	Department of the Environment & Energy (2019), *Approved Conservation Advice (incorporating listing advice) - Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (Eucalyptus ovata / E. brookeriana)*, Commonwealth of Australia, Canberra.	Yes—This is consistent with the guidelines that recommend TASVEG mapping database searches and stratified field surveys. Flora patches were assessed against conditional threshold criteria set out in Section 2.3 of corresponding guidelines (Department of Environment & Energy, 2019).
Tasmanian white gum wet forest	14/2/23 to 17/2/23 – general walkthrough of (original) Survey Area to identify vegetation communities 17/5/23 to 19/5/23 – general walkthrough of (realigned) Survey Area to identify vegetation communities 15/4/24 to 16/4/24 – general walkthrough of (realigned) Survey Area to identify vegetation communities 28/8/24 – general walkthrough of (realigned) Survey Area to identify vegetation communities	Department of Primary Industries, Parks, Water & Environment (2019), *Guidelines for Natural Values Surveys - Terrestrial Development Proposals*, State of Tasmania, Hobart.	Yes—This is consistent with the guidelines that recommend a desktop assessment for species occurrence with an associated natural values assessment (using buffers of 500m and 5km around potential direct/indirect impact areas). Field surveys were undertaken to ground-truth the findings of the desktop assessment. The field survey for threatened species collected location, number and condition of individuals/potential habitat and spatial context. Based on the findings, consideration was given to potential avoidance and mitigation actions to minimise impact on threatened fauna, including the proportion of the identified fauna values that would be impacted vs retained.

4.2 Listed Threatened and Migratory Species

The following assessments present the findings of desktop and survey work to confirm the presence or absence of listed threatened and migratory species in the Project Area.

Note that surveys were conducted only in the Survey Area (i.e. Construction Project Area) while desktop assessments were undertaken for the entire Project Area (i.e.an area buffered 5km either side of the Construction Corridor, excluding entirely aquatic areas (i.e. Bass Strait) but including estuarine areas such as Port Sorrell).The survey findings presented in the below tables, therefore, relate only to the works within the Survey Area. Mapping has been provided for each species indicating the combination of findings from desktop assessments (whole of Project Area) and surveys (Survey Area only).

4.2.1 Flora

Three EPBC listed flora were identified as potentially occurring in the Project Area (Table 4.2). For all three flora species, no individuals were recorded within the Survey Area. However, habitat for the species is expected to occur within the Survey Area and across the balance of the Project Area. Additionally, historical records indicate the presence of species within the broader Project Area which could be affected by operational activities.

Table 4.2 EPBC listed flora species potentially occurring within the Project Area

Common Name	Species Name	EPBC Act Status	Type of presence	Likelihood of occurrence	
				Survey Area	Irrigation District
Tailed spider orchid	*Caladenia caudata*	Vulnerable	Species or species habitat may occur within area	**Potential to occur**	**Likely to occur**
Robust fingers	*Caladenia tonellii*	Critically Endangered	Species or species habitat known to occur within area	**Potential to occur**	**Likely to occur**
Wrinkled cassinia / wrinkled dollybush	*Cassinia rugata*	Vulnerable	Species or species habitat known to occur within area	**Not likely to occur**	**Likely to occur**

Tailed spider orchid (*Caladenia caudata*)

Table 4.3 provides an overview of habitat requirements and expected presence of the tailed spider orchid in the Survey Area and broader Project Area while Figure 4.1 depicts known occurrences. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.3 Summary of habitat requirements and site presence: Tailed spider orchid

Feature	Assessment
POTENTIAL TO OCCUR IN CONSTRUCTION PROJECT AREA / LIKELY TO OCCUR IN IRRIGATION DISTRICT	
Habitat values	*Caladenia caudata* is often found on sunny, north-facing, highly insulated sites. Habitat critical to the species survival is defined as specific areas within and beyond a species' current distribution range containing biological and ecological characteristics essential to the continued existence of the species. However, this was not specifically defined for this species.
Population parameters	*Caladenia caudata* is represented by over 40 subpopulations, with limited information available on the size of most subpopulations. It is thought that the total population of this species in less than 10,000. The extent of occurrence is estimated to be about 34,800km^2, however the total area occupied by this species is unlikely to be greater than 6km^2 (a probable overestimate which is heavily weighted by the two largest subpopulations). Most subpopulations occupy less than 0.05km^2. There are five priority subpopulations considered critical to the survival of the species and are therefore considered important populations. The nearest important population is located at the Henry Somerset Reserve (~1.4 km west of the GBPS), which is not at risk of any construction or operational impacts.
Distribution and site significance	According to the natural values assessment data, there are two observation records attributed to within 500m of the Construction Corridor (last recorded 1975) and a further 37 within 5km, the most recent being in 2022. Within the broader area this species is known primarily from the Henry Somerset Reserve on Railton Road but there are also older sightings from the Warrawee Conservation Area, Harford, Latrobe, and Hawley Beach. The Survey Area contains only marginal habitat for this species. Pockets of dry forest are present within the Survey Area; however, they are largely isolated remnants and are disjunct from known habitat areas.
Survey findings	A targeted search for *Caladenia caudata* was undertaken at peak flowering time for these species in November 2022 and November 2023. The surveys included all potentially suitable habitat of dry forest within and adjacent to the Survey Area between the Mersey River and the Bass Highway, particularly targeting previously known records (and surrounds). On this basis, the survey provided a high degree of confidence regarding the distribution and density of this species in the Survey Area. No evidence of *Caladenia caudata* was detected from any of the targeted areas within the Survey Area.
Habitat presence in Survey Area	Both the desktop assessment and ground truthing surveys indicated that *Caladenia caudata* habitat is not supported in the Survey Area. However, as a conservative measure, all mapped potential habitat for *Caladenia tonellii* (Table 4.4, Figure 4.3) is assumed to also be potential habitat for *Caladenia caudata*. This consists of 0.45ha of optimal habitat and an additional 3.86ha of habitat buffering this. This additional buffer area is unlikely to support orchids but is noted as potential/buffer habitat for the purposes of managing impacts to optimal habitat.

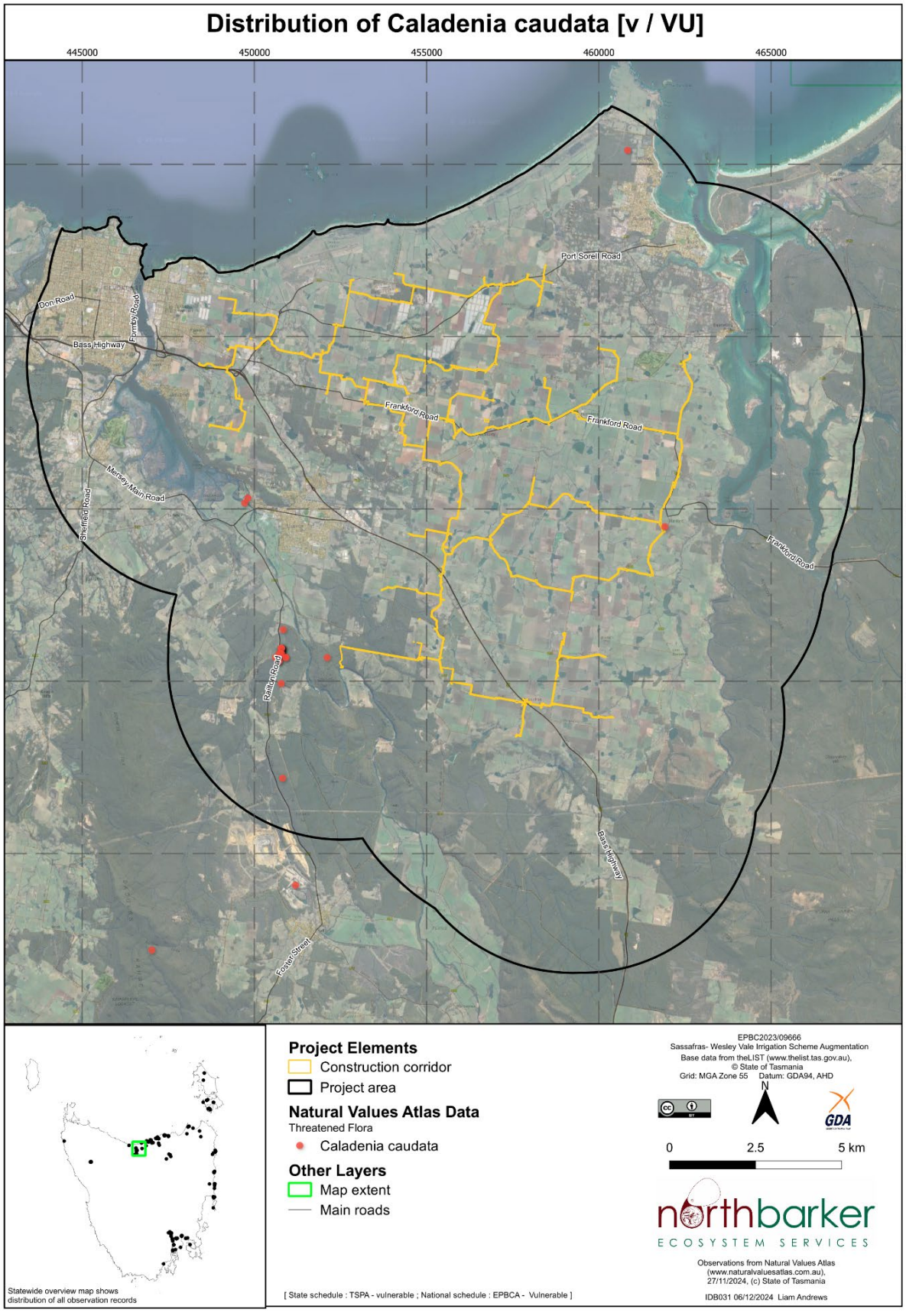

Figure 4.1 Distribution of tailed spider orchid (*Caladenia caudata*) (NBES, 2025)

Robust fingers (*Caladenia tonellii*)

Table 4.4 provides an overview of habitat requirements and expected presence of the robust fingers in the Survey Area and broader Project Area while Figure 4.2 depicts known occurrences. Potential habitat for the species has been adjacent to the Warrawee Conservation Area and is shown in Figure 4.3. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.4 Summary of habitat requirements and site presence: Robust fingers

Features	Assessment
POTENTIAL TO OCCUR IN CONSTRUCTION PROJECT AREA / LIKELY TO OCCUR IN IRRIGATION DISTRICT	
Habitat values	Habitat includes *Eucalyptus amygdalina* dominated forest with a shrubby understorey on shallow clay loam and shallow gravelly loam over clay; topography varies from flats to slopes up to about 80 m elevation. As this species is listed as critically endangered, all subpopulations are considered critical to the survival of the species. The nearest important population is located at the Warrawee Conservation Area (~140m east of the Devil Road alignment near the GBPS).
Population parameters	The total population is probably less than 250 mature individuals with most sites represented by very low numbers, although the subpopulation in the Henry Somerset Reserve may support around 100 plants.
Distribution and site significance	There are 22 observation records on the natural values assessment attributed to within 500 m of the Construction Corridor (last recorded in 2022) and a further 42 within 5 km, the most recent being in 2023. This species is known primarily from the Henry Somerset Reserve on Railton Road but has also recently been confirmed from the Devil Road-Old Deloraine Road area, including from within the existing SWIS pipeline corridor. Pipeline alignments were moved to avoid known locations of this species.
Survey findings	A targeted search for *Caladenia tonellii* was undertaken during the peak flowering time for these species in November 2022 and November 2023. The survey included all areas of potentially suitable habitat within and adjacent to the Survey Area between the Mersey River and the Bass Highway, particularly targeting the previously known records. Several *Caladenia tonellii* plants were recorded around the existing SWIS pipeline. Plants were recorded in the same area in 2021. As a result of these findings the proposed SWISA pipeline alignment has been situated away from the *Caladenia tonellii* population (and thus the existing pipeline), to be adjacent to Devil Road. The closest past record of *Caladenia tonellii* (recorded in 2006) is attributed to 20m from the edge of the proposed Construction Corridor, albeit with spatial inaccuracy of 100m, which could mean the earlier occurrence was in the Construction Corridor – nonetheless, this area (and spatial radius) was included in the targeted search and not found to support any plants. *Caladenia tonellii* was identified at the known site during both surveys but was not observed outside of that site despite the presence of suitable habitat. On this basis it is concluded that the extent of possible distribution had been reasonably determined and that the species is not likely to occur in the realigned section adjacent to Devil Road.
Habitat presence in Survey Area	While the desktop assessment indicates potential habitat across the Survey Area, based on actual records combined with expert opinion from an orchid specialist, the only area in the Survey Area identified as providing potential habitat for the species is the area adjacent to Warrawee Conservation Area (near the Devil Road alignment near the GBPS). While no *Caladenia tonellii* was identified in this area during surveys, it is conservatively still assumed to be potential orchid habitat. This consists of 0.45ha of optimal habitat and an additional 3.86ha of buffering habitat. This additional buffer area is unlikely to support orchids but is noted as potential/buffer habitat for the purposes of managing impacts to optimal habitat.

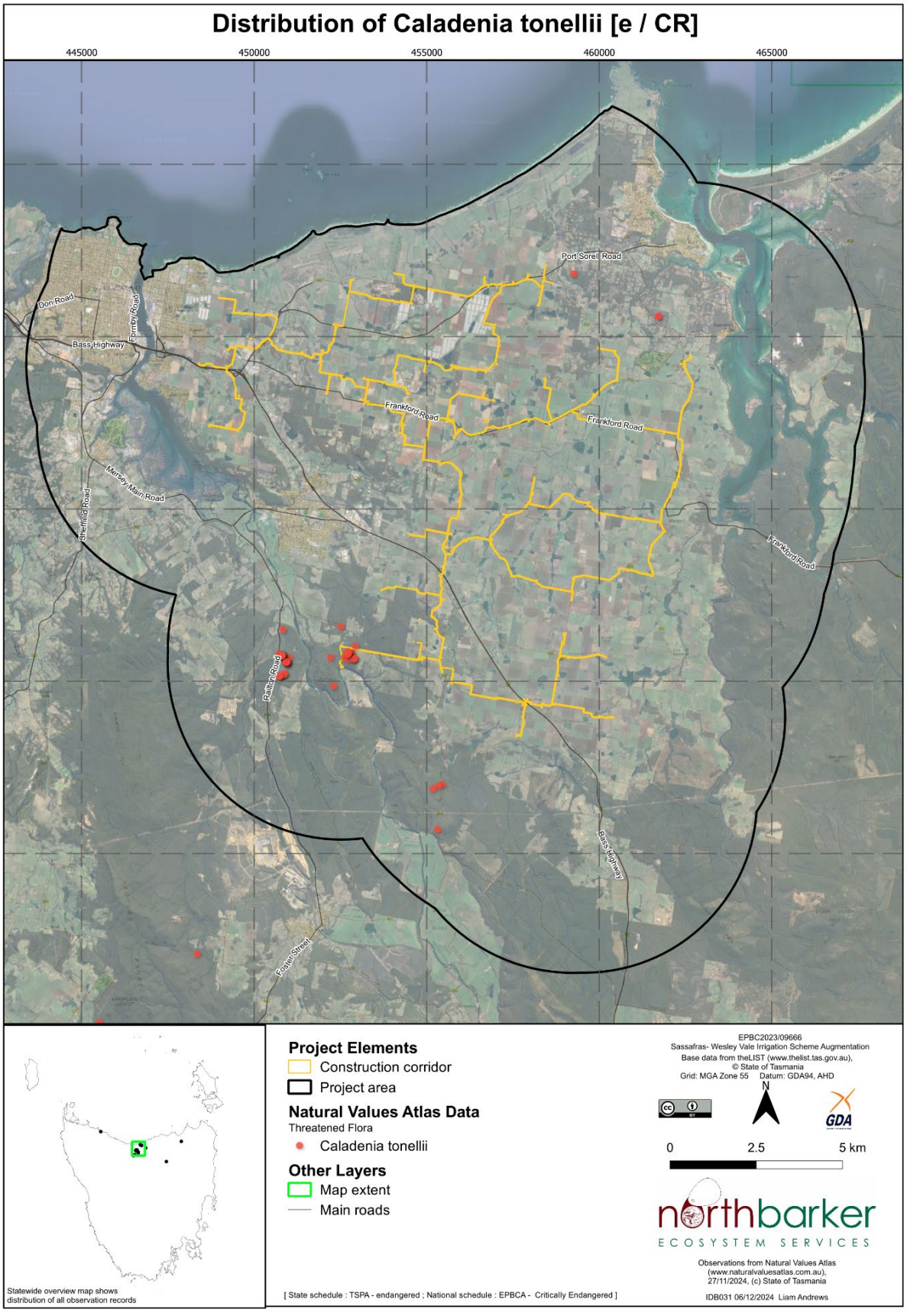

Figure 4.2 Distribution of robust fingers (*Caladenia tonellii*) (NBES, 2025)

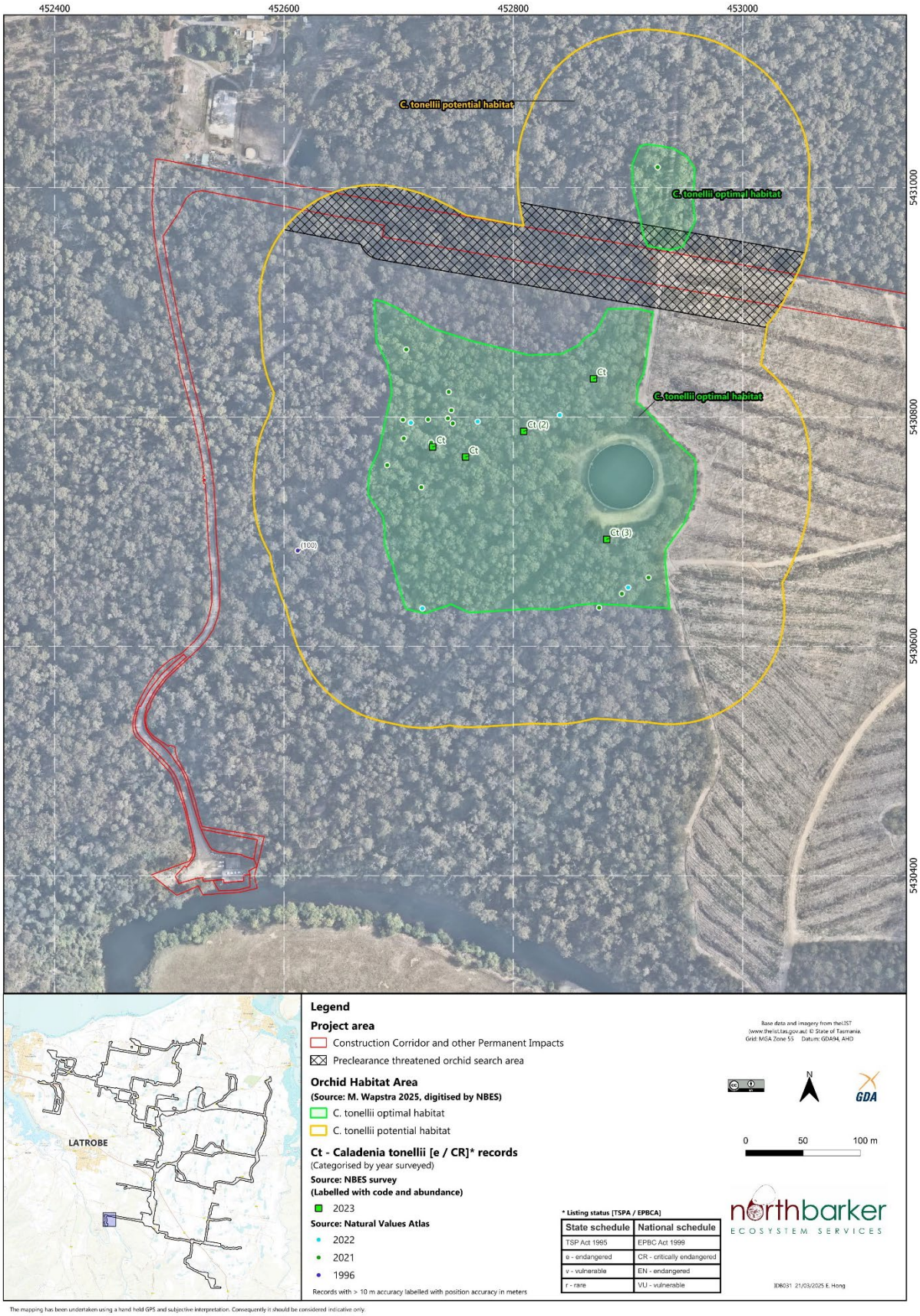

Figure 4.3 Potential habitat for robust fingers (*Caladenia tonellii*) and assumed potential habitat for tailed spider orchid (*Caladenia caudata*) within the Survey Area (NBES, 2025)

Wrinkled dollybush (*Cassinia rugata*)

Table 4.5 provides an overview of habitat requirements and expected presence of the wrinkled dollybush in the Survey Area and broader Project Area while Figure 4.4 depicts known occurrences. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.5 Summary of habitat requirements and site presence: Wrinkled dollybush

Features	Assessment
UNLIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA / LIKELY TO OCCUR IN IRRIGATION DISTRICT	
Habitat values	In mainland subpopulations, *Cassinia rugata* is found in damp, low open forest or dense heathy scrub and is restricted to near coastal areas. The Tasmanian subpopulation is found in open sedgy and/or shrubby wetlands associated with *Themeda triandra*, rarely with over-topping shrubs or trees.
Population parameters	The Tasmanian subpopulation was discovered in 2010 on a remnant wetland that was purchased in 2003 to conserve its natural values. Approximately 300 plants were recorded on this property. Informal searches in the broader area identified a further six patches, supporting very small numbers. The linear extent of the subpopulation is approximately 1.3 km, and the extent of occurrence is estimated at less than 10 ha. The area of occupancy therefore is located within this extent of occurrence, covering an area of approximately 0.35 ha.
Distribution and site significance	The species has 22 observation records on the natural values assessment attributed to within 500m of the Construction Corridor (last recorded 2014) and a further 715 records within 5km, the most recent being in 2020, at the Rubicon Sanctuary. No records are associated with the current Construction Corridor.
Survey findings	Drive-through examinations by ECOtas in 2022 noted that road and property maintenance activities have largely eliminated the species from the strip of land between fence lines and the sealed road edge at previously known sites along road verges. Examination of topographic maps and aerial imagery, combined with the drive-through assessment, suggests limited potential habitat for the species will be present. This was confirmed by NBES during surveys in February 2023 which noted limited potential habitat for the species is present within the alignment, and which did not to detect any individuals within areas of native vegetation in the Survey Area. On this basis, there is a high level of confidence that the Survey Area does not support this species.
Habitat presence in Survey Area	The community is not expected to occur in the Survey Area.

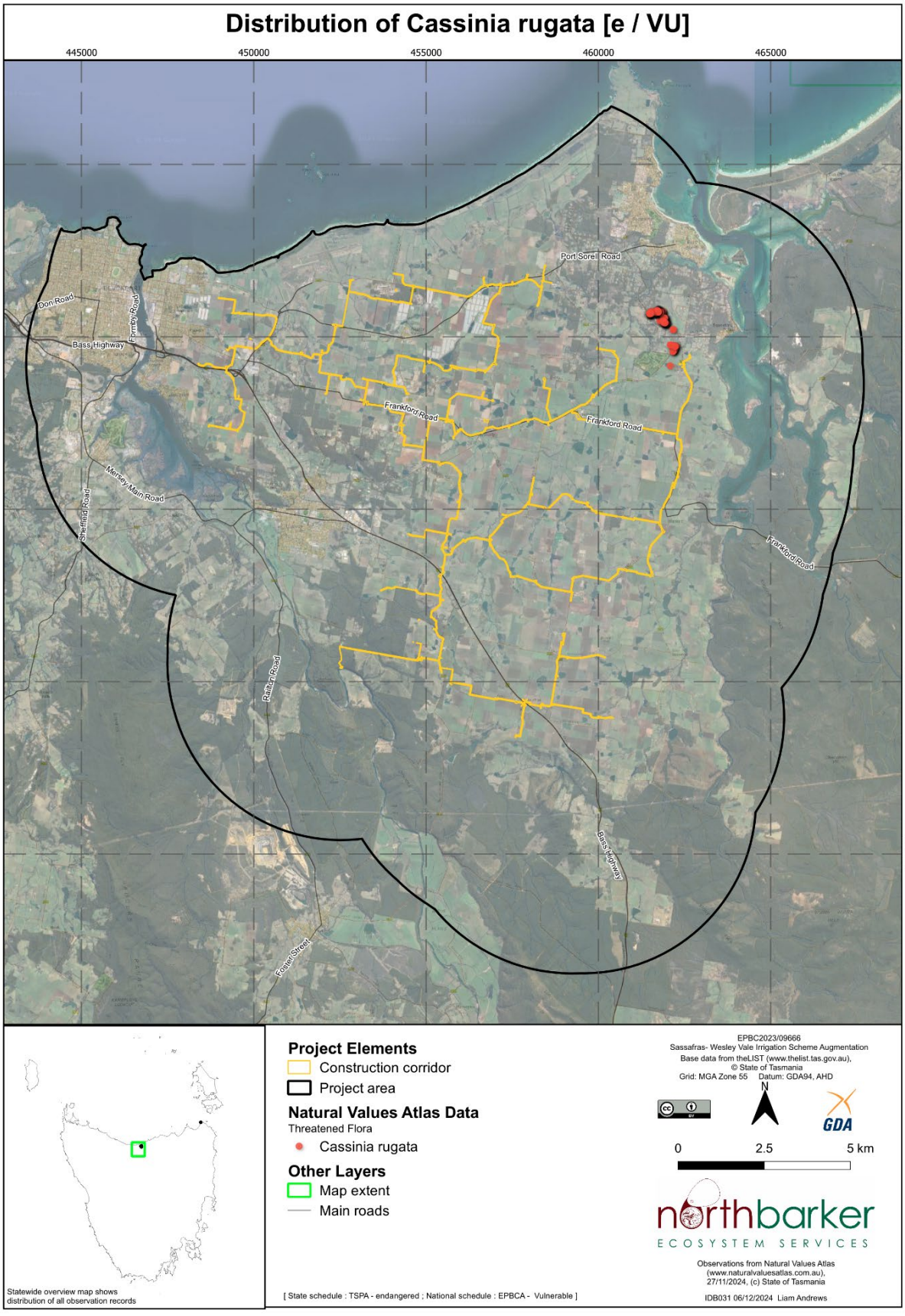

Figure 4.4 Distribution of wrinkled dollybush (*Cassinia rugata*) (NBES, 2025)

4.2.2 Fauna

Eleven EBPC Act listed fauna were identified as potentially occurring within the Project Area (Table 4.6).

Table 4.6 EPBC Listed fauna potentially occurring within the Project Area

Common Name	Species Name	Class	EPBC Status	Type of presence	Likelihood of occurrence
Eastern quoll	*Dasyurus viverrinus*	Mammal	Endangered	Species or species habitat may occur within area	**Potential to occur**
Spotted-tail quoll	*Dasyurus maculatus maculatus*	Mammal	Vulnerable	Species or species habitat likely to occur within area	**Likely to occur**
Tasmanian devil	*Sarcophilus harrisii*	Mammal	Endangered	Species or species habitat likely to occur within area	**Likely to occur**
Eastern barred bandicoot	*Perameles gunnii gunnii*	Mammal	Vulnerable	Species or species habitat likely to occur within habitat	**Potential to occur**
Swift parrot	*Lathamus discolor*	Bird	Critically endangered	Breeding likely to occur within area	**Potential to occur**
Tasmanian masked owl	*Tyto novaehollandiae castanops*	Bird	Vulnerable	Species or species habitat known to occur within area	**Likely to occur**
Tasmanian wedge-tailed eagle	*Aquila audax fleayi*	Bird	Endangered	Breeding likely to occur within area	**Likely to occur**
Blue-winged parrot	*Neophema chrysostoma*	Bird	Vulnerable	Species or species habitat may occur within area	**Likely to occur**
Australian grayling	*Prototroctes maraena*	Fish	Vulnerable	Species or species habitat may occur within area	**Potential to occur**
Central north burrowing crayfish	*Engaeus granulatus*	Crustacean	Endangered	Species or species habitat likely to occur within area	**Likely to occur**
Green and gold frog	*Litoria raniformis*	Frog	Vulnerable	Species or species habitat likely to occur within area	**Likely to occur**

Eastern quoll (*Dasyurus viverrinus*)

Table 4.7 provides an overview of habitat requirements and expected presence of the eastern quoll in the Survey Area and broader Project Area while Figure 4.5 depicts known occurrences and species distribution. Further information on survey effort and findings is provided, including classifcation between optimal and suboptimal and denning and foraging habitat, in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.7 Summary of habitat requirements and site presence: Eastern quoll

Features	Assessment
POTENTIAL TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	The species is found in a range of vegetation types including open grassland (including farmland), tussock grassland, grassy woodland, dry eucalypt forest, coastal scrub, and alpine heathland, but is typically absent from large tracts of wet eucalypt forest and rainforest. The species' distribution is associated with areas of low rainfall and cold winter minimum temperatures.
Population parameters	The current population size is unknown, though the species has continued to decline since listing in 2015. The cause for the decline is not fully understood; however, the EPBC Act Scientific Advisory Committee refers to a correlation of the decline with successive mild wet winters between 2001 and 2003, followed by very limited recovery in the population since. As an endangered species, all populations are seen as important, although some areas might be considered as the primary strongholds for the species (e.g. Cradoc and North Bruny Island). The conservation advice for this species estimates the extent of occurrence is between 41,629km^2 and 47,000km^2, and the area of occupancy is estimated to be between 2,300km^2 and 2,556km^2.
Distribution and site significance	Eastern quolls are widespread in Tasmania but recorded less frequently in the wettest third of the state. Currently, eastern quolls are most abundant in the south-east and north-east of the state, and they are present throughout the north and central regions. They are occasionally observed in low densities in open habitat in the west. The species has no observation records on the natural values assessment attributed to within 500 m of the Construction Corridor and only three records within the Project Area, the most recent being two roadkill records in 2022. Distribution of eastern quoll records in relation to the Project Area is shown in Figure 4.5. Records of the species are sparse in the central north, although eastern quolls do occupy mosaic woodland and farmland throughout their range. Given the size and span of the corridor there is a chance this species may occur on occasion; therefore, presence and activity were assessed through fauna surveys.
Survey findings	Remote camera surveys for eastern quolls did not detect the species at any sites across the Survey Area. This lack of detection of eastern quolls on remote cameras in the Survey Area does not conclusively indicate their absence. No dens or evidence of eastern quoll activity (in the form of tracks, scats, carcasses etc.) were recorded during field assessments. Potential den sites are likely widespread in the broader area and may extend into the vicinity of the of the development footprint. Denning sites for this species, especially natal dens, are located in well concealed locations to provide protection from predators. In areas with frequent occurrences and/or high densities of quolls, such indicators of presence are readily encountered (tracks, scats, etc), which is why these are an accepted survey detection technique; the absence of these indicators during surveys would thus indicate the Project Area is sparsely/infrequently utilised. Both ground and remote camera surveys indicate if this species is present in the Survey Area, it is sparsely or infrequently utilised and therefore does not constitute an important population for the species. Despite the lack of direct evidence of eastern quolls in the Survey Area, its presence is not discounted simply due to the species occurring throughout eastern Tasmania and varying locationally by frequency of occurrence and population density associated with habitat variables (including land use), and environmental traits. Therefore, while there is moderate confidence that the species is not present in the Survey Area, there is ongoing uncertainty and therefore it is treated as occurring, albeit in low density.
Habitat presence in Survey Area	There is 92.05ha of optimal denning and foraging habitat, 37.68ha of suboptimal denning and foraging habitat and 1,538ha of non-denning foraging habitat.

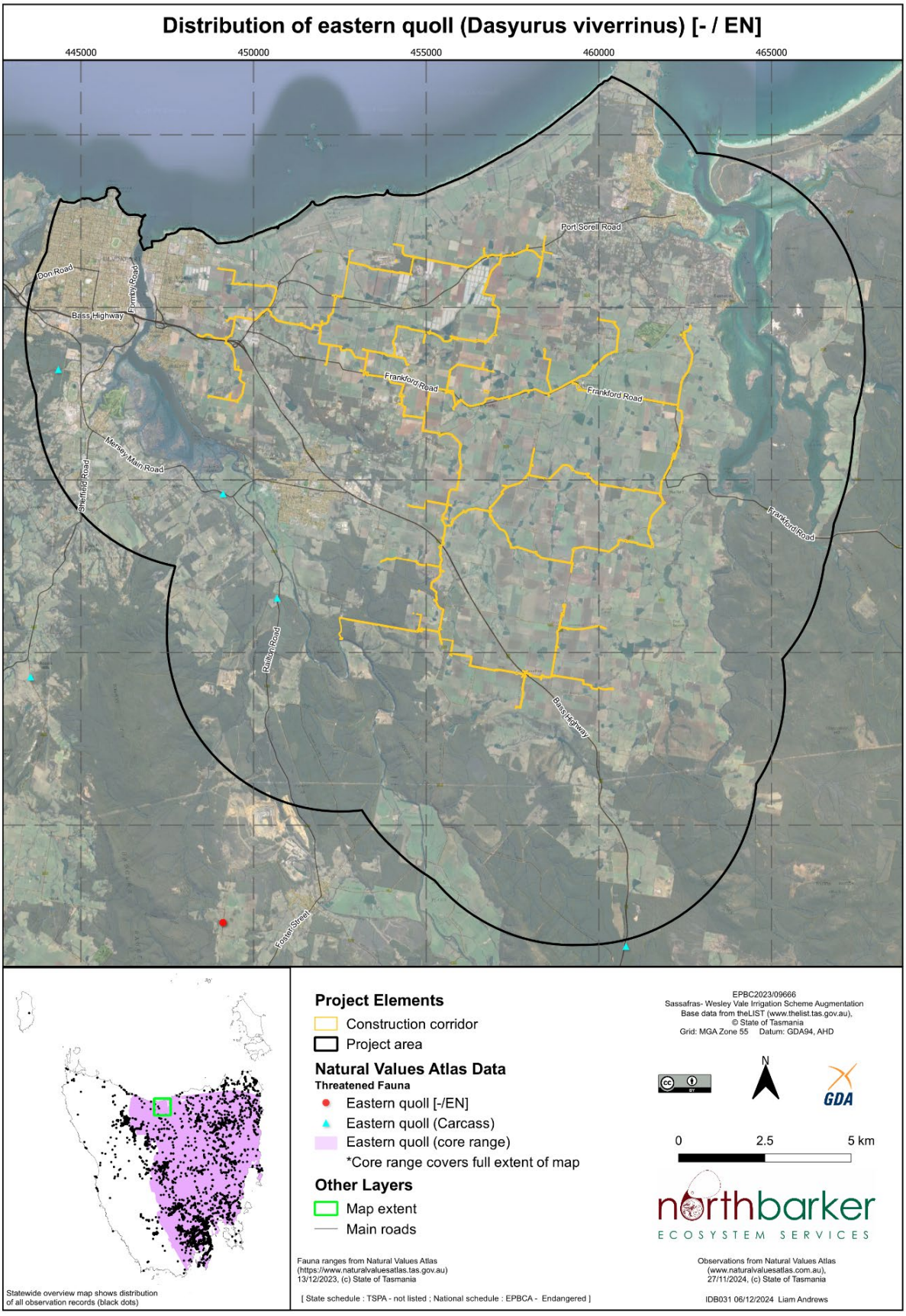

Figure 4.5 Distribution of the eastern quoll (*Dasyurus viverrinus*) (NBES, 2025)

Spotted-tail quoll (*Dasyurus maculatus maculatus*)

Table 4.8 provides an overview of habitat requirements and expected presence of the spotted-tail quoll in the Survey Area and broader Project Area while Figure 4.6 depicts known occurrences and species distribution. Further information on survey effort and findings, including classification between optimal and suboptimal and denning and foraging habitat, is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.8 Summary of habitat requirements and site presence: Spotted-tail quoll

Feature	Assessment
LIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	Spotted-tail quolls are predominantly a forest dependent species, though they are also known to persist within fragmented and agricultural areas. Presence is correlated with availability of suitable denning habitat, prey availability and structural connectivity of matrix habitat. Quolls utilise multiple dens within their home ranges, denning in rock crevices, hollow logs and trees, underground burrows and dense vegetation such as sedges. Habitat critical to the survival of the species includes large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey, however thresholds have not been defined.
Population parameters	The subspecies *Dasyurus maculatus maculatus*, is restricted to Tasmania. The species has an estimated population size of ~5,700 individuals in Tasmania as of 2016. The listing statement for this species estimates the extent of occurrence is 75,696 km^2, and the area of occupancy is estimated to be 4,536 km^2. The Project Area falls within the central north Tasmanian population, designated in the *National Recovery Plan for Spotted-tail Quolls* as an important stronghold and research population.
Distribution and site significance	Spotted-tail quolls are widely, but sparsely distributed across the state, with predictable rainfall, prey densities and denning availability predicting their range. The north and north-west regions report a relatively high abundance of spotted-tail quolls, though they are found in suitable habitat across the state. The species has two observation records on the natural values assessment attributed to within 500 m of the Construction Corridor and a further 160 records within the Project Area, the most recent being in 2023 . Seventeen of these occurrences are attributed to roadkill.
Survey findings	Initial camera surveys detected spotted-tail quolls on two occasions over 84 total trap nights (0.024 detections per trap night). Spotted-tail quolls were detected on one out of three cameras. Secondary camera surveys detected spotted-tail quolls on 47 occasions over 2,462 total trap nights (0.019 detections per trap night). Spotted-tail quolls were detected at a total of 11 locations (out of 39) and were most frequently detected in dry eucalypt forest and woodland and modified land. Spotted-tail quolls were mostly detected within continuous forest in the south-west and mosaic woodland in the north-east of the region. The species was not detected in the primarily agricultural areas in the centre and north-west of the Project Area. One active den was confirmed during camera surveys, <11 m from the Construction Corridor. A further three potential den sites were found within the Survey Area. Ground surveys did not detect any active or potential dens within the Construction Corridor, although it should be noted that these surveys do not constitute comprehensive coverage of the Construction Corridor. Denning sites for this species, especially natal dens, are located in well concealed locations to provide protection from predators. Potential den sites are likely widespread in the broader area and may extend into the vicinity of the of the development footprint. Given the spread of the species across the region and the number of detections within and close to the Survey Area, it is possible that active dens may be present and pre-clearance checks of the Construction Corridor are required. Spotted-tailed quolls were not recorded at any of the den sites near the GBPS surveyed by Enviro-Dynamics (2024).
Habitat presence in Survey Area	There is 92.05ha of optimal denning and foraging habitat, 37.68ha of suboptimal denning and foraging habitat and 1,538ha of non-denning foraging habitat.

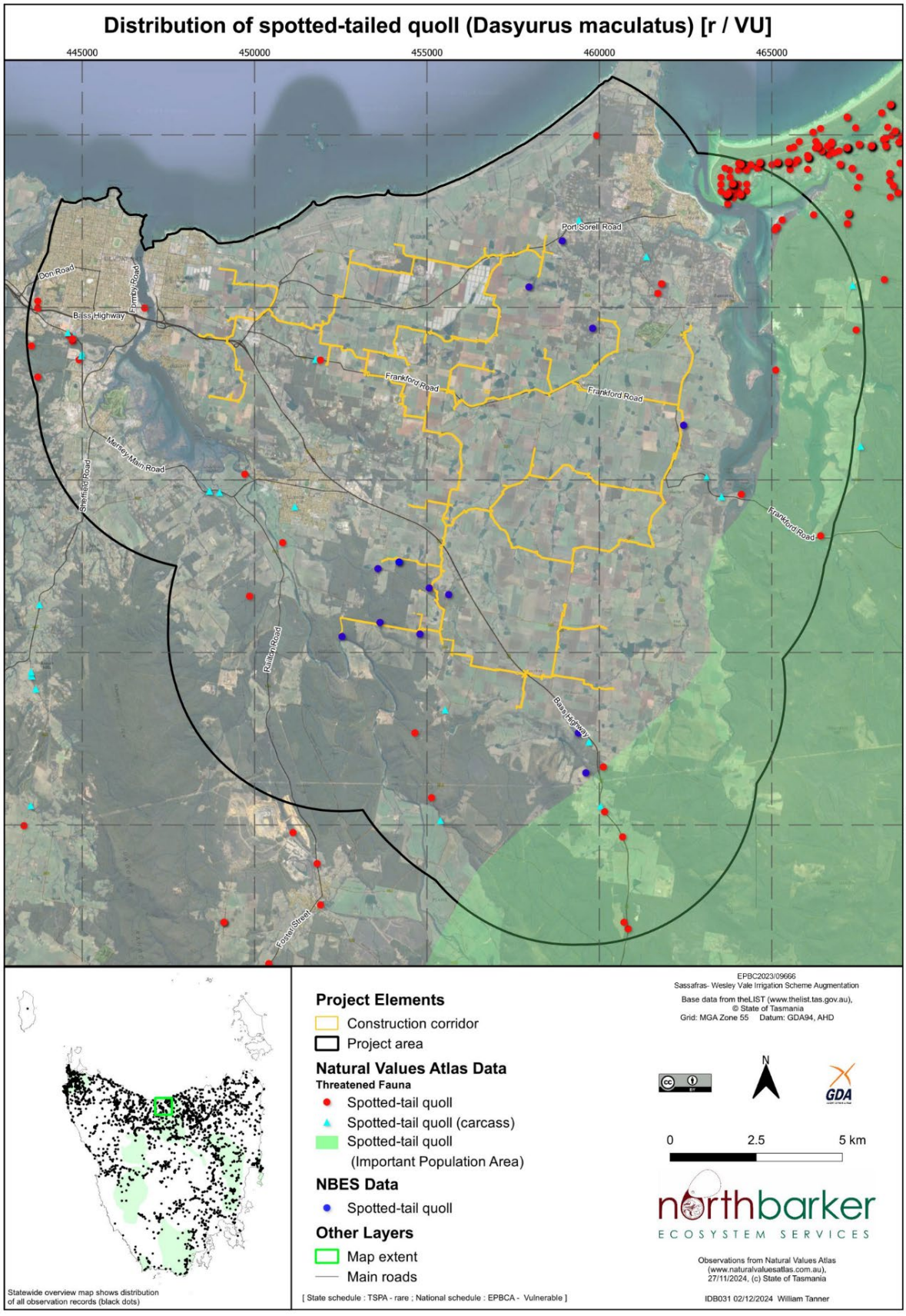

Figure 4.6 Distribution of the spotted-tail quoll (*Dasyurus maculatus*) (NBES, 2025)

Tasmanian devil (*Sarcophilus harrisii*)

Table 4.9 provides an overview of habitat requirements and expected presence of the Tasmanian devil in the Survey Area and broader Project Area while Figure 4.7 and Figure 4.8 depict known occurrences and species distribution. Further information on survey effort and findings,including classifcation between optimal and suboptimal and denning and foraging habitat, is provided in the Natural Values Assessment (NBES, 2025, Annex B) and the GBPS Tasmanian Devil Impact Assessment (Enviro-Dynamics, 2024, Annex D).

Table 4.9 Summary of habitat requirements and site presence: Tasmanian devil

Features	Assessment
LIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	The Draft Tasmanian Devil Recovery Plan states that critical devil habitat includes 'all disease-free areas within mainland Tasmania with suitable devil habitat', 'all areas of pre-disease core habitat', and 'areas that may be required under the recovery program for the future introduction of Tasmanian devils'. The entire north coast is in the range of pre-disease core habitat. Potential habitat for the Tasmanian devil is all terrestrial native habitats, forestry plantations and pasture. Devils require shelter (e.g. dense vegetation, hollow logs, burrows or caves) and hunting habitat (open understorey mixed with patches of dense vegetation) within their home range (4-27km^2). Significant habitat for the Tasmanian devil is defined as a patch of potential denning habitat where three or more entrances (large enough for a devil to pass through) may be found within 100 m of one another, and where no other potential denning habitat with three or more entrances may be found within a 1 km radius, being the approximate area of the smallest recorded devil home range. This definition of significance is relied upon because it supersedes EPBC Act conservation and listing advice and has been developed through collaboration between Tasmanian experts.
Population parameters	Estimated population of Tasmanian devils was predicted to be ~17,000 individuals as of 2020, with species declines expected to continue due to the spread of Devil Facial Tumour Disease (DFTD) across their range. The SPRAT profile for Tasmanian devils divides them into two genetically distinct populations: northwestern; and eastern/southwestern. Tasmanian devils are widespread throughout Tasmania, occupying all terrestrial habitats within their range. Though there is considerable variation in population density across Tasmanian since the emergence of Devil Face Tumour Disease (DFTD), they are generally non-specific in their habitat requirements and are present in most areas of the state. The Construction Corridor (322.88 ha) is within the known geographical and ecological range of the eastern/southwestern population (which in total has a range of 50,630 km^2) and overlaps with the core range of the species; defined on the Tasmanian Natural Values Atlas as the area within the known range known to support the highest densities of the species and/or thought to be of greatest importance for the maintenance of breeding populations of the species.
Distribution and site significance	The species has 15 observation records on the natural values assessment attributed to within 50m of the Construction Corridor and 664 records within the Project Area, the most recent being in February 2024. A total of 76 of these records are attributed to roadkill.
Survey findings	Two sets of surveys were undertaken for the Tasmanian devil within the Survey Area: targeted surveys of den sites at the GBPS and habitat along Devil Road (Enviro-Dynamics, 2024), and targeted surveys across the balance of the Survey Area (NBES, 2025). **Enviro-Dynamics survey** – The Enviro-Dynamics survey focused on [redacted], including installation of remote motion detecting cameras across five potential sites. This identified Tasmanian devils at [redacted] **NBES survey** – Initial camera surveys detected Tasmanian devils on six occasions over 84 total trap nights (0.71 detections per trap night). Tasmanian devils were detected on two out of three cameras. Secondary camera surveys detected devils on 597 occasions over 2,462 total trap nights (0.24 detections per trap night). Tasmanian devils were detected at a total of 17 locations (out of 39) and were most frequently detected in dry eucalypt forest and woodland, modified land and non-eucalypt forest and woodland. [redacted] Ground surveys did not detect any active or potential dens within the Construction Corridor, although it should be noted that these surveys do not constitute comprehensive coverage of the Construction Corridor.
Habitat presence in Survey Area	There is 92.05ha of optimal denning and foraging habitat, 37.68ha of suboptimal denning and foraging habitat and 1,538ha of non-denning foraging habitat.

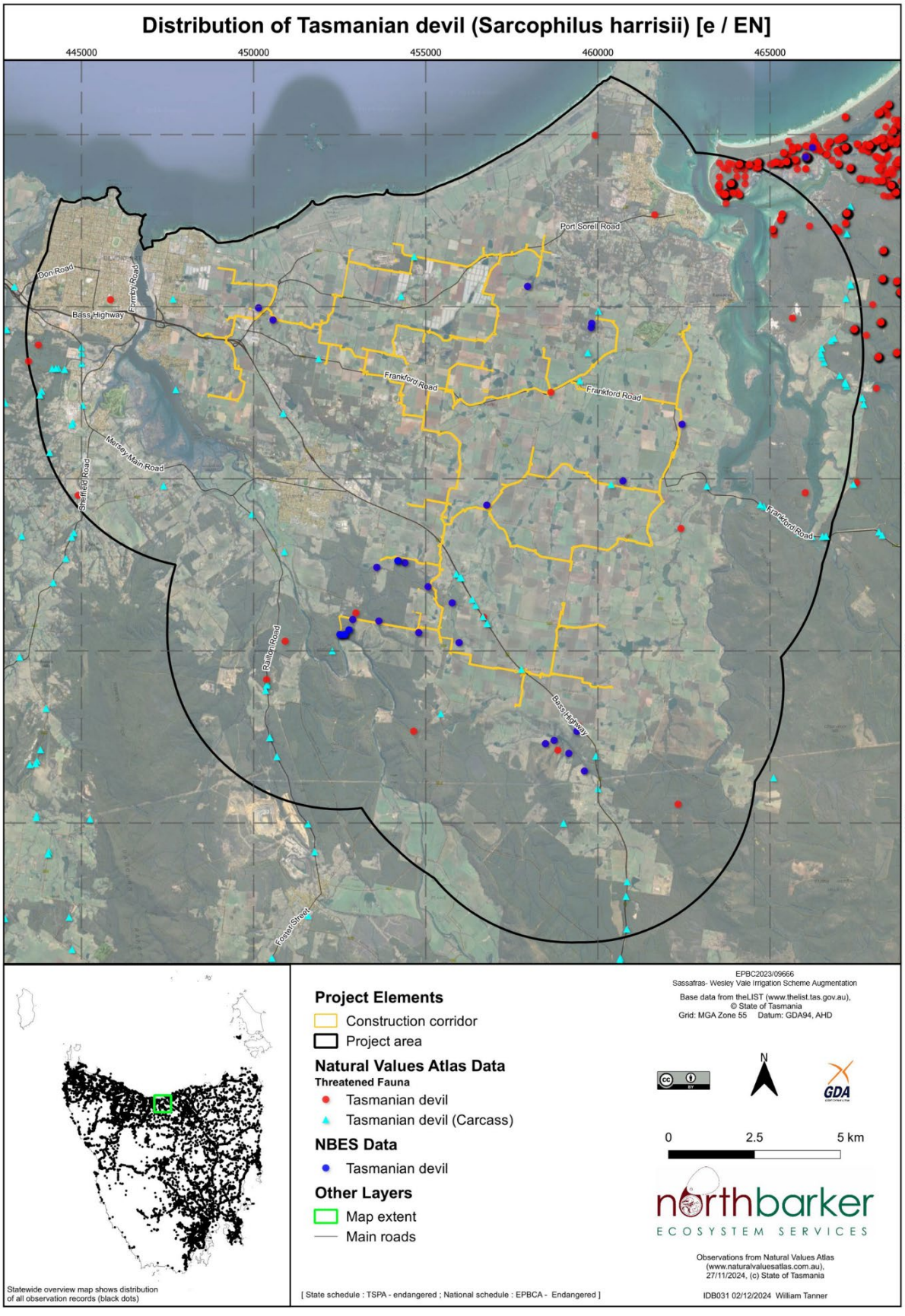

Figure 4.7 Distribution of the Tasmanian devil (*Sarcophilus harrisii*) (NBES, 2025)

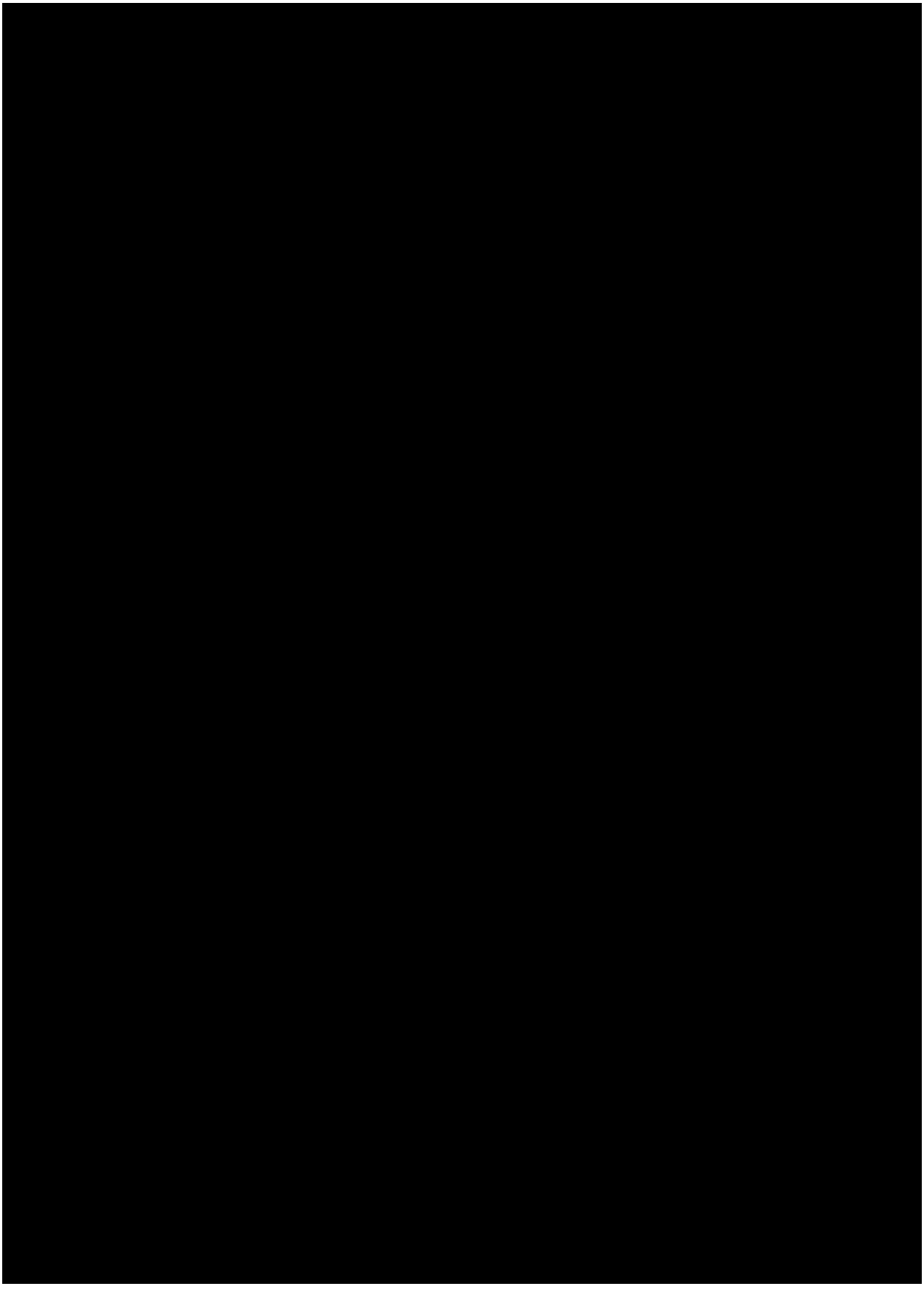

Figure 4.8 Tasmanian devil denning sites [redacted]

Eastern barred bandicoot *(Perameles gunnii gunnii)*

Table 4.10 provides an overview of habitat requirements and expected presence of the eastern-barred bandicoot in the Survey Area and broader Project Area while Figure 4.9 depicts known occurrences and species distribution. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.10 Summary of habitat requirements and site presence: Eastern-barred bandicoot

Features	Assessment
POTENTIAL TO OCCUR IN PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	There is no defined description of habitat critical to the survival of this species, however the eastern barred bandicoot occurs in native grasslands, grassy woodlands and forests, and areas of agricultural and pastural development where there are areas of dense ground cover. Given the relatively restricted range of this species, for the purposes of this assessment, habitat critical to survival of the species is defined as all areas where the species occur and that meet the habitat description above.
Population parameters	The most recent population estimates for the eastern barred bandicoots in Tasmania suggest there is 20,000 individuals, which is declining. The species has declined significantly throughout its historical range in the Midlands though is currently considered locally common in some areas of the state due to range expansion. Estimates suggest that there are >10 subpopulations distributed across Tasmania. According to the Action Plan for Australian Mammals 2012, the estimated extent of occurrence of is 602km^2, and the area of occupancy is estimated to be 16km^2, both ranges are estimated with a low level of reliability.
Distribution and site significance	Initially associated in Tasmania with native grasslands in the midlands and east coast, the eastern barred bandicoot has extended its range into the south-east, north-east and the north-west coast due to post-settlement clearance of forest in these areas. The species is now most common in southeast Tasmania and in agricultural areas along the north coast. The Project Area does not fall within the species' core range. The species has 15 observation records on the natural values assessment attributed to within 50m of the Construction Corridor and a further 108 records attributed to within the Project Area, the most recent being in 2024. A total of 34 of these records are attributed to roadkill.
Survey findings	Camera surveys detected eastern barred bandicoots on four occasions over 2,462 total trap nights (<0.01 detections per trap night). Eastern barred bandicoots were detected at only one location at the intersection of a small remnant patch of wet forest and pasture in the southwest of the Project Area (east of Native Plains Road, near Panatana Rivulet). As they are not uniquely patterned, it is unknown if this is one or multiple individuals. The lack of detection in other areas does not necessarily relate to the absence of the species, though detection of southern brown bandicoots across the Survey Area suggests that eastern barred bandicoots, if present, are likely to persist at very low densities.
Habitat presence in Survey Area	There is 320.85ha of foraging habitat.

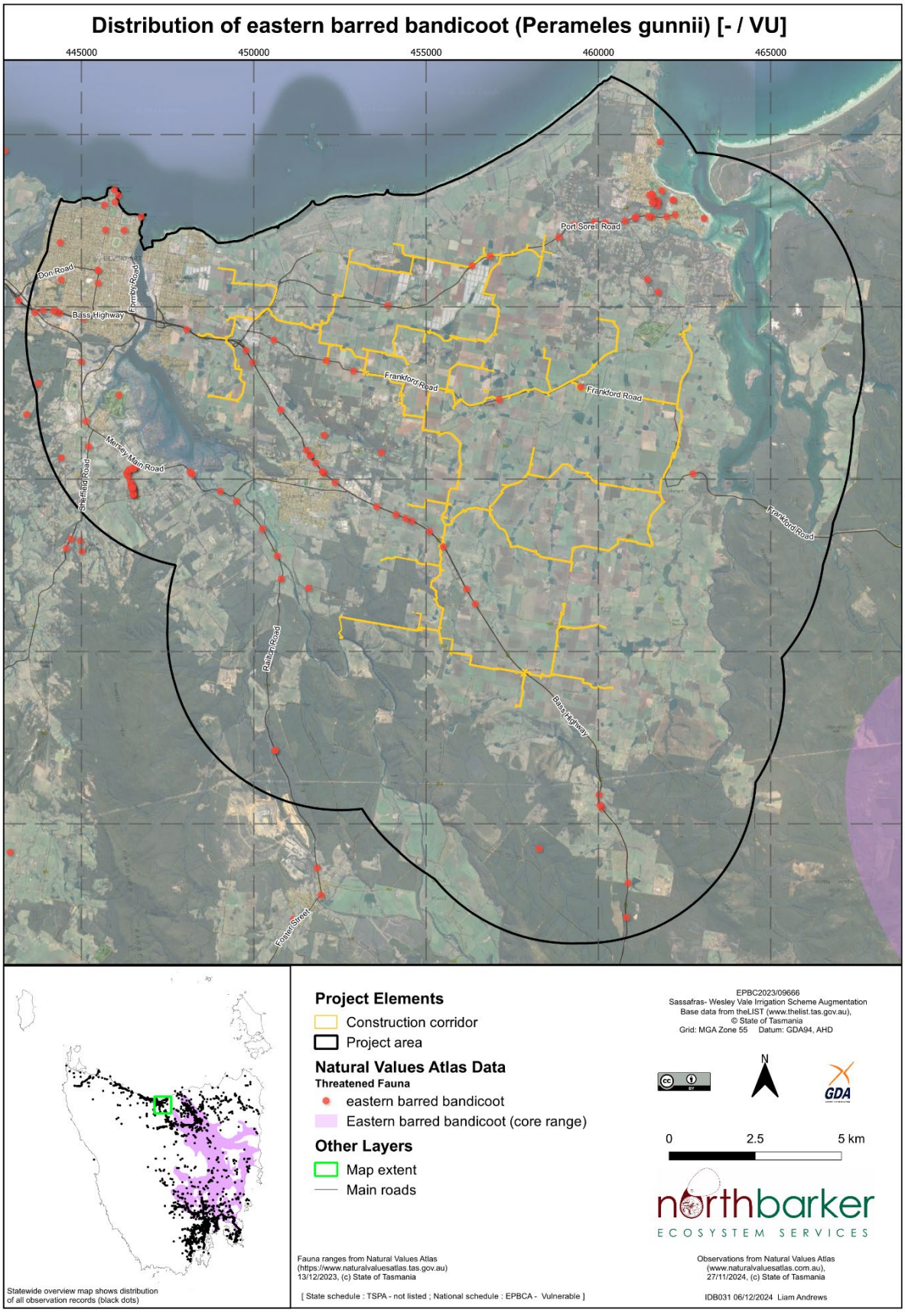

Figure 4.9 Distribution of the eastern barred bandicoot (*Perameles gunnii gunnii*) (NBES, 2025)

Swift Parrot (*Lathamus discolor*)

Table 4.11 provides an overview of habitat requirements and expected presence of the swift parrot in the Survey Area and broader Project Area while Figure 4.10 to Figure 4.12 depict known occurrences and species distribution. Further information on survey effort and findings, including basis of mapping of habitat and habitat trees, is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.11 Summary of habitat requirements and site presence: Swift parrot

Features	Assessment
POTENTIAL TO OCCUR IN CONSTRUCTION PROJECT AND IRRIGATION DISTRICT	
Habitat values	Foraging and breeding habitat are considered as habitat critical to the survival of swift parrots: **Foraging** – During the breeding season, swift parrots forage primarily on *Eucalyptus globulus* (blue gum) and *E. ovata* (black gum) in Tasmania. More recently, *E. brookeriana* (Brookers gum) has been identified as a foraging resource (this species and black gum are closely related and share overlapping flowering times within the swift parrot breeding season). It has been estimated that in good flowering years in the southeast of the state, up to 10% of the population may still breed in the northwest of the state, while in poor flowering years, the northwest flowering blue gum resource (which is more consistent but generally less abundant) becomes more important and as much as 50% of the population may breed here. **Breeding** – Nests are located in deep hollows with the trunk, branch, or spout of eucalyptus trees (including dead trees), with no evidence suggesting a preference towards a particular eucalypt species but rather traits of the tree cavities are the main factor that influences whether a tree is likely to be used for nesting. Potential breeding habitat typically occurs within range (~10 km) of potential foraging habitat. Swift parrots reuse nesting sites and individual nest hollows over different years, highlighting the importance of nesting areas for the species' long-term viability. The presence of a foraging resource influences whether an area is suitable on a year-to-year basis.
Population parameters	The swift parrot occurs as a single panmictic migratory population. Estimating the number of birds within the population from empirical counts is difficult because the species is highly mobile. In 2000, the population was estimated at 2,000 birds, while more recent numbers were estimated at 750 birds with a maximum of 1,000. Using a genetics-based method, the minimum potential population size was recently modelled at below 300. According to the Action Plan for Australian Birds 2020, the estimated extent of occurrence of breeding habitat is 71,000 km^2, and the area of occupancy is estimated to be 1,400km^2, both ranges are estimated with a medium level of reliability. The population is not severely fragmented, however there are fluctuations in the area of occupancy.
Distribution and site significance	Swift parrots spend the winter months in south-eastern mainland Australia before migrating to Tasmania in late winter/early spring to breed. On passage to and from the mainland, swift parrots may be observed almost anywhere within the state, as the records from the Tasmanian Natural Values Atlas illustrate. However, the core range for the species is defined as the southeast potential breeding range that is within 10 km of the coast, or areas designated as a swift parrot important breeding area (SPIBA). There are outlying breeding populations of swift parrots along Tasmania's north coast and these are included in the northwest potential breeding range for the species which occurs in a strip along the north coast of the state, including the Sassafras - Wesley Vale region. The northwest breeding range is defined as the area swift parrots are most likely to breed and is based on known nesting localities, bird foraging observations during breeding season, and extent of nesting and foraging habitat. In total, 18.19% of the Survey Area (297.08 ha) falls within the northwest breeding range. The species has two observation records on the natural values assessment attributed to within 500m of the pipeline alignment and a further 87 records attributed to within 5km, the most recent being in 2023. Four of these records are purported nests in the Kelcey Tier Green Belt, south of Devonport.
Survey findings	No naturally occurring blue gum trees or *Eucalyptus globulus* vegetation communities were recorded within the Survey Area. Black gum foraging (*E. ovata*) trees were recorded in numerous locations throughout the Survey Area within *Eucalyptus ovata* forest and woodland (DOV) and *Eucalyptus amygdalina - Eucalyptus obliqua* damp sclerophyll forest (DSC) forests, and as individual trees in remanent vegetation or paddock trees. In total 16.9 ha of potential foraging habitat and an additional 102 individual foraging habitat trees (of which 44 may also provide breeding habitat) were recorded within the Survey Area Large (>70cm Diameter at Breast Height (DBH)) potential hollow bearing trees were also recorded during field surveys, both within forest blocks and remnant vegetation patches, and paddocks in agricultural land. These trees provide potential nesting habitat for swift parrots. A total of 6.87 ha of forest potentially supporting breeding habitat trees and 175 individual breeding habitat trees were recorded within the Survey Area.
Habitat presence in Survey Area	There is a total of 243 habitat trees for this species occur within the Survey Area, including 142 suitable as potential breeding habitat, 62 as potential foraging, and a further 39 suitable for foraging and potential breeding.

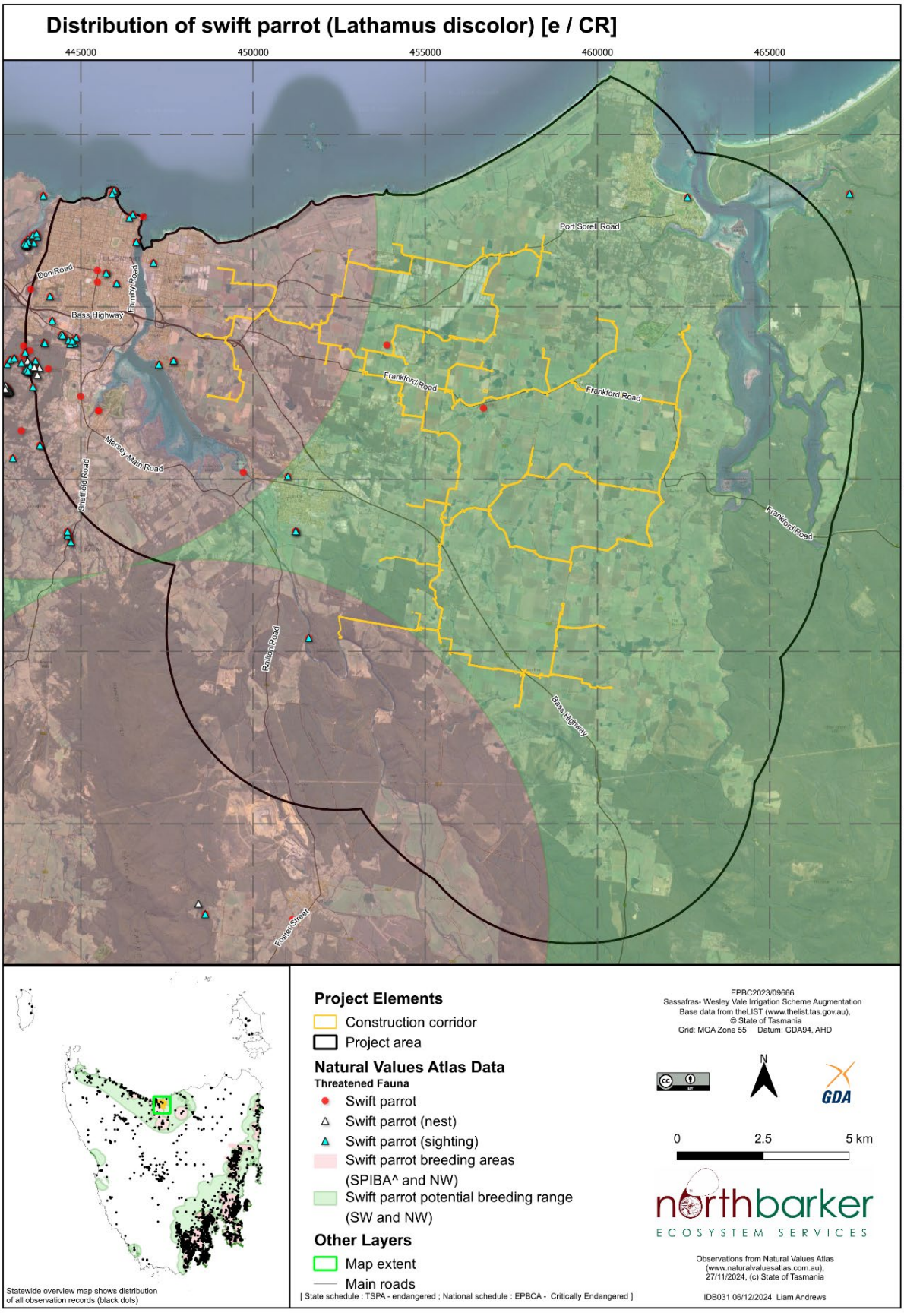

Figure 4.10 Distribution of the swift parrot (*Lathamus discolor*) (NBES, 2025)

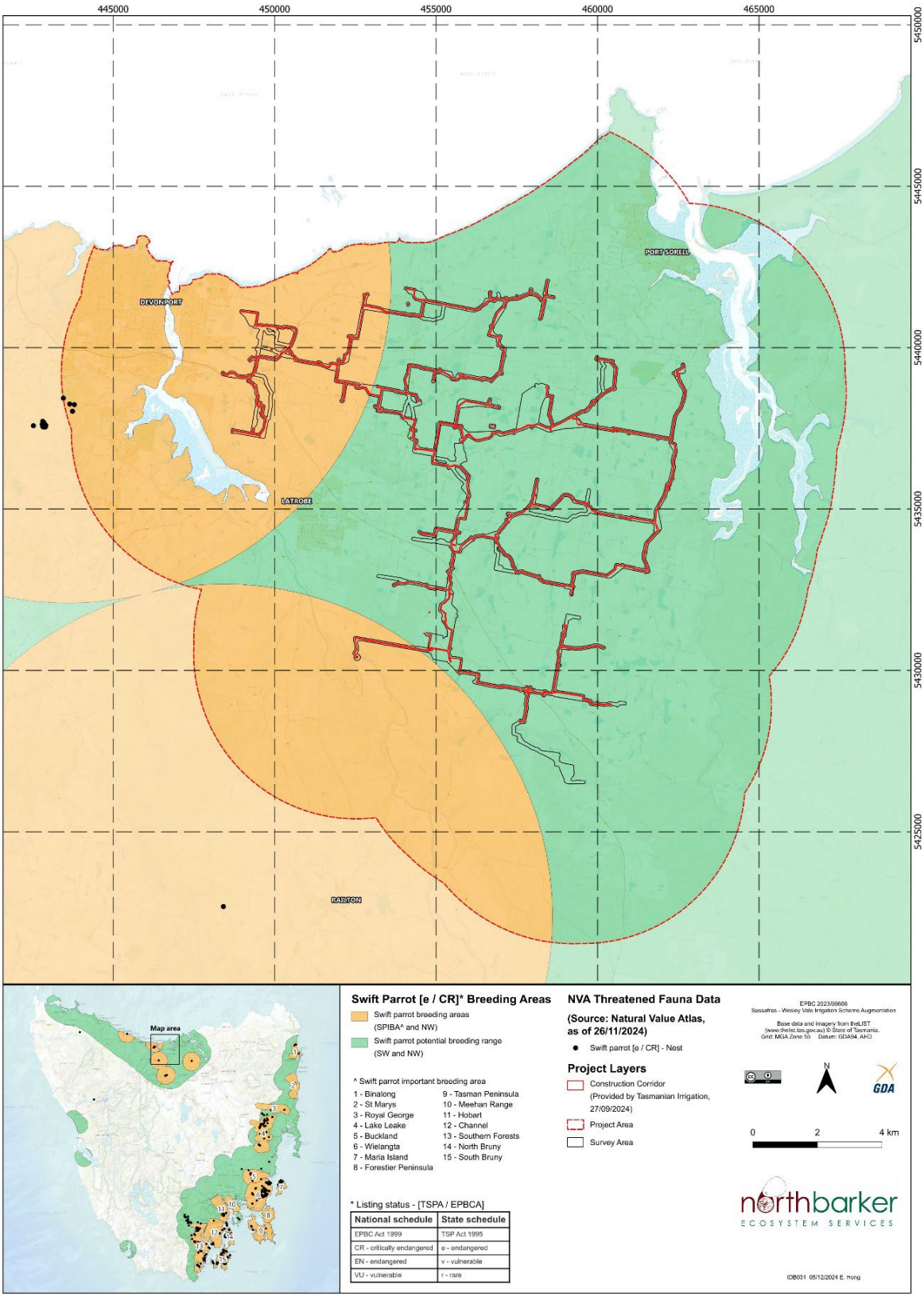

Figure 4.11 Swift parrot (*Lathamus discolor*) important and potential breeding areas (NBES, 2025)

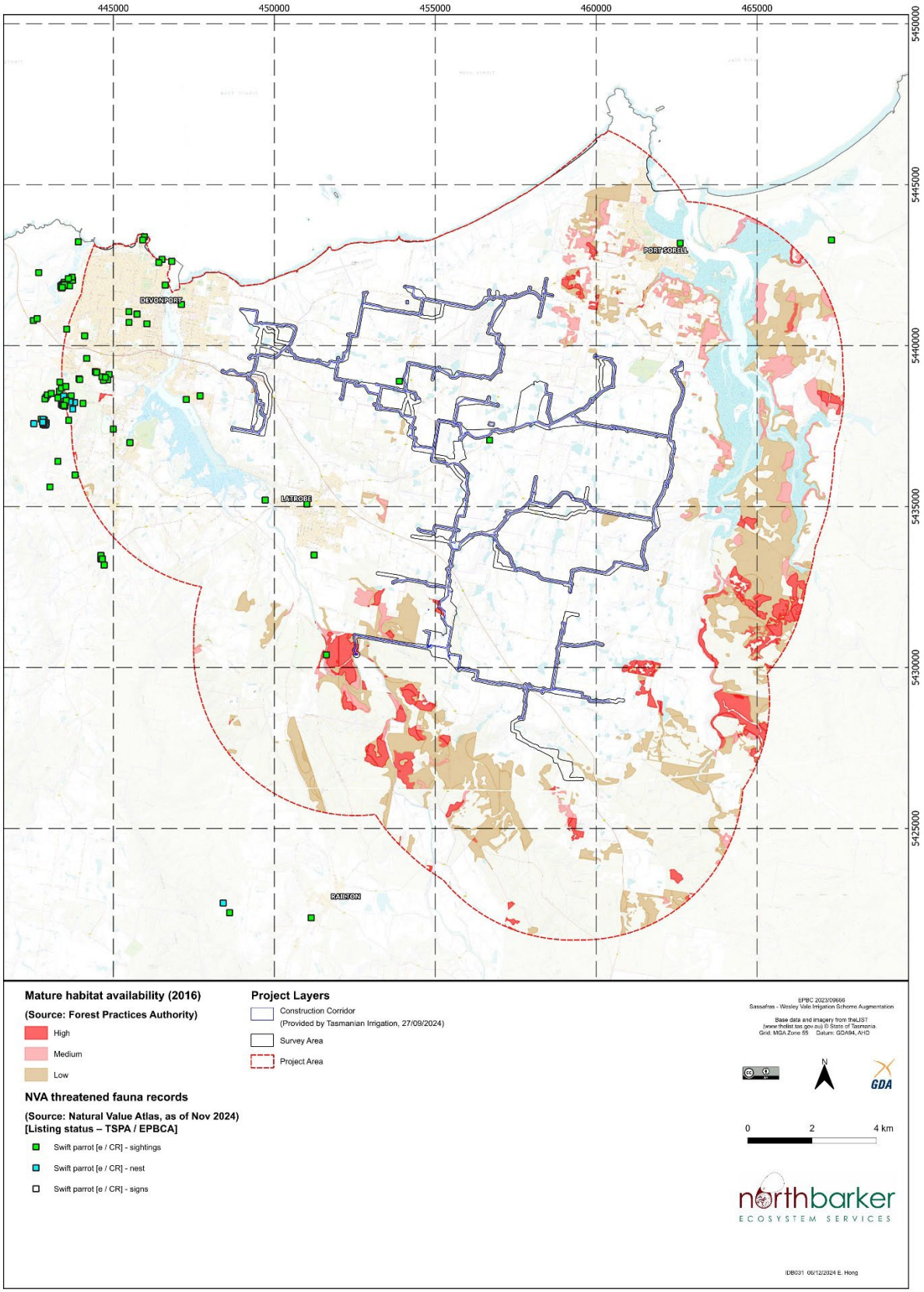

Figure 4.12 Mature habitat availability and swift parrot (*Lathamus discolor*) records within the Project Area (NBES, 2025)

Tasmanian masked owl (*Tyto novaehollandiae castanops*)

Table 4.12 provides an overview of habitat requirements and expected presence of the Tasmanian masked owl in the Survey Area and broader Project Area while Figure 4.13 and Figure 4.14 depict known occurrences and species distribution. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.12 Summary of habitat requirements and site presence: Tasmanian masked owl

Features	Assessment
LIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	Potential breeding habitat is defined as all areas that have trees with large hollows (≥15cm entrance diameter). Suitable breeding hollows must have an entrance diameter that allows efficient entry and exit, are deep enough to be secure from weather and predators and possess enough volume that an adult and chicks may be housed. Typical breeding habitat trees will often have a DBH >1 m and a girth at the location of the hollow of approximately 60cm. In terms of foraging requirements, masked owls are somewhat versatile and can switch between prey items depending on prey size and availability. This adaptable approach to prey selection allows for versatility in terms of foraging habitat selection. In agricultural land they hunt introduced rodents and rabbits (which can form an important component of their diet), while in areas of native habitat they select terrestrial animals and native birds. No definition of habitat critical to the survival of the species is provided in the conservation advice or listing advice for the subspecies (and there is no recovery plan). Given the importance of suitable tree hollows for breeding, typically found in large old trees, can be considered critical habitat for the species.
Population parameters	The conservation advice for the subspecies does not list any important populations in Tasmania. Todd (2012) states that the subspecies occurs as a single population in Tasmania because of their dispersal capabilities, and the Tasmanian subspecies has been determined to be a distinct population of a biological entity under Section 517 of the EPBC Act. Due to the relatively small population estimates for the subspecies (between 520 and 1,330 breeding birds) and the relatively broad distribution of the subspecies across the state, the entire subspecies population in Tasmanian may be classed as important. According to the Action Plan for Australian Birds 2020, the estimated extent of occurrence is 80,000 km^2, and the area of occupancy is 1,000 km^2. The population is not severely fragmented, nor is it subject to extreme fluctuations in the area of occupancy and extent of occurrence.
Distribution and site significance	Masked owls can be found in a wide range of habitats across Tasmania, with owl densities varying geographically. The potential range of the masked owl is the whole state, except the Bass Strait islands. The core range of the masked owl includes all areas that occur at low elevation (<600m ASL). Until recently, the emphasis on dry forested habitats, particularly in the east and north of the state, has eclipsed the wetter forests in the west of the state in terms of significance for the species. The Project Area is within the core range for this species and there are records of masked owls in the broader area, with four occurrences recorded on the natural values assessment attributed to within 500m of the Construction Corridor (with the most recent occurring in 2001) and a further 39 records within the Project Area, the most recent in 2022. There are no known nests within the Project Area, however there are two masked owl nests recorded on the natural values assessment approximately 8km to the south, near Railton.
Survey Findings	Sixty-nine large trees/stags that have potential to contain habitat suitable for nesting and/or roosting for Tasmanian masked owl and an additional 5.71ha of forest likely to contain habitat trees were recorded within the Survey Area. Of these habitat areas, only four individual trees and 0.23ha of potential habitat occur within the Construction Corridor. According to the Forest Practices Authority field-verified assessment criteria, due to the mapped availability of mature habitat within the Project Area, it can be expected that at a minimum, there are a further 36,389 mature trees (>70cm DBH) present in the local landscape. Of these 36,389 trees, approximately 7,665 (at a minimum) would be expected to be greater than >100cm DBH and thus in the optimal size range suitable for the nesting habitat requirements of the masked owl. Tasmanian Masked owls were recorded on three separate occasions in during the December 2023-January 2024 survey season at two discrete locations within the Survey Area. A single bird responded well to the call-back survey within a remnant patch of DOB forest including potential nesting potential habitat trees on Oppenheims Road. No other call-back surveys elicited a response from a Tasmanian masked owl, however more than one owl was seen and heard in the vicinity of the Native Plains Road potential habitat area and call-back site multiple weeks later. Tasmanian masked owls have been shown to be utilising the Project Area. Targeted nest surveys were not conducted as any potential impacts to masked owl nests will be detected and mitigated through pre-clearance surveys before construction is started.
Habitat presence in Survey Area	There is a total of 69 habitat trees for this species occur within the Survey Area, identified as suitable for potential breeding.

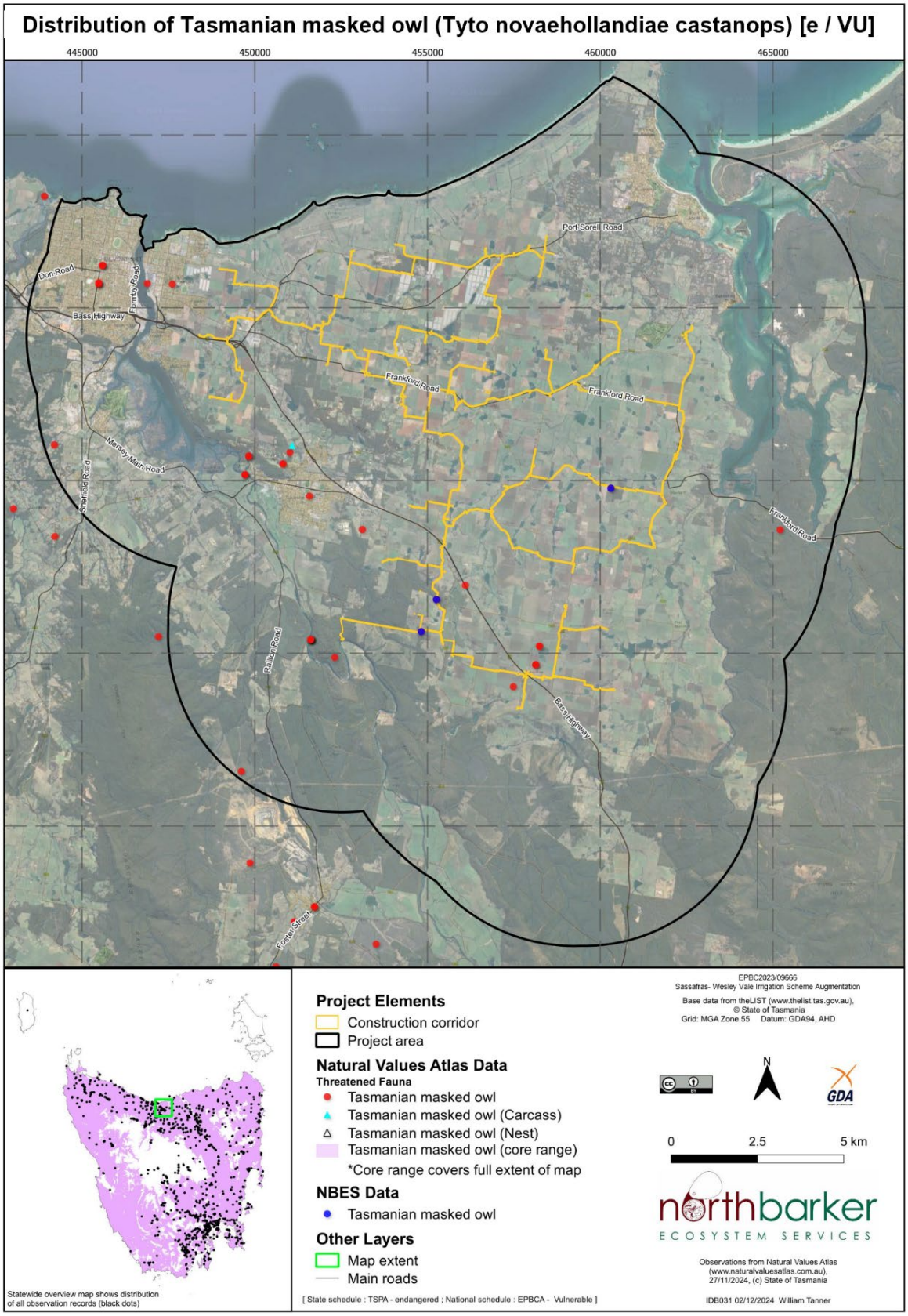

Figure 4.13 Distribution of the Tasmanian masked owl (*Tyto novaehollandiae castanops*) (NBES, 2025)

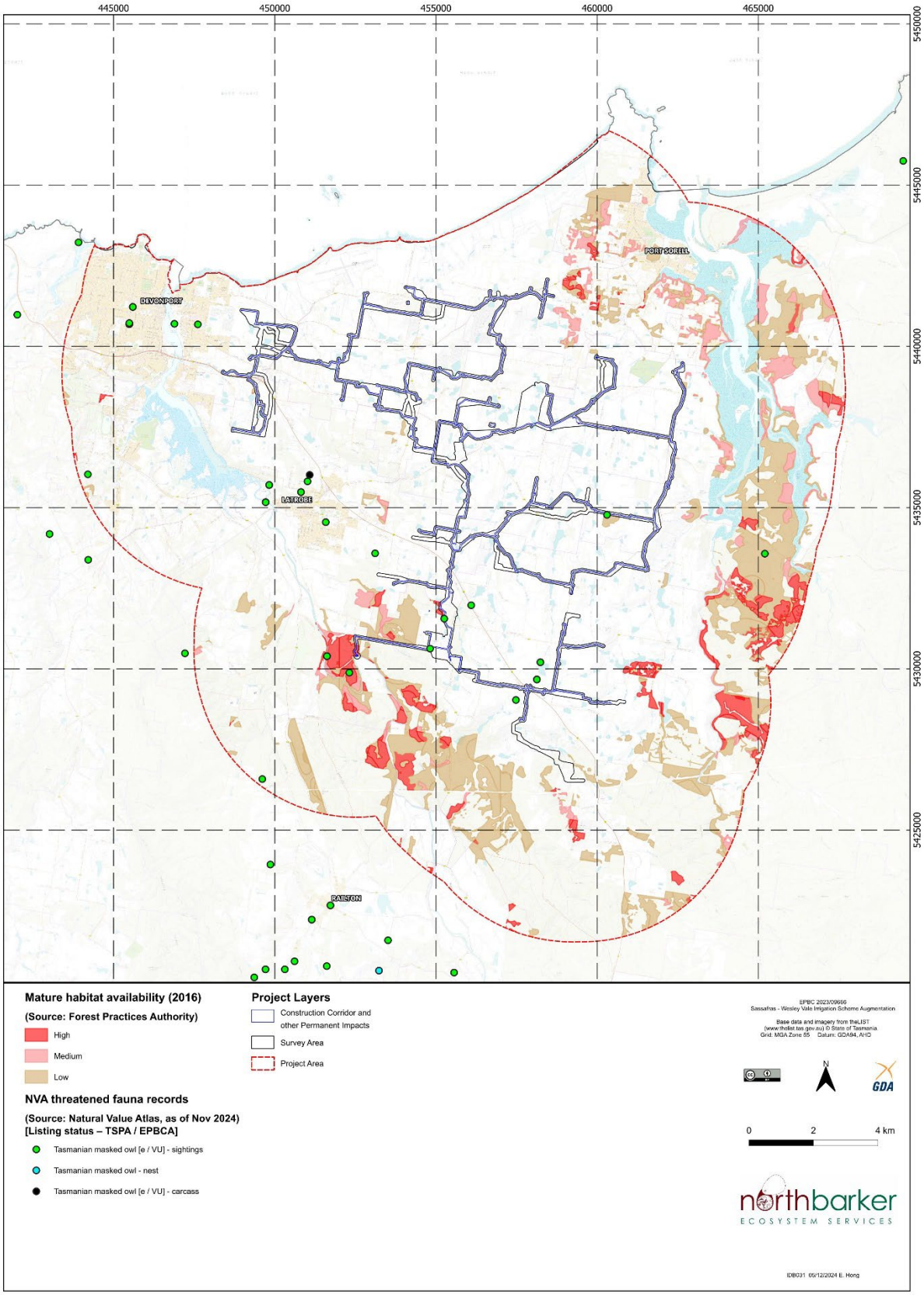

Figure 4.14 Mature habitat availability and Tasmanian masked owl (*Tyto novaehollandiae castanops*) records in the Project Area (NBES, 2025)

Tasmanian wedge-tailed eagle (*Aquila audax fleayi*)

Table 4.13 provides an overview of habitat requirements and expected presence of the Tasmanian wedge-tailed eagle in the Survey Area and broader Project Area while Figure 4.15 depicts known occurrences and species distribution. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.13 Summary of habitat requirements and site presence: Tasmanian wedge-tailed eagle

Features	Assessment
LIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	Tasmanian wedge-tailed eagles' nest in a range of old-growth native forests and are dependent on forest for nesting. This species requires large, sheltered trees for nesting and is highly sensitive to anthropogenic disturbances during the breeding season. Territories can contain up to five alternate nests typically clustered in a territory and usually close to each (but may be up to 1 km apart where habitat is locally restricted). Due to territorial competition for resources, nests for wedge-tailed eagles in separate territories have not been recorded closer than about 1.8 km, even in very productive territories. There is no current recovery plan for this species (expired in 2010), however this is still the adopted recovery plan until an updated recovery plan is published. In this plan, critical habitat for the Tasmanian wedge-tailed eagle is defined as forests of predominantly old-growth trees greater than 10 ha in area and occurring on sites sheltered from prevailing strong winds.
Population parameters	The Tasmanian subspecies of the wedge-tailed eagle occurs only in Tasmania and as a single population. It has been estimated that the total population in the state is between ~1,000 and ~1,500 individuals but ongoing work is required to improve the accuracy and robustness of this range. Indeed, it is likely that current numbers are significantly higher than most documented estimates and potentially several times greater. According to the Action Plan for Australian Birds 2020, the estimated extent of occurrence is 71,000km^2, and the area of occupancy is 8,520km^2, both ranges are estimated with a medium level of reliability. The population is not severely fragmented, nor is it subject to extreme fluctuations in the area of occupancy and extent of occurrence.
Distribution and site significance	The subspecies occurs throughout the state of Tasmania. Territory sizes have been estimated from the known nest distribution and range from 20–30km^2 in the drier, more fertile and open habitats of the lowlands, to much larger territories of 1,200km^2 in the highlands and in the western regions. Nesting habitat within the Project Area is considered low when using the eagle habitat suitability model developed by the Forest Practices Authority due to the lack of dense forest patches and sheltered gullies and valleys. The SWISA landscape is relatively flat, with shallow undulations, and is heavily modified for agriculture. Despite this suboptimal landscape, a number of eagles still nest in the limited forest patches available and likely thrive off using the open plains of farmland for foraging. There are 10 records of wedge-tailed eagles within 500m of the Construction Corridor alignment, and a further 109 recorded occurrences within 5 km of the Construction Corridor. There are seven nests attributed to wedge-tailed eagle nests within the Project Area. Five of these nests are within 500m direct distance of the Survey Area. An additional eight nests are within 1,000 m of the Survey Area.
Survey findings	The aerial survey covered approximately 200km^2, targeting areas of modelled habitat and forest remnants. The aerial nest search established that 11 eagle nests are located within 1.5km of the Construction Corridor at the time of survey. Three nests were new nest records and eight were confirmed known nests. Two previously recorded nests were not relocated. To be formally listed as absent on the natural values assessment they need to have either not been relocated during three consecutive aerial and/or ground searches or be subject to expert assessment where it is known that the nest is now gone. An additional nest was observed from the ground during a realignment survey, taking the total number of nests within 1.5km of the pipeline to 12. Only seven of these nests are within 1,000m of the Construction Corridor. Four of these nests are within 500m direct distance of the Construction Corridor. For more detailed location of these nests see Section 4.3.1.5 of NBES (2025). It should be noted that aerial nest searches are considered to be current for a duration of two years.
Habitat presence in Survey Area	Seven good/excellent condition nests are within the 1,000m of the Construction Corridor.

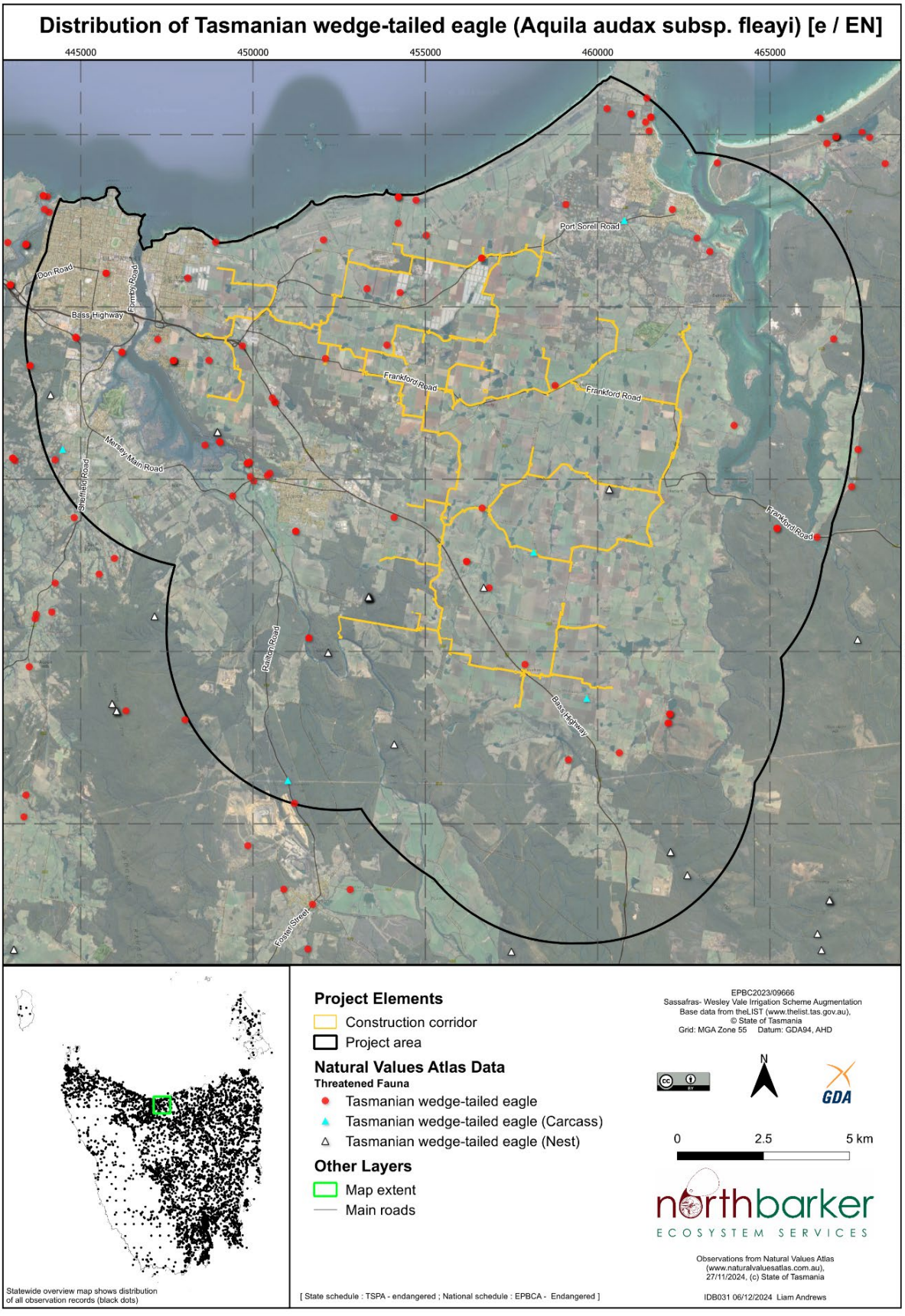

Figure 4.15 Distribution of the Tasmanian wedge-tail eagle (*Aquila audax fleayi*) (NBES, 2025)

Blue-winged parrot (*Neophema chrysostoma*)

Table 4.14 provides an overview of habitat requirements and expected presence of the blue-winged parrot in the Survey Area and broader Project Area while Figure 4.16 and Figure 4.17 depict known occurrences and species distribution. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.14 Summary of habitat requirements and site presence: Blue-winged parrot

Features	Assessment
LIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	In Tasmania, blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs. Habitat critical to the survival of the blue-winged parrot is defined as: • Foraging and staging habitats found from coastal, sub-coastal and inland areas, right through to semi-arid zones including grasslands, grassy woodlands and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs. • Wetlands both near the coast and in semi-arid zones used for foraging and staging. • Eucalypt forests and woodlands within the breeding range in Tasmania, coastal southeastern South Australia and southern Victoria. • Live and dead trees and stumps with suitable hollows within the breeding range. Habitat critical to the survival should not be cleared, fragmented or degraded. Any known or likely habitat should be considered as habitat critical to the survival of the species. Additionally, areas that are not currently occupied by the species due to recent disturbance (e.g. fire, grazing or human activity), but should became suitable again in the future, should also be considered habitat critical to the survival of the species.
Population parameters	The blue-winged parrot population has been reported to have declined by 30–50% in the last 11 years. There are currently an estimated 10,000 (range 7,500–15,000) mature blue-winged parrots in the wild with a declining trend. This species primarily breeds on mainland Australia in southern Victoria, south of the Great Dividing Range. Although, some birds do breed in the far southeast of South Australia and in Tasmania. Blue-winged parrots are partial migrants to Tasmania with some of the population migrating across Bass Strait in spring to breed. According to the Action Plan for Australian Birds 2020, the estimated extent of occurrence is 170,000km^2, and the area of occupancy is estimated to be 11,000km^2, both ranges are estimated with a medium to high degree of reliability. The population is not severely fragmented, and not subject to extreme fluctuations in the extent of occurrence and area of occupancy, subpopulations or mature individuals. Blue-winged parrots are assumed to form two breeding subpopulations, the Victorian and Tasmanian subpopulations. They are assumed to be separate but may mix. As there is no formal definition of what constitutes an important population of this species, it is assumed that each subpopulation is an important population. It is thought that the Tasmanian subpopulation is the larger, estimated to contain 6,000 birds.
Distribution and site significance	Blue-winged parrots primarily breed on mainland Australia south of the Great Dividing Range in southern Victoria, and sometimes in the far southeast of South Australia. In Tasmania, breeding occurs in the States northwest, east and central region, although they can occur across the entire state. They require suitable hollows to breed in and inhabit a wide range of habitats, favouring grassland, grassy woodlands, wetland areas and eucalyptus forests and woodlands, much the same as the swift parrot. A variable number of birds will migrate across Bass Strait in winter, making a non-stop flight to mainland Tasmania. There are 63 NVA records of the blue-winged parrot within 5km of the Construction Corridor, five of which are within 500m. This species was also incidentally observed within the Construction Corridor during the 2023/24 field surveys.
Survey findings	Large (>70cm DBH) potential hollow bearing trees were recorded during field surveys, both within forest blocks and remnant vegetation patches, and paddocks in agricultural land. These trees provide potential nesting habitat for blue-winged parrots. A total of 6.87 ha of forest potentially supporting breeding habitat trees and 181 individual breeding habitat trees were recorded within the Survey Area. These trees may also provide breeding habitat for the swift parrot, and a subset of these potential breeding habitat trees and areas may also support the Tasmanian masked owl. According to the Forest Practices Authority field-verified assessment criteria, due to the mapped availability of mature habitat within the Project Area, it can be expected that at a minimum, there are a further 36,389 mature trees (>70cm DBH) present in the local landscape. This estimate does not take into account the potential for paddock trees, or sporadic large trees within low maturity forest, so is a minimum estimate of available habitat trees (noting the scattered trees recorded within the Project Area do not even register as viable mature forest habitat in this modelling). Of these 36,389 trees, approximately 12,335 (at a minimum) would be expected to be

Features	Assessment
	greater than >70cm DBH and thus in the optimal size range suitable for the habitat requirements for blue-winged parrot nesting. Incidental observations of the blue-winged parrot were made at six locations either within the Survey Area, or in the immediate vicinity of the Survey Area. One of these observations was of a flock of approximately 60 birds near Chapel Road. Other observation locations include Native Plains Road, Saggers Hill, Devil Road, and near Wesley Vale Road. Observations were of perched and foraging birds only, with no hollow usage recorded.
Habitat presence in Survey Area	There is a total of 181 habitat trees for this species occur within the Survey Area, identified as suitable for potential breeding, located within the area of 6.87ha of forest identified as potentially supporting breeding habitat.

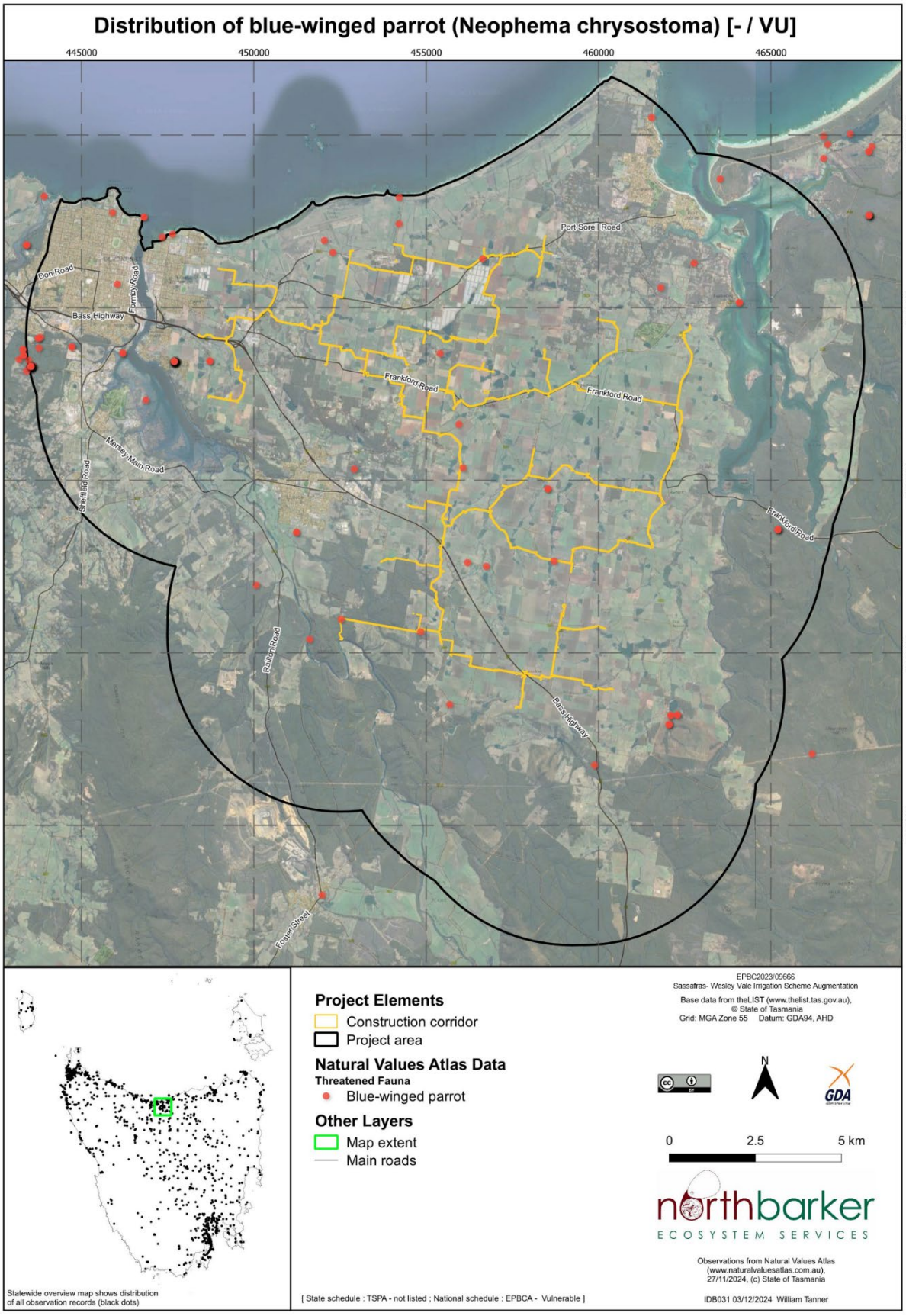

Figure 4.16 Distribution of the Blue-winged parrot (*Neophema chrysostoma*) (NBES, 2025)

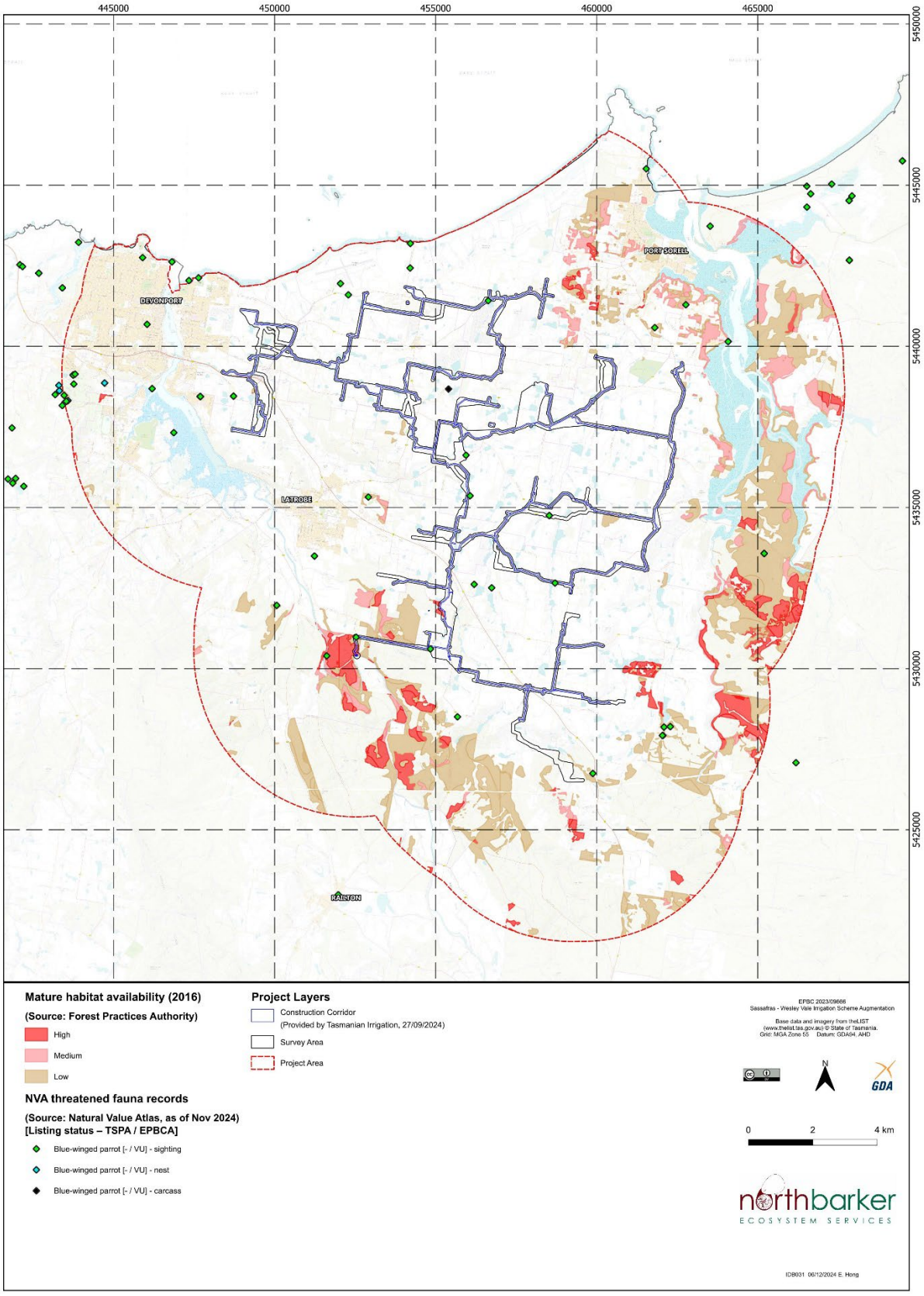

Figure 4.17 Mature habitat availability and blue-winged parrot (*Neophema chrysostoma*) records within the Project Area (NBES, 2025)

Australian grayling (*Prototroctes mareana*)

Table 4.15 provides an overview of habitat requirements and expected presence of the Australian grayling in the Survey Area and broader Project Area while Figure 4.18 depicts known occurrences and species distribution. Further information on survey effort and findings is provided in the Australian Grayling Species Impact Assessment (Elgin, 2025, Annex C).

Table 4.15 Summary of habitat requirements and site presence: Australian grayling

Features	Assessment
POTENTIAL TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	The Australian grayling is a diadromous species, requiring migration between fresh and marine/estuarine environments to complete their life-cycle. Larvae and juveniles inhabit marine and estuarine waters, and adults live in freshwaters. Adults typically occupy restricted reaches of streams (<1km). Their preferred habitats are moderate to fast-flowing glides or runs and are known to use slower-flowing habitats at night. Adults migrate to the lower reaches of freshwater streams and rivers to spawn, which typically occurs in autumn-winter, coinciding with increased river flows. Larvae are swept into estuaries and coastal seas, where they spend approximately 6 months before migrating to freshwaters.
Population parameters	Adults typically migrate downstream to within a few km's of estuaries in early to mid-May for spawning. Spawning migrations have been observed to occur 1-4 weeks before eggs were detected in lower river reaches and estuaries. Rapid downstream migrations have also been observed from late March to late April over distances between 15 and 30 km triggered by controlled environmental flow releases. After spawning in lower freshwater reaches, demersal eggs are dispersed into estuaries where eggs are larvae can spend up to 4-6 months in marine waters before migrating back to freshwaters. Upstream migration of juveniles from estuaries into the lower reaches of rivers has been observed from September to December with peak abundances between late October and Early November. Recruitment and upstream migration of juveniles has been strongly linked to streamflow cues. Exact timings are likely to be spatially variable and may be different in Tasmania. Individuals typically reach 300 mm in total length and may live up to five years.
Distribution and site significance	The Australian grayling has been recorded in catchments throughout the north, west, and east of Tasmania. It is known to be widely distributed and was prolific throughout these areas prior to European colonisation. The Mersey catchment is known to be a remaining stronghold of the species, with several recorded observations in recent surveys. There have also been several recordings of the species within the Sassafras/Wesley Vale area. The species has been recorded both upstream and downstream from the Great Bend site, and it is therefore likely that this reach of the Mersey River provides suitable habitat for residence of adult grayling. It is also highly likely that both adults and juveniles migrate through the Great Bend site during spawning and recruitment migrations. It is unknown whether spawning occurs upstream from the site, and whether Australian grayling eggs are likely to be dispersed through the site.
Survey findings	Initial GIS assessment of the watercourse was conducted to determine if anthropogenic physical barriers existed downstream of the pump station at Great Bend on the Mersey River. Two barriers were identified – a major weir at the tidal interface, and a temporary earth coffer dam located approximately 12km upstream from the Great Bend site. The major weir located downstream is situated on an anabranch of the river and therefore would not prevent fish passage upstream. There have been several recordings of Australian grayling both upstream and downstream from the site. A site survey was conducted to assess the impact of the pump station infrastructure on fish passage and to assess entrainment and mortality risk on 22/08/2024. No surveys were conducted to determine the presence of Australian Grayling as it was assumed the species is present within the river reach due to recent observations. Within the Survey Area, surveys were undertaken for sites identified as potentially supporting graylings and where trenching was proposed for waterway crossings. This consisted of electrofishing activities at one site on Bonneys Creek, three sites on the Panatana Rivulet, and one site on Pardoe Creek across October and November 2024. For each site, three electrofishing sites were sampled, one near the proposed crossing location and two downstream. No graylings were identified at any of the sites. However, despite moderate confidence that graylings do not occur within these waterways, conservatively it is assumed that individuals could still occur due to their presence in the broader catchment.
Habitat presence in Survey Area	Australian grayling inhabits the Mersey River catchment and catchments discharging to Port Sorell estuary (e.g. Panatana Rivulet).

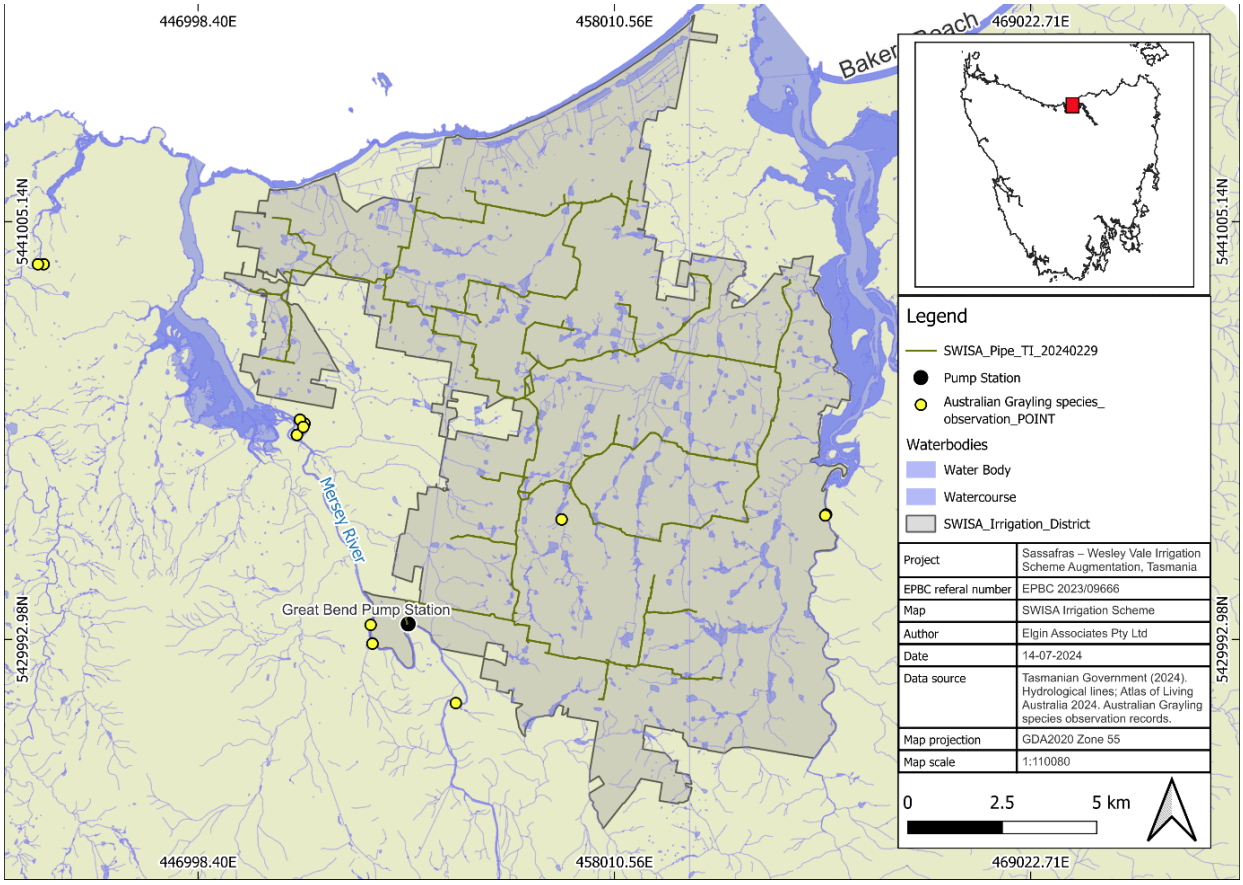

Figure 4.18 Recorded observations of Australia grayling (*Prototroctes mareana*) with reference to the SWISA augmentation (Elgin, 2025)

Central north burrowing crayfish (*Engaeus granulatus*)

Table 4.16 provides an overview of habitat requirements and expected presence of the central north burrowing crayfish (CNBC) in the Survey Area and broader Project Area while Figure 4.19 depicts known occurrences and species distribution. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.16 Summary of habitat requirements and site presence: Central north burrowing crayfish

Features	Assessment
LIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	The CNBC is found in close proximity to streams and springs, largely on natural low lying damp areas, where the soil is high in organic matter. They are associated with riparian vegetation, usually tea-tree swamp and remnants, but in the modified environments within their range they can also be associated with non-native vegetation if aquatic conditions are suitable. As such they are also known from artificial water courses, drains, and damp areas within areas of previous natural CNBC habitat. They are less likely to occur in artificially constructed wet areas such as farm dams and in areas with no hydrological flow. No critical habitat has been described for the CNBC, and there do not appear to be any habitat characteristics that are uniquely necessary for its occurrence.
Population parameters	For the purposes of CNBC population estimates, 'population' refers to the number of animals within the species' range, and any population is considered important under the EPBC Act. Population numbers of CNBC have been estimated by applying density figures derived from other well studied *Engaeus* species to the area of occupancy for this species. Current estimates of total population are between 74,400 and 392,200 individuals. Extent of occurrence is estimated at 514.9km^2 with an area of occupancy of only 0.96 km^2. Population numbers are extremely low for an invertebrate species, particularly considering the range (extent of occurrence) over which it is found.
Distribution and site significance	The CNBC only occurs in central north Tasmania in a triangular area running southwest from Port Sorell to the Railton area and north to Quoiba, near Devonport. The area is bounded approximately to the east and west by the Asbestos Range and the Mersey River respectively, and to the north by the coast, extending about 20km inland. Much of the range of the CNBC is characterised by fertile soils overlying Tertiary basalts, and subsequently much of its range has been extensively cleared for agricultural uses. As a result, populations are largely restricted to isolated fragmented habitat areas. Furthermore, as 90% of its known habitat range is on private land, the species is poorly represented in reserves. The entirety of the Project Area is within the core range of the CNBC and as the habitat availability for this species has been so greatly reduced, any suitable habitat is of significant value.
Survey findings	In excess of 2,000 burrowing crayfish chimneys were recorded at total of 56 locations from the 87 potential CNBC habitat areas where the presence of chimney could be assessed. The number of chimneys at any one location ranged from 1 to 100's. The largest colony was made up of 600 (± 300) chimneys and covered 0.2 ha. Potential habitat includes all stream edges, riparian vegetation, and seasonally wet drainage lines and damp areas. Based on the presence of chimneys, burrowing crayfish were recorded in 80% of the optimal undisturbed habitat areas identified within the Survey Area. This potentially indicates the presence of CNBC. Small patches of *Melaleuca ericifolia* swap forest on drainage lines are a feature of the Project Area and represent remnants of what was likely to be a widespread vegetation community prior to clearing for agriculture. Within the Survey Area, 22 areas of potential CNBC habitat of this type were identified, and burrowing crayfish colonies were located at 14 of the areas surveyed (77.78% of suitable habitat of this type). The findings of the targeted burrowing crayfish surveys show that although potential CNBC habitat is throughout the Survey Area, not all potential habitat is occupied. Of the potential CNBC habitat areas where presence/absence of chimneys was able to be determined, 64.37% were occupied by burrowing crayfish. An additional 20 potential CNBC habitat areas could not be surveyed as the vegetation was too dense to ascertain the presence of burrowing crayfish, it is highly likely that crayfish colonies could exist in these habitat areas and therefore their presence cannot be discounted until their absence can be shown.
Habitat presence in Survey Area	There are 22.18ha of habitat, supporting 166 potential habitat areas; 56 of these areas already have chimneys present. Within this, there are five areas of optimal undisturbed habitat area with native vegetation, four of these have chimneys.

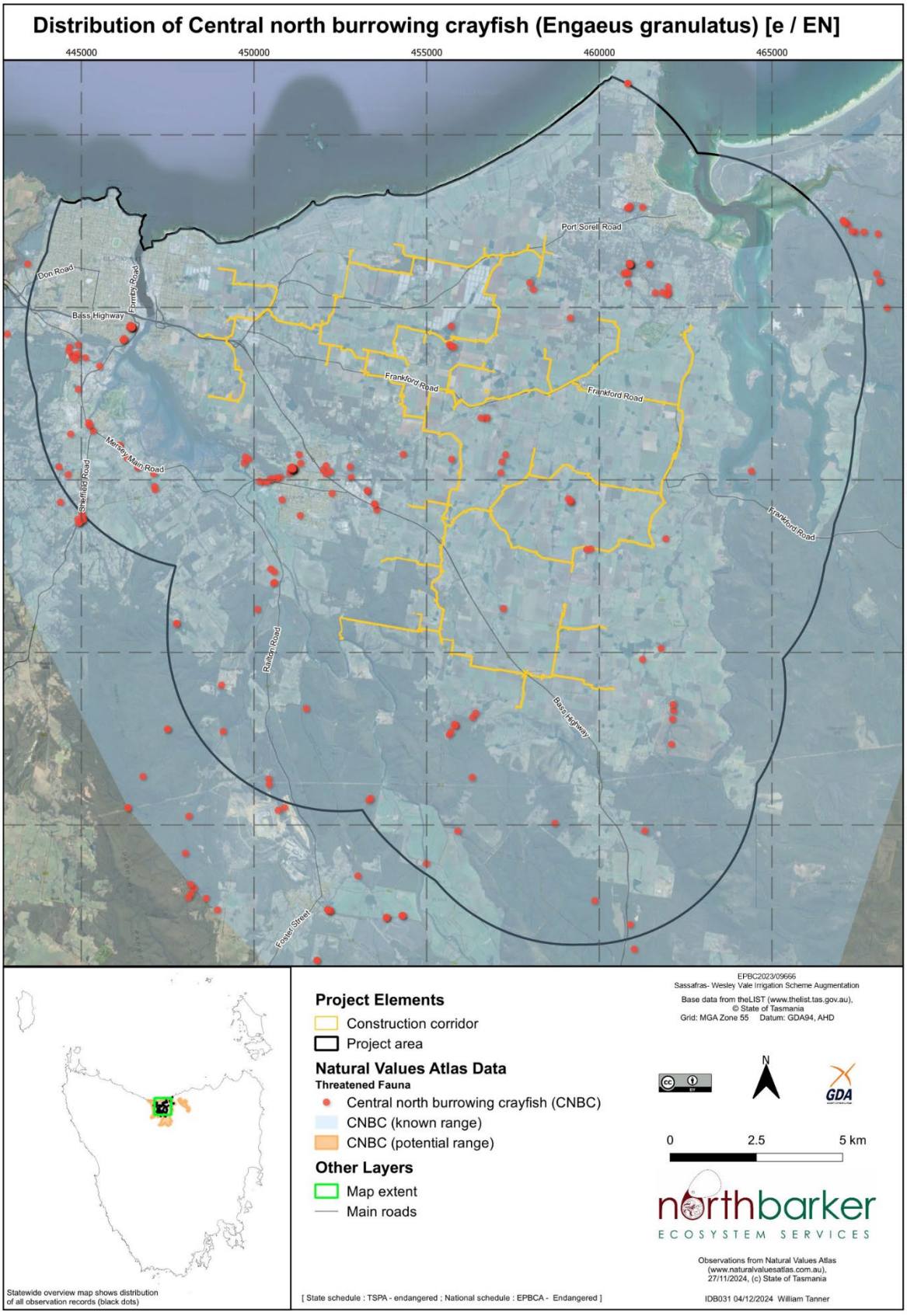

Figure 4.19 Distribution of the central north burrowing crayfish (*Engaeus granulatus*) (NBES, 2025)

Green and gold frog (*Litoria raniformis*)

Table 4.17 provides an overview of habitat requirements and expected presence of the green and gold frog (GGF) in the Survey Area and broader Project Area while Figure 4.20 depicts known occurrences and species distribution. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

NOTE: For the purposes of this assessment, *L. raniformis* is referred to as the green and gold frog. Other names for the species include the southern bell frog and growling grass frog. This is to be distinguished from the green and gold bell frog (*L. aurea*).

Table 4.17 Summary of habitat requirements and site presence: Green and gold frog

Features	Assessment
LIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	Habitat loss and fragmentation are considered a key threat for the GGF. No critical habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat. Due to their biphasic life history, GGFs require both aquatic breeding and terrestrial foraging, shelter, and dispersal habitat. Typically, GGFs breed successfully in permanent freshwater bodies with emergent vegetation. However, breeding success in ephemeral water bodies is possible during favourable seasons, provided the water body remains intact and does not dry out. The species has been recorded in coastal swamps, marshes, dune swales, lagoons, lakes and other estuary wetlands as well as around riverine floodplain wetlands, billabongs and ponds in slow flowing or ephemeral streams. Constructed water bodies such as stormwater detention basins, farm dams, areas bunded by earthworks and by road or rail structures, drains, ditches and other excavated areas that can capture water (including quarries and brick pits) have also been used as breeding habitat. Despite the common association of GGFs with the presence of abundant riparian vegetation (native and non-native) and vegetative complexity along watercourses, GGFs are also found in highly modified environments such as the Project Area. In addition to waterbodies used for breeding, and surrounding refuge and foraging habitats, land connecting waterbodies is important for dispersal of this species. Movement between waterbodies is important for maintaining populations. This dispersal habitats include corridors of native vegetation, drainage lines, and pasture land, but also stormwater culverts, swales, periodically damp areas, easements, laneways, and open grassy areas.
Population parameters	Population number estimates of GGFs in Tasmania are difficult to quantify due to fluctuating abundance year to year and unknow breeding sites. Nevertheless, in 2001 population numbers were estimated at 5,000-10,000, with more recent data not available. Likewise, the extent of occurrence of this species is poorly understood, with estimates in 1999 suggesting that the extent of occurrence is ~45,000 km^2, however this is likely to be less given the declining population trends. According to the significant impact guidelines for this species, any viable population is considered to be an important population. A viable population is one which is not isolated from other populations or waterbodies, such that it can interact with nearby populations or can establish new populations when water bodies fill and become available.
Distribution and site significance	In Tasmania, the species occurs in lowland areas in the south-east (where it is very rare) and north (where it is relatively common). It has declined significantly (over 20%) in range and abundance over the last 30 years, having mostly disappeared from the Midlands, Derwent Valley, much of the Hobart region, and parts of the north-west coast (although historical records are also less common in that region). This decline is primarily attributed to habitat loss and modification, a reduction in available aquatic habitat due to climate change, and the introduction of the chytrid fungus disease (*Batrachochytrium dendrobatidis*), an infectious disease that affects amphibians worldwide, including Tasmania. The GGF is known from the Project Area, particularly the northern half, with 17 records within 500 m of the Construction Corridor and a further 44 records within the Project Area. As such the Project Area overlaps with areas of core range for this species (as defined on the Tasmanian Natural Values Atlas [informed by the FPA] as being all areas within 2 km of a known record from any time or place) and the entire Project Area is within GGF potential range..
Survey Findings	Green and gold frogs were recorded at total of 63 sites during targeted breeding season surveys. These were predominantly audio records (from ground and song meter surveys) with only three sightings. Frogs were heard in abundance with one to many frogs calling in one time period. GGFs were not recorded at the same water body on every visit, and they were most likely to be heard calling in the evening when weather conditions were cool and still. GGF absence was confirmed for 13 water bodies. In addition to targeted survey results, GGF sightings were recorded incidentally at three additional locations (total five frogs) during natural values assessment surveys. These were all recorded in dispersal corridors associated with water bodies in which GGFs were recorded in during breeding season targeted surveys.

Features	Assessment
	The addition of 66 records GGF to the known population represents a seven-fold increase in the number GGF records within 5km of the Project Area. This corresponds to a recorded increase in this GGF population's range, distribution, numbers estimate. Of the 43 breeding habitat zones defined, GGFs were recorded in 36, and confirmed absent in one. In the remaining six breeding habitat zones either GGFs were not detected but not confirmed absent or were unable to be surveyed.
Habitat presence in Survey Area	There is a total of 8.30 ha of dispersal habitat for this species, within this there are 47 dispersal habitat areas. The surrounding habitat within the Survey Area, including modified and native habitat, represents habitat that can also be used for general foraging and refuge/sheltering.

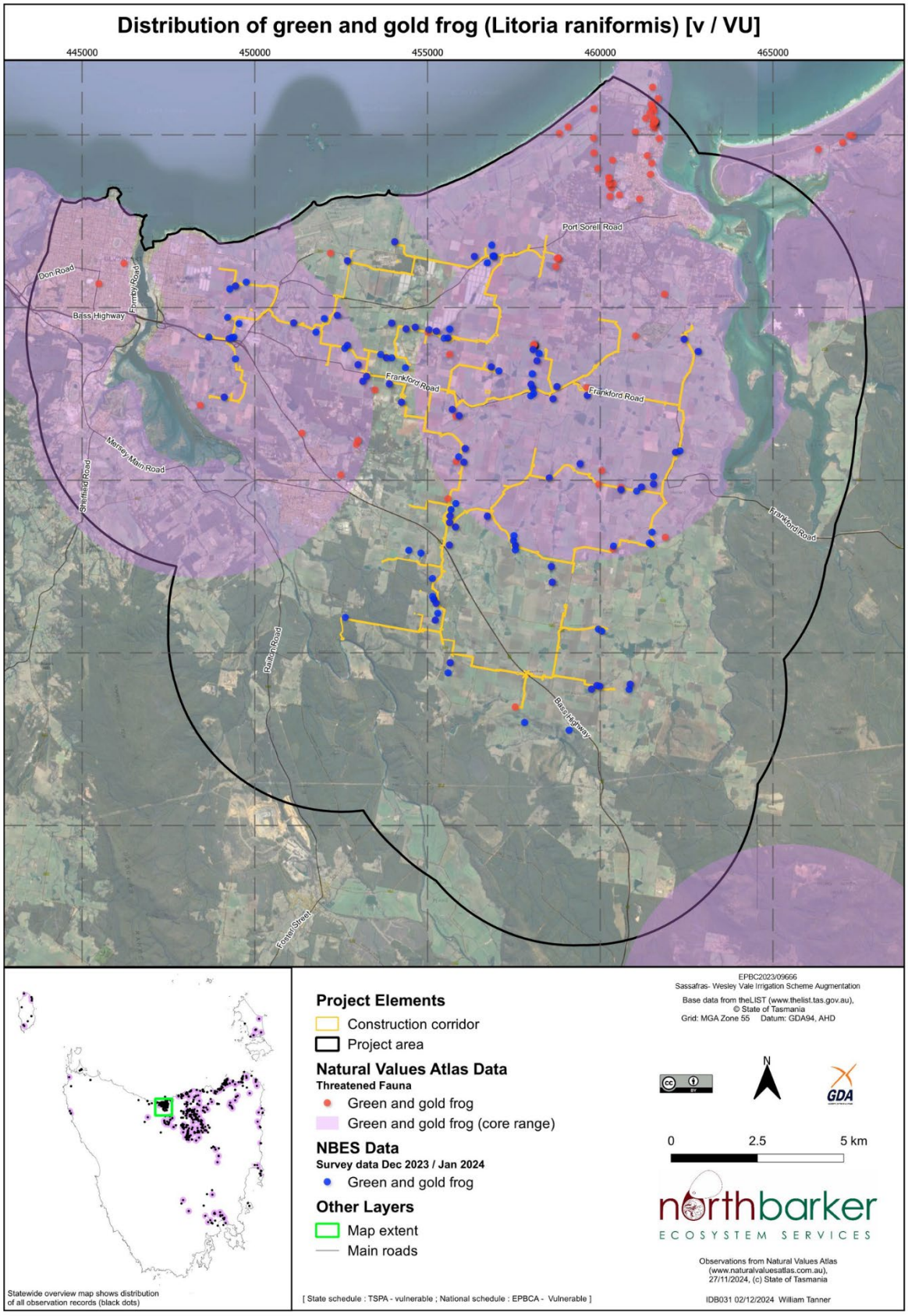

Figure 4.20 Distribution of the green and gold frog (*Litoria raniformis*) (NBES, 2025)

4.3 Listed Threatened Ecological Communities

A Protected Matters Search Report indicated that four threatened ecological communities may occur in the Project Area. The listed Threatened Ecological Communities (TECs) identified as potentially occurring in the Project Area were:

- Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata / E. brookeriana*) (Critically Endangered) (WDBGBG)
- Tasmanian white gum (*Eucalyptus viminalis*) wet forest (Critically Endangered)
- Giant Kelp Marine Forests of South East Australia (Endangered)
- Subtropical and temperate coastal saltmarsh (Vulnerable)

As the latter two ecological communities have no realistic likelihood of occurring within the Project Area and are not at risk of any direct or indirect impact, they were not addressed within the report (further information can be found in the NBES, 2025).

Table 4.18 Listed ecological communities potentially occurring within the Project Area

Common Name	Species Name	EPBC Act Status	Type of presence (EPBC)	Likelihood of occurrence	
				Survey Area	Irrigation District
Tasmanian Forests and Woodlands dominated by black gum or Brookers gum	*Eucalyptus ovata / E. brookeriana*	Critically Endangered	Community likely to occur within the area	**Likely to occur**	**Likely to occur**
Tasmanian white gum	*Eucalyptus viminalis*	Critically Endangered	Community likely to occur within the area	**Unlikely to occur**	**Potential to occur**

Tasmanian forests and woodlands dominated by black gum or Brookers gum

Table 4.18 provides an overview of habitat requirements and expected presence of the WDBGBG community in the Survey Area and broader Project Area while Figure 4.21 depicts distribution of the TEC. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.19 Summary of habitat requirements and site presence: Tasmanian forests and woodlands dominated by black gum or Brookers gum

Features	Assessment
LIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA AND IRRIGATION DISTRICT	
Habitat values	This national ecological community has several variants, notably a major component with a canopy dominated by *Eucalyptus ovata* (black gum) and another dominated by *E. brookeriana* (Brookers gum). The community is generally associated with sites that are typically damp and/or poorly drained, including riverine habitats naturally occurs in mosaics with within forest types. Black gum forest occurs mostly at elevations below 400m ASL, however there are some occurrences associated with impeded drainage up to 700m ASL. Typical sites are drainage flats and valley bottoms. Brookers gum forest typically occur from below 100m ASL to 200m ASL, with isolated occurrences at higher elevations. This community is usually located on moist, rocky soils of dolerite slopes and ridges, alluvial deposits near waterways, and on the margins of blackwood swamp forests.
Population parameters	The dominant species of this community (*Eucalyptus ovata)* typically occurs east of direct line between Burnie and Dover, whereas the *Eucalyptus brookeriana* forest community is most prevalent in the far northwest and King Island, with scattered occurrences elsewhere. The *Eucalyptus ovata* facies of this ecological community is primarily comprised three TASVEG 4.0 communities: • DOV – *Eucalyptus ovata* forest and woodland • DOW – *Eucalyptus ovata* heathy woodland • WBR – *Eucalyptus brookeriana* wet forest The black gum – Brookers gum forest / woodland ecological community mostly occurs in the northern and eastern parts of Tasmania, but small remnants are scattered through the southern and western parts the State. The extent of occurrence therefore approximates the area of Tasmania, about 6,840,000ha. The estimated total area of occupancy of this ecological community (based on TASVEG and associated TASVEG equivalent vegetation units) is 20,000-26,000ha (200-260km^2) and the median patch size is 2.45ha (0.025km^2). The mapped extent of DOV, DOW and Midlands woodland complex (DMW) in TASVEG 4.0 is 16,475ha, with a median patch size of 1.56ha.
Distribution and site significance	The Tasmanian forests and woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata* / *E. brookeriana*) ecological community is restricted to Tasmania and is associated with sites that are typically damp and/or have poor drainage. The Project Area falls mostly within the Furneaux-Flinders bioregion which contains 5.3% (1,170 ha) of the remaining distribution area of the black gum – Brookers gum forest/woodland ecological community (up to 2016). The remainder of the Project Area is within the Tasmanian northern slopes bioregion which contains 16.3% (3,620ha) of this community. The highly modified landscape and lack of native vegetation within the Project Area means that good quality patches of this community contiguous with native vegetation are unlikely to occur.
Survey findings	Within the Survey Area, eight patches of DOV totalling 11.33ha were confirmed. Within the Project Area 280.84ha of DOV has been mapped by TASVEG 4.0; however, verification of these patches would be required to confirm this extent of occurrence. While *E. ovata* patches were recorded within other vegetation communities within the Survey Area, namely DSC, it was not the dominant canopy tree species in any patch other than those mapped as DOV and therefore non-DOV patches do not meet the key diagnostics for the EPBC Act listed community. Patches of DOV were assessed against the condition thresholds set out by the conservation advice for this community to determine if they qualify as the listed community, and the class and category based on condition and quality. Cover of non-native species, patch size, and connectivity with contiguous native vegetation were the main constraints to qualifying patches. This is to be expected in this highly modified landscape. Of the eight confirmed patches DOV patches, two did not meet minimum size requirements (>0.5ha). Of the six patches that meet the minimum size requirement, four patches met the condition thresholds to qualify as black gum – Brookers gum forest / woodland. The two patches that did not qualify did not meet the non-native understory vegetation cover threshold.
Habitat presence in Survey Area	DOV totalling 11.33ha were recorded in the Survey Area. Four patches of black gum – Brookers gum forest / woodland was present in the DOV. One patch (1.82ha) is considered critical to ecological survival (Class A) and three patches (totalling 3.87ha) that retain conservation value and may/may not be isolated from other native vegetation (Class B).

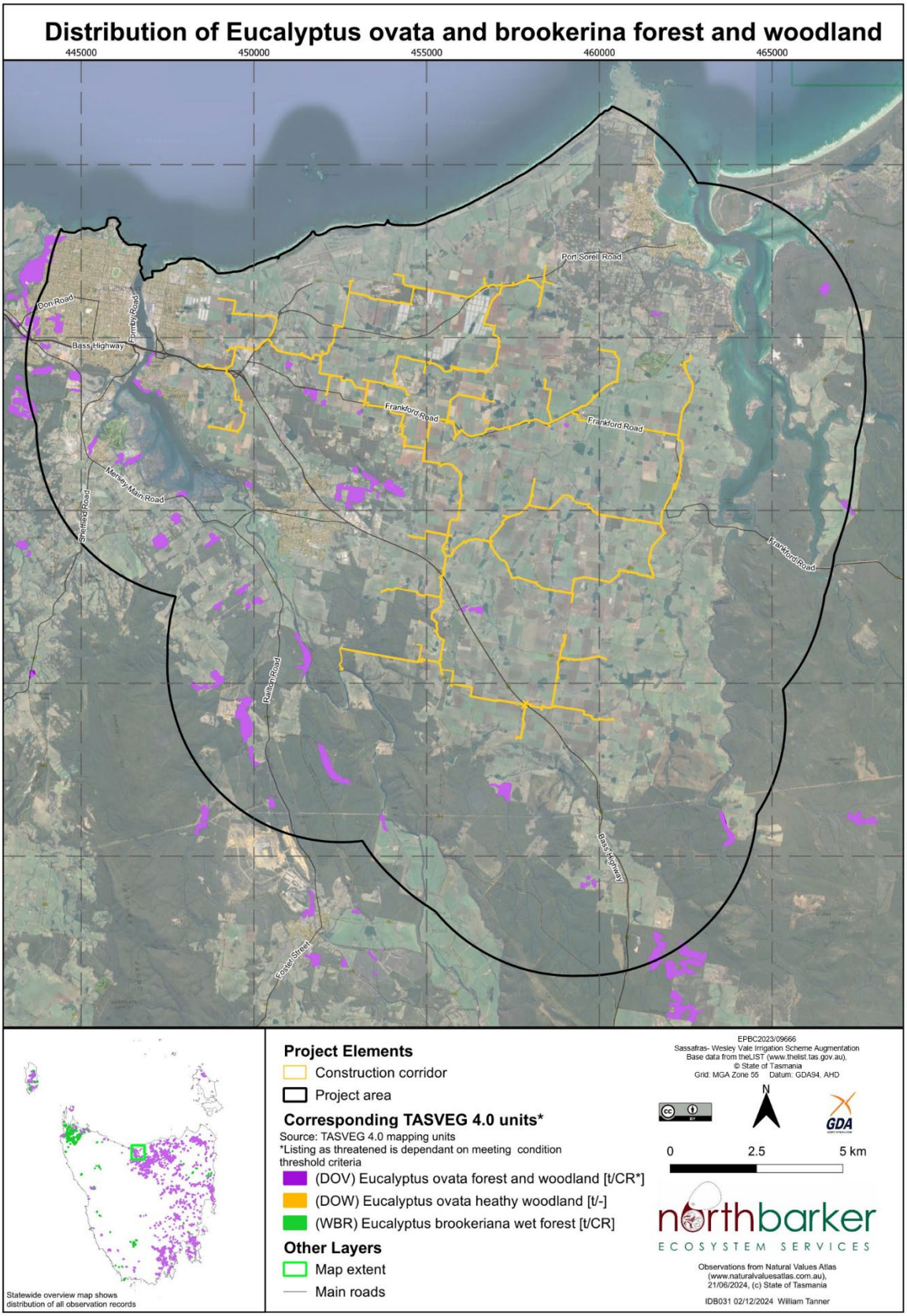

Figure 4.21 Distribution of potential qualifying patches of the Tasmania forests and woodland dominated by black gum/ Brookers gum ecological community (NBES, 2025)

Tasmanian white gum (*Eucalyptus viminalis*) wet forest

Table 4.20 provides an overview of habitat requirements and expected presence of the Tasmanian white gum wet forest TEC in the Survey Area and broader Project Area while Figure 4.22 depicts distribution of the TEC. Further information on survey effort and findings is provided in the Natural Values Assessment (NBES, 2025, Annex B).

Table 4.20 Summary of habitat requirements and site presence: Tasmanian white gum wet forest

Features	Assessment
UNLIKELY TO OCCUR IN CONSTRUCTION PROJECT AREA / POTENTIAL TO OCCUR IN IRRIGATION DISTRICT	
Habitat values	The Tasmanian white gum wet forest ecological community (which corresponds to the TASVEG 4.0 *Eucalyptus viminalis* wet forest – WVI unit) has been predicted as likely to occur within the Project Area. This ecological community intergrades with other vegetation types. Key diagnostic characteristics are used to identify forest patches that may qualify as the Tasmanian white gum wet forest ecological community and define features that distinguish it from other ecological communities. To potentially qualify as this ecological community, patches must: • Occur within Tasmania, including the Furneaux group • Have a tree canopy crown cover of ≥5% • Have a tree canopy dominated by *Eucalyptus viminalis* • Have a wet forest understorey, which is typically dominated by: - Ferns or broad-leaf shrubs; or - Tall (>2m) Leptospermum or Melaleuca spp.; or - Rainforest species; and - Is not dominated by grasses, heath, or narrow-leaf shrubs.
Population parameters	The canopy generally consists of an even-aged stand of tall trees that can exceed 60m in height on fertile sites. The understorey often consists of a dense layer of shrubs and thick layer of leaf litter, which can prevent continuous regeneration of shade-intolerant species, including eucalypts. Regeneration in wet eucalypt forest is typically through disturbance, notably wildfire. This in part explains why forest patches are even aged, as the cohort of regeneration has arisen from the same disturbance event. The canopy is dominated by *Eucalyptus viminalis*, however other species can also be present, including *E. obliqua, E. tasmaniensis, E. regnans, and E. ovata* (in poorly drained areas).
Distribution and site significance	This ecological community can occur in all Tasmanian bioregions; however, it is predominantly recorded in the Northern Slopes and Ben Lomond bioregions. It typically occurs on flats and lower slopes of major river valleys. The estimated total area of occupancy (including the areas on Flinders Island that are not included in the Tasmanian state listed '*Eucalyptus viminalis* wet forest') is around 7,600ha (76km^2) and the median patch size is 2.5ha (0.025km^2). The mapped extent of WVI in TASVEG 4.0 is 7,975ha, with a median patch size of 1.86 ha.
Survey findings	Localised stands of *Eucalyptus viminalis* are present in patches of DSC and DOV vegetation; however, no *Eucalyptus viminalis* wet forest (WVI) was recorded during any of the surveys across the Project Area. Two patches of mapped WVI were visited during field surveys, however these patches were both determined to be DOV with localised dominance of *Eucalyptus viminalis*. Numerous patches of this ecological community are mapped within the Project Area; however, verification of these patches would be required to confirm the extent of occurrence. Assessment of aerial imagery suggests that the mapped WVI in the region is unlikely to be accurate, and if it is, patches are likely to be highly modified. There is high confidence, therefore, that the community is not present in the Survey Area but it could occur as isolated patches in the Irrigation District.
Habitat presence in Survey Area	The community is not expected to occur in the Survey Area.

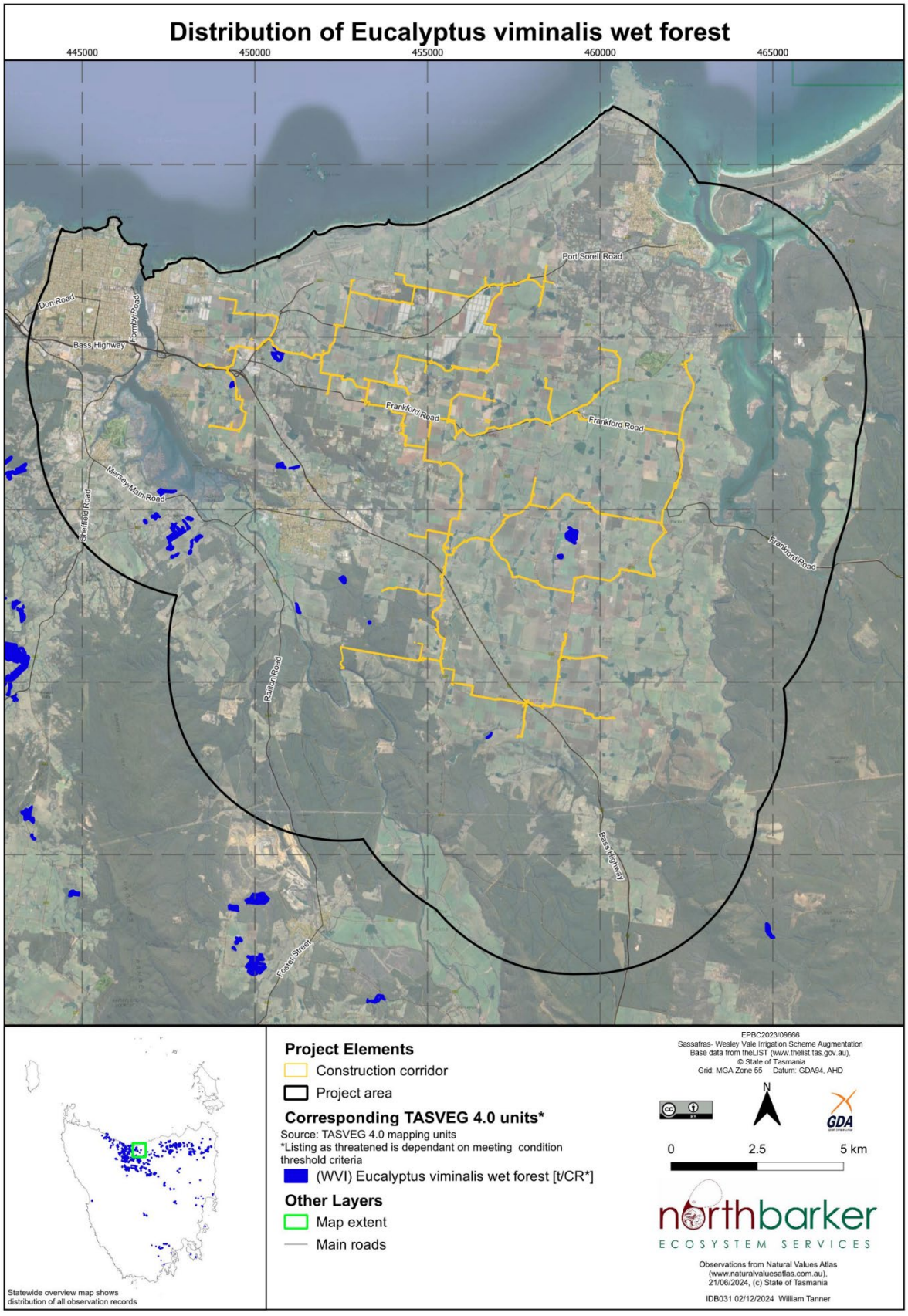

Figure 4.22 Distribution of Tasmanian white gum wet forest (NBES, 2025)

5 Relevant Impacts on MNES

5.1 Introduction

In approaching the assessment of impacts to MNES features, the steps shown in Figure 5.1 are taken:

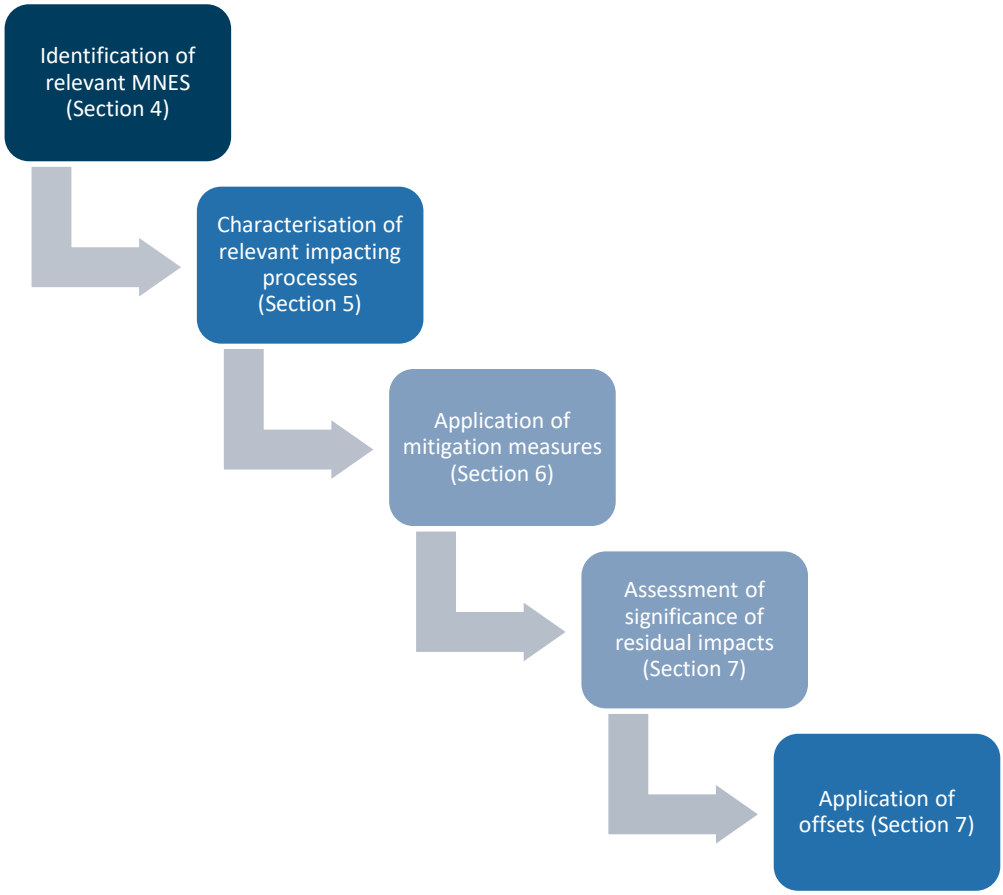

Figure 5.1 Impact assessment steps

This section specifically summarises the MNES of relevance to this impact assessment and sets out the key impacting processes relevant to these matters.

Impact assessment for the SWISA has been based on the additional impacts from the infrastructure and the operational impacts associated with new water access in the Irrigation District. The assessment is comparative to the existing 'baseline' associated with SWIS activities, approved under the existing Controlled Activity Approval EPBC 2010/5327 and therefore is cumulative to these existing impacts. As the SWIS has been in place for over 10 years, it is considered appropriate to adopt this as a baseline rather than undertake an assessment comparative to pre-SWIS background. Despite this, where possible, data from the operation of the SWIS has been used to inform the assessment.

The impacting processes and descriptions provided below relate to the unmitigated case, prior to implementation of design refinements and key management strategies described in Section 6. The residual impacts to MNES and their significance are provided in Section 7.

5.2 Impacting Processes

5.2.1 Overview

For the purposes of this impact assessment, the following key impacting processes have been identified for the SWISA:

1. Construction impacts
    i. Habitat clearing and modification
    ii. Construction vehicle collision (including strike by construction vehicles)
    iii. Trenching
    iv. Construction noise
    v. Introduction of predators (direct and indirect)
    vi. Introduction of weeds
2. Operational impacts
    i. Operational vehicle collision
    ii. Land use changes, including the introduction of more water to the landscape
    iii. Grazing pressures
    iv. Nutrient enrichment and chemical drift from crops and pastures
    v. Entrainment within pump infrastructure
    vi. Changes in flow due to water extraction and dam releases
    vii. Thermal pollution from dam releases.

These have both permanent and temporary impacts, depending on the impacting process and receptor. Temporary impacts to a species or community are those impacts that do not cause permanent or long-term change to a species population or community.

The most relevant long-term impact will be permanent habitat conversion through clearing or other modifying activities. This has the potential to cause the loss of habitat utilised by threatened species and/or direct areas of threatened ecological community. Other impacting processes can also have long-term impacts where they involved acute effects (e.g. mortality of species) at a scale that is significant to a population. Most other processes, however, will lead to temporary disturbance only.

Based on the construction timing (Table 2.4) construction of key infrastructure would occur over a maximum 2.5-year period (commencing May 2025 with final commissioning by October 2027). Cleared areas will be rapidly rehabilitated to form an open grassland community. The impact disturbance period for construction areas would be up to approximately three years. Operational and permanent habitat impacts will continue for the life of the SWISA.

In assessing the significance of habitat-related impacts, key habitat features have been mapped for all species, including breeding areas where relevant. These features differ between species. The extent to which different impacts to different habitat types are significant for individual MNES features depends on their specific context and is discussed in Section 7. Importantly, however, *significant impacts* relate to a subset of permanent and/or temporary impacts, where the relevant significant impact assessment thresholds have been met.

5.2.2 Impacting Processes Description

Habitat Clearing and Modification

Habitat clearing and modification principally pertains to the clearing of vegetation to facilitate construction of project infrastructure (e.g. pipes, pump stations). This process encompasses both permanent alterations associated with the final infrastructure footprint and temporary modifications related to the broader construction corridor, which will undergo rehabilitation post-construction. The total disturbance area is 320.85 hectares, encompassing the pipeline alignment, supporting buffers, and key standalone infrastructure (e.g. GPBS, SHBT, SBPS). It is important to note that not all areas within this footprint will be relevant habitat for MNES.

Habitat modification also relates to any disturbance of waterways at pipeline crossing points. This will consist of either trenching as the preferred methodology or directional drilling where needed to avoid disturbance to waterways supporting threatened species (for example CNBC, Australian grayling).

Clearing and habitat loss also creates consequential impact of potentially fragmenting movement corridors for fauna. This is of relevance to fauna that require habitat cover when moving between core habitat areas, whether as part of standard behaviour or as a form of protection from predation.

Clearing activities will also displace fauna from impacted areas, either temporarily during construction works or permanently due to changes in habitat requirements. This includes impacts associated with direct translocation, such as the use of spotter-catchers to relocate fauna to alternative habitat. Where suitable alternative habitat is not available in the area (e.g. habitat that the species uses and not subject to existing use/competition) this may lead to the subsequent mortality of relocated/displaced species.

Note that temporary impacts consist of disturbance to habitat during construction (e.g. tree clearing, earthworks) where there are no impediments to post-construction remediation. This consists of majority of the disturbance area except where there will be permanent infrastructure or areas required to be kept clear for maintenance purposes. All areas subject to temporary disturbance will be remediated, as set out in the CEMP (Annex F).

Construction Vehicle Collision

Vehicle strike of fauna will be a potential threat during construction, especially:

- During vegetation clearing and road construction (i.e. heavy construction machinery such as bulldozers).
- Use of access tracks by light and heavy vehicles.

A full construction schedule has not yet been developed so the full range of vehicle movements has not yet been determined. Impact assessments, therefore, relate to assumed risks of strike in key areas. Modelling of traffic incidents has been undertaken (reported in NBES, 2025) which indicate a predicted increase of 0.2 incidents per year, representing an average strike of fauna of one every five years. As the SWISA will have a construction period less than five years, this indicates a low likelihood of additional strike.

Trenching

Trenching will occur in the Construction Corridor after clearing. Trenching presents a potential risk to fauna as a result of:

- Falling into the trench causing injury.
- Entrapment of fauna in the trench, resulting in fauna stress or mortality as a result of drowning, exposure (heat, hypothermia), increased predation.
- Burial of animals during backfilling.

Construction Noise and Vibration

Construction will generate a range noise sources, including use of machinery (i.e. trenching, earth-moving equipment, pumps etc.) and potentially including blasting. Noise can lead to both acute (especially blasting) or chronic/behavioural impacts (e.g. avoidance of areas, daytime noise affecting nocturnal fauna etc.).

A full construction schedule has not yet been developed so the full range of noise effects has not yet been determined but the key range of likely construction noises has been assessed. The exception is for modelling of construction noise impacts associated at Devils Road, associated with the GBPS (Tarkarri, 2024, reported in Enviro-Dynamics, 2024).

Introduction of Predators

Clearing of vegetation can create preferential pathways for the introduction and spread of predators (e.g. cats from farm properties). This can also include changing the way in which native predators are able to hunt (e.g. by reducing understorey in which prey species can hide). Additionally, the import of construction materials may lead to the introduction of invasive fauna species which can then become established in the environment. The relevance of this impacting process depends on the particular predator/introduced species and its relationship to a particular MNES species.

Introduction of Weeds

Import of construction material, such as earth and rock, and the movement of construction vehicles from outside of the immediate region can lead to the introduction and spread of weeds. Weeds can establish in native habitat, especially if already subject to disturbance (i.e. areas cleared for construction) and eventually outcompete local flora species and, in extreme cases, lead to the transformation of ecological communities. Where this occurs, it can also lead to the degradation of native fauna habitat.

Operational Vehicle Collision

As project infrastructure will be subject to ongoing maintenance, there will be an operational phase risk of strike of fauna by maintenance vehicles. This will be lower than during construction phase due to lower frequency of vehicle movements but may still cause isolated instances of fauna injury or mortality.

Land Use and Hydrological Changes

The SWISA is intended to irrigate almost 18,000ha of land, including areas already subject to irrigation, and new areas that have not been previously irrigated. The SWISA could alter hydrological patterns and landscape characteristics in both existing and newly irrigated areas, including surface and ground water hydrology. This will alter wet-dry cycles in farmland areas.

These changes will be relevant for water-sensitive fauna and may also have indirect/incidental effects for MNES features along the margins of irrigation districts.

Grazing
Related to changes in landscape characteristics and broader use, grazing activities may change within the SWISA area due to ability to more reliable watering regimes. This may lead to increased grazing pressure on native vegetation communities (e.g. trampling, disturbance of banks of waterways, direct removal of vegetation) and increased pollutant loading in waterways.

Nutrient Enrichment and Chemical Drift
Changes in land use may lead to increased pollutant loads (e.g. sediments, nutrients, pesticides) across the landscape as more areas are subject to year-round farming. This can lead to downstream water quality impacts through the runoff of nutrients and chemicals from farmlands and the drift of chemicals from farmland spraying.

Note that the extent of land use changes, grazing and nutrient enrichment/chemical drift impacting processes is highly dependent on the actual uptake of irrigation by individual farming properties across the SWISA region. Of the properties likely to access water through the SWISA infrastructure, approximately 80% are already supported through the SWIS and operating under Farm WAP which establish environmental management protocols. While there may be increased consistency of water access for some of these properties, the most relevant changes will be for the remaining 20% of properties that will be newly receiving scheme water.

Entrainment within Pipe and Pump Infrastructure
Australian graylings could become entrained within intake infrastructure on the GBPS. This is of relevance to juvenile fish and eggs/larvae that are not able to swim at sufficient speeds to overcome the intake velocity. This could be of relevance to the species due to the mortality caused at this point in the species lifecycle, leading to overall impacts to the species.

Altered Flows
The SWISA will involve intake of water from the Mersey River together with a regime of releases from Parangana Dam to supplement low flow conditions during summer months, if required. Intake poses the risk of significantly reducing available water during naturally low flow conditions which can both available of aquatic habitat in the river and lead to changes in the flow-related cues for migration of Australian graylings. Similarly, while releases from the Parangana Dam can provide sufficient water to maintain baseflow requirements in the river, these releases may impact on flow-related cues as they may not match natural flow processes.

Thermal Pollution
Releases from the Parangana Dam are likely to include deeper cold water within the dam due to the stratification that is known to occur. The release of cold water has the potential to impact on aquatic species, such as the Australian grayling, by either causing mortality/morbidity in fish or changing behavioural patterns.

5.3 Matter-Specific Impacts

5.3.1 Relevant Matters

The following MNES are known or likely occur in the Project Area (see Section 4):

- Listed Threatened Ecological Communities – Critically Endangered
  - Tasmanian Forests and Woodlands dominated by black gum or Brookers gum
  - Tasmanian white gum (*Eucalyptus viminalis*) wet forest

- Listed Threatened Species – Critically Endangered and Endangered
  - Eastern quoll
  - Tasmanian devil
  - Swift parrot
  - Tasmanian wedge-tailed eagle
  - Central north burrowing crayfish
  - Robust fingers.
- Listed Threatened Species – Vulnerable
  - Spotted-tail quoll
  - Eastern barred bandicoot
  - Tasmanian masked owl
  - Blue-winged parrot
  - Australian grayling
  - Green and gold frog
  - Tailed spider orchid
  - Wrinkled dollybush.

Table 5.1 summarises impacting processes relevant to each of the above MNES species and communities. Note that these matters have been confirmed based on surveys within the Construction Corridor and adjoining areas and therefore represent the matters that could be subject to direct and indirect impacts, especially during construction. Irrigation areas more broadly have not been subject to comprehensive survey so could support other matters. However, as part of the Farm WAP process intended to be adopted for individual farming properties, no clearing and direct impact on protected matters can be undertaken and therefore further significant impact is unlikely.

Further discussion on the relevant impacts for each MNES species and communities is provided below, together with the quantification of habitat/community loss in the Construction Corridor prior to avoidance and mitigation measures.

Construction-related impacts to the tailed spider orchid and robust fingers relate to loss of potential/buffer habitat within the Construction Corridor. While these species have not been identified within the Construction Project Area and the mapped potential/buffer habitat is of marginal value, it has been identified for management purposes. For all three threatened flora species (tailed spider orchid, robust fingers, wrinkled dollybush) and the Tasmanian white gum forest (not present in Construction Project Area but potentially present in Irrigation District) operational impacts could be indirectly affected by the project through weed spread, grazing and pollutant loading. The risk of weed spread is not materially different to existing risks associated with agricultural land in the SWIS footprint and can be controlled through standard operational measures (discussed in Section 5.3.2). Further, the Farm WAP process provides for a site-based assessment for these matters for any farms looking to access water which includes measures to reduce landscape style impacts (e.g. use of buffer zones).

Table 5.1 Relevant impacting processes for MNES features known or likely to occur in the Project Area

Matter	Construction						Operational						
	Habitat impact	Vehicle strike	Trenching	Noise	Predators	Weeds	Vehicle strike	Land use change	Grazing	Pollutants	Entrainment	Flow Alteration	Thermal Pollution
WDBGBG community	X					X		X	X	X			
Tasmanian white gum wet forest								X	X	X			
Eastern quoll	X	X	X	X	X		X	X					
Tasmanian devil	X	X	X	X			X	X					
Swift parrot	X			X				X					
Tasmanian wedge-tailed eagle	X			X			X	X					
Central north burrowing crayfish	X							X	X	X			
Robust fingers	X					X		X	X				
Spotted-tail quoll	X	X	X	X	X		X	X					
Eastern barred bandicoot	X	X	X	X	X		X	X	X				
Tasmanian masked owl	X			X				X					
Blue-winged parrot	X			X	X			X					
Australian grayling	X							X		X	X	X	X
Green and gold frog	X	X	X	X	X		X	X	X	X			
Tailed spider orchid	X					X		X	X				
Wrinkled dollybush								X	X				

5.3.2 Tasmanian Forests and Woodlands Dominated by Black Gum and Brookers Gum Woodland and Tasmanian White Gum (*Eucalyptus viminalis*) Wet Forest

The most relevant potential direct impact to the WDBGBG community is clearing as part of construction of infrastructure. Within the Construction Project Area (of which the Construction Corridor is a subset) there is 11.34ha of WDBGBG. This is the conservative potential area that could be impacted, although even at maximum disturbance not all this area would be lost.

Construction works could potentially also lead to indirect impacts in the form of introduction of invasive species, especially perennial weeds such as blackberry, gorse and Spanish heath. This is of highest risk for areas where construction occurs within or directly adjacent WDBGBG communities.

As there is no Tasmanian white gum wet forest in the Construction Project Area, there is no risk of direct or indirect impacts to this community from construction.

The implementation of the SWISA will allow for additional farmland to access water and therefore could facilitate landscape changes, including clearing, changes in grazing processes, and changes in hydrology and water quality. The extent of unmitigated impacts cannot be quantified as it will be dependent upon the number of farms that access water and the nature of WDBGBG and Tasmanian white gum wet forest communities on relevant land. Estimates are that of the farming properties that would access the SWISA water, 80% already access water through the SWIS and are therefore likely to have been subject to existing landscape changes. These potential impacts, therefore, are most relevant to the remaining 20% of farmland, of which only a subset would likely have WDBGBG or Tasmanian white gum wet forest present.

It is unlikely there would be cumulative impacts with the SWIS as the properties already accessing water under the SWIS will have already been subject to landscape changes.

No recovery plan has been adopted for either community.

5.3.3 Dasyurids

The SWISA construction can potentially cause direct impacts for eastern quolls, Tasmanian devils and spot-tailed quolls through the destruction or disturbance of den or layout sites, including disruption during breeding season, as well as through the injury of individuals within construction trenches or from construction vehicles. Based on habitat modelling, up to 129.73ha of denning and foraging habitat (92.05ha optimal habitat, 37.68ha sub-optimal) and 1,538ha of non-denning foraging habitat could be impacted within the Construction Project Area, and construction noise disturbance could occur for at least one known den site and up to seven potential den sites. Estimates on roadkill impacts anticipate a potential increase in 0.2 incidents per year (i.e. strike of quolls or devils) comparative to the current average of 17 incidents per year, without mitigation. No quantification on potential entrapment in trenches is possible.

Construction works are unlikely to lead to the introduction of introduced species that are a threat to dasyurids (e.g. dogs, cats) as no domestic pets would be allowed as part of construction works.

Landscape changes associated with new water access could lead to modification of habitat for dasyurids for the 20% of sites expected to be additional to the existing SWIS-related properties. Additionally, the creation of new cleared corridors could facilitate the spread of cats further through the landscape, leading to increased predation on dasyurids.

It is unlikely there would be cumulative impacts with the SWIS as the properties already accessing water under the SWIS will have already been subject to landscape changes.

Under the Draft Recovery Plan for the Tasmanian Devil (DPIPWE, 2010), the principal threat to the Tasmanian devil recovery is the ongoing spread of DFTD. Other lower priority threats consist of lack of genetic diversity, competition with foxes, habitat degradation, low resilience to ecosystem changes, vehicle strike, and climate change. Habitat disturbance and vehicle strike remain the most relevant of these threats in the context of the SWISA works.

There are no national recovery plans in place for the eastern quoll or spot-tailed quoll.

5.3.4 Parrots and Tasmanian Masked Owl

Under the National Recovery Plan for the Swift Parrot (DCCEEW, 2024), the principal threats to swift parrot recover are habitat modification, especially from land clearing, development and agricultural tree senescence and dieback; predation by sugar gliders; collision with fences, windows and cars in urban areas; competition with native and non-native species; climate change; and illegal capture and trading. Habitat modification remains the most relevant of these threats in the context of the SWISA works.

There are no national recovery plans in place for the blue-winged parrot or Tasmanian masked owl.

Project-related impacts for both parrot species and the masked owl consist of potential direct impact during construction through the clearing of foraging and nesting habitat, construction noise disturbance of retained foraging and nesting habitat, and facilitated impacts through subsequent landscape changes leading to further habitat disturbance. Within the Construction Project Area, swift parrot, blue-winged parrot and Tasmanian masked owl habitat consists of up to 188 trees. This consists of:

Swift parrot

- 62 trees suitable for foraging
- 142 trees suitable for breeding
- Additional 39 trees suitable for both foraging and breeding

Blue-winged parrot

- 181 trees suitable for breeding.

Tasmanian masked owl

- 69 trees suitable for breeding.

Note that these trees overlap with each other (see further Table 7.7 and Table 7.8).

Across the remainder of the Irrigation District and Operational Area, there is estimated to be between 12,335 and 36,389 habitat trees. Most of these trees (60-70%) are in forested areas away from agricultural land and therefore unlikely to be in areas affected by farming activities.

It is unlikely there would be cumulative impacts with the SWIS as the properties already accessing water under the SWIS will have already been subject to landscape changes.

5.3.5 Tasmanian Wedge-tailed Eagle

Project-related impacts to the Tasmanian wedge-tailed eagle consist of potential direct disturbance during construction by undertaking works within 500 to 1,000m line-of-sight of known eagle nests during breeding season, which can cause eagles to abandon nests. These potential disturbance works include clearing works and construction-related noise. There are seven known eagle nests within 1,000m line of site of the Construction Corridor, four of which are also within 500m and therefore could be affected.

There is also possibility of vehicle strike of eagles but, based on existing roadkill data, this would be extremely rare such that an increase in construction vehicles would not likely make a material difference.

Works during the operational phase, such as maintenance of pipeline infrastructure, could also cause disturbance to the same eagle nests through noise and visual effects.

The works are unlikely to facilitate further loss or disturbance or nesting trees from water access based on the location of nesting sites comparative to potential new farming areas.

It is unlikely there would be cumulative impacts with the SWIS as the properties already accessing water under the SWIS will have already been subject to landscape changes.

There are no national recovery plans in place for the Tasmanian wedge-tailed eagle.

5.3.6 Central North Burrowing Crayfish

The construction of the SWISA could have direct impacts to CNBC individuals through the destruction of chimneys at pipeline crossing locations. A total of 56 chimney locations are known across the Construction Project Area (22.18ha of habitat) and could be impacted through waterway crossings, riparian vegetation clearing, waterway drainage, soil compaction along banks, and introduction or spread of weeds.

Landscape changes associated with new water access could lead to modification of habitat for CBNCs if present on the 20% of sites expected to be additional to the existing SWIS-related properties. This includes potential impacts to water quality and drainage patterns downstream of new farming areas, including the introduction of pesticides and fertilisers into waterways.

It is unlikely there would be cumulative impacts with the SWIS as the properties already accessing water under the SWIS will have already been subject to landscape changes.

There are no national recovery plans in place for the CNBC.

5.3.7 Orchids

The SWISA construction can cause the loss of potential habitat for robust fingers and tailed spider orchid within the Construction Corridor. Based on on-ground assessments, only a small proportion of the Construction Project Area (0.45ha) contains optimal orchid habitat that could be disturbed, none of which would represent a permanent impact. An additional 3.86ha of potential/buffer habitat occurs within the Construction Project Area, representing area for management around optimal orchid habitat.

Facilitated impacts could occur to orchids where new water connections lead to the clearing of farmland supporting the species or potential habitat. This includes the direct loss from clearing together with indirect impacts associated with changes in hydrological regimes and introduction or spread of weeds.

Under the Threatened Tasmanian Orchids Flora Recovery Plan (TSS, 2017), which covers both the robust fingers and the tailed spider orchid, high priority threats to the species include inappropriate fire regimes and habitat disturbance, combined with the effect of the small population sizes of many orchid species. Habitat disturbance will be the most relevant of these threats in the context of the SWISA works.

5.3.8 Eastern Barred Bandicoot

The SWISA construction can cause potential direct impacts for eastern barred bandicoots through the clearing of habitat, including ground cover between habitat patches, as well as through the injury of

individuals within construction trenches or from construction vehicles. Based on habitat suitability assessments, majority of the Construction Corridor (320.85ha, 99.68%) represents habitat suitable for foraging and dispersal for the eastern-barred bandicoot and therefore will be subject to temporary disturbance. Only 1.02ha of habitat will be permanently lost in the footprints of the balance tanks and pump stations. Estimates on roadkill impacts anticipate a potential increase of up to 0.9% for all relevant species, comparative to existing annual roadkill incidents (452/yr). Specific counts for eastern barred bandicoots are not available. No quantification on potential entrapment in trenches is possible.

Construction works are unlikely to lead to the introduction of introduced species that are a threat to dasyurids (e.g. dogs, cats) as no domestic pets would be allowed as part of construction works.

Landscape changes associated with new water access could lead to modification of habitat for bandicoots for the 20% of sites expected to be additional to the existing SWIS-related properties. Additionally, the creation of new cleared corridors could facilitate the spread of cats further through the landscape, leading to increased predation on bandicoots.

It is unlikely there would be cumulative impacts with the SWIS as the properties already accessing water under the SWIS will have already been subject to landscape changes.

There are no national recovery plans in place for the Tasmanian population of the eastern barred bandicoot (there is a recovery plan for the mainland subspecies but does not cover Tasmania).

5.3.9 Australian Grayling

Under the National Recovery Plan for the Australian grayling (DSE, 2008), the principal threats to Australian grayling recovery are changes in river flows and passage (e.g. barriers, river regulation), changes in water quality and siltation, introduced fish and disease, fishing, and climate change. Changes in river flows and impacts to water quality are the most relevant of these threats in the context of the SWISA works.

Potential SWISA impacts to the Australian grayling are divided between impacts for graylings within the Mersey River (associated with water intake and release regimes) and within the smaller waterways of the Construction Project Area and Irrigation District.

Mersey River

Construction of the GBPS upgrades could lead to water quality impacts in the Mersey River that could impact on graylings. Entrainment or trapping is highly unlikely based on the nature of the works. The station is also not expected to cause barriers to fish movement due to the retention of a low-flow channel within the river.

Operation of the SWISA could lead to grayling impacts through both take of water and proposed releases from the Parangana Dam. Water extraction through the GBPS can lead to entrainment and mortality of graylings, especially those with weaker swimming abilities. Depending on flow within the river, extraction can also impact on fish migration patterns (which are linked to natural changes in river flow). Releases from the Paragana Dam, proposed for when water levels are low, could also lead to changes in flow regimes as well as the release of cold water that could impact on graylings.

There are no anticipated facilitated impacts to the Mersey River population. Additionally, as the ‘base’ case for the Project includes the Paragana Dam and GBPS as existing infrastructure elements in the river, all assessments on SWISA-specific impacts are ‘cumulative’ to the impacts of these existing structures.

Construction Project Area and Irrigation District

Construction impacts to the Australian grayling consist of habitat disturbance at waterway crossings where not using HDD. A total of eight crossings are proposed for waterways that have been identified as potentially supporting graylings based on habitat characteristics. This can lead to habitat disturbance through changes in flow and water quality impacts.

Operational phase impacts could occur through facilitated landscape changes for farms accessing new water. This could include changes in water quality in downstream watercourses through the introduction of fertilisers and pesticides.

It is unlikely there would be cumulative impacts with the SWIS as the properties already accessing water under the SWIS will have already been subject to landscape changes.

5.3.10 Green and Gold Frog

Under the National Recovery Plan for the Southern Bell Frog (Clemann & Gillespie, 2012), the principal threats to GGF recovery are loss and degradation of aquatic and riparian habitat, including through changes in wetland flow patterns, grazing along margins of waterbodies, river impoundments and regulation, and general clearing; spread of chytridiomycosis; predation by introduced fish; introduction of biocides into water; and ultraviolet radiation. Aquatic and riparian habitat loss are the most relevant of these threats in the context of the SWISA works.

The construction of the SWISA could have direct impacts to GGFs through destruction of habitat in infrastructure footprint. A total of 8.3ha of dispersal habitat is located within the Construction Project Area (consisting of 47 different dispersal habitat areas) and could be impacted through clearing, waterway drainage, introduction or spread of weeds and disease. There is also further modified and native habitat throughout the Construction Project Area that could be opportunistically used for foraging and refuge/sheltering habitat by individual frogs.

Landscape changes associated with new water access could lead to modification of habitat for GGFs if present on the 20% of sites expected to be additional to the existing SWIS-related properties. This includes potential impacts to water quality and drainage patterns downstream of new farming areas, including the introduction of pesticides and fertilisers into waterways. Changes in dam use across farmland could also reduce habitat for the species due to the importance of these features as dispersal habitat, especially during periods of drought.

It is unlikely there would be cumulative impacts with the SWIS as the properties already accessing water under the SWIS will have already been subject to landscape changes.

5.3.11 Wrinkled Dollybush

There is no potential habitat for the wrinkled dollybush within the Construction Project Area and therefore direct impacts are not expected.

Facilitated impacts could occur to the species where new water connections lead to the clearing of farmland supporting the species or potential habitat. This includes the direct loss from clearing together with indirect impacts associated with changes in hydrological regimes and introduction or spread of weeds.

Under the National Recovery Plan for the Wrinkled Cassinia *Cassinia rugata* (Carter & Walsh, 2006), key threats to the species consist of inappropriate fire regimes, road works through habitat areas, weed invasion, and altered hydrology, especially along roadsides. Potential hydrology changes associated with farm water access is the most relevant of these threats in the context of the SWISA works.

6 Proposed Avoidance and Mitigation Measures

The species-specific measures for proposed avoidance and mitigation measures for the construction and operational phases of the project are presented in this section.

6.1 Impact Avoidance

To minimise the extent of impacts from the SWISA, detailed alignment surveys were undertaken to inform potential realignments and/or redesigns to avoid impacts. Noise assessments were also undertaken around potential Tasmanian devil denning locations to further refine construction in these areas. Resulting from these, the following impact avoidance measures were integrated into the SWISA design:

- Multiple pipeline realignments to minimise clearing/disturbance of key habitat and vegetation communities
- Identification of several waterways where pipeline crossing will utilise HDD methods rather than trenching to avoid surface impacts
- For other waterways, realignment of the pipeline crossing location to avoid key aquatic habitat
- Conducting construction works outside key species breeding seasons – while construction works are intended to be undertaken over a two-year period, it will be possible to avoid construction around key habitat areas around relevant breeding times, as per construction management requirements described in Section 6.2.

Table 6.1 provides a summary of the specific habitat impacts avoided as part of these works for relevant project MNES. The significance of these residual impacts is then assessed in Section 7. Note this does not include any direct habitat disturbance for the wrinkled dollybush as no habitat for this species has been identified in the Construction Project Area.

Table 6.1 Direct habitat impacts avoided

MNES	Habitat in Construction Project Area	Residual impact after avoidance*	Avoided impact
WDBGBG	11.33ha	0ha	11.33ha
Tasmanian white gum wet forest	N/A	N/A	N/A
Dasyurids:			
• Optimal denning habitat	91.99ha	8.52ha*	83.47ha
• Sub-optimal denning habitat	35.56ha	2.94ha*	32.62ha
• Non-denning habitat	1,537.09ha	309.39ha*	1,227.7ha
Swift parrot, blue parrot, Tasmania masked owl**			
• Habitat trees in Construction Project Area	188	28	125
• Habitat trees with a >10% tree protection zone (TPZ) incursion		35	
Tasmanian wedge-tailed eagle	N/A	N/A	N/A
CNBC			
• Habitat	22.18ha	1.92ha***	20.26ha
• No. habitat locations	166	48	118
• No. crayfish locations	56	5	51

MNES	Habitat in Construction Project Area	Residual impact after avoidance*	Avoided impact
Eastern barred bandicoot	320.85ha	320.85ha*	0ha
Australian grayling	N/A	N/A	N/A
Green and gold frog			
• Dispersal habitat	8.30ha	1.71ha	6.59ha
• Shelter and foraging habitat	2.5ha	2.5ha	0ha
Orchids			
• Potential/buffer habitat	3.86ha	1.20ha	2.66ha
• Optimal habitat	0.45ha	0ha	0.45ha

*Temporary and permanent impacts – see Section 7 for specific breakdown.
**See Section 7 for specific breakdown of types of habitat trees and counts per species
**Realignment of the pipeline reduced CNBC impacts from 22.18ha (166 habitat areas/56 crayfish locations) to 3.16ha (58 habitat areas/11 crayfish locations). This was further reduced through adoption of HDD to 1.92ha (48 habitat areas/5 crayfish locations).

6.2 Construction Management and EPRs

Under the overarching Environmental Protection Requirements (EPRs) in Annex E, a detailed summary of measures is proposed to be undertaken to avoid, mitigate and manage relevant impacts of the Project on MNES during the construction and maintenance of the SWISA. Additionally site-specific requirements are presented in the Construction Environmental Management Plan (CEMP) and detailed in the Construction Environmental Plan and Tables (CEPs/CETs) (see Appendix B within the CEMP (Annex F). These documents include:

- A series of construction-phase EPRs and associated measures developed in alignment with Commonwealth, State and local government approvals, appropriate regulatory guidelines and practices and S.M.A.R.T principles (Specific-Measure-Achievable-Relevant-Time-bound) detailed in Section 1 (Purpose and structure) and Section 2 (Environmental Protection Requirements) in Annex E, Section 1 (Introduction) and Section 2 (Approval requirements) in Annex F.

- Details of timing, frequency and duration of the avoidance, mitigation, management and monitoring measures, and corrective actions in Section 2 (Environmental Protection Requirements) in Annex E and Section 6 (Reporting requirements) and Section 10 (Environmental management measures) in Annex F.

- Details on expected effectiveness and ongoing mitigation, management and monitoring measures and corrective actions described in Section 10.1 (Performance targets) and Section 10.3 (Environmental monitoring and corrective actions) in Annex F.

- Details of roles and responsibilities and appropriate reporting aligned with Commonwealth, State and local government approvals and appropriate regulatory guidelines is described in Section 5 (Roles and responsibilities) in Annex F.

The application of EPRs differs across the Construction Corridor as different EPRs will apply for different matters and/or contexts. The CEPs and CETs within the CEMP (Annex F) provide site-specific detail on where different EPRs apply.

Table 6.2 presents a summary of the EPRs and the MNES features they apply to. Note that EPRs also apply to general environmental management of construction activities and therefore also include measures not directly related to managing MNES.

Table 6.2 Summary of EPRs for MNES known or likely to occur in the Construction Project Area (Section 2—Annex E)

EPR	Summary	MNES														
		WDBGBG community	Eastern quoll	Tasmanian devil	Swift parrot	Tasmanian wedge-tailed eagle	Central north burrowing crayfish	Spotted-tail quoll	Eastern barred bandicoot	Tasmanian masked owl	Blue-winged parrot	Australian grayling		Green and gold frog	Tailed spider orchid	Robust fingers
EPR1—Flora and Fauna	Construction Corridor, Exclusion Zones and tree protection zones (TPZ) will be clearly delineated with appropriate markings and/or signage and discussed in environmental site inductions. Spatial data on each area will be provided to contractors prior to construction commencing. Unidentified habitat elements that support threatened fauna will be subject to relevant EPRs or consultation with TI. Appropriate mitigation measures will be implemented for entrapment, injury and/or death to fauna. A staged Rehabilitation and Reinstatement Plan will be developed with appropriate measure to discourage future accessibility	X	X	X	X	X	X	X	X	X	X	X		X	X	X
EPR1A—Tasmanian wedge-tailed eagle	Aerial nest searches will be conducted to detect active eagle nests during the eagle management constraint period (1 July to 31 January) with appropriate construction management protocols. Management protocols have been considered for planned and unplanned/urgent maintenance and/or repair works required during the eagle management constraint period. Any blasting works must be authorised by TI and must not occur within the eagle management constraint period.					X										
EPR1B—Burrowing crayfish	Pre-clearance surveys will be undertaken and environmental site induction will include the training and identification of environmental features of the burrowing crayfish. Areas known for potential habitat will be considered for the delineation of the Construction Corridor (i.e. HDD drilling) and Exclusion Zones. Salvage and relocation management protocols will be implemented if ground disturbance to known, or previously unidentified habitat cannot be avoided.						X									
EPR1C—Green and gold frog	Pre-clearance surveys will be undertaken, and environmental site induction will include the training and identification of environmental features of the green and golden frog. Construction Corridor to be clearly delineated with appropriate													X		

EPR	Summary	MNES														
		WDBGBG community	Eastern quoll	Tasmanian devil	Swift parrot	Tasmanian wedge-tailed eagle	Central north burrowing crayfish	Spotted-tail quoll	Eastern barred bandicoot	Tasmanian masked owl	Blue-winged parrot	Australian grayling		Green and gold frog	Tailed spider orchid	Robust fingers
	markings and/or signage with Exclusion Zones (i.e. fencing) applied to known potential habitats. The installation of fencing will be based on pre-clearance survey; where more than five frogs occurs in the protocol application area, fog-proof fencing will be installed to prevent ingress of frogs into the construction area after relocation has occurred. This will be supervised by a suitably qualified ecologist. Relocation management protocols will be implemented in accordance with a Permit to Take Threatened Species and/or Products of Wildlife obtained prior to construction and appropriate animal handling requirements. Injured and/or sick frogs will be handled in accordance with NRE Tas Best Practice Guidelines for Wildlife Rehabilitation.															
EPR1D—Australian grayling	In-stream construction require an impact risk assessment and works cannot occur during peak migration periods in known/likely habitats (spawning—March to April; recruitment—November to January). A water quality monitoring plan will be implemented in alignment with the DGV's for Aquatic Ecosystems of the Mersey Catchment.											X				
EPR1E—Den management	Pre-clearance surveys will be undertaken, and environmental site induction will include the training and identification of environmental features of potential den sites. Potential dens identified within the Construction Corridor and exclusions will be clearly delineated with appropriate markings and/or signage. A den monitoring assessment will be completed for dens that have the potential to be occupied. An appropriate activity assessment will be completed if an unanticipated den site is identified.		X	X				X								
EPR1F—Tasmanian devil management	Appropriate noise management and monitoring procedures will be established and carried out (if required) by suitably qualified ecologist and acoustic specialists during noise generating activities at nearby dens within the devil			X												

EPR	Summary	MNES														
		WDBGBG community	Eastern quoll	Tasmanian devil	Swift parrot	Tasmanian wedge-tailed eagle	Central north burrowing crayfish	Spotted-tail quoll	Eastern barred bandicoot	Tasmanian masked owl	Blue-winged parrot	Australian grayling		Green and gold frog	Tailed spider orchid	Robust fingers
(GBPS and Devil Road)	management constraint period. To manage injury to the Tasmanian devil, appropriate measures will be implemented (i.e. speed limits, training on rescuing injured fauna, site access restrictions, engage suitably qualified wildlife carers).															
EPR1G—Hollowing bearing tree management	Appropriate ecological assessments will be conducted if potential hollow bearing trees are identified in the Construction Corridor, Exclusion Zones and/or TPZs for masked owl, swift parrot and/or blue winged parrot. Passive acoustic and passive/active visual monitoring will be conducted if hollow bearing trees cannot be retained and have been confirmed to contain habitat values. Clearing would occur outside of breeding season. Where breeding is identified, exclusion zones will be established until breeding activities have commenced. Where non-breeding animals are present, they can be flushed from the tree and, once the hollow vacancy is confirmed, the hollow tree can be decommissioned and eventually cleared.					X				X	X					
EPR1H—Roadkill management	Appropriate traffic and roadkill management protocols will be undertaken including speed limits during daylight and night-time hours, advisory signage, retrofitting vehicles for passive high-frequency animal repellent device, heavy vehicle restrictions and injury/kill protocols (i.e. WIRES, Bonorong). Roadkill searches will be undertaken daily on roads actively being used by project vehicles.		X	X		X		X	X							
EPR1I—Threatened flora and vegetation communities	Targeted pre-clearance surveys will be undertaken during peak flowering periods for *Caladenia caudata* and *Caladenia tonellii* (15 October to 30 November). Threatened flora in areas known within the Construction Corridor, s will be clearly delineated with appropriate markings and/or signage. No impacts to *Persicaria decipiens* are permitted unless with an approved a Permit to Take Threatened Species and/or Products of Wildlife. Consultation	X													X	X

EPR	Summary	MNES														
		WDBGBG community	Eastern quoll	Tasmanian devil	Swift parrot	Tasmanian wedge-tailed eagle	Central north burrowing crayfish	Spotted-tail quoll	Eastern barred bandicoot	Tasmanian masked owl	Blue-winged parrot	Australian grayling		Green and gold frog	Tailed spider orchid	Robust fingers
	must be undertaken with DCCEEW if impacts to *Caladenia sp*. cannot be avoided.															
EPR2—Weeds, pests and disease	A Weed and Disease Management Plan will be prepared including landowner requirements, weed control procedures and construction vehicle/machinery/personal protective equipment cleaning procedures in accordance with appropriate guidelines and discussed during environmental site inductions.	X	X	X	X	X	X	X	X	X	X	X		X	X	X
EPR3--Watercourses	Trench excavation will be used for all watercourse crossings, with minimal machinery activity in watercourses to be established. All works in a waterway must be managed and monitoring accordingly to avoid impacts on aquatic fauna and/or sediment disturbance.						X					X		X		
EPR4—Sediment and erosion	An Erosion and Sediment Control Plan (ESCP) will be prepared in accordance with appropriate guidelines and discussed during environmental site inductions.						X					X		X		
EPR5—Noise and vibration	Standard construction hours will be applied as per the State's *Environmental Management and Pollution Control (Miscellaneous Noise) Regulations 2004*. High noise generating works will be undertaken under appropriate approvals and/or respective EPRs (i.e. EPR1F). Additional site-specific measures will be implemented near noise sensitive premises. Nose complaints will be reported to TI within 24 hours.		X	X				X								
EPR6—Air quality and light	Maintenance and servicing of all construction equipment will be implemented and known sources of odour/light emissions will be placed away from sensitive receptors to minimise odour/light impacts. Dust stabilisation/ suppression procedures for transport will be implemented. Works will be suspended during high-wind conditions (<50km/h) if impacts to ambient air quality occur.		X	X	X	X		X	X	X	X			X		

EPR	Summary	MNES														
		WDBGBG community	Eastern quoll	Tasmanian devil	Swift parrot	Tasmanian wedge-tailed eagle	Central north burrowing crayfish	Spotted-tail quoll	Eastern barred bandicoot	Tasmanian masked owl	Blue-winged parrot	Australian grayling		Green and gold frog	Tailed spider orchid	Robust fingers
EPR7—Heritage	Site inductions will include information on heritage values identified onsite. Areas previously identified within the CEPs as Exclusion Zones will be clearly delineated within the Construction Corridor with appropriate markings and/or signage. If a previously unidentified heritage value is uncovered an Unanticipated Discovery Plan will be followed in accordance with appropriate guidelines.															
EPR8—Environmental hazardous materials	Environmental hazardous substances will be registered on a project danger goods register and be stored, handled and transported in accordance with appropriate guidelines. Maintenance and management of stored hazardous materials, vehicles and equipment will be regularly inspected to minimize leaks. Appropriate spill and emergency response procedures and equipment will be provided and followed.	X	X	X	X	X	X	X	X	X	X	X		X		
EPR9—Bushfire risk	Consultation with appropriate regulatory authorities will be undertaken. Construction will be planned and managed considering high fire risk days and construction activities/equipment that pose a fire risk/hazard. Appropriate safety measures will be implemented including training/education, personal protective and firefighting equipment/ An Emergency Response Procedure will be prepared.	X	X	X	X	X	X	X	X	X	X	X		X		
EPR10—Waste	Waste management will align with the waste management hierarchy and appropriate approvals/licenses for waste disposal. Beneficial reuse of excess rock and/or clean fill material will be considered, otherwise disposed of in accordance with appropriate guidelines. Hydrotesting water will be reused otherwise discharged to land and/or storage dam for re-use for irrigation in accordance with appropriate guidelines. Appropriate waste management procedures will be followed at site compounds and work sites.	X	X	X	X	X	X	X	X	X	X	X		X		

EPR	Summary	MNES																
		WDBGBG community	Eastern quoll	Tasmanian devil	Swift parrot	Tasmanian wedge-tailed eagle	Central north burrowing crayfish	Spotted-tail quoll	Eastern barred bandicoot	Tasmanian masked owl	Blue-winged parrot	Australian grayling			Green and gold frog	Tailed spider orchid	Robust fingers
EPR11—Construction traffic	A Vehicle Movement Plan will be developed with appropriate routes and speed limits established for all construction personnel. Dilapidation surveys will be completed for major access roads to be used during construction, Public access via the site access routes will be restricted.		X	X		X		X	X								
EPR12—Contaminated soils and ASS	Acid Sulphate Soil (ASS) Management Plan will be developed for the sites known ASS and potential acid sulphate soils (PASS) in accordance with appropriate guidelines. ASS/PASS will be discussed during environmental site inductions. If potentially contaminated material is identified, work must cease and notify TI. Water runoff from stockpiled PASS/ASS will be contained and appropriately disposed of. Any potentially contaminated soil is to be sampled, tested, classified, and disposed/treated in accordance with appropriate guidelines.						X					X			X		
EPR13—Rehabilitation and reinstatement	Rehabilitation must commence as soon as practicable according to seasonality, and no later than 30 days after the completion of construction works at each site. Site specific planting plans must be developed for each revegetation location. Measures for rehabilitating and reinstating watercourse crossings and or habitat structural elements should be considered as per the EPRs. Long term monitoring must be undertaken on a 5 yearly basis to ensure rehabilitation and restoration targets are achieved.	X	X	X	X	X	X	X	X	X	X	X	X	X	X		

6.3 Operational Management

A detailed summary of measures is proposed to be undertaken to avoid, mitigate, and manage relevant impacts of the project on MNES during the operational phase of the project are provided in the Operational Environmental Management Plan (OEMP) in Annex G. The OEMP includes:

- A series of operational-phase management measures developed in alignment with Commonwealth, State and local government approvals, appropriate regulatory guidelines and practices and S.M.A.R.T principals detailed in Section 2 (OEMP Scope and Objectives), Section 3 (Scheme Description) and Section 5 (Mitigation Measures/ Operational Controls) in Annex G.
- Details of timing, frequency and duration of the avoidance, mitigation, management and monitoring measures, and corrective actions in Section 5 (Mitigation Measures/ Operational Controls) and Section 6 (Risk Management) in Annex G.
- Details on expected effectiveness and ongoing mitigation, management and monitoring measures described in Section 6 (Risk Management) and Section 8 (Reporting) in Annex G.
- Details on corrective and adaptive management actions are described in Section 6 (Risk Management) in Annex G.
- Details of roles and responsibilities and appropriate reporting aligned with Commonwealth, State and local government approvals and appropriate regulatory guidelines is described in Section 7 (Roles and Responsibilities) in Annex G.

Table 6.3 details the operational management measures relevant to the MNES that will occur across the broader Irrigation District. Table 6.4 presents a summary of specific mitigation measures by MNES.

Table 6.3 Operational management measures for MNES across the Operational Area (Section 5—Table 5.1 in Annex G)

Operational management measures	Summary FWAP Mitigation Measures	MNES															
		WDBGBG community	Tasmanian white gum wet forest	Eastern quoll	Spotted-tail quoll	Tasmanian devil	Swift parrot	Blue-winged parrot	Tasmanian wedge-tailed eagle	Tasmanian masked owl	Eastern barred bandicoot	Green and gold frog	Central north burrowing crayfish	Australian grayling	Tailed-spider orchid	Robust fingers	Wrinkled dollybush
Shared impact pathway: Land use changes which result in habitat clearing, loss, modification and/or fragmentation																	
Vegetation/habitat	Property-wide survey for MNES threatened species and ecological communities to identify and confirm habitat	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Prohibit clearance or modification of MNES threatened species and ecological communities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Monitoring and review to ensure rigorous protections against unregulated land clearing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Prevent the clearing of riparian vegetation communities	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Flora and vegetation communities	A 50 m clearing/ disturbance buffer from threatened flora and ecological communities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Monitoring of vegetation condition using a repeatable method	X	X												X	X	X
Fauna habitat	Identify extent and condition of potential habitat for listed MNES known to exist on the property	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Specify a 50 m clearing and disturbance buffer from all known threatened mammal species dens and known occupied habitat			X	X	X											
	Define a 30 m land clearance limit from threatened mammal dens and den habitat			X	X	X											
	Require maintenance of logs/hollows in areas of bush and define habitat tree management prescriptions			X	X	X	X	X	X	X							
	Retain and protect connective habitat corridors	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Operational management measures	Summary FWAP Mitigation Measures	MNES															
		WDBGBG community	Tasmanian white gum wet forest	Eastern quoll	Spotted-tail quoll	Tasmanian devil	Swift parrot	Blue-winged parrot	Tasmanian wedge-tailed eagle	Tasmanian masked owl	Eastern barred bandicoot	Green and gold frog	Central north burrowing crayfish	Australian grayling	Tailed-spider orchid	Robust fingers	Wrinkled dollybush
	Define appropriate re-vegetation techniques for terrestrial habitat areas and/or habitat corridors	X	X	X	X	X	X	X			X	X					
	Define maintenance/increase riparian vegetation for bank stabilisation and for shelter for threatened terrestrial and aquatic species			X	X	X	X	X	X	X	X	X	X	X			
Shared Impact pathway: Biosecurity threats and invasive species impacts including damage from pest animals, diseases and weed invasion leading to increased competition and a reduction in habitat quality.																	
Undertake targeted control strategies for pest animals where required and incorporate monitoring of impacts		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Biosecurity measures applied to prevent the spread of pests, weeds and disease		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Incorporate a weed management plan for declared weeds with control conducted on at least an annual basis		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Shared Impact pathway: Altered hydrology and water quality decline including modifications to the landscape that disrupt natural water flows; increased dryland salinity; drying out of sites through drainage, damming, or irrigation; or water pollution and increased sediment loads from run-off.																	
Outline actions to improve poor drainage resulting from irrigation/urban actions											X	X			X	X	
Outline actions to manage salinity in saline-risk areas according to salinity hazard assessment. Action to be site-specific with the major aim of avoiding groundwater recharge and raising groundwater level.		X	X									X	X	X			X
Outline actions to ensure run-off is managed where excess is likely to be generated i.e. on steeper slopes with duplex soils and on compacted ground where infiltration is limited.		X	X									X	X	X			X
Preclude use of heavy machinery use within 5 m of aquatic habitat sites.												X	X	X			
Soil testing and nutrient management planning to be implemented to reduce risk of run-off and associated water pollution												X	X	X			

Operational management measures	Summary FWAP Mitigation Measures	MNES															
		WDBGBG community	Tasmanian white gum wet forest	Eastern quoll	Spotted-tail quoll	Tasmanian devil	Swift parrot	Blue-winged parrot	Tasmanian wedge-tailed eagle	Tasmanian masked owl	Eastern barred bandicoot	Green and gold frog	Central north burrowing crayfish	Australian grayling	Tailed-spider orchid	Robust fingers	Wrinkled dollybush
Shared Impact pathway: Grazing pressures from domestic stock including increased grazing pressures associated with intensification and changes in landscape function; trampling and soil compaction at the edge of waterways; habitat damage, degradation of wetlands and water quality; and degradation of foraging habitat.																	
	Require installation of barrier protection from livestock for key threatened habitat sites/vegetation communities	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Require installation of barrier protection from livestock for riparian areas											X	X	X			X
	Require creation of off-stream or hardened and fenced stock watering points											X	X	X			X
Shared Impact pathway: Grazing pressure impacts from native fauna including trampling and compaction, habitat damage and degradation of foraging habitat																	
	Require a wildlife management plan developed before controlling native browsers: The Wildlife Management plan must include regular monitoring and compliance with State legislation and permits required.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Preclude chemical spraying or fertiliser application within 10 m of known threatened flora species or threatened ecological community	X	X												X	X	X
	Preclude fertiliser application and chemical spraying within 10 m of aquatic habitat.											X	X	X			
Shared Impact pathway: Inappropriate disturbance, including absent or inappropriate fire regimes.																	
	Outline fire management regime to match burn intensity and frequency to the types of bush on the property giving consideration to mosaic burning and burning in autumn and winter and in accordance with appropriate local laws.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6.4 Unique pathways and specific mitigation measures by MNES (Section 5—Table 5.2 in Annex G)

MNES	Impact Pathway	Mitigation measure
Threatened vegetation communities (Tasmanian forests and woodlands dominated by black gum or Brookers gum, and Tasmanian white gum wet forest)	Hybridisation with non-Tasmanian plantation eucalypts particularly hybridisation with the plantation species, *Eucalyptus nitens* (for both vegetation communities)	• Farm WAP requiring restriction on plantation of *Eucalyptus nitens* within pollinator range (minimum distance of 200m)
Tasmanian wedge-tailed eagle	Risk of disrupting a breeding event during maintenance works around (within 500 m or 1,000m line-of-sight) an active nest within a given breeding season. Disturbance to active nests due to routine, major, or unplanned maintenance activities within proximity to nests.	• No removal of vegetation within 1,000m of an active eagle nest to occur within the eagle management constraint period. • No change in land use with 500m direct distance of an eagle nest. • Planned maintenance within 500m or 1,000m line-of-sight of any active eagle nest must not be conducted during the eagle management constraint period. If unplanned repair work or maintenance must be undertaken during eagle management constraint period (unless the repair work is urgently required to avert serious threat to life, property or the environment), the following measures are required: • Unless a nest activity assessment has been undertaken for all nests within 1,250m of the location, assume that all known nests are active eagle nests • Ensure that, before entering the works area, all workers are aware of the location of all active eagle nests • Ensure that no person or vehicle enters any area within 200m of an active eagle nest • Ensure that no person looks directly towards an active eagle nest while they are within 1,000m of an active eagle nest • Ensure that, unless not visible from any active eagle nest, no heavy vehicles and no more than two light vehicles enter any area within 1,000 m of an active eagle nest, and that in any seven-day period, no vehicle enters within 1,000 m of an active eagle nest more than twice • Ensure that no heavy vehicles, and no more than two light vehicles, enter any area within 500m of an active eagle nest in any seven-day period, or enters within 500m of an active eagle nest more than twice • Ensure that, in any seven-day period, unless not visible from any active eagle nest, no vehicle remains within 1,000m of an active eagle nest any longer than 30 minutes; and that regardless of visibility, no vehicle remains within 500m of an active eagle nest any longer than 30 minutes (unless a suitably qualified eagle specialist has provided prior written agreement specifying the required safeguards and mitigation measures and justification that harm will not result) • If safety requirements allow, instruct workers to not wear hi-visibility clothing while in the allowed proximity to an active eagle nest • Ensure that no vehicle is parked within sight of an active eagle nest • Ensure workers always remain within 5m of one another (to the degree possible) and no work breaks are conducted while within 500m of an active eagle nest. • In the event that the above are not achievable, and/or one or more eagles are noted on or around a nest during works (or the nest is already known or assumed to be active when the

MNES	Impact Pathway	Mitigation measure
		exceptional circumstances have been triggered), NRE Tas as the State regulator must be notified immediately and a nest-specific management plan prepared by the proponent to the satisfaction of the regulator, with further mitigation measures to be implemented to the degree practicable on a case-by-case basis. These measures may include: - If possible/deemed necessary, the works to cease immediately – until the nesting season is finished and/or the nest is deemed inactive; and - If the nature of the works is such that they cannot cease, suitably qualified ecologist/s must be present to observe and monitor the eagle(s) for signs of distress and disruption of breeding activity and advise the contractors accordingly of periods when work can occur. • If a nest activity assessment has been undertaken prior to necessary unplanned repair work or maintenance during the eagle management constraint period and the nest is deemed as inactive, then the eagle management constraint period does not apply and the above are not relevant.
Tasmanian devil	Increased risk of roadkill due to vehicle movement in operational areas.	• Undertake all works during daylight hours only, restrict speed limits on Devil Road to 20km/h • Ongoing monitoring and awareness training for operational staff.
	Noise disturbance	• Undertake works that generate noise levels greater than ambient level at site (36dBH) outside the Devil Management Constraint Period between 1st February and 31st August to minimise impacts on breeding devils. • See EPR 1F – Tasmanian devil management – Great Bend Pump Station and Devil Road in the CEMP for further guidance.
	Predation by domestic dogs	• Prohibit any access by dogs accompanied by workers and contractors to all TI sites.
Green and gold frog	Soil disturbance around waterways	• Farm WAP to preclude use of heavy machinery use within 5 m of habitat sites and ensure the minimisation of mechanical disturbance from vehicle intrusion onto the shoreline to reduce the potential for sedimentation of the waterbody.
	Altered hydrology of breeding habitats leading to disruption of breeding cycles.	• Farm WAP to specify retention of a minimum of two metres of standing water in the basin of the waterbody identified as containing habitat to allow GGF adults and larvae to persist at the site until the end of the season. If this is not practical, an assessment will be taken of the waterbody to determine adequate depths to maintain minimum breeding habitats. • Farm WAP to prohibit physical removal of floating aquatic and riparian vegetation.
	Disease, in particular chytridiomycosis caused by the fungal pathogen *Batrachochytrium dendrobatidis*	• Green and gold frog population and habitat monitoring undertaken at known GGF sites for a minimum of 5 years, which includes: - Surface water quality of GGF breeding and dispersal habitat, including nutrient load - Targeted monitoring program for pest fish species, and control and eradication strategies investigated if incursions into green and gold habitat sites are found - Monitoring of chytrid fungus.
Central North burrowing crayfish	Soil disturbance	• Farm FWAP to limit routine maintenance of drainage lines involving clearance of vegetation or scraping topsoil from May-September when soil is damp, and temperatures are lower to reduce the likelihood of desiccation and mortality of individuals inhabiting impacted burrows.

MNES	Impact Pathway	Mitigation measure
Australian grayling	The Great Bend infrastructure's presence in the waterway has the potential to act as a barrier to fish passage	• Extraction to be managed such that water depth adjacent to the pump house is reduced to <0.2m and water flow below or adjacent to the pump house is reduced to <195 ML/day during Dec-May, and <260 ML/day during November. • The river channel adjacent to the pump station will be monitored to ensure the low flow channel is not diverted to or modified to be within 5m of the pump intake.
	Other on farm instream barriers which have the potential to act as a barrier to fish passage	• Farm WAP to prevent installation of instream barriers
	The Great Bend infrastructure may cause entrainment and mortality of fish during water extraction	• The intake structure will utilise a screen at the outer southern face of each pump well, with the screen oriented parallel to the direction of stream flow, according to the following specifications: - The screens will be constructed so that approach velocities (as measured in Boys *et al*. 2012, 2021, and Boys 2021) will not exceed 0.1m/s. - Screen orientation and mesh size must ensure that sweeping velocities remain higher than approach velocities during all operational conditions. • Where screens that do not meet the above specifications are used at the outer pump well faces, screens that achieve <0.1m/s approach velocities must be installed within the pump well. Unless monitoring determines that Australian Grayling are not entrained within the pump wells at any time, additional design requirements for screens installed within the pump well are specified below: - The pump wells must either: ◦ include a bypass opening on both the upstream and downstream side to allow exit of fish from the pump well in the direction of streamflow, or ◦ include the use of operational procedures to allow entrained fish to exit the pump well. These must include at a minimum, pump shutdowns for at least 20 minutes every 6hrs of operation during the months of September to December.
	Changes to flow regime resulting from water extraction	• Extraction is limited to within the existing framework specified in the Mersey Water Management Plan (DPIWE, 2005) and in (NRE, 2023). • Where timed releases from Parangana dam are used to supplement flow for extraction, water quality parameters of release water must comply with Default Guideline Values as specified in Environment Protection Authority (2021). • Flow rates within the reaches below the dam must be regularly monitored to ensure that the incidence of *cease to take* thresholds as specified in (DPIWE, 2005) and in (NRE, 2023) does not increase because of Project operations. • Quantitative monitoring of the Australian Grayling population in the Mersey River is conducted at least every two years
	Changes to flow regime resulting from water releases from Parangana Dam for the purpose of extraction at Great Bend result in cold water pollution	• Regular monitoring of water quality within the reaches below the dam to ensure that values remain within Default Guideline Values as specified in Environment Protection Authority (2021). • Monitoring of water quality and temperature should be conducted at the point of release from Parangana Dam and stratified downstream to the Great Bend Pump Station to detect the extent, if any, of cold-water pollution resulting from timed supplemental releases for the SWISA.

MNES	Impact Pathway	Mitigation measure
		• Monitoring of water temperatures must be: - Monitored continuously within <1km downstream of Parangana Dam in the main river channel. - Monitored continuously at the Great Bend Pump Station within the main river channel. - Monitored continuously at the existing Liena Gauge. • Monitoring should be conducted for at least 2 years continuously prior to commencement of operation of the scheme, and two years following commencement of operation of the scheme. Continued monitoring after 2 years post commencement can be reevaluated once a suitable data set exists to inform a review of risks associated with cold water pollution – nominally six (6) release events each in winter and summer.

7 Residual Impacts and Proposed Offsets

7.1 Significant Impact Assessment of Residual Impacts

7.1.1 Overview

All assessments have been undertaken using the criteria set out in the Significant Impact Guidelines 1.1 (DoE, 2013) but with guidance from relevant EPBC Policy Statements and guidelines for individual species and communities where available. These consist of:

- Tasmanian Black Gum and Brookers Gum Forests and Woodlands: A Nationally Significant Ecological Community (DAWE, 2020)
- EPBC Act Policy Statement 3.14: Significant impact guidelines for the vulnerable growling grass frog (*Litoria raniformis*) (DEWHA, 2009)
- Draft EPBC Act referral guidelines for four threatened Tasmanian burrowing crayfish (DSEWPaC, 2011) – this includes the central north burrowing crayfish.

EPBC Act Policy Statement 3.6: Tasmanian Devil (*Sarcophilus harrisii*) (DEH, 2006) has also been used as a reference source but it is noted this is now listed as an 'archived' document by DCCEEW and does not have the same force as the above guidance documents.

The key criteria for assessing threatened ecological communities and species based on the Significant Impact Guidelines are presented in Table 7.1.

Table 7.1 Significant impact criteria for listed threatened ecological communities and species

Matter	Significant impact criteria
Critically endangered & endangered species	An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:
	• lead to a long-term decrease in the size of a **population**
	• reduce the area of occupancy of the species
	• fragment an existing **population** into two or more populations
	• adversely affect **habitat critical to the survival of a species**
	• disrupt the breeding cycle of a **population**
	• modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
	• result in **invasive species** that are harmful to a critically endangered species becoming established in the endangered or critically endangered species' habitat
	• introduce disease that may cause the species to decline
	• interfere with the recovery of the species.
Vulnerable species	An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:
	• lead to a long-term decrease in the size of an **important population** of a species
	• reduce the area of occupancy of an **important population**
	• fragment an existing **important population** into two or more populations
	• adversely affect **habitat critical to the survival of a species**
	• disrupt the breeding cycle of an **important population**

Matter	Significant impact criteria
	• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
	• result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
	• introduce disease that may cause the species to decline
	• interfere substantially with the recovery of the species.
Critically endangered & endangered ecological communities	An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:
	• reduce the extent of an ecological community
	• fragment or increase fragmentation of an ecological community
	• adversely affect **habitat critical to the survival of an ecological community**
	• modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
	• cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
	• cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: - assisting **invasive species**, that are harmful to the listed ecological community, to become established, or - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community
	• interfere with the recovery of an ecological community.

*Items in **bold** have technical definitions under the guidelines

The assessments presented are supported by the three technical ecological assessments undertaken as part of the Preliminary Documentation. These are the Natural Values Assessment (NBES, 2025, Annex B), which covers all MNES features except for the Australian grayling; the Australian Grayling Species Impact Assessment (Elgin, 2025, Annex C); and the GBPS Tasmanian Devil Species Impact (Enviro-Dynamics, 2024, Annex D), which covers impacts to Tasmanian devils at GBPS, Devil Road and immediate surrounds. Further detail supporting the assessments below is provided in these reports.

Unless otherwise specified, there is a high level of confidence regarding construction-related impacts due to the detailed mapping of habitat and MNES presence within the Construction Project Area/Survey Area. The exception is where there may be unknown habitat features (e.g. quoll dens, breeding trees) as these features are not always identifiable during baseline surveys. Despite this, pre-construction protocols associated with searches and individual species management actions will be sufficient to mitigate these potential impacts. Similarly, while most of the potential operational areas (e.g. farms accessing new water and therefore undergoing landscape changes) have not been surveyed, creating uncertainty regarding the presence of some MNES features, the Farm WAP process is intended to provide for site-specific assessments and controls that are intended to avoid and mitigate significant impacts to MNES. Thus, while there could be some uncertain/unknown impacts, survey effort and proposed management measures are anticipated to be sufficient to give a high confidence in overall assessment findings.

7.2 Significant Residual Impacts

7.2.1 Critically Endangered Threatened Ecological Communities

Tasmanian Forests and Woodlands Dominated by Black Gum or Brookers Gum
For the purposes of conducting a significant impact assessment, 'habitat critical to the survival of an ecological community' for the WDBGBG community consists of patches considered to meet 'Class A' condition in accordance with the diagnostic criteria for the community. This relates to a single 1.82ha patch at Pardoe Creek which is >40m from the Construction Corridor.

There are no areas of WDBGBG community within the Construction Corridor and therefore no direct impacts will occur to the community. Clearing will be undertaken within 15m of a patch of this community ([redacted] see Figure 7.1). While this is within the 30m buffer zone recommended for the community, the disturbance will occur on already modified land and will not lead to a change in the land use of this land. Based on the conservation advice for the community, this is not considered to pose a risk of impact. Furthermore, the Construction Corridor has been narrowed in this area to a minimum 6m to ensure at least 15m of buffer is retained. This patch of TEC will be clearly demarcated through use of construction fencing and signage to avoid unplanned project impacts. Mitigation measures will also be implemented to prevent the introduction and spread of invasive weeds to this patch, and significant impacts to the community are not expected.

No operational impacts to the TEC are expected. While there may be unmapped areas of TEC on individual farm properties, the Farm WAP process prevents the direct disturbance of these communities and requires the implementation of buffers to prevent indirect nutrient and pesticide-related impacts. Where individual properties require TEC disturbance that could lead to a significant impact, these may require their own individual EPBC referral and approval process.

Table 7.2 presents a significant impact assessment for the WDBGBG community using the criteria within the Significant Impact Guidelines 1.1 and the additional guidance from the Tasmanian Black Gum and Brookers Gum Forests and Woodlands: A Nationally Significant Ecological Community policy statement. Based on this assessment, **no significant residual impact** is anticipated for this TEC.

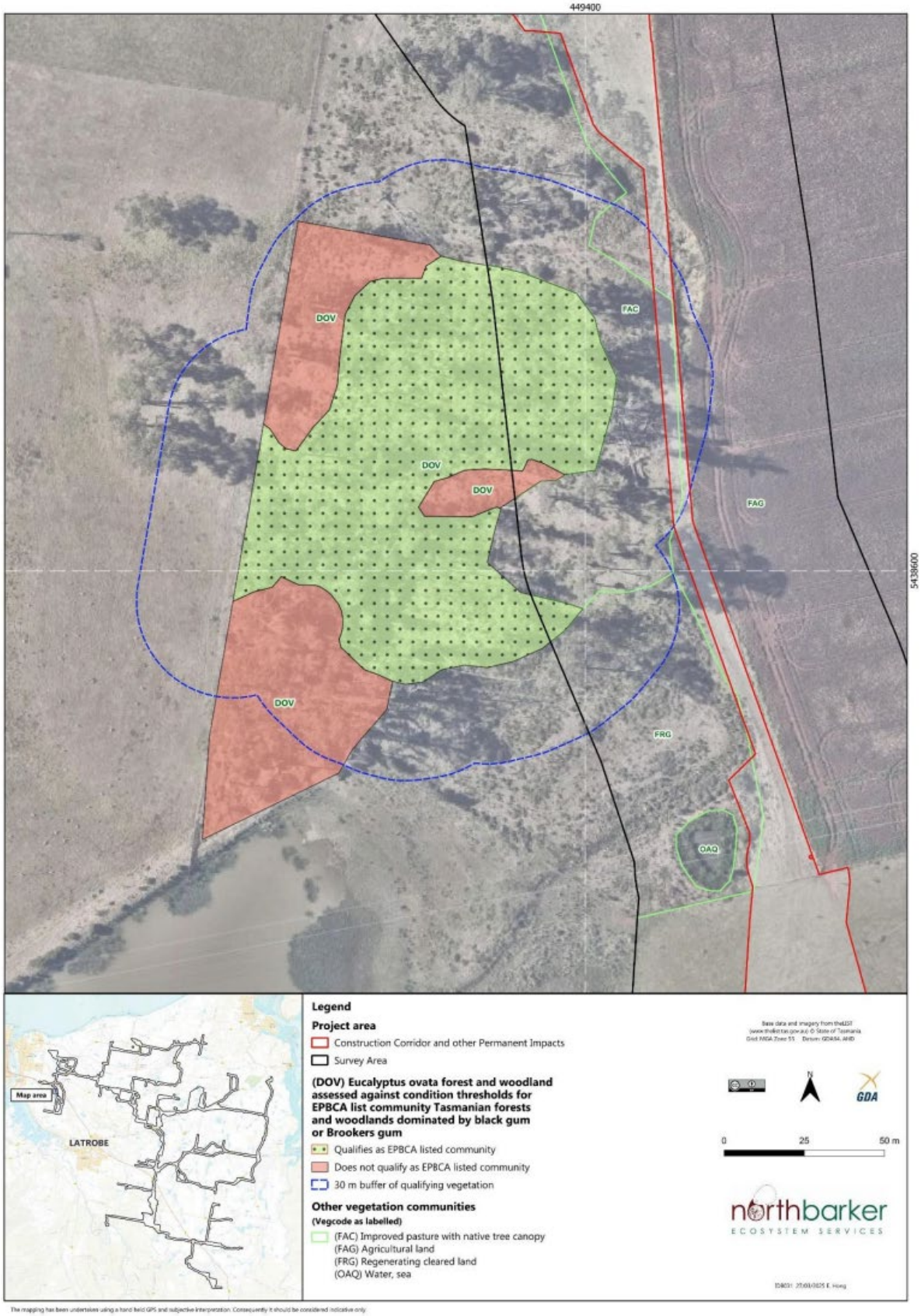

Figure 7.1 Tasmanian forests and woodlands dominated by black gum or Brookers gum TEC patch [redacted] compared to Construction Corridor

Table 7.2 Significant impact assessment: Tasmanian forests and woodlands dominated by black gum or Brookers gum

Criteria	Assessment
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	No change to the extent of this TEC is expected as: (i) there will be no direct clearing of the TEC for construction; and (ii) through the implementation of Farm WAPs, clearing is prohibited and other farming activities will be managed to avoid/minimise impacts to TECs.
Fragment or increase fragmentation of an ecological community	There will be no clearing of this TEC for construction. Farm WAPs prevent the clearing and degradation on the TEC. On this basis, fragmentation of this TEC is not expected to occur.
Adversely affect **habitat critical to the survival of an ecological community**	The only area of habitat critical to the survival of the TEC is the Pardoe Creek patch. This is >40m from the Construction Corridor and will not be affected by clearing works or subsequent irrigation operations.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The Farm WAPs will include measures to avoid and minimise changes to water and soil properties in any TEC patches in farming areas (i.e. buffers, application of control measures etc.). On this basis, significant changes to abiotic properties (water, soil) maintaining this TEC are not expected.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	There will be no clearing of this TEC for construction. Farm WAPs prevent the clearing and degradation on the TEC. On this basis, changes to species composition in this TEC are not expected to occur.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting **invasive species**, that are harmful to the listed ecological community, to become established, or • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Weed management measures will be implemented during construction and for ongoing maintenance of infrastructure areas, especially [redacted] located near infrastructure areas. Farm WAPs provide specific controls around the management of weeds and application of fertilisers and other chemicals for any patches of TEC identified on farmland.
Interfere with the recovery of an ecological community	Direct and indirect impacts to this TEC are not expected, therefore no impacts to community recovery are expected. Note that at present, there is no recovery plan in place for this TEC.

Tasmanian White Gum (*Eucalyptus viminalis*) Wet Forest

There are no known occurrences of the Tasmanian white gum wet forest in the Construction Project Area and therefore no direct disturbance.

No operational impacts to the TEC are expected. While there may be unmapped areas of TEC on individual farm properties, the Farm WAP process prevents the direct disturbance of these communities and requires the implementation of buffers to prevent indirect nutrient and pesticide-related impacts. Where individual properties require TEC disturbance that could lead to a significant impact, these may require their own individual EPBC referral and approval process.

Table 7.3 presents a significant impact assessment for the Tasmanian white gum wet forest community using the criteria within the Significant Impact Guidelines 1.1 Based on this assessment, **no significant residual impact** is anticipated for this TEC.

Table 7.3 Significant impact assessment: Tasmanian forests and woodlands dominated by white gum

Criteria	Assessment
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	No change to the extent of this TEC is expected as: (i) there will be no direct clearing of the TEC for construction; and (ii) through the implementation of Farm WAPs, clearing is prohibited and other farming activities will be managed to avoid/minimise impacts to TECs.
Fragment or increase fragmentation of an ecological community	There will be no clearing of this TEC for construction. Farm WAPs prevent the clearing and degradation on the TEC. On this basis, fragmentation of this TEC is not expected to occur.
Adversely affect **habitat critical to the survival of an ecological community**	No known patches of the TEC that constitute habitat critical to the survival of the TEC have been identified. Where these do occur on farms, the Farm WAPs prevent the clearing and degradation and therefore will maintain any habitat critical to the survival of the TEC.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The Farm WAPs will include measures to avoid and minimise changes to water and soil properties in any TEC patches in farming areas (i.e. buffers, application of control measures etc.). On this basis, significant changes to abiotic properties (water, soil) maintaining this TEC are not expected.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	There will be no clearing of this TEC for construction. Farm WAPs prevent the clearing and degradation on the TEC. On this basis, changes to species composition in this TEC are not expected to occur.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting **invasive species**, that are harmful to the listed ecological community, to become established, or • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Farm WAPs provide specific controls around the management of weeds and application of fertilisers and other chemicals for any patches of TEC identified on farmland.
Interfere with the recovery of an ecological community	Direct and indirect impacts to this TEC are not expected, therefore no impacts to community recovery are expected. Note that at present, there is no recovery plan in place for this TEC.

7.2.2 Critically Endangered and Endangered Species

Eastern Quoll

Habitat mapping has been undertaken for the three threatened dasyurid species (eastern quoll, spotted-tail quoll, Tasmanian devil) based on a denning habitat suitability model. This is intended to distinguish between general habitat utilised by the quoll within its range and habitat that is suitable for actual denning activities. Table 7.4 presents the total denning habitat for the eastern quoll in the Construction Project Area, broken down between impact and non-impact areas. The total residual impact will be a loss of 0.06ha of optimal habitat for the species in the footprint of project infrastructure, with an additional 2.12ha of sub-optimal habitat being converted to infrastructure buffer areas. Temporary impacts have been identified as not likely to affect the eastern quoll as the period of construction (i.e. during which exclusion would occur) is not sufficient to cause any permanent exclusion of quolls.

There is limited advice regarding whether the entire eastern quoll population is considered to be a single 'population' for the purposes of impact assessment or consists of a series of individual regional

populations. In the absence of this advice, it is assumed that there is a single population across all of Tasmania. The 'habitat critical to the survival' of the eastern quoll has not been defined but can conservatively be assumed to align with the optimal habitat identified for the species.

Table 7.4 Dasyurid modelled habitat in the Construction Project Area

Habitat type	Potential impact area (ha)			Avoidance area (ha)	Residual permanent impact (ha)
	Permanent impact area (Construction Corridor)	Temporary impact area	Total potential impact		
Optimal denning and foraging habitat	0.06	8.46	8.52	91.99	0.06
Sub-optimal denning and foraging habitat	0.05	2.89	2.94	35.56	2.12*
Total denning and foraging habitat	0.11	11.35	11.46	127.55	2.18
Non-denning foraging habitat	0.91	308.49	309.40	1,537.09	0.91

*Additional 2.07ha disturbance to sub-optimal habitat involves conversion of existing vegetation to buffer areas

During construction phase, the key potential impacts to the species will include the direct clearing and disturbance of habitat, as well as any peripheral habitat disturbance associated with chronic impacts (e.g. noise extending from construction areas, weeds spreading into habitat) and acute impacts to individual animals (e.g. injury in trenches, strike by construction vehicles). During operations, peripheral habitat disturbance could also occur from farming properties, together with some strike by operational vehicles.

Table 7.5 presents a significant impact assessment for the eastern quoll utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.5 Significant impact assessment: Eastern quoll

Criteria	Assessment
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a **population**	While there will be a permanent loss of optimal denning habitat (0.06ha), this is not sufficient to cause an overall loss in the size of the eastern quoll population in Tasmania. Similarly, loss of sub-optimal denning habitat (2.12ha) and broader foraging habitat (0.91ha) is also not sufficient to impact the population. Importantly, survey evidence indicates that the presence of eastern quolls in the Construction Project Area are limited which indicates that not all mapped denning habitat is utilised by the species. This means that the scale of habitat loss anticipated may not even cause a localised loss in population. As quolls are known to utilise a variety of landscapes for foraging, the large disturbance to foraging habitat will not affect population viability, especially noting the low density of quolls in the area. Injury or mortality from trenching can be mostly avoided through adoption of standard construction practices. The Farm WAP process will minimise the risk of any further habitat loss throughout the SWISA area during operational phase.
Reduce the area of occupancy of the species	Due to the minimal loss of denning habitat for the species across the broader SWISA landscape, there will be no reduction in the occupancy of the eastern quoll locally or across the entire population extent.
Fragment an existing **population** into two or more populations	Eastern quolls utilise open areas such as pasture and grasslands for foraging and linear features (e.g. roads) for dispersal. Any conversion of land, therefore, will not present a 'hard' barrier for eastern quolls in the Project Area and therefore not lead to fragmentation.
Adversely affect **habitat critical to the survival of a species**	While there will be the loss of up to 0.06ha of optimal denning habitat for eastern quolls, this does not represent an overall adverse effect to habitat critical to the survival of the species. This is due to the small footprint of loss comparative to habitat retained across the broader Project Area and the small number of quolls expected to occur in the Construction Project

Criteria	Assessment
	Area. Where the 0.06ha lost represents *actual* denning habitat (as it is currently based on modelling only) there would be sufficient habitat retained across the broader Project Area to be utilised by any quolls that are displaced. A larger area of optimal habitat will be subject to temporary impact (up to 8.46ha). The construction timeframes associated with this temporary disturbance are not sufficient to cause permanent exclusion of quolls. Additionally, this loss represents a series of narrow corridors spread across the broader Project Area, and thus do not represent the net loss of any significant habitat patches.
Disrupt the breeding cycle of a **population**	As above, any loss of denning habitat will not be sufficient to affect overall breeding cycles for the species as any displaced quoll will be able to move to other suitable denning areas nearby.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As above, the permanent loss of 0.06ha of optimal denning habitat is too small to pose a risk to eastern quoll populations, especially noting the low numbers of quolls that could occur in the Construction Project Area. The larger temporary loss of optimal denning habitat (8.46ha) represents linear cleared areas across the landscape and will not cause the loss of any localised patch of significant habitat.
Result in **invasive species** that are harmful to a critically endangered species becoming established in the endangered or critically endangered species' habitat	Construction and operational phase controls on invasive weeds will be sufficient to prevent the introduction and spread of weeds at a rate that would otherwise impact on eastern quoll habitat. Cats are harmful to eastern quolls and may have some change in dispersal patterns from the new SWISA infrastructure. However, cats already existing in the broader landscape and are unlikely to have a sufficient change in their distribution. Therefore, no material change in risk to eastern quolls is anticipated.
Introduce disease that may cause the species to decline	Disease is not a major risk to the Tasmanian mainland population of eastern quolls. Disease could spread through cats but, as noted above, the distribution in cats is unlikely to materially change as a result of the SWISA.
Interfere with the recovery of the species.	Due to the lack of significant changes in risks and habitat for eastern quoll, the SWISA is unlikely to affect species recovery. Note that at present, there is no recovery plan in place for the species.

Tasmanian Devil

The Tasmanian devil was included in the habitat suitability modelling undertaken for dasyurids (Table 7.4). Consistent with this, the total residual impact to Tasmanian devil habitat will be a loss of 0.06ha of optimal habitat for the species in the footprint of project infrastructure, with an additional 2.12ha of sub-optimal habitat being converted to infrastructure buffer areas. Temporary impacts have been identified as not likely to affect the Tasmanian devil as the period of construction (i.e. during which exclusion would occur) is not sufficient to cause any permanent exclusion of devils. However, due to the provisions of the Draft Recovery Plan (see below), these impacts are still considered in conservative estimates of species impacts as presented in Table 7.4.

Additional to this habitat modelling, assessment by Enviro-dynamics (2024) indicates Tasmanian devils utilise [redacted]. These areas will not be directly impacted by construction but will be subject to indirect impact associated with construction noise.

The Tasmanian devil occurs in two geographically distinct populations. The Project Area overlaps with the area occupied by the eastern/southwestern population, including core range for the species. As per Draft Tasmanian Devil Recovery Plan (DPIPWE, 2010), 'habitat critical to the survival' of the Tasmanian devil is considered to be disease-free areas within mainland Tasmanian with suitable devil habitat, all areas of pre-disease core habitat, and areas that may be required for the future introduction of Tasmanian devils. While the Project Area occurs in an area in which DFTD has been present since 2011, it represents area in the range of pre-disease core habitat and therefore can be considered habitat critical to the survival of the species.

During construction phase, the key potential impacts to the species will include the direct clearing and disturbance of habitat, as well as any peripheral habitat disturbance associated with chronic impacts (e.g. noise extending from construction areas, weeds spreading into habitat) and acute impacts to individual animals (e.g. injury in trenches, strike by construction vehicles). During operations, peripheral habitat disturbance could also occur from farming properties, together with some strike by operational vehicles.

Construction and operational noise impacts to [redacted] will require specific management. This includes conduct of construction activities with a noise level above 36dBH (the ambient level for the site) to occur outside of the breeding season, and the use of sound attenuation curtaining for significant construction activities. With these measures, disturbance to [redacted] devils is not expected, with any other residual noise outside breeding season not expected to cause devils to cease using these sites.

Table 7.6 presents a significant impact assessment for the Tasmanian devil utilising the criteria within the Significant Impact Guidelines 1.1 and with reference to the now archived EPBC Act Policy Statement 3.6: Tasmanian Devil (*Sarcophilus harrisii*). Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.6 Significant impact assessment: Tasmanian devil

Criteria	Assessment
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a **population**	The SWISA will lead to the loss of optimal denning habitat (0.06ha) for the eastern/southwestern population of the Tasmanian devil. Based on mean devil densities within the Narawntapu National Park (mean of 0.31 devils per km^2) this would conservatively equate to the loss of devil denning habitat for 0.002 devils and therefore not expected to impact even a single devil. This represents 0.02% of the minimum home range of an individual devil. Similarly, loss of sub-optimal denning habitat (2.12ha) and broader foraging habitat (0.91ha) is also not sufficient to impact the population. As devils are known to utilise a variety of landscapes for foraging, the large disturbance to foraging habitat will not affect population viability, especially noting the low density of devils in the area. Other construction and operational related impacts will be subject to relevant mitigation measures, including roadkill mitigation plans and the Farm WAP process which will address the risk of direct mortality to individual devils.
Reduce the area of occupancy of the species	Due to the minimal loss of denning habitat for the species across the broader SWISA landscape, there will be no reduction in the occupancy of the Tasmanian devil locally or across the entire population extent.
Fragment an existing **population** into two or more populations	Tasmanian devils are highly resilient to habitat fragmentation due to the ability of individual devils to disperse across a wide range of natural and modified habitat features. Construction Corridor and open farmland do not present a 'hard' barrier to devil movements and therefore will not lead to fragmentation across the landscape.
Adversely affect **habitat critical to the survival of a species**	Both optimal and sub-optimal habitat in the Construction Project Area could be considered habitat critical to the survival of the species, based on application of recommendations under the Draft Recovery Plan. On this basis, the project has the potential to cause the permanent loss of up to 0.11ha of habitat. This is not considered to be an adverse impact as it represents an extremely small proportion of the area that would be utilised by a single Tasmanian devil as part of standard ranges. A larger area of habitat will be subject to temporary impact (up to 11.35ha). The construction timeframes associated with this temporary disturbance are not sufficient to cause permanent exclusion of devils. Additionally, this loss represents a series of narrow corridors spread across the broader Project Area, and thus do not represent the net loss of any significant habitat patches.
Disrupt the breeding cycle of a **population**	As above, any loss of denning habitat will not be sufficient to affect overall breeding cycles for the species as any displaced devils will be able to move to other suitable denning areas in the same home range.

Criteria	Assessment
	By avoiding significant noise generating activities at [redacted] and applying noise attenuation to construction equipment and pumps, [redacted] is not expected to be materially affected. Further, management measures will be in place to further reduce noise-related impacts.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As above, the permanent loss of 0.11ha of optimal and sub-optimal habitat is too small to pose a risk to Tasmanian devil populations. The larger temporary loss of habitat (11.35ha) represents linear cleared areas across the landscape and will not cause the loss of any localised patch of significant habitat.
Result in **invasive species** that are harmful to a critically endangered species becoming established in the endangered or critically endangered species' habitat	Tasmanian devils in the Construction Project Area are not known to be at risk from any key invasive species and therefore it is unlikely any harmful species would be introduced or spread by project works. This is due to the lack of foxes in the area, and the lack of evidence indicating risk to devils from cats.
Introduce disease that may cause the species to decline	DFTD is already present in the Project Area, although the secondary strain of DFTD (DFTD2) is not yet present and is isolated to southern Tasmania at present. Due to the distance between the broader Project Area and DFTD2 areas, there is minimal risk that project works would lead to the introduction of this strain of disease.
Interfere with the recovery of the species.	There is a Draft Tasmanian Devil Recovery Plan, although this has not yet been formally adopted. It identifies the following key actions for the species: • Maintain and manage insurance populations • Manage DFTD in the wild • Monitor Tasmanian devils • Conduct disease investigations • Manage other threats in the wild, e.g. threat of foxes, collision with vehicles, habitat loss, illegal culling • Research and measure habitat variables • Coordinate recovery program • Communication with the community and stakeholders. The most relevant of these actions to the project is the management of other threats. As set out against previous criteria, the project is not anticipated to lead to meaningful loss of habitat for the species nor to introduce significant risks from vehicle collision or introduced species and therefore will not impact recovery of the species.

Swift Parrot

Habitat tree assessments have been undertaken for the swift parrot, blue-winged parrot and the Tasmanian masked owl, noting that there is overlap with the habitat requirements of these species. Table 7.7 presents the total habitat trees in the Construction Corridor that could be impacted (including trees for breeding and foraging purposes) while Table 7.8 provides a summary based on species and habitat type. Based on these assessments, the number of habitat trees expected to be impacted for the swift parrot are 28 habitat trees directly lost/cleared and 32 additional trees at risk due to incursion into the TPZ comparative to retention of 183 trees.

Across the broader Project Area (i.e. including operational land) there is between 12,332 and 36,376 habitat trees, based on estimates. The total loss of habitat trees, therefore, represents between 0.11 and 0.32% of the total habitat trees available.

The swift parrot occurs as a single migratory population. Under the National Recovery Plan for the Swift Parrot (DCCEEW, 2024) 'habitat critical to the survival of the species' consists of areas of native vegetation supporting both potential foraging habitat and potential nesting habitat. This is limited to areas of native forest and woodland with either *Eucalyptus globulus* or *E. ovata* as dominant, sub-dominant or low-density species old enough to flower and where there are hollow-bearing eucalypt trees within 10km. These habitat areas are the basis of impact assessments in Table 7.9.

Table 7.7 Swift parrot, Blue-winged parrot and Tasmanian Masked owl habitat areas and trees in the Construction Corridor

No.	Individual tree ID	Swift parrot	Blue-winged parrot	Tasmanian masked owl
Habitat trees within Construction Corridor				
1	TFHpt 111/TFHpt 303*	Potential breeding	Potential breeding	Potential breeding
2	TFHpt 132/TFHpt 015*	Potential breeding	Potential breeding	Potential breeding
3	TFHpt 243/TFHpt 244*	Potential breeding	Potential breeding	Potential breeding
4	TFHpt 017	Potential breeding	Potential breeding	
5	TFHpt 018	Foraging and potential breeding	Potential breeding	
6	TFHpt 055	Potential breeding	Potential breeding	
7	TFHpt 155	Potential breeding	Potential breeding	
8	TFHpt 160	Potential breeding	Potential breeding	
9	TFHpt 162	Foraging and potential breeding	Potential breeding	
10	TFHpt 164	Foraging and potential breeding	Potential breeding	
11	TFHpt 253	Potential breeding	Potential breeding	
12	TFHpt 257	Potential breeding	Potential breeding	
13	TFHpt 258	Foraging and potential breeding	Potential breeding	
14	TFHpt 338	Potential breeding	Potential breeding	
15	TFHpt 152	Foraging habitat		
16	TFHpt 163	Foraging habitat		
17	TFHpt 169	Foraging habitat		
18	TFHpt 170	Foraging habitat		
19	TFHpt 171	Foraging habitat		
20	TFHpt 172	Foraging habitat		
21	TFHpt 173	Foraging habitat		
22	TFHpt 181	Foraging habitat		
23	TFHpt 339	Foraging habitat		
24	TFHpt 340	Foraging habitat		
25	TFHpt 341	Foraging habitat		
26	TFHpt 342	Foraging habitat		
27	TFHpt 343	Foraging habitat		
28	TFHpt 344	Foraging habitat		
Total number of trees	28	28	14	3
Habitat trees with >10% TPZ incursion				
1	TFHpt 130/TFHpt 014*	Foraging and potential breeding	Potential breeding	Potential breeding
2	TFHpt 312/TFHpt 306*	Foraging and potential breeding	Potential breeding	Potential breeding
3	TFHpt 034/TFHpt 035*	Potential breeding	Potential breeding	Potential breeding
4	TFHpt 142/TFHpt 073*	Potential breeding	Potential breeding	Potential breeding
5	TFHpt 229/TFHpt 228*	Potential breeding	Potential breeding	Potential breeding
6	TFHpt 234/TFHpt 233*	Potential breeding	Potential breeding	Potential breeding

No.	Individual tree ID	Swift parrot	Blue-winged parrot	Tasmanian masked owl
7	TFHpt 199			Potential breeding
8	TFHpt 241			Potential breeding
9	TFHpt 336			Potential breeding
10	TFHpt 168	Foraging and potential breeding	Potential breeding	
11	TFHpt 259	Foraging and potential breeding	Potential breeding	
12	TFHpt 282	Foraging and potential breeding	Potential breeding	
13	TFHpt 299	Foraging and potential breeding	Potential breeding	
14	TFHpt 311	Foraging and potential breeding	Potential breeding	
15	TFHpt 016	Potential breeding	Potential breeding	
16	TFHpt 021	Potential breeding	Potential breeding	
17	TFHpt 115	Potential breeding	Potential breeding	
18	TFHpt 131	Potential breeding	Potential breeding	
19	TFHpt 143	Potential breeding	Potential breeding	
20	TFHpt 158	Potential breeding	Potential breeding	
21	TFHpt 159	Potential breeding	Potential breeding	
22	TFHpt 230	Potential breeding	Potential breeding	
23	TFHpt 231	Potential breeding	Potential breeding	
24	TFHpt 232	Potential breeding	Potential breeding	
25	TFHpt 235	Potential breeding	Potential breeding	
26	TFHpt 236	Potential breeding	Potential breeding	
27	TFHpt 242	Potential breeding	Potential breeding	
28	TFHpt 245	Potential breeding	Potential breeding	
29	TFHpt 337	Potential breeding	Potential breeding	
30	TFHpt 174	Foraging habitat		
31	TFHpt 179	Foraging habitat		
32	TFHpt 345	Foraging habitat		
33	TFHpt 346	Foraging habitat		
34	TFHpt 347	Foraging habitat		
35	TFHpt 348	Foraging habitat		
Total number of trees	35	32	26	9

*The number of potential habitat trees is the number of trees directly in the Construction Corridor and therefore subject to clearing. The no. of trees with a TPZ incursion represent those on the margins of clearing areas where there could be sufficient incursion to cause tree mortality.

Table 7.8 Summary of habitat tree impacts per species and habitat type

Tree type (species and habitat)	Directly in Construction Corridor	>10% TPZ incursion	Total*	Retained trees
Swift parrot – potential breeding	10	19	29	113
Swift parrot – foraging	14	6	20	42
Swift parrot – foraging and potential breeding	4	7	11	28
Swift parrot - total	28	32	60	183
Blue winged parrot – potential breeding	14	26	40	141

Tree type (species and habitat)	Directly in Construction Corridor	>10% TPZ incursion	Total*	Retained trees
Tasmanian masked owl – potential breeding	3	9	12	57

*The number of habitat trees overlap – totals presented are totals per species, see Table 7.7 for total tree impacts

The principal impacts of relevance to swift parrots are habitat clearing, specifically the loss of potential habitat trees and supporting foraging habitat. This includes both construction-phase clearing and any consequential clearing that may occur as part of conversion of farmland due to access to irrigation. Construction noise may also lead to disturbance of swift parrots where occurring near habitat trees. Noise related impacts during construction are expected to be relevant only to the trees in the immediate proximity of the construction works and therefore likely affects only those habitat trees already expected to be directly affected.

Table 7.9 presents a significant impact assessment for the swift parrot utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.9 Significant impact assessment: Swift parrot

Criteria	Assessment
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a **population**	Population estimates for the swift parrot are variable, ranging between recent modelling of 300 through to estimates of up to 2,000 in 2000. Across the broader Project Area, there is between 12,332 and 36,376 potential habitat trees, of which 60 will potentially be affected. Based on the population numbers, even at higher estimates, this loss represents a negligible change in availability of habitat trees and will not prevent swift parrots utilising the Project Area. Additional clearing during operations will be managed through the Farm WAP process which is intended to prevent the loss of further potential habitat trees without further site-specific assessment.
Reduce the area of occupancy of the species	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the swift parrot, there will be no change in the use of the Construction Project Area by the species and therefore no change in occupancy.
Fragment an existing **population** into two or more populations	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the swift parrot, there will be no change in the use of the Construction Project Area by the species and therefore no fragmentation of the population.
Adversely affect **habitat critical to the survival of a species**	While there will be a permanent clearing of up to 60 habitat trees, this is compared to 12,332 to 36,376 habitat trees across the broader Project Area. Together with the low number of swift parrots, this will not lead to an adverse effect of critical habitat for the species.
Disrupt the breeding cycle of a **population**	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the swift parrot, there will be no change in ability of parrots to breed within the Construction Project Area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the swift parrot, there will be no habitat changes that will cause broader impacts at a species level.
Result in **invasive species** that are harmful to a critically endangered species becoming established in the endangered or critically endangered species' habitat	Invasive species are not a key threat to swift parrots. An increase in the distribution of the native sugar glider would be a relevant threat to the species but is unlikely to occur as the proposed clearing and land use change impacts would not lead to changes in sugar glider occupancy.
Introduce disease that may cause the species to decline	The swift parrot is potentially affected by the psittacine beak and feather disease (PBFD). However, there is no likely relationship between the project works and the introduction or spread of PBFD to the broader Project Area.
Interfere with the recovery of the species.	Under the National Recovery Plan, the following key recovery actions for the swift parrot are identified:

Criteria	Assessment
	• Maintain known swift parrot breeding and foraging habitat at the local, regional and landscape scales • Reduce impacts from sugar gliders at swift parrot breeding sites • Monitor and manage other sources of mortality • Develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions • Improve understanding of foraging and breeding habitat use at a landscape scale in order to better target protection and restoration measures • Engage community and stakeholders in swift parrot conservation • Coordinate, review and report on recovery progress. As discussed above, the impacts to habitat from the project will be minor and therefore not affect the maintenance of swift parrot breeding and foraging habitat at any scale. No other aspects of the project interact with recovery actions. Therefore, the project is not anticipated to affect the recovery of the species overall.

Tasmanian Wedge-tailed Eagle

The principal impacting processes relevant to Tasmanian wedge-tailed eagles is the direct impact on nests and disturbance within territories associated with these nests. These territories typically extend 500 to 1,000m from nests. There are currently seven nests attributed to wedge-tailed eagles in the broader Project Area, with an additional 19 nests associated with other eagle species that could be shared by wedge-tailed eagles between seasons.

Of these, seven nests are located within 1,000m of the Construction Corridor and of these only four are within 500m. Three of the nests within 500m (3142, 2344 and 2766) have overlapping territories and therefore expected to represent nests that are used across alternate seasons (i.e. in any season only one nest would be used). Table 7.10 lists the details of the nests identified and line of site to the construction area. Note that line of sight modelling was undertaken based on non-vegetated and vegetated scenarios (i.e. accounting for whether vegetation would obscure line of site).

Table 7.10 Eagle nest locations within 500 to 1,000m of Construction Corridor

ID	500m direct distance	1.000m direct distance	1,000m line of sight (vegetated landscape)	1,000m line of sight (non-vegetated landscape)	Nest condition	Likely species
1261	No	Yes	No	Yes	Good	Wedge-tailed eagle
2344	Yes	Yes	No	Yes	Good	Wedge-tailed eagle
2766	Yes	Yes	No	Yes	Excellent	Unknown
3142	Yes	Yes	No	Yes	Good	Unknown
3369	Yes	Yes	No	Yes	Good	Unknown
2593	No	Yes	No	No	Excellent	Wedge-tailed eagle
853	No	Yes	No	No	Good	Wedge-tailed eagle

None of the mapped nests will be directly affected as part of construction works and will also be restricted from impact as part of the Farm WAP process. However, construction activities within 500 to 1,000m of nests can cause impacts to nesting eagles during breeding season due to the species sensitivity and the use of these areas for foraging. Where line of sight from nests to construction areas is obstructed (i.e. by vegetation) disturbance is reduced. Disturbance can be avoided through undertaking construction activities outside of breeding season or when nests are not in use. Noting that only two nests are expected to be in use within 500m of the corridor per breeding season (3369 and one of 2344, 2766 or 3142) and that the other nests do not have line of sight when accounting for vegetation, it is expected that disturbance can be mostly avoided.

Post-construction, the presence of new permanent infrastructure will not cause disturbance to eagles, with the potential exception of operational noise from the GBPS. Maintenance activities within 500 to

1,000m of nests can also cause disturbance but can be timed to occur outside of breeding season or when nests are not in use.

There is considered to be only one population of Tasmanian wedge-tailed eagles, located within the Tasmanian mainland. 'Habitat critical to the survival' of the species consists of forests of predominantly old growth trees greater than 10ha in area on sites that are sheltered from prevailing strong winds.

Table 7.11 presents a significant impact assessment for the Tasmanian wedge-tailed eagle utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.11 Significant impact assessment: Tasmanian wedge-tailed eagle

Criteria	Assessment
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a **population**	Through application of EPRs to avoid disturbance during breeding season, for construction, maintenance and operations, no disturbance to any individual wedge-tailed eagle is anticipated and therefore no change in population size will occur.
Reduce the area of occupancy of the species	The vegetation clearing associated with the project will not change the area over which wedge-tailed eagles will occur as this will be a minor proportion of territory used. Additionally, as no changes to population are anticipated, no change to overall area of occupancy for the species will occur.
Fragment an existing **population** into two or more populations	No project infrastructure represents a hard or soft barrier to dispersal and foraging by wedge-tailed eagles.
Adversely affect **habitat critical to the survival of a species**	The Construction Corridor does not contain mature trees or old growth forest supporting nests for eagles and therefore no impacts to habitat critical to the survival of the wedge-tailed eagle will occur. Similarly, through the application of the Farm WAP process, any such communities associated with new farmland will be subject to a separate assessment process and unlikely to be disturbed.
Disrupt the breeding cycle of a **population**	Through application of EPRs to avoid disturbance during breeding season, for construction, maintenance and operations, no disturbance to any individual wedge-tailed eagle is anticipated and therefore no change in breeding cycles will occur.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Even where clearing occurs, this does not affect the ability for wedge-tailed eagles to forage for food as both disturbed and natural habitats contain prey sources. Together with avoiding impacts to nesting sites and associated viewsheds, there will be no habitat related impacts relevant at a species-scale.
Result in **invasive species** that are harmful to a critically endangered species becoming established in the endangered or critically endangered species' habitat	The wedge-tailed eagle is not vulnerable to any particular invasive species that could be relevant to the SWISA.
Introduce disease that may cause the species to decline	The wedge-tailed eagle is not vulnerable to any particular disease that could be relevant to the SWISA.
Interfere with the recovery of the species.	Due to the lack of significant changes in risks and habitat for wedge-tailed eagle, SWISA is unlikely to affect species recovery. Note that at present, there is no recovery plan in place for the species.

Central North Burrowing Crayfish

Optimal CNBC habitat principally consists of undisturbed native vegetation such as wet *Eucalyptus obliqua* forest in gullies and *Eucalyptus ovata* forest, and damp remnant *Eucalyptus ericifolia* swam forest patches on drainage lines. There are also suboptimal areas associated with drainage lines for paddocks and roadside ditches. Whether burrowing crayfish are present in these habitat areas is typically determined by the presence of chimneys.

Based on survey of potential habitat areas and presence of chimneys, a total of 56 sites in the Construction Project Area are considered to potentially support the species. Majority of these (~75%) occur in highly modified areas within or adjacent to drainage lines within paddocks while the remainder are in damp areas within remnant *Melaleuca ericifolia* (~20%) or optimal undisturbed habitat within native vegetation (~5%).

Of the 56 known sites, all but 11 will be avoided through the realignment of project infrastructure. For these 11 sites, HDD can be undertaken for six of these to avoid surface disturbance to habitat areas. This leaves a total of five sites that will be directly impacted (supporting nine chimneys in total), covering an area of 1.92ha (Table 7.12). None of these sites support a 'colony', following the standardised definition of >4 burrows/16m^2 (Richardson, 2024). The total number of crayfish expected to be directly affected during construction is between four and seven.

Additional crayfish may occur at sites that could not be surveyed due to the density of vegetation. Any crayfish encountered during construction at affected sites (including those not yet surveyed) will be salvaged and relocated into other suitable habitat areas.

Table 7.12 Central north burrowing crayfish habitat impacts in Construction Project Area

Habitat feature	Total recorded	Impacted by construction	Impact avoided
Extent of habitat (ha) – optimal	22.18	0.11	20.26
Extent of habitat (ha) – sub-optimal		1.81	
No. burrowing crayfish locations	56	5 (9 chimneys)	51

A 'population' of burrowing crayfish is conservatively defined as any colony, based on meeting relevant burrow density. While the five sites known to be affected do not support colonies, unsurveyed sites may contain sufficient density of crayfish to constitute a colony. There is no defined 'habitat critical to the survival' of the species and the species is known to be supported even within disturbed features in the landscape. In the context of this species, critical habitat is considered to be the total distribution of habitat areas (i.e. all habitat as listed Table 7.12).

Construction related impacting processes (1.92 ha footprint; Table 7.12) include direct loss of habitat, compaction of soil and temporary changes in hydrology at construction sites. Potential impacts to CNBC could also occur on farmlands during the operational phase, especially in relation to clearing of vegetation along drainage lines as part of farmland development and application of fertilisers and pesticides in drainage features. Through the Farm WAP process, measures will be implemented to avoid or minimise impacts to CNBC. Some clearing and conversion of drainage lines will be unavoidable, and CNBC densities in modified areas are expected to be lower than in undisturbed environments.

Table 7.13 presents a significant impact assessment for the CNBC utilising the criteria within the Significant Impact Guidelines 1.1, with reference to the Draft Referral Guidelines for Four Threatened Tasmanian Burrowing Crayfish. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.13 Significant impact assessment: Central north burrowing crayfish

Criteria	Assessment
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a **population**	Impacts to the majority of crayfish burrows in the Construction Corridor will be avoided, except for five known habitat locations and potentially an additional 20 locations which have

Criteria	Assessment
	not been surveyed. The five known locations do not support colonies that form distinct populations and therefore would be part of the broader population in those local areas. For the other sites, colonies could be present, each of which could represent a population of crayfish. To mitigate potential impacts all crayfish encountered would be salvaged and relocated to other habitat areas. Noting the high availability of habitat areas not currently utilised by burrowing crayfish and the tolerance of these species to some disturbance, no actual change in individual populations is expected. Operational impacts will be managed through the Farm WAP process which aims to reduce direct impacts on CNBC burrow areas. There will be some landscape modification which could reduce the occupancy in some areas but will not lead to the overall loss of crayfish populations due to the ability of the species to occur in modified areas.
Reduce the area of occupancy of the species	While there will be localised movement of populations, the total impact to species habitat will be 0.11ha of optimal habitat and 1.81ha of sub-optimal habitat, comparative to significant available habitat across the broader landscape. This habitat loss will not affect the species more generally as the populations within this habitat area will be relocated to other, available habitat. During operations, any opening of new farmland will be subject to the Farm WAP process which will require localised assessments and avoidance of areas actually occupied by burrowing crayfish. No reduction in occupancy area is therefore expected.
Fragment an existing **population** into two or more populations	Any colonies encountered during construction works (i.e. at any of the 20 unsurveyed sites) will be salvaged and relocated and therefore no individual population will be subject to fragmentation.
Adversely affect **habitat critical to the survival of a species**	While all habitat across the Construction Project Area is considered habitat critical to the survival of the species, there will be no net loss in utilised habitat. Up to 1.92ha of habitat will be impacted. The crayfish within these areas will be relocated to the closest suitable habitat (i.e. in an area where likelihood of future disturbance is minimal and/or not currently utilised). During operations, any opening of new farm land will be subject to the Farm WAP process which will require localised assessments and avoidance of areas occupied by burrowing crayfish.
Disrupt the breeding cycle of a **population**	Impacts to individual crayfish sites has been avoided where possible. For chimney sites that cannot be avoided, salvage works will be required to exhume and relocate crayfish. This will occur in winter months (May to October) at the five identified locations. As breeding generally occurs spring-summer, this relocation will likely be outside of breeding for these species. During operations, any opening of new farm land will be subject to the Farm WAP process which will require localised assessments and avoidance of areas occupied by burrowing crayfish.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As noted above, there is no anticipated net loss in utilised habitat for the burrowing crayfish and therefore no impacts at a species level are anticipated.
Result in **invasive species** that are harmful to a critically endangered species becoming established in the endangered or critically endangered species' habitat	The CNBC is vulnerable to the introduction and spread of weed species that are tussock or mat-forming species which have high densities. This could occur through construction works where spread by vehicles. This will be controlled through the use of specific weed management actions and ongoing monitoring and auditing, allowing for any occasion of weeds to be rapidly addressed.
Introduce disease that may cause the species to decline	The CNBC is not sensitive to diseases and no introduction of diseases is anticipated.
Interfere with the recovery of the species.	Due to the lack of significant changes in risks and habitat for the CNBC, the SWISA is unlikely to affect species recovery. Note that at present, there is no recovery plan in place for the species.

Robust Fingers

Based on a combination of review of desktop records and on-ground survey by orchid specialist, there is no optimal habitat for orchids identified within the Construction Corridor. Up to 1.20ha of potential/buffer habitat has been identified within the Construction Project Area but this represents low

value habitat, identified only for the purposes of construction management. Therefore, no loss of relevant habitat for robust fingers is expected as part of construction.

Across the Irrigation District, there is expected to be robust fingers and associated habitat on undisturbed land. This includes land that may be the subject of future farming where the SWISA facilitates water access. For these areas, the Farm WAP process has strict requirements for property-wide surveys for threatened species, including flora, prohibitions on clearing of any threatened species encountered, and the use of operational buffers to minimise the risk of chemical or hydrological impacts. These controls in effect create a site-by-site assessment and management regime for flora species that will mitigate the risk of population-scale significant impacts and habitat loss.

Under the Threatened Tasmanian Orchids Recovery Plan (TSS, 2017), habitat critical to the survival of the species consists of general habitat for the species where occupied by any subpopulations. Warrawee Conservation Area is known to support a subpopulation and therefore support

habitat critical to the survival of the species. While this adjoins the Construction Project Area, any potential habitat in the Construction Project Area is not critical habitat as it is not known to support any robust fingers. The Irrigation District is not known to support any other subpopulation.

Table 7.14 presents a significant impact assessment for the robust fingers utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.14 Significant impact assessment: Robust fingers

Criteria	Assessment
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a **population**	While construction will lead to disturbance of buffer habitat adjoining known optimal orchid habitat, next to the Warrawee Conservation Area, this will not lead to a loss of relevant orchid habitat. Controls on construction, especially weed and hygiene management, will be implemented to prevent any indirect impacts from the construction leading to degradation in these areas. The Farm WAP process is intended to prevent the further clearing of robust fingers where encountered on farmland and to mitigate any indirect impacts associated with use of chemicals and application of water. While some individual orchids may still be affected, this process will avoid any species-level decline or associated impact.
Reduce the area of occupancy of the species	As there are no known robust fingers within the Construction Project Area and as clearing of orchids on farmland will be avoided through the Farm WAP process, no overall change to the occupancy of the robust fingers is expected. In particular, works will avoid all subpopulations of the species and habitat critical to the survival of the species.
Fragment an existing **population** into two or more populations	The Project will not introduce any further barriers to dispersal from regional subpopulations as these populations are already separated by areas of agricultural clearing and other land modification.
Adversely affect **habitat critical to the survival of a species**	Habitat critical to the survival of the species consists of habitat in the Warrawee Conservation Area. As this will not be subject to construction disturbance, there will not be a loss of any habitat critical to the survival of the species. Controls on construction, especially weed and hygiene management, will be implemented to prevent any indirect impacts from the construction leading to degradation in these areas. There is no habitat critical to the survival of the species across the broader Irrigation District.
Disrupt the breeding cycle of a **population**	As there will be direct impact to a subpopulation of the robust fingers, no disruption of breeding cycle is anticipated.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As there are no known robust fingers in the Construction Project Area and the potential habitat identified is marginal, the temporary clearing of potential habitat is not expected to lead to a species level decline or associated impact.

Criteria	Assessment
	The Farm WAP process is intended to prevent the further clearing of robust fingers where encountered on farmland and to mitigate any indirect impacts associated with use of chemicals and application of water. While some individual orchids may still be affected, this process will avoid any species-level decline or associated impact.
Result in **invasive species** that are harmful to a critically endangered species becoming established in the endangered or critically endangered species' habitat	To prevent the introduction and spread of invasive weeds, a specific weed and hygiene management plan will be adopted during construction, including ongoing monitoring and auditing components. For individual farmland, weeds are unlikely to be spread through the process of connecting to water and broader landscape development and therefore unlikely to lead to any invasive species establishment.
Introduce disease that may cause the species to decline	As above regarding invasive species.
Interfere with the recovery of the species.	The Threatened Tasmanian Orchids Flora Recovery Plan (TSS, 2017) identifies the following key recovery objectives: • Maintain and increase number of known subpopulations • Maintain or increases individuals within subpopulations • Maintain or increase the extent, condition and security of habitat critical to the survival of each species. For the broader Irrigation District, due to the high fragmentation of the landscape, it is unlikely that any occurrences could form the basis of a future important subpopulation and critical habitat. While there may be opportunity for the potential habitat adjacent to the Warrawee Conservation Area to be improved for the species, the SWISA will not affect this opportunity as the disturbance in this area would principally be temporary disturbance as part of construction. For these reasons, the temporary disturbance of the SWISA project construction would not affect recovery actions.

7.2.3 Vulnerable Species

Spotted-tail Quoll

The spotted-tail quoll was included in the habitat suitability modelling undertaken for dasyurids (Table 7.4). Consistent with this, the total residual impact to spotted-tail quoll habitat will be a loss of 0.06ha of optimal habitat for the species in the footprint of project infrastructure, with an additional 2.12ha of sub-optimal habitat being converted to infrastructure buffer areas. Temporary impacts have been identified as not likely to affect the spotted-tail quoll as the period of construction (i.e. during which exclusion would occur) is not sufficient to cause any permanent exclusion of quolls.

Under the National Recovery Plan for Spotted-tail Quolls (DELWP, 2016), quolls within the Project Area form part of the central north Tasmanian population. Conservatively, it is assumed this entire population can be considered an 'important population'. The 'habitat critical to the survival' of the spotted-tail quoll has not been defined but can conservatively be assumed to align with the optimal habitat identified for the species.

During construction phase, the key potential impacts to the species will include the direct clearing and disturbance of habitat, as well as any peripheral habitat disturbance associated with chronic impacts (e.g. noise extending from construction areas, weeds spreading into habitat) and acute impacts to individual animals (e.g. injury in trenches, strike by construction vehicles). During operations, peripheral habitat disturbance could also occur from farming properties, together with some strike by operational vehicles.

Table 7.15 presents a significant impact assessment for the spotted-tail quoll utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.15 Significant impact assessment: Spotted-tail quoll

Criteria	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an **important population** of a species	The typical home range of a spotted-tail quoll in areas of lower density populations is 550 to 2,486ha. The permanent loss of 0.06ha of optimal denning habitat, therefore, represents a maximum of 0.002 to 0.011% of the footprint of a single quoll. As these impacts will be spread across the range of multiple quolls, the actual impact will be even less. Temporary impacts will be greater than this (reaching up to 1.5% of a single range) but, due to the short construction timeframes, are not of sufficient length to cause permanent displacement of quolls. The loss of habitat, therefore, is not anticipated to cause a loss in population. Similarly, loss of sub-optimal denning habitat (2.12ha) and broader foraging habitat (0.91ha) is also not sufficient to impact the population. As quolls are known to utilise a variety of landscapes for foraging, the large disturbance to foraging habitat will not affect population viability, especially noting the low density of quolls in the area. Injury or mortality from trenching can be mostly avoided through adoption of standard construction practices. The Farm WAP process will minimise the risk of any further habitat loss throughout the SWISA area during operational phase.
Reduce the area of occupancy of an **important population**	Due to the minimal loss of denning habitat for the species across the broader SWISA landscape, there will be no reduction in the occupancy of the spotted-tail quoll locally or across the entire population extent.
Fragment an existing **important population** into two or more populations	Spotted-tail quolls utilise open areas such as pasture and grasslands for foraging and linear features (e.g. roads) for dispersal. Any conversion of land, therefore, will not present a 'hard' barrier for spotted-tail quolls in the Project Area and therefore not lead to fragmentation.
Adversely affect **habitat critical to the survival of a species**	While there will be the loss of up to 0.06ha of optimal denning habitat for spotted-tail quolls, this does not represent an overall adverse effect to habitat critical to the survival of the species as it is a minor proportion of the total home range of an individual quoll. There would be sufficient habitat retained across the Project Area to be utilised by any quolls that are displaced. A larger area of optimal habitat will be subject to temporary impact (up to 8.46ha). The construction timeframes associated with this temporary disturbance are not sufficient to cause permanent exclusion of quolls. Additionally, this loss represents a series of narrow corridors spread across the broader Project Area, and thus do not represent the net loss of any significant habitat patches.
Disrupt the breeding cycle of an **important population**	As above, any loss of denning habitat will not be sufficient to affect overall breeding cycles for the species as any displaced quoll will be able to move to other suitable denning areas nearby.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As above, the permanent loss of 0.06ha of optimal denning habitat is too small to pose a risk to spotted-tail quoll populations, especially noting the large home range of individual quolls. The larger temporary loss of optimal denning habitat (8.46ha) represents linear cleared areas across the landscape and will not cause the loss of any localised patch of significant habitat.
Result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Construction and operational phase controls on invasive weeds will be sufficient to prevent the introduction and spread of weeds at a rate that would otherwise impact on spotted-tail quoll habitat. Cats are harmful to spotted-tail quolls and may have some change in dispersal patterns from the new SWISA infrastructure. However, cats already existing in the broader landscape and are unlikely to have a sufficient change in their distribution. Therefore, no material change in risk to spotted-tail quolls is anticipated.
Introduce disease that may cause the species to decline	Disease is not a major risk to the central north Tasmanian population of spotted-tail quolls. Disease could spread through cats but, as noted above, the distribution in cats is unlikely to materially change as a result of the SWISA.
Interfere substantially with the recovery of the species.	Due to the lack of significant changes in risks and habitat for spotted-tail quoll, the project is unlikely to affect species recovery. The focus of the National Recovery Plan for the species is on habitat conversion, primarily through the long-term protection of large blocks of vegetation in quoll core habitat. While there will be clearing as part of the SWISA, it will be at a scale and linear width that will not materially affect the species.

Eastern Barred Bandicoot

Within the Construction Corridor, the following habitat types will be impacted for the eastern-barred bandicoot:

- 319.83ha of temporary impact – this will involve temporary removal of ground cover which would reduce the viability of these areas as foraging habitat (due to the lack of refugia)
- 1.02ha of permanent impact – this relates to the permanent conversion of habitat to balance tanks and pump stations.

Temporary impacts relate to narrow clearings along the pipeline footprint. While these areas will not be available for foraging, bandicoots will still be able to cross between adjoining habitat either side of the corridor. The impacts, therefore, do not represent a broader loss of habitat patches for the species.

During construction, there is a risk of construction vehicle strike and entrapment within trenches. Both these impacts can be mitigated through standard construction controls for the project. Operational phase habitat loss is not anticipated due to the protocols within the Farm WAP process which require site-specific assessments and vegetation retention for farming areas.

Population estimates for the eastern barred bandicoot suggest there are more than 10 sub-populations across Tasmania, although the location of these sub-populations has not been determined. Any one of these sub-populations could be assumed to be an 'important population'. However, as the broader Project Area does not occur within the core range for the species and detection occurred at only one location across the Construction Project Area, the broader Project Area is not expected to support an important population.

Table 7.16 presents a significant impact assessment for the eastern barred bandicoot utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.16 Significant impact assessment: Eastern barred bandicoot

Criteria	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an **important population** of a species	The broader Project Area does not support an important population of the eastern barred bandicoot. While the permanent impact area (1.02ha) (Construction Corridor) could impact up to 7.83 bandicoots in an area of high population density (based on home range of 0.8 to 11.9ha per individual), due to the very low density observed, fewer than one bandicoot's foraging range would be affected. Temporary impacts are more widespread but are not expected to lead to the loss of any one key habitat patch that would be used by bandicoots.
Reduce the area of occupancy of an **important population**	The broader Project Area does not support an important population of the eastern barred bandicoot. Works are not expected to affect the long-term occurrence of the bandicoot in the broader Project Area and therefore will not impact on the area of occupancy.
Fragment an existing **important population** into two or more populations	The broader Project Area does not support an important population of the eastern barred bandicoot. Additionally, no habitat impacts will present a 'hard' barrier to bandicoot movements and therefore will not cause fragmentation of habitat.
Adversely affect **habitat critical to the survival of a species**	As the broader Project Area does not support an important population of the eastern barred bandicoot and also only supports very low densities of bandicoots, no habitat types in the Construction Project Area are expected to support habitat critical to the survival of the species. Further, the only permanent impacts will be small, likely representing partial loss of foraging habitat used by one bandicoot.
Disrupt the breeding cycle of an **important population**	The broader Project Area does not support an important population of the eastern barred bandicoot. Due to the low density of bandicoots in the area, any temporary or permanent loss of habitat will not lead to a net loss in habitat utilised by the species due to the availability of alternative suitable habitat across the area. Therefore, breeding cycles are not expected to be materially affected.

Criteria	Assessment
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The broader Project Area contains a wide range of structurally suitable habitat for bandicoots but supports only low densities of animals. Therefore, any temporary or permanent loss of habitat is not anticipated to cause a net loss in habitat utilised by the species as any bandicoots in these areas will be able to utilise other retained areas.
Result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Cats are harmful to eastern barred bandicoots and may have some change in dispersal patterns from the new SWISA infrastructure. However, cats already existing in the broader landscape and are unlikely to have a sufficient change in their distribution. Therefore, no material change in risk to spotted-tail quolls is anticipated.
Introduce disease that may cause the species to decline	Toxoplasmosis could spread through cats but, as noted above, the distribution in cats is unlikely to materially change as a result of the SWISA.
Interfere substantially with the recovery of the species.	Due to the lack of significant changes in risks and habitat for the eastern barred bandicoot, the project is unlikely to affect species recovery. Note that at present, there is no recovery plan in place for the species.

Tasmanian Masked Owl

Habitat mapping has been undertaken for the Tasmanian masked owl based on identification of potential habitat trees for foraging and breeding activities. This is presented in Table 7.7 and Table 7.8 which also list the habitat trees for swift and blue-winged parrots. Based on these assessments, a total of three habitat trees is expected to be directly lost, with an additional nine potentially at risk due to incursion into the TPZ. This is comparative to retention of 57 habitat trees. Habitat areas are based on potential nesting trees, as foraging activities can occur across a mosaic of landscape types.

Across the broader Project Area (i.e. including operational land) there is between 7,634 and 36,376 habitat trees, based on estimates. The total loss of habitat trees, therefore, represents between 0.03 and 0.15% of the total habitat trees available.

The Tasmanian masked owl occurs as a single population across Tasmania or at least across a significant regional area due to their dispersal capabilities. The entire population is therefore considered to be an important population. No 'habitat critical to the survival' of the species has been defined but for the purposes of this assessment, it is considered that any old growth trees supporting suitable tree hollows would be considered critical habitat.

The principal impacts of relevance to masked owls are habitat clearing, specifically the loss of potential habitat trees and supporting habitat. This includes both construction-phase clearing and any consequential clearing that may occur as part of conversion of farmland due to access to irrigation. Construction noise may also lead to disturbance of masked owls where occurring near habitat trees. Noise related impacts during construction are expected to be relevant only to the trees in the immediate proximity of the construction works and therefore likely affects only those habitat trees already expected to be directly affected.

Table 7.17 presents a significant impact assessment for the Tasmanian masked owl utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.17 Significant impact assessment: Tasmanian masked owl

Criteria	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an **important population** of a species	Conservatively, it is assumed that all 12 potential nesting trees in the Construction Corridor could be occupied by masked owls and could be cleared. This represents the loss of up to 0.15% of the total number of nesting trees across the broader area. Population estimates indicate that there will be a sufficient number of suitable but unutilised trees in the broader area that could be utilised by any owls displaced from the clearing of these 12 trees. To the extent that clearing occurs outside of breeding seasons, there is not expected to be a loss

Criteria	Assessment
	of any individual owls nor a net loss in the capacity of the landscape to support the masked owl population. Note that the 'important population' for the masked owl represents the larger regional population such that any impacts at a project scale would be negligible for the population. Clearing of hollow bearing trees during operations is prohibited under the Farm WAP process except where subject to a site-specific assessment.
Reduce the area of occupancy of an **important population**	As noted above, due to the low level of disturbance to habitat trees comparative to retained habitat across the region together with the ability of masked owls to still use disturbed areas for foraging and dispersal habitat. there will be no change in the occupancy of the species within the Construction Project Area.
Fragment an existing **important population** into two or more populations	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the Tasmanian masked owl, there will be no change in the use of the Construction Project Area by the species and therefore no change in occupancy.
Adversely affect **habitat critical to the survival of a species**	Construction could cause the loss of up to 12 potential nesting trees. However, due to the abundance of other suitable and unutilised trees in the Project Area, there will not be a loss of habitat critical to the survival of any displaced individuals.
Disrupt the breeding cycle of an **important population**	All clearing works will be subject to habitat tree management protocols which prevent clearing during breeding season. This will allow for any displaced masked owls to move to other suitable but unutilised trees in the Project Area without impacts to breeding activities.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As there will be no loss of utilised habitat in the Project Area, there will be no habitat impacts relevant at a species level.
Result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Tasmanian masked owl is not vulnerable to any particular invasive species that could be relevant to the project.
Introduce disease that may cause the species to decline	The Tasmanian masked owl is not vulnerable to any particular disease that could be relevant to the project.
Interfere substantially with the recovery of the species.	Due to the lack of significant changes in risks and habitat for the Tasmanian masked owl, the project is unlikely to affect species recovery. Note that at present, there is no recovery plan in place for the species.

Blue-winged Parrot

Habitat mapping has been undertaken for the blue-winged parrot based on identification of potential habitat trees for foraging and breeding activities. This is presented in Table 7.7 and Table 7.8 which also list the habitat trees for swift parrots and Tasmanian masked owls. Based on these assessments, a total of 14 habitat trees is expected to be directly lost, with a further 26 trees potentially impacted due to incursion into their TPZ, comparative to retention of 141 habitat trees.

Across the broader Project Area (i.e. including operational land) there is between 12,332 and 36,376 habitat trees, based on estimates. The total loss of habitat trees, therefore, represents between 0.11 and 0.32% of the total habitat trees available.

The blue-winged parrot forms two breeding subpopulations, one of which is associated with Tasmania. This entire population is considered an 'important population'. 'Habitat critical to the survival' of the species consists of various foraging, staging and breeding habitat for the species, with particular focus on areas supporting suitable hollows within the breeding range. For the purposes of this assessment, all habitat occurrences are therefore considered to be habitat critical to the species' survival.

The principal impacts of relevance to blue-winged parrots are habitat clearing, specifically the loss of potential habitat trees and supporting foraging habitat. This includes both construction-phase clearing and any consequential clearing that may occur as part of conversion of farmland due to access to irrigation. Construction noise may also lead to disturbance of blue-winged parrots where occurring near habitat trees. Noise related impacts during construction are expected to be relevant only to the trees in

the immediate proximity of the construction works and therefore likely affects only those habitat trees already expected to be directly affected.

Table 7.18 presents a significant impact assessment for the blue-winged parrot utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.18 Significant impact assessment: Blue-winged parrot

Criteria	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an **important population** of a species	The Tasmanian sub-population of the blue-winged parrot consists of 6,000 birds, occurring across Tasmania. Across the broader Project Area and surrounds, there is between 12,332 and 36,376 potential habitat trees, of which 40 will potentially be affected in the Construction Corridor. Based on the population numbers, even at higher estimates, this loss represents a negligible change in availability of habitat trees and will not prevent swift parrots utilising the broader Project Area. Additional clearing during operations will be managed through the Farm WAP process which is intended to prevent the loss of further potential habitat trees without further site-specific assessment.
Reduce the area of occupancy of an **important population**	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the blue-winged parrot, there will be no change in the use of the Construction Project Area by the species and therefore no change in occupancy.
Fragment an existing **important population** into two or more populations	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the blue-winged parrot, there will be no change in the use of the Construction Project Area by the species and therefore no fragmentation of the population.
Adversely affect **habitat critical to the survival of a species**	While there will be a permanent clearing of up to 40 habitat trees for the blue-winged parrot within the Construction Corridor, this is compared to 12,332 to 36,376 habitat trees across the broader Project Area. Together with the low number of blue-winged parrots, this will not lead to an adverse effect of critical habitat for the species.
Disrupt the breeding cycle of an **important population**	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the blue-winged parrot, there will be no change in ability of parrots to breed within the Construction Project Area.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As noted above, due to the low level of disturbance to habitat trees and associated habitat for the blue-winged parrot, there will be no habitat changes that will cause broader impacts at a species level.
Result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasive species are not a key threat to blue-winged parrots. An increase in the distribution of the native sugar glider would be a relevant threat to the species but is unlikely to occur as the proposed clearing and land use change impacts would not lead to changes in sugar glider occupancy.
Introduce disease that may cause the species to decline	The blue-winged parrot is potentially affected by PBFD. However, there is no likely relationship between the project works and the introduction or spread of PBFD to the broader Project Area.
Interfere substantially with the recovery of the species.	Due to the lack of significant changes in risks and habitat for the blue-winged parrot, the project is unlikely to affect species recovery. Note that at present, there is no recovery plan in place for the species.

Australian Grayling

The Australian grayling is present in the Mersey River (including in water supply networks) and larger streams across the irrigation district (associated with pipeline infrastructure and irrigation activities). It has the potential to occur in natural and modified waterways and permanent artificial drainages in two catchments: Mersey River catchment and catchments discharging to Port Sorell estuary (e.g. Panatana Rivulet). For the purposes of this assessment, both catchments are conservatively considered to support an 'important population' of Australian grayling. There is no definition of 'habitat critical to the survival' of the Australian grayling; based on specialist analysis (Elgin, 2025) the habitat present in both

the Mersey River and in the SWISA Irrigation District is considered to not be critical habitat due to its existing degradation and modification.

For the Mersey River, key impacts to the Australian grayling relate to the construction and operation of the GBPS and releases of water from the Parangana Dam. Hydraulic assessments (WMA Water, 2024) of the river indicate the pump station infrastructure will not form a barrier, even in low flow periods, as the infrastructure does not extent into the low flow channel or areas of continuous low velocity water. Fish screens will be installed to prevent entrainment to migrating juveniles and egg/larval stage fish and to lower velocity at the intake location. A 'cease to take' regime will also be in place for periods of low flow, supplemented by releases from the Parangana Dam. These reduce the risk of flow changes affecting migration patterns (e.g. flow cues for recruitment migration) but will require adaptive monitoring of flows during summer months to ensure these impacts can be further mitigated.

Releases from the Parangana Dam will potentially lead to periodic thermal pollution within the Mersey River, especially during summer months where thermal stratification is more likely. At present, there is insufficient data to assess the risk in detail and therefore releases during summer will be subject to an adaptive management process, with monitoring informing the release strategy and whether thermal curtains will be required.

Within the Irrigation District, no Australian graylings were detected at any of surveyed sites, although conservatively it is assumed that some graylings may still occur. Of the eight waterways identified as potentially supporting graylings based on existing habitat, four will be crossed via HDD, with the remaining four subject to trenching. Potential direct impacts, therefore, are isolated to the four trenching crossings. However, as no graylings were present based on survey, it is unlikely any significant impact could occur during construction.

Based on evidence from the SWIS activities (Pinion Advisory, 2023), other operational activities are unlikely to affect Australian grayling as they will not directly impact on key habitat features (e.g. larger waterbodies). In particular, monitoring indicates that irrigation activities for the SWIS did not lead to significant changes in water quality and provides sufficient baseline for ongoing monitoring and adaptation of water use across the landscape. Additional runoff from water use has been quantified as 2% compared to background (i.e. an additional 2% increase in uncontrolled water in scheme areas compared to pre-irrigation baseline) which is significantly less than the natural interannual variation (Pinion Advisory, 2023).

Table 7.19 presents a significant impact assessment for the Australian grayling utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.19 Significant impact assessment: Australian grayling

Criteria	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an **important population** of a species	Assessments of the GBPS infrastructure and operations indicate there will be no impacts to the Australian grayling population in the Mersey River where subject to appropriate monitoring and management. The highest risk activities will be extraction during years of low water and releases of thermal pollution from Parangana Dam, both of which would occur within summer months. However, these can be managed through adaptive management controls which will be continually refined over time. Specifically, there will be no direct loss of habitat for graylings, risks of entrainment will be mitigated through use of screens, and flow and thermal pollution-related impacts will be managed in an adaptive way. Impacts within the irrigation district are unlikely to affect the broader Australian grayling population associated with the Port Sorell catchment as they will be isolated to lower value waterways (e.g. agricultural drains, high order ephemeral streams) and subject to standard

Criteria	Assessment
	management controls. Additionally, existing water monitoring indicates changes in the landscape will be minimal comparative to interannual variability and therefore not create further degradation of these waterways for grayling use.
Reduce the area of occupancy of an **important population**	As there will be no impact to the populations in either the Mersey River or Port Sorell, no change in area of occupancy for an important population is expected to occur.
Fragment an existing **important population** into two or more populations	As there will be no impact to the populations in either the Mersey River or Port Sorell, no fragmentation of important populations is expected to occur.
Adversely affect **habitat critical to the survival of a species**	There is no habitat critical to the survival of the Australian grayling present in the Irrigation District.
Disrupt the breeding cycle of an **important population**	The main potential impacts to breeding cycle would be isolated to the Mersey River and consist of the entrainment of eggs/larval stage fish and juveniles, water extraction masking migration cues (i.e. flow levels) for juveniles, and thermal pollution during migratory pathways. Each of these impacts will be managed, with screens used to stop entrainment while extraction and releases will be subject to ongoing monitoring and supporting controls. Therefore, impacts to breeding cycles are not anticipated.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	While there will be temporary and operational impacts to habitat, none of these will be at a scale that could affect the broader species.
Result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Australian grayling is not vulnerable to any particular invasive species that could be relevant to the project. While invasive species are known from Port Sorrel catchment, the SWISA will not take water from this area and therefore not expected to introduce these to the Irrigation District.
Introduce disease that may cause the species to decline	The Australian grayling is not vulnerable to any particular disease that could be relevant to the project. Diseases harmful to the grayling are spread through introduced species but no introduction or spread of such species is expected.
Interfere substantially with the recovery of the species.	Under the National Recovery Plan for the Australian Grayling (Backhouse et al. 2008), key recovery actions are: • Identify important populations of Australian grayling • Protect and restore habitat for Australian grayling • Investigate important life history attributes to acquire targeted information for management • Investigate and manage threats to population and habitats • Increase awareness of Australian grayling conservation with resource managers and the public. Due to the lack of significant changes in risks and habitat for the Australian grayling, the project is unlikely to affect species recovery or any of these specific actions.

Green and Gold Frog

Habitat-related impacts for the GGF relate to two types of habitat:

- Water bodies that could support breeding activities
- Dispersal habitat areas (areas between water bodies across which frogs can move).

Within the SWISA, water bodies include both natural systems (e.g. waterways) and farm dams. Survey data indicates that frogs occur across these dams, regardless of the mapped core breeding habitat score. For this reason, all dams associated with the SWISA are considered likely to support GGFs.

Table 7.20 sets out the total dispersal habitat areas in the Construction Project Area for the GGF, including expected impacts and avoidance. Table 7.21 sets out expected changes to farm dam use with SWISA water. Based on these assessments, 1.71ha of dispersal habitat is expected to be impacted from the works and no existing dams are expected to have a reduction in water storage. This habitat disturbance will be a temporary impact only as disturbed areas can still be used for frog dispersal. This indicates the only direct habitat impacts anticipated will be from the construction clearing rather than subsequent change in dams across the Irrigation District.

There is an additional 134.10ha of foraging and refuge habitat throughout the Construction Corridor, of which 2.50ha is native and the remaining 131.60ha is modified. While there will be disturbance as part of construction, as this is not core frog habitat, the utility of this habitat for opportunistic foraging and refuge by frogs will be retained, even after disturbance. Therefore this does not represent habitat loss for the species.

Table 7.20 Green and gold frog dispersal habitat areas in the Construction Project Area

Habitat type	Construction Corridor	Avoidance Area
Dispersal habitat area (ha)	1.71	6.59

Table 7.21 Expected changes in farm dam use with SWISA water

Type of change	No. dams
No change	94
More water stored	93
Less water stored	0
Total	187

Any viable population of the GGF is considered to be an 'important population' (DEWHA, 2009). Conservatively, it is assumed the SWISA area represents a single important population of the species. While 'habitat critical to the survival of the species' has not been defined, this is can be assumed to include all dispersal and breeding habitat.

Additional to direct habitat impacts, the GGF may be impacted through construction and operational water pollution, the introduction of diseases, and the potential introduction and spread of invasive species.

The establishment of barriers to movement, such as fences and buildings, is a known impacting process for the frog. However, in the context of the SWISA operations, it is unlikely that the access of farms to new water will lead to significant changes in the built form of the landscape, such as new fences and buildings, and therefore unlikely that there would be facilitate population-scale impacts.

Table 7.22 presents a significant impact assessment for the green and gold frog utilising the criteria within the Significant Impact Guidelines 1.1 and the additional guidance from EPBC Act Policy Statement 3.14. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.22 Significant impact assessment: Green and gold frog

Criteria	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an **important population** of a species	The project will lead to the temporary loss of 1.71ha of dispersal habitat. This will consist mostly of already modified land and will recover to suitable dispersal habitat within six months. No loss of water bodies used for breeding will occur, and during operations the number of dams available for breeding is likely to increase. The spread of weeds will be managed through standard protocols while water quality impacts from operations will be subject to the Farm WAP process requiring buffers around water features. As no breeding areas will be lost and as other dispersal habitat will remain across the Construction Project Area, it is not anticipated that these impacts will cause the population-scale losses for frogs.
Reduce the area of occupancy of an **important population**	As there will be only minimal temporary loss of dispersal habitat (1.71ha) and controls to prevent long-term degradation of habitat (e.g. Farm WAP controls for water quality) no long-

Criteria	Assessment
	term impact to habitat for the species or local populations is expected and therefore no reduction in occupancy will occur.
Fragment an existing **important population** into two or more populations	The project infrastructure will not represent a hard barrier to dispersal by frogs. Even where there are construction impacts to dispersal habitat, these areas can still be crossed by frogs and will be restored to pre-disturbance conditions within six months. No fragmentation to the frog population is therefore expected.
Adversely affect **habitat critical to the survival of a species**	While all dispersal habitat is considered habitat critical to the survival of the species, there will be sufficient dispersal and breeding habitat retained across the Construction Project Area during construction to prevent species-level impacts. Beyond six months, habitat impacts will be mostly remediated, with the Farm WAP process anticipated to provide measures for the ongoing management of the water bodies.
Disrupt the breeding cycle of an **important population**	Avoidance of all works within the breeding season was deemed to not be achievable. Principally this was because breeding season for GGF occurs September to February which coincides with the optimal timeframes for conducting trenching works due to lower water levels. Despite this, specialist advice indicates GGF individuals have high site fidelity during breeding season, suggesting individuals do not venture far from breeding habitat. As construction impacts will not directly affect breeding habitat, therefore, it is unlikely there will be direct impacts to any breeding frogs. Additional management measures will be implemented in accordance with the Green and Gold Frog Habitat Management Protocol, including pre-clearance surveys, relocation of frogs where identified to nearby suitable habitat, and the use of exclusion zones to prevent incidental drawdown. Therefore, it is not expected that construction will affect breeding cycles. Periodic drawdown of water occurs within farm dams as part of the SWIS and will likely occur for the SWISA. While this could cause disruptions to breeding cycles, there is no evidence that this impact has occurred to date and specialist advice indicates that changes in dam levels is unlikely to completely prevent dispersal of adult frogs. Further, any drawdown in dam levels would be highest in late summer which is after tadpoles have developed, thereby minimising the risk of impact to dispersal of juveniles. Despite this, the Farm WAP process requires retention of standing water in the basin of water bodies to allow persistence of GGF adults and tadpoles to prevent impacts to breeding cycles.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As there will be no long-term impacts to frog habitat, no impacts at a species-level are anticipated. All impacts will be isolated and small (1.71ha) and mostly targeting already disturbed habitat, with recovery expected within six months of construction.
Result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	A key risk to the GGF is competition and predation by invasive fish species. The SWISA works are not anticipated to lead to the introduction of any pest species but will be subject to ongoing monitoring to determine if species are present with subsequent eradication occurring if required. The spread and introduction of weeds will be managed through standard weed and hygiene management protocols.
Introduce disease that may cause the species to decline	GGFs are susceptible to impacts from chytrid fungus which is expected to occur in the broader Project Area. Based on survey results, GGFs appear to be abundant in the broader Project Area despite the presence of chytrid fungus, likely due to the unfavourable nature of water bodies (e.g. dams) for the fungus. It is unlikely that this profile will significantly changes as a result of the SWISA works. Despite this, the potential introduction and spread of the fungus will be managed through standard weed and hygiene management protocols.
Interfere substantially with the recovery of the species.	The National Recovery Plan for the Southern Bell Frog: *Litoria raniformis* (Clemann & Gillespie, 2012) identifies the following key recovery objectives: • Secure extant populations, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence • Determine distribution, biology and ecology of the GGF, and identify causes of the decline of the species across its geographic range • Address known or predicted threatening processes and implement appropriate management practices where possible to ensure that land use activities do not threaten the survival of the GGF. • Increase community awareness of and support for GGF conservation Additionally, priority actions for the species have been set under the Threatened Species Action Plan 2022-2032 (DCCEEW, 2022):

Criteria	Assessment
	• Maintain and restore sufficient water flow in the rivers to ensure regular flooding of billabongs and wetlands and to support breeding events • Remove exotic fish species from waterbodies inhabited by GGFs • Eradication of introduce species (e.g. pigs) which degrade potential riparian habitat • Prevent overgrazing of potential terrestrial habitat and infilling of waterbodies • Maintain and restore emergent aquatic vegetation and ground cover around waterways where GGFs are found • Prevent spread of waterborne pathogens (e.g. chytrid fungus). SWISA activities to not substantially interfere with these actions and objectives, with measures to protect against water quality, invasive species and fungus impacts specifically built into the management arrangements for the project. The lack of substantive habitat disturbance also indicates that the works are not expected to interfere with species recovery.

Tailed Spider Orchid

While tailed spider orchids were not identified in the Construction Project Area and habitat in this area was generally not considered suitable for the species, conservatively it is assumed that potential habitat areas for robust fingers is also potential habitat for tailed spider orchids. Despite this, no actual optimal orchid habitat occurs within the Construction Corridor. Up to 1.20ha of potential/buffer habitat will be impacted during construction but as this represents an area buffered around optimal habitat for management purposes, it does not represent relevant habitat loss.

Across the Irrigation District, there is expected to be tailed spider orchids and associated habitat on undisturbed land. This includes land that may be the subject of future farming where the SWISA facilitates water access. For these areas, the Farm WAP process has strict requirements for property-wide surveys for threatened species, including flora, prohibitions on clearing of any threatened species encountered, and the use of operational buffers to minimise the risk of chemical or hydrological impacts. These controls in effect create a site-by-site assessment and management regime for flora species that will mitigate the risk of population-scale significant impacts and habitat loss.

Under the Threatened Tasmanian Orchids Recovery Plan (TSS, 2017), habitat critical to the survival of the species consists of general habitat for the species where occupied by important subpopulations. There are no important subpopulations in the Construction Project Area or Irrigation District, with the closest subpopulation located within Henry Somerset Reserve which is 1.4km west of the GBPS.

Table 7.23 presents a significant impact assessment for the tailed spider orchid utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.23 Significant impact assessment: Tailed spider orchid

Criteria	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an **important population** of a species	No important population will be affected by the SWISA as there is no important population in the Construction Project Area or Irrigation District and the no project-related impacts would extend to known important populations (e.g. subpopulation in Henry Somerset Reserve).
Reduce the area of occupancy of an **important population**	As above, no important population will be affected by the Project.
Fragment an existing **important population** into two or more populations	As above, no important population will be affected by the Project. The Project will also not introduce any further barriers to dispersal from regional subpopulations as these populations are already separated by areas of agricultural clearing and other land modification.

Criteria	Assessment
Adversely affect **habitat critical to the survival of a species**	As there is no important population in the Construction Project Area or Irrigation District, any potential habitat impact is not considered to be an impact to habitat critical to the survival of the species.
Disrupt the breeding cycle of an **important population**	As above, no important population will be affected by the Project.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As there are no known tailed spider orchids in the Construction Project Area and the potential habitat identified is marginal, the temporary clearing of potential habitat is not expected to lead to a species level decline or associated impact. The Farm WAP process is intended to prevent the further clearing of tailed spider orchids where encountered on farmland and to mitigate any indirect impacts associated with use of chemicals and application of water. While some individual orchids may still be affected, this process will avoid any species-level decline or associated impact.
Result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	To prevent the introduction and spread of invasive weeds, a specific weed and hygiene management plan will be adopted during construction, including ongoing monitoring and auditing components. For individual farmland, weeds are unlikely to be spread through the process of connecting to water and broader landscape development and therefore unlikely to lead to any invasive species establishment.
Introduce disease that may cause the species to decline	As above regarding invasive species.
Interfere substantially with the recovery of the species.	The Threatened Tasmanian Orchids Flora Recovery Plan (TSS, 2017) identifies the following key recovery objectives: • Maintain and increase number of known subpopulations • Maintain or increases individuals within subpopulations • Maintain or increase the extent, condition and security of habitat critical to the survival of each species. As the species and associated critical habitat does not occur within the Construction Project Area, it is unlikely that any actions could be undertaken to lead to creation of a subpopulation or expanded critical habitat in these areas. For the broader Irrigation District, due to the high fragmentation of the landscape, it is unlikely that any occurrences could form the basis of a future important subpopulation and critical habitat. For these reasons, the temporary disturbance of the SWISA project construction would not affect recovery actions.

Wrinkled Dollybush

There are no known occurrences of the wrinkled dollybush or potential habitat for the species in the Construction Project Area and therefore no direct disturbance.

Across the Irrigation District, there is expected to be wrinkled dollybushes and associated habitat on undisturbed land. This includes land that may be the subject of future farming where the SWISA facilitates water access. For these areas, the Farm WAP process has strict requirements for property-wide surveys for threatened species, including flora, prohibitions on clearing of any threatened species encountered, and the use of operational buffers to minimise the risk of chemical or hydrological impacts. These controls in effect create a site-by-site assessment and management regime for flora species that will mitigate the risk of population-scale significant impacts and habitat loss.

For the purposes of this assessment, any subpopulation of the species is considered to be an important population and the habitat areas in which these subpopulations occur would be habitat critical to the survival of the species. Based on habitat mapping and desktop records, however, there are no subpopulations in the Irrigation District and therefore no important populations or critical habitat.

Table 7.24 presents a significant impact assessment for the wrinkled dollybush utilising the criteria within the Significant Impact Guidelines 1.1. Based on this assessment, **no significant residual impact** is anticipated for this species.

Table 7.24 Significant impact assessment: Wrinkled dollybush

Criteria	Assessment
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an **important population** of a species	No important population will be affected by the SWISA as there is no important population in the Construction Project Area or Irrigation District.
Reduce the area of occupancy of an **important population**	As above, no important population will be affected by the SWISA.
Fragment an existing **important population** into two or more populations	As above, no important population will be affected by the SWISA. The SWISA will also not introduce any further barriers to dispersal from regional subpopulations as these populations are already separated by areas of agricultural clearing and other land modification.
Adversely affect **habitat critical to the survival of a species**	As there is no important population in the Construction Project Area or Irrigation District, any potential habitat impact is not considered to be an impact to habitat critical to the survival of the species.
Disrupt the breeding cycle of an **important population**	As above, no important population will be affected by the SWISA.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Farm WAP process is intended to prevent the further clearing of tailed spider orchids where encountered on farmland and to mitigate any indirect impacts associated with use of chemicals and application of water. While some individual orchids may still be affected, this process will avoid any species-level decline or associated impact.
Result in **invasive species** that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	For individual farmland, weeds are unlikely to be spread through the process of connecting to water and broader landscape development and therefore unlikely to lead to any invasive species establishment.
Introduce disease that may cause the species to decline	As above regarding invasive species.
Interfere substantially with the recovery of the species.	The National Recovery Plan for the Wrinkled Cassia *Casssia rugata* (Carter & Walsh, 2006) identifies the following key recovery objectives: • Ensure that all populations and their habitat are protected and managed appropriately • Manage threats to populations Through the implementation of the Farm WAP process to mitigate and avoid impacts during operations, these objectives can be achieved and, therefore, the SWISA project operations are not expected to affect recovery actions.

7.3 Summary of Significant Impacts and Offset Requirements

For all 15 MNES identified as relevant for impact assessment (one TEC, six critically endangered/endangered species, eight vulnerable species) **no significant impact** is anticipated. This is principally due to the following:

- Conduct of extensive targeted surveys for MNES through the Construction Corridor to allow for alignment of the infrastructure to avoid or minimise impacts to the maximum extent.
- Proposed use of the Farm WAP process to either prevent future impacts in irrigation areas or minimise the risk through requiring site-specific assessments.
- The nature of the SWISA area as already highly modified, with key species either present only in small numbers across the landscape or able to utilise this modified habitat and therefore resilient to habitat changes.
- Provision of a CEMP (including detailed EPRs) and OEMP to mitigate the risk of direct and indirect impacts and the introduction and spread of invasive species and diseases.

Under the Environmental Offsets Policy (DSEWPaC, 2012) 'offsets are only required if residual impacts are significant (s4, p7) and are intended to provide compensation or counterbalancing of impacts after application of avoidance and mitigation measures. Further 'offsets are not required where the impacts

of a proposed action are not thought to be significant or could reasonably be avoided or mitigated' (s5.3, p12).

Based on the assessment presented above, sufficient avoidance and mitigation actions will be implemented and there are no residual impacts that are significant in accordance with the Significant Impact Guidelines. For this reason, no offsets are required or proposed for the Project.

TI intend to extensively rehabilitate temporary impacts to MNES habitat. Rehabilitation and reinstatement requirements are defined in the CEMP and corresponding EPRs.

Table 7.25 presents the upper limit of permanent and temporary disturbance of habitat for each relevant MNES feature. Note that as there is no significant impact, as noted above, this table is intended for the setting maximum disturbance limits in an approval, if granted. This does not include the Tasmanian white gum wet forest TEC, Australian grayling, Tasmanian wedge-tailed eagle and wrinkled dollybush as there is no direct habitat loss attributable to these species. Rehabilitation and reinstatement requirements and criteria are defined in the CEMP and corresponding EPRs (Annex F).

Table 7.25 Upper limit of permanent and temporary disturbance of habitat for each relevant MNES feature

MNES	Type of impact	Impact		
		Permanent	Temporary	Total
Area based impacts				
Eastern quoll, spotted-tail quoll and Tasmanian devil – optimal denning and foraging habitat	Impact relates to clearing of habitat and disturbance in the footprint	0.06ha	8.46ha	8.52ha
Eastern quoll, spotted-tail quoll and Tasmanian devil – sub-optimal denning and foraging habitat		2.12ha	2.89ha	2.94ha*
Eastern quoll, spotted-tail quoll and Tasmanian devil – non-denning foraging habitat		0.91ha	308.49ha	309.40ha
Eastern barred bandicoot – all habitat	Impact relates to clearing of habitat and disturbance in the footprint	1.02ha	319.83ha	320.85ha
CNBC – optimal habitat	Impact relates to clearing of habitat at water crossings	0.11ha	-	0.11ha
CNBC – sub-optimal habitat		1.81ha	-	1.81ha
GGF – dispersal habitat	Impact relates to clearing of habitat at water crossings	0ha	1.71ha	1.71ha
Robust fingers – potential/buffer habitat	Impact relates to clearing of potential habitat in the footprint	1.20ha	-	1.20ha
Tailed spider orchid – potential/buffer habitat	Impact relates to clearing of potential habitat in the footprint	1.20ha	-	1.20ha
Tree based impacts				
Swift parrot – potential breeding	Impact relates to clearing of trees within the construction corridor	29	-	29
Swift parrot – foraging habitat		20	-	20
Swift parrot – foraging habitat and potential breeding		11	-	11
Blue winged parrot – potential breeding		40	-	40
Tasmanian masked owl – potential breeding		12	-	12

*Note that 2.07ha of temporary impact will become permanent impact due to the conversion of the habitat to buffer land after remediation

8 Social and Economic Impacts

8.1 Overview

The Sassafras-Wesley Vale region offers significant economic opportunities including highly suitable irrigated agriculture and diversification to high-value crops. While developing this potential will drive economic growth opportunities and deliver benefits to the region and state, the full potential remains limited due to current water supply constraints.

The SWIS has served as the region's primary source of irrigation, facilitating on-farm investments in high-value enterprises and the expansion of traditional agricultural industries. However, the current infrastructure of SWIS limits the growth and diversification of the region's irrigated sector, as it cannot meet existing water demand or support the necessary water trading for crop rotation. Therefore, the Tasmanian Government's ability to secure investment from the Australian Government for SWISA will help enhance water access, improve security for agricultural developments, and support distribution for local irrigators.

8.1.1 SWISA

The SWISA was designed to augment, and facilitate the supplementation of, the existing large-scale, multi-user SWIS. Public benefits of the SWISA include:

- The delivery of reliable water supply for up to 18,000 ha highly suited to irrigated agriculture, one third of which is classed as prime agricultural land (32%).
- Enable the development of an additional 2,400 ha of summer irrigation and supplementary irrigation to 1,000 ha.
- Meet Tasmanian Irrigation’s 95 per cent minimum system security requirement.
- Contribute to the State’s agricultural productivity for more than 100 years, the lifetime of the schemes.
- More options to transition from dryland to irrigated production, which delivers significantly higher returns per hectare.
- Grow the agritourism sector, which is a Tasmanian Government priority.
- Have less environmental impact than the alternative of a series of small private systems with individual dams.

8.1.2 Strategic Alignment

In addition to providing significant public benefits, SWISA aligns with and supports the achievement of key priorities set by the Australian and Tasmanian Governments, including:

- Tasmanian Government policies and strategies-
  - AgriVision 2050—grow the annual value of the State’s agriculture to $10 billion by 2050 (NRE Tas, 2023).
  - 2023 T21 Visitor Economy Strategy— Realise the State’s agritourism competitive advantage (Tourism Tasmania, 2024).
  - Brand Tasmania—Strengthen the Tasmanian brand locally, nationally and internationally (Brand Tasmania, 2019).

- The Australian Government's Buy Australia Plan—Buying from Tasmanian and Australian businesses, employing local workers, and targeted opportunities for First Nations businesses and workers (DoF,2024).
- National Water Grid Authority (NWGA) objectives—
  - Ensuring water supply for the shared use and benefit of multiple irrigators, and enable the matching of supply with demand through the movement of water between enterprises
  - Efficiently and effectively address a water security challenge that private irrigators cannot afford to do independently or collectively.
- Governmental and community longstanding shared efforts to—
  - Close the gap in the entrenched inequality faced by First Nations peoples, so that their life outcomes are equal to those of all Australians.
  - Ensure the safe and sustainable use of Australia's natural resources, balancing environmental protection, climate change action and resilience, and economic growth and development.

8.2 Economic, Financial and Net Benefit Assessment

As part of the Business Case, an economic assessment was conducted and concluded that the SWISA is economically viable and has the potential to generate public benefits extending beyond farmgate. The financial and economic viability and net benefits of SWISA are detailed below.

8.2.1 Financial Viability

The financial viability of SWISA was assessed and concluded that private sector participants (irrigators) are expected to generate sufficient free cash flow to cover their capital and operational expenses (net margins), while also contributing to the capital costs of the scheme through the purchase of water entitlements[2] .

Net margins were evaluated using 'expected average annual' outcomes, that considers long-term average margins, market fluctuations, and annual crop variations. These margins are considered prudent depending on conservative estimates for overhead costs and incorporating full contracting rates for all operational activities. The benefits from the use of additional water were estimated using:

- The enterprise mix and farm margins applicable to crops grown in the Project Area (Figure 8.1).
- Data on farmers' plans in relation to additional water required from the scheme based on targeted farm surveys.

[2] Net margins are the enterprise gross margin (revenue less variable costs) less cost of infrastructure required to utilise the water, less any increase in farm overhead costs, less the existing gross margin forgone from the land being irrigated.

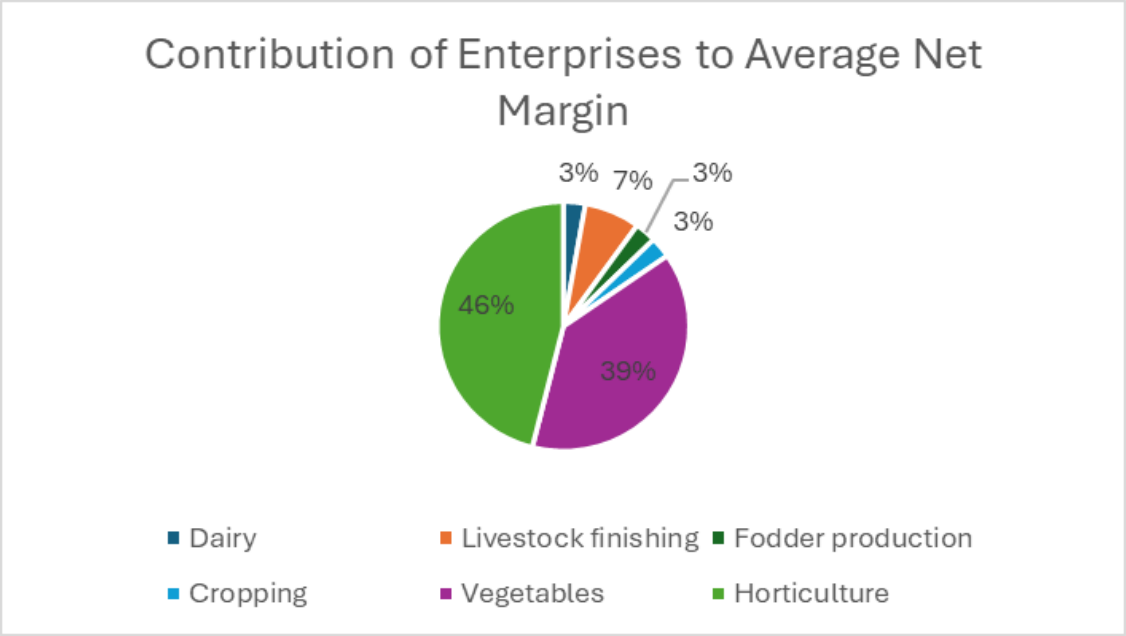

Figure 8.1 Enterprise mix in Project Area (Pinion Advisory, 2022)

The increase in production (hence net returns generated) represents real growth in output from the state and federal perspective and is not offset by reductions in output from other areas of the state. The assumed increase in irrigated output represents a net increase in economic output, contributing to the growth of the local, state and federal economies.

8.2.2 Economic Cost and Benefit Assessment

The economic costs and benefits under central case parameters were assessed using a standard cost benefit framework. Numerous sensitivity tests were conducted, with Table 8.1 highlighting the P90 capital cost estimate. A positive Net Present Value (NPV) and a Benefit Cost Ratio (BCR) greater than 1 indicates that the project is likely to deliver strong net economic benefits.

Table 8.1 Sensitivity estimate (P90 estimate) (Marsden Jacob, 2022)

Component	Present value benefits ($m)	Present value lifecycle costs ($m)	Economic NPV ($m)	Benefit Cost Ratio	IRR %
Central case parameters	231.33	127.99	103.33	1.81	12.0%
Discount rate					
4%	466.98	145.38	321.60	3.21	12.4%
10%	139.48	115.91	23.57	1.20	11.8%
Net margins					
+ 10%	254.81	127.99	126.81	1.99	12.9%
- 10%	207.85	127.99	79.85	1.62	11.0%
Capital cost					
+10%	231.33	138.82	92.51	1.67	11.2%
-10%	231.33	117.17	114.16	1.97	12.9%
Operating cost					
+10%	230.98	129.97	101.02	1.78	11.9%

Component	Present value benefits ($m)	Present value lifecycle costs ($m)	Economic NPV ($m)	Benefit Cost Ratio	IRR %
-10%	231.67	126.02	105.65	1.84	12.1%
Water uptake					
Slow	217.50	127.34	90.15	1.71	11.4%
Rapid	250.16	128.84	121.32	1.94	12.8%

Economic Viability

To demonstrate the resilience of the economics of the scheme, further sensitivity analysis was undertaken for SWISA. These analyses demonstrated that under various assumptions, and accounting for volatility of returns and investment risks, the project is economically viable.

Under a combination of lower bound estimates for all parameters (10% increase in capital and operating costs, 10% reduction in net margins, and slow demand uptake scenario), the project was estimated to deliver:

- A net benefit estimated at $54.98 million (at 7% real discount rate).
- A BCR of 1.39
- An internal rate of return (IRR) of 9.6% assuming the P90 project cost estimate.

Under the P50 estimate, the net economic benefit is estimated to increase to $65.77 million with a BCR of 1.51 and an IRR of 10.3%.

A threshold assessment was undertaken to determine the level of net margins reduction that could be sustained while ensuring the project remained economic at a 7% real discount rate (i.e., NPV of $0, BCR equal to 1 and IRR equal to 7%). The assessment found that net margins would need to reduce to around:

- 56% of those assumed under the central case assessment for the P90 estimate, noting that this reduction in net margins applies to each year of the assessment.
- 52% those assumed under the central case for P50 estimate.

Another sensitivity analyse was undertaken for a scenario where only summer water was utilised. Under a P90 estimate the net benefit reduced from $103.33 million to $45.50 million, the BCR was 1.36, and the IRR 9.7% compared to P50 estimate the net benefit reduced from $113.14 million to $55.31 million, the BCR was 1.48, and the IRR 10.5%.

8.2.3 Net Benefits—Beyond the Farmgate

SWISA's net benefits were evaluated against the without project case using a standard cost benefit framework. The project is expected to:

- Generate ($231M) in direct economic benefits.
- Generate value add to the Tasmanian economy through agricultural output - direct value add (wages and profits of on-farm enterprises) - in-direct value add through earnings in upstream and downstream enterprises.

- Generate significant economic value through construction and farm development activities, creating hundreds of jobs directly engaged in construction and associated sectors including:
  - Support up to 140 full-time equivalent (FTE) positions through direct on-farm employment.
  - Support up to 70 additional FTE through indirect employment.
  - Generate up to 60 FTE during the two-year construction period.
- Support Buy Tasmania as the two main capital costs of the scheme – pipes and labour – are both largely sourced from within Tasmania reinforcing the economic benefits flowing to the state.
- Enhance individual and community resilience to the financial, economic and social pressures that often arise during periods of low water availability.

8.3 Social Impacts and Benefits

Social impact under the Infrastructure Assessment Framework (IA, 2021) refers to the potential positive and negative effects of a project on the people and communities within the Project Area. Impacts include quality-of-life impacts such as on living standards, health and wellbeing, and economic and social participation.

Social impact evaluation considers these impacts and identifies opportunities to enhance or mitigate these options.

8.3.1 Population and Demographics

The Latrobe Local Government Area (LGA) is situated within the Project Area that will be the main LGA that is influenced by SWISA. The 2021 census recorded a usual resident population of 12,420 in Latrobe, representing 2.2% of the State's total population.

Population Growth

Between 2016 and 2021 the population of Latrobe increased by 16% compared to the state growth of 9.3%. The increased population led to rising demands for housing, services and infrastructure development in Latrobe LGA, creating challenges to meet population needs. As a result, there are conflicting opinions in local government on attracting future workers and visitors to generate economic growth as it could intensify the existing pressures of population growth.

First Nations People

Latrobe LGA has a larger proportion of First Nations residents (6.3%) compared to the state's population of 5.4%.

TI has committed to First Nations employment and procurement targets for the life of the SWISA project. This commitment aims to improve in socio-economic and wellbeing outcomes for First Nations people and communities by creating opportunities for training, employment and business which can foster wealth creation, empowerment and self-determination.

8.3.2 Socio-economic Indicators

The Australian Bureau of Statistics (ABS) combines census data such as income, education, employment, occupation, housing and family structure to summarise the socio-economic characteristics of an area. The data is used to assess areas socio-economic disadvantage relative to other areas, expressed as a Socio-Economic Index for Areas (SEIFA) score. A low score indicates relatively greater disadvantage.[3] In 2021, Latrobe had a SEIFA score of 928. While this was better than in 2016 (907),

[3] Socio-Economic Indexes for Areas (SEIFA), Australia, 2021 | Australian Bureau of Statistics (abs.gov.au)

the area's SEIFA was lower compared to Tasmania (945), indicating that Latrobe residents may be more disadvantaged than other Tasmanians.

SWISA's anticipated economic benefits may lead to improvements across the socio-economic indicator that contribute to an improvement in the SEIFA score.

Income

In 2021, the median weekly household income in Latrobe was $1,256. While this was more than in 2016 (+16.5%), it was lower than for Tasmania as a whole ($1,358). The trend for median weekly individual incomes is similar. While median weekly income in Latrobe grew by 16 per cent between 2016 and 2021, at $645 it was lower than the state median $701.

SWISA is expected to generate and increase in total salaries and wages (direct and indirect) of up to $14.70 million p.a. following full utilisation of provided by the scheme. This could lead to an increase the median household and individual incomes and associated social and wellbeing benefits.

Labour Force Participation and Employment

Between 2016 and 2021 labour force participation rates improved slightly (from 53.7% to 54.5%) but was lower than for Tasmania as a whole (58.2%). The unemployment rate improved significantly (4.2% to 6.5%) and was lower than for Tasmania as a whole (5.9%). Latrobe's older age profile compared (with a median age of 49 years and 27% of people aged 65 years and over) may be a key driver of improvements in labour force participation and unemployment.

In 2021, employment in Latrobe was 22.2% higher than in 2016, with most employing sectors reporting higher employment levels. The main employment sectors include health care and social assistance, retail, construction, manufacturing and agriculture, forestry and fishing.

Benefits

On balance, the SWISA project can deliver more positive impacts than negative. The positive impacts will flow from the anticipated economic growth, development and skilled employment opportunities (Table 8.2).

Table 8.2 SWISA benefits

Category	Impact	Description
Economic	Improved economic productivity	• Generate local and regional economic growth, which could support enterprise growth and development. • Generate jobs, including skilled jobs.
Economic	Increased employment opportunities	
Economic	Economic independence	
Quality of life	Reduced financial pressures	• Generate wage growth, which can alleviate cost of living pressures and financial drivers of disadvantage
Personal rights	Reduced personal disadvantage	
Intergenerational	Realisation of aspirations for the future	• Generate economic opportunities that create opportunities to build intergenerational wealth, and address the financial drivers of intergenerational

8.4 Stakeholder Consultation

TI has completed extensive and ongoing public consultation regarding the SWISA project commencing with early design work in 2018/19.

8.4.1 Community Consultation

In 2019 TI commenced an EOI seeking interest for additional irrigation water from existing SWIS irrigators located in the district in the augmented scheme. Landowners within the district without existing water entitlements were also contacted and given the opportunity to submit an EOI. The EOI process was used to determine additional demand for irrigation water and to update the design and project costings.

A six-person working group was elected to represent interested community members and to work with TI to develop an irrigation scheme for the district. During the development of the scheme design, the working group committee met formally several times. In addition, numerous site meetings with individuals have occurred to ensure that any issues of concern were considered in the scheme design.

Meetings with individual landowners, the irrigator working group as a whole and other interested parties continue to be held as needed.

Since 2019, TI has produced community newsletters providing information relating to the scheme design progress. These newsletters were either mailed or emailed to about 120 landowners and 45 interested parties with the newsletters also being currently available on TI's website. Additionally, the local community newspaper has run a number of articles on the scheme and the SWISA scheme has been the subject of a number of local radio and television interviews.

Following approval of the Preferred Option, TI held its water sales for scheme over the period May to June 2022 which was subsequently extended by three weeks. The outcome of water sales confirmed a strong demand for water with contractual offers to purchase of 6,745 ML (73% of total additional available summer water) being achieved.

8.4.2 Local Government Consultation

TI has had ongoing communications with representatives of the Devonport City Council and Latrobe City Council throughout the project's duration.

Both councils have indicated its support for scheme and continue to assist wherever possible. Councils have been consulted regarding pump station and pipeline locations, road crossings and other key infrastructure with these to be finalised as part of the development applications.

8.4.3 State Government Consultation

The Business Case for the scheme has been assessed by NRE Tas and the Treasury Department.

TI has consulted and been supported by both state and federal members of parliament as the scheme proposal has been progressed.

8.4.4 First Nations Consultation

Following an examination of alignment options, and the development of the initial Preferred Option, cultural heritage surveys and consultation with the First Nations community were progressed. Indigenous stakeholder bodies that are being consulted include the regulator; Aboriginal Heritage Tasmania (AHT), and various community representative groups including the Aboriginal Heritage Council.

Consultation with the First Nations community includes the involvement of an Aboriginal Heritage Officer in both the identification of artefacts and the completion of any on-ground survey work.

9 Other Approvals and Conditions

Additional to a Controlled Action Approval under the EPBC Act, the SWISA will require a series of approvals under Tasmanian state legislation. These will include the following:

- *Nature Conservation Act 2002* (Tas) – Permit to Take Wildlife – applies to disturbance of dens and burrows
- *Threatened Species Protection Act 1995* (Tas) – Permit to Take Threatened Fauna and Flora – applies to direct take of GGF, CNBC and slender waterpepper
- *National Parks and Reserves Management Act 1993* (Tas) – Level 2 Reserve Activity Assessment – applies to works in the Warrawee Conservation Area
- *Land Use Planning and Approvals Act 1993* (Tas) – Planning Permit – covers majority of infrastructure and land use works
- *Crown Lands Act 1976* (Tas) – Works Permit – applies to works on Crown land at the Bass Highway, Port Sorell Road and Frankford Road

A permit may also be required under the *Aboriginal Heritage Act 1975* if disturbance to heritage features is required.

These approvals have not yet been obtained and will be sort in parallel with the Controlled Action Approval.

10 Environmental Record of Person Proposing to Take the Action

There have been no past or present proceedings taken by the Commonwealth or the State against Tasmanian Irrigation in relation to environmental protection laws.

The Department has recently conducted inquiries into a potential contravention of Section 142 of the EPBC Act; specifically a potential breach of conditions attached to the approval for Northern Midland Irrigation Scheme (EPBC 2022/09295). On 9 September 2024, TI advised the Department of a non-compliance with conditions 4 and 15 of approval 2022/09295 relating to implementation of the Pre-clearance Check and unanticipated Den Discovery Protocol and implementation of the Construction Environmental Management Plan respectively. Further non-compliance with Condition 1 was reported on 17 October 2024 relating to clearing outside the permitted area. After reviewing a range of information including the information provided by TI, the Department formed the view that a contravention of Condition 1 was substantiated. After consideration of this matter, the Department concluded that the issuing of an infringement notice would not be an appropriate course of action in this case. Consequently, no further action was taken in relation to this matter.

Tasmanian Irrigation schemes are designed and operated in accordance with its environmental policy. The environmental policy is underpinned by construction audit protocols, the Farm Water Access Planning Framework, and a Landscape Monitoring Program.

Previous assessments under the EPBC Act include the following:

- Sassafras-Wesley Vale Irrigation Scheme (EPBC 2010/5327)
- Whitemore Irrigation Scheme (EPBC 2010/5335)
- Headquarters Road Irrigation Scheme (EPBC 2010/5305)
- Winnaleah Irrigation Scheme (EPBC 2011/5798)
- Kindred North Motton Irrigation Scheme (EPBC 2012/6401)
- Upper Ringarooma Irrigation Scheme (EPBC 2013/6787)
- South East Irrigation Scheme (EPBC 2013/6843)
- Dial Blythe Irrigation Scheme (EPBC 2013/7058)
- Southern Highlands Irrigation Scheme (EPBC 2015/7491)
- Swan Valley Irrigation Scheme (EPBC 2015/7560)
- Lower South Esk Irrigation Scheme (Strategic Assessment Midlands Water Scheme)
- Arthurs Pipeline Irrigation Scheme (Strategic Assessment Midlands Water Scheme)
- Duck Irrigation Scheme (EPBC 2016/7778)
- North Esk Irrigation Scheme (EPBC 2017/7936)
- Scottsdale Irrigation Scheme (EPBC 2017/7981).

11 Ecologically Sustainable Development

Under the EPBC Act, the principles of ecologically sustainable development (ESD) consist of the following:

- The long-term and short-term economic, environmental, social and equitable considerations
- The precautionary principle which states that a lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation where there are threats of serious or irreversible environmental damage
- The principle of inter-generational equity which states that the present generation should ensure that the health, diversity, and productivity of the environment is maintained or enhanced for the benefit of future generations
- The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making
- Improved valuation, pricing and incentive mechanisms should be promoted.

The following presents an assessment of the project against these principles.

11.1 Economic, Environmental, Social and Equitable Considerations

The SWISA has been designed with a balance between economic, environmental, social and equitable considerations. The economic and social context for the Project is presented in Section 8 which highlights the benefits anticipated from the improved reliability of water access and the expansion of irrigation to new farming areas. These benefits are dependent on access to water from the Mersey River and the development of pipelines and supporting infrastructure across the Irrigation District.

To minimise the environmental footprint of these activities, detailed survey activities have been undertaken across the Project Area to allow for the detailed alignment of infrastructure away from key habitat areas. As indicated throughout Section 7, this has achieved no significant residual impact for any species, due to the ability to mostly avoid critical habitat and substantial direct impacts on species' populations.

Operational impacts are managed principally through the Farm WAP process which provides a mechanism for balancing economic/social benefits for individual farms against the environmental constraints that may be present.

The SWISA is not expected to lead to any detrimental economic, social and equitable impacts, and has achieved a balance with environmental impacts that avoids any significant impacts occurring, both in the immediate and longer term. For this reason, it is considered that relevant economic, environmental, social and equitable considerations have been appropriately integrated into the development of the Project.

11.2 Precautionary Principle

There is a high level of confidence in construction-phase impacts from the Project due to the detailed surveys and assessments conducted. As some areas for CNBC could not be surveyed due to dense vegetation onsite, there remains some uncertainty around the presence of this species in these areas. Similarly, there may be unknown habitat features (e.g. quoll dens, breeding trees) within the Construction Project Area as these features are not always identifiable from baseline surveys. In these instances, however, management measures (for example preclearance surveys) will be employed and

are expected to be successful in managing impacts and would be related only to a minor occurrence of the relevant MNES features.

There is greater uncertainty associated with operational-phase impacts, specifically:

- The extent to which individual farms will access new water and therefore localised changes to the landscape, including vegetation clearing and drainage changes
- The potential for release of thermal pollution from the Parangana Dam due to a lack of historical monitoring.

To address the uncertainty associated with the first of these, the Farm WAP process requires site-specific assessments. This is intended to identify and protect threatened species and ecological communities. This strikes an appropriate balance between directly managing these areas at an initial approvals stage (when there is uncertainty as to where development will occur) and allowing self-regulation of these impacts. The Farm WAP process is well established and allows for ongoing oversight by TI.

Thermal pollution risks from Parangana Dam require further assessment. However, the controls for thermal pollution are well understood, including the use of thermal curtains and the targeted access of water for release purposes. The risks of releases, therefore, can be managed subject to an adaptive management regime whereby mitigation measures are adopted based on the circumstances at the time, with further refinement as more monitoring data becomes available.

There is also uncertainty associated with the potential for impacts to Tasmanian devil denning habitat near the GBPS site. While the location of these dens and baseline noise is well understood, there remains some uncertainty regarding Tasmanian devil sensitivity to construction noise impacts. This has been addressed by scheduling the construction works outside of breeding season for devils to prevent impacts to breeding activities. Further, strict noise and construction management measures will be applied to further minimise the risk of impacts and ana adaptive management approach will be taken.

In these ways, the precautionary approach has been integrated into the Project design and intended operation.

11.3 Inter-generational Equity

The SWISA will provide enhanced long-term sustainability of irrigation activities in the region through improved access to water, without compromising the flows available within the Mersey River. No significant impact to MNES is anticipated and there will be no loss or decline of threatened species populations due to the Project. For these reasons, the Project is consistent with the principle of inter-generational equity as it does not compromise the ability of future generations to engage with the same MNES and landscape values currently present.

11.4 Conservation of Biological Diversity

Detailed survey across the Construction Corridor has been undertaken to ensure that all impacts to sensitive ecological values are avoided or minimised to the greatest extent practicable. This includes conserving non-listed ecological values across the landscape, in balance with allowing for improved water access and farm use.

11.5 Valuation, Pricing and Incentive Mechanisms

Pricing for water access will be in accordance with existing pricing approaches adopted by TI across all irrigation schemes. These approaches are based on economic modelling for project areas, in accordance with best practice.

12 Conclusion

This Preliminary Documentation report has been prepared to present an assessment of the potential environmental impacts of the SWISA project (EPBC2023/09666) on MNES, in accordance with the EPBC Act.

Based on detailed baseline assessments and survey, the following MNES have been confirmed for the Construction Project Area and are known or likely to occur across the broader SWISA Irrigation District:

- Listed Threatened Ecological Communities – Critically Endangered
  - Tasmanian Forests and Woodlands dominated by black gum or Brookers gum
  - Tasmanian white gum (*Eucalyptus viminalis*) wet forest
- Listed Threatened Species – Critically Endangered and Endangered
  - Eastern quoll
  - Tasmanian devil
  - Swift parrot
  - Tasmanian wedge-tailed eagle
  - Central north burrowing crayfish
  - Robust fingers
- Listed Threatened Species – Vulnerable
  - Spotted-tail quoll
  - Eastern barred bandicoot
  - Tasmanian masked owl
  - Blue-winged parrot
  - Australian grayling
  - Green and gold frog (growling grass frog)
  - Tailed spider orchid
  - Wrinkled dollybush.

The Tasmanian white gum (*Eucalyptus viminalis*) wet forest, tailed spider orchid and wrinkled dollybush were not recorded in surveys but potential habitat may occur across the broader Irrigation District. Potential/buffer habitat for the tailed spider orchid has also been assumed based on habitat mapping for the robust fingers.

Due to detailed baseline surveys and noise assessments, multiple realignments and design refinements were undertaken, allowing for a significant reduction in total habitat impact. Avoidance works included movement of the proposed pipeline infrastructure alignments and use of HDD for waterway crossings. Further direct impact avoidance and general impact mitigation for residual impacts can be managed through the EPRs in the CEMP, which prescribe safeguards and mitigation measures to protect MNES. The total permanent residual impact anticipated is 1.02ha, across a variety of MNES, with no habitat loss anticipated to lead to long-term decline in species populations.

Operational impacts will relate primarily to the change in farming activities in the landscape due to new water access. This will be subject to an OEMP and a Farm WAP process which requires detailed site-specific assessments and measures intended to minimise impacts to MNES. These have been developed based on practice to date and expected to be successful in managing impacts.

Within this context, the Project does not pose a significant residual impact to any MNES and therefore does trigger the requirement for an offset. Additionally, the Project meets the principles of ESD through avoiding significant impacts while still providing for an economic and social benefit by improving the irrigation and agricultural activities for the broader region.

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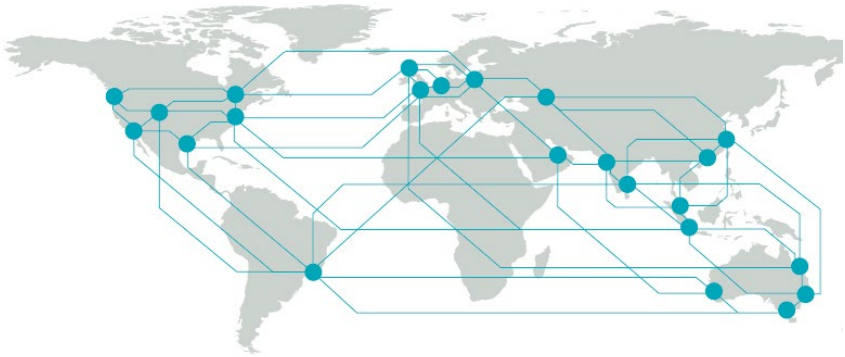

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Level 5
348 Edward Street
Brisbane
QLD 4000
Australia
+61 7 3831 6744

Registered in Australia
Registered no. 010 830 421
Registered office
Level 5, 348 Edward Street,
Brisbane QLD 4000 Australia

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